

**dji** ENTERPRISE

**DJI L1**

Instant Clarity, Superior Accuracy



# A Lidar + RGB Solution for Aerial Surveying

The Zenmuse L1 integrates a Livox Lidar module, a high-accuracy IMU, and a camera with a 1-inch CMOS on a 3-axis stabilized gimbal. When used with Matrice 300 RTK and DJI Terra, the L1 forms a complete solution that gives you real-time 3D data throughout the day, efficiently capturing the details of complex structures and delivering highly accurate reconstructed models.



Integrates a Lidar module, an RGB camera, and a high-accuracy IMU



High Efficiency 2 km<sup>2</sup> covered in a single flight<sup>[1]</sup>



High Accuracy Vertical Accuracy: 5 cm / Horizontal Accuracy: 10 cm<sup>[2]</sup>



Point Rate: 240,000pts/s



Supports 3 Returns<sup>[3]</sup>



Detection Range: 450 m (80% reflectivity, 0 klx)

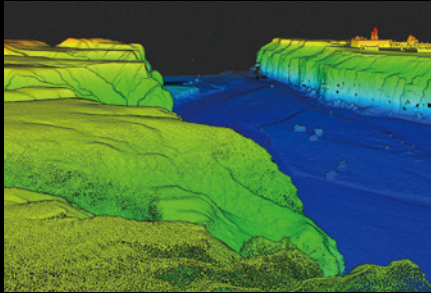


IP54 Ingress Protection Level



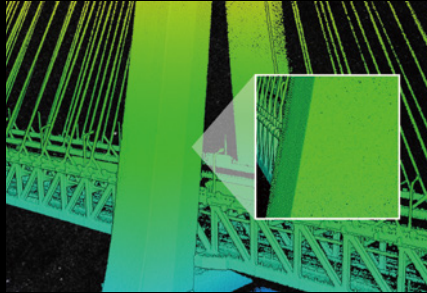
Point Cloud LiveView

# Digitize without Compromise



## Exceptional Efficiency

Generate true-color point cloud models in real time, or acquire 2 km<sup>2</sup> of point cloud data in a single flight<sup>[1]</sup> using the Livox frame Lidar module with a 70° FOV and a visible light camera with a 1-inch sensor.



## Unparalleled Accuracy

Render centimeter-accurate reconstructions thanks to the high-accuracy IMU, a vision sensor for positioning accuracy, and the incorporation of GNSS data.



## Ready When You Are

The IP54 rating allows the L1 to be operated in rainy or foggy environments. The Lidar module's active scanning method enables you to fly at night.





Visualize Data as You Fly

## Livox Lidar Module

- Frame Lidar with up to 100% effective point cloud results
- Detection Range: 450 m (80% reflectivity, 0 klx) / 190 m (10% reflectivity, 100 klx)
- Effective Point Rate: 240,000 pts/s
- Supports 3 Returns<sup>[3]</sup>
- Repetitive and Non-repetitive Scan Mode

Everything in View

## RGB Camera

- 20MP
- 1-inch CMOS
- Mechanical Shutter

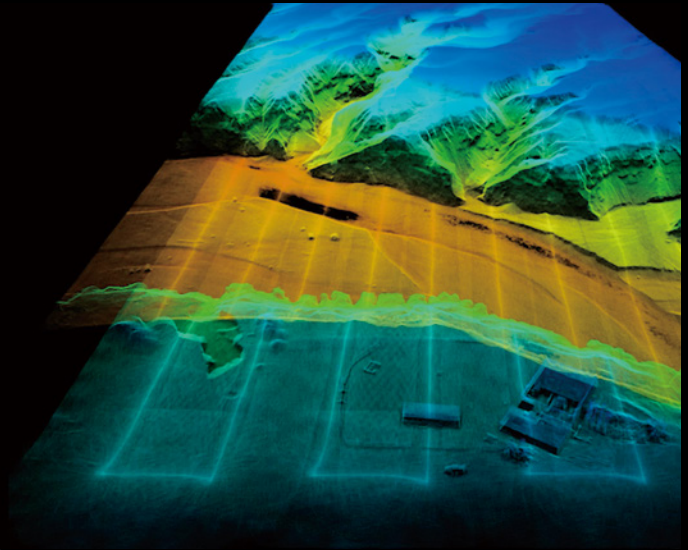
Accurate Details at Your Disposal

## High-accuracy IMU

- Accuracy:  $0.025^\circ$  (roll/pitch) /  $0.15^\circ$  (yaw)
- Vision Sensor for Positioning Accuracy
- GNSS, IMU, RGB Data Fusion



# Recreate the World in 3D Point Clouds



## Point Cloud LiveView

Real-time point clouds provide immediate insights onsite, so operators are informed to make critical decisions quickly. You can also verify fieldwork quality by checking point cloud data immediately after each flight.



## Measurement and Annotation<sup>[4]</sup>

Acquire and communicate critical dimensions on the point cloud model using measurements and annotations.





## One-stop Post-processing

DJI Terra fuses the IMU and GNSS data for point cloud and visible light calculations, in addition to conducting POS data calculations so you can effortlessly generate reconstructed models and accuracy reports.

# Application Scenarios



## Topographic Mapping

Quickly generate topographic maps using accurate digital elevation models.



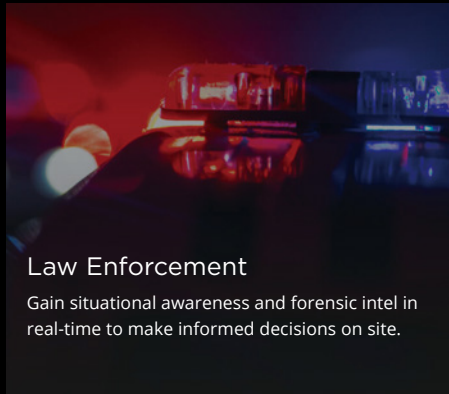
## AEC and Surveying

Manage the full project lifecycle using highly accurate point clouds and 3D models.



## Emergency Response

Any time of the day, gather critical insights in real-time using true-color point clouds.



## Law Enforcement

Gain situational awareness and forensic intel in real-time to make informed decisions on site.



## Energy and Infrastructure

Model sparse or complex structures in detail to manage them efficiently and safely.



## Agriculture and Forestry Management

Gain insight into vegetation density, area, stock volume, canopy width, and growth trends.

# Specifications

## General

Dimensions	152 × 110 × 169 mm
Weight	930 ± 10 g
Power	Typical: 30 W; Max: 60 W
IP Rating	IP54
Supported Aircraft	Matrice 300 RTK
Operating Temperature Range	-20° to 50°C (-4° to 122°F) 0° to 50°C (32° to 122°F) (when using RGB mapping camera)
Storage Temperature Range	-20° to 60° C (-4° to 140° F)

## System Performance

Detection Range	450 m @ 80% reflectivity, 0 klx; 190 m @ 10% reflectivity, 100 klx
Point Rate	Single return: 240,000 pts/s; Multiple return: 480,000 pts/s
System Accuracy	Horizontal: 10 cm @ 50 m; Vertical: 5 cm @ 50 m
Real-time Point Cloud Coloring Modes	Reflectivity, Height, Distance, RGB, by distance

## Lidar

Ranging Accuracy	3 cm @ 100 m
Maximum Returns Supported	3
Scan Modes	Non-repetitive scanning pattern, Repetitive scanning pattern
FOV	Non-repetitive scanning pattern: $70.4^{\circ} \times 77.2^{\circ}$ ; Repetitive scanning pattern: $70.4^{\circ} \times 4.5^{\circ}$
Laser Safety	Class 1 (IEC 60825-1:2014) (Eye Safety)

## Inertial Navigation System

IMU Update Frequency	200 Hz
Accelerometer Range	$\pm 8$ g
Angular Velocity Meter Range	$\pm 2000$ dps
Yaw Accuracy	Real-time: $0.3^{\circ}$ , Post-processing: $0.15^{\circ}$
Pitch / Roll Accuracy	Real-time: $0.05^{\circ}$ , Post-processing: $0.025^{\circ}$

## Auxiliary Positioning Vision Sensor

Resolution	$1280 \times 960$
FOV	$95^{\circ}$

## RGB Mapping Camera

Sensor Size	1 inch
Effective Pixels	20 MP
Photo Size	4864 × 3648 (4:3); 5472 × 3648 (3:2)
Focal Length	8.8 mm / 24 mm (Equivalent)
Shutter Speed	Mechanical Shutter Speed: 1/2000 - 8 s Electronic Shutter Speed: 1/8000 - 8 s
ISO	Video: 100 – 3200 (Auto), 100 – 6400 (Manual) Photo: 100 - 3200 (Auto), 100 - 12800 (Manual)
Aperture Range	f/2.8 - f/11

## Gimbal

Stabilized System	3-axis (tilt, roll, pan)
Angular Vibration Range	0.01°
Mount	Detachable DJI SKYPORT
Mechanical Range	Tilt: -120° to +30°; Pan: ± 320°
Operation Modes	Follow/Free/Re-center

## Data Storage

Raw Data Storage	Photo/IMU/Point cloud data storage
Point Cloud Data Storage	Real-time modeling data storage
Supported microSD Cards	microSD: Class 10 or UHS-1 rating or above; Max capacity: 256 GB

## Post-processing Software

Supported Software	DJI Terra
Data Format	DJI Terra supports exporting standard format point cloud models: Point cloud format: PNTS/LAS/PLY/PCD/S3MB format

[1] The accuracy was measured under the following conditions in a DJI laboratory environment: after a 5-minute warm up, using Mapping Mission with Calibration Flight enabled in DJI Pilot, and with the RTK in FIX status. The relative altitude was set to 50 m, flight speed to 10 m/s, gimbal pitch to  $-90^{\circ}$ , and each straight segment of the flight route was less than 1000 m. DJI Terra was used for post-processing.

[2] Measured in an environment of 25°C with a target (80% reflectivity) 100 meters away. The result may vary under different test conditions.

[3] In operations with two or three returns, the point rate is 480,000 pts/s.

[4] Support coming soon.





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