Reference

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Dr David E Davies is a consultant anaesthetist and the Education Officer of SPUMS. His address is Suite 6, Killowen House, St Anne's Hospital, Ellesmere Road, Mount Lawley, Western Australia 6050.

WHY I USE A DIVE COMPUTER

Guy Williams

I began using a dive computer in the late 1980's, when the first of the modern generation of dive computers came onto the market, and have been using one ever since, although I have updated the model three times. Before this I used a conventional set-up with contents gauge, watch and depth gauge. My first depth gauge was an old oil-filled gauge (a not particularly accurate instrument, and like most divers I never had it serviced) with no maximum depth indicator (MDI), I updated this unit to a more modern model unit with an MDI, and I noted that many of my dives were suddenly deeper than I had previously recognised. I continue to use a dive watch, but only to tell the time. I recall not infrequently descending on a dive, thinking about photography and my camera gear and forgetting to set the bezel on my watch. I believe most of the audience have done this at least once, a computer does this automatically.

At least with a computer, it only requires to be activated before entering the water, everything else is automatic. Computers log depth and time with great accuracy, and as a bonus offer advice on decompression/no-decompression requirements, again without requiring any input. Previously I was a user of the US Navy tables and later the PADI recreational tables. I saw in a recent review in Pressure, that a US Navy survey produced 75% incorrect answers on table usage. Unfortunately no one seems to have a copy of this survey so I cannot test myself. If divers, as they do, run out of air because they do not look at their gauges, how can we expect them to look up the tables, and follow them accurately.

My first computer was an early Oceanic Datamaster, with air integration, I found this a great step forward. It was easy to operate, had a clear display and was very accurate. I could spend more time enjoying my diving and less time on the procedural aspects of diving.

I now use the a current model of air integrated Datamaster. I find it a delight to use. However computers are not yet perfect. I have had computers fail, but only on the surface during the power-up self check. I should add that the Australian diving industry is excellent with replacing defective equipment under warranty. I carry a spare computer, partly because I believe that all computers can fail and therefore a backup is useful. I also carry a Spare Air, so I guess I like spares. However the main reason is that with a gauge on the end of a high pressure hose, and my eyes on the viewfinder of my camera, I find the best position for a gauge is beside the viewfinder. I would prefer a wrist mounted unit as I am used to gauges on my wrist. However this is the year that air integrated hoseless dive computers have appeared on the market, so perhaps in the future Sony will incorporate a dive computer's display in the viewfinder of their cameras.

I believe that air integration is a useful feature, as it accurately predicts a recommended dive time, based on my air consumption or on no-stop limits, whichever is least and to allow enough time to ascend safely. Another useful feature is a low air warning, a number of computers now produce an audible warning when air levels are low and a persistent warning when air reserves are critically low. The audible warning also alerts other divers in the vicinity, if they are aware of its significance.

At last year's meeting Chris Acott presented details of his diving incident survey, in which being out of air or low on air was a significant factor in many incidents. I believe air integrated dive computers will make this much harder to achieve.

Another feature of my dive computers, and I believe some others, is an ascent rate warning, i.e. if I exceed the recommended ascent rate there is a visual and audible warning. I find it interesting the number of times that the ascent rate warning beeps and flashes, on dives when I would not have noted an excessive ascent rate, particularly on dives with no reference point for ascent, such as an anchor line or reef. Perhaps another feature that could be incorporated in future computers is a descent rate indicator, this would be useful for diving Pelilu Comer in Palau, with its vertically down currents.

I also like the bar graph depicting my nitrogen loading, if I follow the manual and stay out of the caution zone, then I always remain 10 minutes outside the no-stop limits, combined with a 5 minute safety stop. I believe this is a useful safety feature. It is informative to see my progress towards the nostop limits. I should add that I have read the manuals that came with my dive computers, on more than one occasion.

Dive computers, like all instruments need to be cared for. I am careful to protect it from excessive trauma, and I keep it in my buoyancy vest pocket, to protect the gauge and the reef from accidental damage. At the end of a

day's diving I usually take my regulator and computer back to be rinsed in fresh water. I carry a spare battery, and change the battery regularly.

One problem is, if I am diving with a partner who is not familiar with my computer's display, the buddy does not appear to understand it. A computer display can be a little confusing if not seen before. This is especially important with the wide variety of models on the market, and the number continues to increase.

I also like the concept of multilevel diving, especially on SPUMS trips. At home in Melbourne most of the diving is square profile. I have tried a PADI Wheel and even had lessons on how to use it from Ray Rogers. However it is much easier to use a computer, as it makes multi-level diving a breeze and diving more enjoyable.

The ability of computers to log previous dives, makes completing log books easier and enables divemasters to check dive profiles. Divers presenting with diving related medical problems can retrieve their dive log from the computer. In the near future more computers will allow details to be down loaded onto a PC. At least one major supplier of dive computers is planning to supply hyperbaric units with free interfaces to suit its computers.

In the near future there will be even more models of dive computers on the market, with interfaces to down load dive details and user modifiable parameters, i.e. the user can make the unit even more conservative. Some newer models are programmed to compensate for water temperature and diver work. One manufacturer even proposes a head-up display in a scuba mask. One model now allows for software upgrades.

After discussions with a variety of dive shop proprietors it is clear that a large number of divers are buying computers and not dive tables. They dive shop owners feel that in the not to distant future only computers will be sold.

In the future we will have computers controlling rebreathers, and one manufacturer is considering a wrist mounted GPS (global positioning system) unit to replace the compass.

Dr Guy Williams is a general practitioner in the seaside town of Rosebud on Port Phillip.

His address is 8 Toorak Street, Tootgarook, Victoria 3941, Australia.

DIVE COMPUTERS

John Lippmann

Some of the newer "multi-level" tables include methods for compensating for parts of a dive spent shallower than the maximum depth. However, the ideal situation is to have a device that tracks the exact dive profile and then calculates the decompression and air requirements for the actual dive.

In the early 1950's, the United States Navy formed a committee to identify equipment modifications and improvements that were necessary to accommodate the newly introduced scuba operations. The committee published a report which incorporated a design of a diver-carried analogue computer which simulated nitrogen uptake and release in two theoretical tissue compartments. It also discussed what it described as the "Ultimate Gauge," an electrical analogue device which would indicate both the decompression and air consumption status of the wearer so that the diver would know if he had enough air to complete any required stops.[1]

Decompression meters and dive computers began to appear around the mid-1950's. Probably the best known of the early devices is the *SOS decompression meter*. This unit was designed in 1959 and is still commercially available today. It incorporates a ceramic resistor through which gas is absorbed and released. The pressure built up inside the unit would determine the required decompression.

In the following years, various organisations including Farallon, DCIEM and others experimented with a variety of pneumatic, electrical and electronic decompression calculating devices. By the mid-1970's, with the advance in microprocessors, it became possible to construct a relatively small computer capable of doing multi-level calculations.

1983 saw the release of two microprocessor computers which were specifically designed for recreational divers. One was the *Decobrain,* produced in Switzerland and the other was the US produced *Edge*. These initial units were large, relatively expensive and prone to problems. Improved technology has overcome some of the early technical restraints and over past several years we have seen the introduction of affordably priced computers that offer more accurate depth and time recording, together with multi-level decompression calculations.

Some early dive computers had decompression tables programmed into their memory and read the tables to give the diver appropriate decompression information. However, most dive computers are programmed with a