KONGSBERG

COMPLETE. COMPACT. PORTABLE.

INTEGRATED SOLUTION FOR SHALLOW WATER BATHYMETRY

THE FULL PICTURE - PORTABLE

With the new EM 2040 Portable Hydrographic System (PHS), KONGSBERG blends the best of its sophisticated multibeam technology with Seapath GNSS technology. The result is an incredibly powerful, world-class portable shallow water bathymetry system for any vessel of opportunity.

Decades of experience and expertise are embedded in both the EM 2040 and Seapath systems. Together they form an unmatched out-of-the-box solution based on proven and de facto industry standard KONGSBERG technology.

Flexibility and portability are paramount to the EM 2040 PHS. It is stored and transported in hardened, easy to carry cases. The integrated nature of the system reduces installation, calibration and setup time, without compromise to bathymetric performance. Pre-alignment of the MRU and the SV probe, together with single cable connection enables rapid deployment with the included mounting package.

Additionally, with the opportunity to utilize any type of KONGSBERG Motion Reference Unit (MRU), varying demands in heave/roll/pitch accuracy are met, adding even more flexibility for diverse projects and vessels.

Pole connection diagram including the transducer, EM2040 processing unit and Seapath position, attitude, time and heading sensor.
(Pole design for illustration purposes)

EM 2040 MULTIBEAM ECHO SOUNDER

The EM 2040P is a shallow water multibeam echo sounder based on the cutting-edge KONGSBERG EM 2040 technology platform. It is highly portable, and has been designed for easy transport and quick deployment on any vessel, while offering survey performance up to and exceeding the IHO-S44 special order and the more stringent LINZ specification. It is ideal for diverse applications, from high resolution mapping and inspection to shallow water surveys.

The EM 2040P is KONGSBERG's newest, most advanced shallow water multibeam echo sounder. Like all KONGSBERG multibeam echo sounders, motion, position and sound velocity measurements are used to compensate for dynamic environmental and platform effects as the data is acquired. The system also employs advanced bottom tracking and data cleaning algorithms during acquisition.

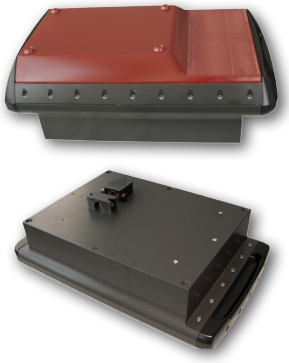
These two practices result in extremely clean bathymetry data that requires minimal or no data cleaning once imported, which dramatically reduces the time needed for post-processing. While these corrections are made automatically during acquisition, all of the raw data is preserved in the datagram format, thus allowing the user to go back and make changes in parameters such as SVP or system offsets during post processing if required.

Frequency of the system is user selectable between 200, 300 and 400 kHz. At 200 kHz the EM 2040P range and swath width is maximised, while the 400 kHz frequency provides higher resolution. Frequency can be manually selected to avoid acoustic interference with other sonar devices.

The EM 2040P incorporates many advanced KONGSBERG deep water multibeam technologies in a shallow water system, including:

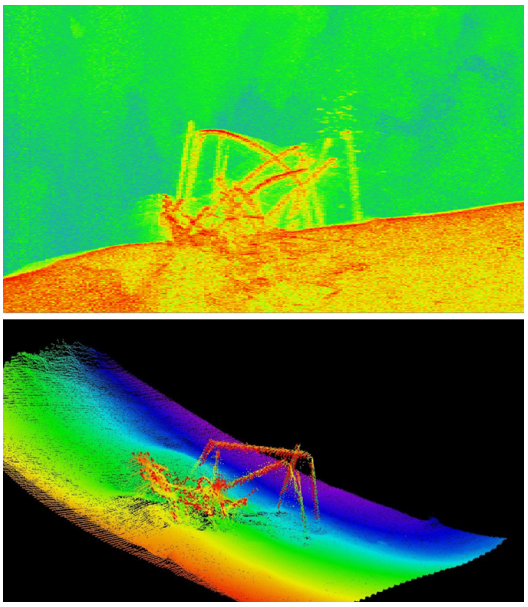
- Dual Swath capability with 100% alongtrack coverage within a ping, allowing ample sounding density alongtrack at high survey speeds
- FM (Frequency Modulated) transmit pulses for better range, greater coverage, less noise and higher resolution in deeper waters
- Complete electronic roll and pitch stabilisation
- Yaw stabilisation in real time (only KONGSBERG shallow water multibeam echo sounders support this capability)
- Near field focusing on both transmit and receive
- Multiple transmit sectors to suppress multi-path interference
- Extra detections utilizes phase and amplitude information to generate up to 10 extra soundings per beam, sorted into 7 classes, visualizing objects in the water column

The EM2040 P processing unit.

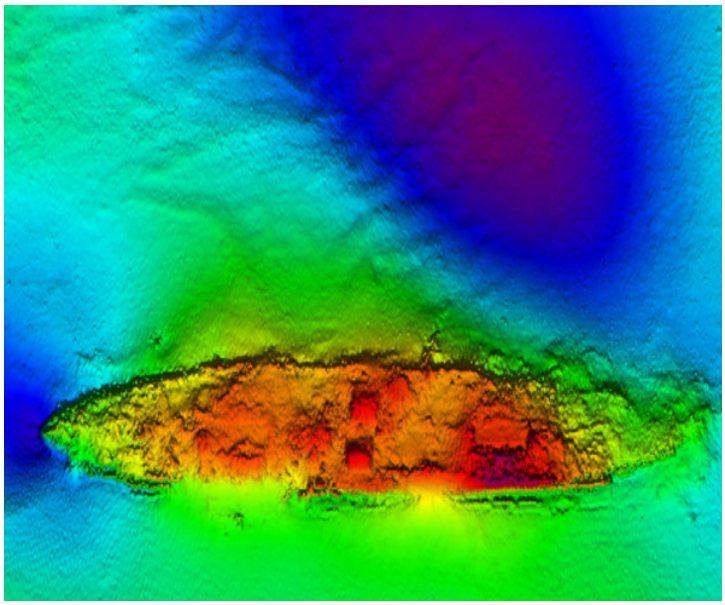


The transducer seen from top and bottom.

BATHYMETRY EXAMPLES EM2040



'Extra Detections' function used over a structure on the seafloor



Shipwreck survey courtesy of SHOM, France

SEAPATH 130 SERIES

The Seapath 130 series is developed specifically for portable hydrographic surveying work where high precision heading, position, roll, pitch, heave and timing are critical measurements. It combines state-of-the-art dual frequency GNSS receivers, inertial technology and processing algorithms in a compact and portable package.

Easy installation
The main component is the sensor unit for top mounting, with the integrated GNSS antennas and receivers. On top of the transducer the inertial sensor (MRU) of choice is mounted within a light weight subsea housing. Connecting a laptop (PC) gives access to the Seapath software for configuration and monitoring.

Various models available
The Seapath 130 series is available with these configurations:
- Seapath 130-3 with MRU 3 to 0.08° roll and pitch accuracy
- Seapath 130-H with MRU H to 0.03° roll and pitch accuracy
- Seapath 130-5 with MRU 5 to 0.02° roll and pitch accuracy
- Seapath 130-5+ with MRU 5+ MK-II to 0.008° roll and pitch accuracy

A unique solution
The advanced Seapath navigation algorithms integrate RTK GNSS data with the inertial sensor data from the MRU. This gives the Seapath 130 unique advantages compared to stand-alone RTK products. Seapath's accurate roll, pitch and heading measurements allow the RTK antenna position to be referenced to any point on the vessel where accurate position and velocity is required. All data are provided with a time stamp and the output is in real-time. Subdecimetre position accuracy can be achieved through downloadable satellite orbit and clock data, and by post processing of satellite and IMU data.

Enhanced stability, accuracy and availability is obtained as Seapath take advantages of both GPS and GLONASS. Continuous calculation for every possible differential solution with e.g. IALA, WAAS, Fugro Seastar XP2/G2 and RTK are provided, and Seapath outputs a best current position, weighing the stability and accuracy of each constellation.

These solutions yield accuracies down to 1 cm in the horizontal and 2 cm in the vertical plane. Logging of raw GNSS and IMU data from Seapath for post-processing is made easy by using SIS (Seafloor Information System).

The very high accuracy of e.g. the Seapath 130-5+ pitch and roll measurement will be a noticed advantage when trying to resolve fine variations in bottom morphology.

MRU and Seapath in their packing cases.

LIFE CYCLE SUPPORT

Designed to purpose – maintained to last

Our life cycle management service will assist our customers throughout all the phases, from design to commissioning and during the operational life time.
Solid in-house competence, both in system design and user competence enables us to provide solutions that are fit to purpose and thus yield efficiency in operation.

Our common base technology provides robust designs, with few and reliable parts, an exellent foundation to maximize the output at competitive costs.
The distributed and open system design employs an industry standard communication network. Standard hardware components used for various applications and the open network approach results in:

- Increased reliability
- Competitive life cycle support
- Easy up-grade solutions

Evergreen

We offer continuous hardware and software upgrade to keep your vessel at maximum efficiency. Our system is designed with consistent boundaries between individual systems and control segments. This design strategy makes it easy to add new functionality or complete new control segments, enabling us to offer step by step upgrades to keep your system evergreen.

Training

Qualified personnel are one of your major assets in efficient and safe operations. Thus, we offer modular training courses for all major subjects – from operator training to technical training - helping you to build the competence of your crews.

GLOBAL CUSTOMER SUPPORT

We are always there, wherever you need us.
KONGSBERG customer services organisation is designed to provide high-quality, global support, whenever and wherever it is needed. We are committed to providing easy access to support and service, and to responding promptly to your needs. Support and service activities are supervised from our headquarters in Norway, with service and support centres at strategic locations around the globe – where you are
and the action is.

As part of our commitment to total customer satisfaction, we offer a wide variety of services to meet individual customers' operational needs. KONGSBERG support 24 is a solution designed to give round-the-clock support. For mission-critical operations, KONGSBERG support 24 can be extended to include remote monitoring. We can adapt the level of support needs by offering service agreements, on-site spare part stocks and quick on-site response arrangements.

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