

Cruising with Expedition

Using Expedition Race Software for Cruising



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Version 0.8

January 2019

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Introduction

This is short ebook about the use of Expedition race navigation software for cruising. There are a couple of excellent books on Expedition that Will Oxley has written: Modern Race Navigation and Expedition Navigation Software but nothing for users who also want to use the software when cruising.

You may ask why take your race system cruising – well here are few reasons; first of all it a piece of software that I’m familiar with which means that I don’t have to spend time learning the ins and out of the chart plotter and other non-essential navigation equipment on the boat. Secondly it provides help with charting and routing for the journey and this can all be done in advance. Thirdly I have a large number of tidal and weather sources so I can get periodic and reliable weather information globally and finally as you can log the route details so I can provide a summary of the trip for all the crew.

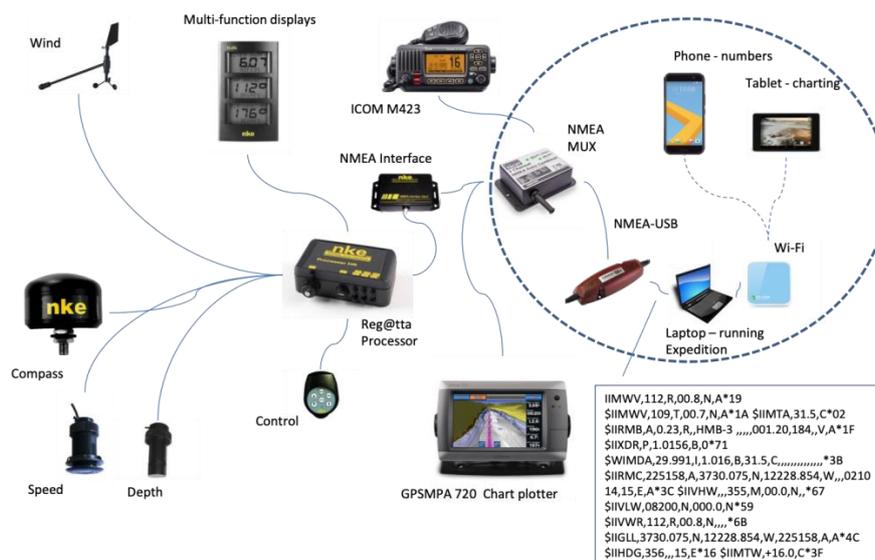
It is also staggering the poor calibration that you find on cruising boats. Typically the boat speed is out and therefore you can’t rely on the log to give you an accurate picture of the distance travelled.

This is not a navigation tutorial and assumes that you have a costal/yacht master or similar qualification and understands the basics of navigation, route planning and pilotage.

I would also point people at Skip Novak’s note [on the use of life jackets](#) which is well worth reading.

Note: no software should be relied on without backup and by this I mean that paper charts, basic navigation instruments such as compass and watch, navigation equipment and pilotage books should also be taken.

The following is a more typical Expedition installation and what I do is use basically the equipment on the right with just GPS and AIS information feeds.



Overview

There are three configurations that I use, based on the needs and the water. The premise is that, unlike when you are doing a race Expedition is not integrated to the boat instruments and electronics. The reason for this is that each boat is different and although the USB adapter may be standard there is the issue of the type of instrument feed: NEMA 0183, 2000 or Ethernet and the potential need to mux the data feed to ensure that GPS and AIS data is available to Expedition.

The basic configuration is what I take every time but if we are going to be sailing in unfamiliar waters I would add the chart plotter so I can check the surrounding waters. Finally if I'm going to be sailing in congested waters, such as the English Channel I would add AIS as it allows alarms to be set if a boat is with a certain distance and allows other vessels to be monitored.

Basic – this is just Expedition laptop with a GPS puck added, that allows position, direction and speed to be determined and logged.

Extended – the basic setup with wifi added supporting a deck repeater that forms a chart plotter

Advanced – this adds AIS which can be used to check for surrounding vehicles and check for possible collisions

Note as the intention is cruising I don't bother about an AIS transponder but this is an option and if it is installed it is advisable to make use of it as it offers better visibility of your location to surrounding vessels. It also will have a proper antenna and therefore coverage will be better (see AIS below).

Equipment

This is the basic equipment that I use and some of the options that I've explored. The photo shows the laptop, the power adapter, GPS puck and WiFi that I use.



The Computer

For the computer I run a Lenovo X220 which has 8GB of memory and a large SSD drive (over 256GB in size). It has a large 9 cell battery attached so it will run for hours without power. You do not need

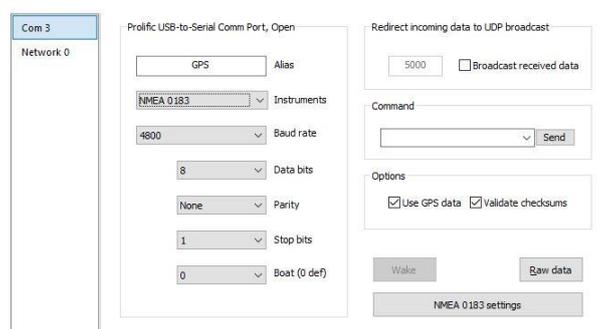
the latest or greatest machine to run Expedition just one that has reasonable processor and plenty of USB ports. I would recommend at least 3 – one for a remote mouse if you use one, one for the GPS puck and one for the WiFi unit.

Most chart tables are in a dry place in the boat and if you are concerned about the machine getting wet you can close the top and put it out of the way while you are sailing. I spent one very wet day on a quartering run from Weymouth to Lymington on the south coast of England in heavy weather where everyone got soaked but the computer was fine. Campbell Field recommends the LenvovoT420 as these are cheap, have adequate processor power and memory, plenty of USB ports and a nice large display.

I do change the power settings so that closing the lid only turns the display off and does not put the laptop into standby. This reduces the power draw while sailing and also help keeps the keyboard and machine dry if it I splashed with water. Right click on the battery icon and then select power options – the options that are available will be displayed.

GPS Puck

This is one that I brought of Amazon which has a G-STAR IV chipset. You want one that connects via USB to the machine so it can simply be plugged in and one that doesn't have a magnet attachment. To configure expedition you need to go to Setting/Instruments or press CNTRL-I to load the instruments panels and ensure it is set to NMEA 0183, 4800 and 8N1. If you change any of these remember to click Apply!



If you click Raw data you should see a data stream along the following lines. If not then check the speed and try again.



WiFi

For the wifi unit I use small TP-LINK travel routers that run off the USB port of main computer which avoids the need for another power supply. The unit is plugged into the computer but it is configured as wifi access point for both the computer and the deck repeater. The current version that I am using is a TL-WR802N which offers both 2.4GHz and 5GHz support, there is no need for anything that offers more throughput as we are basically dealing with a small data volume and some of the older device I have still only support 2.4 GHz (in particular the Motorola G4 that I use for navigation).

The wifi unit is setup to operate on an IP address of 192.168.1.254 and to assign IP addresses via DHCP to the devices in the range 192.168.1.1 to 192.168.1.50. This is largely the default configuration so you only need to name the device and I typically give it the name of 'expedition' so it is clear what it being used for.

Note: if you are going to be using Expedition to provide a data feed then remember that you need to go into Settings/Instruments/Number and ensure that the number of networks is set to '1'. You can then open the instruments panel via Settings/Instruments and select network to configure it.

The question of internet access for weather data is addressed separately below.

Deck Repeater

For the deck repeater/chart plotter I use either my phone or an 8" tablet in a plastic sleeve. This keeps the cost down but they are both functional. Having played with a couple of options for remote access I use Windows Remote Desktop as this is free and reliable.

The only challenge with this is it only allows a single device to access the computer at one point in time. This means if you go to use the computer it will disconnect the remote device, but given the cost it is a restriction that I'm happy to accept.

Note: what I do for Expedition when using in this mode I have a set of number boxes on the right of the display that provide COG, SOG, MkBearing and ETA, that is all the information that I can extract via GPS without the need for any data feeds from the boat (See Display Boxes in the appendices)

Remote Desktop Setup

To configure remote desktop on the laptop:

- Open Control Panel.
- Click on System.
- Click on Remote Desktop (toward the bottom of the menu)
- Click on Enable Remote Desktop.

You should check the user access options on the page. You then need to install the Microsoft Remote Desktop App to your tablet (I install both the standard app and the beta which I find more stable) and load the app.

You then need to add your user to the app and provide your password. When this is added you can connect to the laptop and try the connection out. To exit stroke up from the bottom of the screen which will display the back arrow and you can click twice to end the connection. When you load the

app in future you will be presented with the connection for your machine and you can just click on it to connect.

Note: Windows Pro only allows one user so your desktop will be closed when Remote Desktop app is being used.

AIS

This is the newest piece of equipment that I've invested in. Again it is a simple unit but one that receive both channels. AIS signals are carried on frequencies 4.6 MHz higher than normal VHF ship-to-ship channels with Class A transmitting every 2 or 6 seconds and Class B every 30 seconds. The frequencies used are 161.975 MHz, AIS1, or channel 87B and 162.025 MHz, AIS2, or channel 88B.

The USB dongles that are available are typically frequency hopping to provide the channel coverage, operate at 38,400 baud and uses NMEA-0183 which Expedition supports. Quark-Elec has some interesting options that offer AIS, dual channel AIS and AIS along with GPS via USB

Single channel hopping usb dongle – [QK-A021](#)

Dual channel AIS unit – [QK-A022](#)

Dual channel AIS & GPS unit – [QK-A026](#)

Of these I am exploring the later as this replaces the GPS unit and it is still powered via USB so it only requires one USB port and no separate power.

Aerial wise the options are splitter or separate aerial. The issue with splitters is they both require access to the VHF aerial feed and most of them are active, to avoid signal loss and therefore require 12volt power. This leads you to the use of a separate aerial and this is fine for recreational use where you only want to monitor boats in the surrounding area.

The last remaining point is the length of the antenna as you want something that is portable and will fit in a sailing bag. In the past when I have experimented with long range Wifi the length of the aerial has been an issue as it only just fits in the large 90l sailing bag. This led me towards a small unit like the Glomex RA111 AIS which only 140mm long and rubberised so very durable. This is only 1db versus a typical 3db antenna but again proves adequate. The other option is Digital Yachts QMax which is a ¼ wave antenna and is therefore 250mm long and again offers unit gain. The issue with this unit is the cable in integrated in to the base and at 4m long is a bit on the long side for my needs.

The setup of the A026 is quite straight forward: just plug the device in and let Windows configure the device driver. You can then startup Expedition and open the instruments panel and see what COM port has used (on my machine it came up on COM5). You then need ensure the feed is set as NMEA 0183, 38,400 and then apply this if necessary. You can check



the raw feed to see the data and then you'll need to wait minute for Expedition to start showing the GPS fix. The device has three LEDs on the end and the middle one while flash on the receipt of AIS data – it is important that you check this and ensure that the unit it seeing vessels.

If you want to explore this at home there is an AIS web feed from San Francisco that you can use. In instruments configure the network for NMEA 0183, TCP Client, with a target address of 192.174.2.16 on port 80.

Note: It is worth noting that the ISAF offshore special regulations require AIS antenna to be at the mast head or at least 3m over the water for category 1, 2 and 3 races. See for some context - [AIS Overview and Installation Considerations](#).

For splitters the Vesper seems well regarded – [SP160](#)

Power

This really important and what I do is use a DC adapter to power the laptop while sailing connected via a cigarette lighter socket. Most boats still have one around the chart table so I am always assured of finding a power source. I also carry the mains adapter for the laptop and use this when we have mains power available (we are talking about cruising).

This typically avoids the need to run the engine during the day to charge the batteries but I always check the battery state in the morning and keep an eye on it during the day. On most race boats we typically have two batteries running in parallel for instruments because the draw has increased a lot with the number of electronic devices that we now use.

Connectivity

Most connections are via USB and the configuration is addressed under the individuals sections above but one thing I ensure is the device itself is not plugged into directly the USB port and therefore is some that could be knocked. I prefer devices that have a lead so nothing other than the plug is attached to the computer and if not then I use a short USB lead (0.5m) so the device can be located separately. In the case that you run out of USB ports or only have one then a USB adapter can be used that offers more ports.

Charts and Weather Sources

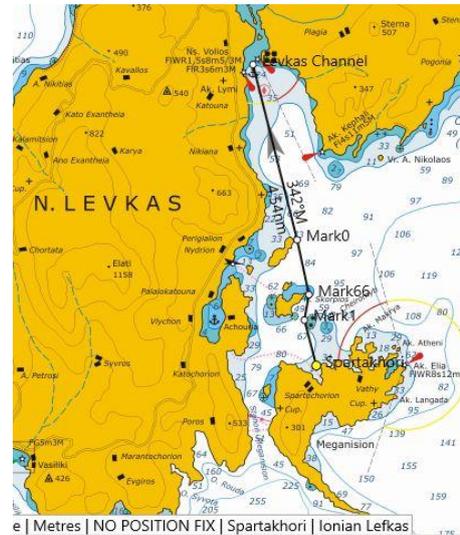
This could fill a whole book in it on right so this is only the basics. This first area to be address is charts and then we move on to weather sources

Charts

This is the trickiest issue as charts can be expensive and then there is the question of which type – raster or electronic. The simple answer is both and also make sure you include paper ones. The way I approach this is to look at the pilotage/cruising books for the area that you will be sailing in and purchase a copy of the charts that they recommend. Expedition does include a basic global C-MAP chart but this is insufficient for navigation. I then look at sources for raster and electronic versions of the paper charts that you have for the area. If you are sailing in American waters then the government provided charts are the way to go but for the rest of us we typically have to purchase them.

Personally I use C-MAP 4D but these can be expensive and the install/upgrade process always has issues (and it is also time consuming). The advantage of having C-MAP charts is the 'safe route' and 'easy route' options are available (see planning below). Their 3D is also great to get a bird eye view of a harbour or landfall if you not been there before or for a while (by default this is set at a 30 degree elevation but this can be changed).

If you are in the UK <http://www.visitmyharbour.com/> have a great package of raster images of HMHO charts that are updated on an annual basis. Since the cost is quite reason this is not an upgrade option and you need to buy a new set of charts each year. This is available as a download so it does not need a USB dongle attached to the laptop (see appendices for installation and configuration for Expedition). This is again large and you need to install this where you have a high bandwidth internet connection (I have a FTTC based home service).



If you are sailing in other water then have a look at the links on the Expedition Marine site as this is a crated list of charts that will work with Expedition – see <http://www.expeditionmarine.com/charts.htm>. For Greek waters I brought some BSB charts from <http://www.1yachtua.com/nauticalcharts/index.asp>. Their summary is misleading as it focused on the east coast of Greece so you need to select the charts based on the ports of interest.

Note: always remember to check the relevant authority for instructions to mariners for chart changes and season changes. I recall one class 0 race in Cowes Week where the race committee set the boats out around a mark in the out of the eastern Solent only for the boats to find the mark had been lifted for maintenance.

Weather Sources

I make use of PredictWind and have a professional subscription so I have global coverage and down to 0.1/0.2 resolution. PredictWind added ECMRF support in 2016 which was a bit of a game changer as before that access to their weather models was extremely expensive and was the order of £2,000 per annum. Expedition Marine are starting to provide WRF based (look at mygrib on the weather tab) weather data that include 10m wind, rain and wave state so see if this can be used.

What you need to ensure is that wave state data is included as this is helpful in determining if you are going to sea or staying in port. You are after all on a cruise and comfort is also a consideration. The only reliable way I've found of get the significant wave height, which is the average height in coastal waters is using Saildocs. You need to ensure that you select wave which is not enabled by default.

I also make use of TideTech but if you are sailing somewhere like the Southern Ionian where there are basically no tides this is not relevant as there is basically no current and therefore no drift or set to be considered.

Planning and Routing

I start by reading the pilotage books for the area and looking at points of interest. This also involves looking at the prevailing weather patterns and outlining the overall routing. This leads to a set of destinations and the order which provides the initial routing.

This is supposed to be a cruise (or so I tell my kids) so I typically try and limit the individual days to around 30nm so that there is only 5-6 hours of sailing assuming you will make on average 6 knots. This leaves plenty of time for stops along the way while still ensuring that you get there in good time to tie up and have a beer before the evening meal.

When routing I start with the first port and then add the destination. You simply right click on the start location that you have chosen and chose 'Set active mark and route'. You can then 'Add new end mark' for the destination and then 'Insert mark' for the intermediate points to form the route. Adding the intermediate points is an iterative process to form the basic route.

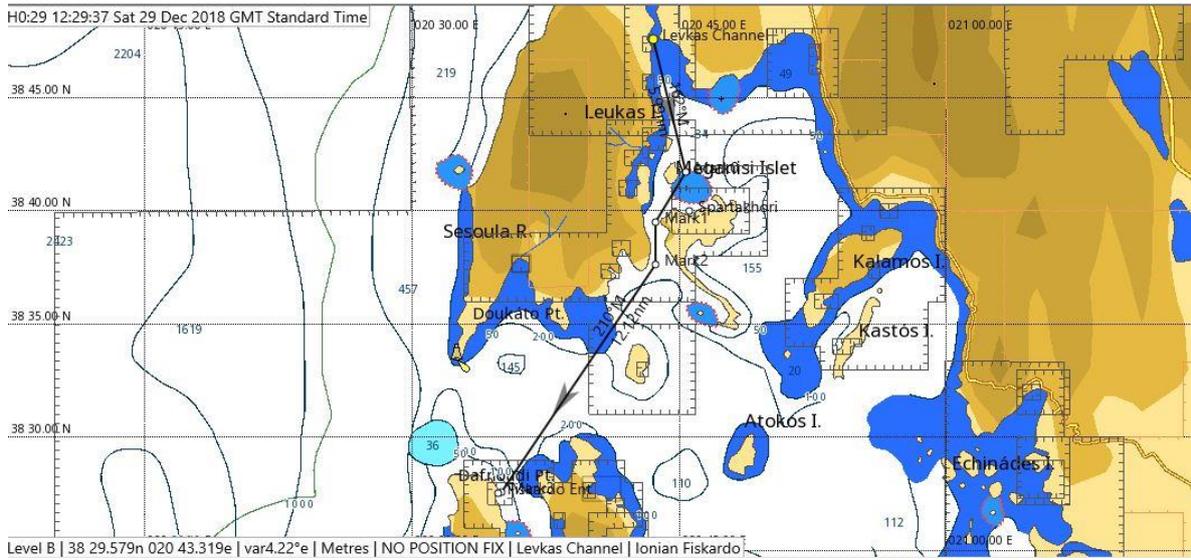
I will then review the route in detail to ensure that the depths are okay and clearances for any obstruction and rocks are appropriate. Again since this is cruising I make sure the clearances are generous. When racing the clearance is usually determined by the depth contours but cruising I'll add another 0.5nm (at 6 knots this is around 5mins of clear water) and increase this if there is going to be a lee shore. If there are notable obstructions then I use the notes feature of Expedition (add a bit on using notes?) to add an exclusion and shade it so it is clear – this ensure it is flagged when you come back to reviewing the course if you are doing the routing a couple of months in advance.

Note: it should be noted that most charter companies now require you to advise them if you have touched the bottom or hit something so ensure clear and navigable water is important

I then label the more common points so these start to establish as set of waypoints for the trip and I set these points as 'always draw' so they are visible on the chart at all times. You mouse over the mark until the cursor changes to the up-arrow, right click and select 'Edit mark xxx', change the name and 'lock' the mark so you don't accidentally move it later. If it is an intermediate mark also flag which side you should pass for routing purposes – the rule of thumb is all intermediate marks should be passed to one side or the other. Expedition will colour the mark, green if you've flagged it should be left to starboard and red if it should be left to port.

I then label the route based on destination – this is still a bit tricky in Expedition. You do this by going to Marks/Edit marks and then double clicking on the default route name (Support for right clicking on the name to get a context sensitive menu would be a great edition to the product).

The following is the routing for Levkas channel in the Ionian to Fiskardo in the south west and the related marks



The prevailing wind in the Ionian at the time of year that we were sailing was north-west and on this leg we were sheltered in the lee of Levkas until we entered open water on the reach across to Fiskardo (what has become the Chelsea on the Ionian in the last decade) on the north east corner of Kefallinia.

In Marks/Edit marks you can click on Details for the route to display the location of the marks and the bearing/distance along with the total length of the route

Move down

Set active

Clear active

Details

Ionian Fiskardo

- ✖ Loop
- ➕ Levkas Channel
- ➕ Mark0
- ➕ Mark1
- ➕ Mark2
- ➕ Mark3
- ➕ Fiskardo Ent

Ionian Fiskardo

Mark	Latitude	Longitude	Bearing	Range nm	Comment
Levkas Channel	38 47.537n	020 43.602e			
Mark0	38 41.709n	020 45.380e	162	5.99	
Mark1	38 39.486n	020 43.698e	206	2.58	
Mark2	38 37.601n	020 43.700e	176	1.89	
Mark3	38 27.549n	020 35.044e	210	12.12	
Fiskardo Ent	38 27.493n	020 34.895e	240	0.13	Ionian
				22.71	

Note: the route can be exported and loaded to hand held GPS as a backup – see appendices for the process.

All of this can be done before the trip and is basically what you are doing when you are looking at routing for a race expect the number of options that you are looking at is more limited. You are looking at visiting certain places so I don't bother optimise the route in advance other than to check if this is going to be upwind, offwind or downwind based on the prevailing weather for that time of year . I don't make a leeway allowance at this stage as this is dynamic and assess it as part of the day's activities.

When cruising in tidal waters you also need to consider the tide times and what would the most sensible departure time. This is really important around the South Coast of England and France where tidal streams can be 3-4 knots or stronger. You can look at the tidal flows (admiralty tide tables, pilotage book, C-MAP data or third party tidal models) and see what is are sensible times and then run some 'what if' routing options to explore the passage duration and the estimated arrival

times. This is also important as it feeds in to pilotage planning (see below). In Expedition this is quite straight forward

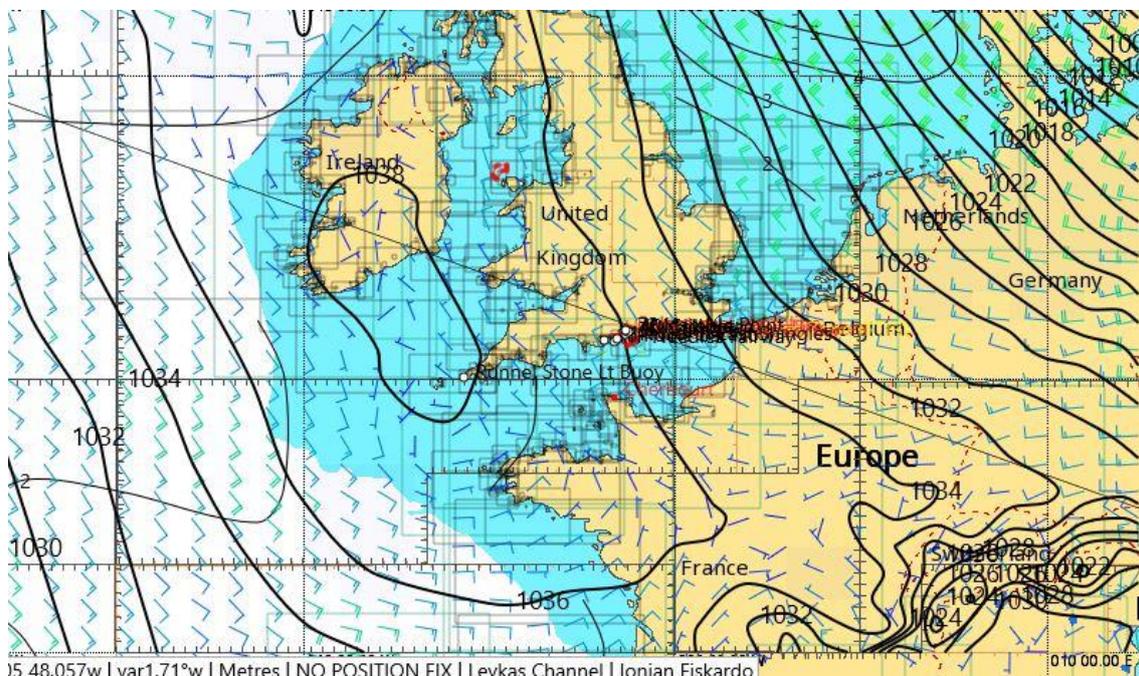
- Having a route active you go to the Optimal tab
- Open Multiple and specify the start time, number of runs and the time interval
- Click Ok to run the routing analysis

When you done this you can review the options and by clicking on Results and the Run on the left of the page to review the estimated time. This assumes that you both have a defined set of polars and some tidal data to allow Expedition to do the routing analysis. You may also want to run these at a finer granularity if you already have a preferred departure time just to see if leaving 30 minutes earlier or later would be of benefit.

Note: if you are doing these in advance and the timezone is going to be different then make sure you check the timezone offset as you need to make the estimates in local time.

When this is done I also use C-MAP 'safe route' to check any route that I define. This is because I am typically the only navigator (okay race navigator) on-board and this applies the four eyes principle. It is easy to overlook something and this basically costs nothing to execute this check.

As we get closer to the departure time I'll also look at the synopsis of the weather and start to get an understanding of how this is going to change over the first part of the cruise. This can be explored by downloading the weather for a wider area (see appendices for the MPSL display configuration) and running this forward in time over the cruise. Remember long range forecasts are over 5 days are only indicative so you really need to do this in the week leading up to the departure.



Note: it is now a [legal](#) obligation under SOLAS V (2007)¹ to plan your passage, Regulation 34 - Safe navigation and avoidance of dangerous situations. The RYA also have an app <http://www.safetrxapp.com/> available for UK waters.

Pilotage

This is a very important bit as you are typically visiting areas that you are not necessarily familiar with. Make sure you have read the relevant pilotage book or books for the area in which you are sailing. In the UK VisitMyHarbour² is a great source of information which is maintained and updated, otherwise you'll need to refer to the standard pilotage books such as Reeds. It's also worth reserving a berth if you are in the UK as marinas are typically full over bank holiday weekends. This means making the reservation around a month in advance – don't expect to be able to find a berth in the week running up to the weekend!

For each harbour that we are looking at visiting I record the email address (used for reservation typically), the phone number, channel number, call sign and stated call sequence (some have a preference). You need to add the standard pilotage information on buoyage.

In the UK it is worth checking the tidal heights if the pilotage notes indicate that there are access restrictions. This is generally the exception in the UK as most marinas and access channels are dredged to ensure access at all times but there are exceptions – remember secondary ports have the same characteristics as a primary port but are offset in terms of time.

When I need to calculate the tidal height I do this for 2 hours either side of the estimated arrival time, either using the chart datum or the specified minimum water in the pilotage notes. I always ensure that I tag the timezone and if you are doing this in advance then make sure you adjust this to the local time that you will be using when sailing. If you have opted for C-MAP charts then you can query the area and use that to provide an idea of the minimum water depth but note this may not be chart datum.

Time (GMT)	Water (chart datum + height)
14:00	3.7
15:00	4.0
ETA 16:00	4.2m
17:00	4.5
18:00	4.8

Equipment Installation and Setup

This section covers getting Expedition and the related components installed and tested on the boat. I will first check out the standard boat instruments which should include boat speed, depth, log, wind instruments (at least apparent if not also true) and steering compass.

¹ See <http://solasv.mcga.gov.uk/>

² You have Garmin ActiveCaptain which has a similar focus - <https://activecaptain.garmin.com/en-GB/>

Note: if they have not advised how the depth is calibrated it is worth dropping a line over the side and estimating this so you have some idea of how the unit is configured and how much water there is under the keel.

I'll then move on to setting up Expedition along with the feeds and connections. First; ensure the machines' time is set correctly that Wi-Fi is setup, if available. I then move onto the GPS puck out and ensure that it is providing a fix to Expedition. I have a small GPS unit with a suction cup that I locate on a window by the navigation table or as high as it is possible to place it. Unless you are on a boat made of carbon fibre this is fine.

If you are going to be running a deck repeater for a chart plotter I then plug in the Wifi unit and change the laptops connection to it. You can then connect the tablet to the wifi and open the remote desktop app and check the connection. Ensure you use the tablet in landscape mode as it will otherwise resize the screen on the machine. It is preferable to fix the orientation of the tablet and stop it auto-rotating while you are using it as a chart plotter.

Note: in Android go to settings, screen, orientation and stop auto-rotate and set the orientation as landscape.

If you have an AIS unit this is little more involved as it need a RF signal feed. Having review the options I have settled for an short 'regatta' antenna (see AIS equipment) and just tape this to the side of the boat in the vicinity of the chart table. The unit I use is combined AIS/GPS unit and connects to Expedition at 38,400 Baud.

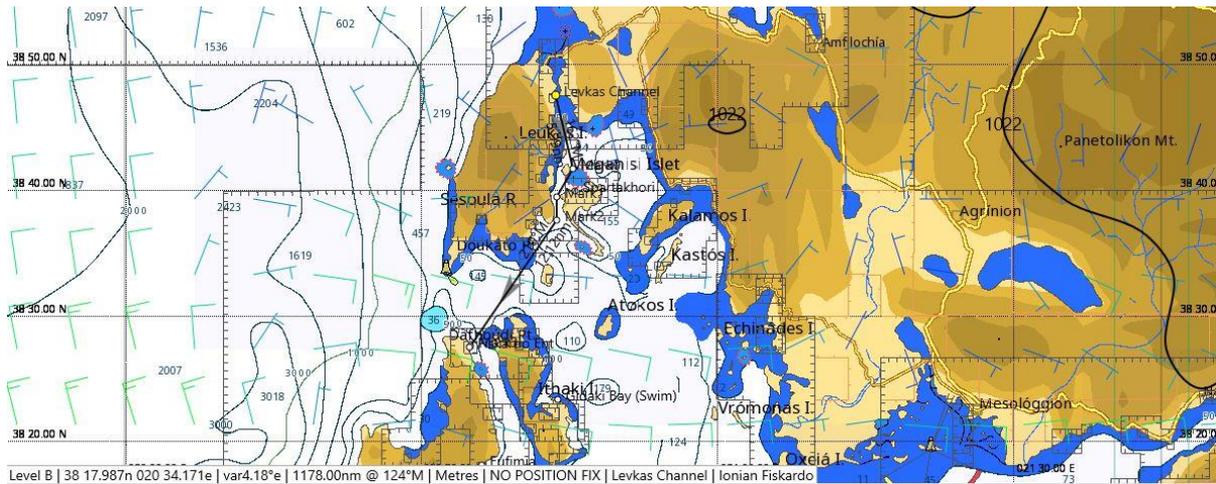
A Day on the Water

On a typical day of sailing I will go through the standard boat checks and then check the weather and routing for the day.

I check the weather updates in the morning. In most European locations you will also be offered wifi as part of the port fees and this is typically good enough to get the weather updates. I have had mixed success with mifi³ (mobile wifi) units that some charter companies provide. If you are going to pay for a mifi makes sure that the provider is different to the one that your phone is using as this will provide an alternative if you struggle to get connectivity on your device.

I will also do a synopsis update and look at the general weather pattern to see if this is basically the same and run this forward to see how the wind is going to change over the day. This is useful to check if there will be any rain over the period – see weather configuration in the appendices for some display options.

³ See <https://en.wikipedia.org/wiki/MiFi>



For wave height, that is the significant wave height the best way of displaying this is using the weather display options. I have one of the display set up to display the general synopsis which includes rain and wave height. See the appendices for the individual configuration that I use. As noted above I use SailDocs to get a view on wave height in coastal waters

I would then do a simple route optimisation if I have polars loaded to see if there is any routing basis and also to get an update on the estimated elapsed time is expected to be. This the stand process of once the weather data is loaded and you've clicked Weather/Display time/ 'Now' you need to go to Optimal/Settings and change the time is the top right to the time that you expect to be start sailing. You can then click Optimise and let Expedition do its magic. Assuming you have sufficient weather data for the route it will calculate the optimal and display it on the chart

Note: on Sailing/Polars/Nav make sure you set the % lower than you would normally, say around 80% – 85%

I'll then plot a summary of the course on a paper chart and use this give the crew an idea of the weather, the routing and points of interest along the way for the day. I also set Expedition to track the boat position at this point, Charts/Follow boat and leave it in this mode for the day unless I need to make some logs notes. This means that if you want to use the tablet on the deck you just need to open the app up.

This is important when there is commercial shipping around and you'll also find large ferries in the coastal waters that are worth keeping an eye on.

Expedition is configured to remove the chatter and only alert if the routing looks iffy – this amounts to having a pair eyes in the back of your head but you should always keep a good look out and check the surrounding waters on a regular basis.

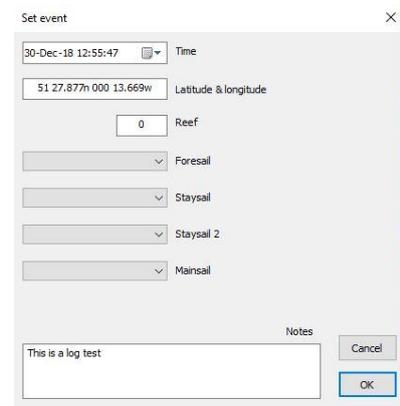
I will use the events feature to note any major points along the way and may copy these in the boats log book later. I like to retain the logs as they are useful reference point. There is a feature in Expedition of 'Route from here' which is useful if you stopped off for a couple of hours and want an update on the estimate time of arrival. I rarely use this.

Using Events for the Boat Log

On the Sailing menu the testing options support adding events. Typically, this records the internal events such as updates to the active mark but this can be used for the boat log and then exported later.

You can click on 'set event' and if the GPS feed is available the location will be provided. You can then add a note at the bottom about the weather and the action and click 'OK'. Note you can also indicate the number of reefs in the sail plan and the other sails that are up.

The event can be exported as a CSV file and then edited separately if you want to provide a log to the crew.



Summarising the Trip

These are two options that I use to summarise a trip – Expedition charts or Google Earth. The former is simpler and works if the route is latitudinal in nature. If the route is more longitudinal in nature then the latter is better.

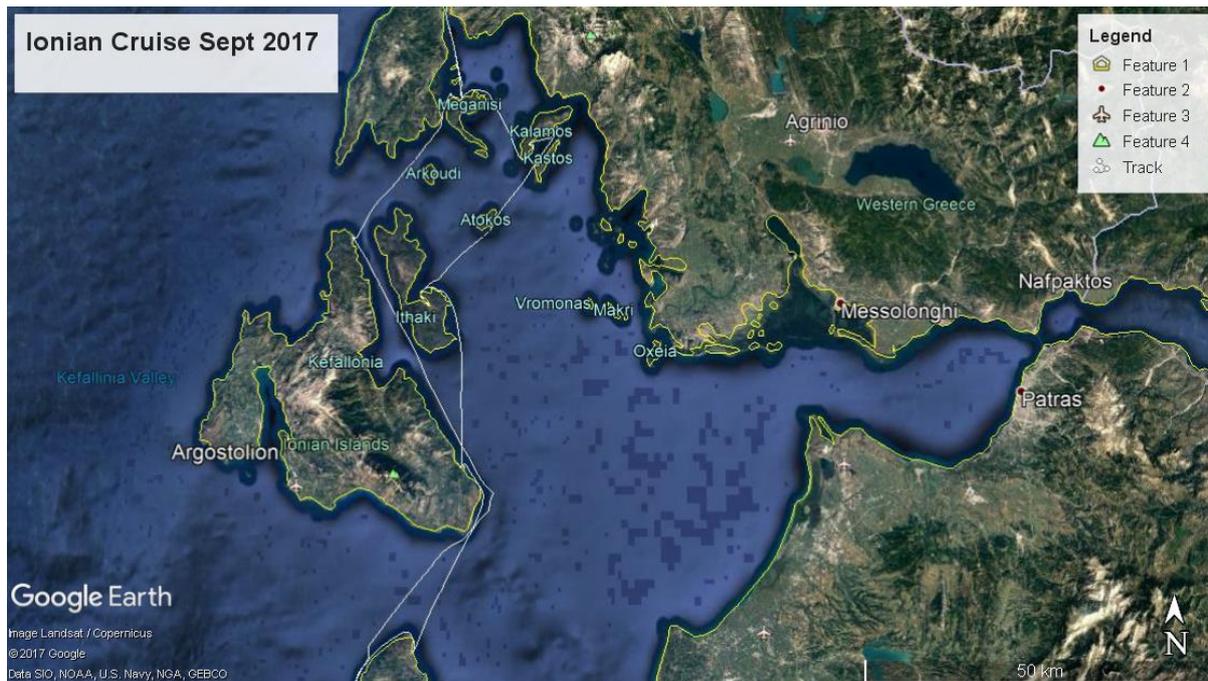
Expedition Charts

This is the simplistic and is fine if you done some short cruises that you want to summarise for the crew and you can show this to them at the end of each day. I leave the routing for the day on the screen so they can see the planned route and the route sailed. You can, if you want also add in the weather data but this can become a bit confusing

To do this go into the Chart and set the size so it will accommodate the route that you are going to display. Then go into Marks/Edit marks, select the route that you want to display and click 'Set active' so it is displayed.

With regards to the track I prefer to trim the log data so it shows the route minus any pilotage. To do this I go to Tools tab and export the logs, minus events at 300 second interval for the day. I then use GPS Utility to edit the extracted gpx data and remove the entries at the start and the end of the day so that only the time at sea is shown. This is done based on time and I then load the track (on the left of the Tools tab) and set the display with as 3 (Settings/Track/Track width).

The following are the routes and track for a couple of legs from this year's cruise on the south coast of England. You will notice in the first that the optimal route (in red) was to lay out across Christchurch Bay before tacking and laying into the entrance to Poole but it was windy (this was over a UK bank holiday weekend) so we stayed inside the bay and sought calmer waters.



MOB and AIS

There is also the question of support for MOB and a friend James Rock had some interesting considerations on the use of AIS in this space. James's consideration came from doing an Atlantic crossing and the realisation that even in warm water you are not going to survive for long so EPIRB is of not much value and you really need to rely on your own crew.

There are some recent developments in this space such as CrewWatch at around £200 for two beacons. These are based on Bluetooth 4 based so range is a couple of hundred meters at best and a battery life of the order of 3 years. These are probably okay for coastal waters but an issue if you are in open water and the boat is doing 12+ knots downwind. The time it takes to get the sails down and the boat turned around means that you are probably out of range as 10 mins at 12 knots is 2 nms.

An AIS unit would allow the crew to be alerted (some have DSC integrated), operate over 5-6nm and have a 7 years life. These are now around £200 which is starting to make them practical for offshore use. Given that you are paying a couple of hundred for a good jacket like the Spinlock DeskVest 275N life jackets and in fact Spinlock offer the option of adding an Ocean Signal MOB1 as part of the purchase. The integrated DSC capability provides an alert capability and AIS will provide range and bearing.

The fact that these are DSC/AIS based which most boats have these days. The Global Maritime Distress and Safety System (GMDSS) has changed and since Feb 2005 there is no longer a legal requirement for any ship or coast station to maintain a manual watch on Ch16. This means that most boats have a fixed DCS radio that can raise the alarm and then AIS can be used to locate the individual.

Since AIS is mandated in the offshore regs for category 0, 1 & 2 then this is a sensible investment. You just need to code the device for the boats radio which is quite straightforward.

Essential Gear

In addition to the taking all the usual navigation tools and aids these are the other bits of kit that I've found essential when cruising.

A Gerber Crucial multi-tool – this has proved itself on a number of occasions as you can't rely on all the gear being on the boat that you need for running repairs. I don't think you need anything more than what this offers.

A few metres of 2m dynemna – this is the catchall and is great for doing running repairs. We pulled the port lazy jack out earlier this year while putting a second reef in and having a spare bit of line enabled us to do running repairs the following morning (photo is of the repair being effected)

Powerpack for mobile devices – I have a large powerpack that I always thrown in the sail bag if it is going to be a long trip. This ensures that I can charge the mobile devices if we have no shore power without the need to run the motor. The powerpack is around 2,000mA capacity so it can charge more than one device a couple of times.



References

These are worth a read

1. Modern Race Navigation: Expedition Software in Action, Will Oxley, 2014
2. Expedition Navigation Software: A "Gentle" Introduction, Will Oxley, 2017
3. Sails for Cruising: Trim to Perfection, Mark Chisnell, 2003

Appendices

Expedition Configuration

Ensure that the machine is running and you have Expedition installed. These are the basic settings for Expedition that you need to check before you start. Expedition can be confusing so this is the basic configuration to use the routing capability with the location in the menu indicated for each.

System (setting/system) – ensure local time (machine time) and magnetic are selected. Use of magnetic simplifies everything bearings can be used on a compass without correction as long as you are not sailing somewhere where there is a large variation like the southern ocean.

Display (setting/display) – change update frequency down from 8Hz to 4Hz if you are going to be use a deck repeater as this reduces the required updates.

Boat dimensions (settings/ racing) - this is basically the LOA of the boat, the location of the gps unit as an offset and the beam of the boat. This is not critical but I like to set it and the other thing you will need is the height of the rig from water (also useful if we have to pass under any bridges).

Logging frequency (setting/user/boat logging) – I set this to 0.5 Hz, once every 2 seconds for offshore to reduce the size of logs a bit. Expedition automatically rolls the logs over on a daily basis so again it is import to ensure that the time of the machine is set correctly.

Wind scaling factor – (settings/weather/scale 10m wind %) - this is important as it used in the routing calculation. Please see ‘Scale 10m Wind’ in the Weather setting section of the help file on how to calculate this. For most boat in the 30ft range this will be around 105% - 107%

Routing options (settings/opt advanced) – motor if below 5 knots and set an idea of your motoring speed, which I normally set at 6knotts. I don’t use a higher value so the routing is bit conservative and we are cruising so I we not be pushing the motor.

Note: you should set the timezone of the machine to the area that you are operating in so that weather and tide data is correctly reflected in local time. To do this right click on time/date displayed at the bottom of the screen (this assumes you are running Windows 10 which Nick recommends these days). You can then change the timezone and I recommend that you do this manually and do not opt for automatic

In addition you need a set of polars for the boat. This is not critical but I like to have these and it also means that I have a pretty good idea of the characteristics of the boat that we are going to be sailing. There are a few sources that you can look at:

- Find someone who has a set of polars that you can use.
- Use a set from the internet - there is a lot of one design polars available on - ???
- If not then you may be able to find a set of polars on the ORC website and manually define one. This is a bit more involved and you have to buy

See the appendix for information on setup of the polars and make sure you set the nav percentage at a reasonable value – I use 80% for cruising. I do not worry about sail plans as you are most likely

to only have a main and jib on most charter boats. If you are taking your own boat by all means make sure the sail charts are realistic.

Display Boxes

These are the number boxes that can be floated or docked on a screen. I use a fairly conventional layout of have them down the right hand side of the screen and docked. I use number boxes 3 and customise this for the following information. I also tap the magnifying symbol and increase the font size by 1, then click the padlock symbol to lock the settings and click on the number to hide the menu. When I'm then using Expedition in this mode I then just need to load this number box via window/number box 3 (closing any other that are not relevant).

- COG
- SOG
- Mark bearing
- Mark range
- Mark time

You can also add some of the GPS metrics such as number of satellites and HPE (horizontal position error) if you are some inclined. I generally find that the GpsNum is around 10, plus or minus 2 and that the HPE settles to around 10m. This data is also contained in Expedition standard logs.

VisitMyHarbour Charts (UK and Europe)

This is small company based on the Isle of Wight that offers unified charts which are BSB raster images <http://www.visitmyharbour.com/articles/category/872/unified-charts> based on licenced UKHO charts. Expedition support was added in 2016 just before they came out with their unified download product. They offer 3 sets of charts that are general of interest to UK sailors:

UK & IRL – offer over 800 charts covering UK, Ireland and the Channel Islands

UK, IRL and near continent – same as the above but adds France, Belgium and some Dutch charts

France – which covers the west Atlantic seaboard of France

If you join, for a one off fee then the cost of these are £23, £39 and £21 respectively. The licence is similar to C-MAP in that the licence maps can be installed on one primary and one backup device along with two android devices.

Installation and configuration

Purchase and download the charts – given the discount offered to members it makes sense to pay the one off membership fee, unless you are only looking to use these. Also note they provides a great amount of pilotage information which is regularly updated.

Set the drive up and load it by running RunMe in the source of the virtual drive. This will provide the licence page which you need accept and then the splash screen which you can dismiss.

Then in Expedition charts – add and index the Charts/RNCs/Search – you can use this to re-index when you update also.

Check access – right click on an area and select ‘open chart’ and you should see some the charts that have been indexed for this area.

Note: You need to reloaded the drive if you reboot the computer for an reason

If you are looking for US or Brazilian waters Google "NOAA" or "DHN Brazil" as they offer free BSB charts that work well with Expedition. It only us in the UK and Europe that end up paying twice!

Exporting a Route

When you display the details of a route you can export it as a gpx file and load this to a handheld GPS for backup and use on deck. The process is quite straight forward. When the route is selected click on ‘.gpx’ in the lower left of the mark panel and enter a suitable file name. Note this is not te name that will appear on the GPS unit as the name of the route will be written to the file. I still use a Garmin 78s as this does most things I need a handheld to do and has good battery life.

You then need to plug the GPS unit and copy the file over. For my Garmin the gpx directory E:\Garmin\gpx and I just drag the file using File Explorer from the desktop. Once done you will need eject the unit and start it to load the route. This where the age of interface on the Garmin is annoying as you can’t go into the route to check it and set it as active – there are two separate menu option; one to review/edit and one to set the active route.

If you are happy with the routes then you can load them all prior to the departure, just remember to update the GPS if you make any changes. After an event or trip I also delete the routes out of the Garmin, unless I think I will need them again to reduce the amount of entries and to make it easier to manage the device.

Note: I don’t worry about the waypoints themselves but they are automatically added to the devices database.

Weather Settings

Expedition allows you to preconfigure 6 different views of the data. This is a couple that I find of use. I keep option 1 as standard but ensure rain is flagged via the following and significant wave

Feature	Characteristic	Suggested Value
MPSL	Fade	N/A
	Contour	Yes
	Shade	N/A
	Colour	Black (000000)
	Colour mode	Solid
	Line width	2
	Shade min	960
	Shade max	1050
	Contour step	2
	Contour high-low	1000
Wind	Fade	Yes
	Contour	N/A
	Shade	Yes
	Colour	Blue (0000ff)
	Colour mode	Solid or Beaufort

	Arrows	Barbs
	Line width	1
	Shade max	30
	Contour step	2
	Contour high-low	0
Current	Fade	N/A
	Contour	N/A
	Shade	N/A
	Colour	Blue (0000ff)
	Colour mode	Spectrum
	Arrows	Scaled arrows
	Line width	1
	Shade max	2
	Contour step	0.5
	Contour high-low	0
Rain	Fade	Yes
	Contour	N/A
	Shade	Yes
	Colour	Blue (0000ff)
	Colour mode	Solid
	Line width	1
	Shade max	10
	Contour step	0.5
	Contour high-low	0
Sig Wave	Fade	Yes
	Contour	N/A
	Shade	Yes
	Colour	Red (f0000)
	Colour mode	Solid
	Line width	1
	Shade max	10
	Contour step	2
	Contour high-low	0

Polars

This is a short outline of the basic data you need for a polar for it to be useful. This needs to covers the basic points of sail. You are cruising so you only need these for say 8, 12, 16, 20, 24 and maybe 30 knots. You are probably going to be motoring if the wind is much below 8 knots or going out if the wind is much over 20knots.

- Close hauled – around 38-42 degrees
- Freed – freed at around 60
- Reaching – beam reach
- Running – running angles which are going to be typically around 150-160 true
- Dead down wind – wind astern

This site has a range of polars for cruising boat such as the Beneteau Oceanis 37 but I've not checked these out - <http://download.meltemus.com/polars/>. Also note that they are TAW/TWS and

therefore need to be transposed for use by Expedition and the twa added before the bsp figure to create twa/bsp pairs for each wind speed.

Another resource is - http://l-36.com/polar_polars.php

This is an example from a Beneteau 40.7.

```
!Expedition polar 40.7
4  0  0  47 3.59  60 4.3  110 4.36  141 3.26  180 2.02
6  0  0  45 4.99  60 5.93  110 6.13  143 4.67  180 3.06
8  0  0  43 5.89  60 6.93  110 7.21  146 5.77  180 4.08
10 0  0  41 6.39  60 7.44  110 7.82  150 6.57  180 5.04
12 0  0  40 6.63  60 7.71  110 8.29  155 6.99  180 5.94
14 0  0  39 6.75  60 7.87  110 8.64  165 7.19  180 6.72
16 0  0  38 6.82  60 7.98  110 8.89  168 7.6  180 7.3
20 0  0  38 6.91  60 8.15  110 9.43  170 8.38  180 8.15
25 0  0  39 6.98  60 8.27  110 10.36  168 9.45  180 9.08
30 0  0  41 7.01  60 8.32  110 11.04  157 11.62  180 10.17
```