Ellipse Series

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 Series - The Most Advanced Miniature Inertial Sensors

ACCURACY

- Up to 0.1° real-time attitude
- Up to 2 cm RTK GNSS Position
- 10 cm Auto-Adaptative Heave

KEY FEATURES

- Very low noise gyroscopes
- 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.

Extreme Flexibility for High Demanding Applications

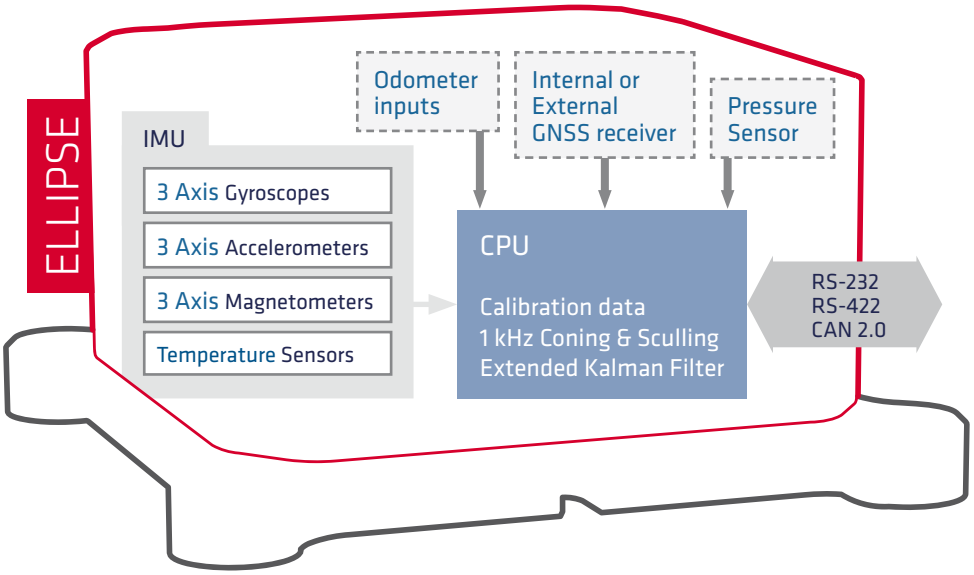
	Ellipse-A	Ellipse-E	Ellipse-N	Ellipse-D
Roll, Pitch	0.2 °	0.2 °	0.2 °	0.1 °
Heading	1 °	0.5 °	0.5 °	0.2 ° (Dual-antenna)
Heave: 10 cm or 10 %	●	●	●	●
Odometer aiding		●	●	●
DGPS corrections			●	●
Navigation		Navigation with external GPS / GNSS receiver	Internal GNSS receiver 2 m GNSS accuracy	Survey-grade 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



Depending on the model

Ellipse Series comes with features inspired from high end inertial systems such as GNSS receiver, FIR and rejection filtering, extensive temperature calibration, and motion profiles that adjust the sensor to the application constraints.

OEM version available

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.

Ellipse-D, the Most Powerful Model

- Immune to magnetic disturbances
- Accurate heading even under low dynamics
- L1/L2 GNSS receiver

Ellipse-D integrates a Survey-grade GNSS receiver with two antennas for unmatched heading, attitude, and position accuracy in real-time and post-processing.

This is the ideal sensor for antenna tracking, payload orientation, and cost-effective survey.

Dead Reckoning

Pointing & Stabilization

Orientation & Navigation

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

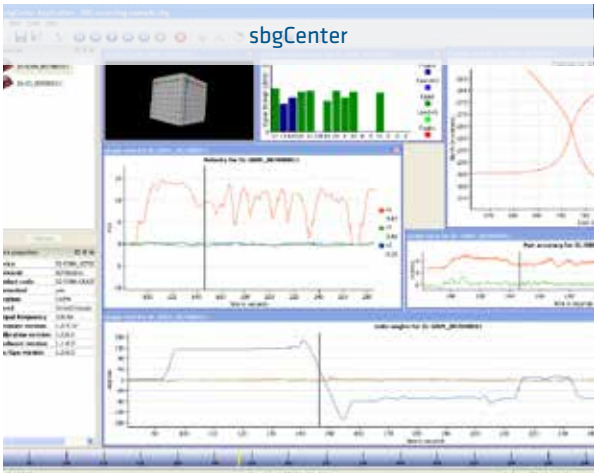

Development Kit

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

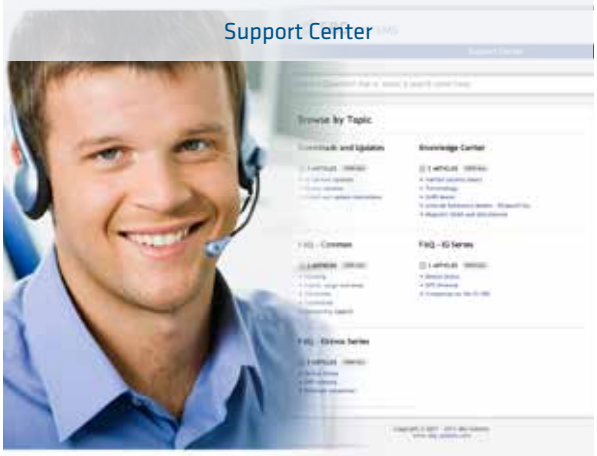

sbgCenter

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

Preliminary

ACCURACY (RMS)

360 ° sensing in all axes, no mounting limitation

Model	A	E/N	D
Roll / Pitch	0.2 °	0.2 °	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	10 cm or 10%		
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. Post-processing with Inertial Explorer®.

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

PRODUCT CODE

▪ *standard product options*

ELLIPSE-#-G#A#-##

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

GYROSCOPE
2: 100 °/s
3: 200 °/s
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

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	Up to 200 Hz
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	Model N: 72-channel, 10 Hz, L1 C/A GPS, GLONASS, QZSS, BeiDou, SBAS Model D: 120-channel, 5 Hz STD: GPS L1/L2/L2C, SBAS, QZSS Option: GLONASS, Galileo, Beidou
Cold start / Hot start	Model N: 26 s / < 1 s Model 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	-

SENSORS

	Accelerometers	Gyroscopes	Magnetometers
Range	± 8 g	± 450 °/s	± 8 Gauss
Gain stability	< 0.1 %	< 0.05 %	< 0.5 %
Non-linearity	< 0.2 % FS	< 0.05 % FS	< 0.1 % FS
Bias stability	± 5 mg	± 0.2 °/s	± 0.5 mGauss
Random walk/ Noise density	100 µg/√Hz (X,Y) 150 µg/√Hz (Z)	0.18 °/√hr	200 µg/√Hz
Bias in-run instability*	20 µg	8 °/h	-
VRE	7 mg/g² RMS	0.001 °/s/g² RMS	-
Alignment error	< 0.05 °	< 0.05 °	< 0.1 °
Bandwidth	250 Hz	133 Hz	110 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	Model A/E/N: 5 - 36 V Model D: 9 - 36 V
Power consumption	Model A/E: < 460 mW Model N: < 650 mW Model D: < 2,500 mW
Specified temperature	Model A/E/N: -40 to 85 °C, -40 to 185 °F Model D: -40 to 75 °C, -40 to 167 °F
Shock limit	2,000 g
Operating vibration	3 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

SBG Systems EMEA (Headquarters)
Phone: +33 1 80 88 45 00
E-mail: sales@sbg-systems.com

SBG Systems North America
Phone: +1 (657) 845-1771
E-mail: sales.usa@sbg-systems.com

www.sbg-systems.com