Ellipse Series **Ellipse-E**

MADE IN FRANCE

Ext. GNSS-aided Inertial Navigation Systems

Compact and Robust Inertial Sensors for Reliable Navigation

No Export Restriction

2-year Warranty

Vehicle Positioning

Autonomous Navigation

Motion Monitoring & compensation

Ellipse-E features an integrated Inertial Measurement Unit (IMU) and supports a wide range of external GNSS receivers and additional sensors. All inputs are combined using our in-house advanced sensor **fusion** algorithm to provide accurate **position** and **orientation**, even in challenging environments

- Compatible with wide range of GNSS receivers
- Compatible drivers (ARDUPILOT, ROS, pixhawk)
- Vibration resilient
- Built-in magnetometer
- **Reliability & Robustness**
- Auto-adjusting heave
- External sensors input
- Dead reckoning capable
- Spoofing & Jamming mitigation OSNMA capable

SBG SYSTEMS | Motion & Navigation you can trust

ISO 9001 BUREAU VERITAS Certification

Specifications

SYSTEM PERFORMANCE[1]

1-sigma error over the full temperature range for a typical land application

Correction	Single point	RTK	PPK[2]
Roll / Pitch	0.1°	0.05°	0.03°
Heading [3]	0.2°	0.2°	0.1°
Horizontal position	1.2 m	0.01 m	0.01 m

[1] *Performance depends on GNSS receiver (validated with u-blox and Septentrio)*

[2] *Using Qinertia post processing software*

[3] *Single / dual antenna*

SENSORS

	Accelerometers	Gyroscopes	Magnetometers
Measurement range	Marine: 8 g Land/Air: 20 g High dynamics: 40 g	Marine: 450°/s Land/Air: 450°/s High dynamics: 1000°/s	50 Gauss
In run bias instability	14 ug	7°/h	1.5 mGauss

INTERFACES

Aidings	GNSS, RTCM, Odometer, DVL, Magnetometers, Air data
Protocols	NMEA, sbgEcom (binary), REST API, third party protocols
Output rate	1 kHz (IMU & INS)
Main Serial Interface	RS-232, RS-422, USB – up to 2 Mbps
CAN interface	CAN 2.0 A/B – up to 1 Mbps
Sync I/O	4x Sync inputs (RS232), 2x Sync output (TTL)

VERSIONS

Box version are IP68, resistant to dust and water.
OEM version are PCB mounted for tight integration.

	Box	OEM
Dimensions	46 x 45 x 24 mm	29.5 x 25.5 x 11 mm
Weight	49 g	8 g

LONG GNSS OUTAGE PERFORMANCE[1]

Application	Position accuracy
Land	0.5% travelled distance
Marine	1.0% travelled distance
Airborne	2.0% travelled distance

[1] *With external aiding inputs.*
Test report available upon request.

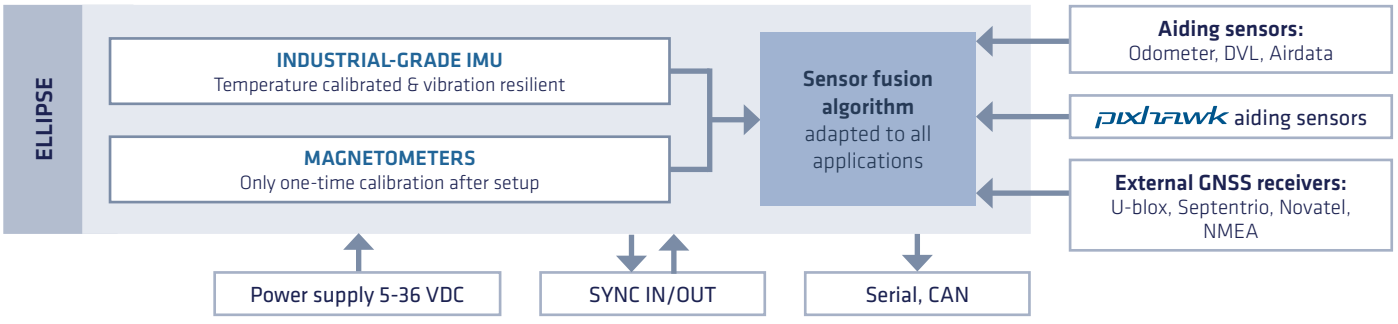
HEAVE PERFORMANCE *Marine version*

Accuracy	5 cm or 5%	Whichever is greater
Wave period	0 to 20 s	Auto-adjusting

ELECTRICAL & ENVIRONMENTAL

Input voltage	5 - 36 VDC
Power consumption	< 300 mW
Operating temperature	-40 to 85 °C
Shock limit	500 g / 0.1 ms
Operating vibration	8 g RMS (20 Hz to 2 kHz per MIL-STD 810G)
MTBF	218,000 hours

FUNCTIONAL BLOCK DIAGRAM



Free Technical Support | Lifetime Firmware Updates | 2-year Warranty

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Ellipse Series **Ellipse-N/D**

GNSS-aided Inertial Navigation Systems

MADE IN FRANCE

Compact and Robust Inertial Sensors for Reliable Navigation

- No Export Restriction
- 2-year Warranty

Vehicle Positioning

Autonomous Navigation

Motion Monitoring & compensation

The Ellipse INS series combines Inertial Measurement Unit (IMU) with GNSS and external sensors using our advanced **fusion** algorithm, delivering accurate **position** and **orientation**, even in challenging environments.

- Robust L1/L2 RTK capable
- ARDUPILOT, ROS, pixhawk — Compatible drivers
- Vibration resilient
- Built-in magnetometer
- **Reliability & Robustness**
- Auto-adjusting heave
- External sensors input
- Dead reckoning capable
- Spoofing & Jamming mitigation OSNMA capable

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Specifications

VERSIONS

Box version are IP68, resistant to dust and water. OEM version are PCB mounted for tight integration.

	Ellipse-N		Ellipse-D	
	Box	OEM	Box	OEM
Dual-antenna heading	✕	✕	✓	✓
Dimensions	46 x 45 x 24 mm	29.5 x 25.5 x 16 mm	46 x 45 x 32 mm	29.5 x 25.5 x 16 mm
Weight	47 g	17 g	65 g	17 g

SYSTEM PERFORMANCE

1-sigma error over the full temperature range for a typical land application

Correction	Single point	RTK	PPK[1]
Roll / Pitch	0.1°	0.05°	0.03°
Heading	0.2°	0.2°	0.1°
Horizontal position	1.2 m	0.01 m	0.01 m

[1] *Using Qinertia post processing software*

SENSORS

	Accelerometers	Gyroscopes	Magnetometers
Measurement range	Marine: 8 g Land/Air: 20 g High dynamics: 40 g	Marine: 450°/s Land/Air: 450°/s High dynamics: 1000°/s	50 Gauss
In run bias instability	14 ug	7°/h	1.5 mGauss

INTERFACES

Aidings	GNSS, RTCM, Odometer, DVL, Magnetometers, Air data
Protocols	NMEA, sbgEcom (binary), REST API, third party protocols
Output rate	1 kHz (IMU & INS)
Main Serial Interface	RS-232, RS-422, USB – up to 2 Mbps
CAN interface	CAN 2.0 A/B – up to 1 Mbps
Sync I/O	2x Sync inputs (RS232), 1x Sync output (TTL)

LONG GNSS OUTAGE PERFORMANCE[1]

Application	Position accuracy
Land	0.5% travelled distance
Marine	1.0% travelled distance
Airborne	2.0% travelled distance

[1] *With external aiding inputs. Test report available upon request.*

HEAVE PERFORMANCE *Marine version*

Accuracy	5 cm or 5%	Whichever is greater
Wave period	0 to 20 s	Auto-adjusting

INTERNAL GNSS

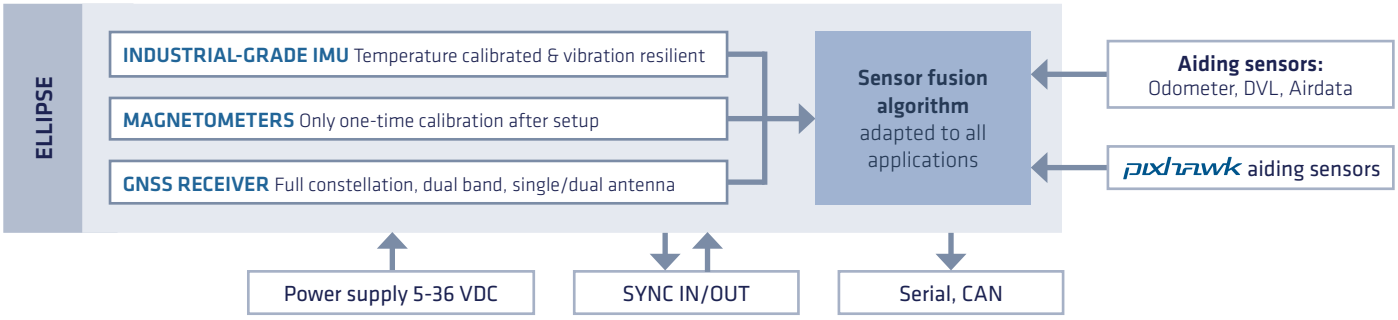
Features	RAW, OSNMA, PointPerfect (SPARTN/ RTCM), SBAS	
Signals	GPS: L1C/A, L2C GLONASS: L1OF, L2OF	GALILEO: E1, E5b BEIDOU: B1/B2
Time to first fix	< 24 s (cold start)	
Jamming / Spoofing	Mitigation & advanced indicators	

ELECTRICAL & ENVIRONMENTAL

Input voltage	5 - 36 VDC
Power consumption	N[1]: < 600 mW, D[1]: < 900 mW
Operating temperature	-40 to 85 °C
Shock limit	500 g / 0.1 ms
Operating vibration	8 g RMS (20 Hz to 2 kHz per MIL-STD 810G)
MTBF	218,000 hours

[1] *Without GNSS antenna*

FUNCTIONAL BLOCK DIAGRAM



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Ellipse Series **Ellipse-A**

Attitude and Heading Reference System

MADE IN FRANCE

Compact & Robust Inertial Sensors for Accurate Orientation & Heave

No Export Restriction

2-year Warranty

Motion & Heave Monitoring

Subsea Navigation

Pointing & Stabilization

The Ellipse AHRS series integrates Inertial Measurement Unit (IMU) with magnetometers to provide **reliable** orientation & heave in both low and high **dynamic** environments & mitigate the transient magnetic disturbances.

ROS pixhawk ARDUPILOT

Compatible drivers

Accurate & Reliable Orientation

Reliable roll, pitch and heading

Auto-adjusting heave

Immunity to transient magnetic disturbances

Built-in magnetometers with advanced magnetic calibration

Vibration resilient

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Specifications

Each of our sensors is subjected to a thorough calibration and testing process across its entire operating temperature range, at our manufacturing facilities. This guarantees all delivered products will meet their specifications for their entire lifetime without the need for a recalibration.

SYSTEM PERFORMANCE *1-sigma error over the full temperature range.*

Environment	Static	Dynamics[2]
Roll / Pitch	0.1°	0.4°
Heading[1]	0.8°	1°

[1] Magnetic heading under homogeneous magnetic field after calibration
[2] Evaluated for typical marine dynamics

SENSORS

	Accelerometers	Gyroscopes	Magnetometers
Measurement range	Marine: 8 g Land/Air: 20 g High Dynamics: 40 g	Marine: 450°/s Land/Air: 450°/s High Dynamics: 1000°/s	50 Gauss
Scale factor error	1000 ppm	500 ppm	< 0.5%
Long term bias repeatability	1.5 mg	500°/h	
In run bias instability	14 ug	7°/h	1.5 mGauss
Random walk	0.03 m/s/√h	0.18 °/√h	3 mGauss
VRE	0.05 mg/g²	1°/h/g²	-
Bandwidth	390 Hz	133 Hz	22 Hz

INTERFACES

Protocols	sbgEcom (binary), REST API, NMEA, third party protocols
Output rate	Up to 1 kHz (IMU & Euler)
Main Serial Interface	RS-232, RS-422, USB – up to 2 Mbps
CAN interface	CAN 2.0A/B – up to 1 Mbps
Sync I/O	2x Sync inputs (RS232), 1x Sync output (TTL)

VERSIONS

Box version are IP68, resistant to dust and water. OEM version are PCB mounted for tight integration.

	Box	OEM
Dimensions	46 x 45 x 24 mm	29.5 x 25.5 x 11 mm
Weight	45 g	8 g

HEAVE PERFORMANCE *Available on marine version*

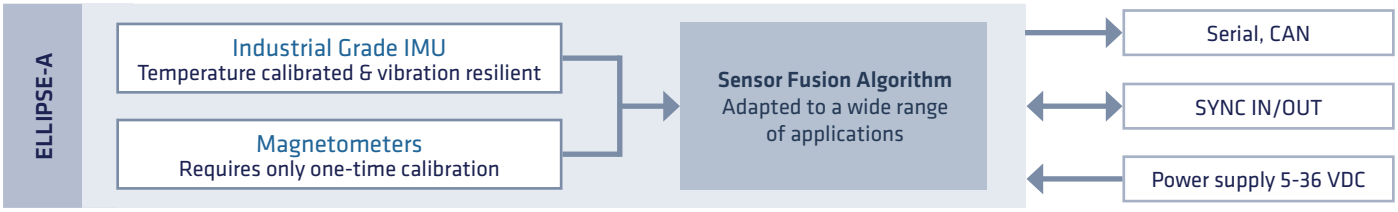
Accuracy	5 cm or 5%	Whichever is greater
Wave period	0 to 20 s	Auto-adjusting

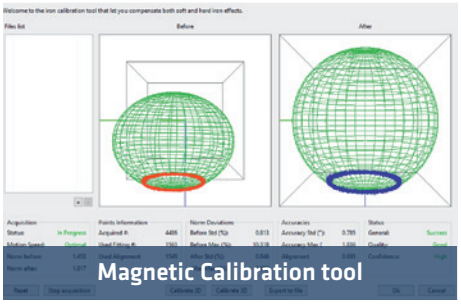
ELECTRICAL & ENVIRONMENTAL

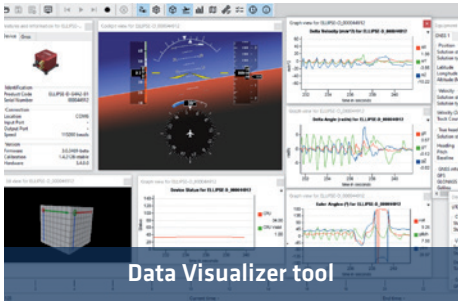
Input voltage	5 - 36 VDC
Power consumption	< 300 mW
Operating temperature	-40 to 85 °C
Shock limit	500 g
Operating vibration	8 g RMS (20 Hz to 2 kHz per MIL-STD 810G)
MTBF	218,000 hours

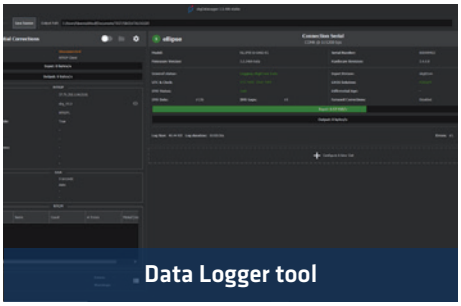
Communication interface: **REST API / C library**

FUNCTIONAL BLOCK DIAGRAM




Magnetic Calibration tool


Data Visualizer tool


Data Logger tool

CLI version available

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