Inertial Labs
Attitude is Everything

Embention Partners with Inertial Labs to Supply Complete Autopilot Payload Solution

Partnership

Embention began investigating Inertial Labs as a supplier for inertial measurement units (IMU) or attitude and heading reference systems (AHRS) in 2013. Their developing project would involve integrating such sensors with targeted munition rounds specifically designed for controlling and mitigating forest fires.

In subsequent years, the Inertial Labs Inertial Navigation System became an appealing GPS-Denied navigation solution for Embention, who started discussing an integration with the Veronte Autopilot (produced by Embention) in 2016. Inertial Labs is delighted to announce the successful completion of integration efforts on November 26, 2019 when the INS-P, the professional version of the INS, was declared fully integrated and validated through testing.

Features and Usability

The Veronte Autopilot features many top-of-the-line options that give users a competitive edge when it comes to making a selection in the market. With extended efforts for line of sight (LOS) and beyond line of sight (BLOS) communication, intuitive and high-performing software, and a navigation solution that be tailored towards so many different applications, Embention's robust solution stands out in the marketplace.

Extended Communication

For typical operations, the Veronte Autopilot contains an embedded line of sight module that encrypts communication on the 400 MHz, 900 MHz or 2.4 GHz frequencies. However, the unit also features a 4G communication module for beyond line of sight (BLOS) communication.

Robust Graphical User Interface

For those looking for a complete solution, the Veronte Autopilot can be purchased with Veronte Pipe Software, which allows the user to customize the system and create or modify mission profiles.

Special Features

With the additional navigational accuracy that the Inertial Labs INS-P provides, the Veronte Autopilot now offers highly accurate navigation in a GNSS-denied environment. Additionally, Embention created a platform solution that can be further customized to fit the needs of the end user due to its compatibility with commonly used, mission-critical items that include tracker antennae, flight simulators, and camera payloads.

Integrated for Performance

The Inertial Labs INS-P utilizes a fluxgate magnetometer and a tactical grade IMU, all manufactured and temperature-calibrated in-house for performance. However, when it comes to high performance in a GNSS-denied environment, accurate inertial sensing components are only part of the solution.

A robust Kalman Filter that can properly filter the best data from each sensor is key. That is where Inertial Labs excels. Properly fusing and managing magnetic field data, inertial data from MEMS-based gyroscopes and accelerometers, and GNSS data is not a task for the faint of heart. But with nearly 20 years of experience in development and application-based implementation, Inertial Labs is an expert in data fusion.

The INS-P is connected to the Veronte Autopilot using the standard RS-232 serial interface and can be configured with the Veronte Autopilot in two ways.

1. Primary Navigational Solution

In it's main mode of operation the Inertial Labs INS outputs a converged navigation solution that has been run through Inertial Labs Kalman Filter. This solution is used as the primary navigation data and is primarily helpful for GPS-Denied environments. Parsed data from the Inertial Labs INS includes: attitude, velocity, position and time.

2. Combined Navigation Solution

Optionally, the Inertial Labs INS outputs pre-parsed sensor data from gyroscopes and accelerometers along with navigation data such as position, velocity, and time stamp. In turn, this data fuses with data from the Veronte Autopilot, which also accounts for information from its own integrated sensors, which include:
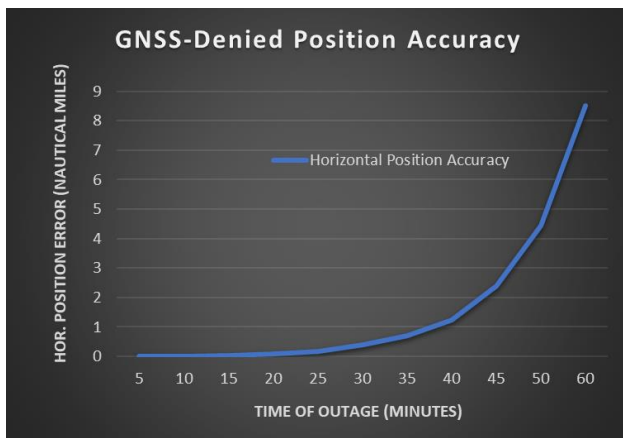
- Static and Dynamic Pressure sensors for calculating Airspeed
- Magnetometer for Aiding in Course Correction
- Redundant GNSS receivers for heading calculation

Navigation in GPS-Denied

But what does this mean in terms of navigational accuracy? Test data from customer use cases indicates that during an hour-long GNSS outage, horizontal position drift is limited to an impressive 8.9 nautical miles (NM).

At first glance, the average person may conclude that this is not a considerable feat. For those familiar with alternative solutions, a common ring laser gyro-based navigation system results in a position drift of 6 NM. This solution, however, costs triple the effective cost of the Veronte Autopilot. One may quickly conclude that paying more does not mean a consumer gets a better product.

Compatibility

Inertial Labs has worked for years to develop a robust navigation solution that works for many different applications. A key advantage to the Inertial Labs INS solution is the ability for users to input aiding data into the system. Aiding data fuses with other sensing components and adaptively adjusts to create a robust Kalman Filtering process that gives the user the ability to increase navigational performance. With Embention's integration of the Inertial Labs INS-P, the user has the ability to increase performance of their existing system by using aiding data sources that already exist on the platform.

For aerial platforms, commonly used aiding data may include airspeed sensors, doppler shift information from a locator, wind speed sensors, doppler velocity logs, and external attitude information. The INS-P can be configured to accept all these data types through its main communication port, which increases navigational performance and efficiently meets user needs.

Precision Mapping

Logging data and performing preconfigured flight maneuvers is critical whether the solution is used for Remote Sensing or Bathymetric surveys.

Tactical UAV

Those requiring a solution that allows offensive or defensive responses must be able to trust it to maintain safety of people and property.

SWARM Flight Control

Disaster response and mitigation is an increasingly successful market for autopilot suppliers. Whether they are putting out forest fires or identifying and responding to personnel in critical condition, the Veronte Autopilot can handle long mission profiles while carrying large payloads in GNSS-denied environments.

Gimbaled Tracking
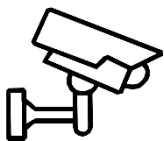
Optionally configurable with additional infrared, thermal, or HD RGB cameras, the Veronte Autopilot can monitor and recognize vehicles and people from several kilometers away.

What Do You Think?

At Inertial Labs, we value customer satisfaction and want to continuously provide solutions specifically tailored to today's problems, while aggressively developing products that tackle tomorrow's concerns. Your opinion is always important to us whether you are a student, an entrepreneur, or an industry heavyweight. Please share your thoughts on our products, what you would like them to achieve, or just say hello at opinions@inertiallabs.com
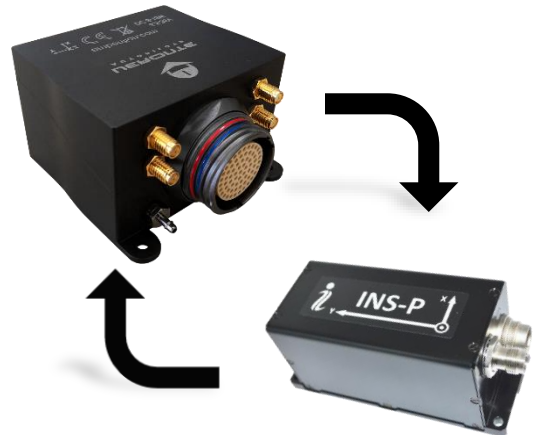
Features	• Enhanced Performance for Extended GNSS-denied Navigation • Redundancy in Navigation Sensors	
Pitch and Roll (Accuracy)	0.08° (RMS, RTK)	
Heading (Accuracy)	0.1° (RMS, RTK)	
Horizontal Position (Accuracy)	0.01 m (RMS, RTK)	< 9 NM (free-inertial)
I/O Ports	PWM/GPIO, DIGIN, CAN Bus, ADC, EQEP, I2C, UART, USB, RS232, RS485 &FTS	
Communication	LOS: Encrypted 400 MHz, 900 MHz, or 2.4 GHz	BLOS: Satcom compatibility & embedded M2M LTE module
Weight	470 grams	
Size	120 x 50 x 53 mm (INS-P) 67.9 x 63 x 39.6 mm (Veronte)	

About Inertial Labs Inc.

Established in 2001, Inertial Labs is a leader in position and orientation technologies for commercial, industrial, aerospace and defense applications. Inertial Labs has a worldwide distributor and representative network covering 20+ countries across 6 continents and a standard product line spanning from Inertial Measurement Units (IMU) to GPS-Aided Inertial Navigation Systems (INS). With application breadth on Land, Air, and Sea; Inertial Labs covers the gambit of inertial technologies and solutions.

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Scan me!!!

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