OpenRTK330

GNSS / RTK INERTIAL NAVIGATION SYSTEM

The ACEINNA OpenRTK330 is a state-of-the-art, high performance GNSS receiver with built-in RTK engine and triple redundant inertial sensors. It is designed for use in Level 3 ADAS and other high-volume applications requiring precise position information. It includes a multi-band RTK/GNSS receiver coupled with a triple redundant inertial sensor array to provide cm-level accuracy, enhanced reliability, and superior performance during GNSS outages. The dead reckoning solution delivers strong performance in GNSS challenged urban environments.   OpenRTK300 is supported by ACEINNA's open-source tool chain which enables direct customization of the on-board algorithms, I/O, and communication stack on the device.

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The ACEINNA OpenRTK330 is compatible with GPS, GALILEO, GLONASS, QZSS, and BeiDou satellite systems. The on-board triple redundant IMU provides for accurate dead-reckoning for short duration outages. Ethernet, UART, SPI, and CAN interfaces make for versatile integration into a host system.

Applications

- Autonomous Vehicles
- ADAS Systems
- Agriculture Vehicle Auto steer Systems
- Construction Vehicles
- Commercial Drones

Features

- 100Hz GNSS + Inertial Solution; Position, Velocity, Heading, and Attitude
- Supported GNSS
  - GPS (L1 C/A, L2C and L5)
  - GLONASS (L1OF, L2OF)
  - BeiDou (B1I,B2I),
  - Galileo (E1,E5a, E6)
  - QZSS (L1 C/A)
  - SBAS
- 80 Channels Tracking, RTK and PPP Algorithm support for cm accurate positioning
- Integrated, Triple-Redundant MEMS Inertial Measurement Unit - 8G and 400 °/s
- On-board application processor with open-source GNSS/IMU fusion code
- Ethernet, UART, SPI, and CAN Interfaces

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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]	0.5°
Attitude Accuracy (Roll/Pitch, RMS)	0.1°
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
Update Rate	10Hz
Output Data Rate	100 Hz (200Hz max)
Sensitivity	
Tracking	-160dBm
Cold Start	-140dBm
Environment	
Operating Temperature (ºC)	-40 to +85
Non-Operating Temperature (ºC)	-55 to +105
Vibration	IEC 60068-2-6 (5g)
Shock survival	MIL-STD-810G (40g)
Electrical	
Input Voltage (VDC)	2.7 to 5.5V
Power Consumption (W)	1.0 (Typical)
Digital Interface	Ethernet, CAN, UART, SPI
Physical	
Package Type	50-pin LGA
Size (mm)	31 x 34 x 5
Weight (gm)	5
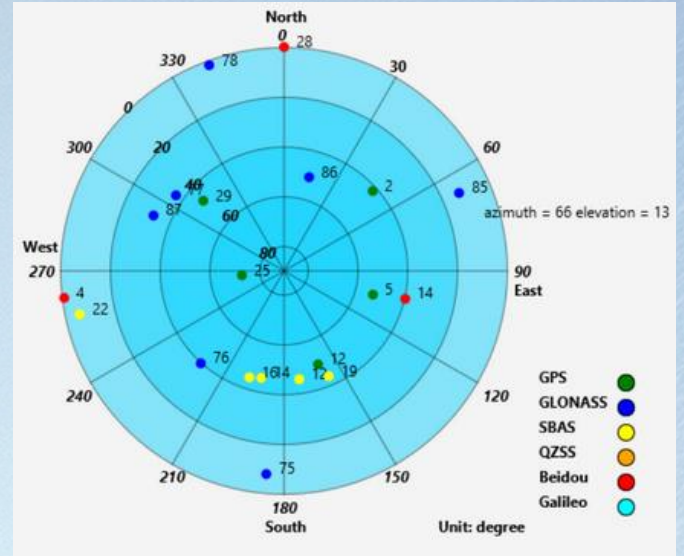
RTK / PPP Support

OpenRTK supports both RTK and PPP corrections. These corrections can be provided by ACEINNA's CloudRTK network or NTRIP protocol connection to 3rd party CORS services are also supported.

Multi-Band, Multi-Constellation

OpenRTK's GNSS chipset is based on ST Microelectronics Teseo V chipset. The Teseo V chipset baseband processor tracks various subsets of constellations and bands. Teseo V is connected to the powerful on board application processor, which runs the OpenRTK open-source stack. TeseoV can be reprogrammed directly via the on-board Application processor.

Ordering Information

Model	Description
OpenRTK330LI	Inertial Navigation System Module – Industrial Grade
OpenRTK330LA	Inertial Navigation System Module – Automotive Grade

Note 1: Typical values, subject to ionospheric/tropospheric conditions, satellite geometry, baseline length, multipath.
Note 2: Add 1ppm of baseline length.
Note 3: After dynamic motion initialization.
Note 4: Typical values.

Note 5: No previous satellite or position information.
Note 6: Using aged ephemeris and last known position.
Note 7: Using accurate ephemeris and last known position.

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Developer Kit

- OpenRTK330LI EVK
    - OpenRTK33LI Mounted on Evaluation Board
    - ST Link JTAG Pod
    - L1/L2/L5 GNSS Antennae
    - USB Cable
- EVK Interfaces and Connectors
    - Bluetooth, WiFi,
    - USB, SPI, Ethernet, CAN and JTAG interfaces
    - SMA antenna connector

Open Navigation Platform

Embedded navigation applications quickly developed on PC, MAC, and Ubuntu and deployed to run on OpenRTK hardware.

- Code / Compile / Debug
- Simulate / Analyze

ACEINNA Navigation Studio developer tools and GUI are found on our developer site: **developers.aceinna.com**

Full manual, API and Algorithm documentation are found at: **openrtk.readthedocs.io**

IDE and Compilation tools, download VS Code and Add ACEINNA Extension: **code.visualstudio.com**
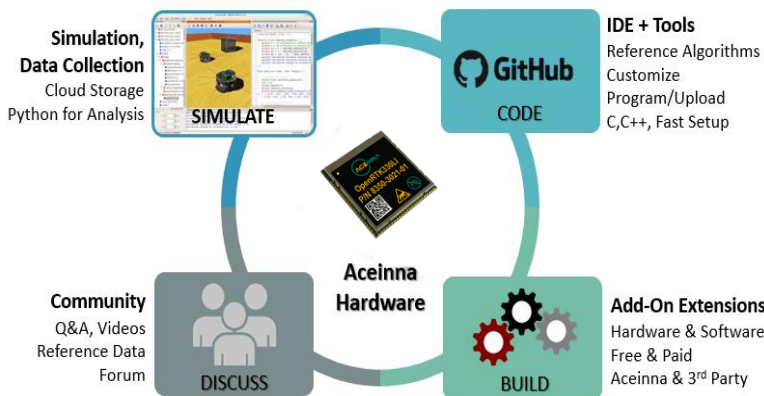
Ready to Use Open GNSS/INS Source Algorithms

- Calibrated IMU, 3D Acceleration, 3D Rate
- INS, Position, Velocity, Attitude and Heading
- VG / AHRS, Dynamic Roll, Pitch and Heading

System Requirements

- Windows 10 PC, Mac, or Ubuntu
- USB Port (2.0)
- Internet Connection

OPEN NAVIGATION PLATFORM

SIMULATE, CAPTURE, ANALYZE