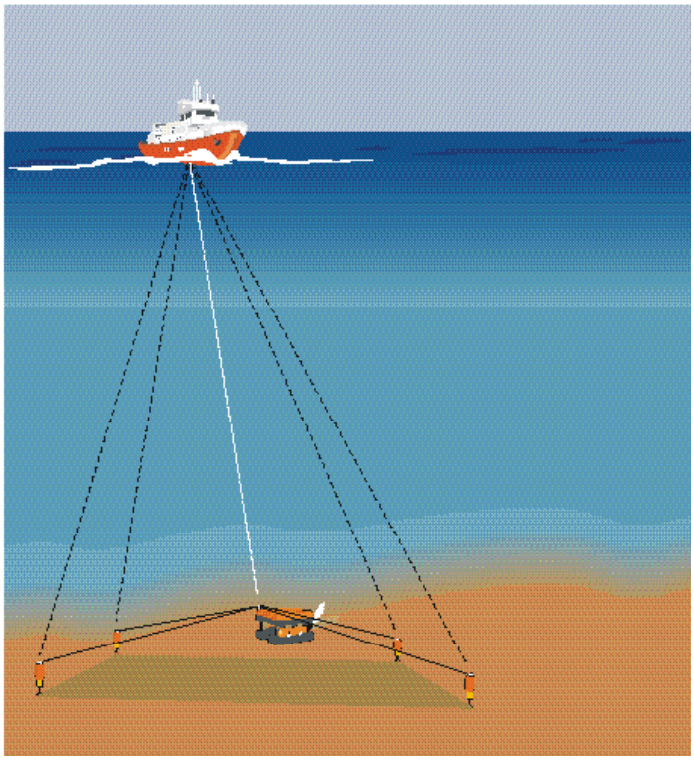
HPR 418

KONGSBERG

Hydroacoustic Positioning Reference
Combining the SSBL and LBL principles



Increased accuracy requirements

The Super Short Base Line (SSBL) principle 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 the vessel relative to the seabed in deeper waters. How accurat is dependent on some practical and physical factors, but, under normal conditions, the position stability of the vessel is within a few decimetres.

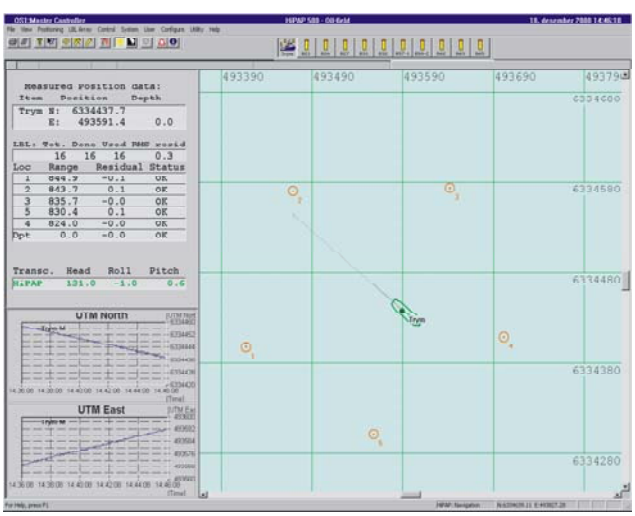
Combined SSBL / LBL system

This system uses an on-board multi-element transducer. The system may operate as an SSBL system and as an LBL system simultaneously. As an example, the vessel may be positioned relative to the seabed using LBL when an SSBL transponder is positioned relative to the vessel, and the positions are displayed relative to the LBL transponder array on the seabed. The combined system will also use the measured angles together with the measured ranges in the LBL positioning. The combined measurement gives a robust system with increased accuracy. An LBL solution is achievable when only two transponder replies are detected. The system is a result of demands in the world market when going into deeper waters, where an accurate and stable reference will be more important, as well as accurate subsea ranging requirements for calibrated transponder arrays will be solved. Other features are:

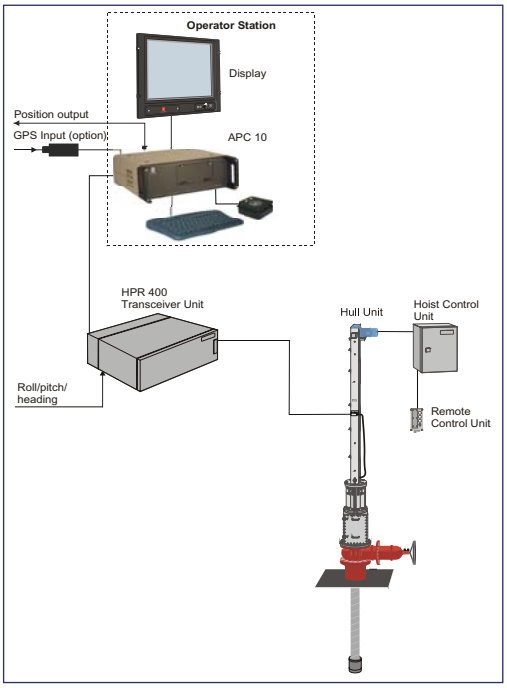
- LBL Auto calibration
- Hundreds of transponder locations can be tied in
- Real time ray-bending error compensation
- Global co-ordinate calibration and positioning
- LBL training mode
- Flexible redundant alternatives
- 56 different transponder channels

Application areas

The system can be used in *relative positioning*, as a *stand-alone navigation system*, or it can be *integrated with surface navigation systems* for absolute geographical positioning. High accuracy and reliability also ensure secure *reference to DP systems.*



Typical HPR 418 system configuration



The HPR 418 system operates with the transducer mounted on a hull deployment unit, allowing the transducer to be lowered some metres below the keel. A Transceiver Unit containing transmitter, preamplifiers andbeam-forming electronics is interfaced to the transducer and hull unit. The system can be configured with one or two hull-mounted transducers. With the use of two transducers, flexibility and redundancy will be further improved. The system is controlled and operated from an Operator Station (OS) using the APOS software. The APOS software runs on a Windows XP platform, using standard windows graphical user interface.

Hull deployment units

A key element in the reliability and precision of the HPR systems is the range of high quality hull units, which allows the transducer to be lowered to a depth sufficient to minimise the effect of noise and air layers below the vessel. The hull unit is installed on top of a gate valve, which can be closed when servicing and maintaining the transducer. These high quality hull units can, either locally or remotely, automatically raise and lower the transducer through the vessel's hull.

"World record" in transponder channels

The HPR 418 can operate with up to 56 transponder channels, in addition to the "old HPR 309" channels, and has also transponder telemetry communication for use with transponder release, sensor readings and Long Base Line (LBL) telemetry and functionality.

Perfect survey tool and preferred DP reference

With its high accuracy, good repeatability and high reliability, HPR 418 is seen as the multi-purpose hydroacoustic positioning system.

Suppression of noise

All the HPR 418 transducers have directive receiving beams. This will minimise the influence from noise coming in from the vessel's thrusters and propellers.

Automatic compensation for ray bending and sound velocity errors

The HPR 418 takes input of the local sound velocity profile, it calculates, error compensates and displays the effect of the physical phenomena 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

The vessel position can be calculated to within a few decimetres using the LBL principle. Please refer to the HPR 410 brochure for SSBL accuracy.

Operating range 20 - 32 kHz

Standard transponder

w/ 188 dB SL ..... Typical max. 1500 m

High power transponder

w/ 195 dB SL ..... typical max. 2000 m

w/ 206 dB SL ..... typical max. 3000 m

The range capabilities very much depend on the vessel's noise level and reduction in transponder signal level due to ray bending.

Operating range 10 - 15 kHz

w/ 205 dB SL ..... typical max. 6000 m

Kongsberg Maritime AS

Strandpromenaden 50
P.O.Box 111
N-3191 Horten,
Norway

Telephone: +47 33 02 38 00
Telefax: +47 33 04 47 53
www.kongsberg.com
E-mail: subsea@kongsberg.com

KONGSBERG