



**O'DIVE PRO CONNECTED SERVICE**  
**Risk Management - Decompression Procedures Monitoring**

**The recurrence of DCS despite the compliance with the diving procedures is indicative of a limit that has now been reached**

- **Numerous DCS cases are reported every year around the world**

These accidents can occur randomly, despite the compliance with the regulatory decompression procedures.

- **What progress can be made for the safety of hyperbaric workers?**

The large and uncontrolled number of factors potentially contributing to DCS precludes any prospect of rapid progress.

Even beyond decompression sickness, poorly adapted decompression procedures are also synonymous with increased arduousness, fatigue, and potential long-term effects for personnel.

**O'Dive PRO<sup>1</sup> provides access to unprecedented risk control**

In such a context and for the first time in the world, **O'Dive PRO offers the possibility to control the level of adaptation of decompression procedures to a group of users in their real working conditions.**

**Control the quality of procedures through desaturation monitoring**

**O'Dive PRO** is a patented innovation that enables the **analysis of the quality of decompression procedures** by **considering two indicators** for which a correlation to the DCS risk has been proven: the dive exposure parameters on the one hand and **the quantity of microbubbles detected in the operators' bloodflow after their intervention.**



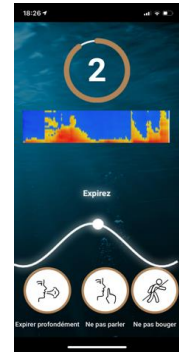
**O'Dive PRO includes a vascular microbubble sensor (ultrasonic Doppler technology) connected to a server with specialized analysis tools.**

Exposure profiles can be imported either manually, or by means of a **data-logger watch used to record these profiles.**

<sup>1</sup> O'DIVE PRO connected service is one of the TOTAL Group's *Recommended Practices*.

## How are the measurements taken?

1. After the decompression, each intervenor places the sensor for 20 seconds under his left and then right clavicle and records the signals on the tablet. He is fully assisted in this by the O'Dive software and can ensure the correct positioning of the sensor thanks to a venous flow presence indicator (red-orange signal on blue background).



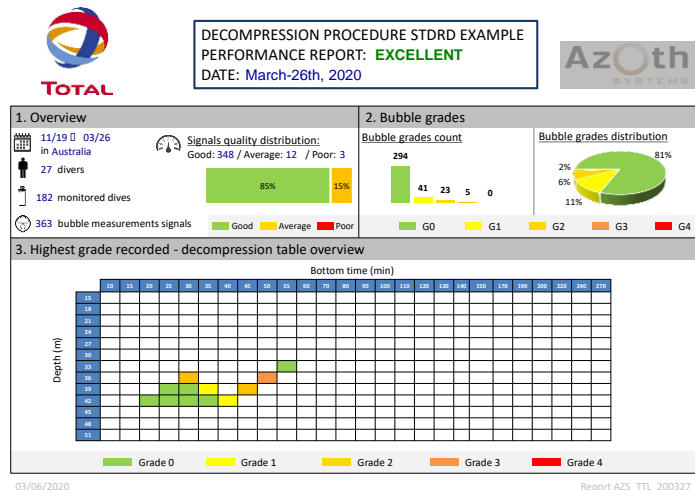
2. He then inputs his exposure settings manually or imports the digitized exposure profile if he uses a data-logger (option).

3. Data is synchronized to a server at the push of a button.

4. A collective summary reporting the adequacy of the decompression procedures to the operators in their current conditions of intervention is updated on a server. This information can be used - if necessary - to increase the conservatism of the procedures.



## Example of a periodic report:



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## References:

- (1) - Hugon J. et al. "Reliability of venous gas embolism detection in subclavian area for decompression stress assessment following scuba diving", *Diving and Hyperbaric Medicine* 2018; 48 (3): 132-140.
- (2) - Hugon J. "Decompression models: review, relevance and validation capabilities", *Undersea Hyperbaric Medicine* 2014; 41(6): 531-556.
- (3) - Gardette B. "Correlation between decompression sickness and circulating bubbles in 232 divers", *Undersea Biomedical Research*, vol. 6, No. 1, 1979.
- (4) - Eftedal O.S., Tjelmeland H., Brubakk A.O. "Validation of decompression procedures based on detection of venous gas bubbles: a Bayesian approach". *Aviation, Space and Environmental Medicine* 2007; 78: 94-99.
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- (6) - Jones A.D., Miller B.G., Colvin A.P. "Evaluation of Doppler monitoring for the control of hyperbaric exposure in tunneling", *Research Report RR598. UK Health and Safety Executive*; 2007.