Ellipse 2 Series

NEW

MINIATURE
HIGH PERFORMANCE
Inertial Sensors

ITAR Free

0.1° RMS

IMU
AHRS
MRU
INS
VG

Navigation, Motion & Heave Sensing

ELLIPSE SERIES sets up new standard for miniature and cost-effective inertial systems with an extremely rugged design, cutting-edge sensors, enhanced capabilities, and advanced algorithms.

SBG SYSTEMS

Ellipse 2 Series - The Most Advanced Miniature Inertial Sensors

ACCURACY

- 0.1° Real-time Attitude
- Up to 2 cm RTK GNSS Position
- 5 cm Auto-Adaptative Heave

KEY FEATURES

- High quality sensors
- GNSS receiver
- DGPS corrections
- IP 68 enclosure
- 200 Hz output rate

Ellipse inertial sensors provide outstanding orientation and position data in a small, light-weight, and rugged enclosure. Incredibly versatile, you can connect your own GPS/GNSS receiver or use the internal one, connect an odometer, receive differential GPS corrections, etc.

Product Line

GNSS-based Heading
Immune to magnetic disturbances

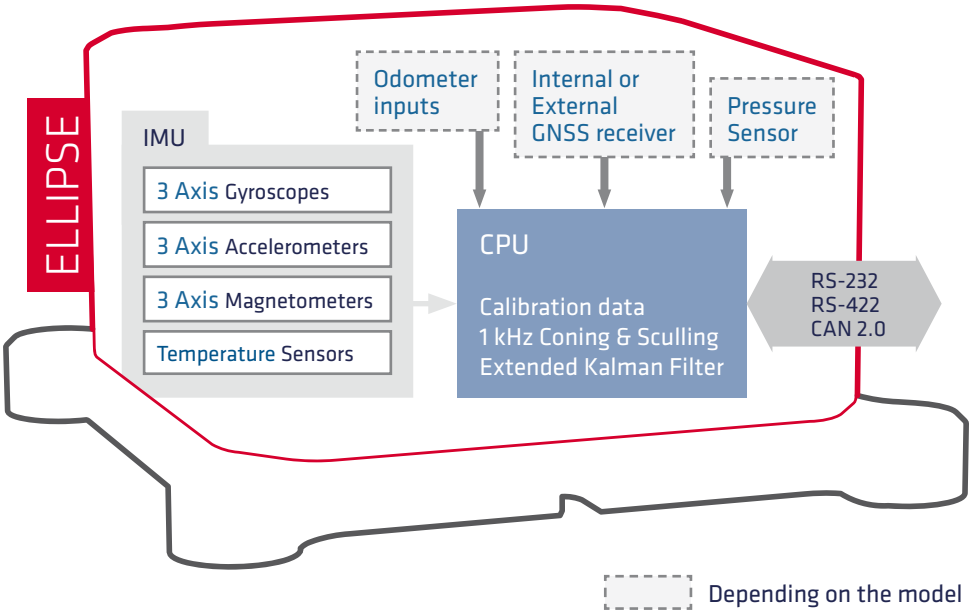
	Ellipse2-A	Ellipse2-E	Ellipse2-N	Ellipse2-D
Roll, Pitch	0.1 °	0.1 °	0.1 °	0.1 °
Heading	0.8 ° (Magnetic-based)	<0.5 ° (External GNSS)	0.5 ° (GNSS-based)	0.2 ° (Dual-antenna GNSS)
Heave: 5 cm or 5%	●	●	●	●
Odometer aiding		●	●	●
DGPS corrections			●	●
Navigation		Navigation with external GNSS receiver	Internal GNSS receiver 2 m GNSS accuracy	Survey-grade L1/L2 GNSS receiver 2 cm RTK GNSS Accuracy
Post-Processing				●

Motion & Heave Monitoring

Payload Orientation & Positioning

Data Georeferencing

Features Inherited from High End INS/GNSS



OEM version available
for Ellipse2-A/E/N models

Advanced Filtering

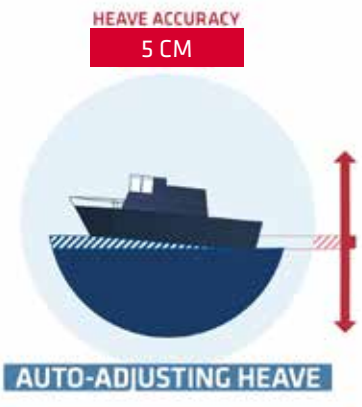
- Efficient vibration rejection
- Real time fusion of inertial, GNSS, and aiding data (DMI, RTCM, etc.)
- False GPS measurements rejection

Calibration

- Extensive test and calibration from -40 to 85°C
- Easy hard and soft magnetic disturbances compensation

Motion Profiles

Select your motion profile (helicopter, car, etc.) and Kalman Filter, vibration level, dynamics, magnetic disturbance immunity are automatically adjusted.

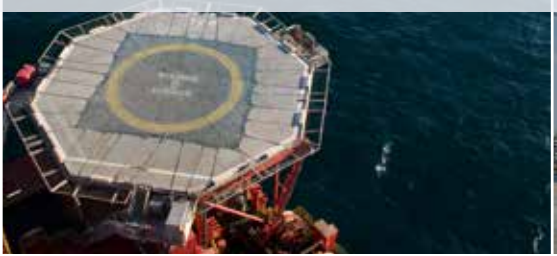


High Accuracy Heave

Ellipse (A2 option) delivers a 5-cm accurate heave which automatically adjusts to the wave period.

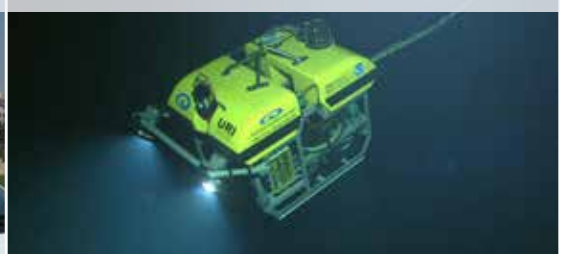
Ellipse is a cost-effective alternative solution for instrumented buoys, helideck, or boat motion monitoring applications.

Helideck Monitoring System



Pointing & Stabilization

Orientation



Development Kit, all-in-one package for easy integration


Development Kit

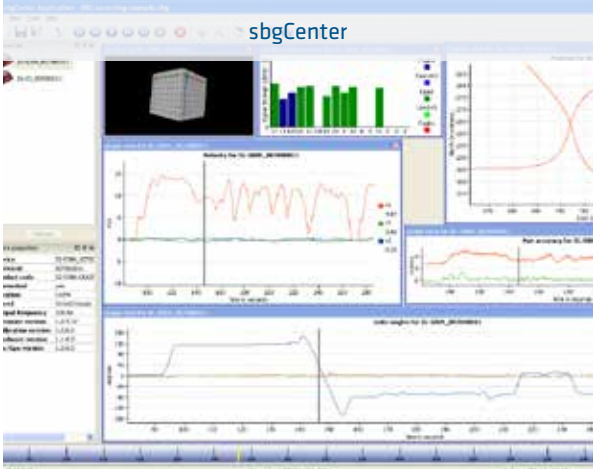
Hardware

The Development kit comes with your Ellipse.

It contains:

- A quick start guide and the user manual,
- The calibration report,
- A USB cable,
- A USB Key including software and tools

All Ellipse models come with a two-year warranty.


sbgCenter

Software

The windows-based sbgCenter software allows:

- Real-time data visualization
- Easy configuration through motion profiles
- Data Analysis by zooming through time
- Export into Excel, Matlab, Google Earth formats

A C library, and some code source examples are provided.


Support Center

Support

As expert of inertial navigation, we are at your side, helping you to get the most of your sensor:

- Free technical support by phone and email
- Unlimited firmware updates
- Dedicated support platform (Knowledge center, support answers archive, documentation, etc.)
- Custom Training on demand

Navigation

Dynamics Analysis

Avionics

Specifications

ACCURACY (RMS)

360 ° sensing in all axes, no mounting limitation

Model	A	E/N	D
Roll / Pitch	0.1 °	0.1 °	0.1 ° / 0.05 ° (PPK)
Heading	0.8 ° Magnetometers*	< 0.5 ° GPS**	< 0.2 ° Dual GPS*** (> 1 m baseline)
Velocity* **	-	0.1 m/s	0.03 m/s
Position* **	-	2 m	Single point L1/L2: 1.2 m SBAS: 0.6 m DGPS: 0.4 m RTK: 2 cm + 2 ppm (option) PPK: 1 cm (option)
Heave accuracy	5 cm or 5%	Valid for A2 version	
Heave period	Up to 15 s	Automatically adjusts to the wave period	

**Under homogenous magnetic field*
*** Under regular acceleration, or automotive motion*
**** Under good GNSS availability*
PPK = Post-processing Kinematic.

INTERFACES

Available data	Euler angles, quaternion, velocity, position, heave, calibrated sensor data, delta angles & velocity, barometric data, status, GPS data, UTC time, GPS raw data (Post-processing), etc.
Aiding sensors	GNSS, Odometer (DMI), RTCM
Output rate	200 Hz, 1,000 Hz (IMU data)
Main Serial Interface	RS-232, RS-422, USB - up to 921,600 bps
Serial protocols	Binary eCom protocol, NMEA, ASCII, TSS
CAN interface	CAN 2.0A/B - up to 1 Mbit/s
Pulses	Inputs: Events, PPS, DMI (Direction or quadrature) Outputs: Synchronization (PPS), Virtual DMI Model A & N: 2 inputs / 1 output Model E: 4 inputs / 2 outputs Model D: 3 inputs / 2 outputs

INTERNAL GNSS

Engine, update rate	N: 72-channel, 5 Hz, L1 C/A GPS, GLONASS, QZSS, BeiDou, SBAS, GALILEO D: 120-channel, 5 Hz STD: GPS L1/L2/L2C, SBAS, QZSS Option: GLONASS, Galileo, Beidou, RTK, RAW
Cold start / Hot start	N: 26 s / < 1 s D: < 50 s / < 35 s

MECHANICAL

		Box	OEM model
Size	**models A/E/N:**	46 x 45 x 24 mm 1.8 x 1.77 x 0.9 ”	34 x 34 x 13 mm 1.34 x 1.34 x 0.51 ”
	model D:	87 x 67 x 31.5 mm 3.43 x 2.64 x 1.24 ‘’	- -
Weight		A: 45 g / 0.1 lb N: 47 g / 0.1 lb E: 49 g / 0.1 lb D: 180 g / 0.4 lb	12 g / 0.02 lb 12 g / 0.02 lb 12 g / 0.02 lb -
IP Rating		IP68	-

All parameters apply to full specified temperature range, unless otherwise stated. Full specifications can be found in the Ellipse Hardware Manual available upon request.

PRODUCT CODE

▪ *standard product options*

Ellipse-D GNSS OPTIONS
Contact your Representative

ELLIPSE2-#-G#A#-##-####

MODEL
A: AHRS
E: Externally Aided INS
N: INS with integrated GNSS
D: INS with integrated dual antenna GNSS

GYROSCOPE
4: 450 °/s ▪
5: 1,000 °/s

PACKAGING
B1 *Box* ▪ RS-232/422
B2 *Box* RS-232 + CAN
L1 *OEM* TTL
L2 *OEM* RS-232/422 + CAN

ACCELEROMETER
2: 8 g
3: 16 g▪
4: 40 g

SENSORS

	Accelerometers	Gyroscopes	Magnetometers
Range	± 16 g	± 450 °/s	± 50 Gauss
Gain stability	1000 ppm	500 ppm	< 0.5 %
Non-linearity	1500 ppm	50 ppm	< 0.1 % FS
Bias stability	± 5 mg	± 0.2 °/s	± 1 mGauss
Random walk/ Noise density	57 µg/√Hz	0.15 °/√hr	3 mGauss
Bias in-run instability*	14 µg	7 °/h	1.5 mGauss
VRE	50 µg/g² RMS	1 °/h/g² RMS	-
Alignment error	< 0.05 °	< 0.05 °	< 0.1 °
Bandwidth	390 Hz	133 Hz	22 Hz

** Allan Variance, @ 25 °C*

PRESSURE SENSOR (models N & E)

Resolution	1.2 Pa / 10 cm / 0.3 ft	
Pressure accuracy	± 50 Pa / ± 200 Pa	Relative / Absolute

ELECTRICAL & ENVIRONMENTAL

Input voltage	A/E/N:	5 - 36 V
	D:	9 - 36 V
Power consumption	A/E:	< 460 mW
	N:	< 650 mW
	D:	< 2,500 mW
Specified temperature	A/E/N:	-40 to 85 °C, -40 to 185 °F
	D:	-40 to 75 °C, -40 to 167 °F
Shock limit	2,000 g	
Operating vibration	8 g RMS (20 Hz to 2 k Hz per MIL-STD 810G)	
MTBF	50,000 hours	

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, antenna tracking, camera stabilization, and surveying applications.

TEST RESULTS

Marine

Automotive

VIDEO

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