




INS1000

RTK INERTIAL NAVIGATION SYSTEM



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The INS1000 is a state-of-the-art, high performance GNSS with built-in inertial sensors. It offers dual frequency RTK and tight coupling between GNSS and inertial sensors to provide cm-level accuracy, enhanced reliability, and superior performance during GNSS outages. The Automotive Dead Reckoning (ADR) solution delivers strong performance in GNSS challenged urban environments.

The ACEINNA INS1000 is compatible with all major global satellite systems; it supports USB, Ethernet, CAN, and RS-232 interfaces; and it supports dual GNSS antennae for accurate heading in static and dynamic scenarios, and difficult magnetic environments.

Applications

- Autonomous Vehicles
- Precision Agriculture
- Construction Vehicles
- Automotive testing



Features

- Tightly coupled GNSS + Inertial solution
- Internal MEMS Gyros and Accelerometers
- GPS, GLONASS, Beidou, Galileo, SBAS
- Dual antennae for accurate heading
- Dual frequency (L1 / L2) RTK
- 100 Hz navigation solution (position, velocity, pitch, roll, heading)
- Calibrated over -40C to +85C
- High Reliability, MTBF > 50k hours

This product has been developed exclusively for commercial applications. It has not been tested for, and makes no representation or warranty as to conformance with, any military specifications or its suitability for any military application or end-use. Additionally, any use of this product for nuclear, chemical or biological weapons, or weapons research, or for any use in missiles, rockets, and/or UAV's of 300km or greater range, or any other activity prohibited by the Export Administration Regulations, is expressly prohibited without the written consent and without obtaining appropriate US export license(s) when required by US law. Diversion contrary to U.S. law is prohibited. Specifications are subject to change without notice.

Technical Characteristics

Accuracy ¹	
Horizontal Position Accuracy (RMS)	
SPS	1.2 m CEP
SBAS	0.6 m
DGPS	0.4 m
RTK ²	0.02 m
10s GNSS Outage	0.3 m
Vertical Position Accuracy (RMS)	
SPS	1.8 m CEP
RTK ²	0.03 m
10s GNSS Outage	0.4 m
Velocity Accuracy (RMS)	
Horizontal	0.01 m/s
Vertical	0.02 m/s
Heading Accuracy (RMS) ³	0.1°
Attitude Accuracy (Roll/Pitch, RMS)	0.05°
Operating Limits	
Velocity	515 m/s
Acceleration	8 g
Angular Rate	400°/s
Temperature Calibration Range	-40°C to +85°C
Timing	
Time to First Fix ⁴	
Cold Start ⁵	< 60 s
Warm Start ⁶	< 45 s
Hot Start ⁷	< 11 s
Signal Re-acquisition	< 2 s
RTK Initialization Time	< 1 min
Output Data Rate	100 Hz (200Hz max)
Environment	
Operating Temperature (°C)	-40 to +85
Non-Operating Temperature (°C)	-55 to +105
Enclosure Rating	IP67
Vibration	IEC 60068-2-6 (5g)
Shock survival	MIL-STD-810G (40g)
Electrical	
Input Voltage (VDC)	12V (10 - 24)
Power Consumption (W)	5
Digital Interface	Ethernet, CAN, USB, RS-232
Physical	
Size (mm)	145 x 120 x 45
Weight (gm)	680

Note 1: Typ values, subject to ionospheric/tropospheric conditions, satellite geometry, baseline length, multipath and interference effects.

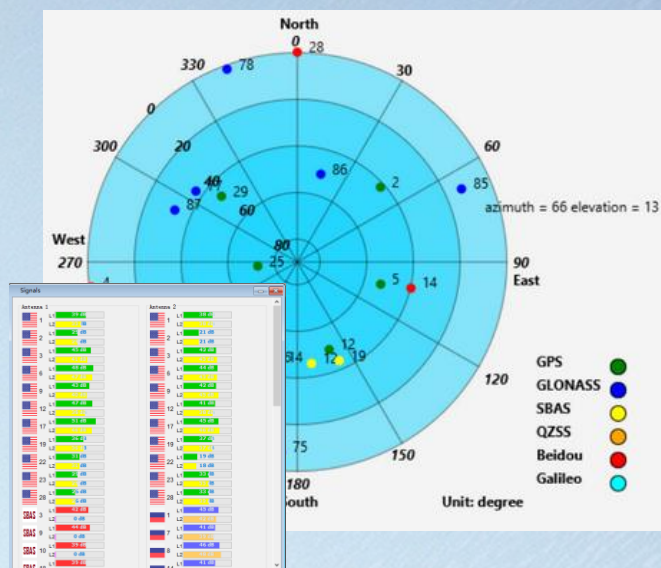
Note 2: Add 1ppm of baseline length.

Note 3: Based on 2m baseline between antennae.

Note 4: Typical values.

Note 5: No previous satellite or position information.

Note 6: Using ephemeris and last known position.



Ordering Information

Model	Description
INS1000-MT	Inertial Navigation System- Mobile Unit with IMU
INS1000-BASE	Remote Base-station for RTK

Support

For more detailed information, please refer to the INS1000 Developer Manual. It is available at the following location:

<https://docs-ins1000.readthedocs.io/en/latest/index.html>

AceinnaNav Control Software (ACS) is a graphical user interface for the AceinnaNav integrated navigation system. It displays continuous position, velocity, attitude, and trajectory information from the system. Additionally, it also provides tools to configure the system and log output data from the system.

Hardware

- INS1000 DEV KIT
 - INS1000 (INS1000 Rover)
 - Antenna GPS (2x Rover GPS Antenna)
 - INS1000-Base (INS1000 Base Station)
 - Antenna-GPSB (High Gain Survey Grade GPS Antenna)
 - INS1000-CKit (Cables/Connectors)
 - INS1000-Pbox (Pelican Box)
- Note: The DEV KIT comes disassembled. Some basic assembly is required.



Developer Tools

- System Setup Guide – How to connect the hardware, install and configure the system.
 - https://docs-ins1000.readthedocs.io/en/latest/system_setup_guide.html
- Base station Guide – How to set up and configure the base station.
 - https://docs-ins1000.readthedocs.io/en/latest/base_outline.html#
- Reference Manual – How to use the system.
 - https://docs-ins1000.readthedocs.io/en/latest/ref_outline.html
- Software Guide – How to use the GUI.
 - https://docs-ins1000.readthedocs.io/en/latest/user_outline.html#

System Requirements

- Rover Internet connection

