

# **How your VHF radio and the Global Maritime Distress and Safety System can help save your life!**

Presented by Wayne R. Norton - KB1VGE - B4C4B45262

One of the most important pieces of safety equipment aboard any vessel is a Marine VHF Radio with a good quality antenna mounted as high off the deck as possible

## **Digital Selective Calling (DSC)**

Digital Selective Calling (DSC), allows boaters to instantly send an automatically formatted distress alert to the Coast Guard or other rescue authority anywhere in the world

Digital Selective Calling also allows boaters to initiate or receive distress, urgency, safety, and routine radiotelephone calls to or from any similarly equipped vessel or shore station, without requiring either party to be near a radio loudspeaker

All DSC-equipped radios, and most GPS receivers, have a data interface connector. The interface allows most models of GPS to be successfully interconnected to DSC-capable radios, regardless of manufacture. The Coast Guard recommends that you interconnect your GPS and DSC-equipped radio. Doing so may save your life in an emergency situation (Courtesy - A BOATER'S GUIDE TO THE FEDERAL REQUIREMENTS FOR RECREATIONAL BOATS)

Coupled with a GPS sensor (via dedicated GPS puck or via NMEA data from chartplotter), and an MMSI Service Identity, the VHF Radio can alert rescue personnel of a distress situation and **automatically relay GPS coordinates as well as critical vessel information to the GMDSS**

## **What is the Global Maritime Distress and Safety System?**

In 1979, a group of experts drafted the International Convention on Maritime Search and Rescue, which called for the development of a global search and rescue plan. This group also passed a resolution calling for the development of a Global Maritime Distress and Safety System (GMDSS) to provide the communication support needed to implement the global search and rescue plan.

This system, which the world's maritime nations - including the United States - have implemented, is based upon a combination of satellite and terrestrial radio services and has changed international distress communications from being primarily ship-to-ship-based to primarily ship-to-shore-based (Rescue Coordination Center). (Courtesy US Coast Guard - <https://www.navcen.uscg.gov/?pageName=GMDSS>)

## **MMSI - Maritime Mobile Service Identity**

Modern marine radios now feature Digital Selective Calling (DSC) for routine operations and for automated distress hailing.

These features can only be used if your radio is programmed with a unique code called a Maritime Mobile Service Identity, or MMSI

GMDSS is a set of digital signaling protocols used for both routine and distress hailing. Aside from the convenience of automated hailing and reduced congestion on calling channels, **the MMSI is the key to enhanced emergency message traffic possible with GMDSS.**

Digital distress calls contain the **MMSI, latitude, longitude, and time of fix**

This way, rescue authorities know

**who you are**

**where you are**

**when you are there**

This saves valuable time in validating the emergency and deploying search and rescue assets. High seas rescues that used to take days now take hours or even minutes thanks to the system.

The information you provide upon registration is used to identify your vessel and its characteristics

if you call for emergency assistance. These data reside on a secure site maintained by USPS, and within the Operations Systems Center of the United States Coast Guard.

(Courtesy US Power Squadrons - [http://www.usps.org/php/mmsi\\_new/gmdss.php](http://www.usps.org/php/mmsi_new/gmdss.php))



**MMSI Certificate**  
338344207

**Registered : 09/04/2019**

**Vessel Name/Classification** Shibumi / Sailing ship

## EMERGENCY POSITION INDICATING RADIOBEACON (EPIRB)

EPIRBs also take advantage of the GMDSS

**Proper registration** of your 406 MHz satellite emergency position-indicating radio beacon (EPIRB) is intended to save your life, **and is mandated by Federal Communications Commission regulations**. The Coast Guard is enforcing this FCC registration rule.

Your life may be saved as a result of registered emergency information. This information can be very helpful in confirming that a distress situation exists, and in arranging appropriate rescue efforts. **Also, GOES, a geostationary National Oceanic & Atmospheric Administration weather satellite system can pick up and relay an EPIRB distress alert to the Coast Guard well before the international COSPAS-SARSAT satellite can provide location information. If the EPIRB is properly registered**, the Coast Guard will be able to use the registration information to immediately begin action on the case. If the EPIRB is unregistered, a distress alert may take as much as **two hours longer** to reach the Coast Guard over the international satellite system. If an unregistered EPIRB transmission is abbreviated for any reason, the satellite will be unable to determine the EPIRB's location, and the Coast Guard will be unable to respond to the distress alert. Unregistered EPIRBs have needlessly cost the lives of several mariners since the satellite system became operational.

The COSPAS-SARSAT System

COSPAS - Space System for Search of Distress Vessels (a Russian acronym)

SARSAT - Search and Rescue Satellite-Aided Tracking

COSPAS-SARSAT is an international satellite-based search and rescue system established by the U.S., Russia, Canada and France to locate emergency radio beacons transmitting on the frequencies 121.5, 243 and 406 MHz.

If you purchase a new or a used 406 MHz EPIRB, you **MUST** register it with NOAA. If you change your boat, your address, or your primary phone number, you **MUST** re-register your EPIRB with NOAA. If you sell your EPIRB, make sure the purchaser re-registers the EPIRB, or you may be called by the Coast Guard if it later becomes activated.

(Courtesy USCG - <https://www.navcen.uscg.gov/?pageName=mtEpirb>)

**EPIRB 406Mhz Beacon Registration** - <https://beaconregistration.noaa.gov/RGDB/index>

## When Things Go Wrong



### Transmission of DSC Distress Alert

A distress alert should be transmitted if, in the opinion of the Master, the ship or a person is in distress and requires immediate assistance.

Lift the red gate labeled "DISTRESS" and press the button underneath for 3 seconds and the DSC signal is automatically triggered including your MMSI and location information

**Get control of the emergency as best as possible then transmit an Emergency Signal via channel 16**

### Marine Emergency Signals

The three spoken international emergency signals are:

**MAYDAY** -- The distress signal MAYDAY is used to indicate that a station is threatened by grave and imminent danger and requests immediate assistance

**PAN PAN** -- The urgency signal PAN PAN is used when the safety of the ship or person is in jeopardy.

**SECURITE** -- The safety signal SECURITE is used for messages about the safety of navigation or important weather warnings.

When using an international emergency signal, the appropriate signal is to be spoken three times prior to the message. You must give any message beginning with one of these signals priority over routine messages (Courtesy FCC - <https://www.fcc.gov/wireless/bureau-divisions/mobility-division/ship-radio-stations>)

## **Mayday! Mayday! Mayday! Sending a distress call**

You may only have seconds to send a distress call. Here's what you should do:

Procedure for VHF Channel 16 MAYDAY:

If you have a VHF marine radio, tune it to channel 16. Unless you know you are outside VHF range of shore and ships, call on channel 16 first.

Distress signal "MAYDAY", spoken three times.

The words "THIS IS", spoken once.

Name of vessel in distress (spoken three times) and call sign or boat registration number, spoken once.

Repeat "MAYDAY" and name of vessel, spoken once.

Give position of vessel by latitude or longitude or by bearing (true or magnetic, state which) and distance to a well-known landmark such as a navigational aid or small island, or in any terms which will assist a responding station in locating the vessel in distress. Include any information on vessel movement such as course, speed and destination.

Nature of distress (sinking, fire etc.).

Kind of assistance desired.

Number of persons onboard.

Any other information which might facilitate rescue, such as length or tonnage of vessel, number of persons needing medical attention, color hull, cabin, masks, etc.

The word "OVER"

Stay by the radio if possible. Even after the message has been received, the Coast Guard can find you more quickly if you can transmit a signal on which a rescue boat or aircraft can home.

**For example:**

**MAYDAY-MAYDAY-MAYDAY**

**THIS IS BLUE DUCK-BLUE DUCK-BLUE DUCK WA1234 MAYDAY THIS IS BLUE DUCK**

**CAPE HENRY LIGHT BEARS 185 DEGREES MAGNETIC-DISTANCE 2 MILES**

**STRUCK SUBMERGED OBJECT**

**NEED PUMPS-MEDICAL ASSISTANCE AND TOW**

**THREE ADULTS, TWO CHILDREN ONBOARD**

**ONE PERSON COMPOUND FRACTURE OF ARM**

**ESTIMATE CAN REMAIN AFLOAT TWO HOURS**

**BLUE DUCK IS THIRTY TWO FOOT CABIN CRUISER-WHITE HULL-BLUE DECK HOUSE**

**OVER**

Repeat at intervals until an answer is received.

**If you hear a distress call...**

If you hear a distress message from a vessel and it is not answered, then you must answer. If you are reasonably sure that the distressed vessel is not in your vicinity, you should wait a short time for others to acknowledge. (Courtesy USCG - <https://www.navcen.uscg.gov/?pageName=mtBoater>)

**Radio Watchkeeping Regulations**

In general, any vessel equipped with a VHF marine radiotelephone (whether voluntarily or required to) must maintain a watch on channel 16 (156.800 MHz) whenever the radiotelephone is not being used to communicate. (Courtesy FCC - <https://www.fcc.gov/wireless/bureau-divisions/mobility-division/ship-radio-stations>) (Courtesy US Coast Guard - <https://www.navcen.uscg.gov/?pageName=mtWatch>).

Vessels not required to carry a marine radio – for example, recreational vessels less than 65 feet (20 meters) in length, but which voluntarily carry a radio – must maintain a watch on Channel 16 (156 800 MHz) or VHF Channel 9 (156 450 MHz), the boater-calling channel, whenever the radio is operating and not being used to communicate (Courtesy - A BOATER'S GUIDE TO THE FEDERAL REQUIREMENTS FOR RECREATIONAL BOATS)

## How To Comply with Watch Regulations

Most modern VHF radios have dual / triple watch functions which allow communications on any channel while maintaining watch (usually every 2 seconds) on channel 16 (dual watch) or channels 16 & 9 (triple watch)

### DSC individual, group or all ships calling

Modern VHF radios include a programmable directory for maintaining a list of individual MMSI numbers corresponding with other vessels you wish to contact. Once the directory is programmed you can use it to place direct DSC calls to those other vessels without the need to hail. Select an MMSI entry from the directory and the radio will prompt you for the analog channel you wish to talk on (i.e. Channel 68 or 69) and the call is made directly to the corresponding vessel

### Receiving a DSC Call (see user manual for your radio model)

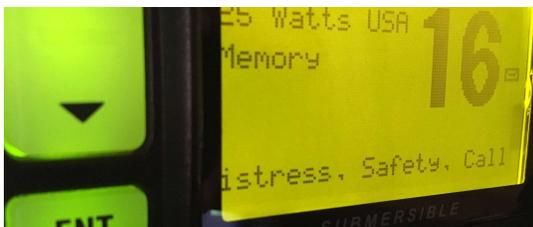
If your radio receives an individual DSC call from another station, it sounds an incoming call tone and displays the name or MMSI number of the station calling you. To respond to the call, select *Send: Able-Comply*; the radio sends an acknowledgement and automatically switches to the designated response channel. To reject the call, select *Send: Unable-Comply*; the radio advises the other station that you are unable to respond to the call.

If the DSC request contains a response channel that you are not allowed to use, the radio displays *Not Support CH*; your only response option is *Send: Unable-Comply*.

If the radio receives a group or all ships call, it sounds an incoming call tone and automatically switches to the designated response channel.

### Receive log

Just like your telephone's caller ID list, your radio keeps track of the calls you receive but do not answer. The receive log is useful if you have been off your boat or away from your radio and want to see who has tried to contact you. The radio displays the last 10 distress calls and the last 20 non-distress calls that it received. If you have unread incoming DSC calls, the radio displays a Message icon. When you display all Distress and Other receiving logs, the message icon disappears. **(VHF585 RADIO user guide)**



## **Making a Call Using Voice Calling on VHF**

Maintain your watch. **Whenever your boat is underway, the radio must be turned on and be tuned to Channel 16 except when being used for messages.**

Power. Try one watt first if the station being called is within a few miles. If there is no answer, you may switch to higher power.

Calling coast stations. Call a coast station on its assigned channel. You may use Channel 16 when you do not know the assigned channel.

Calling other ships. Call other ships on Channel 16. You may call on ship-to-ship channels when you know that the ship is listening on both a ship-to-ship channel and Channel 16. NOTE: To do this the ship has to have two separate receivers.

Limits on calling. You must not call the same station for more than 30 seconds at a time. If you do not get a reply, wait at least two minutes before calling again. After three calling periods, wait at least 15 minutes before calling again.

Change channels. After contacting another station on Channel 16, change immediately to a channel which is available for the type of message you want to send.

Station identification. Identify, in English, your station by your FCC call sign, ship name, the state registration number or official number at the beginning and end of each message.

## **How to Call Another Ship Using Voice Calling**

Make sure your radio is on.

Speak directly into the microphone in a normal tone of voice -- clearly -- distinctly.

Select Channel 16 (156.8 MHz) and listen to make sure it is not being used. NOTE: Channel 9 (156.45 MHz) may be used by recreational vessels for general-purpose calling. This frequency should be used whenever possible to relieve congestion on Channel 16.

When the channel is quiet, press the microphone button and call the ship you wish to call. Say "[name of ship being called] THIS IS [your ship's name and call sign (if applicable)]."

Once contact is made on Channel 16, you must switch to a ship-to-ship channel.

After communications are completed, each ship must give its call sign or ship name and switch to Channel 16 (Courtesy FCC - <https://www.fcc.gov/wireless/bureau-divisions/mobility-division/ship-radio-stations>)

## **YOU MUST NOT TRANSMIT --**

False distress or emergency messages.

Messages containing obscene, indecent, or profane words or meaning.

General calls, signals, or messages on channel 16, except in an emergency or if you are testing your radio (these are messages not addressed to a particular station), or

When your ship is on land (for example, while the ship is on a trailer).

Voluntary boaters are not required to keep radio logs or keep a copy of the FCC's rules.

**Regardless of whether or not you have a copy of the rules, however, you are responsible for compliance.** (Courtesy FCC - <https://www.fcc.gov/wireless/bureau-divisions/mobility-division/ship-radio-stations>)

## **Advanced Functions**

### **Position Request and Reply**

Requesting another station's position (POS Request)

Anytime you need to know where another boat currently is—to find your boating partners, to respond to a request for assistance, etc.—you can send a position request to their radio:

(Typical use)

1. Press CALL-MENU to display the call menu.
2. Select *DSC Call sub-menu*, then select *POS Request*.
3. The radio displays the names listed in your directory; use CHANNEL UP and CHANNEL DOWN to choose the directory entry you want to contact and press ENT-1W/25W. If you want to contact a station that is not in your directory, select Manual. The radio prompts you to enter the MMSI number you want to call. Enter the MMSI number the same way you enter directory entries (see page 22). Enter all nine digits and press ENT-1W/25W.
4. The radio displays the MMSI number you are about to contact and asks you to confirm. If you want to request the position of the displayed MMSI number, select *Send*. To cancel the request, select *Cancel*.
5. When the other station responds, the radio displays the MMSI number, the longitude, and the latitude of the other station. If your radio is connected to a chartplotter through the NMEA OUT connection (see page 43), the position information will also be displayed on the plotter screen.
6. If the other station does not have valid GPS data, the radio displays *No Position*.

## **Weather Functions**

Modern VHF radios provide direct access to current weather conditions and automated weather alert functions for your area and locale

## **Place a Call through a Public Coast Station**

Boaters may make and receive telephone calls to and from any telephone with access to the nationwide telephone network by utilizing the services of Public Coast Stations. Calls can be made to other ships or telephones on land, sea, and in the air.

**IMPORTANT:** A ship owner who plans on using these services should consider registering with the operator of the Public Coast Station through which he/she plans to operate. If a person is not registered with the Public Coast Station, then billing information must be given to the Coast Station operator each time a call is made, which results in additional time and effort.

## **Making Ship to Shore Calls**

Select the public correspondence channel desired.

**LISTEN** to see if the channel is busy (i.e., speech, signaling tones, or busy signal).

If not busy, say, for example, "Pleasure craft [name of ship] calling [name of Public Coast Station] on Channel XX.

If busy, wait until the channel clears or switch to another channel.

When a coast station operator answers, say, "This is [name of ship and ships phone or billing number if assigned] placing a call to [city and phone number desired]." Give the operator billing information. If billing information for your ship has not been registered, the operator will ask for additional identification for billing purposes.

At completion of call say, "[Name of ship] OUT."

### **Connecting to a GPS Receiver**

If you connect the radio to a GPS receiver, the radio can automatically transmit your current position during an automated distress call or during a normal DSC call.

Typical NMEA0183 connection - (check your radio user guide for details)

- Connect the GREEN wire of the included accessory cable to the GPS DATA OUTPUT (-) WIRE or the GROUND WIRE on your GPS receiver.
- Connect the YELLOW wire of the included accessory cable to the GPS DATA OUTPUT (+) WIRE on your GPS receiver.
- Connect the BROWN wire of the included accessory cable to the GPS DATA OUTPUT (-) WIRE on your GPS receiver..

*NOTE: Do not connect the BROWN wire to the GROUND WIRE on your GPS receiver.*

Be certain all wire connections are secure and that all open wires are adequately covered.

*NOTE: to extend the life of the radio, use waterproof tape to seal electrical connections.*

### **GPS Verification (Depends on radio model)**

If the GPS receiver is correctly connected and it transmits valid data, the display shows *GPS Data OK*. If the GPS does not send coordinates within 30 minutes, an audible alert sounds once and the display shows *Input GPS*. This message remains until the coordinates are updated.

### **Had Enough? Time to get your MMSI Certificate!**

**Fill out an MMSI request form online - it's free**

[http://www.usps.org/php/mmsi\\_new/rules.php](http://www.usps.org/php/mmsi_new/rules.php) - rules and use - do I qualify?

[http://www.usps.org/php/mmsi\\_new/index.php](http://www.usps.org/php/mmsi_new/index.php) - entry to MMSI portal

Become a member to login

request new MMSI

fill in blanks - done!

(Courtesy US Power Squadrons - [http://www.usps.org/php/mmsi\\_new/index.php](http://www.usps.org/php/mmsi_new/index.php))

**VHF Channel Listing** - (Courtesy FCC - <https://www.fcc.gov/wireless/bureau-divisions/mobility-division/ship-radio-stations>)

The following chart summarizes a portion of the FCC rules -- 47 CFR 80.371(c) and 80.373(f)

**Type of Message Appropriate Channel(s)**

**DISTRESS SAFETY AND CALLING** - Use this channel to get the attention of another station (calling) or in emergencies (distress and safety). 16

**INTERSHIP SAFETY** - Use this channel for ship-to-ship safety messages and for search and rescue messages to ships and aircraft of the Coast Guard. 6

**COAST GUARD LIAISON** - Use this channel to talk to the Coast Guard (but first make contact on Channel 16). 22

**NONCOMMERCIAL** - Working channels for voluntary boats. Messages must be about the needs of the ship. Typical uses include fishing reports, rendezvous, scheduling repairs and berthing information. Use Channels 67 and 72 only for ship-to-ship messages. 96, 679, 68, 69, 718, 72, 78, 794, 804

**COMMERCIAL** - Working channels for working ships only. Messages must be about business or the needs of the ship. Use channels 8, 67, 72 and 88A only for ship-to-ship messages. 15, 7, 8, 9, 10, 11, 18, 19, 635, 677, 79, 80, 88A1

**PUBLIC CORRESPONDENCE (MARINE OPERATOR)** - Use these channels to call the marine operator at a public coast station. By contacting a public coast station, you can make and receive calls from telephones on shore. Except for distress calls, public coast stations usually charge for this service. 24, 25, 26, 27, 28, 84, 85, 86

**PORT OPERATIONS** - These channels are used in directing the movement of ships in or near ports, locks or waterways. Messages must be about the operational handling movement and safety of ships. In certain major ports, Channels 11, 12 and are not available for general port operations messages. Use channel 20 only for ship-to-coast messages. Channel 77 is limited to intership communications to and from pilots 15, 53, 12, 14, 20, 635, 65, 66, 73, 74, 7510, 7610, 77

**NAVIGATIONAL** - (Also known as the bridge-to-bridge channel.) This channel is available to all ships. Messages must be about ship navigation, for example, passing or meeting other ships. You must keep your messages short. Your power output must not be more than one watt. This is also the main working channel at most locks and drawbridges. 13, 67

**MARITIME CONTROL** - This channel may be used to talk to ships and coast stations operated by state or local governments. Messages must pertain to regulation and control, boating activities, or assistance to ships. 17

**DIGITAL SELECTIVE CALLING** - Use this channel for distress and safety calling and for general purpose calling using only digital selective calling techniques. 70

**WEATHER** - On these channels you may receive weather broadcasts of the National Oceanic and Atmospheric Administration. These channels are only for receiving. You cannot transmit on them. Wx-1 162.55 Wx-2 162.4 Wx-3 162.475 Wx-4 162.425 Wx-5 162.45 Wx-6 162.5 Wx-7 162.525

## US Marine Channels and Frequencies

<b>Ch No.</b>	<b>RX Freq</b>	<b>TX Freq</b>	<b>Status</b>	<b>Name on display</b>
1A*	156.0500	156.0500	Simplex	Vessel traffic system/Commercial
5A	156.2500	156.2500	Simplex	Vessel traffic system/Commercial
6	156.3000	156.3000	Simplex	Inter-ship safety
7A	156.3500	156.3500	Simplex	Commercial
8	156.4000	156.4000	Simplex	Commercial
9	156.4500	156.4500	Simplex	Non commercial
10	156.5000	156.5000	Simplex	Commercial
11	156.5500	156.5500	Simplex	Vessel traffic system
12	156.6000	156.6000	Simplex	Vessel traffic system
13	156.6500	156.6500	Simplex, 1W	Bridge to bridge
14	156.7000	156.7000	Simplex	Vessel traffic system
15	156.7500	Inhibit	Receive Only	Environmental
16	156.8000	156.8000	Simplex	Distress, Safety, Calling
17	156.8500	156.8500	Simplex, 1W	Govt maritime control
18A	156.9000	156.9000	Simplex	Commercial
19A	156.9500	156.9500	Simplex	Commercial
20	161.6000	157.0000	Duplex	Port operation
20A	157.0000	157.0000	Simplex	Port operation
21A	157.0500	157.0500	Simplex	Coast guard only
22A	157.1000	157.1000	Simplex	Coast guard
23A	157.1500	157.1500	Simplex	Coast guard only
24	161.8000	157.2000	Duplex	Marine operator
25	161.8500	157.2500	Duplex	Marine operator
26	161.9000	157.3000	Duplex	Marine operator
27	161.9500	157.3500	Duplex	Marine operator
28	162.0000	157.4000	Duplex	Marine operator
63A	156.1750	156.1750	Simplex	Vessel traffic system
65A	156.2750	156.2750	Simplex	Port operation
66A	156.3250	156.3250	Simplex	Port operation
67	156.3750	156.3750	Simplex, 1W	Bridge to bridge
68	156.4250	156.4250	Simplex	Non commercial
69	156.4750	156.4750	Simplex	Non commercial
70	156.5250	156.5250	DSC Only	DSC
71	156.5750	156.5750	Simplex	Non commercial
72	156.6250	156.6250	Simplex	Non commercial (ship-ship)
73	156.6750	156.6750	Simplex	Port operation
74	156.7250	156.7250	Simplex	Port operation
75	156.775	156.7750	Simplex, 1W	Port operation
76	156.825	156.8250	Simplex, 1W	Port operation
77	156.8750	156.8750	Simplex, 1W	Port operation (ship-ship)
78A	156.9250	156.9250	Simplex	Non commercial
79A	156.9750	156.9750	Simplex	Commercial
80A	157.0250	157.0250	Simplex	Commercial
81A	157.0750	157.0750	Simplex	Government
82A	157.1250	157.1250	Simplex	Government
83A	157.1750	157.1750	Simplex	Coast guard
84	161.8250	157.2250	Duplex	Marine operator
85	161.8750	157.2750	Duplex	Marine operator
86	161.9250	157.3250	Duplex	Marine operator
87**	157.3750	157.3750	Simplex	Marine operator
88**	157.4250	157.4250	Simplex	Commercial (ship-ship)

**Weather Channels and Frequencies (US - Canada - International)**

<b>Ch No.</b>	<b>RX Freq</b>	<b>Name on display</b>
WX01	162.5500	162.550 MHz
WX02	162.4000	162.400 MHz
WX03	162.4750	162.475 MHz
WX04	162.4250	162.425 MHz
WX05	162.4500	162.450 MHz
WX06	162.5000	162.500 MHz
WX07	162.5250	162.525 MHz
WX08	161.6500	161.650 MHz
WX09	161.7750	161.775 MHz