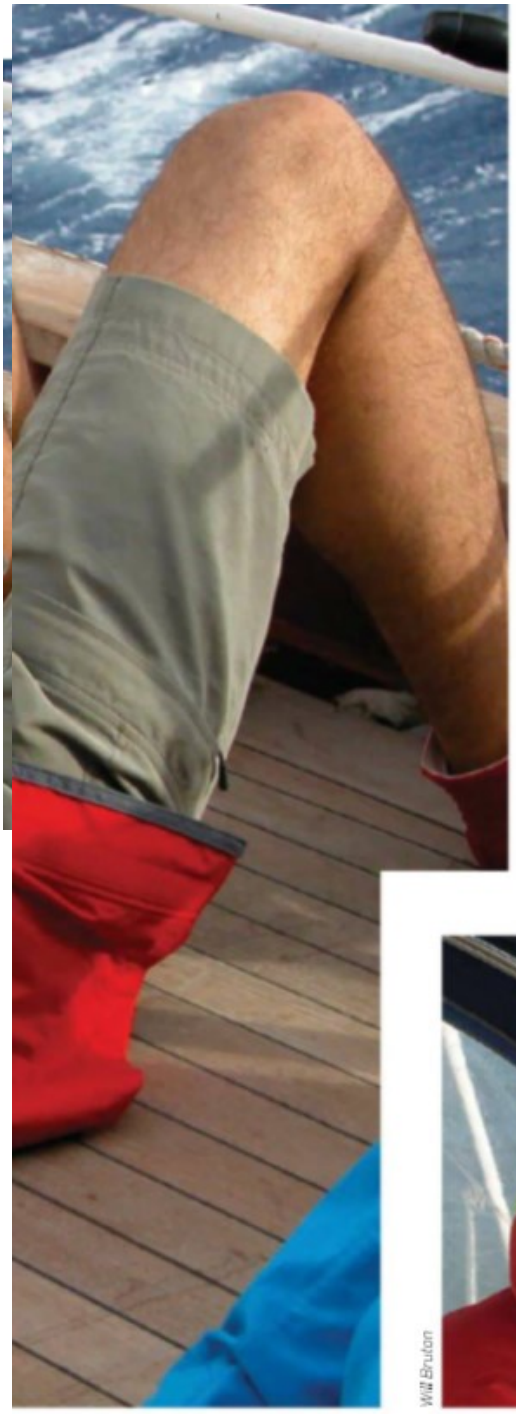

Yachting World
ATLANTIC ESSENTIALS
81 ARC skippers reveal their must-have kit
THE VIKING ROUTE
A transatlantic in short hops
EXPLORE THE AZORES
The perfect mid-ocean pit stop
FEELING SEASICK?
A radical new 15-minute cure
A DECADE IN THE PACIFIC
One man's Polynesian dream
ESCAPE THE CROWDS
We test Discovery's 48S swing keel adventurer
HOW TO
PROVISION LIKE A PRO
HANDLE BIG BREEZE UPWIND
SAIL TO SCANDINAVIA

Between **25-40%** of virtual reality users experience motion sickness.



WILL BRUTON ON VIRTUAL REALITY SEASICKNESS RELIEF

Charles Darwin gave a warning to any of his readers tempted to romanticise sailing, declaring in *The Voyage of the Beagle* "if a person suffer much from seasickness, let him weight it heavily in the balance: it is no trifling evil which may be cured within a week."

But while Darwin's theory of evolution became established science, what causes seasickness still remains fiercely debated. What's more, nothing invented so far has managed to work universally to relieve the symptoms, and drug-based treatments are renowned for their side effects. So even professional sailors learn to live with the debilitating condition rather than overcome it for good. In the Volvo Ocean Race there have been multiple instances of over half a professional crew being unwell at the same time.

New Zealand start-up See-Level promises to help sailors overcome symptoms of seasickness by bringing together movement sensor technology and virtual reality. Founder Dudley Jackson, originally from the Isle of Wight, started the business after being forced to call off his own circumnavigation plans. "I'd bought the boat, got ready over a number of years and was excited to cross oceans," he explains. But overcome by seasickness as soon as he was offshore, Dudley returned to New Zealand disappointed, turning to his background in IT to find a solution.

See-Level/Dudley Jackson

The system uses a standard Pico VR headset preprogrammed with the See-Level software

Virtual reality had an awkward start in the consumer electronics market when it first became available to computer gamers around five years ago, and videos on YouTube show first-timer users crashing into furniture, having lost all sense of spatial awareness outside the headset. Even latest generation VR games can be disorientating, and for many people induce motion sickness. But it is this powerful feeling of being somewhere else that Dudley hopes to capitalise on, temporarily extracting the wearer from their real environment.

Facebook's Mark Zuckerberg recently invested over **$2billion** in the virtual reality headset maker Oculus.

Jackson was introduced to VR gaming by his son. "I was shocked at how quickly I got motion sickness," he recalls. But it raised the question: "If virtual reality can make me sick, could it remove seasickness just as quickly? And the answer is: yes."

A virtual reality headset provides 360° immersion in a virtual environment, which, combined with sound, effectively seals out the real world. If you haven't used one before, the experience is both a little strange and impressive. Look up, down or behind you and the world you're immersed in is continuous.

See-Level's patented offering is two-fold. First, it offers relief to sufferers as soon as they start to feel unwell. Second, it is designed to train users out of a propensity to suffer from ▶

Will Bruton

The headset is designed to be worn while sitting down, but has good wireless range so it's not necessary to have the sensor box up on deck

The user view inside the VR headset, as See-Level recreates a stable horizon.

Sensors feed the See-Level system with data on the yacht's pitch, heave and roll

Will Bruton

seasickness – something the company calls INT, or Incremental Neurological Training.

If the system is a commercial success on larger craft over the next few years, it's likely to come down in price significantly. A small boat version of the system is already available, called the 'Companion Edition', supplied in a waterproof armoured case for easy stowage, but at around £850 it's not cheap.

The 'Yacht Edition', aimed at commercial sailing operations, comprises two main components: a processing box kept flat inside the boat and a virtual reality headset (several can be connected to the system at once). The headsets are linked wirelessly to the processor unit which requires power from the boat to run.

VIRTUAL HORIZON

For seasickness treatment, See-Level advises that the headset is only used when sitting or lying down. Once the unit is placed over the wearer's head, they find themselves sitting on a virtual beach looking out to a virtual sea horizon, while a voiceover talks through the program.

Stage one, called 'Signal Matching,' offers relief for most seasickness sufferers within 15 minutes. Once the patient feels better, they can continue for a further 45 minutes with INT.

See-Level creates a virtual environment on dry land but uses wireless links to sensors that sit firmly in the real world, using real-time live data on the pitch, roll and heave from the vessel. This data is then used to gradually reintroduce the real-world motion of the boat over time.

Initially the picture the user sees is level. After 15 minutes the second stage of the simulation gradually reintroduces the yacht's real-world motion over a period of 45 minutes, so when the headset is taken off, the real motion of the boat has been progressively normalised for the user.

Dudley Jackson explains that users are encouraged to put the headset on as soon as they feel even slightly unwell for maximum

University of Minnesota

Professor Tom Stoffregen has conducted experiments on motion sickness

effectiveness. "When we ran our first tests in the Southern Ocean on an expedition vessel for two weeks with 50 passengers, they reached for the kit in big seas when food was being served. After a short spell in the virtual world, they were able to eat a full meal."

Further testing has recently been undertaken with whale-watching tour operators, and New Zealand's Littleton Port Company is installing the system on board its commercial pilot boats.

The See-Level's INT training mode is the more developmental part of the product and is aimed at getting users used to unusual motions while still on land. It's something that could prove useful for those who find themselves only susceptible to seasickness after a prolonged period ashore.

While the system hasn't yet been independently tested, the company's own results claim the device was effective, on average, after seven minutes of use. Most of their testing has been undertaken on voyages from New Zealand's Cook Strait to Antarctica aboard a small expedition cruise ship, with 85% of those using the headset reporting a reduction in symptoms.

DEBILITATING SYMPTOMS

A lot happens to your body when suffering from seasickness:

- Brain is confused by contrasting inputs, sometimes also making us drowsy
- Eye muscles attempt to compensate for the motion by stretching
- Inner ear feeds conflicting signals to the brain
- Salivary glands produce extra saliva to protect the mouth from stomach acids
- Diaphragm contracts, pressuring the stomach, eventually causing us to be sick

TOO GOOD TO BE TRUE?

Professor Tom Stoffregen is Director of Affordance Perception-Action Technology at the University of Minnesota and has conducted numerous experiments investigating seasickness. He stresses that many commonly held beliefs about what causes sailors to feel unwell are a confused mix of theories.

"The real test for any kind of technology that claims to beat seasickness, or any other relief product for that matter, is whether or not it is any more effective than simply sitting down and closing your eyes; it's the sensory perception here that's most crucial to consider."

In one simple demonstration Stoffregen moves a vertical flat surface quickly towards a person who is standing still on a small platform, stopping short of making contact with them. Most people step backwards off the platform, unable to remain balanced. This experiment demonstrates humans' poor postural stability; something Stoffregen believes makes us susceptible to seasickness.

In a more extensive study Stoffregen measured how subjects stood naturally when they were ashore, gathering data on how much they moved subconsciously while trying to simply stand still. Those that stood less static ashore proved more susceptible to nausea and sickness in the days that followed while at sea; suggesting some of us are simply inherently less balanced and so more likely to get seasick.

Professor Stoffregen suggests that, as we still don't fully understand seasickness, it's best to work with the strongest evidence we have to help ourselves when sailing. "It's actually the rise and fall of the ship (rather than pitch or roll) that has the greatest impact on making people feel sick.

"We know every movement you make at sea is completely different to that on land, so sitting down will certainly help because immediately you'll have to compensate less. We also know seasickness almost always goes away in under 96 hours. So, by doing the right things early, sitting on deck with a view of the horizon for a few hours rather than minutes, you'll help your body go through the difficult process of acclimatisation more quickly." ■