



Using Optics to Stabilize and Simulate Indirect Fire Control

Aiding with Optics

The main limitation for many microelectromechanical (MEMS) based inertial measurement units (IMUs) is the realization that drift will always be a factor when left uncompensated for. In today's market many solutions have been developed using GNSS data, magnetics, or optical sensors.

Optical data, when fused with an IMU, is useful for both dynamic and static applications depending on the level of computer vision implemented into the system. By using the IMU as a reference for orientation, optical data can be used to mitigate drift of the gyroscopes.

Inertial Labs has been continuously developing next generation systems that can use a combination of day and night operation cameras to stabilize heading.

Sensor Fusion Filtering

So how does a complex system take into account multiple forms of data from different systems? By recognizing the best qualities of each source.

By themselves, each sensor in a complex system is vulnerable to many sources of error. For the OptoAHRS-II, the trick is to use a combination of sensors that each compliment the others weaknesses. For an IMU, drift of the gyroscopes is the biggest flaw; which is where optical data comes to the rescue. If the system can recognize that the frame of reference is not moving, then biases can be ignored, preventing the IMU from drifting in its orientation calculations.

But what if you're not in a static environment? Can optical data still be trusted? In short, the answer is yes, but the effort of computing power required for such calculations is much more than what many companies are willing to tackle.

This is where magnetometers become helpful: in an environment where there is not a large amount of magnetic interference.

By using the IMU to detect when an environment changes from static to dynamic, the Kalman filter can adjust and weigh the reliability of data from the different sensors based on the kind of dynamic environment the system is in.

Application Base

Indirect Fire Control Training

Many training facilities often require controlled simulations that demonstrate realistic conditions seen in the field. The OptoAHRS-II has been demonstrated to be an effective training solution for 60mm, 81mm, 105mm, and 120mm mortars.



Antenna Pointing

Ideally used in environments where the need for a high pointing accuracy with low latency arises, the OptoAHRS-II stabilizes heading without requiring any GNSS receiver input. This makes it a great solution, especially in GNSS Denied environments.



Crane Orientation

As an industrial use-case, the OptoAHRs-II is perfectly suited for the construction zone where keeping a steady orientation is crucial; especially when safety is a priority.



Stabilization

For pan and tilt platforms with varying ranges of rotational velocities, the OptoAHRs-II can be configured to multiple gyroscope ranges to suit the need of the application. The two generic models of the OptoAHRs-II can stabilize platforms rotating at velocities up to 450 degrees per second and 950 degrees per second.



Our Customers

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EXPAL

KWESST INTELLIGENT
TACTICAL
SYSTEMS



THALES



OptoAHRs-II

with

Real-time optical and inertial sensors orientation tracking

	Accuracy
Applications	Land Survey, Geodesy and Cartography, Crane Safety and Control Systems, Geospatial Systems, Gas Drilling, Antenna Pointing, North Finding & Keeping
Heading Accuracy	<0.2°
Pitch and Roll Accuracy	0.08° (in full temperature range)
Gyro. Bias in-run Stability	1 (°/hr)
Accel. Bias in-run Stability	0.005 mg
Mag. Bias in-run Stability	0.1 nT
Weight	784 grams
Size	163.6 x 80.5 x 55 mm

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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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