



RESEPI™ Ultra LITE



RESEPI Ultra LITE Overview

Introducing the latest innovation from Inertial Labs, the lightest complete payload featuring both LiDAR and camera technology. Designed with the modern surveyor in mind, this solution offers unparalleled ease of use and versatility.

Key Features:

- **Light Weight Design:** Our lightest payload yet, ensuring ease of transport and deployment without compromising on performance.
- **SnapFit Adapters:** Experience seamless integration with various platforms (Freefly, WISPR, DJI, Sony, Mobile) through our quick plug-and-play SnapFit adapters, allowing for rapid dismounting and mounting.
- **Cost-Effective:** As the most affordable and comprehensive solution we've released, it provides exceptional value without sacrificing quality.
- **Precision and Accuracy:** High data accuracy and precision has remained our priority and promise to our customers. This product has gone through meticulous cycles of testing and refining in proper time-stamping and calibration methods to make sure we bring unrivaled performance at the right value.
- **Multi-Mode Operations:** Versatile in application, it supports aerial scanning, pedestrian hand-held SLAM operations, and vehicle-mounted mobile mapping, making it an all-in-one solution for diverse surveying needs.

This product embodies Inertial Labs' commitment to innovation and excellence, providing surveyors and key-players in the 3D mapping space with a powerful tool that enhances efficiency and accuracy in their mapping projects.

Featuring the XT-32

Compact and light-weight, the RESEPI featuring the XT-32 LiDAR scanner is an all-around very attractive system, offering the benefits of best-in-class data accuracy, good detection range, high point density, and versatility.

Applications and Ideal Use Cases

The RESEPI Ultra LITE featuring the XT-32 LiDAR was strategically designed to accommodate the market needs for an all-in-one system that delivers accuracy and precision to 3D mapping applications. The RESEPI Ultra LITE has SnapFit adapters designed and released specifically to support common Freefly, WISPR, and DJI drones. This payload with its embedded 5MP colorization camera and ultra-lightweight design is going to achieve maximum return for endurance missions in aerial mapping and low to mid-range altitudes. Given the compact nature of the system it is also perfect for SUAS integrators to adopt and bring inside to any platform with volume constraints where both LiDAR and a camera are the desired configuration. This RESEPI system will see its highest return on investment where customers are conscious of cost but still desiring to see a quality point cloud primarily in the applications of: utilities mapping (power lines), construction volumetrics, site surveying, precision agriculture, forestry, mining operations, and much more.

System

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|---|--------------------------------|
| System Accuracy | 2 - 3 cm ⁽¹⁾ |
| Precision | 2 - 4 cm ⁽¹⁾ |
| Precision (1 σ Noise Removal) | 1.5 - 2.5 cm ⁽²⁾ |
| Recommended AGL | Up to 100 m |
| Weight | 1.2 kg |
| Dimensions | 13.1 x 11.2 x 10.3 cm |
| Max Flight Time (DJI M350) | 35 minutes |
| External Storage | 256GB USB |
| System Computer | Quad Core 1GB RAM, 8GB eMMC |
| Operational Voltage Range | 9-45V |
| Power Consumption | 20 W |

Software (PCMasterPro™)

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| Field Checks | Yes |
| Pre-Processing | Yes |
| Post-Processing | Yes, Supported |
| SLAM (Powered by Kudan) | Yes |
| Strip Alignment (Powered by BayesMap) | Yes |
| Additional Features | Coordinate System Transformation, Batch Processing, Noise Filtering, etc. |

About Inertial Labs

Inertial Labs is at the forefront of developing and manufacturing position and orientation technologies for the commercial sector, government, defense, and aerospace. Inertial Labs' product catalog includes Inertial Measurement Units (IMU), Inertial Navigation Systems (INS), Motion Reference Units (MRU), and Wave Sensors (WS) along with RESEPI, our LiDAR scanning and mapping package. We supply solutions for land, sea, and air to exacting customers from some of the largest organizations in the world.

LiDAR

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|--------------------------|--|
| Laser Range Capabilities | 80m @ 10% ref. (c9-24) 50m @ 10% ref. (c1-8, 25-32) 0.05 to 120m |
| Range Accuracy | +/- 1cm |
| FOV (Horizontal) | 360° |
| FOV (Vertical) | 31° |
| Scan Angle (Vertical) | -16° to 15° |
| Beam Divergence | 0.021° (H), 0.047° (V) ⁽³⁾ |
| Number of Laser | 32 |
| Number of Returns | 2 |
| Pulse Rate | 640k/s (single return); 1280k/s (dual return) |

Colorization Camera

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|------------------|----------------------------|
| Type | CMOS Rolling Shutter |
| Resolution | 5MP |
| Lens | Fixed Manual Focus |
| Max Trigger Rate | 2 s |
| Field of View | HFOV = 70.8°, VFOV = 55.6° |

⁽¹⁾Single Pass, 50m AGL, 5m/s, Nadir, Values Based on Inertial Labs Test Conditions.

⁽²⁾Single Pass, 50m AGL, 5m/s, Nadir, Single Noise Removal, Values Based on Inertial Labs Test Conditions.

⁽³⁾Varies by measurement range

⁽⁴⁾Dynamic accuracy is dependent on type of motion.

Estimated post-processed accuracy in controlled aerial mission.

GPS-Aided INS

GPS-Aided Inertial Navigation System

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|---------------------|---|
| GNSS | NovAtel OEM7500 |
| Constellations | GPS, GLONASS, Galileo, BeiDou, QZSS, SBAS, L-Band |
| Frequencies | L1, L1C, L2, L2C, B1, B2, E1, E5b |
| Operation Modes | RTK and PPK |
| INS Algorithm Type | Extended Kalman Filter |
| Output Rates | Up to 200Hz (INS); Up to 2,000Hz (IMU) |
| Pitch/Roll Accuracy | 0.03° (RTK); 0.004° (PPK) ⁽⁴⁾ |
| Heading Accuracy | 0.1° (RTK); 0.02 (PPK) ⁽⁴⁾ |
| Velocity Accuracy | <0.03m/s |
| Position Accuracy | 1cm + 1ppm (RTK); 0.5cm (PPK) |

Inertial Measurement Unit

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|--|----------------------|
| IMU Type | Inertial Labs Kernel |
| Accelerometer | |
| Bias in-run stability (Allan Variance) | 0.02 mg, 1σ |
| Noise. Velocity Random Walk (VRW) | 0.045 m/sec/√hr, 1σ |
| Scale Factor (STD, over temperature range) | 100 ppm, 1σ |
| Gyroscope | |
| Bias in-run stability (Allan Variance) | 2 deg/hr, 1σ |
| Noise. Angle Random Walk (ARW) | 0.23 deg/√hr, 1σ |
| Scale Factor (STD, over temperature range) | 600 ppm, 1σ |

