



# OpenIMU330

Triple Redundant 1.5°/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

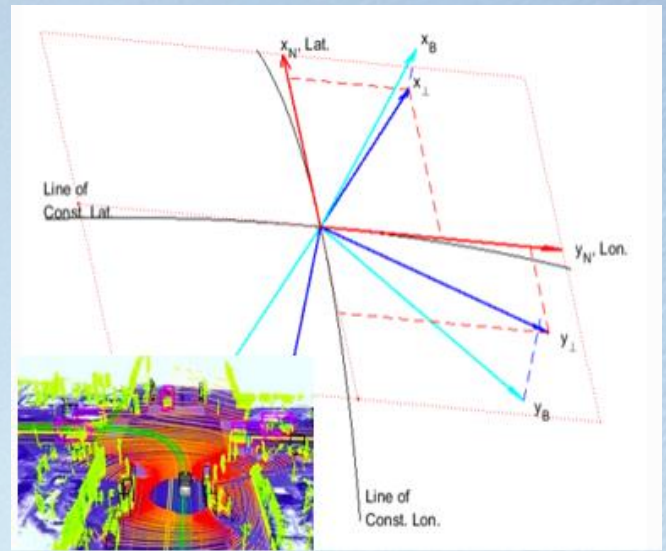
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### Technical Characteristics

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
Resolution UART (°/s)		0.006	
Resolution SPI (°/s/LSB)		0.0156	
Scale Factor error (-40 – 85 C) (%)		0.4	
Bias Instability (°/hr) <sup>1</sup>		1.5	
Bias Stability over Temp (°/s)		0.3	
Axis to Axis Misalignment (Degree)		0.1	
Nonlinearity (%FSR) <sup>3</sup>		0.02	
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
Resolution UART (mg)		0.08	
Resolution SPI (mg/LSB)		0.25	
Scale Factor error (-40 – 85 C) (%)		0.4	
Bias Instability (μg) <sup>1</sup>		20	
Bias Stability over Temp (XY (mg))		3	
Bias Stability over Temp (Z (mg))		7	
Axis to Axis Misalignment (Degree)		0.1	
Nonlinearity (±1g) (%FSR) <sup>3</sup>		0.02	
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			
Calibrated Temperature (°C)	-40 °C to 85°C		
Operating Temperature (°C)	-40 °C to 105°C		
Non-Operating Temperature (°C)	-40 °C to 105°C		
Physical			
Size (mm)	11 x 15 x 3.4		
Weight (g)	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  
 Note 3: Best line straight fit



### 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)

### Ordering Information

Part Ordering Information	
<b>EZ Family High-Performance OpenIMU Platform</b>	
OpenIMU330BI	<b>Industrial Grade:</b> 6 DOF IMU, FSR = 400dps / ±8g
IMU330LA	<b>Automotive Grade (ASIL B):</b> Contact Aceinna
OpenIMU330BI EVK	<b>Developer Kit with OpenIMU330BI, EVB, JTAG, and Precision Test Fixture</b>

### EVALUATION HARDWARE

- OpenIMU330BI
- Virtual COM-port USB interface, providing connectivity to OpenIMU330BI unit from PC
- Connector for programming and debugging target via Serial Wire Debug (SWD) interface
- Connector for interfacing OpenIMU330BI from custom-designed system
- Test terminals for connecting oscilloscope or logic analyzers to the dedicated OpenIMU330BI signals
- Test fixture adapter for convenient aligned mounting of OpenIMU evaluation board and OpenIMU330BI unit
- ST-Link debugger for in-system development of application code



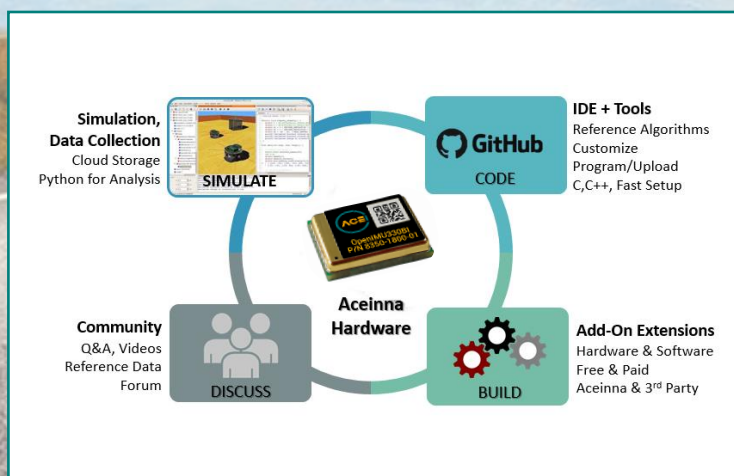
### DEVELOPER TOOLS (click the links)

- [OpenIMU Developer Manual](#)
- [OpenIMU Evaluation Kit Setup](#)
- [Tools Installation](#) – Installation of OpenIMU Development Environment and Development Platform
- [ACEINNA Navigation Studio](#) – Simulate, Deploy, Capture, and Analyze
- OpenIMU330BI Eval Kit

### SYSTEM REQUIREMENTS

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

### OPEN NAVIGATION PLATFORM



### SIMULATE, CAPTURE, ANALYZE

