MAKE MOBILITY MORE INTELLIGENT

High-precision GNSS/INS

SoC | P-Module | P-Box

BYNAV TECHNOLOGY

bynav®

ABOUT

Specialty and Innovation on RTK and INS Makes the Mobile Vehicle More Intelligent

Bynav is a technology-oriented enterprise with high-precision positioning chips and algorithms as its core, dedicated to providing high-precision positioning products and solutions for intelligent mobile vehicles. Based on self-developed chips, Bynav has launched a series of automotive-grade high-precision positioning chips, modules and boxes featuring full constellations, full frequencies and high performance. We also offer multi-sensor fusion high-precision positioning and combined navigation solutions.

Among Chinese high-precision positioning solution suppliers, Bynav is one of the few that has mass-produced and provided products for automotive industry. Our products have been adopted by several domestic traditional automakers, emerging carmakers, and joint ventures. Also, we have got nominated in over 20 vehicle models and received strategic investments totaling hundreds of thousands of dollars from internationally renowned Tier 1 companies and multiple automotive OEMs. Presently, the company has obtained several automotive-grade certifications and functional safety product certifications, including ISO 26262, ISO/SAE 21434, IATF 16949, ASPICE and AEC-Q.

Our products have been widely used in various professional fields, including intelligent driving, drones, robots, smart agricultural machinery, port and mining automation, among others.

GNSS SoC

The First ISO 26262 ASIL B Functional Safety Product Certification of High-Precision Positioning SoC in China

P-Module

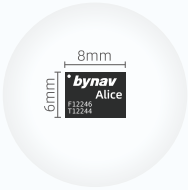
Full-constellation, full-frequency, Full-temperature IMU calibration, Deeply-coupled combined navigation, Anti-jamming and Anti-spoofing

P-Box

Full-temperature IMU calibration, Real-time calibration, Leading deeply-coupled combined navigation engine

CE FC IC UK CA RoHS REACH COMPLIANT

GNSS SoC



Alice

High Precision GNSS SoC

Key Features

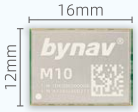
» Full constellations and frequencies, 1507 channels
» REAL, high-performance RTK algorithm
» DIST, deeply-coupled combined navigation algorithm
» SAIF, composite interference suppression algorithm
» Support L-Band and CLAS
» ISO26262 ASIL B functional safety
» Automotive-grade 22nm advanced process

Singal Tracking

GPS	L1C/A、L1C、L2、L5
BDS-2	B1I、B2I、B3I
BDS-3	B1I、B1C、B2a、B2b (PPP)、B3I
GLO	G1、G2
GAL	E1、E5a、E5b、E6 (HAS)
QZSS	L1C/A、L2、L5、L6 (CLAS)
NavIC	L5
SBAS	L1C/A
L-Band	3 channels，1525~1559 MHz

GNSS/INS Positioning and Heading Module

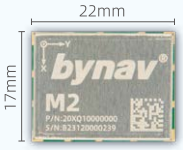
M10



GNSS positioning

» Full-constellation multi-frequency
» Small size
» Anti-jamming

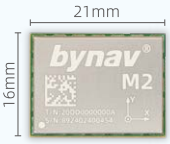
M20/M21/M22



GNSS positioning
Combined navigation

» Full-constellation full-frequency
» Deeply-coupled combined navigation
» Support L-Band

M20D/M21D



Positioning and heading
Combined navigation

» Full-constellation multi-frequency
» Dual-antenna positioning and heading
» Deeply-coupled combined navigation

Specification

Channels	1507	Single point positioning accuracy	H：1.5 m (RMS)	PPS accuracy	20 ns
Sensitivity	Acquisition：-144 dBm		V：2.5 m (RMS)	First positioning	Cold start：30 s
	Tracking：-154 dBm	RTK positioning accuracy	H：1.0 cm+1 ppm (RMS)		Hot start：5 s
Re-acquisition time	≤1s		V：1.5 cm+1 ppm (RMS)	RTK initialization	≤5 s
Observation accuracy	Carrier phase ≤1 mm (RMS)	Timing accuracy	≤20 ns (RMS)	RTK solution latency	≤50 ms
	Pseudorange：≤ 0.1 m (RMS)	Velocity accuracy	0.03 m/s (RMS)	Anti-jamming	65 dBc（ISR）

All Modules are based on the Alice, please refer to the Specification of each model for details of supported frequencies.

Module	Dimension	RTK output	INS output	DR accuracy	Zero-bias instability (gyroscope)	Heading accuracy	Power Consumption
M10	16.0×12.0×1.8 mm	10 Hz	–	–	–	–	450 mW
M20	17.0×22.0×2.75 mm	10 Hz	–	–	–	–	500 mW
M21	17.0×22.0×2.75 mm	5 Hz	100Hz	0.80%	5°/h	–	510 mW
M22	17.0×22.0×2.75 mm	5 Hz	100Hz	0.20%	1°/h (Z); 5°/h (XY)	–	520 mW
M20D	16.0×21.0×2.6 mm	10 Hz	–	–	–	0.1°/1m baseline (RMS)	540 mW
M21D	16.0×21.0×2.6 mm	5 Hz	100Hz	0.80%	5°/h	0.1°/1m baseline (RMS)	550 mW

GNSS/INS Positioning and Heading Box

BOX

X1 Series

Industrial

Dual-antenna

116×114.2×38.6 mm

X36D

Automotive

Dual-antenna

153×100×30 mm

X26

Automotive

Single-antenna

118x71x29 mm

Specification

Single point positioning accuracy	H: 1.5 m (RMS)	Pseudorange measurement accuracy	L1C/A, L2, G1, G2 ≤ 0.12 m (RMS)	Speed limit	300 m/s
	V: 2.5 m (RMS)		Other signals ≤ 0.06 m (RMS)	Timing accuracy	≤20 ns (RMS)
RTK positioning accuracy	H: 1.0c m + 1 ppm (RMS)	Carrier phase measurement accuracy	≤1 mm (RMS)	PPS accuracy	20 ns
	V: 1.5 cm + 1 ppm (RMS)	Observation output	5 Hz	RTK initialization	≤5 s
RTK positioning output	5 Hz	Velocity accuracy	0.03 m/s (RMS)	RTK solution latency	≤50 ms

P-Box	Range (gyroscope)	Zero-bias instability (gyroscope)	Real-time accuracy (GNSS denied for10s)	INS output	Working temp.	Weight
X1-5	± 450 °/s	3 °/h	H: 0.235 m; V: 0.140 m	125 Hz	-40~+75℃	432 g
X1-6	± 450 °/s	1.2 °/h	H: 0.180 m; V: 0.125 m	125 Hz	-40~+75℃	432 g
X1-7	± 450 °/s	0.5 °/h	H: 0.140 m; V: 0.100 m	125 Hz	-40~+75℃	432 g
X11D	± 300 °/s	5 °/h	H: 0.320 m; V: 0.200 m	100 Hz	-40~+75℃	380 g
X36D	± 300 °/s	1.4 °/h (Z); 1.8 °/h (XY)	H: 0.235 m; V: 0.140 m	100 Hz	-40~+85℃	290±30 g
X26	± 300 °/s	1.4 °/h (Z); 1.8 °/h (XY)	H: 0.235 m; V: 0.140 m	100 Hz	-40~+85℃	165 g

Visual Fusion Positioning

DC

» AI computing power 20/40 TOPS
» Nvidia Orin Nano platform
» Visual fusion positioning solution
» AI vision to recognize, mark and avoid obstacles

157×106.6×36 mm

Positioning	GNSS (dual-antenna) + IMU + VISION
Camera	GMSL2 × 4
Sensing, planning and control	SDK
Communication	4G LTE / WIFI / BT
Data interface	CAN / RS232 / PPS
Extended interface	USB* / GbE* / microHDMI*

IMU BOX

IMU

» Multi-sensor integration
» High precision, high resolution
» Small size

44.8×38.6×20 mm

Range (gyroscope)	± 400 °/s
Zero-bias instability (gyroscope)	1 °/h
Range (accelerometer)	± 10 g
Zero-bias instability (accelerometer)	0.1 mg
Working temperature	-45~+85 ℃
Weight	55±5 g

SECURE PROCESSES AND RELIABLE QUALITY CONTROL

Certificates

Strict adherence to automotive standards

ISO 26262
ASIL D (Management)

ISO 26262
ASIL B (Product)

ASPICE

ISO/SAE 21434

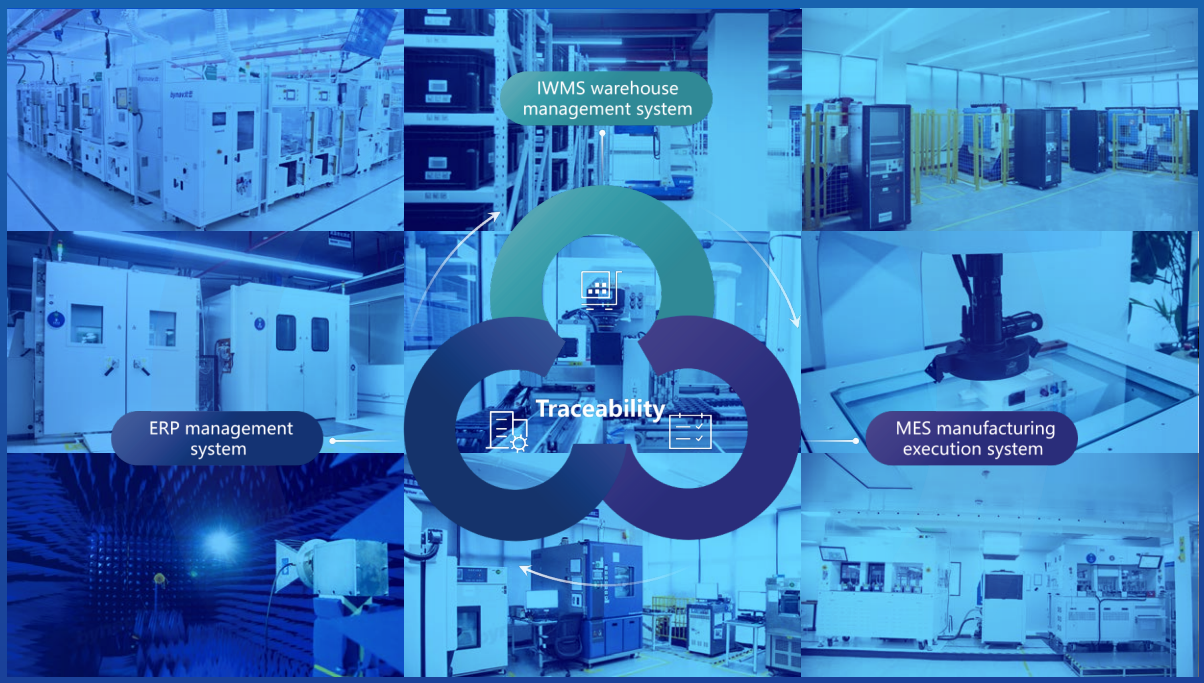
IATF 16949

AEC-Q104

AEC-Q100

Smart Manufacturing

With intelligent warehousing system and automation of product assembly, functional tests, packaging and package inspection, more than 96% of processes are automated. Integration of ERP, IWMS and MES makes the whole process traceable.



HIGHLIGHTS

Full-Constellation Full-Band for RTK

GPS, BDS, GAL, GLO, QZSS, NavIC
L1, L2, L5

L-Band/CLAS Support

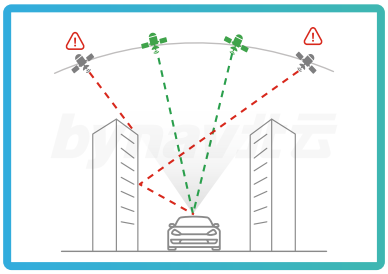
Single-module supports L-Band/CLAS Satellite-Based Augmentation

Full temperature IMU Calibration

Offline & Online IMU Calibration Algorithms

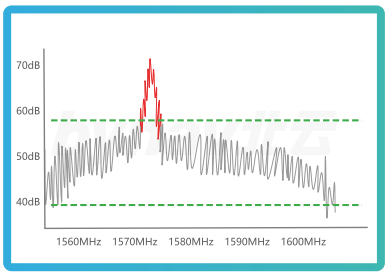
Multi-Path Suppression

Support for multi-frequency signals and advanced anti-multipath algorithms contribute to identifying and reducing multiple propagation errors, including multipath, for more accurate and reliable position.



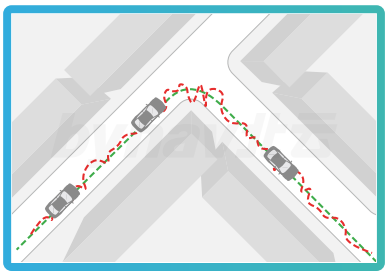
Anti-Jamming and Anti-Spoofing

Higher hardware computing power and optimized software algorithms combined to achieve better anti-jamming and anti-spoofing performance.



Deeply-Coupled GNSS/INS

Enhance GNSS observation quality, addressing challenging conditions with limited satellites. This improves adaptability to various of applications and enhances positioning accuracy in complex environments.



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