



- 0,5 cm Precisione della posizione (PPK)
- Precisione di prua di 0,03 gradi (PPK)
- Precisione Pitch & Roll da 0,006 gradi (PPK)
- Soluzione ideale per point cloud precisi
- Tempo reale (RTK) e post elaborazione (PPK)
- Dimensioni ridotte, leggero
- Compatibile con LIDAR, fotocamera ottica
- Applicazioni: controllo di volo, telerilevamento

# Versione OEM di GPS-Aided Sistema di navigazione inerziale **“INS-B-OEM”**

Il sistema di navigazione inerziale assistito da GPS (INS-B-OEM) di Inertial Labs è la versione OEM di nuova generazione, completamente integrata, combinata GPS, GLONASS, GALILEO e BEIDOU GNSS e sistema strapdown ad alte prestazioni, che determina la posizione, la velocità e l'assoluto orientamento (Heading, Pitch and Roll) per qualsiasi dispositivo su cui è montato. Posizione orizzontale e verticale, velocità e orientamento sono determinati con elevata precisione per applicazioni sia dinamiche che immobili.



L'Inertial Labs INS-B-OEM utilizza un ricevitore GNSS avanzato a singola antenna, un barometro, a 3 assi ciascuno calibrato nell'intero intervallo di temperatura operativa, Accelerometri e giroscopi MEMS avanzati per fornire posizione, velocità, direzione, inclinazione e rollio precisi del dispositivo su misura. INS-B-OEM contiene nuovi filtri di fusione dei sensori integrati Inertial Labs, algoritmi di navigazione e guida all'avanguardia e software di calibrazione.

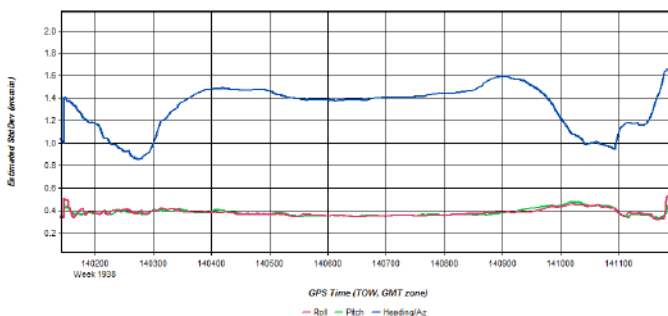
### CARATTERISTICHE, VANTAGGI E FUNZIONALITÀ PRINCIPALI

- Sistema di navigazione inerziale GPS supportato commercialmente ed esportabile
- Dimensioni ridotte e peso leggero: dimensioni 85 x 47 x 36 mm e peso di 115 grammi
- IMU di alta precisione (giroscopi da 1 grado / ora e 5 accelerometri micro g Stabilità in-run bias)
- Segnali supportati: GPS, GLONASS, GALILEO, BEIDOU, SBAS, DGPS, RTK
- Compatibilità con LiDAR (Velodyne, RIEGL, FARO)
- Trigger per telecamera ottica
- IMU fino a 2000 Hz; Velocità dati 200 Hz INS e 20 Hz GNSS
- Misure GNSS e dati grezzi IMU per la post elaborazione
- Algoritmi di fusione del sensore integrati, estensibili e basati su filtro Kalman
- Algoritmi all'avanguardia per diversi movimenti dinamici di navi, elicotteri, UAV, UUV, UGV, AGV, ROV, Gimbals e veicoli terrestri
- Implementate funzionalità ZUPT, angolo di tracciamento GNSS
- Calibrazione completa della temperatura di tutti gli elementi sensibili

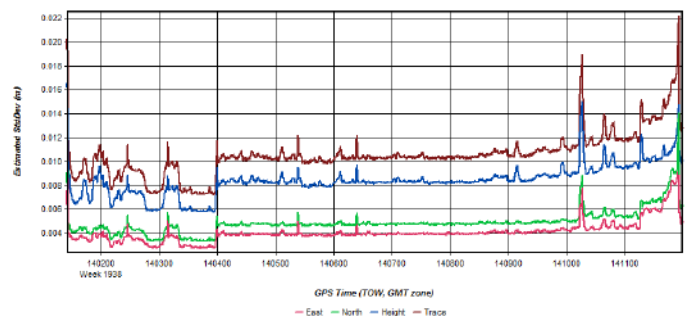
### Performance INS-B-OEM

Outage duration	Positioning mode	Position accuracy (meters, RMS)		Velocity accuracy (meters/sec, RMS)		Attitude accuracy (degree, RMS)	
		Horizontal	Vertical	Horizontal	Vertical	Pitch, Roll	Heading
0 sec	RTK	0.01 + 1ppm	0.02 + 1ppm	0.02	0.01	0.015	0.08
	SP	1.2	1.0	0.03	0.02	0.08	0.1
	PP	0.005	0.01	0.02	0.01	0.006	0.03
60 sec	RTK	7	2	0.3	0.1	0.05	0.15
	SP	8	3	0.3	0.1	0.1	0.5
	PP	0.3	0.2	0.03	0.05	0.01	0.1

Results [Smoothed TC Combined] - Estimated Attitude Accuracy Plot



Results [Smoothed TC Combined] - Estimated Position Accuracy Plot

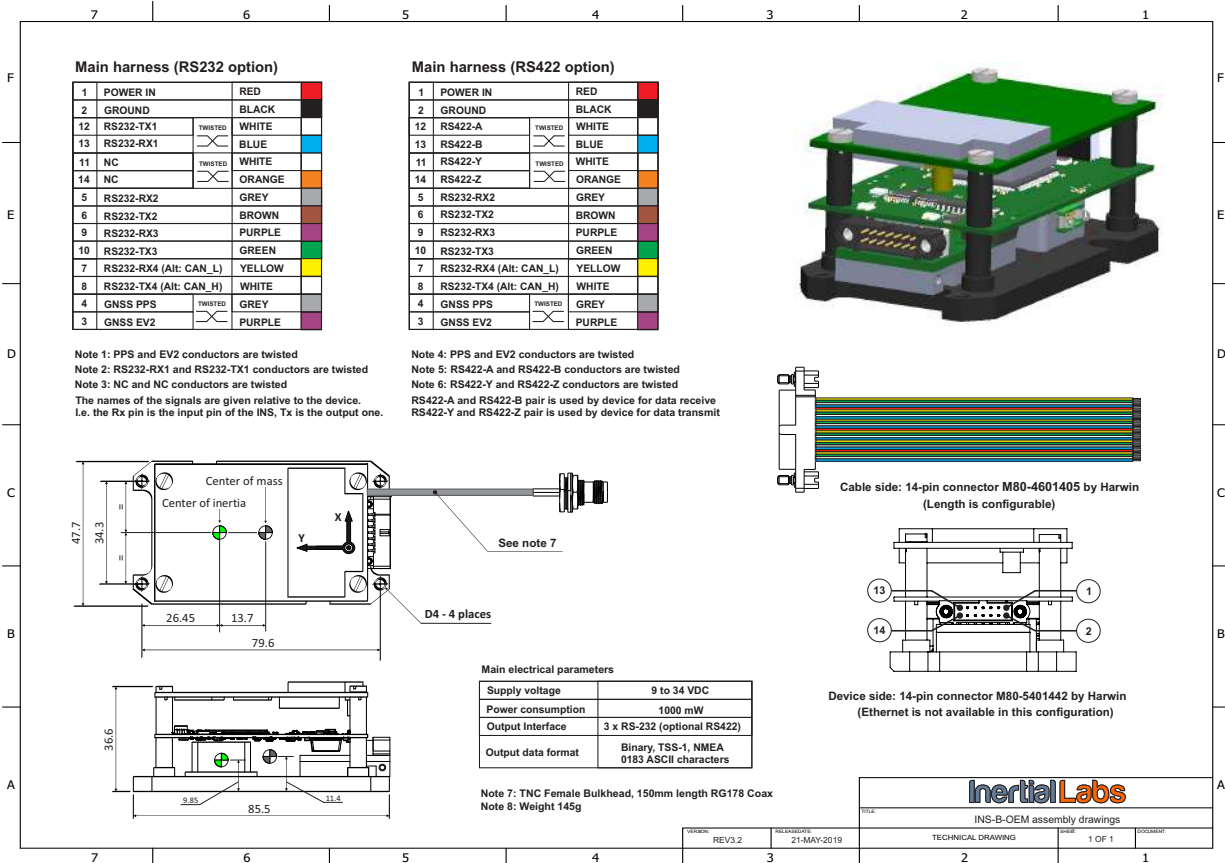


### INS-B-OEM Specifiche

	Parameter	Units	INS-B-OEM
<b>Inputs &amp; Outputs</b>	Input signals		<ul style="list-style-type: none"> <li>Marine application: DVL (Doppler Velocity Log)</li> <li>Land application: Odometer, Wheel sensor, Encoder, DMI</li> <li>Aerial application: Wind sensor, Air Speed Sensor, Doppler shift from locator (for long-term GPS denied)</li> <li>All: External Stand Alone Magnetic Compass (SAMC/AHRS)</li> </ul>
	Output signals		<ul style="list-style-type: none"> <li>Positions, Heading, Pitch &amp; Roll, Velocity, Accelerations, Angular rates, Barometric data, 1PPS</li> <li>Direct AT_ITINS message with Position, Heading, Pitch &amp; Roll to COBHAM AVIATOR UAV 200</li> </ul>
	Main feature		Ideal solution for flight control and remote sensing (mapping, survey and inspection with LiDAR, Optical Camera)
	Update rate (INS data)	Hz	1 ... 200 (user settable)
	Update rate (IMU data)	Hz	1 ... 2000 (user settable)
	Start-up time	sec	<1
<b>Navigation</b>	<b>Positions, Velocity and Timestamps</b>	<b>Units</b>	<b>INS-B-OEM</b>
	Horizontal position accuracy (GPS L1), RMS	meters	1.5
	Horizontal position accuracy (GPS L1/L2), RMS	meters	1.2
	Horizontal position accuracy (SBAS), RMS <sup>(1)</sup>	meters	0.6
	Horizontal position accuracy (DGPS), RMS	meters	0.4
	Horizontal position accuracy (post processing) <sup>(2)</sup>	meters	<0.005
	Horizontal position accuracy (RTK), RMS	meters	0.01 + 1 ppm
	Vertical position accuracy, RMS	meters	<1
	Velocity accuracy, RMS	meters/sec	0.03
	PPS timestamps accuracy	nano sec	20
<b>Orientation</b>	<b>Heading</b>	<b>Units</b>	<b>INS-B-OEM</b>
	Range	deg	0 to 360
	Static Accuracy <sup>(3)</sup>	deg	1
	Dynamic accuracy (GNSS) <sup>(6)</sup>	deg RMS	0.1
	Post processing accuracy <sup>(2)</sup>	deg RMS	0.03
	<b>Pitch and Roll</b>	<b>Units</b>	<b>INS-B-OEM</b>
	Range: Pitch, Roll	deg	±90, ±180
	Angular Resolution	deg	0.01
	Static Accuracy in whole Temperature Range	deg	0.05
	Dynamic Accuracy <sup>(6)</sup>	deg RMS	0.08
Post processing accuracy <sup>(2)</sup>	deg RMS	0.006	
<b>GNSS</b>	<b>GNSS receiver</b>	<b>Units</b>	<b>INS-B-OEM</b>
	Number of GNSS Antennas		Single
	Supported GNSS signals & corrections (optional)		GPS L1/L2/L5; GLONASS L1/L2; BeiDou B1/B2/B3 GALILEO E1/E5; SBAS, DGPS, RTK
	Channel configuration <sup>(4)</sup>		555 Channels (Novatel GNSS receiver) 120 Channels (Hemisphere GNSS receiver)
	GNSS Positions data rate <sup>(5)</sup>	Hz	20, 50
	GNSS Measurements (raw) data rate	Hz	20
	Velocity accuracy, RMS	meters/sec	<0.03
	Initialization time	Sec	<50 (cold start), <30 (warm start), <10 (hot start)
Time accuracy (clock drift) <sup>(7)</sup>	nano sec	20	
<b>IMU</b>	<b>Gyroscopes</b>	<b>Units</b>	<b>INS-B-OEM</b>
	Measurement range	deg/sec	±450
	Bias in-run stability (RMS, Allan Variance)	deg/hr	1
	Angular Random Walk (ARW)	deg/√hr	0.2
	<b>Accelerometers</b>	<b>Units</b>	<b>INS-B-OEM</b>
	Measurement range	g	±8
Bias in-run stability (RMS, Allan Variance)	mg	0.005	
Velocity Random Walk (VRW)	m/sec/√hr	0.015	
<b>General</b>	<b>Environment</b>	<b>Units</b>	<b>INS-B-OEM</b>
	Operating temperature	deg C	-40 to +70
	Storage temperature	deg C	-50 to +85
	Vibration & Shock		MIL-STD-810G
	MTBF	hours	100,000
	<b>Electrical</b>	<b>Units</b>	<b>INS-B-OEM</b>
	Supply voltage	V DC	9 - 36
	Power consumption	Watts	2.5
	Output Interface (options)	-	RS-232/RS-422
	Output data format	-	Binary, NMEA 0183 ASCII characters
<b>Physical</b>	<b>Units</b>	<b>INS-B-OEM</b>	
Size	mm	85 x 47 x 36	
Weight	gram	115	

<sup>(1)</sup> GPS only; <sup>(2)</sup> RMS, incremental error growth from steady state accuracy. Post-processing results using third party software.; <sup>(3)</sup> calibrated in whole operational temperature range, in homogeneous magnetic environment, for latitude up to ±65 deg; <sup>(4)</sup> tracks up to 60 L1/L2 satellites; <sup>(5)</sup> 50 Hz while tracking up to 20 satellites. 20 Hz position update rate for Basic model of INS; <sup>(6)</sup> dynamic accuracy may depend on type of motion; <sup>(7)</sup> time accuracy does not include biases due to RF or antenna delay

### Disegni dell'interfaccia elettrica e meccanica INS-B-OEM



### INS-B-OEM part numbers structure

Model	Gyroscope	Accel	Calibration	Connector	GNSS receiver	Version	Interface	
INS-B-OEM	G450	A8	TGA	C4	O719	V0	1	
						V1	2	
	G950	A15		C6	P327	V2	11	
						V3	22	
							V4	
							VR43	
							VR5	
							V8	

**Example:** INS-B-OEM-G450-A15-TGA-C6-O719-V0.1  
 Part number details:

- INS-B-OEM: Basic Model of GPS-Aided Inertial Navigation System
- G450: Gyroscopes measurement range =  $\pm 450$  deg/sec
- G950: Gyroscopes measurement range =  $\pm 950$  deg/sec
- A8: Accelerometers measurement range =  $\pm 8$  g  $\rightarrow$  recommended for applications with low level of operational vibrations
- A15: Accelerometers measurement range  $\pm 15$  g  $\rightarrow$  recommended for applications with medium level of operational vibrations
- A40: Accelerometers measurement range  $\pm 40$  g  $\rightarrow$  recommended for high dynamic applications or/and with high level of operational vibration
- TGA: Gyroscopes and Accelerometers
- C4: Aluminum Base Plate - 26 pin header and ribbon cable (20021121-00026T4LF by Amphenol)
- C6: Aluminum Base Plate - 14 pin screw-lock connector (M80-5401442 by Harwin)
- C8: Aluminum Base Plate - 25 pin enclosed cable with screw lock connector (CCA-025-I36R152 by NorComp)
- O719: Novatel OEM719 single antenna GNSS receiver (INS-B and INS-P only)
- P327: Hemisphere P327 single antenna GNSS receiver (INS-B and INS-P only)
- V0: GPS L1, SBAS, DGPS, 20 Hz positions
- V1: GPS L1, SBAS, DGPS, 50 Hz positions
- V2: GPS L1, GLONASS, SBAS, DGPS, 20 Hz positions
- V3: GPS L1/L2, SBAS, DGPS, 20 Hz positions
- V4: GPS L1/L2, GLONASS L1/L2, SBAS, DGPS, 20 Hz positions
- VR43: GPS L1/L2, GLONASS L1/L2, SBAS, DGPS, 20 Hz positions, 20 Hz measurements
- VR5: GPS L1/L2, GLONASS L1/L2, SBAS, DGPS, RTK, 20 Hz positions, 20 Hz measurements
- V8: GPS L1/L2/L5; GLONASS L1/L2; BeiDou B1/B2/B3; GALILEO E1/E5; SBAS; DGPS; 20 Hz measurements; 20 Hz positions RTK
- VX.1: RS-232 interface
- VX.2: RS-422 interface
- VX.11: two RS-232 interfaces
- VX.22: two RS-422 interfaces