

Marine VHF Radio Use



What is a marine VHF radio?

Marine VHF radio refers to the radio frequency range between 156.0 and 162.025 MHz, inclusive. In the official language of the International Telecommunication Union (ITU) the band is called the *VHF maritime mobile band*.

Marine radio equipment is installed on all large ships and most seagoing small craft. It is also used, with slightly different regulation, on rivers and lakes. It is used for a wide variety of purposes, including summoning rescue services and communicating with harbours, locks, bridges and marinas, and operates in the very high frequency (VHF) range, between 156 and 162.025 MHz.

These radios are primarily line-of-sight, but ranges of up to 25-30 miles are relatively routine.

Channels / Frequencies

Channel 16 (156.800 MHz) - Distress, safety and calling

Channel 13 (156.650 MHz) - Intership navigation (bridge-to-bridge). Must monitor in U.S. territorial waters.

Channel 67 (156.375 MHz) - Mississippi River as described in Bridge-to-Bridge Radiotelephone Regulations (33 CFR 26)

Channel 70 (156.525 MHz) - Digital Selective Calling

U.S. frequencies are simplex, which means that the radio will transmit and receive on the same frequencies.

International frequencies are duplex, which means that the radio will transmit and receive on different frequencies (as per ITU channels).

Radio Controls

Volume : Adjust to a comfortable level to ensure pertinent radio traffic can be heard, yet does not interfere with other watchstanding duties.

Squelch : Used to suppress channel noise when the radio is not receiving a transmission. To adjust, turn down until background noise is heard and then turn up until the background noise is silenced. In the event distant radio traffic

interferes, the squelch can be increase slightly. The user is cautioned not to increase squelch excessively, as this may prevent necessary radio calls from being heard.

High/Low : Switches radio transmissions between 1 watt of power and 25 watts of power. 1 watt should be used for calls to stations within 6-8 miles, whereas 25 watts might be used for more distant stations.

USA/INTL : Switches between U.S. channels (simplex) and international channels (duplex).

Digital Selective Calling (DSC)

Global Maritime Distress & Safety System

VHF maritime channel 70 (156.525 MHz) is authorized exclusively for distress, safety and calling purposes using digital selective calling (DSC) techniques. No other uses are permitted.

Channel 70 is used to send distress alerts, safety announcements and for calling purposes under the Global Maritime Distress and Safety System (GMDSS). Many vessels are now equipped with DSC capability and are using channel 70 for this purpose. It is essential that this channel be protected.

Maritime Mobile Service Identity (MMSI)

Maritime Mobile Service Identities (MMSIs) are nine digit numbers used by maritime digital selective calling (DSC), automatic identification systems (AIS) and certain other equipment to uniquely identify a ship or a coast radio station. MMSIs are regulated and managed internationally by the International Telecommunications Union in Geneva, Switzerland, just as radio call signs are regulated. The MMSI format and use is documented in Article 19 of the ITU Radio Regulations and ITU-R Recommendation M.585-6, available from the ITU.

MMSI Format

Maritime Identification Digits (MID)

MIDs are three digit identifiers ranging from 201 to 775 denoting the administration (country) or geographical area of the administration responsible for the ship station so identified. See the [ITU Table of Maritime Identification Digits](#).

Ships

All ship MMSIs use the format M₁ I₂ D₃ X₄ X₅ X₆ X₇ X₈ X₉ where in the first three digits represent the Maritime Identification Digits (MID) and X is any figure from 0 to 9. (Hint: Ships transmitting with an MMSI not starting with the digits 201-775 are likely doing so improperly, and may be subject to FCC or USCG enforcement action)

MMSI are used when utilizing DSC functions to call individual vessels.

Types of Calls

Routine

Procedure for routine VHF call to another vessel or shore station:

1. Tune your radio to channel 16 or the designated channel for the shore station (i.e. Vessel Traffic Service (VTS)) you will be contacting.
2. Name of vessel or shore station spoken three times.
3. The words "THIS IS <your vessel>", spoken three times.
4. The word "OVER"

Standby the radio for a response. If no response is heard in 30-60 seconds, repeat your call. If no response is heard after 3 attempts, wait at least 2 minutes before trying again.

When the shore station or other vessel responds, suggest a working channel in order to keep channel 16 clear.

For example:

MV NIGHTHAWK, MV NIGHTHAWK, MV NIGHTHAWK
THIS IS MV SEA GULL, MV SEA GULL, MV SEA GULL
OVER

SEA GULL, THIS IS NIGHTHAWK
OVER

NIGHTHAWK, THIS IS SEA GULL.
SWITCH AND ANSWER CHANNEL 77
OVER

SEA GULL, THIS IS NIGHTHAWK
SWITCHING TO 77
OVER

Both vessels would then switch to channel 77 and conduct their business.

Safety of Navigation (Securité)

Securité calls are used to communicate safety of navigation information and meteorological warnings. Frequently used within a harbor or confined waterway, they are a good way of maintaining situational awareness of what other vessels are doing.

For example:

SECURITÉ, SECURITÉ, SECURITÉ
THIS IS MV SEA GULL INBOUND BALTIMORE APPROACHING THE KEY BRIDGE
BOUND FOR DUNDALK MARINE TERMINAL
ANY CONCERNED TRAFFIC, THIS IS MV SEA GULL

Urgency (Pan-Pan)

The urgency call pan-pan derives from French. In French, *panne* (*/pa:n/*, "pahn") is "broken": a breakdown or a mechanical failure. In English, it is also sometimes pronounced as */pæn/* ("pan"). It is used when the safety of the ship or person is in jeopardy.

A three-letter backronym, "possible assistance needed" or "pay attention now" is derived from "pan". It is used in maritime and aeronautical radio communications courses as a mnemonic to radio and communications operators, specifically to reaffirm the important difference between mayday and pan-pan emergency communications.

For example:

PAN-PAN, PAN-PAN, PAN-PAN
THIS IS MV SEA GULL INBOUND BALTIMORE APPROACHING THE KEY BRIDGE
WE HAVE A MAN OVERBOARD AND ARE MANEUVERING TO RECOVER.
ANY AVAILABLE TRAFFIC PLEASE STANDBY TO ASSIST AND REMAIN CLEAR
WHILE VESSEL IS MANEUVERING.
THIS IS MV SEA GULL

Distress (Mayday)

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

Procedure for VHF Channel 16 MAYDAY:

1. 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.
2. Distress signal "MAYDAY", spoken three times.
3. The words "THIS IS", spoken once.
4. Name of vessel in distress (spoken three times) and call sign or boat registration number, spoken once.
5. Repeat "MAYDAY" and name of vessel, spoken once.
6. 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.
7. Nature of distress (sinking, fire etc.).
8. Kind of assistance desired.
9. Number of persons onboard.
10. 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.
11. 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.

Watchkeeping

RADIO WATCHKEEPING REGULATIONS

Regulations Requiring Monitoring and Listening to VHF Marine Radios

A charter boat whose radio was not tuned to the proper channel missed a severe storm warning. By the time the captain learned of the storm, it was too late to return to shore. The ship sank and a couple of persons died. A yacht in trouble off the west coast of Mexico and far from help saw a passenger ship. What should have been a quick rescue could have turned to disaster when the passenger ship (improperly) had its radio off. The yacht was able to attract the ship's attention, however, and was rescued. Misunderstanding of passing intentions by approaching vessels and near collisions have repeatedly been averted by working radios tuned to the proper channel.

Who regulates whom?

Three U.S. government agencies, the Federal Communications Commission, the National Telecommunications and Information Administration, and the U.S. Coast Guard; and two international organizations, the International Telecommunications Union and the International Maritime Organization; have each established marine radio watch keeping regulations. Regulations on radio watch keeping exist for all boats and ships --commercial, recreational, government and military, domestic and foreign-- carrying marine radios.

International Telecommunications Union (ITU). ITU regulates all use of radio spectrum by any person or vessel outside U.S. waters. ITU rules affecting radio, which have treaty status in the U.S. and most other nations, are published in the ITU Radio Regulations. The ITU has established three VHF marine radio channels recognized worldwide for safety purposes:

- Channel 16 (156.800 MHz) - Distress, safety and calling
- Channel 13 (156.650 MHz) - Intership navigation (bridge-to-bridge)
- Channel 70 (156.525 MHz) - Digital Selective Calling

International Maritime Organization (IMO). IMO regulates the outfitting and operation of most vessels engaged on international voyages, except warships. Most IMO radio regulations affect all passenger ships and other ships of 300 gross tonnage and upward. IMO rules affecting radio are promulgated in the Safety of Life at Sea (SOLAS) Convention which has been ratified in the U.S.

Federal Communications Commission (FCC) - the FCC regulates all sales, marketing, and, use of radios in the U.S., including those onboard any recreational, commercial, state and local government, and foreign vessel in U.S. territorial waters. These regulations are contained in Title 47, Code of Federal Regulations.

National Telecommunications and Information Administration (NTIA) - NTIA regulates all use of radio onboard any federal government vessel, including military vessels. NTIA rules do not apply outside the federal government.

U.S. Coast Guard (USCG) - The USCG regulates carriage of radio on most commercial vessels, foreign vessels in U.S. waters, survival craft, and vessels subject to the Bridge-to-Bridge Act (generally all vessels over 20m length) and operating in a Vessel Traffic Service (VTS) area.

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.

Source: FCC 47 CFR §§ 80.148, 80.310, NTIA Manual 8.2.29.6.c(2)(e), ITU RR 31.17, 33.18, AP13 §25.2

In addition, every power-driven vessel of 20 meters or over in length or of 100 tons and upwards carrying one or more passengers for hire, or a towing vessel of 26 feet or over in length, as well, as every dredge and floating plant operating near a channel or fairway, must also maintain a watch on channel 13 (156.650 MHz) -- channel 67 (156.375 MHz) if operating on the lower Mississippi River-- ; while navigating on U.S. waters (which include the territorial sea, internal waters that are subject to tidal influence, and, those not subject to tidal influence but that are used or are determined to be capable of being used for substantial interstate or foreign commerce). Sequential monitoring techniques (scanners) alone cannot be used to meet this requirement; two radios (including portable radios, i.e. handhelds) or one radio with two receivers, are required. **These vessels must also maintain a watch on the designated Vessel Traffic Service (VTS) frequency, in lieu of maintaining watch on channel 16, while transiting within a VTS area.** See 33 CFR §§ 2.36, 26, and 161; 47 CFR §§ 80.148, 80.308-309; NTIA: NTIA Manual Chapter 8.2.29.7.

Digital Selective Calling

Ships, where so equipped, shall, while at sea, maintain an automatic digital selective calling watch on the appropriate distress & safety calling frequencies [e.g. channel 70] in the frequency bands in which they are operating. If operating in a GMDSS Sea Area A1 may discontinue their watch on channel 16. However, ships, where so equipped, shall also maintain watch on the appropriate frequencies for the

automatic reception of transmissions of meteorological and navigational warnings and other urgent information for ships.

Ship stations complying with these provisions should, where practicable, maintain a watch on the frequency 156.650 MHz for communications related to the safety of navigation.

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.

Identifying the Vessel Being Called

AIS (Automatic Identification System)

This VHF-based system allows vessels (so equipped) to be easily identified through the use of chart plotters, ECDIS (Electronic Chart Display and Information System), ECS (Electronic Chart System) or standalone AIS units. As the other vessel's name, call sign and MMSI are easily obtainable, radio calls can be made directly to that vessel.

Visually

In daylight, using binoculars, the type and aspect of many vessels can be identified. When calling an unknown vessel, it is normally best to mentally place yourself in the position of the vessel you are calling. Describing what he/she would see when looking at you will frequently elicit a faster response.

For example :

BLUE-HULLED TANKER, BLUE-HULLED TANKER, BLUE-HULLED TANKER
THIS IS MV SEA GULL, MV SEA GULL, MV SEA GULL
THE RED HULLED OFFSHORE SUPPORT VESSEL ON YOUR PORT BOW
OVER

At night, the aspect and general course of the other vessel can be determined by the navigation lights. While this is helpful in identifying the other vessel, it may be difficult to identify and contact a specific vessel when multiple vessels are in the area.

Radar/ARPA (Automatic Radar Plotting Aid)

Using radar and ARPA to identify another vessel is quite useful. Through rapid radar plotting or ARPA, the course and speed of the other vessel can be determined. In addition, ARPA units will frequently determine the latitude and longitude of a cursor position, thus allowing you to call a vessel by their position.

For example:

VESSEL IN POSITION LATITUDE 27 DEGREES 34 MINUTES NORTH, 125 DEGREES
12 MINUTES WEST ON COURSE 127 SPEED 14,
THIS IS MV SEA GULL, MV SEA GULL, MV SEA GULL
THE RED HULLED OFFSHORE SUPPORT VESSEL ON YOUR PORT BOW
OVER

Referenced to a Geographic Position or Aid to Navigation

Through a combination of visual and radar/ARPA identification, you might also call a vessel by identifying its approximate position. Referencing a prominent landmark or aid to navigation may catch their attention and elicit a response.

For example:

VESSEL APPROACHING AMBROSE LIGHT TOWER ON A COURSE OF 270 SPEED 16,
THIS IS MV SEA GULL, MV SEA GULL, MV SEA GULL
THE RED HULLED OFFSHORE SUPPORT VESSEL ON YOUR PORT BOW
OVER

OR

RED-HULLED TANKER SOUTHBOUND OFF MONTAUK POINT,
THIS IS MV SEA GULL, MV SEA GULL, MV SEA GULL
THE RED HULLED OFFSHORE SUPPORT VESSEL ON YOUR PORT BOW
OVER