

VersaPNT – Assured Position, Navigation, and Timing in a Single Solution



Applications

Ground

- Blue Force Tracking
- Vehicle navigation
- Satcom On The Move (SOTM)
- Anti IED jamming systems
- Mobile radios and C4ISR
- Robotics

Airborne

- Intelligence, Surveillance, and Reconnaissance (radar, optical, RF signals)
- Electronic warfare
- Flight analysis
- Tactical UAV navigation

Marine/Naval

- Sensor support (radars, sonars, optical, electronic warfare)
- Communication networks
- Offshore platforms

Accurate in All Conditions

- Multi-Constellation GNSS capability; optional GPS SAASM
- High performance internal time-base and inertial sensor to manage potential loss of GNSS
- GNSS time and frequency source with NTP/PTP time server
- Integrate future PNT signal sources
- Broadshield™ GNSS spoofing and jamming detection

Flexible

- Highly versatile with software configurable inputs/outputs
- Network sync, set-up and management
- Easy integration with small footprint and low size, weight and power
- Compatible with external IMU's
- VICTORY interface compatible (optional)

Compact/Rugged

- Ruggedized - MIL-STD-810G, MIL-STD-461F, IP 65
- Conduction-cooled
- Mil-performance connectors
- Configurable for multiple vehicle and airframe platforms
- Shock and vibration resistant
- Compact VITA 75 form factor

A Resilient Position, Navigation, and Timing (PNT) Sensor Fusion Platform

The VersaPNT provides PNT assurance in a flexible, configurable, and scalable device that allows your PNT-reliant system to function in disrupted GNSS environments. It fuses GNSS, inertial measurement, and high-performance timing oscillators with BroadShield™ threat detection and CRPA/AJAS antenna compatibility to provide reliable, trusted PNT in current and future GNSS threat environments. The rugged and highly customizable device serves as a navigation system, master clock, and network time server for mobile applications in harsh environmental conditions. The FlexFusion® sensor fusion engine combines complementary PNT signals, meaning superior PNT accuracy without resorting to the traditional brute-force, high-cost IMU approach. VersaPNT minimizes size, weight, power, and cost (SWaP-C) by combining PNT functions normally achieved through multiple independent subsystems, ready for integration into myriad ground, air, and maritime platforms.

High Performance GPS Aided Inertial Navigation System (INS)

VersaPNT provides extremely accurate positioning, attitude and orientation measurements, even in GNSS denied or disrupted environments. Measurement data is logged internally and streamed at a high output rate through a serial or LAN interface. VersaPNT is available with several GNSS receiver and IMU configurations, including SAASM. An external IMU interface is available for applications that require improved inertial drift performance.

High-Performance Time Server

VersaPNT maintains an accurate internal timing signal via a low-phase noise OCXO, MAC or CSAC oscillator, holding frequency and time accuracy for extended periods of GNSS outage. It can also be re-synchronized by an external reference. Precise time and frequency signals are available as 1 PPS, unmodulated IRIG DCLS timecode, 10 MHz, and NMEA time-of-day messages. PTP and NTP servers provide accurate time distribution over an IP network.

- NTP/PTP precise time transfer over Ethernet, including security protocols that prevent network vulnerabilities
- Low phase noise 10 MHz frequency distribution
- Configurable pulse signals, including IRIG or HaveQuick timecodes
- Serial link Time of Day (ToD) message

Reliable, Configurable, Versatile

VersaPNT incorporates a software-programmable I/O switch that allows the user to quickly configure electrical and data interfaces through a user-friendly web interface. Two Gigabit Ethernet ports and combinations of DCLS, RS-232, and RS-485 interfaces are available in the base VersaPNT. If additional interfaces are required, the VersaPNT can accommodate an internal option board to add additional existing interfaces (such as more RS-232 ports) or new ones.

Several methods of real-time system monitoring are available both locally and remotely. Analog and SNMP alarms allow the system operator to quickly recognize and diagnose issues. The exportable system event log provides information for in-depth analysis.

Interfaces

Inputs

GNSS L1, 72 Channel Receiver (SAASM GPS L1/L2 optional)

- SMA connector, 5 VDC to GNSS antenna
- Serial data for AJAS antenna
- SAASM adds key-load port

DCLS Configurable Inputs (TTL level, 10 V)

- 1PPS
- IRIG DCLS (A, B, G, NASA-36), HaveQuick

Time of Day Message (NMEA0183, HaveQuick)

- Over RS232, RS485

Network Inputs

- NTP Stratum 2
- IEEE1588 v2 Slave

External IMU

- Serial data input

Outputs

DCLS Configurable (up to 4x TTL outputs, 1x 10 V output)

- 1PPS, any pulse up to 10 MHz
- IRIG DCLS (A, B, E, G, NASA-36), HaveQuick

RS232 and RS485

- NMEA 0183 time and position messages
- HaveQuick

Frequency

- 10 MHz, sine, +0 dBm, SMA connector

Network Interface (10/100/1000bT)

- NTP server (v3, v4)
- PTP IEEE1588 v1, v2 master

Timing and Frequency Performance

Performances	OCXO**	OCXO High Perf	CSAC	MAC
Timebase Performances				
Relative Frequency Variation with Aging:				
- 24 hours	5 x 10 ⁻¹⁰	2 x 10 ⁻¹⁰	-	±2.5 x 10 ⁻¹¹
- One month	1 x 10 ⁻⁹	4 x 10 ⁻⁹	3 x 10 ⁻¹⁰	±1 x 10 ⁻¹⁰
- One year	5 x 10 ⁻⁸	2 x 10 ⁻⁸	1 x 10 ⁻⁹	±1 x 10 ⁻⁹
Relative Frequency Variation with Temperature	±5 x 10 ⁻⁸ (-40°C to 65°C)		±5 x 10 ⁻⁸ (-10°C to 65°C)	≤1 x 10 ⁻¹⁰ (-10°C to 65°C)
Short Term Stability (Allan Deviation):				
@ 1 s	1 x 10 ⁻⁹		3 x 10 ⁻¹⁰	≤3 x 10 ⁻¹¹
@ 10 s	1 x 10 ⁻¹⁰		8 x 10 ⁻¹¹	≤1.6 x 10 ⁻¹¹
@ 100 s	3 x 10 ⁻¹¹		3 x 10 ⁻¹¹	≤8 x 10 ⁻¹²

Performances	OCXO**	OCXO High Perf	CSAC	MAC
Phase Noise on 10 MHz Output:				
@ 10 Hz	-120 dBc/Hz		-70 dBc/Hz	<-87 dBc/Hz
@ 100 Hz	-140 dBc/Hz		-113 dBc/Hz	<-114 dBc/Hz
@ 1 kHz	-150 dBc/Hz		-128 dBc/Hz	<-130 dBc/Hz
@ 100 kHz	-155 dBc/Hz		-140 dBc/Hz	-
Harmonic Distortion	-40 dBc			
Spurious	-60 dBc			<-85 dBc
System Performance*				
Frequency Accuracy Averaged Over 24 hour when Locked on GNSS	5 x 10 ⁻¹²	2 x 10 ⁻¹²	1 x 10 ⁻¹²	1 x 10 ⁻¹²
Phase (1 PPS) Drift in Holdover (no reference available)				
- 4 hours	3 μs	2.8 μs	1 μs	0.6 μs
- 24 hours	40 μs	30 μs	7 μs	4 μs
- 7 days	1.2 ms	0.6 ms	100 μs	75 μs
Phase (1 PPS) Accuracy to UTC	±50 ns			

** A Rugged, Low Phase Noise OCXO option is available for high-vibration environments such as aircraft and maritime. Contact Orolia for details.

Navigation Performance

(Dependent on GNSS satellite performance, ionospheric conditions, signal blockage and other factors. Typical, clear-sky performance is provided.)

Performance		
Receiver Type	GPS and SAASM	GPS and SAASM
IMU Sensor Type	Internal MEMS	Internal MEMS (High performance)
Position Accuracy (Horizontal)	2.5 m RMS (GPS L1) 2.0 m (GPS L1 w/SBAS)	2.5 m RMS (GPS L1) 2.0 m (GPS L1 w/SBAS)
Position Accuracy (Vertical)	5.0 m RMS (GPS L1) 2.5 m RMS (GPS L1 w/SBAS)	5.0 m RMS (GPS L1) 2.5 m RMS (GPS L1 w/SBAS)
Gyro In-Run Bias Stability	<10°/hr.	<1°/hr.
Velocity Accuracy	±0.05 m/s	±0.05 m/s
Roll & Pitch Accuracy (Dynamic)	0.1° RMS	<0.03° RMS
Heading Accuracy (Dynamic)	0.3° RMS	<0.1° RMS
Output Update Rate (Navigation Data) (Hz)	400	400

Operational Readiness

1PPS time of day available (hot start)

- 60 s: 1ms accuracy to UTC
- 200 s: 1µs accuracy to UTC

Additional GNSS protection

BroadShield™ GNSS spoofing/jamming detection (optional)

AJAS antenna-compatible (obtained separately)

External IMU interface (IMU obtained separately)

Management & Monitoring

User, local:

- Power and Status LEDs on front panel
- USB: ASCII Command Line Interface

User, remote (LAN):

- Status, configuration, event log, software update through web pages

Machine, remote (LAN):

- SNMP v2, v3 (get, set, traps)
- JSON RPC

Network Security

- Password protected administration accounts
- SSL/SSH-based https, ftps protocols supported for secured access to user interface
- NTP implementation supports MD5, Autokey

Network Synchronization

- NTP v2, v3, v4: Conforms with or exceeds RFC 1305 and RFC 5905. Supports unicast, broadcast, multicast, peering, stratum 2, MD5 encryption, autokey
- PTP v1 and v2: Master – conforms with default profile IEEE 1588. Supports layer2/layer 3, unicast/multicast
- VICTORY Interface compatible (optional)

Environmental

- Tested to MIL-STD-810G CH1
- Temperature, in operation: -40°C to +71°C with OCXO
- Mounting plate temperature, in storage: -45°C to +85°C
- Humidity: 95% RH, non-condensing
- Altitude: 45,000 ft
- Environmental Protection: IP 65
- Vibration MIL-STD-810G CH1 Method 514.7, Categories 12,13,14,20,21,24
- Shock: 20 g, 11 ms, sawtooth

EMI/EMC

- Tested according to MIL-STD-461F

Physical

- Size (WxHxD): 5.8" x 2.5" x 5.0" (147.3 x 127.5 x 63.0 mm) VITA 75 compliant
- Weight: 1.0 kg (2.2 lbs)
- Mounting: On a plate, optimized for conduction cooling, 6 through holes

Power

- Input Voltage: 10-32 VDC
- Typical Power Draw: <25 W (with OCXO)
- Standby mode (only oscillator is powered): 0.4 W, DC power supply must be within 10 - 32 VDC

Certification/Marking

- RoHS, WEEE compliant

Warranty

- 2 years

Optional front plate interface



Service Options

Optional Services

- Premium Support Package (PSP)
- Yearly Warranty extension
- Long-life support package