

Novel Autonomous and Cabled OBS Solutions for Offshore Seismic Research

Seismologists have historically focused more on terrestrial seismic research, due to the logistical and financial challenges presented by offshore research. Guralp has developed technology which allows the seismology community to more easily monitor offshore seismicity, improving offshore seismic data resolution. This is due to systems such as the Aquarius autonomous ocean bottom seismometer (OBS) and world-leading engineering advancements in Science Monitoring and Reliable Telecommunications (SMART) cables.

Aquarius can be deployed autonomously on the sea floor for up to 18 months. The sensor works at any angle without using a gimbal system, and can wirelessly transmit SOH and seismic data to the surface via an integrated acoustic modem. These features allow researchers to monitor and transmit data without offshore cabling, thereby reducing the logistical challenge associated with offshore OBS whilst maintaining some degree of real-time data transmission. Optional surface communications can be permanent (buoy-mounted), semi-permanent (wave-glider) or on demand (ship-of-opportunity or dedicated voyage).

Cabled solutions are also important, as they give users access to high-resolution data in real-time via a data cable linked to an onshore data centre. As an example, Guralp's Orcus cabled OBS provides these features as a complete underwater seismic station with observatory grade seismometer and strong-motion accelerometer in a single package. The Maris cabled broadband system offers additional flexibility with omnidirectional functionality, a narrow diameter and the ability to string multiple sensors together.

SMART cables show great potential for increasing the number of cabled ocean observatory deployments in the future. Combining several applications into a single system, including seismic monitoring and telecommunications, large scale monitoring networks can be created cost effectively by combining efforts from several industries. As a practical example, Guralp is developing a demonstration SMART Cable system to monitor volcanic and seismic activity offshore in the Ionian Sea in collaboration with Istituto Nazionale Di Geofisica e Vulcanologia (INGV). This will be the first practical demonstration of this technology and there are plans for additional projects in the future.

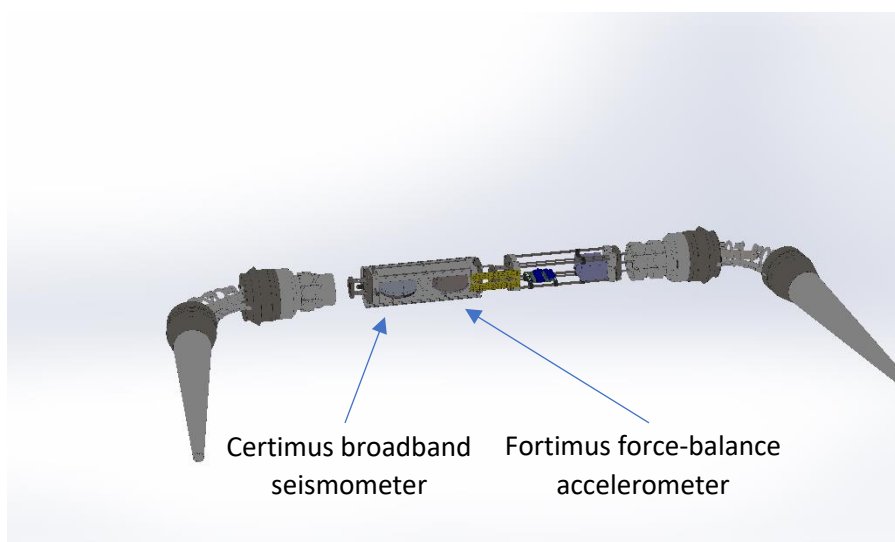


Figure 1: Model showing the Fortimus and Certimus housed inside the repeater.