

Odyssey Marine Exploration Extends Positioning Range with Sonardyne GyroiUSBL



Odyssey Marine Exploration has successfully evaluated subsea technology allowing a geophysical towfish to be tracked at distances far greater than current methods allow by during trials in the Bay of Biscay. The Sonardyne Ranger 2 GyroiUSBL system was able to track Odyssey's latest deep tow side-scan platform at a slant range of 7,500 metres from its vessel, *Odyssey Explorer*. Only the depth of the ocean prevented greater ranges being achieved.

Inverted USBL

Long layback tracking of towfish has traditionally always been a major challenge for conventional Ultra-Short BaseLine (USBL) acoustic positioning systems due to the very long slant ranges involved and vessel noise degrading performance. Sonardyne first sought to address this challenge back in 2006, turning the problem on its head to create Inverted USBL (iUSBL).

In normal USBL operations, an acoustic transceiver is fitted to the survey vessel and an acoustic transponder is fitted to the target being tracked. With iUSBL, their positions are swapped; the transceiver is installed on the towfish looking up at the transponder deployed from the vessel. The net result is that the signal-to-noise ratio is dramatically improved which in turn, allows long ranges and greater precision to be achieved.

The Ranger 2 GyroiUSBL system builds on this technique by exploiting the long term accuracy and precision of acoustic positioning with the continuous availability and fast update rate of high-grade inertial navigation sensors.

Single-housing Motion Compensation

All USBL transceivers require motion compensation, whether vessel-based or installed on a towfish. Typically this requires an attitude and heading reference sensor to be co-located with the transceiver, which is both complex and time consuming to correctly align. Inside the Sonardyne GyroiUSBL, the features of the sixth generation HPT acoustic transceiver technology are combined with SPRINT, a subsea INS that can result in more than 10 times improvement in positioning precision over USBL alone. Combining both instruments into a single titanium housing depth rated to 7,000 metres enables organisations like Odyssey to quickly and efficiently mobilise deep tow technology without having to worry about navigation sensor offsets.

For the test, Odyssey used a directional Wideband Mini Transponder (WMT) in responder mode mounted to an over-the-side deployment pole from the *Odyssey Explorer*. This was interfaced via control room hardware to the GyroiUSBL transceiver mounted on the towfish. Power and communications to the GyroiUSBL was provided through a Nexus multiplex fibre optic telemetry system.

With the towfish fully deployed, Odyssey used the GyroiUSBL to passively listen for the WMT's signal in a low noise, dynamically stable subsea environment. This meant that they were able to accurately track the position of their towfish at a previously unachievable slant range of 7,500 metres. Additionally, the acoustic transceiver component of the system incorporated Sonardyne's unique ping stacking technology to provide a tracking update rate of 2 hertz, irrespective of range and water depth.

Potential Beyond 9,000m

Odyssey are pioneers in the salvage of historic, deep water shipwrecks and rely heavily on side-scan sonar to identify potential targets. The towfish being used during the recent trial has been designed to their exact specification to enable far deeper depths to be explored.

During the trial, the GyroiUSBL kept tracking until the ocean depth became prohibitive. Analysis of the signal-to-noise data at the time indicated that the potential to continue tracking could have gone to beyond 9,000 metres had the winch cable been able to extend further. These ranges were attained using the lower end of the medium frequency band. This means that the multi-beam data quality is significantly enhanced due to less in-band interference at the source.

Speaking about the positive results of the tests, Andrew Craig, senior project manager at Odyssey Marine Exploration, said that the addition of the GyroiUSBL system has introduced a new dynamic to the positioning of towed vehicles at greater water depths and slant ranges that are not facilitated by traditional USBL. The ability to achieve accurate and precise positioning of the towfish mitigates the concerns of gaps in search blocks, unknown offsets from currents and the influences of catenary in the cable that were by-products of

traditional layback calculations. As a result, the positions acquired via the GyroiUSBL system have allowed for a great reduction in operational time spent locating and inspecting subsea targets.

<https://www.hydro-international.com/content/news/odyssey-marine-exploration-goes-to-great-lengths-with-sonardyne-gyroiusb>
