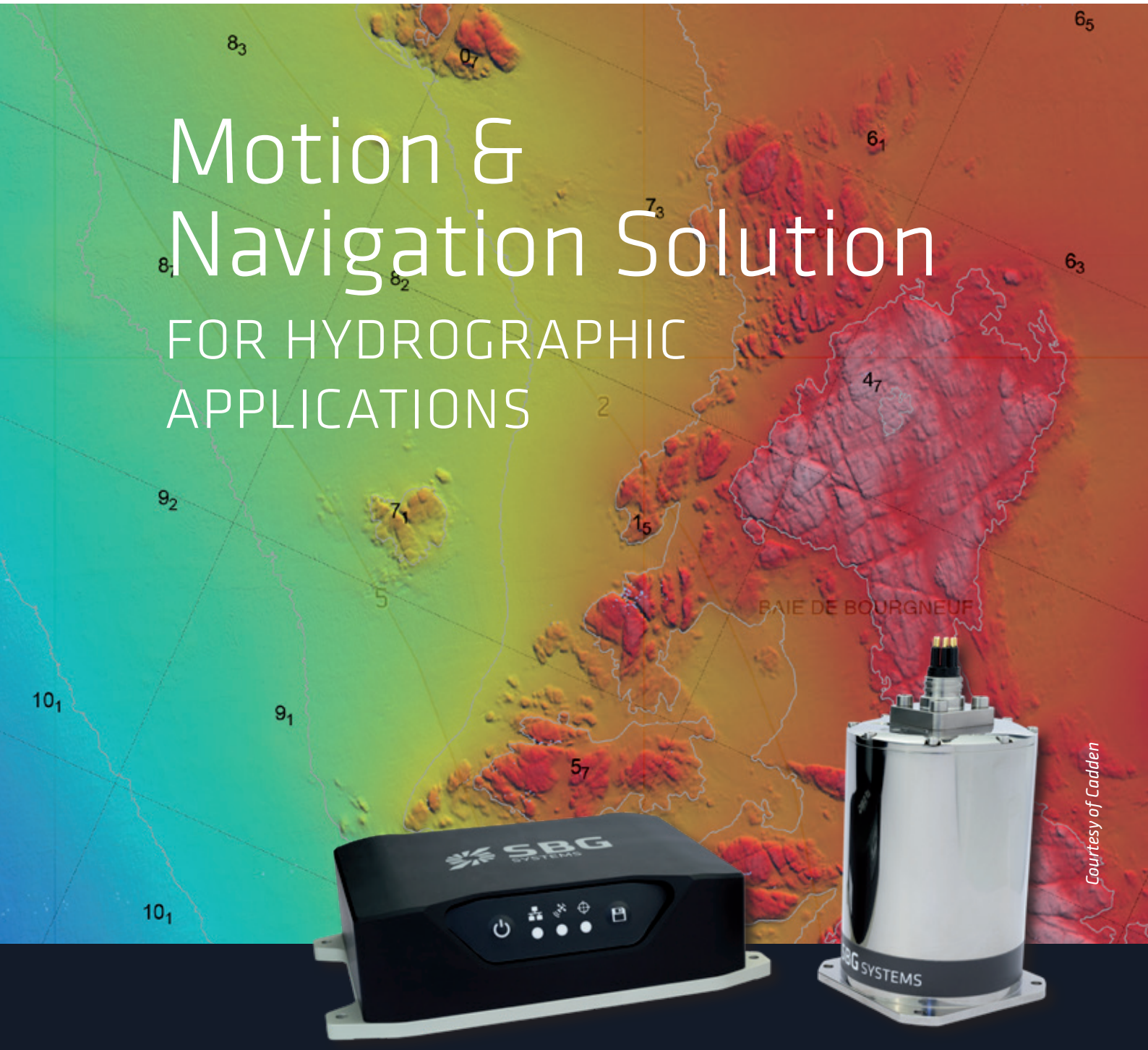
# Navsight Marine Solution

# Motion & Navigation Solution

## FOR HYDROGRAPHIC APPLICATIONS




*Courtesy of Cadden*

Navigation, Motion & Heave

Extremely easy to set up, and highly versatile, the NAVSIGHT MARINE SOLUTION makes hydrographers' surveying tasks easier on both shallow and deep waters.

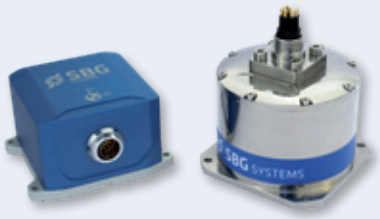
SBG SYSTEMS

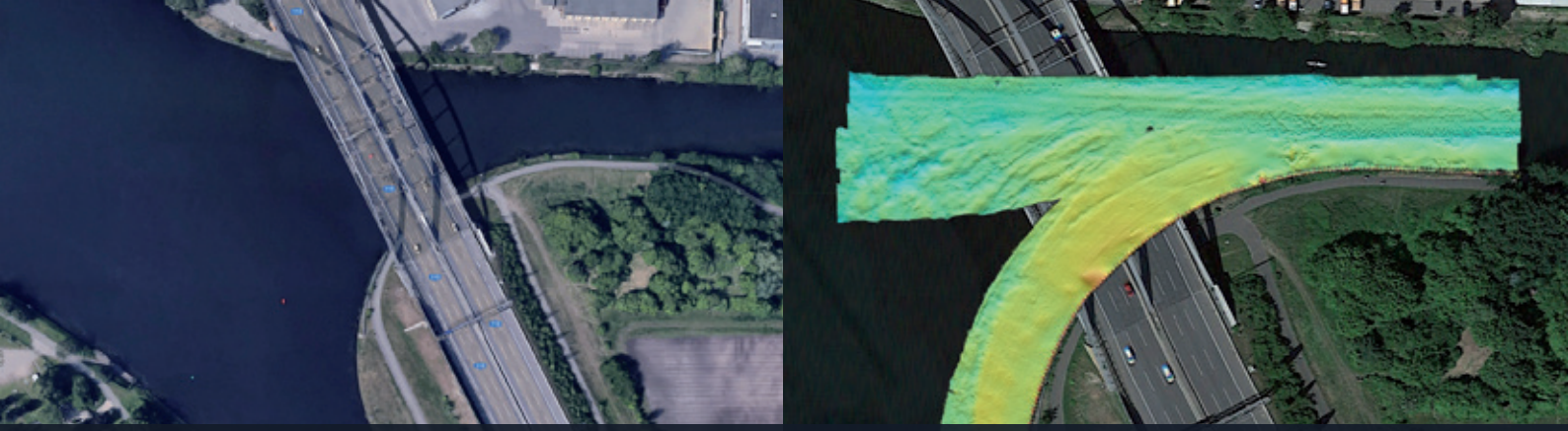
# STATE-OF-THE-ART
## Navsight Marine Solution


**Navsight Marine Solution integrates the latest IMU and GNSS technologies to offer a modern, powerful, and easy-to-use motion and navigation solution for Hydrographers.**

## Scalable Performance for Every Application

*RTK Accuracy*

| EKINOX GRADE | APOGEE GRADE | HORIZON GRADE |
|---|---|---|
|  |  |  |
| **Economic** | **Highly Versatile** | **FOG Technology** |
| **Ideal for Shallow Water Applications** | **Ideal for Challenging Shallow to Deep Water Applications** | **Large vessels with low Dynamics and Harsh Conditions** |
| » 0.015° Roll/Pitch | » 0.008° Roll/Pitch | » 0.007° Roll/Pitch |
| » 0.02° Heading | » 0.01° Heading | » 0.01 ° Heading |
| » 5 cm Real-time Heave | » 5 cm Real-time Heave | » 5 cm Real-time Heave |
| » 2 cm Delayed Heave | » 2 cm Delayed Heave | » 2 cm Delayed Heave |
| » Up to 1 cm RTK Position | » Up to 1 cm RTK Position | » Up to 1 cm RTK Position |
| Low Power Consumption<br>Compact, Lightweight | Amazing performance under GNSS Outage | Very Low Drift<br>Single antenna Heading Capable |



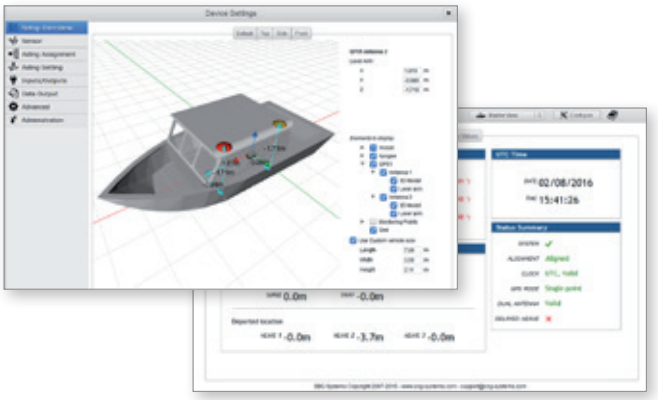
*Charting under bridges with the Apogee sensor. The vessel «Spreegrund», property of WSA Berlin, has been equipped by MBT, part of MacArtney group.*

**MRU or INS?** Inertial Navigation Systems greatly improves navigation data in all conditions. Position information are fused in real-time with inertial data to provide a robust trajectory when GNSS outages occur (crossing a bridge, surveying a river near several mountains, etc.). In this example, the Apogee sensor is connected to an external GNSS receiver and a DVL for even better performance.

## Configuration Made Easy

The interactive web interface helps you configuring the solution and checking in real-time your mechanical installation, especially your sensor position, your alignments, and GNSS main lever arm (the secondary lever arm is automatically calculated).

All configuration settings are then stored for further surveys.



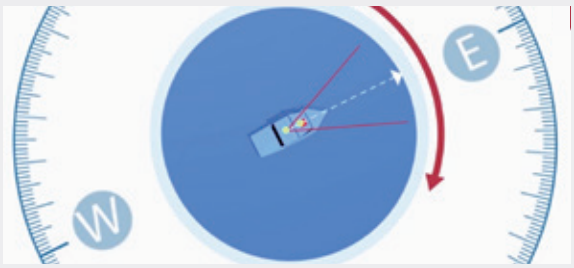
Main Drivers available for

TELEDYNE PDS Everywhereyoulook

QPS a SAAB group company

HYPACK Inc.

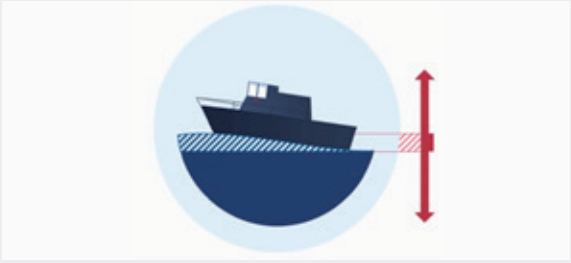
## Fast Initialization with GNSS-based Dual-Antenna Heading




Dual antenna GNSS provides accurate heading with fast initialization time, even if the vessel is mooring.

Additionally, it is not subject to latitude scaling faced by gyro-compass technology.

## Accurate Data in Rough Sea with Delayed Heave



When wave frequency is erratic or in case of long period swell, the delayed heave feature can save the day by allowing survey in rough conditions.

This specific algorithm allows a more extensive calculation, resulting in a heave accurate to 2 cm computed in real-time with a little delay.

# A Full Solution for Hydrographic Applications

## INS/GNSS Post-processing Software

Qinertia is the SBG Systems' in-house post-processing software. This full-featured software enhances SBG inertial navigation systems performance by post processing inertial data with raw GNSS observables.

### The Fastest Processing

### Tight Coupling INS/GNSS fusion

### Modern & Intuitive User Interface

### + 8,000 Base Stations always up-to-date

**Why Post-processing ?** By processing all your INS and GNSS raw data forward and backward, Qinertia PPK software greatly increases accuracy, solves GNSS outages, installation errors, etc. Qinertia can save your survey, or allow you to survey in very complicated areas.

## SBG⊕SERVICES

**NO Surprise!** Navsight solution is based on proven and maintenance-free technologies. Technical assistance is free of charge and firmware upgrades are available during the life of the product without extra cost to secure your day to day operations.

### Take advantage of our SBG⊕Services:

#### Warranty Extension

All SBG inertial sensors come with a 2-year warranty. This warranty can be extended up to 5 years. Secure your budget during 3, 4, or 5 years.

#### Check & Calibration

The Check & Calibration service includes a quality check, a firmware update, cleaning, and if required, a calibration in temperature and dynamics. A certificate is delivered with the sensor. It guarantees the quality of the sensor data during 3 years.

#### Back-up System

The back-up system consists in a complete inertial system set delivered in replacement of your sensor during repair operations and during the « check and calibration » service. This service is included into the PREMIUM and ELITE packages.

# Specifications

All parameters apply to -20 to 60°C temperature range, unless otherwise stated.
**Full specifications can be found in the Navsight Hardware Manual available upon request.**

IHO Compliant

## INERTIAL MEASUREMENT UNIT (IMU)





| IMU | Ekinox-I Surface | Ekinox-I Subsea Enclosure | Apogee-I Surface | Apogee-I Subsea Enclosure | Horizon-I Surface |
|---|---|---|---|---|---|
| **Size** | 86 x 100 x 58 mm | 94 x 94 x 112 mm | 130 x 100 x 58 mm | 94 x 94 x 177 mm | 150 x 168 x 215 mm |
| **Weight** | 425 g | 1 kg | 635 g | 1.32 kg | 4.29 kg |
| **Rating** | IP68 | 200 m Depth | IP68 | 200 m Depth | IP68 |

*OEM Versions available upon request*

## EKINOX ACCURACY

| | RTK[2] | PPK[3] | RTK Outage (30 s) | PPK Outage (30 s) |
|---|---|---|---|---|
| **Roll, Pitch** | 0.015° | 0.01° | 0.05° | 0.04° |
| **Heading[1] - 2 m / 4m** | 0.03° / 0.02° | 0.02° / 0.02° | 0.12° / 0.1° | 0.05° / 0.05° |
| **Position (X,Y) / Altitude (Z)** | 0.01 m + 0.5 ppm / 0.015 m + 1 ppm | 0.01 m + 0.5 ppm / 0.015 m + 1 ppm | 3 m / 0.75 m | 1 m / 0.3 m |

## APOGEE ACCURACY

| | RTK[2] | PPK[3] | RTK Outage (60 s) | PPK Outage (60 s) |
|---|---|---|---|---|
| **Roll, Pitch** | 0.008° | 0.005° | 0.012° | 0.008° |
| **Heading[1] - 2 m / 4 m** | 0.02° / 0.01° | 0.01° / 0.01° | 0.05° / 0.04° | 0.025° / 0.025° |
| **Position (X,Y) / Altitude (Z)** | 0.01 m + 0.5 ppm / 0.015 m + 1 ppm | 0.01 m + 0.5 ppm / 0.015 m + 1 ppm | 4 m / 0.75 m | 0.15 m / 0.05 m |

## HORIZON ACCURACY

| | RTK[2] | PPK[3] | RTK Outage (60 s) | PPK Outage (60 s) |
|---|---|---|---|---|
| **Roll, Pitch** | 0.007° | 0.004° | 0.01° | 0.005° |
| **Heading[1] - 2 m** | 0.01° | 0.008° | 0.015° | 0.01° |
| **Position (X,Y) / Altitude (Z)** | 0.01 m + 0.5 ppm / 0.015 m + 1 ppm | 0.01 m + 0.5 ppm / 0.015 m + 1 ppm | 1 m / 0.5 m | 0.1 m / 0.05 m |

## HEAVE

| | Ekinox / Apogee / Horizon | Wave period | Remarks |
|---|---|---|---|
| **Real-time Heave** | 5 cm | up to 20 sec | Automatic adjustment to the sea state |
| **Delayed Heave** | 2 cm | up to 40 sec | Internal computation |

## VELOCITY AIDED POSITIONING

| | |
|---|---|
| **DVL** | < 0.2 % Travelled distance |

## NAVSIGHT PROCESSING UNIT

**Rugged Version**

**Rack Version**

**Three modes available:**

INS with GNSS

INS + external GNSS

## PHYSICAL & ENVIRONMENTAL

| | |
|---|---|
| **Size (Rugged / Rack)** | 227 x 156 x 63 mm / 422 x 204 x 44 mm |
| **Weight (Rugged / Rack)** | 1.94 kg / 1.99 kg |
| **Wide input voltage range (isolated)** | 9 – 36V |
| **EN-60945 compliant** | Isolated Interfaces and power supply |
| **Power consumption** | <7W with external GNSS |
| **Operating Temperature** | -40 to 75°C |
| **MTBF** | 50,000 hours |

## INTERFACES

| | |
|---|---|
| **Aiding Sensors (input)** | 2X GNSS, RTCM, DVL |
| **Protocols** | Output: NMEA, ASCII, Binary, TSS, Simrad<br>Input: NMEA, Trimble, Novatel, Septentrio, Hemisphere, Fugro, PD0, PD6 |
| **Logging Capacity** | 8 GB ≈ 48h, 200 Hz |
| **Ports/Communication** | 5x RS-232/RS-422 Tx/Rx ports |
| **Synchronization** | 2x Sync Out (PPS) + 5x Sync In signals |
| **Ethernet** | 5x UDP / TCP bidirectional ports<br>Web interface , FTP<br>PTP Grand Master Clock<br>NTRIP v1/v2 client |

## INTERNAL GNSS

| | |
|---|---|
| **Internal GNSS Receiver** | GPS, GLONASS, GALILEO, BEIDOU, QZSS, L1/L2/L5/L6[4], NAVIC [4], RTK, RAW |
| **PPP Ready** | PPP Ready MARINESTAR™[4], HAS Ready[4], CLAS[4] |

*[1]Baseline, dual antenna [2]Real Time Kinematic*
*[3]Post-processing Kinematic [4]GNSS board variant dependant*
*RMS values for typical survey trajectories. Performance depends on velocity aiding accuracy. Performance may be affected by atmospheric conditions, signal multipath, and satellite geometry. All specifications subject to change without notice.*

SBG Systems is a leading supplier of MEMS-based inertial motion sensing solutions. The company provides a wide range of inertial solutions from miniature to high accuracy. Combined with cutting-edge calibration techniques and advanced embedded algorithms, SBG Systems products are ideal solutions for industrial & research projects such as unmanned vehicle control, surveying applications, antenna tracking, and camera stabilization.

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