Micro-Miniature Inertial Navigation System

Features

- Extended Kalman Filter
- Low Power and Cost Effective
- High performance MEMS gyro
- Miniature in size
- Weight: <40 gms
- Complied to MIL-STD-810G
- Accepts External Aiding Data
- Supports Multi-Constellation

Applications

- Drone and UAV Navigation
- Autonomous Control and ADAS
- Autopilot
- Unmanned Ground Vehicles (UGV)

Description

Aeron's PLX3 is a family of highly compact MEMS-based Inertial Navigation Systems. The system runs an Extended Kalman Filter (EKF) offering near-tactical performance and providing the best estimates of navigation parameters including position, velocities, attitude, and heading. PLX3-N features tri-axial MEMS solid state accelerometers, tri-axial gyroscopes, tri-axial magnetometer for heading measurement and an integrated multi-constellation GNSS.

PLX3-N is a miniature INS that is low-powered and can fit in applications where size is a constraint. Due to its small size, it can be used in UAVs, UGVs, and other unmanned systems for navigation and control applications.

This strap-down system is very well suited for applications requiring precise positioning and is designed to perform in highly dynamic situations. The device can control aerial and ground vehicles by using its precise attitude, heading, and position information.

Aeron's PLX3-N inertial navigation system has a navigation output data rate of 200 Hz and a raw gyro and acceleration data rate of up to 1000 Hz. It can be interfaced over serial RS232 and UART TTL ports making data acquisition analysis easy.

Technical Specifications

Parameter Name	Parameter Value	Unit	Precondition
Acceleration			
Range	±10/40	g	User Configurable
Bias Instability	8	µg	Typical
VRW	0.03	m/s/√hr	
Noise Density	50	µg/√Hz	
Bias Repeatability	0.15	mg	
Angular Rate			
Range	±500/2000	°/s	User Configurable
Bias Instability	2	°/hr	Typical
ARW	0.2	°/√hr	
Noise Density	0.002	°/s/√Hz	
Bais Repeatability	15	°/hr	
Magnetometer			
Range	±50	guass	-
Barometer			
Range	300 - 1250	hPa	-
Accuracy	0.5	hPa	Typical
Attitude			
Roll Range	±180	deg	-
Pitch Range	±90	deg	-
Accuracy	0.1	deg	1σ (static)
	0.2		1σ (dynamics)
Resolution	0.01	deg	-
Heading			
Range	±180	deg	-
Accuracy	1	deg	1σ with magnetometer
	<0.3	deg	1σ in dynamic conditions
Resolution	0.01	deg	-
Velocity Accuracy			
Horizontal Velocity	0.1	m/sec	1σ (under good GNSS availability)
Vertical Velocity	0.3	m/sec	
Position Accuracy			
Horizontal [1]	1.5	m CEP	Under good GNSS availability
	1	m CEP	With SBAS
	3	%	1σ DT with external speed aiding - 3D accuracy (airspeed)[2]
	2	%	1σ DT with external speed aiding - 2D accuracy
Vertical	2	m	1σ with GNSS
	1.5	m	1σ with SBAS
GPS/GNSS			
Constellations	GPS (L1C/A, L5), GLONASS (L1OF), Galileo (E1-B/C, E5a), BeiDou (B1i, B2a), NavIC (SPS-L5)		
Correction Signal	SBAS		
TTFF	35	seconds	Typical
Jamming & Spoofing Detection	Yes	-	-

Note:

1 - Denied performance accuracy depends on the accuracy of external aiding .

2 - Subject to wind current stability at the altitude while flying operation and airspeed sensor accuracy.

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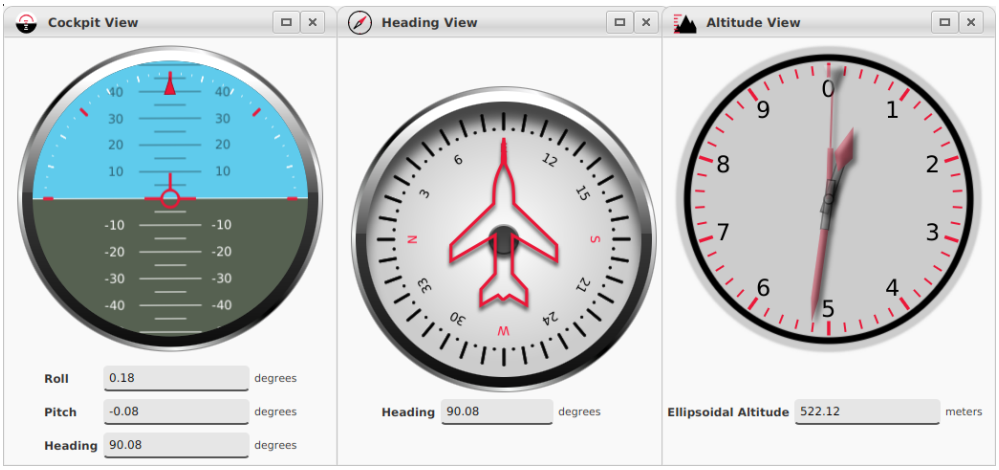
Technical Specifications

Parameter Name	Parameter Value	Unit	Precondition
Electrical Specifications			
Supply Voltage	5 ± 0.5 V	VDC	-
Power Consumption	<1.5	W	-
Communication Interface			
RS232	Data Output (NMEA and Binary); Configuration Input and Output (Binary); External Aiding Input (Binary)		upto 2000000 baudrate
UART			Upto 921600 baudrate
Output Data Protocol	Data Output : NMEA 0183; Data Output and Configuration : Binary (Aeron Standard Binary Protocol)		
Input Data Protocol	Aiding and Configuration : Binary (Aeron Standard Binary Protocol)		
SPI/ I2C	External Airspeed and Magnetometer Input Interface		
Data Rate	Upto 1000	Hz	IMU
	Upto 200	Hz	Navigation
Output Parameters	Euler Angles (Yaw, Pitch, Roll), Quaternion, Position, Velocity, Acceleration, Angular Rate, GNSS parameters, other sensor parameters, Health status and Time		
Physical Specifications			
Weight	~ 38	gms	Tolerance ±2 grams
Size	37 (L) x 37 (W) x 15 (H)	mm	Tolerance ±0.3 mm
Operating Temperature	-40 to +71	°C	-
Storage Temperature	-40 to +85	°C	-
Connector	Device connector, mating connector		
Environmental Specifications			
Environmental Test	MIL-STD-810G	-	-
Ingress Protection	IP65	-	-

Aeron INS Connect Suite

The PLX3-N INS is accompanied by a feature Aeron INS Connect Suite, for easy configuration, calibration, data display and data logging.

Note: *Below are the images of the Aeron INS Connect Suite for reference.*



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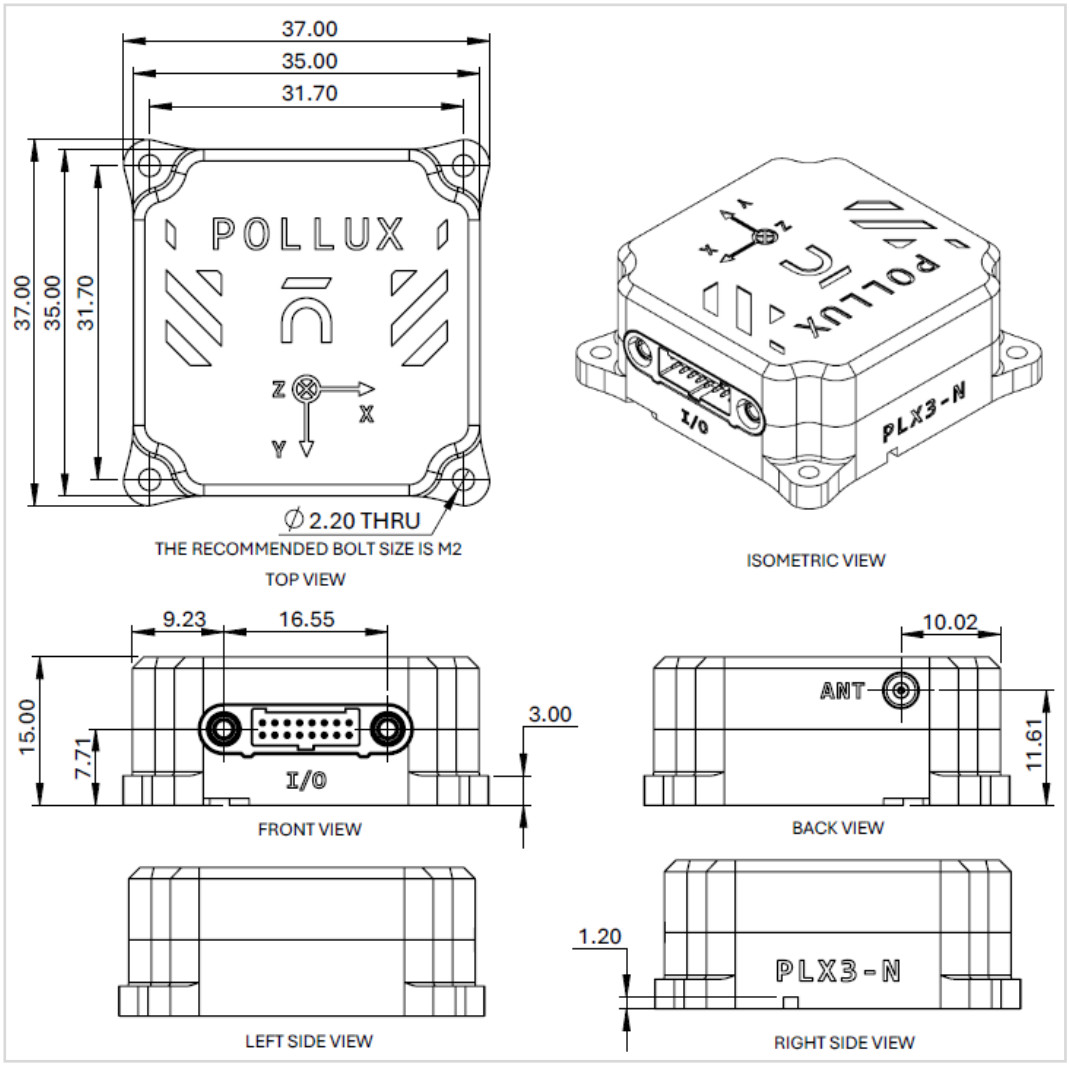
Mechanical Dimensions

All the dimensions in mm.



Ordering Information

Device / Accessories	Product Code
PLX3-N	17014
Integration Cable for PLX3-N	73172
Test Cable Harness for PLX3-N	74374
GNSS Antenna (V3-Novus GGI-102)	76081
GNSS Antenna Cable Harness	74387
Quick Start Guide	1701408023001