

INMARSAT-C

Maritime User's Manual

(Issue 2)

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*Maritime Services Division
International Maritime Satellite Organization (Inmarsat)
40 Melton Street
London NW1 2EQ
U.K.*

Telephone: +44 71 728 1000

Telex: 297201 INMSAT G

Fax: +44 71 728 1614

INMARSAT-C Maritime User's Manual
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Compiled by Hugh Shaw

Maritime Services Division
International Maritime Satellite Organization (Inmarsat)
40 Melton Street
London NW1 2EQ
UK

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HOW TO SEND A DISTRESS CALL

When you are In grave and Imminent danger, you may use your Ship Earth Station (*SES*) to send two types of distress call - *either* a brief distress alert, *or* a more detailed *Distress priority message*. Both types of message are routed automatically through a Coast Earth Station (*CES*) to a land-based Rescue Co-ordination Centre (*RCC*), which is equipped to co-ordinate search and rescue efforts.

When you should send a distress alert

Initially, you should send a *distress alert* stating your name and position, and summarized information on your distress circumstances, to inform the rescue services as quickly as possible of your emergency. The procedure is outlined below.

When you should send a *Distress priority message*

Later, as search and rescue activities proceed, you may choose to send a *Distress priority message*, to communicate with the rescue services. *Chapter 4, Distress and safety services* gives more information on how to send a *Distress priority message*.

How to send a distress alert

You may send a distress alert to an *RCC* *either* using your *SES* terminal menus, *or* by pressing the remote distress button(s), if fitted to your *SES*. Sending a distress alert using your terminal menus is recommended because it allows you to provide up-to-date information on your circumstances.

To send a distress alert using your *SES* terminal menus:

1 Access the distress alert menus on your *SES* terminal - if necessary refer to your manufacturer's instructions for details.

2 Fill in the selections on the menus presented, firstly entering your vessel's name and position, and then manually entering as much other information as you can in the time available (unless this information is supplied automatically from instruments).

3 If requested, specify the distress type as *maritime*. Specify the *nature* of the distress from the list provided.

4 Select preferably the nearest *CES* to your vessel within your ocean region. This will assist the search-and-rescue efforts by the *RCC* associated with the *CES*. (You may, however, select *any CES* within your ocean region, if that *CES* can connect you to an *RCC* which can help you, for example, communicate in a language other than English.)

5 Confirm, by pressing the appropriate key(s), that you want to send the distress alert. The *SES* will now automatically transmit your distress alert via the selected *CES* to its associated *RCC*.

6 Wait for an acknowledgement from the *CES*. **If you do not receive an acknowledgement within 5 minutes, repeat the above.**

To send a distress alert using the remote distress button(s) (If fitted):

If your terminal is fitted with a remote distress button (or combination of buttons), you may send a distress alert simply by pressing the button(s), and holding down for the required number of seconds (typically 5 seconds). Note, however, the following points about using the remote distress alert button(s):

Note 1: Sending a distress alert by pressing the distress button(s) sends only 'pre-programmed' information, dating from when it was previously entered. Since then, your position, course and speed may have changed. If so, you should update the information sent to the rescue authorities, by sending either an updated distress alert from your terminal, or a more detailed Distress priority message.

Note 2: Pressing the remote distress button(s) sends a distress alert immediately via the Inmarsat system to an RCC, whether or not your SES is engaged in message transfer, and whether or not your SES is logged-in to an ocean region.

Note 3: To avoid sending false distress alerts, do not press the remote distress alert button(s), except in a real emergency, when you are in grave and imminent danger.

After you have sent a distress alert or Distress priority message

Set the automatic scan on your *SES* to scan *only your current ocean region*, to ensure that your *SES* remains in communications with the *RCC*. For more information, refer to the section *Automatic scan and Log-in* on page 3-3.

General comments on Sending a distress call

You are advised to keep a copy of this notice in a prominent position near your terminal - for your convenience, a second copy of this sheet is provided, for you to pull out and display.

Make sure that people who may need to make distress calls are aware of its contents.

IMPORTANT OPERATING PROCEDURES

Note the following Important operating procedures, which you should observe at critical times, to ensure your own safety. The terms used are explained in [Chapter 1](#), and in later chapters.

DURING A DISTRESS CALL:



SET THE AUTOMATIC SCAN ON YOUR SES TO SCAN ONLY YOUR CURRENT OCEAN REGION.

When you make a distress call, the INMARSAT-C system uses the [NCS Common Channel](#) for the ocean region you are currently logged-in to, to establish a communications channel from an [RCC](#) to your [SES](#). To ensure that your [SES](#) remains tuned to this channel, set the *automatic scan facility* on your [SES](#) to scan *only the ocean region you are logged-in to*, by making it the *only preferred ocean region*. So doing ensures that the [RCC](#) can continue to communicate with you (so long as you remain within the ocean region).

A summary of how to make a distress call is given on the yellow pages in the front of this manual. Detailed information is given in [Chapter 4 Distress and safety services](#). For information on setting the automatic scan facility on your [SES](#), see the section *Automatic scan and Log-in*, on page [3-3](#).

WHEN RECEIVING MARITIME SAFETY INFORMATION:



IF YOU WANT TO CONTINUE RECEIVING MARITIME SAFETY INFORMATION (MSI) FROM YOUR CURRENT OCEAN REGION, YOU SHOULD SET THE AUTOMATIC SCAN ON YOUR SES TO SCAN ONLY THAT OCEAN REGION.

If you have logged into a particular ocean region, and want to continue to receive its [MSI](#), then you should set the automatic scan facility on your [SES](#) to scan *only that ocean region*, by making it the *only preferred ocean region*. So doing ensures that your [SES](#) remains tuned to the [NCS Common Channel](#) for the ocean region, ready to receive further [MSI](#) broadcasts (so long as you remain within the ocean region).

For information on the [MSI](#) you can expect to receive, see [Chapter 6](#) The EGC SafetyNETSM and FleetNETSM services.

For information on setting the automatic scan facility on your [SES](#), see the section *Automatic scan and log-in*, on page [3-3](#).

IMPORTANT OPERATING PROCEDURES

(contd.)

Note the following important point about switching off your **SES**. The terms used are explained in *Chapter 1*, and later chapters.

Log-out before you switch off!



IF POSSIBLE, KEEP YOUR **SES POWERED ON AT ALL TIMES, AND LOGGED-IN TO AN OCEAN REGION, SO THAT YOUR **SES** IS READY TO SEND OR RECEIVE MESSAGES AT ALL TIMES.**

If, however, you intend not to use your **SES** for a prolonged period (for example to conserve electrical power), and it is logged-in to an ocean region, then **YOU MUST LOG-OUT YOUR SES BEFORE YOU SWITCH IT OFF.**

Logging-out your **SES** informs the NCS in your ocean region that your **SES** is no longer available to receive messages. By logging-out your **SES**, the Inmarsat system knows not to accept any messages intended for your **SES**, and the system informs would-be callers that your **SES** is not available at that time.

If, however, you do not log-out before you switch off, and a remote caller tries to send you a message, then the Inmarsat system will attempt repeatedly to send the message via the selected **CES** to your **SES**. Eventually (after a number of re-tries which depend on the particular **CES**), the **CES** will cease attempting to send the message. So, if your **SES** remains switched off, *you may lose the message.*

Furthermore, the **CES** may charge the remote caller for the repeated attempts to send the message (even if your **SES** never receives the message). If your **SES** remains switched off for a long time, but still logged-in, *this could prove expensive to the remote caller!*

PREFACE

Sending a distress call

These pages (*printed on yellow background in the front of the manual*) summarize how you can send a distress call, when you are in grave and imminent danger. You should familiarize yourself with these procedures, before you have to use them. A second copy of the distress call page is provided, that you could remove from the manual, and display in a prominent position near your SES.

Important operating procedures

This page (*printed on yellow paper in front of this preface*) contains warnings about how you should set the automatic scan facility on your Ship Earth Station (SES), to ensure that your SES continues to receive communications from shore at critical times, for example during a distress call, or while you are receiving Maritime Safety Information (*MSI*). The page also contains advice about keeping your SES powered on at all times, if possible, but otherwise, if you have to switch it off, to be sure to log-out before you switch off, to ensure you do not lose messages sent to you.

What you should read in this manual

The *INMARSAT-C Maritime User's Manual* contains a variety of information - some essential, some useful, and some technical. The **essential information** tells you what you should know to be able to operate your INMARSAT-C SES properly. The **useful information** gives you more detail about some aspects of the system. The **technical information**, provides information on how your SES works within the INMARSAT-C system.

Quick reference guide

This sheet summarizes how you should use your INMARSAT-C SES for distress and safety purposes, and to send and receive messages. More detailed information is given in the references shown.

The essential information

To obtain the essential information for operating your SES, you should read the chapters below:

Chapter 1 explains how messages are routed to and from your SES and a shore-based correspondent, via an Inmarsat satellite and *Coast Earth Station (CES)*. The chapter introduces the communications services you may be able to access on your SES, provided the services are supported by your SES and the CES.

The chapter also explains that to be able to communicate, your SES must be located within one of the four satellite *ocean regions*, and must be *logged-in* to the *Network Co-ordination Station (NCS)* for that ocean region.

Chapter 2 describes how your SES must initially be *commissioned*, before Inmarsat will permit it to access the INMARSAT-C system.

Chapter 3 informs you how your SES should be prepared for operating in the INMARSAT-C system.

Chapter 4 describes the *distress and safety services* you can access on your SES.



You should familiarize yourself with the distress and safety services before you have to use them.

Chapter 5 describes how to access the different communications services available.

Appendixes A to D contain tables of information about the services you may be able to access on your SES, and the *country codes* (telex and telephone) that you will need to use to send messages.

Useful information

The following information, while not essential, should give you a wider understanding of the INMARSAT-C system, and the services you can access:

Chapter 6 gives more information about the *Enhanced Group Call (EGC)* services *SafetyNETSM* and *FleetNETSM*.

Chapter 7 gives more information about *data reporting, polling and SCADA*.

Appendix D is *Glossary* of the terms used in the manual.

Appendix E contains a *Publications Registration Form* that you should complete and return to Inmarsat to obtain future issues of this manual, or to obtain other publications issued by Inmarsat. This appendix also contains a *Comments Sheet* on which you could send any comments you may have on the manual, or any other aspects of the Inmarsat system.

Technical information

Chapter 8 gives technical information about the system, and how calls are made, to and from your SES. The chapter describes in simple terms the communications techniques used, and does not require you to have a technical background to follow the descriptions.

Generic INMARSAT-C SES information

Several different models of INMARSAT-C SESs have been *type-approved* by Inmarsat for use in the INMARSAT-C system. The information in this manual is not specific to any particular SES model, but is *generic* in nature. For specific information on the operation or features of a particular INMARSAT-C SES model, you are referred to the manufacturer's information.

Getting help

If you have any problems or questions associated with your INMARSAT-C SES, or with the INMARSAT-C system, you may get help from the following different sources:

For help on your INMARSAT-C SES:

If you have any problems specific to your SES model, or want to find out about upgrades or new features to your model, contact your SES manufacturer's agent, or the manufacturer directly at the address given in Appendix A, *Table A-1 INMARSAT-C SES and LMES manufacturers and type-approved models*.

Table A-2 in Appendix A explains the communications services which may be possible on your SES (subject to your SES supporting the service).

For help on CES services, charges and technical matters:

For any information relating to a CES, contact the *CES Customer Service Contact Point* at the numbers given in *Table B-1* to *Table B-4* in Appendix B.

For an explanation of the CES services, mandatory and optional, refer to *Table B-5*.

For general help on the INMARSAT-C system:

Contact the INMARSAT-C Maritime Customer Relations Officer at the address:

INMARSAT-C Maritime Customer Relations Officer Maritime Services Division
International Maritime Satellite Organization (Inmarsat) 40 Melton Street,
London NW1 2EQ, UK
Telephone: +44 71 728 1095 Fax: +44
71 728 1614 Telex: 297201 INMSAT G

The INMARSAT-C Maritime Customer Relations Officer will answer the call as soon as possible

(BUT NOTE THAT IF THE CALL ARRIVES AFTER NORMAL BUSINESS HOURS, 9.00AM TO 5.00PM LONDON LOCAL TIME, MONDAY TO FRIDAY, IT WILL BE ANSWERED THE FOLLOWING BUSINESS DAY.)

PC Help-line

Inmarsat provides a *PC Help-line*, which provides maritime help facilities, including information retrieval, a mailbox facility, and access to the INMARSAT-C Maritime Customer Relations Officer. Unfortunately, you cannot access the PC Help-line directly using your INMARSAT-C SES, because the delay caused by the INMARSAT-C *store-and-forward techniques* (explained later in this manual) prevents you from interacting straightaway with the helpline software, as it requires. To access the PC Help-line, you must have a computer that is equipped with suitable communications software, and that is connected by modem to the international *PSTN* networks. The PC Help-line number is:

+44 71 728 1079

For more information on the PC Help-line, contact the INMARSAT-C Maritime Customer Relations Officer at the above address.

Telex Help-line

Another help facility available to you is the *Inmarsat Maritime Telex Help-line*. This is similar to the PC Help-line, in that you cannot access it directly using your INMARSAT-C SES. Instead, you must have a telex terminal (or use an *INMARSAT-A* terminal) to access the telex number:

(51) 920327 INMHLP G

For more information on the Telex Help-line, contact the INMARSAT-C Maritime Customer Relations Officer at the above address.

Training in the use of an INMARSAT-C SES

In the interests of safety, the master of the vessel, or other authorized officer, should ensure that people who may need to use the INMARSAT-C **SES** are adequately trained in its use for normal communications, and for distress and safety purposes.

The authorized officer should also ensure that arrangements are made for keeping the INMARSAT-C equipment in good working condition.

Associated publications

Inmarsat produces a wide range of publications on their different systems, as shown in Appendix G. To obtain a copy of any of these publications, contact the INMARSAT-C Maritime Customer Relations Officer at the address on the previous page.

Conventions



Important points, to which the reader should pay particular attention, are shown as below:

Incorrect operation of an INMARSAT-C **SES, caused either by malfunctioning of the equipment, or operator action, could affect the system, or other users.**

If this occurs frequently, Inmarsat might *decommission* such an **SES, to prevent it from interfering with the INMARSAT-C system.**

A request for feedback

If you have any comments on this manual, or consider that some information is incorrect, or should be included, please let us know and return it with your comments to the INMARSAT-C Maritime Customer Relations Officer at the address on the previous page.

QUICK REFERENCE GUIDE

The steps below summarize how you should use your INMARSAT-C **SES** for distress and safety purposes, and to send and receive messages. More detailed information is given in the references shown.

Prepare your SES	Comment
1 Switch on your INMARSAT-C SES , and all associated equipment.	Refer to the equipment manufacturer's instructions.
2 Decide on the ocean region and CES through which you are going to communicate.	Figure 8 on page 1-15 shows the ocean regions and CESSs , and Table B-1 to Table B-4 in Appendix B list the CESSs in each ocean region. The section ' Selecting an ocean region and a CES ' on page 3-1 tells you more.
3 Make sure that your SES antenna has an unobstructed view of the sky, in all directions.	See page 2-2, step b.
4 Log-in to the ocean region you have selected.	See ' Logging-in to an ocean region/NCS Common Channel ', page 3-1.
5 Confirm that your SES is logged-in and receiving a strong NCS Common Channel signal.	Check the indications on your SES monitor.
Routine checks	
<ul style="list-style-type: none"> Throughout your journey, make sure that your SES is receiving a strong signal, and all associated equipment is working properly. 	See steps 1 to 6 on page 3-6.
<ul style="list-style-type: none"> If you are travelling outside the ocean region you are currently logged-in to, make sure that your SES is logged-in, either manually or automatically, to another ocean region with a stronger signal. 	See ' Logging-in to a different ocean region/NCS Common Channel ' on page 3-5.
Sending a distress call	
<ul style="list-style-type: none"> You may use your SES to send a brief distress alert, or a more detailed Distress priority message. 	For a summary of the distress call procedures, refer to the yellow page '-', at the front of this manual. For more information, refer to Chapter 4 Distress and safety service '.
Receiving MSI broadcasts	
<ul style="list-style-type: none"> Your SES can receive broadcasts of Maritime Safety Information (MSI) within an ocean region (provided your SES has an EGC receive capability tuned to the NCS Common Channel for that ocean region). 	Refer to Chapter 6 ' The EGC SafetyNETSM and FleetNETSM services '
Sending a message (ship-to-shore)	
1 Create your message on the SES text editor, or edit an existing message.	Refer to the SES manufacturer's instructions for details.
2 Select transmit (send) mode.	The number you enter, and the transmission type and format, depends on whether the destination is a telex, fax or computer terminal, or another Inmarsat mobile. For details, see the appropriate section, a) to e), from page 5-5 on.
3 Insert the destination for your message.	
4 Select the transmission type and format suitable for the destination.	
5 Select the CES through which you want your message routed.	If necessary, refer again to ' Selecting an ocean region and a CES ' on page 3-1.
6 Select the time and routine priority for your message, and whether you want confirmation of delivery.	See steps 5 to 7 on page 5-9.
7 Before sending your message, check that all the details you have entered are correct.	Any errors in the details entered could result in your message not being delivered.
8 Enter the command to transmit (send) your message.	Your SES should now start to transmit your message, and proceed automatically until complete. See steps 10 to 12 on page 5-9 for more information.
Receiving messages (shore-to-ship)	
<ul style="list-style-type: none"> Make sure that the people who may need to contact you know how to do so. 	See step 11 on page 3-7, and ' Conditions which must be met for shore-to-ship communications ', page 5-2.
<ul style="list-style-type: none"> Provided your SES is logged-in and receiving a strong NCS Common Channel signal, it should automatically receive all messages intended for it 	At regular intervals, check your SES Receive Log and EGC Log for any messages received.
<ul style="list-style-type: none"> Make sure that your SES is set to store and/or print all received messages. 	Refer to the SES manufacturer's instructions for details.
<ul style="list-style-type: none"> Note that some EGC messages may be sent frequently, and could fill up your SES's memory or disk storage. 	See step 15 on page 3-7.

Chapter 1 Introduction to the INMARSAT-C satellite communications system

Introduction

Your INMARSAT-C Ship Earth Station (*SES*) can be used to send and receive text messages or data between practically any locations around the globe, 24 hours a day. The INMARSAT-C system, which is based on *satellite communications technology*, ensures that your messages get through, regardless of time of day or distance to the intended destination. Advanced technology ensures that your messages are received reliably, unaffected by atmospheric conditions or interference from crowded radio frequencies.



Figure 1 Yacht fitted with INMARSAT-C terminal (antenna shown ringed)

Figure 1 and Figure 2 show typical installations.

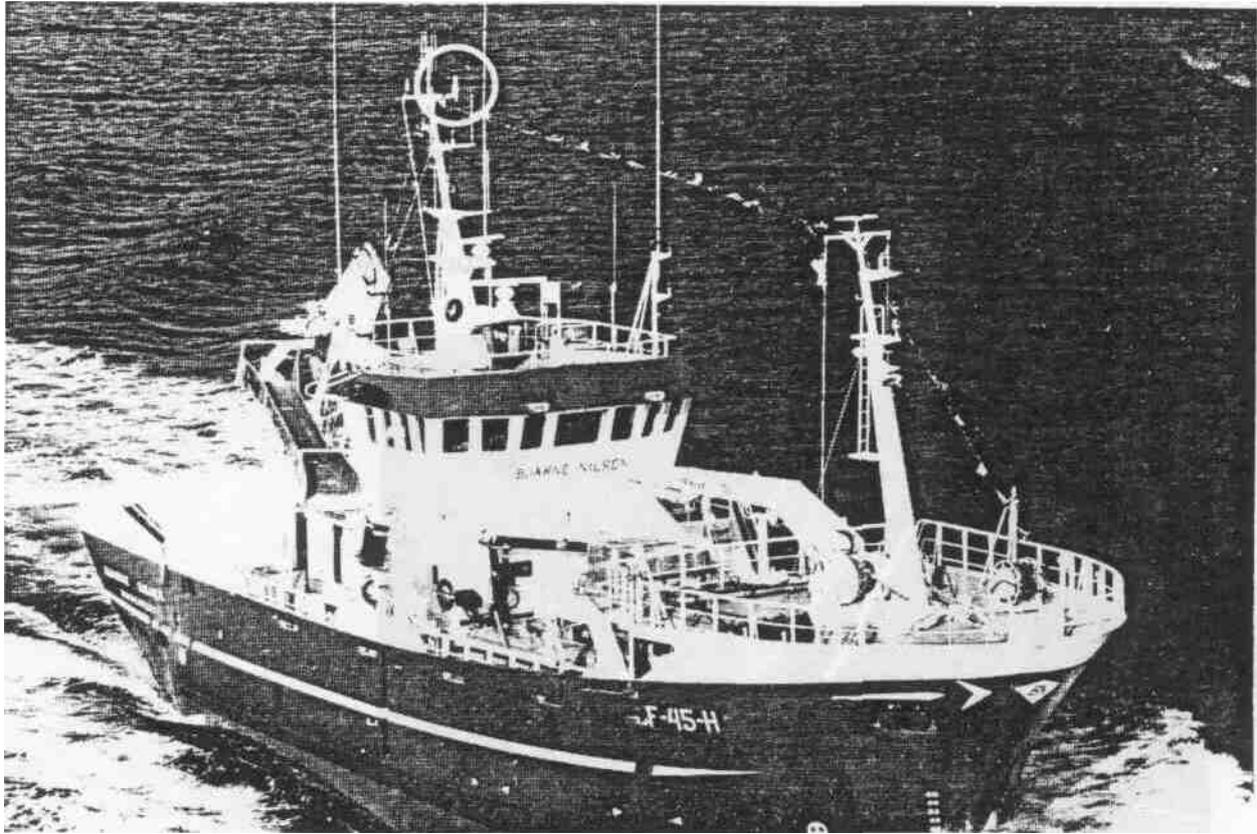


Figure 2 Fishing trawler fitted with INMARSAT-C terminal (antenna shown ringed)

Various manufacturers produce a range of *SES*' models, as shown in *Figure 3*. The *SES* models produced have different controls and operating features, but all share the common characteristics of providing global communications on a small terminal, which is inexpensive to purchase, simple to install, uses low power, and is economical to run.

Using your INMARSAT-C *SES* you can send *messages* (text or data) to a fixed location, for example your company office or home, (we call this *ship-to-shore messaging*) or receive messages from those locations (we call this *shore-to-ship messaging*).

Footnote 1: *The term 'Ship Earth Station (SES), is used primarily for maritime communications, and is found throughout this manual. Also used in this manual, in place of the term SES, are the more general terms 'terminal' and 'mobile'.*

In other literature, however, you may see the term 'Land-mobile Earth Station' (LMES) which applies specifically to land-mobile communications, or the more general term 'Mobile Earth Station (MES) which applies to both maritime and land-mobile communications. Note that some operational differences exist between SESs and LMESs, as described in the relevant user's manual.

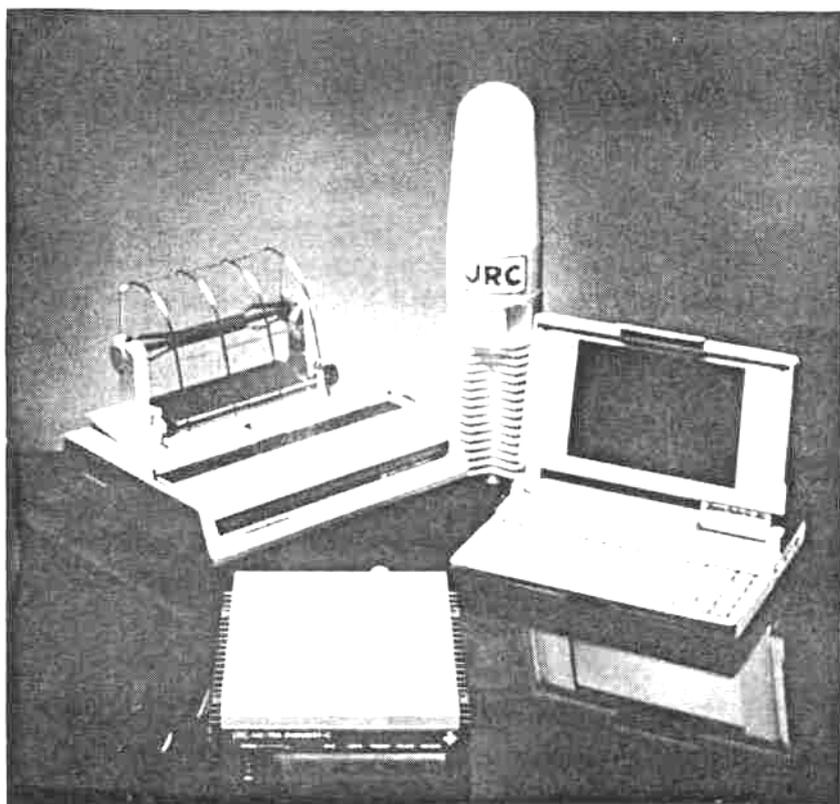


Figure 3 Typical INMARSAT-C SES models

Also, your **SES** may be used to communicate with another Inmarsat **SES** (or a Land Mobile Earth Station, **LMES**), both sending and receiving messages (we call this *ship-to-ship (or mobile-to-mobile) messaging*).

A summary of the INMARSAT-C system operation

The INMARSAT-C system is based on *digital technology*, which means that anything that can be encoded into digital data, whether text keyed in, numeric data read from instruments, or other information in digital form, can be sent and received over the system.

The basic technique used for sending a message over the INMARSAT-C system, to or from the **SES** is known as *Store-and-forward messaging*. When sending a ship-to-shore message, you prepare the message initially on your terminal. It is then transmitted via an Inmarsat satellite, as shown in *Figure 4*, in a series of *data packets*, to an INMARSAT-C Coast Earth Station (**CES**). This **CES** acts as an *interface (or Gateway)* between the satellite link (the *space segment*) and the national/international telecommunications networks. If the **CES** receives any data packets in error, it signals back to the **SES** to re-transmit those packets, and the procedure repeats until the **CES** has received the complete message with no errors. The **CES** stores the message briefly, before forwarding it (hence the term *store-and-forward*) over the telecommunication networks to its intended destination.

A similar procedure happens when a shore-based correspondent sends a message through a **CES** to your terminal. *Chapter 8, A technical description of the INMARSAT-C system*, describes the procedures in more detail.



Correspondents should be aware of the *brief delay* introduced by the *store-and-forward techniques* used in the INMARSAT-C system.

For a ship-to-shore or shore-to-ship message, this delay, from a message being sent, to it being received at its final destination with no errors, is typically 3-6 minutes.

For a ship-to-ship message, the delay may be longer, typically 5-20 minutes.

The INMARSAT-C system is very flexible, allowing a wide variety of equipment to be connected at either end. *Figure 4* shows a general overview of the system, indicating some of the equipment which may be connected at either end. The actual equipment at either end - and the associated communications services - depends on individual circumstances. The following sections discuss the possibilities.

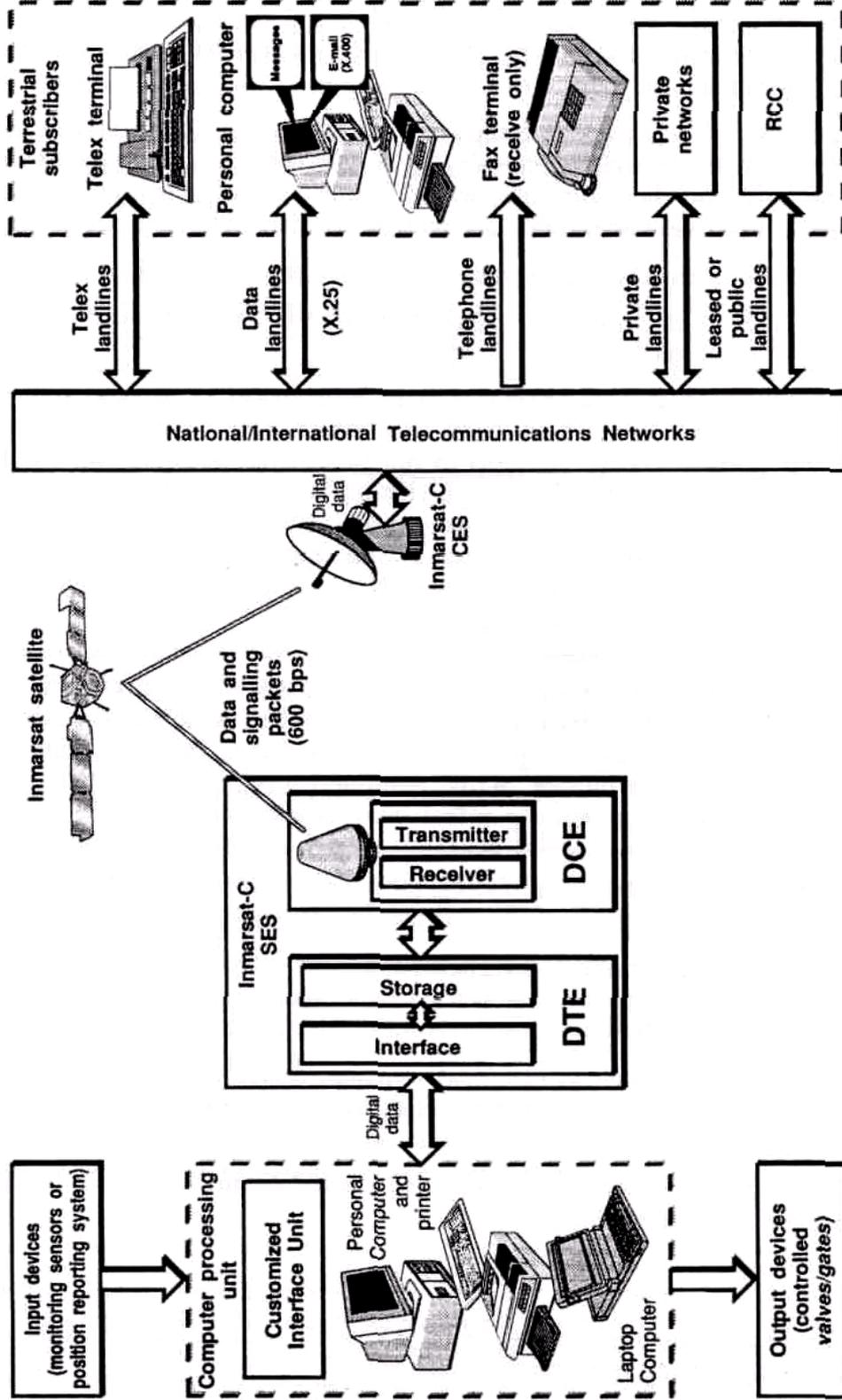


Figure 4 The INMARSAT-C communications system - an overview

Equipment which may be connected at the SES end

Inmarsat permits only *Type-approved SES* modes, and their peripherals, to be *commissioned* into the INMARSAT-C system - [Chapter 2 Commissioning an INMARSAT-C SES](#) gives more information on these terms.

As shown in [Figure 4](#), an *SES* comprises two parts - the *DTE* (*data terminal equipment*), and the *DCE* (*data circuit terminating equipment*). In some models the *DTE* and *DCE* may be built into the same case, whilst in other models they are separate. The functions performed by these components are outlined on the following pages.

The *DTE* interfaces external *input/output devices* to the *SES*, such as:

- ❑ A keyboard, screen and printer - in some *SES* models these are built-in to the *DTE*, whilst in other models they are separate.
- ❑ An external computer (typically a laptop or desktop model), complete with its own keyboard, screen, hard disk/diskette drive and printer. This computer may be used to format and store messages, and also to run specialized software (for example formatting the data into a *data report* for sending to a reporting centre, or compressing input data to save transmission time). Ideally, the computer should be dedicated solely to operating the INMARSAT-C *SES*, but in some installations may *multi-task* other functions on board the ship. Note, however, the following precaution about using a multi-tasking computer:



If a multi-tasking computer is used to operate an INMARSAT-C SES, no 'unnecessary' software should be installed, to avoid the computer being busy when required to perform an INMARSAT-C function, and especially to avoid the danger of the computer becoming infected by 'viruses', which could adversely affect your communications.

- ❑ A position reporting system, using for example GPS, *Glonass*, DECCA, *LORAN-C*, or *Transit* to provide the ship's position, for use in periodic position reports.
- ❑ *Input devices (sensors)*, connected via a computer or interface unit as shown in [Figure 4](#), and monitoring for example a ship's machinery, structure, cargo, environment, and so on.
- ❑ *Output control devices*, such as electrical switches, relays or valves. These are used typically to control operations at remote installations, for example a lighthouse or oil platform.

The *DTE* also provides storage for messages created on the keyboard, before they are transmitted over the satellite link.

Footnote 2: *Inmarsat grants type-approval to an SES model, produced by an independent manufacturer, if the model meets technical specifications defined by Inmarsat.*

Footnote 3: *Commissioning is the process by which a type-approved SES is registered into the INMARSAT-C system.*

The *DCE* interfaces the *SES* to the satellite system, using its *transmitter and receiver* and an *antenna*. (You could think of the INMARSAT-C *DCE* as a sort of 'satellite modem', performing like the modem which interfaces a computer to the telephone networks.) The *DCE* transmitter and receiver can be tuned independently to different channels, depending on the circumstances.



The antenna must be able to maintain line-of-sight communications with the selected satellite.

On a ship-based *DCE*, the antenna is *omni-directional*, so that it can transmit to and receive and from a satellite, even when the vessel is pitching and tossing in the strongest seas.

(NOTE THAT THIS TYPE OF ANTENNA HAS NO MOVING PARTS, UNLIKE THE MUCH LARGER INMARSAT-A DIRECTIONAL ANTENNA, WHICH CONSTANTLY MOVES TO COUNTER THE MOTION OF THE SHIP, AND SO REQUIRES CONSIDERABLY MORE ELABORATE ELECTRONICS AND POWER SOURCES.)

Equipment which may be connected at the CES end

As shown in *Figure 4*, a *CES* may interface with any of the following devices connected to the national/international telecommunications networks:

- ❖ A telex terminal connected to the international *Telex networks*.
- ❖ A computer connected to the international data networks (known as the *PSDN* (*packet switched data networks*) or the *X.25* or *X.400* networks, named after the communications standards (*protocols*) used on the networks).
- ❖ A computer connected to the international telephone networks (known as the *PSTN*, *public switched telephone networks*).
- ❖ A fax terminal connected to the *PSTN*⁴ landlines.
- ❖ Dedicated equipment such as a data processing system, connected to a private network (such as a leased line).

Also as shown in *Figure 4*, the *CES* is connected via leased or public landlines directly to a *Rescue Co-ordination Centre (RCC)*. So every INMARSAT-C *CES* can route distress calls from an *SES* with top priority to a specialized land-based centre, to ensure efficient search and rescue activities.

Depending on its policy, an INMARSAT-C *CES* may also interface messages received from one *SES*, for forwarding over the satellite link to another *SES*, to enable *ship-to-ship* (also known as *mobile-to-mobile*) communications.

Footnote 4: *The INMARSAT-C system allows an SES to send messages to a shore-based fax terminal, but does not, however, allow a shore-based fax terminal to send messages directly to an SES. A fax terminal may, instead, send text messages indirectly, via a **fax bureau service**, where the fax message is re-typed, and sent as a store-and-forward message to the SES. Several INMARSAT-C CESs, and other organizations, offer a fax bureau service. See the section [Shore-to-ship fax bureau services \(text only\)](#)' on page 5-14 for more information.*

The INMARSAT-C communications services

Your **SES** can access the communications services listed below, subject to the following condition:



The communications service selected must be supported by both the SES model, and the CES selected. To find out if an SES supports a particular service, now, or can be upgraded to do so, contact your agent, or the manufacturer directly at the address given in Table A-1 in Appendix A. To find out if a CES supports a particular service, contact the CES Customer Service Contact Point at the numbers given in Table B-1 to Table B-4 in Chapter 8 Appendix B.

- ✓ *Store-and-forward messaging* services.
- ✓ *Distress alerting* and safety services.
- ✓ EGC (Enhanced Group Call) SafetyNETSM and FleetNETSM broadcasting.
- ✓ Data reporting, polling, and *SCADA* (*supervisory control and data acquisition*).
- ✓ Operator-assisted and value-added services.

Store-and-forward messaging services

Different *Store-and-forward messaging* services are possible, as outlined below. For more information, see [Chapter 5 'How to access the INMARSAT-C communications services'](#).

Telex message service - you can send and receive messages between your **SES** and any telex terminal which is connected to the national/international *Telex networks*.

Fax messaging service - see [Footnote 4](#).

Messages to and from a computer - you can send and receive messages between your **SES** and any computer terminal which is connected to the *PSDN* or *PSTN* networks, provided the computer and your **SES** are equipped with suitable hardware and software.

Electronic mail (E-mail) services - if your **SES** is registered with an E-mail service, you can interchange messages and files with subscribers to E-mail services, world-wide.

Ship-to-ship (also known as mobile-to-mobile) message service: This service allows you to send and receive messages between your INMARSAT-C **SES** and any other Inmarsat **SES** (or *LMES*).

Distress alerting and safety services

Every INMARSAT-C **CES** is connected by reliable telecommunications networks to a nearby *Rescue Coordination Centre (RCC)*, which is equipped with special facilities to organize search and rescue activities in response to a distress alert from an **SES**. In addition, each **RCC** is interconnected by the international telecommunications networks to other **RCCs** in other parts of the world. Many **RCCs** are also equipped with Inmarsat terminals, enabling them to communicate with other rescue centres, and with ships in your vicinity, to ensure that you rapidly get the help you need.

Using your **SES**, you can make two different types of distress call:

- A brief **distress alert**, which contains summarized information on your distress circumstances.
- A more detailed *Distress priority message*, in which you can type in your distress circumstances, and explain the assistance you require.

Either of the above types of distress call will be routed through the INMARSAT-C system with top priority to an **RCC**, which will establish communications with you to organize the rescue services you need.

In addition to the above types of distress calls, the INMARSAT-C system also enables you to access on your **SES** a wide range of *navigational, weather and other safety services* from specialized centres.

Chapter 4 Distress and safety services explains these services.

The EGC SafetyNETSM and FleetNETSM services

Provided your **SES** is fitted with an *EGC receive capability*, it can receive messages broadcast to it by the *EGC SafetyNETSM* and *FleetNETSM* services.

The SafetyNETSM service allows an Information Provider such as a meteorological or hydrographic office to broadcast *Maritime Safety Information (MSI)*, addressed to all, or selected, EGC receivers within an ocean region, or to **SES** within a defined geographical area such as a **NAVAREA**.

The FleetNETSM service allows an Information Provider such as a shipping company or government to broadcast information such as company news, or government broadcasts, addressed to selected EGC receivers belonging to a *Closed network*.

Chapter 5 How to access the INMARSAT-C communications services gives more information on the EGC services.



The position of your ship must be updated in the SES at least every 12 hours, otherwise the EGC receiver will print-out *all SafetyNETSM messages*, above routine priority, which have been addressed to *any areas* within the ocean region.

Updating the position can be done manually, as instructed in the manufacturer's literature, or automatically, from either the ship's electronic navigation system, or a GPS (Global Positioning System) receiver which is connected to, or integrated into, the SES.

Data reporting, polling and SCADA

The data reporting service allows your **SES** to send *short data reports* to an operational centre for analysis. Typical data in a report could be a ship's position, read from a navigational/global positioning system (GPS), or pressure in an oil pipeline, monitored by sensors interfaced to the **SES**.

Data reports may be sent regularly, or randomly, or in response to a *polling command* from a shore-based operational centre.

Sending short data reports makes efficient use of the INMARSAT-C system, and offers time and cost-savings over conventional *Store-and-forward messaging* techniques. Also, data reporting allows the use of *data encoding* and *data compression* techniques to fit more information into a data report, so giving further savings.

The INMARSAT-C system allows an operational centre to send *polling commands* to selected SESs. Typical polling commands instruct an *SES* to send a data report immediately, or at a defined start time and repetition interval, or to perform a defined task such as energizing a relay, or closing a switch to initiate a required control function.

The reporting and polling services, when used together, make possible *SCADA* (*supervisory control and data acquisition*) on a system to which an *SES* is interfaced. A typical *SCADA* application is the control of operations at a remote lighthouse, whereby sensors collect data from the system, to be applied via an interface to the *SES*, for forwarding in a data report over the Inmarsat system to an operational centre. In response, the centre could return polling/control commands to control some of the operations of the system, for example switch on a fog horn at a lighthouse.

See [Chapter 7](#) for more information on data reporting, polling and *SCADA*.

Operator-assisted services and value-added services

In addition to the services outlined above, you may also access a wide range of *Operator-assisted services* and *value-added services* through, for example, some INMARSAT-C CESSs, or specialized value-added service (VAS) bureaus.

Examples of *Operator-assisted services* are a shore-based operator receiving a message from your terminal, and forwarding it as a voice message to a telephone, or as a letter to a specified address.

Examples of value-added services are a *CES* providing E-mail services, or routing arrangements to enable subscribers to send messages to SESs from countries which do not support direct dialling access to the INMARSAT-C system.

See [Chapter 5](#) for more information on operator-assisted and value-added services.

A guided tour of the INMARSAT-C system

For you to be able to operate your terminal confidently, you might like to know how it fits into the entire INMARSAT-C system. The following sections introduce the major elements of the system, and how your terminal interacts with them.

Inmarsat is a global partnership

The International Maritime Satellite Organization (*Inmarsat*) is a partnership of member countries from all over the world. Since the Partnership began commercial operation in 1982, the number of member countries (known as the *Signatories*) has increased steadily, and now totals 67, with more countries in process of joining.

The purpose of the Partnership has been to provide global communications via satellite to and from ships voyaging all over the world. In recent years, Inmarsat has extended its operations to land-mobile vehicles and to aircraft.

Individual Signatories invest as shareholders in the Partnership, take part in decision-making, and generally provide communications services within their country. Many Signatories are *national telecommunications authorities*, and several also operate a *CES* for one (or more) of the Inmarsat systems.

The Inmarsat systems

Inmarsat operates the global communications systems outlined below. *Figure 5* shows typical sizes and weights of the *SES* antennas of the different systems.

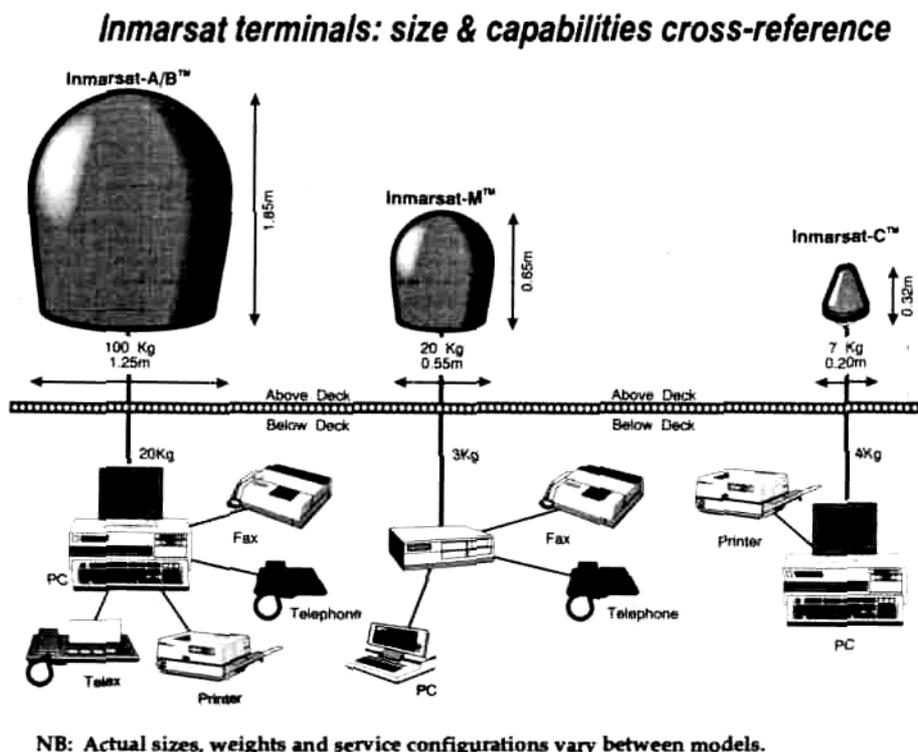


Figure 5 Comparative sizes and weights of Inmarsat SES antennas

INMARSAT-A This was the first Inmarsat system, introduced into commercial operation in 1982, and now providing telephone, telex, fax, electronic mail (*E-mail*), and high-speed data communications from ship-to-shore and shore-to-ship. Recent developments in data compression techniques enable the transmission of still photographs and even compressed video, to and from a ship.

Many **INMARSAT-A** models, produced by different manufacturers, are now available, ranging from maritime models to land-based models. The total number of **INMARSAT-A** terminals in use all over the world is now nearly 20,000, and continues to grow.

The large size of the on-board equipment has meant that **INMARSAT-A** terminals have generally been fitted on larger ships such as trading vessels and 'superyachts'.

INMARSAT-C To complement the *INMARSAT-A* system, the INMARSAT-C system was introduced in 1990 to provide *low-cost global communications*, using a small, lightweight terminal. Its small size and weight make it suitable for smaller vessels such as fishing boats, yachts and supply craft, but it is also finding increasing use providing low-cost/backup communications for the larger vessel.

As explained in this manual, the INMARSAT-C system provides a wide range of communications services, including two-way *store-and-forward messaging*, *Distress alerting and safety services*, *EGC SafetyNETSM* and *FleetNETSM*, and *data reporting, polling and SCADA (supervisory control and data acquisition)*.

An important benefit of the INMARSAT-C system is that it can comply with the *Global Maritime Distress and Safety System (GMDSS)*, which is becoming a mandatory requirement for many vessels.

Many different INMARSAT-C models, produced by different manufacturers, are now available, ranging from maritime models and EGC receive-only terminals, to land-mobile, portable or land-fixed models. The total number of INMARSAT-C models now in use exceeds 5,000, and is growing rapidly. Eventual numbers of INMARSAT-C terminals are expected to exceed 50,000.

INMARSAT-M This system, which was introduced at the end of 1992, provides *global telephone, fax and data communications* on a terminal which is smaller, and lighter in weight, than a typical *INMARSAT-A* terminal, and at lower equipment cost and operating cost. The *INMARSAT-M* terminal is suitable for fitting on many different types of vessels, small and large, which require voice communications at affordable cost. The number of *INMARSAT-M* models being produced by different manufacturers is growing, and eventual numbers are expected to be in the hundreds of thousands.

INMARSAT-B This new system, to be introduced later in 1993, is intended as the successor to *INMARSAT-A*, providing telephone, fax, and high-speed data communications to higher specifications, and at lower cost, than the *INMARSAT-A* system. The larger size of the INMARSAT-B equipment, which is similar to *INMARSAT-A*, and the high communications volume of which the INMARSAT-B terminal is capable, make it suitable for larger ships such as trading vessels, ocean-going cruise ships, superyachts and oil rigs.

The Inmarsat space segment

The Inmarsat space segment is based on four operational communications satellites, with backup satellites ready to be used if necessary. Each satellite was launched by a powerful rocket into space, where the satellite's solar panels are deployed, as shown in *Figure 6*, and used to draw electrical power from the strong rays of the sun, enabling the satellite to remain self-sufficient for electrical power for many years.

Each satellite is also equipped with communication antennas and a supply of fuel for its small thruster rockets, which are controlled from the earth by the *Satellite Control Centre (SCC)*.

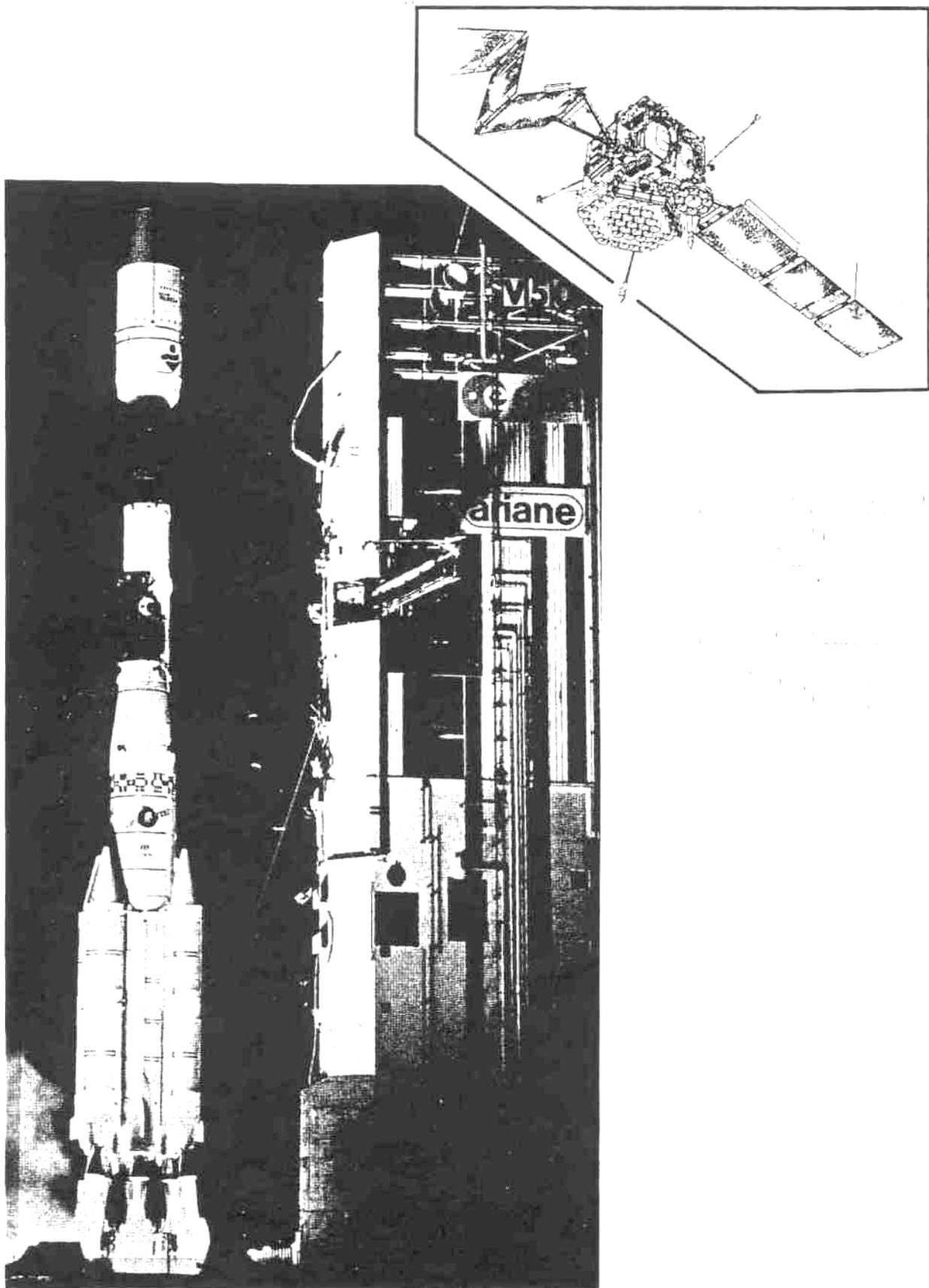


Figure 6 Rocket used to launch an Inmarsat satellite into geostationary orbit.
In space the satellite's solar panels are deployed to power the satellite's electrical systems.

The Satellite Control Centre (SCC)

The SCC, which is based in the Inmarsat headquarters in London, is responsible for operating the satellites owned by Inmarsat. The SCC receives data from a worldwide network of *Telemetry, Tracking & Command (TT&C) Stations*, which communicate directly with the satellites. These stations can also provide backup control of the satellites, in place of the SCC, if required.

Each satellite has a *coverage area* (also known as the *footprint*), which is defined as the area on the earth's surface (sea or land) within which an antenna can obtain line-of-sight communication with the satellite.

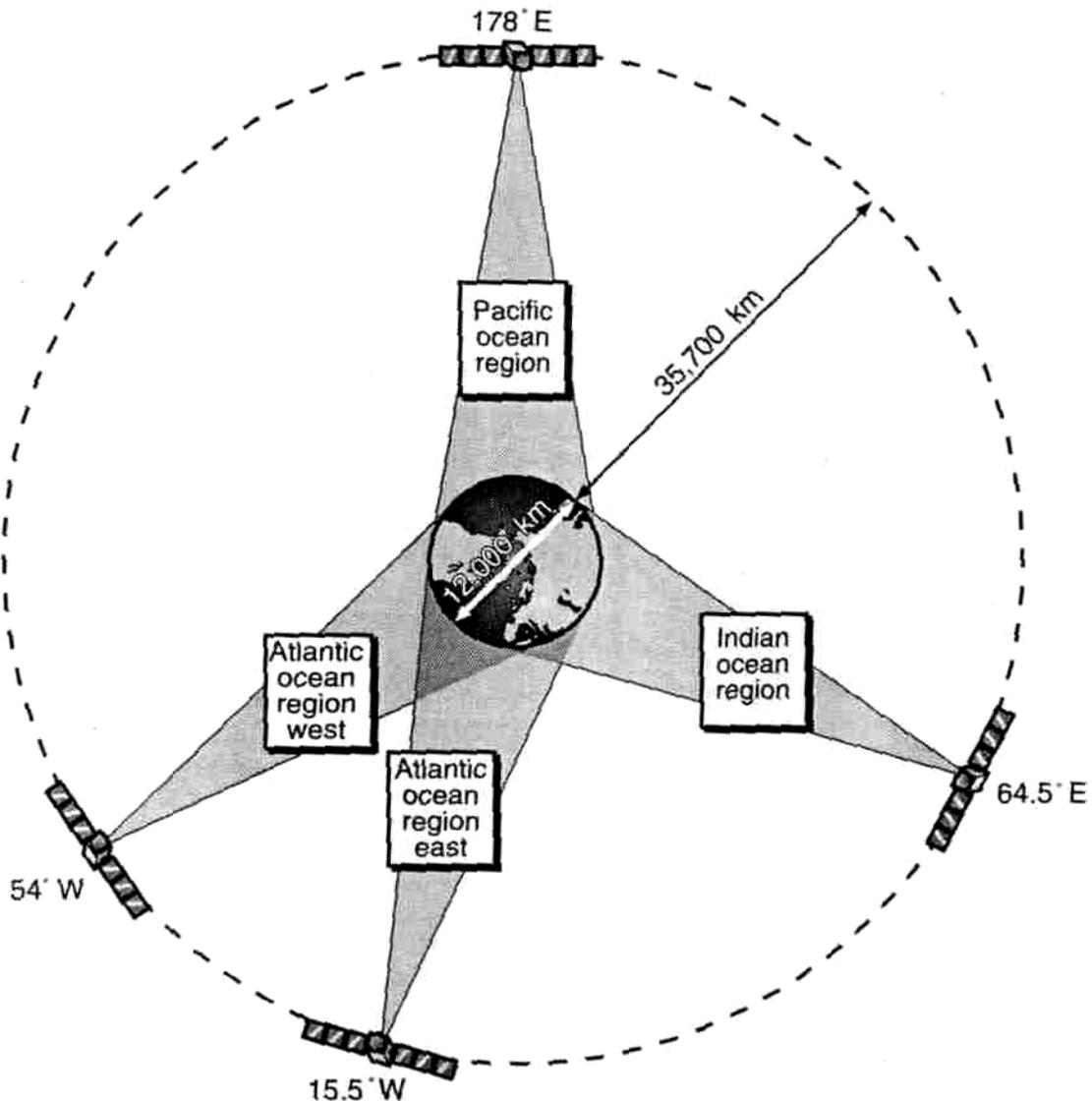
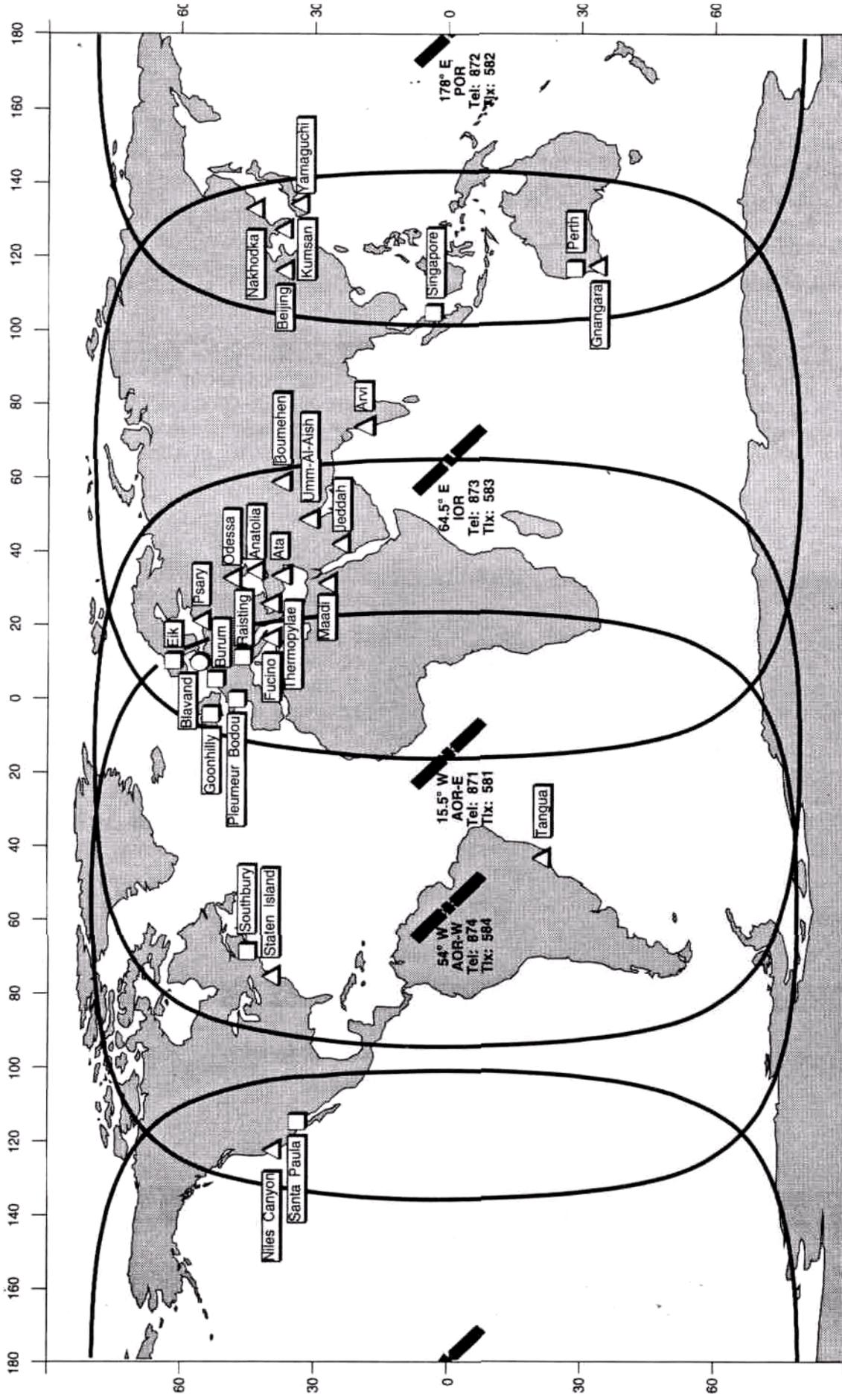


Figure 7 View of the satellites in geostationary orbit above the four ocean regions

Chapter 1

Introduction to the INMARSAT-C satellite communications system



△ Inmarsat-A ○ Inmarsat-C □ Inmarsat-A + C

Figure 8 The four satellite ocean regions and the Inmarsat CESSs (refer to Tables B-1 to 5-4 in Appendix B for the CESSs located in each ocean region, and to your SES for an updated list of the CESSs operational in each ocean region.)

Figure 7 shows the four satellites in space, and their coverage areas, corresponding to the four *ocean regions*:

- ✓ Atlantic Ocean Region-East (AOR-East).
- ✓ Atlantic Ocean Region-West (AOR-West).
- ✓ Pacific Ocean Region (*POR*).
- ✓ Indian Ocean Region (*IOR*).

Figure 8 shows that the four ocean regions cover practically the entire surface of the earth, with the exception of the extreme polar regions, beyond about 75° latitude North and South. (Although Norwegian fishermen have succeeded in extending the limits to about 86° North, using dual antennas, vertically stacked.)

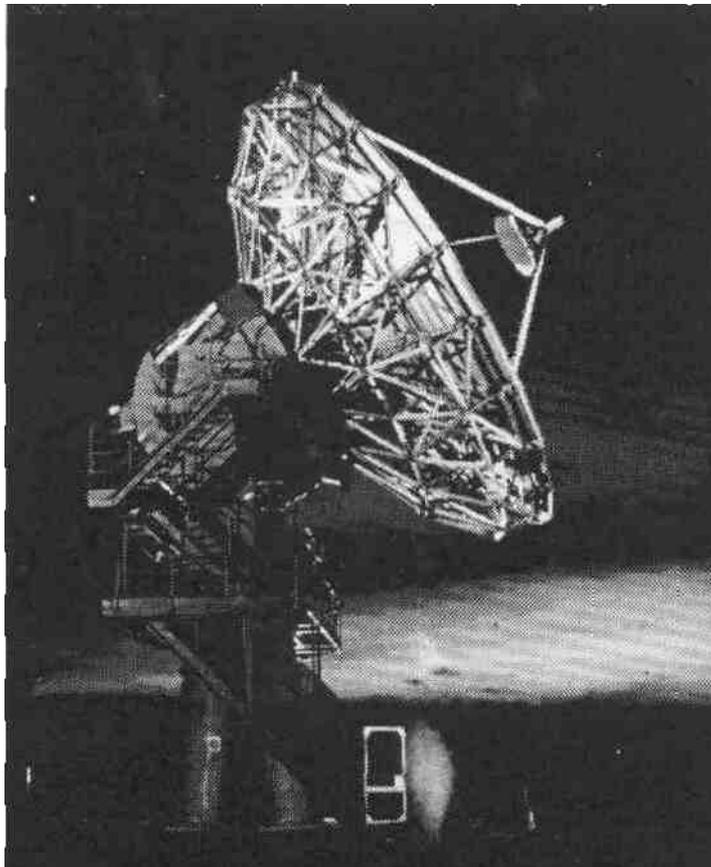


Figure 9 The 14m parabolic dish antenna of an Inmarsat Coast Earth Station

The Coast Earth Stations (CESs)

Figure 8 shows the INMARSAT-C Coast Earth Stations (CESs) around the world, and, for the benefit of the thousands of *INMARSAT-A* users, the *INMARSAT-A* CESs.

Tables B-1 to B-4 in Appendix B identify the INMARSAT-C CESs in each ocean region.

Each *CES* is a powerful receiving and transmitting station, which acts as an *interface* (also known as a *Gateway*) between the space segment and the terrestrial telecommunications networks. *Figure 9* shows the large dish antenna of a typical Inmarsat *CES*.

Generally, each *CES* in the Inmarsat system is owned and operated by an Inmarsat *Signatory*. In many countries, the Inmarsat Signatory is the national telecommunications authority, while in other countries it may be a government administration, or a private company.

CES services

Each *CES* offers a range of communication services, and sets its own user charges, details of which may be published by the *CES* Operator.

Table B-5 in Appendix B shows the services which are possible at a *CES*.

NOTE THAT SOME SERVICES ARE DEFINED AS *MANDATORY*, WHICH MEANS THEY ARE SUPPORTED BY ALL *CESs*, WHILE OTHER SERVICES ARE DEFINED AS *OPTIONAL*, WHICH MEANS THEY *MAY BE SUPPORTED BY A *CES, ACCORDING TO ITS INDIVIDUAL POLICY.**



At the time of writing (December 1992), some optional services at a *CES*, for example data reporting, polling and SCADA are supported by a *limited number of CESs*. As the system develops during 1993 and later, more *CESs* are expected to support these optional services.

To find out if a *CES* supports a particular service, you should contact the *CES* directly, at the *CES* Customer Service Contact Point given in Tables B-1 to B-4 in Appendix B.

In deciding which *CES* to communicate through within an ocean region, an *SES* operator may consider the services and charges set by a particular *CES*, but otherwise may select any operational INMARSAT-C *CES* within that ocean region.

Footnote 5: *The term 'Coast Earth Station' (CES) is used primarily for maritime communications, and is found throughout this manual. In other literature, you may see the more general term 'Land Earth Station' (LES), which applies to both maritime and land-mobile communications. There is no operational difference between a CES and an LES.*

Ship Earth Stations (SESs)

The term **SES** used here applies to an Inmarsat mobile earth station which has been type-approved by Inmarsat for use in a *maritime environment*. For convenience, the term **SES** is used here to apply both to *maritime-mobile* use, and to *fixed* installations in a maritime environment. A maritime-mobile **SES** is equipped with a *maritime distress facility*, which is a mandatory requirement for sea-going vessels. (A land-based **SES**, however, must not issue a maritime distress call.)

Different manufacturers produce a range of INMARSAT-C *Type-approved SES* models, as listed in Table A-1 in Appendix A.

(NOTE, HOWEVER, THAT INMARSAT DOES NOT MANUFACTURE ANY MOBILE EARTH STATIONS.)

Note the following important point about the services you can access on your particular **SES** model:



Although all type-approved INMARSAT-C models meet technical specifications set by Inmarsat, individual models may differ significantly in operating features, and in the services each supports.

Table A-2 in Appendix A explains the communications services accessible on an SES, provided it supports the service. To find out if a particular SES model supports the service you require, or can be upgraded to do so, refer to the manufacturer's literature, or contact your agent or the manufacturer directly at the address given in Table A-1 in Appendix A.

For information on how to access a particular service, refer to [Chapter 5 How to access the INMARSAT-C communications services](#).

NOTE THAT THIS MANUAL CONSIDERS THE COMMON (GENERIC) FEATURES OF ALL TYPE-APPROVED SESs, BUT DOES NOT GIVE DETAILED OPERATING INSTRUCTIONS ON ANY PARTICULAR MODEL - FOR THAT INFORMATION, YOU ARE REFERRED TO THE MANUFACTURER'S LITERATURE.

The Network Co-ordination Stations (NCSs)

Within each ocean region is a special station known as the *Network Co-ordination Station (NCS)*, which monitors and controls communications traffic within its ocean region. The NCSs play an important role in your communications, as outlined below.

Logging-in to the NCS in an ocean region

To be able to send and receive messages, an **SES** must be *logged-in* to the NCS for an ocean region. So doing informs the NCS that your **SES** is available for communications. The NCS keeps this information in a *database* of the operational status of all INMARSAT-C mobiles in the system, updating the database every time an **SES** logs-in or logs-out. Each NCS also exchanges information with the other NCSs, and with the *Network Control Centre (NCC)* (the next section gives more information on the **NCC**), and with the **CEs**, allowing each of these elements to maintain a database on the **SESs** (and **LMESs**).

The Network Control Centre (NCC)

The Inmarsat *Network Control Centre (NCC)*, which is located in the Inmarsat Headquarters building in London, is linked by a world-wide communications network to the four NCSs. Communications between the *NCC* and NCSs enable the *NCC* to monitor, coordinate and control the communications activities throughout the network.

The **NCC** can also send, via the NCSs, *Inmarsat system messages*, with information relevant to the INMARSAT-C system, to all or selected mobiles within an ocean region.

Communications channels between the elements of the INMARSAT-C system

The different elements of the INMARSAT-C system described above use several *Communications channels* to perform the communication tasks required. These are summarized in *Figure 10*, and detailed in *Chapter 8 A technical description of the INMARSAT-C system*.

Note:
This Figure does not give an exhaustive list of the Signals

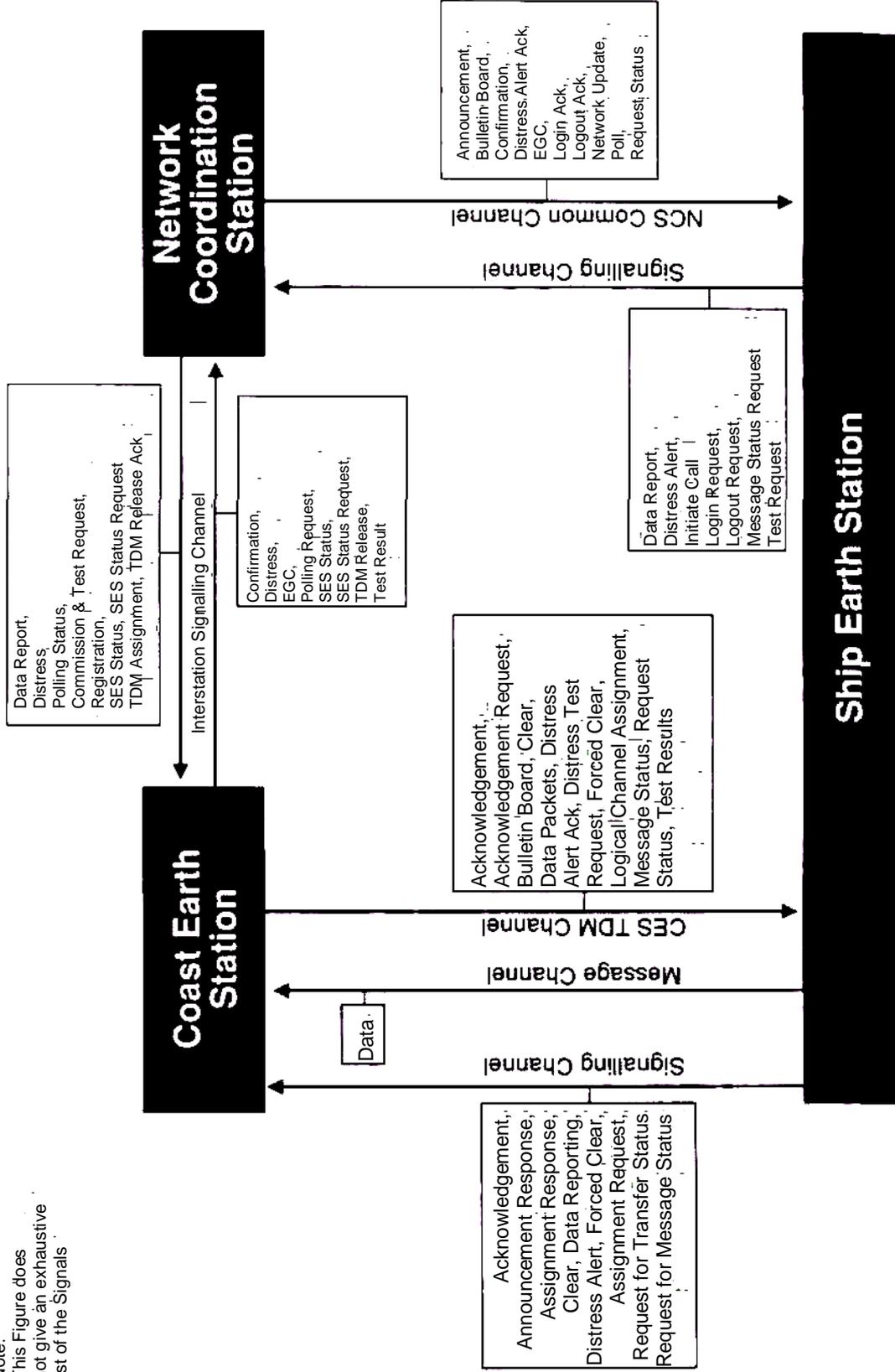


Figure 10 The INMARSAT-C communications channels - an overview

Chapter 2 Commissioning an INMARSAT-C SES

Introduction

Before an **SES** may be used in the INMARSAT-C system, it must be *commissioned*, for the following reasons:

- Technical** - to ensure that the **SES** functions correctly, and is capable of providing reliable communications without affecting the Inmarsat system or other users.
- Legal** - to ensure that operation of the **SES** meets the legal requirements of the country of registration, and of Inmarsat.
- Financial** - to ensure that proper arrangements are made to pay charges for the use of the Inmarsat system.

Summary of the INMARSAT-C commissioning procedure

Commissioning involves a series of steps, which are outlined in this chapter, and detailed in the publication:

- *The Inmarsat Commissioning Procedures Manual.*

This publication may be obtained by completing the Publications Registration Form in Appendix G, and returning to Inmarsat at the address given.

The steps involved in commissioning are:

- 1 The INMARSAT-C **SES** model purchased must be type-approved for the usage and installation for which it is intended.
- 2 A Maritime *Commissioning Application Form* must be completed, giving details of the equipment, the installation and usage, the billing arrangements, and the owner/licensee/manager.

The form is obtainable from the manufacturer at the address given in [Table A-1](#), or from the *national Routing Organization (RO)* for the country of registration of the vessel. The address of the **RO** may be obtained from the manufacturer, or from the Inmarsat Commissioning Department, at the address at the front of this manual.

A sample form is included in Appendix C, with accompanying notes to assist you filling it in.

- 3 The *Applicant* must sign and date the form to indicate acceptance, on behalf of the **SES** owner/operator of the Terms and Conditions printed on the back of the form.
- 4 The *Applicant* should send the completed form to the national **RO**.



The completed Commissioning Application Form must be sent to the national Routing Organization, and NOT TO INMARSAT.

- 5 The national **RO** verifies the details on the form, contacting the *Applicant* if necessary for any information.

- 6 The *RO* then sends the *Applicant* notification of the following:
- The unique nine-digit *Inmarsat Mobile Number (IMN)* in the format **4xxxxxxxx** which the *RO* assigns to the *SES* - this is the number that subscribers to the public networks will use later to communicate with the *SES*.
 - Authorization for the *SES* to be tested, but with the following restriction:



At least 24 hours must elapse after the RO gives authorization for the SES to be tested, to allow time for the commissioning details to be distributed throughout the system.

- 7 Separately, the *SES* should be installed at the *SES* installation defined in the *Maritime Commissioning Application Form*.

Installing the SES

- 8 The person installing the *SES* should be experienced in installing electronic equipment, and familiar with the particular INMARSAT-C *SES* model. A summary of the installation procedure is given below, but for detailed information you are referred to the following publications:

- *INMARSAT-C Ship Earth Station Design and Installation Guidelines*.
- *Enhanced Group Call Receiver Design and Installation Guidelines*.

These publications may be obtained by completing the Publications Registration Form in Appendix G, and returning to Inmarsat at the address given.

The steps involved in installation are summarized below. If the *SES* installation is intended to be part of the *Global Maritime Distress and Safety System (GMDSS)*, see also the section *GMDSS considerations* on the next page.

- a At the installation defined in the *Commissioning Application Form*, locate the *SES* and peripherals where required.
- b Site the antenna so that it has an unobstructed view of the sky to the horizon, in all directions, and is not obstructed by, for example, the ship's structure, or nearby vessels, or, if you are near to the shore, by mountains, buildings or machinery.

(NOTE THAT THE ANTENNA'S VIEW TO A SATELLITE IS NOT AFFECTED BY ATMOSPHERIC CONDITIONS SUCH AS RAIN OR CLOUD, WHICH MEANS THAT YOUR INMARSAT-C SES CAN COMMUNICATE IN ALL WEATHER CONDITIONS.)

- c Make sure that the cables are the correct length and type. Especially make sure that the antenna cable is not too long, otherwise signal strength could be reduced.
- d Check that the power sources are the correct voltage for the *SES* and all of the terminal equipment. If using a battery, check that it is properly charged, and has the means of being re-charged.

- e Connect all peripherals to be used with the [SES](#).
- f **DO NOT YET SWITCH ON THE SES**, but wait until at least 24 hours have elapsed after receiving authorization from the [RO](#) to test the [SES](#).
- g Refer to the next section on [GMDSS](#), if applicable, and then proceed to step 9 below.

GMDSS considerations

If the [SES](#) installation is intended to be part of the *Global Maritime Distress and Safety System (GMDSS)*, and is to comply with the carriage requirements of the *Safety of Life at Sea (SOLAS) Convention*, the person installing the [SES](#) is advised to contact the National Administration of the country in which the vessel is registered, for the precise [GMDSS](#) requirements for that country.

Information on [GMDSS/SOLAS](#) requirements may be obtained from the *International Maritime Organization (IMO)*, at the address:

International Maritime Organization (IMO)
4 Albert Embankment
London SE1 7SR
U.K.
Tel: +44 71 735 7611
Fax: +44 71 587 3210
Telex: 23588 IMOLDN G

Testing the SES

- 9 **After a delay of at least 24 hours** from the time your national [RO](#) notifies you of the [IMN](#) assigned to your [SES](#), you may proceed to test the [SES](#), as outlined below. The test procedure involves performing a *Performance Verification Test (PVT)* (also known as the *link test*), to confirm that the terminal operates correctly, without causing interference to the system or to other users.
- a Before initiating the [PVT](#), the operator should make sure that the antenna still has an unobstructed view of the sky to the horizon in all directions.
 - b The operator should then select an ocean region where the [SES](#) is located at that time. (If the [SES](#) is in an area of overlap of more than one ocean region, the operator may select any one of those regions.) For more information, see the section [Selecting an ocean region and a CES](#) on page 3-1.
 - c To initiate the [PVT](#), the operator should key the commands as given in the manufacturer's instructions. The [PVT](#) should then proceed automatically.

(NOTE THAT THE PVT IS PERFORMED IN CONJUNCTION WITH AN INMARSAT-C CES, BUT THE OPERATOR DOES NOT NEED TO SELECT A CES FOR THIS PURPOSE, INSTEAD THE ACTION OF THE OPERATOR INITIATING THE PVT CAUSES THE SYSTEM AUTOMATICALLY TO SELECT A CES TO CONDUCT THE TESTS.)

- d Within a few minutes of the *PVT* being initiated, the *PVT* should commence automatically, and proceed under control of the *CES*, which will send messages requesting action from the operator.
- e During the *PVT*, the operator will be prompted to initiate a *test distress alert*. The operator should note the following important point about initiating the test distress alert:



During the *PVT*, when prompted to initiate a test distress alert, the operator must press the distress alert button(s) **WITHIN TWO MINUTES**, to initiate the test. If, however, the distress button is not pressed within two minutes, the *SES* will automatically issue a test alert, in order not to interrupt the *PVT*.

If the operator has not manually initiated the test distress alert within two minutes of being prompted, and instead the *SES* has automatically initiated the test alert, the operator **MUST NOT LATER INITIATE A MANUAL TEST DISTRESS**.

If the operator does wrongly initiate a manual test distress after the *SES* has automatically done so, then the Inmarsat system will **TREAT IT AS A REAL DISTRESS**, and will respond accordingly.

- f After the test distress alert has been initiated, the *PVT* should continue automatically to completion, and the operator should respond as requested.

Successful completion of the *PVT*

On successful completion of the tests, the *CES* sends confirmation to the operator that the *SES* is officially approved to access the INMARSAT-C system. See the section *After commissioning - duration of approval to access the INMARSAT-C* system for more information.

Before accessing the system, however, the operator should make the preparations described in *Chapter 3 Preparing to use your SES*.

Furthermore, for the first hour after receiving approval to access the system, the operator should communicate *only through the CES which performed the PVT* - this is to allow time for the information on the successful commissioning to be distributed throughout the system.

Unsuccessful completion of the *PVT*

If the *PVT* does not proceed within a few minutes of the operator giving the command, the operator should repeat the command to initiate the *PVT*.

The operator may make *up to three attempts* to initiate the *PVT*. If, however, the *PVT* still fails to start after three attempts, a fault may be present in the *SES*, and the system will automatically *bar* the *SES* from accessing the system (to ensure that the *SES* does not cause interference to the system or to other *SESs*).



If after three attempts, the PVT has not commenced, the operator should make *no more attempts to initiate the PVT* at this time, but should instead contact Inmarsat on the following address, for advice on further action.

**INMARSAT-C Commissioning Department
40 Melton Street, London NW1 2EQ, UK**

Telephone: +44 71 728 1518

Fax: +44 71 383 0152

Telex: (51) 888 152 LMSS G

EGC receive-only type SESs - arrangements for commissioning

Different commissioning arrangements apply to an EGC receive-only **SES** which is intended for receipt of FleetNETSM messages, and to an EGC receive-only **SES** which is intended for receipt of SafetyNETSM messages. These different arrangements are as follows:

Commissioning arrangements for an EGC receive-only SES intended for receipt of FleetNETSM messages

An EGC receive-only **SES** which is intended for receipt of FleetNETSM messages must be commissioned into the INMARSAT-C system, in order that it can be assigned a unique **IMN**. The system later uses the **IMN** to address the **SES** uniquely, and to download an *EGC network identification (ENID)* code for internal storage in the **SES**. Subsequently, the FleetNETSM Information Provider can send messages via the INMARSAT-C system, to be received only by those SESs that are storing the ENID code.

The initial part of the commissioning procedure for this type of EGC receive-only **SES** is similar to that described in steps 1 to 9 on pages 2-1 to 2-3. The subsequent procedure differs, however, after step 9, as follows:

- 10 An application must be made to one or more FleetNETSM Information Providers to register the **SES** into the ENID *Closed networks*.
- 11 In preparation for the system *Downloading* an ENID code, switch on the **SES** and synchronize it to the *NCS Common Channel*, as detailed in the manufacturer's instructions.
- 12 Await the system *Downloading* ENID codes into the **SES**. Your **SES** may give an indication when it is storing the ENID code.
- 13 Program the **SES** for receipt of FleetNETSM messages intended for the ENID groups. The section *Pre-programming an SES for FleetNETSM message reception* on page 6-8 gives more information.
- 14
- 15 This completes the arrangements for commissioning the **SES**, and registering it in the required ENID groups.
- 16 Note that no formal testing, such as a *PVT*, is required for an EGC receive-only **SES** to receive FleetNETSM messages. Instead, the **SES** operator should simply wait for the **SES** to receive FleetNETSM messages intended for the ENID groups. The operator should check that the messages are received correctly, and that they are displayed, printed and/or stored as expected.

Arrangements for preparing an EGC receive-only SES intended for receipt of SafetyNETSM messages

An EGC receive-only **SES** which is intended *only* for receipt of SafetyNETSM Maritime Safety Information (**MSI**) does not need to be commissioned formally into the INMARSAT-C system. (The reason for not requiring formal commissioning is that **EGC SafetyNETSM** broadcasts of **MSI** are intended for *open access* to all applicable SESs. So individual EGC receive-only SESs intended for SafetyNETSM reception are not registered into a **Closed network** (as for FleetNETSM), and therefore do not need to be assigned an **IMN** for **Downloading Closed network** information.)

To prepare the **SES** for receiving **EGC SafetyNETSM MSI** broadcasts, do the following:

- a Ensure that the **SES** is installed as detailed in the *Enhanced Group Call Receiver Design and Installation Guidelines*.
- b Switch on the **SES** and synchronize it to the **NCS Common Channel**, as detailed in the manufacturer's instructions.
- c Program the **SES** with the relevant geographical position and area information, as detailed in the manufacturer's instructions. The section *Pre-programming an SES for SafetyNETSM message reception* on page 6-6 gives more information.
This completes the arrangements for preparing the **SES** to receive Safety NETSM **MSI** broadcasts.
- d Note that no formal testing, such as a **PVT**, is required for an EGC receive-only **SES** to receive SafetyNETSM broadcasts. Instead, the **SES** operator should simply wait for the **SES** to receive **MSI** messages (or *Inmarsat system messages*), and check that the messages are received correctly, and displayed, printed and/or stored as expected. (For more information, refer to **Chapter 6 The EGC SafetyNETSM and FleetNETSM services**.)

After commissioning - duration of approval to access the INMARSAT-C system

After an **SES** has been successfully commissioned, it remains approved to access the INMARSAT-C system, without restriction, unless any significant changes occur in the **SES** status, as listed in **Table 2-1**. The possible consequences which may result from a change in **SES** status are as below:

- ❖ An **SES** may be *temporarily suspended* by Inmarsat, while, for example, it is being repaired. While it is suspended, the **SES** is *not permitted by Inmarsat to communicate over the INMARSAT-C system*, through any **CES**. When Inmarsat is satisfied that the reason(s) for the suspension are cleared, the suspension will be lifted, and the **SES** will again be permitted to communicate over the system.
- ❖ An **SES** may be *decommissioned* from the INMARSAT-C system, if a significant change occurs in the **SES** status, such as a *change of SES model*, a *change of country of registration*, or if the **SES** is *installed in another vessel*. When an **SES** is decommissioned, Inmarsat will not permit it to make calls of routine priority over the INMARSAT-C system (but will still permit it to make distress calls), until the necessary arrangements have been made, and the **SES** is *recommissioned*.

- ❖ An **SES** may be *barred* by a particular **CES**, if the **SES** is operated *seriously incorrectly*, for example, if its bills are not paid when due. That **CES** will not permit the **SES** to make routine priority calls through the **CES** (but will still accept distress calls from the **SES**). All other INMARSAT-C **CES**s will be informed of the barring, and each will decide individually on whether or not it will bar the **SES** from communicating through it.

Table 2-1 lists the actions which must be performed by the **SES** operator, and other parties, when the changes shown below occur. More information is given in the *Inmarsat Commissioning Procedures Manual*, available from the INMARSAT-C Customer Relations Officer, at the address in the front of this manual.

Table 2-1 Change of SES status, and related action

(The term '**SES Rep**' is used below for convenience, to mean either 'the commissioning **Applicant**, or 'the **SES** owner / licensee / operator', as appropriate.)

Change of **SES model (or any other significant change to an **SES**).** The **SES Rep** must inform the national **RO** in writing of the old **SES** model, including its **IMN** and the proposed date of the change (giving at least seven days notice). On the date of the change, Inmarsat will *decommission* the **SES** under its former model, and *recommission* it under its new model. The **SES Rep** should note that on the date of the change, the **SES** *cannot be used* for sending or receiving messages between the hours of 12.15 and 14.00 London time. At 14.00 hours London time, or later, the **SES** operator should *manually initiate a PVT*, referring if necessary to the manufacturer's instructions. If the **PVT** is completed successfully, as notified by the **CES** which conducted the tests, the **SES** may be used thereafter for communications, for the next hour *only through the **CES** that conducted the **PVT***, but subsequently through any **CES**. The national **RO** will inform the **SES Rep** if the **IMN** for the **SES** needs to be changed.

Change of country of registration (also known as 're-flagging'). If, for example, a vessel is sold with the **SES** still installed, the former **SES Rep** should notify the former **RO** in writing, giving details of the change. The new **SES Rep** must submit a new Commissioning Application Form to the national **RO** for the new country of registration, in order to have a new **IMN** assigned by that **RO** to the **SES**. The **RO** will also give the **SES Rep** permission to initiate a **PVT**, **after a delay of 24 hours** from the **RO** sending the notification. When the **SES** successfully completes the tests, it is permitted to access the INMARSAT-C system.

Removing the **SES from a vessel.** The **SES Rep** must inform the national **RO** in writing, giving details of the **SES** model, the vessel, and the proposed date of the change (giving at least seven days notice). On the date of the change, Inmarsat will *decommission* the **SES**.

(NOTE THAT WHEN AN **SES** IS DECOMMISSIONED, IT WILL NOT BE PERMITTED TO MAKE ROUTINE PRIORITY CALLS OVER THE INMARSAT-C SYSTEM, BUT WILL STILL BE PERMITTED TO MAKE DISTRESS CALLS.)

Installing the **SES in another vessel.** An **SES** which was decommissioned may be recommissioned if the proper arrangements are made, and the **SES Rep** completes and submits a new Commissioning Application Form to the national **RO** for the country of registration of the vessel. The **RO** will advise the **SES Rep** of the new **IMN** assigned to the **SES**, and give the **SES Rep** permission to initiate the **PVT**, **after a delay of 24 hours** from the **RO** sending the notification.

Change of Accounting Authority (AA) or Billing Entity (BE). The **SES Rep** must initially enquire with the national **RO** whether the proposed change in **AA** or **BE** is acceptable. If so, the **SES Rep** must confirm the change with the **RO** in writing, giving details of the new **AA** or **BE**, and the proposed date of the change. On that date, the Inmarsat system will update the information that it keeps in its **SES** databases. This change does not involve the **SES** being decommissioned or recommissioned, and does not require a new **PVT** to be performed.

Change of **SES answerback.** The **SES Rep** must inform the national **RO** in writing, giving details of the new answerback (4 letters, a - z, upper or lower case, no numbers), and the proposed date of the change. On the date of the change, Inmarsat will *decommission* the **SES** under its former model, and *recommission* it under its new model. **The **SES Rep** should note that on the date of the change, the **SES** cannot be used for sending or receiving messages between the hours of 12.15 and 14.00 London time.** At 14.00 hours, London time, or later, the **SES** operator should *manually initiate a PVT*, referring if necessary to the manufacturer's instructions. If the **PVT** is completed successfully, as notified by the **CES** which conducted the tests, the **SES** may be used thereafter for communications, but for the next hour *only through the **CES** that conducted the **PVT***, then through any **CES**. This change does not involve a change in **IMN** for the **SES**.

(Continued over)

Table 2-1 Change of SES status, and related action (contd.)

(The term '**SES Rep**' is used below for convenience, to mean either 'the commissioning **Applicant**, or 'the **SES** owner/licensee/operator', as appropriate.)

The SES Is malfunctioning, and causing system Interference. If a CES detects an SES which is causing system interference, the CES will notify the Inmarsat NCC, which will inform *all* CESs to suspend the SES from accessing the system, until further notice. Also, the CES which detected the interference will notify the Inmarsat Commissioning Department, who will notify the SES operator, licensee, and the national RO, about the SES malfunctioning and its suspension. The Commissioning Department will also advise the SES operator/licensee to have the SES repaired *within a specified period*, failing which the SES may be *decommissioned*. The RO will contact the SES operator to assist in having the SES repaired within the specified period.

To repair an SES, the SES operator should contact the SES agent/manufacturer - Table A-1 in Appendix A gives the manufacturer's addresses. When the SES has been repaired, the SES operator should inform the RO, who will make arrangements with Inmarsat to have new commissioning tests (*PVT*) performed on the SES, if necessary. When the SES successfully completes the PVT, the suspension will be removed, and the SES is permitted again to access the INMARSAT-C system.

An SES Is malfunctioning, but not causing system interference. When an SES is malfunctioning, and the Inmarsat Commissioning Department is advised of the malfunctioning (by, for example, a CES which monitors poor signal levels from an SES), the Commissioning Department will notify the SES operator, licensee, and national RO, about the SES malfunctioning. The Commissioning Department will also advise the SES operator to have the SES repaired *within a specified period*, failing which the SES may be *suspended* or *decommissioned*. The RO will contact the SES operator to assist in having the SES repaired within the specified period. To repair an SES, the SES operator should contact the SES agent/manufacturer - Table A-1 in Appendix A gives the manufacturer's addresses. When the SES has been repaired, the SES operator should inform the RO, who will make arrangements with Inmarsat to have new commissioning tests (*PVT*) performed on the SES, if necessary. When the SES successfully completes the PVT, any suspension will be removed, and the SES is permitted again to access the INMARSAT-C system. If the SES has been decommissioned, the SES Rep must complete and submit a new Commissioning Application Form, to apply to access the INMARSAT-C system again.

An SES Is in breach of other Inmarsat Terms & Conditions The SES Rep must rectify the problem, and inform the RO in writing. The RO will inform the Inmarsat Commissioning Department, who will notify the SES operator, licensee and RO, of the breach of the Terms & Conditions, and will request compliance by the SES Rep within a specified period, failing which the SES may be *suspended* or *decommissioned*, as determined by Inmarsat depending on the nature of the breach in the Terms & Conditions.

If the SES has been suspended, the suspension will be removed when the SES Rep complies with the Terms & Conditions, and informs the RO, who will notify the Inmarsat Commissioning Department to remove the suspension.

If the SES has been decommissioned, the SES Rep must complete and submit a new Commissioning Application Form to the national RO.

The SES Rep Is In dispute with an AA/BE or a CES. If an **SES Rep** is in dispute with an Accounting Authority (AA) or **Billing Entity (BE)**, because of, for example, non-payment of bills for communication charges through one or more CESs, the AA/BE or **CES(s)** may apply (through the national **RO**), to have the **SES** *barred* from communicating through the **CES(s)** involved, until the matter under dispute is settled. All other INMARSAT-C CESs will be informed of the barring, and each will decide individually on whether it will also bar the **SES**.

(NOTE THAT WHEN AN SES IS BARRED, IT WILL NOT BE PERMITTED BY THE CES(S) INVOLVED TO MAKE ROUTINE PRIORITY CALLS THROUGH THOSE CESS, BUT WILL STILL BE PERMITTED TO MAKE DISTRESS CALLS.)

An SES Is operated seriously Incorrectly, If, for example an SES is used to make 'nuisance calls', it may be barred from communicating through some, or all, CESs.

Any other significant change occurs In an SES status. If any other significant change occurs in an SES details, the SES Rep should inform the national RO, who will advise the SES Rep of any further action required.

(End of Table)

Chapter 3 Preparing to use your SES

Introduction

After your *SES* has been installed and commissioned as described in [Chapter 2](#), you may prepare your *SES* for use, as below. Note, however, the following precautions:



Check initially, and at frequent intervals, that your antenna has an unobstructed view of the sky to the horizon in all directions, and is not obstructed by the ship's structure, or by nearby vessels, or, if you are near to the shore, by, for example, mountains, buildings, or machinery.

(If, however, you have to communicate when your antenna's view to one satellite is obstructed, you may be able instead to select another satellite which is not obstructed. See below for details.)

Logging-in to an ocean region/NCS Common Channel

Your *SES* must be *logged-in* to an ocean region, before you can send or receive messages over the INMARSAT-C system. Logging-in informs the system that your *SES* is now available for communications, and causes your *SES* to tune to the *NCS Common Channel* for that ocean region. (When your *SES* is tuned to the *NCS Common Channel*, it is said to be *synchronized*, or *listening*, to the channel, or in *idle mode*.)

Some *SES*s perform a *Log-in* automatically when switched on, selecting the strongest *NCS Common Channel* signal. Other *SES*s do not perform an automatic *Log-in*, but must be logged-in manually to a selected ocean region/NCS. Refer to your manufacturer's instructions for how to perform a manual *Log-in*. If required to supply the NCS ID code, refer to Tables B-1 to B-4 in Appendix B. For information on selecting an ocean region, refer to the section below.

After a few minutes, your *SES* should indicate on the monitor that it has successfully logged-in to the selected ocean region, and show the received signal strength of the *NCS Common Channel*. The signal strength should be at least the minimum suggested by the manufacturer. If not, refer to the *Troubleshooting* section on page 3-8 for the action you should take.

Selecting an ocean region and a CES

In many parts of the world, the ocean regions covered by different satellites overlap. For example, [Figure 8](#) shows that the North Sea is covered by the AOR-West, AOR-East, and *IOR*. Within such an overlap zone, an antenna is in line-of-sight of the satellites for each of these ocean regions (provided the antenna is not obstructed), and the *SES* may be logged-in to any one of these ocean regions. You should be aware, however, of the following considerations before selecting an ocean region to *Log-in* to:

1 Can your shore-based correspondents contact you in the ocean region you select?

Your choice of ocean region may determine whether or not your shore-based correspondents can contact you. At present, while the INMARSAT-C system is developing, some countries do not yet have a *routing arrangement* between their national telecommunications authority and an INMARSAT-C *CES* in each ocean region. In those countries, although your correspondents are able to send you a message if you are logged-in to a particular ocean region, they may not be able to contact you if you are logged-in to a different ocean region. If this is so, and you have a choice of ocean regions, you should *Log-in* your *SES* to an ocean region that your correspondents can contact.

You should advise your correspondents to enquire with their national telecommunications authority whether they can send messages to INMARSAT-C SESs in all, or some, of the ocean regions, and to let you know the results. If, however, your correspondents find they cannot access all ocean regions through their national telecommunications authority, you could advise them that they may be able to send you messages in any ocean region, by registering with an INMARSAT-C *CES* in *another country*, which can route messages to all ocean regions. This access arrangement, known as *two-stage selection*, is explained (with other access arrangements) in the section *Conditions which must be met for shore-to-ship communications* on page 5-2.

(NOTE THAT, FOR WHICHEVER ACCESS ARRANGEMENT YOUR CORRESPONDENTS USE, THEY MUST KNOW THE IMN FOR YOUR SES, YOUR CURRENT OCEAN REGION, AND THE APPROPRIATE OCEAN REGION ACCESS CODE (TELEX OR TELEPHONE, DEPENDING ON THE METHOD OF ACCESS THEY USE). MAKE SURE THAT YOUR CORRESPONDENTS KNOW THIS INFORMATION. ALSO, IF YOU LOG-IN TO ANOTHER OCEAN REGION, CONSIDER SENDING YOUR CORRESPONDENTS A MESSAGE TO LET THEM KNOW YOUR NEW OCEAN REGION.)

2 Does the CES you select support the communications services you want?

Your choice of ocean region determines the CESs you can select, and the associated services and charges accessible from that *CES*. Tables B-1 to B-4 in Appendix B show the CESs in operation in each ocean region at the time of writing (December 1992). Table B-5 explains the communications services that a *CES* may support.

NOTE THAT SOME CESS OPERATE IN MORE THAN ONE OCEAN REGION, SO YOU MAY FIND THE CES THAT YOU PREFER, OPERATING IN THE OCEAN REGION YOU REQUIRE. TO FIND THE CESS OPERATING IN MORE THAN ONE OCEAN REGION, REFER TO TABLES B-1 TO B-4. NOTE THAT AS THE INMARSAT-C SYSTEM DEVELOPS, MORE CESS ARE EXPECTED TO BECOME OPERATIONAL - YOUR SES WILL BE UPDATED AUTOMATICALLY BY THE INMARSAT-C SYSTEM AS EACH NEW CES BECOMES OPERATIONAL. TO FIND OUT THE CESS CURRENTLY OPERATIONAL, DISPLAY ON YOUR SES THE CURRENT LIST OF CESS FOR EACH OCEAN REGION. CONSIDER UPDATING TABLES B-1 TO B-4 IN APPENDIX B WITH THIS INFORMATION.

To find out the services and charges supported by an individual *CES*, contact the *CES* Customer Service Contact, at the numbers given in Tables B-1 to B-4.

3 Do you want to receive Maritime Safety Information (MSI) for a particular NAVAREA/METAREA ?

The *NAVAREA/METAREAS*, as shown in *Figure 12*, receive both *scheduled* and *unscheduled* broadcasts of Maritime Safety Information (*MSI*), as follows:



For a given NAVAREA/METAREA which is covered by more than one ocean region, *scheduled broadcasts* of MSI, such as navigational warnings and weather forecasts, are made *only via a single nominated ocean region*. YOUR SES MUST BE LOGGED-IN TO THAT OCEAN REGION, TO RECEIVE SCHEDULED BROADCASTS OF MSI FOR THAT NAVAREA/METAREA.

For an NAVAREA/METAREA which is covered by more than one ocean region, *unscheduled broadcasts* of MSI, such as gale warnings and distress alert relays, are made via *all ocean regions* which cover the area concerned.

For example, *NAVAREA I*, which is covered by ocean regions AOR-West, AOR-East, and *IOR*, as shown in *Figure 12*, at the time of writing receives scheduled broadcasts of *MSI* only from the AOR-East. An *SES* requiring *MSI* for

that *NAVAREA* must be logged-in to, AOR-East. If, instead, the *SES* is logged-in to either the AOR-West or *IOR*, it would not receive scheduled broadcasts of *MSI* for that *NAVAREA*, even if it is located in *NAVAREA* I (the *SES* would, however, receive any *unscheduled* broadcasts of *MSI*, which are made via all of the ocean regions that cover that *NAVAREA*).

To find out which ocean regions make scheduled broadcasts of *MSI* for a given *NAVAREA*/METAREA - and the scheduled times of the broadcasts - you should refer to an up-to-date version of your national *List of Radio Signals*, or contact the *International SafetyNETSM Co-ordinating Panel*, at the address given on page 6-3.

SET THE AUTOMATIC SCAN ON YOUR SES:



After you have logged-in to an ocean region to receive scheduled broadcasts of *MSI* for a given ocean region, as described above, you must ensure that you *remain logged-in to that ocean region*. To do so, set the automatic scan facility on your *SES* to scan only that ocean region, by making it the *only preferred ocean region*. See the section *Automatic scan and log-in* below for more information.

Maintaining a distress communications channel

A similar precaution to the above, namely ensuring that you remain logged-in to a selected ocean region, applies when you make a distress call - then an *RCC* (*Rescue Co-ordination Centre*) establishes communications with your *SES*, using the *NCS Common Channel* for the ocean region you are logged-in to. To ensure that your *SES* remains tuned to this channel, you should set the *automatic scan facility* on your *SES* to scan *only the ocean region you are logged-in to*, as explained in the section *Automatic scan and Log-in* below.

Conflicting interests for selecting an ocean region

The above considerations may cause conflicting interests when you are selecting an ocean region to *Log-in* to. For example, the ocean region you would select for consideration 1, as suitable for your shore-based correspondents, may be different to your selection for consideration 3, for receipt of scheduled broadcasts of *MSI*. In these circumstances, you must decide which consideration has the higher priority, and select the appropriate ocean region. You could, for example, be logged-in for most of the time to the ocean region which is suitable for your correspondents, but approaching the scheduled time for an *MSI* broadcast, change your *Log-in* briefly to the ocean region for the *MSI* broadcast. At the end of the scheduled *MSI* broadcast time, you could *Log-in* again to the former ocean region.

Automatic scan and log-in

Your *SES* has a facility known as *automatic scan and Log-in*, which, when initiated, causes your *SES* to scan through a list of *preferred ocean regions*, searching for the *strongest NCS Common Channel signal*. The automatic scan facility may be initiated either automatically, every 24 hours from switching on or logging-in, or manually, by issuing a command from the *SES*. For details, refer to your *SES* manufacturer's instructions.

When the automatic scan facility finds a stronger NCS signal than your current ocean region *NCS Common Channel*, it automatically performs a *log-out* from your current ocean region *NCS Common Channel*, and performs a *Log-in* to the strongest NCS signal.

You must make sure that the automatic scan facility is set to suit your purposes. Typical situations are:

- ❑ As stated on the previous pages, and as explained in the section *Limitations on reception of EGC SafetyNET MSI in some areas*, on page 6-3, the amount of *MSI* that you receive may differ when logged-in to one ocean region, as compared to another. If you have logged into a particular ocean region to receive scheduled broadcasts of *MSI* for a particular *NAVAREA*, you should set the automatic scan facility on your *SES* to scan *only that ocean region*, by making it the *only preferred ocean region*. So doing ensures that your *SES* remains tuned to the NCS Common Channel for the ocean region, ready to receive further *MSI* broadcasts (so long as you remain within the ocean region).
- ❑ When you make a distress call, an *RCC* establishes communications with you, using the NCS Common Channel for the ocean region that you have selected. To ensure that your *SES* remains tuned to this channel, set the automatic scan facility on your *SES* to scan *only the ocean region you are logged-in to*, by making it the *only preferred ocean region*. So doing ensures that the *RCC* can continue to communicate with you (so long as you remain within the ocean region).
- ❑ If your shore-based correspondents can contact only particular ocean region(s), then set those as the preferred ocean region(s). See consideration 1 on page 3-1 for more information.
- ❑ If you want to continue communicating through a particular *CES*, because of, for example, its communications services and/or charges, then set your preferred ocean region(s) to be only the ocean region(s) in which that *CES* is operating. See consideration 2 on page 3-2 for more information.
- ❑ If you do not mind through which ocean region your *SES* communicates, then set the preferred ocean regions to *None* (so that your *SES* scans *all* ocean regions).

Features of the automatic scan facility

- ❑ A typical time for an *SES* to perform an automatic scan is 2 minutes per ocean region scanned. During this time, the *SES* cannot send or receive messages.
- ❑ If an *SES* travels out of the ocean region to which it is logged-in (and out of any other ocean regions defined in its list of preferred ocean regions), the *SES* will be unable to tune to any NCS Common Channel. The automatic scan facility will wait 10 minutes (in case the *SES* antenna is temporarily interrupted), and then initiate a scan of *all* ocean regions. Your *SES* will be unable to send or receive messages until it is again logged-in to an NCS Common Channel.
- ❑ When your *SES* performs a scan of the preferred ocean regions, and finds a stronger NCS Common Channel, it automatically logs-out from its current ocean region, and logs-in to the ocean region with the strongest signal. When this happens, your *SES* monitor displays a message informing you of the new ocean region, and the received signal strength.



Remember to do the following routine checks:

- 1 **On your SES monitor, check the ocean region you are logged-in to. If this has changed from the ocean region you were previously using, make sure that the new ocean region is suitable for your purposes, and for your correspondents, as explained in the section *Selecting an ocean region and a CES* on page 3-1. Remember that the *CES* you select in the new ocean region must support the communications services you want.**
- 2 **Consider informing your correspondents of your new ocean region, so that they can contact you when they want to.**
- 3 **Check that the signal strength indicated on your SES is above the minimum level recommended by the manufacturer.**

Keep your SES logged-in

Note the following important points about keeping your **SES** logged-in:



- 1 You should keep your SES logged-in at all times, so that your terminal is ready to send and receive messages at any time.
- 2 If you travel out of one ocean region, and into another, you must log-in to the new ocean region, as discussed in the next section.
- 3 If, however, you need to conserve power, and want to switch off your terminal, remember **ALWAYS TO LOG-OUT BEFORE YOU SWITCH OFF**. If you do not log-out before you switch off, you may lose messages.

Logging-in to a different ocean region/NCS Common Channel

As you travel towards the edge of an ocean region, the signal strength indicated on your **SES** may decrease. While the signal strength remains above the minimum set by the manufacturer, you can remain logged-in to that region, and can continue to communicate through the **CES** you have selected. If, however, the signal strength falls below the minimum, your **SES** will not be able to maintain communications via the satellite for that ocean region. To maintain communications, your **SES** must be logged-in to another ocean region/NCS with a stronger signal.

(NOTE THAT WHEN YOUR **SES** IS LOGGED-IN TO ANOTHER OCEAN REGION, THE **INMARSAT-C** SYSTEM AUTOMATICALLY LOGS OUT YOUR **SES** FROM THE PREVIOUS OCEAN REGION, SO YOU DO NOT NEED TO PERFORM A LOG-OUT FROM THAT OCEAN REGION.)

Your **SES** may be logged-in to another ocean region either manually, or automatically. To perform a manual *Log-in*, refer to the manufacturer's instructions. For information on automatic *Log-in*, see the section *Automatic scan and log-in* on page 3-3.

Logging-out when not using your SES

If you expect not to use your **SES** for a prolonged period, you are strongly advised to *log-out* before you switch your **SES** off. Logging-out transmits a signal to the NCS, informing it that your **SES** is no longer available for communications. The NCS in your ocean region updates its database with this information, and passes the information via the NCC to the other NCSs, and hence to all **CES**s, in all ocean regions. So, any selected **CES**, in any ocean region, knows not to accept calls for your **SES**. These elements of the system store the status of your **SES** as *logged-out*, until you *Log-in* again.

Some **SES**s automatically perform a log-out when the **SES** is switched off - check with your manufacturer's instructions whether your **SES** has this facility. Otherwise, if your **SES** does not have automatic log-out, or if you are not sure, **you should log-out every time before you switch off**.

The consequences of not logging-out before switching off your SES

If your **SES** is not logged-out before it is switched off, the databases in the **INMARSAT-C** system still hold the status of your **SES** as *logged-in*, because the system has no means of knowing that your **SES** is switched off.

If someone tries to send you a message, it will be routed via the public networks to the associated **CES**, which will try to deliver the message - the **CES** may try either for a pre-determined time, or for a certain number of attempts, depending on its policy, before it stops trying.

The **CES** will then send a *Non-delivery Notification* to the message originator (such as those shown in Table C-3 on Appendix C). Separately, the originator *may be charged* by the national/international telecommunications authorities for the time spent accessing the networks.

Remember the following advice:



To avoid the possibility of you missing important messages, remember always to log-out your SES before you switch it off.

Summary of recommended operating procedures

The following is a summary of recommended operating procedures when your **SES** is in regular use:

- 1 If possible, keep your **SES** switched on and logged-in to an ocean region at all times.
- 2 If you have to switch your **SES** off, make sure you log-out first.
- 3 At regular intervals, do the following:
 - Check on your **SES** monitor that your **SES** is logged-in to the ocean region you want, considering your requirements, and those of your correspondents, as discussed in *Selecting an ocean region and a CES* on page 3-1.
 - Check on your **SES** monitor that the received signal strength indication is above the minimum level recommended by your manufacturer, and the Bulletin Board Error Rate (**BBER**) is nearly zero. If they are not, refer to the *Troubleshooting* section on page 3-8 for advice.
 - Referring to *Figure 8*, check that your geographical position is within the ocean region you logged-in to. If you are travelling towards the edge of this ocean region, consider logging-in to an adjacent ocean region, or selecting the automatic scan option. See the section *Logging-in to a different ocean region/NCS Common Channel* on page 3-5 for more information.
- 4 Ensure that any printer connected to your **SES** is adequately supplied with paper, ribbon and/or ink for any messages that may be received.
- 5 Ensure that all equipment associated with your **SES**, for example navigational instruments, computers, printers, interfaces, data collecting sensors, and so on, are switched on and properly prepared for use.
- 6 If your **SES** is equipped with a hard disk/diskette, consider setting your **SES** to store all incoming messages on disk, for later examination. (Check also that the disk/diskette has sufficient storage capacity.)
- 7 If possible, prepare your message on your **SES** text editor before you send it. Consider saving the message as a file for later recall.

- 8 When sending a message to a telex terminal, *do not exceed 69 characters on any line* before entering a carriage return. (Some [SES](#) models allow you to select an option to limit the number of characters in a line, on other SESs, you will have to check the number yourself.) The reason for limiting the numbers to 69 characters per line is to avoid a problem which can occur with some telex terminals which malfunction or 'hang' on receiving a line with more than 69 characters. In this fault condition, this type of telex terminal does not return a *message received* indication to the [CES](#) which forwarded the message. This [CES](#) therefore attempts to re-send the message, and again does not receive a message received indication. After each unsuccessful delivery, the [CES](#) sends a *Non-delivery Notification* to the [SES](#). Depending on its policy, the [CES](#) may make several further attempts to deliver the message, until eventually the [CES](#) stops trying, and the message will not be delivered.
- 9 Consider saving messages as files to save later re-typing.
- 10 Consider storing commonly-used destination numbers in the [SES](#) memory, for ease of later recall. (You may also be able to give them names for ease of reference.)
- 11 You should inform the people who may need to contact you, the [IMN](#) assigned to your [SES](#), and the ocean region you are currently logged-in to (and also the ocean regions you may later [Log-in](#) to as your journey proceeds).
- 12 Check the size of your file before you send it - the size you may send may be limited, either by your [SES](#), or by the [CES](#) you select. For your [SES](#), check the manufacturer's instructions. For the [CES](#), check with the [CES](#) Customer Service Contact Point, at the numbers given in Tables B-1 to B-4.
- 13 Remember that you are generally charged by the *size of file* you send (and not by the time taken to transmit your message over the satellite system). For more information, see the sections from [Charges for communications services](#), page 5-14.
- 14 If you require notification that your message has been successfully delivered at its intended destination, select that option on your [SES](#) (provided the option is supported on your [SES](#), and also by the [CES](#) - note that this is sometimes a chargeable option supplied by some CESs.) To find out if a [CES](#) supports this option, and its charges, contact the [CES](#) Customer Service Contact Point at the numbers given in Tables B-1 to B-4. (Alternatively, you may prefer to rely on receiving a *Non-delivery Notification (NDN)* from the [CES](#), only in the event of your message *not being delivered*. All CESs provide this service without charge.)
- 15 Regularly check the Transmit Log, Receive Log, and EGC Log on your [SES](#), to make sure you know about all messages sent and received.
- 16 Some types of messages, for example SafetyNETSM Maritime Safety Information ([MSI](#)), may be sent frequently by the shore-based Information Provider, and could fill up the memory or disk storage capacity on your [SES](#) - if this occurs, your [SES](#) could lose messages, so remember to clear the storage regularly. Consider printing important messages to keep a permanent record.

Upgrading your SES software version

The services and facilities which you can access on your [SES](#) are determined by the *software version* stored in your [SES](#). If you have an early version of the software, you may not be able to access some services. You may be able to access these services, however, by upgrading the software version.

To find out if an upgraded software version is available, and the new services you can access with it, contact the agent who supplied your [SES](#), or the manufacturer directly at the address given in Table [A-1](#) in Appendix A.

The actions necessary to upgrade the software in your [SES](#) depend on the model -on some models you simply open the case and replace a few integrated circuits ('chips'), as explained in the manufacturer's instructions. Other models may need to be returned to the agent/manufacturer for upgrading.

Power supply considerations

You may want to know the power consumption of your [SES](#), in case your power resources are limited. Typical figures for the power consumption of your INMARSAT-C [SES](#) transceiver are given below. For exact figures, refer to the manufacturer's instructions.

SES transceiver in standby mode:	15W - 25W
SES transceiver transmitting or receiving:	60W - 100W

For the power consumption figures of the computer, printer or any other peripherals associated with your [SES](#), refer to the equipment manufacturer's information.

Troubleshooting

If the indicated signal strength on your [SES](#) is outside the manufacturer's limits, or if the Bulletin Board Error Rate ([BBER](#)) is consistently high, try the following:

- 1 Check if you have travelled outside the ocean region you are logged-in to. If so, you must [Log-in](#) to an ocean region with a stronger signal.
- 2 Ensure that your antenna is not obstructed from a line-of-sight view of the satellite, in all directions around the horizon, by, for example, the ship's structure or nearby vessels, or, if you are near to the shore, by mountains, buildings, machinery, or similar.
If you have to re-install the [SES](#), consider repeating the [PVT](#), to ensure that the [SES](#) is functioning correctly.
- 3 You may be able to send a test message to a [CES](#), to check your transmissions. To find out if a [CES](#) supports this option, contact the [CES](#) Customer Service Contact Point at the numbers given in Tables B-1 to B-4 in Appendix B.
- 4 Check your [SES](#) equipment for low battery voltage, damaged cables, loose connections, or water or humidity in the equipment.
- 5 If you suspect that your [SES](#) is not functioning correctly, contact the agent who supplied it, or the manufacturer directly, at the address given in Table [A-1](#), Appendix A.

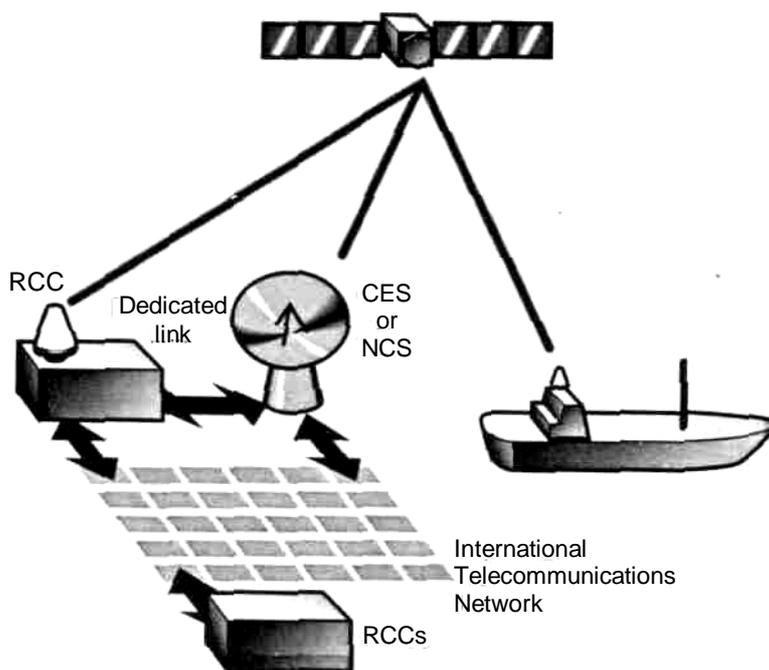
Chapter 4 Distress and safety service

Introduction

After your *SES* has been prepared for operation in the INMARSAT-C system, as described in *Chapter 3*, you can access a wide range of distress and safety services to help you avoid problems at sea, and to deal with any emergencies that arise.

Inmarsat satellite communications technology ensures that your distress or safety call gets through to specialized centres, regardless of atmospheric or weather conditions, or distance within an ocean region between your vessel and the centre. *Figure 11* illustrates the communication channels used in the INMARSAT-C system for distress alerts.

Figure 11 Distress alert communications channels to an RCC



The INMARSAT-C distress services

Using your *SES* you can make two different types of distress call automatically to a specialized Rescue Co-ordination Centre (*RCC*):

Distress alert - this contains a limited amount of information about your vessel, its position, and your distress circumstances. The information which should be included (if time permits) is listed in *Table 4-1*; some of this information may be obtained automatically from instruments or sensors, while other information may be entered manually. See the section *Sending a distress alert* on page 4-4 for more information.

Distress priority message - this allows you to send a complete text message, giving details of your emergency, and the help you require. See the section *Sending a distress priority message* on page 4-6 for more information.



Initially, you should send a distress alert to provide the rescue services quickly with summarized information on your distress circumstances.

Later, as search and rescue activities proceed, you may choose to send a distress priority message with more information on your situation, to assist the rescue services to co-ordinate activities.

Rescue Co-ordination Centres (RCCs)

The CESs and NCSs in the INMARSAT-C system are linked directly by dedicated landlines and/or automatic priority dial-up lines to land-based Rescue Co-ordination Centres (RCCs), to ensure that a distress call is routed reliably, and with top priority, to specialized rescue facilities. (The **RCC** linked to a **CES** is designated as *associated* with that station.)

The **RCC** is equipped with specialized facilities to organize search and rescue activities, co-ordinating with other rescue services as required. The RCCs are interconnected by international telecommunications networks to other RCCs located in different parts of the world. The RCCs may also be equipped with Inmarsat terminals which allow them to communicate with other RCCs and ships in your vicinity, if required, to ensure that you rapidly get the help you need.

Note the following important precautions about sending distress alerts:



The procedures described below for sending a distress alert or a distress message are general to all SES models. For the exact procedures for your SES, you should refer to your manufacturer's instructions.

YOU ARE ADVISED TO STUDY YOUR MANUFACTURER'S INSTRUCTIONS ON HOW TO SEND A DISTRESS ALERT OR A DISTRESS PRIORITY MESSAGE, BEFORE YOU NEED TO DO SO.



Incorrect use of the distress facility, caused either through equipment malfunctioning or operator action, could affect search and rescue operations by RCCs, and so threaten life.

Incorrect operation could also affect the operation of the INMARSAT-C system. If this occurs, Inmarsat could decide to *decommission* the SES, so preventing it from being used for normal communications (although the SES is still able to make distress alerts).

Re-commissioning involves the shipping company/owner having to re-apply to the national Routing Organization to *re-test* the SES. Until that is complete, the SES would not be available for use.

Table 4-1 Information which should be Included In a distress alert

Try to supply as much of the information listed below as you can in the time available, to enable the rescue services to get the help to you that you need, as quickly as possible.

If you cannot supply all of the information listed, you should still initiate the alert.

Information required	Comment
<i>SES IMN</i>	Entered automatically by the <i>SES</i>
<i>CES</i> Identity	Select preferably the nearest <i>CES</i> to your vessel in your ocean region. (You may, however, select <i>any CES</i> within your ocean region, if that <i>CES</i> can connect you to an <i>RCC</i> which can help you, for example, communicate in a language other than English.)
Ship position Latitude N/S & Longitude E/W	Entered either manually or automatically by the <i>SES</i>
Date & time of previous position update (<i>UTC</i>)	Entered either manually or automatically from instruments
Nature of distress	Enter one of the options: Unspecified Fire/explosion Flooding Collision Grounding Listing Sinking Disabled & adrift Abandoning ship Assistance required
Ship's course (0° - 359°)	Entered either manually or automatically from instruments
Ship's speed (knots)	Entered either manually or automatically from instruments

Sending a distress alert

You may send a distress alert automatically to an *RCC* either using your *SES* terminal, or by pressing the remote distress button(s), if provided with your *SES*. Sending an alert using your terminal is recommended because it allows you to provide up-to-date information on your distress circumstances. (The information sent when you press the remote distress button may be out-of-date, as explained below.)

How to send a distress alert using your *SES* terminal

- 1 Access the distress alert menus on your *SES* terminal - the procedure to do this depends on your particular *SES* model. If necessary, you should refer to the *SES* manufacturer's instructions for details.
- 2 You will be presented with a selection of menus which require information as listed in *Table 4-1*.

NOTE THAT SOME OF THIS INFORMATION MAY BE COMPLETED AUTOMATICALLY FROM INSTRUMENTS CONNECTED TO YOUR TERMINAL, WHILE OTHER INFORMATION MAY NEED TO BE COMPLETED MANUALLY.



Try to supply as much of the information listed in *Table 4-1* as possible in the time available, to enable the rescue centres to get the help to you that you need, as quickly as possible.

If you cannot, however, supply all of the information listed, you should still initiate the alert. You may later be able to send a further alert (or more detailed distress priority message) containing updated information.

- 3 If you are prompted by the *SES* menu, specify the distress type as *maritime*. Specify the *nature* of the distress from the selection on the menu, as in *Table 4-1*.
- 4 Select a *CES* within your ocean region, through which your distress alert is to be routed automatically to an *RCC* associated with that *CES*. You should select preferably the *nearest CES* to your vessel within your ocean region, to assist the search and rescue efforts by the *RCC*. (You may, however, select *any CES* within your ocean region, if that *CES* can connect you to an *RCC* which can help you, for example, communicate in a language other than English. If necessary, that *RCC* will forward your distress alert over the public networks to other *RCCs* that are located nearer to you.)

Figure 11 illustrates the *Communications channels* between the different elements of the system.



Ensure that you select a *CES* within the ocean region that you are currently logged-in to. If you fail to select a *CES* within your current ocean region (or if you select no *CES*), then your distress alert will be routed instead via the *NCS* for your ocean region, to the rescue services. This could take longer, and is to be discouraged.

Confirm, by pressing the appropriate key(s), that you want to send the distress alert. When you do so, the **SES** automatically transmits your distress alert via the selected **CES** to its associated **RCC**, which will initiate search and rescue activities. Your **SES** may give an indication that it is in distress mode, until it receives an acknowledgement from the **CES**, and then from the **RCC**.



If you do not receive an acknowledgement from both the CES and RCC within 5 minutes, repeat the distress alert.

Sending a distress alert using the remote distress button(s) provided with your SES

If circumstances do not allow you to use your **SES** terminal to send a distress alert, you may instead send a distress alert by pressing the special remote distress alert button (or combination of buttons), if provided with your **SES**.

(NOTE THAT THIS IS AN OPTIONAL EXTRA, AND MAY NOT BE PROVIDED WITH YOUR SES.)

As stated above, the information sent when you press the remote distress button(s) may be out-of-date, dating back to when the distress menus were previously updated. (Depending on your terminal, instruments may automatically update the ship's position, speed and course at regular intervals. If, however, the information is 24 hours or more out-of-date, the screen may display the status of the information as INVALID. This indication will change to VALID when the information is next updated.)

Note the following precautions about sending an alert using the remote distress button:



- 1 You may send an alert by pressing the remote distress button(s) whether or not your SES is engaged in sending or receiving a message, or any other function. If your SES is engaged in sending or receiving a message when a distress alert is initiated, the message is abandoned immediately, and the alert is initiated.**
- 2 You may also send an alert by pressing the remote distress button(s) whether or not your SES is logged-in to an ocean region. If, however, your SES is logged-out when the distress button is pressed, your alert will be routed via the NCS for your ocean region, to the rescue services. This could take longer, and is to be discouraged.**

In addition to the NCS routing your distress alert to an RCC, the NCS will also automatically enforce a log-in of your SES, to ensure that messages can be handled between your SES and a CES, using normal non-distress procedures.



It is in your own interests to keep your SES logged-in, ready to send or receive messages or distress alerts at all times.

To send a distress alert using the remote distress button, do as below:

- 1 Press the remote distress alert button - depending on the model, you may have to hold down the distress button for several seconds (typically 5 seconds). Your [SES](#) may give an indication that it is in distress mode, until it receives an acknowledgement from the [CES](#), and then from the [RCC](#).



If you do not receive an acknowledgement from both the CES and RCC within 5 minutes, repeat the distress alert.

- 2 If possible, send updated information about your distress circumstances by updating the [SES](#) distress menus and sending a distress alert from the [SES](#) terminal (or, alternatively, send a more detailed [Distress priority message](#), as described below).

Sending a distress priority message

A [Distress priority message](#) differs from a distress alert, in that you type in a distress message directly, using the [SES](#) text editor. Your message is not limited in size (except by the maximum file size set by your [SES](#) and the [CES](#)), but you are advised to keep it brief, to ensure rapid transmission to the rescue services.

Like a distress alert, a distress message is routed automatically through a selected [CES](#) to an associated [RCC](#).

To send a [Distress priority message](#), do the following:

- 1 Make sure that your [SES](#) is logged-in to an ocean region, and is synchronized to the NCS Common Channel.
- 2 Prepare your distress message on your [SES](#) text editor just like a normal text message (see [Chapter 5 How to access the INMARSAT-C communications services](#), and your [SES](#) manufacturer's instructions for more information on preparing a message). Leave blank the destination.
- 3 Include as much of the information listed in [Table 4-1](#) as you can.
- 4 Give details of the help you require. (Remember that the international language used for distress messages is English, although you may be able to communicate in another language if supported by the [RCC](#), as explained below.)
- 5 Set the message priority to *distress*.

- 6 Select a **CES** within your ocean region, through which your *Distress priority message* is to be routed automatically to an **RCC** associated with that **CES**. You should select preferably the *nearest CES* to your vessel within your ocean region, to assist the search and rescue efforts by the **RCC**. (You may, however, select *any CES* within your ocean region, if that **CES** can connect you to an **RCC** which can help you, for example, communicate in a language other than English. If necessary, that **RCC** will forward your distress alert over the public networks to other **RCCs** that are located nearer to you.)
- 7 You do not need to specify a destination, as all *Distress priority messages* are routed automatically by the selected **CES** to its associated **RCC**.
- 8 Confirm that you want to transmit the message. If so, you should now transmit the message, noting progress indications as the transmission proceeds.
- 9 Wait for an acknowledgement from the **CES**, and a message from the **RCC**.
- 10 If you do not receive an acknowledgement within 5 minutes from both the **CES** and **RCC**, send the message again.
- 11 **Remember to update your message as circumstances change.**
- 12 Note the following important warning:

WARNING - DISTRESS CALLS AND AUTOMATIC SCAN



DURING A DISTRESS CALL, SET THE AUTOMATIC SCAN ON YOUR SES TO SCAN ONLY YOUR CURRENT OCEAN REGION.

When you make a distress call, the INMARSAT-C system uses the NCS Common Channel for the ocean region you are currently logged-in to, to establish a communications channel from an **RCC** to your **SES**. To ensure that your **SES** remains tuned to this channel, set the *automatic scan facility* on your **SES** to scan *only the ocean region you are logged-in to*, by making it the *only preferred ocean region*. So doing ensures that the **RCC** can continue to communicate with you (so long as you remain within the ocean region).

For more information, refer to the section *Automatic scan and log-in*, on page 3-3.

What to do if you accidentally send a distress alert or distress priority message

If you *accidentally* send a distress alert or *Distress priority message*, you should wait for an acknowledgement from the rescue services, then send them a message explaining the circumstances. They will cancel the alert. Note, however, the caution:



Incorrect operation of an INMARSAT-C terminal, caused either by malfunctioning of the equipment, or operator action, could affect the system, or other users. If this occurs frequently, Inmarsat might decommission such a terminal, to prevent it from accessing the INMARSAT-C services.

The INMARSAT-C safety services

Depending on your *SES* model, you may be able to obtain a wide range of *navigational, weather and other safety services* from specialized centres. These services are available either by request, or through broadcasts, as below:

- By broadcasts of *Maritime Safety Information (MSI)*, from shore-to-ship, via the *EGC SafetyNETSM* service. For more information, see the section *The EGC SafetyNETSM Maritime Safety Information (MSI) service* below.
- By request from ship-to-shore for safety services, accessed using special *2-digit* codes. For more information, see the section *The 2-digit code safety services* on the next page.

The EGC SafetyNETSM Maritime Safety Information (MSI) service

The INMARSAT-C system has a special capability known as *Enhanced Group Call (EGC)*, which enables an authorized shore-based Information Provider to broadcast *Maritime Safety Information (MSI)* information, to *selected* groups of *SESs*.

The selected *SESs* may be within specified navigational areas (*NAVAREAS*), or meteorological areas (*Metareas*), or within a defined geographical area such as a circle or rectangle, for example around the scene of an emergency.

To receive EGC messages, an *SES* must have an *EGC receive capability*, which is tuned to that ocean region's NCS Common Channel, on which the *MSI* is being broadcast.

Table 6-1 lists the types of *MSI* which may be provided, but note the following comment about limitations on reception of *MSI* in some areas:



For a given NAVAREA / METAREA which is covered by more than one ocean region, *scheduled broadcasts* of *MSI*, such as navigational warnings and weather forecasts, are made *only via a single nominated ocean region*. *Unscheduled broadcasts* of *MSI*, such as gale warnings or distress alert relays, are made *via all ocean regions* which cover the NAVAREA / METAREA concerned.

TO RECEIVE SCHEDULED BROADCASTS OF *MSI* FOR A GIVEN NAVAREA/METAREA, YOUR *SES* MUST BE LOGGED-IN TO THE APPROPRIATE OCEAN REGION.

See consideration 3 on page 3-2 for more information.

Note also the following warning:

WARNING:



WHEN YOU WANT TO CONTINUE RECEIVING MSI FROM YOUR CURRENT OCEAN REGION, SET THE AUTOMATIC SCAN ON YOUR SES TO SCAN ONLY THAT OCEAN REGION.

If you have logged into a particular ocean region, in order to receive its MSI, then you should set the automatic scan facility on your SES to scan *only that ocean region*, by making it the *only preferred ocean region*. So doing ensures that your SES remains tuned to the NCS Common Channel, ready to receive further MSI broadcasts (so long as you remain within that ocean region).

For more information, refer to the section *Automatic scan and log-in*, on page 3-3.

The INMARSAT-C system is an element of the GMDSS

The access which the INMARSAT-C system provides to distress and safety services, as well as its global coverage and reliability, has resulted in the INMARSAT-C system, with its *Enhanced Group Call (EGC)* capability, being included in the *Global Maritime Distress and Safety System (GMDSS)*, by the International Maritime Organization (*IMO*).

[Chapter 6 The EGC SafetyNETSM and FleetNETSM services](#) gives more information on the role of the *EGC SafetyNETSM MSI* service in the *GMDSS*.

The 2-digit code safety services



At the time of writing (December 1992), the 2-digit code safety service is still being implemented at several CESs, and is not yet available for public use. As the system develops, however, this service will be available at a growing number of CESs.

To find out if a CES will be supporting the 2-digit code services, and when, and to find also the particular services which will be available, contact the CES Customer Service Contact Point, at the numbers in Tables B-1 to B-4 in Appendix B.

You should also check if your SES model can access the 2-digit code services, by referring to the manufacturer's information.

(Note that some CESs and manufacturers refer to the 2-digit codes more generally as 'special access codes', or 'SACs'.)

The INMARSAT-C 2-digit code safety services (plus other general services) are listed in [Table C-2](#) in Appendix C.

To access a 2-digit code service, do as follows.

(NOTE THAT THE PROCEDURE GIVEN IS GENERAL TO ALL SES MODELS - FOR THE EXACT PROCEDURE FOR YOUR SES, REFER TO YOUR SES MANUFACTURER'S INSTRUCTIONS.)

- 1 Select the 2-digit code facility on your **SES** as instructed in your manufacturer's information.
- 2 Using the **SES** text editor, prepare the message or request that you want to send.
- 3 Enter the 2-digit access code of the safety service required, as shown in Table C-2 in Appendix C. For example, to send a request for medical advice, enter code 32, while to send a weather report, enter code 41.
- 4 Select the **CES** in your ocean region which supports the 2-digit code service you require.
- 5 Transmit your message or request.
- 6 Wait for an acknowledgement from the **CES**, and, if an answer has been requested, a response from the service you have dialled.

(NOTE THAT THIS COULD TAKE SEVERAL MINUTES.)

Chapter 5 How to access the INMARSAT-C communications services

Introduction

After your *SES* has been prepared as described in [Chapter 3](#), you can use it to access the wide range of services available on the INMARSAT-C system, provided the conditions given below are met.

The first sections in this chapter tell you how to use your *SES* to send messages and data to any of the devices listed below, provided the conditions for ship-to-shore communications given below are met.

Later sections in the chapter tell how your correspondents, based at an office or home, can send you messages and data, using any of the devices listed below, provided the conditions for shore-to-ship communications given on page 5-2 are met.

The devices with which your *SES* can communicate are listed below, and illustrated in [Figure 4](#).

- A telex terminal connected to the international telex landlines.
- A fax terminal connected to the international *PSTN* (telephone) landlines. Your *SES* can send fax messages (text only) to any fax terminal on the *PSTN*. A shore-based fax terminal, however, can only send text messages *indirectly* to your *SES*, by accessing a third party *Fax bureau service*. Later sections explain the procedures.
- A computer connected to the international telex, *PSTN* or *PSDN* (X.25) landlines.
- An E-mail service on the international *PSTN* or *PSDN* (X.400) landlines.
- Dedicated equipment such as a data processing system, connected to a private network (such as a leased line).
- Any other Inmarsat mobile terminal.

The chapter also explains how charges for ship-to-shore and shore-to-ship calls are applied.

Conditions which must be met for ship-to-shore communications

For your *SES* to be able to communicate with any of the above devices, the following conditions must be met:

- Your *SES* must support the service required - to find out if your model supports the service now, or can be modified to do so by purchasing an upgrade kit, refer to the manufacturer's literature, or contact your agent or the manufacturer directly at the address given in [Table A-1](#) in Appendix A.
- Your *SES* must be logged-in to an ocean region, and be made ready to operate within the system as described in [Chapter 3](#).
- The *CES* selected must support the service required - to find this out, contact the *CES* Customer Service Contact Point at the numbers given in [Tables B-1 to B-4](#) in Appendix B.

- ❑ The shore-based equipment must be suitably equipped for the required service - advice on the hardware and software required may be obtained from the manufacturer, or from the [CES](#) Customer Service Contact Point, at the numbers given in Tables B-1 to B-4.

Conditions which must be met for shore-to-ship communications

Your correspondents, based at an office or home, can send text messages or data files to your [SES](#), using any of the devices listed on the previous page, provided one of the following means of access is available:

One-stage selection. In a country where an *Inmarsat access arrangement* exists between the national telecommunications authority and an Inmarsat [CES](#), shore-based subscribers may use the national public telecommunications networks to *direct-dial* an [SES](#) by its [IMN](#). The message is routed automatically via the public networks to an INMARSAT-C [CES](#), which forwards it over the Inmarsat satellite system to your [SES](#). See the section *Shore-to-ship access by one-stage selection* below for details.

Two-stage selection. In a country where no Inmarsat access arrangement exists, subscribers can become *registered users* of a [CES](#) in another country. See the section *Shore-to-ship access by two-stage selection* on page 5-3 for more information.

E-mail Service Provider. If both the shore-based correspondent and an [SES](#) owner subscribe to an international *E-mail service* (such as is provided by several INMARSAT-C [CESs](#), and some private organizations), they can interchange text messages and data files. See the section *Shore-to-ship access via an E-mail Service Provider* on page 5-3 for more information.

Mobile-to-mobile access. Provided national radio licensing regulations permit the use of a *land-based* Inmarsat mobile earth station ([INMARSAT-A](#), INMARSAT-C or [INMARSAT-M](#), and from 1993, INMARSAT-B), shore-based correspondents may install one at their premises, and interchange text messages and data files with an INMARSAT-C [SES](#). See the section *Mobile-to-mobile access* on page 5-4 for more information.

These various means of access are discussed below:

Shore-to-ship access by one-stage selection

This means of access requires an *Inmarsat access arrangement* to exist between the national telecommunications authority and an Inmarsat [CES](#). Under the terms of this arrangement, a shore-based subscriber initially prepares the message (text or data file) in a suitable format on the equipment to be used (for example a telex terminal or computer). The subscriber then accesses the public networks (telex, [PSTN](#) or [PSDN](#), depending on the arrangement), and uses a pre-defined dialling format to direct-dial an [SES](#) by its [IMN](#). So doing routes the message over the public networks to an INMARSAT-C [CES](#), which automatically forwards the message over the Inmarsat satellite system to the [SES](#).

Note the following comments about using this sort of access:

- ❑ Shore-based subscribers may send messages to any SESs which are logged-in to the ocean region(s) served by the **CES** involved in the access arrangement. To enable subscribers to send messages to SESs logged-in to another ocean region, a similar arrangement must exist with a **CES** which serves that ocean region. In many countries, such arrangements do exist, between the national telecommunications authority of the originating country, and the equivalent authority of another country which has an INMARSAT-C **CES** in the required ocean region(s). So a subscriber in any of these countries can direct-dial any INMARSAT-C **SES** which is logged-in to any of the four ocean regions.
- ❑ In some countries, however, the Inmarsat access arrangement may not provide access to *all* of the four ocean regions, but only to defined ocean regions. Subscribers based in such countries should find out which ocean region(s) they can contact, and advise the **SES** operators whom they want to contact, to remain logged-in, if they have the choice, to those ocean regions.

To find out about the Inmarsat access arrangement applicable within any particular country, subscribers should contact their national telecommunications authority directly, and ask for details of the Inmarsat access arrangement.

Shore-to-ship access by two-stage selection

In a country where no arrangement exists between the national telecommunications authority and an INMARSAT-C **CES**, a subscriber wishing to route messages over the public networks to an INMARSAT-C **SES**, may instead be able to register with an INMARSAT-C **CES** which is located in another country, and which provides access by two-stage selection.

Depending on the arrangement, a subscriber uses a pre-defined dialling format on the public networks (telex, **PSTN** or **PSDN**) to access the VAS Provider **CES**, giving the **IMN** and ocean region for the **SES** required. This **CES** then accesses the INMARSAT-C system, to forward the message to the **SES**. Typical access schemes which may be available include:

- ❑ *Registered User Access*, whereby the **CES** initially assigns a *user id* and *personal identification number (PIN)* to a subscriber. The subscriber subsequently uses a pre-defined dialling format to access the **CES**, and be given fast connection via the INMARSAT-C system to the **SES**.
- ❑ *Open Access*, whereby the subscriber has no personal identification number, but may access the **CES** whenever required, over the public networks.

Details of access schemes with individual **CEs** may be obtained by contacting the **CES** Customer Services Contact Point directly, at the numbers given in Tables B-1 to B-4 in Appendix B.

Shore-to-ship access via an E-mail Service Provider

If both a shore-based correspondent and an **SES** owner subscribe to an international E-mail service, they can interchange text messages and data files. These messages are stored in the E-mail Service Provider computer, for access by either party when required, using a pre-defined dialling format.

A growing number of INMARSAT-C CESs, and private organizations, are now providing an *E-mail service*. To find out which CESs offer this service, and details of the arrangements, contact the *CES* Customer Service Contact Point directly at the numbers given in Tables B-1 to B-4. To find out the private organizations providing an E-mail service, contact the INMARSAT-C Maritime Customer Relations Officer at the address in the front of this manual.

Mobile-to-mobile access

In some countries, permission must be obtained from the national radio licensing authority to operate a *land-based* Inmarsat mobile earth station (*INMARSAT-A*, *INMARSAT-C* or *INMARSAT-M*, and from 1993, *INMARSAT-B*). Provided this permission is granted, a shore-based correspondent may install an Inmarsat *MES* on their premises, and send and receive text or data messages with an *INMARSAT-C SES*.

For the particular access procedure, refer to the relevant Inmarsat User's Manual. (Section E) on page 5-7 explains how to use an *INMARSAT-C maritime SES* to send a message to another *INMARSAT-C mobile* - a similar method is applicable to using a *land-based INMARSAT-C mobile earth station* to send a message from land to another Inmarsat mobile.)

General advice for shore-to-ship communications

The following general points apply to shore-to-ship communications:

- ✓ Shore-based subscribers wanting to send messages to an *SES* must know the *IMN* (*Inmarsat Mobile Number*) of the *SES*, and the *ocean region* where it is currently logged-in.
- ✓ The *SES* operator should advise shore-based correspondents of the intended journey, and any expected change of the ocean regions to which the *SES* will be logged-in (considering the factors in choice of ocean region, as listed on page 3-1).

The INMARSAT-C ship-to-shore communications services

Provided the conditions for ship-to-shore communications listed on page 5-1 are met, your *SES* can access the following communications services:

- ✓ Store-and-forward messaging.
- ✓ E-mail services.
- ✓ *EGC SafetyNETSM* and *FleetNETSM* services.
- ✓ Data reporting, polling and *SCADA*.
- ✓ *Operator-assisted services* and value-added services.

These services are discussed in the following sections, but note the following point:



The following guidelines are general to all SES models - for the exact procedures for your particular model, you should refer to the manufacturer's instructions.

How to send a store-and-forward message from an SES to a destination on the international telecommunications networks

To send a store-and-forward text or data message to a destination on the international telex, *PSTN* or *PSDN* landlines, or to another Inmarsat mobile, do as below. If you experience any problems, you may obtain advice from the *CES* you select, at the *CES* Customer Service Contact Point, at the numbers given in Tables B-1 to B-4 in Appendix B, or from the INMARSAT-C Maritime Customer Relations Officer, at the address in the front of this manual.

- 1 Create your message using the terminal text editor, or edit an existing message.
- 2 Select transmit (send) mode.
- 3 Enter the destination - this may be either an existing destination, or a new destination in the general form:

Name (optional)	International dialling number	<i>Answerback</i> (Optional, but if used, must be an exact match for the destination.)
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The following sections, a) to e), show how you should insert the destination for different types of destinations:

a) Inserting the destination of a telex terminal on the international telex networks

a.1) The international dialling number of a telex terminal connected to the international *Telex networks*, has the form:

- ✓ *Telex country code*, as in Table C-1, Appendix C.
- ✓ *National telex number* for the telex terminal.

For example, the international dialling number for a telex terminal located in the UK (telex country code 51, see Table C-1), and national telex number 123456 ANSBCK G is 51123456. The complete destination for the telex terminal should be inserted as follows:

Name (optional)	International dialling number	<i>Answerback</i>
(Name)	51123456	ANSBCK G

a.2) Select the transmission type as *Telex*, to indicate that the transmission is to be via the international *Telex networks*.

a.3) Select the format as *Telex*, or as indicated on your SES¹.

Footnote 1: *The term 'format' used here is also known as the 'Presentation Code'. Some SESs and CESs use different terms for the formats, as listed below. (Note that some CESs may not support every format for particular communications services - see Table B-5 in Appendix B for more information.)*

Telex, also known as ITA2 (International Telegraph Alphabet 2). or 5-bit Packed. (This is an alphanumeric character set. based on 5-bit codes, which is generally used for sending text messages over the telex networks. Note that this character set supports only UPPER CASE characters, so any lower case characters entered on your SES will be received as UPPER CASE.)

ASCII, also known as **IA5** (International Alphabet 5). (This is an alpha-numeric character set, based on **7-bit codes**, which is generally used for sending text messages over the PSTN networks to a computer or fax terminal. This character set supports both UPPER and lower case characters, so any lower case characters entered on your SES will be received correctly.)

Data. This format, based on **8-bit codes**, is used to send binary-encoded data over the PSDN landlines, for example numerical data from instruments, encoded text from a word processor, or from software which supports national characters such as Arabic, Chinese, Japanese or Russian.

a.4) Proceed as in step 4 on page 5-9.

b) Inserting the destination of a fax terminal on the international PSTN landlines

b.1) You can send a text message to a *Group 3 type fax terminal* which is connected to the international *PSTN* (telephone) landlines, provided the *CES* selected supports *fax delivery*. The international dialling number for a fax terminal has the format:

- ✓ Telephone country code, as in Table C-1, Appendix C.
- ✓ National telephone number for the fax terminal.

For example, the international dialling number for a fax terminal located in London, UK (telephone country code 44, see Table C-1), and national telephone number (0) 71 123 4567 is 44711234567.

(NOTE IN THIS EXAMPLE THAT THE FIRST DIGIT OF THE NATIONAL TELEPHONE NUMBER IS EXCLUDED FROM THE INTERNATIONAL TELEPHONE NUMBER - FOR THE METHOD USED IN OTHER COUNTRIES, CONTACT A NATIONAL TELEPHONE OPERATOR.)

In this example, the complete destination for the fax terminal should be inserted as follows:

Name (optional) (Name)	International dialling number 44711234567	(An <i>Answerback</i> is not used in sending a message to a fax terminal.)
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b.2) Select the transmission type as *Fax*, and the format as *ASCII* or as indicated on your *SES* (see *Footnote 1*: on page 5-5).

b.3) Proceed as in step 4 on page 5-9.

c) Inserting the destination of a computer on the international PSTN landlines

c.1) You can send a text message to a computer which is connected by modem to the international *PSTN* (telephone) landlines. You can also access an E-mail service computer, as discussed in the section *Ship-to-shore access via an E-mail Service Provider* on page 5-10.

The international dialling number for a computer connected to the international *PSTN* landlines has the format:

- ✓ Telephone country code, as given in Table C-1, Appendix C.
- ✓ National telephone number for the computer.

For example, the international *PSTN* dialling number for a computer located in London, UK (telephone country code 44, see Table C-1), and national telephone number (0) 71 234 5678 is 44712345678.

(NOTE IN THIS EXAMPLE THAT THE FIRST DIGIT OF THE NATIONAL TELEPHONE NUMBER IS EXCLUDED FROM THE INTERNATIONAL TELEPHONE NUMBER - FOR THE METHOD USED IN OTHER COUNTRIES, CONTACT A NATIONAL TELEPHONE OPERATOR.)

In this example, the complete destination for the computer should be inserted as follows:

Name (optional) (Name)	International dialling number 44712345678	(An <i>Answerback</i> is not used in sending a message to a computer.)
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c.2) Select the transmission type as *PSTN*, and the format as *ASCII* or *data*, depending on whether the message to be sent comprises text or binary encoded data. For more information, see *Footnote 1*: on page 5-5.

c.3) Proceed as in step 4 on page 5-9.

d) Inserting the destination of a computer on the international PSDN (X.25) landlines

d.1) You can send a text or data message from your *SES* to a computer connected to the international *PSDN* landlines (also known as the *X.25 networks*). You can also access an E-mail service computer on the *PSDN* landlines, as discussed in the section *Ship-to-shore access via an E-mail Service Provider* on page 5-10.

The international dialling number for a computer connected to the international *PSDN* landlines is sometimes known as the *X.25 address*, or the *NUA (Network User Address)*, or the *DNIC (Data Network Identification Code)*.

For example, if the international dialling number of a computer on the *PSDN (X.25)* networks is 2345 1234567890, you should enter its complete destination as:

Name (optional) (Name)	International PSDN dialling number 23451234567890	(An <i>Answerback</i> is not used in sending a message to a computer.)
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d.2) Select the transmission type as *PSDN (or X.25)*, and the format as *ASCII* or *data*, depending on whether the message to be sent comprises text or binary encoded data. For more information, see *Footnote 1*: on page 5-5.

d.3) Proceed as in step 4 on page 5-9.

e) Inserting the destination of another Inmarsat mobile (SES or LMES)

e.1) You can send a text message from your *SES* to another Inmarsat *SES* (or *LMES*), provided the *CES* selected supports *ship-to-ship (also known as mobile-to-mobile) messaging* (see the section *How a ship-to-ship call is made*, on page 8-13, for more information). The method of addressing the remote *SES* depends on its type, as follows:

Inserting the destination of an INMARSAT-A, INMARSAT-B or INMARSAT-C SES:

At the time of writing (December 1992), you can send a message to an *INMARSAT-A* or *INMARSAT-C SES*, and during 1993, to an *INMARSAT-B SES*, by inserting its destination in the format:

- ✓ *Telex ocean region access code*, as in Table C-1, Appendix C.
- ✓ *IMN (Inmarsat Mobile Number)* for the *SES*.

For example, an *INMARSAT-A SES*, of *IMN* 1234567, and *Answerback* ANSBKA G, which is operating in the AOR-East (telex ocean region access code 581, see Table C-1) has an international dialling number of 5811234567. The complete destination for this *SES* should be inserted as:

Name (optional)	International dialling number	<i>Answerback</i> (optional)
(Name)	5811234567	ANSBKA G

As another example, an *INMARSAT-C SES*, 423456789 ANSBKC G, which is operating in the Indian Ocean Region (telex ocean region access code 583, see Table C-1) has an international dialling number of 583423456789. The complete destination for this *SES* should be inserted as:

Name (optional)	International dialling number	<i>Answerback</i> (optional)
(Name)	583423456789	ANSBKC G

(If you are not sure of the ocean region for the other *SES*, use the telex ocean region access code for the ocean region where you think the other *SES might be* at that time. If this is incorrect, the *SES* will inform you it has not been able to deliver the message, and you may try again with another telex ocean region access code. Some *SES*s automatically try another ocean region, without contacting you, but the message will be delayed while the *SES* is doing this.)

Inserting the destination of an INMARSAT-M SES:

From availability of the *INMARSAT-M* service, at the end of 1992, you can send a message to an *INMARSAT-M SES*, provided it is connected to a fax terminal or to a computer. To insert its destination, use the format:

- ✓ *Telephone ocean region access code*, as in Table C-1, Appendix C.
- ✓ *IMN (Inmarsat Mobile Number)* for the *SES*.

For example, an *INMARSAT-M SES*, of *IMN* 687654321 which is operating in the Pacific Ocean Region (telephone ocean region access code 872, see Table C-1) has an international dialling number of 872687654321. The complete destination for this *SES* should be inserted as:

Name (optional)	International dialling number	<i>(An Answerback is not used in sending a message to a fax terminal or computer.)</i>
(Name)	872687654321	

- e.2) Select the transmission type as *Mobile*, and the format as *Telex*, *ASCII* or *Data*, as appropriate to the message, and the terminal attached to the remote *SES*, (which could be, for example, a fax or computer terminal). See *Footnote 1:* on page 5-5 for more information.
- e.3) Proceed as in step 4 below.

Procedure after inserting the destination for your message

After you have entered the appropriate destination on the international networks, as in the previous sections, and specified the type of transmission and message format, you may proceed with the remaining steps:

- 4 Select the *CES* in your ocean region through which you want to send your message, considering the factors listed on page 3-1.
- 5 Select the *time* for the message to be sent (if selectable on your *SES*), or select immediate transmission, as required.
- 6 Select *routine priority*.
- 7 If required, select to receive *confirmation of delivery* of your message at the destination (provided the *CES* supports this option, and remembering that the *CES* may charge for this service).
- 8 Before issuing the command to send the message, check carefully that everything is correct.
- 9 Enter the command to transmit (send) your message.
- 10 Your *SES* should now start to transmit the message, and proceed automatically until complete. Within a few minutes the *CES* should return an acknowledgement that the message has been successfully received *at the CES*. (Note this is *not* the same as confirmation of delivery of the message at the destination.)
- 11 If you requested confirmation of delivery of your message *at the destination*, you should later receive this from the *CES* - normally the *CES* returns this confirmation within five to ten minutes. Note, however, the following comment:



When the CES is busy, it may take upwards of one hour to return confirmation of successful delivery of your message at the intended destination, although the message may have been delivered successfully within a few minutes of you sending it. Provided you have not received a *Non-Delivery Notification* from the CES within about ten minutes from you sending the message, you may presume that the message has been delivered successfully at its destination, and you should expect the confirmation to arrive eventually from the CES.

- 12 If, however, the *CES* is unable to deliver the message, it will send you a *Non-Delivery Notification (NDN)* about the problem, within about ten minutes from you sending your message. Table C-3 in Appendix C shows the codes used by some CESs, and their meanings.

(NOTE, HOWEVER, THAT NOT ALL CESs USE THE CODES IN TABLE C-3- SOME USE THEIR OWN WORDING, WHICH IS NOT DEFINED HERE - FOR EXAMPLE, YOU MIGHT RECEIVE THE FOLLOWING NDN FROM A CES:

NOT DELIVERED AFTER 6 ATTEMPTS DUE TO XXXX

SEVERAL DIFFERENT CONDITIONS MAY PRODUCE THIS REPORT, FOR EXAMPLE, "THE INTERNATIONAL NETWORKS ARE FAULTY", OR "THE DESTINATION NUMBER IS UNAVAILABLE". IF YOU RECEIVE SUCH A REPORT, YOU MAY HAVE TO INTERPRET ITS MEANING.)

Ship-to-shore access via an E-mail Service Provider

Provided your *SES* is registered with an E-mail Service Provider such as some INMARSAT-C CESs and private organizations, you can access a wide range of *E-mail services*, which allow you to interchange text messages and data files with subscribers to E-mail services throughout the world.

To find out the CESs which provide an E-mail service, and the access arrangement for the shore-based subscriber, contact the *CES* Customer Service Contact Point directly at the numbers given in Tables B-1 to B-4 in Appendix B. To find out the private organizations providing an E-mail service, contact the INMARSAT-C Maritime Customer Relations Officer at the address in the front of this manual.

To access an E-mail Service Provider computer, and read your mail or deposit a mail message for another subscriber, you simply insert the destination of the E-mail computer on the international *PSTN* or *PSDN* landlines, as described in sections c) and d) earlier, and send your message or instructions.

Receiving EGC SafetyNETSM MSI broadcasts

The *EGC SafetyNETSM* service involves shore-to-ship broadcasts of *Maritime Safety Information (MSI)* from authorized Information Providers. The service does not involve any ship-to-shore communications.

To receive *EGC SafetyNETSM MSI* broadcasts, your *SES* must have an *EGC receive capability*, which must be tuned to the NCS Common Channel for the appropriate ocean region. The *SES* operator should key in the current *position* and the *NAVAREAS* for which the *MSI* is required - if this information is not keyed in, the *SES* will receive *all MSI* broadcasts, of priority level² higher than routine, within the ocean region.

Footnote 2: *EGC SafetyNETSM broadcasts of MSI are made in one of four priority levels Routine, Safety, Urgent or Distress.*

Note the following important point about receiving EGC SafetyNETSM MSI broadcasts:



As explained in the section *Limitations on reception of EGC SafetyNETSM MSI* in some areas, on page 6-3, the amount of MSI you receive may differ when logged-in to one ocean region, as compared to another. At a critical time, such as during a search and rescue operation, or during bad weather, your SES should be logged-in to - and remain logged-in to - the ocean region that provides you with the MSI you require.

During this time, make sure that the automatic scan facility on your SES does not automatically log-in your SES to another ocean region, where you might not receive the MSI you require. See the section *Automatic scan and login option* on page 3-3 for more information.

See [Chapter 6](#) for more information on the EGC SafetyNETSM MSI service.

Receiving EGC FleetNETSM broadcasts

The EGC FleetNETSM service involves shore-to-ship broadcasts, typically of commercial information from authorized Information Providers. The service does not involve any ship-to-shore communications.

Initially, your SES must have an *EGC receive capability*, and have been registered with the FleetNETSM Information Provider, into its FleetNETSM *Closed network*. To receive FleetNETSM broadcasts, you should ensure that the SES is tuned to the NCS Common Channel for the appropriate ocean region, and the current position has been entered, either manually or automatically.

See [Chapter 6](#) for more information on the EGC FleetNETSM service.

Note the following precaution about receiving EGC SafetyNETSM or FleetNETSM broadcasts:



EGC SafetyNETSM and/or FleetNETSM messages may be broadcast frequently, and could fill up the storage capacity on your SES, possibly causing you to miss later messages. To avoid this happening, you should regularly check the *EGC Log* on your SES, and print and/or clear the messages.

Receiving Inmarsat system messages

To receive *Inmarsat system messages*, your SES must have an *EGC receive capability*, and be tuned to the NCS Common Channel for the selected ocean region. To receive system messages applicable to a particular geographical area, your SES should be updated with your current position - depending on your SES, this may be done automatically, or you may have to do it manually.

Using the data reporting and polling services and SCADA



At the time of writing (December 1992), a limited number of INMARSAT-C CESs support the data reporting and polling services, and the related application of SCADA. As the system develops, however, during 1993 and beyond, more CESs are expected to support the services.

To find out if a particular CES supports data reporting and/or polling, contact the CES Customer Service Contact Point directly, at the numbers given in Tables B-1 to B-4 in Appendix B.

The data reporting service

The data reporting service enables an *SES* to send short data reports, containing data collected by the terminal, to an operational centre for analysis.

To be able to send data reports, an *SES* must initially have been registered with the operational centre, which arranges data reporting network identification information, comprising a *Data Network Identification (DNID)* code, plus *Member number* within the network, to be downloaded into the *SES* memory. Subsequently, when the *SES* has a data report to send, the *SES* must include the appropriate DNID information in the report. Depending on the terminal and type of data report (whether unreserved, programmed unreserved, or reserved), the DNID information may be pre-set into the *SES*, or entered manually by the *SES* operator at the time of sending the report.

If the data reports require the vessel's geographical position to be updated regularly, the operator should ensure that the appropriate arrangements are made -depending on the terminal, this may be done automatically, by an electronic navigation system, or manually, by the operator. For information on how to enter data into a report, the operator should refer to the supplied instructions.

The polling service

The polling service enables an operational centre to send polling/control commands over the INMARSAT-C system, addressed to *selected* *SESs*, instructing them to perform a defined task, for example '*commence sending data reports*'.

The operator should ensure that the terminal has initially been registered with the operational centre, and is storing the appropriate DNID information. Also, the operator should ensure that the terminal is prepared for operating in the INMARSAT-C system as described in [Chapter 3](#).

The SCADA application

The application *SCADA* (*supervisory control and data acquisition*) combines data reporting and polling, as outlined above. To perform a *SCADA* application, an *SES* must be interfaced via a suitable controller and monitoring sensors/control devices to the system under control, and be programmed to perform pre-defined tasks.

Data collected from the system is transmitted in *data reports* by the *SES* to an operational centre or office. This centre analyzes the data received, and responds by returning *polling/control commands* via the *SES* to the system to perform required actions.

For example, an *SES* may be interfaced and programmed to send data reports on the status of a remote lighthouse to an operational centre. This centre may respond by instructing the *SES* to send signals to the controller to operate various equipment, performing functions at the lighthouse, as directed by the centre.

As above, the *SES* must initially have been registered with the operational centre. Subsequently, the operator action required depends on the system - for example the operator should ensure that the terminal, sensor and control equipment is operating correctly, and the *SES* is receiving the NCS Common Channel.

For more information, refer to [Chapter 7 Data reporting, polling and SCADA](#).

Operator-assisted services and value-added services

From your *SES*, you can obtain a selection of *Operator-assisted services*, and *value-added services*, as listed below. At the time of writing (December 1992), a limited number of INMARSAT-C CESs, and other organizations, are offering these services. During 1993 and later, more CESs and other parties are expected to offer these services.

To find out more about the services being offered, contact the CESs directly, at the numbers given in Tables B-1 to B-4 in Appendix B, or contact the INMARSAT-C Customer Relations Officer at the address in the front of this manual.

Operator-assisted services

Some *Operator-assisted services* offered by CESs are listed below:

- You send a text message from your *SES* to an operator, to be forwarded as a *voice message* to a telephone number, answering machine, or voice mail-box.
- You send a text message from your *SES* to an operator to be posted through the mail as a *telex message*.
- You can send a text message from your *SES* to an operator to be forwarded as a *telex/voice/morse message* to an MF or HF transceiver.
- The operator will inform you of the *delivery status* of a message you have sent.
- The operator will attempt *deferred delivery* of a message from your *SES* to a destination on the international networks, if not initially delivered.
- Directory services* - the operator will find you a number on the national international networks.
- Translation services* - the operator will arrange to have your text translated into another language, and forwarded to a specified destination.
- Access to databases* - the operator will find the information you require, and call you back.

Value-added services

Some of the *value-added services* (VASs) provided by a growing number of INMARSAT-C CESs include:

- ❑ Providing shore-to-ship access by *two-stage selection*, for subscribers in a country where no Inmarsat access arrangement exists with the national telecommunications authority. See the section *Shore-to-ship access by two-stage selection* on page 5-3 for more information.

Other value-added services which are provided by several CESs, and some private organizations, are listed below:

- ❑ *E-mail services*, enabling your [SES](#), and your shore-based correspondents, to access the international E-mail networks, to interchange text messages and data files with subscribers all over the world. See the sections *Shore-to-ship access via an E-mail Service Provider* on page 5-3, and *Ship-to-shore access via an E-mail Service Provider* on page 5-10 for more information.
- ❑ *Fax bureau services* - see the section *Shore-to-ship (text only) Fax bureau services* below for more information.
- ❑ *2-digit code services*, allowing your [SES](#) to access a wide range of special safety and maritime services. See the section *The 2-digit code safety services* on page 4-9 for more information.

To find out the value-added services provided by a particular [CES](#), contact the [CES](#) Customer Service Contact Point directly at the numbers given in Tables B-1 to B-4 in Appendix B. To find out the private organizations which are offering a range of value-added services, contact the INMARSAT-C Maritime Customer Relations Officer at the address in the front of this manual.

Shore-to-ship fax bureau services (text only)

The INMARSAT-C system supports an [SES](#) sending a message to a fax terminal on the international [PSTN](#) landlines, as described in section b) on page 5-6. The system does not, however, support a fax terminal sending a message *directly* to an [SES](#). To achieve shore-to-ship fax messaging, the shore-based fax operator must use a *Fax bureau service (text only)*.

Some INMARSAT-C CESs, and other organizations, are offering such a *Fax bureau service*, whereby the fax terminal operator sends a fax message (text only, typed or in clear hand-writing) to the fax bureau, and including the [IMN](#) and ocean region for the [SES](#). In the fax bureau, the message is read and re-typed by an operator, and forwarded as a *store-and-forward message* over the INMARSAT-C system to the [SES](#).

To find out which CESs, or other organizations, are offering a *Fax bureau service*, contact the INMARSAT-C Customer Relations Officer at the address in the front of this manual.

Charges for communications services

Ships of different nationalities, travelling across international waters, and communicating with subscribers in different countries, each with its own national currency, create unique problems in billing and settling communication charges.

To deal with these problems in the days of conventional HF/MF radio communications, the maritime industry devised a special billing and settlement process. This process has proved to be suitable for application to satellite communications, and so has been used by Inmarsat as the basis of the process.

The following sections explain the Inmarsat billing and settlement process, from a ship sending a message on its INMARSAT-C terminal, to the owner/shipping company receiving and settling the bill.

Ship-to-shore calls - a summary of the INMARSAT-C billing and settlement process

The INMARSAT-C billing and settlement process used for ship-to-shore messages is summarized as follows:

- 1 When completing the Maritime Commissioning Application Form, an Accounting Authority (AA) must be nominated, to act as an intermediary for billing and settlement between the owner/shipping company and all CESs through which the **SES** communicates. A list of Accounting Authorities which are approved for the country of registration is published by the **ITU** (in its *List of Ship Stations*), available from the national Routing Organization.
- 2 Optionally, in addition to indicating an Accounting Authority on the Commissioning Application Form, an owner/shipping company may also nominate a **Billing Entity (BE)** as an alternative method of billing. The Billing Entity must be approved by the Routing Organization.
- 3 An **SES** sending a message involves several different telecommunications elements, for example the satellite link to a **CES** (the *Inmarsat space segment*), the **CES**, public switched telecommunication networks in one or more countries, and a telecommunications switching centre.
- 4 When an **SES** sends a message through a **CES**, the **CES** checks its database to find the **Accounting Authority Identification Code (AAIC)** and/or the Billing Entity acting for the **SES**.
- 5 The **CES** calculates the cost of using all of the elements involved in the call, and makes a total charge for the call, based on the charging policy which it applies. (Individual CESs generally publish a directory of their services and charges, which may be obtained from the **CES** Customer Service Contact Point at the numbers given in Tables B-1 to B-4 in Appendix B.)
- 6 Typical factors used by a **CES** in charging for a call are listed in the section *Factors involved in the cost of sending a ship-to-shore message* on page 5-17.

- 7 When the **CES** has established a total cost of the call, it bills that cost to the AA or BE acting for the **SES** which made the call.
- 8 If the **SES** sent messages through other CESs, a similar procedure occurs, with each **CES** passing the total cost for the messages sent by the **SES** through that **CES** to the one AA/BE.
- 9 The AA/BE must settle with the CESs.
- 10 The AA/BE consolidates all bills from the different CESs used by an **SES** over a given period. Also, if there are several ships in a shipping company, the AA/BE consolidates the bills for all the ships in the company.
- 11 The AA/BE bills the owner/shipping company for the total consolidated amount, plus its own AA/BE charge.
- 12 A common practice on ships is for a member of the ship's staff (usually the Radio Officer) to compile a *monthly abstract* of the outgoing calls, with a calculated cost for each call. This abstract is sent to the AA, which bills the ship owner. The ship owner pays the AA against this abstract, thus ensuring quicker settlement of the bills. Meanwhile, the AA awaits the actual bills from the **CES**(s) for the calls, and if the AA finds any differences with the costs in the ship's abstract, it bills the ship owner for the balance.
- 13 To ensure that ship's staff can continue this method, if desired, integrating their INMARSAT-C calls with other forms of communications such as MF or HF, the next section *Factors involved in the cost of sending a ship-to-shore message*, explains how INMARSAT-C calls are charged. Later sections give examples of INMARSAT-C call charges.
- 14 The owner/shipping company must settle with the AA/BE under the terms and conditions agreed with that organization. (For more information, see the section *Methods of settling ship-to-shore communications charges* on page 5-18.)
- 15 Separately, Inmarsat bills the CESs for the use of the space segment, and the CESs must settle with Inmarsat.

Note the following points which apply to an owner/shipping company settling its communications charges:



Inmarsat is *not involved* in the billing process between an SES owner / shipping company, and its Accounting Authority/Billing Entity. Any queries which an owner/shipping company has, relating to communications charges, should be referred initially to the AA/BE. If required, the AA/BE should refer any queries to the appropriate CES Customer Service Contact Point, at the numbers given in Tables B-1 to B-4 in Appendix B.



Failure of an owner/shipping company to settle its bills with its AA/BE within the agreed period may result in the CES involved barring the SES(s) involved from using its communications services.

(Distress calls, however, will not be barred.)

Factors involved in the cost of sending a ship-to-shore message

A question often asked is "How much does it cost to send a message via the INMARSAT-C service?" There is no direct answer to this, the cost depends on several different factors, including:

The CES charge

The **CES** through which a message is routed generally bases its charges on two elements - a *service charge*, for the communications service used (including the use of the Inmarsat space segment), and a *landline charge*, for routing the message over the national/international telecommunications networks to the destination. The examples on page 5-19 illustrate the charges.

The service charge: The **CES** makes a service charge which depends on the communications service used by the **SES**, for example sending a store-and-forward message to a destination on the telex, **PSDN** (X.25), or fax (**PSTN**) landlines, or sending a data report to an operational centre on an unreserved, programmed unreserved, or reserved basis.

The **CES** generally bases its service charge on the *size of message*, and a *unit charge* - some CESs apply a unit charge of *1 kilobit* (or 1 kbit, or 1024 bits), other CESs apply a unit charge of a *quarter kilobit* (256 bits). In addition, some CESs apply a fixed charge for each message.

(The size of a message is displayed on some SESs in *bits*, and on other **SES** in *characters* or *bytes*, where a *character* is defined as a letter, number, or any other symbol on the keyboard, and is represented by 1 byte, which comprises 8 bits). These different units of size are related:

1 character = 1 byte = 8 bits

1 kilobit = 1024 bits = 128 bytes or characters

To find out the particular charging method applied by a **CES**, contact the **CES** Customer Service Contact Point at the numbers given in Tables B-1 to B-4.

A comparison of message sizes for different forms of communications is given in an Inmarsat Fact Sheet *What is a kilobit?*, which is available from the INMARSAT-C Customer Relations Officer at the address in the front of this manual.

The landline charge: CESs may additionally apply a *landline charge* for routing a message from the **CES**, over the national/international telex, **PSDN** or **PSTN** landlines, to the required destination.

Some CESs base their landline charges on the *she of* a message, other CESs base their landline charges on the *length of time* taken to deliver the message over the national/international networks to its destination (generally using a conversion factor for telex transmission over landlines as 400 characters per minute).

To find out the particular charging method used by a CES, contact the CES Customer Service Contact Point directly at the numbers given in Tables B-1 to B-4 in Appendix B.

Generally, using either method, CESs apply zero landline charges for routing a message to a destination *within the country of the CES* (and some CESs also apply zero landline charges, or reduced rates, for routing a message to other countries with which their telecommunications authority has a routing arrangement).

Some CESs offer preferential terms for sending multiple messages in one connection, or for sending a single message to multiple destinations.

Accounting Authority/Billing Entity charge

An Accounting Authority or Billing Entity adds its charge for its administration services. Typically this charge is around 10% of the CES charge.

Methods of settling ship-to-shore communications charges

The owner/shipping company must settle with the AA/BE under the terms and conditions agreed with that organization.

Payment by credit card

It may be possible to pay your communications charges by some of the major credit cards, (Visa, Mastercard, Diners Club, etc.), subject to the agreement of your national Routing Organization and AA/BE.

Currencies and exchange rates used in settling bills

To overcome problems of bills being issued or settled in many different currencies, some CESs use special *nominal* accounting currencies, such as the *Special Drawing Right (SDR)*, or the *Gold Franc (GF)*. Other CESs use international currencies such as the US\$ or GB£.

An AA/BE bills an owner/shipping company in one or other of these currencies. To settle the bill, the owner/shipping company must convert the balance due into a currency of payment agreed with the AA/BE. The exchange rate used should be that published by the IMF on the day prior to payment, or the most recently published rate. Daily exchange rates for these currencies are published in many newspapers, for example *Lloyd's List* and the *Financial Times*.

As a guide, on 25 November 1992, 1 SDR was worth US\$1.38612. The SDR is *always at a fixed rate against the Gold Franc* of 1 SDR = 3.061 GF.

So on that date, 1 GF = US\$(1.38612 divided by 3.061) = US\$0.4528324

(ALTERNATIVELY, SOME AAS APPLY AN AVERAGE EXCHANGE RATE OVER A PERIOD OF SEVERAL DAYS.)

Example 1

An **SES** sends a text message of total size 400 characters (approximately equivalent to an average radio telex message of one minute), to a telex terminal located in the same country as the **CES** selected. This **CES** applies a service charge for a store-and-forward telex message of 0.80 SDR per kilobit, in units of 256 bits (= 1 quarter kilobit). The **CES** applies zero landline charges for delivery to a telex terminal within its country. (See **Footnote 3**: for a comment on these charges.)

The message size of 400 characters = 400 x 8 bits = 3200 bits. This represents 3.25 kilobits to the next higher quarter kilobit unit.

CES charge:

Service charge on 3.25 kilobits @ 0.80 SDR per kilobit SDR	2.60
Landline charges within country	<u>0.00</u> SDR
Total CES charge	2.60 SDR (plus AA surcharge)

(TO RELATE THIS COST TO AN INTERNATIONAL CURRENCY, USING THE EXCHANGE RATE ON THE PREVIOUS PAGE OF 1 SDR = US\$1.38612, THIS CES CHARGE REPRESENTS A COST OF US\$3.60 (PLUS AA SURCHARGE)).

Example 2

An **SES** sends a data file of size 3.3 kilobits to a computer destination in a country outside that of the **CES** selected. This **CES** applies a fixed charge per message of 0.5 GF, plus service charge of 2.0 GF per kilobit for X.25 store-and-forward messaging, plus a landline charge to the destination country of 0.3 GF per kilobit. (See **Footnote 3**: for a comment on these charges).

The message size of 3.30 kilobits represents 3.50 kilobits to the next higher quarter kilobit unit.

CES charge:

Fixed charge	0.50 GF
Service charge on 3.50 kilobits @ 2.0 GF per kilobit	7.00 GF
Landline charges to the destination country on 3.50 kilobit @ 0.3 GF per kilobit	<u>1.05</u> GF
Total CES charge	8.55 GF (plus AA surcharge)

(TO RELATE THIS COST TO AN INTERNATIONAL CURRENCY, USING THE EXCHANGE RATE ON THE PREVIOUS PAGE OF 1 GF = US\$0.4528324, GIVES A TOTAL CES CHARGE OF US\$3.87 (PLUS AA SURCHARGE)).

Footnote 3: *The figures used in these examples are for illustration only, and do not necessarily represent actual charges made by any particular CES.*

Shore-to-ship calls - a summary of the INMARSAT-C billing processes

The billing processes used for shore-to-ship calls are different to those used for billing ship-to-shore calls, and depend on the particular type of access. When a shore-based subscriber makes a call, (for example sending a telex message, or a FleetNETSM message to an [SES](#), or polling an [SES](#)), several telecommunications elements are involved. These elements, and the costs involved, depend on the type of access, as summarized below:

Shore-to-ship access by one-stage selection (see page 5-2 for a definition) - for this type of access, a *landline charge* is applied, generally based on the time that the call is accessing the national/international telecommunications networks, while the [CES](#) involved is forwarding the call over the INMARSAT-C system to the [SES](#).

The national telecommunications authority charges for the call at the rate it applies to Inmarsat calls. Generally, the authority adds this charge to the normal telecommunications bill, which it sends to the subscriber, adding national taxes as appropriate. The subscriber must settle the bill with the national authority as for a normal telecommunications bill. (Note that no AA or BE is involved in shore-to-ship billing.)

Shore-to-ship access by two-stage selection - the charging method used for this type of access depends on the arrangement which the correspondent has with the [CES](#) involved - whether the correspondent has *Registered User Access*, or *Open Access* (see page 5-3 for definitions):

Registered User Access - for this type of access, the charging method generally involves two elements:

- ❑ A *landline charge*, based on the time taken to route the call over the national/international telecommunications networks to the [CES](#) involved. The national telecommunications authority adds this charge to the normal telecommunications bill, which it sends to the subscriber, adding national taxes as appropriate. The subscriber must settle the bill with the national authority as for a normal telecommunications bill.
- ❑ A [CES service charge](#), for forwarding the message over the INMARSAT-C system. The [CES](#) generally bases its charge on the *size of the message* sent, and bills the registered subscriber directly, under the terms of the registration agreement. (In addition to individual [CES](#) service charges, the subscriber may also have to pay an annual registration fee with the [CES](#).)

Open Access - this type of access generally involves a landline charge and a [CES](#) service charge (as for a Registered User, as above), but because no direct billing arrangement exists between the correspondent and the [CES](#), the [CES](#) passes its charge to the correspondent's national telecommunications authority. This authority adds the charge to the subscriber's normal telecommunications bill, adding national taxes as appropriate. The subscriber must settle the bill with the national authority as for a normal telecommunications bill. (Note that no AA or BE is involved in shore-to-ship billing.)

Shore-to-ship access via an E-mail Service Provider - this type of access generally involves two elements of charge:

- ❑ A charge made by the E-mail Service Provider under the terms of the arrangement with the subscriber.
- ❑ A charge made by the INMARSAT-C [CES](#) for the call via the INMARSAT-C system.

Mobile-to-mobile access - this type of access is charged as for a ship-to-shore call, as explained in the section *Factors involved in the cost of sending a ship-to-shore message* on page 5-17 (except when using the one [CES](#), no landline charges are involved.)

As well as the above charging methods, some CESs may offer preferential terms for sending multiple messages in one connection, or for sending a single message to multiple destinations.

For details of the charging policy applied by a national telecommunications authority, a subscriber should contact the authority directly.

For details of the charging policy applied by a [CES](#), contact the [CES](#) Customer Service Contact Point at the numbers given in Tables B-1 to B-4 in Appendix B.

No charges for receipt of SafetyNETSM messages or Inmarsat system messages

No charges are made to the [SES](#) owner/operator for receipt of SafetyNETSM messages. (Separately, SafetyNETSM Information Providers are charged for message transmission by national telecommunications administrations, and by CESs which offer EGC services.)

Similarly, the [SES](#) owner/operator is not charged for receipt of [Inmarsat system messages](#).

Charges for receipt of FleetNETSM messages

Providers of subscription information, broadcast through the FleetNETSM service, may charge for receipt of the information they provide. For details, contact the Information Provider directly.

EGC FleetNETSM Information Providers (including shipping companies and subscription news services) are charged by national telecommunications administrations, and by CESs which offer EGC services.



This chapter contains information which, while not essential to operating your terminal, should be useful to you in understanding more about the EGC SafetyNETSM and FleetNETSM services.

Introduction

The INMARSAT-C system has an inherent capability known as *Enhanced Group Call (EGC)* which enables an authorized Information Provider to broadcast messages through a *CES* and *NCS* to selected groups of *SEs* that are fitted with an *EGC receive capability*.

Two EGC services are available - EGC Safety NETSM, for broadcasts of *Maritime Safety Information (MSI)*, and EGC FleetNETSM, for broadcasts of commercial information to subscribers. All *SEs* fitted with an *EGC receive capability* can receive SafetyNETSM *MSI* broadcasts, but to receive FleetNETSM messages, an *SE* must also include a FleetNETSM option, and be registered as a subscriber with an FleetNETSM Information Provider. To find out if your *SE* has a FleetNETSM option (or can be upgraded to include it), refer to the manufacturer's literature, or contact the agent who supplied the model, or the manufacturer at the address given in Table A-1, Appendix A.

The EGC SafetyNETSM Maritime Safety Information (MSI) service

This service provides a means for Information Providers that have been authorized by the International Maritime Organization (*IMO*), under the *Global Maritime Distress and Safety System (GMDSS)*, to distribute Maritime Safety Information (*MSI*) from shore-to-ship.

Authorized Information Providers include:

- ✓ Hydrographic Offices, for navigational warnings and electronic chart correction data.
- ✓ National Weather Services, for meteorological warnings and forecasts.
- ✓ RCCs, for shore-to-ship distress alerts and other urgent information.
- ✓ International Ice Patrol, for North Atlantic ice hazards.

Table 6-1 lists the SafetyNETSM *MSI* services (but note the comments on page 6-3 on limitations which may apply to the reception of *MSI* in some areas.)

Selecting an ocean region with consideration for MSI

To receive a scheduled broadcast of *MSI* for a given *NAVAREA*/*METAREA*, you should be logged-in to the appropriate ocean region for the time of the broadcast, as explained in consideration 3 on page 3-2. See also the comments in the section *Conflicting interests for selecting an ocean region*, on page 3-3.

Table 6-1 The EGC SafetyNETSM Maritime Safety Information (MSI) service

See the section opposite Limitations on reception of EGC SafetyNETSM MSI in some areas for more information.

Urgency messages & navigational warnings to ships within selected rectangular areas.

Coastal warnings¹:

- ★ Navigational warnings.
- ★ Meteorological warnings.
- ★ Ice reports.
- ★ Search and rescue information.
- ★ Meteorological forecasts.
- ★ Pilot service messages.
- ★ **DECCA** system messages.
- ★ LORAN system messages.
- ★ *Omega* system messages.
- ★ SATNAV system messages.
- ★ Other electronic navaid messages.
- ★ Additional navigational warnings.

Shore-to-ship distress alerts to ships within selected circular areas.

Search-and-rescue co-ordination to fixed areas.

Urgency messages, meteorological and navigational warnings to ships within selected circular areas.

Meteorological and *NAVAREA* warnings and meteorological forecasts to NAVAREAS and meteorological areas

Search-and rescue co-ordination to ships within selected rectangular areas.

Search-and-rescue co-ordination to ships within selected circular areas.

Chart correction information.

Footnote 1: *The coastal warning broadcast facility is made available for the transmission of coastal information to areas where NAVTEX is not provided, or the Information Provider desires to re-broadcast the information simultaneously through the SafetyNET' service.*

Limitations on reception of EGC SafetyNETSM MSI in some areas

Note the following limitations on the reception of *MSI* in some areas:



Although *all* INMARSAT-C CESs around the globe have a capability for EGC SafetyNETSM broadcasting, note that in some areas, the Information Providers, which provide the MSI to the CESs for broadcasting, have not yet made the necessary arrangements. This may result in MSI not being provided in some navigational areas (*Navareas*)/*meteorological areas (Metareas)*, or a limited amount of MSI being provided when an SES is logged-in to one ocean region, compared to another ocean region.

At the date of writing, IMO has authorized the following arrangements:

- For a given NAVAREA/METAREA which is covered by more than one ocean region, *scheduled broadcasts* of MSI, such as navigational warnings and weather forecasts, are made *only via a single nominated ocean region*. Information on the ocean regions which make scheduled broadcasts of MSI to a given NAVAREA should be available in the current issue of your national *List of Radio Signals*, or may be obtained from IMO at the address below.
- For an NAVAREA/METAREA which is covered by more than one ocean region, *unscheduled broadcasts* of MSI, such as gale warnings and distress alert relays, are made via *all ocean regions* which cover the area concerned.

As the SafetyNETSM service is developed, during 1993 and later, more SafetyNETSM Information Providers are expected to make arrangements with CESs for SafetyNETSM broadcasts. For current information, contact:

The Chairman, International SafetyNETSM Co-ordinating Panel
International Maritime Organization (IMO)
4 Albert Embankment
London SE1 7SR, UK

Tel: +44 71 735 7611
Fax: +44 71 587 3210
Telex: 23588 IMOLDN G

Remember the following important precaution about ensuring that your *SES* continues to receive scheduled broadcasts of *MSI* for the *NAVAREA/METAREA* you require:

SET THE AUTOMATIC SCAN ON YOUR SES:



If you have logged into a particular ocean region, in order to receive its MSI, then you should set the automatic scan facility on your SES to scan *only that ocean region*, by making it the *only preferred ocean region*. So doing ensures that your SES remains tuned to the NCS Common Channel for that ocean region, ready to receive further MSI broadcasts (so long as you remain within the ocean region).

See the section *Automatic scan and log-in* on page 3-3 for more information.

The EGC SafetyNETSM MSI service, GMDSS/SOLAS and NAVTEX

The EGC SafetyNETSM Maritime Safety Information (*MSI*) service has been accepted by the International Maritime Organization (*IMO*) as an element of the *Global Maritime Distress and Safety Service (GMDSS)*. From 1992, the *GMDSS* is being implemented as a part of the *Safety of Life at Sea (SOLAS) Convention*.

Provided an INMARSAT-C *SES* has an *EGC receive capability*, and its installation meets the *GMDSS* requirements of the national administration of the country in which the vessel is registered, the ship may use its INMARSAT-C installation to meet the following *SOLAS* Convention carriage requirements:

- ✓ A ship fitted with an INMARSAT-C *SES* with an *EGC receive capability* meets *SOLAS* carriage requirements in Sea Areas A1 and A2 (see *Footnote 2: below for a definition of the Sea Areas*), and which are not served by the *NAVTEX* system.
- ✓ A ship fitted with an INMARSAT-C *SES* with an *EGC receive capability* meets *SOLAS* requirements for primary communications equipment in Sea Area A3 (see *Footnote 2: below for a definition of the Sea Areas*).

More information on *GMDSS/SOLAS* may be obtained from the *IMO* at the address on the previous page.



The combination of 518kHz NAVTEX and the International SafetyNETSM Service through the Inmarsat EGC system provides a highly reliable method of promulgating worldwide navigational warnings, weather forecasts and other urgent information.

Priority levels for MSI messages

EGC SafetyNETSM *MSI* messages are broadcast in one of four priority levels -*Routine, Safety, Urgent or Distress*. Unless the *SES* has been programmed with the current position within the last 12 hours, the *SES* will receive *all MSI* broadcasts for the entire ocean, of priority higher than routine.

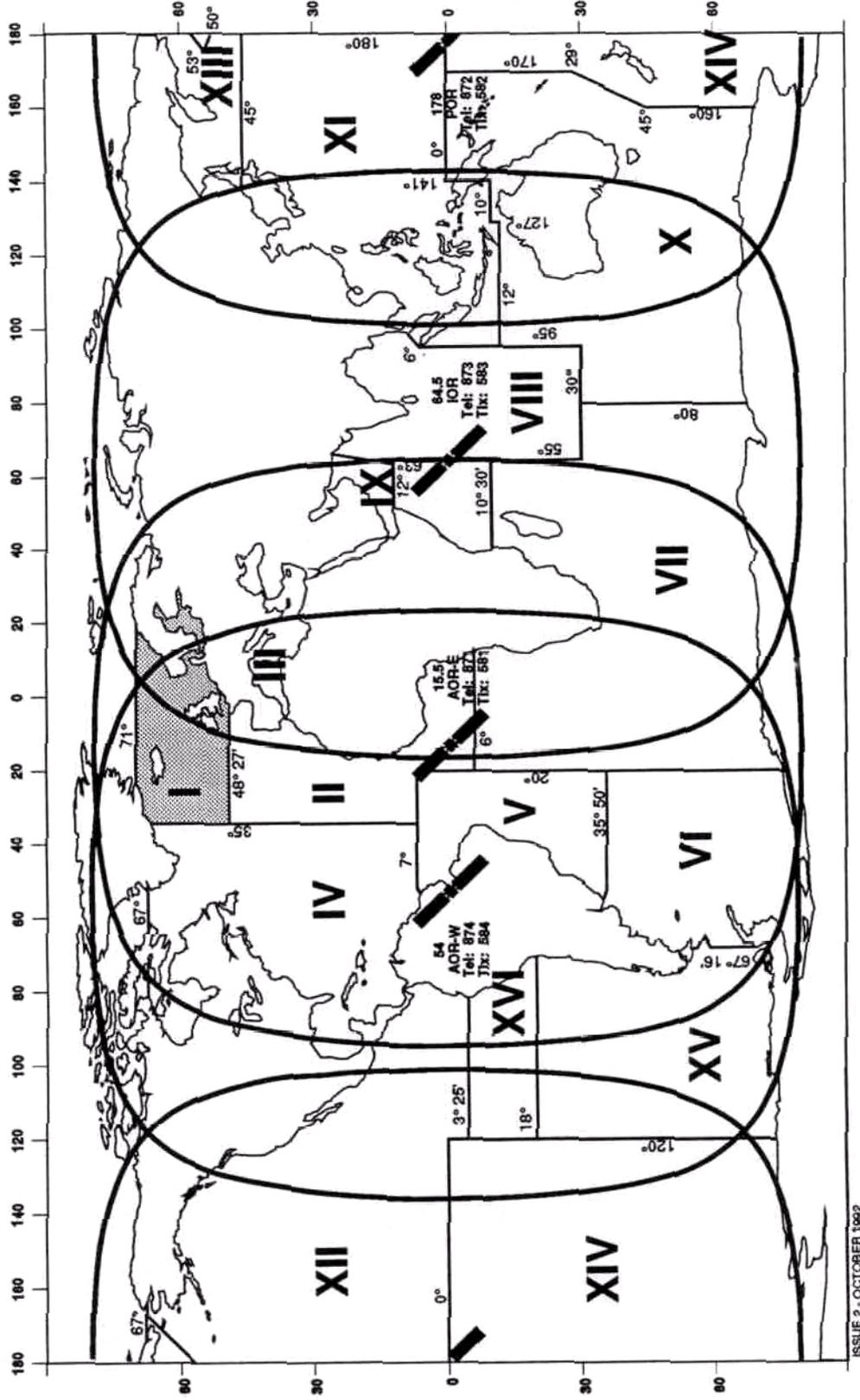
The EGC FleetNETSM service

This service allows authorized Information Providers, such as commercial subscription services, shipping companies and governments, which have registered with a *CES* that supports the FleetNETSM service, to broadcast messages to *selected* groups of *SESs*, each of which has registered with the Information Provider, and been added to a FleetNETSM *EGC Closed network*.

Footnote 2: *The Sea Areas are defined as below:*

- *Sea Area A1 is defined as an area approximately 20 - 30 miles from land, and within range of a shore-based VHF station, fitted with DSC (Digital Selective Calling).*
- *Sea Area A2 is defined as an area approximately 100 miles from land, and within range of a shore-based MF station, fitted with DSC, and excluding Sea Area A1.*
- *Sea Area A3 is defined as an area within coverage of the Inmarsat satellite system, and excluding Sea Area A1 and A2.*

Sea Area A4 is defined as all areas outside Sea Areas A1, A2 and A3.



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Figure 12 SafetyNETSM message to all ships in NAVAREA I (shown shaded)

The SESs in the *Closed network* may belong to a fleet, or be registered subscribers to a commercial service.

Typical applications of FleetNETSM include:

- Fleet or company broadcasts.
- News **broadcasts**.
- Commercial weather services.
- Market quotations.
- Government broadcasts to all vessels on a country's register.

EGC message broadcasting

An EGC message, SafetyNETSM or FleetNETSM, which has been broadcast over an entire ocean region is received by *all* SESs in the ocean region that are equipped with an EGC receive facility synchronized to the NCS common channel. The message is accepted, however, *only* by those EGC receivers that have been pre-programmed for the message reception, or that are within the geographical area addressed. All other EGC receivers reject the message. For more information see the next sections in this chapter on programming an *SES*, and the section *How an EGC message is broadcast* on page 8-14.

To select the EGC receivers that are to receive a message, the sender prepares a message and includes a *Group Call ID* to specify the area or group of SESs for which the message is intended. The Group Call ID may specify one of the following groups:

- EGC receivers within an *open network*, such as all ships within a given geographical area. The area could be a specific *NAVAREA*, or within a *circle* around a point, like the site of a maritime emergency, or a *rectangular area*, defined by latitude and longitude.
- EGC receivers within a *Closed network*, for example, all ships belonging to a fleet, identified by an *EGC Network Identification (ENID)* code.
- Individual EGC receivers.
- A // EGC receivers in an ocean region.

(NOTE THAT IF AN EGC MESSAGE IS TO BE BROADCAST TO SHIPS IN MORE THAN ONE OCEAN REGION, THE SENDER MUST ROUTE THE MESSAGE TO A CES FOR EACH OCEAN REGION.)

Figure 12 to *Figure 14* show typical groupings for SafetyNETSM and FleetNETSM broadcasts.

The SES operator should note the following precaution:



EGC SafetyNETSM and/or FleetNETSM messages may be broadcast frequently, and could fill up the storage capacity on your SES, possibly causing you to miss later messages. To avoid this happening, you should regularly check the *EGC Log* on your SES, and print and/or clear the messages.

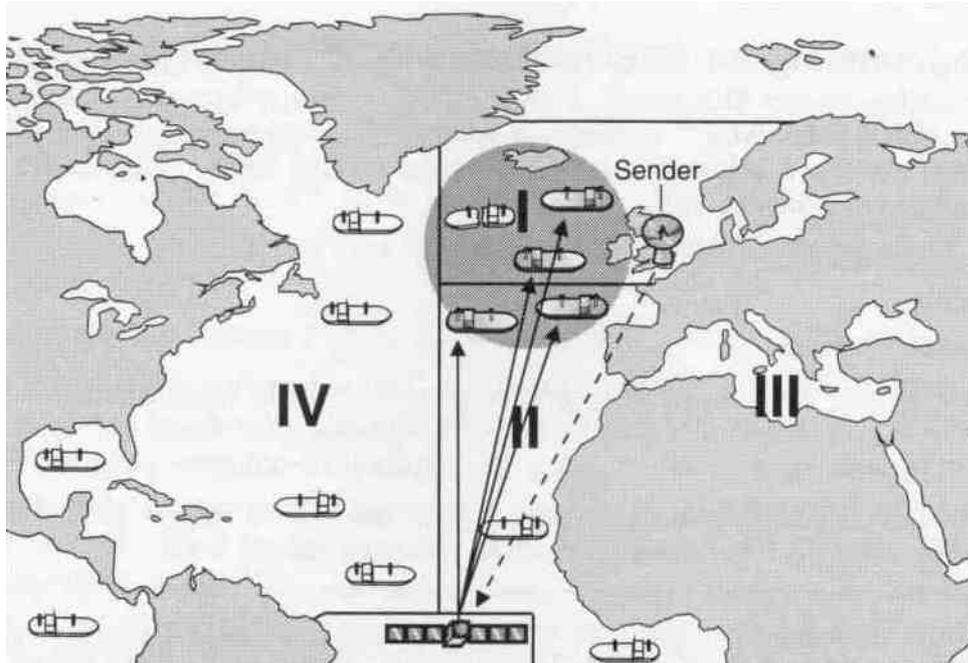


Figure 13 SafetyNETSM call to a circular area around an emergency

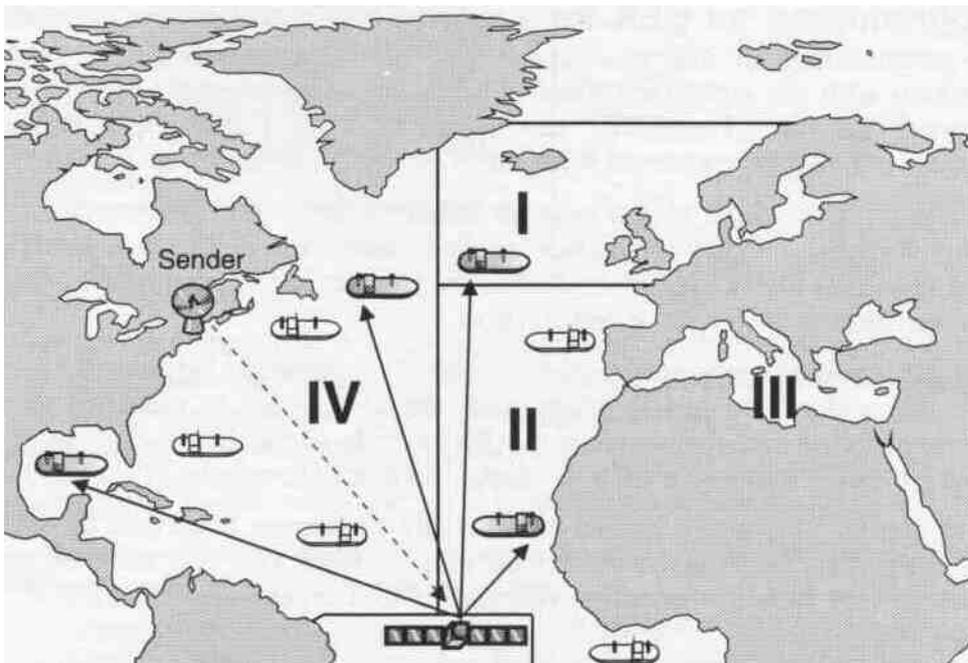


Figure 14 FleetNETSM call to a selected group of vessels

Pre-programming an SES for SafetyNETSM message reception

Depending on the *SES* model, an *SES* operator may pre-program the *SES* to determine which SafetyNETSM messages it accepts. The options which may be pre-programmed are listed below. For details on programming these options, refer to the *SES* manufacturer's instructions.

- ★ NAVAREA/METAREA.
- ★ Position.
- ★ Coastal warnings.

For example, the operator may pre-program the *SES* to receive SafetyNETSM messages when the vessel is within one or more geographical areas, say according to the planned ship route, by manually entering geographical co-ordinates along the trackline.

Alternatively, the operator may pre-program the *SES* to receive SafetyNETSM *MSI* messages for selected fixed areas such as NAVAREAS or coastal areas.



Note that the SES must be logged-in to an appropriate ocean region, to be able to receive SafetyNETSM messages, under any of the above pre-programmed options. See consideration 3 on page 3-2 for more information.

Pre-programming an SES for FleetNETSM message reception

Pre-programming an *SES* to receive FleetNETSM messages is performed by the *CES* in conjunction with the authorized FleetNETSM Information Provider, (and *not* by the *SES* operator). To join a FleetNETSM service, for example a commercial news service, an *SES* must initially be registered with the FleetNETSM Information Provider.

To add an *SES* to the *Closed network* which is to receive the broadcasts, the Information Provider initially downloads an *EGC network identification (ENID)* code for the *Closed network*, for storage in the *SES*. See the Section *How an EGC message is broadcast* on page 8-14 for more information.

The *SES* remains able to accept all FleetNETSM messages addressed by the Information Provider to its ENID group, until the *SES* ceases to subscribe to the service. The Information Provider then cancels the ENID code stored in the *SES* by *Downloading a cancellation code*, sent via a *CES* as above, addressed uniquely to the *SES*.

Note that an *SES* is not limited to receiving broadcasts from one FleetNETSM Information Provider, but may register with several. Note also that the *SES* operator cannot change this stored information (but can inhibit reception of FleetNETSM messages, if desired.)

EGC messages addressed to All Ships, and Inmarsat system messages

Note that *all* EGC receivers accept EGC messages addressed to *All Ships*, irrespective of the options which have been pre-programmed into the *SES*s.

Similarly, all EGC receivers accept *Inmarsat system messages*.

Classes of INMARSAT-C SES and their EGC reception

Referring to [Figure 16](#) in [Chapter 8](#), A technical description of the INMARSAT-C system, EGC reception in the different classes of SESs is as follows:

- ✓ A Class 0, Option 1 [SES](#) is for standalone EGC reception only.
- ✓ A Class 0, Option 2 [SES](#) is a standalone EGC receiver added-on to an [INMARSAT-A](#) terminal.
- ✓ A Class 1 [SES](#) **cannot receive EGC messages**.
- ✓ A Class 2 [SES](#) can receive EGC messages, when not engaged in normal (non-EGC) message transmission and reception. See the section below for more information.
- ✓ A Class 3 [SES](#) has two receivers, one for INMARSAT-C message transfer at any time, the other for EGC reception at any time. So continual uninterrupted operation of both modes is possible.

Selecting operating mode for EGC reception on a Class 2 SES

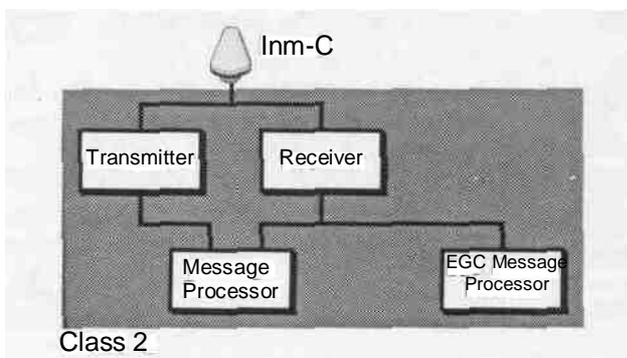


Figure 15 Class 2 SES with shared receiver

As shown on [Figure 15](#), a Class 2 [SES](#) shares the one receiver between the EGC message processor and the normal INMARSAT-C (non-EGC) message processor. EGC message reception is determined by the operating mode selected for the [SES](#). To change the operating mode, refer to the [SES](#) manufacturer's instructions.

The operating modes selectable on a Class 2 [SES](#) are:

- either:* **shared message mode**, when the receiver is ready for *either* normal message reception *or* EGC message reception. See Note 1 about using this mode,
- or:* **exclusive EGC reception mode**, when the receiver is *not available* for normal message reception. See Note 2 about using this mode.

Note 1: *In shared message mode on a Class 2 SES, when the SES receiver is engaged in normal message reception, it is tuned to a Message Channel assigned by the CES (refer to the section How an SES receives a message from a subscriber to the public networks on page 8-10 for more information). For the duration of the normal message, the SES receiver is not tuned to the*

NCS Common Channel, and so any incoming EGC messages on the NCS Common Channel during this time will not be received. (Many SafetyNETSM MSI messages are generally repeated, however, so your receiver may be free later to receive the message.)

Once the normal message is complete, however, the receiver automatically re-tunes to the NCS Common Channel, and is ready to receive EGC messages, all of which are broadcast on the NCS Common Channel.

Note 2: *If you want to be certain of receiving EGC messages during a particular time, when you do not want interruptions from other messages, you should LOG-OUT FROM NORMAL MESSAGE MODE, AND SELECT EXCLUSIVE EGC RECEPTION MODE, referring to the manufacturer's instructions for information. Then the Inmarsat system knows not to send you messages until you resume normal (shared message) mode.*

Language used for EGC SafetyNETSM broadcasts

International SafetyNETSM MSI messages are broadcast only in the English language, in an alpha-numeric character set known as the *International Alphabet 5 (IA5)*. (This is also known as 7-bit ASCII.)

Languages used for EGC FleetNETSM broadcasts

EGC FleetNETSM messages may be broadcast in English, using *International Alphabet 5 (IA5)* (also known as 7-bit ASCII). Alternatively, FleetNETSM messages may be broadcast in any other language, using any national character set (for example Arabic, Chinese, Japanese or Russian), provided the following conditions are met:

- The FleetNETSM Information Provider must prepare the messages in 8-bit binary data code.
- The CES through which the FleetNETSM message is routed must support 8-bit data presentation.
- The SESs that are to receive the messages are equipped with suitable software to interpret the 8-bit codes.

To receive a FleetNETSM message, an SES must have had downloaded the appropriate ENID code, and be synchronized to the appropriate NCS Common Channel.

Charging arrangements for receipt of SafetyNETSM and FleetNETSM messages

As explained on page 5-21, the following charging arrangements are made for receipt of SafetyNETSM and FleetNETSM messages:

- No charges are made for receipt of SafetyNETSM messages, or *Inmarsat system messages*.
- Charges may be made for receipt of FleetNETSM messages, depending on the arrangement with the FleetNETSM Information Provider.

Chapter 7 Data reporting, polling and SCADA



This chapter contains information which, while not essential to operating your terminal, should be useful to you in understanding more about data reporting, polling and SCADA.

Introduction

The data reporting service of the INMARSAT-C system is designed to enable *small amounts of data*, collected from instruments, or input manually, to be sent in *short data reports* from an [SES](#) via the Inmarsat satellite system, and an INMARSAT-C [CES](#), to an operational centre. The efficient use which the data reporting service makes of the INMARSAT-C system resources results in fast throughput times, and consequently economical rates - cheaper even than sending data by conventional INMARSAT-C store-and-forward messaging techniques.

The *polling service* enables an operational centre to send *polling or control commands* to a selected [SES](#), to perform required functions, such as to return a data report, or to operate equipment in a system under control.



At the time of writing (December 1992), the number of INMARSAT-C CESs which support data reporting and polling, and the related application of SCADA, is limited. As the system develops, however, during 1993 and later, more CESs are expected to support these services.

To find out if a particular [CES](#) supports the data reporting and polling service you require, contact the [CES Customer Service Contact Points](#) at the numbers given in Tables B-1 to B-4 in Appendix B, or the *INMARSAT-C Maritime Customer Relations Officer*, at the address given in the front of this manual.

To confirm if your [SES](#) model supports the data reporting and polling service you require (or can be upgraded to do so), refer to the manufacturer's literature, or contact your agent, or the manufacturer directly at the address given in [Table A-1](#) in Appendix A.

An SES must be registered into a data reporting closed network

For data reporting purposes, each [SES](#) must initially be registered into a *Closed network* with the operational centre. This centre arranges with a [CES](#) to download, over the INMARSAT-C system, network identification information, for storage in the [SES](#).

This network information comprises a unique *Data Network Identification (DNID)* code, plus a *Member number* of the [SES](#) within the network.

The section *How an SES sends data reports* on page 8-15 describes the process.

The requirements for data reports

Data reports sent from ships are desirable for commercial operations, and also to meet government requirements. Shipping companies normally require updated position information and other data from their ships at regular intervals - typically once or even twice a day. They require this data to be supplied reliably, with minimum effort, and at low cost, to their office during their working day, irrespective of time difference with the ship.

Government agencies also need various types of data reports from ships for many reasons, such as helping authorities to carry out their responsibilities for analyzing weather, and to develop navigational and meteorological warnings and weather forecasts. Other important applications of data reports required by governments are to assist ships in distress, and to prevent marine pollution.

For these reasons, governments, through various international 'instruments' (*SOLAS Convention, Search and Rescue Conference, IMO Assembly Resolutions, ITU Radio Regulations*, and others), have developed requirements for ships to make reports to shore authorities.

These developments, combined with standardization of reports supported by the *International Maritime Organization (IMO)* and the *World Meteorological Organization (WMO)*, are leading to an increasing use of reporting systems on-board ships, large and small. The benefits to be gained from data reporting systems are greater efficiency in maritime operations, and greater safety for the mariner.

The INMARSAT-C system allows data reports to be initiated *manually*, from the *SES* keyboard, or *automatically*, by pre-programming the terminal or by using a *polling or control command* from a shore-based operational centre.

A natural development of data reporting and polling is the application *SCADA* (*supervisory control and data acquisition*), whereby an INMARSAT-C terminal connected via a suitable interface to sensors can monitor a maritime system (for example a ship's engine, or remote lighthouse), and send reports to its operational centre. This centre (which may be the company office) can analyze the data and return *polling commands* to the terminal to operate devices such as switches, relays or valves, to control the systems.

Advantages of the INMARSAT-C system for data reporting, polling and SCADA

The INMARSAT-C system offers many advantages for data reporting over traditional reporting methods, such as radio transmissions, and also over using INMARSAT-C store-and-forward messaging techniques. The advantages of INMARSAT-C for data reporting include:

- ❑ The *digital technology* used in the INMARSAT-C system is suitable for interfacing with digital devices such as navigational systems, or monitoring sensors for the collection of data.

- ❑ The data included in reports can be contained in a concise *standardized format*, using data encoding and/or data compression techniques, so enabling *rapid collection and transmission* of the data. This also provides *significant savings* in time and cost over other reporting methods (including savings over INMARSAT-C store-and-forward messaging).
- ❑ Cost-savings are also achieved through the *low power consumption* and running costs of the different INMARSAT-C **SES** models. Some **SES** models are specifically designed for minimal power consumption.
- ❑ The *independence from mains power supplies or landline networks*, which an INMARSAT-C terminal offers, make it suitable for long periods of unattended operation in isolated environments, such as on a navigation aid, or an off-shore platform. If required, an INMARSAT-C terminal can be solar-powered.
- ❑ Satellite communications offer *high reliability of data transfer*, in all weather and atmospheric conditions, ensuring secure system monitoring and/or control.
- ❑ The *global communications capability* of the INMARSAT-C system allows the operational centre to be located anywhere in the world (and also allows the centre to monitor and control similar INMARSAT-C systems located around the world).
- ❑ Data reports may be transmitted either *automatically* at preset intervals, or *manually*, without requiring a skilled operator to intervene.
- ❑ A *high degree of privacy* of data is ensured through the unique addressing techniques used by the INMARSAT-C system, compared with conventional radio transmission techniques.
- ❑ *Polling* (interrogating) an INMARSAT-C **SES** allows the operational centre to control the actions performed by the terminal, whether sending data reports, or performing defined **SCADA** (*supervisory, control and data acquisition*) tasks.
- ❑ The *flexibility of the INMARSAT-C system* allows it to be adapted to many different **SCADA** tasks, in different environments. See the section on **SCADA** at the end of this chapter for more details.

Sources of input data

An **SES** can receive data from many different sources, including:

- ✓ *Data keyed in manually by an operator.* Using suitable software, which should be available from the **SES** manufacturer/agent, data can be keyed into a menu-driven program for automatic encoding.
- ✓ *Data transferred automatically from instrumentation*, such as navigational receivers, for example GPS, **LORAN-C**, DECCA, **Transit** or **Glonass**, or from pressure or temperature sensors, or weather-logging instrumentation. (Note that, to accept data from these sources, the **SES** must be fitted with the proper interfaces (hardware and software), details of which may be available from the **SES** manufacturer/agent.)

Types of data reports

The INMARSAT-C system supports the following different types of data reports. Check with your agent or [SES](#) manufacturer whether your model supports the particular option required (or whether it can be upgraded to support the option by purchasing suitable hardware/software.) Table [A-1](#) in Appendix A gives the manufacturer's addresses.

Unreserved data reports (U), which are sent at *random times*, initiated either manually by the operator, or automatically, under control of instruments monitoring random events such as weather.

The unreserved type of data report is limited to *three packets*, allowing a maximum of *32 bytes* of data.

Programmed unreserved data reports (P), whereby the [SES](#) is programmed to send data reports on a pre-defined schedule (for example to send a position report at 0800 hours every day), as entered into the [SES](#) either by the [SES](#) operator, or by a *polling/control command* downloaded from an operational centre. The [SES](#) subsequently transmits its report as an *unreserved data report*, as above.

Reserved (pre-assigned) data reports (R), which are pre-programmed initially by an operational centre [Downloading](#) a *polling command* to define the times and/or reporting procedure. A typical pre-assigned data report would be a position monitoring report, sent at specific pre-selected times to an operational centre.

The pre-assigned type of data report is limited to *four packets*, allowing a maximum of *44 bytes* of data.

Macro-encoded Messages (MEMs)

In order to include as much information as possible into the 32 bytes of an unreserved data report, or the 44 bytes of a pre-assigned data report, *binary encoding techniques*, and also *Macro-encoded Messages (MEMs)* are used. MEMs use unique binary codes to represent pre-defined data or text messages.

MEMs may be customized to a user's requirements - for example, one [MEM](#) code could be assigned to represent "*Require fuel at next port of call*". At the time of writing (December 1992), Inmarsat is developing a set of standard [MEM](#) codes for maritime use. For more information, contact the INMARSAT-C Maritime Customer Relations Officer at the address in the front of this manual.

An example of where an [MEM](#) code may be used is in the Inmarsat standard Maritime Position Report, where one 7-bit field is available for an [MEM](#). In other customized data reports, provision may be made for including more than one [MEM](#), as required.

Maritime ship report types

A data format similar to that used by INMARSAT-C maritime position reports may be used for *position-reporting systems* like [AAIC](#), [AUSREP](#), and [JASREP](#). Other reports which are considerably longer than the maritime position reports, for example the Dangerous Goods Report, Hazardous Substances Report and Marine Pollution Report may be adapted to the three-packet format (unreserved) by the use of MEMs.

Other reports which may be suitable for encoding into data reporting format are the *Weather Data Report* from Ships, or a *Fish Catch Report*.

A user may also, of course, customize a report to a specified requirement.

Table 7-1 lists typical ship reports which may be supported by the INMARSAT-C system. For details of the structure of these reports, contact the INMARSAT-C Maritime Customer Relations Officer.

To find out how your terminal can be made suitable in hardware and software, you could contact your agent, or the [SES](#) manufacturer at the address given in Table A-1 in Appendix A.

Table 7-1 Typical ship reports

- ★ Sailing Plan
- ★ Position Report
- ★ Deviation Report
- ★ Arrival Report
- ★ Departure Report
- ★ Shipping Company Position Report
- ★ Weather Data Report
- ★ Fish Catch Report

Transmitting data reports

When a data report is being prepared, it must include the *Closed network information* (comprising a DNID code, plus [SES Member number](#)), that was previously downloaded to the [SES](#). The report is sent over the satellite link to a selected [CES](#), which stores it in an appropriate DNID file. Depending on the arrangements made between the [CES](#) and the operational centre, the [CES](#) may send the DNID file over the public networks to the centre at pre-set times, or when the file is full. Alternatively, the centre may access the file and download the data when required.

To decode the data in the reports, the operational centre requires suitable hardware and software, details of which may be obtained from the agent who supplied the [SES](#) and/or software, or the [SES](#) manufacturer, at the address given in Table A-1.

Different types of polling

An operational centre may use any of the following different types of polling:

Individual polling - the operational centre prepares a polling command, including the *DNID*, plus a list of the *Member numbers* that are to be polled. If required, the centre may also include a short text message with the polling command.

The operational centre sends the polling command over the public networks to a *CES*, which forwards it to an NCS, to be broadcast on its NCS Common Channel, addressed individually to each *SES* on the list.

To receive the polling command, each *SES* must be logged-in, synchronized to the NCS Common Channel, and not engaged in communications traffic at that time. If, however, the *SES* database held by the NCS shows that any *SES* is busy at that time, the NCS does not send the command at that time, but stores it briefly, to try again later, when the *SES* database indicates that the *SES* is available to receive the command. This method is very effective for ensuring that individual *SES*s receive a polling command.

On receipt of the command, each *SES* responds as instructed - for example returning a data report or performing a *SCADA* task (see the section *SCADA, hazard detection and alarm generation* on the next page for more information).

Group polling - the operational centre prepares the polling command, including the *DNID* for the *Closed network*, but does not specify individual *SES*s. The operational centre sends the polling command over the public networks to a *CES*, which forwards it to an NCS, to be broadcast on the NCS Common Channel.

The polling command is accepted by all *SES*s that belong to the *DNID* group, and that are synchronized to the NCS Common Channel, and are not busy at that time. To avoid the system being overloaded by many *SES*s responding at the same time, the NCS includes a *random interval number* in its broadcast, causing the *SES*s to return their reports at different, random, times.

If, however, some *SES*s are not synchronized to the NCS Common Channel when the message is broadcast, or are busy at that time, they *will not receive the command*, and will not respond as required. In this form of polling, the NCS will not re-broadcast individually to those *SES*s (unless specifically requested by the operational centre).

Area polling - the type of polling is similar to group polling, the operational centre sends the polling command to the *CES*, with details of the *DNID* group, plus the geographical area that is to receive the command. The centre does not specify individual *SES*s that are to be polled.

When the NCS broadcasts the polling command on the NCS Common Channel, the command is accepted only by those *SES*s that belong to the *DNID* network, *and* are not busy at that time, *and* that are within the defined geographical area.

If any addressed *SES*s are busy at that time, they will not receive the command, and will not respond as desired. The NCS will not later re-transmit the message to those *SES*s (unless specifically requested by the operational centre).

Typical polling/control commands

Typical polling/control commands which an operational centre may send include:

Send a data report immediately - this command may also include instructions on the data structure of the report (from pre-defined types) to be sent, or on the task to be performed (from pre-defined tasks).

Start reporting at a defined start time, and thereafter at regular intervals, for an overall period (or until instructed to stop).

Receive a text message - the operational centre may include with the polling command a short message (containing up to 256 bytes or characters, which may be encoded, as required by the [SES](#) software, or a brief text message to the operator).

Modify operating parameters - the operational centre can download new operating parameters to the terminal, for example instructing it to monitor different sensors, without requiring a skilled operator to visit the installation.

Operate control equipment - the operational centre can send a control command via an [SES](#) to a controller interface, to operate equipment such as a switch, relay or valve, in order to control a system.

Stop reporting immediately.

SCADA, hazard detection and alarm generation

The data reporting and polling services may be used in applications such as:

SCADA (*supervisory control and data acquisition*), in this application, an [SES](#) is polled to return a data report to an operational centre. In response, the centre may return *polling commands* to control some of the operating features of the system.

Typical maritime applications suitable for [SCADA](#) are:

- ✓ operations at a remote lighthouse
- ✓ ship's equipment status and performance
- ✓ flow of oil or gas in a pipeline

Hazard detection and alarm generation. As shown in [Figure 4](#), input sensors, interfaced to the [SES](#), monitor conditions at the [SES](#) installation, for example a lighthouse or oil or gas pipeline. The sensors transmit warnings of hazardous conditions, for example high or low pressure, to the operational centre. The centre could respond by, for example, returning a control command to shut off supply valves, or to release extinguishant, and/or to sound alarms to warn personnel.

Security monitoring of boats left unattended, whereby sensors such as bilge water level detectors, or navigation equipment such as GPS (global positioning system) provide data periodically - say every 12 hours - to the [SES](#), which is energized automatically at specified times to send data reports.

The above examples are just a few typical applications of the INMARSAT-C services of data reporting and polling. The flexibility of the INMARSAT-C system allows many different sorts of control systems to be customized to the requirements of an owner/operator.

Chapter 8 A technical description of the INMARSAT-C system



This chapter contains technical information which, while not essential to operating your SES, should help you understand more about the INMARSAT-C system, and some of the automatic actions of your SES, and the status indications displayed.

Introduction

The following technical descriptions of the INMARSAT-C communications techniques are stated in simple terms, and do not require you to have a technical background to follow them. Where necessary, the descriptions refer to earlier chapters for more information.

Different classes of INMARSAT-C SES

Different classes of INMARSAT-C SES are manufactured, as listed below, and illustrated in *Figure 16*:

Class 1 SES - this may be used only for ship-to-shore and shore-to-ship message transfer and *Distress alerting*, but is **not able to receive EGC messages**.

Class 2 SES - this is capable of two modes of operation (selectable by the operator):

Either: As Class 1, and also capable of receiving EGC messages when not engaged in INMARSAT-C traffic,

or: Ready for EGC reception *exclusively*, (and not available in that mode for INMARSAT-C message transfer).

Class 3 SES - this has two independent receivers, one capable of two-way INMARSAT-C message transfer, the other capable of receiving EGC messages. So this class makes possible the independent simultaneous operation of both modes, via the one SES.

In addition to the above classes, *Figure 16* shows that EGC receivers may be fitted as listed below:

Class 0, Option 1 - As a stand-alone EGC receiver. Note that this type of SES can only receive EGC messages, and cannot send or receive INMARSAT-C (non-EGC) messages.

Class 0, Option 2: - As an add-on EGC receiver, which may be connected to an *INMARSAT-A SES* (or *INMARSAT-M* or INMARSAT-B SES), and using the antenna of that SES.

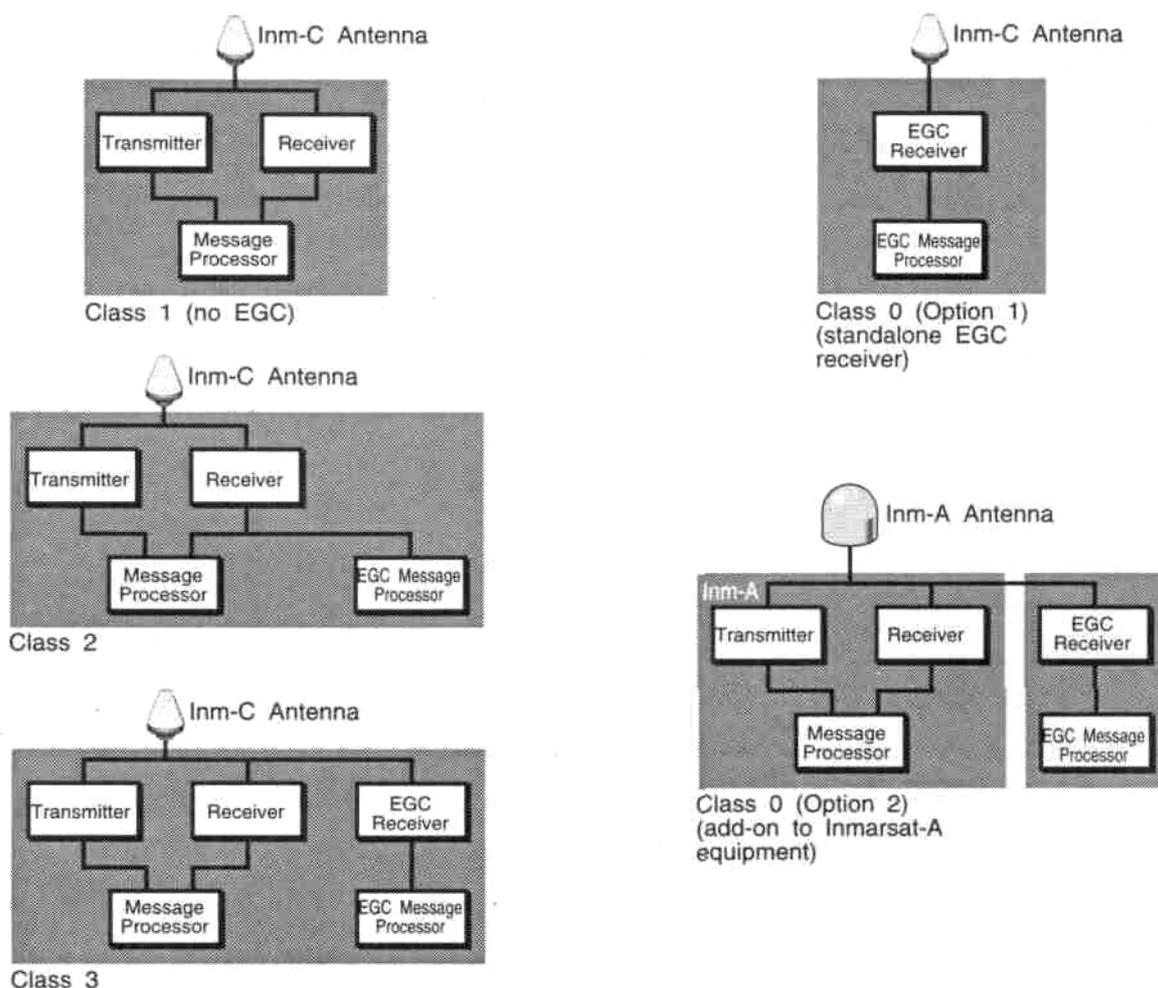


Figure 16 Different classes of INMARSAT-C SES

The SES DTE and DCE

As shown in [Figure 4](#) in [Chapter 1](#), an *SES* comprises two parts - the *DTE* (data terminal equipment), and the *DCE* (data circuit terminating equipment). In general terms, the *DTE* interfaces the *SES* to the human operator, and to the input/output devices, while the *DCE* interfaces the *SES* to the satellite link.

The *DCE* comprises a *transmitter and receiver*, both of which are tunable separately to the different channel frequencies used by the system. The *DCE* transmitter or receiver can tune itself to a channel frequency stored in memory, or respond to an instruction from the system to tune to a particular channel.

Note:
This Figure does not give an exhaustive list of the Signals

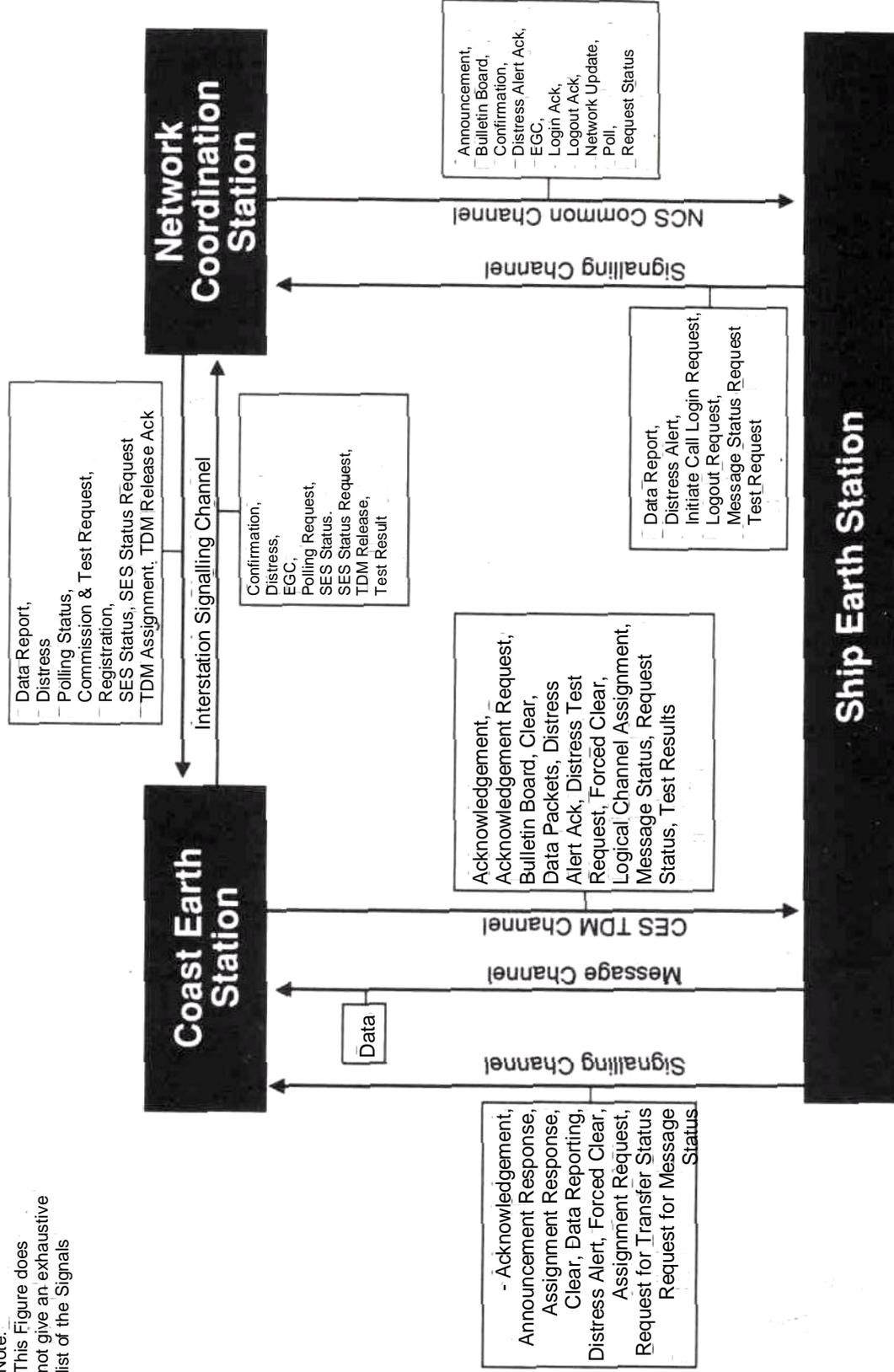


Figure 17 The INMARSAT-C communications channels - an overview

The communications channels used in the INMARSAT-C system

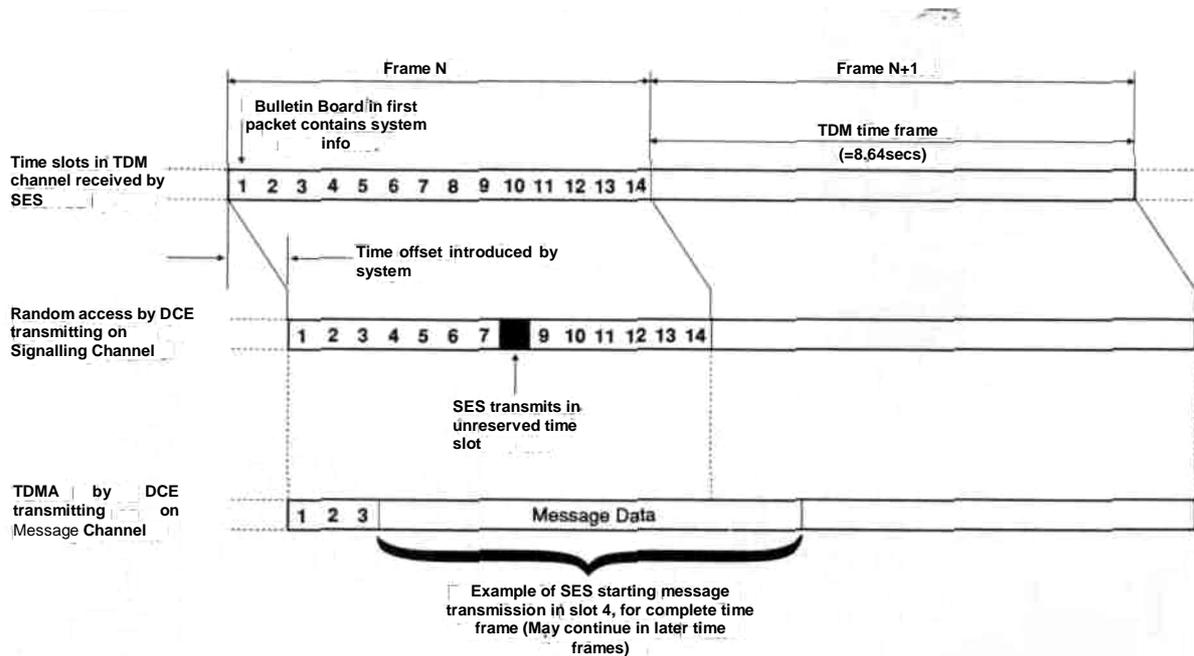


Figure 18 INMARSAT-C communications channels typical timing relationships

The TDM channels

The *Communications channels* used in the INMARSAT-C system are based on *time division multiplex (TDM)* techniques, whereby each NCS and CES in the system broadcasts on a *TDM channel*, at a unique frequency.

Each NCS broadcasts continually on its TDM channel (known as the *NCS Common Channel* because all SESs in an ocean region use the channel as a common means of receiving system information). The CESs broadcast on their *CES TDM channel* only when required, for example during call set-up. Each unique TDM channel frequency is identified by a *Channel number*, which is stored at manufacture in every *SES*.

The NCSs and CESs use their TDM channel to send to the SESs a wide range of information, for example signalling data or message data. *Figure 17* shows some of the information which may be sent over an NCS Common Channel, and over a *CES TDM Channel*. Addressing information contained in the TDM identifies the SESs which are to receive the broadcast.

To be able to receive a TDM channel, and extract the information that it contains, an *SES* must be receiving a strong signal, and be *synchronized* to the TDM. Most *SES* models give an indication of the *strength of reception* of the TDM channel. The manufacturer's instructions should state the minimum strength of reception necessary for reliable communications.

When an *SES* is *logged-in* to an ocean region, its *DCE* receiver synchronizes to the corresponding NCS Common Channel, ready to receive information on the channel. Subsequently, for example during call set-up, the *DCE* receiver synchronizes to the required *CES* TDM Channel. When the *SES* is no longer engaged in a call, its *DCE* receiver re-synchronizes to the NCS Common Channel. (In this mode, the *SES* is said to be *idle*, or *listening* to the NCS Common Channel, awaiting further information from the NCS.)

The NCS and *CES* TDM channels all have a common *time frame* structure, which is based on the 24 hour day divided into 10,000 frames (making each frame 8.64 seconds). Every frame is numbered, starting at 0000 midnight, and advancing in number throughout the day.

Figure 18 shows a typical frame structure for an NCS or *CES* TDM channel. As shown, each frame is divided into 14 *Time slots*. Each *Time slot* contains a defined number of *data packets*, each of which is made up of *8-bit bytes* of binary-encoded data. The first packet of every frame is the *Bulletin Board*, which contains system operational information, and the current *Frame number*. Reception of consecutive Bulletin Board packets is used by the *SES* to measure the *quality of reception* of the TDM channel. This measure is displayed on the *SES* as the *Bulletin Board Error Rate (BBER)*. Ideally, the *BBER* should be zero, but a value near zero is acceptable.

The TDM channels are used for communications in the direction NCS-to-*SES*, or *CES*-to-*SES*. For communications in the direction *SES*-to-NCS, or *SES*-to-*CES*, the *SES* uses the *Signalling Channels*, or *Message Channels*. These are based on the system TDM, as explained below.

The SES Signalling Channels

As shown in *Figure 17*, an *SES* uses an *SES-to-CES Signalling Channel* to send information such as a data report or distress alert to a *CES*, and an *SES-to-NCS Signalling Channel* to send information such as a *Log-in* request or log-out request to the NCS.

The structure of these Signalling Channels is the same, and, as shown in *Figure 18*, is based on the frame structure of the system TDM channels, offset in time by the delay from the NCS or *CES* transmitting its TDM via a satellite, to it being received by the *SES*.

The Signalling Channels use a technique known as *random access TDMA (time division multiplex access)*, whereby an *SES* gains random access to a *CES* or NCS by examining a *slot state marker* which is transmitted in a special packet in every frame on the TDM. This marker indicates which *Time slots* are *unreserved* in subsequent time frames. The *SES* is also informed in the TDM of the frequency of the Signalling Channel on which its *DCE* transmitter should transmit.

In certain circumstances, a different technique is used on the Signalling Channel, for example when the *CES* has sent a packet to the *SES* and expects a response. To avoid the delay and uncertainty of *Unreserved access*, the *CES* in its TDM informs the *SES* of an unused *Time slot*, in which it expects the *SES* to transmit on the *SES-to-CES* Signalling Channel.

The SES Messaging Channels

The other type of channel used by an *SES* is the *Messaging Channel*, which, as shown on *Figure 17*, is used to transmit *message data* to a *CES*. Access to a *Message Channel* is *pre-assigned* by the *CES* during call set-up - the *CES* requests a message transmission from an *SES*, by sending a special *signalling packet* in its TDM, indicating the *Message Channel* frequency and *Time slot* number which the *SES DCE* transmitter should use.

The NCS - CES and CES - NCS Interstation Signalling Links (ISLs)

The NCS and CESs interchange information about the system, and individual SESs, using *Interstation Links (ISLs)*. *Figure 17* shows the signals transferred over the NCS - *CES* ISLs, and over the *CES* - NCS ISLs.

Using these links, the NCS and CESs can transfer commissioning test results and *SES* operational status, enabling them to update their *SES* databases. The NCS and CESs also use the links to transfer data reports and distress alerts, when necessary.

The NCC - NCSs links

The NCC and NCSs are linked by dedicated landlines, allowing them to exchange information on the system and individual SESs, and providing a means for the NCC to communicate with every ocean region.

How an SES sends a ship-to-shore message

This section describes how an **SES** sends a ship-to-shore message, using store-and-forward techniques. *Figure 19* illustrates the interactions in simple terms, and *Figure 20* shows the step-by-step procedure.

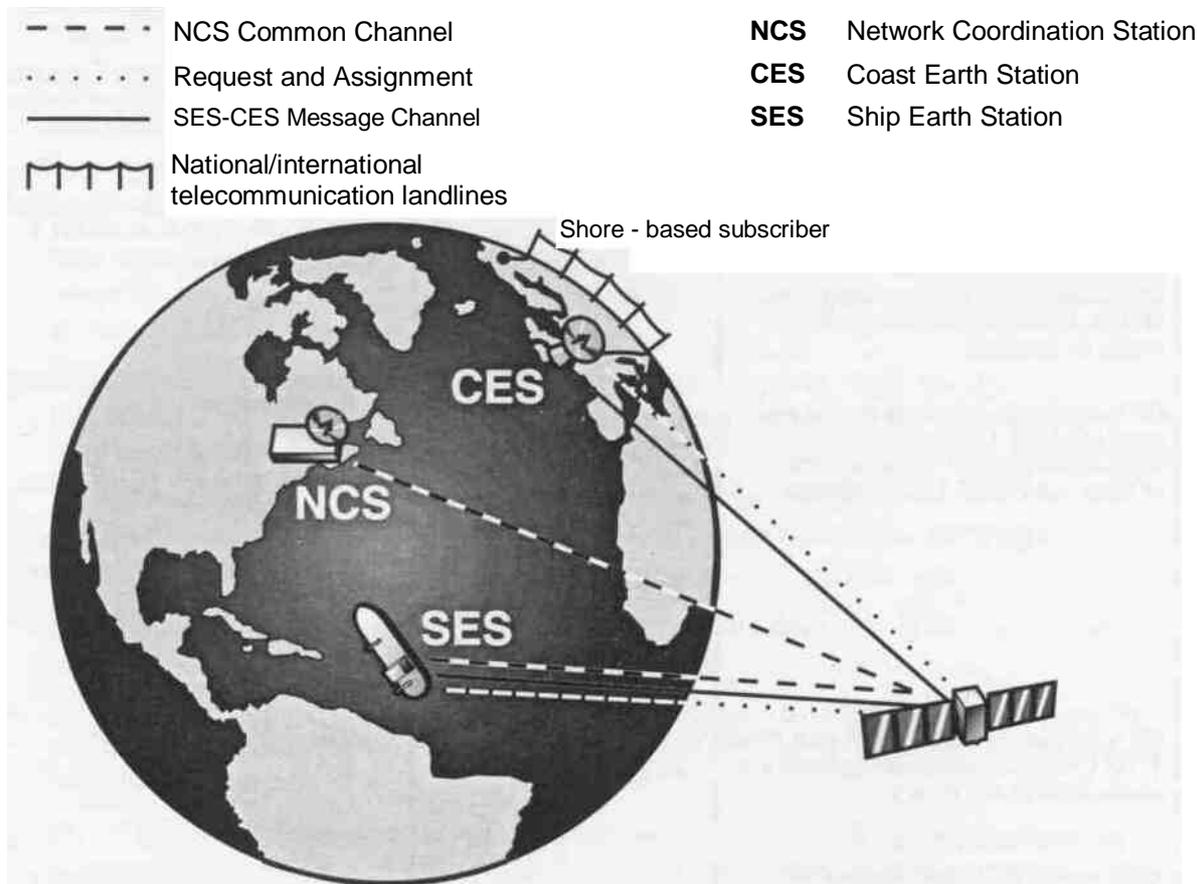


Figure 19 Assigning a Message Channel for a ship-to-shore message

- 1 Initially, the **SES** must be logged-in to an ocean region, and its **DCE** receiver synchronized to the NCS Common Channel.
- 2 The **SES** operator prepares the message in the text editor in the required format. The **SES** stores the message in its **DTE**, ready to pass it to the **DCE** for transmission.
- 3 On the **SES** keyboard, the operator selects a **CES** through which the message is to be routed, and gives the command to send the message.

The following actions proceed automatically, without requiring operator action. The operator may, however, select the relevant status displays on the **SES** to witness the actions proceeding.

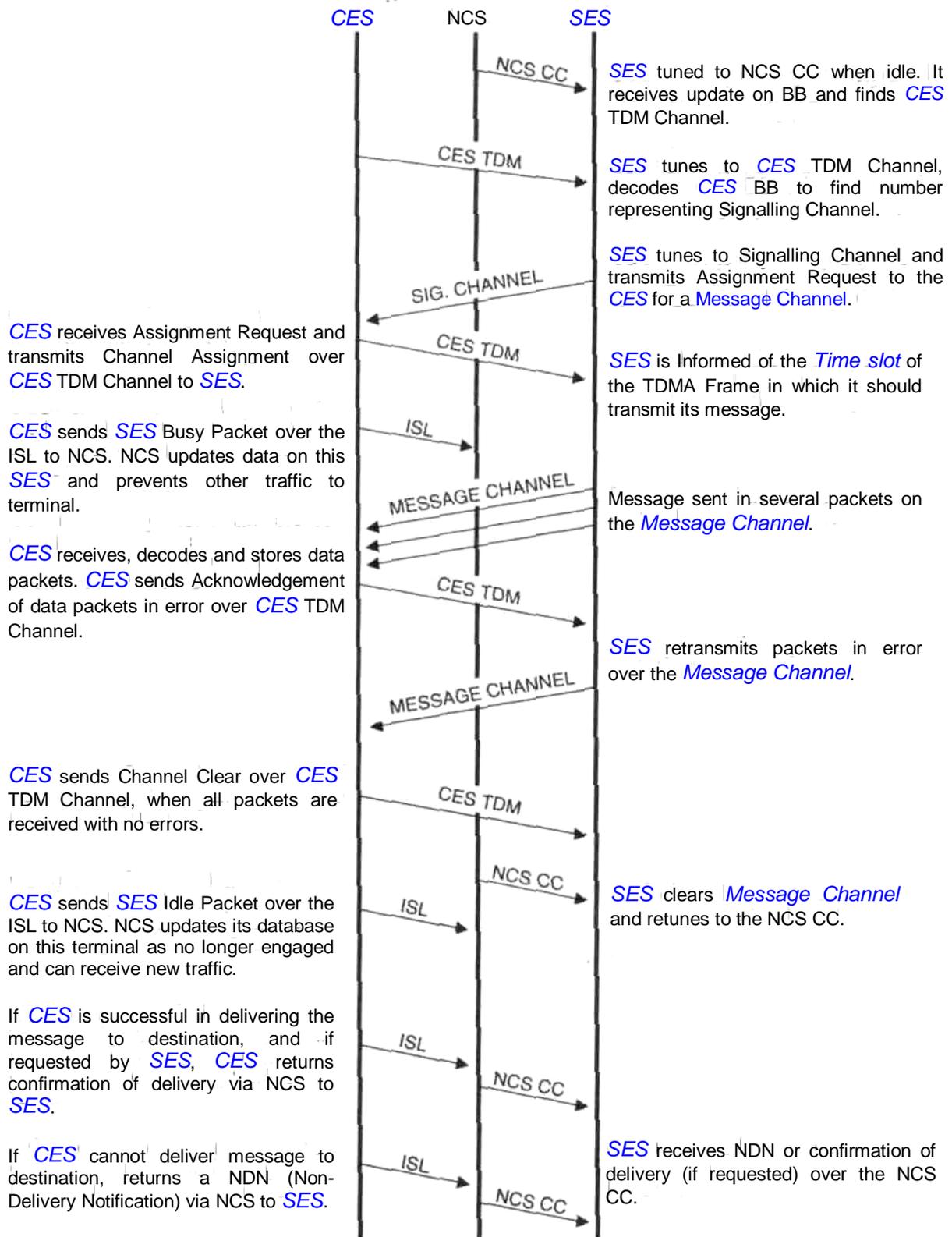


Figure 20 Ship-to-shore call set-up sequence

- 4 The *SES DCE* receiver checks the NCS Common Channel Bulletin Board for the *CES* TDM Channel which the *SES* should use.
- 5 The *DCE* receiver tunes to this *CES* TDM Channel - on some *SES*s you may see the signal strength indication drop briefly, and then return to an operational level, as the receiver tunes from the NCS Common Channel to the *CES* TDM Channel. Also, if you select to display the current status of the *SES*, you may see the channel selection change, and the numbers representing their frequencies.
- 6 The *DCE* receiver decodes the *CES* TDM to find the *Signalling Channel* which it should use.
- 7 The *DCE* transmitter tunes to this *Signalling Channel* frequency, and transmits an *Assignment Request*.
- 8 The *CES* receives the *Assignment Request* (as the first indication that the *SES* wants to send a message), and transmits a *Channel Assignment* packet in its TDM to the *SES*.
- 9 The *DCE* receiver receives the *Channel Assignment*, and finds the *Message Channel* which the *CES* requires the *SES* to use to transmit the message, and the *Time slots* of the TDMA frame, in which the *SES* should transmit on the *Message Channel*.
- 10 Separately, the *CES* sends an *SES Busy Packet* over the *CES* - NCS ISL, to inform the NCS that this *SES* is engaging in message transfer.
- 11 The NCS logs the *SES* in its database as *busy*, and does not allow any other traffic to be sent to the *SES* until it is idle again.
- 12 As shown in *Figure 18*, the *DCE* transmitter starts transmitting the message in packets on the *Message Channel*, at the pre-assigned start slot number, in one or more time frames.
- 13 The *CES* checks the received packets for errors, and if it finds any, returns an *Acknowledgement Packet* identifying the packets in error.
- 14 The *SES* re-transmits those packets, and the sequence repeats until the *CES* has received all the data packets, with no errors. (This method of transmission, known as *ARQ* (*automatic request repeat*), guarantees eventual error-free reception of a message.)
- 15 The *CES* then returns a *Channel Clear Packet*, confirming reception of the message, and instructing the *SES* to clear the *Message Channel*, and to re-tune to the NCS Common Channel.
- 16 The *SES* clears the *Message Channel*, re-tunes to the NCS Common Channel, and displays details of the message received at the *CES*.
- 17 Meanwhile, the *CES* sends an *SES Idle Packet* to the NCS on the ISL, to indicate that the *SES* is no longer engaged in message transfer, and logs the *SES* as *idle* in its database, for further traffic.

18 Meanwhile, the **CES** attempts to forward the message, via the public networks, to the intended destination.

If the message delivery is successful, the **CES** returns details of the delivery, provided the **SES** operator has requested it, and also provided the **CES** supports the option. Because, however, the **SES** is no longer tuned to the **CES** TDM, but has now re-tuned to the NCS Common Channel, the **CES** sends the delivery details via the ISL to the NCS, for forwarding on the Common Channel, addressed uniquely to the **SES**.

If, however, the delivery was not successful (because, for example, the number dialled is wrong), the **CES** returns a *Non-delivery Notification*, indicating the reason for the non-delivery. As above, the **CES** sends this notification via the NCS, to be forwarded on the NCS Common Channel to the **SES**.

How an SES receives a message from a subscriber to the public networks

A subscriber to the public telecommunications networks can send a message to an **SES**, using any of the devices shown in *Figure 4*, for example a telex terminal or personal computer, provided the following conditions are met:

a. *Either* **One-stage access** - an arrangement exists between the national telecommunications authority and an Inmarsat **CES**, whereby subscribers can access the public networks using a pre-defined dialling format, and send a message to any **SES** logged-in to the ocean region(s) served by the **CES**. (The public networks automatically route the message to the **CES**, which forwards it over the INMARSAT-C system to the **SES**.)

Or: **Two-stage access** - in a country where no arrangement exists between the national telecommunications authority and an INMARSAT-C **CES** to route traffic over the public networks to the Inmarsat system, a subscriber may instead be able to register with an INMARSAT-C **CES** in another country, acting as a *Value-added Service Provider (VAS)*.

See the section [Conditions which must be met for ship-to-shore communications](#) on page 5-2 for more information.

b. The **SES** must be logged-in to an ocean region, and be synchronized to the NCS Common Channel.

The sequence of actions when a subscriber sends a shore-to-ship message is given below, and illustrated in *Figure 21*.

1 The subscriber must access the public networks, and follow the exact dialling procedure as instructed, giving the **IMN** and appropriate (telex or telephone) ocean region access code for the **SES**. (*Chapter 5 How to access the INMARSAT-C communications services* gives more information on the ocean region access codes.)

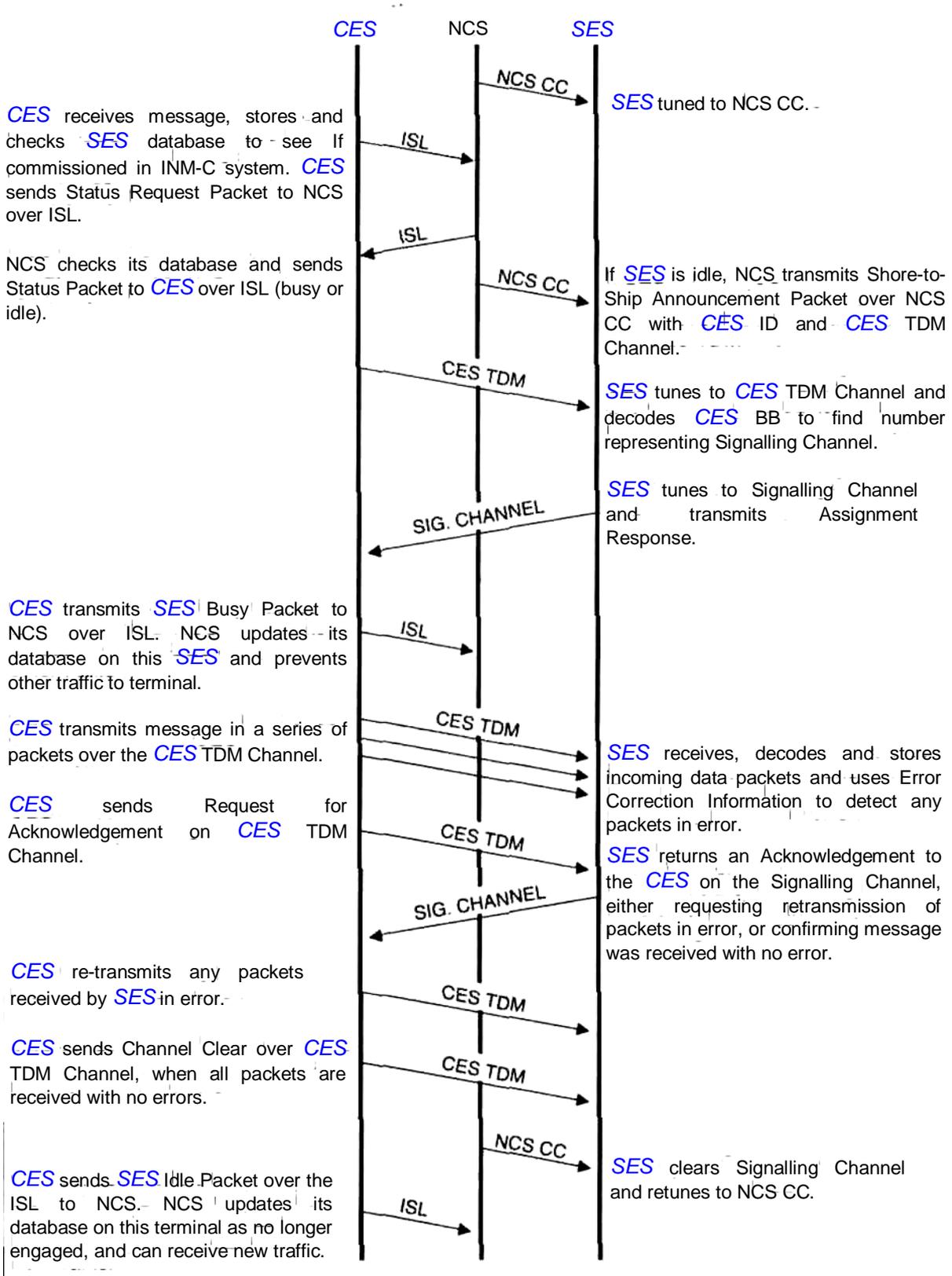


Figure 21 Shore-to-ship call set-up sequence

- 2 On receipt of the call over the public networks, the *CES* checks its *SES* database, to ensure that the *SES* is valid and logged-in. If so, the *CES* accepts and stores the incoming message, and sends an *SES status request* over the ISL to the NCS in its ocean region.
- 3 The NCS checks its database to find the status of the *SES*, and returns this information to the *CES* in an *SES status packet* over the ISL.
- 4 If the *SES* is free, the NCS transmits a *shore-to-ship announcement* over its Common Channel to the *SES*. (If, however, the *SES* is not free, the NCS informs the *CES*, which tries several times, and if unsuccessful, notifies the caller.)
- 5 The *SES* receives the announcement and finds the *CES TDM Channel*, to which it should tune.
- 6 The *SES* tunes from the NCS Common Channel to the *CES TDM Channel*.
- 7 In the *CES TDM*, the *SES* finds the *Signalling Channel* to which it should tune its transmitter.
- 8 On this Signalling Channel, the *SES DCE* transmitter transmits an *assignment response* to the *CES*, to indicate that the *SES* is ready to receive the message. (This is the first response that the *CES* receives from the *SES*.)
- 9 The *CES* transmits an *SES busy packet* on the Interstation Link to the NCS.
- 10 The NCS updates its database with this information, and prevents other calls to the *SES* until the *SES* is free again.
- 11 The *CES* transmits the message on its TDM channel in data packets to the *SES*.
- 12 In the *SES* the *DCE* receiver stores the packets, and checks for errors.
- 13 When the *CES* has completed sending the message, it sends a *request for acknowledgement* on its TDM channel to the *SES*.
- 14 The *DCE* transmitter returns an *acknowledgement* on the Signalling Channel, either confirming that the *SES* received the message with no errors, or giving details of any packets received in error.
- 15 If any packets were in error, the *CES* re-transmits those packets, and the sequence repeats until the *DCE* returns an *acknowledgement* to the *CES* that the message has been received with no errors.
- 16 The *DCE* transfers the complete message to the *DTE* for display and/or printing.
- 17 The *CES* transmits a *channel clear* signal on its TDM channel to instruct the *SES* to re-tune to the NCS Common Channel, to await further traffic.
- 18 The *CES* waits 60 seconds to allow the *DCE* to re-tune, then sends an *SES idle* signal on the ISL to the NCS.
- 19 The NCS logs the *SES* in its database as *idle*, to await any further traffic.

How a ship-to-ship call is made

Provided the selected *CES* supports the appropriate *ship-to-ship* service, as outlined below, an INMARSAT-C *SES* can send store-and-forward messages to another Inmarsat *SES* (*INMARSAT-A*, INMARSAT-C now, and from 1993, to an INMARSAT-B and *INMARSAT-M SES* (using, for example, the *message-to-fax* service),

Similarly, an INMARSAT-C *SES* can receive messages from an *INMARSAT-A*, INMARSAT-C *SES* now, and, from 1993, from an INMARSAT-B and *INMARSAT-M SES* (using, for example, a *third party service* to forward a telephone or fax message to the INMARSAT-C *SES*).

Different categories of ship-to-ship calls are possible, as defined below:

Ship-to-ship within the same ocean region

Both *SES*s must be within the same ocean region. The sending *SES* sends its message to a *CES* which supports the service. This *CES* forwards the message in a format suitable for the receiving *SES*:

- If the receiving *SES* is an INMARSAT-C, the *CES* forwards the message in store-and-forward data packets.
- If the receiving *SES* is an *INMARSAT-A* or an INMARSAT-B, the *CES* forwards the message as a telex transmission.
- If the receiving *SES* is an *INMARSAT-M*, equipped with a fax terminal, the *CES* forwards the message as a fax transmission.

Ship-to-ship in different ocean regions, served by the same *CES*

The *SES*s are in different ocean regions, which are served by the *same CES*, which operates in *both regions*. See Tables B-5 to B-8 in Appendix B for the *CES* ocean regions.

The sending *SES* sends the message to the *CES*, which forwards it to that part of its operations which functions in the other ocean region. That part transmits the message to the receiving *SES*, in a suitable format, as discussed above.

Ship-to-ship in different ocean regions, served by different *CES*s

The *SES*s are in different ocean regions, which are not served by the *same CES*. The sending *SES* sends the message to the *CES* in its ocean region. This *CES* forwards the message to the *CES* in the other ocean region, for transmission to the receiving *SES*, in a suitable format, as discussed above.

Note that at the time of writing (December 1992), the number of *CES*s offering the above ship-to-ship services is limited, but should increase as the system develops. To find out if a particular *CES* supports the required service, contact the *CES Services Contact Point* at the numbers given in Table B-1 in Appendix B.

How an EGC message is broadcast

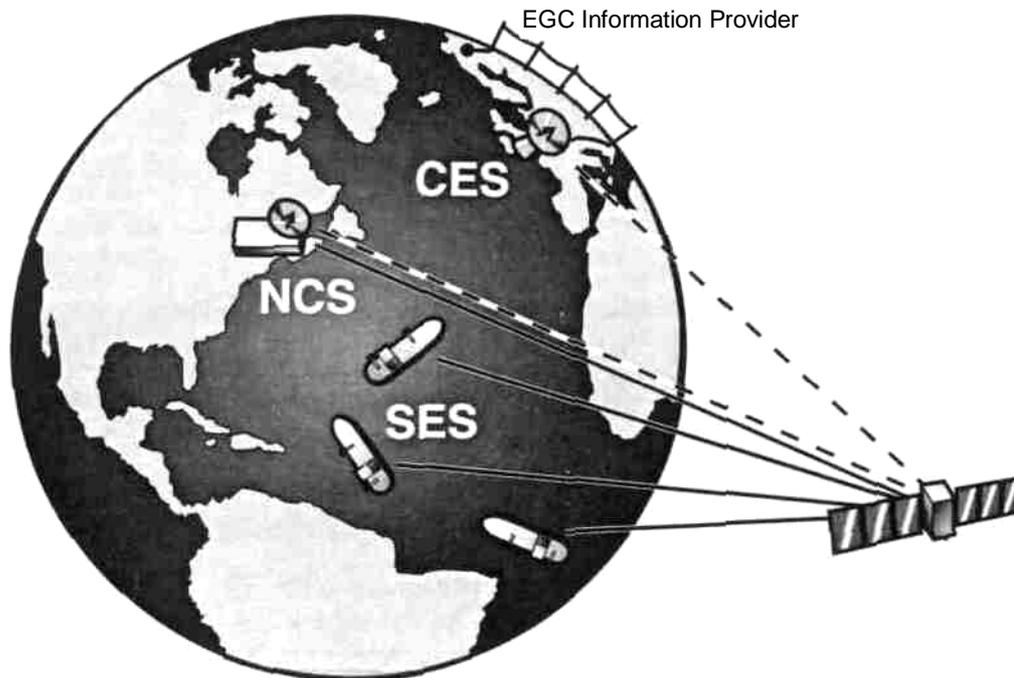
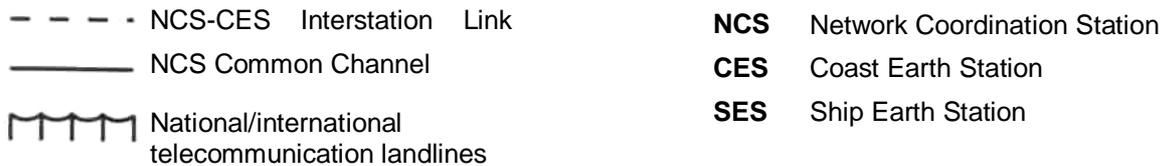


Figure 22 EGC message broadcast on an NCS Common Channel

The EGC services SafetyNETSM and FleetNETSM enable authorized Information Providers, such as meteorological offices, shipping companies or governments, to send messages via the INMARSAT-C system to *selected groups of SESs*, provided the following conditions are met:

- An operating and accounting arrangement must exist between the FleetNETSM Information Provider and an INMARSAT-C *CES*, for the *CES* to forward the EGC message over the INMARSAT-C system to the defined group of SESs.
- Individual SESs must be equipped with an *EGC receive capability* - on some models this is standard, whilst on other models it is an optional extra.
- No special arrangements are necessary for an *SES* to receive SafetyNETSM messages. To receive FleetNETSM messages, however, the SESs must have an arrangement with the FleetNETSM Information Provider (such as a subscription news service). This arrangement includes the FleetNETSM Provider *Downloading* via the INMARSAT-C system, into the *SES* memory, an *EGC Network Identification (ENID)* code, defining the *Closed network*.

- d. Each **SES** that is to receive the EGC messages must be synchronized to an NCS Common Channel, and must meet any geographical conditions for receipt of the messages.

The sequence of events when an EGC Information Provider sends a message is given below, and illustrated in simple terms in *Figure 22*.

- 1 Initially, the Information Provider prepares the message, normally using a computer, in a format agreed with the **CES**. For a SafetyNETSM message, the Information Provider includes details of the geographical area within which SESs are to receive the message. For a FleetNETSM message, the Information Provider also includes the ENID code, along with any geographical area definitions.
- 2 The Information Provider accesses the public networks using the agreed dialling procedure, and sends the message to the **CES**.
- 3 The **CES** forwards the message over the ISL to the NCS for the ocean region.
- 4 The NCS broadcasts the message on its NCS Common Channel throughout the ocean region.
- 5 Although all SESs in the ocean region which are equipped with an *EGC receive capability*, and are synchronized to the NCS Common Channel, can receive the EGC message, it is accepted *only* by those EGC receivers that match the conditions specified by the Information Provider - for a SafetyNETSM message, these conditions may be SESs only within a defined geographical area. For a FleetNETSM message, the message is accepted only by those SESs which are storing the ENID code, and may be further specified to be within a defined geographical area. All other EGC receivers do not accept the message.

For more information on the EGC services, see *Chapter 6 The EGC SafetyNETSM and FleetNETSM services*.

How an SES sends data reports

An **SES** can send *short* data reports, containing, for example, the vessel's position or sailing plan, via a **CES**, to an operational centre such as a shipping office, provided the following conditions are met:

- a. Both the **SES** and the selected **CES** must support the type of data reporting required. The types of reports possible on the INMARSAT-C system are:

Unreserved data reports (U): - these are initiated randomly at the **SES**, for example, by an operator entering data on the keyboard, or by external events such as weather conditions monitored by instruments interfaced to the **SES**.

Programmed unreserved data reports (P): - these are unreserved reports as above, but sent by the **SES** only after it has been programmed to send reports on a pre-defined schedule, entered into the **SES** either by the **SES** operator, or by a polling/control command from the operational centre. See the section *How an SES receives a polling/control command* on page 8-18 for more information.

Reserved (pre-assigned) data reports (R): - these are reports sent at *regular intervals*, as instructed in a *polling command* from an operational centre. Typical reserved data reports are position reports, read automatically at pre-determined times from a position monitoring system.

- b. Each **SES** that is to return data reports must previously have been registered with the operational centre. Registration includes the centre **Downloading**, via the INMARSAT-C system, a **Data Network Identification (DNID)** code for the **Closed network** to which the **SES** will belong, plus a **Member number** for the **SES** within the network.
- c. Each **SES** that is to send data reports must be synchronized to the NCS Common Channel for the ocean region where the receiving **CES** is located.

Sending an unreserved data report

- 1 In the **SES**, the data for the report is made available, either keyed in by the operator, or obtained from monitoring instruments.
- 2 The **CES** through which the report is to be routed is selected on the **SES**, either manually by the operator, or automatically by the **SES**, in response to the data being collected, and/or the earlier polling command,
- 3 The command to send the data report is given, either manually by the operator, or automatically by the **SES**.
- 4 The **SES** checks the NCS Common Channel Bulletin Board, to find the frequency of the **CES TDM Channel** for the **CES** selected.
- 5 The **DCE** receiver changes its tuning from the NCS Common Channel to the **CES** TDM channel.
- 6 In the **CES** TDM channel, the **DCE** receiver checks *Slot State Marker bits* in *Signalling Channel Descriptor packets*, for *unreserved Time slots*. (These are the *Time slots* in which the **SES** may later transmit its data report.)
- 7 When finding available unreserved *Time slots*, the **DCE** transmitter tunes to the corresponding Signalling Channel, to await these *Time slots*.
- 8 At the occurrence of these *Time slots*, the **DCE** transmitter transmits the first packet of the data report. This packet may contain up to eight bytes of data, plus the DNID and **Member number** for the data reporting **Closed network** (and other signalling information.)
If the **SES** has to transmit more than eight bytes of data in its data report, the **DCE** also sets a *continuation marker* in the first packet.
- 9 The **CES** receives the first packet, and checks for errors - if no errors are present, the following occurs:
 - The **CES** stores the data in a *DNID file*, to be accessed later by the operational centre.
 - If the continuation marker was set, the **CES** changes the Slot State Marker bit in its next TDM time frame to *reserved*. The **SES** receives this information in the TDM channel, as an indication that it may transmit the next packet of its data report in that *Time slot*.

This sequence repeats for a maximum of two continuation packets, each containing up to *twelve bytes* of data. So the maximum amount of data that the *SES* can transmit in an unreserved data report is (8 + 12 + 12) bytes, that is 32 bytes.

- 10 If, however, the *CES* finds errors in the first packet received from the *SES*, then the *CES* does not change the state of the Slot State Marker, as an indication to the *SES* to re-transmit its first packet.

Similarly, if the *CES* detects a 'collision', when two (or more) *SES*s happen independently to transmit in the same unreserved *Time slot*, the *CES* does not change the state of the Slot State Marker.

When an *SES* has to re-transmit its first packet, due to either of the above conditions, it refers to a 'randomizing interval' number contained in the *CES* TDM channel. The *SES* uses this number to introduce a *random time delay* before retransmitting its first packet, so giving a high probability of avoiding another collision.

This method of random access (known as *slotted ALOHA* after the form of recognition used) gives a high probability that the data report will be received successfully. It also makes optimum use of the system resources, so making data reporting a very cost-effective method of transmitting data.

Sending a programmed unreserved data report

The procedure for an *SES* sending a programmed unreserved data report is the same as above, except that the *SES* reports on a pre-defined schedule, which has been entered into the *SES* either by the *SES* operator, or by a polling/control command from the operational centre.

Sending a pre-assigned data report

- 1 Prior to an *SES* sending a reserved data report, an operational centre must have sent a *polling command* to the *SES*, giving instructions for the *SES* to transmit a data report at a specified *start time, interval and duration*.
- 2 Prior to the start time, the *SES* must be logged-in and synchronized to the NCS Common Channel, and have ready the means of automatically collecting the data.
- 3 Also, immediately prior to the start time, the *CES*, in its TDM channel, must set a *Slot State Marker* to *reserved*.
- 4 The *SES DCE* receiver changes its tuning from the NCS Common Channel to the *CES* TDM Channel, where it detects the reserved Slot Marker, and also details of the Signalling Channel which the *SES* should use to transmit its report. The *DCE* transmitter tunes its transmitter to this Signalling Channel, and transmits the first packet of the report. This packet contains identification information, after which a maximum of *eight bytes* of data can be included - if further data is to be transmitted, the *DCE* sets a *continuation marker* in this first packet.
- 5 The *CES* receives the first packet, and checks for errors. If none are present, the *CES* keeps the Slot Marker as reserved, as an indication to the *SES* to transmit the next packet in the next time frame.

This sequence repeats for up to three continuation packets, each of which may contain up to *twelve* bytes of data. So the maximum amount of data that an *SES* can transmit in a pre-assigned data report is (8 + 12 + 12 + 12) bytes, that is *44 bytes*.

How an *SES* receives a polling/control command

The polling service enables an authorized reporting centre to send *polling commands* (also known as *control commands*) to selected *SESs*, to instruct them to perform a defined task, for example to initiate transmission of a data report, or to operate a control device, such as an electronic relay, switch or valve.

To be able to receive polling commands, an *SES* must initially be registered with the operational centre, which downloads via the INMARSAT-C system a *Closed network Data Network Identification* (DNID) code plus *Member Code* for storage in the *SES*.

Subsequently, the operational centre sends any of the polling/control commands listed below to selected *SESs*, by the following sequence:

- 1 Initially, the operational centre prepares the polling/control command in a format agreed with the *CES*, including the information to define the *SESs* that are to receive the command - the DNID, *Member number(s)*, and any geographical area information, as applicable.
- 2 The operational centre then accesses the public networks using the agreed dialling procedure, and sends the polling/control command to the *CES*.
- 3 The *CES* forwards the command over the ISL to the NCS for the ocean region.
- 4 The NCS broadcasts the command on its NCS Common Channel throughout the ocean region.
- 5 Although all *SESs* in the ocean region which are equipped with an *EGC receive capability*, and that are synchronized to the NCS Common Channel, can receive the command, it is accepted *only* by those *SESs* that match the addressing conditions specified in the message.

The different types of polling/control command that an operational centre may send are:

- Individual polling commands
- Group polling commands
- Area polling commands

See the section *Different types of polling* on page 7-6 for more information.

How an *SES* performs SCADA tasks

An *SES* can perform *SCADA* (*supervisory control and data acquisition*) tasks as a combination of *data reporting* and *polling*, whereby the *SES* sends a data report to the operational centre, as described on page 8-15. The centre analyzes the data in the report, and may return a polling/control command, to instruct the *SES* to perform a defined task, as described above.

Appendix A INMARSAT-C SES and LMES manufacturers and type-approved models

Introduction

Table [A-1](#) lists the manufacturers who produce INMARSAT-C MESs (SEs and LMESs), and the type-approved models they produce.

(NOTE THAT INMARSAT DOES NOT MANUFACTURE MESs, BUT GRANTS TYPE APPROVAL TO MES MODELS PRODUCED BY INDEPENDENT MANUFACTURERS, AS LISTED IN TABLE [A-1](#))



Inmarsat will permit to be commissioned only *MES* models which are type-approved for their intended environment, installation and services, as defined on the relevant Commissioning Application Form.

Note also that if any peripherals (for example computers, printers, monitoring sensors or navigational equipment) are to be connected to the *MES*, confirmation must be obtained from the manufacturer/agent that the equipment is suitable for the purpose.

Table [A-2](#) lists the communications services that may be supported by an INMARSAT-C *SES*. To find out if your *SES* model supports a particular service, in its present form, or can be modified to do so by purchasing an upgrade kit, refer to the manufacturer's literature, or contact the agent who supplied the *SES*, or the manufacturer directly at the address given in Table [A-1](#).

Table A-1 INMARSAT-C SES and LMES manufacturers and type-approved models

(as at 30 Dec 1992)

MES Manufacturer	MES model	Type
ABB-Nera AS, Mr Ottar B Bjastad, Sales Manager, Satoom Division PO Box 91, N 1361 Billingstadsletta, Norway Tel +47 66 844 700, Tlx (56) 71721 UMEB N, Fax +47 66 982267	Saturn-C Saturn-C EGC Saturn-C Land-fixed Saturn-C Portable	Maritime EGC add-on to Inm A Land-fixed Portable
Anritsu Corporation, Mr K Sasaki 5-10 27 Minami-Azabu, Minato ku Tokyo 106, Japan Tel +81 3 3446 1111, Tlx (72) 2422353 ANRITU J, Fax +81 3 3440 2430	RSS403A	Maritime
Aviato A/S, Mr Jan Chnstensen, PO Box 251, Vaeselvej 130 132, DK-7800, Skieve, Denmark Tel +45 9751 2188, Fax +45 9751 2621	Aviato Safecom CL	Land-mobile
Bennex AS, Mr Egil Hanssen PO Box 1992. Nordnes, N 5024, Bergen, Norway Tel +47 590 2520, Tlx (56) 42908 SEA N, Fax +47 590 2212	Bensat TM-1250A Bensat TM-1700A	Mantime Portable
Celeritek, Mr Kenneth McKean or Mr Frank Sasselli 617 River Oaks Parkway, San Jose, California 95134, USA Tel +1 408 433 0335, Fax +1 408 433 0991	Vanguard 3000	Land-fixed
DCG, Mr Encco de Bias, Mendez Alvaro 34, 28045 Madnd, Spain Tel +34 1468 0211, Fax +34 1468 0011	Briefcom	Portable
DMT Marltechnik GmbH Mr Alois Salfner, STN Systemtechnik Nord Fachgeblet, Behnngstrasse 120, D 2000 Hamburg 50, Germany Tel +49 4088 252845, Fax +49 4088 254105	Debeg 3220B	Mantime
Furuno Electric Co Ltd, Mr Hiroaki Komatsu, Gen Mgr, Marketing Div 9 52 Ashihara-Cho, Nishinomiya City 662, Japan Tel +81 798 652 111, Tlx (72) 5644 326, Fax +81 798 65 4200	EGC-5 Felcom-10	EGC receive-only Mantime
Hagenuk GmbH, Mr Nils Schwarz Grosse Elbstrasse 277-279, D 2000 Hamburg, Germany Tel +49 431 8184242, Fax +49 431 818 306	TT-3020B Capsat TT-3022A	Mantime Land-mobile
Hughes Network Systems (HNS), Mr Zubair Ajaz 11717 Exploration Lane, Germantown, Maryland 20876, USA Tel +1 301 428 5646, Fax +1 301 428 2817	3100	Land mobile with GPS
Japan Radio Company (JRC), Mr Akeyoshi Sumita Executive Managing Director, Akasaka Twin Towers (Main) 17 22 Akasaka 2-Chome, Minato-ku, Tokyo 107, Japan Tel +81 3 3584 8836 Tlx (72) 2425420 JRCTOK J, Fax +81 3 3584 8878	JHR-6A (<i>Discominued</i>) JRE-60A JUE-65A (<i>Discontinued</i>) JUE-75A JUE-80M JUE-80P JUE-80S NMB-165A (<i>DscommvMd</i>) NRF-70A	EGC receive-only EGC receive-only Mantime Mantime Land-mobile with GPS Portable with GPS SCADA EGC add-on to Inm A EGC add-on to Inm A
Kelvin Hughes Ltd, Mr John Almond New North Road, Hainault, Ilford, Essex IG6 2UR, UK Tel +44 81 500 1021, Fax +44 81 500 0837	Husun 2095B	Mantime
Koden Electronics Co Ltd, 10-45 Kami-Osaki 2-Chome, Shinagawa ku, Tokyo 141, Japan Tel +81 3 3440 3864. Fax +81 3 3473 3837	KSC-90	Mantime
M.A.N. Technologle AG. Mr Armin Keller, Communication Technology Bauschingerstrasse 20, D-8000 Munich 50, Germany Tel +49 8131 907354, Fax +49 8131 907372	Mantronic	Mantime

TABLE A-1 INMARSAT-C SES and LMES manufacturers and type-approved models (contd)
(as at 30 Dec 1992)

MES Manufacturer	MES model	Type
Logiq, Leyland Daf On board Systems Mr Ian Jones, Managing Dir Eastern Bypass, Thame Oxfordshire, OX9 3FB UK Tel +44 844 261 111, Tlx (51) 838848, Fax +44 844 217 111	Logiq 1010	Land-mobile
Mobile Telesystems Inc (MT1), Mr George F Corbin, VP Eng Ops 300 Professional Drive Gaithersburg Maryland 20879 USA Tel +1 590 8555, Tlx (23) 901885 Fax +1 301 590 8558	Datalite MDT6000N	Portable Mantine
Philips Radio Communications Systems Mr Jens Bjarne Thostrup Jenegade 22 Postbox 1818 DK 2300 Copenhagen S Denmark Tel +45 32 88 3793, Tlx (55) 31201 PHIL DK Fax +45 32 88 3930	Safecom CL Safecom CM	Land-mobile Mantine
PTT Telecom BV Mr E T Ottolini Product Manager Mobile Comms Postbus 30150, 2500 GD Gravenhage Netherlands Tel +31 70 343 7761, Fax +31 70 343 5040	Spacebox	Land mobile
Rafael, Dr Adam Uvne, Director PO Box 2250 (8k) Haifa Israel 31021 Tel +972 4 794 303, Fax +972 4 794 291	BIPSAT MSC-101	Portable
Salt Marine International Mr A Godts Herentalsebaan 55, B 2100 Deume, Antwerp, Belgium Tel +32 3 320 1711, Tlx (46) 31547 SAIT AB Fax +32 3 321 5034	Arles-C	Mantine
Scientific Atlanta Mr William C Buckett, Network Systems Group 4291 Communications Dnve, Norcross GA 30093 USA Tel +1 404 903 6215, Fax +1 404 903 5346	MarlStar 9801 Terrastar 9805	Mantine Land-mobile
SNEC Mr R Dickens 2 Rue de Caen, B P 7, 14740 Bretteville l'Orgueilleuse, France Tel +33 31 807122. Tlx (42) 171813F, Fax +33 31 806549	C-Mate Landbased PC C-Mate Landmobile (GPS) C-Mate Reporter C-Mate Maritime C-Mate Maritime-GPS C-Mate Maritime-PC	Land-fixed Land-mobile with GPS option Portable Mantine Mantine with GPS Mantine
Sperry Marine inc, Mr Pat Lee, Worldwide Marketing Manager Sat Comms Systems, 1070 Seminole Trail Charlottesville, VA 22901, USA Tel +1 804 974 2566, Tlx (23) 210379, Fax +1 804 974 2259	Sperry H2095B	Mantine
SP Radio A/S Mr K E Dantoft Porsve) 2 DK 9200 Aalborg SV, Denmark Tel +45 9818 0999. Tlx (55) 69789 SPRAD DK Fax +45 9818 6717	Sailor H1622A Sailor H2095B	Land-mobile Mantine
STC International Marine Mr Rodger Perks Inteico House, 302 Commonsides East, Mitcham, Surrey CR4 1YT, UK Tel +44 81 640 3400 Tlx (51) 261440/8953234 IMRCCR G Fax +44 81 685 0321	Mascot C Nomad 2000 STR 1250	Mantine Portable Mantine
Thrane & Thrane A/S, Mr Per Thrane Tobaksvejen 23, DK-2860 Soborg, Denmark Tel +45 3156 4111, Tlx (55) 19298 THRANE DK, Fax +45 3156 2140	TT-3020A (DsconliniMd) TT-3020B TT-3020B (Option 5) TT-3022A TT-3022A (Option 5)	Mantine Mantine Mantine with GPS Land-mobile Future option with GI Maritime with GPS
Toshiba Corporation, Mr Shuji Funo 1-1 Shibaura, 1-Chome, Minato-ku, Tokyo 105, Japan Tel +81 33 3457 3116, Tlx (72) 22587 TOSHIBA J. Fax +81 33 3457 0545	TM-1250A TM-1700A	Mantine Portable
Trimble Navigation Ltd, Mr Don Green 645 North Mary Avenue, PO Box 3642, Sunnyvale CA 94086, USA Tel +1 408 481 6834. Tlx (23) 6713973, Fax +1 408 737 6057	TNL 7001 TNL 7002	Mantine with GPS Land-mobile with GPS

Table A-2 INMARSAT-C SES communications services, and explanation of terms used



To find out if your **SES** model, in its present form supports a particular communications service from the list below, or can be modified to do so by purchasing an upgrade kit, refer to the manufacturer's literature, or contact the agent who supplied the model, or the manufacturer directly at the address in **Table A-1**.

Communications service	Explanation
Telex	The SES can send and receive messages to and from a telex terminal connected to the international Telex networks .
PSTN	The SES can send and receive messages to and from a computer or E-mail service on the international PSTN (telephone) landlines.
PSDN (also known as the X.25 networks)	The SES can send and receive messages to and from a computer or E-mail service on the international PSDN (data) landlines. (These networks are also known as the X.25 networks , after the communications standards (Protocol) used on the networks.)
X.400 (used for E-mail services)	The SES can send and receive messages to and from registered subscribers to electronic-mail (E-mail) services which use the X.400 communications standards (Protocol) on the PSDN landlines.
Telex characters (also known as ITA2 or 5-bit packed)	The SES can display or print characters in messages sent or received using the standard alpha-numeric character set known as Telex, or ITA2 (International Telegraph Alphabet), or 5-bit packed. This character set is based on 5-bit codes, and supports only UPPER CASE characters (so any lower case characters entered on your SES will be received at the destination as UPPER CASE). This format is generally used to send messages over the Telex networks .
ASCII characters (also known as IA5)	The SES can display or print characters in messages sent or received using the standard alpha-numeric character set known as ASCII (<i>American Standard Code for Information Interchange</i>), also known as IA5 (<i>International Alphabet 5</i>). This character set is based on 7-bit codes, and supports both UPPER and lower case characters. This format is generally used to send messages over the PSTN landlines , to a fax terminal or computer.
Data presentation	The SES can send and receive any 8-bit binary-encoded data , for example numerical data from a word processor, encoded text from a word processor, or from software which supports national characters such as Arabic, Chinese, Japanese and Russian. This format is used to send binary-encoded data over the PSDN (X.25 or X.400) landlines to a computer.
Maritime Distress alerting	The SES can transmit a pre-programmed maritime distress alert via the INMARSAT-C system, to be routed with top priority to an RCC (Rescue Coordination Centre).
Closed network	The INMARSAT-C system supports two types of Closed networks - data reporting Closed networks , and EGC FleetNETSM Closed networks . Different registration arrangements are necessary for each type: For a data reporting Closed network , the owner/shipping company must register the SES with the relevant operational centre. This centre arranges with an INMARSAT-C CES to download data reporting network identification information , comprising a Data Network Identification (DNID) code and a Member number within the group. When downloaded, the SES stores these codes in its memory, for subsequent use during data reporting , polling and the related application of SCADA (<i>supervisory control and data acquisition</i>)

Table A-2 INMARSAT-C SES communications services, and explanation of terms used
(contd.)

 To find out if your **SES** model, in its present form supports a particular communications service from the list below, or can be modified to do so by purchasing an upgrade kit, refer to the manufacturer's literature, or contact the agent who supplied the model, or the manufacturer directly at the address in **Table A-1**.

Communications service	Explanation
Closed networks (contd.)	For a FleetNET SM Closed network , the owner/shipping company must register the SES with the relevant FleetNET SM Information Provider. This Information Provider arranges with an INMARSAT-C CES to download an EGC network identification (ENID) code, to be stored in the SES . The Information Provider subsequently broadcasts messages addressed exclusively to the SESs storing the ENID code.
EGC SafetyNETSM	The SES , if equipped with an EGC receive capability , can receive broadcasts of Maritime Safety Information (MSI) in the EGC SafetyNET SM service.
EGC FleetNETSM	The SES can receive EGC FleetNET SM broadcasts from an Information Provider, provided it has an EGC receive capability , and has been registered into the FleetNET SM Closed network by receiving an ENID code downloaded into its memory.
Integrated GPS	The SES has a built-in GPS (Global Positioning System) receiver, enabling integrated communications and navigation functions.
Special Access Codes	Special Access Codes (also known as SACs), pre-arranged with a CES and Service Provider, can be stored in the SES to enable it to access predefined services.
2-digit codes	2-digit codes are particular Special Access Codes , using two digits, as shown in Table C-2 .
Prefixed store-and-forward	Special prefix codes, pre-arranged with an CES , can be entered into the SES to enable the SES to select, on request, a pre-defined service at the CES (such as selecting a particular carrier for forward transfer of the store-and-forward message to the intended destination).
Data reporting (U)	The SES , if registered with an operational centre, can send data reports to the centre at any random time.
Data reporting (P) (programmed)	The SES , if registered with an operational centre, and after it has been programmed by the SES operator with a pre-defined schedule, can send unreserved data reports (as above) to the centre at the scheduled times.
Data reporting (R) (reserved)	The SES , if registered with an operational centre, can send data reports to the centre at scheduled times, as defined in a polling command from the centre.

Appendix B INMARSAT-C CES information

Table B-1 INMARSAT-C CESS, Atlantic Ocean Region - West (AOR - W) - CES Customer Service Contact Point (as at 30 December 1992)

CES Customer Service Contact Point

CES ID code	Country CES operator	Telex number	Telephone number	Fax number	Operational status
Goonhilly 002	UK British Telecom	(51) 916554 BTIMR G	444 71 492 4990	+44 71 606 4640	In operation*
Pleumeur-Bodou 011	France France Telecom	(42) 572077	+33 56 83 14 13	+33 56 83 13 05	In operation*
Southbury 001	USA Comsat	(230) 962408 COMGEN ES STHB	+1 203 264 9055	+1 203 262 2083	In operation*

The NCS for the AOR-West is Goonhilly, with the ID code of 044.

* This CES also operates an INMARSAT-A CES in this ocean region.



All operational Inmarsat-C CESS support the following services: Two-way Store-and-forward Messaging, Distress alerting & Distress Priority Messaging, and broadcasting EGC SafetyNETSM Maritime Safety Information (MSI).
Optionally, a CES may support other services, as described in Table B-5.

For details of the services supported by a particular CES, contact the CES directly at the CES Customer Service Contact Point, at the numbers given above.

Table B-2 INMARSAT-C CESS, Atlantic Ocean Region - East (AOR - E)
 - CES Customer Service Contact Point (as at 30 December 1992)

CES Customer Service Contact Point

<i>CES ID code</i>	<i>Country CES operator</i>	<i>Telex number</i>	<i>Telephone number</i>	<i>Fax number</i>	<i>Operational status</i>
Blavand 131	Denmark Telecom Denmark	(55) 22999 TELCOM DK	+45 42 52 91 11	+45 42 52 93 41	In operation*
Burum 112	Netherlands PTT Telecom NL	(44) 41400 HDINM NL	+31 2550 62 440	+31 2550 62 424	In operation*
Fucino 105	Italy Telespazio SPA	(43) 620424 TSPZRO I	+39 6 4069 3379	+39 6 4069 3624	Under implementation*
Goonhilly 102	UK British Telecom	(51) 916554 BTIMR G	+44 71 492 4990	+44 71 606 4640	In operation*
Odessa 107	CIS Morsv'язspu'tnik	(64) 411197 MMF SU	+7 095 258 4417	+7 095 253 9910	In planning*
Pleumeur-Bodou 111	France France Telecom	(42) 572077	+33 56 83 14 13	+33 56 83 13 05	In operation*
Raisting 115	Germany DBF Telekom	(41) 88 66 68 GDT	+49 228 181 3349	+49 228 181 3394	In operation*
Southbury 101	USA Comsat	(230) 962408 COMGEN ES STHB	+1 203 264 9055	+1 203 262 2083	In planning*
Tangua 114	Brazil EMBRATEL	(38) 2121810 EBTL BR	+55 21 216 7738	+55 21 233 7399	In planning*

* This CES also operates an **INMARSAT-A CES** in this ocean region.

The NCS for the AOR-East is Goonhilly, with the ID code of 144.



All operational INMARSAT-C CESS support the following services: Two-way Store-and-forward Messaging, Distress alerting & Distress Priority Messaging, and broadcasting EGC SafetyNETSM Maritime Safety Information (MSI). Optionally, a CES may support other services, as described in **Table B-5. For details of the services supported by a particular CES, contact the CES directly at the CES Customer Service Contact Point, at the numbers given above.**

Table B-3 INMARSAT-C CESSs, Pacific Ocean Region (POR) - CES Customer Service Contact Point (as at 30 December 1992)

CES Customer Service Contact Point

CES ID code	Country CES operator	Telex number	Telephone number	Fax number	Operational status
Beijing 211	China Beijing Mar Com/Nav	(85) 22462 COMCT CN	+86 1 421 3131	+86 1 421 3509	Under implementation*
Kurmsan 207	Korea KTA	(801) 27749 K	+82 2 750 3745	+82 2 750 3749	In planning*
Nakhodka 272	CIS Morsvialputnik	(64) 411197 MMF SU	+7 095 258 4417	+7 095 253 9910	In planning*
Perth 202	Australia Ore Maritime	(71) 10166 OTSEA	+61 2 901 2000	+61 2 906 5175	In operation*
Santa Paula 201	USA Comsat	(230) 698521 COMGEN ES SPLA	+1 805 933 1211	+1 805 933 3952	In operation*
Singapore 270	Singapore Singapore Telecom	(87) 20213	+65 331 6766	+65 334 6110	In operation*

The NCS for the **POR** is Singapore, with an ID code of 244.

*This CES also operates an **INMARSAT-A CES** in this ocean region.



All operational INMARSAT-C CESSs support the following services: Two-way Store-and-forward Messaging, Distress alerting & Distress Priority Messaging, and broadcasting EGC SafetyNETSM Maritime Safety Information (MSI). Optionally, a CES may support other services, as described in Table B-5. For details of the services supported by a particular CES, contact the CES directly at the CES Customer Service Contact Point, at the numbers given above.

Table B-4 INMARSAT-C CESs, Indian Ocean Region (IOR) - CES Customer Service Contact Point (as at 30 December 1992)

CES Customer Service Contact Point

CES ID code	Country CES operator	Telex number	Telephone number	Fax number	Operational status
Arvi 306	India VSN	(81) (118) 2429	+91 22 27 0250	+91 20 95 4321	In planning*
Ata 310	Turkey PTT Genel Mudurlugu	(607) 44850 AKYI TR	+90 4 312 2583	+904 311 5248	In planning*
Beijing 311	China Beijing Mar Com/Nav	(85) 22462 COMCT CN	+86 1 421 3131	+86 1 421 3509	Under implementation*
Burum 312	Netherlands PTT Telecom NL	(44) 41400 HDINM NL	+31 2550 62440	+31 2550 62424	In operation*
Eik 304	Norway Norwegian Telecom	(56) 72666 TRM N	+47 22 48 87 45	+47 22 41 53 65	In operation*
Jeddah 315	Saudi Arabia Ministry of PTT	(495) 401220 PTT SJ	+966 1 404 1515	+966 1 405 9008	In planning*
Odessa 307	CIS Morsviatsputnik	(64) 411197 MMF SU	+7 095 258 4417	+7 095 253 9910	In planning*
Perth 302	Australia OTC Maritime	(71) 10166 OTSEA	+61 2 901 2000	+61 2 906 5175	In operation*
Thermopylae 305	Greece ore SA	(601) 215432 PLAN GR	+30 1 611 8100	+30 1 806 7099	Under implementation*

The NCS for the IOR is Thermopylae, with the ID code of 344.

* This CES also operates an INMARSAT-A CES in this ocean region.

 All operational INMARSAT-C CESs support the following services: Two-way Store-and-forward Messaging, Distress alerting & Distress Priority Messaging, and broadcasting EGC SafetyNETSM Maritime Safety Information (MSI).
Optionally, a CES may support other services, as described in Table B-5.
For details of the services supported by a particular CES, contact the CES directly at the CES Customer Service Contact Point, at the numbers given above.

Table B-5 INMARSAT-C CES services - mandatory and optional



All operational INMARSAT-C CESs support the following mandatory services: *Two-way*

Store-and-forward Messaging, Distress alerting & Distress Priority Messaging, and broadcasting EGC SafetyNETSM Maritime Safety Information (MSI).

Optionally, a CES may also support other services, as described below. For details of the services supported by a particular CES, contact the CES directly at the CES Customer Service Contact Point, at the numbers given in Table B-1 to Table B-4.

Two-way store-and-forward messaging services

Presentation codes

- Telex** (ITA2) (5-bit) The CES can accept text messages formatted in the *Telex character set*. This is a standard alpha-numeric character set, based on 5-bit codes. It is also known as *ITA2 (International Telegraph Alphabet 2)*, or **5-bit packed**. Supporting Telex (ITA2) *Presentation code* is an optional CES service.
- ASCII** (IA5) (7-bit) The CES can accept text messages formatted in the *ASCII (American Standard Code for Information Interchange)* character set. This is a standard alpha-numeric character set, based on 7-bit codes, and also known as the *IA5 (International Alphabet 5)*. All INMARSAT-C CESs support *ASCII (IA5) Presentation code*.
- Data** (8-bit) The CES can accept data messages (text or numeric information) formatted in *8-bit binary code*. Supporting data *Presentation code* is an optional CES service.

Fax delivery (ship-to-shore)

The CES receives a text-only message from an SES, and forwards it over the PSTN networks to a fax terminal. Fax delivery is an optional CES service.

Fax bureau service (shore-to-ship)

The CES accepts a fax message (text only) from a shore-based subscriber. The message must contain the IMN and ocean region of the SES that is to receive the message. In the CES the message is re-typed by an operator, and forwarded as a store-and-forward message over the INMARSAT-C system to the nominated SES. Providing a *Fax bureau service* is an optional CES service.

Prefixed store-and-forward

The CES accepts store-and-forward messages prefixed with a special pre-defined code, to request a specific service, such as forwarding a message from an SES, via a particular telecommunications carrier, to the intended destination. This is an optional CES service.

Shore-to-ship multi-addressing of SESs

The CES receives a message from a shore-based subscriber, accompanied by a list of SESs that are to receive the message. The CES forwards the message, addressed to all SESs on the list. This is an optional CES service.

Ship-to-shore Special Access Codes/2-digit Codes

The CES accepts *Special Access Codes (SACs)*, up to six digits in length, from a sender to access a pre-defined destination or service. Particular *Special Access Codes* are the *2-digit codes*, to enable an SES to access special safety services. See Table C-2 for details. Supporting SACs/*2-digit codes* is an optional CES service.

Data reporting closed network addressing (DNID)

The CES accepts *Data Reporting Network Identification (DNID)* codes in the following circumstances:

- When an operational centre initially registers an SES into the *Closed network*, it sends pre-formatted information defining the DNID code and the SES, over the public telecommunications networks, to the CES. The CES forwards the information to its NCS, which downloads it on the NCS Common Channel to the SES, for storage in the SES

memory.

- ❑ When an **SES** sends a data report, accompanied by a DNID code, to the **CES**, for storage and subsequent retrieval by the appropriate operational centre.

Supporting DNID addressing is an optional **CES** service.

EGC FleetNETSM closed network addressing (ENID)

The **CES** accepts *EGC FleetNETSM Network Identification (ENID)* codes in the following circumstances:

- ❑ When a FleetNETSM Information Provider initially registers an **SES** into the EGC FleetNETSM *Closed network*, it sends pre-formatted information defining the ENID code and the **SES** for which it is intended, over the public telecommunications networks, to the **CES**. The **CES** forwards the information to its NCS, which downloads it on the NCS Common Channel to the **SES**, for storage in the **SES** memory.
- ❑ When the FleetNETSM Information Provider subsequently sends a message, accompanied by an ENID code, over the public networks to the **CES**. The **CES** forwards the message to its NCS, which broadcasts it on the NCS Common Channel, to be received only by those **SESs** that are storing the ENID code.

Supporting ENID addressing is an optional **CES** service.

Ship-to-ship within the same ocean region, served by the same CES

The **CES** is capable of receiving a message from an INMARSAT-C **SES**, and forwarding it to a second Inmarsat **SES** within the same ocean region. Provided the message from the first **SES** is in a suitable format, the second **SES** may be an *INMARSAT-A, -B, -C or -M*. (The format suitable for sending a message to an *INMARSAT-A, -B or -C SES*, is as a telex message. Suitable formats for sending a message to an *INMARSAT-M SES*, are as a message-to-fax or E-mail message). This service is optional to a **CES**.

Ship-to-ship within the same ocean region, served by different CESs

The first **CES** is capable of receiving a message from an **SES**, and forwarding it over terrestrial lines to a second **CES** within the same ocean region. The second **CES** forwards the message over an Inmarsat system to the required **SES** (which may be an *INMARSAT-A, -B, -C or -M*, using the techniques mentioned above). This service is optional to a **CES**.

Ship-to-ship in different ocean regions, served by the same CES

The **CES** must operate in the two ocean regions, and be capable of receiving a message from an **SES** and forwarding it via its own facilities to a second **SES** in the other ocean region. (The second **SES** may be an *INMARSAT-A, -B, -C or -M*, using the techniques mentioned above). This service is optional to a **CES**.

Ship-to-ship in different ocean regions, served by different CESs

The **CES** is capable of receiving a message from an **SES**, and forwarding it over terrestrial landlines to another **CES** in another ocean region, for forwarding to a second **SES** (which may be an *INMARSAT-A, -B, -C or -M*, using the techniques mentioned above). This service is optional to a **CES**.

Distress alerting and distress priority messaging service

Routing to an RCC

The **CES** is capable of receiving a distress alert and/or a *Distress priority message* from an **SES**, and routing it directly to an RCC associated with the **CES**. The **CES** sends the **SES** acknowledgement of receipt of the distress alert. The RCC then assumes control of the search and rescue activities.

All INMARSAT-C CESs support the *Distress alerting* and distress priority messaging service.

EGC BROADCASTING SERVICES

EGC SafetyNETSM

The **CES** is capable of accepting *EGC SafetyNETSM Maritime Safety Information (MSI)* messages from an authorized Information Provider. The **CES** forwards the **MSI** message to its **NCS**, for broadcasting on the NCS Common Channel to all SESs in the ocean region, or to selected SESs. The **MSI** message must define one of four priority levels - Routine, Safety, Urgent or Distress, and may contain geographical or **NAVAREA** addressing information.

All INMARSAT-C CESs have a capability of supporting the EGC SafetyNETSM **MSI** service (but refer to the section *Limitations on reception of EGC SafetyNETSM MSI in some areas* in **Chapter 6** for more information.)

EGC FleetNETSM

The **CES** accepts an *EGC FleetNETSM message*, including addressing information, from an authorized Information Provider. The **CES** forwards the message to its NCS, for broadcasting on the NCS Common Channel, addressed to the selected SESs. The addressing information in the message (the ENID code and any geographical information), determines the SESs that are to accept the message.

Supporting the EGC FleetNETSM service is an optional **CES** service.

Presentation codes

Telex The **CES** can accept EGC messages formatted in the *Telex character set*. This is a (**ITA2**) standard alpha-numeric character set, based on 5-bit codes. It is also known as **ITA2 (5-bit)** (*International Telegraph Alphabet 2*), or 5-bit packed. Supporting Telex (**ITA2**) **Presentation code** is an optional **CES** service.

ASCII The **CES** can accept EGC messages formatted in the **ASCII** (*American Standard (IA5) Code for Information Interchange*) character set. This is a standard alpha-numeric (**7-bit**) character set, based on 7-bit codes, and also known as the **IA5** (*International Alphabet 5*). All CESs support **ASCII (IA5) Presentation code**.

Data The **CES** can accept EGC FleetNETSM messages (text or binary-encoded data), (**8-bit**) formatted in *8-bit binary code*. Supporting data **Presentation code** is an optional **CES** service.

Choice of **Presentation code** for EGC messages is optional to a **CES**.

Data reporting and polling services

Data reporting - CES can accept:

ASCII The **CES** can accept data reports from an **SES**, formatted in the **ASCII (IA5)** (**IA5**) character set.

Data The **CES** can accept data reports from an **SES**, formatted in *8-bit binary code*. Data reporting, and the **Presentation code** accepted, is an optional **CES** service.

Automatic delivery of a DNID file, based on:

Time The **CES** automatically forwards the data stored in a DNID file at pre-arranged times, to the operational centre.

File Full The **CES** automatically forwards the data stored in a DNID file to the operational centre when the file is full.

Automatic delivery of a DNID file, and the method of delivery that a **CES** provides, is an optional **CES** service.

Polling text field can contain:

- ASCII** The **CES** can accept text in the polling field of a polling command formatted in the (IA5) **ASCII (IA5)** character set, for forwarding via the NCS Common Channel to defined SESs.
- Data** The **CES** can accept text or binary-encoded data in the polling field of a polling command, formatted in *8-bit code*, for forwarding to defined SESs.

Choice of **Presentation code** for the text in a polling command is an optional **CES** service.

Pre-assigned data reporting

The **CES** can pre-assign **Time slots** in its Signalling Channel for an SES to transmit pre-assigned data reports via the **CES**, for forwarding to the operational centre.
Pre-assigned data reporting is an optional **CES** service.

Operator-assisted services and value-added services

The following operator-assisted and value-added services are optional **CES** services:

Operator-assisted services

- ✓ An SES sends a text message to a **CES** operator, to be forwarded as a *voice message* to a telephone number or answering machine, or to a voice mail-box.
- ✓ An SES sends a text message to a **CES** operator, to be posted through the mail as a *telex message*.
- ✓ An SES sends a text message to a **CES** operator, to be forwarded as a *telex/voice/morse message* to an MF or HF transceiver.
- ✓ A **CES** operator confirms to an SES the *delivery* of a message to its intended destination.
- ✓ A **CES** operator attempts *deferred delivery* of a message from an SES to a destination on the international networks, if not initially delivered.
- ✓ *Directory services* - a **CES** operator finds a subscriber's number on the national / international networks.
- ✓ *Translation services* - a **CES** operator arranges to have text translated into another language, and forwarded to a specified destination.
- ✓ *Access to databases* - a **CES** operator finds the information an SES operator requires, and calls the SES operator back.

Value-added services

- ✧ The **CES** provides shore-to-ship access by *two-stage selection*, for subscribers in a country where no Inmarsat access arrangement exists with the national telecommunications authority.
- ✧ *E-mail services*, whereby the **CES** provides access for SESs and shore-based correspondents to international E-mail networks.
- ✧ *Fax bureau, services*, whereby the **CES** receives a fax message (text only) from shore-based subscribers, re-types the message, and forwards it as a store-and-forward message to an SES.
- ✧ *Two-digit Code services*, allowing an SES to access a wide range of special safety and maritime services.

Appendix C Telex / Fax / Phone country codes
Table C-1 Telex / Fax / Phone country codes

COUNTRY CODE	TELEX COUNTRY CODE N°	FAX/PHN COUNTRY CODE N°
AFGHANISTAN	79	93
ALASKA	200	1907
ALBANIA	604	355
ALGERIA	408	213
ANDORRA	590	376
ANGOLA	991	244
ANGUILLA	391	1254
ANTIGUA & BARBUDA	393	1268
ARGENTINA	33	54
ARMENIA	684	374
ARUBA	303	297
ASCENSION	939	247
AUSTRALIA	71	61
AUSTRIA	47	43
AZERBAIJAN	784	994
AZORES	404-8	35192/35195/35196
BAHAMAS	297	1242
BAHRAIN	490	973
BANGLADESH	780	880
BARBADOS	392	1246
BELARUS	681	375
BELGIUM	46	32
BELIZE	371	501
BENIN	972	229
BERMUDA	290	1441
BHUTAN	890	975
BOLIVIA	309	591
BOSNIA & HERZEGOVINA	600	387
BOTSWANA	962	267
BRAZIL	38	55
BRUNEI DARUSSALAM	809	673
BULGARIA	67	359
BURKINA FASO	978	226
BURUNDI	903	257
CAMBODIA	807	855
CAMEROON	970	237
CANADA	21	1
CANARY ISL.	52-91/52-92/52-95/52-96	34-22/34-28
CAPE VERDE	993	238
CAROLINE ISL.	764	691
CAYMAN ISL.	293	1345
CENTRAL AFRICAN REP	971	236
CHAD	976	235
CHILE	34/342 to 346	56
CHINA (PEOPLE'S REP]	85	86
CHRISTMAS ISL	766-7	619164
COCOS KEELIMG ISL.	766	619162
COLOMBIA	35	57

Appendix C Telex / Fax / Phone country codes

COUNTRY CODE	TELEX COUNTRY CODE N°	FAX/PHN COUNTRY CODE N°
COMOROS	994	2697
CONGO (DEM. REP OF)	982	243
CONGO (REP OF) (Brazz)	981	242
COOK ISL.	772	682
COSTA RICA	376	506
COTE D'IVOIRE	983	225
CROATIA	599	385
CUBA	28	53
CYPRUS	605	357
CZECH. RER	663	420
DENMARK	55	45
DIEGO GARCIA	938	246
DJIBOUTI	979	253
DOMINICA	394	1767
DOMINICAN RER	201 /202/241	1809
ECUADOR	308	593
EGYPT	91	20
EL SALVADOR	373	503
EQUATORIAL GUINEA	999	240
ERITREA	920	291
ESTONIA	537	372
ETHIOPIA	980	251
FALKLAND ISL	306	500
FAROE ISL.	502	293
FIJI	701	679
FINLAND	57	358
FRANCE	42	33
FRENCH GUIANA (D.O.MT)	300	594
FRENCH POLYNESIA (T.O.M.)	702	689972
GABON	973	241
GAMBIA	996	220
GEORGIA	683	995
GERMANY (FED. REP)	41	49
GHANA	94	233
GIBRALTAR	405	350
GREAT BRITAIN & N.IRELAND	51	44
GREECE	601	30
GREENLAND	503	299
GRENADA	395	1473
GUADELOUPE (D.O.M)	299	590
GUAM	700	1671
GUATEMALA	372	502
GUERNSEY	4191	441481
GUINEA	995	224
GUINEA-BISSAU	969	245
GUYANA	295	592
HAITI	203	509
HAWAII	704/705/708/709/773	1808
HONDURAS	374	504
HONG KONG - S.A.R	802	852
HUNGARY	61	36
ICELAND	501	354
INDIA	81	91
INDONESIA	73	62

Appendix C Telex / Fax / Phone country codes

COUNTRY CODE	TELEX COUNTRY CODE N°	FAX/PHN COUNTRY CODE N°
IRAN	88	98
IRAQ	491	964
IRELAND	500	353
ISRAEL	606	972
ITALY	43	39
JAMAICA	291	1876
JAPAN	72	81
JERSEY	514192	441534
JORDAN	493	962
KAZAKHSTAN	785	7-3272
KENYA	987	254
KIRIBATI	761	686
KOREA (DEM.PEOPLE'S REP)	899	850
KOREA (REP)	801	82
KUWAIT	496	955
KYRGHZYSTAN	788	996
LAOS	804	856
LATVIA (PER)	538	371
LEBANON	494	961
LESOTHO	963	266
LIBERIA	997	231
LIBYA	901	218
LIECHTENSTEIN	45-887/45-888/45-889	4175(423)
LITHUANIA	539	370
LUXEMBOURG	402	352
MACAO	808	853
(F.Y.H.O.M.)	597	389
MADAGASCAR	986	261
MADEIRA	404-7	35191
MALAWI	904	265
MALAYSIA	84	60
MALDIVES	896	960
MALI	985	223
MALTA	403/406	356
MARIANA ISL.	760	1670
MARSHALL ISL.	765	692
MARTINIQUE (D.O.M.)	298	596
MAURITANIA	974	222
MAURITIUS	966	230
MAYDTTE (D.O.M.)	935	269
MEXICO	22	52
MICRONESIA	764	691
MIDWAY ISL.	704/705/708/709/773	1808
MOLDOVA (PER)	682	373
MONACO	42-. .9	377
MONGOLIA	800	976
MONTSERRAT	396	1664
MOROCCO	407	212
MOZAMBIQUE	992	258
MYANMAR (BURMA)	83	95
NAMIBIA	908	264
NAURU	775	674
NEPAL	891	977
NETHERLANDS	44	31

Appendix C Telex / Fax / Phone country codes

COUNTRY CODE	TELEX COUNTRY CODE N°	FAX/PHN COUNTRY CODE N°
NETHERLANDS ANTILLES	390	599
NEW CALEDONIA (T.O.M)	706	687
NEW ZEALAND	74	64
NICARAGUA	375	505
NIGER	975	227
NIGERIA	905	234
NIUE ISL.	776	683
NORFOLK ISLAND	766-3	672
NORWAY	56	47
OMAN	498	968
PAKISTAN	82	92
PALAU	763	680
PANAMA	379	507
PAPUA NEW GUINEA	703	675
PARAGUAY	305	595
PERU	36	51
PHILIPPINES	75/751/752/	63
PITCAIRN ISL.		872
POLAND	63	48
PORTUGAL	404	351
PUERTO RICO	305/206/209/240	1787
QATAR	497	974
REUNION (D.O.M.)	961	263
RODRIGUEZ ISL.	966	230
ROMANIA	65	40
RUSSIA	64	7
RWANDA	909	250
SAO TOME & PRINCIPE	967	23912
ST. CHRISTOPHER (ST. KITTS & NEVIS)	397	1869
ST HELENA	960	290
ST. LUCIA	398	1758
ST. PAUL & AMST. ISL.		1900
ST PIERRE & MIQUELON (D.O.M.)	204	509
ST. VINCENT & GBENADINES	399	1784
SAMOA (USA)	770	684
SAMOA (WESTERNS)	779	685
SAN MARINO	505	378
SAUDI ARABIA	495	966
SENEGAL	906	221
SEYCHELLES	965	248
SIERRA LEONE	998	232
SINGAPORE	87	65
SLOVAKIA	666	421
SLOVENIA	598	386
SOLOMON ISL.	778	677
SOMALIA	900	252
SOUTH AFRICA REP.	95	27
SPAIN	52	34
SRI LANKA	803	94
SUDAN	984	24911
SURINAME	304	597
SWAZILAND	964	268

Appendix C Telex / Fax / Phone country codes

COUNTRY CODE	TELEX COUNTRY CODE N°	FAX/PHN COUNTRY CODE N°
SWEDEM	54	46
SWITZERLAND	45	41
SYRIA	492	963
TAIWAN	769	886
TAJIKISTAN	787	992
TANZANIA/(ZANZIBAR]	989/990	255/(350)
THAILAND	86	66
TIMOR	73	62
TOGO	977	228
TOKELAU ISL	762	690
TONGA	777	676
TRINIDAD & TOBAGO	294	1868
TRISTAN DA CUNHA		290
TUNISIA	409	216
TURKEY	607	90
TURKMENISTAN	789	993
TURKS & CAICOS	296	1649
TUVALU	774	688
UGANDA	988	256
UKRAINE	680	380
UNITED ARAB EMMTES(UAE)	893	971
URUGUAY	32	598
U.S.A.	23/230 to 239 246 to 249/25	1
UZBEKISTAN	786	998
VANUATU	771	678
VATICAN CITY STATE-HOLY SEE	504	379
VENEZUELA	31	58
VIETNAM	805	84
VIRGIN ISL- GB	292	1284
VIRGIN ISL- US	208	1340
YEMEN REP	707	681
WALLIS&FUTUNA (T.O.M.)	895	967
YUGOSLAVIA (Serbia-Montenegro)	62	381
ZAMBIA	902	260
ZIMBABWE	907	263
EUROPE		
I .M.F. (INTERNATIONAL MONETARY FUND)		
ATLANTIC OCEAN — REGION-EAST	581	871
PACIFIC OCEAN REGION	582	872
INDIAN OCEAN REGION	583	873
ATLANTIC OCEAN REGION-WEST	584	874

Table C-2 The 2-digit code services accessible on the INMARSAT-C system

Service	2-digit code
Automatic calls using an international number	00
Maritime enquiries	31
Request for medical advice	32
Request for technical assistance	33
Time and charges requested at end of call	37
Request for medical assistance	38
Request for maritime assistance	39
Sending weather reports to meteorological centres	41
Sending reports of navigational and weather dangers to shore-side authorities	42
Sending ship position and sail plan reports to shore-side authorities	43
Administration specialized use fee leased lines)	6X

Table C-3 INMARSAT-C Non-delivery Notification codes

 The following is a selection of Non-delivery Notification (NDN) codes, as used by some INMARSAT-C CESs. In addition to, or instead of, these codes, some CESs may use their own codes. To find out the particular NDN codes used by a CES, and their meaning, contact the *CES Services Contact Point*, at the numbers given in *Table B-1* in Appendix B.

NDN code	Meaning
ABS	Absent subscriber. The mobile terminal is not logged-in to the ocean region.
ACB	Access barred.
ADR	Addressee refuses to accept message.
ANU	Deleted. The message has not been delivered within an hour and is therefore deleted.
ATD	Attempting to deliver the message.
BK	Message aborted. Is used when a fax or <i>PSTN</i> -connection is cleared abnormally.
BUS	Busy.
CCD	Call cut or disconnected.
CI	Conversation impossible.
CIE	The <i>CES</i> ran out of processing/communications capacity to process your message.
CNS	Call not started.
<i>DTE</i>	Data terminal equipment. Used when an X.25 subscriber has cleared the connection during the call attempt.
ERR	Error.
FAU	Faulty.
PMT	format error.
FSA	Fast select acceptance not subscribed.

Appendix C Telex / Fax / Phone country codes

NDN code	Meaning
LAB	Invalid <i>Answerback</i> from destination.
IAM	Was unable to process the address information in the following message:
IDS	Invalid data from ship.
IDT	Input data timeout.
IFR	Invalid facility request.
IMS	Message size is invalid, 7932 characters maximum.
IND	Incompatible destination.
INH	Was unable to establish the type of message from the following header:
INV	Invalid.
ISR	Invalid ship request.
LDE	Maximum acceptable message length or duration has been exceeded.
LEF	Local equipment failure.
LPE	Local procedure error.
MBB	Message broken by higher priority.
MCC	<i>Message Channel</i> congestion.
MCF	<i>Message Channel</i> failure.
MKO	Message killed by operator.
MSO	Machine switched off.
NA	Correspondence with this subscriber is not admitted.
NAL	No address line is present.
NC	No circuits.
NCH	Subscriber's number has been changed.
NDA	There was no delivery attempted.
NPA	No final <i>Answerback</i> .
NIA	No initial <i>Answerback</i> .
NOB	Not obtainable.
NOC	No connection.
NP	No party. The called party is not, or is no longer, a subscriber.
NTC	Network congestion.
OAB	Operator aborted.
OCC	Subscriber is occupied.
OOO	Out of order.
PAD	Packet assembler/disassembler.
PRC	Premature clearing.
PRF	<i>Protocol</i> failure.
RCA	Reverse charging acceptance not subscribed.
REF	There was a failure in the remote equipment.
RLE	Resource limit exceeded.
RPE	Remote procedure error.
RPO	RPOA out of order.
SEC	Call completed successfully.
SHE	SES hardware error.
SNF	The satellite network has failed.

Appendix C Telex / Fax / Phone country codes

NDN code	Meaning
SPE	SES <i>Protocol</i> error.
SUE	Test results being delivered.
TBY	Trunks busy.
TOR	TDM group reset.
TIM	Timeout.
TMD	Too many destinations
UNK	Unknown. Is used when no other failure codes are suitable.
WFA	Wrong final <i>Answerback</i> .
WIA	Wrong initial <i>Answerback</i> .

Appendix D Glossary



Entries shown *in italics* appear under their own names.

AAIC: Accounting Authority Identification Code. A unique code, assigned by the *ITU* to identify an *Accounting Authority*.

Accounting Authority (AA): This is an organization nominated on a *Commissioning Application Form* to administer the billing and settlement of the communications charges incurred by an *SES*.

AMVER: Automated Mutual-assistance Vessel Rescue System - a vessel position reporting system operated by the U.S. Coast Guard for any merchant vessel of 1000 grt or greater on a voyage lasting longer than 24 hours, to and from anywhere on the globe.

Answerback: This is an optional identifier given to an INMARSAT-C *SES*, and used in message transmissions. The format must be up to four-letters (a - z, upper or lower case, no numbers).

AOR - E: Atlantic Ocean Region - East.

AOR - W: Atlantic Ocean Region - West.

Applicant: This is the person who completes and signs a *Maritime Commissioning Application Form*, to apply to commission an INMARSAT-C *SES* into the INMARSAT-C system. The applicant must submit the form to the national *Routing Organization* for the country of registration of the vessel.

ARQ: Automatic request repeat. The error correction process used in store-and-forward messaging, by which a receiver checks for errors in received data *packets*, and requests the sending end to re-transmit those packets.

ASCII: American Standard Code for Information Interchange. A standard alphanumeric character set, based on 7-bit codes.

AUSREP: A vessel position reporting system similar to *AMVER*, but operated by the Australian Authorities.

BBER: *Bulletin Board Error Rate*.

Billing Entity (BE): This is an organization which may be nominated optionally on a *Maritime Commissioning Application Form*, in addition to an *Accounting Authority*, to administer the billing and settlement of the communications charges incurred by an *SES*.

Bit: The basic unit of digital communications, may be either 1 or 0. The INMARSAT-C system uses different bit formats in its communications - see *5-bit packed*, *7-bit ASCII*, *8-bit data*. See also *byte*.

bps: Bits per second - a unit of measurement for speed of transfer of data through a system. The INMARSAT-C system currently uses 600 bps data transfer over the satellite link.

Bulletin Board (in a TDM channel): This is the first *packet* transmitted in each frame of a *TDM channel*. It contains information on the INMARSAT-C network configuration, and also contains the current *Frame number*, used by the *SES* as a timing reference. **Bulletin Board (in an E-mail service):** A group of subscribers who wish to exchange information.

Bulletin Board Error Rate (BBER): An *SES* displays the BBER in the *Bulletin Board of a TDM Channel*, as a measure of the quality of reception by the *SES* of the channel. Ideally the BBER should be zero, but a value near zero is acceptable.

Byte: One byte is comprised of eight *bits*. Depending on circumstances, one byte may represent one alpha-numeric *character*, or numeric information collected by the terminal, or signalling data used by the INMARSAT-C system. Typically, in the INMARSAT-C system, fifteen bytes are contained in one *packet*.

CCITT: Comite Consultant International Telegraphique et Telephonique - an advisory committee to the *International Telecommunication Union (ITU)*. The CCITT publishes standards and recommendations to enable telecommunications systems and equipments worldwide to communicate with each other. Examples of CCITT standards are the X.25 and *X.400 protocols* used on *PSDN* landlines.

CES: Coast Earth Station.

CES TDM Channel: A TDM channel used by a CES to transmit system information and data to addressed SESs.

Channel number: This is a number representing the frequency of an INMARSAT-C communications channel. Also known as the *Logical channel*.

Character: One element of an alpha-numeric character set. One character is equivalent to one byte (= 8 bits).

Class 1 INMARSAT-C SES: A Class 1 SES is capable of ship-to-shore and shore-to-ship message transfer and *Distress alerting*, but is not capable of receiving EGC messages.

Class 2 INMARSAT-C SES: A Class 2 SES is capable of two modes of operation (selectable by the operator):

- ✓ As Class 1, and also capable of receiving EGC messages when not engaged in INMARSAT-C traffic.
- ✓ Ready for EGC message reception exclusively (and not available in that mode for INMARSAT-C message transfer).

Class 3 INMARSAT-C SES: A Class 3 SES has two independent receivers, one capable of receiving two-way INMARSAT-C messages, the other capable of receiving EGC messages.

Closed network: This is a private network, access to which is limited to registered users. The INMARSAT-C system allows two types of closed networks - *data reporting* networks, identified by a Data Reporting Network Identification (DNID) code, and *EGC FleetNETSM* networks, identified by an EGC Network Identification (ENID) code.

Coast Earth Station (CES): The name used in an Inmarsat maritime environment for a shore-based receiving and transmitting station which acts as an interface between SESs and the terrestrial communications networks. The CES is also given a generic name of *Land Earth Station (LES)*, which is applicable to both maritime and land-mobile environments.

Commissioning: The process by which an SES is registered into the INMARSAT-C system, and tested by means of the PVT (Performance Verification Test) to prove that it can communicate properly, without causing interference to the system, or to other users.

Commissioning Application Form: The form which must be completed and signed by an Applicant and submitted to the national Routing Organization of the country of registration, to commission an SES into the INMARSAT-C system.

Communications channels: The INMARSAT-C system uses the following communications channels: CES TDM Channels, *Interstation Signalling Links (ISLs)*, *Message Channels*, *NCS Common Channels*, *Signalling Channels (SES - CES)* and *Signalling Channels (SES -NCS)*. See separate definitions for more information.

Coverage area (of a satellite): The area on the earth's surface (sea or land) within which an antenna can obtain line-of-sight communications with a satellite. In the Inmarsat systems, this area corresponds to an *ocean region*. Coverage area is also known as *footprint*.

Data services: Depending on the hardware and software at each end, a terminal may send and receive data from databases, *E-mail* systems, *SCADA* systems, and so on.

Data report (reserved, R): A small amount of data (up to 44 bytes in four packets), which is transmitted by an SES in reserved *times slots* in a *Signalling Channel*, in response to an earlier *polling command* from an *operational centre*.

Data report (programmed unreserved, P): A short collection of data (up to 32 bytes in four packets), which is transmitted by an SES at random times in unreserved *Time slots* of a *Signalling Channel*, after receipt of a *polling command* from an *operational centre*.

Data report (unreserved, U): A small amount of data (up to 32 bytes in three packets), which is transmitted in unreserved *Time slots* of a *Signalling Channel*, by an SES to an *operational centre*.

DCE: Data circuit terminating equipment - a component part of an SES. An SES contains a DCE receiver and a DCE transmitter, which are used for communications between the SES and an INMARSAT-C CES.

DECCA Navigator: A position-fixing system, based on chains of shore-based radio transmissions.

Demand assigned TDM Channel: This is a TDM channel assigned by the NCS temporarily to a CES on a demand basis, from a pool of available TDM channels.

Differential GPS: Global Positioning System used with INMARSAT-C terminals - based on *GPS* satellites, with accuracy enhanced by the use of transmission of differential corrections from suitably located shore-based radiobeacons.

Distress alerting: A facility available on all maritime SESs, enabling the SES to send distress information, on a *Signalling Channel* with distress priority, through the INMARSAT-C system to a *Rescue Co-ordination Centre (RCC)* for the required action.

Distress priority message: This is a message prepared in the *SES* text editor, and sent on a *Signalling Channel* with distress priority through the INMARSAT-C system to a *Rescue Co-ordination Centre (RCC)* for action.

DNIC: Data Network Identification Code.

DNID: Data reporting Network Identification code. See *data report (unreserved)*, *data report (reserved)*, and *data report (pre-assigned)*.

Downloading: The process by which a shore-based party transfers information over the INMARSAT-C system to an *SES*, for storage and subsequent use. For *data reporting* purposes, an *operational centre* downloads a *DNID* code plus *Member number* to an *SES* joining a *closed network*. In the *EGC FleetNETSM* service, an *Information Provider* downloads an *EGC Network Identification (ENID)* code to an *SES* joining a *FleetNETSM* group.

DTE: Data terminal equipment - a component part of an *SES*, used primarily for storage and interfacing the *SES* to external devices (such as a keyboard or monitor).

E-mail: Electronic mail - a global message handling system whereby subscribers to commercial E-mail services can interchange messages and electronic data files between computers. E-mail services are provided by some INMARSAT-C CESs, and by some private organizations. Access to E-mail services may be by *PSTN* or *PSDN* networks.

EGC: The EGC (Enhanced Group Call) services provided in the INMARSAT-C system are *EGC SafetyNETSM*, *EGC FleetNETSM*, and *Inmarsat system messages*.

EGC FleetNETSM: This service is provided by *FleetNETSM Information Providers*, to distribute commercial information to *SESs* belonging to a *FleetNETSM* group, identified by a unique *ENID* code.

EGC receive capability: This is a capability provided on a *Class 2* or *Class 3 INMARSAT-C SES* to receive *EGC* broadcasts.

EGC SafetyNETSM: This service is provided by *SafetyNETSM Information Providers* to distribute Maritime Safety Information (*MSI*) to *SESs* fitted with an *EGC receive capability*.

EMD: EGC network identification (*ENID*) code. See *EGC FleetNETSM*.

Facsimile: See *Fax*.

Fax: Abbreviation for 'facsimile', a device used to transmit a facsimile copy of an original document. The INMARSAT-C system allows an *SES* to send text messages to a fax terminal, but a fax terminal must use a third party *fax bureau service* to send text messages (no graphics) to an *SES*.

Fax bureau service: A service offered by some CESs, and some private organizations, to receive a fax message from a shore-based sender, and forward it as a *store-and-forward message* to an INMARSAT-C *SES*.

FleetNETSM: See *EGC FleetNETSM*.

Footprint (of a satellite): The area on the earth's surface (sea or land) within which an antenna can obtain line-of-sight communications with a satellite. In the Inmarsat systems, this area corresponds to an *ocean region*. Footprint is also known as *coverage area*.

Frame number: The number of the current frame of a *TDM channel*. The count advances from 0 to 9999 each 24 hours, starting at midnight *UTC* (so each frame lasts 8.64 secs.)

Gateway: An interface between communications systems such as the INMARSAT-C system and the national / international telecommunications networks.

Glonass: A global positioning system similar to *GPS*, but using satellites of the former Soviet Union.

GMDSS: The Global Maritime Distress and Safety Service - the INMARSAT-C system is included in the GMDSS by the *IMO* International Maritime Organization.

GPS: Global Positioning System - provides the geographical position of a vessel, using American military satellites, made available for civilian use. See also *Differential GPS*.

IA5: International Alphabet 5 - a standard alpha-numeric character set, also known as *ASCII*, based on 7-bit codes. Supports both UPPER and lower case characters.

IMN: Inmarsat Mobile Number - the number assigned by the national Routing Organization to an INMARSAT-C SES as its identity number. An INMARSAT-C maritime IMN has the format **4xxxxxxxxx**.

IMO: International Maritime Organisation -the organization responsible for the *GMDSS*.

Information Provider: An EGC *SafetyNETSM* Information Provider provides *MSI* for broadcasting to SESs fitted with an *EGC receive capability*.

INMARSAT: The International Maritime Satellite Organization.

INMARSAT-A: The original Inmarsat system, operating since 1982, based on analogue techniques and capable of global two-way voice-grade telephony (and *Voice-band data* transfer), facsimile and telex communications.

INMARSAT-B: To be introduced in 1993, based on digital techniques, and capable of high quality two-way voice telephony, telex, *Distress alerting*, fax and *Data services*.

INMARSAT-C: A digital system, operating since 1991, based on low-cost SESs of low power-consumption. This system provides the services of global *two-way store-and-forward messaging*, *Distress alerting*, *EGC SafetyNETSM* and *FleetNETSM*, *data reporting* and *polling*.

INMARSAT-M: To be introduced in 1992/1993, based on digital techniques, and capable of *two-way voice telephony*, *Distress alerting*, fax and *Data services*.

Inmarsat system messages: A message broadcast by the NCC, an NCS or *CES*, to ships equipped with an *EGC receive capability*.

Interstation Signalling Links (ISLs): These signalling channels are used between an NCS and the CESs in it ocean region to pass system information around the system.

IOR: Indian Ocean Region.

ITA2: International Telegraph Alphabet 2 - a standard alpha-numeric character set, generally used for sending messages on the international *Telex networks*. The character set is based on 5-bit codes, also known as *Telex format*, or *5-bit packed*.

ITU: The International Telecommunications Union, which publishes a list of approved *Accounting Authorities*. See also *CCITT*.

JASREP: A vessel position reporting system similar to AMVER (*see definition*), but operated by the Japanese Authorities.

kbyte: 1024 bytes or characters.

LES: Land Earth Station. The generic name applicable to both maritime and land-mobile communications for the term Coast Earth Station (*CES*).

LMES: Land-mobile Earth Station.

Logical channel: A term representing a communications channel. Also known as the *Channel number*.

Log-in: The action performed on an INMARSAT-C SES to inform the NCS in an ocean region that the SES is available for communications.

LORAN-C: A position-fixing system, based on chains of shore-based, low-frequency radio transmissions.

MEM: Macro-encoded Message.

Member number: This is the number *downloaded* with a *DNID* to an SES, when the SES is registered into a *data reporting* network.

MES: Mobile Earth Station, The generic name used instead of Ship Earth Station (*SES*), and applicable to both maritime and land-mobile communications.

Message Channel: A communications channel used by an SES to send message data through a *CES* to a required destination. Modem: *Modulator - demodulator*, a device used to transmit digital data along *PSTN* lines, by converting (modulating) to analogue form at the sending end, and re-convening (demodulating) to digital form at the receiving end.

MSI: Maritime Safety Information - provided by shore-based Information Providers, and forwarded to an INMARSAT-C CES for broadcasting over the INMARSAT-C system to SESs fitted with an *EGC*

receive capability.

NAVAREA: One of sixteen areas of sea into which the world's oceans are divided for the dissemination of navigational warnings.

NAVTEX: The low frequency system developed by the *IMO* for the broadcast and automatic reception of *MSI* by means of direct-printing telegraphy.

NCC: Network Co-ordination Centre.

NCS Common Channel: A *TDM channel* used by the NCS to transmit system information and data to selected *SESs*. **NUA:** Network User Address.

Ocean region: The coverage area of an Inmarsat satellite within which an *SES* may send and receive messages.

Omega: A position-fixing system, based on chains of shore-based, very-low frequency radio transmissions.

Omnidirectional antenna: A small antenna fitted to an *INMARSAT-C* *SES* capable of line-of-sight communications with a satellite, without pointing.

Operational centre: A shore-based centre of a *data reporting closed network*. The operational centre initially downloads a *DNID* code plus *Member number* to an *SES* joining the group. The centre subsequently sends *polling commands* to instruct selected *SESs* to return *pre-assigned data reports*, or to perform a defined task such as *SCADA*. The centre also receives *unreserved data reports* from *SESs* belonging to the closed network.

Operator-assisted services: Communications services provided by some *CEEs*, for example forwarding a text message from an *SES* as a voice message to a shore-based telephone.

Option 1 stand-alone EGC receiver: This type of stand-alone EGC receiver can only receive EGC messages, and cannot engage in non-EGC message transfer.

Option 2 stand-alone EGC receiver: This type of stand-alone EGC receiver may be added-on to an *INMARSAT-A* *SES* and, in future, to an *INMARSAT-B* or *INMARSAT-M* *SES*, and using the antenna of that *SES*. So doing may meet *GMDSS* requirements for the vessel.

Packet: A self-contained component of a message, typically comprising fifteen *bytes* of data.

Permanently assigned TOM Channel: This is a *TDM channel* permanently assigned to a *CEC*, for continuous transmission on a defined frequency.

Polling: The facility whereby an *operational centre* sends an instruction (a polling command) to selected *SESs* to perform a defined task, such as return a *pre-assigned data report*, or perform *SCADA*.

POR: Pacific Ocean Region.

Presentation code: A code included in a transmission (ship-to-shore or shore-to-ship), to indicate to the receiver the presentation or formatting of the data contained in the message.

Protocol: A defined set of communications standards. The *INMARSAT-C* system uses several different protocols - *store-and-forward messaging*, *Distress alerting*, *EGC*, *data reporting* and *polling*. Other protocols in general use are *X.25* and *X.400*.

PSDN: Packet Switched Data Network.

PSTN: Public Switched Telephone Network.

PVT: Performance Verification Test.

RCC: Rescue Co-ordination Centre.

RO: Routing Organisation - A company or organization responsible to a country's administration for the authorization of the commissioning of an *SES* which is registered in that *country*.

SafetyNETSM: See *EGC SafetyNETSM*.

SCADA: Supervisory control and data acquisition.

SES: Ship Earth Station

Signalling Channel (SES - CES): A random access *TDMA channel*, used by an *SES* to transmit signalling information and data to a *CEC*.

Signalling Channels (SES - NCS): A random access *TDMA channel*, used by an *SES* to transmit signalling information and data to an *NCS*.

SOLAS: Safety of Life at Sea.

Special Access Code: A destination address code used in a ship-to-shore or shore-to-ship message to access a special service provided by a *CES*. The *two-digit codes* are examples of special access codes.

Store-and-forward messaging: The *Protocol* used by the INMARSAT-C system to transfer text or data in data *packets* to a receiving equipment. Error correction information may be contained in the packets to enable the receiver to perform *ARQ*.

System message: An *EGC* message, originated by the Inmarsat *NCC*, an *NCS*, or *CES*, containing information relevant to the INMARSAT-C system. A system message is broadcast on the *NCS Common Channel*, and can be received by all *SESs* with an *EGC receive capability* that is synchronized to the *NCS Common Channel*.

TDM: Time division multiplex - the process by which multiple signals can share the same communications channel, each using a different time slot.

TDM channel: The INMARSAT-C system uses different TDM channels, each transmitted on a unique frequency. The TDM channels are used for system control and message transfer to *SESs*. See *CES TDM Channel* and *NCS Common Channel*.

TDMA: Time division multiple access - the process by which *SESs* communicate with a *CES* or *NCS*. The INMARSAT-C system uses two types of TDMA channels - a *Message Channel* for pre-assigned TDMA, and *Signalling Channel* for random access.

Telex format (also known as 5-bit packed format or ITA2): A format, based on 5-bit codes, used for sending alpha-numeric characters to and from telex terminals on the international *telex networks*.

Telex networks: The world-wide communications system based on the international telex network.

Time slot: Basic unit into which one *time frame* of a *TDM channel* is divided.

Transit: A global positioning system similar to *GPS*, but using satellites of the US Navy.

Type-approved SES: An *SES* which has been manufactured to a design approved by Inmarsat for use within the applicable system.

Unreserved access: The method by which an *SES* gains random access on a *Signalling Channel* to the INMARSAT-C system.

UTC: Universal Co-ordinated Time - a term which, for practical purposes, has the same meaning as Greenwich Mean Time (GMT).

Value-added Service (VAS) Provider: An organization, such as some INMARSAT-C *CEs* or private organizations, that provide services such ship-to-shore access by two-stage selection, *E-mail services*, *Fax bureau services*, or *2-digit codes*.

Voice-band data: Data which is transmitted by *modem* over the bandwidth and channels normally used for voice transmission.

X.25: The communications *Protocol* used on the national/international *PSDN* networks to exchange digital data between devices attached to the network.

X.400: A messaging handling *Protocol* used on the national/international X.25 (*PSDN*) networks by electronic mail (E-mail) services around the world to exchange messages and electronic files between subscribers.

2-digit codes: Special examples of *Special Access Codes*. See *Table C-2*.

5-bit packed (also known as telex format or ITA2): A format, based on 5-bit codes, used for sending alpha-numeric characters to and from telex terminals.

7-bit ASCII: A format, based on 7-bit codes, used for sending the alpha-numeric characters of the *ASCII* character set.

8-bit data: A format, based on 8-bit codes, used for encoding information such as text, national character sets, numerical information, and so on.

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