

REEBOT



UniVTOL V2200

Terrain Mapping Application Manual

No Terrain Too Challenging
One Flight for Complete Coverage

Reebot Robotics
July, 2025

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Terrain Mapping

Runway-Free Deployment & Long-Endurance Coverage for Efficient Wide-Area Mapping



Mining Site Mapping

Remote data collection ensures safe and precise 3D modeling in high-risk areas



Hydrological Mapping

Supports long-range patrols and accurate mapping of water structures



Urban and Planning Mapping

Micro takeoff and landing in urban areas, fast 3D modeling with oblique photography

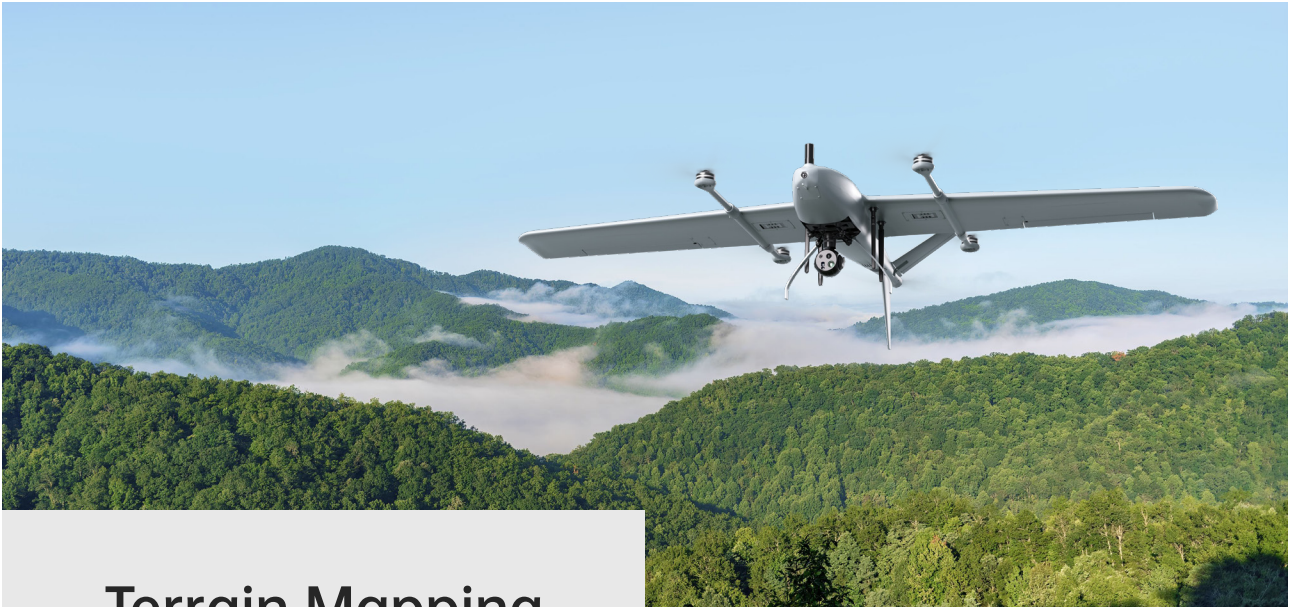


Agricultural Mapping

Quick assembly for efficient adaptation to agricultural tasks

Solution	Drone Platform	Gimbal Camera	Software
Solution A	 UniVTOL V2200 Drone Platform	 REEBOT UniPod MT11 Basic Mapping Camera	 UniGCS
Solution B	 UniVTOL V2200 Drone Platform	 RIEBO R6P Full-Frame Mapping Camera	 UniGCS
Solution C	 UniVTOL V2200 Drone Platform	 SHARE 102S SDK Five-Lens Oblique Camera	 UniGCS

Application	Gimbal Camera	REEBOT UniPod MT11 Basic Mapping Camera Suitable for Basic Surveying	RIEBO R6P Full-Frame Mapping Camera Suitable for Orthophoto Mapping and Medium-Precision Modeling	SHARE 102S SDK Five-Lens Oblique Camera Suitable for Multi-Angle, High-Precision 3D Modeling
Terrain Mapping		☒	☒	☒
Mining Site Mapping				☒
Urban and Planning Mapping			☒	☒
Hydrological Mapping			☒	☒
Agricultural Mapping		☒	☒	



Terrain Mapping

Painpoints

1. Manual placement of control points is **dangerous** and **inefficient**. In mountainous, hilly, and canyon regions with complex terrain and significant elevation changes, ground-based manual measurements are unsuitable.
2. Traditional fixed-wing drones require runways, while multirotor drones have shorter endurance, resulting in low operational efficiency.
3. Large coverage area and long task cycles.
4. Frequent flights and multiple flight path overlaps increase errors, impacting the accuracy of overall **DEM/orthophotos**.
5. In mountainous or remote environments, multiple personnel are required for operations. Equipment assembly, relocation, and backup scheduling are complex.

Solutions

1. **Vertical takeoff and landing** – No runway required, ideal for complex environments such as mountains, hills, and forests.
2. Maximum takeoff altitude of **3000m** – Suitable for most medium to high-altitude terrain mapping tasks.
3. Extended endurance – **Reduces the need for repeated flights** and improves efficiency over large areas.
4. Supports five-lens mapping camera or full frame mapping camera + automated flight routes – Integrated high-precision mapping.
5. Centimeter-level RTK positioning and orientation – Provides ultra-high accuracy and reliability, with full-frequency multi-system support and excellent anti-interference performance.
6. Quick-disassembly structure without screws – Wing and V-tail can be **assembled/disassembled in under a minute**, facilitating quick deployment and transport.



Mining Site Mapping

Painpoints

1. Steep slopes and complex terrain make 3D modeling difficult.
2. Mining sites often involve high-risk operations (e.g., slopes, caverns), with restrictions due to blasting, dust, and closed areas, making manual operations dangerous.
3. Frequent volume measurements, slope changes, and tunnel progress calculations require long task cycles and frequent takeoffs and landings for battery replacement.

Solutions

1. Supports five-lens oblique cameras or full-frame cameras – Enables high-precision modeling and volume calculations.
2. Flexible deployment – Vertical takeoff and landing at spoil banks, transport routes, and platforms for precise area mapping.
3. IP53 protection + wind resistance up to level 5 – Designed for harsh mining environments.
4. 40km remote video transmission – Safe operation in hazardous zones.
5. Automatic flight route recovery – Facilitates periodic comparison and monitoring in mining areas.



Hydrological Mapping

Painpoints

1. Patrol tasks often involve long linear distances, with traditional fixed-wing aircraft limited by takeoff and landing requirements.
2. Survey areas such as rivers, levees, and lakes have unique environmental challenges, including [water surface reflections](#) and [GNSS signal interference](#).
3. During flood seasons, there may be a need for rapid emergency mapping, leakage detection, and rescue operations.

Solutions

1. Runway-free deployment – Vertical takeoff and landing directly from adjacent water bodies for efficient operations in challenging environments.
2. [Full-frame mapping camera](#) support – Ideal for [large-area orthophoto mapping](#), riverbank profiling, and high-precision levee top surface mapping.
[Five-lens mapping camera](#) support – Enables [3D modeling of urban water infrastructure](#), levee slope reconstruction, and other detailed applications.
3. 40 km remote video transmission range – [Supports long-distance waterway mapping and levee inspections](#), ensuring safe operation in hazardous zones.
4. Quick assembly – [Single-person assembly within 1 minute](#), compatible with thermal or infrared gimbals for emergency applications such as levee leakage detection and night patrols.
5. Dual-antenna RTK technology – Provides [centimeter-level positioning and orientation](#) with strong anti-interference capabilities, ensuring flight safety and data reliability.



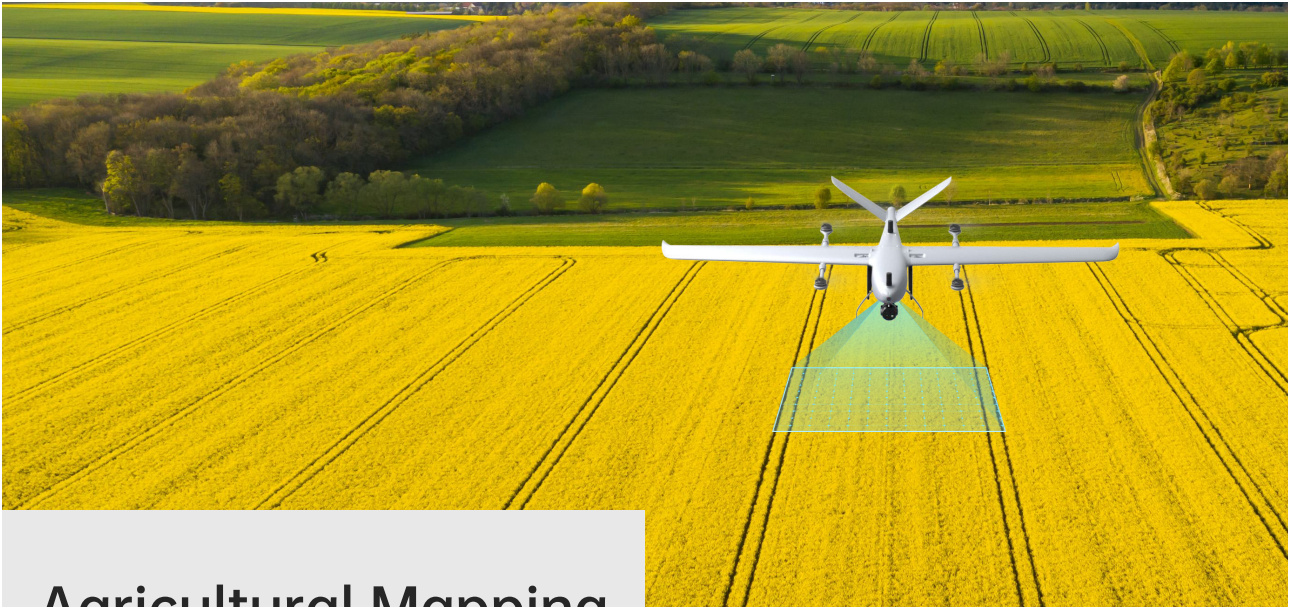
Urban and Planning Mapping

Painpoints

1. Dense urban areas require [high-precision 3D modeling](#) to capture building facades.
2. Orthophoto mapping and 3D modeling are both common tasks, depending on the scenario.
3. Urban renewal requires periodic aerial surveys, resulting in frequent task scheduling.

Solutions

1. Five-lens oblique camera support – [Captures complete rooftop and facade data](#) for high-precision urban modeling.
2. Automated flight route recovery – [Facilitates regular city comparison and monitoring](#) for urban development analysis.
3. Dual-antenna RTK technology – Ensures [centimeter-level positioning and orientation](#) with strong anti-interference, guaranteeing safety and data accuracy.



Agricultural Mapping

Painpoints

1. Agricultural areas are vast, and manual patrols and surveys are inefficient.
2. Many scenarios require [high flexibility in flight path planning](#), accounting for varying field sizes and surveying tasks.
3. Data collection is required for tasks such as field boundary mapping, cultivated land area calculation, and monitoring crop changes.

Solutions

1. Long endurance – [Supports large-area farmland mapping in a single flight](#), reducing the need for frequent takeoffs and landings.
2. UniGCS route planning – Automatically generates flight routes, with [one-click takeoff](#), [autonomous flight](#), and return. Routes can be replicated for periodic crop change monitoring.
3. Full-frame mapping camera compatibility – Outputs high-precision orthophotos and field results, meeting [cadastral verification](#) and [planning requirements](#).

SHARE Mapping Camera Installation Guide



Step 1



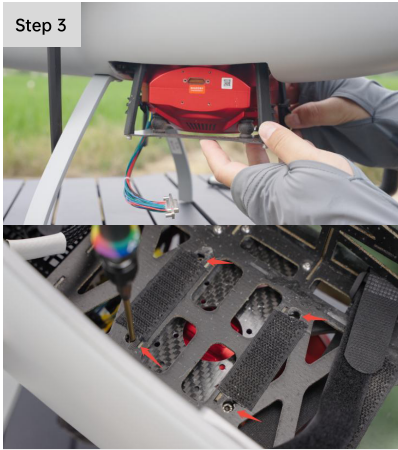
Attach the shock-absorbing dampers included with the SHARE mapping camera to the camera body, and mount the carbon fiber base plate at the bottom.

Step 2



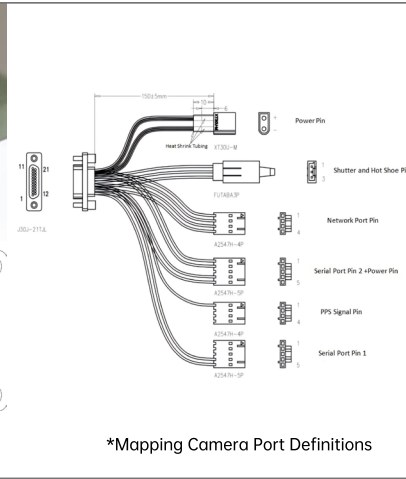
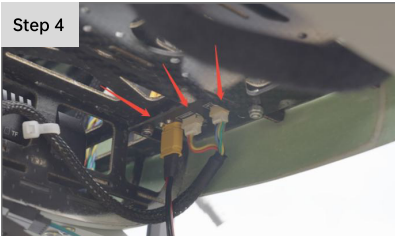
Use M3×6 screws to secure the mapping camera onto the UniVTOL V2200 damping mount.

Step 3



Insert the mapping camera into the UniVTOL V2200 payload bay, and use M3×8 screws to fix it firmly to the drone frame.

Step 4



PIN	Item	Interface Type	Color	Physical Map	Illustration
1 -	GND	XT30-	Black		Camera power input negative
2, 3					
4	LAN_TXN	A2547H-4P(PIN1)	Blue		Network port cable, H264Video Pushing Stream
5	LAN_TXP	A2547H-4P(PIN2)	Blue		
6	LAN_RXN	A2547H-4P(PIN3)	Green		
7	LAN_RXP	A2547H-4P(PIN4)	Green	Network Port Pin	
8	TX3	A2547H-5P (PIN4)	Blue		(TTL) serial port Pin1 (for camera to drone communication)
9	RX3	A2547H-5P (PIN5)	Green	Serial Port Pin 1	

*UniVTOL V2200 Payload Bay Port Definitions

*Mapping Camera Port Definitions

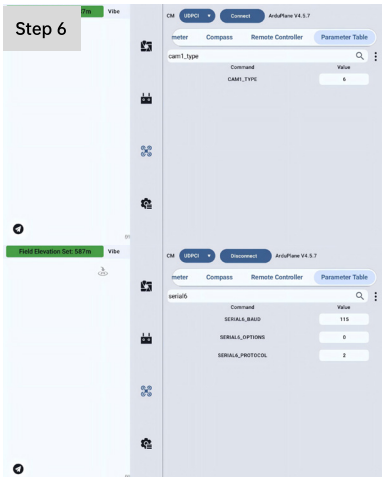
The mapping camera must be connected to the following interfaces: XT30 12V power input, UART & SBUS (GH1.25 5-pin serial port), and Gimbal LAN (GH1.25 4-pin Ethernet port). The interface type on the camera side is A2547H. Please refer to the diagram above for detailed pin definitions.

Step 5



Connect the communication cable to the mapping camera, and secure it using a Phillips screwdriver.

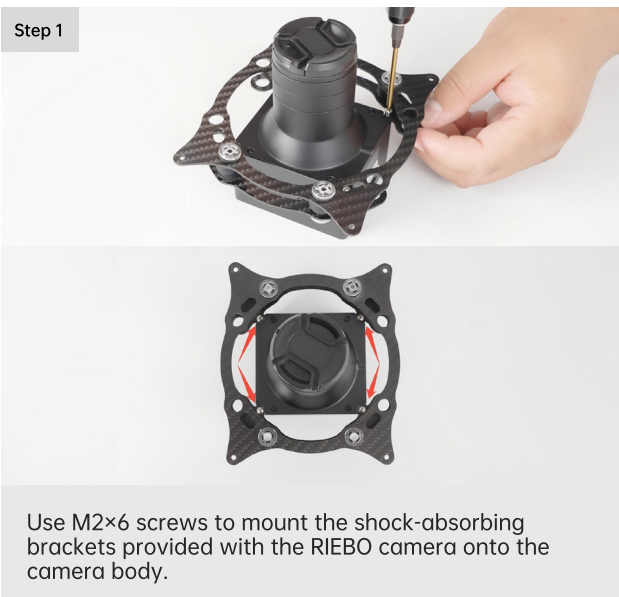
Step 6



Command	Setting Value	Description
Serial6 PROTOCOL	2	Mavlink2
Serial6 BAUD	115	115200
Cam1_type	6	Mavlinkcamv2

After powering on the drone and the remote controller, open the UniGCS configuration interface, search for the parameters listed in the table on the right, and update the values accordingly. It is recommended to restart the drone after setting the parameters to verify that the changes have taken effect.

Step 1



Use M2×6 screws to mount the shock-absorbing brackets provided with the RIEBO camera onto the camera body.

Step 2



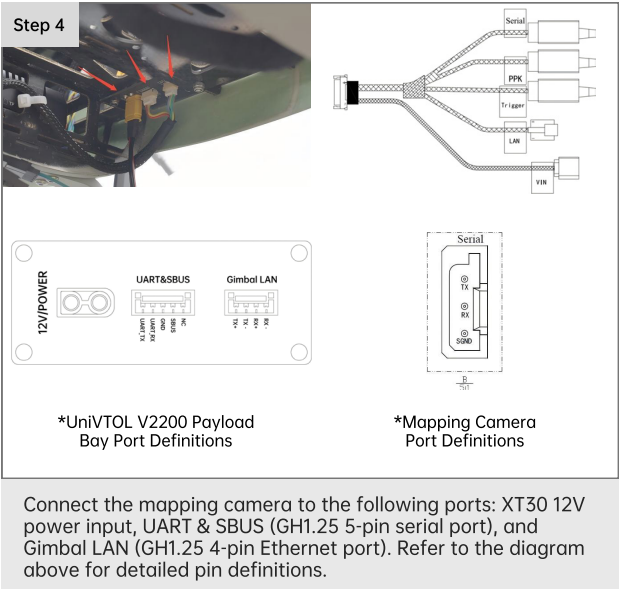
Use M3×6 screws to attach the mapping camera, now equipped with the shock-absorbing brackets, to the UniVTOL V2200 camera damping mount.

Step 3



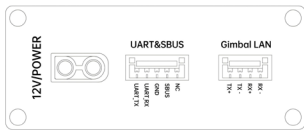
Ensure the end of the R6P mapping camera marked with an arrow is facing the front of the drone. Then use M3×8 screws to secure the camera damping mount inside the UniVTOL V2200 payload bay.

Step 4

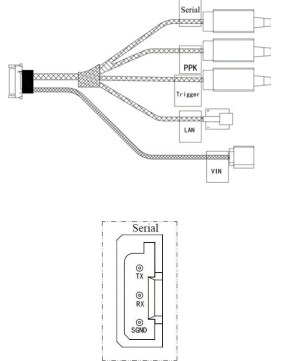


Connect the mapping camera to the following ports: XT30 12V power input, UART & SBUS (GH1.25 5-pin serial port), and Gimbal LAN (GH1.25 4-pin Ethernet port). Refer to the diagram above for detailed pin definitions.

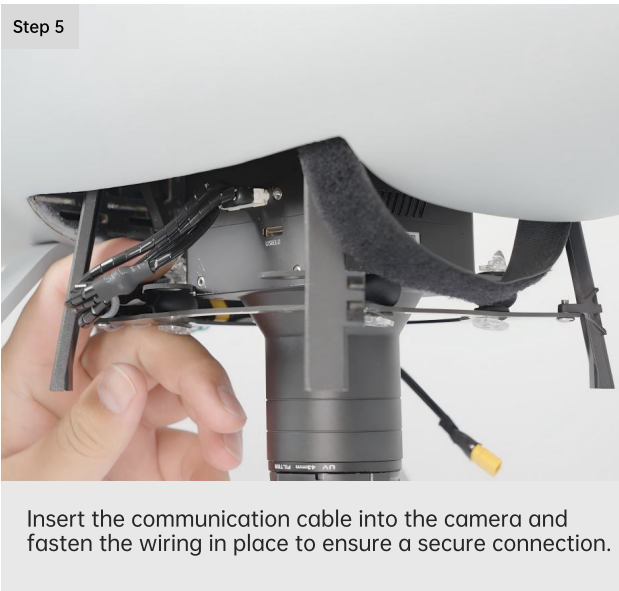
*UniVTOL V2200 Payload Bay Port Definitions



*Mapping Camera Port Definitions

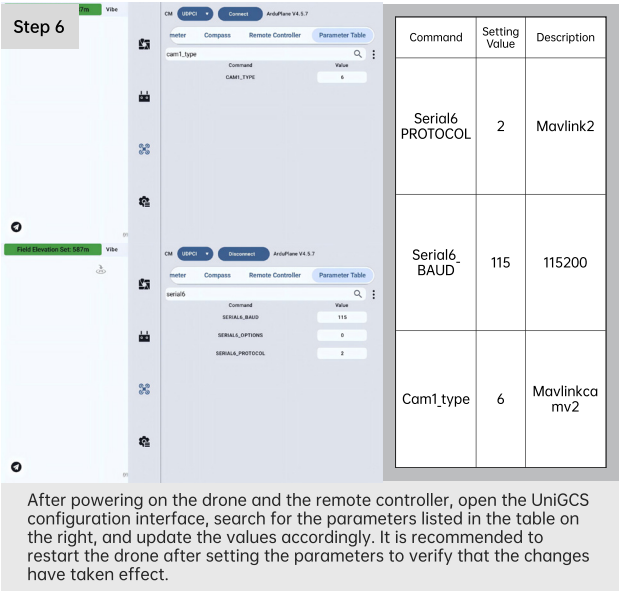


Step 5



Insert the communication cable into the camera and fasten the wiring in place to ensure a secure connection.

Step 6



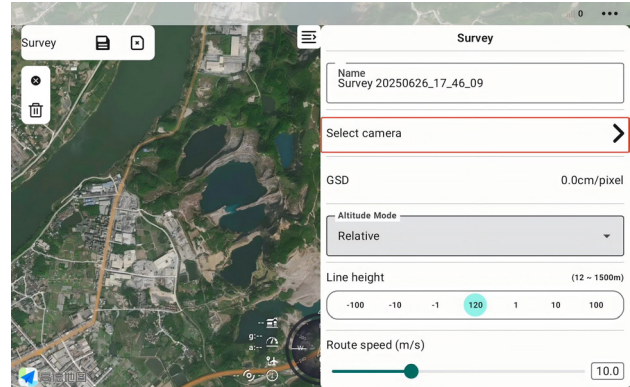
After powering on the drone and the remote controller, open the UniGCS configuration interface, search for the parameters listed in the table on the right, and update the values accordingly. It is recommended to restart the drone after setting the parameters to verify that the changes have taken effect.

Command	Setting Value	Description
Serial6 PROTOCOL	2	Mavlink2
Serial6 BAUD	115	115200
Cam1_type	6	Mavlinkcamv2



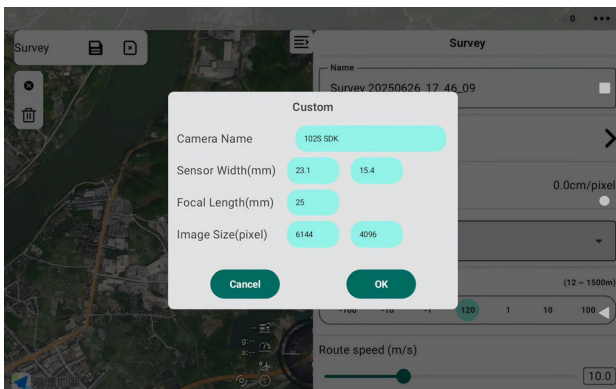
Step 1

Enter the UniGCS map interface, click on the flight planning function, and create a mapping route.



Step 2

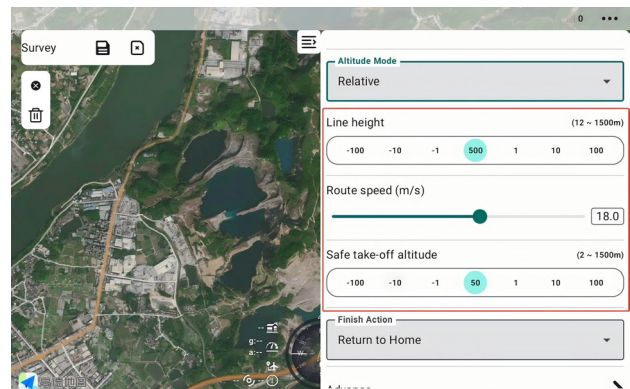
For first-time use, camera parameters need to be added. Click on "Select Camera" and then click "+ Add Camera."



Step 3

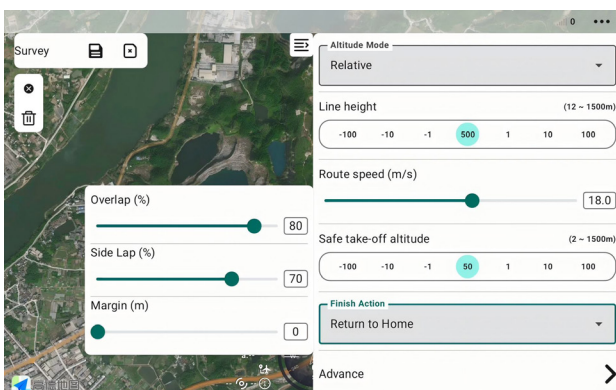
Enter the camera name, input the corresponding parameters based on the camera model, and save the settings

RIEBO R6P: 35.9 x 23.9 mm, Focal Length: 40 mm, Image Resolution: 9568 x 6368
SHARE 102S SDK: Sensor Size: 23.1 x 15.4 mm, Focal Length: 25 mm, Image Resolution: 6144 x 4096



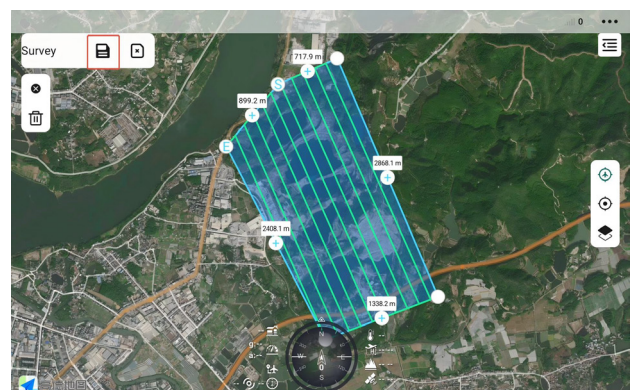
Step 4

Set the flight altitude according to the operational requirements. The recommended flight speed is 18 m/s, consistent with the UniVTOL V2200's cruising speed. Set the safe takeoff altitude to 50 meters.



Step 5

Configure the front and side overlap ratios and margins based on mission requirements. If there are no specific requirements, use the default parameters.



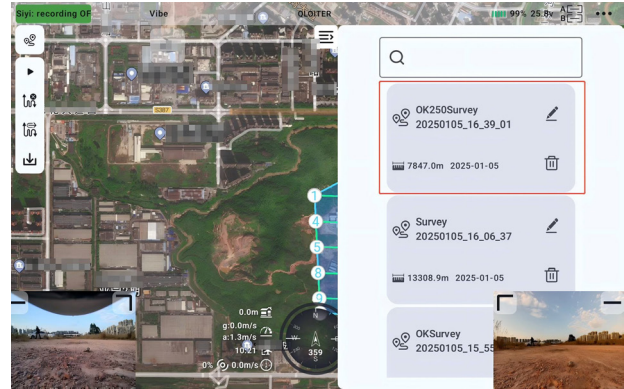
Step 6

On the map interface, select the target mapping area by drawing a polygon around it, then click "Save."



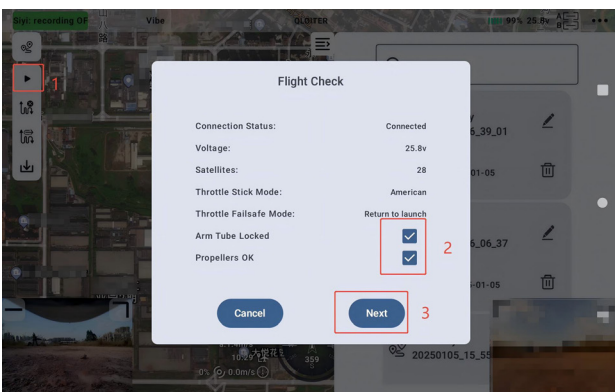
Step 7

Power on the remote controller and connect the drone to the power supply. Before flight, ensure that there are no buildings taller than 50 meters within a 200-meter radius of the takeoff point, and that the takeoff area is open and free of people or vehicles. **Perform pre-flight calibration and strictly follow the UniVTOL V2200 flight safety operation guidelines.**



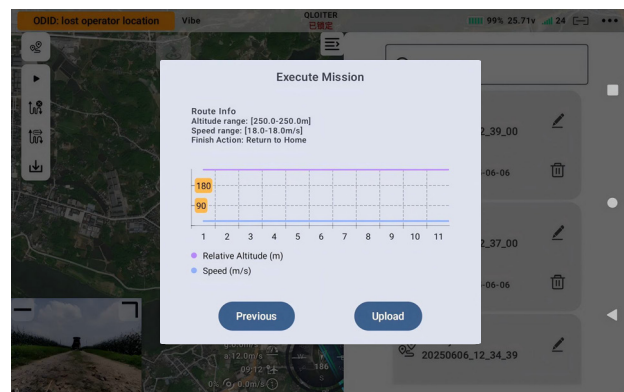
Step 8

Enter the route library, select the desired flight task, and click "Start Mission" to perform the pre-flight checklist. Make sure the arm sleeves are securely locked and the propellers are intact, then check the items on the list and proceed to the next step.



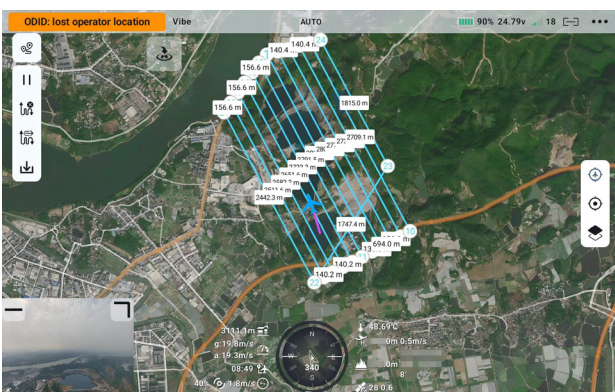
Step 9

Verify that the flight altitude and speed are correct. Once confirmed, upload the mission route to the drone.



Step 10

After the upload is complete, click "Download Route" to recheck the flight path.



Step 11

Once confirmed, unlock the drone using the control sticks and click "Start Mission." The drone will automatically take off to the predefined safety altitude, switch to fixed-wing mode, and begin the mission. The mapping camera will capture images automatically without any manual intervention.

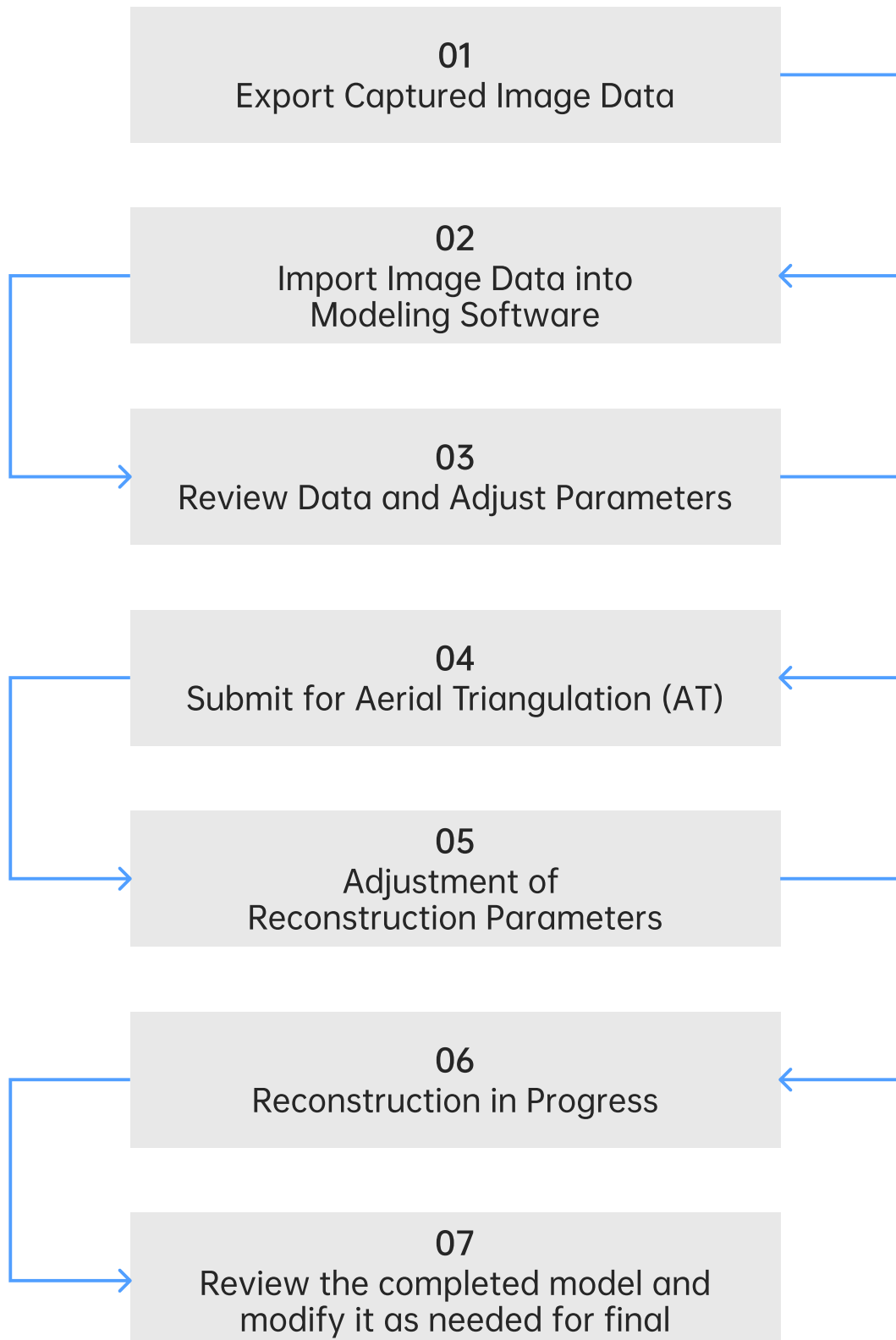


Step 12

Upon completion of the mission, the drone will automatically return to the takeoff point. Before landing, reconfirm that there are no structures taller than 50 meters within a 200-meter radius, and ensure that the landing area is clear of people, vehicles, or any other obstacles.

Modeling process:

3D modeling software can be selected based on specific project needs. Recommended commonly used software includes: **Pix4Dmapper** and **ContextCapture**.



Solution A	No.	Name	Optional Components
	1	Drone Platform	UniVTOL V2200 Drone Platform
	2	Gimbal Camera	REEBOT UniPod MT11 Basic Mapping Camera
	3	Software	UniGCS

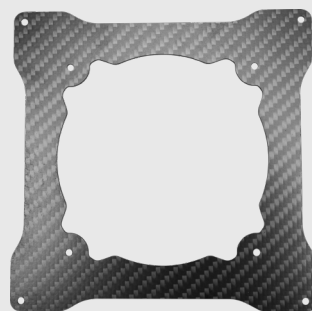
Solution B	No.	Name	Optional Components
	1	Drone Platform	UniVTOL V2200 Drone Platform
	2	Installation Component	UniVTOL V2200 Mapping Camera Damping Mount
	3	Gimbal Camera	RIEBO R6P Full-Frame Mapping Camera
	4	Software	UniGCS

Solution C	No.	Name	Optional Components
	1	Drone Platform	UniVTOL V2200 Drone Platform
	2	Installation Component	UniVTOL V2200 Mapping Camera Damping Mount
	3	Installation Component	UniVTOL V2200 Carbon Plate for SHARE Mapping Camera
	4	Gimbal Camera	SHARE 102S SDK Five-Lens Oblique Camera
	5	Software	UniGCS

Installation Component



UniVTOL V2200 Mapping Camera
Damping Mount



UniVTOL V2200 Carbon Plate
for SHARE Mapping Camera

			
UniVTOL V2200 Drone Platform		Purchase Index	
Name	Parameter	Name	Parameter
Aircraft Weight (Without Battery)	5.1kg	Max Take-off Weight	8.4kg
Max Payload	1kg	Transmission Range	40km ^[1]
Flight Time	125min ^[2]	Cruise Speed	18m/s
Flight Time (Full Load)	114min ^[2]	Hovering Radius	200m
Max takeoff altitude	3000m	Horizontal Positioning Accuracy	0.8 cm + 1 PPM
Max Airspeed	25m/s	Wind Resistance	Multirotor: Level 4 Fixed-wing: Level 5
Vertical Positioning Accuracy	1.5 cm + 1 PPM	Dimensions	2200*1280*460mm
Wingspan	2200mm	IP Protection Rating	IP53
Flight Time with REEBOT UniPod MT11	94min ^[3]	Flight Time with RIEBO R6P	101min ^[3]
Flight Time with SHARE 102S SDK	93min ^[3]		
Features	Quick release without screws, Self - developed & integrated, 40KM transmission range, Dual - antenna centimeter - level positioning and orientation, Supporting third - party payloads, 4K Ultra - wide FPV camera, Open source Ardupilot...		



UniGCS
Software

Product Introduction:

UniGCS is a professional software for drone pilots and missions. The abundant features of UniGCS such as intelligent route planning, low-latency HD video display, precise camera control, AI recognition and tracking, RC / autopilot configuration, etc. provides drone operators unparalleled efficiency and intuitive operating experience.



Purchase Index

[1]Flight environment is unobstructed with slight interference, and flight altitude is below 120 meters. The above data are for reference only, please always refer to the actual situation.

[2]No wind at sea level, no payload load, wind resistance reduction measures taken on payload cabin, airspeed 18m/s flight to 0% battery level. The above data are for reference only, actual flight time may vary due to different flight methods and flight environments, please always refer to the actual situation.

[3]Measured at 110m altitude, 18 ms cruise speed, until battery depletion. Results for reference only; Actual performance may vary by environment and mission profile.



**REEBOT UniPod
MT11
Basic Mapping
Camera**

Total		Zoom Camera	
Video Output Interface	Ethernet Port	Focal Distance	15-50mm(Effective focal distance: 81-270mm)
Control Signal Input Methods	S.BUS, UART, Ethernet (TCP, UDP)	Image Sensor	1/2" CMOS, effective resolution 48 MP
Operating Voltage	3-6S	FOV	28.98°(D) 23.48(H) 17.81(V)
System Power Consumption	Average 11.4 W	Video Resolution	3840*2160, 2560*1440,
IP Level	IPX4		1920*1080, 1280*720
Dimensions (With the Quick Release Anti-Vibration Board)	141.5mm*141.5mm*169mm	Photo Resolution	3840*2160, 8000*6000
Weight (With the Quick Release Anti-Vibration Board)	533.5g	Infrared Camera	
		Focal Distance	18mm
		FOV	DFOV: 31°
		Digital Zoom	8x
Angle Jitter	0.01°	Video Resolution	640*512, 1280*1024@AI
Control Angle	Pitch: -90° ~ 20°	Photo Resolution	640*512, 1280*1024@AI, 2560*2048@AI
Yaw	Limitless		
Laser Rangefinder		Wavelength	8~14μm
Measuring Range	5-1200m	Temperature Measurement Range	-20°C~60°C ambient temperature
Measurement Accuracy	±1m	Color Palette	11 selectable palettes



**RIEBO R6P
Full-Frame
Mapping Camera**

General	Product Dimensions	75.6*69*103.2mm
	Product Weight	355g
	Operating Temperature	-40°C-65°C
	Power Supply	External DC 12~27V
	Operating Model	Triggered via flight controller using serial communication (Mavlink 2 protocol)
Camera	Effective Pixels	61 Megapixels *Sensor Size: 35.9*23.9mm
	Image Resolution	9568×6368 px
	Data Storage	Supports photo / POS file storage with embedded GPS and camera metadata
	Lens Focal Length	40 mm fixed focus
	ISO Range	100-6400
	Shutter Speed	1/100 s ~ 1/2000 s
	Aperture	Fixed at F5.6
	Storage Capacity	256 GB
	Data Transfer Speed	≥300M/s
	Parameter Adjustment	Supports adjustment of shutter speed, ISO, white balance, contrast, sharpness, EV, saturation, image quality, custom folders, and file naming; adjustable via mobile Bluetooth app
	Video Recording	4K @ 30 FPS



**SHARE 102S SDK
Five-Lens
Oblique Camera**

General	Product Dimensions	120×120×82.7mm
	Product Weight	580g
	Ingress Protection	IP5X
	Operating Temperature	-20°C-65°C
	Power Supply	External DC 12~50V
	Operating Model	Triggered via flight controller using serial communication (Mavlink 2 protocol)
Camera	Effective Pixels	Each individual lens >25 MP per lens, total >125 MP, Pixel Size: 3.76μm
	Image Resolution	6144×4096 px
	Data Storage	Supports photo / POS file storage with GPS and camera parameter information
	Lens Focal Length	Oblique: 35 mm fixed focus; Nadir: 25 mm fixed focus
	Oblique Angle	45°
	ISO Range	50-200; 50-400; 50-640; 50-800; 50-1000; 50-1600
	Shutter Speed	1/500, 1/640, 1/800, 1/1000, 1/1250
	Aperture	Fixed at F5.6
	Storage Capacity	1280 GB
	Parameter Adjustment	Supports ISO, white balance, color mode, and shutter speed settings; adjustable via Bluetooth mobile app or serial port
	Data Transfer	Data copy via data reader module; max speed up to 600 MB/s

REEBOT

Empower Global Intelligent Robotics & Drone Industries

Business Area



Industrial-grade
Multirotor UAV Platform



Industrial-grade
VTOL Drone Platform



Support Third-party
Various Drone Payloads

Electric Inspection | Traffic Inspection | Search & Rescue |
Surveying & Mapping | River Inspection Oil, Gas, Pipelines and Mines Inspection |
Tethered | Security | Firefighting

REEBOT

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