



# OpenIMU330

Triple Redundant 2°/Hr SMT IMU



The ACEINNA OpenIMU330B is a small form factor high-performance 6-DOF open inertial platform. The OpenIMU330B features a triple-redundant 3-Axis Accelerometer and 3-Axis Rate Gyroscope for excellent accuracy and reliability. It is powered by a 32 Bit ARM M4 CPU with Floating Point Unit. The OpenIMU330B runs the OpenIMU open-source stack that includes an optimized full-state Kalman Filter for Attitude and GPS-Aided Position-Velocity-Time (PVT) measurement. A free tool-chain based on VS Code supports PC, MAC, and Ubuntu.



The ACEINNA OpenIMU330B is designed for use in automotive Level 3 ADAS systems. The triple-redundant architecture combined with the small, low-cost packaging is intended to meet the challenging performance, reliability and cost requirements of the automotive market.

## Applications

- Autonomous Vehicles
- Self-Driving Taxis/Delivery Vehicles
- ADAS Systems
- Electronic Stability Control
- Lane Keep Assist



## Features

- Triple Redundant, 3 axis MEMS angular rate sensor
- Triple Redundant, High Performance 3 axis MEMS Accelerometer
- Open Source Tool Chain and Custom Algorithms, ARM M4 CPU
- Built in 16-State Open Source Extended State Kalman Filter
- Automotive Grade ASIL-B Version
- SPI and UART interfaces
- Up to 3 UARTs
- Wide Temp Range, -40C to +85C
- High Reliability, MTBF > 50k hours
- Open Community & Support

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

Ta = 25°C, VDC = 3.3V, unless otherwise stated

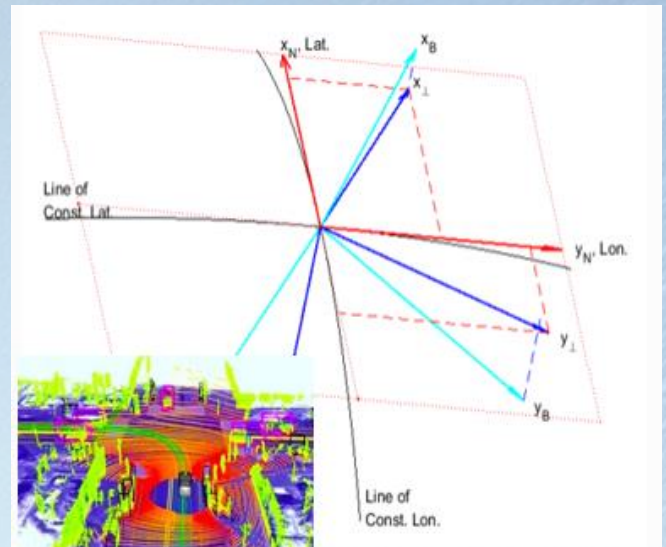
Ready-to Use Algorithms		Outputs		
IMU		Calibrated Accel, Gyro		
VG-AHRS		Dynamic Roll, Pitch Heading		
INS		Position, Velocity, Attitude		
Angular Rate		MIN	TYP <sup>2</sup>	MAX
Range (°/s)		-400		400
Bias Instability (°/hr) <sup>1</sup>			2	
Bias Stability over Temp (°/s)			0.3	
Scale Factor Accuracy (%)			0.02	
Cross-Axis Error (%FSR)			0.01	
Angle Random Walk (°/√hr) <sup>1</sup>			0.2	
Configurable Bandwidth (Hz)		5		50
Acceleration		MIN	TYP <sup>2</sup>	MAX
Range (g)		-8		+8
Bias Instability (µg) <sup>1</sup>			20	
Bias Stability over Temp (mg)			3	
Scale Factor Accuracy (%FSR)			0.03	
Cross-Axis Error (%FSR)			0.03	
VRW (m/s/√hr) <sup>1</sup>			0.04	
Configurable Bandwidth (Hz)		5		50
Electrical		MIN	TYP	MAX
Input Voltage (V)		3.0		5.5
Current Consumption (mA)			20	
Interface		SPI or UART		
Output Data Rate – SPI (Hz)				200
Output Data Rate – UART (Hz)				100
Environment				
Operating Temperature (°C)		-40 °C to 85°C		
Non-Operating Temperature (°C)		-55 °C to 85°C		
Physical				
Size (mm)		11 x 15 x 3		
Weight (gm)		1.0		
Interface Connector		44 ball, ball grid array (BGA)		

Note 1: Allen variance curve, constant temperature

Note 2: Typical values are 1 sigma values unless otherwise noted

### Ordering Information

Part Ordering Information	
EZ Family High-Performance OpenIMU Platform	
OpenIMU330BI	Industrial Grade: 6 DOF IMU, FSR = 400dps / ±8g
OpenIMU330BA	Automotive Grade (ASIL B): Contact Aceinna
OpenIMU330B EVK	Developer Kit with OpenIMU330BA, EVB, JTAG, and Precision Test Fixture



### Developer Tools

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

ACEINNA Navigation Studio developer tools and GUI are found on our developer site:

[developers.aceinna.com](http://developers.aceinna.com)

Full manual and API and Algorithm documentation is found at:

[openimu.readthedocs.io](http://openimu.readthedocs.io)

IDE and Compilation tools, download VS Code and Add ACEINNA Extension:

[code.visualstudio.com](http://code.visualstudio.com)



## EVALUATION HARDWARE

- OpenIMU330B
- Virtual COM-port USB interface, providing connectivity to OpenIMU330B unit from PC
- Connector for programming and debugging target via Serial Wire Debug (SWD) interface
- Connector for interfacing OpenIMU330B from custom-designed system.
- Test terminals for connecting oscilloscope or logic analyzers to the dedicated OpenIMU330B signals
- Test fixture adapter for convenient aligned mounting of OpenIMU evaluation board and OpenIMU330B unit
- ST-Link debugger for in-system development of application code



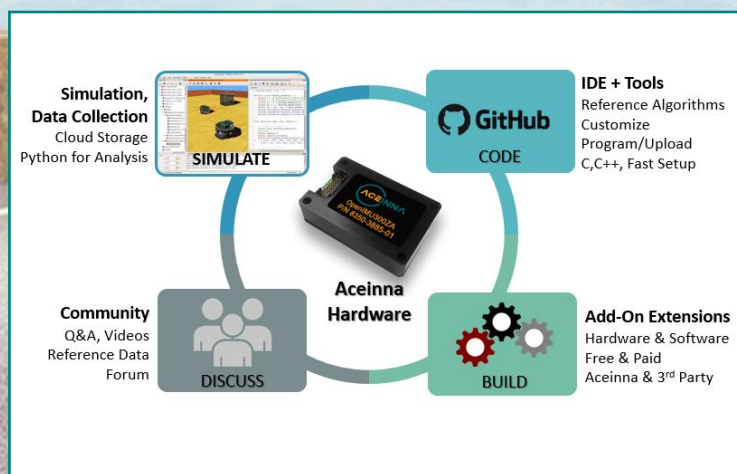
## DEVELOPER TOOLS (click the links)

- [OpenIMU Developer Manual](#)
- [OpenIMU Evaluation Kit Setup](#)
- [Tools Installation](#) – Installation of OpenIMU Development Environment and Development Platform
- OpenIMU330B Eval Kit

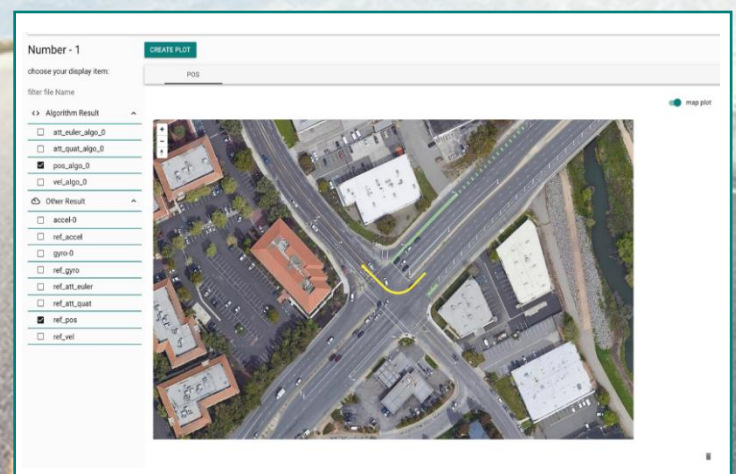
## SYSTEM REQUIREMENTS

- PC or MAC
- USB Port (2.0)
- Internet Connection

## OPEN NAVIGATION PLATFORM



## SIMULATE, CAPTURE, ANALYZE



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