The smallest INDUSTRIAL-GRADE Inertial Navigation System

Ellipse 2 Micro Series

Navigation, Motion & Heave Sensing

The ELLIPSE 2 MICRO SERIES brings the highest accuracy in the smallest and most economic package. Ellipse 2 Micro takes industrial-grade IMU, AHRS, and INS to high volume projects.
**Ellipse 2 Micro Series** - Highest Accuracy, Smallest Sensor

- **High Performance**
  - 0.1° Roll / Pitch

- **Light-weight**
  - 10 grams

- **Calibrated in dynamics**
  - and Temperature (-40° to 80°C)

- **Industrial grade**
  - High End Gyroscopes and Accelerometers

**ALL ELLIPSE MODELS COME WITH A TWO-YEAR WARRANTY**

- **10 years of Filtering embedded in the 10-gram Ellipse 2 Micro**

---

**Land**

- Fusion with GNSS receiver and odometer for a robust position in all conditions (forest, tunnel, urban canyons, etc.)
- Specific motion algorithms dedicated to land vehicle
- CAN Protocol

**Marine**

- The only micro sensor to provide a 5 cm Heave, automatically adjusted to the wave period
- Fusion with GNSS receiver for a robust position and heave in all conditions

**Aerial**

- Calibrated from -40 to +85°C for a constant behavior in all environments
- High resistance to shock and vibrations (< 2 000g)
- Fusion with GNSS receiver for a high accuracy position and heading
Bring the highest accuracy to your project, in the smallest and most economic package.

Development Kit for an Easy Integration

Ellipse 2 Micro IMU is an Inertial Measurement Unit. It embeds 3 gyroscopes, 3 accelerometers, 3 magnetometers and a temperature sensor.

Ellipse 2 Micro AHRS additionally runs an Extended Kalman Filter to provide Roll, Pitch, Heading, and Heave.

Ellipse 2 Micro INS additionally connects to a GNSS receiver and an odometer for Navigation.

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.

Evaluation Board
The Evaluation board integrates:
» A ublox module for INS applications (Model E)
» All the cables and accessories
There is no MOQ when ordering the Ellipse 2 Micro Development Kit.

Technical Support
When investing in a Development Kit (DK), you access free technical support by phone and email, and unlimited firmware updates.
## Specifications

### IMU SENSORS

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

* Allan Variance, @ 25 °C

### AHRS ACCURACY

- Roll & Pitch: 0.1 °
- Heading: 0.8 ° Magnetic** Heading
- Heave: 5 cm

### INS ACCURACY

- Roll & Pitch: 0.1 °
- Heading: 0.8 ° Magnetic** or External GNSS
- Position: External GNSS
- Heave: 5 cm
- Aiding Equipment: GNSS and Odometer

**Under homogenous magnetic field

### ELECTRICAL

- Specification
  - Size: 26.8 x 18.8 x 9.5 mm
  - Weight: 10 g
  - Shocks: < 2000 g
  - Operating Voltage: 4 – 17 V
  - Power Consumption: 400 mW

### ENVIRONMENTAL

- Specified Temperature: -40 to 85 °C (-40 to 185 °F)
- Humidity: 98 % - Non condensing
- MTBF (computed): 50 000 hours

### MECHANICAL

- Available data for A and E models
  - Euler angles, quaternion, velocity, position, heave, calibrated sensor data, delta angles & velocity, status
- Aiding sensors: GNSS: NMEA, UBX, Septentrio, Novatel
- Output rate: 200 Hz
- Main Serial Interface: 1 RS422 or 2 RS232, 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
  - Outputs: Synchronization (PPS)
  - 2 inputs / outputs

### INTERFACES

- Available data
  - Euler angles, quaternion, velocity, position, heave, calibrated sensor data, delta angles & velocity, status
- Aiding sensors: GNSS: NMEA, UBX, Septentrio, Novatel
- Output rate: 200 Hz
- Main Serial Interface: 1 RS422 or 2 RS232, 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
  - Outputs: Synchronization (PPS)
  - 2 inputs / outputs

### TRAINING

- Full training based on your specific needs to help you shorten your project development.

### REMOTE QUICK START

- A 2-hour session with an SBG Support Engineer, using a remote access software.