

KEY FEATURES

The Swegeo GD21D-INS board is designed to deliver high-precision navigation capabilities in a compact form factor. It features advanced **anti-jamming technology** with 65 dBc narrowband suppression and high-performance RTK for reliable positioning. The board offers a deeply-coupled combined navigation solution to address challenges such as satellite signal interference and multipath effects. It provides **continuous, real-time, and accurate position and attitude information**, making it ideal for applications including **automated driving, drones, precision agriculture, surveying, and mapping**.



DEEPLY-COUPLED COMBINED NAVIGATION ALGORITHM

Built-in with a MEMS IMU, it enables DR calculation, allowing continuous output of highprecision position and velocity information even in brief occlusion scenarios. It supports the deeply coupled combined navigation algorithm based on the Bynav Alice SoC, which improves the quality of GNSS observation. In environments like urban canyons, its positioning accuracy is 2 to 5 times better than loosely coupled algorithms.

INDEPENDENT INTELLECTUAL PROPERTY RIGHTS

The board is designed with unique technologies and innovations that are protected by intellectual property rights, ensuring proprietary and advanced functionalities.

FULL CONSTELLATIONS AND FULL FREQUENCY (1507 CHANNELS)

The board supports tracking of all available GNSS constellations and operates across a wide range of frequencies with 1507 channels, ensuring comprehensive and precise positioning capabilities.

HIGH-PERFORMANCE ANTI-JAMMING

The board includes advanced anti-jamming technology that effectively minimizes the impact of signal interference, ensuring reliable performance even in environments with significant radio frequency noise.

DEEPLY-COUPLED COMBINED NAVIGATION

The board offers a sophisticated navigation solution that combines multiple data sources for enhanced accuracy and robustness, addressing challenges such as satellite signal interference and multipath effects.

BUILT-IN HIGH-PRECISION FUNCTIONAL SAFETY IMU, WITH 100% FULL-TEMPERATURE CALIBRATION

The board integrates a high-precision Inertial Measurement Unit (IMU) that has been fully calibrated across the entire temperature range. This ensures accurate and reliable sensor data under varying environmental conditions.

SUPPORT ETHERNET PORT, GPTP TIME SYNCHRONIZATION, EMBEDDED SDK DIFFERENTIAL ACCOUNT

The board integrates a high-precision Inertial Measurement Unit (IMU) that has been fully calibrated across the entire temperature range. This ensures accurate and reliable sensor data under varying environmental conditions.

AP PARTITION DESIGN ENSURES STABLE AND RELIABLE OTA UPGRADES

The board is designed with an Application Processor (AP) partition that supports stable and reliable Over-The-Air (OTA) firmware upgrades, ensuring that updates can be applied seamlessly without disrupting operations.

GENERAL	
Channels	1507 channels
Signal Supported	L-Band 3 channels, 1525~1559 MHz
	BDS-2 B1I, B2I, B3I
	BDS-3 B1I, B1C, B2a, B2b (PPP)
	GPS L1 C/A, L1C, L2, L5, GLO:G1, G2
	GAL E1, E5a, E5b, E6 (HAS),
	QZSS L1 C/A, L1C, L2, L5, L6 (CLAS),
	NavIC L5
	SBAS L1 C/A
Accuracy	Horizontal Positioning Accuracy
	Single Point 1.5 m (RMS)
	RTK 1 cm + 1 ppm (RMS)
	Vertical Positioning Accuracy
	Single Point 2.5 m (RMS)
	RTK 1.5 cm + 1 ppm (RMS)
	Timing Accuracy 20 ns (RMS)
	Velocity Accuracy 0.03m/s (RMS)
IMU (GD21-INS only)	Gyroscope
	Measure Range (° /s) ± 300
	Angle Random Walk (° /h) 0.5
	Bias instability (° /h) 5
	Bias (° /s) 0.3
	Scale Error 4%
	Cross Coupling Error 1.7‰ (0.1°)
	Accelerometer
	Measure Range (g) ± 16
	Velocity random walk (m/s/√ h) 0.3
	Bias instability (μg) 50
	Bias (mg) 5
	Scale Error 2‰
	Cross Coupling Error 0.9‰ (0.05°)
	System Functional Safety* ASIL B
Data Update Rate	GNSS Observation 10 Hz
	GNSS Position Results 10 Hz
Initialization / Time to first fix	Cold start ≤ 30 s
	Hot start ≤ 5 s
Sensitivity	Sensitivity Tracking & Nav. -167 dBm
	Cold starts -148 dBm
	Hot starts -157 dBm
	Reacquisition -160 dBm
RTK performance	RTK Initialization
	RTK Solution Delay
	≤ 15 Re-acquisition Time
	≤ 1s DR Accuracy 0.8 %

PHYSICAL AND ELECTRICAL	
Dimensions	71.1 x 45.7 x 1.62 mm
Weight	646 g
Input voltage	3.3V DC
Connectors	RS232 x 2, USB x 1
	Bluetooth(Long Range SPP)

ENVIROMENTAL	
Operating Temperature	-40°C to +85°C
Storage Temperature	-55°C to +105°C
Humidity	5% - 95% Non-condensing
Vibration	JESD22-B103
Shock	JESD22-B110

