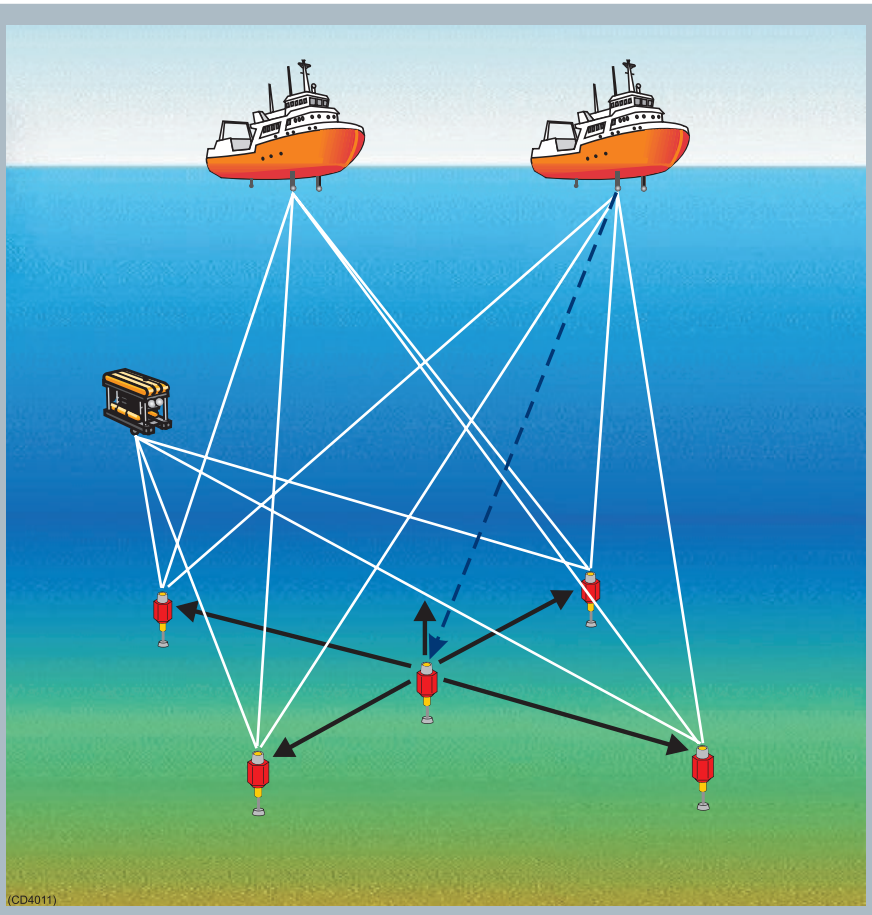
MULBL

KONGSBERG

Multi-User Long Base Line system



Key features:

- One offshore field
- One transponder array
- Many vessels and ROVs
- Proven since 1998

System description

The Multi-User Long Base Line (MULBL), is a hydroacoustic positioning system. Several individual vessels and Remotely Operated Vehicles (ROVs) can position themselves using the same seabed transponder array.
The MULBL will especially prove its value in deeper waters, as it can give a higher position update rate than any other acoustic positioning system.

The system has the main advantages:

- Provides high position accuracy (comparable to standard Long Base Line (LBL).
- A small number of transponders can serve several vessels and ROV's at the same time.
- Secures high position update rate (down to approximately 2 seconds), which is essential in Dynamic Positioning (DP) operations.
- Avoids transponder frequency collisions when vessels are working in the same area (all vessels are "listening" only).
- Uses standard LBL transponders (MULBL is a mode setting).

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Operational principles

A transponder array is deployed and calibrated using subsea baseline measurements, or run time calibration. The transponder (TP) array must be deployed in such a way that one of the transponders in the array has communication with all the other transponders in the array. This transponder is used as the Master in the positioning phase. The other transponders are called the Slaves.

The Master transponder acts as a Beacon. It starts a positioning sequence by performing the steps described below. This is done regularly with an interval set by telemetry from one of the vessels
(Positioning update rate).

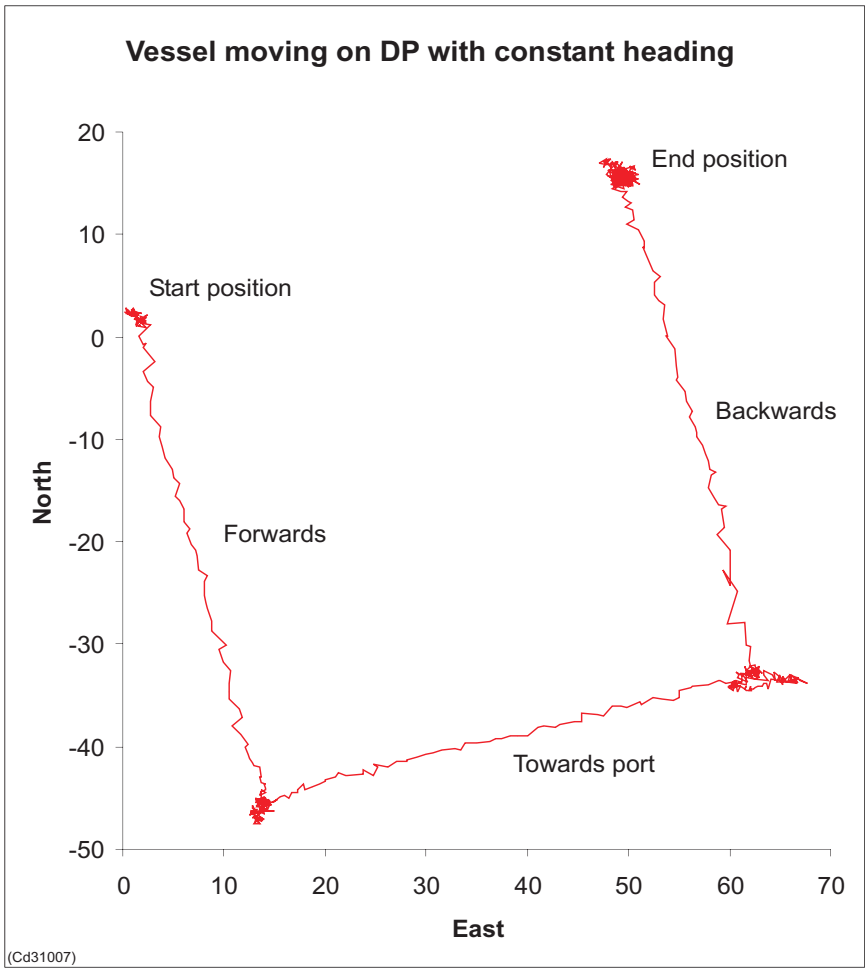
1. The Master interrogates the Slaves in the array by transmitting the common LBL interrogation channel to them.
2. After a "turn-around" delay from its own interrogation, the Master transmits the individual transponder channel to be received by the vessels / ROVs positioned in the array.
3. Each Slave transponder receives the interrogation from the Master Beacon, and transmits its individual reply channels after a turn-around delay.

If a Slave misses an interrogation from the Master, it will still reply because it knows the position update rate. The same principle may be used to save battery for the Master. The Master may be programmed to send an interrogation with lower rate, and the Slaves will use this interrogation to adjust its timing and still send pulses at the position update rate.

The calculation of the position is based on the measured differences in range between the transponders in the array. In addition, any measured angles towards the transponders will be used. Together with the known coordinates of each transponder, this is enough to calculate a position. Compared to standard LBL, the MULBL needs one more transponder in the array.

All vessels that are going to use the MULBL array, need the coordinates of the transponders and the channel numbers. These data are distributed on a file.

The illustration below shows horizontal accuracy for a vessel that is positioned using the synchronized Beacon Array method, and it presents 1008 positions with update every 2.2 seconds. During this period, one fix position where lost. The water depth is 1160 m.



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