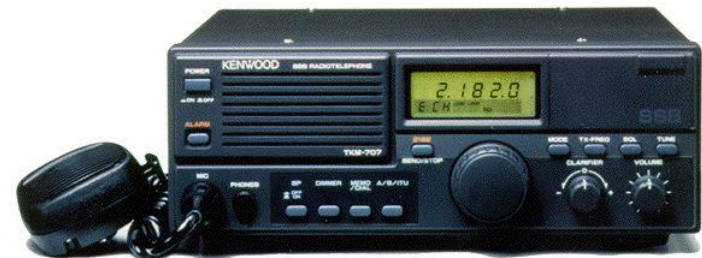
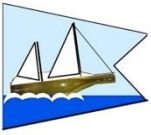


# HF/SSB/WFAX/EMAIL



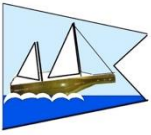
## Part II





# A Bit About Me

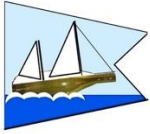
Lifetime cruiser & Lifetime “Radio Guy”  
Ham Radio Operator (WAØLSS /MM)  
Marine Coast Station KCQ (part of KPK Net)  
ABYC Certified Electrical Tech  
USCG RTMC/GMDSS Task Force  
Cruising Editor of Waterway Guide™  
Owner of CHARDONNAY BOATWORKS  
USCG Licensed Deck & Engine Room  
FCC Licensed Maritime Radio Operator



# You Just Bought a Boat With an HF (SSB) Radio



What do I do now???

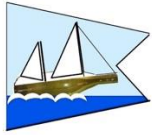


# Using Your Radio

## First Things First



- Turn it On
- Choose a Frequency from the list
- Press the TUNE Button
- Listen before talking
- Then talk, identify your self by boat name; sign off with your call sign
- That's it

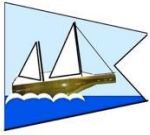


# Licensure & Legality P.1



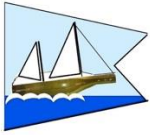
Or Keeping a Clean Wake on the Air

- Ship's Radio License
  - Issued by the FCC
  - Good for 10 years
  - Same for VHF, Radar, HF, AIS, etc
  - Includes your World Wide MMSI & Call Sign
- Operator's License
  - RROP, MROP, or GROL
- Ham License (for Amateur Radio Bands)



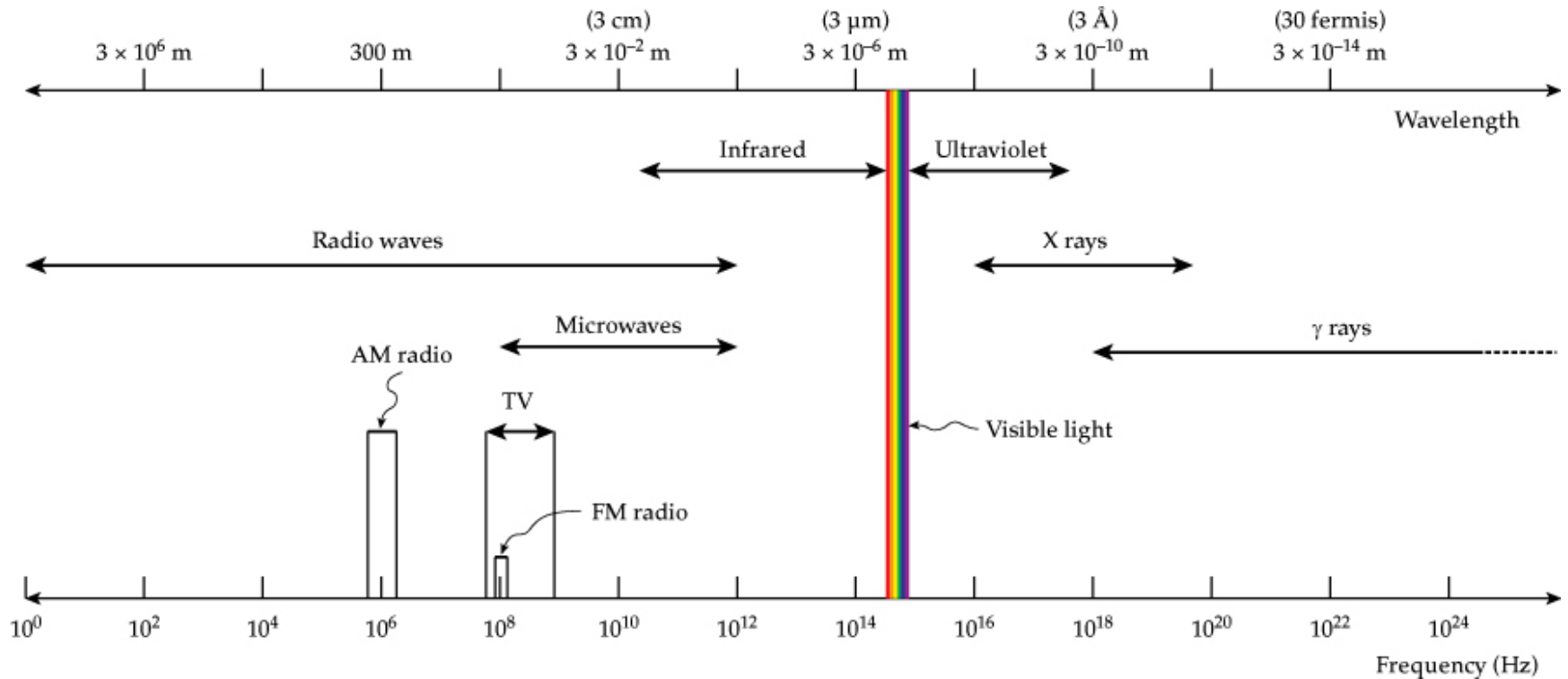
# Learning More

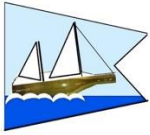
- What is Radio (if you missed our 1<sup>st</sup> Class
- What is HF (and SSB)
- What are “Nets”
- How do I send Email
- How can I get GRIBS and other weather
- What is Ham Radio
- How is my radio installed (or should be)



# What is Radio?

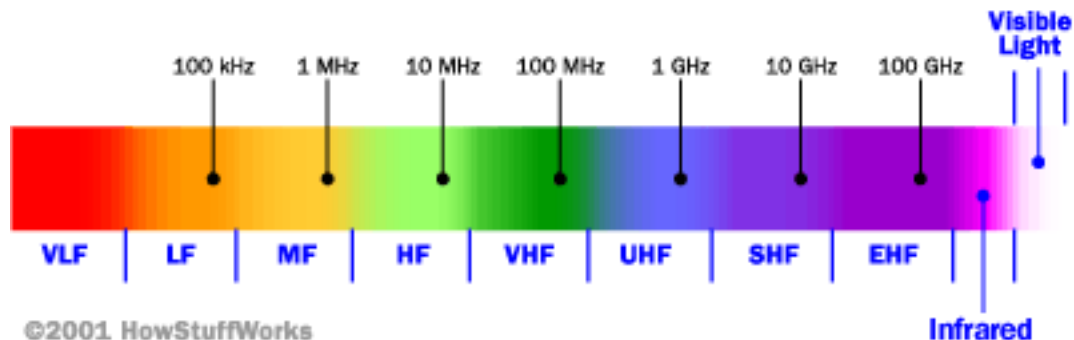
## It's All About the Waves





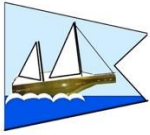
# Frequency Spectrum

- LF: 30kHz to 300kHz (Military mostly)
- MF: 300kHz to 3MHz (AM Broadcast)
- **HF: 3MHz to 30MHz (HAM/Marine SSB)**
- VHF: 30MHz to 300MHz (Marine VHF, TV)
- UHF: 300MHz to 3GHz (Public Safety, TV)



©2001 HowStuffWorks

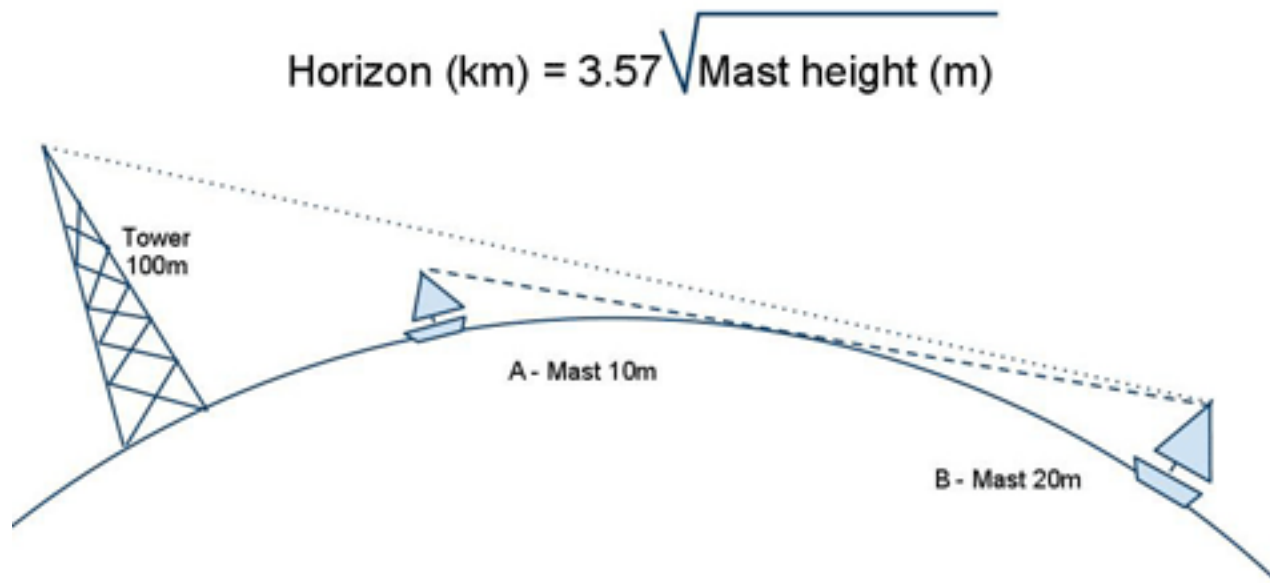


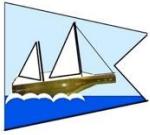


# Let's Start with VHF Radio



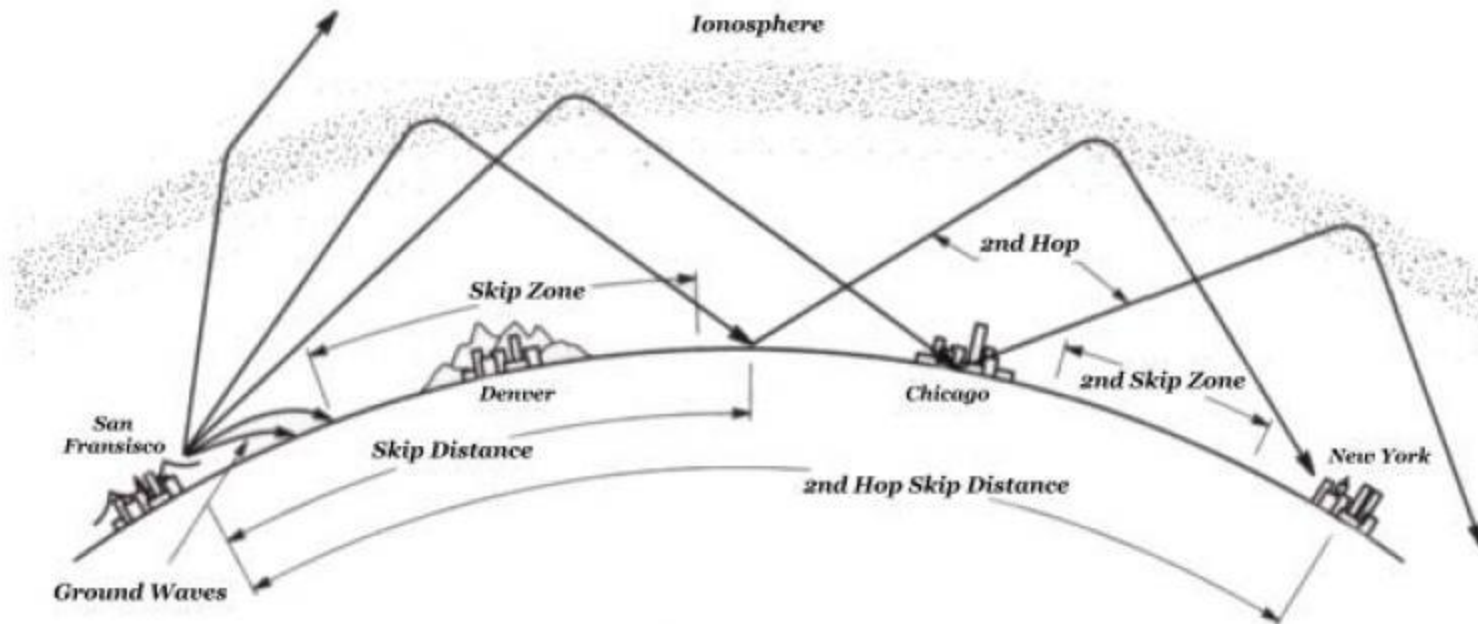
- Common on all Boats
- Installed and Hand Held
- Line of Sight Communication





# HF Radio

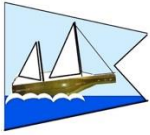
- Long Range Communication
- Line of Sight (Ground Wave) & Sky Wave
- Propagation and Skip





# Marine HF Services

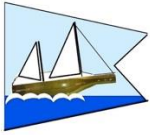
- 4mhz to 25mhz
- USB (Upper Sideband Only)
  - How voice information is encoded
- DSC (Digital Selective Calling)
  - For direct calling and emergencies
- Pactor (For Email and File Transfer)
- Shiptrak (Via Winlink/Pactor,
  - For position reporting



# Other HF Services



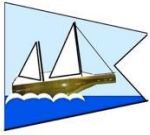
- Short Wave Broadcast (BBC, AFRS)
- Military
- Commercial Aviation
- Civil Air Patrol
- MARS (Military Aux Radio Service)
- Amateur (Ham)



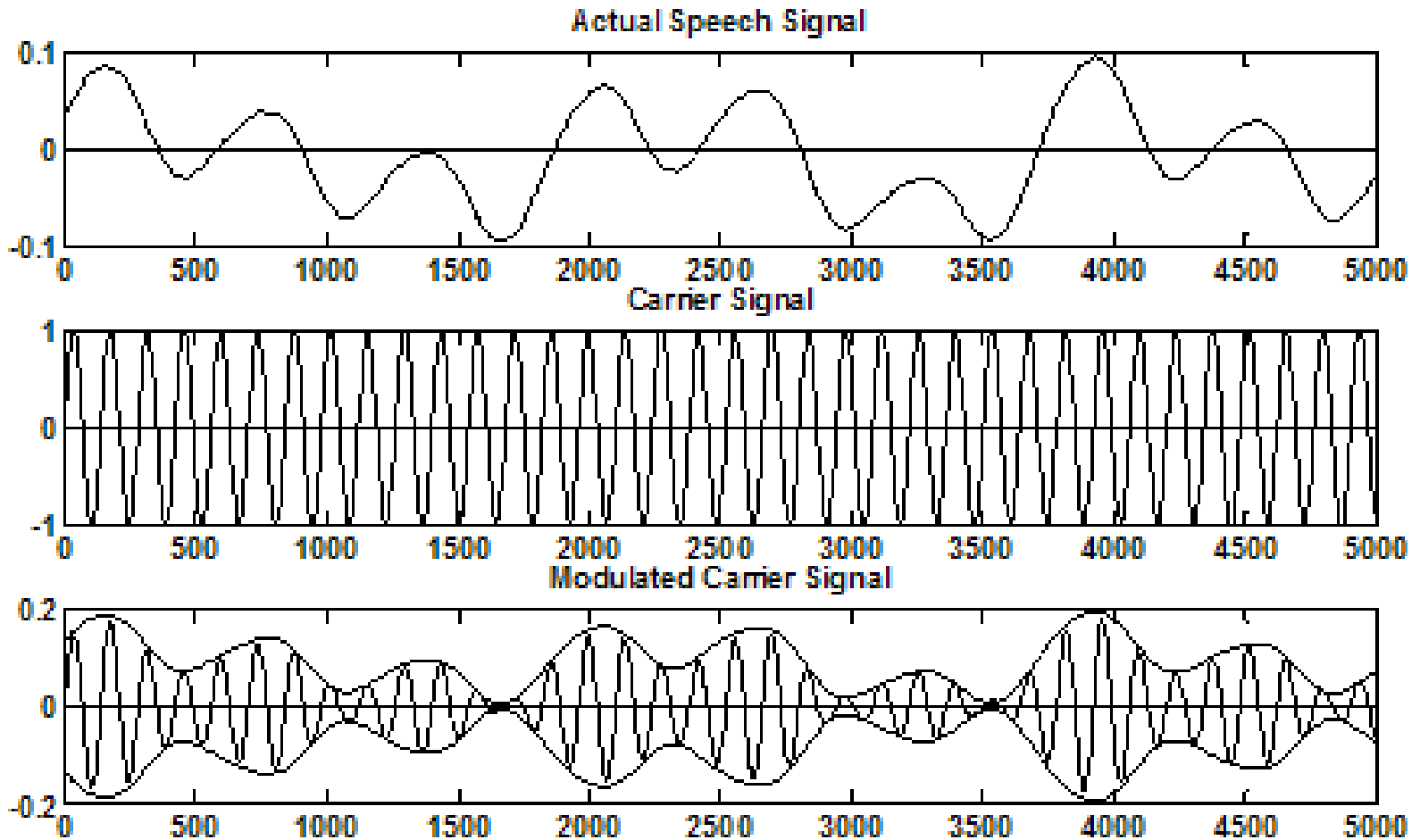
# Single Sideband

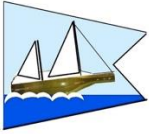


- A special form of AM Radio
- Permits more signals to share the same band
- Gets more power into the intelligent part of the signal
- Best for long range phone (voice) communication
- Time to get a bit technical for minute...

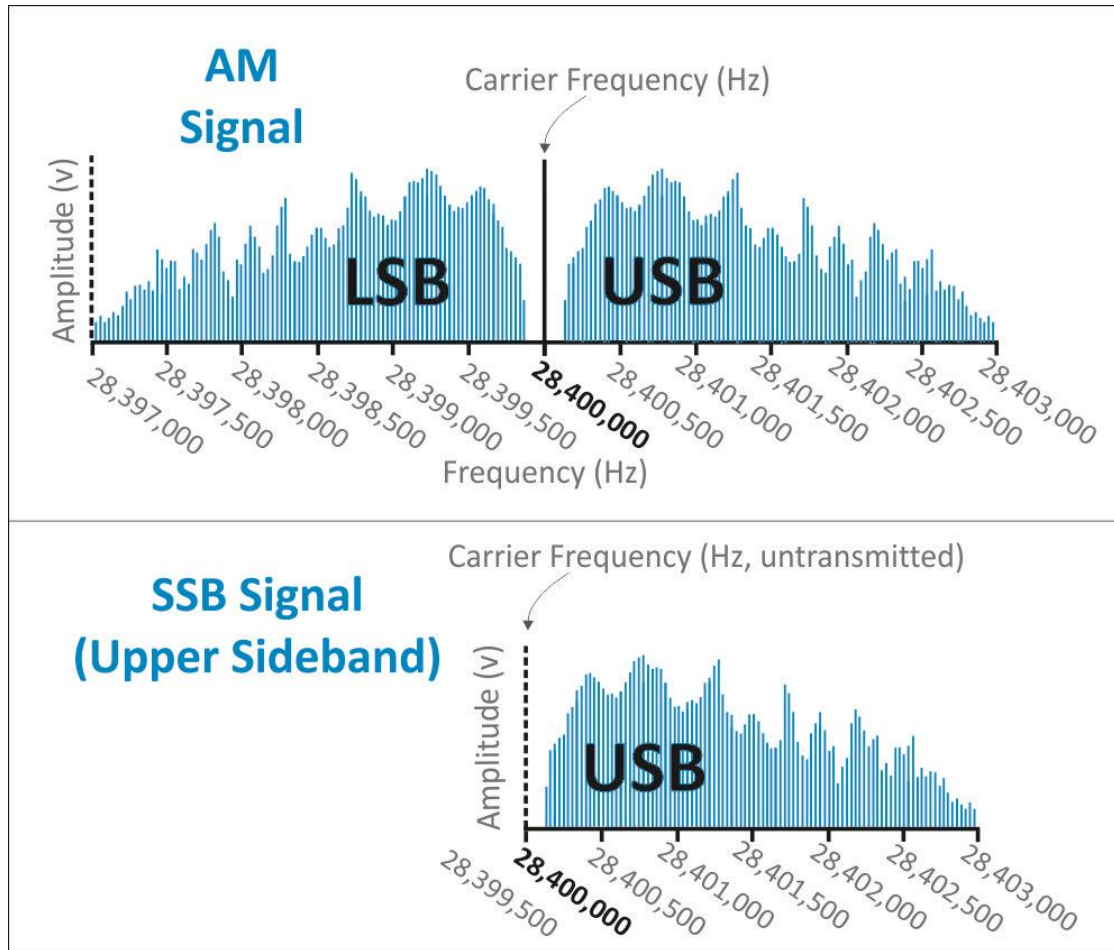


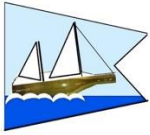
# Traditional AM





# Single Sideband



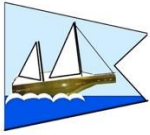


# Reviewing some Terms



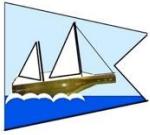
- Very High Frequency (VHF)
- High Frequency Radio (HF)
- Digital Selective Calling (DSC)
- Single Sideband (SSB)
- Hertz (Cycles per Second)
- Propagation
- Skip





# Keep Going

- What is Radio
- What is HF (and SSB)
- What are “Nets”
- How do I send Email
- How can I get GRIBS and other weather
- What is Ham Radio
- How is my radio installed (or should be)



# What are “Nets”

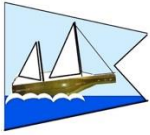
- Scheduled communication between stations (both ship and shore)
- On both Maritime and Ham Frequencies
- SSCA Operates several from KPK
- Maritime Mobile Service Net (MMSN)
- SSCA Transatlantic Net
- Great opportunity to get current info
- List maintained by Dockside Radio



# Email over HF Radio

- Winlink and Sailmail
- Pactor Modem
- VARA, Winmor, & Others
- Designed for EMCOMM
- More than just text emails
- Works worldwide but subject to propagation challenges





# Weather over HF

- NOAA Weather Fax
- GRIB Files
- Download Directly from NOAA Broadcast
- Poll (request) from Sailmail and Winlink
- Communicate with a 'Router' ashore
- Get real time weather from other boats

# GRIB/WFAX

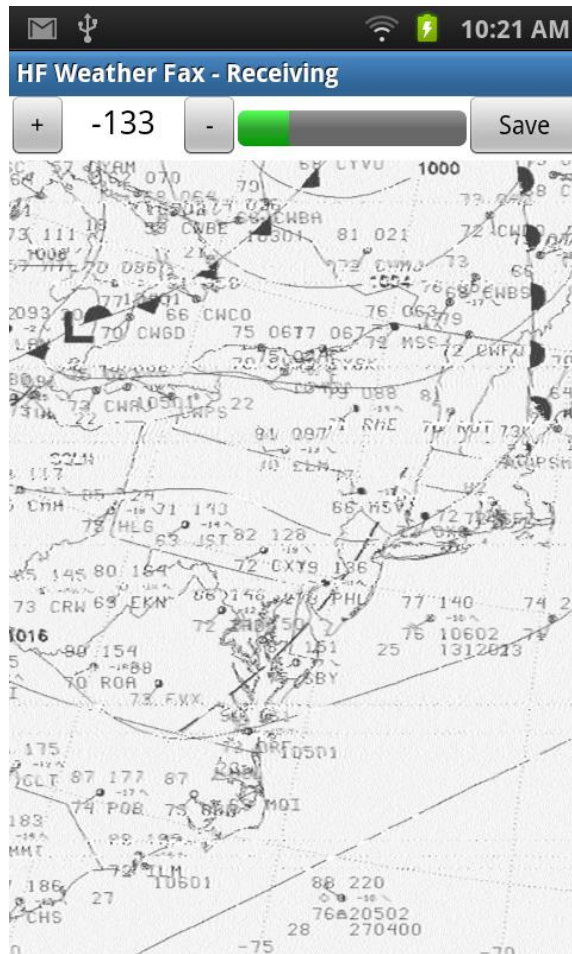
**Sailmail Catalog Tree**

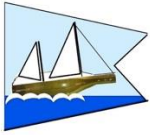
The screenshot displays the 'Sailmail Catalog Tree' interface within the AirMail application. The window title is 'AirMail - [Cat Tree]'. The interface includes a menu bar (File, View, Message, Tools, Auto, Mgdules, Window, Help) and a toolbar. On the left, a tree view shows the 'Catalogs' structure under 'Saildocs', with 'Grib Files' selected. The main area features a map of the Pacific Ocean with a blue rectangular area selected, centered around 173°W and 48°S. Below the map, there are controls for the model (GFS), a 'Request' button, and options for 'Request (to be sent once)' or 'Subscribe for 14 days, to be sent every 24 hours at 00:00 UTC'. The status bar shows the time as 07:56:45 utc.

Note: Single request is far safer than subscribing to either GRIB file or weather bulletin

59

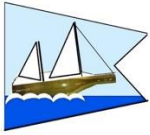
# NOAA WFAX





# Keep Going

- What is Radio
- What is HF (and SSB)
- What are “Nets”
- How do I send Email
- How can I get GRIBS and other weather
- What is Ham Radio
- How is my radio installed (or should be)

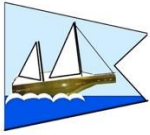


# HAM Radio



- Most of our technology comes from amateur radio research and development
- Support from many shore nets, exp:
- The Maritime Mobile Service Network
- It's a great hobby in itself
- Celebrating 100 years!
- Requires an exam but you can pass it!





# Ham Radios

- Not “Channelized—choose any authorized frequency on any band (*e.g.* 14.225-14.350)
- Work on wide range of modes (CW, TV, *etc.*)
- Icom 706 & 718
- Yaesu 857
- Kenwood 480
- Many others
- The Icom M802 and M803 make good Ham Rigs





# Licensure & Legality P.2



Or Keeping a Clean Wake on the Air

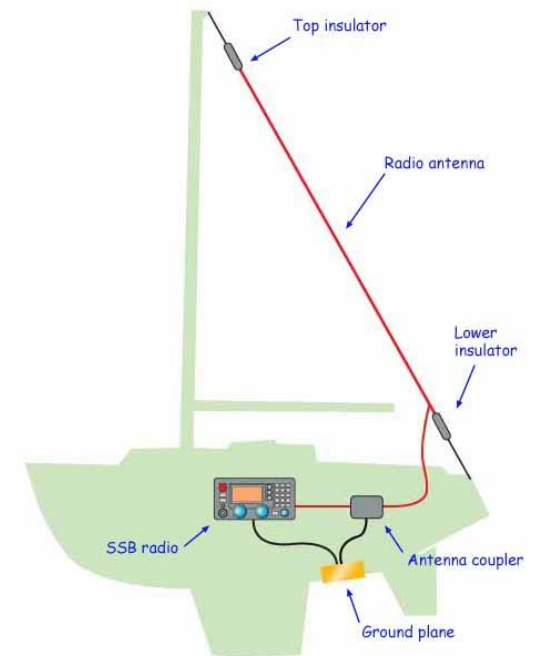
- Ham HF Radios ARE NOT Marine Radios
- They both use the same technology but:
  - Marine rigs are better made
  - Have a purer signal (less interference)
  - Work at lower voltages (for emergencies)
  - Are easier to use
- You can use a Marine Radio on the Ham Bands, but you can not legally use a Ham on the Marine Bands

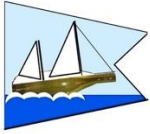


# HF Radio Installation



- Radio Unit
- Opt. Remote Control Head (e.g. M802)
- Antenna
- Automatic Tuner/Coupler
- “Grounding” System
- Power Supply
- Cabling
- Metering & Monitoring

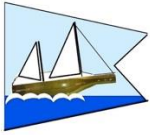




# Marine HF Radios



- Icom M803 (Current Model)
- Icom M700, M700Pro, M710, M802
- Kenwood TKM707
- SGC SG2000
- SEA 235 and Older Models
- Sailor/Thrane & Thrane



# Icom M803

- Replaces the 802
- Used 802's still around
- 12 Volt available
- “Split” System
- Designed for Cruisers
- VERY well engineered
- Easy PACTOR Hook up for Email
- Works well as a Ham Radio



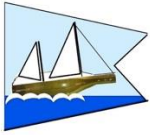


# Older Marine HF Rigs



- Many work with Email
- Few have DSC
- Parts are getting hard to find
- Harder to use on the Ham Bands
- Still available and very affordable
- You probably have one (you're here!)





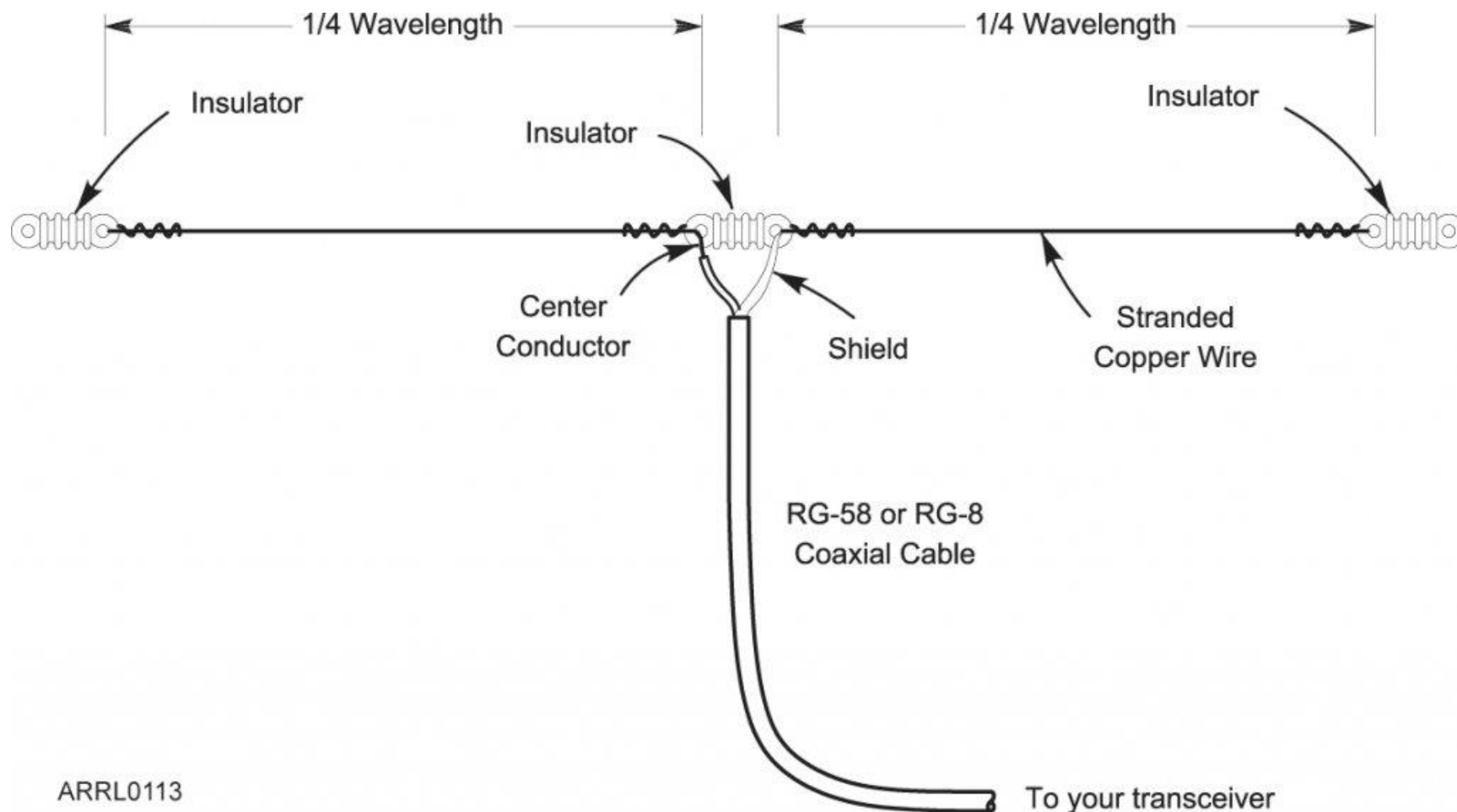
# Maritime Antennas



- Insulated Backstay
  - Traditional for Sailboats, often the best option)
- “Alternative” Backstay (Sloper)
- 23’ Whip
  - Traditional for Power Boats
- GAM and alternatives
- Others (Hustler, Screwdriver, Dipole, Inverted L, Inverted V, more)

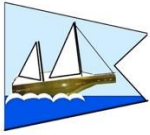


# Simple Dipole Antenna



ARRL0113





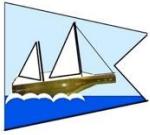
# Antenna Coupling



Tuner/Coupler/ATU

- Why do we need one (technically we don't, practically we do)
- Location (near antenna)
- Wiring
  - Feed Wire (GTO 014 14awg High Voltage)
  - Feed is PART OF THE ANTENNA
- Control Cabling
- Grounds, Anchors, and Guns

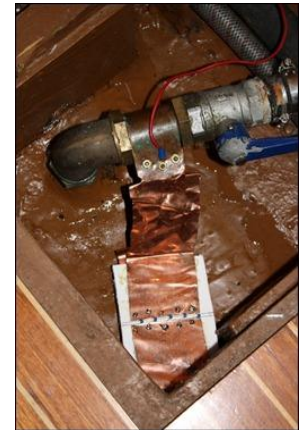




# Ground, Counter Poise, etc



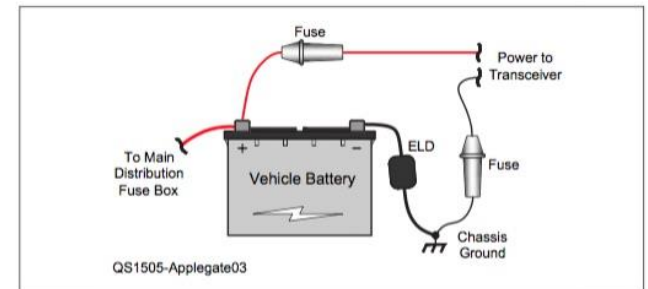
- Why do we need one (and here we do!)
- Capacitance (that 100sq ft of copper)
- Direct to Seawater (Dyna-plate & SeaCock)
- Copper Foil vs Wire
- Wire Counterpoise (and a KISS)
- RWE (Real World Experience)
  - Hams and the Military for a century!

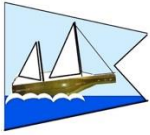




# Power

- Radio Connects DIRECTLY to Battery
- Fuse both Positive and Negative
- Use BIG wire (4awg for long runs)
- Cut off the 10-12awg wires that came with the radio (as much as possible)
- The ICOM manual is WRONG
- DO NOT Ground the Radio
- DO Ground the Tuner



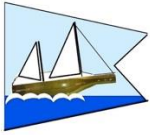


# Metering and Monitoring



- Voltage to the Radio is Critical
  - You want 12VDC + while transmitting
- Watts (output)
- SWR (effective output)
- Resonance
- Real World Testing





# Organizations

- International Telecommunications Union (ITU)
- Federal Communications Commission (FCC)
- Radio Technical Commission for Maritime Services (RCTM)
- Global Maritime Distress Safety System (GMDSS)