# Seapath® 130 series

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

## Specifications

| | |
|---|---|
| **Product** | Seapath® 130 series |
| **Country of origin** | Norge |
| **Manufacturer** | Kongsberg Discovery |

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## Function

The advanced Seapath sensor fusion algorithms integrate raw inertial sensor data from our unique and very high-performance MGC® (Motion Gyro Compass), MRU (Motion Reference Unit) or miniMRU, together with raw GNSS data and RTK, PPP or DGNSS corrections. Our unique navigation algorithms enable high accuracy position output even when no correction signals are available.

The Seapath is robust against GNSS dropouts by using the inertial sensor for dead reckoning navigation, providing all measurements even when GNSS is not available.

Post-processing of the Seapath data is possible to further enhance accuracy in position and attitude. The Seapath 130 includes a new post-processing format that contains all necessary data and system configuration in a single file. Centimetre position accuracy can be achieved through downloaded satellite orbit and clock data or data logged from base stations.

## Product components

The main component is the Sensor Unit with the integrated GNSS antennas and receivers. The Sensor Unit is mounted on top of the vessel mast or a pole. The inertial sensor is mounted on top of the transducer within a light-weight subsea housing. The Sensor Unit supports all 3-axis IMU versions of our MGC®, MRU or miniMRU lines.

The Seapath operator software is installed on the customer's computer for configuration and monitoring. The latest Seapath software includes Automatic Online Calibration (AOC) which significantly improves the roll and pitch accuracy. With the AOC functionality, a recalibration of the MGC/MRU/miniMRU is no longer required.

## Interfaces

The product has three configurable RS-232/422 serial lines and eight Ethernet ports for output of motion data and NMEA messages to the multibeam and survey computer. DGNSS corrections of various quality and sources are input on a configurable RS-232/422 serial line or Ethernet.

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## Features

- Compact and robust integrated INS/GNSS system
- 0.007° to 0.015° roll & pitch accuracy dependent on IMU (Inertial Measurement Unit) model
- No accuracy degradation in roll, pitch and heave measurements during turns
- Precise heave at long wave periods by use of PFreeHeave® algorithms
- 550-channel multi-frequency GPS/GLONASS/Galileo/BeiDou/QZSS receiver
- Multi-frequency GNSS ionospheric compensation
- All data are provided with a time stamp with an accuracy of 0.001 s to the actual measurement time

- Robust against GNSS dropouts due to inertial sensor part of product
- Multiple differential correction support including SBAS
- RTK correction on RTCM format supported
- Seastar® OmniSTAR® and Marinestar™ corrections supported
- Outputs on RS-232, RS-422 and Ethernet
- Up to 100 Hz data output rate
- Precise Time Protocol (PTP) and NTP available for time critical applications over Etherne
- Logging of raw satellite and IMU data possible
- Meets IHO exclusive order requirements

## Model types

| | Motion | | | Position | | | | |
|---|---|---|---|---|---|---|---|---|
| | Roll/pitch | Heading | Heave | Non-differential | Galileo HAS | RTK | Real-time PPP | Dead reckoning 60 s |
| Seapath 130-3/40 | 0.015° | 0.10° | 2 cm or 2 % | 0.3 m | 0.1 m | 0.01 m | 0.05 m | 1.6 m |
| Seapath 130-5/60 | 0.010° | 0.08° | 1 cm or 1 % | 0.3 m | 0.1 m | 0.01 m | 0.05 m | 0.6 m |
| Seapath 130-5+ | 0.007° | 0.08° | 1 cm or 1 % | 0.3 m | 0.1 m | 0.01 m | 0.05 m | 0.3 m |
| Seapath 130-R3 | 0.007° | 0.05° | 1 cm or 1 % | 0.3 m | 0.1 m | 0.01 m | 0.05 m | 0.2 m |
| Seapath 130-R2 | 0.009° | 0.06° | 1 cm or 1 % | 0.3 m | 0.1 m | 0.01 m | 0.05 m | 0.6 m |

## Interfaces

| | |
|---|---|
| **Communication ports** | 3 serial RS-232/RS-422 lines and 8 Ethernet UDP/IP ports |
| **Data output interval** | Programmable in 0.01-second steps and 1PPS pulse |
| **Data output rate** | Up to 100 Hz |

## GNSS signal tracking

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|---|---|
| **GPS** | L1 C/A, L1C, L2C, L2P, L5 |
| **GLONASS** | L1 C/A, L2 C/A, L2P, L3, L5 |
| **Galileo** | E1, E5 AltBOC, E5a, E5b, E6 |
| **BeiDou** | B1I, B1C, B2I, B2a, B2b, B3I |
| **QZSS** | L1 C/A, L1C, L1S, L2C, L5, L6 |

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