

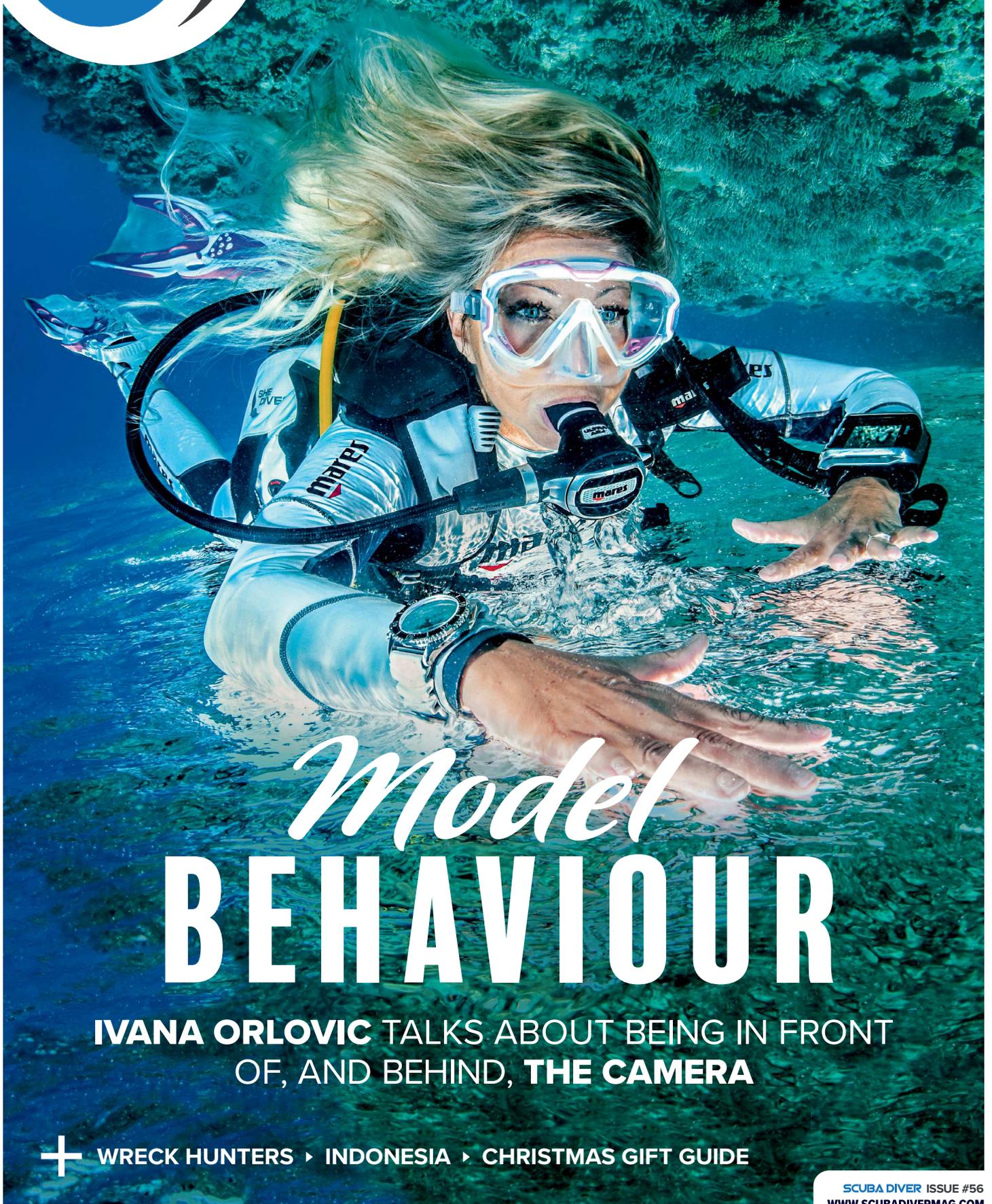


ISLAND THERAPY
REPORT ON THE DEPTHERAPY
TRIP TO THE SPICE ISLAND
OF GRENADA

THE BIG, BAD WOLF
MIKE CLARK EXPLAINS HOW
TO FIND AND SHOOT THE
ELUSIVE WOLF FISH

TECH: AZOTH O'DIVE
IS THIS PIECE OF TECH A
GAME-CHANGER FOR
TECHNICAL DIVERS?

SCUBA DIVER®



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IVANA ORLOVIC TALKS ABOUT BEING IN FRONT
OF, AND BEHIND, **THE CAMERA**

+ WRECK HUNTERS ▶ INDONESIA ▶ CHRISTMAS GIFT GUIDE



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Game-changing technology for divers

We often hear that a new piece of dive equipment is a 'game-changer' - the Hollis Explorer was much-touted by the then-distributor in the UK as such and look how that turned out! - but for once, I think the hype is justified when it comes to the Azoth Systems O'Dive.

Now you might have never heard of the French-based Azoth Systems, and the O'Dive could well mean nothing to you, but mark my words, this little device is set to make a huge difference in the world of diving, particularly for technical divers.

So what is it? Well, the O'Dive is effectively a personal ultrasound doppler which, used in conjunction with a clever app, allows you to capture post-dive bubble measurements from your own bloodstream.

Why would you want to do this? Well, all divers 'bubble' after every dive, regardless of how 'good' their dive profile is, but now imagine being able to utilise the O'Dive app to finetune the safety and efficiency of your decompression profile. As I said - 'game-changer'.

But don't just take my word for it. Turn to page 48 to read Jason Brown's article on the Azoth Systems O'Dive, and find out what tech dive supremo Phil Short thought of the unit during extensive testing.

Elsewhere this issue, we showcase the stunning imagery by, and featuring, Ivana Orlovic; go on the hunt for the elusive wolf fish in Scotland; join the Depththerapy team on expedition in Grenada; explore Raja Ampat in the 'off season'; and present a round-up of potential Christmas gift ideas you can wave in front of your friends and family.

Mark Evans, Editor-in-Chief



BEYOND TECHNICAL

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Science tells us that every diver bubbles after every dive, but how do you know how bad you're bubbling and what can you do to improve the safety of your dives? Jason Brown gets in a fizz about Azoth's new personal doppler device

Photographs by Jason Brown, Richard Stevenson, Anders Torstensson and Marie Jonsson

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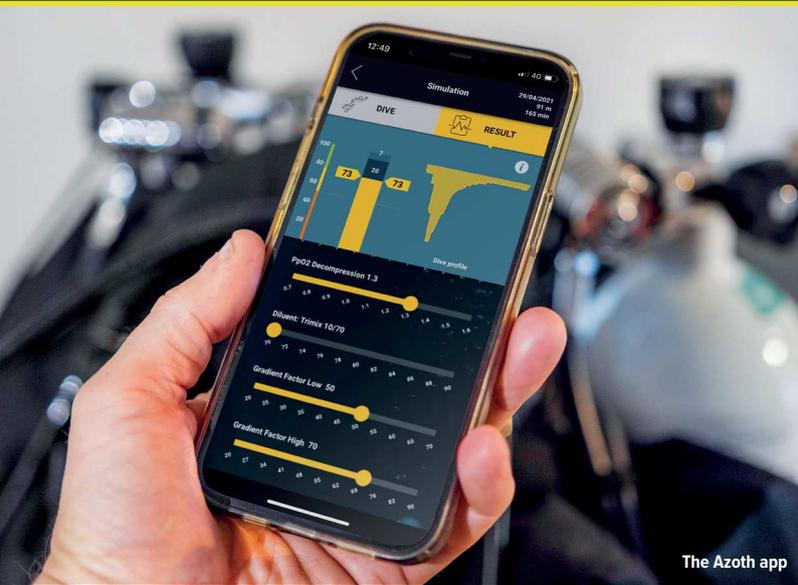
Popping the DECO BUBBLE

We all love bubbles. Whether they're in our drinks, our baths or - dare I say it - our bubbly chocolate, bubbles are cool. Where they're not so cool, though, is in our blood stream post-dive. Regardless of how safe you think your dive profile is, bubbles are an inescapable residual effect of scuba diving.

Studies conducted by DAN in the 1990s concluded that all divers 'bubble' after every dive, regardless of how efficient you believe your dive profile is – what varies are the amount of bubbles in your blood stream. A controlled ascent that gives the body time to safely off-gas inerts will significantly reduce the probability of you ending up in a recompression chamber, but there are no guarantees. Modern dive computers are very smart devices, but they operate on a generic model - they're not tuned to your own unique physiology. Many factors affect how efficiently your body off-gases – fitness, BMI, age, hydration levels and so on – but your computer won't account for any of these. Even those divers that cut their own deco schedules rarely adjust profiles to mitigate for variations in their own physiology.

Imagine if you could fine tune your dive computer to reflect your physiology. France-based Azoth Systems believe they may have the answer – the O'Dive personal ultrasound doppler. Combined with a sophisticated app that runs on both iPhone and Android devices, this clever little puck-sized sensor allows you to capture post-dive bubble measurements from your own blood stream in a non-intrusive way. You don't need a PhD to analyse the results either – Azoth's own servers do all the heavy number crunching and return the results to your smart phone in an easy-to-digest form.

Correct positioning of the O'Dive sensor does take some practice, but the app thankfully provides plenty of guidance. Unlike precordial dopplers used by research scientists, O'Dive is a subclavian sensor – that is, it measures bubbles via the subclavian veins that lie just below the collar bone. Using this type of sensor does have its benefits – the raised collar bone makes positioning the sensor relatively ▶



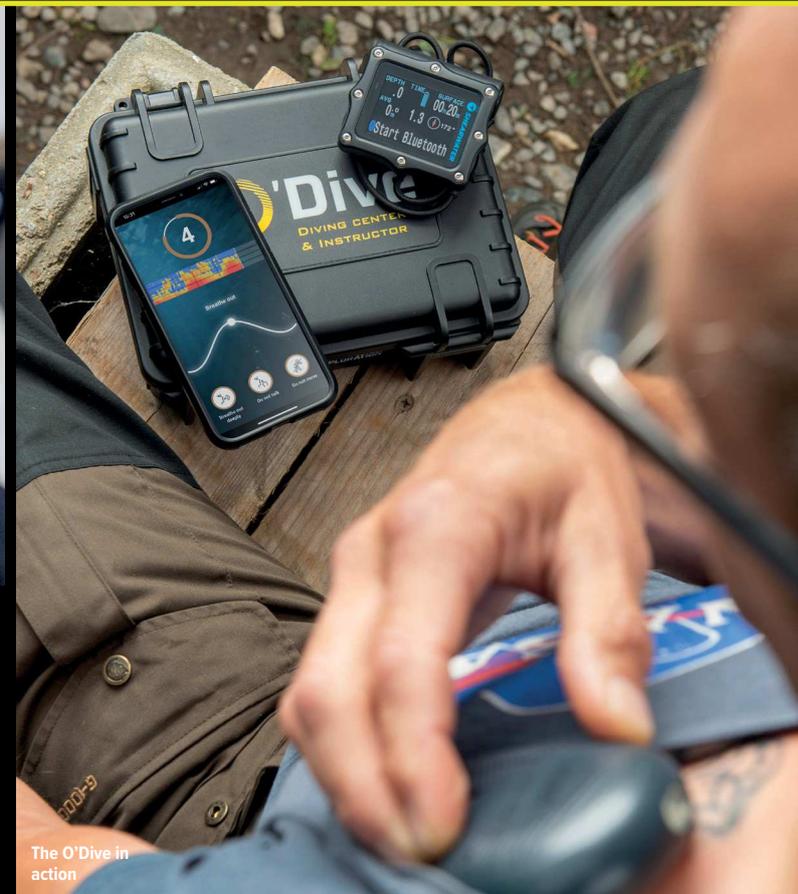
The Azoth app

“ For any diver – or team of divers - involved in more adventurous diving, O'Dive could be the most-significant new diving product to see the light in recent years ”

easy and measuring here gives a cleaner signal, with the sensor not having to deal with the noise generated by the heart's own valves.

To get a bubble reading that the system can analyse, you need to take two sets of readings – the first are taken from both the left and right subclavian veins 30 minutes after surfacing from your dive. 60 minutes later, you're then prompted to take a second set of readings. For best results, you also need to upload the dive profile data from your computer – the app can communicate directly with both Shearwater computers and CCR controllers, plus Suunto EON Steel computers with Buhlmann via Bluetooth. The app packages up the bubble readings and dive profile data and then transmits it to Azoth's servers.

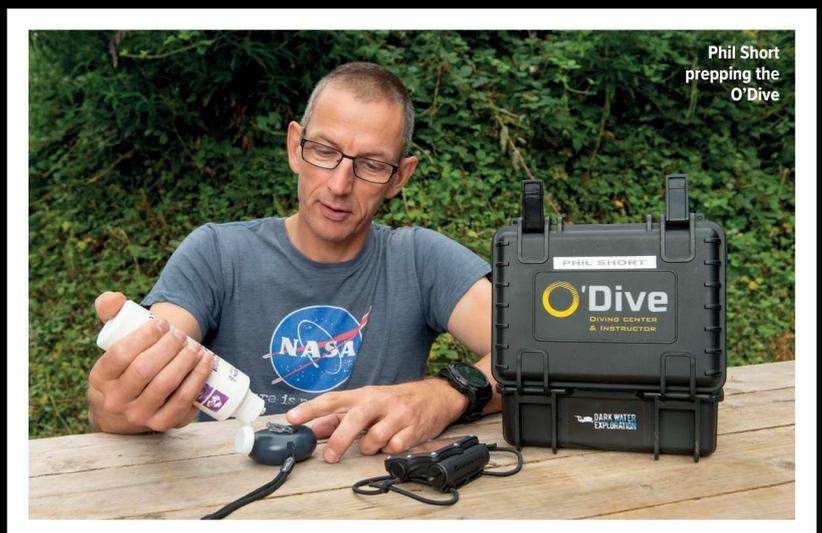
Azoth uses the profile data from your computer to compare your bubble readings against diving databases generated by COMEX, DCIEM and the French, British, Canadian and US Navies. What is transmitted back to your smart phone is a simple-to-understand bar graph that represents the safety of your dive using three values – a 'QI' (Quality Index), which scores the safety of your dive between 0 and 100, 'Sc' (Severity Component), which scores the relative risk of DCS between 0 and 100, and finally, a 'Bc' (Bubble Component), which scores the amount of bubbles detected between 0 and



The O'Dive in action

40. In an ideal world, you want a very high QI and very low Sc and Bc components.

Assuming that the results you received back from Azoth raised an eyebrow, O'Dive gives you the tools to improve the safety and efficiency of your decompression profile. Built into the O'Dive app is a sophisticated 'simulator' that lets you view the effect of tweaking specific factors of your dive – the gases you breathed, the gradient factor used, or the setpoint of your CCR controller at depth, and so on. By adjusting the onscreen sliders, the effect of these changes will be displayed in real time with the reduction in both the severity and bubble values and the 'Quality Index' of the



Phil Short prepping the O'Dive

COMPUTERS • O2 CELLS • GAS ANALYSERS
CABLES & CONNECTORS • REBREATHER PARTS
PATHFINDER STROBES • SENSORS
TOOLS • SOLENOIDS

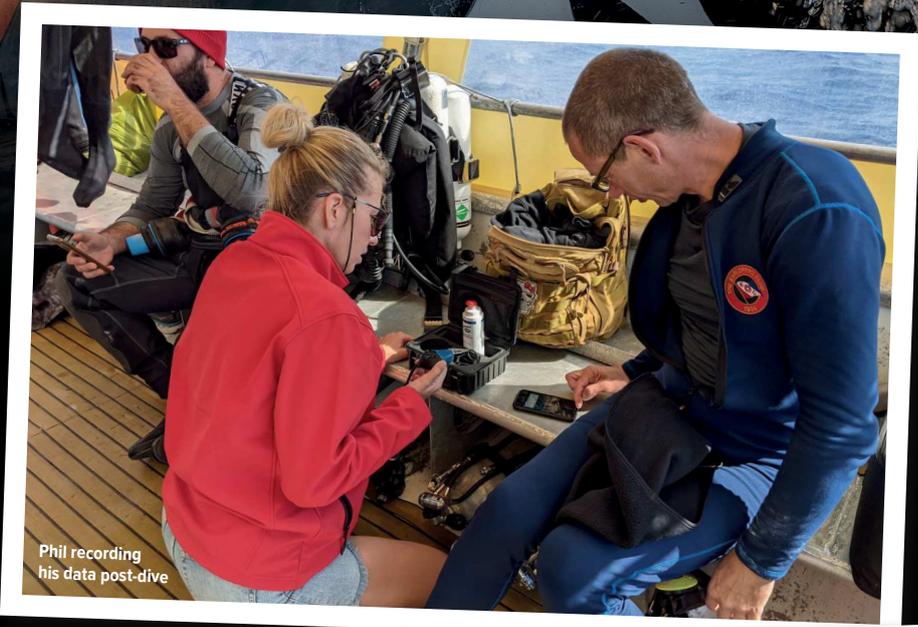
“ Regular readers will already know Phil Short – he’s arguably one of the world’s leading deep trimix wreck and cave divers and has featured in the magazine on many occasions ”

dive displayed as a percentage. An estimated ‘safety multiplier’ is also displayed, which represents the increase in safety compared to the original profile.

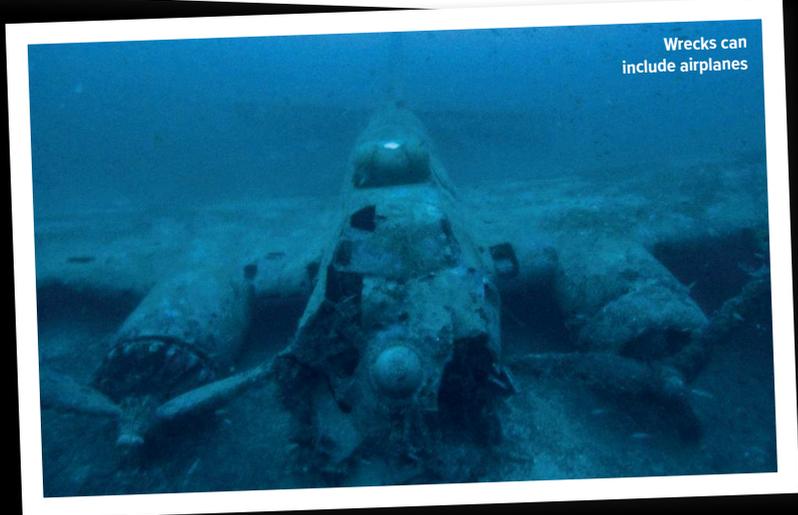
Armed with the insight you’ve gained from tweaking your profile with the simulator, the theory is that you incorporate these changes into your profile and take them diving. But how well does it work in reality? Regular readers will already know Phil Short – he’s arguably one of the world’s leading deep trimix wreck and cave divers and has featured in the magazine on many occasions.

With years of experience diving at expedition level in some of the world’s most-inhospitable regions, Phil is just the sort of indestructible ‘lab rat’ you need to thoroughly evaluate the effectiveness of something like the O’Dive. Phil has used the device on a number of recent projects, including high workload dives on a World War Two B-17 bomber aircraft laying at a depth of 70m in Croatia and – most recently – exploration at depths of up to 130m in the Langbans Mine in Sweden. We asked Phil for his take on how the O’Dive had performed on these projects.

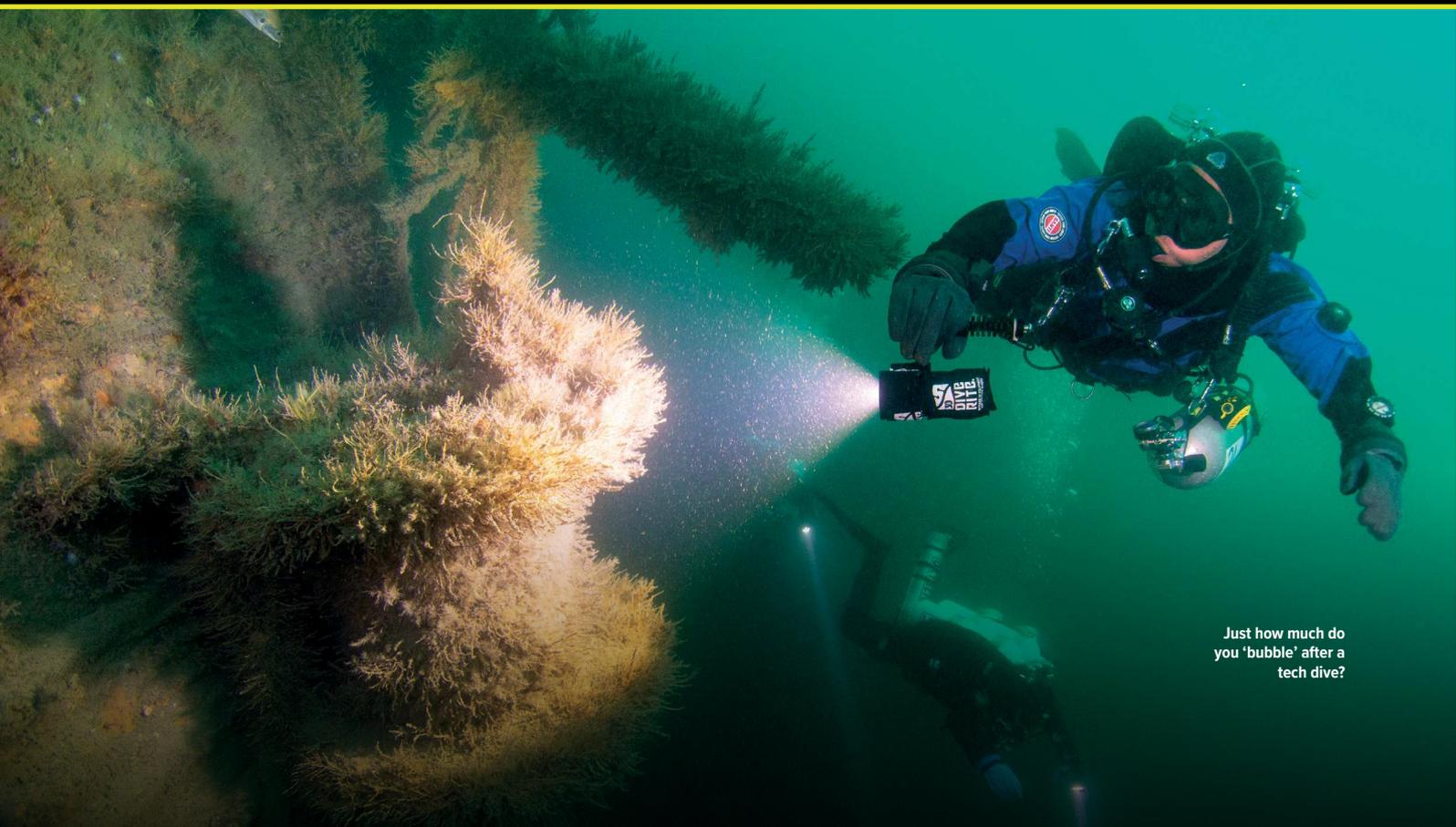
“The O’Dive was used to great effect daily during the B-17 repatriation project in Croatia by the entire six-man team. We were physically working at depth ▶



Phil recording his data post-dive



Wrecks can include airplanes



Just how much do you 'bubble' after a tech dive?

and to lower work of breathing, we used high helium content CCR diluent mixtures to reduce gas density. The work involved placing and operating a hydraulic water dredge to syphon away sediment inside the fuselage of the aircraft. This workload produced reasonably high bubble scores and many of our O'Dive results were processed and analysed by a technician due to this. From these results we altered our Gradient Factors in line with modern thinking pioneered by leading scientists like Professor Simon Mitchell.

"I started with modifications that rested on well-established methods, mainly extending the last stop before surfacing, adding an additional stop half-way between the last required stop and the surface and conducting a very slow ascent from the conclusion of the last required stop and the surface. I then started to make very small changes in the first stop depth - for example, one stop difference or 3m. The bubble count reduced, the severity component dropped and yes, I felt less tired and had more energy post-dive.

"I've managed to get a few dives 'out of range' and several dives where an email from Azoth advised me that the automated results based on Azoth's enormous databases were being personally analysed by support technical staff. Which, to be honest, is reassuring.

"What I learnt was that my profiles needed reshaping rather than lengthening or shortening and that it would be prudent to always extend my last stop with the addition of a safety stop once my prescribed deco had cleared."

But what benefit would the average diver gain from using O'Dive? Again, we put this to Phil. "I've logged over 6,000 dives in 30 years as a diver and to date, had no incidence of decompression illness. I would like to maintain that track record by monitoring and evolving my dive profiles with all available advice and methods long into my diving future. Right now, the O'Dive is a significant advance in personal dive planning that will help me meet that goal."

Praise indeed, but perhaps the most exciting aspect of O'Dive is something far less tangible. O'Dive gives us an enticing insight into the potential



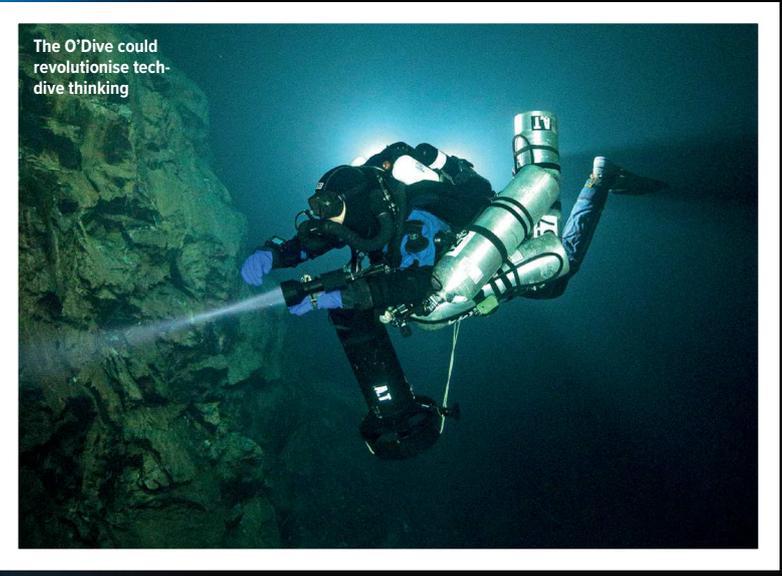
The O'Dive could make tech dives to wrecks like this much safer

COMPUTERS • O2 CELLS • GAS ANALYSERS
 CABLES & CONNECTORS • REBREATHER PARTS
 PATHFINDER STROBES • SENSORS
 TOOLS • SOLENOIDS

Every tech diver wants to minimise their risks



The O'Dive could revolutionise tech-diving thinking



“ Phil is just the sort of indestructible ‘lab rat’ you need to thoroughly evaluate the effectiveness of something like the O’Dive ”

of this technology and what it could mean for diving moving forward. As the technology reduces in size still further, could we see a future where divers wear sensors during a dive that communicate real-time physiological data to their dive computers? Imagine a future where your computer is generating a dive profile specific to your body. Dehydrated?

Feeling the cold? Your computer could compensate for these factors. Now that is truly exciting and could represent a seismic shift in diver safety. The future is ‘wearables’ and you heard it here first, folks.

Ok, so we’re not there yet by a long shot, but O’Dive still offers a glimpse of that tantalising future in a compact and easy-to-use package that could deliver genuine improvements in diver safety. While it may appear expensive, bear in mind that every O’Dive supports multiple user accounts so a dive club could buy just one and share it among all their club members. The first two users – the owner and their buddy, for example – get unlimited bubble analyses while additional users get 30 free analyses shared between them. Additional users then have the option of paying just £3 per analysis. For the cost of a coffee, that’s pretty good value.

For any diver – or team of divers - involved in more adventurous diving, O’Dive could be the most-significant new diving product to see the light in recent years. It’s easy to use and manages to present immensely complicated data in a form that most divers can understand and interpret relatively easily. For those who feel they may need a little guidance, several training agencies now offer O’Dive courses. Whatever your level of diving, O’Dive provides the additional insight you and your dive buddies need to increase personal safety and feel far better post-dive. For anyone that’s felt like they’ve gone ten rounds with Mike Tyson after a dive, that’s got to be a good thing. ■

Tech diver exploring inside a mine

