Emergency Marine Communications

Presented by: Steve Chamberlin

Content:Chuck Hawley
Safety at Sea Seminar
US Sailing

Goals of Emergency Communications

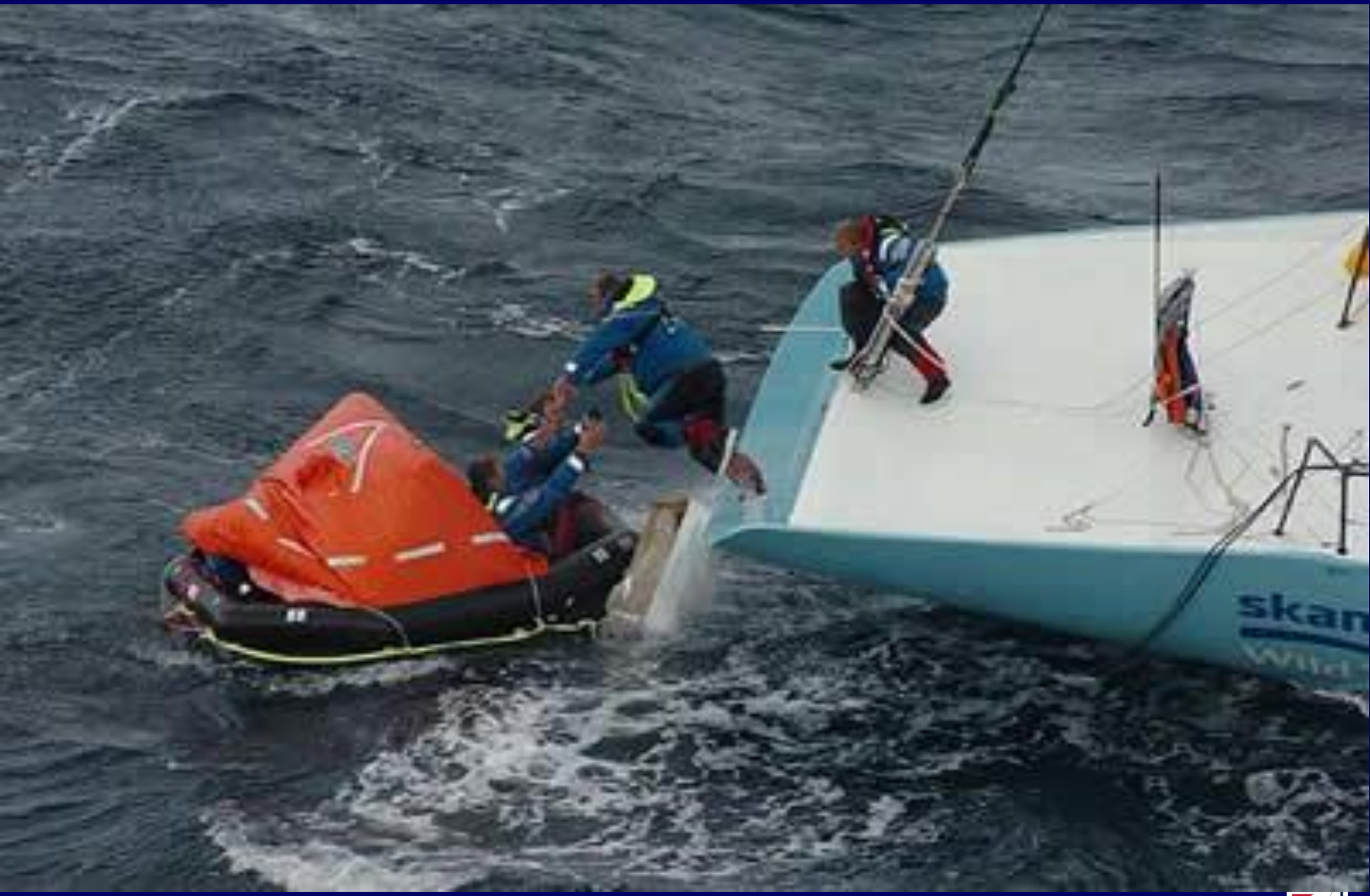
- To alert rescue services to your situation
- To get medical or other expert advice
- To alert other vessels of potential hazards
- To relay information regarding another vessel
- To maintain a radio schedule with rescuers

Different levels of severity

- MAYDAY
  Use when there is a risk loss of life or vessel
  Man overboard, fire, flooding, collision

- PAN PAN
  Use when there is a serious medical issue or damage to vessel
  Loss of rudder, drifting towards danger, injury to crewmember

- SECURITE
  Use for safety oriented messages for other vessels
  Debris in water, navigation aid in wrong location, flare demonstration



In a distress communication, what's important?

- Distress or Urgency Word
- Vessel name
- Position (Lat long if possible; geographic if not)
- Nature of emergency
- Number of people
- Description of vessel
- Life saving equipment

How do you broadcast a Mayday?

“Mayday, mayday, mayday.”

“This is the sailing vessel Surprise, Surprise, Surprise.”

“We are located at 24 degrees 15 minutes north, 151 degrees 56 minutes west.”

“We are taking on water, and we can’t find the source of the leak.”

“Surprise is a 38 foot sailboat with a tan deck and dark blue hull.”

“There are 6 souls on board. We have an EPIRB and a life raft.”

“This is the sailing vessel Surprise, standing by on Channel 16.”

If you receive a Mayday…

- Pause to see if anyone else responds
  - Especially the Coast Guard
- Acknowledge receipt of Mayday
- Establish whether you're in a position to help
  - Direct assistance
  - Standby vessel in distress
  - Relay communications
- Log communications in logbook
  - Time, name, position, action taken

Portable or mounted communications devices?

- Portables:
  - Independence from ship's systems
    - Antennas
    - Power
  - Convenience
- Mounted units:
  - Generally better antenna installations
  - Longer "battery life"
  - Greater transmit power
  - Work from below decks

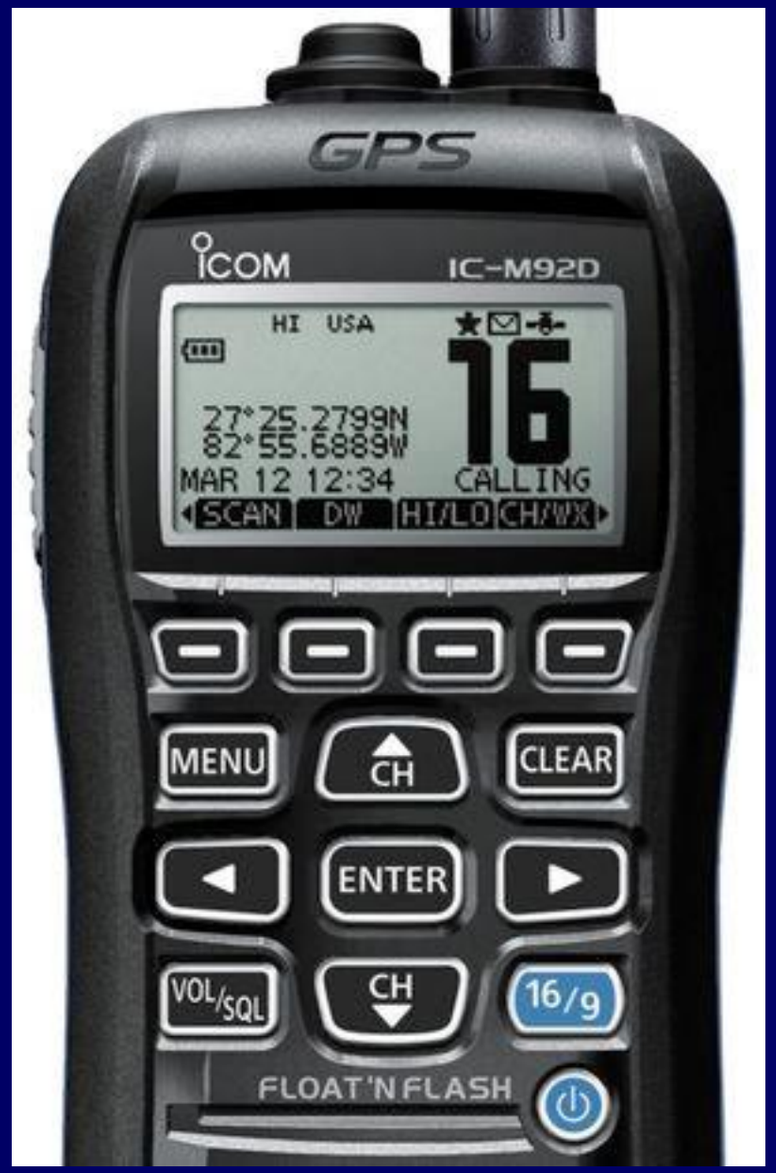
Summary of Marine Communications

How far? What type? What cost?

Name	Cost	Range	Type of Comms
HH VHF	$100-$300	3-20	Voice
Fixed VHF	$100-$500	20-60	Voice
AIS	$500	15	Vessel Data
EPIRB/PLB	$400-$1200	Worldwide	Mayday
HF SSB	$2000-$3000	25-4000	Voice, Data
Sat Telephone	$500-$1500	~Worldwide	Voice, Data
Inmarsat C	$2500	Worldwide	Data
Inmarsat M	$3000-$6000	~Worldwide	Voice, Data

Handheld VHF-FM Marine Radio

Range:	**3 miles (another boat) to 20 miles (CG tower)**
Cost:	$100 to $300
Best Uses:	Cockpit safety, ship to dinghy, small boats (kayaks, inflatables. Autonomous from ship's systems. ***Strongly consider models with DSC and GPS built-in.***
Limitations:	Some uses are illegal but handy, short range, few chat channels

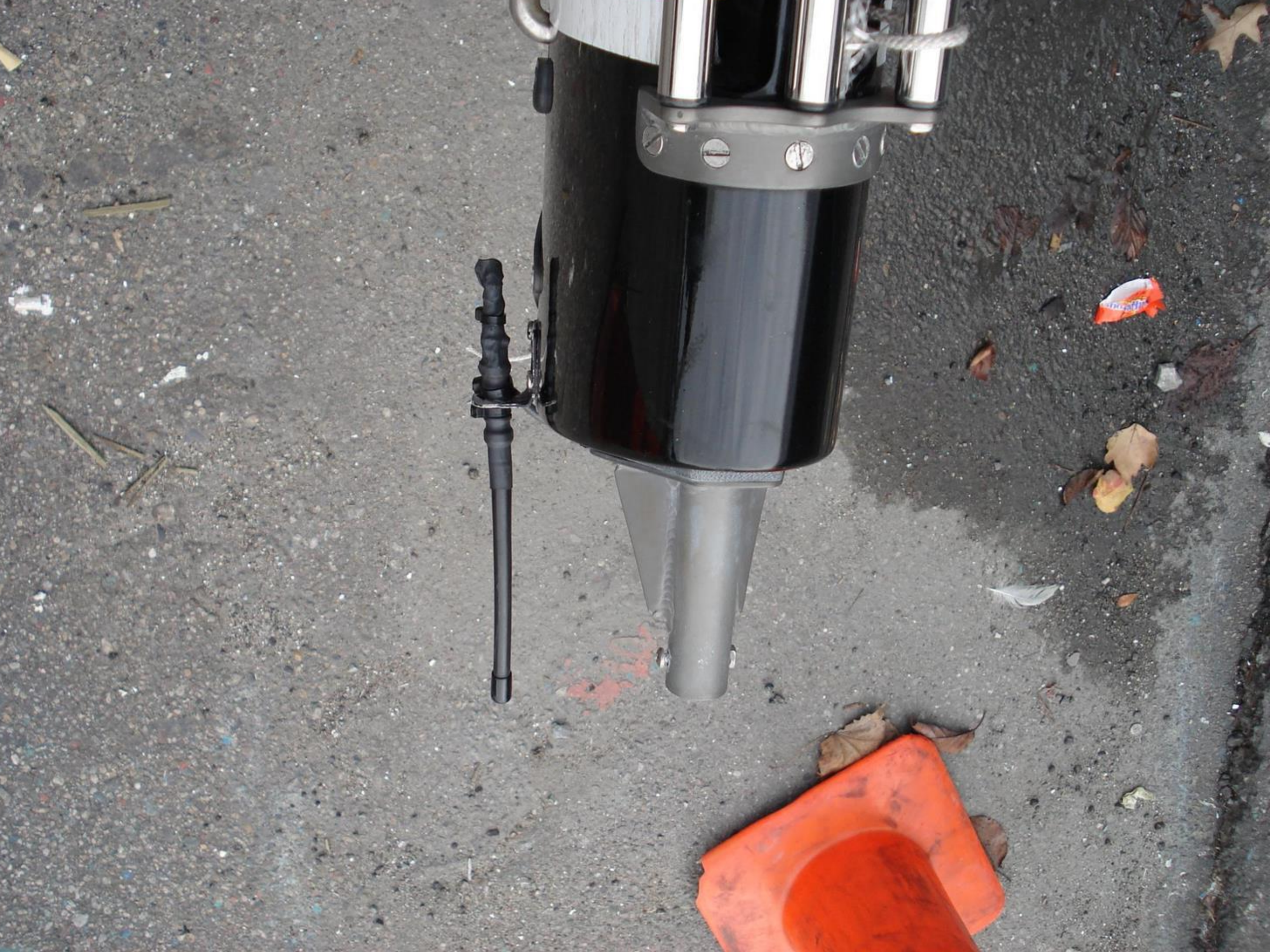


Fixed Mount VHF-FM Marine Radio

Range:	**20-60 miles**
Cost:	$100 to $500
Best Uses:	Calling the Coast Guard Calling virtually any marine station of interest Most cost-effective safety item on board.
Limitations:	Marine only. Line of sight range.

VHF Antenna Considerations

- Antenna height largely controls transmit range
- Higher gain antennas can focus signal to increase punch or power
- Boats which roll require an antenna with a wider transmission angle to avoid “clipping”
- Use the largest lead-in wire (coax) that can be used
- Use coax connectors for all terminations



ISAF Special Regs

- Radio shall have 25W output
- Masthead antenna
- No more than 40% power loss due to cable

  <50’ RG-8X

  50-90’ RG-8U

  90-140’ 9913F

  140-230’ LMR600
- Handheld VHF in addition to fixed mount

Digital Selective Calling

- Flip the Distress cover and press the button briefly
- Scroll down to select the nature of the emergency
- Press and hold the Distress button for 5s
- Monitor channel 16 for a response
- Must have:
  - “Modern” VHF Radio
  - GPS interfaced
  - MMSI number entered

Why not use a cell phone?

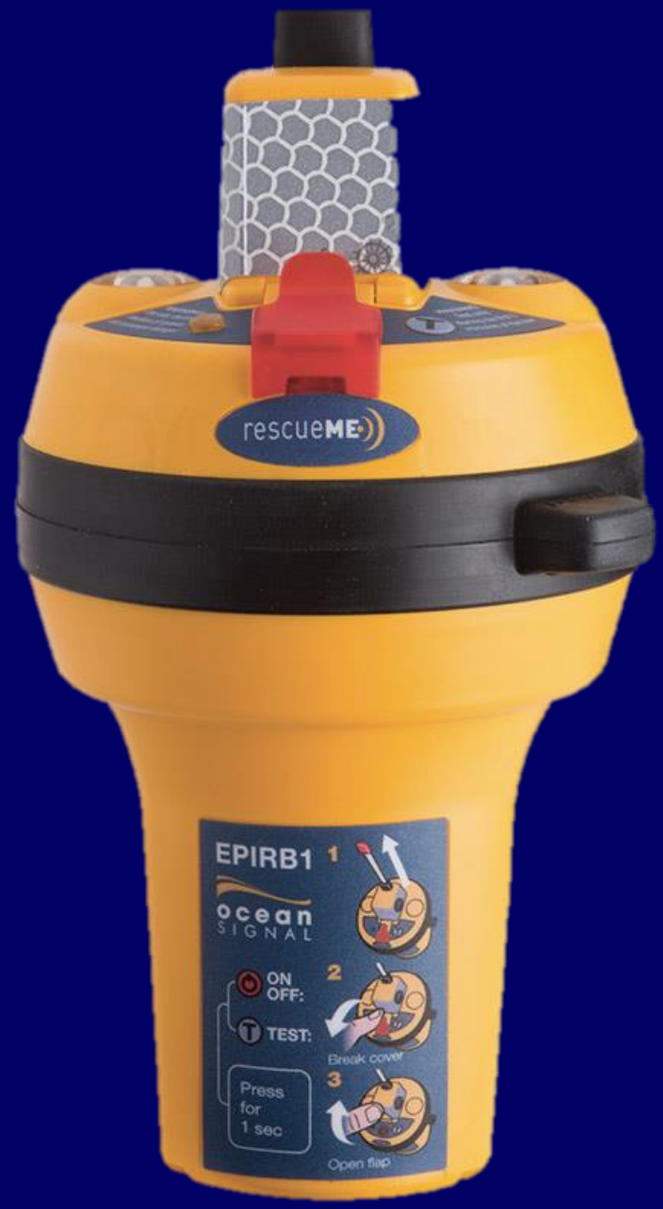
VHF	Cellular Phone
Marine only; meets the needs of boaters	Ability to call any phone number
Direct line to the Coast Guard	Simple user-interface
Can communicate with vessels and aircraft	Must be used with a shore network
Greater range	Very short range
Broadcast	Narrowcast
Waterproof	Not waterproof

AIS
Automatic Identification System

- Automatic broadcasts via VHF frequencies
  - Vessel MMSI, status (anchor, underway)
  - Lat-long, heading, speed, rate of turn
  - Calculates CPA, TCPA
  - May include name, time to port, draft, size, type of cargo
- Connects to chart plotter or standalone display
- Virtually unlimited capacity of vessels
  - Designed for 4500 vessels
  - Prioritizes closest ships

EPIRBs

- 406 MHz Beacons
  - Category 1
  - Category 2
- Unique ID number for each unit
- Register it with NOAA
  - www.beaconregister.com
- World wide coverage
- Most now have an internal GPS receiver
- Waterproof, reliable, independent, buoyant, rugged



Save Time! Register your beacon online at: www.beaconregistration.noaa.gov

Official 406 MHz PLB Registration Form

Mail or Fax to:
NOAA/SARSAT
NSOF, E/SP3
4231 Suitland Road
Suitland, MD 20746
Fax No. 301-817-4565

PLB Information

Beacon ID (Unique Identifier Number)

(15-digit character ID provided by PLB manufacturer)

PLB Manufacturer _____ Model No. _____

PLB Registration

☐ New PLB Registration
☐ Renewal of PLB Registration
☐ Change of PLB Information or Ownership
☐ Replacement of PLB Decal
☐ Check here if this PLB is a replacement for a previously registered PLB.
Please enter the old PLB unique ID number _____

Owner/Operator Information

Name _____
(Last, First, Middle Initial)

Mailing Address _____

_____

City _____ State/Province _____

ZIP (Postal) Code _____ Country _____

E-mail _____

Telephone

( ) _____ ☐ Home ☐ Work ☐ Cellular ☐ Fax ☐ Other
Area Code

( ) _____ ☐ Home ☐ Work ☐ Cellular ☐ Fax ☐ Other
Area Code

( ) _____ ☐ Home ☐ Work ☐ Cellular ☐ Fax ☐ Other
Area Code

( ) _____ ☐ Home ☐ Work ☐ Cellular ☐ Fax ☐ Other
Area Code

General Use Data

Usage
☐ Commercial ☐ Non-commercial ☐ Government Military ☐ Government Non-military

Specific Usage
☐ Hiking ☐ Hunting ☐ Fishing ☐ Other _____

Type
☐ Land Vehicle ☐ Boat ☐ Aircraft ☐ None ☐ Other _____

Additional Data

_____

_____

_____

_____

Emergency Contact Information *(Please indicate someone other than the owner)*

Name of **Primary** 24-Hour Emergency Contact:

_____

Telephone

( ) _____ ☐ Home ☐ Work ☐ Cellular ☐ Fax ☐ Other
Area Code

( ) _____ ☐ Home ☐ Work ☐ Cellular ☐ Fax ☐ Other
Area Code

( ) _____ ☐ Home ☐ Work ☐ Cellular ☐ Fax ☐ Other
Area Code

( ) _____ ☐ Home ☐ Work ☐ Cellular ☐ Fax ☐ Other
Area Code

Name of **Alternate** 24-Hour Emergency Contact:

_____

Telephone

( ) _____ ☐ Home ☐ Work ☐ Cellular ☐ Fax ☐ Other
Area Code

( ) _____ ☐ Home ☐ Work ☐ Cellular ☐ Fax ☐ Other
Area Code

( ) _____ ☐ Home ☐ Work ☐ Cellular ☐ Fax ☐ Other
Area Code

(709) _____ ☐ Home ☐ Work ☐ Cellular ☐ Fax ☐ Other
Area Code

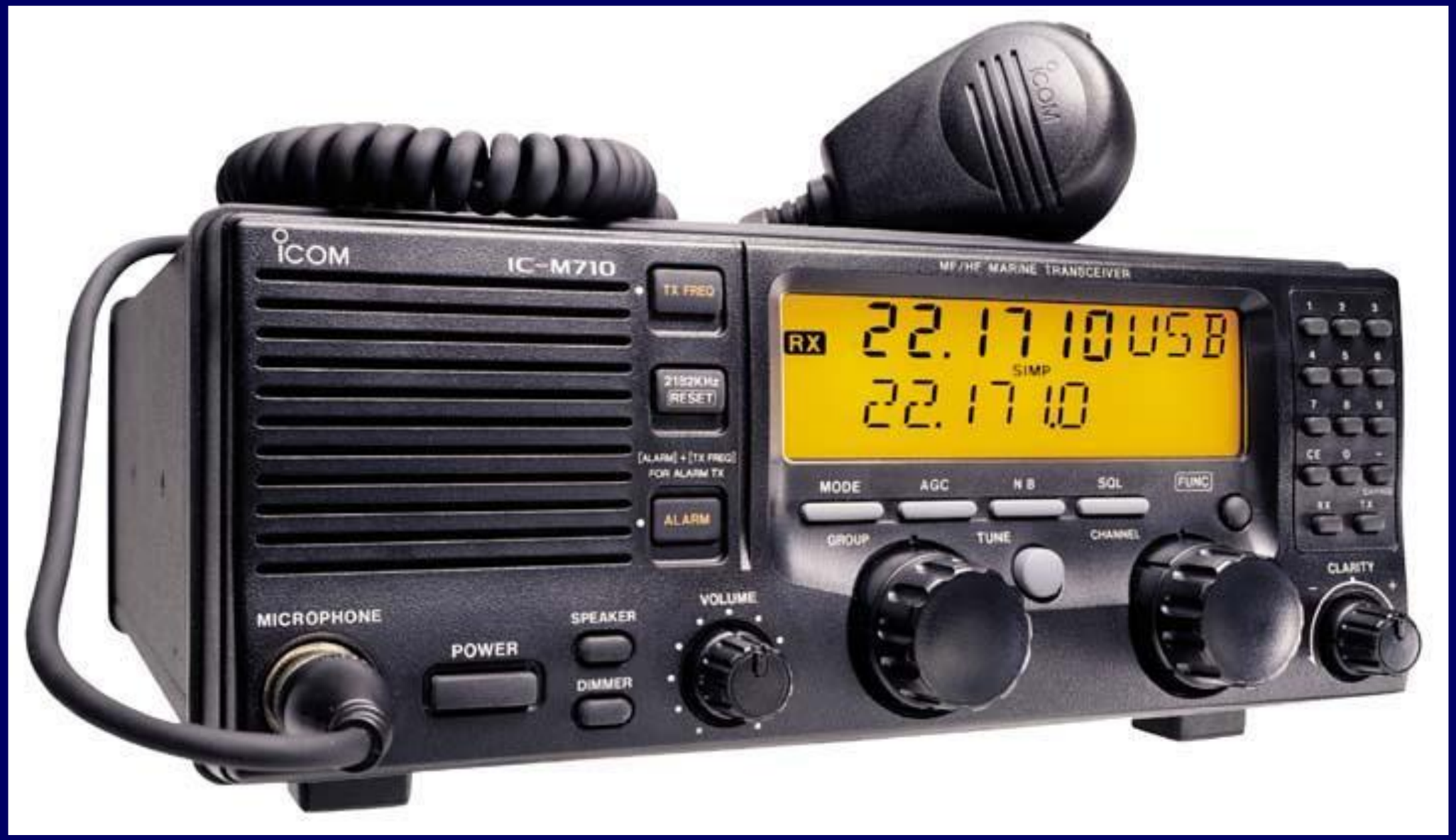
Signature _____ Date _____

If you have any questions about this form or with PLB registration in general, please call 1-888-212-SAVE (7283) or 301-817-4515.
For information on the U.S. Search & Rescue Satellite-Aided Tracking system, please visit: www.sarsat.noaa.gov

OMB (0648-0295) Expires: 31JAN 2008

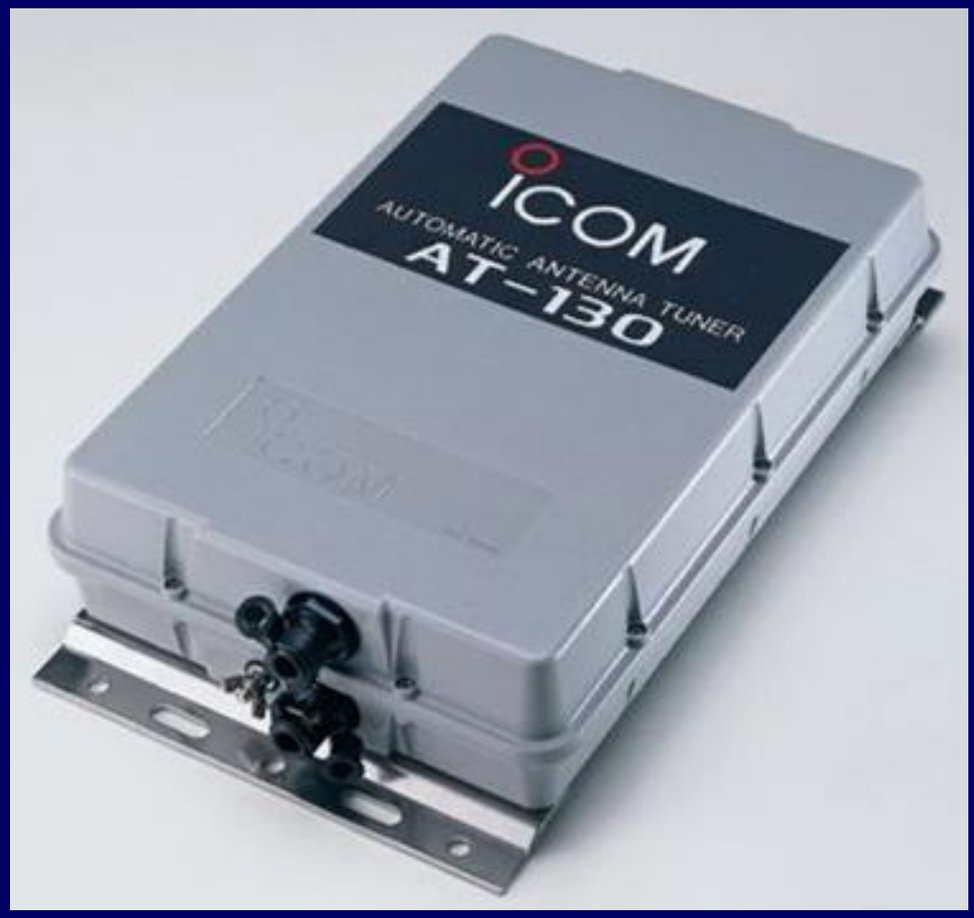
US SAILING

Single Sideband Radios



HF, SSB or Single Sideband Radios

Range:	**50-4,000 miles**
Cost:	$2,000 to $3,000 plus installation
Best Uses:	Long distance ship to ship and ship to shore Coast Guard monitors 4 bands Rugged, marinized designs.
Limitations:	Learing curve Complicated installation Time sensitive High current draw when transmitting.



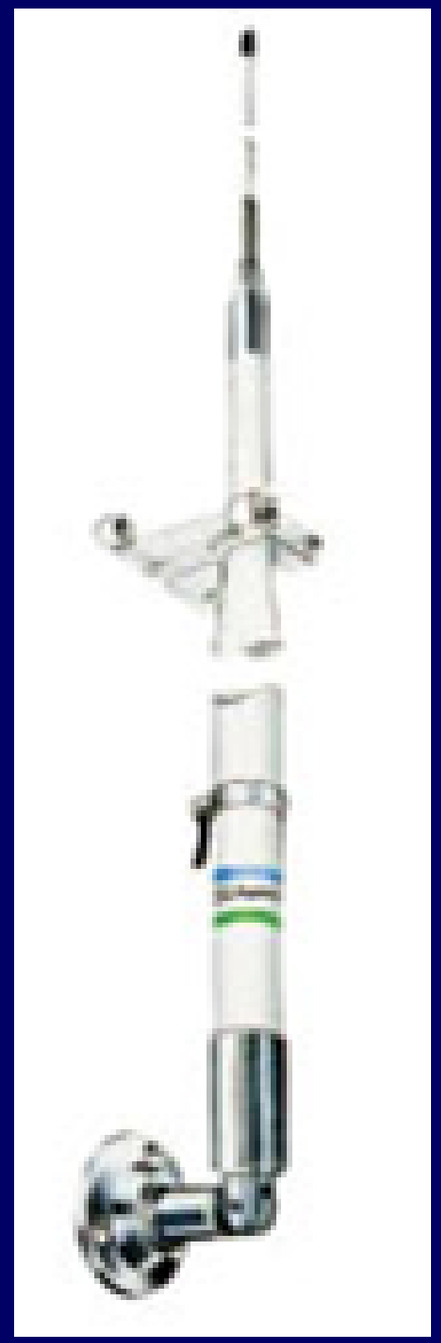
Icom AT-130 Antenna Tuner

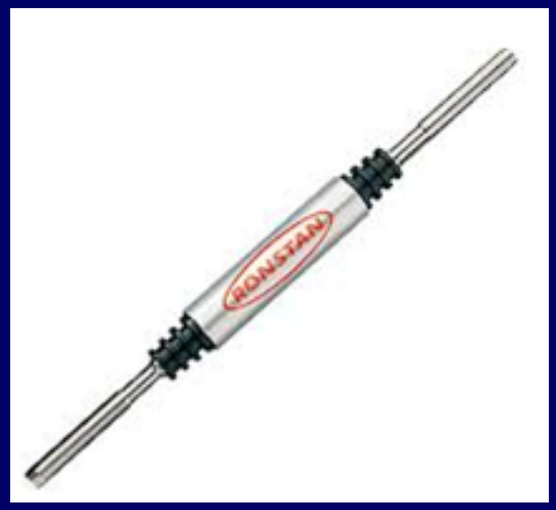
How much skill is reasonable to expect for the operator?

- Ham, in particular, is difficult for non-Hams to operate (and illegal)
- SSBs have a lesser, but still challenging, operating “system”
- Other systems are as familiar as a portable phone

HF (SSB) Antenna Considerations

- Two general types
  - 23’ fiberglass whip antennas
  - Insulated wire antennas
- Requires an antenna tuner to match frequency to wire length
- Requires a “counterpoise” in contact with water or coupled to water



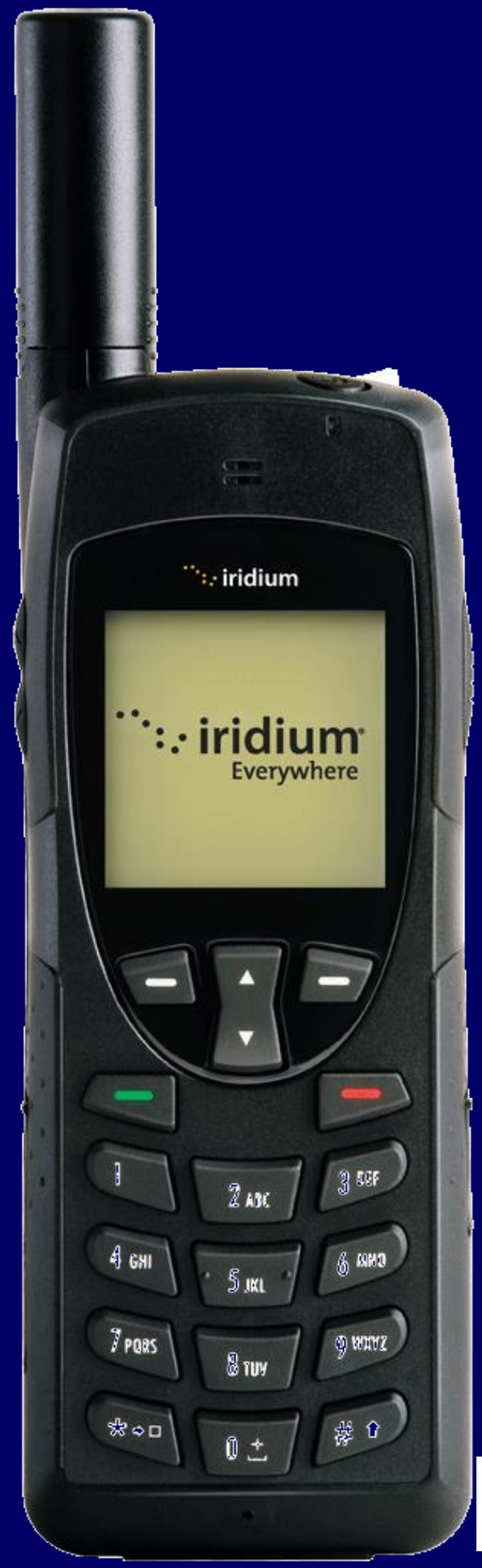


E-mail via SSB or Ham

- Requires a radio, laptop, and TNC (Terminal Node Controller, $650)
- Slow transmission rates
- Several non-profit services (Sailmail and WinLink)
- 10 minute per day limit (Sailmail)
- Very inexpensive compared to other options
- HAM transmissions limited by non-commercial rules

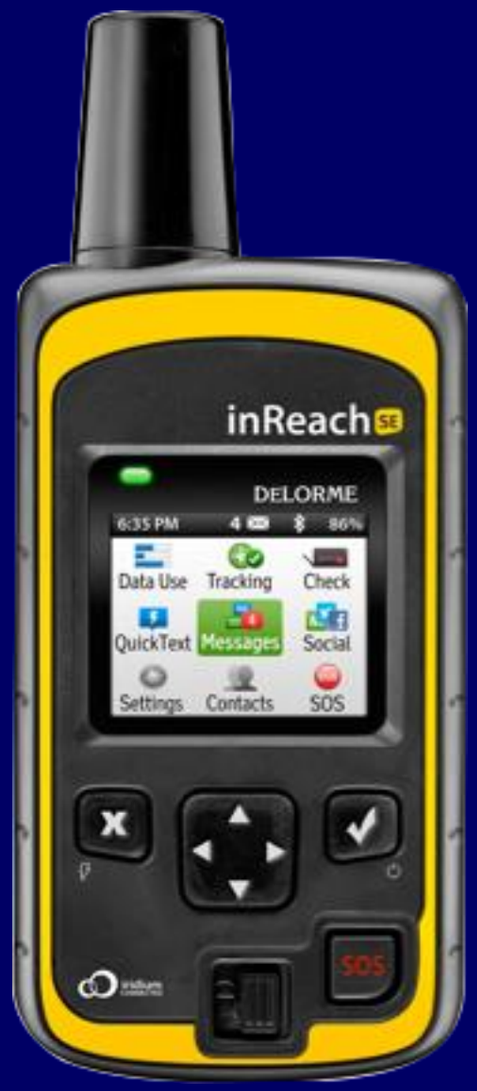
Iridium

Range:	**Worldwide**
Cost:	$1500 plus $20 per month plus $1.50 per minute
Best Uses:	Portable voice communications where there is no celluar, or where phone calls are prohibitively expensive. Independent of the ship's systems
Limitations:	Slow baud rate (2.4k, 9.6k with compression) Ridiculously complicated pricing



S.E.N.D. Devices

- SMS/e-mail capable
- Standardized or customized messages
- One-way or two-way
- SOS button
- Allows others to track your progress
- May be worldwide
- Integrates with smart phones



In summary:

- Range?
- Voice or data?
- Portable or mounted?
- Radio or telephone?

What kind of communications?

- Voice
- Data (e-mail)
- Fax
- Internet Access
- Emergency