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## **HALIOS an innovative and clever Broad Band OBS.**

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A fruitful close collaboration between teams of researchers and engineers of Geoazur, a research laboratory specializing in seismic observation, and Osean, a dynamic company combining the talents of engineers in low-noise, low-power electronics specialized in underwater acoustics, gives this instrument a guarantee of robustness, reliability and innovation by capitalizing on all their knowledge in their respective fields. Halios has an autonomy of 18 months, dimensions of 1.1 x 1.1 x 1 m and a total weight with ballast of 346 kg. Electrical power is supplied by lithium or alkaline batteries. Halios is made entirely from corrosion-resistant materials. The 4-panel, mortise-and-tenon structure naturally creates a well in which the seismometer is protected. This well is covered by two flaps that open when the OBS sinks into the water, and close when the OBS stops on the bottom. During descent, the seismometer is suspended in the well. Once the OBS is in place, the seismometer is released automatically or by an acoustic command to land on the ground without any mechanical contact with the structure. This type of coupling is ideal, and protects the sensor from underwater currents. Communication with the OBS is possible via Ethernet, Wi-fi or acoustics once in the water by non-specialists. An acoustic module makes it possible to retrieve a health report on demand, which groups together the essential parameters of the station, and to modify some of them once the OBS is in the water. Halios incorporates precise clock or a CSAC-type atomic clock, if time precision is required. The seismometer is a compact Nanometrics Trillium, integrated in a dedicated container which also houses an accelerometer. An hydrophone, a precision temperature sensor and an absolute pressure sensor complete the range of sensors integrated on Halios. An dedicated acoustic modem also enables partial data retrieval from the surface. To retrieve the OBS, an acoustic command activates a mechanical release which frees the ballast. Dynamic assistance from leaf springs accelerates the positive thrust provided by the OBS's high-density syntactic foam. This foam is injected into a PHD shell, which effectively protects the whole unit and, thanks to its compact shape, provides effective anti-shock protection. The ascent of the OBS into the water column can be monitored by the acoustic module. Once at the surface, the time difference between the OBS clock and the GPS datum is automatically calculated. The OBS sends its GPS coordinates to the ship by VHF to facilitate recovery. At night, an LED flashing light can also be used to pinpoint its position. Halios is equipped with an interface that enables it to be connected to a real-time cable network, making it a versatile OBS of the highest performance and innovation.