



# HIGH-PRECISION POSITIONING & HEADING RECEIVER



The Vector VS1000 is Hemisphere GNSS' premiere multi-GNSS, multi-frequency receiver designed specifically for the professional marine market. Providing precise heading, Athena RTK positioning, and full Atlas capability, its rugged design is compliant to 60529:2013 IP67 and IEC 60945:2002 8.7 standards.

The VS1000 supports antenna separations up to 10 meters, offering heading accuracy to 0.01 degrees RMS in addition to RTK position accuracy and full support for Hemisphere GNSS' Atlas worldwide L-band corrections.

## Key Features

- Athena™ RTK and Atlas® L-band capable
- Extremely accurate heading (to 0.01° RMS)
- Multi-frequency GPS/GLONASS/BeiDou/Galileo
- Purpose-built for the most challenging environments
- Supports Ethernet, CAN, Serial, USB, Bluetooth, and Wi-Fi
- Powerful WebUI accessed via Wi-Fi plus a 128x64 display and 10 multi-color LEDs

## GNSS Receiver Specifications

<b>Receiver Type:</b>	Vector GNSS RTK Receiver
<b>Signals Received:</b>	GPS, GLONASS, BeiDou, Galileo, & Atlas <sup>3</sup>
<b>Channels:</b>	1059
<b>GPS Sensitivity:</b>	-142 dBm
<b>SBAS Tracking:</b>	2-channel, parallel tracking
<b>Update Rate:</b>	10 Hz standard, 20 Hz optional
<b>Timing (1PPS)</b>	
<b>Accuracy:</b>	20 ns
<b>Rate of Turn:</b>	100°/s maximum
<b>Cold Start:</b>	60 s (no almanac or RTC)
<b>Warm Start:</b>	30 s typical (almanac and RTC)
<b>Hot Start:</b>	10 s typical (almanac, RTC and position)
<b>Heading Fix:</b>	10 s typical (valid position)
<b>Antenna Input</b>	
<b>Impedance:</b>	50 Ω
<b>Maximum Speed:</b>	1,850 mph (999 kts)
<b>Maximum Altitude:</b>	18,288 m (60,000 ft)
<b>Differential Options:</b>	SBAS, Atlas (L-band), RTK

## Accuracy

<b>Positioning:</b>	<b>RMS (67%)</b>	<b>2DRMS (95%)</b>
<b>Single Point:</b> <sup>1</sup>	2.4 m	
<b>SBAS:</b> <sup>2</sup>	0.6 m	
<b>Atlas H10:</b> <sup>6</sup>	0.08 m	0.16 m
<b>Atlas H30:</b> <sup>6</sup>	0.3 m	
<b>Atlas Basic:</b> <sup>6</sup>	0.5 m	
<b>RTK:</b> <sup>1,3</sup>	8 mm + 1 ppm	15 mm + 2 ppm
<b>Heading (RMS):</b>	0.2° @ 0.5 m antenna separation 0.1° @ 1.0 m antenna separation 0.05° @ 2.0 m antenna separation 0.02° @ 5.0 m antenna separation 0.01° @ 10.0 m antenna separation	
<b>Pitch/Roll (RMS):</b>	1°	
<b>Heave (RMS):</b>	30 cm (DGPS) <sup>1</sup> , 10 cm (Atlas) <sup>1,6</sup> , 5 cm (RTK) <sup>1,6</sup>	

## L-Band Receiver Specifications

<b>Channels:</b>	1525 to 1560 MHz
<b>Sensitivity:</b>	-130 dBm
<b>Channel Spacing:</b>	5 kHz
<b>Satellite Selection:</b>	Manual or Automatic
<b>Reacquisition</b>	
<b>Time:</b>	15 sec (typical)

1. Depends on multipath environment, number of satellites in view, satellite geometry, no SA, and ionospheric activity
2. Depends on multipath environment, number of satellites in view, WAAS coverage and satellite geometry
3. Depends on multipath environment, number of satellites in view, satellite geometry, baseline length (for differential services), and ionospheric activity
4. Based on a 40 second time constant
5. Hemisphere GNSS proprietary
6. Requires a Hemisphere GNSS subscription
7. CMR and CMR+ do not cover proprietary messages outside of the typical standard

## Communications

<b>Ports:</b>	1x CAN, 1x Ethernet, 1x USB, 1x 12-pin multi-purpose (RS232, RS422, CAN, 1PPS, Event Marker)
<b>Baud Rates:</b>	4800 - 115200
<b>Radio Interfaces:</b>	Bluetooth 2.0 (Class 2), Wi-Fi 2.4 GHz
<b>Correction I/O Protocol:</b>	Hemisphere GNSS proprietary ROX format, RTCM v2.3, RTCM v3.2, CMR <sup>7</sup> , CMR+ <sup>7</sup>
<b>Data I/O Protocol:</b>	NMEA 0183, Hemisphere GNSS binary
<b>Timing Output:</b>	1PPS (CMOS, rising edge sync)
<b>Event Marker Input:</b>	Open drain, falling edge sync, 10 kΩ, 10 pF load

## Environmental

<b>Operating Temperature:</b>	-40°C to +70°C (-40°F to +158°F)
<b>Storage Temperature:</b>	-40°C to +85°C (-40°F to +185°F)
<b>Humidity:</b>	95% non-condensing
<b>Enclosure:</b>	ISO 60529:2013 for IPx6/IPx7
<b>Vibration:</b>	IEC 60945:2002 Section 8.7 Vibration
<b>EMC:</b>	IEC 60945:2002, EN 301 489-1 V2.1.1, EN 301 489-5 V2.1.1, EN 301 489-19 V2.1.0, EN 303 413 V1.1.1

## Mechanical

<b>Dimensions:</b>	
<b>No Plate:</b>	23.2 L x 16.5 W x 7.9 H (cm) 9.1 L x 6.5 W x 3.1 H (in)
<b>With Plate:</b>	23.2 L x 21.4 W x 8.3 H (cm) 9.1 L x 8.4 W x 3.3 H (in)
<b>Display:</b>	128 x 64 Resolution
<b>Weight:</b>	1.7 kg (3.8 lb)
<b>Status Indications (LED):</b>	Power, Primary Antenna, Secondary Antenna, Heading, Quality, Atlas, Bluetooth, Wi-Fi, CAN, Ethernet
<b>Power/Data Connector:</b>	M12 CAN/Power, 12-pin multi-purpose, RJ45, USB
<b>Antenna Connectors:</b>	BT/Wi-Fi

## Aiding Devices

<b>Gyro:</b>	Provides fast reacquisition and reliable heading for short periods when loss of GNSS has occurred
<b>Tilt Sensors:</b>	Provide pitch, roll data and assist in fast start-up and reacquisition of heading solution



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