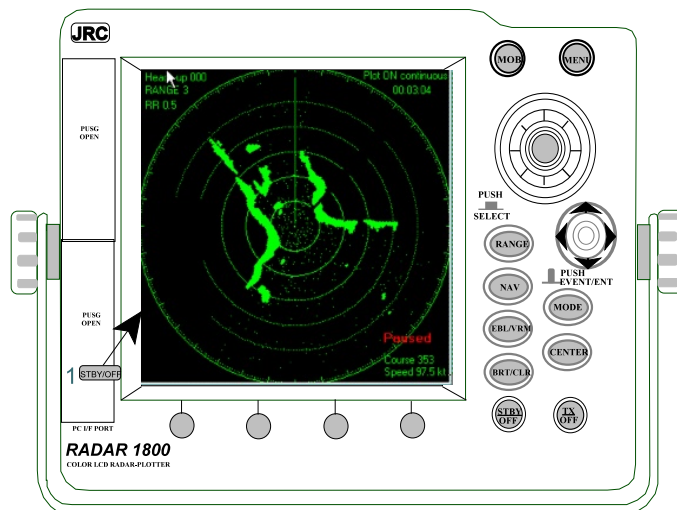


Simulate Electronic Navigation Limited.

The new Canada Shipping Act 2001 was passed into law in 2001. The Regulations by which the act functions were first published in the Canada Gazette on November 18th 2006 9KNOWN AS Canada Gazette Part 1) and will likely come into operation by May of 2007.

The new Act and associated Regulations have significant impact of Fishermen and small commercial vessel operations. Particularly as, in future, all fishing and small commercial vessel certificates will have to be renewed 5 years after issue.

Every Fishing Master certificate including the new Fishing Master Certificate of Service for Vessels to 60 gross tons include a requirement for the certificate holder to have a Simulated Electronic Navigation certificate, either the Simulated Electronic Navigation Part 1 and Part 2 or the Simulated Electronic Navigation - Limited certificate, known as SEN Ltd. This latter certificate will provide the Small Commercial Vessel Watch-keeper with a thorough knowledge of the application of the Collision Regulation as it applies to the keeping of a navigational watch while using Radar.



Using a RADAR simulator those attending the course will practice navigating the vessel using radar including fixing your position using ranges and bearings. Will practice collision avoidance while using the radar and establish the target vessels course, speed and closest point of approach, etc.

The course will cover:

Basic radar concepts

- Demonstrate RADAR Controls
 - Turn RADAR On Stand-by
 - Turn RADAR On
 - Return to Stand-by
 - Turn RADAR Off
 - Adjust RADAR Sensitivity
 - Gain, Sea Clutter & Rain Clutter
 - Tuning
- Discuss system limitations
 - Theoretical minimum range
 - Theoretical maximum range
 - Horizontal beam width
 - Horizontal bearing discrimination
 - Range discrimination
 - Side lobe effect
 - Multiple echoes
 - Multipath effects
 - Blind and shadow sectors
 - Retraction
 - Sub-refraction
 - Other environmental effects

Describe, using visuals, the basic RADAR controls

Identify the appropriate navigation charts and publications.

Demonstrate the Starpath PC radar simulator

Identify and demonstrate the Starpath simulator course and speed controls.

- Define Sea Clutter
 - Discuss effects of large waves
 - Discuss effects of waves on target recognition
 - discuss the effect of wind on sea clutter
- RADAR anti sea clutter filters
 - Names given to Anti sea clutter filters include
 - Sea Clutter
 - AC Sea (AC = anticlutter)
 - STC (sensitivity Time Control)
 - Identify International Symbol for Sea Clutter



- Rain Clutter
 - Discuss effects of rain or snow squalls on the RADAR.
 - Effects of filters on Rain Clutter
 - Discuss FTC control(Fast Time Constant)
 - AC Rain
- Using digital presentation show construction of a plotting sheet.
 - Identify, on a plotting sheet, other vessels initial range bearing and, after plotting, designate with the letter "O" (original position)
- Identify other vessels final position in plotted range and bearing and designate with letter "T" (Terminal position)
 - Demonstrate drawing line connecting "O" through "T" and extending towards centre of plotting sheet and identify "CPA" Closest Point of Approach.
 - Measure distance between "O" and "T" and identify the time interval between the two echo's.
 - Measure the distance between "T" and the "CPA" and identify the time interval between the two positions
 - Divide the time interval between "O" and "T" into the time interval between "T" and "CPA"
 - Multiply above resultant by time interval between "O" and "T" to obtain Time of Closest Point of Approach "TCPA"

Explain the relationship between Speed, Distance and Time.

- Explain how Time is always in hours or decimals of a hour
- Explain how Speed is in knots
- Explain how Distance is in Nautical Miles
- Draw Speed, Distance, Time triangle
 - Using triangle determine formula
 - Distance = Speed x Time
 - Speed = $\frac{\text{Distance}}{\text{Time}}$
 - Time = $\frac{\text{Distance}}{\text{Speed}}$
 -
- Using whiteboard and above formula, work each type of formula examples
- Demonstrate the use of the Radar Simulator controls

- Define Stages of collision avoidance
 - Alteration of course
 - Alteration of speed
- Plan action to be taken with reference to the Collision Regulations
- Identify if risk of collision exists
 - Is bearing constant
- Set examples for students to study

To Demonstrate Closest Point of Approach

- Draw line from “O” through “T” and extend across the plotting sheet to demonstrate the RELATIVE track of the target
 - If this line passes through centre of sheet the target is on a collision course
- Demonstrate placing a 90° tee square on the line “O” - “T” such that the line drawn 90° to “O” - “T” passes through the centre of the plotting sheet
 - Where Line “O” - “T” intersects the line drawn at right from it to the centre of the plotting sheet, is the CPA (Closest Point of Approach)

To Demonstrate the Time of Closest Point of Approach

- Demonstrate, using dividers, measure the distance between “O”-“T” and note the time interval between these observations
 - Measure the distance between “T” and the CPA.
 - Divide the distance between “O”-“T” into the distance between “T”-CPA
 - Multiply the resultant by the time interval between “O”-“T”
- The answer from step above is the Time, in minutes, to the CPA (TCPA)
- Practice Sample questions
 - Calculating CPA
 - Calculating TCPA

To Establish targets Relative Course and Speed

- Identify initial target range and bearing marked “O”
- Draw, from position “O” - a reciprocal course line (in the opposite direction to ships head)
 - Multiply time interval in minutes, by own ships speed.
 - Measure distance calculated from “O” and mark point “M”
- Connect point “T” through point “M” and extend line. This is other ships relative course
 - Transfer line “T”-“M” through centre of plotting sheet and where this line cuts the circumference of the sheet, read off the relative course.
 - Add own true course to other ship relative course to obtain other ship true course
 - Measure the distance between “T” - “M”
 - Distance between “T” & “M” is the targets speed in the interval used between “O” & “M”.
 - Use Distance, Speed, Time calculation to calculate speed.
- Verify effectiveness of action taken by continuing to plot target until past and clear
- Practice Sample Questions

Using Simulator and sample question handout, identify the RADAR plot for vessel on a collision course or unacceptable close quarter situation.

- Define the stages of collision avoidance
- Plan and evaluate action to be taken in relation to Collision Regulations
- Identify if risk of a close quarter situation or collision exists
- Determine own ships action to achieve minimum acceptable CPA
- Determine when vessel may resume original course
- Verify effectiveness of action taken by continuing to plot target until past and clear
- Assist Students with sample exercises to determine (CPA, and TCPA,) targets course and

Targets speed for vessels on a collision course.

- Discuss use of target trails and indexing lines to estimate CPA and TCPA
- Identify the aspect of the other vessel using target trails.
- Using sample question handout, demonstrate a RADAR plot for vessel which has altered course.
- Using sample question handout, demonstrate on the RADAR plot the apparent changes when you alter course.
- Assist Students calculating sample questions to determine if other vessel alters course or effect of own ship altering course
- Using simulator and sample chart, identify features common to both.
- demonstrate taking relative bearing of known feature using radars variable bearing marker
- demonstrate measuring distance of known feature using radars variable range marker.
- ensure student recognizes requirement to correct relative bearing to true bearing.
- plot true bearings and distances on navigational chart.
- Exercise: student to navigate vessel between start and destination using radar.