MODIFYING YOUR MEG FOR DEEP DIVING

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Having spent the last ten years diving and teaching rebreathers, I had the opportunity to try most of the existing models, either commercially available, homebuilt or restricted to the military market. All of them have some benefits and some disadvantages, but none of them matched my needs like the ISC Megalodon CCR (in a previous article, I explained why the Meg became my favourite rebreather instead of the well-know APD Inspiration: www.cedricverdier.com/writings/articles.php).
However nothing could be perfect for everyone and I had to slightly modify my rebreather to better suit all the different types of diving I do. Some of these changes might be useful for other Meg divers (or any other CCR), some are very specific to the environment I dive in, the procedures I follow or the way I'm used to dive and work underwater.

1. For a comfortable and streamlined rig

- Counter-lungs:

Without being a fully DIR believer (I wouldn't dive a CCR otherwise!), I rather like to have a streamlined, neat and tidy equipment. So one of the first things I did with my Meg was to check if I needed all the Velcro straps, D-rings and plastic fastex buckles one can find on the counterlungs. I ended up with the conclusion that:

- I don't need any Velcro strap. With less hoses (see below), there is no need for the Velcro straps on both sides. The hoses are routed beneath other components that keep them in place. So I cut all the Velcro…
- I don't like the plastic buckles that hold the CLs. They can break or accidentally open. As I don't need the D-rings either, I just cut all of them and replaced everything with small loops of chock cords with SS dog clips. It's light, simple and always adjusted. I clip the CLs directly on some holes on the Koplin backplate and it keeps the CLs and the breathing hoses close to the chest, in a very low position on the shoulder and under the arms.

Leon Scamahorn was also kind enough to sew and re-size my counter-lungs to have a flatter and more streamlined profile.

- Handset:

I attached the primary handset with 2 loops of chock cord instead of the Velcro strap I found difficult to adjust, especially in cold water. The 2 loops are always adjusted, even at depth when the neoprene is compressed. And no more problem when I switch from wet suit to dry suit.
The secondary handset has a dog clip that goes on the left shoulder D-ring, the cable being tucked underneath the waist strap.

- Back-plate and wing:

I use a Koplin back-plate, so small and convenient that I sometimes use it with single tanks or even doubles! A hogarthian harness (continuous webbing) keeps everything simple. An Armadillo CCR Sidemount kit made by Golem Gear also helps to keep the bail-out tanks in a convenient and streamlined place (see article about the Sidemount kit at: www.cedricverdier.com/writings/articles.php)

- Tanks and regulators:

After having tried all the configurations I could think of (and I have a lot of imagination…), I chose to de-invert the on-board tanks. While still having an easy access to the valves, this configuration has several benefits: all the LP hoses can be cut much shorter, giving a more streamlined overall hose routing. The additional weight on top (tank valves and regs) actually helps to have a much better horizontal trim (a good option for all the "butt-heavy" rebreather divers).
All the regulators have custom-length hoses. I also have a Y block (M & J Engineering) on the diluent reg to keep everything simple.
The O2 manual injection hose is plugged in the exhalation CL instead of the inhalation CL. It gives more chance to have a better gas mixing before you breathe it and before the sensors tell you what you are breathing. Convenience wise, everything (ADV and O2) can be operated with one hand, the left one when I'm scootering, taking pictures or holding a shot line in a strong current.

- Protections:

For wreck penetration, or for cave diving through very small restrictions, I found quite useful to add some protections to several key components of the Meg. All the cables (handsets and HUD) are wrapped with plastic spiral coil (McMaster), even if people at ISC think that it's a kind of overkill, because of the highly resistant material used.
All the breathing hoses have some custom-made neoprene protections. It helps to avoid punctures, keeps the breathing mix warm in cold water and adds more buoyancy to a heavy DSV/BOV.

2. For deep and/or long dives

- Enough gas:

It maybe sounds logical but you should make sure that you have a lot of gas in all on-board tanks, as the IP of the regs has always to be lower then the HP in the tanks. And at great depths, the IP is quite high…
I have an off-board diluent connector on the ADV so I can plug different tanks directly on the ADV. M&J Engineering made a special shut-off valve (based on the standard one on the Meg) with a Quick-Connect fitted. It's a standard LP hose connector so I can use the same fitting on all the manual injectors, the ADV, the Wing Inflator or even the dry suit.
This off-board connector gives more flexibility in term of tank configuration. The Meg can be even run with only off-board tanks, depending on the cylinders available.

- Crush depth:

Some components of the Meg are limited in depth and for any dive deeper than 150m / 490fsw, it should be reasonable to modify them.

Any air-filled SPG might implode at depth. The battery compartments and the handsets can also crush as they are at atmospheric pressure. So these compartments should be filled with mineral oil (Johnson baby oil is fine, and it makes your skin smoother). Make sure there's absolutely no air bubble trapped or it's simply useless. However be aware that the oil will screw up your display over time. You might have some discoloration on the LCD display, but it's better than no LCD at all if it floods at depth.

- Enough scrubber duration:

Obviously the new ISC radial scrubber is the first choice when it comes to long duration, cold temperature or high level of exertion. ISC has tested different scrubbers at the ANSTI lab in the UK and the performance of their radial scrubber is awesome. Nevertheless, the standard axial scrubber is fine for most of the deep dives, as long as it's filled with the appropriate high performance absorbent and properly packed. Tests done for the CE certification show that the axial scrubber performs extremely well.

- Additional safety:

A FFM is clearly a good option to consider for long exposure (risk of Hyperoxia, cold, jaw fatigue). I chose a Supermask KMB-48 made by Kirby-Morgan because of its unique design (2 independent compartments) but I'm also aware of several Meg divers who use the Draeger Panorama FFM because of its large field of vision and its comfort (ISC makes a special DSV for it). (See articles about the M-48 FFM at: www.cedricverdier.com/writings/articles.php).
In any case, a BOV (Bail-out Valve) is a very convenient add-on. In case of problem, it becomes so easy to switch to OC for a few sanity breaths. Golem Gear has a BOV specially made for the Meg or any clamped hose rebreather.

There are not so many rebreathers on the market that can actually go very deep. I used the Meg at 226m / 740fsw and plan some deeper dives soon. I fully trust this unit as I know exactly how the Megs are designed and made at the factory. I spent a week doing the ISC Technician course and I really enjoyed building some units from scratch, including all the electronics. I was pleased to see the amount of work and the quality that are necessary to make a Meg. Thanks to Leon Scamahorn, Steve Stolen and all the team at ISC for taking the time to design, build and control their CCRs.