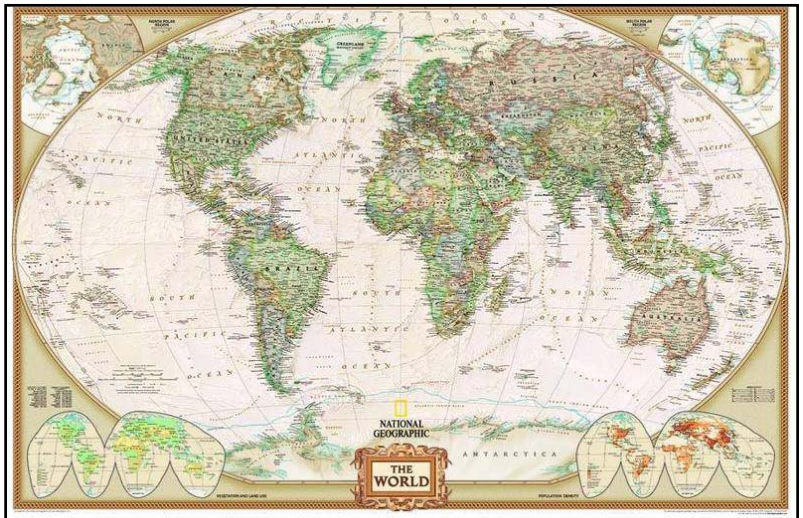


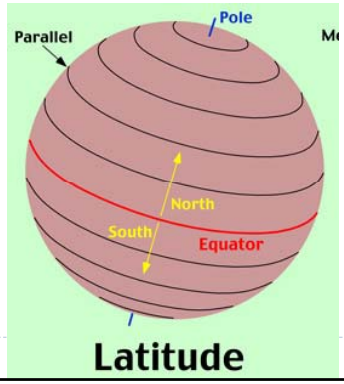
Navigation –
terms & equipment

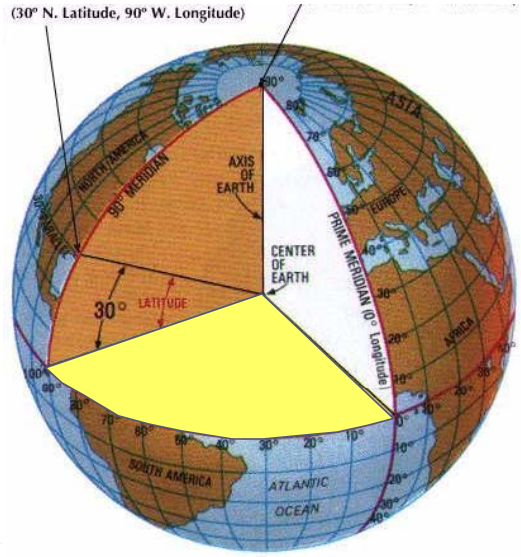
Objectives

- Define navigation (3 parts)
- Discuss the differences between latitude and longitude
- Convert latitude & longitude from one format to another
- List 3 navigation aids and explain their functions
- Choose the appropriate radio for various situations
- Identify 4 important features on a chart

Background

- Geographic structure of the earth
  - Lines of latitude

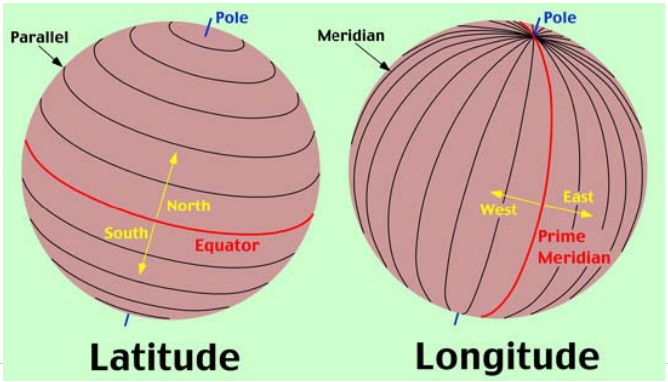


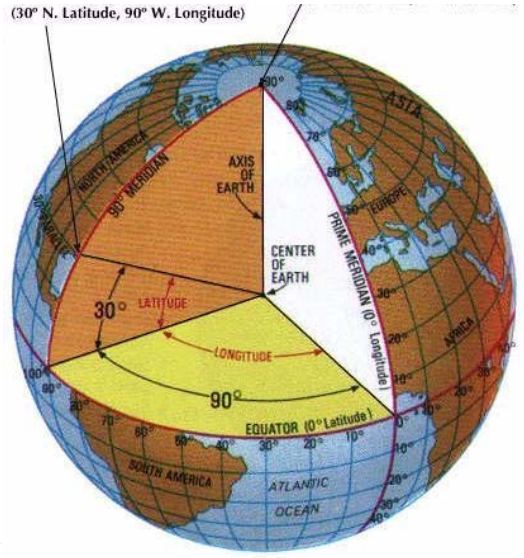


http://www.navis.gr/marinav/latlong.htm

Background

- Geographic structure of the earth
  - Lines of latitude
  - Lines of longitude

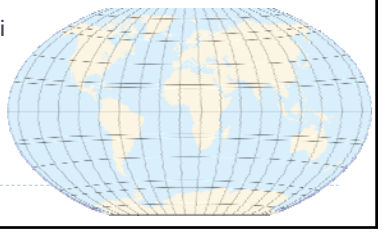




http://www.navis.gr/marinav/latlong.htm

Background

- Geographic structure of the earth
  - Lines of latitude
  - Lines of longitude
- Nautical measurements
  - 1 degree = 60 minutes (')
  - 1 minute = 60 seconds (")
- Distance & speeds
  - 1 nmi = 1,852 meters = 1.15 mi
  - 1 knot = 1 nmi / hour



Navigation aids & terms

- **Chart** – map; reproduction of the earths surface in 2D

Navigation aides

- Charts - Activity
  - Split into 2 (or 3) groups and go to a chart on the wall
  - Each chart has several features highlighted
  - Instructors will guide activity at each chart

Navigation terms

- **Chart** – map; reproduction of the earths surface in 2D
- **Bearing** - The direction (degrees) of an object expressed either as a true bearing as shown on the chart, or as a bearing relative to the heading of the boat
- **Course** – direction vessel is being steered
- **Current** – horizontal movement of water

Navigation aides

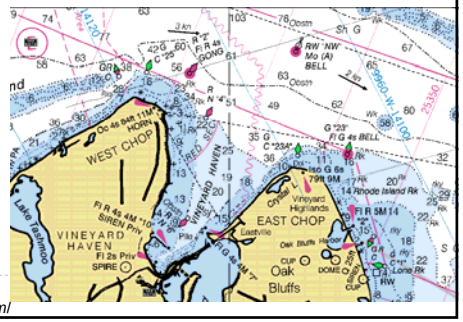
- Bridge equipment
  - Compass

Gyrocompass – Liberia
K. Dietrich, 2011

http://www.nauticexpo.com

Navigation aides

- Bridge equipment
  - Compass
  - GPS / Plotters
  - GPS=Global Positioning System



Images from *http://www.maptechnavigation.com/*

GPS - formats

- Output in multiple formats – be aware of the settings before writing down coordinates on your forms
  - degrees, minutes, seconds- N 03° 25’ 30”
  - degrees, decimal minutes - N 03° 25.5’
  - decimal degrees- N 03.425°
- Converting
  - Degrees, minutes, second >>> degrees, decimal minutes
    - Divide seconds by 60 and add to minutes
  - Degrees, decimal minutes >>> Decimal degrees
    - Divide fraction of minutes by 60
  - Decimal degrees >>> degrees, decimal minutes
    - Multiply the decimal value by 60

Navigation aids

- Bridge equipment
  - Compass
  - GPS / Plotters
  - Radar

store.vernondeon.com/ images/sm/ra050.jpg

Images from *http://fis.com/*

http://www.tsb.gc.ca/eng/rapports-reports/marine/1994/m94m0009/m94m0009.asp

Navigation aids

- Bridge equipment
  - Compass
  - GPS / Plotters
  - Radar
  - Sonar / Echo sounder

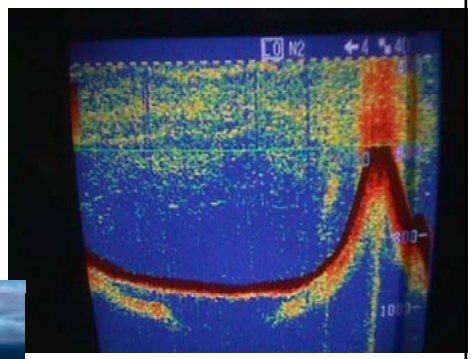


Image from C. Heineken, CapFish

http://oceanservice.noaa.gov

Navigation aids

- Bridge equipment
  - Compass
  - GPS / Plotters
  - Radar
  - Sonar / Echo sounder
  - Communications
    - Mobile phone – satellite, cell

Images from *http://www.satellitephonestore.com/*

Navigation aids

- Bridge equipment
  - Compass
  - GPS / Plotters
  - Radar
  - Sonar / Echo sounder
  - Communications
    - Mobile phone – satellite, cell
    - Radios

VHF: http://www.nauticexpo.com
SSB: http://www.davesmarineelectronics.com/

Radios - VHF

- Very High Frequency
- International Distress Channel – 16
- Transmission distance ~line of sight

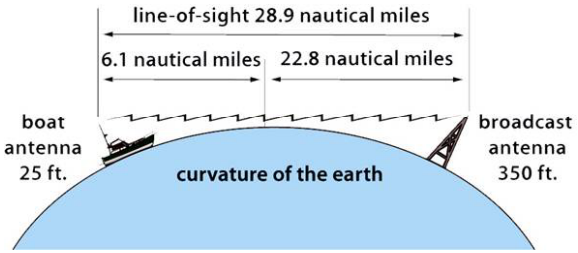


Image: USCG Auxiliary 2007

Radios - SSB

- Single Side Band – High frequency (HF)
- International Distress Channel – 2183 kHz
- Transmission medium to long distances

SSB: http://www.davesmarineelectronics.com/

Radios – How to use

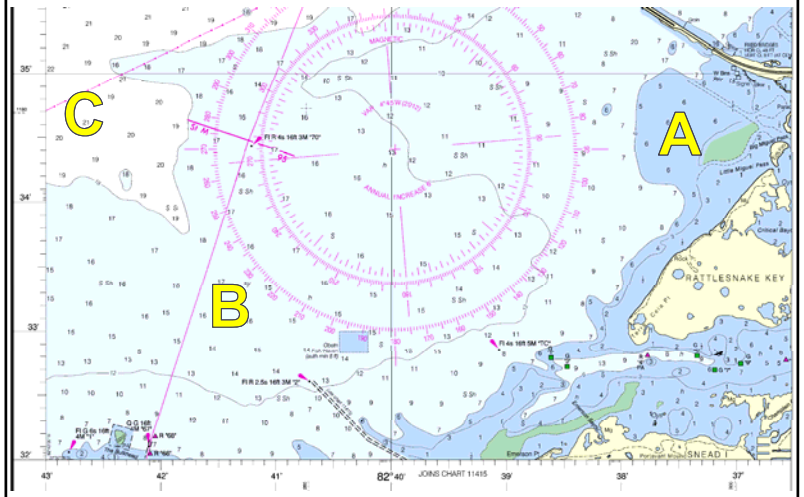
- One-way transmission
- Public - be mindful of what you say
- Speak slowly & distinctly into the microphone
- Switch to working channel if initial contact is on emergency channel/frequency
- Short & concise

Radios – General procedure

- Verify power & appropriate channel
- Verify not in use
- Adjust squelch
- Depress microphone button & call the vessel or group you are trying to contact 3x followed by your vessel name, call sign & station you're calling on
- Wait 2 minute before trying again.
- Switch to working channel
- Use terms like "over" and "copy" when you are done speaking or understand
- When finished, end call with vessel name, call sign and the word "out"

Summary

- How is navigation defined?
  a) The act of determining a vessel's position
  b) Ascertaining speed
  c) Directing the course of a ship by using charts and electronic aids
  d) None of the above
  e) All of the above



Summary

- Describe latitude and longitude.
- How many minutes are in a degree of latitude? How about longitude?
- What are 3 navigation aids and explain their functions?
- Which radio would you use to call a vessel that you can see?
- Which radio would you use to call the observer program 100 nmi away?
- Homework – conversion practice

Acknowledgements / References

- Thank you to Chris Heineken, Capricorn Fisheries (CapFish), Cape Town South Africa for sharing his observer training materials.

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