Ellipse 2 Series

NEW

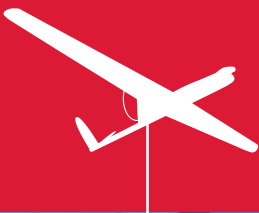## MINIATURE
HIGH PERFORMANCE
Inertial Sensors

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.

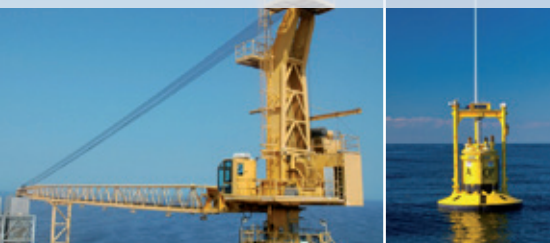GNSS-based Heading Immune to magnetic disturbances

Product Line

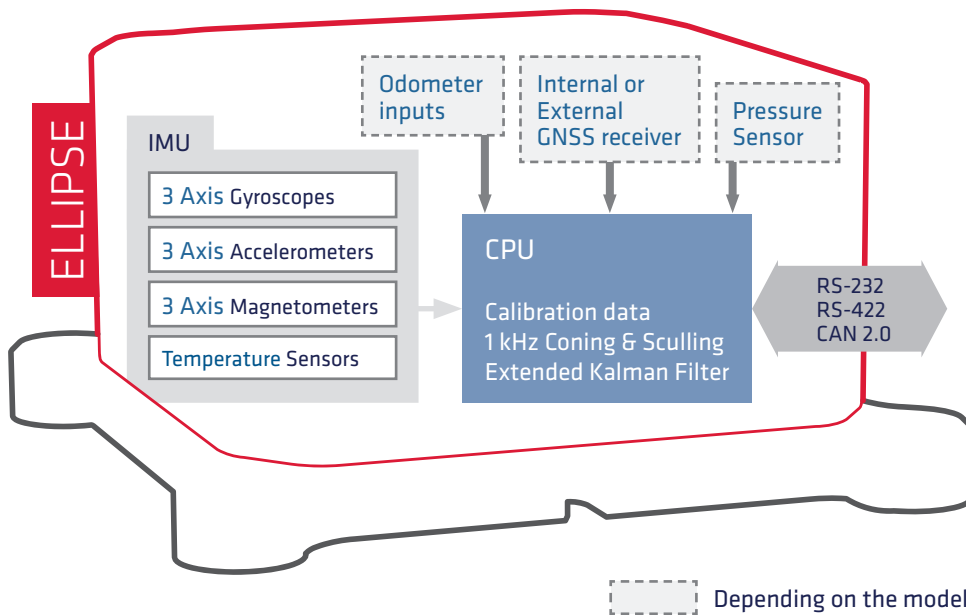|	Ellipse2-A	Ellipse2-E	Ellipse2-N	Ellipse2-D
Roll, Pitch	0.1 °	0.1 °	0.1 °	0.1 °
Heading	0.8 ° (Magnetic-based)	<0.5 ° (External GNSS)	0.5 ° (GNSS-based)	0.2 ° (Dual-antenna GNSS)
Heave: 5 cm or 5%	●	●	●	●
Odometer aiding		●	●	●
DGPS corrections			●	●
Navigation		Navigation with external GNSS receiver	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

ELLIPSE

IMU
- 3 Axis Gyroscopes
- 3 Axis Accelerometers
- 3 Axis Magnetometers
- Temperature Sensors

Odometer inputs

Internal or External GNSS receiver

Pressure Sensor

CPU

Calibration data
1 kHz Coning & Sculling
Extended Kalman Filter

RS-232
RS-422
CAN 2.0

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

┌ ┄ ┄ ┐ Depending on the model

Advanced Filtering + Calibration + Motion Profiles

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

- » Extensive test and calibration from -40 to 85℃
- » Easy hard and soft magnetic disturbances compensation

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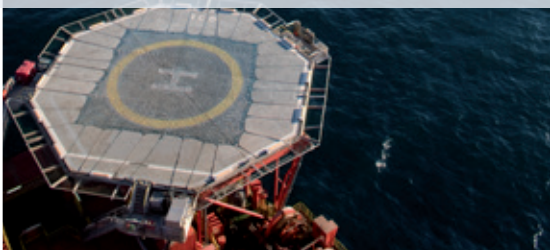
HEAVE ACCURACY
5 CM

AUTO-ADJUSTING HEAVE

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.
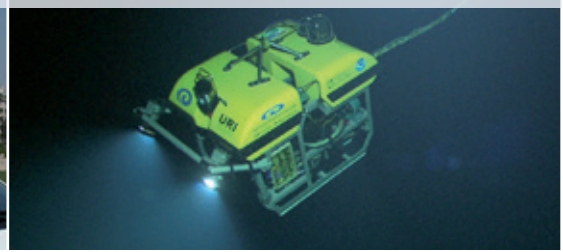
Helideck Monitoring System

Pointing & Stabilization

Orientation

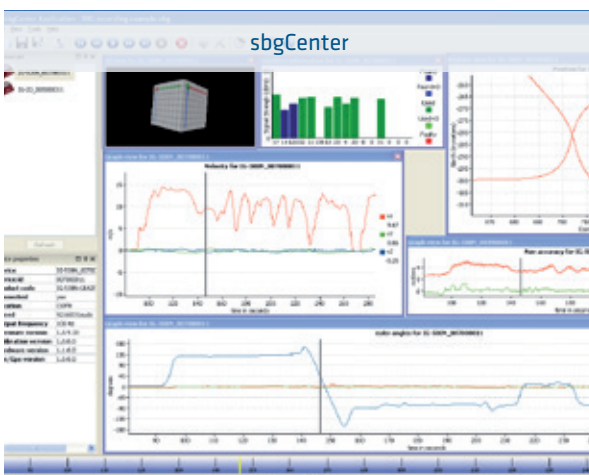# Development Kit, all-in-one package for easy integration

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
	D: 120-channel, 5 Hz STD: GPS L1/L2/L2C, SBAS, QZSS Option: GLONASS, 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	34 x 34 x 13 mm
		1.8 x 1.77 x 0.9 "	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	12 g / 0.02 lb
		N: 47 g / 0.1 lb	12 g / 0.02 lb
		E: 49 g / 0.1 lb	12 g / 0.02 lb
		D: 180 g / 0.4 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

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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