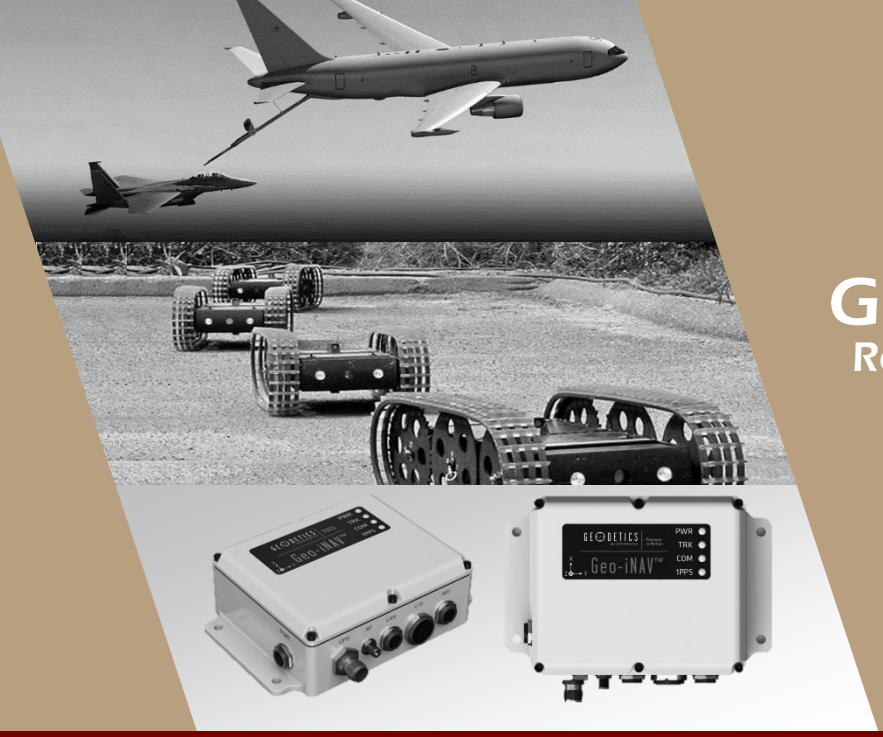

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Geo-RelNAV®

Relative GPS/INS Navigation System

- **Sense and Avoid**
- **Aerial Refueling**
- **Autonomous Landing**
- **Swarming**

Geo-RelNAV® provides precise relative position, velocity and attitude between moving platforms such as manned or unmanned air and ground vehicles. This information can be used for applications including autonomous aerial refueling, autonomous landing systems and collision avoidance. Geo-RelNAV® is offered in several configurations designed to meet a wide range of requirements, and is available for both commercial and military applications:

Geo-RelNAV® Commercial: Designed for civilian navigation applications (no ITAR restrictions)
Geo-RelNAV® SAASM: Designed for applications that have a military SAASM GPS requirement

Geo-RelNAV® Features

- High-accuracy relative position based on carrier phase differential GPS[1]
- Provides vector closure rate and high-accuracy differential velocity between the platforms (< 0.1 m/s)
- High-accuracy relative attitude (<0.25° depending on IMU and data link options) [1]
- Provides relative solutions in different non-inertial reference frames including body frame, local navigation frame (Wander Azimuth) and earth-fixed frame
- Provides relative solutions at arbitrary points of interest
- Provides absolute navigation solutions for the platforms
- Built-in support for many commonly used IMU's (see supported Plug & Play IMU's in the IMU Specifications)
- Mil-spec ruggedization

Geo-RelNAV® Applications

- Autonomous landing systems for UAV's
- Autonomous aerial refueling
- UxV collision avoidance and swarming
- UxV leader/follower formations
- Platooning

[1]Accuracy is dependent on GPS satellite system performance, ionospheric conditions, satellite visibility, data-link and other factors.

For all sales and technical-support related questions, please contact Geodetics, Inc. at:

P: 858.729.0872 F: 858.729.0874 E: info@geodetics.com

Geo-RelNAV®
Product Configuration Options

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Geo-RelNAV® IMU Technical Specifications

Parameter	KVH 1750	Epson M-G362	Epson M-G352
Gyroscope Dynamic Range	±490°/sec.	±150°/sec.	±440°/sec.
Gyroscope Bias In-Run Stability (1σ)	0.05°/hr.	3°/hr.	6°/hr.
Gyroscope Angle Random Walk (1σ)	≤0.012°/√hr.	0.1°/√hr.	0.2°/√hr.
Accelerometer Dynamic Range	±10 g	±3g	±6g
Accelerometer Bias In-Run Stability (1σ)	7.5 mg	<0.1 mg	<0.1 mg
Accelerometer Velocity Random Walk (1σ)	0.07(m/sec)/√hr.	0.04(m/sec)/√hr.	0.04(m/sec)/√hr.
Plug & Play IMU's Supported – Honeywell HG9900, HG1700, HG1900, Litton LN200			

Geo-RelNAV® Technical Specifications

Parameter	Commercial Configurations	SAASM Configurations
Size	33.8 in^3 (not including external IMU) (each unit)	
Weight	20 oz. (not including external IMU) (each unit)	
Environmental	MIL-810E, MIL-461 Compliant	
Power	10 – 30 VDC @ 2 Amps min.	
Interfaces	External power connector, TNC GPS antenna connector, 1 Ethernet data port, 3 RS-232 serial ports, 1PPS output, 4 status LEDs.	External power connector, TNC GPS antenna connector, 1 Ethernet data port, 3 RS-232 serial ports, 1PPS output, 4 status LEDs, SAASM Keyload Connector, SAASM Zeroize button.
Real-Time Data Output	Navigation solutions at IMU rate (depending on data link throughput) available via Ethernet, RS-232	
Data Recording/Logging	Navigation solutions (position, velocity, attitude), raw GPS & IMU data (for post-processing with Geo-PostProcessing tools), diagnostics.	
GPS Frequency Tracking	L1/L2	L1 & L2 (P/Y Code)
Key Loading	N/A	DS101
RTK Algorithm	Precise Instantaneous Network (PIN) Positioning with Geodetics' Epoch-by-Epoch® technology.	
Safety & Diagnostics	Internal safety and monitoring systems. Internal BIT with operator notification.	
Temperature Range	Specified: -20°C to +60°C | Operating: -40°C to +70°C	

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