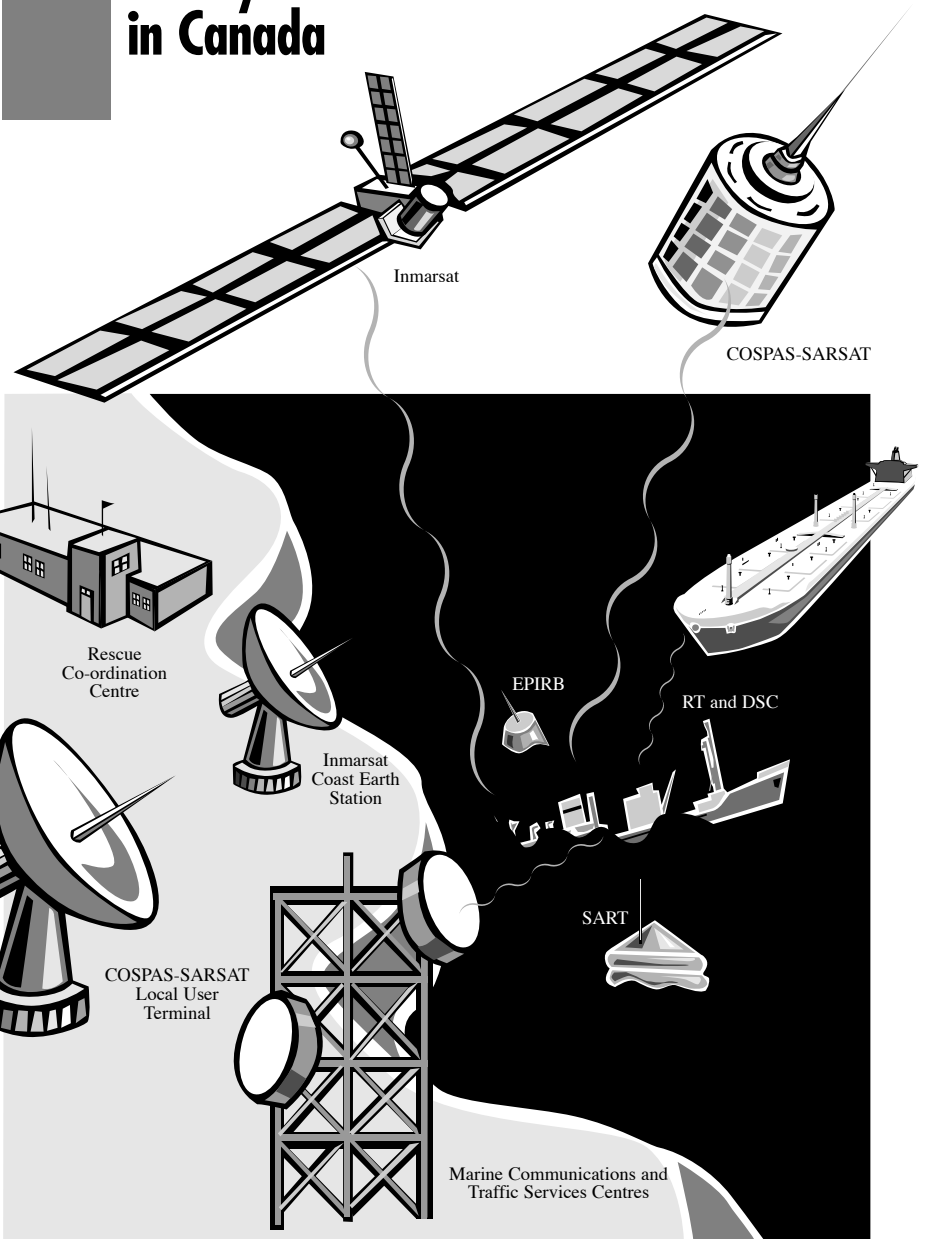
Maritime Distress and Safety Communications in Canada



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What are Maritime Communications?

The term "maritime" or "marine" communications generally refers to the *Maritime Mobile* and the *Maritime Mobile-Satellite Service* as defined by the International Telecommunications Union. This service is made up of several sub-systems, such as: Mobile Radiotelephone (RT), Emergency Position Indicating Radio Beacons (EPIRBs), and other systems. It is a regulated international system that requires both mobile communication equipment on vessels and shore-based/space-based communications facilities.

Since 1992 this system has been, and still is being, transformed into the new Global Maritime Distress and Safety System (GMDSS). If you currently use a marine radio, these changes affect you.

Why Modernize Communications?

By using satellite and digital technology, the existing radiocommunications system has been enhanced. The GMDSS provides a more effective distress alerting system. It improves the current system by:

- increasing the probability that an alert will be sent when a vessel is in distress;
- increasing the likelihood that the alert will be received;
- increasing the ability to locate survivors;
- improving rescue communications and coordination; and
- providing mariners with vital Maritime Safety Information (MSI).

Communications Equipment On Your Vessel

Radiotelephone (RT) with Digital Selective Calling (DSC)

The traditional marine radiotelephone which uses the VHF or MF/HF bands to provide two-way voice communications has been enhanced with the addition of a feature known as Digital Selective Calling (DSC). This feature provides an automatic digital watch

on distress and calling Channel 70 in addition to the current aural listening watch. A DSC radio will only respond to the vessel's unique Maritime Mobile Service Identity number (MMSI#), similar to a telephone number, or to an "All Ships" DSC call within range. Once DSC has made contact, follow-on communications take place by voice (RT) on another frequency.

It is essential to safety that the DSC radio is programmed with a valid MMSI # issued free of charge by an Industry Canada district office. Also, to ensure a higher level of safety, the DSC radio should be connected to a navigation receiver, such as a GPS.

CAUTION – VHF-DSC radios automatically switch to Channel 16 upon receipt of a MSI Broadcast. After a broadcast, mariners must ensure that they continue to monitor vessel traffic frequencies other than Channel 16.

NAVTEX Receivers

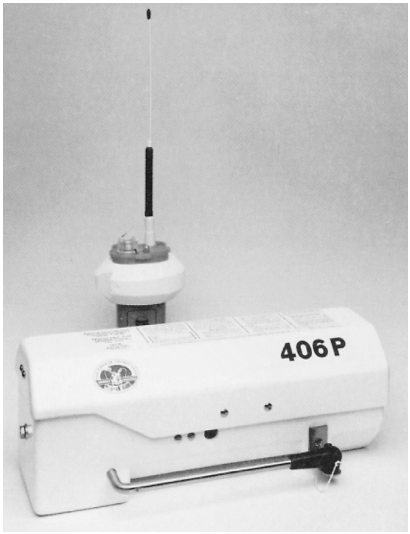
NAVTEX is a fully automated radio telex system. NAVTEX receivers carried aboard vessels will print-out Maritime Safety Information (MSI) transmitted by the Canadian Coast Guard. This is a "one-way" communication service as these receivers do not transmit.

Inmarsat Satellite Terminals

The Inmarsat satellite network provides global communications, except for the Polar Regions. In areas without any VHF or MF DSC shore facilities, Inmarsat A, B or C terminals are used for distress alerting and communications between ship and shore. Inmarsat provides an efficient means of routing distress alerts to Search and Rescue (SAR) authorities. Inmarsat-C terminals also receive Maritime Safety Information (MSI) broadcasts from shore authorities.

Emergency Position Indicating Radiobeacon (EPIRB)

These coded beacons are small, portable and buoyant, and provide an effective means of issuing a distress alert anywhere in the world. Class 1 EPIRBs are float free and activate automatically if the vessel sinks. Class 2 EPIRBs must be manually activated by the user in order to transmit a distress alert.



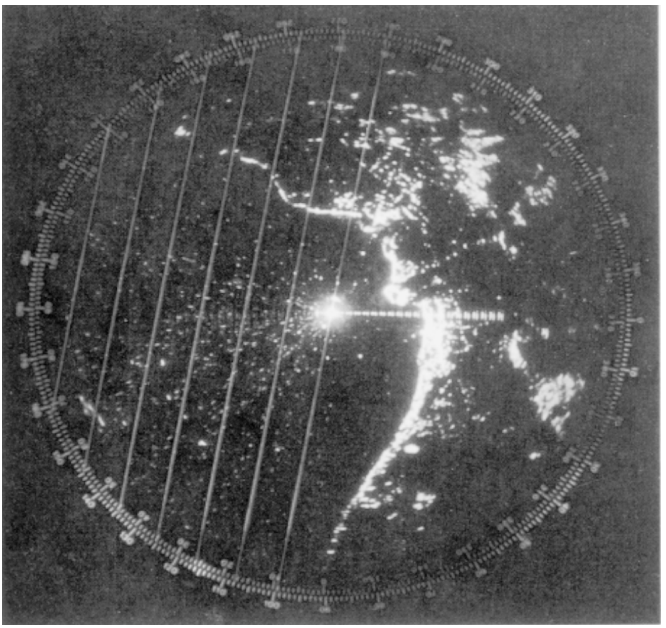
406 MHz COSPAS/SARSAT EPIRB

406 MHz COSPAS/SARSAT EPIRBs

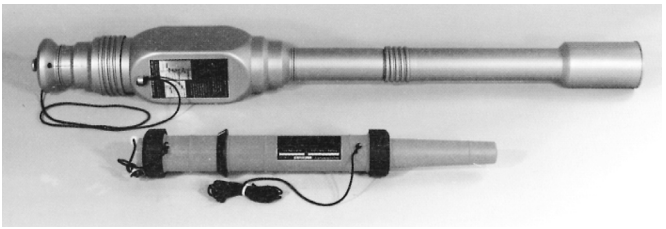
The GMDSS makes use of the COSPAS/SARSAT Satellite System to provide global detection of 406 MHz EPIRBs. Owners must register these EPIRBs in the Canadian National Beacon Database (1-800-727-9414)

Inmarsat-E EPIRBs

The GMDSS also makes use of the Inmarsat Satellite System to provide detection of Inmarsat-E EPIRBs within the satellite "footprint". Owners must register these EPIRBs with Inmarsat (information provided at time of purchase).



SART dots on radar screen



an example of a SART

Search and Rescue Transponder (SART)

SARTs are portable radar transponders used to help locate survivors of distressed vessels which have sent a distress alert. They are detected by radar and therefore operate in the same frequency range as radar carried onboard most vessels. SARTs transmit in response to received radar signals and show up on a vessel's radar screen as a series of dots, accurately indicating the position of the SART. In the event that a ship must be abandoned, SARTs should be taken aboard survival craft.

Cellular Telephones

Mariners are cautioned that a **cellular telephone is not a good substitute for a marine radio** because the mobile radio safety system in the southern waters of Canada is based principally on VHF, RT and DSC communications. VHF has the advantage that a call can be heard by the closest MCTS Centre(s) and by ships in the vicinity which could provide immediate assistance. On the other hand, the cellular telephone network is a party-to-party system and the benefit of the broadcast mode in an emergency situation cannot be obtained.

CCG MCTS Centres in certain parts of Canada are connected to the cellular telephone network system where cellular telephone users can, in an emergency situation only, dial *16 to access an MCTS Centre to obtain assistance.

Details of this service may be obtained by contacting local cellular telephone companies, however, mariners are cautioned that not all cellular telephone companies provide this service.

Maritime Safety Information (MSI)

Maritime Safety Information comprises distress alerts, SAR information, navigational and weather warnings, as well as weather forecasts. MSI is broadcast by the Canadian Coast Guard and can be received via the following methods:

1. **NAVTEX receivers** which are fully automatic and receive broadcasts in coastal regions up to 300 nautical miles offshore.
2. **Inmarsat-C terminals** which receive Enhanced Group Call – SafetyNET (EGC) broadcasts for areas outside NAVTEX cover age.
3. **HF Narrow Band Direct Printing (NBDP) transceivers** which can be used where service is available as an alternate to EGC.
4. **Marine Radio Telephone Transceivers** which receive broadcasts on distress and calling frequencies and on the continuous marine broadcast frequencies.

GMDSS Sea Areas

Internationally there are four sea areas defined in the GMDSS. These sea areas are based on services provided from shore and are used to determine the types of communications equipment regulated onboard vessels.

Sea Area A1 – Within range of shore-based VHF DSC coast station (40 nautical miles.)

Sea Area A2 – Within range of shore-based MF DSC coast station (excluding sea areas A1)(150 nautical miles)

Sea Area A3 – Within the coverage of an Inmarsat geostationary satellite (approximately 70°N to 70°S) (excluding sea areas A1 and A2)

Sea Area A4 – the remaining areas outside sea areas A1, A2 and A3 (polar regions)

Canada is implementing radio services for A1, A3 and A4 areas and will not be declaring an A2 area.

Carriage Requirements for Commercial Vessels

Consolidated table taken from the Ship Station (Radio) Regulations (SSRR), 1999

Ships ≥ 20m and certified to carry >12 passengers, or ships ≥300gt

All other ships

Italics *represent new requirements to be complied with by April 1st, 2001, unless otherwise indicated.*

- Requirements for Safety Convention ships are not shown as they must comply with the Safety Convention
- Requirement for ships on inland voyages and minor waters voyages are not shown since there are no new requirements
- Regulations do not apply to a pleasure yacht not carrying a master or crew for hire, or a tow-boat in a booming ground.

Sea Area A1 or VHF Area	Sea Area A3	Sea Area A4
VHF-DSC RADIO		
Yes – *unless ship operates within a VTS Zone, then will have until January 31, 2003, or until the sea area A1 is completed, whichever is latest*		
Yes – *by February 1, 2003, or after sea area A1 completed, whichever is latest* • *ships ≥8m in length and of closed construction,* • *ships carrying >6 passengers, and* • *tow boats* – exempted are ships on a home-trade voyage, class IV in a VTS Zone – current VHF radiotelephone provisions remain in effect until then		
INMARSAT TERMINAL AND MF-DSC RADIO, OR MF/HF – DSC RADIO AND NBDP		
no	***Yes*** (EGC required only if outside NAVTEX range)	***Yes*** MF/HF option only
no		

Sea Area A1 or VHF Area	Sea Area A3	Sea Area A4
NAVTEX RECEIVER		
no	***Yes***	no
no	***Yes*** • if ≥ 150gt tow boat • if ≥ 300gt cargo ship • if ≥ 24m fishing, or • if passenger ship	no
EPIRB (FLOAT FREE)		
Yes		
Yes • if ≥20m (and beyond home trade IV voyage) • if tug >5gt and <20m if voyage >50 miles long and >2 miles from shore • ***if ≥ 15gt and go beyond home-trade III voyage limits i.e., 20 miles from shore by April 1, 2001*** • ***if ≥ 8m and go beyond home-trade III voyage limits on April 1, 2002*** (Note: EPIRB does not have to be float-free if less than 15gt) – exempted are ships on home-trade voyages, class IV or minor waters voyages		
SART		
no	***Yes*** *2 are required, unless ship is certified to carry ≤ 12 passengers and is<500gt, then carry 1*	
Yes 1 if 20m in length or over on > HTII voyages; but, can continue to carry 2 Class II EPIRBs instead until one of the batteries expire.		
SURVIVAL CRAFT VHF PORTABLE RADIO		
Yes 3 are required, unless ship is certified to carry ≤ 12 passengers and is <500gt, then carry 2 ***(new requirement for ships on home-trade voyages, class III)***		
no	***Yes*** 3 are required if ship is certified to carry >12 passengers and is >5gt	

DSC: digital selective calling **EGC**: enhanced group calling **NBDP**: narrow band direct printing

Additional requirements: emergency procedures card, operating and routine maintenance manuals, consumable spare parts, radio publications, time piece, weather facsimile (Arctic), spare antennas (some ships ≥ 20m).

***Note –Operators are advised to refer to the regulations for further clarification of this table.**

Carriage Recommendations for Pleasure Craft and Commercial Vessels not Subject to Mandatory Carriage Regulations

Although radiocommunications equipment is not required by regulation on-board pleasure craft and certain small commercial vessels, it is highly recommended that these vessels be fitted with:

1. VHF Radio Telephone with the Digital Selective Calling feature

2. EPIRB

Further details on pleasure craft safety, including recommendations for communications equipment, can be found in the CCG's **Safe Boating Guide**.

Communications between DSC and non-DSC fitted vessels

To comply with GMDSS requirements, commercial ships now maintain watches on VHF Channel 70 and MF 2187.5 kHz using Digital Selective Calling (DSC). Maintaining a voice watch on 2182 kHz is no longer required by ships, although they are required to maintain the voice watch on VHF Channel 16 until 2005 in order to communicate with vessels which have not yet upgraded to VHF-DSC radio

Canadian Coast Guard Marine Communications and Traffic Services (MCTS) Centres

To help ease the transition to the GMDSS and bridge the communication gap between Radiotelephone and Digital Selective Calling, MCTS Centres will continue to monitor VHF Ch 16 and MF 2182 kHz, the current distress and safety channels, for the foreseeable future.

During this transitional period, MCTS Centres can assist GMDSS equipped and non-GMDSS equipped vessels in contacting each other, when communication difficulties are experienced within the coverage area of an MCTS Centre.

To supplement the broadcasting of Maritime Safety Information (MSI) on NAVTEX and Inmarsat Enhanced Group Call (EGC), MCTS Centres will continue safety broadcasts using the existing VHF continuous marine broadcast system.

Further information on maritime communications services in Canada can be found in the CCG publication "Radio Aids to Marine Navigation"

Canadian Joint Rescue Co-ordination Centres (JRCC) and Maritime Rescue Sub-Centres (MRSC)

Canadian Forces/Canadian Coast Guard JRCCs and MRSCs receive distress alerts transmitted by vessels and relayed via MCTS Centres or satellite. When a distress alert is received, the MCTS Centre may issue a MAYDAY relay broadcast in the vicinity of the distressed vessel so those vessels in the immediate area are aware and can respond. The JRCC or MRSC will task aircraft and vessels at this time. If a distress alert is sent in error, the CCG MCTS Centre or JRCC/MRSC should be notified immediately so that these resources can be released from the search.

More information on all services provided by the CCG, including the Safe Boating Guide, is available at *www.ccg-gcc.gc.ca*

Operator Proficiency

It takes training and experience to operate communications equipment during an emergency. Also of major concern are the number of false alerts that are being experienced on some distress sub-systems, especially DSC and Inmarsat-C. Since the large percentage of false alerts are attributed to a lack of operator proficiency, it is especially important that operators of vessels receive instruction in the proper operation of their equipment. Instruction is currently available through various training institutes across Canada

All operators of marine radios require one of three operator certificates issued by Industry Canada or an authority certified by Industry Canada:

1. General Operators Certificate (GOC) – Required on most compulsory fitted GMDSS vessels operating outside sea area A1. This certificate involves a two-week training course including a written and practical exam. For details consult Industry Canada Radiocommunication Information Circular (RIC) 26.

2. Restricted Operators Certificate-Maritime Commercial (ROC-MC) – Basic certificate for operators of compulsory fitted vessels operating in an A1 sea area. It is also recommended for operators of GMDSS equipment on voluntary fitted vessels. For details consult Industry Canada Radiocommunication Information Circular (RIC) 25.

3. Restricted Operator Certificate – Maritime (ROC-M) – Basic certificate for operators of non-compulsory fitted vessels (generally pleasure craft).

Radiocommunication Information Circulars (RICs) are available on the Internet at: **http://strategis.ic.gc.ca/spectrum**. Select "Official Publications", then "Information" then "Radiocommunication Information Circulars"

For further information on radio certification contact Industry Canada at 613-998-3693

This information was compiled in 2001 by the Canadian Marine Distress and Safety Communications Working Group under the authority of the Canadian Coast Guard – Safety and Environmental Response Systems Directorate and by Transport Canada – Marine Safety. Photographs have been reproduced from the IMO publication "GMDSS Handbook" with the kind permission of the International Maritime Organization.

More information can be obtained by contacting
Transport Canada – Marine Safety Regional Offices
Canadian Coast Guard Regional Offices of Boating Safety
Marine Communications and Traffic Service Centres
Canadian Coast Guard "Boating Safety Info Line"
1-800-267-6687