

HOW TO USE A MARINE VHF RADIO

A FHYC Education Committee Presentation

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Just a note....

We have a diverse group of participants today, with a wide range of experience. Some are new to boating, some are experienced blue water cruisers. This presentation is designed to provide something for everyone without being too technical. Your patience is appreciated.

KNOWING HOW TO USE A MARINE RADIO:

Provides an essential link to:

- other vessels (collision avoidance, intentions, assistance, towing, etc.)
- bridges (to request opening, etc.)
- weather reports and forecasts
- marine services (marinas, dockage, fuel, etc.)
- and safety resources (USCG, etc.)

Proper use reflects well upon a boat, and demonstrates that her crew is competent. Improper use can cause confusion, block important communications, cause frustration among other boaters.

OUR OBJECTIVE FOR TODAY

Is to give you the information necessary to use your radio correctly, and to help you feel more capable, comfortable, and competent in using it as needed; and for those of you who may be more experienced, to dust off the cobwebs.....

HOW TO USE A MARINE VHF RADIO

Fundamentals of VHF communication:

- What is VHF marine radio?
 - How is it different from a cellphone?
 - How do I use the controls?
 - When might I have to use it?
 - What should I say?
 - What is DSC?



WE'LL ALSO TAKE A LOOK AT:

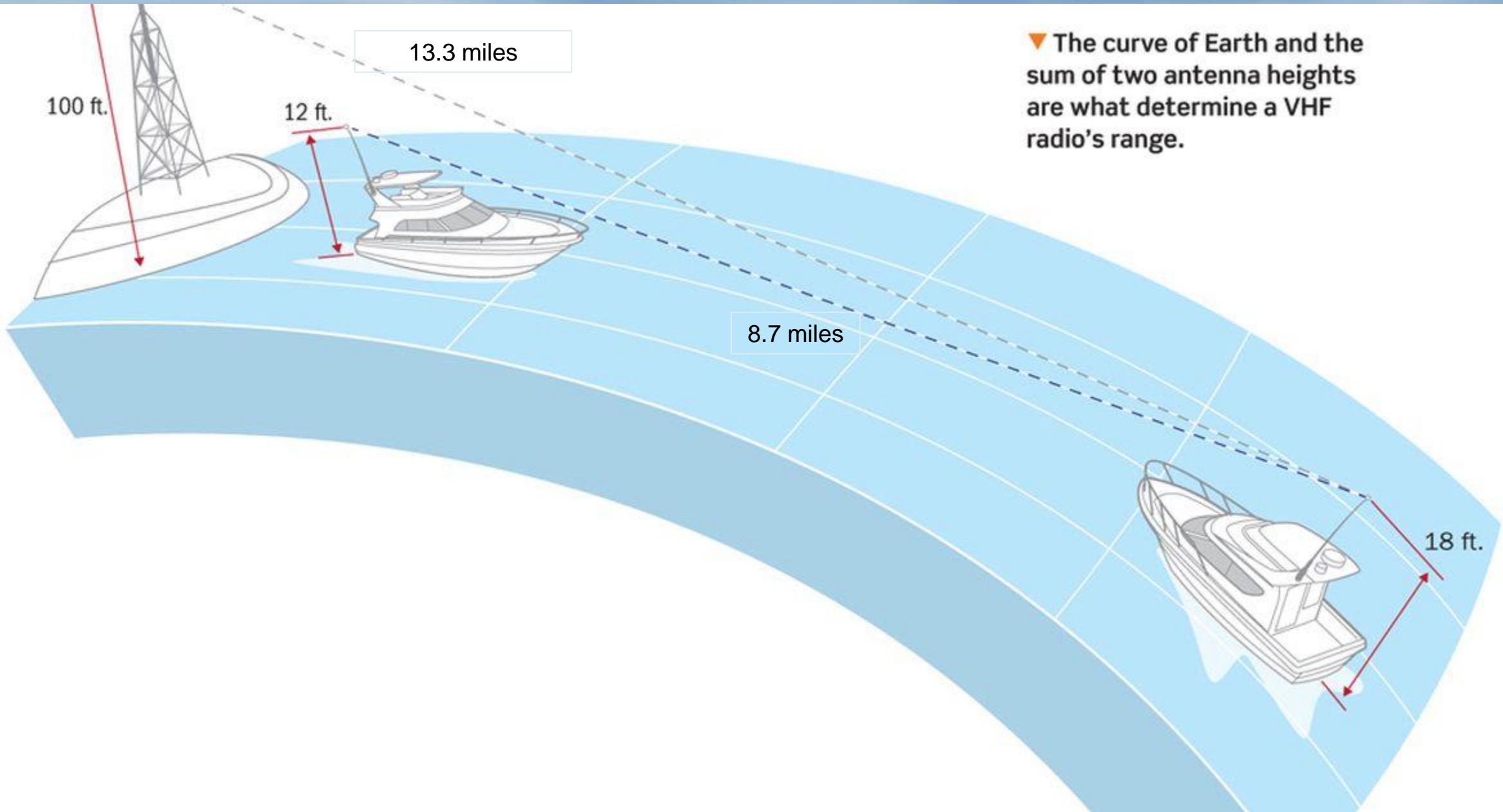
- Special calls, to include

“Securite” “Silence” “Pan-Pan” and “Mayday”

- How to easily report your position when necessary
- How to properly accomplish a “radio check”
- What to do if you hear a DSC Distress (Mayday) call

FUNDAMENTALS OF VHF COMMUNICATION

- There are many kinds of marine radios in use, but the most common, inexpensive, and generally useful aboard recreational vessels is VHF-FM radio.
- VHF refers to the radio frequency band used; Very High Frequency
- Important characteristics of VHF:
 - line of sight, signals generally can not bend over the horizon and around the earth
 - this means they are used for relatively short range communications
 - typical range depends on height of sending and receiving antennas
 - commonly useful out to 5 - 15 miles, and up to 20 miles for the USCG
 - Good general rule...if you can see the other vessel with binoculars, she's in VHF radio range



USEFUL RANGE - NOTES

- Typical line of sight to the horizon while standing in cockpit of a boat is about 3 miles
- The USCG now operates a newer system known as “Rescue 21”, such that they can communicate anywhere along the coasts with a vessel that’s within 20 miles of shore

Types of VHF – FM marine radios

Hand Held, Flush Mount, Binnacle Mount



VHF MARINE RADIOS VS. CELL PHONES

- Cell phone use is dependent on network cell tower location. Affected by trees, hills, buildings, etc. If cell tower coverage is available, 4G range is up to 10 miles. The new 5G range is only 1000'. However, most cell phones are NOT waterproof, and 911 Emergency Services are not necessarily familiar with on water locations. Cell phones are "duplex", meaning both parties can talk simultaneously and be heard over each other. Cell phone conversations are private.
- VHF marine radios are commonly water resistant or waterproof and made for the marine environment. They are set up to communicate directly with other vessels on the water and the USCG.
- Most VHF marine frequencies are "SIMPLEX", meaning only one party can transmit and talk at a time. If the other party attempts to transmit simultaneously, only a loud squeal will be heard by those on the frequency. VHF conversations are NOT private.

VHF MARINE RADIOS ARE REGULATED

- Federal Communications Commission and USCG regulate use of VHF – FM radios on commercial and recreational vessels
- If installed, must maintain a “listening watch” on channel 16
- Use of vulgar or profane language is prohibited
- Marine radio to be used from vessel only, not from ashore except as listening station unless licensed as shore station (Use caution....do not transmit with hand held radio while ashore)
- No license is required unless going into international waters
- False distress calls prohibited
- Violations punishable by fines up to \$10,000 and one year imprisonment + costs

VHF MARINE RADIOS USE “CHANNELS” TO SIMPLIFY TUNING OF FREQUENCIES

- No need to memorize frequencies with lots of numbers....just a two digit channel number (corresponds to a specific frequency)
- Channels are organized for specific purposes to avoid congestion with too many users on a limited number of frequencies
- Channels SHOULD NOT be used for purposes other than as designated
- All calls originate on one of two channels: 16, the “Hailing and Distress” channel, or channel 9, an alternate “Hailing ONLY” channel for recreational vessels designed to alleviate congestion on channel 16.
- DO NOT carry on ANY conversation or ask for a “radio check” on a Hailing Channel
- After establishing communications on a “Hailing Channel”, traffic is shifted to the appropriate “working channel” established for that purpose

VHF MARINE RADIOS USE “CHANNELS” TO SIMPLIFY TUNING OF FREQUENCIES

- WX1 to WX 10 – weather broadcast (receive only)
- 06 – Commercial Intership safety ONLY
- 07A – Commercial intership and ship to coast
- 09 – Alternate Hailing for recreational boat
- 12 – Port operations and traffic advisory
- 13 – Navigational ship to ship, and ship to bridge (1 watt)
- 14 – Port operations (intership and ship to coast)
- 16 – Hailing and Distress
- 22A – Coast Guard Communications
- 24, 26, 28 – Public Telephone Marine Operator for ship to shore calls (duplex)
- 65A – Port operations; ship to shore and ship to ship
- 67 – Commercial intership all areas, lower Mississippi ship to ship navigation (1 watt)
- 68 – Non commercial ship to ship and ship to coast (Yacht Clubs,marinas, etc.)
- 69 – Non commercial ship to ship and ship to coast
- 70 – DSC Distress and general purpose calling
- 71 – Non Commercial intership and ship to shore
- 72 – Non Commercial intership only
- 78A – Non Commercial Intership and ship to shore

**IN EFFECT, THIS MEANS THAT YOU WILL
PRIMARILY USE ONLY ABOUT 8 CHANNELS:**

- Channel 16 or 9 to make an initial call
- When your party answers, you are to suggest a “working channel” to carry on your conversation
- In general, there are only five working channels for non commercial, recreational vessels....they are 68,69, 71, 72, and 78A (I remember these by thinking of them as ages when getting older.)

USE OF CHANNELS - CONTINUED

- If you want to talk with another vessel about safety, maneuvering for collision avoidance, passing, etc., use one of the working channels. It helps to identify yourself as a “motor vessel” or “sailing vessel” in these circumstances.
- If you have business with a bridge operator, use the channel depicted on the chart or in the Coast Pilot for that bridge. Channel 13 is commonly used for bridge operators but there are a few others.

CHOOSE BETWEEN 2 POWER SETTINGS:

- Normal power setting is 25 watts for most VHF Marine radios
- Alternately, use 1 watt (low power) for vessels close to you
- Range of signal is not dramatically different between the two power settings; but clarity of signal is better at longer ranges with higher power.
- Use the lowest power setting necessary
- Handheld VHF radios have outputs of 5 to 6 watts
- Some VHF channels are restricted to 1 watt: ie., Channels 13 and 67. Most radios will automatically reduce power on these channels

COMMON CONTROL FUNCTIONS



LET'S GET READY TO MAKE A NORMAL CALL...

Remember the following rules when “hailing” another vessel:

1. Transmit for no more than 30 seconds – (this shouldn't be a problem!)
2. If no reply is received, a 2 minute pause should be observed before calling again
3. A maximum of 3 calling attempts, with a 2 minute pause between, may be made before a 15 minute waiting period must be observed. This 15 minute period may be reduced to 3 minutes if it wouldn't interfere with other traffic on the channel
4. No transmission on channel 16 may exceed 1 minute

SIMPLEX FREQUENCIES REQUIRE OPERATIONAL PROCEDURES TO ALLOW ONE PARTY TO SPEAK AT A TIME

- These procedures include “procedural words” or “pro-words”
- Once you move your “traffic” to a working channel, you’ll need to tell the other party when you’re finished with your comment, and let him know that he is free to respond on the frequency. To do this, end with the word “**OVER**”. This also indicates to others who may be waiting to use the frequency that the conversation is not finished.
- When you are finished with your conversation, end with the word “**OUT**.**”** This means that the conversation has ended and your are leaving the working frequency for others to use.
- Never use the two words (over and out) together as they have different meanings!

NORMAL RADIO CALL PROCEDURE

- First: Think about who you will call, what working channel you will propose, and what you will say
- Check the squelch knob - adjust it to eliminate background noise, and adjust the volume knob if necessary
- Select a hailing channel....16 or 9. Use 9 only if you know the other vessel is set up to monitor 9 as well as 16. (Some vessels will do this using channel scanning or by prearrangement.) Use the appropriate output power setting (25 or 1 watt)
- Wait to ensure no one else is speaking
- Push the transmit key on the microphone, keeping it 1 to 2 inches from your mouth and speak using a normal voice volume
- Identify the vessel you're calling using it's name, one two, or up to three times (depending on noise levels and clarity of signals), followed by your own vessel's name.

EXAMPLE, NORMAL CALL

Sand Dollar, hailing vessel

“Blue Marlin, Blue Marlin, this is Sand Dollar”

“Blue Marlin, 71”

(Switches to working channel 71)

“Blue Marlin, what are your sea conditions
like up there by Fox Shoal, over?”

“OK, thank you, Sand Dollar out.”

(returns to monitor channel 16)

Blue Marlin, hailed vessel

“Sand Dollar, this is Blue Marlin...”

“71”

(Switches to working channel 71)

“Sand Dollar, we’ve got 2 to 3 foot seas
running from the South West with a period of
about 7 seconds, over.”

“Blue Marlin, out.”

(returns to monitor channel 16)

NORMAL CALL - NOTES

- Notice that each speaks with brevity, remember others may be waiting for the channel
- AVOID the use of words and phrases, such as:
“Come in Blue Marlin, Come in....” or “Blue Marlin do you read me?”
or “10-4” or “What’s your 20 there good buddy....?”

....these phrases are considered unprofessional for the mariner and unnecessarily consume time on the frequency compared to standard phraseology.

TO MAKE A “RADIO CHECK” ...

- DO NOT broadcast “radio check anyone?” on channel 16. Channel 16 is a Hailing and Distress channel ONLY. (The Coast Guard may reprimand you.)
- Use an "open channel" to perform the check (channels 68, 69, 71, 72 and 78A). Turn **radio** to one-watt power setting, and key the microphone. Call "**radio check**" three times, followed by your **boat** name and location. Wait for a reply confirming someone has heard your transmission.

OR

SEA TOW Automated service

1. Automated **Radio Check** Service uses one of **VHF** Channels 24, 25, 26, 27, 28, 84. Simply tune your **radio** to the proper channel for your community. (26,27 near Atlantic Beach)
2. Conduct a **radio check** as you normally would.
3. Upon releasing the mic, the system will replay your transmission, letting you hear how you sound.

TO MAKE A “RADIO CHECK” ...

- If you have two people and a hand held radio in addition to your fixed mount, have one take your hand held as far away as he/she can on the boat. Turn the volumes low to avoid squeals and feedback, then transmit on a working channel at 1 watt using proper radio check protocol.
- A check of reception only can be made by listening to the continuous NOAA WX broadcasts on one of the WX channels. (Channel 2 in our area)

A SECURITE' CALL...PRONOUNCED “SEECURITAY”

Is a safety message broadcast on channel 16 by any vessel as needed, spoken three times. Example:

“Seecuritay, Seecuritay, Seecuritay; tug Gordon Sanders pushing barges downbound Neuse River off Minnesott Beach”

Heads up whenever you hear a Securite' call.....no routine response on VHF is necessary. You may call vessel if required to coordinate...

A SILENCE CALL – PRONOUNCED “SEE LONS”

- A “Silence” call is usually made to clear a frequency of traffic to allow an important message. It may also be used to allow the Coast Guard to disseminate critical information, or to listen for a distress call.
- When you hear “SEE LONS, SEE LONS, SEE LONS”, it’s a command to stop all traffic on frequency. Comply and listen.
- When the need for silence is over, you’ll hear “SEE LONS FEENEE” meaning Silence Finished. You may resume your normal traffic.

KEY ELEMENTS OF URGENT OR DISTRESS MESSAGES:

1. Type of message (Pan-Pan, or Mayday)
2. To whom message is intended (usually all stations)
3. Identity of your vessel
4. Position of vessel
5. Nature of distress or emergency
6. Assistance required and intentions
7. Persons on board
8. Description of boat (type, hull color, trim color, etc.)
9. Name of boat and proword “OVER”

Suggest that you put this on a card near your radio for easy reference!

URGENT RADIO CALL PROCEDURE – PAN PAN

“PAHN PAHN, PAHN PAHN, PAHN PAHN”

- The calling station has a “very URGENT message to transmit concerning the safety of a ship, aircraft, vehicle, or person,” and transmits the message in the open to all vessels on channel 16.
- Do not attempt to make a call during the transmission of the PAN-PAN call.

Example:

“Pahn-Pahn, Pahn-Pahn, Pahn-Pahn, Hello all stations, hello all stations, this is the United States Coast Guard, Sector North Carolina. At time 1950 Zulu the USCG received a report of overturned sailing vessel with 3 persons in the water 2 miles southeast of Shackleford Point. All vessels in the vicinity should be on the lookout for and render assistance if possible. For further information switch to channel 22 Alpha. This is the United States Coast Guard, North Carolina Sector, out.”

URGENT RADIO CALL PROCEDURE – “PAHN PAHN, PAHN PAHN, PAHN PAHN”

Example 2:

“Pahn-Pahn, Pahn-Pahn, Pahn-Pahn; Hello all stations, hello all stations, this is the motor vessel Blue Marlin. Blue Marlin is a blue hulled 34 foot Mainship located 4 miles south of Hawley Point. We’ve struck a submerged object and are taking on water and may not be pumping it overboard as fast as we’re taking it on. We have 4 persons aboard and are requesting any available assistance. Blue Marlin, over.”

EMERGENCY RADIO CALL PROCEDURE – “MAYDAY, MAYDAY, MAYDAY”

- Mayday is a distress message of the “highest priority, sent when a person, boat, or aircraft is threatened by grave or imminent danger and requires immediate assistance.”

EXAMPLE:

“Mayday, Mayday, Mayday, Hello all stations, hello all stations; this is the sailing vessel Algernon. Our position is Latitude 35 degrees, 6.3 minutes North, Longitude 77 degrees, 2.4 minutes West. Algernon is a white 36 foot Catalina on fire and we are abandoning ship; We have 4 persons aboard getting into our dinghy. Requesting all available assistance. Algernon, over.”

COMMON MISTAKE...

- Waiting too long to issue either a PAN-PAN or MAYDAY MESSAGE

Remember you will be busy managing problem and crew

As soon as it becomes apparent to you that you need help, send the appropriate message

HOW DO I REPORT MY POSITION?

You have two choices:

1. If you know your position with respect to a geographic point; ie., “2 miles west of Killarney shoal”, or “Alongside Green Buoy 7 in Muscle Channel”

OR

2. Give position in terms of latitude and longitude. This can usually be found quickly on GPS chartplotters...

A BRIEF WORD ABOUT LATITUDE AND LONGITUDE



LATITUDE: HORIZONTAL LINES WHICH MEASURE N AND S FROM 0 AT EQUATOR, TO 90 AT BOTH POLES



LONGITUDE: VERTICAL LINES 0 TO 180 DEGREES

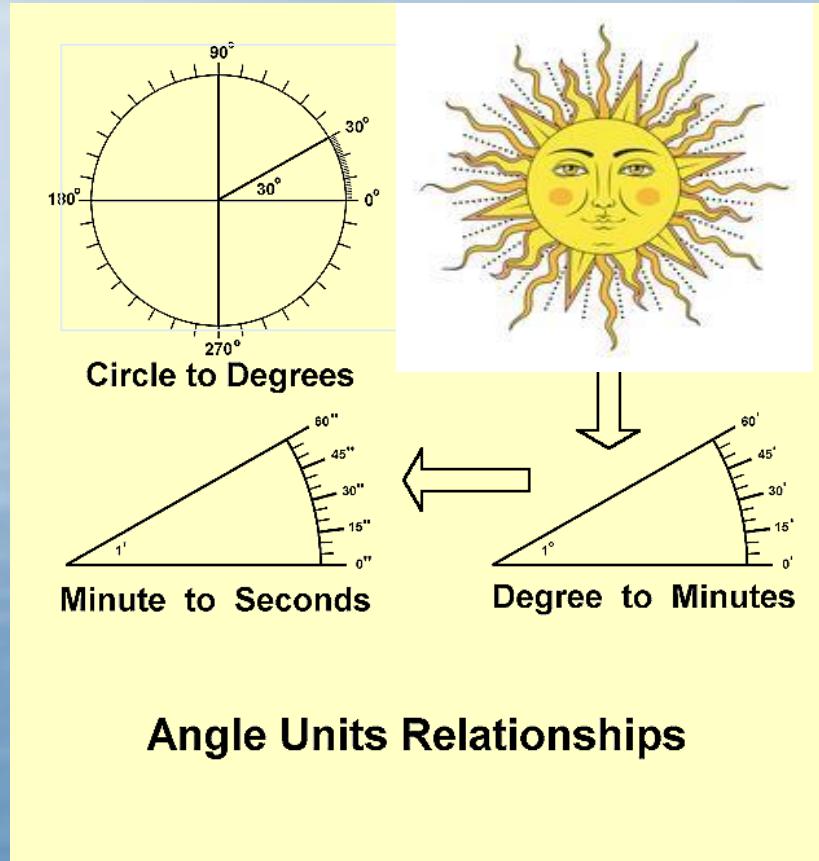
Prime Meridian 0 degrees (Greenwich, England)



THE US IN LAT / LON COORDINATES



EXPRESSED IN DEGREES, MINUTES, AND TENTHS OF MINUTES ON GPS CHARTPLOTTERS

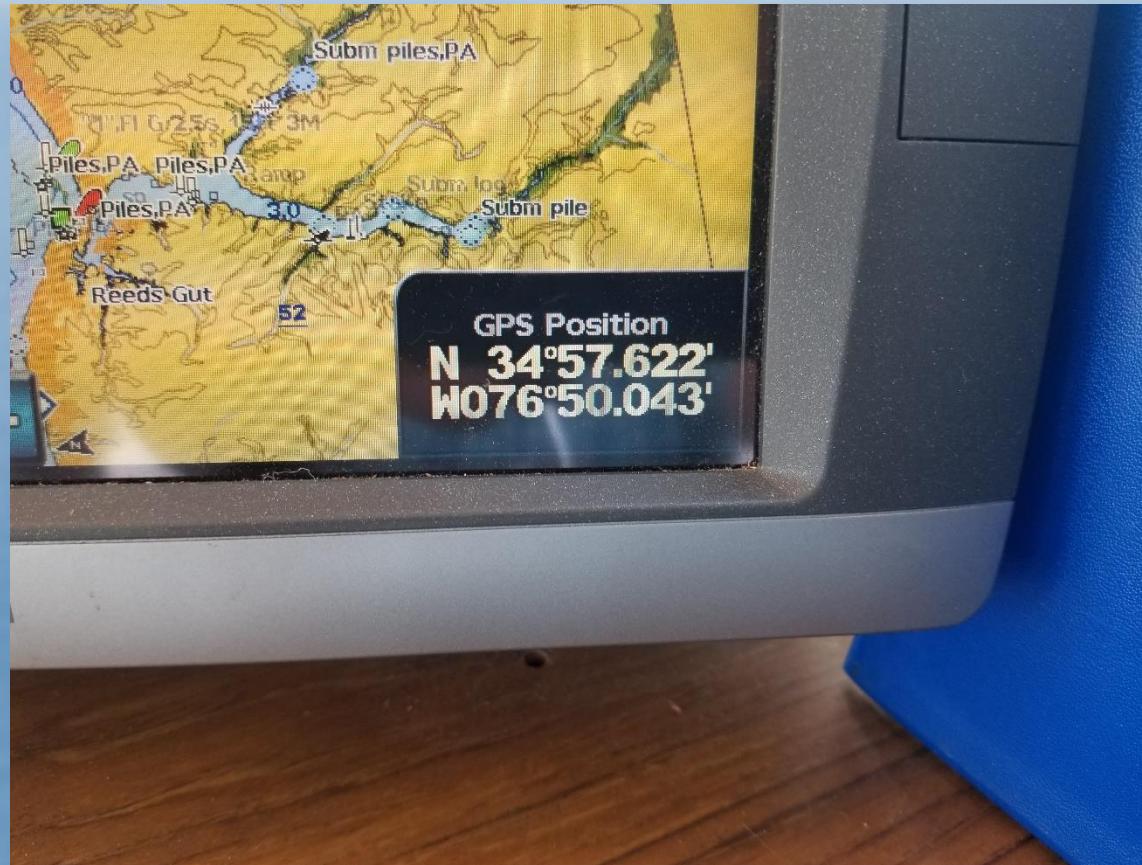


“North 34 degrees, 57.622 minutes and
West 76 degrees, 50.043 minutes”

can also be expressed as:

“34 degrees, 57.622 minutes North and
76 degrees, 50.043 minutes West”

GPS CHART PLOTTER CONFIGURED TO SHOW POSITION CONTINUOUSLY



A Quick Look at Digital Selective Calling or DSC

Note: Not all VHF radios have DSC. Among those that do, there may be differences in the way in which you program them and use their DSC functions. This introduction is an example only, intended to familiarize you with their general operation. Check the owners manual for specifics regarding your radio.

DSC BASICS

- Unique registered Maritime Mobile Service Identity (MMSI) number must be programmed into unit
- Allows user to digitally HAIL another vessel or another group of vessels, discretely, using their MMSI numbers, rather than using traditional public voice calls over channels 16/9.
- Message is sent on Channel 70. Sender also designates working channel to be used in follow on verbal communication.
- After message is sent, the receiving radio sounds a tone or beep to indicate an incoming message; analogous to a phone ringing... "hey, you have a call"
- The digital message will be displayed on the receiving radio, including what working channel you should shift to after responding. You should select and send a digital reply message; "able to comply" or "not able to comply", and then move to the designated working channel for voice communications.

Must register DSC
radio for a unique
MMSI, "Maritime
Mobile Service
Identity" 9 digit
number

VHF MARINE IC-M602



o ICOM

MIC

VOL

H/L

CH/WX

SQL

9

16

POWER

POWER

MENU

CLR

F



1 DUAL
QZ

2 TRI
ABC

3 DIM
DEF

4 SCN
GHI

5 TAG
JKL

6 LO/DX
MNO

7 HAIL
PRS

8 FOG
TUV

9 IC
WXY

CE

0 SCRIM
A - .

ENT

DIGITAL SELECTIVE CALLING FEATURES

- Uses digital menus to build Hailing message; replaces call on 16/9
- Message may be addressed to single vessel, or all vessels, or USCG
- Compact digital signal is transmitted further resulting in greater range
- Distress calls are automatically made by depressing “DISTRESS” button for 5 seconds, and automatically repeated at about 3.5 to 4.5 minute intervals there after until acknowledged or canceled
- Distress signal is automatically rebroadcast by other receiving vessels to extend range and ensure reception by USCG
- Results in quick, clear, concise communications that are harder to misunderstand

VHF MARINE IC-M602

--DSC Menu--

- Select Item
- Position Input
- Individual Call
- Group Call
- All Ships Call
- Position Request
- Position Report

WATERPROOF

MIC

H/L

CH/WX

VOL

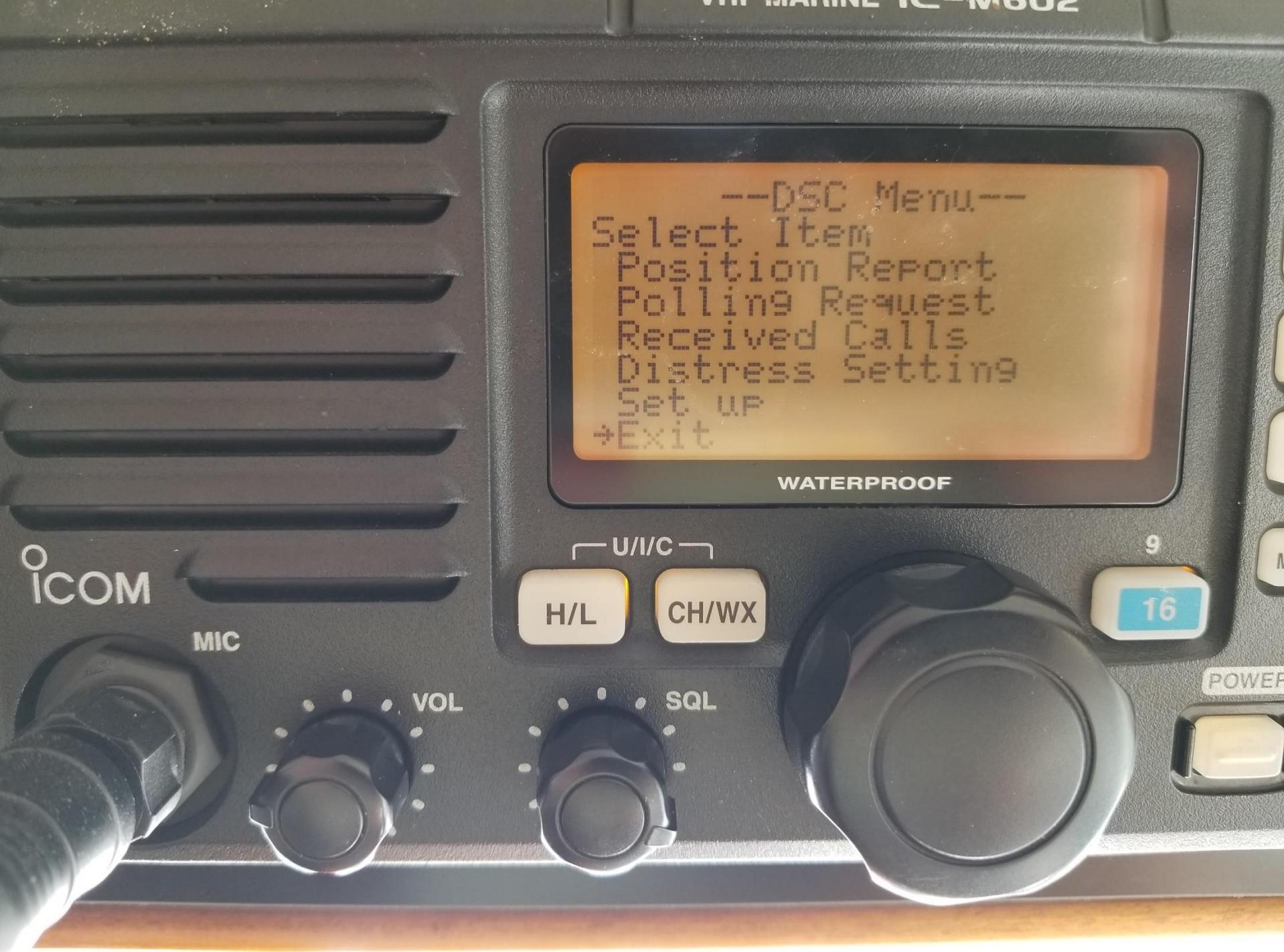
SQL

9

16

POWER

MEN



---DSC Menu---

Select Item
Position Input
→Individual Call
Group Call
All Ships Call
Position Request
Position Report

WATERPROOF

U/I/C

H/L

CH/WX

MIC

VOL

SQL

9

16

POWER

MENU

1 DUAL
QZ

4 SCN
GHI

7 HAIL
PRS

CE

VHF MARINE IC-M602

--DSC Menu--
Input Address
Input 9 digits

<CLR→Exit / ENT→OK>

WATERPROOF

U/I/C

H/L

CH/WX

MIC

VOL

SQL

9

16

POWER

1 DUAL
QZ

4 SCN
GHI

7 HAIL
PRS

CE

MENU

CL

--DSC Menu--

Select Item
Position Input
Individual Call
Group Call
→All Ships Call
Position Request
Position Report

WATERPROOF

U/I/C

H/L

CH/WX

9

16

ME

POWER

VOL

SQL

VHF MARINE IC-M602

--DSC Menu--
All Ships Call Ready

<CLR→Exit / ENT→OK>

WATERPROOF

U/I/C

H/L

CH/WX

MIC

VOL

SQL

9

16

POWER

DISTRESS

1 DUAL OZ 2 TRI ABC 3 DI DEF
4 SCN GHI 5 TAG JKL 6 LOID MNO
7 HAIL PRS 8 FOG TUV 9 IC WXY
CE 0 SCRIM A -/- ENT

MENU

CLR

F

--DSC Menu--
Select Item
Position Request
Position Report
Polling Request
Received Calls
→Distress Setting
Set UP

WATERPROOF

U/I/C

MIC

H/L

CH/WX

VOL

SQL

9

16

MEN

POWER

1

D

4

S

7

H

P

CE

VHF MARINE IC-M602

---DSC Menu---

Select Nature
→Undesignated
Explosion
Flooding
Collision

<CLR→Exit / ENT→OK>

WATERPROOF

U/I/C

MIC

H/L

CH/WX

VOL

SQL

9

16

VHF MARINE IC-M602

25W USA

TAG

No Position
No Time

16
CALLING

WATERPROOF

U/I/C

H/L

CH/WX

VOL

SQL

9

16

POWER

MENU

CLR

F

1 DUAL
QZ

2 TRI
ABC

3 DIM
DEF

4 SCN
GHI

5 TAG
JKL

6 LO/DX
MNO

7 HAIL
PRS

8 FOG
TUV

9 IC
WXY

CE

0 SCRM
A - /

ENT

BATTERY VOLTAGE

1 HOUSE

8235 DC VOLTS

BAT

BLU

IC



IF YOU HEAR A DSC DISTRESS ALERT:

- A vessel receiving a DSC Distress call from another vessel should not normally acknowledge the alert by DSC, since acknowledgement of a DSC distress alert by DSC is normally made by USGC stations only.
- A vessel so receiving a DSC distress call should also defer an acknowledgement of the DSC alert by voice response on channel 16, so as to allow the USCG a chance to call the distressed vessel using normal voice communication. Jot down location of distressed vessel and determine whether it is in close proximity to your own position. Also make a note of its MMSI number.
- Ships receiving the DSC distress call should listen for USCG response...if none is observed, acknowledge receipt of DSC distress call on channel 16 as follows:

“MAYDAY, (the 9 digit MMSI of the distress vessel)” repeated 3 times, “this is (your own 9 digit #)” repeated 3 times. “Received Mayday.”

What you do from there depends on circumstances and is up to you....

IN REVIEW:

- We've looked at the characteristics of VHF – FM marine radios and their effective range, and the nature of simplex frequencies
- We've compared cell phones to VHF marine radios and understand the relative advantages and disadvantages of each
- We've taken a look at some of the regulatory rules that affect VHF radio use
- We've looked at the controls common to all VHF radios, including the squelch knob and channel selectors
- We've talked about the 8 most commonly used frequencies and their intended purpose
- We reviewed the proper use of prowords and the protocols for making normal, urgent, and distress calls
- We've looked at some other common types of messages, including Security calls, Silence calls, and Silence Finished calls
- We've talked about the essential elements of urgency and distress calls, and how we communicate our position during those calls
- We've also looked at some basics of Digital Selective Calling (DSC)

WE HOPE YOU FOUND THIS USEFUL

- If you have any questions, I'd be happy to try to answer them....
- If you have any comments or suggestions for revisions to this course, please feel free to email me at capt.davephipps@gmail.com

Thank you all for attending!