Dual Antenna MEMS GNSS-INS

FEATURES

- Dual antenna GNSS configuration for accurate true heading without reliance on magnetic sensors or vehicle dynamics.
- 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: <1% DT with odometer aiding.
- High-precision inertial sensors (IMU with <1°/hr bias instability gyroscope).
- Compliant to military standards:
  - Environmental: MIL-STD-810H, JSS-55555
  - EMI/EMC: MIL-STD-461G
  - Power Supply: MIL-STD-1275E.
- 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-NS7700T** is a dual-antenna 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 <1°/hr bias instability and a dual-antenna GNSS receiver, allowing the system to determine true heading independent of motion or magnetic sensors. The system employs Extended Kalman Filtering (EKF) to combine inertial and satellite data, enabling seamless transitions between GNSS-available and GNSS-denied scenarios. Engineered to meet stringent military standards for environmental, EMI/EMC, and power compliances, it ensures reliable operation in extreme and contested environments. With odometer aiding, the system achieves a GNSS-denied accuracy of <1% of the Distance Travelled (DT), making it the best choice for demanding tactical and autonomous applications.

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Datasheet Ver. 1.1, April 2026

TECHNICAL SPECIFICATIONS

Parameter Name	Parameter Value	Unit	Confidence Band/Condition
Accelerometer			
Range	±16	g	-
Bias Instability	15	µg	Typical
Noise Density	15	µg/√Hz	Typical
VRW	0.04	m/s/√Hz	Typical
Gyroscope			
Range	±450	°/s	-
Bias Instability	0.8	°/hr	Typical
Noise density	0.0015	°/s/√Hz	Typical
ARW	0.4	°/√Hr	Typical
Accuracy			
Roll, Pitch[2]	0.06	deg	Static
	0.1		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[2,10]	0.03	m/s	-
Horizontal Position[1,3,10,11]	0.8	cm	RTK
	1.5	m	Standalone
	1	m	SBAS
	<1	%	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	0.000012	Gauss / √Hz	-

TECHNICAL SPECIFICATIONS

Parameter Name	Parameter Value	Unit	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
Connectors	2 x TNC Female Connectors (Amphenol make P/N: 122428)	-	-
Communication Interface			
RS-232 (Isolated)	Data Output (Binary/NMEA) / GUI interface / External Aiding input	-	up to 921600 baudrate
	RTK input		up to 460800 baudrate
RS-422 (Isolated)	Data Output (Binary/NMEA) / GUI interface / External Aiding input	-	up to 921600 baudrate
CAN (Isolated)	Data Output and External Speed and Gear 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 I/Ps	Speed, Velocity, Position, Altitude, Heading, Magnetometer	-	-
Output data protocols	NMEA (version 4.11), Binary, J1939	-	-
Input data protocols	Aiding: Custom Binary Packet RTK Correction: RTCM v2.3, RTCM v3.2, CMR, CMR+	-	-
Built-In Tests	PBIT, CBIT	-	-
Update Rate (Configurable)	500	Hz	Sensor parameters
	200		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
Mechanical			
Weight	1000	gm	Tolerance ±75 grams
Dimensions	138 (L) x 115 (W) x 56 (H)	mm	Tolerance ±0.5 mm
Fixation bolts	M4	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	-	-

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TECHNICAL SPECIFICATIONS

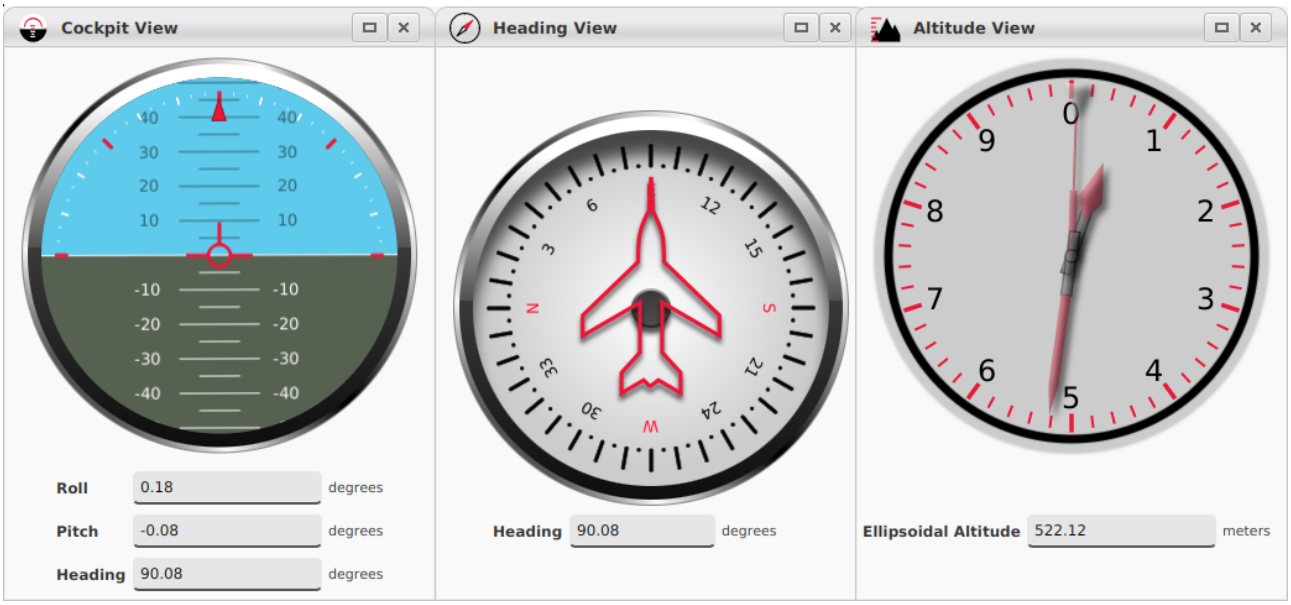
Parameter Name	Parameter Value	Unit	Confidence Band/Condition
Electrical and Environmental Compliant			
Input Voltage	+12 to +32	V DC	-
Power Consumption[7]	5.4	W	Tolerance ±0.5W
Digital Input Voltage Range	+5 to +32	VDC	-
Digital Output Voltage	+5	VDC	-
Operating Temperature	-40 to +71	°C	-
Storage Temperature	-55 to +85	°C	-
Survival Shock	Up to 40	g	As per MIL-STD-810H
Ingress Protection	IP65	-	-
Power Supply Protection	MIL-STD-1275E, MIL-STD-704F	-	-
EMI/EMC	MIL-STD-461G	-	-
Environmental Tests	MIL-STD-810H and JSS-55555	-	-

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 6.4W ±0.5W.
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

Aeron INS Connect Suite

The OCT3-NS7700T 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

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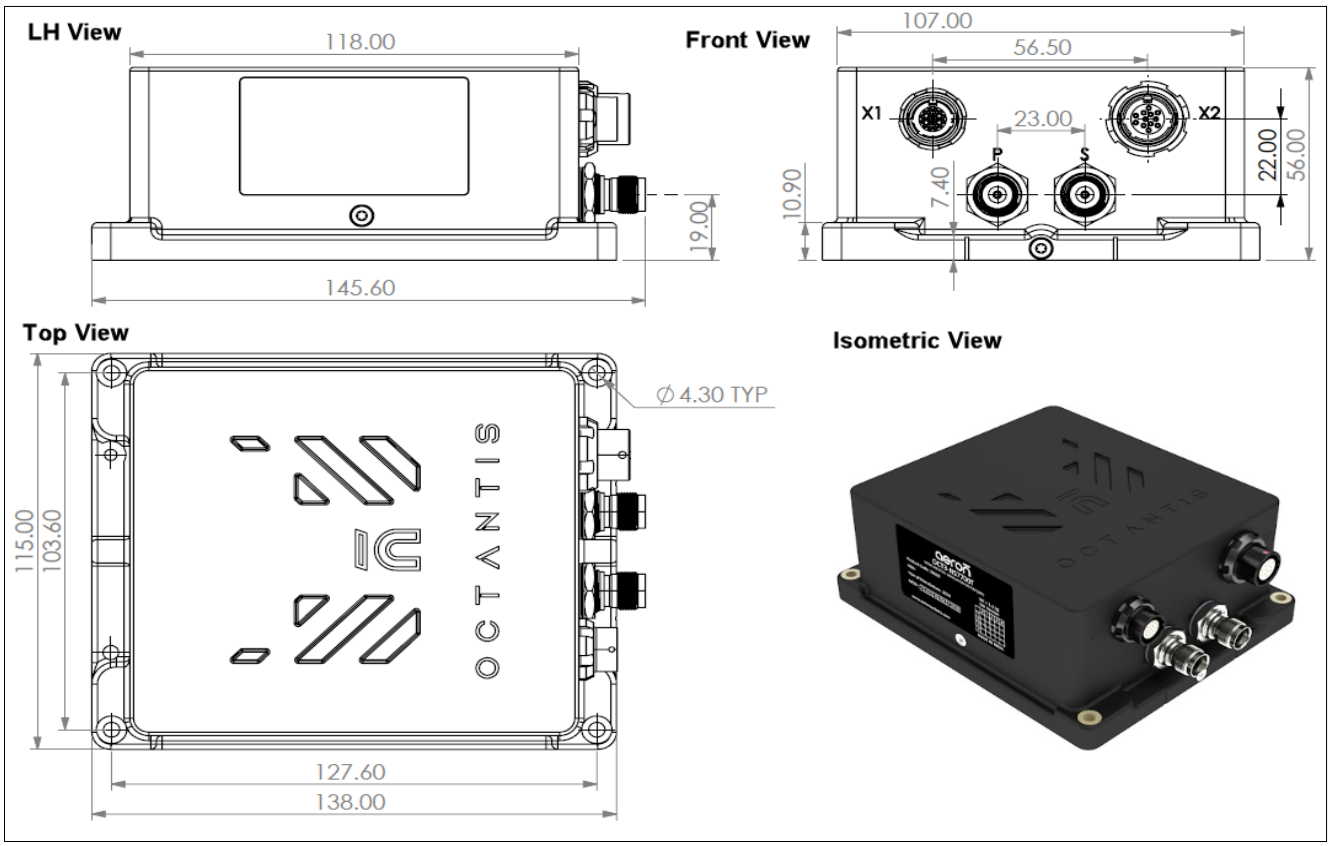
MECHANICAL DIMENSIONS



ORDERING INFORMATION

OCT3-NS7700T (Product Code: 19029)

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