

# Navigation foundations

## 1. Slides

### 1.1 Navigation foundations

#### *e-Learning Module*

Navigation foundations  
e-Learning Module



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Notes:

## 1.2 Meet your presenter

### Martin Vaughan

#### Meet your presenter

#### Martin Vaughan

Resources

Career highlights:

- 20+ years offshore sailing incl Navigator in M2H & S2H
- 10 years as owner/skipper
- 6 x Sydney to Hobarts (2 as skipper)
- 4 x Melb to Hobarts (2 as skipper & several 1st places)
- 1 x Melbourne to Osaka double handed (1st IRC)
- Numerous ocean races, regattas and deliveries

- ORCV SSSC Instructor and past Commodore



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#### Notes:

## 1.3 Navigating

### Moving through this module


Resources

To move through this module you may wish to use:

- The Video icon to access additional content (on some slides)
- The left hand menu to jump around between slides
- The scroll bar at the bottom to move forward and back within a slide
- The play/pause icon to pause audio and/or video
- The volume control to increase/decrease audio (all slides have audio)
- The Next button to move (or skip) to the next slide
- The Resource page containing all URLs (button in the top right corner)

The course can be Resumed if you leave or Restarted after you finish it

Make sure you click the "Finished" button on the last "Success" slide to record course completion



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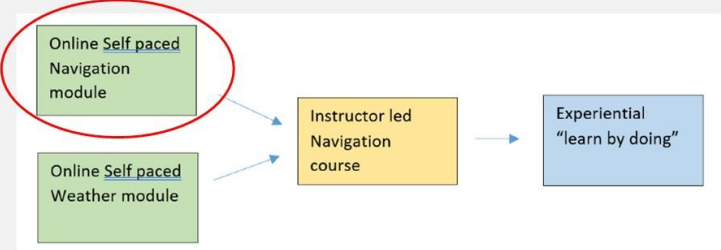
## 1.4 Where this module fits

### Where this module fits

Resources

This module is one component of the Navigation course.

It is designed to bring people up to a foundation level of knowledge. More experienced people may know some or all of this content already, so skip ahead if you wish.



```
graph LR; A[Online Self paced Navigation module] --> B[Instructor led Navigation course]; C[Online Self paced Weather module] --> B; B --> D[Experiential "learn by doing"]
```

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## 1.5 Learning outcomes

### Learning outcomes

By the end of the online module, participants will be able to;

- Explain navigation terminology
- Describe a location using Latitude and Longitude
- Determine Bearing and Distance from one location to another
- Describe the use of Navigating technology



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## 1.6 What is Navigation

### What is Navigation ?

Navigation has always been about:

- Where am I ?
- How do I get to where I want to go ?
- How do I avoid hazards ?

These days it also includes:

- How do I use technology ?



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## 1.7 Part 1 – Where am I ?

Resources

### Part 1 – Where am I ?



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## 1.8 Paper charts

Resources


### Paper charts

The following is important to consider when using a paper chart

- Key information
- Age of chart
- Chart datum
- Zones of confidence
- Lat & Long
- Compass rose

**Click on the links to learn more**

We know paper charts are no longer being produced. This content is included as some people are still using them. Others keep them as a backup.



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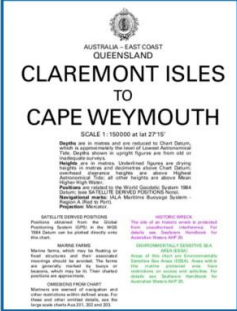
Speaking the language

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## Tab A (Slide Layer)

### Paper charts

The following is important to consider when using a paper chart

Key information	<b>Key information</b>	
Age of chart	Chart name and Reference number	
Chart datum	The scale	
Zones of confidence	Depth in (Metres, Fathoms or Feet)	
Lat & Long	Chart datum (typically WGS84)	
Compass rose	Age of chart	

Note Symbols and abbreviations are published separately


Projection (typically Mercator)

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## Tab B (Slide Layer)

### Paper charts

The following is important to consider when using a paper chart

Key information	<b>Age of chart</b>	
Age of chart	A chart may be purchased or obtained recently but it might:	
Chart datum	• Be published some time ago	
Zones of confidence	• Be based on very old survey data. (See Zones of Confidence")	
Lat & Long	• Notices to Mariners – provides advice on hazards and changes to navigation since chart was produced	
Compass rose	• Charts still may be wrong, get local knowledge	

An example is the Lady Baron approach from the East. The Pot Boil sand bank constantly moves so chart leads are inaccurate.

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## Tab C (Slide Layer)


[Resources](#)

### Paper charts

The following is important to consider when using a paper chart

Key information	<b>Chart datum</b>
Age of chart	Chart datum affects GPS plotting accuracy.
Chart datum	For example with the wrong datum, plotting GPS Lat/Long to WGS 84 varies by 150m on Aus143 (Port Phillip Bay)
Zones of confidence	Depth datum (Lowest Astronomical tide) Colour coding related to depth <ul style="list-style-type: none"> <li>• Light blue 5-10m</li> <li>• Dark blue 0-5m</li> <li>• Green – Intertidal (High to Low tide)</li> </ul>
Lat & Long	
Compass rose	Clearance datum (Highest Astronomical tide) Elevation datum (Mean High Water Level)




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
## Tab D (Slide Layer)

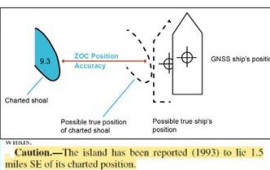
[Resources](#)


### Paper charts

The following is important to consider when using a paper chart

Key information	<b>Zones of Confidence</b>
Age of chart	Note zones of confidence on your chart
Chart datum	
Zones of confidence	
Lat & Long	
Compass rose	

ZOC	ZOC Symbol	Position Accuracy	Depth Accuracy	Seafloor Coverage
A1		± 5 m + 5% depth	0.50 + 15d	Full area search undertaken. Significant seafloor features detected and depths measured.
A2		± 20 m	+ 1.00 + 25d	Full area search undertaken. Significant seafloor features detected and depths measured.
B		± 50 m	+ 1.00 + 25d	Full seafloor coverage not achieved; uncharted features, hazardous to surface navigation are not expected but may exist.
C		± 500 m	+ 2.00 + 50d	Full seafloor coverage not achieved; depth anomalies may be expected.
D		Worse than ZOC C		Full seafloor coverage not achieved; large depth anomalies may be expected.
U		Unassessed - The quality of the bathymetric data has yet to be assessed.		




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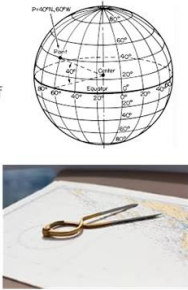
Navigation foundations

## Tab E (Slide Layer)

### Paper charts

Resources

The following is important to consider when using a paper chart

Key information	<b>Lat &amp; Long</b>	
Age of chart	Note the vertical and horizontal lines on the chart	
Chart datum	Note they line up with the vertical (Latitude) and horizontal (Longitude) scale on the outside edges of the chart	
Zones of confidence	Only the Latitude scale is used for distance measuring, typically using a caliper tool.	
Lat & Long	Note the graduations – degrees and minutes	
Compass rose	1 minute of Latitude = 1 Nautical Mile (Nm)	

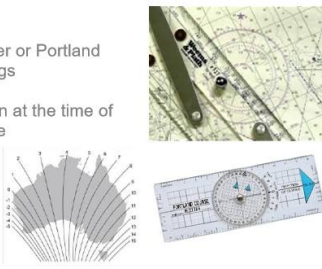
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## Tab F (Slide Layer)

### Paper charts

Resources

The following is important to consider when using a paper chart

Key information	<b>Compass rose</b>	
Age of chart	Charts are aligned to "True North"	
Chart datum	Compass is used with a parallel ruler or Portland plotter to measure or project bearings	
Zones of confidence	Chart rose shows Magnetic variation at the time of chart publication and annual change	
Lat & Long	<i>"In the East, Compass is Least"</i>	
Compass rose		

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## 1.9 Key concept 1





### Key concept – Bearing

Resources

A Bearing is fundamental to Navigation:

- A bearing is expressed in degrees
- Either a Magnetic or True bearing (Magnetic variation being the difference)
- From somewhere or to somewhere (which are 180 degrees from each other)
- A bearing to steer to

If you would like to see a good optional video showing how to take a compass bearing and plot it on a paper chart, click on the link below.



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## Video (Slide Layer)



00:00 / 00:43

Extract from video by "Carpe Diem Sailing" ref <https://www.youtube.com/watch?v=wmbLuPXDv7w>

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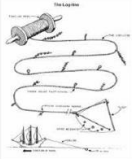

## 1.10 Key concept 2

### Key concept – Distance

Distance and speed are fundamental to Navigation:

- Distance is expressed in Nautical miles (1Nm = 1.852km)
- 1Nm = 1 degree of Latitude
- 1 Knot = 1Nm per hour
- Distance measuring device is called a “log” (originally a coil of rope with equally spaced knots)

If you would like to see a good optional video showing how to measure distance on a paper chart, click on the link below.

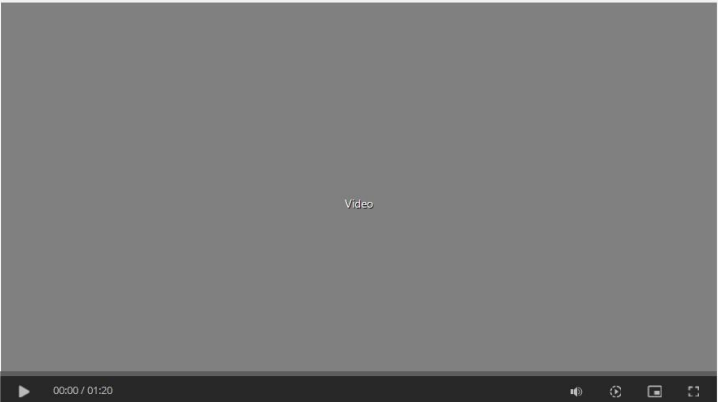


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## Video (Slide Layer)

Video



Extract from video by "SplashSeaSchool" ref [https://www.youtube.com/watch?v=LM\\_V-f\\_TXmk](https://www.youtube.com/watch?v=LM_V-f_TXmk)

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## 1.11 Determine location





### Determining your location

Resources

Before GPS, we would use tools such as:

- A Log to measure boat speed and the boat's compass to measure heading
- A Sextant to measure the angle between a celestial object such as the sun and the horizon to determine Latitude
- A Compass to measure a bearing to a known point reference point (shown on the chart) such as a lighthouse

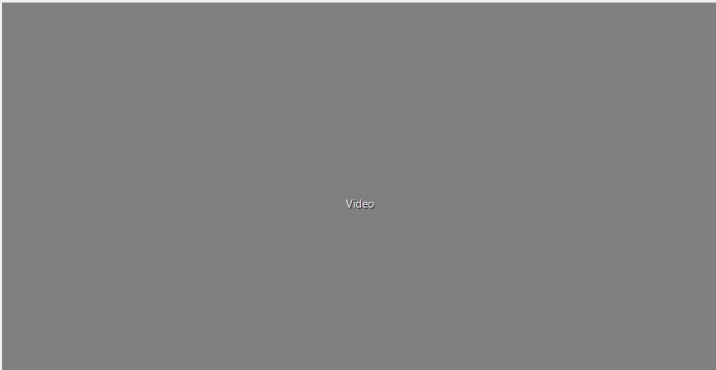
If you would like to see a good optional video showing how to determine your location from a sighting compass, click on the link below



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### Video (Slide Layer)



00:00 / 04:46

Extract from video by "Aus Navigation" ref <https://www.youtube.com/watch?v=aVHY8aA15i4&t=185s>

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## 1.12 Now there is GPS

### But now there is GPS

Resources

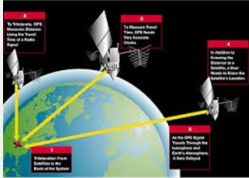
Now we are surrounded by GPS which can provide your location:

- In our chart plotter(s) or GPS units
- In our AIS unit
- Sometimes in our VHF radios for DSC Distress messaging
- In our phones and some iPads/tablets
- In our PLBs and our EPIRBs
- In our Satellite trackers

These days they are accurate to within 5 meters (but they do degrade from time to time)

Be sure whether your GPS format is:

- Degrees : Minutes : Seconds
- Degrees : Minutes : Decimal of Minutes
- Degrees : Decimal of Degrees



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## 1.13 GPS position

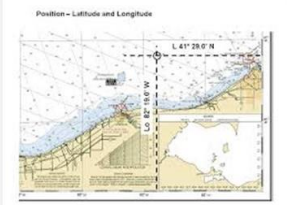


### GPS position

Resources

Now we have GPS, we can plot our position (which is what Chartplotters do):

- Be careful chart datum is consistent
- Be careful of decimal minutes vs minutes and seconds


If you would like to see a good optional video showing how to plot your location on a paper chart from a GPS, click on the link below



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## Video (Slide Layer)



Plotting a GPS derived fix

Extract from video by Free Sailing Tutorials® ref <https://www.youtube.com/watch?v=roUGuc0zvXI>

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### 1.14 Q1. Paper charts:

(Multiple Choice, 0 points, unlimited attempts permitted)

Resources

**Q1. Paper charts:**

- Are not useful any more, that's why they are no longer sold
- Need to be updated with Notices to Mariners
- Deceptive as the Magnetic Variation changes every year
- Too fragile to have on a boat



Submit

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Correct Choice

Are not useful any more, that's why they are no longer sold

X	Need to be updated with Notices to Mariners
	Deceptive as the Magnetic Variation changes every year
	Too fragile to have on a boat

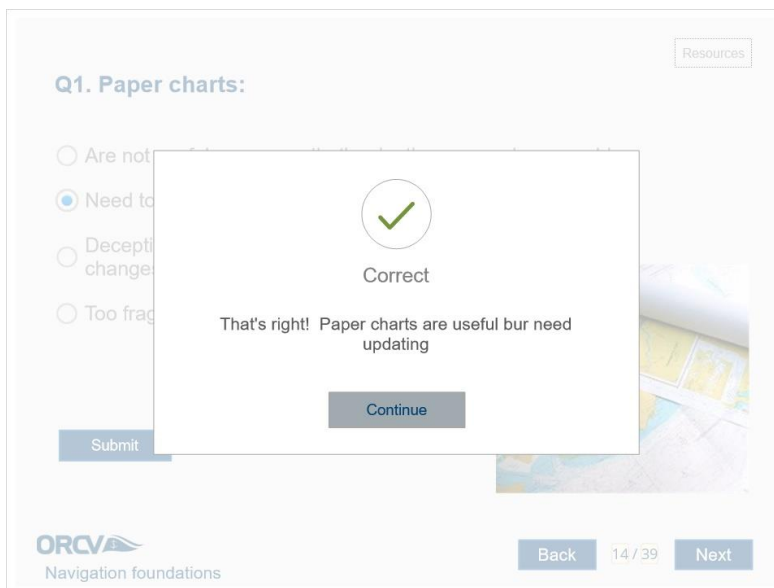
**Feedback when correct:**

That's right! Paper charts are useful bur need updating

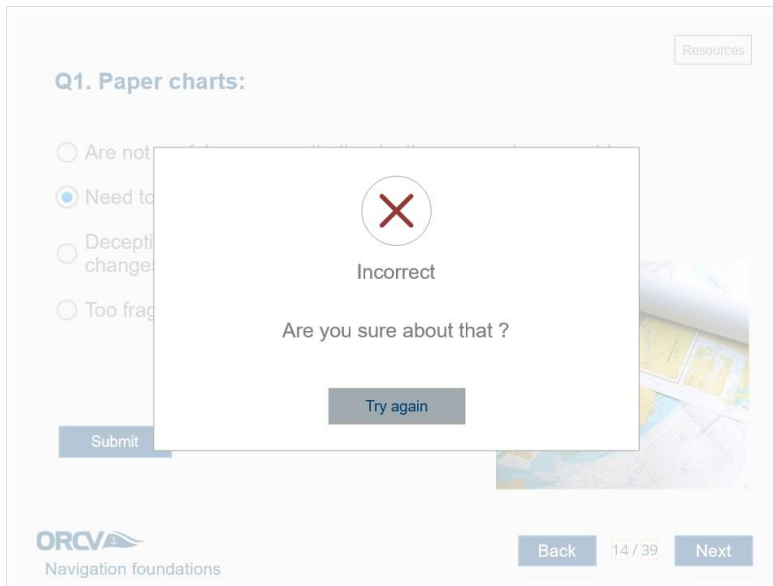
**Feedback when incorrect:**

Are you sure about that ?

**Correct (Slide Layer)**

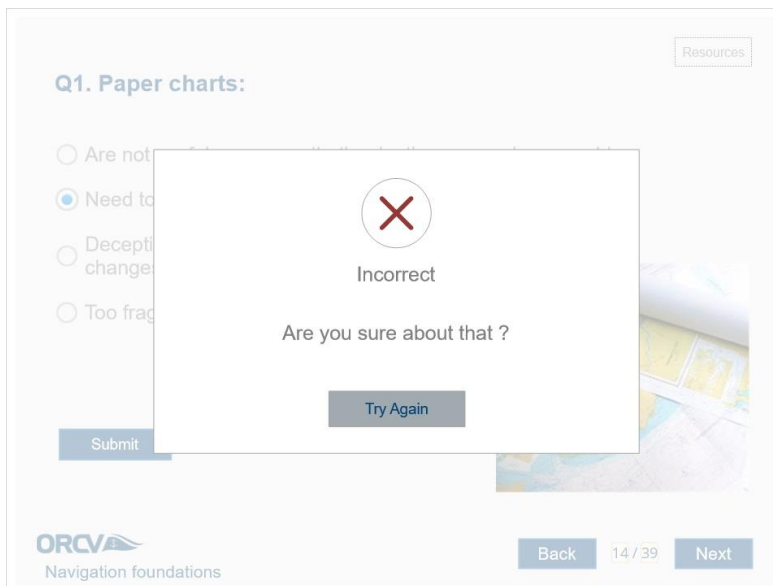


## Incorrect (Slide Layer)



The screenshot shows a quiz interface for 'Q1. Paper charts:'. A modal window is displayed in the center with a red 'X' icon, the text 'Incorrect', and the question 'Are you sure about that?'. Below the question is a 'Try again' button. In the background, a 'Submit' button is visible, along with a list of radio button options: 'Are not', 'Need to', 'Decepti change', and 'Too frag'. The ORCV logo and 'Navigation foundations' are at the bottom left, and 'Back 14 / 39 Next' are at the bottom right.

## Try Again (Slide Layer)



This screenshot is identical to the one above, showing the 'Incorrect' feedback modal. The 'Try Again' button is highlighted, indicating the user's next action. The background quiz question and navigation elements remain the same.


### **1.15 Q2. How confident can you be about chart data such as depth and location:**

*(Multiple Choice, 0 points, unlimited attempts permitted)*

[Resources](#)

**Q2. How confident can you be about chart data such as depth and location:**

- It depends how old the chart is
- It depends on where you are and where the Zone of Confidence is
- It depends on where you bought the chart from
- It depends on where you are and what the Zone of Confidence is



[Submit](#)

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Correct	Choice
	It depends how old the chart is
	It depends on where you are and where the Zone of Confidence is
	It depends on where you bought the chart from
X	It depends on where you are and what the Zone of Confidence is

**Feedback when correct:**

That's right! The Zone of Confidence indicates the level of uncertainty

**Feedback when incorrect:**

Are you sure about that ?

## Correct (Slide Layer)

Resources

**Q2. How confident can you be about chart data such as depth and location:**

- It depends on the chart's age
- It depends on the chart's scale
- It depends on the chart's source
- It depends on what the Zone of Confidence indicates

Submit

Correct

That's right! The Zone of Confidence indicates the level of uncertainty

Continue

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## Incorrect (Slide Layer)

Resources

**Q2. How confident can you be about chart data such as depth and location:**

- It depends on the chart's age
- It depends on the chart's scale
- It depends on the chart's source
- It depends on what the Zone of Confidence indicates

Submit

Incorrect

Are you sure about that ?

Try again

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## Try Again (Slide Layer)

Resources

**Q2. How confident can you be about chart data such as depth and location:**


It depends on the chart

It depends on the depth

It depends on the location

It depends on what the chart says

Submit



Incorrect

Are you sure about that ?

Try Again

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### **1.16 Part 2 – How do I get**

**to where I want to go ?**

Resources

**Part 2 – How do I get to where I want to go ?**



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## 1.17 Mayday

### What would you do ?

Resources

Let us look at a real scenario




You are traveling down the remote West Coast of Tasmania when you hear a distress message over the radio.

You are the only ones who can hear the message.

You are probably the only ones who can help.

What do you do ?

When you are ready,  
Click the icon to listen.



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## Position (Slide Layer)

### What would you do ?

Resources

Let us look at a real scenario


You are traveling down the remote West Coast of Tasmania when you hear a distress message over the radio.

You are the only ones who can hear the message.

You are probably the only ones who can help.



What do you do ?

When you are ready,  
Click the icon to listen.



Distress position  
42 17.6S  
145 48.2E

Your position  
42 14.2S  
145 44.7E



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## 1.18 Bearing and distance

### You need to get to them ASAP Resources

To get to the vessel in distress, you will need a bearing and distance to them:

1. Plot where they are
2. Plot where you are
3. Determine the bearing to steer (and immediately turn to that bearing)
4. Determine distance (and maximise your speed)
5. Communicate with them and your crew

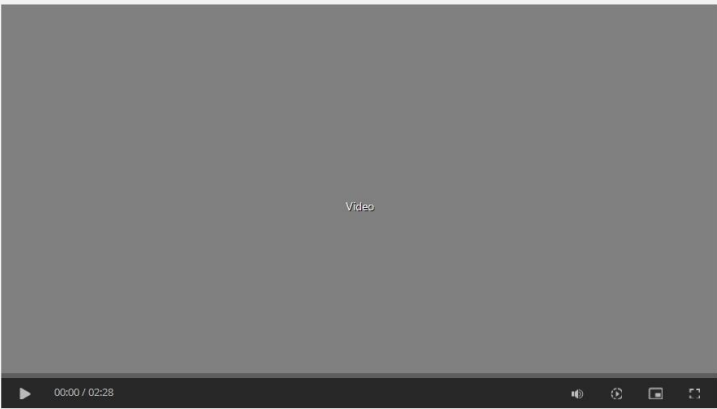
Click on the link below to see how we did steps 1-4. We used paper chart in this example, realistically we would likely use our Chartplotter.



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### Video (Slide Layer)



00:00 / 02:28

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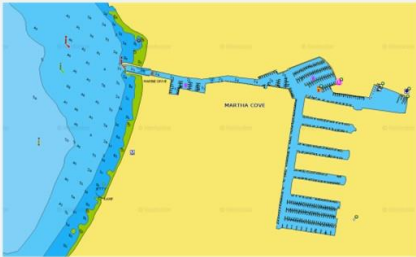
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## 1.19 Locating destination

### Locating your destination

Resources

Let's say we want to go from Sandringham Yacht Club to Martha Cove (near Safety Beach). We need to put in a destination marker. But where ?



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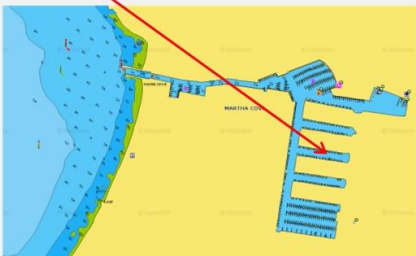
### L1 (Slide Layer)

### Locating your destination

Resources

Let's say we want to go from Sandringham Yacht Club to Martha Cove (near Safety Beach). We need to put in a destination marker. But where ?

We aren't going to put in the pen location. We aren't going to navigate the marina entrance using bearings and distances. We will use our eyes for that, backed up by a zoomed in plotter.



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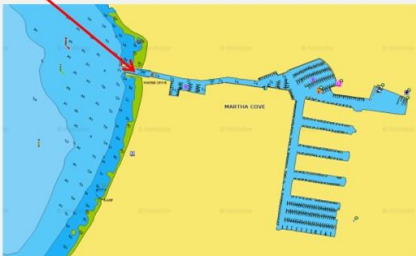
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## L2 (Slide Layer)

### Locating your destination Resources

Let's say we want to go from Sandringham Yacht Club to Martha Cove (near Safety Beach). We need to put in a destination marker. But where ?

We aren't going to put it in the entrance either as there is a shallow approach and marks to navigate.



The map shows a coastal area with a yellow background for land and blue for water. A red arrow points to the entrance of Martha Cove, which is a narrow channel leading to a larger body of water. The entrance is marked with several small blue and white symbols. The text 'MARTHA COVE' is visible on the map.

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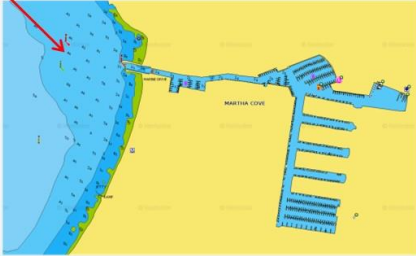
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## L3 (Slide Layer)

### Locating your destination Resources

Let's say we want to go from Sandringham Yacht Club to Martha Cove (near Safety Beach). We need to put in a destination marker. But where ?

We would most likely put it between these two channel marks on the approach.



The map is identical to the one in slide L2, showing the entrance to Martha Cove. A red arrow points to a specific location between two channel marks on the approach to the cove. The text 'MARTHA COVE' is visible on the map.

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## 1.20 Navionics demo

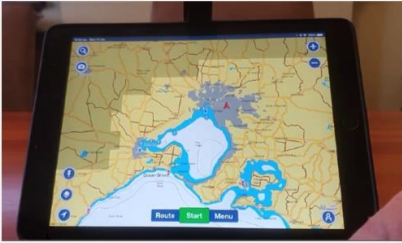

### Let's do that using Navionics

Resources

Watch the creation of the destination mark in Navionics and then a review of the simple route going from Sandringham Yacht Club to Martha Cove.

There is a problem with that route. Can you spot it?

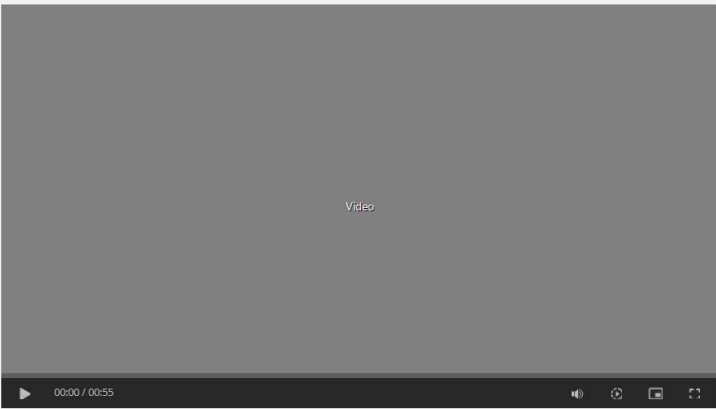
Click the icon to watch the demonstration video.



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## Video (Slide Layer)



Video

00:00 / 00:55

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## 1.21 Waypoints Navionics demo

### We need Waypoints

We usually can't go directly from one place to another.

Land, reefs and other hazards mean we often have to put a number of intermediate Waypoints into our route.

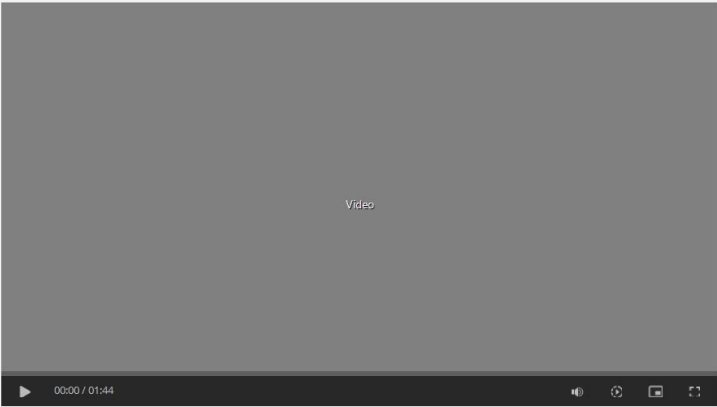
Click the icon to watch the demonstration video.



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### Video (Slide Layer)



Video

00:00 / 01:44

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## 1.22 Sailing by numbers

### Sailing by numbers

Resources


On longer trips we tend to sail by numbers, key data that relates to our route. The plotter is just used to visually check for hazards.


- BTW
- COG
- DTW
- SOG
- XTE

**Click on the links to learn more**

For short trips we tend to navigate visually (looking at channel markers and at the plotter).

For longer trips we tend to sail by numbers.





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### Tab A (Slide Layer)

### Sailing by numbers

Resources

On longer trips we tend to sail by numbers, key data that relates to our route. The plotter is just used to visually check for hazards.

- BTW
- COG
- DTW
- SOG
- XTE

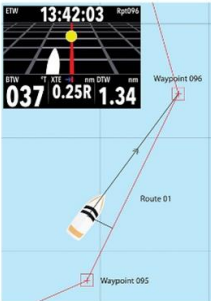
**Bearing to Waypoint (BTW)**


Expressed as either True or Magnetic.

The bearing from your position to the Waypoint.

This is not necessarily the course you would need to steer (e.g. there may be current and/or leeway).

You compare BTW with COG.





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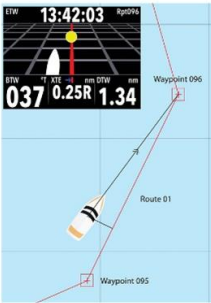
## Tab B (Slide Layer)

### Sailing by numbers

Resources

On longer trips we tend to sail by numbers, key data that relates to our route. The plotter is just used to visually check for hazards.

BTW	<b>Course Over Ground (COG)</b> Expressed as either True or Magnetic.
COG	The actual direction of progress of a vessel relative to the Earth surface (measured by a GPS).
DTW	This is not necessarily the same as the Heading (e.g. there may be current and/or leeway).
SOG	You compare COG with BTW.
XTE	You also compare COG with Heading to get a sense of current and leeway.



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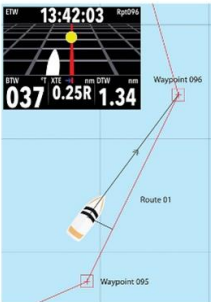
## Tab C (Slide Layer)

### Sailing by numbers

Resources

On longer trips we tend to sail by numbers, key data that relates to our route. The plotter is just used to visually check for hazards.

BTW	<b>Distance to Waypoint (DTW)</b> Typically expressed in Nautical Miles.
COG	The distance from your position to the Waypoint.
DTW	There may also be Distance to Destination (the end of the Route).
SOG	
XTE	



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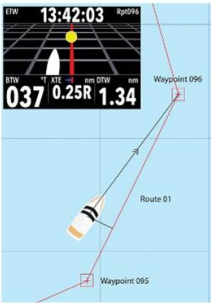
## Tab D (Slide Layer)

### Sailing by numbers

Resources

On longer trips we tend to sail by numbers, key data that relates to our route. The plotter is just used to visually check for hazards.

BTW	<b>Speed Over Ground (SOG)</b> Typically expressed in Knots.
COG	The actual speed of progress of a vessel relative to the Earth surface (measured by a GPS).
DTW	This is not necessarily the same as Boat speed (e.g. there may be current and/or leeway).
SOG	You compare SOG with Boat Speed to get a sense of current.
XTE	



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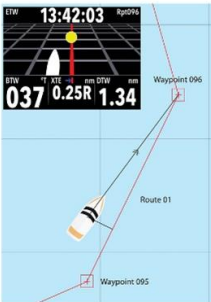
## Tab E (Slide Layer)

### Sailing by numbers

Resources

On longer trips we tend to sail by numbers, key data that relates to our route. The plotter is just used to visually check for hazards.

BTW	<b>Cross Track Error (XTE)</b> Typically expressed in Nautical Miles.
COG	A measure to Port or Starboard between your actual track and the intended track.
DTW	Used to see how far off the intended course you are.
SOG	
XTE	



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### 1.23 Q3. Waypoints are:


(Multiple Choice, 0 points, unlimited attempts permitted)

Resources

**Q3. Waypoints are:**

- Necessary to avoid land and other hazards
- Are only necessary for advanced navigation
- Must align with WGS84 chart datum
- Only useful for keeping the crew motivated

[Submit](#)



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Correct	Choice
X	Necessary to avoid land and other hazards
	Are only necessary for advanced navigation
	Must align with WGS84 chart datum
	Only useful for keeping the crew motivated

**Feedback when correct:**

That's right! Waypoints are critical to navigation

**Feedback when incorrect:**

Are you sure about that ?

## Correct (Slide Layer)

Resources

Q3. Waypoints are:

- Necessary
- Are only
- Must all
- Only us  
motivati

Correct

That's right! Waypoints are critical to navigation

Continue

Submit

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## Incorrect (Slide Layer)

Resources

Q3. Waypoints are:

- Necessary
- Are only
- Must all
- Only us  
motivati

Incorrect

Are you sure about that ?

Try again

Submit

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## Try Again (Slide Layer)

Resources

**Q3. Waypoints are:**

- Necessary
- Are only
- Must all
- Only use
- Motivati

Incorrect

Are you sure about that ?

Try Again

Submit

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## 1.24 Q4. The best way to see the effect of current you can compare which numbers:

(Multiple Choice, 0 points, unlimited attempts permitted)

Resources

**Q4. The best way to see the effect of current you can compare which numbers:**

- COG with Heading and XTE
- XTE with 10% of DTW
- COG with Heading, SOG with Boat speed
- COG with BTW, SOG with DTW

Submit

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Correct	Choice
	COG with Heading and XTE
	XTE with 10% of DTW
X	COG with Heading, SOG with Boat speed
	COG with BTW, SOG with DTW

**Feedback when correct:**

That's right! Current may affect your speed and/or direction

**Feedback when incorrect:**

Are you sure about that ?

**Correct (Slide Layer)**

The screenshot shows a quiz question titled "Q4. The best way to see the effect of current you can compare which numbers:". The question has four radio button options: "COG with...", "XTE with...", "COG with..." (selected), and "COG with...". A feedback overlay is displayed in the center, featuring a green checkmark icon, the word "Correct", and the text "That's right! Current may affect your speed and/or direction". Below the text is a "Continue" button. The background shows a map of Australia with labels for "Horn's Reef", "East Australian Current (EAC)", and "Ocean Eddies". At the bottom left is the "ORCA Navigation foundations" logo, and at the bottom right are "Back", "24 / 39", and "Next" buttons.

## Incorrect (Slide Layer)

Resources

**Q4. The best way to see the effect of current you can compare which numbers:**

COG w

XTE w

COG w


COG w

Submit

Incorrect

Are you sure about that ?

Try again



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## Try Again (Slide Layer)

Resources

**Q4. The best way to see the effect of current you can compare which numbers:**

COG w

XTE w

COG w


COG w

Submit

Incorrect

Are you sure about that ?

Try Again



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## 1.25 Part 3 – How do I avoid hazards ?

[Resources](#)

### Part 3 – How do I avoid hazards ?



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## 1.26 Incidents

[Resources](#)

### Incidents can happen to anyone

November 2014, during Volvo around the World yacht race, the yacht Vestas Wind ran aground on the Cargados Carajos Shoals 240nm north east of Mauritius.



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## L1 (Slide Layer)

### Incidents can happen to anyone Resources

After the 2019 Melbourne to King Island yacht race the yacht Arcadia hit Sea Elephant Reef, approximately 15Nm north of the Grassy Harbour. It caused an injury to a crew member and extensive damage to the yacht.



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## L2 (Slide Layer)

### Incidents can happen to anyone Resources

After the 2014 Melbourne to Hobart yacht race the yacht Seduction hit Gull Island off Flinders Island. All crew managed to reach shore without injury although the yacht sunk.




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### L3 (Slide Layer)

**Incidents can happen to anyone** Resources

During the 2010 Flinders Islet yacht race the yacht Shockwave hit Flinders Islet off Wollongong NSW as they were rounding it. 16 crew were rescued, the skipper and navigator died and the yacht was lost.



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### L4 (Slide Layer)

**Incidents can happen to anyone** Resources

November 2014, during Volvo around the World yacht race, the yacht Vestas Wind ran aground on the Cargados Carajos Shoals 240nm north east of Mauritius.



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## 1.27 Is the risk worth it ?


[Resources](#)

### Is the risk worth it ?

In October 2023 the Pilot Vessel Corsair ran aground off Point Lonsdale as it entered the Heads of Port Philip Bay, doing 24k. Tide was 5.6k ebb, nearing low tide. SSW wind 22k gusting 26k. Wave height was 2.4m.

Was the risk (of avoiding the worst of the waves by going in close) worth it ?



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## 1.28 Navigation and Weather

[Resources](#)

### Navigation and Weather

A major input into Navigation planning is weather. By weather we mean:

- Wind forecast (short, medium and long term based on different models)
- Wave forecast
- Swell forecast
- Current and tide forecast
- Localised effects from land
- The resulting sea state

Instead of duplicating this content, participants who have not done a recent Weather or SSSC course will be offered a free login to the online weather module. It is an optional module but we will be relying on that knowledge for future navigation course content.



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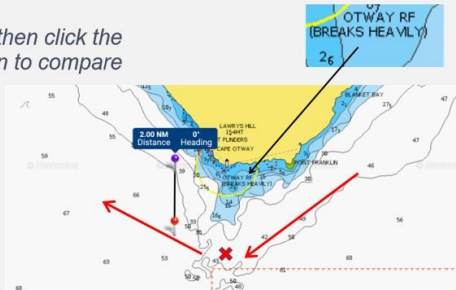
## 1.29 How far off ?

[Resources](#)

### Exercise – How far off ?

You are helping to take a friends boat from Melbourne to Port Fairy and have been asked to do the Navigation plan. You need to put a Waypoint off Cape Otway. How far off shore do you put it ?

Write your thoughts down then click the “Check my answers” button to compare your thoughts with ours.



[Check my answers](#)

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## Answers (Slide Layer)

[Resources](#)

### Exercise – How far off ?

[Hide answers](#)

Risk assessment(s):

- Wind forecast and observations (especially whether it will be a lee shore)
- Current and wave forecast and observations (to assess sea state)
- Visibility forecast and observations (day/night, moon, fog)
- Risk appetite of owner/skipper and crew

Navigation plan:

- Set the Waypoint for the worst case scenario
- Do a final risk assessment as you get closer
- Then if conditions and risk assessment warrants, you can cut the corner (safely)

Worst case scenario no closer than 5Nm  
Best case scenario 3Nm

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## 1.30 Plan for “what if” too

[Resources](#)

### Plan for “what if” too

What if:

- There was unexpected weather
- There was damage to the vessel
- There was an injury or medical incident
- There was a change of circumstances and you needed or wanted to go somewhere else

Your navigation plan doesn't only cover “Plan A”

It must also cover Plan B (and Plan C)

Which means additional navigation plans are needed to safely get to one or more ports of refuge.



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## 1.31 Know your Chartplotter

[Resources](#)

### Know your Chartplotter




Chartplotters are complex and vary enormously, you need to be able to use:

- Customisation of screen (to add those numbers)
- MOB function
- AIS data and alerts
- Quickly able to enter and steer to a manual waypoint (in case of distress)
- Routing incl advancing and skipping Waypoints

Be wary of false precision – that is where data is beautifully presented and looks like it must be right because the computer says. Remember those Zones of Confidence, old surveys and GPS glitches from time to time ?

Be careful using auto routing

Be careful of the autohelm automatically controlled by the route



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**1.32 Q5. You are sailing from Melbourne to Hobart. The weather forecast has changed and looks like it might get nasty in the next day or two. As skipper you should:**

*(Multiple Choice, 0 points, unlimited attempts permitted)*

**Q5. You are sailing from Melbourne to Hobart. The weather forecast has changed and looks like it might get nasty in the next day or two. As skipper you should:**

[Resources](#)

- Stick with "Plan A" but keep an eye on the weather
- Consider changing to "Plan B" and head for the nearest safe port
- Turn around and head back to Melbourne
- Ask the crew what they want to do



[Submit](#)

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Correct	Choice
	Stick with "Plan A" but keep an eye on the weather
X	Consider changing to "Plan B" and head for the nearest safe port
	Turn around and head back to Melbourne
	Ask the crew what they want to do

**Feedback when correct:**

That's right! Be conservative and plan for the worst

**Feedback when incorrect:**

Are you sure about that ?

## Correct (Slide Layer)

Q5. You are sailing from Melbourne to Hobart. The weather forecast has changed and looks like it might get nasty in the next day or two. As skipper you should:

Stick with the original plan

Consider the weather and plan for the worst

Turn around and return to Melbourne

Ask the crew what they think

Submit

Resources

Correct

That's right! Be conservative and plan for the worst

Continue

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## Incorrect (Slide Layer)

Q5. You are sailing from Melbourne to Hobart. The weather forecast has changed and looks like it might get nasty in the next day or two. As skipper you should:

Stick with the original plan

Consider the weather and plan for the worst

Turn around and return to Melbourne

Ask the crew what they think

Submit

Resources

Incorrect

Are you sure about that ?

Try again

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## Try Again (Slide Layer)

**Q5. You are sailing from Melbourne to Hobart. The weather forecast has changed and looks like it might get nasty in the next day or two. As skipper you should:**

Stick with the plan

Consider the weather forecast

Turn around

Ask the crew

Resources

Incorrect

Are you sure about that ?

Try Again

Submit

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**1.33 Q6. You are planning to sail around Wilsons Prom and are wondering how far out you should put your Waypoint. What factors should you consider:**

*(Multiple Choice, 0 points, unlimited attempts permitted)*

**Q6. You are planning to sail around Wilsons Prom and are wondering how far out you should put your Waypoint. What factors should you consider:**

The wind, current and wave forecasts

Shipping and the traffic separation zone

Visibility at the time

All of the above

Resources

Submit

Correct	Choice
	The wind, current and wave forecasts
	Shipping and the traffic separation zone
	Visibility at the time
X	All of the above

**Feedback when correct:**

That's right! There is a lot to consider

**Feedback when incorrect:**

Are you sure about that ?

**Correct (Slide Layer)**

The screenshot shows a question interface with a feedback overlay. The question is: "Q6. You are planning to sail around Wilsons Prom and are wondering how far out you should put your Waypoint. What factors should you consider:". The options are:
 

- The wind
- Shipping
- Visibility
- All of the above

 The feedback overlay is a white box with a green checkmark icon, the text "Correct", and the message "That's right! There is a lot to consider". A "Continue" button is at the bottom of the overlay. In the background, a map of Wilsons Prom is visible with a pink shaded area and a "Submit" button on the left. The ORCA Navigation foundations logo is at the bottom left, and "Back 33 / 39 Next" buttons are at the bottom right.

## Incorrect (Slide Layer)

**Q6. You are planning to sail around Wilsons Prom and are wondering how far out you should put your Waypoint. What factors should you consider:** Resources


- The wind
- Shipping
- Visibility
- All of the above

**Incorrect**

Are you sure about that ?

[Try again](#)

[Submit](#)



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## Try Again (Slide Layer)

**Q6. You are planning to sail around Wilsons Prom and are wondering how far out you should put your Waypoint. What factors should you consider:** Resources


- The wind
- Shipping
- Visibility
- All of the above

**Incorrect**

Are you sure about that ?

[Try Again](#)

[Submit](#)




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## 1.34 Part 4 – The wrap

[Resources](#)

### Part 4 – The wrap





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## 1.35 Finalising the plan

[Resources](#)

### Finalising the plan

Melbourne to Sydney - Route						
No	Description	Latitude	Longitude	Bearing	Distance	
				(M)	(NM)	
1	SYC	37.56.391	144.59.572	n/a	n/a	
2	W OH PIL	38.11.600	144.45.400	204	18.9	
3	Sth Chan	38.15.721	144.42.459	197	4.7	
4	CORSAIR	38.18.000	144.38.300	224	4.0	
5	FLIN-SCH	38.30.300	144.53.200	125	17.0	
6	Liptrap	38.54.940	145.54.454	106	53.8	
7	Glennia	39.03.379	146.13.706	107	17.2	
8	Prom	39.08.763	146.21.767	118	8.3	
9	Prom2	39.08.155	146.25.886	66	3.2	
10	Prom3	39.03.730	146.29.559	20	5.3	
11	Refuge	39.02.185	146.28.452	319	1.8	
12	Seal	39.57.547	146.42.790	55	12.0	134.2
13	Hicks	37.50.269	149.47.546	53	160.0	5.5 24.40
14	Howe	37.31.289	150.01.072	16	21.8	7.5 17.89
15	Green Cp	37.16.532	150.08.119	7	16.8	
16	Eden	37.04.699	149.58.254	313	14.2	
17	Eden 2	37.04.755	149.54.224	295	3.2	
18	Eden	37.04.699	149.58.254	75	3.2	230.2
19	Montague	36.15.514	150.18.190	3	51.2	5.5 41.85
20	Restrict2	35.08.660	151.08.107	19	79.0	6.5 35.42
21	Restrict3	34.58.915	151.08.358	348	9.8	7.5 30.69
22	Bondi	33.53.448	151.17.765	354	65.9	
23	Syd Head	33.49.763	151.17.334	342	3.7	
24	Syd On1	33.49.735	151.16.413	259	0.8	
25	CYC1	33.51.703	151.14.364	208	2.6	
26	CYC2	33.52.080	151.14.012	205	0.5	
27	CYC3	33.52.388	151.13.896	185	0.3	213.8
						5.5 38.87
						6.5 32.89
						7.5 28.51
						3.21
						total days
						4.38
						3.71
						3.21
						578.2

I printed and laminated it and stuck it on the companionway bulkhead

I entered it into the main Chartplotter

I entered it into the backup GPS

I briefed the crew before we left



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## 1.36 Homework exercise


### Homework exercise

This exercise is to be done prior to the first Navigation online session. Bring the results to class for discussion.

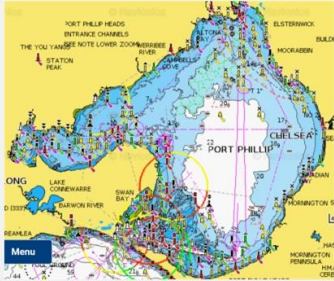
It should only take you about 10 minutes.

Click the link below to download the homework work sheet

(You may need to check your downloads folder)



There are also links to two good videos for how to use Navionics in the Resource Page.



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## Worksheet (Slide Layer)


### Homework exercise

This exercise is to be done prior to the first Navigation online session. Bring the results to class for discussion.

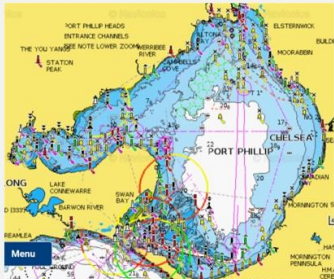
It should only take you about 10 minutes.

Click the link below to download the homework work sheet

(You may need to check your downloads folder)



There are also links to two good videos for how to use Navionics in the Resource Page.



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## 1.37 What did we learn ?

### What did we learn ?

The key objective is to stay safe.

Other objectives may include getting somewhere as fast as possible.

- Know where you are
- Know where you are going
- Avoid hazards
- Be conservative and enjoy



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## 1.38 What next

### What next ?

If you haven't already done it, try to complete the weather module.

Otherwise see you at the first instructor led session.

Remember to bring your questions and homework.



```
graph LR; A[Online Self paced Navigation module] --> B[Instructor led Navigation course]; C[Online Self paced Weather module] --> B; B --> D[Experiential "learn by doing"]
```

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## 1.39 Success

### Success

Thank you for completing this online learning module

We look forward to seeing you at the Instructor led sessions



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Finished

### Notes:

## 2. General

### 2.1 Resources

Resources

- [Link to free Navionics Chartviewer](#)
- [Link to free C-Map Chartviewer](#)
- [Link to Google Earth](#)
- [Australian Notices to Mariners](#)
- [Video - Basic use of Navionics](#)
- [Video - How to create known Waypoints using Navionics](#)
- [Video - How to create a Route from Waypoints using Navionics](#)
- [Homework exercise worksheet](#)

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