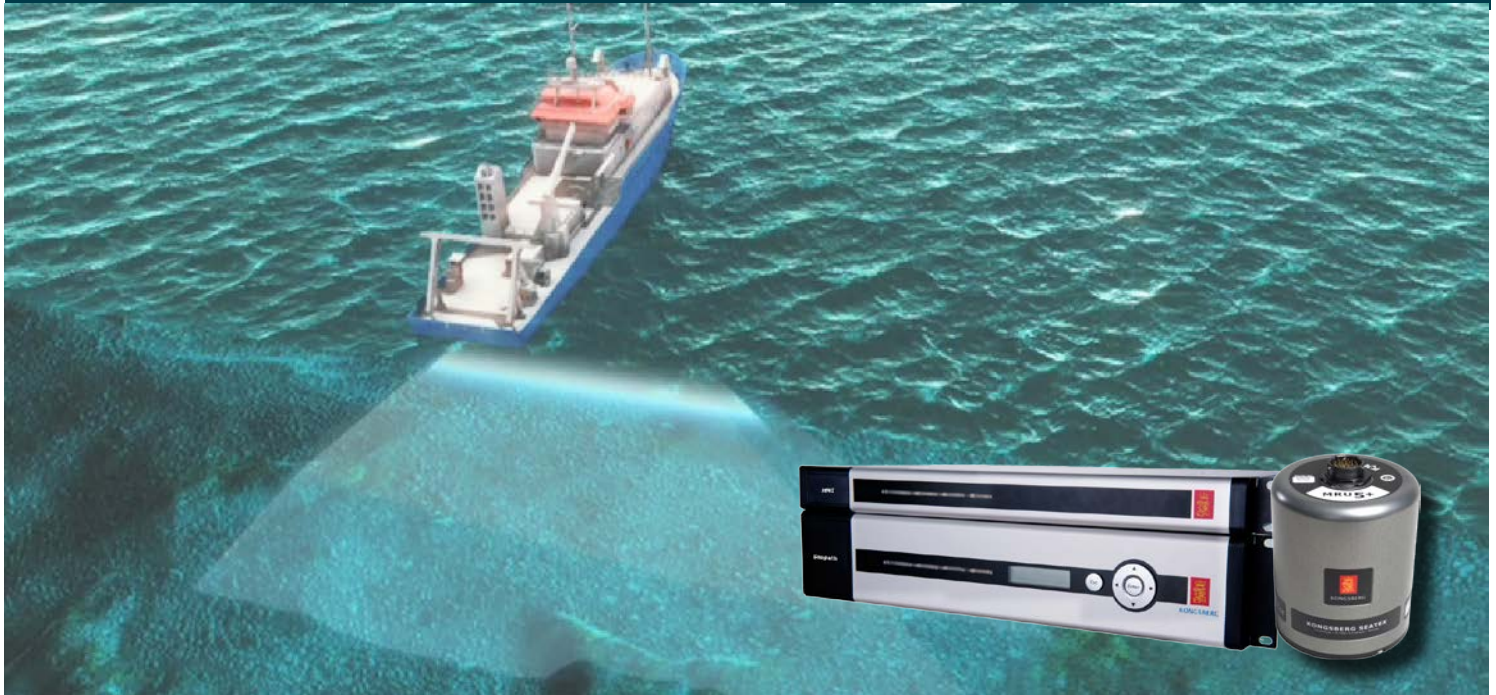


# SEAPATH® 330+



KONGSBERG



March 2014

## THE ULTIMATE HEADING, ATTITUDE AND POSITIONING SENSOR

The Seapath 330+ product uses a state-of-the-art dual frequency GNSS receiver, inertial technology and processing algorithms to provide surveyors with the best possible accuracy in position, attitude and timing. The Seapath 330+ can be delivered complete with an RTK reference station and a UHF radio data link. For surveys where RTK position accuracy is not required in real-time, the Seapath 330+ has the possibility to log raw satellite and IMU data for post processing.

### Integrated inertial/GNSS product

The Seapath 330+ offers the best possible combination of GNSS signals and inertial measurements for demanding operations in challenging environments. This Seapath product includes the latest MRU generation, the MRU 5+, providing 0.01° RMS roll and pitch accuracy. This accuracy is achieved by the use of accurate linear accelerometers and unique MEMS type angular rate gyros.

The combination of GNSS signals and inertial data enables a much better performance than each of the signals alone with a high output data rate (up to 200 Hz), zero delay on output data, data available in up to eight different monitoring points and a total of sixteen configurable serial lines and Ethernet ports, together with three analog channels.

### Accuracy and reliability

The advanced Seapath navigation algorithms integrate the RTK GNSS data with the inertial sensor data from the MRU 5+. This gives the Seapath 330+ unique advantages compared to stand alone RTK products. The Seapath 330+ product's highly 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 are required. All the data from Seapath have the same time stamp and the output is in

real-time. Subdecimetre position accuracy can be achieved through download of satellite orbit and clock data from internet and by post processing of satellite and IMU data.

### System configuration

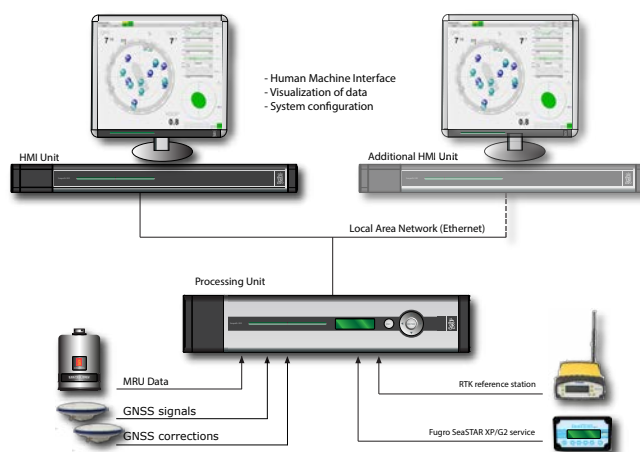
This Seapath product is a two-module solution with a Processing and an HMI Unit connected via Ethernet. The Processing Unit runs all critical computations independent from user interface on the HMI Unit to ensure continuous and reliable operation. Multiple HMI Units can be connected to the same Processing Unit in a networked architecture. The HMI Units present the vessel motion in a clear and easy-to-understand format. The Seapath is operated through the operator software installed on one or several HMI Units. This software is used for performance monitoring, configuration and troubleshooting of the system.

### Applications

By using standard DGPS/DGLONASS, Fugro XP/G2 and RTK corrections, the Seapath 330+ is a unique solution for hydrographic surveying and dredging work demanding the most comprehensive and accurate surveying data available.

## FEATURES SEAPATH 330+

- 0.01° roll and pitch accuracy
- 2 cm heave accuracy by use of the PFreeHeave® algorithms
- Meets IHO special order requirements
- Robust against GNSS dropouts due to the inertial sensor part of the product
- 120-channel dual frequency GPS/GLONASS receiver
- GNSS receiver compatible with GPS/GLONASS/Galileo/Beidou
- Includes ionospheric compensation methods to reduce Sunspot 24 cycle effects
- Fugro XP/G2 corrections and RTK supported
- RTK corrections format RTCM and CMR supported
- Includes SBAS corrections (WAAS, EGNOS, MSAS, GAGAN)
- All data have the same time stamp and to an accuracy of 0.001 s to the actual measurement time
- Logging of raw satellite and IMU data possible



## TECHNICAL SPECIFICATIONS

### PERFORMANCE

|                                            |                                                         |
|--------------------------------------------|---------------------------------------------------------|
| Heading accuracy                           | 0.04° RMS (4 m baseline)<br>0.065° RMS (2.5 m baseline) |
| Roll and pitch accuracy                    | 0.01° RMS for ±5° amplitude                             |
| Scale factor error in roll, pitch, heading | 0.05 % RMS                                              |
| Heave accuracy (real-time)                 | 5 cm or 5 % whichever is highest                        |
| Heave accuracy (delayed signal)            | 2 cm or 2 % whichever is highest                        |
| Heave motion periods (real-time)           | 1 to 20 seconds                                         |
| Heave motion periods (delayed signal)      | 1 to 50 seconds                                         |
| Position accuracy (X and Y)                | 1 cm + 1 ppm RMS                                        |
| Position accuracy (Z)                      | 2 cm + 1 ppm RMS                                        |
| Velocity accuracy                          | 0.03 m/s (RMS)                                          |
| Range to RTK reference station             | 10 km                                                   |
| UHF radio frequencies                      | 430 to 470 MHz<br>390 to 430 MHz (optional)             |

### DATA OUTPUTS

|                      |                                                              |
|----------------------|--------------------------------------------------------------|
| Communication ports  | 8 serial RS-232/RS-422 lines and<br>16 Ethernet UPD/IP ports |
| Data output interval | Programmable in 0.005-sec. steps<br>and 1PPS pulse           |
| Data update rate     | Up to 200 Hz                                                 |

### WEIGHT AND DIMENSIONS

|                 |                            |
|-----------------|----------------------------|
| Processing Unit | 5.4 kg, 89 x 485 x 357 mm  |
| HMI Unit        | 3.8 kg, 44 x 485 x 330 mm  |
| Monitor         | 3.8 kg, 383 x 380 x 170 mm |
| IMU             | 2.4 kg, 140 x Ø105 mm      |
| GNSS antenna    | 0.5 kg, 69 x 185 mm        |

### POWER

|                 |                              |
|-----------------|------------------------------|
| Processing Unit | 100 to 240 V AC, 75 W (max)  |
| HMI Unit        | 100 to 240 V AC, 40 W (max)  |
| Monitor         | 100 to 240 V AC, 23 W (max)  |
| IMU             | 24 V DC from Processing Unit |
| GNSS antenna    | 5 V DC from Processing Unit  |

### ENVIRONMENTAL SPECIFICATION

#### Operating temperature

|                         |               |
|-------------------------|---------------|
| Processing and HMI Unit | -15 to +55 °C |
| Monitor                 | +5 to +40 °C  |
| IMU                     | -5 to +55 °C  |
| GNSS antenna            | -40 to +85 °C |

#### Humidity (enclosure protection)

|                         |                                        |
|-------------------------|----------------------------------------|
| Processing and HMI Unit | 10 to 95 % rel. non condensing (IP 21) |
| Monitor                 | 20 to 80 % rel. non condensing (IP 21) |
| IMU                     | Hermetically sealed (IP 66)            |
| GNSS antenna            | Hermetically sealed (IP 66)            |
| Cables                  | IP 67                                  |
| Connectors              | With self-amalgamating tape (IP 67)    |

#### Mechanical

|           |                    |
|-----------|--------------------|
| Vibration | IEC 60945/EN 60945 |
|-----------|--------------------|

#### Electromagnetic compatibility

|                                       |                    |
|---------------------------------------|--------------------|
| Compliance to EMCD, immunity/emission | IEC 60945/EN 60945 |
|---------------------------------------|--------------------|

#### PRODUCT SAFETY

|                                  |                        |
|----------------------------------|------------------------|
| Compliance to LVD, standard used | IEC 60950-1/EN 60950-1 |
|----------------------------------|------------------------|

Specifications subject to change without any further notice.