

The Technological Research and Development Department of the French Research Institute for Exploitation of the Sea (IFREMER) is currently working on the integration of ARGOS PMTs* into their ARVOR float. They plan to deploy these new, improved floats by the end of the year.

In Brest, in Western France, Serge LE RESTE, director of the profiler development project, Xavier ANDRE, an electronics expert, and Bertrand Moreau, a computer specialist, are developing the latest generation of ARVOR floats.

As part of IFREMER's operational oceanography program, the three engineers are using cutting-edge technology to help oceanographers collect more and more in-situ data on our seas and oceans. The first Argos-3 ARVOR floats will be added to the EURO-ARGO network as a European contribution to the international ARGO program.

These subsurface floats collect data (temperature, salinity, pressure) from all the world's oceans. Here is a look into some avant-garde development.

Why did you decide to integrate ARGOS-3 into your latest ARVOR float?

The floats that we develop at IFREMER are designed to be of use to physical oceanographers. They are at their most vulnerable when they come to the surface in order to transmit the data to the ARGOS satellites:

- surface drifting can lead to a float running aground,
- danger from trawling or collisions,
- risk of biofouling (accumulation of biological matter on the sensors, reducing measurement quality).

In order to mitigate these hazards, it is absolutely necessary to reduce the time the float spends on the surface.

Our latest ARVOR float, a descendant of the PROVOR model, includes several technological advances. Firstly, it has been miniaturized. Its weight has been reduced from 35kg to 20kg, its length from 2m40 to 2m and its diameter by 6cm to only 11cm.

We are currently working on ways to reduce the time spent on the surface for the reasons given above. The PROVOR float spent an average of six to eight hours on the surface. With the introduction of the ARGOS-3 interactive transmission mode, ARVOR floats will only need to spend 40 minutes,

15 minutes of which will be actual transmission time! This performance is made possible by their ability to foresee satellite passes, thanks to information communicated by the ARGOS-3 downlink.

This allows us to set a rendezvous between the ARVOR and an Argos-3 satellite for the float's next rise to the surface. It no longer has to spend hours transmitting to an empty sky. This means we are more efficient, as we now only transmit when a satellite is in range. In addition, the bi-directionality offered by the third generation of ARGOS instruments guarantees that transmissions succeed, thanks to the acknowledgements sent back by the satellite.

This ARVOR ARGOS-3 mode of transmission will therefore accommodate the transfer of a greater volume of data (a profile from 0 to 2000m with increased resolution), at a lower cost (less energy spent on transmission) and more efficiently (less time spent on the surface).



When will they be deployed?

We have been developing the software for this float for nearly 10 months. Test bench qualification for nominal operations, simulating the float's environment, is almost complete. However, we still need to be sure it can manage cases of error, which is vital for such an autonomous instrument.

We therefore hope to deploy our first 'ARGOS-3 generation' ARVOR by the end of this year.

The first stage will be integration of ARGOS-3 in IFREMER's ARGO floats!

Over the next few years, we hope that this technology will allow us to transmit data from other sensors and therefore to measure such physical parameters as oxygen, chlorophyll or sea turbidity.

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A new generation of ARVOR floats with ARGOS-3 capability

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* PMT: Platform Messaging Transceiver - Emetteur-récepteur Argos-3.