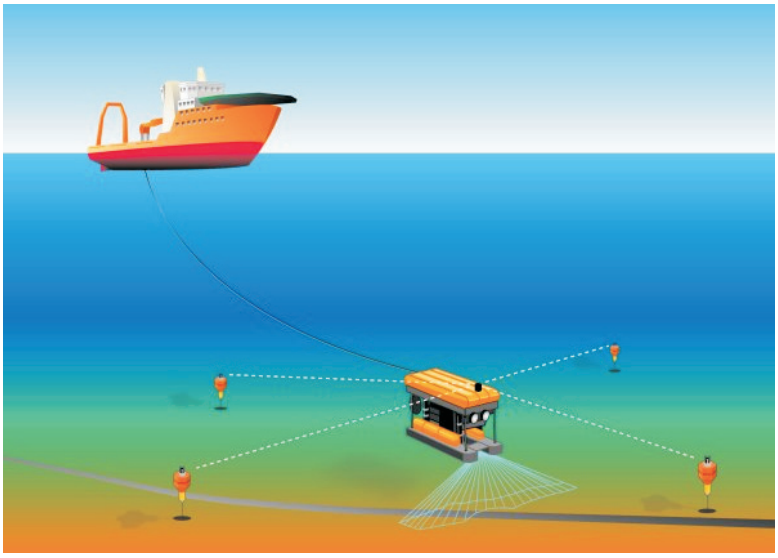
HPR 408S

KONGSBERG

Subsea Long Base Line hydroacoustic positioning reference system

Increased accuracy requirements

Since the shipboard Super Short Base Line (SSBL) system has its accuracy degree as a result of how accurate it is possible to measure the angles down to the transponder, the position error will increase with the range to the transponder. The Long Base Line (LBL) principle of underwater positioning, using range measurements only, will improve the position accuracy and stability of a subsea ROV / structure relative to a seabed transponder array. How accurately is dependant on some practical and physical factors, but, under normal conditions, the position stability of the ROV is within a few decimetres.



System description

The HPR 408S subsea LBL system uses a special beam-forming ROV transducer with a doughnut shaped beam. This beam design is used to concentrate the sensitivity towards the transponder array, and hence reduce the sensitivity towards ROV and surface vessel generated noise. The HPR 408S system has the 3000-m rated subsea transceiver installed on the ROV together with the transducer. The interface to the surface is via an optical or electrical serial line through the umbilical to the onboard HPR operator station. The onboard operator station may be the same as the HiPAP or HPR 410 / 418 system. This will secure full acoustic synchronisation. The LBL position update rate is typically around 2 seconds.

The system is a result of demands in the world market when going into deeper waters, where an accurate ROV and subsea module positioning will be more important, as well as accurate subsea infrastructure ranging using LBL calibration routines.

Other features are:

- LBL Auto Calibration
- Hundreds of transponder locations can be tied in
- Real time ray-bending error compensation
- Global co-ordinate calibration and positioning (if used with a ship system)
- LBL training mode
- Flexible redundant alternatives
- 56 different Transponder Channels
- Built-in simulation tool to optimise and adjust the transponder turn-around delays

Perfect subsea survey tool

With its high accuracy, good repeatability and high reliability, HPR 408S is seen as the multi-purpose hydroacoustic positioning system for ROVs, UUVs, AUVs and other subsea devices.

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"World record" in transponder channels

The HPR SSBL and LBL systems can operate with up to 56 transponder channels. They also provide transponder telemetry communication for use with transponder release, sensor readings and Long Base Line telemetry and functionality.

Suppressing of noise

The HPR 408S transducers have directive receiving beams. This minimises the influence of noise coming from the ROV's thrusters and propellers, as well as sea surface noise.

Automatic compensation for ray bending and sound velocity errors

The HPR 408S takes input of the local sound velocity profile, calculates, error compensates and displays the effect of the physical phenomenons of sound velocity differences in the water layers.

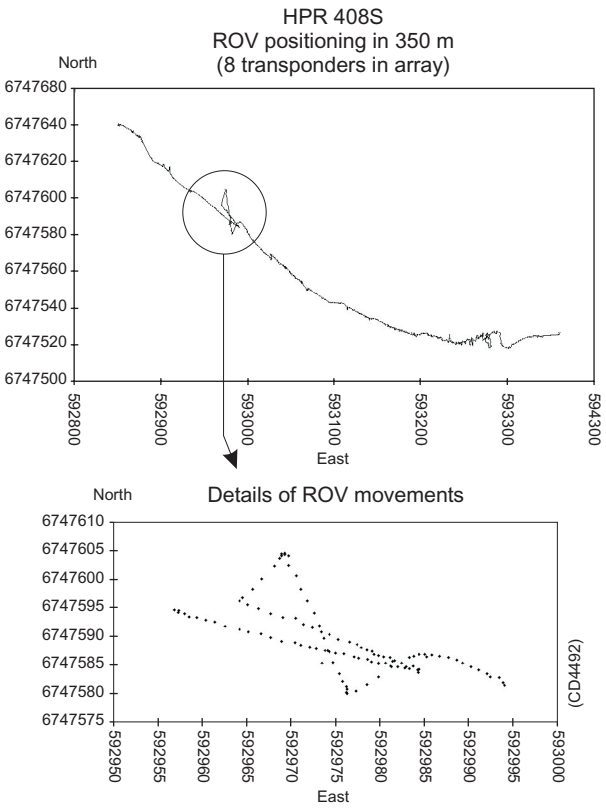
Deep water version

The system can also be delivered in a deep water version using ultra deep water transponders. Even a combination of deep water and standard is made possible by having two transducers interfaced to one transceiver unit.

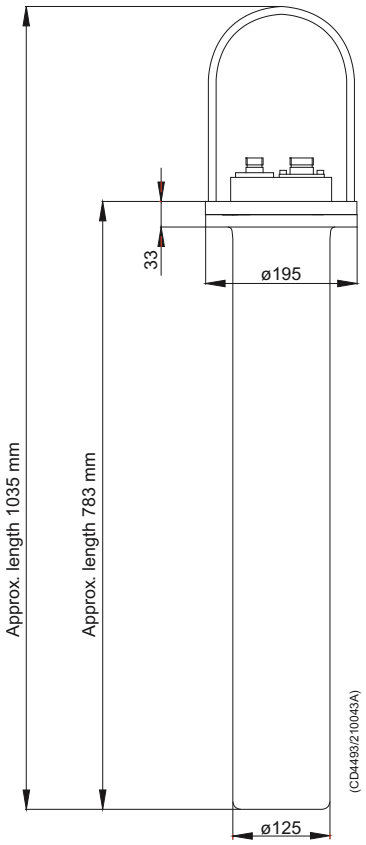
Position accuracy

Kongsberg Maritime has gone to great lengths in hardware and software development to ensure that the ranges are measured accurately. The HPR 408 may be interfaced to accurate sound velocity profiling sensors, and the software will compensate both for ray bending and range errors caused by variations in sound velocities in the different thermal layers. However, the accuracy of an LBL system is not determined by range measurement accuracy only. It is totally dependent on the number of transponders, the network geometry, baseline lengths and network calibration. When these details are known is it possible to define the position accuracy for a given application.

Range accuracy's down to a few centimetres can be obtained, while ROV / module positions can be calculated within a few decimetres.



Examples of HPR 408S ROV LBL position plots (UTM)



Subsea transceiver

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