CA-ELI-USB-3M

Ellipse-A: Robust, High-Performance AHRS Sensor | SBG Systems
Unveiling Stellar-40, our High-performance & Resilient Navigation Solution
Applications
Geospatial
Get high-precision positioning for accurate mapping
Vehicles
Determine vehicle or payload position, orientation, and velocity with high accuracy
Defense
Get reliable, signal-independent orientation and navigation data
Solutions
IMU
Inertial Measurement Units
AHRS / MRU
Attitude and Heading Reference Systems
INS
Inertial Navigation Systems
Systems for surveyors
For hydrographers and land surveyors
OEM sensors
OEM solutions for seamless integration
Software suite
Setup and post-processing software to refine your data
Case studies
About us
Our company
Who we are and what we do
News
Discover our latest news
Events
Have a look at our upcoming events
Careers
Join us for an exciting job
MySBG
Keep up to date with the latest news about your products
Resources
Building trust
It all starts with high quality standards
Technology
Discover the technology behind the magic
Test reports
We push our products to the limit in this series of tests
Webinars
Expert-led webinars on inertial technology
Integrations & compatibilities
Integrations with PX4, Ardupilot, ROS, and more ?
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Home AHRS / MRU Ellipse-A
Ellipse-A Robust AHRS sensor for accurate orientation
Ellipse-A belongs to the Ellipse series of miniature, high-performance MEMS based Inertial

Systems providing a reliable orientation and heave in a compact package. It includes an Inertial Measurement Unit (IMU), a built-in magnetometer and runs an on-board latest generation sensor fusion algorithm. The IMU embeds high performance, industrial grade MEMS accelerometers and gyroscopes. Coupled with a cutting-edge calibration across its entire operating temperature range and advanced filtering techniques, these accelerometers and gyroscopes will provide excellent performance, even in highly vibrating environment. Discover all features and applications.

Get a quote Test reports and documentation

Features

Specifications

Documentation

Case studies

Ellipse-A features

Ellipse-A combines precise orientation and compact design, making it ideal for applications where space and weight are critical. It delivers precise orientation (roll, pitch, heading) and heave even in dynamic environments. Supporting smooth motion and orientation tracking, Ellipse-A provides real-time, three-axis acceleration and angular rate measurements. To achieve the best performance for all various applications, specific algorithm configurations have have been implemented to meet applications requirements. Sensor configuration is made easy through the sbgCenter software.

EFFICIENT VIBRATIONS HANDLING

High performance accelerometers and gyroscopes with advanced filtering to provide efficient vibration rejection.

BUILT-IN MAGNETOMETER

Ellipse embeds a 3-axis magnetometers with a start pf the art calibration, making them robust against transient magnetic disturbances.

HIGH RATE IMU DATA

The Ellipse-A offers a high IMU output rate of up to 1 kHz, providing accurate data ideal for stabilization and pointing applications.

AUTO ADJUSTING HEAVE

Ellipse-A embeds a high end accelerometers and latest generation heave algorithm to provide an accurate heave for marine applications.

6

Motion Sensors (3-axis high performance MEM accelerometers and gyroscopes)

18

Motion Profiles ? Air, Land and Marine

250

mW

Power Consumption

218

000

h

Expected Computed MTBF

Download the datasheet

Specifications

Motion & navigation performance

Roll/Pitch

0.1 °

Heading

0.8 ° Magnetic

Navigation features

Real time heave accuracy

5 cm or 5 %

Real time heave wave period

Up to 15 s

Real time heave mode

Automatic adjustment

Motion profiles

Air

Airplane, Fixed Wing UAV, Helicopter, UAV

Marine

Marine, Underwater

Land
Automotive, Heavy Machinery, Off Road Vehicle, Pedestrian, Railway, Static, Truck
Accelerometer performance
Range
– 40 g
Bias in-run instability
14 ?g
Random walk
0.03 m/s/?h
Bandwidth
390 Hz
Gyroscope performance
Range
– 450 °/s
Bias in-run instability
7 °/h
Random walk
0.15 °/?hr
Bandwidth
133 Hz
Magnetometer performance
Range
50 Gauss
Bias in-run instability
1.5 mGauss
Random walk
3 mGauss
Bandwidth
22 Hz
Environmental specifications & operating range
Ingress protection (IP)
IP-68 (1 hour at 2 meters)
Operating temperature
-40 ”C to 85 ℃
Vibrations
8 g RMS ? 20 Hz to 2 kHz
Shocks
500 g for 0.1 ms
MTBF (computed)
218 000 hours
Compliant with
MIL-STD-810
Interfaces
Output protocols
NMEA, Binary sbgECom, TSS, KVH, Dolog
Input protocols
N/A
Output rate
200 Hz, 1,000 Hz (IMU data)
Serial ports
RS-232/422 up to 2Mbps: up to 2 outputs
CAN
1x CAN 2.0 A/B, up to 1 Mbps
Sync OUT
PPS, trigger up to 200 Hz ? 1 output
Sync IN
PPS, event marker up to 1 kHz ? 5 inputs
Mechanical & electrical specifications
Operating voltage
5 to 36 VDC
Power consumption
300 mW

Weight (g)
45 g
Dimensions (LxWxH)
46 mm x 45 mm x 24 mm
Applications
Ellipse-A is a versatile, all-in-one AHRS solution tailored for applications demanding precision in orientation and stability. Advanced filtering and calibration techniques further ensure Ellipse-A resilience against vibrations, providing dependable data in dynamic environments. Built with advanced MEMS technology , it delivers reliable, real-time attitude and heading data in challenging conditions, making it ideal for industries where accuracy and robustness are essential. Discover all its applications.
Antenna Tracking
Gimbal Camera
Instrumented Buoy
SATCOM OTM
Subsea Navigation
UGV Navigation
USV Navigation
Ellipse-A datasheet
Get all the sensor features and specifications delivered straight to your inbox!
Please enable JavaScript in your browser to complete this form. Please enable JavaScript in your browser to complete this form.
Last Contact Datasheet
First Name *
Last Name *
Professional Email *
Download
Compare Ellipse-A with other products
The following table helps you evaluate which AHRS products best aligns with your project?s requirements, whether you prioritize compactness, cost-efficiency, or high-performance navigation. Discover how our range of AHRS products can bring exceptional stability and reliability to your operations.
Ellipse-A
Ellipse Micro AHRS
Ekinox-A
Apogee-A
Roll/pitch
Roll/pitch
0.1 °
Roll/pitch
0.1 °
Roll/pitch
0.02 °
Roll/pitch
0.01 °
Heading
Heading
0.8 ° Magnetic
Heading
0.8 ° Magnetic
Heading
0.03 °
Heading
0.02 °
Accelerometer range
Accelerometer range
– 40 g
Accelerometer range
– 40 g
Accelerometer range
8 g
Accelerometer range

– 10 g
Gyroscope range
Gyroscope range
– 450 °/s
Gyroscope range
– 450 °/s
Gyroscope range
300 °/s
Gyroscope range
– 200 °/s
Magnetometer range
Magnetometer range
50 Gauss
Magnetometer range
50 Gauss
Magnetometer range
?
Magnetometer range
?
Datalogger
Datalogger
?
Datalogger
?
Datalogger
8 GB or 48 h @ 200 Hz
Datalogger
8 GB or 48 h @ 200 Hz
Ethernet
Ethernet
?
Ethernet
?
Ethernet
Full duplex (10/100 base-T), PTP master clock, NTP, web interface, FTP, REST API
Ethernet
Full duplex (10/100 base-T), PTP master clock, NTP, web interface, FTP, REST API
Weight (g)
Weight (g)
45 g
Weight (g)
10 g
Weight (g)
400 g
Weight (g)
< 690 g
Dimensions (LxWxH)
Dimensions (LxWxH)
46 x 45 x 24 mm
Dimensions (LxWxH)
26.8 x 18.8 x 9.5 mm
Dimensions (LxWxH)
100 x 86 x 58 mm
Dimensions (LxWxH)
130 x 100 x 58 mm
Compatibility
SbgCenter is the best tool to quickly start using your SBG Systems IMU, AHRS or INS. Data logging can be done through sbgCenter.
Robot Operating System (ROS) is an open-source collection of software libraries and tools designed to simplify the development of robotic applications. It offers everything from device drivers to cutting-edge algorithms. ROS driver now therefore offers full compatibility across our entire product lineup.

Pixhawk is an open-source hardware platform used for autopilot systems in drones and other unmanned vehicles. It provides high-performance flight control, sensor integration, and navigation capabilities, allowing for precise control in applications ranging from hobbyist projects to professional-grade autonomous systems.
Documentation & resources
Ellipse-A comes with comprehensive documentation, designed to support users at every step. From installation guides to advanced configuration and troubleshooting, our clear and detailed manuals ensure smooth integration and operation.
Test Report ? New Ellipse
Algorithms improvements of the New Ellipse
Test Report ? AHRS performances
Our products have undergone extensive testing in real-world environments to assess their performance in Attitude and Heading Reference System mode.
Test Report ? Performances under vibrations
Evaluation of the performance of the Ellipse under various vibration conditions.
Ellipse-A documentation
This page contains everything you need for the hardware integration.
Ellipse-A important notices
This page contains everything you need about Ellipse-A Safety instructions, RoHS statement, REACH statement, WEEE statement & Warranty, liability and return procedure.
Ellipse-A firmware update procedure
Stay up-to-date with the latest enhancements and features by following our comprehensive firmware update procedure. Click the link below to access detailed instructions and ensure your system operates at peak performance.
Our case studies
Explore real-world use cases demonstrating how our product enhance performance, reduce downtime, and improve operational efficiency. Learn how our advanced sensors and intuitive interfaces provide the precision and control you need to excel in your applications.
Vikings
Compact inertial navigation system for autonomous navigation
Autonomous robot
Transmin
Ellipse-A chosen for remotely operated rockbreakers
Automated control system
The Office of Naval Research MIZ
Wave measurement in the arctic sea
Instrumented buoy
Zen Microsystems
Motorcycles roll and lean acceleration analysis
Tire testing
Aquatica Submarines
Expedition Survey Belize?s Great Blue Hole With Ellipse INS sensor
Surveying
AGH University of Kraków
How Ellipse-D helped a solar-powered boat compete in Monaco
Solar-powered boat
See all the use cases
Additional Products & Accessories
Discover how our solutions can transform your operations by exploring our diverse range of applications. With our Motion and Navigation sensors and software, you gain access to state-of-the-art technologies that drive success and innovation in your field. Join us in unlocking the potential of inertial navigation and positioning solutions across various industries.
Qinertia GNSS-INS
Qinertia PPK software delivers advanced high-precision positioning solutions. Qinertia delivers reliable, centimeter-level positioning for geospatial professionals, supporting UAV mapping, mobile surveying, marine operations, and autonomous vehicle testing?anywhere, anytime.
Discover
Cables
SBG Systems offers a comprehensive range of high-quality cables designed to streamline the integration of its GNSS/INS sensors across various platforms. From plug-and-play split cables that simplify installation, to open-ended cables allowing custom connectivity, and GNSS antenna cables ensuring optimal signal quality, each solution is built for reliability and performance

in demanding environments. Whether for UAVs, marine vessels, or embedded systems, SBG?s cable options provide flexibility, durability, and seamless compatibility with its navigation sensors.

Discover

Production process

Discover the precision and expertise behind every SBG Systems products. This following video offers an inside look at how we meticulously design, manufacture, and test our high-performance inertial navigation systems. From advanced engineering to rigorous quality control, our production process ensures that each product meets the highest standards of reliability and accuracy. Watch now to learn more!

Ask for a quotation

Please enable JavaScript in your browser to complete this form. Please enable JavaScript in your browser to complete this form.

Do you have a question about our products or services? Need a quote? Fill out the form below, and one of our experts will address your request quickly. You may also contact us by phone at +33 (0)1 80 88 45 00.

First Name *

Last Name *

Company *

Professional Email *

Mobile phone

Country * ? Select Choice ? Afghanistan Albania Algeria American Samoa Andorra Angola Anguilla Antarctica Antigua and Barbuda Argentina Armenia Aruba Australia Austria Azerbaijan Bahamas Bahrain Bangladesh Barbados Belarus Belgium Belize Benin Bermuda Bhutan Bolivia (Plurinational State of) Bonaire, Saint Eustatius and Saba Bosnia and Herzegovina Botswana Bouvet Island Brazil British Indian Ocean Territory Brunei Darussalam Bulgaria Burkina Faso Burundi Cabo Verde Cambodia Cameroon Canada Cayman Islands Central African Republic Chad Chile China Christmas Island Cocos Islands Colombia Comoros Congo Cook Islands Costa Rica Croatia Cuba Curaçao Cyprus Czech Republic Côte d?Ivoire Denmark Djibouti Dominica Dominican Republic Ecuador Egypt El Salvador Equatorial Guinea Eritrea Estonia Ethiopia Falkland Islands Faroe Islands Fiji Finland France French Guiana French Polynesia French Southern Territories Gabon Gambia Georgia Germany Ghana Gibraltar Greece Greenland Grenada Guadeloupe Guam Guatemala Guernsey Guinea Guinea-Bissau Guyana Haiti Heard Island and McDonald Islands Honduras Hong Kong Hungary Iceland India Indonesia Iran Iraq Ireland Isle of Man Israel Italy Jamaica Japan Jersey Jordan Kazakhstan Kenya Kiribati Kosovo Kuwait Kyrgyzstan Laos Latvia Lebanon Lesotho Liberia Libya Liechtenstein Lithuania Luxembourg Macao Madagascar Malawi Malaysia Maldives Mali Malta Marshall Islands Martinique Mauritania Mauritius Mayotte Mexico Micronesia Moldova Monaco Mongolia Montenegro Montserrat Morocco Mozambique Myanmar Namibia Nauru Nepal Netherlands New Caledonia New Zealand Nicaragua Niger Nigeria Niue Norfolk Island North Korea Northern Mariana Islands Norway Oman Pakistan Palau Panama Papua New Guinea Paraguay Peru Philippines Pitcairn Islands Poland Portugal Puerto Rico Qatar Romania Russian Federation Rwanda Saint BarthØlemy Saint Helena Saint Kitts and Nevis Saint Lucia Saint Martin Saint Pierre and Miquelon Saint Vincent and the Grenadines Samoa San Marino Sao Tome and Principe Saudi Arabia Senegal Serbia Seychelles Sierra Leone Singapore Sint Maarten Slovakia Slovenia Solomon Islands Somalia South Africa South Korea South Sudan Spain Sri Lanka Sudan Suriname Svalbard and Jan Mayen Sweden Switzerland Syria Taiwan Tajikistan Tanzania Thailand Timor-Leste Togo Tokelau Tonga Trinidad and Tobago Tunisia Turkmenistan Turks and Caicos Islands Tuvalu Turkey Uganda Ukraine United Arab Emirates United Kingdom United States Minor Outlying Islands United States of America Uruguay Uzbekistan Vanuatu Vatican Venezuela Vietnam Virgin Islands (British) Virgin Islands (U.S.) Wallis and Futuna Western Sahara Yemen Zambia Zimbabwe

Area of use * ? Select Choice ? Aerospace Defence Land Marine Subsea Indoor Other

Where did you hear about us * ? Select Choice ? Chatbot Colleagues Linkedin Newsletter Online magazine Print magazine Search engine Trade show Webinar Other

URL User Form

Tell us about your project *

Attachment

Drag & Drop Files, Choose Files to Upload

Max 5 MB

File format accepted: csv, jpeg, jpg, heic, png, pdf, txt

Send

They talk about us & Ellipse-A

We showcase the experiences and testimonials from industry professionals and clients who have

leveraged the Ellipse-A product in their projects. Discover how our innovative technology has transformed their operations, enhanced productivity, and delivered reliable results across various applications.

University of Waterloo

?Ellipse-D from SBG Systems was easy to use, very accurate, and stable, with a small form factor?all of which were essential for our WATonoTruck development.?

Amir K, Professor and Director

Fraunhofer IOSB

?Autonomous large-scale robots will revolutionize the construction industry in the near future.?

ITER Systems

?We were looking for a compact, precise and cost-effective inertial navigation system. SBG Systems? INS was the perfect match.?

David M, CEO

FAQ section

Welcome to our FAQ section, where we address your most pressing questions about our cutting-edge technology and its applications. Here, you?ll find comprehensive answers regarding product features, installation processes, troubleshooting tips, and best practices to maximize your experience. Whether you?re a new user seeking guidance or an experienced professional looking for advanced insights, our FAQs are designed to provide the information you need. Find Your Answers Here !

What are wave measurement sensors?

Wave measurement sensors are essential tools for understanding ocean dynamics and improving safety and efficiency in marine operations. By providing accurate and timely data on wave conditions, they help inform decisions across various sectors, from shipping and navigation to environmental conservation. Wave buoys are floating devices equipped with sensors to measure wave parameters such as height, period, and direction.

They typically use accelerometers or gyroscopes to detect wave motion (e.g. wave period) and can transmit real-time data to shore-based facilities for analysis.

What is bathymetry?

Bathymetry is the study and measurement of the depth and shape of underwater terrain, primarily focused on mapping the seafloor and other submerged landscapes. It is the underwater equivalent of topography, providing detailed insights into the underwater features of oceans, seas, lakes, and rivers. Bathymetry plays a crucial role in various applications, including navigation, marine construction, resource exploration, and environmental studies.

Modern bathymetric techniques rely on sonar systems, such as single-beam and multibeam echo sounders, which use sound waves to measure water depth. These devices send sound pulses toward the seafloor and record the time it takes for the echoes to return, calculating depth based on the speed of sound in water. Multibeam echo sounders, in particular, allow for wide swaths of the seafloor to be mapped at once, providing highly detailed and accurate seafloor representations. Frequently, a RTK + INS solution is associated to create accurately positioned 3D bathymetric representations of the seafloor.

Bathymetric data is essential for creating nautical charts, which help guide vessels safely by identifying potential underwater hazards like submerged rocks, wrecks, and sandbanks. It also plays a vital role in scientific research, helping researchers understand underwater geological features, ocean currents, and marine ecosystems.

Keep in touch with us

Stay ahead in the world of navigation technologies by subscribing to our monthly newsletter. This is your gateway to our latest product updates and inertial sensors industry insights.

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Last Name *

Professional Email *

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Product ranges

Apogee Series

Ellipse Series

Ellipse Micro Series

Ekinox Series

Navsight Series

Pulse Series
Quanta Series
Solutions
IMU
AHRS ? MRU
INS
Systems for surveyors
OEM sensors
Post processing software
Glossary
Attitude
Dead reckoning navigation
Georeferencing
Reference station
Real time kinematic
Full glossary
Useful links
Support Center
ISO 9001 certified

Mis àflot par Pilot?in
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Functional
Always active
The technical storage or access is strictly necessary for the legitimate purpose of enabling the use of a specific service explicitly requested by the subscriber or user, or for the sole purpose of carrying out the transmission of a communication over an electronic communications network.
Preferences
Preferences
The technical storage or access is necessary for the legitimate purpose of storing preferences that are not requested by the subscriber or user.
Statistics
Statistics
The technical storage or access that is used exclusively for statistical purposes.
The technical storage or access that is used exclusively for anonymous statistical purposes. Without a subpoena, voluntary compliance on the part of your Internet Service Provider, or additional records from a third party, information stored or retrieved for this purpose alone cannot usually be used to identify you.
Marketing
Marketing
The technical storage or access is required to create user profiles to send advertising, or to track the user on a website or across several websites for similar marketing purposes.
Manage options
Manage services
Manage {vendor_count} vendors
Read more about these purposes
Accept
Deny
View preferences
Save preferences
View preferences
{title}
{title}
{title}
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Functional
Functional
Always active
The technical storage or access is strictly necessary for the legitimate purpose of enabling the use of a specific service explicitly requested by the subscriber or user, or for the sole purpose of carrying out the transmission of a communication over an electronic communications network.
Preferences
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The technical storage or access is necessary for the legitimate purpose of storing preferences that are not requested by the subscriber or user.
Statistics
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The technical storage or access that is used exclusively for statistical purposes.
The technical storage or access that is used exclusively for anonymous statistical purposes. Without a subpoena, voluntary compliance on the part of your Internet Service Provider, or additional records from a third party, information stored or retrieved for this purpose alone cannot usually be used to identify you.
Marketing
Marketing
The technical storage or access is required to create user profiles to send advertising, or to track the user on a website or across several websites for similar marketing purposes.
Manage options
Manage services
Manage {vendor_count} vendors
Read more about these purposes
Accept
Deny
View preferences
Save preferences
View preferences
{title}
{title}
{title}
Manage consent
Manage consent