



Pushing Boundaries with Ocean Bottom Seismometers (OBS) with a Pool-Ready System: Guralp Aquarius

Aaron Clark¹, James Lindsey¹, Phil Hill¹, **Connor Foster**¹, Federica Restelli¹, Neil Watkiss¹, Ella Price¹, Mladen Nedimović², and Graeme Cairns²

¹Guralp Systems, Aldermaston, United Kingdom of Great Britain – England, Scotland, Wales (aclark@guralp.com)

²National Facility for Seismic Imaging, Halifax, Canada

Cabled ocean bottom seismometer (OBS) solutions are financially and logistically challenging and autonomous OBS systems do not provide operators with seismic data until recovery. To address this issue Guralp has developed Aquarius, an ultra-low-power, free-fall OBS system, operational at any angle and with the ability to transmit seismic data in near-real-time from the seafloor without the use of cables.

The Guralp Aquarius incorporates seafloor-to-surface acoustic communication technology that allows state-of-health and noise performance interrogation during installation followed by retrieval of seismic data throughout the deployment period.

Omnidirectional broadband seismometer components allow the Aquarius to land and operate on steep slopes without requiring a gimbal mechanism that inherently introduces noise and failure modes. Raw data is recorded uncorrected for orientation to allow users to correct during post-processing.

These unique features allow the sensor to function on uneven seafloor as well as transmitting seismic data to the surface where the operator can use noise characteristics, location, and orientation data to determine if the landing site is suitable.

Intelligent battery design allows for typical 18-month deployments, with charging being possible alongside data transfer. This allows recharging, download and configuration simultaneously on the ship in between deployments.

Ease of configuration, deployment and recovery followed by simple data processing are all central themes to the Aquarius. The capital investment required to purchase OBS systems often means that the OBS instrument must be adaptable to a range of use-cases.

The Aquarius is in use in 6 different countries and is the unit of choice for the Canadian OBS pool, comprising 120 units for deployment around the globe. Aquarius units have been successfully deployed in the Mediterranean, North Atlantic as well as the North and South Pacific. Here, we focus on the mechanics of deployment and recovery for demonstrating to experienced and prospective principle investigators how this system simplifies and improves confidence in

deployment.