

# Geo-APNT™ - Assured Positioning, Navigation and Timing



- ✓ Available with SAASM or Commercial GPS Receivers
- ✓ PTP Grandmaster (IEEE 1588 v2)
- ✓ NTP server (v3, v4)
- ✓ Precise 1 PPS, 10 MHz and other timing signals
- ✓ Support for MEMS, FOG, RLG, and Navigation grade IMU's
- ✓ Support for RTK and PPK

## Geo-APNT™ Assured Position, Navigation and Timing (Master Clock) in a Single Box

### High-Accuracy Navigation System

Geo-APNT offers a fully integrated GPS-aided inertial navigation solution supporting a wide range of IMU grades and provides a high-performance trusted positioning and navigation capability.

- Proven performance in wide range of application areas
- Available with SAASM or Commercial GPS
- Centimeter-level position accuracy (RMS) with RTK and PPK
- In-motion dynamic alignment
- Support for low, medium and high-dynamic platforms
- GPS/IMU Post-processing support with Geodetics' RTD-Post

### High-Performance Time Server

Geo-APNT maintains an accurate internal timescale with very low power consumption via a low-phase noise OCXO (other oscillator options available upon request). Precise time and frequency signals are available as 1 PPS, unmodulated IRIG B timecode, 10 MHz, and NMEA time-of-day messages.

- PTP grandmaster (IEEE 1588 v2)
- Network: NTP server (v3, v4)
- DCLS: digital outputs (1PPS, IRIG B002, PPO, ALARM), 3.3V, 50Ω
- RS232: x1 NMEA ToD message (GPZDA, GPRMC)
- Frequency: 10 MHz, sine, 0 dBm in 50Ω

### Geo-APNT: Applications

#### Airborne

- Observation payload
  - ✓ Radar
  - ✓ Optronics
  - ✓ Electronic warfare
- Flying test bench
- Flight analysis
- Tactical UAV navigation

#### Ground

- SATCOM on the move
- Anti IED jamming systems
- Mobile radios and C3I
- Robotics

#### Marine/Naval

- Sensor support
  - ✓ Radar, Sonar
  - ✓ Optronics
- Electronic warfare
- Communications networks
- Offshore / DSO platforms

## Technical Specifications

### Data Recording / Logging

- Navigation solutions (position, velocity, acceleration, attitude, angular rate, ...)
- Raw GPS and IMU data (for post processing with RTD-Post)
- Full diagnostics

### External IMU Support

Fiber Optic Gyro is standard in Advanced configurations. Built-in support for:

- Honeywell HG1900, HG1700, HG9900
- Litton LN200
- Other IMU's available upon request

### Safety and Diagnostics

- Internal safety and monitoring
- Systems

### Operational Readiness

- Cold Start: 60 s (commercial)
- 1 PPS/Time-of-Day: 60 s

### Power

- Input Voltage: 10-30 VDC
- Tactical Configurations: 9 W typical, Advanced Configurations: 13 W typical

### Monitoring

- Power/status LEDs
- Remote/local status, configuration, event log, software update through web interface

### Environmental

- Temperature in Operation: -40°C to +65°C
- Temperature in Storage: -45°C to +85°C
- Humidity: 95% RH, non-condensing
- Altitude: 35,000 ft
- Mechanical (MIL-STD-810G):
- Vibration: 7.7 g rms, 20 to 1000 Hz
- Shock: 20 g, 11 ms

### Physical

- Size: 120 x 100 x 55 mm (4.7" x 3.9" x 2.2")
- Weight: 0.75 kg (1.7 lbs.)
- Mounting: On a plate, 4 through holes

## Geo-APNT IMU Performance (External)\*

Configuration	IMU	Parameter	Accelerometer	Gyroscope
Advanced, Advanced SAASM	Fiber Optic Gyro	Range	±10g	±490°/sec
		Bias Stability (in-run)	< 7.5 mg	1°/hr.
		Random walk	0.07 (m/sec)/Vhr.	0.012/Vhr.
Advanced, Advanced SAASM	Ring Laser Gyro	Range	±37g	±1074°/sec
		Bias Stability (in-run)	< 1 mg	1°/hr.
		Random walk	0.001 (m/sec)/Vhr.	0.125/Vhr.

\* Built-in Support for Honeywell HG1900, HG1700, HG9900, Litton LN200. Other IMU's available upon request.

## Timing

### Output Signals

- PTP grandmaster (IEEE 1588 v2)
- Network: NTP server (v3, v4)
- DCLS: configurable digital outputs (1PPS, IRIG B002, PPO, ALARM), 3.3V, 50Ω
- RS232: x1 NMEA ToD message (GPZDA, GPRMC)
- Frequency: 10 MHz, sine, 0 dBm in 50Ω

### Management

- 10/100bT LAN interface
- Web User Interface (status, configuration, log, SW update)
- SNMP

## Position Accuracy\*

Configuration (GPS Receiver)	Standalone Mode Horizontal/Vertical Accuracy (RMS)	Differential Mode Horizontal/Vertical Accuracy (RMS)
Tactical (L1 only)	1.5 m / 2.5 m	-
Tactical-RTK (L1/L2) Tactical-RTK SAASM	1.5 m / 2.5 m	0.05 m / 0.1 m
Advanced (L1/L2) Advanced SAASM	1.0 m / 2.0 m	0.05 m / 0.1 m

## Dynamic Attitude Accuracy\*

Configuration (IMU)	Standalone Mode Roll-Pitch / Heading Accuracy (RMS)	Differential Mode Roll-Pitch / Heading Accuracy (RMS)
Tactical (internal IMU)	±0.2° / ±0.5°	-
Tactical-RTK Tactical-RTK SAASM (internal IMU)	±0.2° / ±0.5°	±0.1° / ±0.3°
Advanced Advanced SAASM (external FOG)	±0.05° / ±0.1°	±0.01° / ±0.05°

NOTE: Accuracy must be measured once dynamic alignment is complete

\* Accuracy is dependent upon GPS satellite system performance, ionospheric conditions, GPS blockage, environmental conditions, data link and other factors

## Geo-APNT IMU Performance (Internal)

Config.	IMU	Parameter	Accelerometer	Gyros
Tactical, Tactical-RTK, Tactical-RTK SAASM	MEMS 1	Range	±3g	±150°/sec
		Bias Stability (in-run)	< 0.1 mg	3°/hr.
		Random walk	0.04 (m/sec)/Vhr.	0.2/Vhr.
	MEMS 2	Range	±3g	±200°/sec
		Bias Stability (in-run)	< 0.1 mg	2.2°/hr.
		Random walk	0.04 (m/sec)/Vhr.	0.09/Vhr.
	MEMS High-Performance	Range	±4g, ±10g	±450°/sec
		Bias Stability (in-run)	< 0.05 mg	0.8°/hr.
		Random walk	0.02 (m/sec)/Vhr.	0.06/Vhr.

## Time and Frequency Performance

Performance	Oscillator Level I	Oscillator Level II
Time-base Performance	24 hours / One year	24 hours / One year
Relative Frequency Variation with Aging (based on 30-day aging)	1x10 <sup>-12</sup> / 1x10 <sup>-10</sup>	0.5x10 <sup>-12</sup> / 0.5x10 <sup>-10</sup>
Relative Frequency Variation with Temperature (-40°C +75°C)	±5x10 <sup>-11</sup>	±2x10 <sup>-11</sup>
Phase Noise on 10 Mhz. Output		
@10 Hz	-120dBc/Hz	-120dBc/Hz
@100 Hz	-140dBc/Hz	-145dBc/Hz
@1 kHz	-145dBc/Hz	-150dBc/Hz

Other oscillators available upon request

