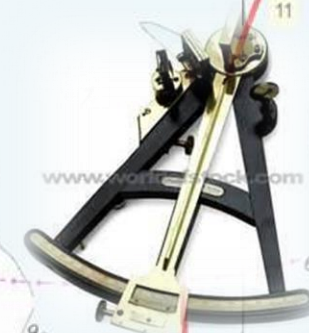
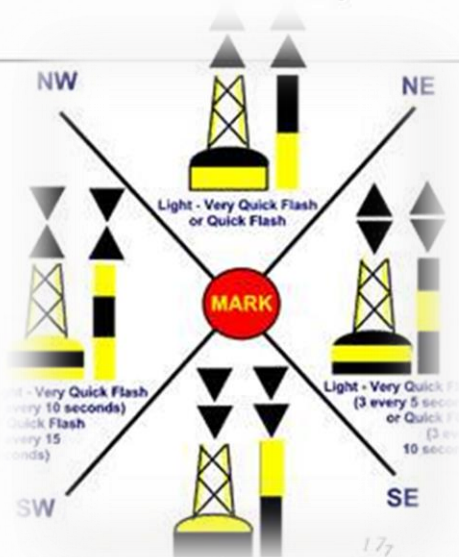


Nav Rally Course Plotting

BMYS Training 2025



58' 59' 145°E 01' 02' 03' 04' 05'

What Information do you have?



COURSE INSTRUCTIONS

THE BEAUMARIS MOTOR YACHT SQUADRON
 THE COMMODORE, BOATING COMMITTEE & MEMBERS
 Present
THE COMMODORES NAV RALLY
 On Sunday 23rd February 2020

Members of all clubs are invited to attend this event to be held at the Beaumaris Motor Yacht Squadron
 Followed by lunch starting at 12:30 pm
 Free to all Skippers & Navigators ---\$10 per head others

ENTER NOW FOR THIS GREAT EVENT
 Entries close on **Sunday 16th February 2020**
 All participating entrants will have the opportunity to win great prizes



LEG	DEGREES (TRUE)	DISTANCE (Nm)	TOTAL DISTANCE (Nm)	LATITUDE	LONGITUDE
Start				37 59.550 S	145 02.750 E
1	55	0.31	0.31	37 59.372 S	145 03.072 E
2	142	0.32	0.63	37 59.624 S	145 03.322 E
3	180	0.41	1.04	38 00.034 S	145 03.322 E
4	168	0.77	1.81	38 00.787 S	145 03.525 E



GPX File

Chart: AUS143 WGS84
Official Time: GPS Satellite Time
Time Is: <https://time.is/>
Start Time: 0900 Hours

- **Course Document has all key info**
- **Chart – AUS 143**
- **Timing - 1194**
- **Datum / Start**
- **Legs / Degrees**
- **Coordinates**
- **Running Sheet Course Timing**

Latitude Fast Facts

- **1 NM = 1852 M**
- **1 degree Lat = 60NM**
- **1 minute Lat = 1 NM**
- **0.1 minute = 185.2M**
- **0.001 minute = 1.852M**
- **0.0001 minute = 0.1852M**

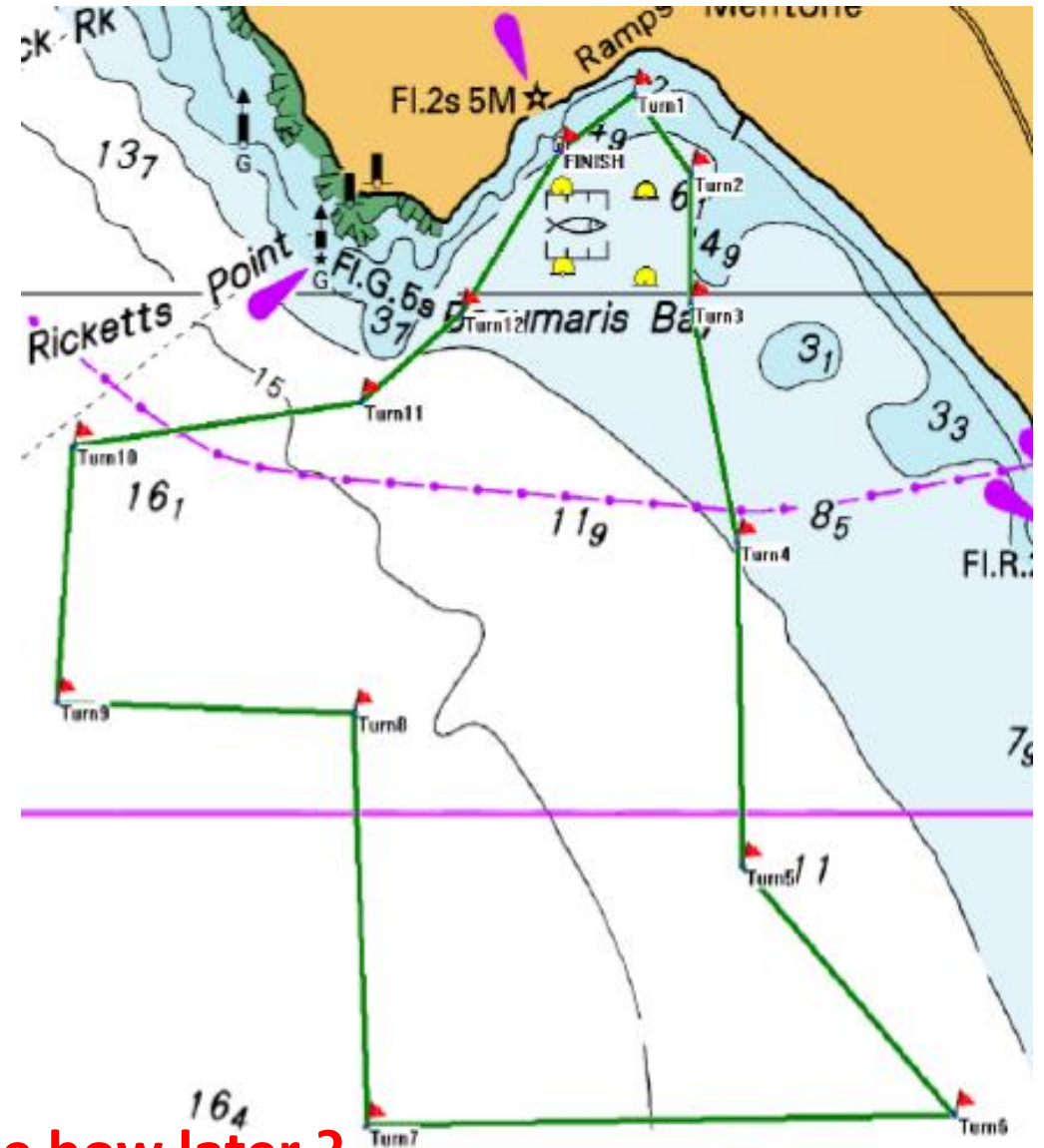
Datum Point: 1.0 Cable 145 degrees True from seaward end of BMYS Jetty
(37 59.550 S 145 02.750 E WGS84)

Start / Finish Line: Line 145 degrees True through flagpole on end of BMYS jetty to three red lights on clubhouse roof

Plotting the Course – Legs and Turns

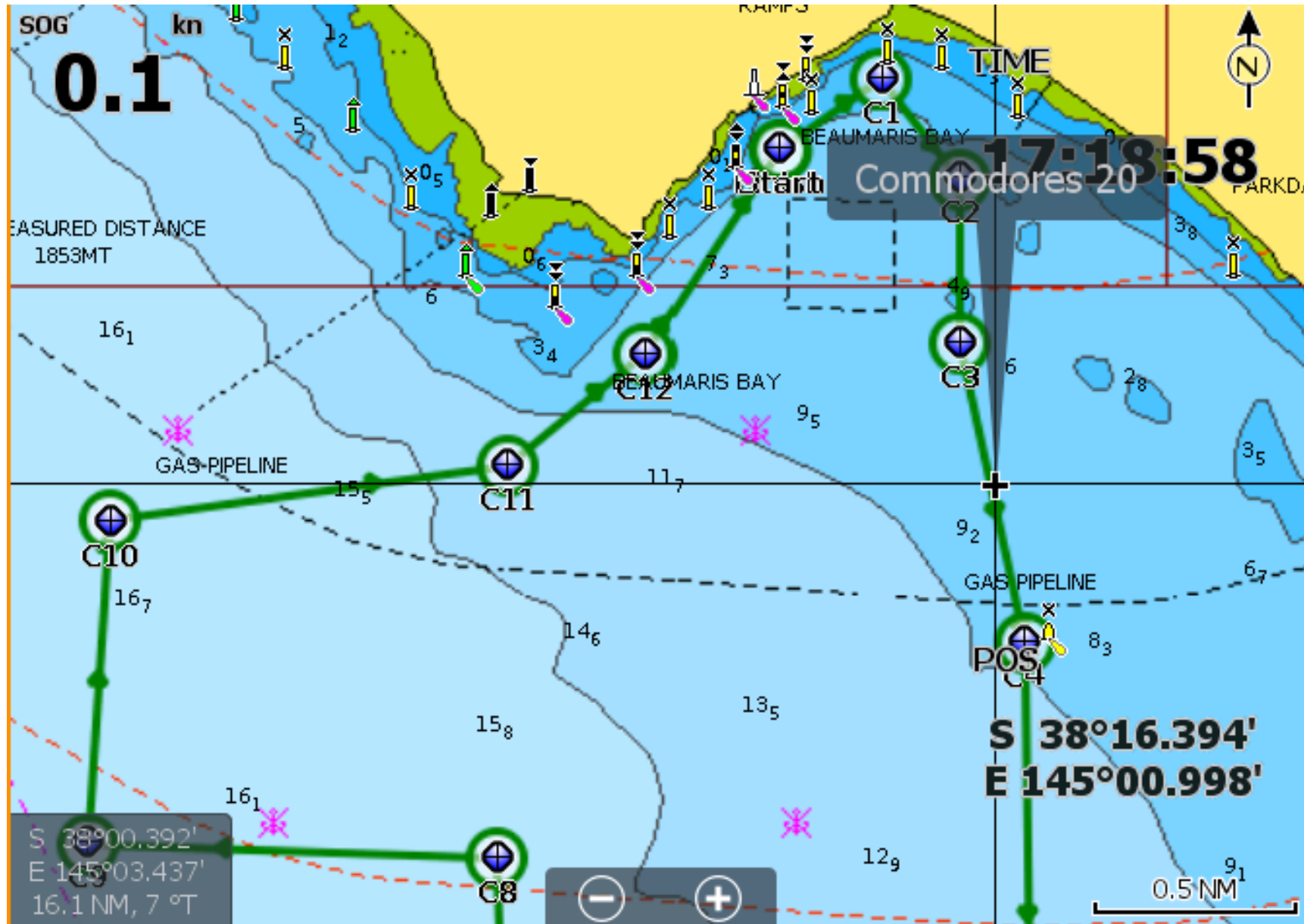
COURSE INSTRUCTIONS

LEG	DEGREES (TRUE)	DISTANCE (Nm)	TOTAL DISTANCE (Nm)	LATITUDE	LONGITUDE
Start				37 59.550 S	145 02.750 E
1	55	0.31	0.31	37 59.372 S	145 03.072 E
2	142	0.32	0.63	37 59.624 S	145 03.322 E
3	180	0.41	1.04	38 00.034 S	145 03.322 E
4	168	0.77	1.81	38 00.787 S	145 03.525 E
5	179	1.02	2.83	38 01.806 S	145 03.547 E
6	137	1.07	3.90	38 02.588 S	145 04.473 E
7	269	2.02	5.92	38 02.623 S	145 01.910 E
8	358	1.3	7.22	38 01.325 S	145 01.853 E
9	272	1.02	8.24	38 01.289 S	145 00.560 E
10	4	0.81	9.05	38 00.482 S	145 00.632 E
11	82	1.0	10.05	38 00.343 S	145 01.887 E
12	51	0.44	10.49	38 00.066 S	145 02.321 E
Finish	33	0.62	11.11	37 59.550 S	145 02.750 E



Course Instructions becomes Navigation Route – See how later ?

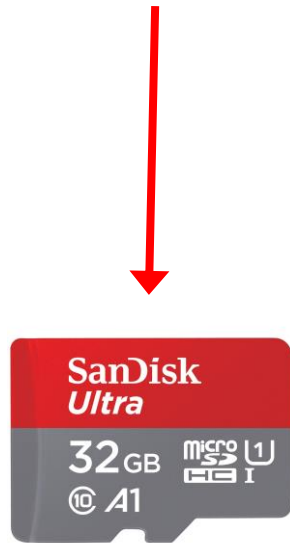
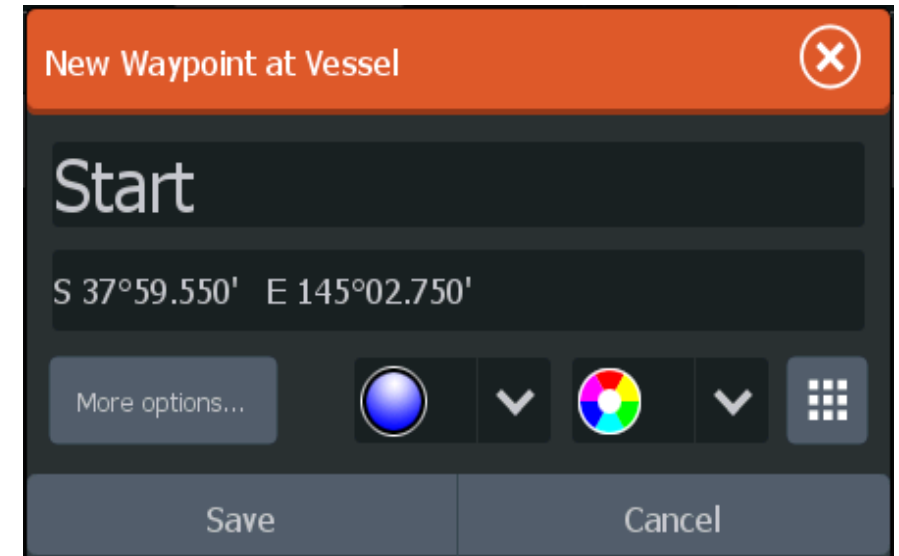
GPS – Plot the Course



- Create Route for the Nav Rally Course.
- Route is a series of connected waypoints.
- Create waypoints for Start, Turns and Finish
- Add series of waypoints to route
- View route on Chart
- Navigate the route for Nav Rally Course
- Works OK on handheld GPS
- Don't need a Map

GPS – Plot the Course - Options

- Enter Route and Waypoints manually
- Chartplotter / GPS Route Builder
- GPX File Import - Fast



GPX File
Route and Waypoints



GPS – Create Waypoints 1

Waypoints, Routes and Trails ✕

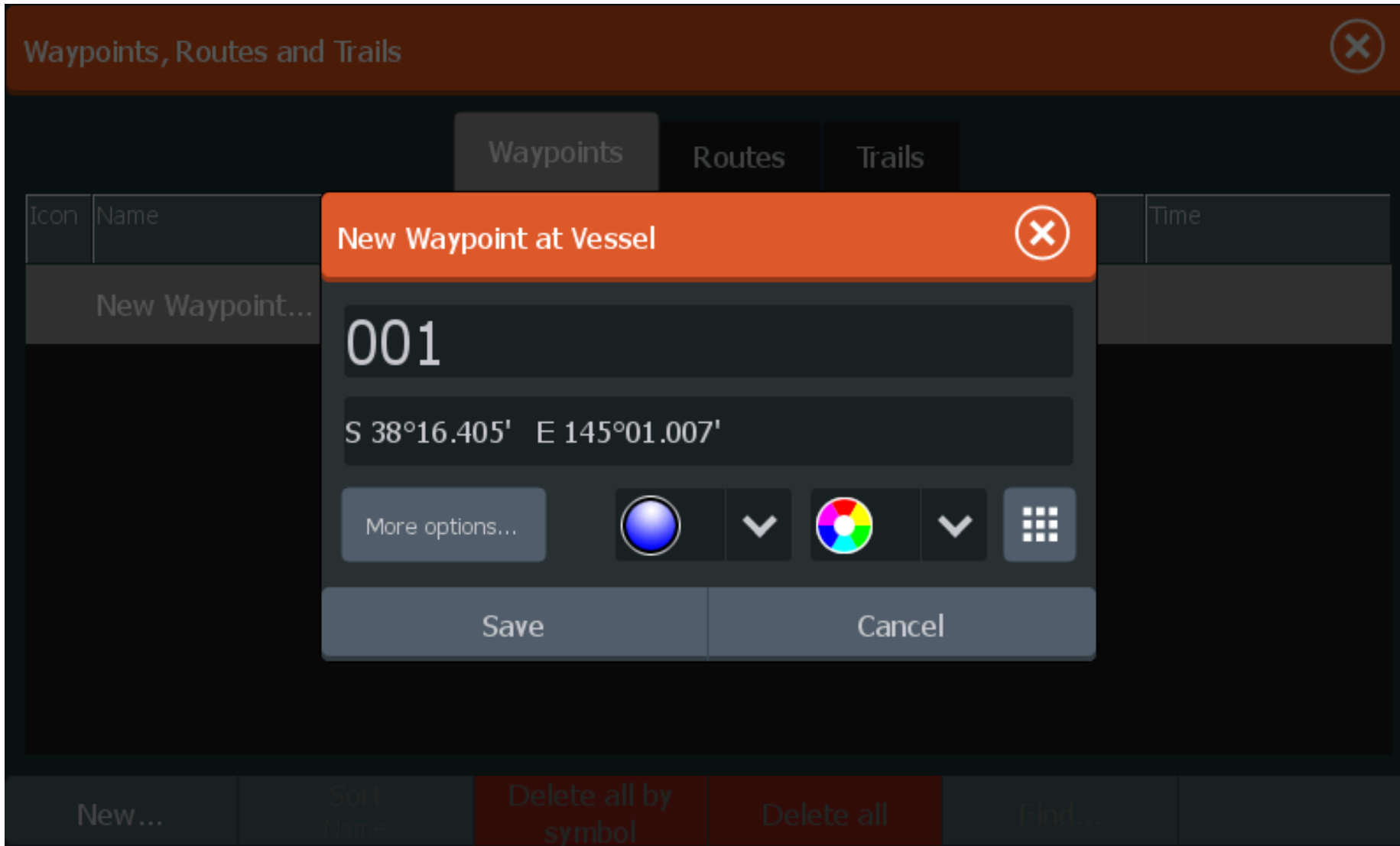
Waypoints Routes Trails

Icon	Name	Distance Bearing	Position	Time
	New Waypoint...			

New... Sort Name Delete all by symbol Delete all Find...

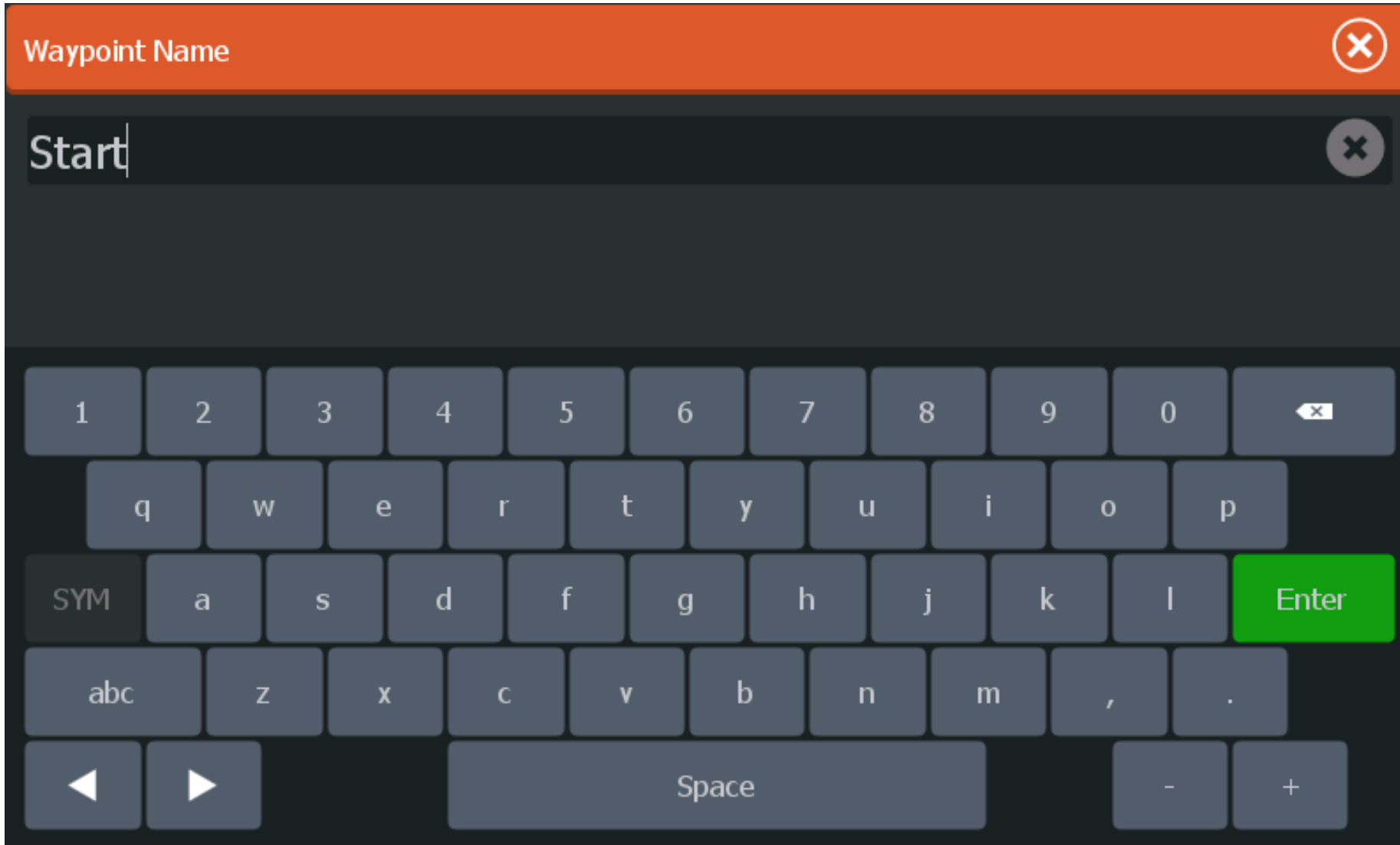
- Calculate Nav Rally waypoint coordinates for turns (Refer Course Document)
- Enter Waypoints in GPS
- New waypoint menu shown

GPS – Create Waypoints 2



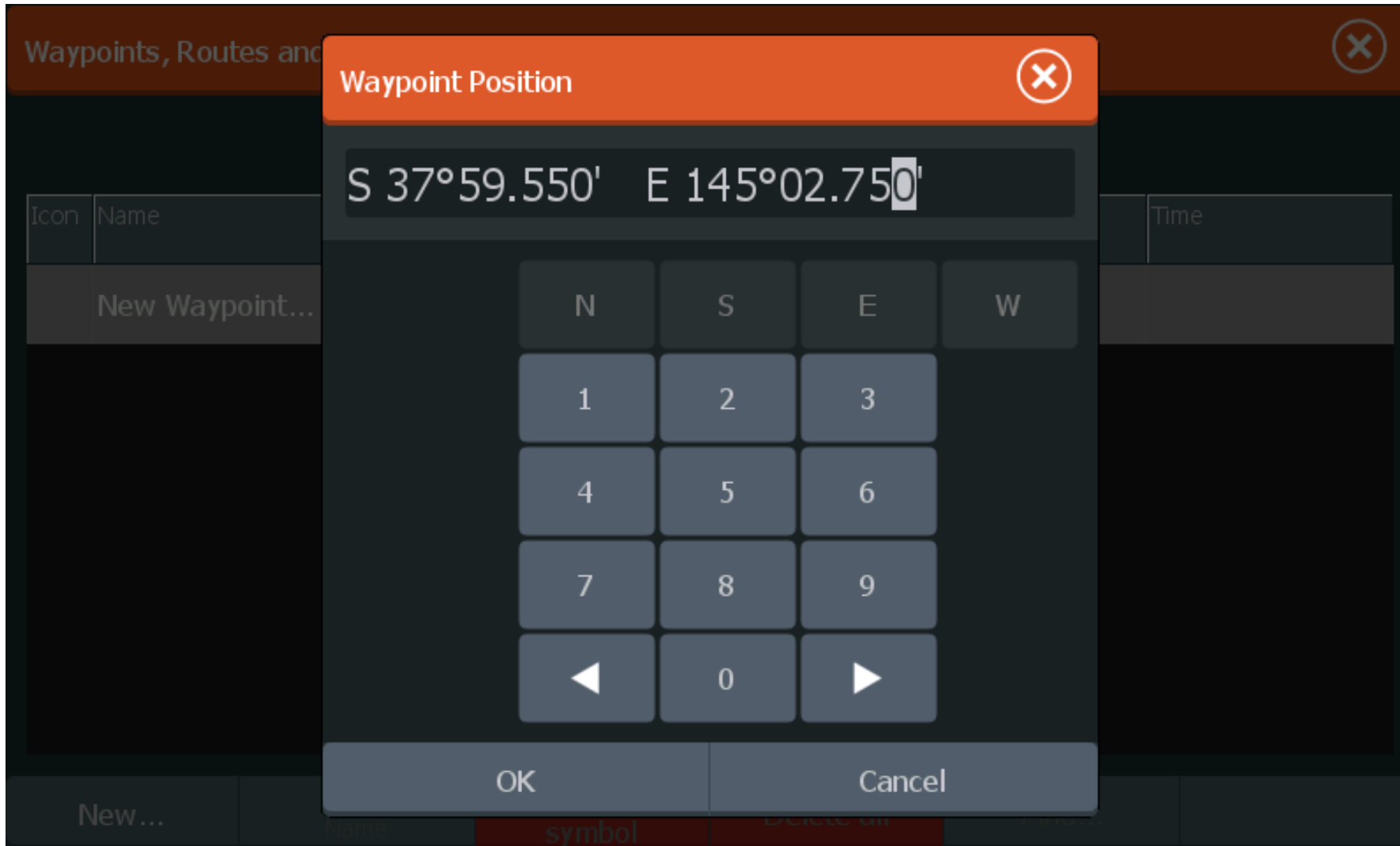
- Calculate Nav Rally waypoint coordinates for turns (Refer Course Document)
- Enter Waypoints in GPS
- New waypoint shown

GPS – Create Waypoints 3



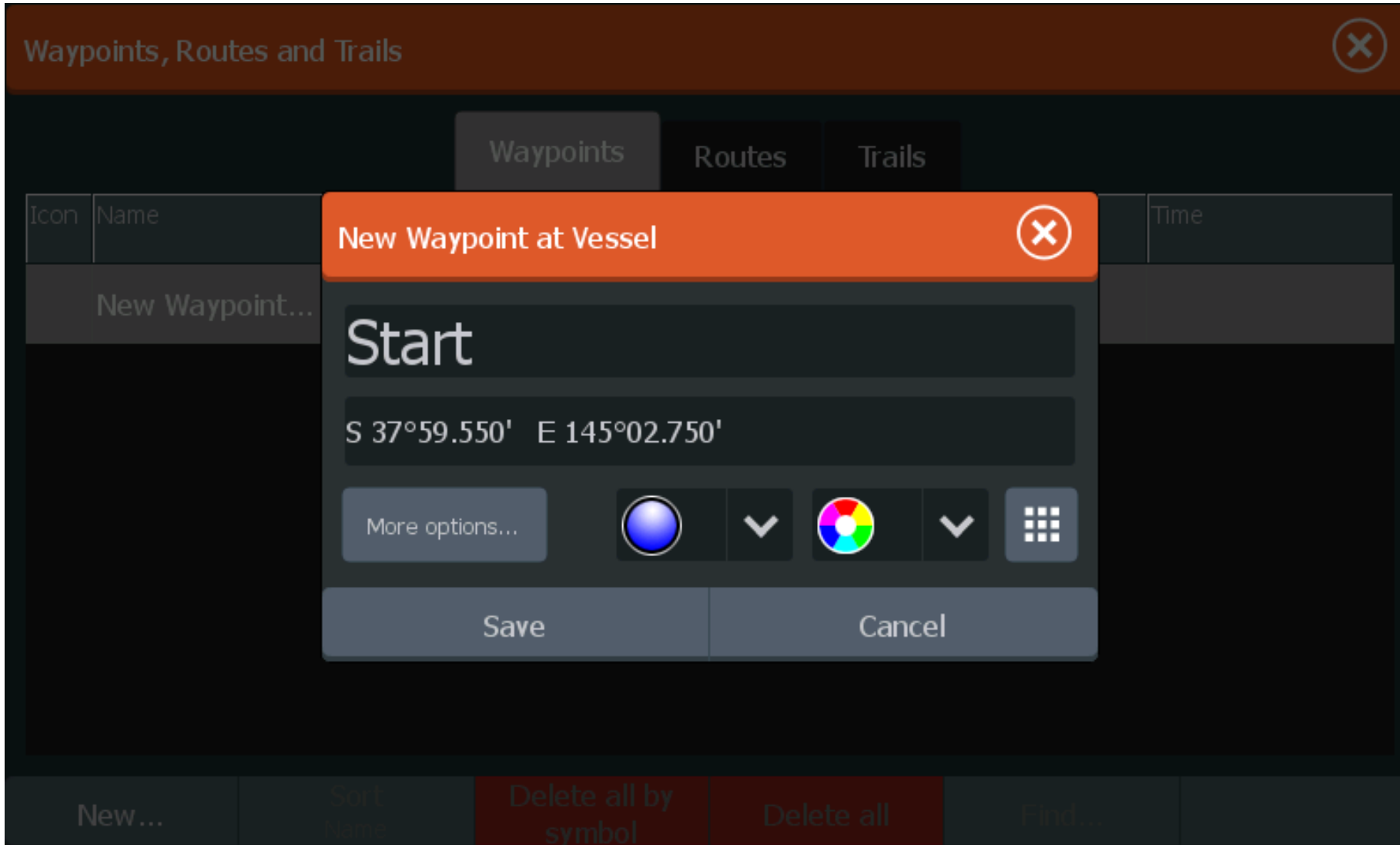
- Calculate Nav Rally waypoint coordinates for turns (Refer Course Document)
- Enter Waypoints in GPS
- Waypoints name shown

GPS – Create Waypoints 4



- Calculate Nav Rally waypoint coordinates for turns (Refer Course Document)
- Enter Waypoints in GPS
- New waypoint menu shown

GPS – Create Waypoints 5





- Calculate Nav Rally waypoint coordinates for turns (Refer Course Document)
- Enter Waypoints in GPS
- New waypoint menu shown

GPS – Create Waypoints 6

Waypoints, Routes and Trails ✕

Waypoints Routes Trails

Icon	Name	Distance Bearing	Position	Time
	Start	16.9 NM 5 °T	S 37°59.550' E 145°02.750'	16:47 04/02/2020
	New Waypoint...			








New... Sort Name Delete all by  Waypoint Start created || Find...

- Calculate Nav Rally waypoint coordinates for turns (Refer Course Document)
- Enter Waypoints in GPS
- Create a waypoint for each Turn on the course

GPS – Create Waypoints 7

Waypoints, Routes and Trails ✕

Waypoints Routes Trails

Icon	Name	Distance Bearing	Position	Time
	C5	8 °T	E 145°03.547'	04/02/2020
	C6	14.1 NM 11 °T	S 38°02.588' E 145°04.473'	16:57 04/02/2020
	C7	13.8 NM 3 °T	S 38°02.623' E 145°01.910'	16:58 04/02/2020
	C8	15.1 NM 3 °T	S 38°01.325' E 145°01.853'	16:59 04/02/2020
	C9	15.1 NM 359 °T	S 38°01.289' E 145°00.560'	17:00 04/02/2020
	Finish	16.9 NM 5 °T	S 37°59.550' E 145°02.750'	17:05 04/02/2020
	Start	16.9 NM 5 °T	S 37°59.550' E 145°02.750'	16:47 04/02/2020

New... Sort Name Delete all by symbol Delete all Find...

- Calculate Nav Rally waypoint coordinates for turns (Refer Course Document)
- Enter Waypoints in GPS
- Create a waypoint for each Turn on the course including Start and Finish

GPS – Create Route for Course

Waypoints, Routes and Trails ✕

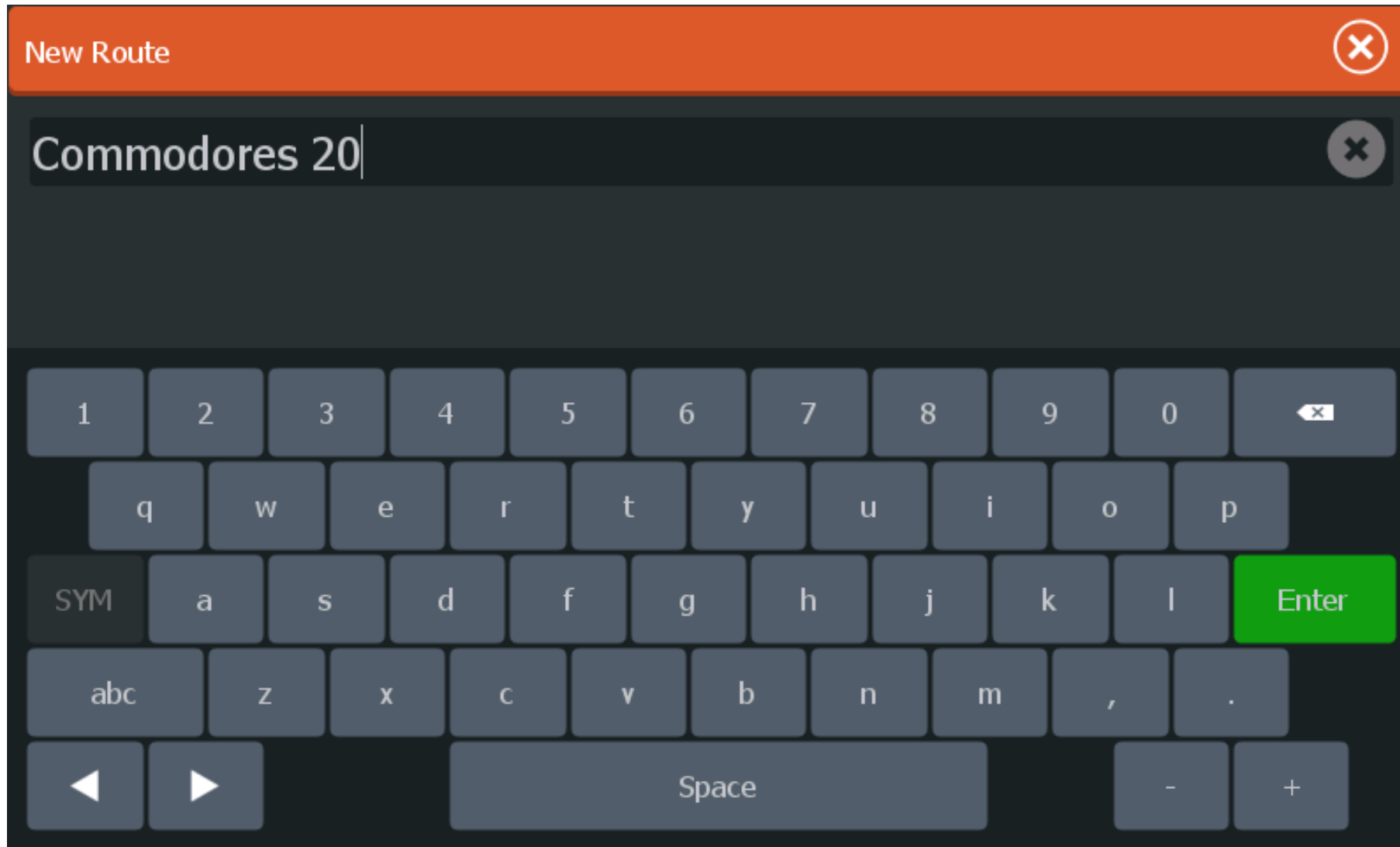
Waypoints **Routes** Trails

Name	Start	End	Legs	Distance (NM)
New Route...				

New... Delete all Find...

- Calculate Nav Rally waypoint coordinates for turns (Refer Course Document)
- Enter Waypoints in GPS
- Create a Route for the Nav Rally course

GPS – Edit Route Name



- Calculate Nav Rally waypoint coordinates for turns (Refer Course Document)
- Enter Waypoints in GPS
- Create Route – Enter Name

GPS – Route Add Waypoint

The screenshot shows a GPS application interface. At the top, there is a title bar labeled 'New Route' with a close button. Below the title bar, the text 'Commodores 20' is visible. A dialog box titled 'Select Waypoint To Insert' is open in the center, displaying a list of waypoints: 'New Waypoint...', 'C1', 'C10', and 'C11'. The 'New Waypoint...' option is currently selected. In the background, a table with columns 'Leg' and 'Waypoint' is visible, showing a single row with '0' and 'Start'. To the right of the dialog, there are controls for 'ON' and 'Display', and a table with columns 'Distance (NM)' and 'Bearing (°T)', showing a value of '5'. At the bottom of the screen, there are buttons for 'Remove', 'Insert...', 'Save', and 'Cancel'.

Leg	Waypoint
0	Start

Distance (NM)	Bearing (°T)
	5

- Calculate Nav Rally waypoint coordinates for turns (Refer Course Document)
- Enter Waypoints in GPS
- Create Route
- Add waypoint to Nav Rally Route from list in GPS

GPS – Route Add Waypoints for Turns

New Route ✕

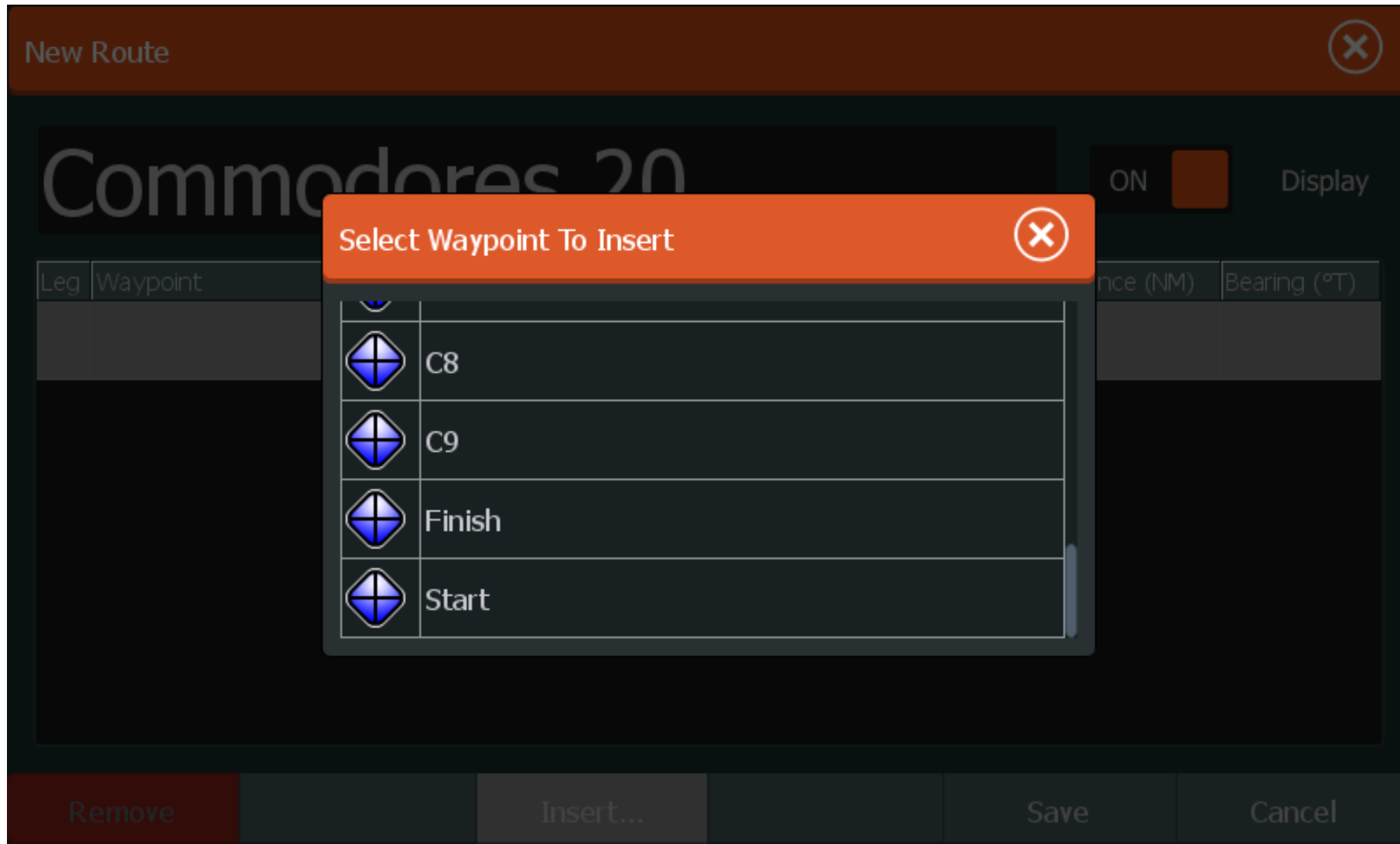
Commodores 20 ON Display

Leg	Waypoint	Distance (NM)	Bearing (°T)
0	Start	16.9	5
1	C1	0.31	55
2	C2	0.32	142
3	C3	0.41	180

Remove Insert... Save Cancel

- Calculate Nav Rally waypoint coordinates for turns (Refer Course Document)
- Enter Waypoints in GPS and create Route for course
- Add all Turn, Start and Finish waypoints

GPS – Route - Waypoints for All Turns



- Calculate Nav Rally waypoint coordinates for turns (Refer Course Document)
- Enter Waypoints in GPS
- Add Start, Finish and Turn waypoints to route

GPS – Route - Waypoints for All Turns

New Route ✕

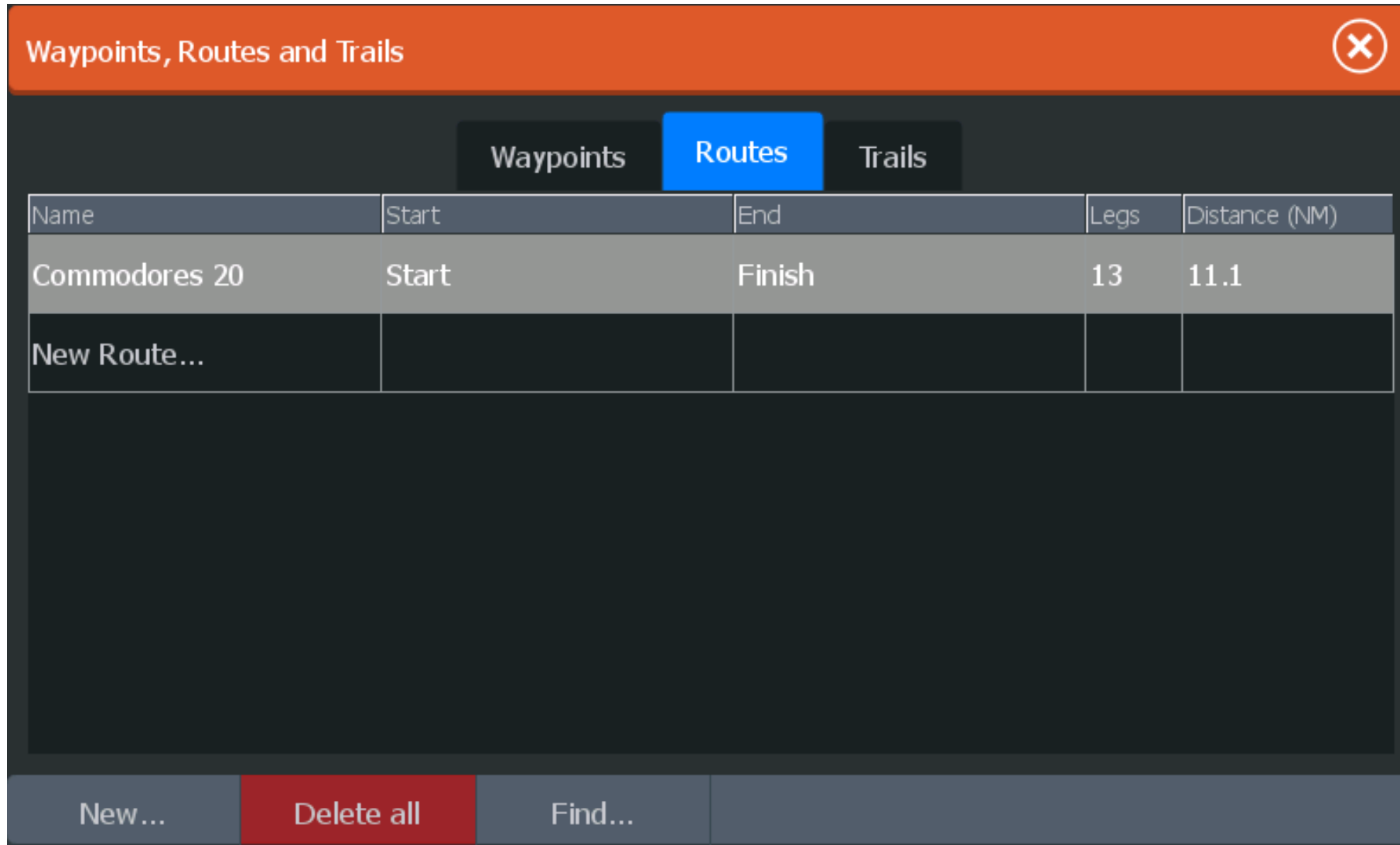
Commodores 20 ON Display

Leg	Waypoint	Distance (NM)	Bearing (°T)
8	C8	1.30	358
9	C9	1.02	272
10	C10	0.81	4
11	C11	1.00	82
12	C12	0.44	51
13	Finish	0.62	33

Remove Insert... Save Cancel

- Calculate Nav Rally waypoint coordinates for turns (Refer Course Document)
- Enter Waypoints in GPS
- Add Start, Finish and Turn waypoints to route
- You can insert intermediate waypoints in between the turns

GPS – Route - Waypoints for All Turns



The screenshot shows a mobile application interface for managing routes. At the top, there is a title bar with the text "Waypoints, Routes and Trails" and a close button. Below the title bar, there are three tabs: "Waypoints", "Routes" (which is highlighted in blue), and "Trails". The main content area is a table with the following columns: "Name", "Start", "End", "Legs", and "Distance (NM)". The table contains one row of data for a route named "Commodores 20", with a start point of "Start", an end point of "Finish", 13 legs, and a distance of 11.1 NM. Below the table, there is a "New Route..." button. At the bottom of the screen, there is a navigation bar with four buttons: "New...", "Delete all" (highlighted in red), "Find...", and an empty space.

Name	Start	End	Legs	Distance (NM)
Commodores 20	Start	Finish	13	11.1
New Route...				

- Calculate Nav Rally waypoint coordinates for turns (Refer Course Document)
- Enter Waypoints in GPS
- Add Start, Finish and Turn waypoints to route
- NavRally - Navigate Route using GPS

Recap : Course -> Waypoints / Route -> NavRally -> Runsheet

COURSE INSTRUCTIONS

LEG	DEGREES (TRUE)	DISTANCE (Nm)	TOTAL DISTANCE (Nm)	LATITUDE	LONGITUDE
Start				37 59.550 S	145 02.750 E
1	55	0.31	0.31	37 59.372 S	145 03.072 E
2	142	0.32	0.63	37 59.624 S	145 03.322 E
3	180	0.41	1.04	38 00.034 S	145 03.322 E
4	168	0.77	1.81	38 00.787 S	145 03.525 E
5	179	1.02	2.83	38 01.806 S	145 03.547 E
6	137	1.07	3.90	38 02.588 S	145 04.473 E
7	269	2.02	5.92	38 02.623 S	145 01.910 E
8	358	1.3	7.22	38 01.325 S	145 01.853 E
9	272	1.02	8.24	38 01.289 S	145 00.560 E
10	4	0.81	9.05	38 00.482 S	145 00.632 E
11	82	1.0	10.05	38 00.343 S	145 01.887 E
12	51	0.44	10.49	38 00.066 S	145 02.321 E
Finish	33	0.62	11.11	37 59.550 S	145 02.750 E



New Route ✕

Commodores 20

ON Display

Leg	Waypoint	Distance (NM)	Bearing (°T)
8	C8	1.30	358
9	C9	1.02	272
10	C10	0.81	4
11	C11	1.00	82
12	C12	0.44	51
13	Finish	0.62	33

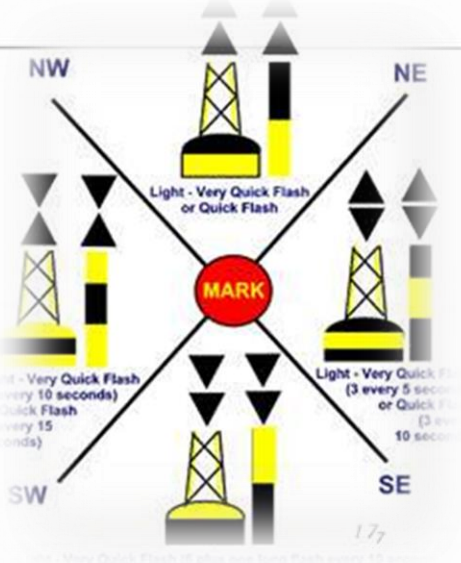
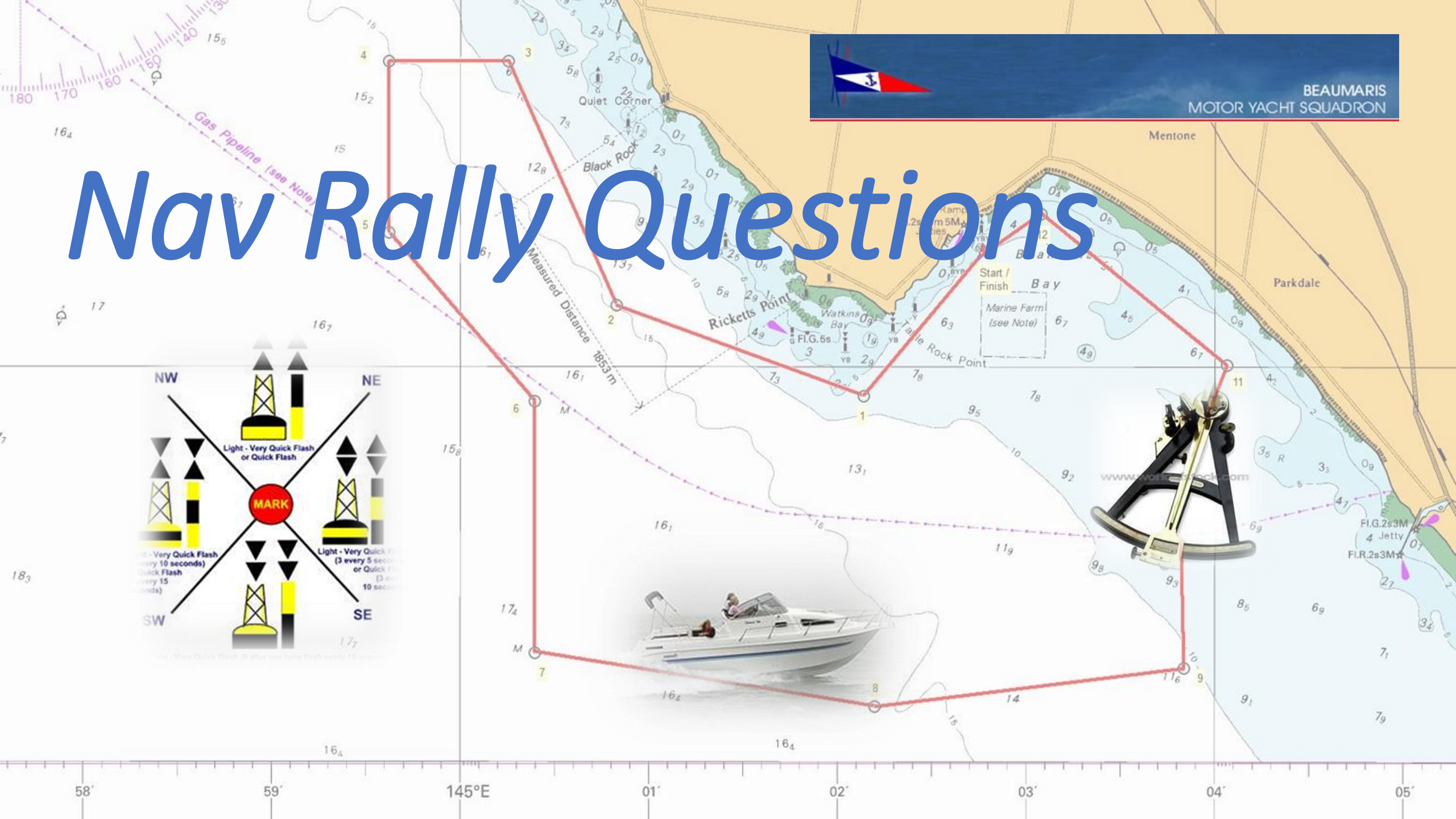
Remove
Insert...
Save
Cancel



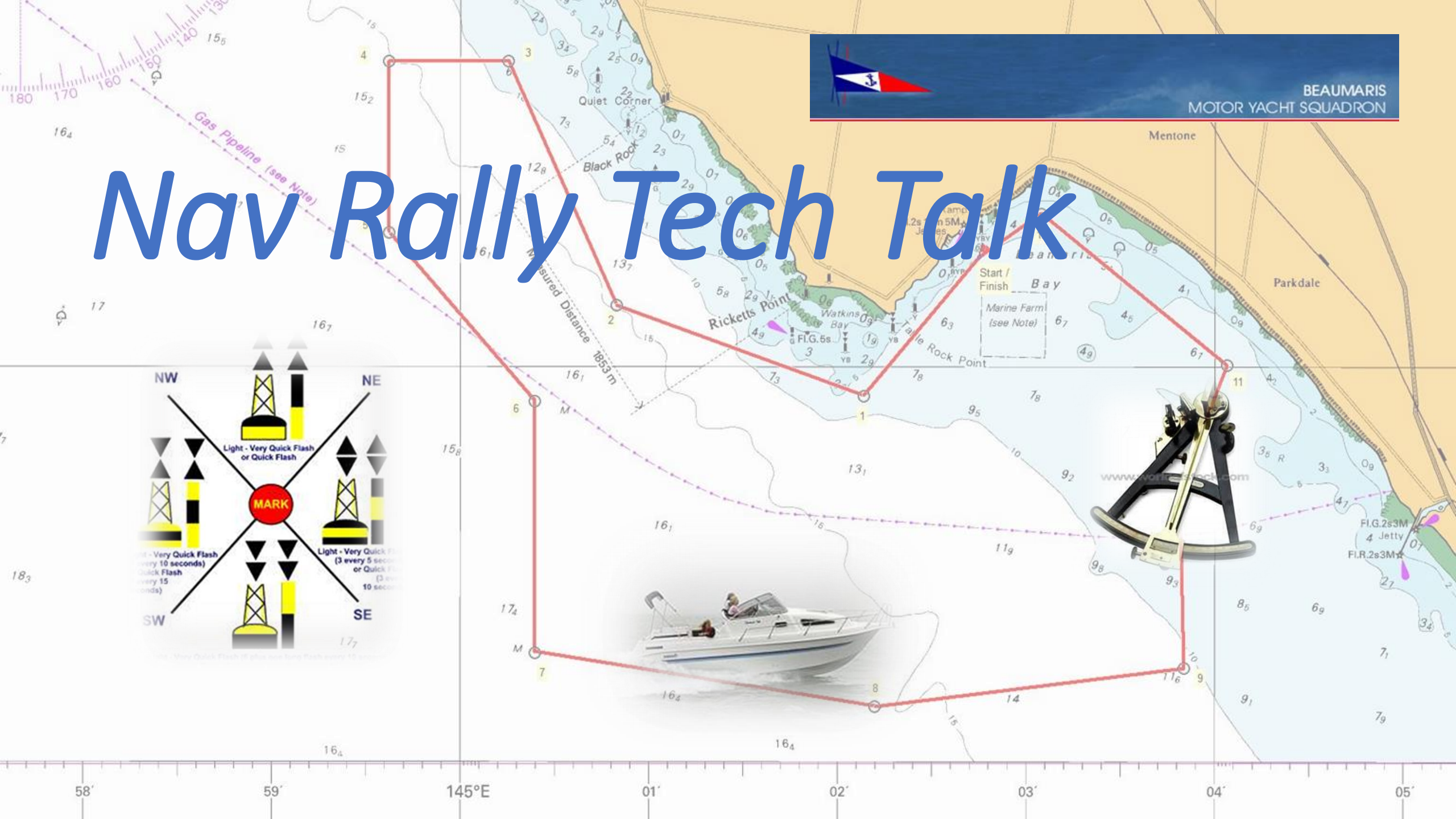
SKIPPER NAME: Roger Hartley		SPEED: 10 KN			BOAT NAME	
NAVIGATOR NAME : Brendan O'Donoghue					TACK-TRACK	
POSITION	DIST	SPEED	TIME	TOTAL DIST	TOTAL TIME	ETA
START HEAD 220 TRUE	0.000	10	0:00:00	0.000	0:00:00	9:30:00
	0.000					
TURN TO 190 TRUE	0.900	10	0:05:24	0.900	0:05:24	9:35:24
Intermediate Position 1A	0.450	10	0:02:42	1.350	0:08:06	9:38:06
Intermediate Position 1B	0.480	10	0:02:53	1.830	0:10:59	9:40:59
Intermediate Position 1C	0.670	10	0:04:01	2.500	0:15:00	9:45:00
	0.000					
TURN TO 138 TRUE	2.220	10	0:13:19	3.120	0:18:43	9:48:43
	0.000					
TURN TO 48 TRUE	0.790	10	0:04:44	3.910	0:23:28	9:53:28

- Navigation Route for the Nav Rally Course.
- Route is a series of connected waypoints.
- Create waypoints for Start, Turns and Finish
- Add series of waypoints to route
- View route on Chart
- Navigate the route for Nav Rally Course
- Use Run Sheet for Position and Time

Nav Rally Questions



Nav Rally Tech Talk



Plotting the Course – Waypoint Coordinates

GPS Visualizer

<http://www.gpsvisualizer.com/calculators>

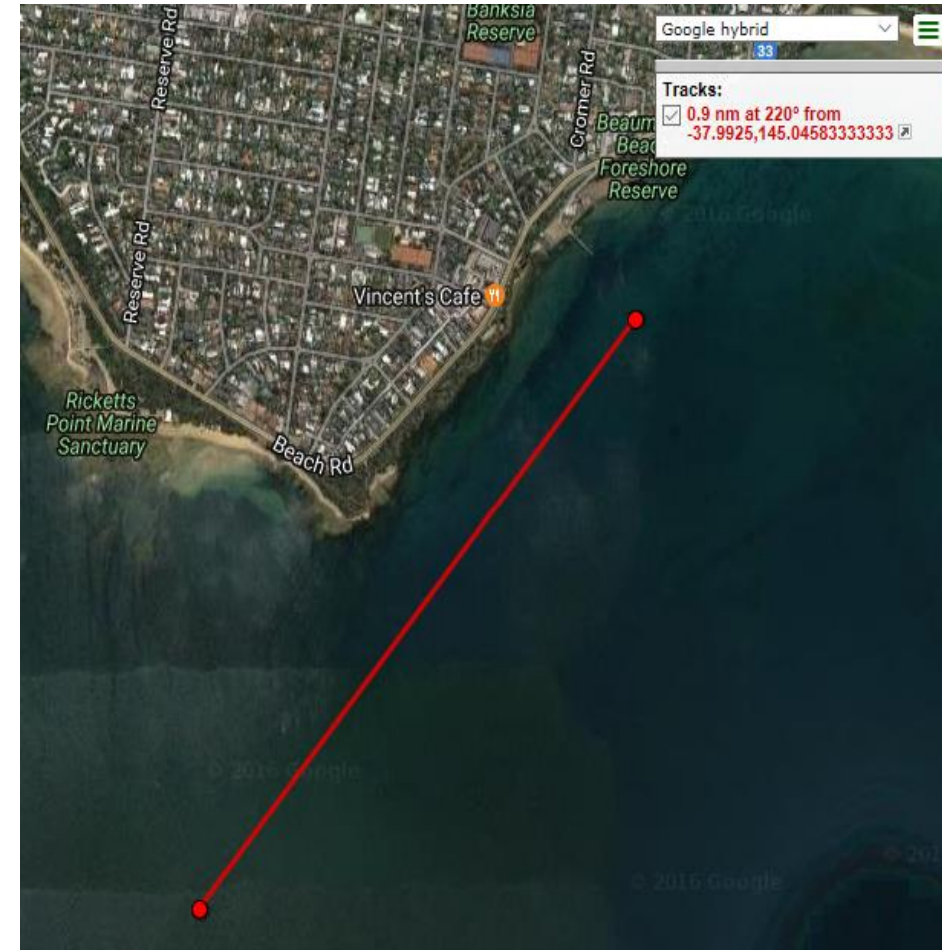
Find the coordinates at a given distance and bearing

This form will tell you what point lies at any distance and bearing from another point. If you don't supply units in the distance box itself (e.g., "100 mi"), it will default to kilometers. (The formula used here was adapted from "[Sprong](#)" by Dale Bickel at the FCC.)

Starting Lat., Lon. -37 59.55, 145 02.75	Distance 0.9 nm	Bearing 220 °	Ending Lat., Lon. -38.0039829379, 145.0336	output format: Google Map	Draw map
<small>Convert to DMM/DMS format</small>					

Turn 1 from Start
0.9 NM at
220 degrees

Leg 1 Intermediate
Change distance 1-2
to 0.1 NM



Plotting the Course – Waypoint Coordinates 2

Great Circle Calculator

<http://edwilliams.org/gccalc.htm>

Compute lat/lon given radial and distance from a known point

Enter lat/lon of initial point, true course and distance. Select distance units and earth model and click "compute". Lat/lons may be entered in DD.DD, DD:MM:MM or DD:MM:SS.SS formats.

Input data

Lat1		Lon1	
37:59.5500	S ▾	145:02.750	E ▾
Course 1-2		Distance 1-2	
220		0.9	

Turn 1 from Start
0.9 NM at
220 degrees

Leg 1 Intermediate
Change distance 1-2
to 0.1 NM

Output

Lat2		Lon2	
38:0.2402	S	145:2.0181	E

Latitude Facts

- 1 NM = 1852 M
- 1 degree Lat = 60NM
- 1 minute Lat = 1 NM
- 0.1 minute = 185.2M
- 0.001 minute = 1.852M
- 0.0001 minute = 0.1852M

Units: ▾ Earth model: ▾

Plotting the Course – Easy GPS -> GPX File

EasyGPS - [isle of mordy 2017.g...]

File Edit Geocache Tools GPS Window Help

New Open Save Print Add Find Send Receive Move Map Zoom Select Route

isle of mordy 2017.g...

List Find: Clear

Waypoints

Name on GPS	Latitude	Longitude
turnn 9	S38 01.443	E145 03.088
turn3	S38 00.280	E145 01.866
turn2	S38 00.598	E145 03.056
turn1	S38 00.102	E145 03.663
turn 8	S38 01.161	E145 03.034
turn 7	S38 01.379	E145 01.762
turn 6	S38 01.119	E145 01.681
turn 5	S38 00.840	E145 02.993
turn 4	S38 00.548	E145 01.776
turn 17	S38 00.419	E145 03.563
turn 16	S38 01.261	E145 03.735
turn 15	S38 01.286	E145 03.550
turn 14	S38 00.733	E145 03.400
turn 13	S38 00.758	E145 03.161
turn 12	S38 01.607	E145 03.328
turn 11	S38 01.868	E145 01.929
turn 10	S38 01.697	E145 01.866
start	S38 00.621	E145 04.223
pre start	S38 00.736	E145 04.332
finish	S38 00.621	E145 04.222

- **Navigation Route for the Nav Rally Course.**
- **Route is a series of connected waypoints.**
- **Each waypoint has a name and Latitude Longitude coordinates.**
- **When running course need to be at each point at target time**
- **Easy GPS freeware in example**



Save course as GPX file

isle of mordy 2017.gpx

NEVER write to map card !

Plotting the Course – Transfer GPX to GPS

Details - isle of mordy 2017.gpx

Type	gpx
Size	11.2 kB
Created	31/01/2018
Modified	29/04/2017
User data file	

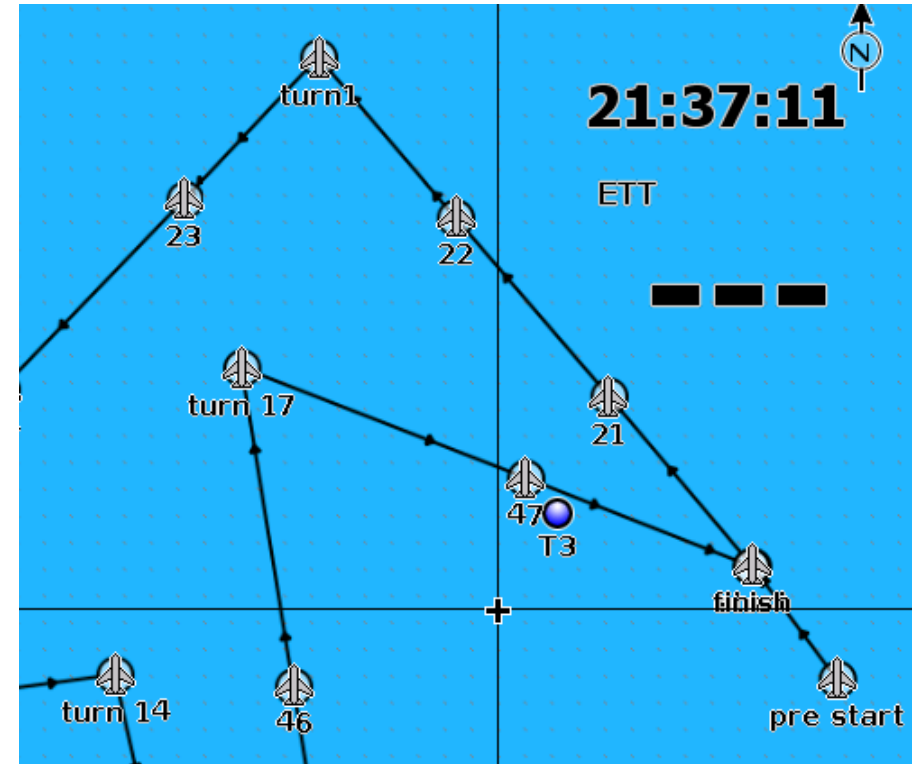
Import Copy Rename Delete



Waypoints, Routes and Trails

Waypoints Routes Trails

Name	Start	End	Legs	Distance (NM)
Commodores 18	Start	Finish	13	10.6
ISLE OF MORDY	pre start	finish	46	11.9



- Import GPX file
- Creates waypoints and course
- Do all the work on laptop in the lounge room