



**Risk Management**  
**Control and supervision of the quality of Hyperbaric Procedures**

**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**

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

- **As it stands, there is virtually no prospect of improvement in the situation**

The large 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>: a connected risk management and decision support service**

In such a context and for the first time in the world, O'Dive PRO offers the possibility to monitor and control the quality of decompression procedures in real working conditions.

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

O'Dive PRO analyzes the quality of decompression procedures by considering two indicators for which a correlation to the DCS risk has been proven: the dive exposure parameters and the quantity of microbubbles detected in the operators' bloodflow.

O'Dive PRO includes a vascular microbubble sensor (ultrasonic Doppler technology) connected to an analysis server and an information reporting site.

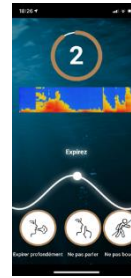


*O'DIVE PRO connected system*

<sup>1</sup> O'DIVE PRO connected service is one of the TOTAL Group's [Recommended Practices](#)

## How are the measurements taken?

After surfacing, the intervenor places the sensor for 20 seconds under his left and then right clavicle. The signals are automatically recorded on the tablet. A visual feedback shows the operator the correct positioning of the sensor (red-orange signal on blue background). Exposure parameters are input manually or digitally imported.



The operation is done in just a few minutes, autonomously by the workers themselves. It does not require any additional human support.



## Control & supervise the quality of hyperbaric procedures

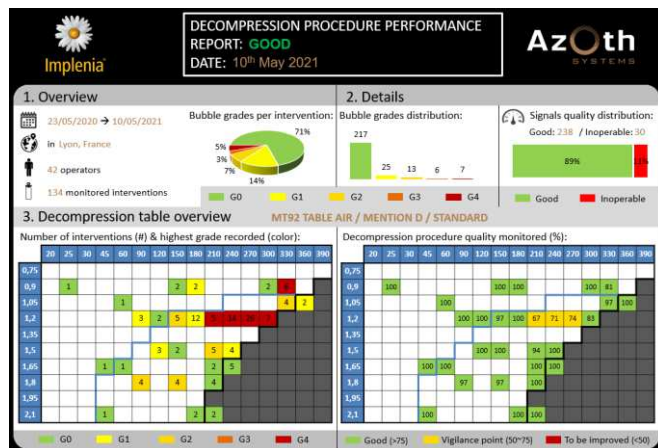
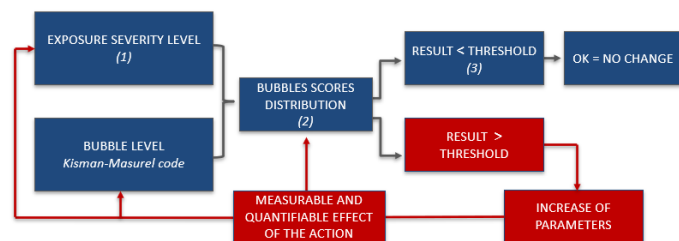


Illustration of an online report

A digital synthesis reporting on quantities of bubbles measured (Kisman-Masurel code) on each table point is updated periodically.

The statistical value of bubble levels is representative of a level of physiological stress specific to each table point.

A robust and controlled decision-support tool is made available to the EHS chain to optimize the safety of operators.



- (1) : Ratio between gas charge and total decompression time
- (2) : Function of (1) and circulating bubble level (KM code)
- (3) : Maximum bubble grade distribution threshold (convention)

Example of a decision support flowchart

## Rewards

**SUHMS prize:** Best poster at the 2nd International Scientific Congress of Francophone Hyperbaric Medicine



ITA TUNNELLING AWARDS 2021

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