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Mastering celestial navigation

Having been a liveaboard cruiser for eight years, Fergus Dunipace has always held a passion for navigation.

Now needing to add an RYA Yachtmaster Ocean to further his sailing career, he took on the challenge of learning celestial navigation

I find the idea of navigating using the sun and stars fascinating and have owned a sextant for years, but never learnt how to use it properly, despite sailing 40,000 miles and crossing two oceans on my own boat!

I've often been asked to deliver yachts all over the world but, because of insurance, if the deliveries were beyond the remit of RYA Yachtmaster Offshore – a qualification I've held for 16 years – I've had to turn down the skipper jobs. This really frustrated me, so I decided it was time to step up and master the art of celestial navigation while studying for the RYA Yachtmaster Ocean qualification.

Online Theory Course

I looked into the options of a weeks' shorebased course but, after a fair amount of research, decided to do an online course with Skippers Online. This course had good reviews and the open timeframe suited my calendar. While it primarily focused on celestial navigation, it also covered offshore weather, ocean passage planning and communications.

Prior to starting the course, I read *Celestial Navigation* by Tom Cunliffe and *Basic Astro Navigation* by Conrad Dixon, which gave me a good insight into the subject.

However, I can honestly say that getting my head around celestial →

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navigation was one of the hardest things I have ever done. In the end, I completed the course in 60 hours. Knowing how long it took me to grasp the subject, I'm not sure I would have managed it in a classroom in five days.

Skippers Online made a complicated subject enjoyable to learn and even entertaining at times. I had the help of an instructor I could tap into at any stage I got stuck – which was quite often! And being able to go over sections again and again really worked for me.

Maths has never been my strongest suit and I was pretty rubbish at trigonometry at school. So, getting to grips with spherical trigonometry used in celestial navigation took time and practice. But the format of the online course tackled each part of the sight reduction process in manageable chunks before putting it all together.

My perseverance paid off and there was a defining moment where reducing sun sights suddenly made complete sense, after which, the reduction of stars and planets came relatively easily.

Once I was ready, I took the online exam, which had to be adjudicated by an RYA instructor and this was easy to arrange at my local sailing school in Cowes. I was over the moon when I heard the next day that I'd passed with flying colours.



Qualifying Passage

My next challenge was to organising a qualifying passage of 600nm, where, for at least 20nm, you have to be more than 50nm from land and charted objects.

There are plenty of companies offering qualifying training passages for a fee, but I was lucky enough to be asked to help take a catamaran on her maiden voyage across the Atlantic from South Africa.

The owners, who were also on the boat, were happy for me to run a separate set of charts and log, and we agreed I wouldn't look at the boat's position via GPS for

ABOVE

Fergus working out the boat's position via celestial navigation

BELOW

The catamaran offered a stable platform for celestial navigation

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Fergus uses the sextant to take a noon sight

the first leg from Cape Town to St Helena, which was 1,700nm.

Setting up a navigation table in their spare cabin, I laid out my charts, plotting sheets, almanac, sight reduction tables and sextant. I also had a batch of handy downloadable pro-formas from my theory courseware, useful for all the different types of sight reduction, which proved invaluable. I went on to adapt these more as my experience grew.

Once the boat was underway, I was doing celestial navigation for real. I kept a very close watch on the ship's log, heading and drift to ensure reliable dead reckoning until I was confident that the sights were generating accurate positions. I started with noon sights and sun sights for the first few days and then added in star sights and planets.

Getting the stars right was a whole new challenge. On the suggestion of another astro navigator, I started with one star, which was Betelgeuse in Orion on my first attempt, then branched out to two stars and three stars. By the end of the 1,700nm passage I was regularly getting five or six stars and maybe Jupiter, Mars or the Moon thrown in for good measure. It became a bit of a game and certainly kept me busy on night watches.

When St Helena appeared on the horizon exactly where I



Celestial navigation



Tips

- If possible, eliminate all sextant error before sailing. Find a good place on the boat from which to take your sights and accurately calculate your height of eye while still on the dock.
- Stars can often be seen well before nautical twilight. Set your sextant altitude to that suggested in the sight reduction table and scan the horizon in the direction of the stars bearing, this can buy valuable minutes when trying for four or five stars in a row.
- Work out exactly how fast or slow your watch is and ensure it has a good backlight that clearly shows the time to the second. Additionally, have a back up watch.

thought it would be, the feeling of relief and achievement was huge.

Once the boat was safely moored up, I looked back over my track and compared it to the yacht's GPS track and was really pleased with how accurate the celestial navigation was. Of course, there were some really wild fixes, usually when the seas was rough, but on the whole I was within 10-15nm of our true position. Much aided by the incredibly stable platform that catamarans offer.

Oral Exam

On return to the UK, I organised a one-on-one oral exam with an RYA assessor. I had to gather up all my

information about the trip and answer in-depth questions about the planning, condition of the yacht and its equipment as well as storage, spare gear, fuel and victualling.

I had well over 100 sight reductions with sun-run-suns, meridians, moon sights, star sights and the planets that were available on our crossing. In addition, I took my workings-out, plotting sheets and charts with the plotted course. My examiner took one look at the pile of paperwork and said, "This should be easy then!"

He quizzed me about my sight reductions, sextant handling, time keeping and asked me to

ABOVE

All the essential equipment needed for route planning

BELOW

Fergus on the helm

BELOW LEFT

A colourful sky as dawn breaks

choose a plotting sheet from the trip and talk him through the sight reductions and also show that I had done a compass check using the bearing of a celestial body.

There were also questions to gauge my experience and knowledge. This is where sailing halfway around the world for eight years came into its own!

At the end, he kindly told me I'd passed. I'm now a very proud Yachtmaster Ocean.

Cost

The RYA Yachtmaster Ocean theory course cost £295 with www.skippersonline.net

