VECTORNAV

PRODUCT BROCHURE

IMU/AHRS

GNSS/INS

ASSURED PNT

Solving real-world navigation problems with high-quality systems and standout support.

Whether you are engineering cutting-edge technology or delivering mission-critical systems, knowing you can rely on your navigation solution means everything. At VectorNav, we deliver inertial navigation products that you can depend on to complete your objective and give you the competitive edge.

GUIDED BY ONE MISSION:

The Relentless Pursuit of Inertial Navigation Excellence.

This has led us to produce tiered and multi-layered systems that provide unrivaled performance to size, and capability that delivers across land, air, and sea. Partner with VectorNav and leverage that value to succeed in your market.

OVER
100K
Units fielded across land, air, and sea applications.

MORE THAN
3K
Customers choose VectorNav to solve their navigation challenges.

MORE THAN
50K
Square feet of state-of-the-art manufacturing space.

FAST LEAD TIMES
1-2
Business days for Industrial, 1-2 weeks for Tactical products.

U.S. Designed & Manufactured

AS9100D / **ISO**9001 CERTIFIED COMPANY

APPLICATIONS

NAVIGATION

POINTING

STABILIZATION

VECTORNAV SOLUTIONS

IMU/AHRS
Temperature-Calibrated 3-axis Gyro, Accel, & Magnetometer

GNSS/INS
Trusted Position, Velocity, & Attitude solution

ASSURED PNT
Resilient navigation fusing external aiding sources

IMU / AHRS

Inertial Measurement Unit /
Attitude Heading Reference System

INDUSTRIAL SERIES PERFORMANCE

5°/hr	0.5°	< 0.04 mg	2.0°	800 Hz
Gyro In-Run Bias Stability	Pitch/Roll (Static)	Accel In-Run Bias Stability	Magnetic Heading Accuracy	IMU Data

	ACCELEROMETER	GYROSCOPE	MAGNETOMETER	BAROMETER
Range	±16 g	±2,000°/s	±2.5 Gauss	10 to 1200 mbar
In-Run Bias Stability (Allan Variance)	< 0.04 mg	< 10°/hr (5°/hr typ.)	-	-
Noise Density	0.14 mg/√Hz	0.0035°/s /√Hz	140 μGauss/√Hz	-
Bandwidth	230 Hz	265 Hz	200 Hz	-
Cross-Axis Sensitivity	< 0.05 °	< 0.05 °	< 0.05 °	-

TACTICAL SERIES PERFORMANCE

0.6°/hr	0.05°	< 10 μg	2.0°	800 Hz
Gyro In-Run Bias Stability	Pitch/Roll (Static)	Accel In-Run Bias Stability	Magnetic Heading Accuracy	IMU Data

	ACCELEROMETER	GYROSCOPE	MAGNETOMETER
Range	±15 g	±490°/s (Optional ±2,000°/s)	±2.5 Gauss
In-Run Bias Stability (Allan Variance)	< 10 μg	< 1°/hr (0.6°/hr typ.)	-
Noise Density	< 0.04 mg/√Hz	5°/hr /√Hz	140 μGauss/√Hz
Bandwidth	200 Hz	210 Hz	-
Cross-Axis Sensitivity	< 0.05 °	< 0.05 °	< 0.05 °

INDUSTRIAL PACKAGING OPTIONS

▶ **SMD:**   Serial TTL, SPI; 3.5-5 g; 185 mW-1.25 W

▶ **RUGGED:**   Serial TTL, RS-232; 15-30 g; 220 mW-1.25 W

TACTICAL PACKAGING OPTIONS

▶ **EMBEDDED:**   Serial TTL; 12-15 g; 1-1.6 W

▶ **MIL-STD:**   RS-422, RS-232; MIL-STD, DO-160; 125-160 g; 2-3.3 W

PRODUCTS

VN-100

Inertial Measurement Unit / Attitude Heading Reference System

▶ Continuous attitude solution over the complete 360° range of operation

▶ Hard/Soft Iron Compensation

▶ Data output: ASCII (VectorNav), NMEA-0183, Binary (VectorNav)

▶ Inputs for external magnetometers or velocity measurements (Airspeed, GNSS)

▶ On-board World Magnetic and Gravity Reference Models

▶ Individually calibrated for bias, scale factor, misalignment, and temperature over full operating range (-40° C to 85° C)

SMD   Rugged

PRODUCTS

VN-110

Inertial Measurement Unit / Attitude Heading Reference System

Embedded

▶ Ultra-Low-SWaP-C: 31 x 31 x 12 mm; 12 grams

▶ Surface-mount design enables streamlined modularity and seamless system integration

MIL-STD

▶ Temperature (DO-160)

▶ Electrical (MIL-STD-1275)

▶ Vibration & Shock (MIL-STD-810)

▶ EMI & Radiation (MIL-STD-461)

Embedded   MIL-STD Enclosure

GNSS/INS

GNSS-Aided Inertial Navigation System

INDUSTRIAL SERIES PERFORMANCE

| 0.2°	0.03°	L1	400 Hz
Dynamic Heading (INS)	Dynamic Pitch/Roll (INS)	GNSS	Position, Velocity, and Attitude Data

PRODUCTS

VN-200

GNSS-Aided Inertial Navigation System

- ► 1 x 72 Channel GNSS Receiver
- ► Coupled position, velocity, and attitude estimates
- ► True INS Filter, no mounting restrictions, modes of operation or constraints required
- ► Raw Psuedorange, Doppler and Carrier Phase outputs

SMD Rugged
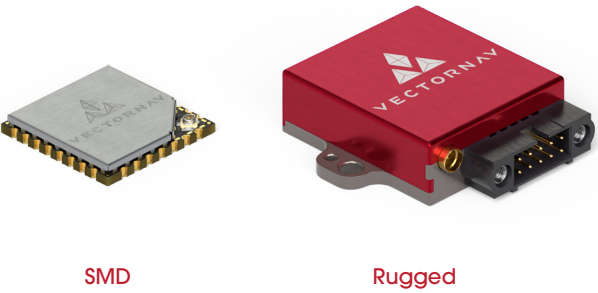
VN-300

Dual GNSS-Aided Inertial Navigation System

- ► 2 x 72 Channel GNSS Receivers
- ► GNSS Compass for static and low dynamic heading accuracy
- ► Coupled position, velocity, and attitude data for optimal dynamic performance
- ► Raw Psuedorange, Doppler and Carrier Phase outputs

SMD Rugged
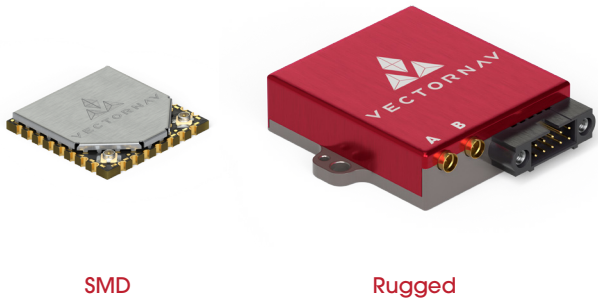
POSITION & VELOCITY DRIFT AFTER LOSS OF GNSS

VectorNav's proprietary INS maintains an accurate solution after loss of GNSS for a limited time. For improved accuracy over longer durations, consider the VectorNav Tactical Series and coupling external PNT systems for a resilient navigation system.

▶ Horizontal **Position** Drift

▶ Horizontal **Velocity** Drift
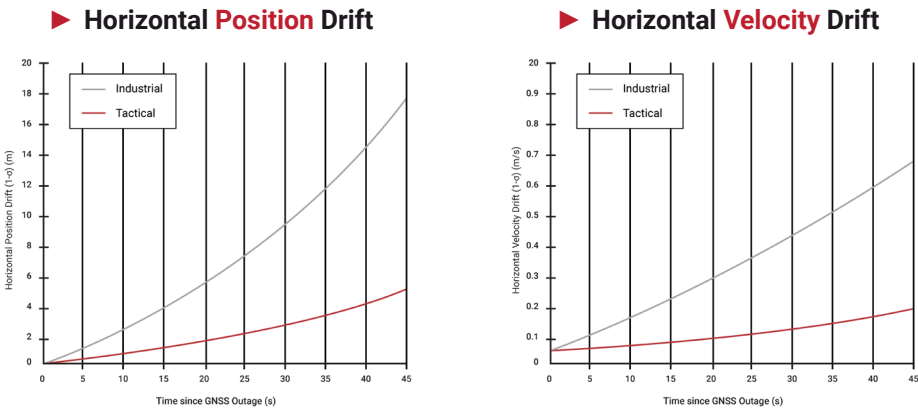
TACTICAL SERIES PERFORMANCE

0.05° - 0.1°	0.015°	L1/L2/L5*	400 Hz
Dynamic Heading (INS)	Dynamic Pitch/Roll (INS)	GNSS	Position, Velocity, and Attitude Data

PRODUCTS

VN-210

GNSS-Aided Inertial Navigation System

Embedded
- ► Integrated L1/L2 GNSS Receiver
- ► Ultra-Low-SWaP-C: 31 x 31 x 12 mm; 14 grams
- ► Modular external aiding sources via 4 serial ports

MIL-STD
- ► Integrated L1/L2 GNSS Receiver
- ► Electrical (MIL-STD-1275)
- ► Vibration & Shock (MIL-STD-810)
- ► EMI & Radiation (MIL-STD-461)

Embedded MIL-STD Enclosure

VN-210-S

GNSS-Aided Inertial Navigation System

- ► Integrated L1/L2/L5 GNSS Receiver
- ► Available in Extended Range Velocity (ERV) option for operation beyond COCOM limits
- ► Built to Tactical DO/MIL Standards

MIL-STD Enclosure

VN-310

Dual GNSS-Aided Inertial Navigation System

Embedded
- ► Integrated L1/L2 GNSS Receivers
- ► Ultra-Low-SWaP-C: 31 x 31 x 12 mm; 16 grams
- ► Modular external aiding sources via 4 serial ports

MIL-STD
- ► Integrated L1/L2 GNSS Receivers
- ► Electrical (MIL-STD-1275)
- ► Vibration & Shock (MIL-STD-810)
- ► EMI & Radiation (MIL-STD-461)

Embedded MIL-STD Enclosure
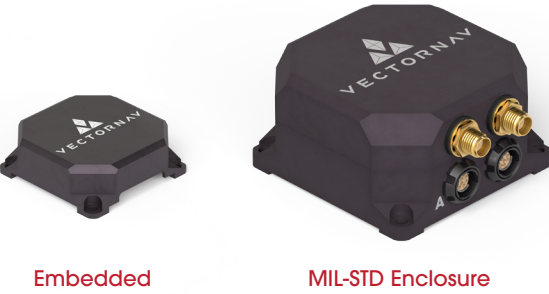
* L5 only available with the VN-210-S

APNT
ASSURED POSITION, NAVIGATION, AND TIMING

Proven PNT, Engineered by Navigation Experts

VectorNav's PNT capabilities are the result of nearly 20 years of focused development by a team of engineers who specialize exclusively in navigation. Our expertise isn't spread across disciplines—it's concentrated on the precise integration of inertial sensors, GNSS, and timing through advanced sensor fusion and filtering. This focus has produced algorithms that are both highly sophisticated and refined through deployment on thousands of platforms across defense and commercial domains. The result is performance that feels effortless—made possible by a team that understands navigation at its core.

ADVANCED SENSOR FUSION **TWO DECADES OF EXPERIENCE** **MODULAR SYSTEMS**
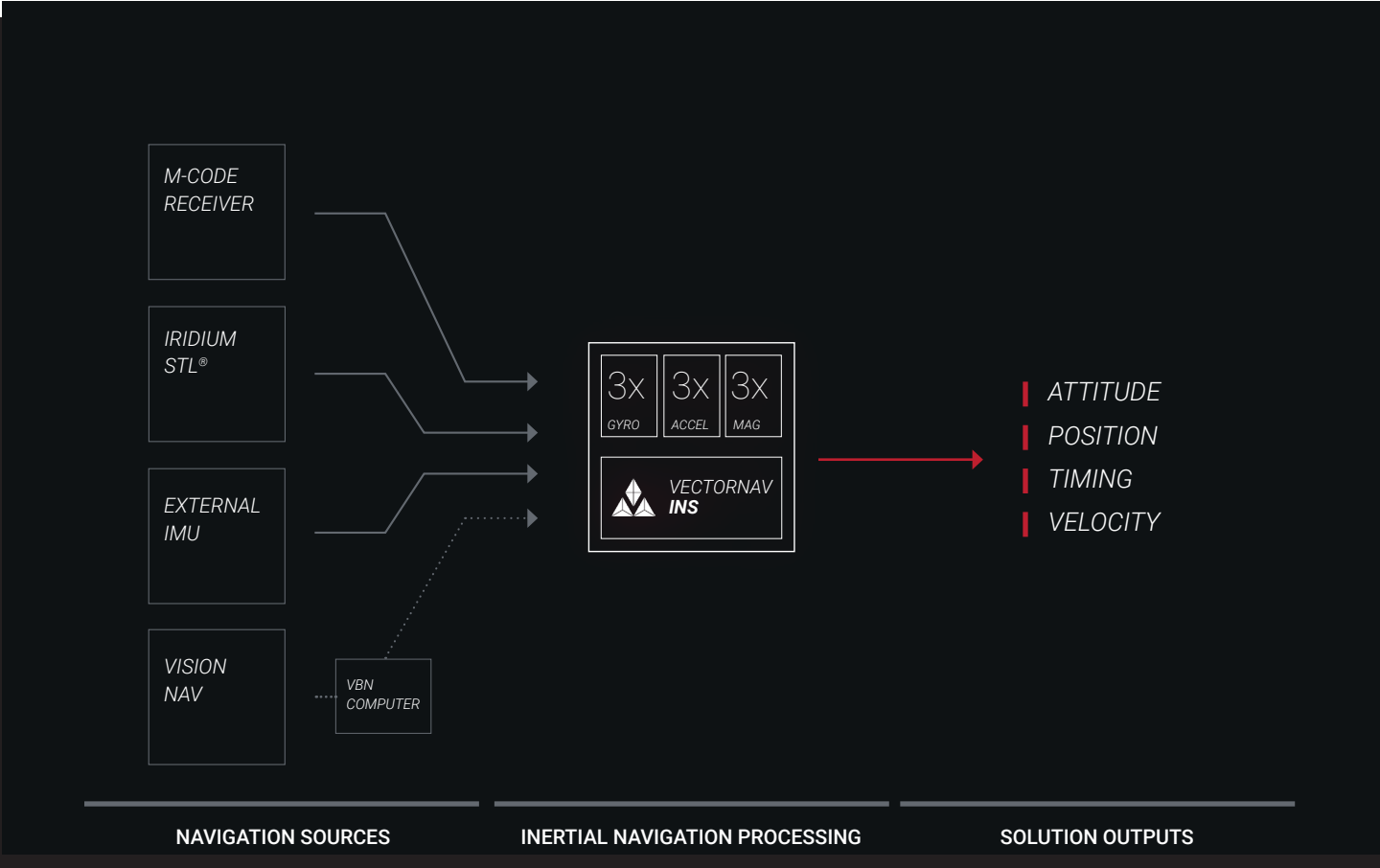
VECTORNAV TACTICAL SERIES

The Tactical Series uses multiple serial ports which can be used to fuse external PNT sources with VectorNav's proven algorithms, enhancing resilience without compromising precision.
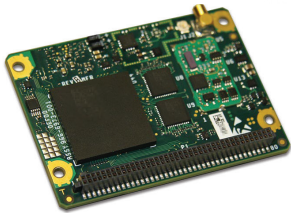
4 SERIAL PORTS   **1 AUXILIARY PORT**

EXTERNAL M-CODE GPS RECEIVERS

Applications that require precise positioning when operating in contested environments require the latest developments in modernized GPS with anti-jamming/ anti-spoofing capabilities for increased security.

BAE SYSTEMS®
MPE™-M

BAE SYSTEMS®
MicroGRAM™-M

IRIDIUM STL® PNT

Add next-generation positioning to your VectorNav system with External Low Earth Orbit (LEO) Networks and Iridium STL Receivers. Increase signal strength and resilience in contested environments.

NAL RESEARCH®
ALTM GEN2 MINI

VISION-BASED NAVIGATION

VectorNav is working with VBN Systems to bring advanced vision technology alongside our proven INS, enhancing capability and resilience today while driving greater system maturity and adaptability across applications.
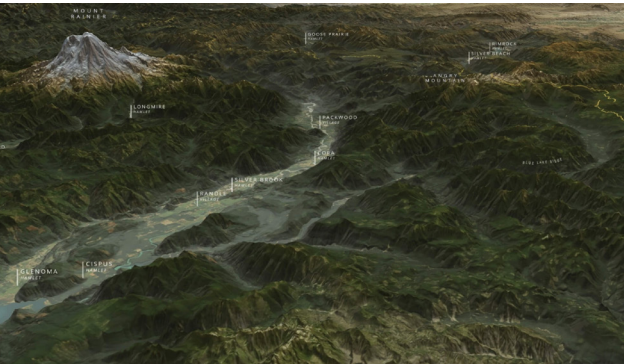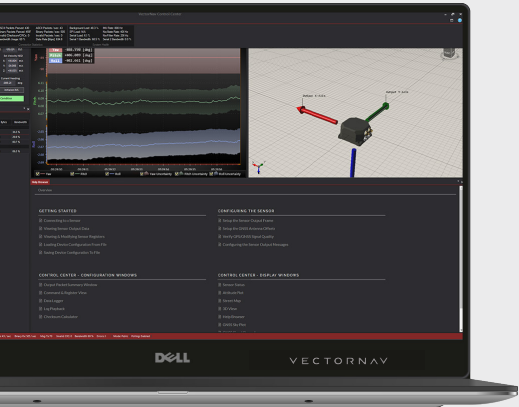
VECTORNAV
PRODUCT LINE COMPARISON

Find the right system for your application. Compare performance specifications, capabilities, interfacing, and additional features available across VectorNav's IMU and INS offerings.

	INERTIAL MEASUREMENT UNIT / ATTITUDE HEADING REFERENCE SYSTEM		GNSS-AIDED INERTIAL NAVIGATION SYSTEM		DUAL GNSS-AIDED INERTIAL NAVIGATION SYSTEM	
	Calibrated IMU; Magnetic Heading and Pitch & Roll (AHRS)		Calibrated IMU; AHRS; GNSS/INS Position, Velocity, and Attitude		Calibrated IMU; AHRS; GNSS/INS Position, Velocity, and Attitude; GNSS-Compass Heading	
	VN-100	VN-110	VN-200	VN-210	VN-300	VN-310
Accel Range	±16 g	±15 g	±16 g	±15 g	±16 g	±15 g
Accel In-Run Bias (Allan Variance)	< 0.04 mg	< 10 µg	< 0.04 mg	< 10 µg	< 0.04 mg	< 10 µg
Accel Noise Density (VRW)	0.14 mg/√Hz	< 0.04 mg/√Hz	0.14 mg/√Hz	< 0.04 mg/√Hz	0.14 mg/√Hz	< 0.04 mg/√Hz
Gyro Range	±2,000°/s	±490°/s (Optional ±2000°/s*)	±2,000°/s	±490°/s (Optional ±2000°/s*)	±2,000°/s	±490°/s (Optional ±2000°/s*)
Gyro In-Run Bias (Allan Variance)	5°/hr typ.	0.6°/hr typ.	5°/hr typ.	0.6°/hr typ.	5°/hr typ.	0.6°/hr typ.
Gyro Noise Density (ARW)	0.0035°/s /√Hz	5°/hr /√Hz	0.0035°/s /√Hz	5°/hr /√Hz	0.0035°/s /√Hz	5°/hr /√Hz
Heading (Magnetic)	2.0° RMS	2.0° RMS	2.0° RMS	2.0° RMS	2.0° RMS	2.0° RMS
Heading (Dynamic, INS)	-	-	0.2°, 1σ	0.05°-0.1°, 1σ	0.2°, 1σ	0.05°-0.1°, 1σ
Heading (GNSS Compass)	-	-	-	-	0.15° RMS	0.15° RMS
Pitch/Roll (Static, AHRS)	0.5° RMS	0.05° RMS	0.5° RMS	0.05° RMS	0.5° RMS	0.05° RMS
Pitch/Roll (Dynamic, INS)	-	-	0.03°, 1σ	0.015°, 1σ	0.03°, 1σ	0.015°, 1σ
Horizontal Position	-	-	1.0 m RMS	1.0 m RMS	1.0 m RMS	1.0 m RMS
Vertical Position	-	-	1.5 m RMS	1.5 m RMS	1.5 m RMS	1.5 m RMS
RTK Positioning	-	-	-	1 cm + 1 ppm CEP	-	1 cm + 1 ppm CEP
Support for External Position Sources	-	-	Limited	Native	Limited	Native

Performance specifications are based on comprehensive field testing and results from real-world applications. VectorNav regularly conducts comprehensive testing on all products to verify continued conformance to all performance specifications.

* Contact VectorNav for Extended Range Gyro Option.

CONTROL CENTER & SDK

VectorNav Control Center delivers real-time visualization and easy configuration, while our SDK ensures flexible integration with our IMU and INS products using your preferred libraries.

Download at: www.vectornav.com/resources/software

PRECISION. PERFORMANCE. PARTNERSHIP.

With nearly two decades of experience in inertial navigation, VectorNav has established a reputation for engineering excellence and customer dedication. We believe in collaboration, working with you to identify and implement the best solutions.

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