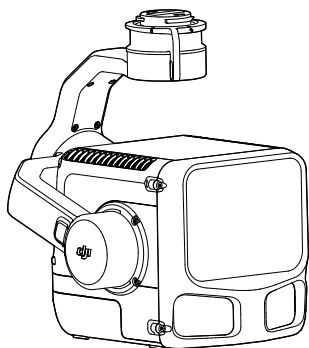


dji ZENMUSE L3

User Manual

v1.0 2025.11





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In the event of divergence among different versions, the English version shall prevail.

Searching for Keywords

Search for keywords such as “battery” and “install” to find a topic. If you are using Adobe Acrobat Reader to read this document, press Ctrl+F on Windows or Command+F on Mac to begin a search.

Navigating to a Topic

View a complete list of topics in the table of contents. Click on a topic to navigate to that section.

Printing this Document

This document supports high resolution printing.

Using this Manual

Legend

 Important

 Hints and Tips

 Reference

Read Before Use

Watch all the tutorial videos first, then read the documentation included in the package and this user manual.

If you have any questions or issues during installation and use of this product, contact official support or an authorized dealer.

Video Tutorials

Go to the address below or scan the QR code to watch the tutorial videos, which demonstrate how to use the product safely:



<https://enterprise.dji.com/zenmuse-l3/video>

Download DJI Assistant 2

Download and install DJI ASSISTANT™ 2 (Enterprise Series) using the link below:

<https://www.dji.com/downloads/softwares/assistant-dji-2-for-matrice>

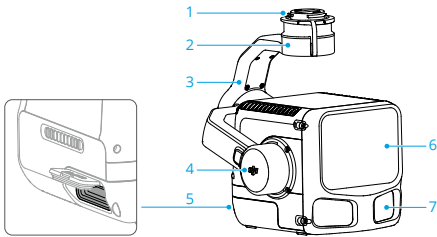
Contents

Using this Manual	2
Legend	2
Read Before Use	2
Video Tutorials	3
Download DJI Assistant 2	3
1 Product Profile	6
1.1 Overview	6
1.2 Product Performance	6
Performance Charts	6
LiDAR Usage Scenario	8
Warnings	8
2 Usage	10
2.1 Installation	10
2.2 Activation	11
2.3 DJI Pilot 2 App Camera View	11
3 Field Data Collection	13
3.1 Preparation	13
3.2 Payload Parameters	13
3.3 Flight Route Operation	14
Planning Task	14
Route Parameters	15
Point Cloud Result Preview	16
Task Quality Report	16
3.4 Manual Flight	17
3.5 Power Line Follow	18
3.6 View Point Cloud Results	19
3.7 Point Cloud Data File Description	20
4 Office Data Processing	21
4.1 PPK Data Acquisition	21
4.2 Point Cloud Processing	22
5 Appendix	24
5.1 Specifications	24
5.2 Log Export	24
5.3 Firmware Update	24
Using DJI Pilot 2	24

	Online Update	24
	Offline Update	24
	Using Memory Card	24
	Notices	25
5.4	Maintenance	25
	Storage and Transportation	25
	LiDAR Maintenance	26
5.5	Point Cloud Anomaly Correction	26
	Re-calibrating the Internal and External Parameters	26
	Restore Factory Settings	27

1 Product Profile

1.1 Overview



1. Gimbal Connector

2. Pan Motor

3. Roll Motor

4. Tilt Motor
5. CFexpress Card Slot

6. LiDAR

7. RGB Mapping Camera

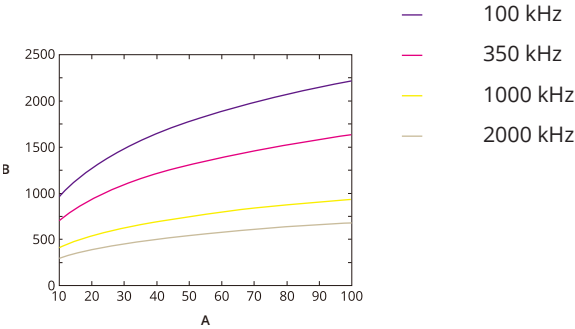
1.2 Product Performance

Performance Charts

Detection Range at Different Reflectivities

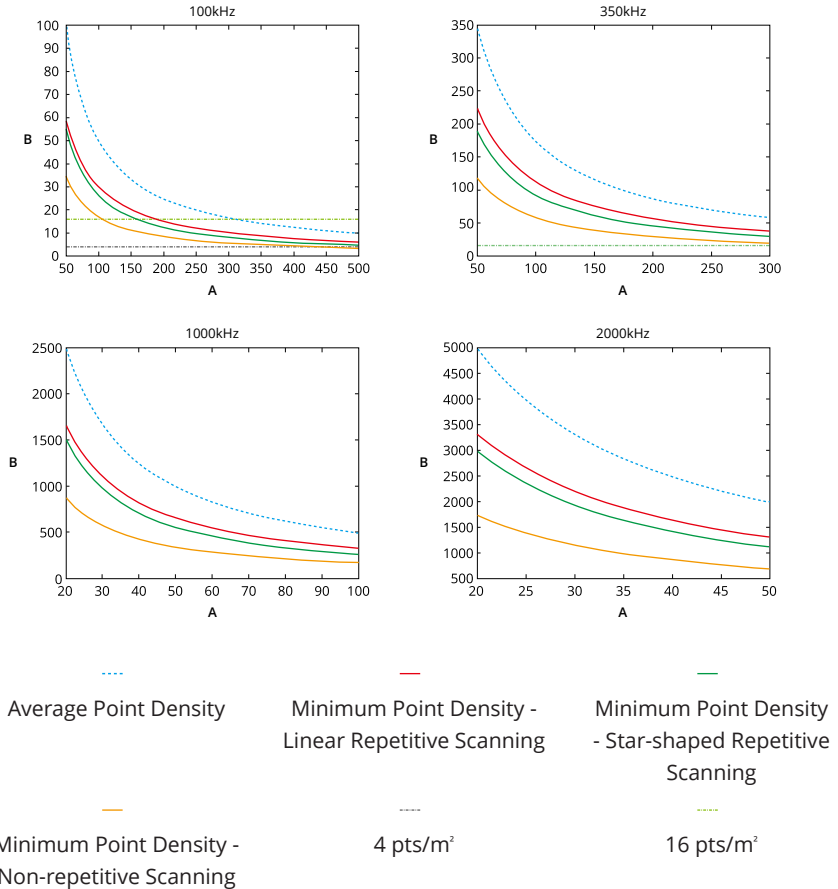
The detection range (B, in meters) at different reflectivities (A, %) and sampling frequencies is shown in the figure.

* The maximum detection range is 900 m by default. For a longer range, contact official support or an authorized dealer.



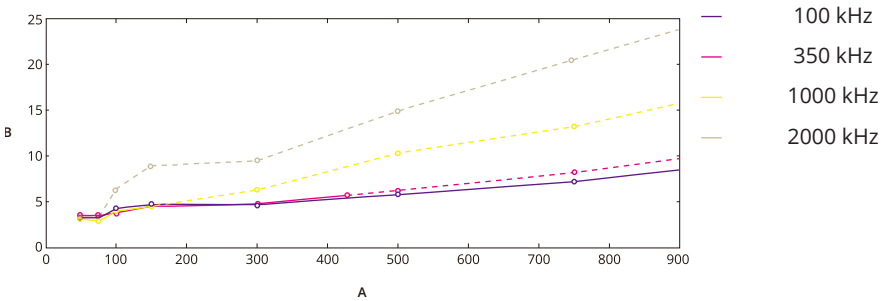
Point Cloud Density

When the point cloud overlap is 20% and the flight speed is 15 m/s, the point cloud density (B, in pts/m³) at various altitudes (A, in meters) under different sampling frequencies is shown in the figure.



Measurement Error

The figure shows how the random error (B, in millimeters) for different sampling frequencies varies with target distance (A, in meters) when scanning an object with 80% reflectivity. Select appropriate sampling frequency and target distance to meet accuracy requirements.



* Measured in a laboratory environment under the following conditions. Data may vary with environmental conditions. Refer to the actual measured values.

Ambient temperature of 25°C

Target reflectivity of 80%

Central FOV and normal incidence

* The dashed line indicates the random error when the target distance exceeds the maximum unambiguous measurement range for the respective sampling frequency.

LiDAR Usage Scenario

Avoid using LiDAR in the following scenarios, as this may reduce the detection range and accuracy, or cause point cloud noise or voids.

- Laser beam incident on mirror, fully reflective, or highly reflective surfaces.
- Scanning bodies of water or wet surfaces.
- Conditions with low visibility such as rainy or foggy weather.
- The payload has just powered on and has not warmed up.
- The target distance is within 10 m.
- Excessively strong ambient light.
- Backscattering caused by tiny particles such as raindrops, fog droplets, or suspended particles (dust and haze) near the LiDAR.
- Use high sampling frequency in scenarios with significant elevation differences.

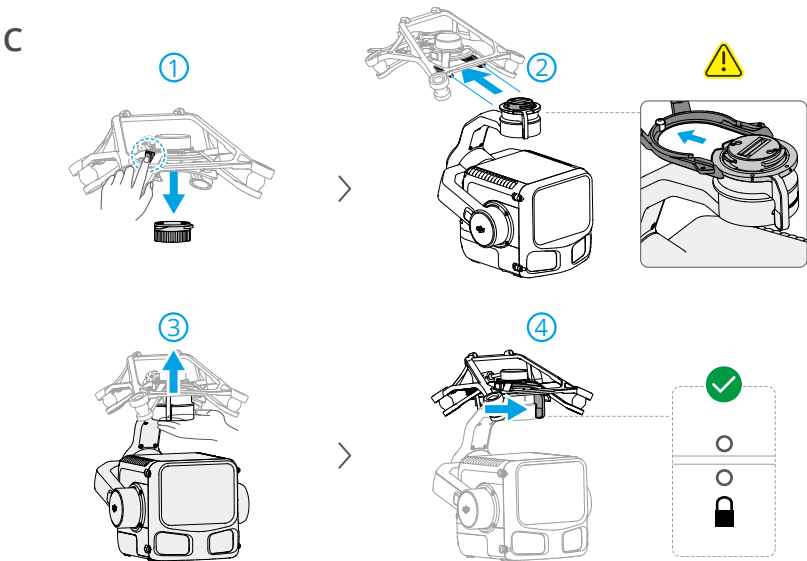
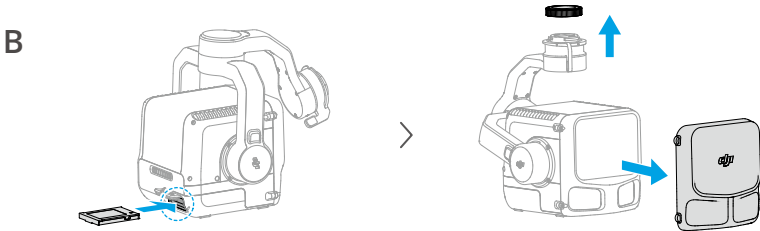
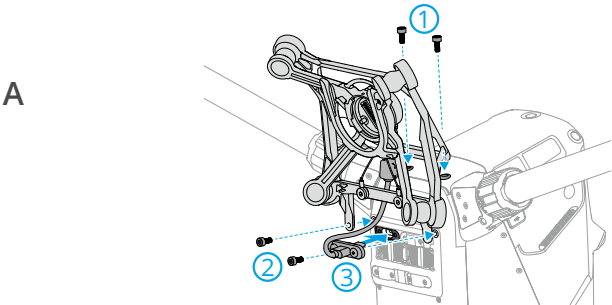
Warnings

- This product is classified as a Class 1 laser product and is safe under all normal conditions of use. To avoid potential injury, DO NOT look directly at the LiDAR optical window for extended periods or view it through optical magnifiers, such as telescopes or magnifying glasses.

- DO NOT photograph the LiDAR while in use to prevent damage to the camera sensor.
- When the LiDAR angle approaches horizontal, the performance such as range and accuracy may decrease.
- Disabling RGB Coloring or operating at night may result in abnormal modeling results.

2 Usage

2.1 Installation

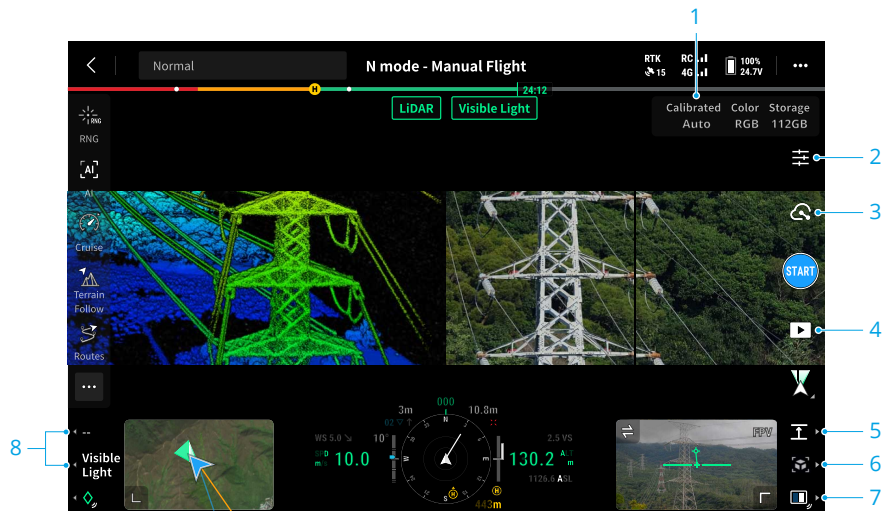


- ⚠ • Detach the payload from the aircraft during transportation or storage. Otherwise, the service life of the damper balls maybe shortened or they may even be damaged.
- To remove the payload, press the release button on the aircraft and rotating the payload.

2.2 Activation

The payload requires activation via DJI PILOT™ 2 App before first use. Mount it on the aircraft, then power on the aircraft and remote controller and follow the on-screen instructions to activate using the DJI Pilot 2 app. An internet connection is required for activation.

2.3 DJI Pilot 2 App Camera View



1. IMU Calibration Status
2. Camera Settings
Tap to set the shooting parameters for point cloud and visible light photos.
3. Recording Mode (Shutter/Video Record/Point Cloud Record)
4. Playback

Tap to view or download photos and videos. Select the point cloud data files to preview the 3D model. Select multiple files to view the merging models.

5. Switch the point cloud rendering mode.
6. Preview the current point cloud model.
7. Side-by-Side (SBS) View Switch Button

Press and hold the R3 button, then tap to select desired SBS view, or press the R1, R2, or R3 buttons to choose the corresponding SBS view.

8. Press the button to switch between the visible light view and the LiDAR view.

3 Field Data Collection

3.1 Preparation

1. Make sure the payload is correctly installed on the aircraft, and the memory card is inserted. Power on the aircraft and remote controller. Make sure the aircraft is linked to the remote controller.
2. Go to **Camera View** > ... >  in DJI Pilot 2, select the RTK service type, and ensure the RTK status is FIX.



- When the mobile network or remote controller video transmission signal is weak, set up an RTK base station to obtain high-precision location information to assist with post-processing. Refer to the [Office Data Processing](#) section for more information.
- If using a third-party RTK base station, make sure the station supports at least three GNSS systems.
- When setting up a third-party RTK base station, follow the steps to set the coordinates of the origin for the RTK base station (using RINEX format as an example):
 - a. Erect the RTK base station to a point with known coordinates and record the XYZ coordinates in ECEF format (use a third-party software for format conversion if necessary).
 - b. Use Notepad to open the RINEX file with the .O extension and modify the APPROX POSITION XYZ coordinates in the .O file to the coordinate recorded in step one.

3.2 Payload Parameters

Set the payload parameters according to the following instructions before collecting data.

Parameters	Description
Return Mode	The greater the number of returns, the higher the point cloud density. In areas with sparse vegetation, you can select the mode with fewer returns.

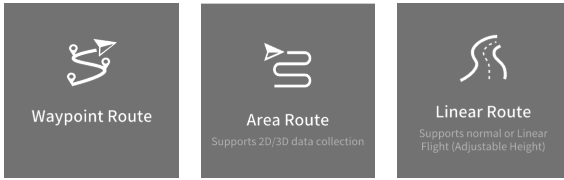
Parameters	Description		
Sampling Rate	It is recommended to operate according to the following parameters. Otherwise, it may result in anomalies in point cloud liveview, laser ranging function, or point cloud results.		
		Altitude relative to ground	Distance to the object
	100 kHz	<500 m	<1500 m
	350 kHz	<300 m	<430 m
	1000 kHz	<100 m *	<150 m
	2000 kHz	<50 m *	<75 m
* Real-Time Follow must be enabled.			
Scanning Mode	Repetitive scanning is suitable for topographic mapping, with higher accuracy and even point cloud scans. Star-shaped repetitive scanning mode is well-suited for forests or dense urban environments. Linear repetitive scanning mode achieves more consistent point cloud distribution and is suited for high-accuracy terrain mapping. Use non-repetitive scanning for electricity and forestry data collection to generate more complete tree trunk and electrical transmission tower models.		
RGB Coloring	When enabled, the user can color the point cloud using the photographs captured by the RGB mapping camera (enabled by default). It is recommended to disable the function during night operation. The photographs can also be used for 2D and 3D reconstruction.		

3.3 Flight Route Operation

Tap **Flight Route** on the homepage of DJI Pilot 2, or tap the flight route icon in the camera view or in the map view to enter the flight route library. Users can view flight tasks or create a flight task.

Planning Task

The payload supports the following types of flight tasks. Refer to the aircraft user manual for more information on flight route planning.



Waypoint Route

Area Route

Supports 2D/3D data collection

Linear Route

Supports normal or Linear Flight (Adjustable Height)

Route Parameters

Parameters	Description																																
GSD	GSD is the ground sampling distance of the photos taken on the first route, i.e., the distance between two consecutive pixel centers measured on the ground. The larger the GSD value, the lower the image resolution. Adjusting the GSD will affect the point cloud density and flight altitude. The figure shows the corresponding oblique GSD (B, in centimeters) for various typical flight altitudes at different horizontal FOVs (A, in degrees). When the direction of the horizontal FOV is opposite but the angle is the same (i.e., $\pm A$), the corresponding oblique GSD remains the same. <table><caption>Approximate data points from the GSD graph</caption><thead><tr><th>Horizontal FOV (A) [degrees]</th><th>GSD (120m) [cm]</th><th>GSD (300m) [cm]</th><th>GSD (500m) [cm]</th></tr></thead><tbody><tr><td>0</td><td>1.0</td><td>2.5</td><td>4.0</td></tr><tr><td>10</td><td>1.1</td><td>2.8</td><td>4.5</td></tr><tr><td>20</td><td>1.2</td><td>3.1</td><td>5.0</td></tr><tr><td>30</td><td>1.3</td><td>3.5</td><td>5.8</td></tr><tr><td>40</td><td>1.5</td><td>4.0</td><td>6.8</td></tr><tr><td>50</td><td>1.8</td><td>4.8</td><td>8.2</td></tr><tr><td>60</td><td>2.2</td><td>6.0</td><td>10.0</td></tr></tbody></table>	Horizontal FOV (A) [degrees]	GSD (120m) [cm]	GSD (300m) [cm]	GSD (500m) [cm]	0	1.0	2.5	4.0	10	1.1	2.8	4.5	20	1.2	3.1	5.0	30	1.3	3.5	5.8	40	1.5	4.0	6.8	50	1.8	4.8	8.2	60	2.2	6.0	10.0
Horizontal FOV (A) [degrees]	GSD (120m) [cm]	GSD (300m) [cm]	GSD (500m) [cm]																														
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40	1.5	4.0	6.8																														
50	1.8	4.8	8.2																														
60	2.2	6.0	10.0																														
Flight Route Altitude	The altitude of the flight route of a flight task. Different altitude modes use different reference planes for the flight route altitude. Adjusting the flight route altitude will affect the GSD and point cloud density.																																
Flight Route Speed	The operating speed of the aircraft after entering the flight route. This speed is related to the point cloud density and the frontal overlap ratio.																																
IMU Calibration	Enabled by default. When enabled, the aircraft will automatically perform calibration during the flight route task.																																

Parameters	Description
Efficiency Mode	When enabled, the number of calibrated flight segments will be reduced.
Side Overlap Ratio/Frontal Overlap Ratio	Side overlap ratio is the overlap ratio of two pictures taken on two parallel paths. Frontal overlap ratio is the overlap ratio of two pictures captured consecutively in the same heading along the flight path. The overlap ratio is one of the key factors affecting the success of later model reconstruction. The default side overlap ratio is 70%, and the default forward overlap ratio is 80%, which is suitable for most scenarios. If the mapping area is flat and has no undulations, the overlap ratio can be appropriately reduced to improve operational efficiency. If the mapping area has large fluctuations, it is recommended to increase the overlap ratio to ensure the reconstruction effect.  When using Oblique Collection, two more settings will be available: Side Overlap Ratio (Oblique) and Frontal Overlap Ratio (Oblique). The overlap ratio of oblique photos can be lower than that of orthophotos.

Point Cloud Result Preview

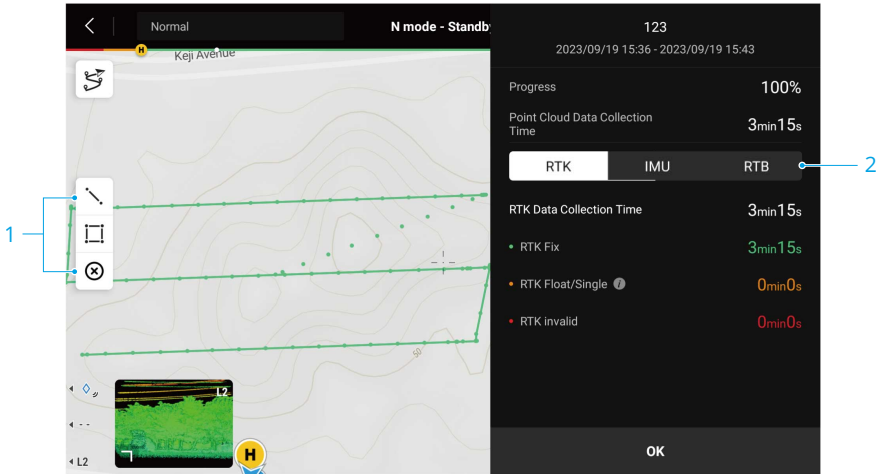
Select **Area Route > LiDAR Mapping > Ortho Collection**, the recommended parameters and estimated point cloud result will be displayed in the app. Users can review the point cloud quality before the task and adjust parameters based on the estimation.

1. In the flight route setting panel, tap **Point Cloud Task Output Estimate** to view the recommended parameters, and the point cloud density profile and scatter plot generated based on the parameters.
2. If the estimated result meets expectations, apply the current parameters. If not, adjust the parameters and regenerate the estimated result.

Task Quality Report

After completing an area route or linear route task, a task quality report is generated automatically to display the detailed information of the task. Users can mark the route segments with low quality in the report.

Tap **View Now**, or select the desired route in the flight route library to view the report.



1. Tap to display the Edit Line/Area View. Users can mark the flight route segments that require re-survey. Set the marked area as a mapping area and create a new flight task.
2. Tap to view the RTK, POS, and RTB status of the flight route.
 - a. RTK: Including fixed solutions, floating/single solutions, and invalid solutions. The floating/single solutions is available for PPK calculation.
 - b. IMU: Tap to view the POS status of the flight route, including fixed solutions and invalid solutions.
 - c. RTB: Tap to view base station data. If there is any abnormal data, post-processing may be affected and the available base station data is required.

3.4 Manual Flight

Fly the aircraft to an appropriate altitude and adjust the gimbal to the proper angle. Maintain an suitable distance from the object, and enable the obstacle sensing system to ensure flight safety.

It is recommended to perform IMU calibration before and after point cloud recording. Repeat the calibration during flight when prompted. Make sure there are no obstacles in the calibration area.

⚠ If the flight speed exceeds 25 m/s, recording during sideways flight may cause gimbal vibration, affecting imaging quality and point cloud accuracy. In this case, reduce the flight speed accordingly.

3.5 Power Line Follow

Power Line Follow is designed for overhead power line scenarios.

1. In the preflight check, set the max flight altitude and distance, and enable obstacle sensing. It is recommended to set the max flight altitude higher than the tallest obstacle within the task area and the maximum altitude that may be reached during the task. It is recommended to disable the distance limit, or set the distance to the maximum.
2. Fly the aircraft to a certain altitude diagonally above the transmission tower. Adjust the gimbal to ensure the tower is displayed in the camera view.
3. Tap  to create a task and set the parameters.

- a. Select the power line type. The identification accuracy may be decreased if the selected power line type is inconsistent with the actual situation.
- b. Set the flight parameters.

The altitude is the height of the aircraft relative to the highest point of the power line. It is recommended to set the altitude to more than twice the flight speed value. For transmission lines, an altitude of 50-80 m is recommended, while for distribution lines, 30-50 m is suggested.

- c. Set the point cloud recording parameters.

The sampling frequency supports 100 kHz and 350 kHz, with 350 kHz recommended. If the towers are particularly tall, use 100 kHz and reduce the flight speed accordingly. Scanning mode is set to non-repetitive scanning mode. When RGB Coloring is enabled, the user can color the point cloud using the photographs captured by the RGB mapping camera.



The results are affected by factors such as the diameter and material of the power line, and the tower width. It is recommended to adjust the parameters according to the actual situation.

4. Tap Next and complete the calibration flight if IMU Calibration is enabled, the app will automatically display the identified power lines. After selecting the power lines, tap Start to begin.
5. The aircraft will hover automatically when multiple power lines are detected, and then continue with the flight task after selecting the lines.
6. Tap  to complete the task. The point cloud data files will be saved to the corresponding folders. The task will also end automatically in the following situations:
 - No power lines detected.
 - RTH is initialized.

- The flight pause button on the remote controller is pressed.
- The flight mode is switched.
- An obstacle is detected. The aircraft will brake and enter obstacle avoidance mode.
- The aircraft is disconnected from the remote controller.
- Flight altitude/distance exceeds the maximum limit.
- The aircraft approaches restricted zones.



- When the aircraft fails to identify power lines, adjust the altitude and gimbal angle and try again.
- When the flight altitude of the aircraft relative to the power line exceeds 130 m, the app will not display the AR projection. In this case, lower the flight altitude.
- The aircraft will not respond to the remote controller stick movements during the flight task. Press the flight pause button or switch the flight mode on the remote controller to exit the task and manually control the aircraft.
- Make sure to check for obstacles around the aircraft using the FPV camera view. In case of an emergency, promptly control the aircraft using the remote controller.
- The following scenarios may result in inaccurate identification or abnormal termination of the task. In these cases, you can manually end the task.
 - ♦ Multiple parallel power lines in close proximity, such as near substations.
 - ♦ Insulated power lines.
 - ♦ The power lines are close to the ground vegetation.
 - ♦ The presence of numerous linear objects from the top-down perspective, such as buildings, street lamp, and billboards.
 - ♦ Low visibility conditions such as rainy or foggy weather.

3.6 View Point Cloud Results



- Make sure the aircraft and the remote controller are connected when viewing the point cloud models.
- The model displayed in point cloud playback is generated using sparse point clouds.

Point Cloud Playback

Tap  to enter the album and download the point cloud data files to preview the 3D models directly.

Point Cloud Merging

On the point cloud playback display, press the L3 button on the remote controller to select multiple point cloud data files and view the merging model.

3.7 Point Cloud Data File Description

Power off the aircraft after the task is completed and remove the memory card from the payload. Connect it to a computer and check the point cloud data files in the DCIM folder.

 DO NOT power off the device or remove the memory card immediately after image capture or point cloud recording. Wait at least 60 seconds to avoid reduced accuracy or data corruption.

File Suffix	Description
CLC	Camera LiDAR calibration file
CLI	LiDAR IMU calibration file
LDR	LiDAR data
RTK	RTK data of main antenna
RTL	Compensation data of RTK pole
RTB	Base station RTCM data
IMU	IMU raw data
SIG	PPK signature file
LDRT	Real-time point cloud data
RPT	Point cloud quality report

 After the task is completed, tap  to enter the album and select the data files, then upload the real-time point cloud results to the relevant project in DJI FlightHub 2.

4 Office Data Processing

The procedure of point cloud data processing: **Import data > Set parameters > Start reconstruction**. If a base station is used during data collection, the base station data corresponding to the task time period is needed for PPK calculation.

DJI Terra and DJI Modify are required for data processing. Visit <https://www.dji.com/downloads/softwares/dji-terra-4-5-0-modify> to download and install the software.

Click the link or scan the QR code to view the software user manual for information on configuration and usage.

DJI Terra



<https://enterprise.dji.com/dji-terra/downloads>

DJI Modify



<https://enterprise.dji.com/modify/downloads>

4.1 PPK Data Acquisition

Follow the steps below to import base station data to assist with point cloud post-processing.

1. Create a new task in DJI Terra and import point cloud data, then select **Local PPK** and click ⚙️ to configure the settings.
2. Click **Add Base Station File** to import base station data.
 - D-RTK 3 Mobile Station: Import the .DAT file corresponding to the time period (local time) of the task.
 - Third-party base station: .oem/.obs/.rtcm files are supported. Rename the file to the name of the .RTB file in the point cloud data directory by following the name format in the table below, then select the renamed file to import. DJI Terra prioritizes files in the following order: .oem > .obs > .rtcm.

Protocol Type	Protocol Version	Message Type	Naming Rules
OEM	OEM4, OEM6	RANGE	DJI_YYYYMMDDHHMM_XX.oem
RINEX	v2.1x, v3.0x	--	DJI_YYYYMMDDHHMM_XX.obs

Protocol Type	Protocol Version	Message Type	Naming Rules
RTCM	v3.0, v3.1, v3.2, v3.3	MSM3, MSM4, MSM5, MSM6, MSM7	DJI_YYYYMMDDHHMM_X XX.rtcn

3. Select the horizontal and elevation coordinate systems for the base station center point, and set the base station center point coordinates.
 4. Start calculation, then wait for the calculations to complete and save the data for reconstruction.
-
- 
 - If a D-RTK mobile station was used, users can also directly copy all the base station data files from that day, and DJI Terra will automatically merge them.
 - Make sure the distance between the RTK base station and the device is less than 15 km. Otherwise, the calculation may fail. Refer to DJI Terra Quality Report for more details.
 - Refer to the D-RTK mobile station manual for more information.
-

4.2 Point Cloud Processing

Using DJI Terra

1. Create Task

Run DJI Terra, select **New Task > LiDAR Point Cloud**.
2. Import Data
 - a. Click , select the folder named after the data collection time, and import the point cloud data.
 - b. If using a D-RTK mobile station or a third-party base station, follow the instructions in the [PPK Data Acquisition](#) section to import the base station data.
3. Set Parameters

Set the usage scenario and parameters according to the actual task conditions. Refer to the DJI Terra user manual for more information.
4. Start Reconstruction

Tap Start Processing to start reconstruction and wait until it is completed.
5. View Reconstruction Results

After the reconstruction is completed, users can view the point cloud results and quality report in the software.

Using DJI Modify

By integrating with DJI Modify, users can process the point cloud results generated by DJI Terra to obtain various mapping results. Refer to the DJI Modify user manual for more information.

5 Appendix

5.1 Specifications

Visit the following website for specifications.

<https://enterprise.dji.com/zenmuse-l3/specs>

5.2 Log Export

If any abnormalities occur during use, run DJI Pilot 2, tap **HMS > Log Management**, then select the device and log files. You can export the log to the remote controller for further analysis.

5.3 Firmware Update

Using DJI Pilot 2

Online Update

1. Ensure the payload is properly installed on the aircraft. Power on the aircraft and remote controller. Ensure the aircraft is linked to the remote controller, and the remote controller is connected to the internet.
2. Run DJI Pilot 2. A prompt will appear on the homepage if new firmware is available. Tap to enter the Firmware Update view.
3. Tap Update All, and DJI Pilot 2 will download the firmware and update the device.

Offline Update

An offline firmware package can be downloaded from the DJI official website to an external storage device. Run DJI Pilot 2, tap HMS, and then **Firmware Update > Offline Update** to select the firmware package of the remote controller, aircraft, or payload from the external storage device and tap **Update All** to update.

Using Memory Card

1. Download the latest firmware from the DJI official website, and copy the file to the root directory of the memory card.

2. Ensure the payload is properly installed on the aircraft, and that the aircraft battery is fully charged and powered off. Insert the memory card into the payload.
3. Power on the aircraft. The payload will perform an auto-check and start to update automatically. Restart each device after the firmware updates are complete.

Notices

-
- ⚠ • Make sure that the device has sufficient power before updating the firmware.
 - Do not remove accessories or turn off the device during the update process.
 - During the update process, it is normal for the gimbal to go limp, the aircraft status indicators to blink, and the ESC to beep. Wait patiently for the update to complete.
 - Make sure to keep the aircraft away from people and animals during a firmware update, system calibration, or parameter configuration.
 - For optimal performance, make sure you are using the latest firmware version.
 - After the firmware update is complete, the payload will automatically restart and perform an auto-check.
-

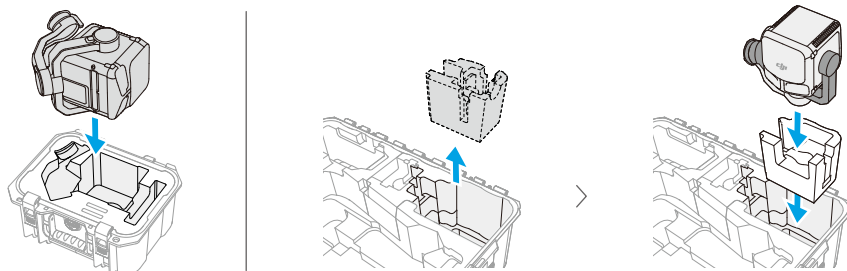
Visit the following link and refer to the *Release Notes* for firmware update information.

<https://enterprise.dji.com/zenmuse-l3/downloads>

5.4 Maintenance

Storage and Transportation

- Store the payload in a dry, well-ventilated, and dust-free environment. DO NOT place the product under direct sunlight, in areas with poor ventilation, or near heat sources.
- Make sure the product is not exposed to environments containing poisonous or corrosive gases or materials.
- It is recommended to transport the product with the original product packaging. If using the aircraft carrying case, ensure to replace the gimbal foam insert in the case with the dedicated foam insert provided in the original packaging. Place the payload as shown in the diagram.



- Handle with care during storage and transportation. DO NOT drop it or collide with other objects.
- DO NOT touch the surface of the camera lens with your hands or scratch it with hard objects. Otherwise, the quality of images may be effected. Clean the surface of the camera lens with a soft, dry, clean cloth.

LiDAR Maintenance

Dust and stains on the optical window can negatively affect the performance of the LiDAR sensor. If it is necessary to clean it, follow the steps below:

1. Clean the optical window with compressed or canned air before wiping.
2. Use a damp lens cleaning cloth to wipe the optical window in one direction. DO NOT use substances containing alcohol. DO NOT wipe with a dry cloth directly as it will scratch the surface of the optical window.
3. If stains remain, use mild soap solution to clean the optical window, then remove any soap residue.

⚠ DO NOT directly wipe the granular dust or impurities on the optical window to prevent scratching the surface, which may negatively affect the LiDAR's performance.

5.5 Point Cloud Anomaly Correction

Re-calibrating the Internal and External Parameters

Major calibration errors may result in issues such as layered point clouds and inaccurate color rendering. Select to calibrate the payload.

1. Collecting Calibration Data

Make sure that there is a facade of the building in the mapping area and the area is larger than 200 m × 200 m. Using Area Route to create a route of about 5 minutes, and enable IMU Calibration, Elevation Optimization, RGB Coloring, Single return and Repetitive scanning. Set the side overlap ratio to 50%, flight route altitude to 100 m, and speed to 10 m/s. Perform the flight to collect the data.

2. Using DJI Terra to Export Calibration File

Use DJI Terra (v5.1.0 or later) to create a LiDAR Point Cloud Processing task, import the calibration data collected in step one, and select **LiDAR Calibration**. Click **Export Calibration File** after the processing task is completed. The generated calibration file is the .tar file in the lidars/terra_lidar_cali project folder.

It is recommended to check if the point cloud data had any issues such as layered point clouds or inaccurate color rendering. Repeat steps one and two if there are issues. Proceed to step three if there are no issues.

3. Calibrating the Payload

Copy the calibration file to the root directory of the memory card, then insert the card into the payload. Install the payload onto the aircraft, and power on the aircraft and wait for about 5 minutes for the calibration to complete.

4. Checking the Result

After the calibration is completed, remove the memory card, then connect it to a computer and check the .txt format log file. The calibration is successful if All succeed is displayed. Users can also record the point cloud data to check whether the time parameter of the .CLI file is updated.

Restore Factory Settings

If the calibration results are not satisfactory, the internal and external parameters can be restored to the default settings by following the steps below.

1. Creating restoring files

- a. Restoring the .CLI file: Create a new .txt file and name it clear_user_extri_params.txt.
- b. Restoring the camera parameters: Create a new .txt file and name it reset_cali_user.txt. Open the file and enter the serial number of the payload that will be reset with the format: XXXXXXXXXXXXXXXX. The serial number can be found in the .CLI file in the task folder or in the device version information in the app.

2. Importing the files

Copy the .txt file to the root directory of the memory card, then insert the card into the payload. Install the payload onto the aircraft, then power on the aircraft and wait for about 5 minutes for the calibration to complete.

3. Record the point cloud data and remove the memory card from the payload, then connect it to a computer and check the .txt format log file. The restoration is successful if All succeed is displayed. It is also possible to check whether the time parameter of the .CLI file is restored to the default settings.

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