Dual Antenna High Performance MEMS INS-GNSS

KEY FEATURES



- Dual antenna GNSS configuration for accurate true heading without reliance on magnetic sensors or vehicle dynamics.
- FOG grade performance in MEMS Inertial Navigation System (INS).
- Advanced Kalman filter-based sensor fusion for robust navigation.
- Continuous navigation in GNSS-denied environments, including urban canyons, foliage, and under-jamming.
- RTK positioning accuracy is <1 cm.
- GNSS-denied performance: 0.3% DT with odometer aiding.
- High-precision inertial sensors (IMU with <0.5°/hr bias instability gyroscope).
- Compliant to military standards:
  - Environmental: MIL-STD-810H
  - EMI/EMC: MIL-STD-461G
  - Power Supply: MIL-STD-1275F, MIL-STD-704F
- Cost-effective, rugged, and field-deployable solution.
- Real-time position, velocity, and attitude (roll, pitch, yaw) outputs.
- Accepts External Aiding Data.
- Multi-frequency, multi-constellation GNSS (L1/L2/L5).

APPLICATIONS

- Armoured vehicles: Navigation (PNT) and pointing
- Unmanned Aerial Vehicles (UAVs): Reliable airborne navigation
- Secondary navigation systems for aircraft
- Robust navigation for GNSS-degraded environments
- Radar Antenna Pointing and Stabilization
- Mobile systems requiring low-cost, high-accuracy heading

DESCRIPTION

The **OCT3-NS7710-HP** is a dual-antenna high performance MEMS INS-GNSS system designed to provide highly accurate and reliable navigation and orientation data for a range of mission-critical applications. It includes an integrated high-end tactical grade MEMS-based inertial measurement unit (IMU) with <0.5°/h bias instability and a dual-antenna GNSS receiver, allowing the system to determine true heading independent of motion or magnetometers. The system employs Extended Kalman Filtering (EKF) to combine inertial and satellite data, enabling seamless transitions between GNSS-available and denied scenarios. Engineered to meet stringent military standards for environmental, EMI/EMC, and power compliance, it ensures reliable operation in extreme and contested environments. With odometer aiding, the system achieves a GNSS-denied accuracy of 0.3% of the Distance Travelled (DT), making it ideal for demanding tactical and autonomous applications.

TECHNICAL SPECIFICATIONS

Parameter	Value	Units	Confidence Band/ Condition
Acceleration			
Range	±20	g	-
Bias Instability	25	µg	Typical
Bias Repeatability	1.7	mg	Typical
Noise Density	15	µg/√Hz	Typical
VRW	0.03	m/s/√hr	Typical
Angular Rate			
Range	±325	°/s	-
Bias Instability	0.25	°/hr	Typical
Bias Repeatability	7	°/hr	Typical
Noise Density	0.0003	°/s/√Hz	Typical
ARW	0.04	°/√hr	Typical
Scale Factor Accuracy	600	ppm	Typical
Non-Linearity	100	ppm	Typical
Accuracy			
Roll, Pitch[2]	0.02	deg	Static
	0.05		Dynamic
Heading[1,2,4,5,9,10]	0.5	deg	Magnetometer
	0.3		Single antenna GNSS in dynamic conditions
	0.1		Dual antenna @ 1.0 m antenna separation
	0.02		Dual antenna @ 5.0 m antenna separation
Velocity[2,9]	0.03	m/s	-
Horizontal Position[1,3,10,11]	0.8	cm	RTK
	1.5	m	Standalone
	1	m	SBAS
	0.3	%	DT with odometer aiding
Vertical Position[1,2,3,10]	<2	cm	RTK
	3	m	Standalone
	2	m	SBAS
Vertical Position (with Baro.)	2	m	1σ relative (with barometer)
GNSS Parameters			
Maximum Altitude	18,288	m	-
Maximum Speed	513.9	m/s	-
Attitude			
Roll Range	±180	deg	-
Pitch Range	±90	deg	-
Heading Range	±180	deg	-
Angle Resolution	<0.01	deg	-
Barometer			
Range	300-1250	hPa	-
Noise density	0.02 - 0.9	Pa	-
Magnetometer			
Range	±8	gauss	-
Noise density	0.002	Gauss / √Hz	-

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TECHNICAL SPECIFICATIONS

Parameter	Value	Units	Confidence Band/ Condition
Aiding			
Internal GNSS[8]	**GPS** L1CA/L1P/L1C/L2P/L2C/L5 **GLONASS** G1/G2/G3, P1/P2 **BeiDou** B1i/B2i/B3i/B1C/B2a/B2b/AceBOC **GALILEO** E1BC/E5a/E5b/E6BC/AltBOC **NavIC** (IRNSS) L5	-	-
Correction and Signal Information	SBAS, RTK	-	-
TTFF[6] Cold Start	30	sec	Typical
Hot Start	<10	sec	Typical
Connector	2 x TNC Female Connector (Amphenol make P/N: 122428)	-	-
Interfaces			
RS-232 (Isolated)	Data Output (Binary/NMEA), GUI interface, External Aiding input	-	up to 921600 baudrate
RS-232 - RTK (Isolated)	RTK input		up to 460800 baudrate
RS-422 (Isolated)	Data Output (Binary/NMEA), GUI interface, External Aiding input	-	up to 921600 baudrate
CAN (Isolated)	CAN Data Output, External Speed and Gear Data Input	-	J1939 format (250 Kbps)
Ethernet (Isolated)	Data Output (Binary/NMEA)	-	100 Mbps
Output	Euler Angles (Yaw, Pitch, Roll); Quaternion; Position; Velocity; Acceleration, Angular Rate, Time, GNSS parameters, Sensor parameters, Health status	-	-
External Aiding Inputs	Speed, Velocity, Position, Altitude, Heading, Magnetometer	-	-
Output data protocols	NMEA 0183 (version 4.11), Binary (Aeron Standard Binary Protocol), J1939	-	-
Input data protocols	Aiding: Aeron Standard Binary Aiding Packet RTK Correction: RTCM v2.3, RTCM v3.2, CMR, CMR+	-	-
Built-In Tests	Power-ON Built-in Test (PBIT) Continuous Built-in Test (CBIT)	-	-
Update Rate (Configurable upto)	500	Hz	Sensor parameters
	100		Navigation parameters
I/O			
Digital Input (2 Channels)	DI1 (Odometer input) (Configurable Scaling)	-	Isolated, Max Frequency: 10 KHz
	DI2 (Reserved)	-	Isolated
Digital Output (3 Channels)	1PPS	-	Isolated
	DO1: GNSS fix type indicator	-	Isolated
	DO2: Device health indicator	-	Isolated

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TECHNICAL SPECIFICATIONS

Parameter	Value	Units	Confidence Band/ Condition
Mechanical			
Weight	1500	g	Tolerance ±75 g
Dimensions	156 (L) x 129 (W) x 74 (H)	mm	Tolerance ±0.5 mm
Fixation bolts	M6	metric	-
Connector	12 Pin Receptacle - ODU AMC® Connector - GK2YAR-PDMUF00-000L 12 Pin Mating - ODU AMC® Connector - S12YAR -PDMXFG0-0000 19 Pin Receptacle - ODU AMC® Connector - GKAYAR-P19UC00-000L 19 Pin Mating - ODU AMC® Connector - S1AYAR -P19XCD0-0000	-	-
Electrical and Environmental			
Input voltage	+12 to +32	VDC	Isolated
Power consumption[7]	7.3	W	Tolerance ±1W
Digital Input Voltage	+5 to +32	VDC	-
Digital Output Voltage	+5	VDC	-
Operating temperature	-40 to +71	ºC	-
Storage temperature	-55 to +85	ºC	-
Survival Shock*	Operational (Functional Shock) - 40g at 11ms; Non-Operational (Crash Hazard Shock) - 75g at 6ms	-	As per MIL-STD-810H
Ingress Protection*	IP65	-	-
Power Supply Protection*	As per MIL-STD-704F, MIL-STD-1275F	-	-
EMI/EMC*	As per MIL-STD-461G	-	-
Environmental Tests*	As per MIL-STD-810H	-	-

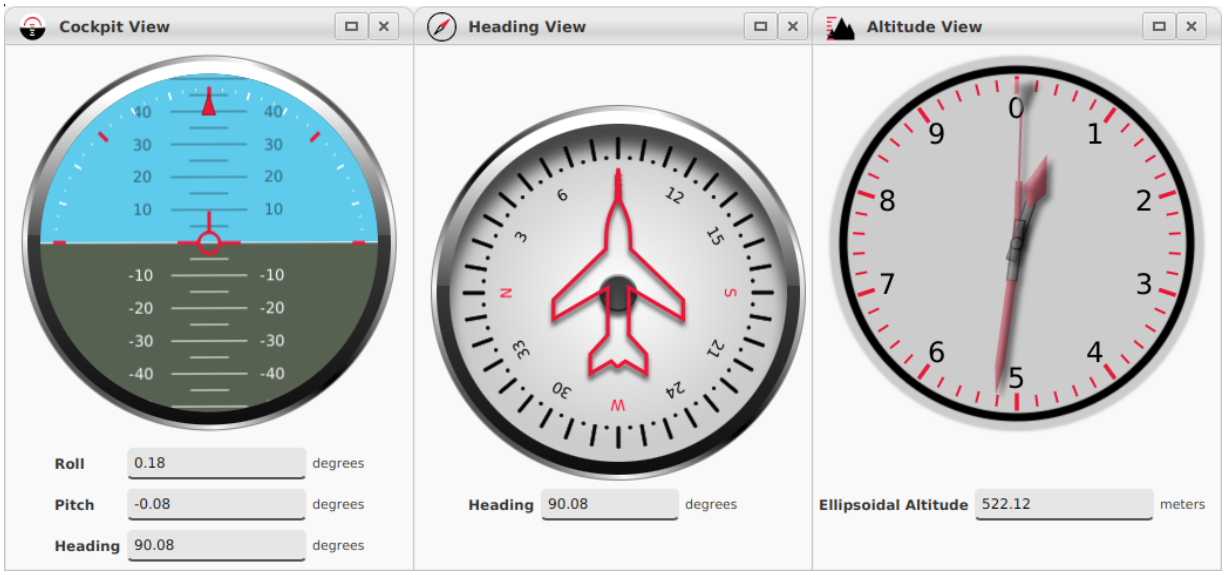
Note:

1 - Open sky conditions
2 - RMS Levels
3 - Baseline <40 km
4 - Accuracy after magnetic calibration and setting correct declination/offset angle
5 - After magnetic calibration for Hard Iron and Soft Iron disturbances and in static magnetic field
6 - Time to First Fix
7- Power consumption with default constellations (GPS, GLONASS, SBAS, NavIC) enabled and dual antenna connected
8 - Power consumption with all GNSS constellations enabled and dual antenna connected is 8.3W ±1W
9 - For single antenna GNSS in dynamic conditions, the vehicle speed is kept at **>11 m/s** in an open-sky environment
10 - Validated through PPK
11 - CEP Levels
* - Design Complied

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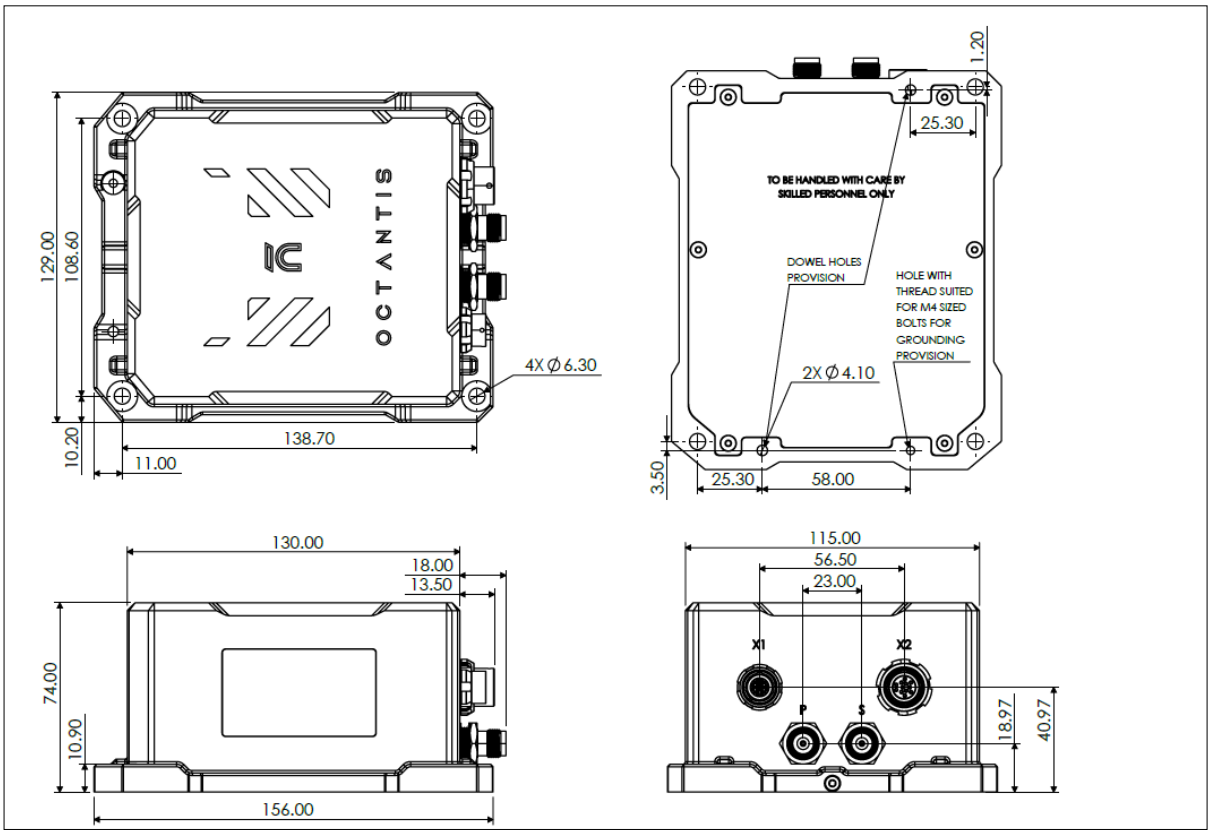
Aeron INS Connect Suite

The OCT3-NS7710-HP INS is accompanied by a Aeron INS Connect Suite (AICS), for easy configuration, performing magnetometer calibration, viewing and logging the data.



Note: These images are for representational purposes

MECHANICAL DIMENSIONS



ORDERING INFORMATION

OCT3-NS7710-HP (Product Code: 19031)

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