RESEPI

LiDAR Scanning & Mapping Solution



RESEPI™ GEN-II M2X-ILX

System

System Accuracy	2 - 3 cm(1)
Precision	2 - 4 cm(2)
Precision (1σ Noise Removal)	1.5 - 2.5 cm(3)
Recommended AGL	Up to 150 m
Weight	1.7 kg
Dimensions	21.6 x 17.8 x 13cm
Max Flight Time (DJI M300)	33 minutes
Internal Storage	512GB SSD
System Computer	Hexacore, 8GB DDR4 RAM, 16GB eMMC
Operational Voltage Range	9-50V
Power Consumption	40 W

Software (PCMasterPro™)

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.

RESEPI GEN-II Overview

The RESEPI (Remote Sensing Payload Instrument) GEN-II payload is an advanced, next-generation, sensor-fusion platform designed for accuracy-focused real-time and post-processed aerial, mobile, and pedestrian-based remote sensing applications. RESEPI GEN-II utilizes the Inertial Labs' Dual Antenna Inertial Navigation System (INS-D), a high-performance and expandable navigation system powered by Inertial Labs' Extended Kalman Filter (EKF). Within this system lies a Tactical Grade Inertial Measurement Unit (IMU), the Kernel-210, also by Inertial Labs. It provides more expandability over its predecessor by offering end-users and integrators the ability to integrate their platforms by taking advantage of built-in software integrations made by MAVLink and DJI's Payload SDK (PSDK). Benefit from two new camera options with a wider field of view, faster shutter speeds, and higher resolution images. Field-swappable mounts and accessories easily integrate with platforms like the WISPR Ranger Pro 1100, Freefly Astro, Sony Airpeak S1, and DJI M350. The RESEPI GEN-II platform features a more powerful on-board computing module for real-time point cloud visualization and further integrations with external/additional sensing modules, giving users the ability to integrate and synchronize their additional cameras and LiDAR or input-aiding data to the navigation filter from wheel speed sensors, encoders, external IMU's or Air Data Computers (ADC). This payload is perfectly suited for plug-and-play with end-users and engineering firms looking to adopt a hardware package that offers customization and expandability with a versatile remote sensing solution.

RESEPI GEN-II with XT-32M2X

RESEPI GEN-II with the XT-32M2X LiDAR makes use of enhanced mobile XT-series LiDAR scanner which features a lighter weight and extended detection range over its predecessor model. It enables an M2X-equipped RESEPI to fly longer, combined with a higher recommended maximum AGL and wider vertical FOV to more effectively map larger areas and sites with dense vegetation cover. It is an all-around desirable system, offering the benefits of best-in-class data accuracy, better detection range, high point density, and versatility.

Applications

The RESEPI GEN-II M2X-ILX was strategically designed for multiple application bases with mounting options for mobile vehicles, DJI supported drones (DJI M300, M350, M600 Pro), custom drones, handheld platforms (including the RESEPI LiDAR Payload Backpack), indoor robotics vehicles, the Freefly Alta-X and Astro, WISPR Ranger Pro 1100, Sony Airpeak S1, and many more. Because of this diverse mounting portfolio, the RESEPI can be used for many services including utilities mapping (power lines), construction volumetrics, site surveying, precision agriculture, forestry, mining operations, and much more.

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

Laser Range Capabilities	80m @ 10% ref. (all channels); 0.05 to 300m
Range Accuracy	+/- 1cm
FOV (Horizontal)	360°
FOV (Vertical)	40.3°
Scan Angle (Vertical)	-20.8° to 19.5°
Beam Divergence	0.056° (H), 0.1°(V)[4]
Laser Channels	32
Number of Returns	3
Pulse Rate	640k/s (single return); 1280k/s (dual return); 1920k/s (triple return)

SONY ILX-LR1 Camera

Model	Sony ILX-LR1
Resolution	61MP
Lens	Fixed Manual Focus 18mm Lens
Max Trigger Rate	1 second
Field of View	100°
Estimated GSD Accuracy	2 cm at 50 m AGL

[1][2]Single Pass, 50m AGL, 5m/s, Nadir, Values Based on Inertial Labs Test Conditions.

[3]Single Pass, 50m AGL, 5m/s, Nadir, Single Noise Removal, Values Based on Inertial Labs Test Conditions.

[4]Varies by measurement range

[5][6]Maximum available; dependent on receiver configuration.

[7]Dynamic accuracy is dependent on type of motion.
Estimated post-processed accuracy in controlled aerial mission.

[8]Dynamic accuracy is dependent on type of motion; RTK with a 2-meter baseline.

GPS-Aided INS

GPS-Aided Inertial Navigation System

GNSS	NovAtel OEM7720
Constellations	GPS, GLONASS, Galileo, BeiDou, QZSS, NavIC (IRNSS), SBAS, L-Band[5]
Frequencies	L1, L2, L5[6]
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)[7]
Heading Accuracy	0.08° (RTK); 0.02° (PPK)[8]
Velocity Accuracy	<0.03 m/s
Position Accuracy	1cm + 1ppm (RTK); 0.5cm (PPK)

Integration Support

External Camera Support	Yes
External LiDAR Support	Yes
External GNSS Receiver Support	Yes
Odometer or Wheel Speed Sensor Support	Yes
MAVLink, DJI PSDK, and ROS2 Capable	Yes

Inertial Measurement Unit

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

