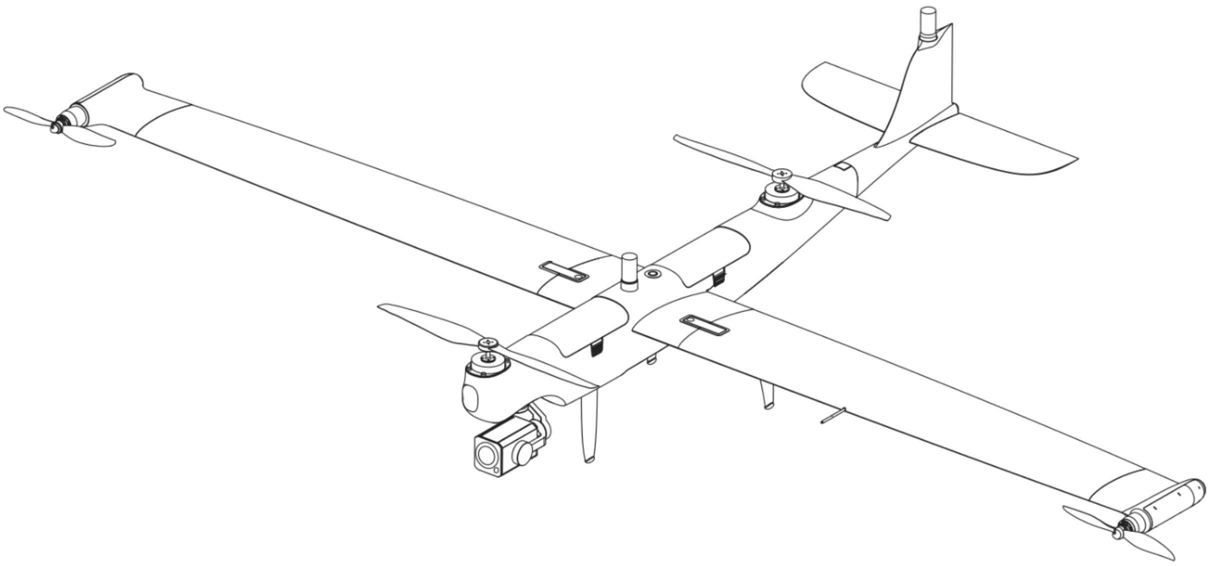
Dragonfish Series

Dragonfish Standard Aircraft

Flight Manual

V2.2.3 2026.01



AUTEL ROBOTICS

EU Declaration of Conformity

The product complies with EU Declaration of Conformity. For details, please refer to **Dragonfish Standard Aircraft DoC**.

Copyright

Trademark Information

Dragonfish™, Autel Voyager™ and AUTEL® trademarks are registered trademarks of the Autel Robotics Co., Ltd. (hereinafter referred to as "Autel Robotics") in China or other countries/regions.

Reading Assistance

- This manual is an electronic PDF document that supports high-resolution printing.
- If you are using a PDF reader such as Adobe Reader or Microsoft Edge to read this manual, press Ctrl+F on Windows or Command+F on Mac to search for keywords.
- View the content structure in the table of contents and click on titles to navigate to the respective pages.

Update Log

Version	Date	Content Updated
V2.1	2024.02	● Optimized Doc structure. ● Autel Voyager Application Version Update with more functions. For details, please refer to App update description.
V2.2	2024.07	● Updated no-fly zone unlocking method.
V2.2.2	2026.01	● Update video resolution for T3H Gimbal.

Thank you for purchasing and using the Dragonfish Series Standard aircraft (hereinafter referred to as “aircraft”) from Autel Robotics. Relevant user documents for this product are provided in electronic form along with the product, and download links are provided in this manual. Before using this product, please carefully read the operation steps and precautions in this manual, so that you can quickly understand the characteristics and usage methods of this product, so as to ensure safe use of the product.

- The final interpretation right of this document and all related documents of this product belongs to Autel Robotics.
- This document is subject to update without notice.

Legend

The following symbols are used in this manual to draw the user's attention to important safety and operating information. Please be sure to follow the notes or requirements under each symbol, otherwise, it may affect the safety features of the product or cause personal injury.

Symbol	Definition
	Warning: Alerts to a potentially hazardous situation.
	Important: Reminds the user to pay attention to a point.
	Remarks: Supplementary information.
	Tips: Quick tips to get the best possible experience.

Read Before Your First Flight

To ensure safe use of the Dragonfish Series Standard aircraft, Autel Robotics provides you with the following documents and relevant tutorial videos. Please scan the QR codes in this manual or use the provided links to access them.

1. “Packing List”: A list of everything that should be included in the packing box.

2. “Disclaimer and Safety Operation Guidelines”: Instructions on how to operate the product safely.
3. “Battery Safety Operation Guidelines”: Basic knowledge and safe handling of smart batteries.
4. “Quick Start Guide”: Basic knowledge of operating the product.
5. “Flight Manual”: A guide for you to master the operation method of the product proficiently.
6. “Maintenance Manual”: Instructions on how to maintain the aircraft and its accessories.

We recommend that you first check the completeness of the items in the packing box according to the “Packing List”, then read the “Disclaimer and Safety Operation Guidelines” carefully, and then watch the tutorial videos and read the “Quick Start Guide” to get a basic understanding of how to use the product.

Before your first flight, please read the “Battery Safety Operation Guidelines” and “Flight Manual” carefully to get a more detailed understanding of how to use the product.

Getting Tutorial videos, User Documents, and Relevant Software

You can scan the QR codes below or visit the following links to access tutorial videos and user documents or download relevant software for the Dragonfish Series Standard aircraft:

To watch tutorial videos, please visit:

https://www.autelrobotics.com/videos/dragon-fish/

To download resources, please visit:

https://manuals.autelrobotics.com/?dir=/Autel%20Dragonfish/Aircraft/#/home

Manual Guide

This manual contains 5 main chapters and 3 appendices. You can refer to the corresponding chapters for the desired information.

Chapter	Chapter Overview
Product Overview	This chapter introduces the main functions of the Dragonfish Series Standard aircraft.
Flight Safety	This chapter introduces the flight environment, wireless communication requirements, and important flight safety features of the aircraft.
Product Details	This chapter introduces details of the Dragonfish Series Standard aircraft, gimbals, base station and the ground control station (remote controller.
Flight Operations	This chapter introduces the whole flight operations, includes pre-flight operations, during-flight operations and post-flight operations.
Firmware Updates and Maintenance	This chapter introduces how to perform firmware updates and routine maintenance for the aircraft.
Appendix A	This chapter provides technical specifications for the Dragonfish Series Standard aircraft and its accessories.
Appendix B	EU Declaration of Conformity for Dragonfish Series Standard aircraft.
Appendix C	EU Drone Pilot Information Notice

Disclaimer

To ensure the safe and successful operation of this product, please read and fully understand all user documents listed above and strictly follow the operating instructions and steps described in this manual. Store the aircraft and its accessories out of the reach of children and pets. If you do not abide by the Safety Operation Guidelines, Autel Robotics shall not be responsible for any product damage or personal and property loss during use, and shall not provide any warranty service. Never modify the product using any incompatible component or in any way that does not conform to the official instructions of Autel Robotics. Please make sure that the operations you perform do not endanger the personal or property safety of yourself or those around you. By starting to use this product, you agree that you have read and accepted all terms related to this product. You undertake to be responsible for your own actions and all consequences arising therefrom. You undertake to use this product only for legitimate purposes and agree to these terms and any relevant policies or guidelines that Autel Robotics may establish.

Important
● When unboxing the product for the first time, carefully check the aircraft and other accessories included in the packing box according to the “Packing List”. ● The content of this manual will be updated from time to time based on the function updates of the product. ● Please be aware that in the absence of flight logs from the Autel Voyager App, Autel Robotics may not be able to analyze the causes of product damage or accidents and provide after-sales service.

Warning
● Using the Dragonfish Series Standard aircraft of Autel Robotics involves certain safety risks. Do not allow minors to operate the aircraft.

End Use Statement

This product may be subject to export control laws in China, U.S, EU or other countries, which can only be authorized for civil (not military) use in sale, export or domestic transfer. Users need to confirm the product will not be used in the following situations, otherwise he or she will assume all losses caused by usage in such situations and legal responsibility on their own:

1. any military end use;
2. used for nuclear weapons, biological or chemical weapons or missiles that carry those weapons;
3. export or re-export or transfer it to any entity or person sanctioned by China, U.S, EU or any other government with jurisdiction;
4. export, re-export or transfer it to Cuba, Iran, North Korea, Syria, Crimea, Sevastopol and other areas under embargo;
5. any device or equipment that supports monitoring purpose.

Warranty Policy

Autel Robotics guarantees users who purchase products through its official authorized channels that:

Under normal use, the Autel Robotics products you purchase will be free from material and workmanship defects during the warranty period.

If you can provide a valid purchase receipt, the warranty period of this product is calculated from the midnight of the next day after you receive the product.

If you cannot provide a valid purchase receipt, the warranty start date will be postponed by 90 days from the date of manufacture indicated by the product's serial number or as defined by Autel Robotics.

Tips
● For the after-sales policy of the product, please visit: ● **https://www.autelrobotics.com/service/policy/**.

After-Sales Support

If you have any questions or concerns about our products, please contact Autel Robotics customer support:

Hotline: (844) MY AUTEL or (844) 692-88 35

Maintenance Service

If your equipment needs to be inspected or repaired, please contact Autel Robotics through the following methods:

Email after-sale@autelrobotics.com or support@autelrobotics.com.

Call Autel Robotics customer support at (844) MY AUTEL or (844) 692-88 35.

Contact dealers authorized by Autel Robotics.

Important
● All data stored on the product may be erased during the repair process. To avoid data loss, please back up important files in your aircraft or remote controller before the product is under warranty.

Company Information

Manufacturer: Autel Robotics Co., Ltd.

Address: 601,701,801,901, Block B1, Nanshan iPark, No. 1001 Xueyuan Avenue, Nanshan District, Shenzhen, Guangdong, 518055, China

Official Website: https://www.autelrobotics.com

Table of Contents

Chapter 1 Product Overview

1.1 Introduction

The Dragonfish Standard aircraft (hereinafter referred to as the “aircraft”) is a small vertical takeoff and landing fixed-wing aircraft with a total weight of 7.5 kg (excluding the gimbal camera), a maximum payload of 1.5 kg, and a full battery life of up to 126 minutes. The aircraft adopts a unique tilt-rotor design, combining the advantages of both multi-rotor and fixed-wing flight modes: it uses multi-rotor mode for vertical takeoff and landing, adapting to various terrain conditions; during level flight, it switches to fixed-wing mode, balancing flight speed and long endurance.

The aircraft's body features a modular design, enabling rapid assembly in 3 minutes. The aircraft incorporates multiple redundancy designs for safety and reliability. It has built-in dual battery slots, high-performance dual-engine RTK, and conventional GNSS positioning modules to support high-precision navigation. It includes an ADS-B receiver that can detect the status of manned aircraft and provide alerts through the UAV App, facilitating safe operations and collision avoidance. The aircraft supports various gimbal attachments to meet diverse business requirements.

The Dragonfish Standard aircraft has excellent environmental adaptability and can operate in temperatures ranging from -20℃ to 50℃.

The Dragonfish ground control station (hereinafter referred to as the “remote controller” or “RC” for short) is equipped with a 9.7-inch TFT-LCD capacitive touch screen, with 2048*1536 ultra-high-definition resolution. The highest brightness is up to 1000cd/m², with a built-in 128GB memory, the image transmission range is up to 30 kilometers, and the battery life is up to 4.5 hours. With a customizable interactive interface, it is simple to control, supports online parameter adjustment, route planning, and supports multiple control modes such as fully automatic and semi-automatic. It adopts a customized Android system that supports the installation of third-party apps and offers functions such as satellite-based positioning, Wi-Fi, and HDMI output.

The Dragonfish base station (hereinafter referred to as the “base station”) is a high-precision satellite signal receiver that supports 11-frequency satellite signal reception. It is compatible with GPS, Beidou, Galileo and Glonass navigation systems. It has a built-in data transmission system that is convenient for users to use in different application environments. The Dragonfish base station can be used as an RTK base station to improve the positioning accuracy from meter level to centimeter level. It also provides good anti-magnetic interference capabilities to ensure reliable flight in environments with intensive magnetic interference such as high-voltage lines and metal buildings.

The image transmission range reaches 30 km when the base station copes with the remote controller and the aircraft.

Tips

- The total weight of the aircraft, including two smart batteries, is 7.5 kilograms, and the maximum takeoff weight is 9 kilograms.
- The flight duration of the aircraft is measured in a laboratory environment and is for reference only. The actual flight duration may vary depending on factors such as the environment and flight mode.
- The aircraft can carry various gimbal cameras, and the model should be based on the actual purchase order when accepting the purchase.
- The protection level of the aircraft is not permanent and may experience varying degrees of failure as components age and wear. Regular maintenance of the aircraft is required according to Autel Robotics' requirements.
- The 4.5-hour battery life of the remote controller is measured with the screen brightness set to 50%. The actual battery life may vary in different scenarios and is for reference only.
- The factory default setting is for the aircraft, base station, and remote controller to be used in combination. If only the remote controller and the aircraft are used in combination, the transmission distance will be limited, with a 5.8G data transmission distance of only 1 kilometer and an image transmission distance of 8-10 kilometers.

Warning

- If multiple aircraft are flying in an area at the same time, please keep an appropriate air distance to avoid any accidents.

1.2 What's In The Rugged Case

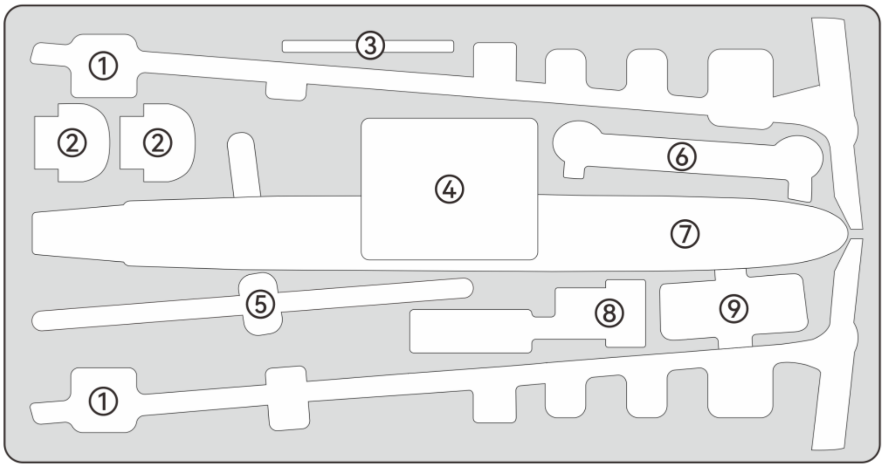


Fig 1-1 Layout

Table 1-1 In The Case

No.	Item	No.	Item
1	Wings	2	Battery
3	Manuals	4	Gimbal
5	Tail	6	Remote controller
7	Fuselage	8	Charger
9	Base station		

Tips

- Only the location of the main parts of the product is marked in the diagram, and other items are not marked in the diagram.

- Items not marked in the diagram include data cable, maintenance tool, AC cable, base station tray, wingtip propellers, ground control station lanyard, propeller holders, TF card, etc.
- The base station tripod is packed in a separate package with base station tray, antenna, and feeder.

1.3 Product Acceptance Checklist

After unboxing the product, please check whether the actual items match the items described in the following packing list and carefully inspect the appearance of the aircraft and all accessories. If anything missing or damage is found, please contact Autel Robotics After-Sales Support or authorized dealers promptly.

Important

- Upon receiving the product, please inspect the rugged case in its entirety and confirm that its outer packaging is intact, with no signs of unpacking. Meanwhile, save the unboxing video for potential logistics damage claims.

Table 1-2 Packing List

No.	Item	Quantity	Note
1	Aircraft Body	1	Including gimbal interface protective cover
2	Wing Set	1	Left wing and right wing
3	Tail	1	Including tail interface protective cover
4	Airspeed Indicator Cover	1	/
5	Battery	4	*the actual quantity is subject to the purchased set.

6	Charger + AC line	1	Including AC line
7	Propeller Blades	2	Left and right: 2 pcs each
8	Propeller Holder	2	Front and rear: 1 pcs each
9	Gimbal Camera*	1	The gimbal model is subject to the actual set purchased, compatible: Z2, T3, T3H, L20T
10	TF Card	1	Placed in gimbal
11	Ground Control Station	1	DFRC series
12	Ground Control Station Lanyard	1	/
13	Base Station	1	/
14	Base Station Tray	1	/
15	Base Station Tripod	1	/
16	Base Station Antenna	2	Columnar antenna
17	Base Station Feeder	2	/
18	Base Station Charger	1	/
19	USB Type-C Cable	1	For charging base station
20	Maintenance Kit	1	/
21	Manuals	/	1 set

1.4 UAS Introduction

Before first flight, please perform a comprehensive inspection of the UAS to ensure that all components meet the following requirements. A complete UAS consists of three parts: the aircraft, the base station and the remote controller. The relevant requirements and explanations are as follows:

- Aircraft Components And Payload

Please be noted that a complete aircraft includes the aircraft body (including 2 RTK modules), gimbal camera, propellers, and the battery. Any damage or missing of these components may result in a malfunction.

Table 1-3 Dragonfish Component List

Item	Product Info	Manufacturer	Note
Dragonfish Standard Aircraft	Max. weight: 8.2kg Max. Dimension: 1465×2496×483 mm (with propellers installed) EAN: 6924991128212 UPC: 889520208215	Autel Robotics	Includes propellers, battery, and a Z2 gimbal.
Dragonfish Standard Aircraft	Max. weight: 8.3kg Max. Dimension: 1465×2496×483 mm (with propellers installed) EAN: 6924991127888 UPC: 889520207881	Autel Robotics	Includes propellers, battery, and a T3 gimbal.
Dragonfish Standard Aircraft	Max. weight: 8.3kg Max. Dimension: 1465×2496×483 mm (with propellers installed) EAN: 6924991128205	Autel Robotics	Includes propellers, battery, and a T3H gimbal.

	UPC: 889520208208		
Dragonfish Standard Aircraft	Max. weight: 8.3kg Max. Dimension: 1465×2496×483 mm (with propellers installed) EAN: 6924991123903 UPC: 889520203906	Autel Robotics	Includes propellers, battery, and an L20T gimbal.
Smart Battery	Max. weight: 1300 g EAN: 6924991123101 UPC: 889520203104	Autel Robotics	Included
CW/CCW Propeller	EAN: 6924991131618 UPC: 889520211611	Autel Robotics	Included
Wingtip Propeller	EAN: 6924991131656 UPC: 889520211659	Autel Robotics	Included

Tips

- All the above components have passed Autel Robotics safety and compatibility tests, users can purchase and use accordingly.
- In case of adding any payload before flight, please evaluate the check the mounting weight reasonably. More details, see "**2.5 Declaration of Maximum Take-off Mass**" in Chapter 2.

■ Remote Controller Components & The App

A complete remote controller includes the controller body (equipped with a functional touchscreen and buttons), sticks, and antennas. Any damage or missing of these components may result in a malfunction. The Autel Voyager App, serving as the flight application software that controls the aircraft, should be maintained to ensure comprehensive control over the UAS.

Table 1-4 Remote Controller Components List

Item	Product Info	Operating System	Manufacturer	Note
Dragonfish Ground Control Station	Max. Dimension: 319×398×74 mm EAN: 6924991125396 UPC: 889520205399	Android 7.0	Autel Robotics	Includes sticks and antennas.

Table 1-5 Firmware And Software Version Details

No.	Item	Release Version	Note	Release Date
1	Image Transmission	V1.1.4.13	/	2024 Q1
2	5.8G Data Transmission	V1.0.8.0	/	2024 Q1
3	Remote Controller	V1.0.15	Base on Android 7.0	2024 Q1
4	Voyager	V10.3.3.21	Flight Control Software	2024 Q1

Table 1-6 List of Pre-installed Apps on the Remote Controller

NO.	Pre-installed App	Software Version	Note
1	Voyager	V10.3.3.21	Flight Control Software
2	Calculator	7.0	System Software
3	Calendar	7.0	System Software

4	Clock	4.5.0	System Software
5	Files	7.0	System Software
6	Gallery	1.1.40030	System Software
7	Chrome	68.0.3440.70	System Software
8	Settings	7.0	System Software
9	Maxitools	2.01	System Software
10	Google Pinyin Input	4.5.2.193126728-arm64-v8a	System Software
11	Android Keyboard (AOSP)	7.0	System Software
12	CX File Explorer	1.4.2	System Software

Tips

- The pre-installed Apps mentioned are the basic application for the remote controller. Users also have the option to install third-party software if desired.

- Base Station

Please be noted that a complete base station includes the base station main body, two antennas, tripod, tray and feeders. Any damage or missing of these components may result in a malfunction.

Table 1-7 Base Station Component List

Item	Product Info	Manufacturer	Note

Dragonfish Base Station	Max. weight: 1275g Max. Dimension: 193×177×73mm	Autel Robotics	Included

Tips

- The above information is for reference only. The remote controller, base station and the aircraft have all been upgraded to the latest versions before shipment. Users can use accordingly.
- When the remote controller, base station and the aircraft are frequency-paired and the remote controller is connected to the internet, Autel Voyager APP will automatically check for firmware updates. More instructions, see "**5.1 Equipments Updates**" in the Chapter 5.
- When there's any prompt for updates, please follow the instructions to update accordingly to address any issues and to enjoy the new features. Users also have the option to temporarily pause updates; however, this won't affect the existing functions.

Chapter 2 Flight Safety

After the first unboxing, please scan the QR code to obtain the latest version of the manual. Please read and understand the entire manual carefully to ensure the safe and correct use of the aircraft.

Before engaging in actual outdoor flights, it is essential to undergo relevant basic flight training (such as watching instructional videos, receiving guidance from professionals, etc.) to familiarize oneself with the functions and characteristics of the aircraft and remote controller.

Prior to flight, please familiarize yourself with all local laws and regulations concerning civilian unmanned aerial vehicles. Choose an appropriate flight environment, set a reasonable flight altitude, and conduct legal flights in accordance with relevant flight requirements and restrictions. Using the aircraft in unsuitable flight environments may pose legal risks.

Before flight, be sure to read the "Disclaimer and Safety Operation Guidelines" to understand relevant safety precautions.

2.1 Legal Use Notice

Upon the initial unboxing, please adhere to the legal requirements of the country or region where you are currently located and complete the real-name registration of the aircraft.

2.1.1 Chinese Mainland

- According to the requirements of the Civil Aviation Administration of China's "Management Regulations for the Real-Name Registration of Civil Unmanned Aerial Vehicles," owners of civilian drones must register their real names on the "Comprehensive Management Platform for Civil Unmanned Aerial Vehicles" (**https://uom.caac.gov.cn**) after purchase and affix the QR code registration mark on the aircraft. Failure to register with real names and affix the registration mark may result in penalties imposed by regulatory authorities.
- The dragonfish standard series aircraft is a light unmanned drone, and the operation of this product by individuals under the age of 18 is prohibited by Autel Robotics. The pilots are required to obtain an UAV operation license according to the requirements of the Civil Aviation Administration. Application website: **https://uom.caac.gov.cn**.
- It is recommended to read the "Interim Regulations on the Management of Unmanned Aerial Vehicle Flights" for more detailed regulatory requirements before conducting flights.

2.1.2 The U.S.

- Before using a drone, please complete the real-name registration on the FAA website (**https://faadronezone-access.faa.gov/#/**) (registrants must be 13 years old or above). Failure to do so may result in regulatory and criminal penalties.
- The Federal Aviation Administration (FAA) in the United States may impose civil fines of up to $27,500. Criminal penalties may include fines of up to $250,000 and/or a maximum of three years in prison.

2.1.3 Canada

- Drone pilots must be 14 or older and always carry a valid drone pilot certificate while operating their drone. A valid drone pilot certificate is a printed or electronic document issued by Transport Canada. No other form of certification will be accepted. For details about how to get a drone pilot certificate in Canada, refer to the following link:

  https://tc.canada.ca/en/aviation/drone-safety/drone-pilot-licensing/getting-drone-pilot-certificate

- Before flight, please register your drone through the following portal:

  https://tc.canada.ca/en/aviation/drone-safety/drone-management-portal

- You can only fly Dragonfish series aircrafts in following operating environments:

  1. In controlled airspace. For details about the controlled airspace, please refer to relevant Canadian law:

  https://tc.canada.ca/en/aviation/drone-safety/learn-rules-you-fly-your-drone/choosing-right-drone

  2. Near people. For details about flying a drone near people, please refer to relevant law:

  https://tc.canada.ca/en/aviation/drone-safety/learn-rules-you-fly-your-drone/choosing-right-drone

- Violation of relevant laws and regulations may incur penalty of up to 3000 dollars (for person) or 15000 dollars (for company) or jail time.

⚠ Warning
● Please do not fly over people, which may cause physical damage to people around.

2.1.4 The EU

- Drone operators/owners must register with the National Aviation Authority (NAA) of the Member State where they reside. (**https://www.easa.europa.eu/en/domains/civil-drones/naa**).
- This product is not a toy and should not be used by children under the age of 16.
- In the EU region, the dragonfish series aircraft belongs to the category of Level C3 UAV. When in use, it must comply with the operational restrictions of the A3 subcategory, specifically in urban environments:

  1. **Flying over non-involved persons is not allowed.**
  2. **Maintain a horizontal distance of 150 meters from uninvolved people.**
  3. **Maintain flight altitude below 120 meters above ground level.**

- Drone operators are required to obtain "Proof of Completion of Online Training" in the open subcategory A1/A3.
  1. Complete online training.
  2. Pass online theory exam.
- Before using this product, click the following link to learn the detailed information on safety operation limitations about EASA Class 3 drones:
- **(https://www.easa.europa.eu/document-library/general-publications/drones-information-notices)**

Important
● According to the relevant laws and regulations in the EU, the dragonfish series aircraft is equipped with sensors (gimbal cameras) that can detect personal data. Users are required to register in compliance with the laws and regulations when using the aircraft. ● After registration, users should input the operator registration number in the Autel **Voyager Application** and activate the DRI system. For more details, please refer to "**2.17 Direct Remote Identification**" in this chapter.

2.1.5 Other countries and regions

Before flying, please consult local legal professionals or aviation authorities to obtain information on laws, regulations, and policies regarding civilian unmanned aerial vehicles. Follow the relevant guidelines to undergo legal registration.

2.2 Flight Operation Regulations

Before flying, it is crucial to understand and adhere to the following flight operation regulations. Violating these regulations may lead to severe consequences or even legal consequences.

- Operating the aircraft while under the influence of alcohol, drugs, medication-induced impairment, dizziness, fatigue, nausea, or any other compromised physical or mental condition is strictly prohibited.
- Avoid flying near manned aircraft and ensure that the aircraft's flight does not impact larger manned aircraft on their flight paths. Remain vigilant, steer clear of other aircraft, and land immediately if necessary.
- Do not fly in areas prohibited by local regulations without obtaining authorized permits. Prohibited areas may include airports, borderlines, major cities and densely populated areas, large event venues, emergency situations (such as forest fires), and sensitive building facilities zones (such as nuclear power plants, power stations, hydroelectric plants, prisons, traffic arteries, government buildings, and military facilities).
- Prohibit the use of the aircraft at large event venues, including but not limited to sports stadiums and concerts.
- Avoid flying in airspace exceeding the regulated altitude.
- Do not use the aircraft to carry any illegal hazardous materials.
- Ensure a clear understanding of the type of flight activity (e.g., recreational, official, or business). Obtain permits from relevant authorities before flying. If necessary, consult with local legal professionals for detailed definitions and explanations of flight activity types.
- When using the aircraft for filming, respect the privacy of others. It is strictly forbidden to use this product for any unauthorized surveillance activities, including but not limited to monitoring of individuals, groups, events, performances, exhibitions, or buildings.
- Please note that recording or photographing others, groups, events, performances, exhibitions, etc., without legal authorization may violate copyright, privacy rights, or other lawful rights of others. Therefore, it is essential to thoroughly understand and comply with local laws and regulations before use.
- Please note that using cameras to film or photograph individuals, groups, events, performances, exhibitions, or buildings without authorization may infringe upon copyrights, privacy rights, or other legal rights of others. Therefore, it is essential to familiarize yourself with and comply with local laws and regulations before using the aircraft.

2.3 Flight Environment Requirements

- Do not fly in severe weather conditions such as strong winds, snow, rain, heavy fog, dust storms, extreme cold, or extreme heat. The aircraft has a maximum wind resistance of 12 meters per second.
- The performance of the aircraft's smart battery is subject to ambient temperature and air density. Please use the aircraft within the temperature range of -20℃ to +50℃. When flying in a low temperature environment, ensure that the fuselage of the aircraft is free of snow and the blades are not frozen.
- Ensure the aircraft takes off from and lands on open, unobstructed, and flat ground. Keep a safe distance from crowds, surrounding buildings, trees, etc., and control the aircraft within visible range to ensure flight safety.
- Fly at an altitude below 6000 meters.
- Due to poor lighting conditions, GNSS signal loss, narrow spaces, etc., some functions of the aircraft may be restricted. Always be aware of the surrounding environment and maintain safe control of the aircraft.
- For night flights, turn on the strobe and make sure that the Aux Light is enabled during landing for flight safety.
- Do not take off from or land in flammable and explosive environments.
- Do not take off from or land on sandy surfaces to prevent sand particles from affecting the motor service life.
- When using the aircraft in disaster-stricken areas after events such as fires, explosions, lightning, storms, tornadoes, heavy rain, floods, earthquakes, sandstorms, etc., pay special attention to the safety of takeoff and landing points and changes in the surrounding environment. Prioritize personal safety.
- Keep the aircraft away from steel structures, iron ore mines, etc., to avoid interfering with the compass of the aircraft. Unless equipped with Autel robotics smart auto tracking antenna, do not take off and land aircraft on a moving platform, such as moving vehicles and ships.

2.4 Wireless Communication Requirements

- Stay away from areas with strong electromagnetic interference, such as radar stations, microwave stations, mobile communication base stations, drone interference devices, etc., and maintain a distance of at least 200 meters.

- Exercise caution when flying near electromagnetic interference sources and continuously monitor and assess the stability of the remote controller's video transmission signal and image. Common sources of electromagnetic interference include, but are not limited to, high-voltage transmission lines, high-voltage substations, mobile communication base stations, and TV broadcast signal towers. If significant interference occurs in these places during flight operations, the aircraft may not be able to fly normally, so return and landing should be done promptly.
- Choose open and spacious areas or high grounds for flying. Tall mountains, rocks, urban structures, and forests may obstruct the GNSS signal and the aircraft's video transmission signal.
- It is recommended to turn off unnecessary Wi-Fi and Bluetooth devices in the vicinity to avoid interference with the remote controller signal.

2.5 Declaration of Maximum Take-off Mass

During flight operations, make sure that the actual take-off mass of the aircraft does not exceed the maximum take-off mass (MTOM) declared for the aircraft. Exceeding this limit can lead to safety accidents. For detailed data, see Appendix A “**A.1 Aircraft**”.

The actual take-off mass of the aircraft consists of the aircraft's mass and the mount mass. Before adding any mount, make sure that the mount mass is within a reasonable range.

Remarks

- The aircraft's mass comprises the mass of the fuselage, gimbal camera, propellers, and smart battery.
- Payloads include functional module mounts and material mounts, among others. When users add payloads to the aircraft, it is essential to reevaluate the actual takeoff weight of the aircraft through weighing.
- The payload weight should adhere to the following rule: Payload Maximum Weight ≤ Maximum Takeoff Weight - Aircraft Weight.

2.6 Aircraft Mode Switching

The Dragonfish Standard aircraft undergoes two mode-switching processes throughout the entire “takeoff—level flight—landing” sequence:

1. Vertical takeoff using the multi-rotor mode switches to horizontal flight using the fixed-wing mode.

2. Horizontal flight using the fixed-wing mode switches to vertical descent using the multi-rotor mode.

Departure routes (during takeoff) and arrival routes (during return) are involved during these two mode-switching processes.

■ Departure Route

The segment from takeoff to before the transition to level flight.

When users create a mission in the Autel Voyager App, the system automatically generates the departure route. Users have the option to adjust the departure route's takeoff mode-switching altitude (relative to the takeoff point), departure hover radius, departure hover point coordinates, and departure altitude.

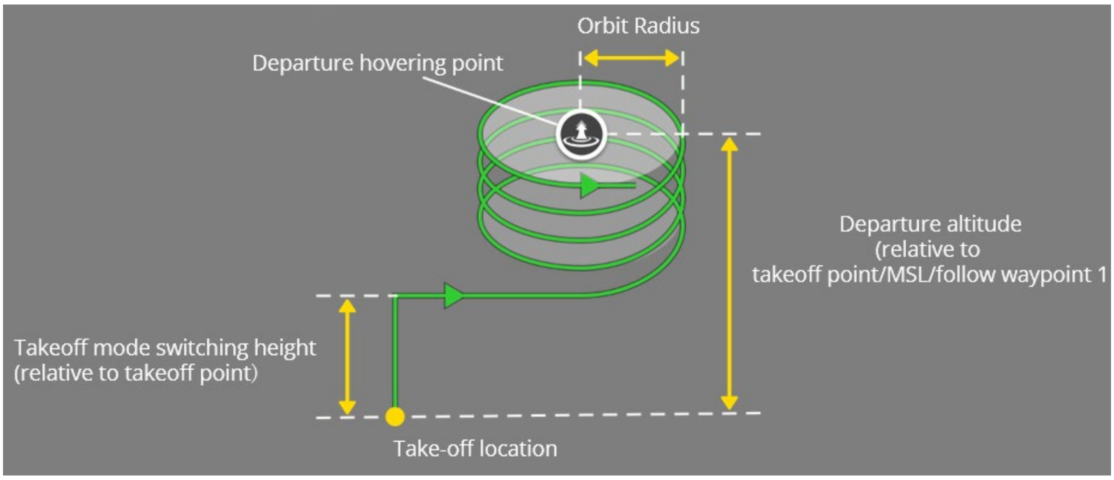


Fig 2-1 Departure Route

Table 2-1 Departure Route Attribute Settings

Departure Route Attribute	Altitude Type and Range	Meaning
Takeoff mode switching height (relative to takeoff point)	40 meters to 500 meters	The altitude at which the aircraft switches from multi-rotor mode to fixed-wing mode.

Departure Route Attribute	Altitude Type and Range		Meaning
Departure hovering point coordinates	Follows latitude and longitude ranges		The central location of the hover during departure.
Departure altitude	Relative to takeoff point	40 meters to 2000 meters	The aircraft's departure altitude, as it leaves the departure route, is the height at which the aircraft, after switching to fixed-wing mode, will adjust to this altitude within the departure hover, departing the departure route to execute a normal mission.
	MSL (above sea level)	-410 meters to 9000 meters	
	Follow waypoint 1 (during waypoint missions)		
Departure orbit radius	100 meters (minimum turning radius for the aircraft) to 2000 meters		The radius of the hover circle centered around the departure hover point in the departure route.

Tips

- The default minimum distance between the departure hovering point and the takeoff point is calculated as follows: [√3 times the minimum hover radius + 360 meters]. Users have the flexibility to drag the departure hover point icon “ ” on the map interface of the Autel Voyager Application to change its position. However, the distance between the departure hover point and the takeoff point cannot be less than the default distance. If a departure hover point is set to be closer than the default distance, the point will be automatically adjusted to a safe distance.

■ Arrival Route

After the completion of level flight, the aircraft transitions to the segment before landing.

When users create a mission in the Autel Voyager App, the system automatically generates the arrival route. Users have the option to adjust the arrival route's landing mode-switching altitude (relative to the landing point), arrival hover radius, arrival hover point coordinates, and arrival altitude.

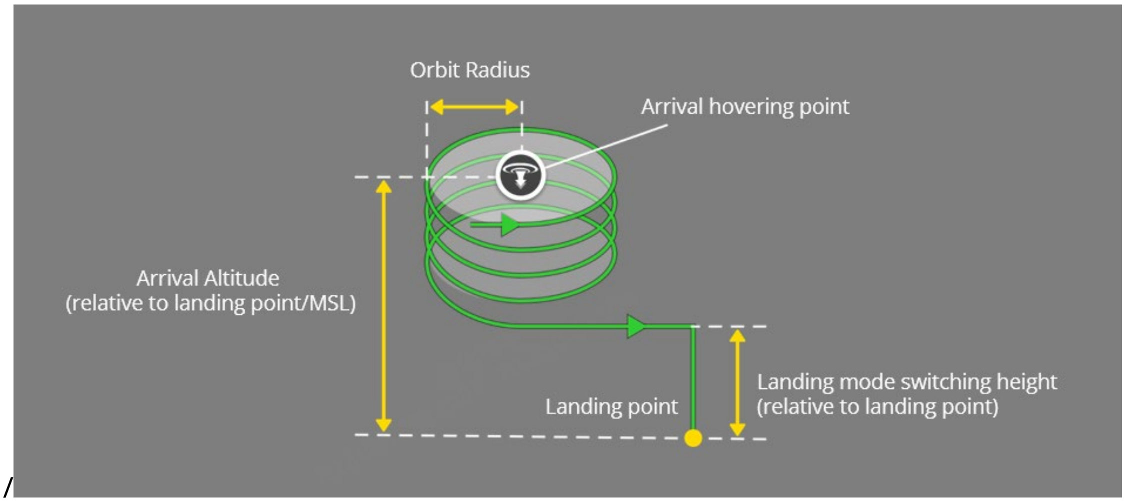


Fig 2-2 Arrival Route

Table 2-2 Arrival Route Attribute Settings

Arrival Route Attribute	Altitude Type and Range		Meaning
Landing point altitude	Relative to takeoff point	-6000 meters to 6000 meters	The altitude of the landing point (also known as the home point)
	MSL (Above sea level)	-410 meters to 9000 meters	
Landing mode switching height (relative to landing point)	40 meters to 500 meters		The altitude at which the aircraft switches from fixed-wing mode to multi-

		rotor mode during landing.
Arrival hovering point coordinates	Follows latitude and longitude ranges	The central location of the hover during arrival.
Arrival altitude	Relative to landing point: 40 meters to 2000 meters Above sea level: -410 meters to 9000 meters	The minimum altitude at which the aircraft enters the arrival route; the aircraft will commence the arrival route at an altitude not lower than this specified value.
Arrival orbit radius	100 meters (minimum turning radius for the aircraft) to 2000 meters	The radius of the hover circle centered around the arrival hover point in the arrival route.

Tips

- The default minimum distance between the arrival hovering point and the landing point is calculated as follows: [√3 times the minimum hover radius + 360 meters]. Users can drag the arrival hover point icon” ” on the map interface of the Autel Voyager Application to change its position. However, the distance between the arrival hover point and the landing point cannot be less than the default distance. If an arrival hover point is set to be closer than the default distance, the point will be automatically adjusted to a safe distance.

In contrast to the departure route, the arrival route's arrival altitude is the minimum altitude at which the aircraft enters the arrival route. If the aircraft begins executing the arrival route (e.g., completing a mission or returning in fixed-wing mode), the following strategy is implemented:

- If the current altitude of the aircraft is lower than the set arrival altitude, the aircraft needs to ascend to the arrival altitude before proceeding to the arrival hovering point.

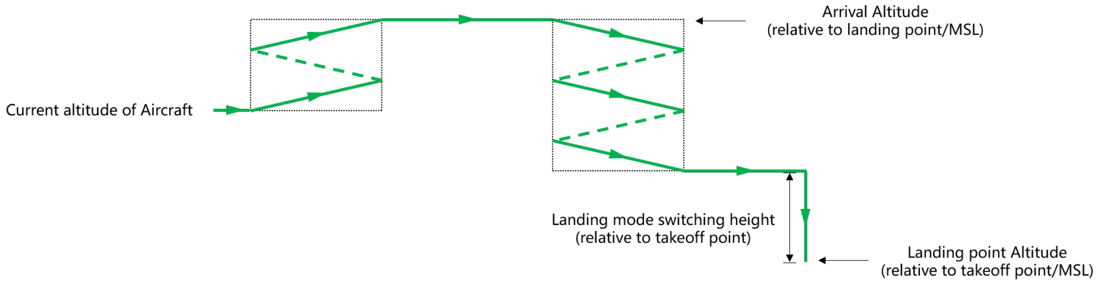


Fig 2-3 Ascending to Arrival Altitude Before Executing Arrival Route

- If the current altitude of the aircraft is greater than the set arrival altitude, the aircraft will directly proceed to the arrival hover point at its current altitude.

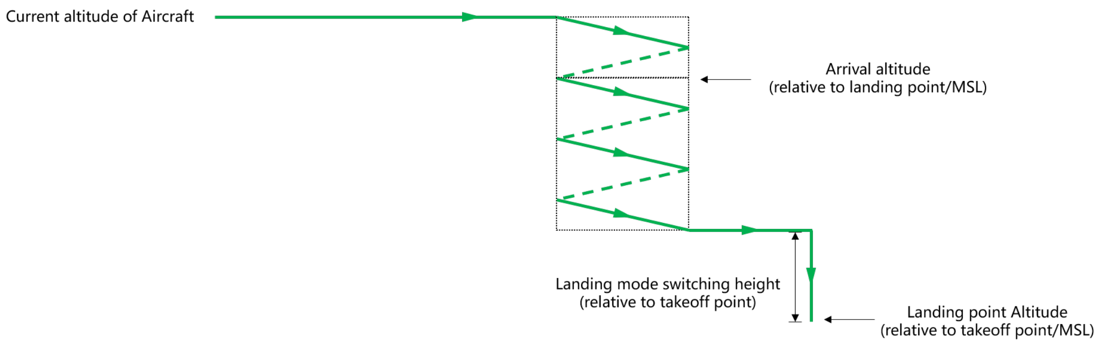


Fig 2-4 Normal Execution of Arrival Route

2.7 Terrain Obstacle Avoidance

The aircraft achieves terrain avoidance functionality through terrain maps, preventing collisions with terrain obstacles such as mountains during flight. The implementation involves real-time monitoring of the aircraft's altitude and the terrain's elevation. Based on the user-defined safety height, the aircraft adjusts its altitude to avoid potential collisions.

Remarks

- During the execution of route missions (including waypoint missions and polygon missions) or temp mission, users have the option to selectively enable or disable terrain avoidance functionality.
- When the aircraft is engaged in automatic return processes, emergency landing procedures, quick missions, dynamic track, or during mission transfer, terrain avoidance will be forcibly enabled.

- Terrain avoidance is not activated during manual flight or when failure protection is triggered (no GNSS signal). It is crucial to remain vigilant to changes in terrain during flight. For details about failure protection, please refer to "**2.10 Failure Protection**".
- The terrain avoidance function relies on a pre-loaded terrain database within the aircraft. The accuracy of terrain avoidance is limited by the precision of the stored terrain data and may exhibit some latency. It may not respond to the latest changes in terrain or structures.

Tips

- The absolute altitude range for terrain obstacle avoidance is calculated as follows: Absolute Altitude Range = Terrain Elevation + Safety Height.
- To set the safety height, follow these steps in the Autel Voyager Application: " ">- "safety"> "Safe altitude (m)", follow the instructions on the interface.
- Users can also independently set the safety height for specific missions such as waypoint missions, polygon missions, temp mission, and quick missions during aircraft operation. For more details, please refer to Chapter 4, "**4.1.7.6 Creating a route mission** " , "**4.2.2.1 Quick mission**" and "**4.2.2.5 Temp mission** ".

Remarks

- When the aircraft is executing a waypoint mission, the user can selectively enable or disable terrain obstacle avoidance.
- During automatic return processes, quick missions, or tracking missions, terrain obstacle avoidance will be enforced and activated.
- Terrain obstacle avoidance will not be activated during manual missions when the aircraft is under manual control.

Users can inspect the terrain and altitude of the route by tapping on the elevation preview icon " " in the top right corner of the corresponding mission interface when creating or executing waypoint missions or quick missions. They can also choose whether to enable terrain avoidance functionality during this process.

Important

- Upon selecting terrain avoidance, if there is a conflict between the current route and the terrain, the system will automatically adjust the altitude of the flight segment based on the terrain height and the set safety height. This adjustment will be displayed on the elevation preview.
- Please note that for waypoint missions, terrain avoidance is only effective during the segment from the end of the departure orbit to the beginning of the arrival orbit. It is not activated during the vertical takeoff to the end of the departure orbit or from the beginning of the arrival orbit to the vertical landing. Therefore, before initiating a waypoint mission, it is crucial to confirm the positions and altitudes of the takeoff point, landing point, as well as the arrival and departure orbit points, ensuring the safety of the airspace near these orbit points.

When terrain obstacle avoidance is enabled, if the aircraft's current flight altitude relative to the ground falls below the safety height, the aircraft will initiate a climb to avoid obstacles. The climb maneuver is subject to certain angle limitations, and climb avoidance can be categorized into the following two situations:

- If the distance between the aircraft and the obstacle is significant, and the altitude difference is small, the climb angle required is minimal, and the aircraft can perform a direct climb.

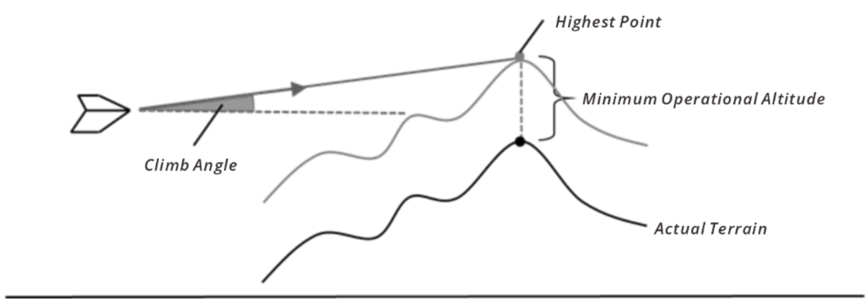


Fig 2-5 Climb up to avoid obstacles

- If the distance between the aircraft and the obstacle is short, and there is a significant altitude difference, requiring a steep climb angle, the aircraft will utilize a spiraling maneuver to ascend to the obstacle avoidance height.

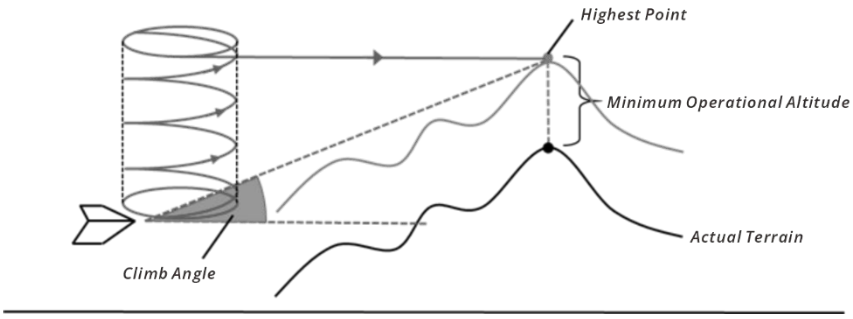


Fig 2-6 Circle up to avoid obstacles

Remarks

- The aircraft's spiraling climb for obstacle avoidance has a circular path with its center located above the aircraft. The radius of this spiraling path is 100 meters.

After the aircraft has successfully avoided the collision threat, it will return to its original altitude and continue executing the initial mission.

⚠ Warning

- During the modal transition process before the aircraft enters the multi-rotor mode or fixed-wing mode, the terrain avoidance function will not be activated. When the user controls the aircraft to execute return, quick, or ad-hoc missions starting from the multi-rotor mode, it is crucial to pay attention to the current flight altitude of the aircraft and ensure that the distance from the aircraft to the home point or the desired flight path satisfies the clearance requirements for the aircraft to switch to the fixed-wing mode.
- Regarding the return process, the terrain avoidance function is not active from the beginning of the arrival orbit to the vertical descent stage. Special attention is needed when setting up the arrival route.
- For the emergency landing process, if it is a temporary precision landing, the terrain avoidance function is not active from the beginning of the arrival orbit to the vertical descent stage. Extra caution is required when setting up the arrival route. The terrain avoidance function is also not available during an immediate emergency landing.
- If the aircraft returns to the route through waypoint adjustments, the safety height of the

aircraft will be reset to the safety height of the returned route.

2.8 Landing Protection Function

When users manually operate the aircraft for landing to ensure a safe descent, the following procedures will be executed:

In manual flight mode (Mode M), control the aircraft's descent speed and altitude using the sticks. Automatic control of the sticks is engaged during the descent. When the aircraft's altitude is above 3 meters above the ground, pulling the sticks down will result in a faster descent. When the aircraft is less than 3 meters above the ground, the descent speed gradually decreases.

1. During the landing process, when the aircraft reaches an auxiliary descent height of 1 meter above the ground, it will enter the automatic landing program and descend slowly.

2. During the automatic landing process, if you manipulate the sticks while in Mode M, the aircraft will assume that the user is taking control of the aircraft, and the automatic landing program will stop. At this point, the user can manually control the aircraft for landing.

3. If the aircraft's propellers are not locked after landing, you can only pull down the sticks and should avoid making lateral movements or other stick inputs to prevent the aircraft from tipping over.

Tips

- The setting of the sticks is dependent on the stick mode chosen by the user. For specific details, please refer to Chapter 4, "**4.1.7.3 Selecting stick mode**".
- When the aircraft reaches directly above the landing point, you can release the stick to hover the aircraft in the air.
- If the aircraft's propellers are not locked after landing, you can enable the "Force Stop Power" function to turn off the aircraft's motors. To set this, navigate to the Autel Voyager App's map interface or camera interface, and tap "⚙" > "Safety" > "Emergency Shut Off".

Important

- Pay attention to the aircraft's flight speed when it reaches the airspace above the landing point to avoid collisions with buildings, trees, and other obstacles. During the landing process, be cautious to stay away from people, vehicles, and other moving objects to ensure flight safety.

- After the aircraft lands, if the ultrasonic sensor detects the ground, the aircraft will automatically disarm the propellers. In areas like grass that may affect the performance of the ultrasonic sensor, the aircraft might not automatically disarm the propellers. In such cases, you can choose to take off again, attempt another landing, or land the aircraft in another location with a flat surface.

2.9 Rebuilding the C2 Link

To ensure the safety and controllability of flight behaviors, the Dragonfish Standard aircraft will stay in reconnection status and constantly attempt to reestablish a connection with the ground control station (remote controller) after losing the C2 link. In practice, this process is divided into the following stages:

- Within the first 15 seconds after the link is disconnected, the aircraft will automatically attempt to restore the C2 link. If the connection is restored within 15 seconds, the remote controller regains control of the aircraft.
- If the link is not restored within 15 seconds, the aircraft will automatically execute relevant flight actions according to set lost action and the current flight mode.
- During the execution of a lost action, the aircraft will continue its attempts to restore the C2 link with the ground control station.

Tips

- During the flight, as long as the aircraft and the remote controller can communicate normally, the C2 link will remain active.
- If there are decoding errors that persist for a certain duration, leading to communication failure, the C2 link will be disconnected, and the aircraft will enter the reconnection status.
- The lost connection actions of the Dragonfish Standard aircraft include Go Home and Continue Mission.

2.10 Failure Protection

When there is no GNSS signal, the aircraft will enter the failure protection mechanism, The details are as follows:

1. If the aircraft is in the muti-rotor mode, and the altitude relative to takeoff point is less than 100 meters, the aircraft will hover for 10 seconds, rotate its heading direction and land on the spot.

2. If the aircraft is not in the muti-rotor mode, and the altitude relative to takeoff point is more than 100 meters, the aircraft will hover for 20 seconds and descend to 100 meters, and it will slow down and hover within 20 seconds and then rotate its heading direction and land on the spot. If the altitude relative to takeoff point is less than 100 meters, the aircraft will slow down and hover within 20 seconds, then rotate the heading direction and land on the spot.

If in the above process the GNSS signal of the aircraft is restored and become available, the above process will be terminated immediately and the aircraft will slow down, hover and switch to manual control mode.

2.11 Geofencing system

To ensure the safe and legal operation of the Dragonfish series aircraft, Autel robotics has developed an electronic fence system. This system allows for relevant constraints and limitations on the flight airspace of the aircraft during the flight. For details about geofencing system, please refer to "**4.1.7.5 Creating a geofence and Unlocking a no-fly zone"** in chapter 4.

2.12 Altitude and Distance Limits

The altitude limit is the maximum flight altitude of the aircraft, while the distance limit is the maximum radius (distance from the take-off point) that the aircraft can fly.

Users can set altitude and distance limits in the Autel Voyager Application to ensure the safe flight of the aircraft.

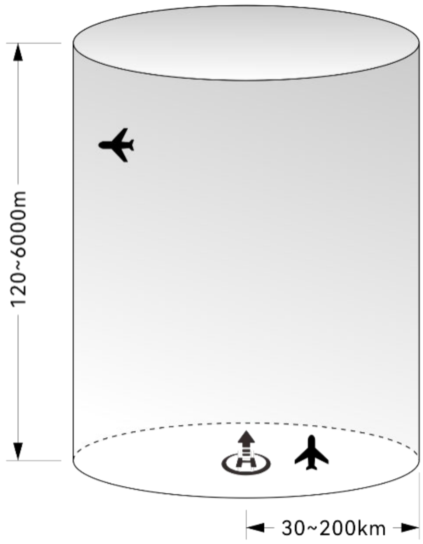


Fig 2-7 Diagram of altitude and distance limits

Tips
• To set altitude and distance limits, follow these steps in the Autel Voyager App's map interface or camera interface: Tap "⚙"> "Safety" > "Maximum Distance (m)" and "Height Restriction (m)." • In the Autel Voyager App, the allowable range for setting the safety altitude is 50 to 1000 meters, the allowable range for setting the altitude limit is 120 to 6000 meters, and the allowable range for setting the distance limit is 30,000 to 200,000 meters. During actual flight, the set maximum altitude limit should not exceed the height restrictions imposed by local laws and regulations. For example, in mainland China, the United States, the European Union, and other countries and regions, the maximum flight altitude for aircraft is typically restricted to 120 meters or 400 feet. Flights exceeding this altitude require airspace authorization. • During actual flights, the set flight altitude should not exceed the maximum height allowed by local laws and regulations.

2.13 Dual Control Function

The Dragonfish Standard aircraft supports a dual control function, meaning that in scenarios where the aircraft, the base station, and the remote controller are used in combination, one aircraft can simultaneously connect to two remote controllers (both connected to the base station). This allows simultaneous control by two remote controllers, with one primarily used for flying the aircraft and the other for controlling the camera or other payload operations. Utilizing the dual control function enhances the flexibility and versatility of the aircraft's operation. This function is commonly used in scenarios that require simultaneous flight operations and complex tasks, thereby improving efficiency and safety.

When using the dual control function, the two remote controllers are assigned different roles based on operational permissions, as outlined below:

- Aircraft Operator Role: Has all operational permissions for the aircraft, including all flight controls and payload control permissions. Responsibilities may include managing the flight control of the aircraft, such as takeoff, cruising, landing, and other critical operations, or handling gimbal and camera operations.
- Observer Role: Can only perform gimbal or camera operations in certain scenarios (such as taking photos, recording videos, etc.) and view relevant information (such as assisting in map viewing) or perform partial configuration operations.

Remarks

- The operations performed on the remote controller in the observer role, such as controlling the aircraft gimbal and camera, will be synchronized to the remote controller in the pilot role. However, when switching between the map interface and the camera interface on the remote controller in the observer role, these operations will not be synchronized to the remote controller in the pilot role.

Table 2-3 Explanation of Operational Permissions Allowed in the Observer Role Identity

No.	Scene
1	Gimbal operation permissions in non-tracking mode (i.e., when the aircraft is not in dynamic track mode): includes pointing and centering, adjusting gimbal angle, and using gimbal lock.

2	Camera operation permissions includes zooming and focus adjustment, linked zoom, switching cameras and split screens, taking photos, recording videos, and adjusting camera settings.

Table 2-4 Explanation of Unauthorized Operations for Observer Role Identity

No.	Scene
1	Unable to control the aircraft's flight through virtual or physical buttons or sticks.
2	Unable to control the aircraft's flight through commands: this includes not allowing editing, uploading, or executing missions, not permitting editing and issuing quick missions, and not allowing control of the aircraft's return.
3	Not allowed to edit, set, or upload electronic fences.
4	Not allowed to turn on or off the RTK function.
5	Not allowed to perform airspeed calibration operations.
6	Not allowed to set the expected landing battery level for the aircraft.
7	Not allowed to operate the “Safety” section in the Autel Voyager App's “Aircraft Settings” interface.
8	When the aircraft is in tracking mode, unable to operate the gimbal of the aircraft.

Remarks
• When an observer role attempts to perform unauthorized operations, the Autel Voyager Application will prompt "Insufficient permissions." • The role identity on the remote controller can be determined through the status bar icon in the Autel Voyager Application. For more details, please refer to Chapter 3, "**3.4.10.2 Status bar**".

■ Connection and Permission Explanation

In scenarios where the aircraft, the base station, and the remote controller are used in combination, the aircraft is connected to the ground control station via the video transmission link, and the remote controller is connected to the base station via the base station's Wi-Fi (or wired connection). The first remote controller connected to the base station will automatically obtain the pilot role identity, and subsequent remote controllers connected to the base station will automatically become observer role identity. The remote controller with the pilot role identity will automatically establish a 5.8 GHz frequency connection with the aircraft.

Tips
• The allocation of role identities is solely based on the order in which the remote controllers connect to the ground control station, regardless of the connection method. • For frequency allocation and connection operations between the aircraft, ground control station, and remote controller, please refer to Chapter 4, "**4.1.4 Matching and Connection**".

When the remote controller with the pilot role identity disconnects from the base station (the 5.8 GHz link between the remote controller and the aircraft will also automatically disconnect), the operational permissions of the pilot role will automatically transfer to the remote controller with the original observer role identity. The role identity of the remote controller with the original observer role will change to pilot role. At this point, the Autel Voyager Application will display a popup message saying "Previous pilot offline. You are now the pilot." and the remote controller will automatically establish a 5.8 GHz frequency connection with the aircraft.

Remarks

- If the connection between the remote controller with the pilot role and the ground control station is stable, there will be no permission transfer when the connection between the remote controller with the observer role and the ground control station is lost. Upon reconnection, the remote controller will still retain the observer role.
- If the 5.8 GHz link between the remote controller with the pilot role and the aircraft is disconnected while the connection with the ground control station is normal, the operational permissions for the aircraft will not transfer. The remote controller with the observer role will also not automatically establish a 5.8 GHz frequency connection with the aircraft.
- Please note that the current version does not support permission transfer when both remote controllers are connected to the ground control station.

2.14 Aircraft Calibration

Aircrafts undergo calibration processes before leaving the factory, and typically, user calibration is not necessary. If you encounter any anomalies during the startup and usage of the device, please follow the calibration instructions provided by the Autel Voyager Application before proceeding with flight operations.

2.14.1 Compass Calibration

The aircraft compass is highly sensitive to strong magnetic field environments, which may result in deviations in magnetic heading. In severe cases, it could prevent the aircraft from taking off. If a compass malfunction prompt is displayed, please contact Autel robotics support or an authorized dealer for calibration.

Remarks

- Before leaving the factory, the compass of the aircraft has already been calibrated, and users can use it with confidence.
- Please be aware that the compass does not provide a user-initiated calibration method.

2.14.2 IMU Calibration

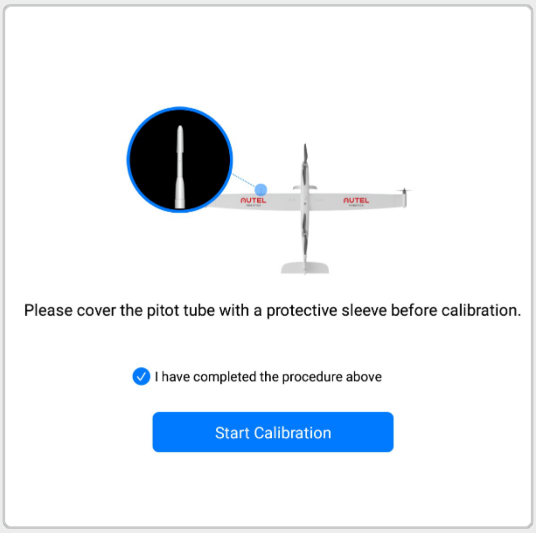
The IMU (Inertial Measurement Unit) module of the aircraft performs automatic calibration each time the aircraft is powered on, eliminating the need for manual user intervention.

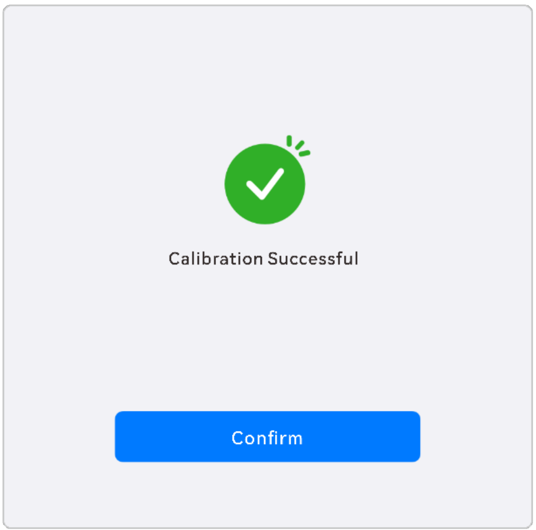
Important
● If there is an abnormality in the IMU module after the power-on self-check, please contact Autel robotics support or an authorized dealer for assistance.

2.14.3 Airspeed Sensor Calibration

When the Autel Voyager Application displays a ”Airspeed failure. Please calibrate the airspeed meter. “ warning message, please follow the steps below to calibrate the airspeed sensor.”

Table 2-5 Airspeed Sensor Calibration

Step	Operation	Figure
1	After powering on the aircraft and remote controller, make sure they are successfully paired. On the Autel Voyager App, navigate to the map or camera interface and follow these steps: Tap the “> ““Air Speed Sensor.” Follow the on-screen instructions to install the airspeed tube protector.	

	Tap the “Start Calibration” button. During the calibration process, the rear arms of the aircraft will flash yellow rapidly.	
2	● Wait for the calibration to complete, and when the interface displays “Calibration Successful!”, the airspeed sensor calibration is successful.	

> ⚠ **Warning**
>
> - After successfully calibrating the airspeed sensor, remember to remove the airspeed tube protector promptly.
> - If the airspeed sensor calibration fails multiple times, please stop flying and contact Autel Robotics Support team for assistance.

2.14.4 Gimbal Auto Calibration

The aircraft's gimbal performs a self-check each time the aircraft is powered on. If you notice any abnormal gimbal rotation during use, follow the steps below to perform an automatic calibration:

1. After powering on both the aircraft and the remote controller, ensure that they are connected and in sync.
2. Place the aircraft on a level surface and keep it still.

3. In the Autel Voyager App, navigate to the map interface or camera interface and select "⚙"> "Gimbal" > "Automatic Gimbal Calibration" > "Start".

4. Tap the "Confirm" button on the calibration interface to initiate the calibration. Wait for the calibration progress bar to reach 100%. If the screen displays "Calibration successful," the gimbal auto calibration is complete. Tap the map interface or camera interface of the Autel Voyager Application.

2.15 Emergency Propeller Stop

The "Emergency Propeller Stop" function is used to forcefully shut down the power output of the aircraft motors, typically serving as a supplementary measure for emergency situations. Users can activate the "Emergency Propeller Stop" function in the following scenarios:

- Abnormal landing judgment function: When there is an issue with the ground sensors of the aircraft, it may fail to automatically stop the propellers' rotation after landing. In such a situation, the "Emergency Propeller Stop" function can be used to forcibly stop the propellers after the aircraft has completely landed.
- Loss of control of the aircraft: In the event of a complete loss of control during flight, posing a serious threat to ground personnel or property safety, the "Emergency Propeller Stop" function can be utilized to forcefully cut off the power output of the aircraft, minimizing potential harm caused by the loss of control.

Tips

- To set up the "Emergency Propeller Stop" function: In the Autel Voyager App, navigate to the map interface or camera interface. Tap "⚙", select "Safety", and find the "Emergency Shut Off" option and toggle the switch to enable it. After confirming the secondary pop-up, the aircraft will immediately stop the rotation of all motors, and the tilt of the wingtips will be adjusted to a vertical upward position. For more details, please refer to Chapter 3, "**3.4.10.5 Aircraft settings interface**".
- After using the Emergency Propeller Stop function, it is essential to first turn off the "Emergency Shut Off" switch and restart the aircraft to return it to normal operation.

⚠ Warning

- The “Emergency Propeller Stop” function is only intended for extremely rare emergency situations and risk avoidance. Once the emergency propeller stop operation is performed, the aircraft will be unable to restart the motors in the air, and improper handling may lead to a flying accident.
- In the event of an aircraft malfunction in the air, such as damaged propellers or abnormal motor power, if possible, users should attempt to control the stick to move the aircraft away from crowds or buildings. Lower the aircraft altitude and horizontal speed, then execute the emergency propeller stop function to minimize ground-related damage.
- After executing the emergency propeller stop in the air, it is crucial to contact Autel Robotics for a power inspection of the aircraft.

2.16 Mid-flight Sensing

Automatic Dependent Surveillance-Broadcast (ADS-B) is a manned aircraft monitoring technology that allows a manned aircraft to determine its position using satellite navigation systems and broadcast the information regularly, making the aircraft trackable. Other aircraft can receive the information to achieve attitude awareness and autonomous avoidance.

The 7kg VTOL Fixed-Wing Aircraft series aircraft is equipped with ADS-B receivers that can receive flight information broadcast by ADS-B transmitters that support the 1090ES and UAT standards within a range of 10 kilometers. By analyzing the received flight information, the position, altitude, course, and speed of the manned aircraft will be obtained, and the obtained information will be compared with the current position, altitude, course, and speed information of the aircraft. The UAV Application will provide real-time risk warnings, reminding users to plan flight paths rationally and pay attention to avoidance.

Important

- Operation path: Tap “⚙” > “Safety” > “Receive Remote Information” in the main interface of the UAV Application and follow the on-screen instructions to perform relevant operations. For more information, see “**3.4.10.5 Aircraft settings interface**“ in Chapter 3.

2.17 Direct Remote Identification

The Direct Remote Identification (DRI) system allows for uploading the registration number (Remote ID) of a UAS operator to the system. During flight, it can actively broadcast some non-sensitive data to mobile devices within its broadcast range in real time via an open, documented transmission protocol. The non-sensitive data includes the registration number of the operator, the unique serial number, timestamp, geographical location, altitude above ground level or take-off point, route measured clockwise from true north, and ground speed of the unmanned aircraft, and the geographical location of the operator (if available, otherwise the geographical location of the take-off point). This system not only effectively controls potential risks to public safety posed by unmanned aircraft during flight but also provides effective information and data tools for unmanned aircraft flight regulation.

The Dragonfish standard series aircraft supports the DRI system and uses Wi-Fi (Wi-Fi Beacon, 802.11n) for broadcasting. To enable the DRI system, configure it in the Autel Voyager Application.

Tips

- Operation path: On the main interface of the Autel voyager App, tap "" > "" > "**Safety**" > "Receive Remote Information", and follow the on-screen instructions to perform relevant operations. For more information, see "**3.4.10.5 Aircraft settings interface**" in Chapter 3.
- The availability of the DRI system depends on the regulations in various countries and regions. Currently, the DRI system is not available in China.

2.18 Aircraft Inspection Monitoring System

The aircraft is equipped with a one-key self-check function and a safety monitoring function, which, together with manual checks before and after flight, constitute a comprehensive inspection monitoring system to ensure flight safety. Users can monitor the aircraft status in real-time through the Autel Voyager Application. For details, please refer to "**4.1.7.7 Real-time monitoring and one-key self-check**" in chapter 4.

2.19 Standard flight operation procedures

Aircraft safety monitoring functions and one-key self-check functions cannot eliminate all safety-related risks associated with aircraft. Therefore, please refer to the following instructions and Chapter 5, "**5.4 Pre-Flight Manual Checklist**" for the necessary pre-flight manual inspection.

2.19.1 Pre-Flight Check

Before each flight operation, perform a comprehensive pre-flight check according to the following steps (including external inspection, assembly check, actuator check, communication link check, and payload check) to ensure the safe operation of the aircraft.

- Ensure that the aircraft's structural condition is normal, with no fractures, deformations, or other damage to the fuselage.
- Ensure that the aircraft's surface is free from stains, with no peeling paint, and no water inside the fuselage.
- Ensure that the aircraft's wings, tail, and airspeed indicator are in the locked position.
- Ensure that the landing gear of the aircraft is securely mounted, with no looseness or displacement.
- Ensure that the heat dissipation holes on the bottom of the aircraft's fuselage are not blocked, and the surface of the ultrasonic sensor is clean.
- Ensure that there are no foreign objects in the aircraft's battery compartment and battery interface, the Smart Battery is properly installed, the battery is fully charged, and the battery unlock button is in the locked position.
- Ensure that all propellers of the aircraft are in good condition, with no obvious deformations, damage, fractures, delamination, or structural damage, and the surface is clean.
- Ensure that the front and rear propellers, as well as the left and right propellers, are installed in the correct positions, securely fastened to the power motors, and the propeller tightening screws are not missing.
- Ensure that the surface of the power motors is clean, and both the power motors and servos rotate smoothly without any obstructions.
- Ensure that the gimbal camera is in the locked position with the aircraft's fuselage.
- Ensure that the lens cover of the gimbal camera has been removed, and the lens surface is free from foreign objects, dirt, or fingerprints.
- Ensure that the three-axis movement of the gimbal camera is in normal condition.
- Ensure that the gimbal camera has been inserted into the TF card slot and the rubber protective cover is securely closed; otherwise, it will affect the gimbal's protective performance.

- Ensure that the remote controller's antenna is extended, the base station is stable, and the base station body is connected well to the antenna cable.
- Place the aircraft in an open, flat outdoor area, ensuring that there are no obstructions, buildings, trees, or electromagnetic interference facilities nearby. The user should stand at least 10 meters away from the tail of the aircraft.
- After turning on the power of the aircraft, base station, and remote controller, make sure that they have been properly paired and have a good communication link.
- After the aircraft's self-check is completed, ensure that all alarms and error messages displayed on the Autel Voyager Application have been addressed.
- Make sure that the aircraft's safety flight parameters, such as return-to-home point, stick mode, ADS-B risk warning distance, safety altitude, RTK switch, etc., have been set in the Autel Voyager App, and the RTK module is receiving data normally. Familiarize yourself with the flight operation to ensure that the parameter settings meet your own needs and ensure flight safety.
- If multiple aircraft are flying simultaneously, maintain an appropriate distance in the air to prevent safety incidents.

Tips
● The inspection procedure for standardized flight operations can be found in "5**.4 Pre-flight manual checklist**" and "**5.5 Post-flight manual checklist**".

2.19.2 Basic Flight Process

The aircraft provides three stick modes: Mode 1, Mode 2, and Mode 3. Each mode controls the aircraft differently. The default mode is Mode 2. You can switch the mode in the Autel Voyager Application according to your control habit (For how to switch the mode, see "**4.1.7.3 Selecting stick mode**" in Chapter 4).

The following is the basic operation of aircraft flight:

1. Please refer to "**2.19.1 Pre-Flight Check**" or "**4.1 Pre-Flight Operations**" to complete the preparations before flight.

- Place the aircraft in an open and flat area outdoors and make sure that there are no obstacles, buildings, trees, etc. around.
- Press and hold the battery power button for 1 seconds to turn on the power of the base station.
- Press and hold the battery power button for 3 seconds to turn on the power of the RC.

- Press and hold the battery power button for 3 seconds to turn on the power of the aircraft and for the aircraft to complete the self-checking.
- Stand at least 10 meters away from the rear arms of the aircraft.

2. Please refer to "**4.2.1 Takeoff**" in Chapter 4 to use the remote controller to start the aircraft and take off accordingly.

3. Please refer to "**4.1.7.3 Selecting stick mode** "in Chapter 4 to control the aircraft carefully.

4. Please refer to "**4.2.3 Landing**" to land the aircraft. (When the aircraft has landed successfully, the motor will automatically lock the propeller.)

2.19.3 Post-Flight Process

After each flight, it is recommended that user should take following post-flight operations:

1. After the aircraft ends its flight and lands, users must ensure that the aircraft propellers and motors are turned off and check whether the aircraft body and motors are hot, wait them to cool down before taking any other post-flight operations.
2. Inspect the appearance of the aircraft, check whether there is any damage on the aircraft, such as dent. If there is serious damage, please contact Autel Robotics.
3. Remove the batteries from the aircraft. For details about how to remove the battery, please refer to "**4.1.1 Assembling the Aircraft**" in chapter 4.
4. If you need to remove the gimbal camera after flight, please refer to steps in "**3.2.5 Replacing the Gimbal Camera**" in chapter 3. After removing the gimbal camera, be sure to install the lens protective cover and gimbal interface protective cover (or aircraft gimbal interface protective cover) of the gimbal camera in time to avoid damage during transportation and storage.

❗ Important
● Do not change the gimbal camera frequently. The gimbal interface is a precision device. Frequent plugging and unplugging may cause poor contact between the aircraft and the gimbal camera due to wear and tear.

5. If you need to transport the aircraft, you need to dissemble the aircraft into components and put them in the case. For details about dissembling the aircraft, please refer to "**4.1.1 Assembling the Aircraft**" in chapter 4.

Chapter 3 Product Details

3.1 Aircraft

3.1.1 Aircraft Components

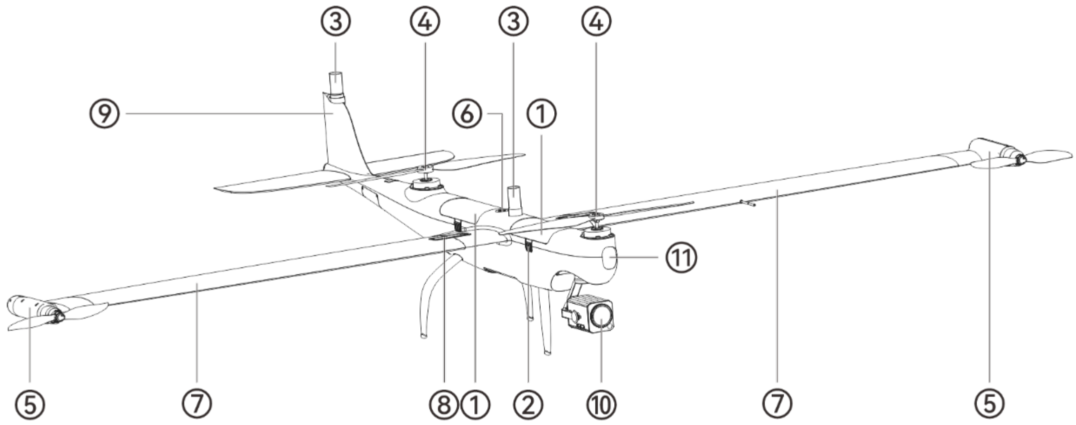


Fig 3-1 Aircraft side top view

Table 3-1 Description of the side top view of the aircraft

Number	Name	Description
1	Smart battery	The aircraft requires 2 batteries to provide the power required for operation.
2	Battery unlock button	When removing the smart battery from the aircraft, you need to press and hold the battery unlock button.
3	RTK module	Receive RTK data for high-precision positioning of aircraft.
4	Body motor	Used to drive the fuselage propeller to rotate.
5	Wing tip motor	Used to drive the wingtip propellers.
6	Aircraft power button	After installing the smart battery, press and hold the power button for 3 seconds to turn on the aircraft.

7	Wing	The left and right wings of the aircraft adopt a quick-release design.
8	Wing lock	Used to lock the wings and fuselage to ensure that they are firmly connected and will not fall off.
9	Tail wing	The aircraft tail adopts a quick-detachable design.
10	Gimabal camera	Integrate a variety of sensors for stable shooting or measurement while flying.

Tips
● The frequency matching button is located inside the rear battery compartment of the aircraft.

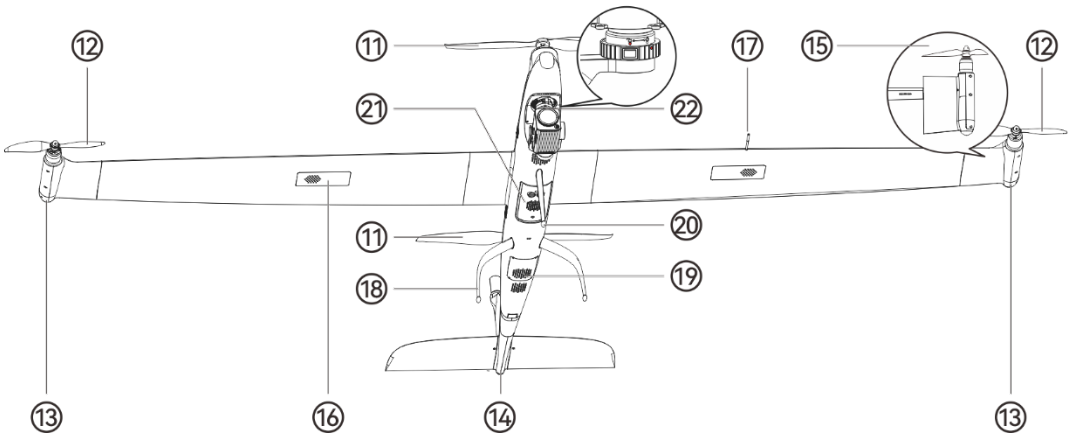


Fig 3-2 Aircraft bottom view

Table 3-2 Description of the side and upward view of the aircraft

Number	Name	Description

11	Fuselage propeller	During the vertical take-off and landing phase, it provides lift for the aircraft and stops rotating during the horizontal flight phase.
12	Wing tip propeller	During the vertical take-off and landing phase, it provides lift for the aircraft; during the level flight phase, it provides thrust for the aircraft.
13	Wing Navigation light	When flying at night, the direction of the aircraft can be identified by the color of the Navigation light.
14	Rear Navigation light	When flying at night, the direction of the aircraft can be identified by the color of the Navigation light.
15	Tilting wingtip	During the vertical takeoff and landing phase, the wingtips rotate through the servos so that the wingtip propellers point upward to provide lift for the aircraft; during the level flight phase, the wingtips rotate through the servos so that the wingtip propellers face the front of the aircraft to provide thrust for the aircraft.
16	GNSS receiver	Located on the right wing of the aircraft, it is used for GNSS positioning of the aircraft.
17	Airspeed tube	Located on the right wing of the aircraft, it is connected to the airspeed indicator and is used to measure the airspeed of the aircraft.
18	Rear tripod	Used to support the aircraft to avoid damage to the bottom of the fuselage.
19	Dust net	Protect the aircrafts internal cooling ducts.
20	Front leg	Used to support the aircraft to avoid damage to the bottom of the fuselage.

21	Ultrasonic sensor	Used to detect the distance between the aircraft and the ground.
22	Body gimbal interface	The aircraft can carry various types of gimbal cameras.

⚠ **Warning**

- Please do not disassemble the factory-installed parts by yourself (except for the parts expressly allowed in the description of this manual), otherwise the product will lose its warranty qualification.
- The gimbal camera interface area is equipped with a rubber protective cover to protect the TF card slot and USB Type-C interface. Please make sure the rubber protective cover is tightly closed during flight.

3.1.2 Aircraft Navigation Lights

The aircraft Navigation light (left Navigation light, right Navigation light, rear Navigation light) are located on the wingtip motors on both sides of the fuselage and at the end of the tail of the tail. When flying at night, turning on the Navigation light can indicate the aircraft's position and heading to avoid air traffic accidents. The aircraft's Navigation light can be turned on or off manually in the Autel Voyager Application.

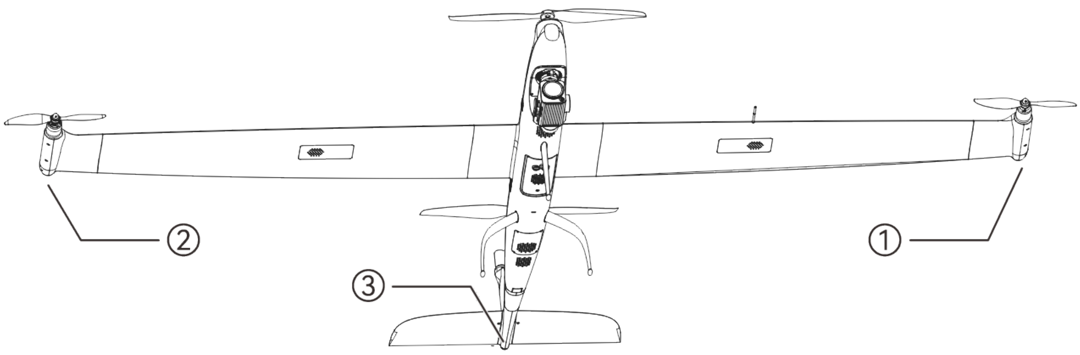


Fig 3-3 Aircraft navigation light

Table 3-3 Aircraft Navigation light description

Number	Name	Description
1	Left Navigation light	Located inside the rear end housing of the left wingtip motor, it supports dual-color display in green and red.
2	Right Navigation light	Located inside the rear end housing of the right wingtip motor, it supports dual-color display in yellow and green.
3	Rear Navigation light	Located inside the housing at the rear of the aircraft's tail fin, it supports dual-color display in green and yellow.

Table 3-4 Navigation light status description

Flight Situation	Blinking Cycle
non-ATTI function	Left navigation light: Green light on for 0.25 seconds/off for 0.1 seconds/red light on for 0.75 seconds/off for 0.1 seconds/red light on for 0.5 seconds/off for 0.1 seconds. Right navigation light: Green light on for 0.25 seconds/off for 0.95 seconds/green light on for 0.5 seconds/off for 0.1 seconds Tail navigation light: Green light on for 0.25 seconds/off for 0.1 seconds/yellow light on for 0.75 seconds/off for 0.1 seconds/yellow light on for 0.5 seconds/off for 0.1 seconds
ATTI function	Left navigation light: Green light on for 0.25 seconds/off for 0.1 seconds/red light on for 0.75 seconds/off for 0.1 seconds/red light on for 0.5 seconds/off for 0.1 seconds. Right navigation light: Green light on for 0.25 seconds/off for 0.1 seconds/yellow light on for 0.75 seconds/off for 0.1 seconds/green light on for 0.5 seconds/off for 0.1 seconds

Tail navigation light: Green light on for 0.25 seconds/off for 0.1 seconds/yellow light on for 0.75 seconds/off for 0.1 seconds/yellow light on for 0.5 seconds/off for 0.1 seconds

Tips

- Navigation light setting path: Tap "⚙">- "Navigation light" on the map interface or camera interface of the Autel Voyager App, follow the interface guidance to perform relevant operations.
- The flight light setting is only valid for a single power-on operation. The flight lights will return to the default flashing state after the aircraft is restarted.
- The Navigation light flashing period can be set from 1s to 200s.

Warning

- Be sure to turn on the aircraft's Navigation light when flying at night. Turning off the Navigation light will violate local laws and regulations.

Remarks

- When flying the aircraft in the European Union region, please do not change the default navigation light settings. Autel Robotics has ensured that the above navigation light states comply with the regulatory requirements of the European Union region.
- When conducting flights in other regions, please ensure that the navigation light settings comply with the relevant laws and regulations of the respective location.

In case of any of the above abnormalities during power-on self-test, flight will be prohibited to ensure safety.

Table 3-5 Abnormal Items in Power-On Self-Test Resulting in Flight Prohibition

Abnormal Items	● IMU abnormal ● Magnetometer abnormal

- Airspeed sensor abnormal
- Barometer abnormal
- Ultrasonic sensor abnormal
- Servo malfunction
- Elevator malfunction
- Motor malfunction
- Battery imbalance
- Video transmission link not connected
- Flight controller firmware version mismatch with aircraft model
- Aircraft maintenance interval reached
- Weak RTK signal or GNSS signal
- Gimbal camera detection abnormality
- Navigation attitude initialization incomplete
- RTK heading not locked
- Flight attitude detection abnormality

3.1.3 Smart Battery

The Dragonfish Standard aircraft comes standard with two DF6_12000_2310 smart batteries (hereafter referred to as smart battery) as the power battery. This battery is a rechargeable lithium-ion polymer (LiPo) battery and features high energy density and capacity. The smart battery can be charged with an DF_CHARGER battery charger.

Remarks
● The battery charger is included as part of the aircraft kit. Users do not need to purchase it separately.

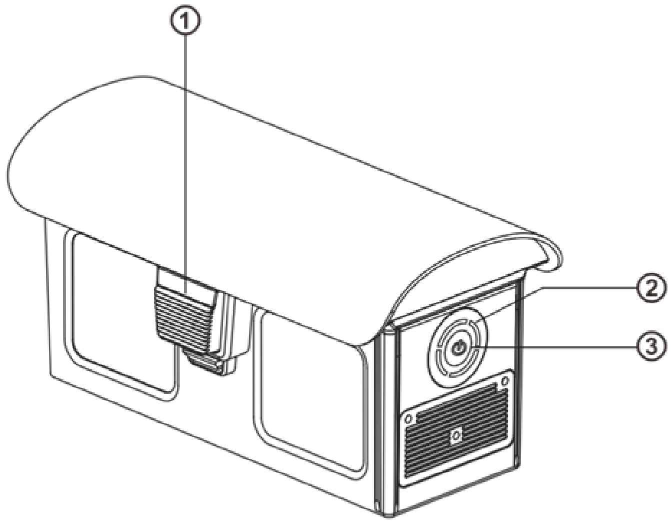


Fig 3-4 Battery Appearance

Table 3-6 Battery Appearance Details

No.	Name	Description
1	Unlock Button	To remove the battery from the aircraft, press and hold the unlock buttons on both sides and pull out the battery.
2	Battery Level Indicator	Used to display the current battery level of the smart battery in normal situations.
3	Power Level Check Button	When the battery is turned off, press this button for 1s to check current battery power range.

3.1.3.1 Checking the battery level

When the battery is turned off, press the power level check button for 1 second and then release it quickly to check the battery level. LED will indicate the current battery level, as shown below.

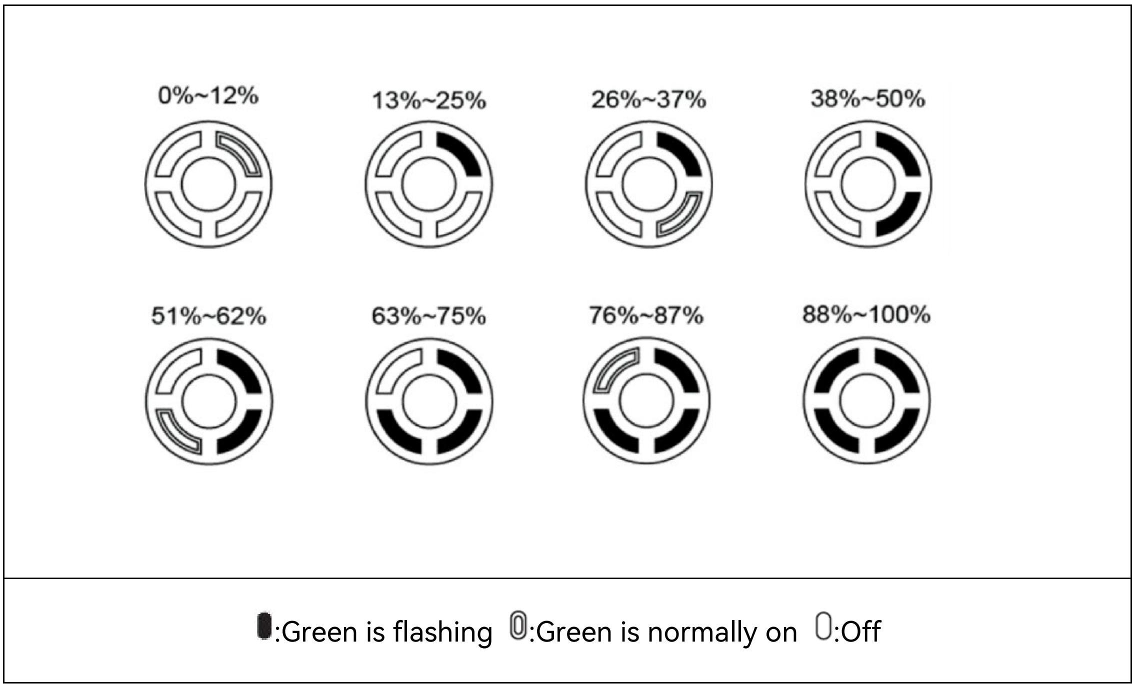


Fig 3-5 Battery level indicator status (non-charging status)

Tips

- After the aircraft is connected to the remote controller, you can check the current smart battery level of the aircraft in the top status bar or in the "Aircraft Battery" of the Autel Voyager Application. For more information, see "**3.4.10.2 Status bar**" and "**3.4.10.5 Aircraft settings interface**" in Chapter 3.

3.1.3.2 Charging the smart battery

Connect the charging interface of the official battery charger to the notch of the metal electrode of the smart battery, and connect the plug to the AC power supply (100-240 V~ 50/60 Hz).

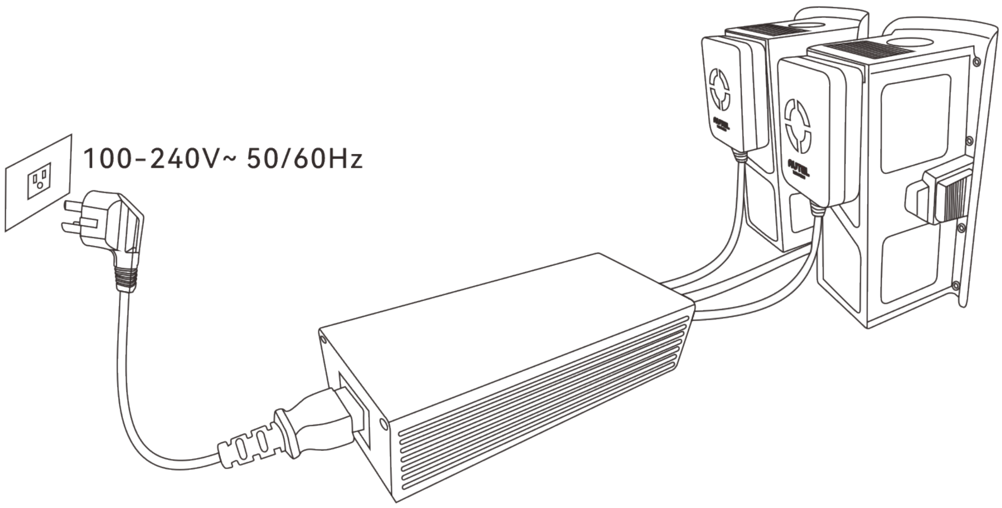
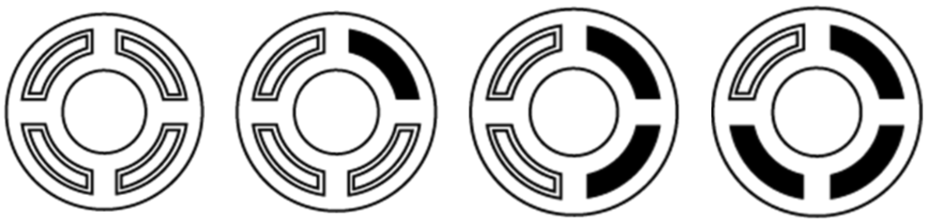


Fig 3-6 Use the Battery Charger to Charge the Smart Battery

Fig 3-7 Battery Level Indicator Status (While charging)

0%~25%	26%~50%	51%~75%	76%~100%
			
:Green light is always on :Green light blinking			

⚠ Warning

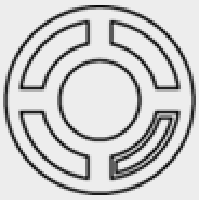
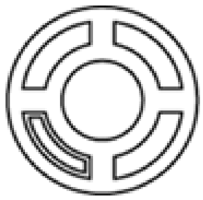
- Do not charge a battery that emits smoke, is bulged, leaks liquids, or has a damaged appearance.
- Do not use damaged charging devices to charge the smart battery.
- Modifying the official smart battery or charging device provided by Autel Robotics is prohibited.
- Only use the battery and charging device provided by Autel Robotics. Autel Robotics is not responsible for any consequences, such as battery accidents and flight failure, caused by the use of third-party batteries or charging devices.
- Keep the smart battery away from flammable and explosive items during charging.

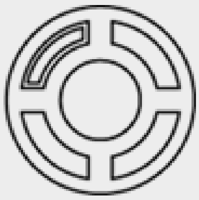
- After the smart battery is fully charged, disconnect the connection between the charger and the smart battery and power supply promptly.
- After flight, it is recommended to wait until the smart battery naturally cools down to an appropriate temperature before charging the battery. If the temperature of the smart battery is higher than 45℃ (113℉), when the battery is connected to the charging device, the battery temperature protection function will be activated, and the battery cannot be charged until its temperature drops below 40℃.

Remarks

- It is recommended to fully charge the smart battery of the aircraft before the aircraft takes off.
- It is recommended to mark and match the two smart batteries for simultaneous charging/discharging to get the best performance.
- Generally, it takes about 120 minutes to fully charge a smart battery of the aircraft and about 210 minutes to fully charge two smart batteries at the same time, but the charging time is related to the remaining battery level.

Table 3-7 Other Battery Indicator Warning Instructions

No.	Description	Example
1	The temperature is too high/too low for charging.	
2	The charging current is too high, which causes a short circuit.	

3	A circuit overcurrent, a circuit overload, or a short circuit occurs during battery discharge.	

: Green light blinking : Off

Tips
• During the take-off stage, if the battery temperature exceeds the usable range, the Autel Voyager Application will issue a “Front/Rear battery temperature is too high (or too low), please do not take off” warning and prevent take-off.

3.1.3.3 Smart battery functions

The smart battery has the following functions:

■ **Battery Level Display**

The smart battery has a built-in battery level indicator, which shows the current battery level of the smart battery.

■ **Self-discharge protection for storage**

If the battery is stored in high temperature environment or it is not used for 6 days at a high battery level, the self-discharge protection will be activated. The battery will automatically discharge to a safe level, this is a default setting, and the discharging process takes 2-3 days. The discharge threshold can be manually defined with Autel Voyager.

Tips
• Although the battery has no indication in the self-discharge period, it is normal that the battery may be slightly hot.

■ **Low battery protection**

In the case of low battery level, the battery will automatically enter sleep mode to avoid damage. Under this mode, there will be no reaction when pressing the power button. To wake up the battery, it must be connected with charger.

- **Charging temperature detection**

The battery will stop charging if its temperature drops lower than 5°C(41ºF) or rises higher than 45°C(113ºF).

- **Overcurrent protection**

Charging with a large current can severely damage the battery. The battery will stop charging if the charging current exceeds 16A.

- **Overcharge protection**

The battery will automatically stop charging after it is fully charged.

- **Balanced protection**

Each battery unit shall maintain voltage balance to avoid overcharge or overdischarge.

It automatically balances the voltage of each smart battery unit to protect the battery, prevent overcharging or over-discharging, and ensure the maximum performance of the battery.

- **Overdischarge protection**

The battery will automatically disconnect the power output function when it is not used and completes the self-discharge procedure. This function is disabled in flight.

- **Short-circuit protection**

The power supply will be disconnected if a short circuit is detected.

- **Power-down mode**

The battery will turn off if there is no operation within 5 minutes to reduce the battery consumption.

- **Communication**

During use, the aircraft will continuously communicate with battery to provide the real-time information, including voltage, capacity, current, and temperature.

- **Low power consumption mode**

To save power, this mode will be activated when the battery is low and has not been charged for 1 day. After connecting the charger, the battery will resume normal functions.

- **Dust and water resistance**

After correctly installing the smart battery to the aircraft, the battery complies with IP43 protection level.

■ Self-heating

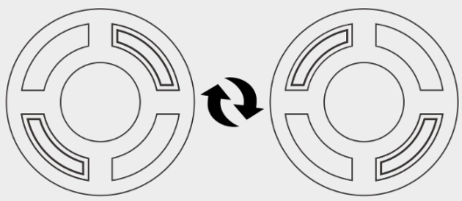
The smart battery has a self-heating function, which can increase the battery temperature in low-temperature environments, helping maintain good output performance.

- When the smart battery is installed in the aircraft and the battery power is turned on, if the battery temperature is lower than 25°C, the battery self-heating function will be activated to heat up to 27°C.
- If the smart battery is not installed in the aircraft, short press the power level check button for 1 second and then press and hold the power level check button for 3 seconds to activate the battery self-heating function to keep the battery temperature at 27°C for 10 minutes. At this point, if you want to exit the battery self-heating function, short press the power level check button for 1 second, and then press and hold the power level check button for 3 seconds.
- When the smart battery is connected to the battery charger and the battery power is turned on, if the battery temperature is lower than 5°C (41°F), the charger will supply power to the smart battery for self-heating. Once the battery temperature reaches 15°C, the self-heating function will be turned off.

Important
● When the self-heating function of the smart battery is manually activated, the battery should have at least around 10% of remaining power for self-heating.

When the smart battery is in the states of self-heating and heat preservation, the statuses of the battery level indicators are shown in the following table.

Table 3-8 Battery Level Indicator Status (self-heating and heat preservation)

No.	Description	Example
1	LED1, LED3 and LED2, LED4 blink alternately in groups, indicating that it is heating.	

2	The 4 LEDs blink at the same time, indicating that it has entered the heat preservation state.	

: Green light is always on : Off

Warning

- To bring out the best performance of the smart battery, it is recommended to keep the battery temperature above 25℃ before flying.
- Using a smart battery in a low-temperature environment will reduce the battery life. You must ensure that the battery is fully charged before taking off and arrange the flight time reasonably.
- If the smart battery power is low, it is advised not to take off as the low power makes it difficult to activate the battery, compromising flight safety.
- During the flight, if the Autel Voyager Application prompts for intelligent low battery return, it is advisable to return immediately.
- In some low-temperature environments, even with the battery self-heating function turned on, the smart battery temperature may still not reach a usable temperature, so add the insulation measures during the heating process.
- In low-temperature conditions, the smart battery self-heating time may be longer, it is suggested that the user provide battery insulation in advance to reduce self-heating time.

Warning

- Before using the smart battery, please carefully read and strictly follow the requirements in this Manual, "Battery Safety Operation Guidelines", and "Disclaimer", and those on the battery's surface sticker. The user shall undertake all consequences if he/she fails to follow the usage requirements.

3.1.4 Flight Control System

The Dragonfish Standard aircraft achieves stable and convenient flight control through the built-in intelligent flight control system. The system supports a number of advanced functions, including dynamic track, terrain obstacle avoidance, automatic return to home, loss of contact protection, etc.

Table 3-9 Flight control system

Module	Description
IMU	Acceleration and angular velocity are measured using a three-axis gyroscope and three-axis accelerometer. When the aircraft is powered on, IMU calibration will be performed automatically.
compass	Measures the geomagnetic field and provides heading reference for aircraft.
GNSS receiver	Receive global satellite navigation signals for determining longitude, latitude, and altitude.
barometer	Measures atmospheric pressure and is used to determine the altitude of an aircraft.
ultrasonic sensor	Measure the distance between the aircraft and the ground.

3.1.5 Flight Modes

Depending on the availability of GNSS signals and flight conditions, the aircraft can switch between 2 flight modes.

Table 3-10 Flight mode

Flight mode	Description
Auto flight mode	Switch the remote controller to A position. When the aircraft detects an appropriate GNSS signal, the aircraft will be able to fly fully autonomously without manual control. In automatic flight mode, the aircraft can achieve safe flight through terrain obstacle avoidance, and supports safety functions such as automatic return to home and loss of contact protection.
Manual flight mode	Switch the remote controller to M position, and the user can manually control the aircraft to fly through the remote controller. In this mode, the aircraft needs to be positioned through GNSS and supports safety functions such as automatic return to home and loss of contact protection.

⚠ **Warning**

- ATTI function: When there is no GNSS signal, ATTI function will be activated automatically. In this way, the obstacle avoidance function is disabled and the aircraft only controls its altitude through the barometer. At the same time when there is no GNSS signal, the aircraft will enter the failure protection program. For details about failure protection, please refer to "**2.10 Failure Protection**".
- If the user does not fully master the flight control of the aircraft, please do not fly in manual flight mode.
- In manual flight mode, the aircraft's terrain obstacle avoidance function cannot be turned on. Be sure to pay attention to the surrounding environment when flying.
- If the user does not fully master the flight controls of the aircraft and the aircraft is using ATTI function, please do not take off hastily.

Important
• When flying, please choose a flat, open, well-lit ground area as your take-off and home point.

3.1.6 Flight Speed

Under different flight stages, the aircraft has different flight performance:

Multi-rotor mode: used in the vertical take-off and landing phase of the aircraft. By rotating the wingtip motor, the aircraft switches to multi-rotor mode.

Fixed wing mode: used during the level flight phase of the aircraft. After the aircraft takes off, the aircraft switches to fixed-wing mode by rotating the wingtip motors and turning off the locking fuselage motors.

Table 3-11 Maximum flight speed range

Flight phase	Description
Multi-rotor mode	Flight speed: 0m/s~17m/s, ascending: 4m/s, descending: 3m/s.
Fixed-wing mode	Flight speed: 17 m/s~30 m/s, ascending: 5 m/s, descending: 5 m/s.

Warning
• When flying manually in fixed-wing mode, be sure to pay attention to the surrounding environment and ensure that the flying airspace is open, unobstructed, and away from crowds, trees, and buildings.

3.1.7 Intelligent Flight Function

The aircraft can be used with the Autel Voyager Application to achieve related intelligent flight functions.

■ Dynamic track

Tap and drag to select the target on the Autel Voyager Application camera interface. After the gimbal locks the target, the aircraft can track the target point according to the set tracking method and tracking parameters.

■ Terrain obstacle avoidance

The aircraft achieves terrain avoidance functionality through terrain maps, preventing collisions with terrain obstacles such as mountains during flight. The implementation involves real-time monitoring of the aircraft's altitude and the terrain's elevation. Based on the user-defined safety height, the aircraft adjusts its altitude to avoid potential collisions.

■ Automatic return

When the GNSS signal is good, press and hold the Home button “” on the remote controller for 3 seconds, you can manually activate the automatic return-to-home function. The aircraft will head towards the home point and return based on the current settings.

■ Loss of connection protection

If the communication between the aircraft and the remote controller is interrupted, the loss protection will be activated. When the lost contact protection function is activated, if the GNSS signal is good, the aircraft will start the automatic return function. Once communications are restored, the user can still regain control of the aircraft.

■ Intelligent low-battery return

When the GNSS signal is good, when the current battery power of the aircraft minus the set remaining power after landing is only enough for the aircraft to return to the home point, the aircraft will activate the automatic return function.

3.1.8 Noise Description

The Dragonfish Standard series aircraft will generate a certain level of noise during operation. You should understand local noise pollution prevention regulations in advance and set an appropriate flight altitude or safe distance to ensure that it does not disturb other individuals, groups, or organizations.

■ **A-weighted sound pressure level**

Measurement results for the Dragonfish Standard series aircraft, in accordance with the requirements of GB 42590-2023 in Chinese mainland, are provided below:

Table 3-12 Noise Measurements Results (normalized to 1 m from the aircraft)

Observation Points	Hover	Fly (1 m/s)
Ground Measure Point (Below)	92.7dB	93.9dB
Side Measure Point (Horizontal Plane)	89.4dB	88.6dB
Note: The measurement environment is an outdoor cement ground.		

Tips

- Before flight, please make sure to verify the noise restrictions in the flying area in advance to avoid any violation of local regulations regarding aircraft noise.

3.1.9 Image Transmission Function

The Dragonfish Standard aircraft is equipped with Autel Robotics self-developed image transmission technology. When used in combination with the Dragonfish base station (base station) and Dragonfish ground control station (remote controller), the image transmission distance can reach 30 kilometers. The relevant features are as follows:

- It supports adaptive frequency hopping transmission in multiple frequency bands, selects the optimal channel according to electromagnetic interference conditions, and has strong anti-interference capabilities.
- The real-time transmission quality reaches 1080p@30FPS, and it has a high transmission bit rate of 40Mbps and low-latency transmission characteristics.
- Full-link data storage uses AES-128 encryption to ensure that end-to-end communication data cannot be intercepted.

Remarks

- The data of transmission bit rate comes from test data. The data may be different due to different test environments and conditions.
- The image transmission distance is for reference only. Please always pay attention to the quality of the image transmission signal during actual use. When the image transmission signal is poor, the flight radius should be shortened in time. Please refer to "**3.4.10.2 Status bar**" in Chapter 3.
- Please note that when using only the remote controller in combination with the aircraft, the maximum image transmission distance is only 8-10 kilometers. If you want to achieve a 30-kilometer image transmission distance with the aircraft, you need to use it with a base station.
- When the aircraft is used in combination with the Autel smart tracking antenna, it can achieve an ultra-long image transmission distance of 45 kilometers.

■ Information of Image Transmission Frequency Bands for Aircraft

The image transmission frequency bands of the Dragonfish Standard aircraft comply with regulatory requirements worldwide. The relevant used frequency bands are listed in the table below.

In actual use, after the aircraft and the remote controller are turned on and matched in frequency, the Autel Voyager Application in the remote controller will automatically determine the location based on the GNSS information received by the aircraft. It will then automatically select the radio communication frequency band that complies with local regulations for the specific country or region.

Tips

- After the aircraft is paired with the remote controller, the frequency bands between them will be automatically controlled by the Autel Voyager Application based on the geographical information of the aircraft. This is to ensure compliance with local regulations regarding frequency bands.
- Before flight, please ensure that the aircraft receives a strong GNSS signal after powering on. This allows the Autel Voyager Application to receive the proper communication frequency

band.

- When users adopt ATTI function, the wireless communication frequency band between the aircraft and remote controller will default to the band used in the previous flight. In this case, it is advisable to power on the aircraft in an area with a strong GNSS signal, then start flight in the actual operational area.

Table 3-13 Global Frequency Bands Used (Image Transmission)

Operating Frequency	Detailed Frequency	Countries & Regions
900M	902-928MHz	■ US (FCC) ■ Canada (ISED)
2.4G	2400–2476MHz	■ Chinese Mainland (SRRC)
2.4G	2400–2483.5MHz	■ US (FCC) ■ Canada (ISED) ■ EU (CE) ■ Australia (RCM)
5.2G	5150-5250MHz	■ US (FCC) ■ Australia (RCM)
5.8G	5725-5829MHz	■ Chinese Mainland (SRRC)
5.8G	5725-5850MHz	■ US (FCC) ■ Canada (ISED) ■ EU (CE) ■ Australia (RCM)

Remarks

- Some countries and regions have strict restrictions on the use of radio communication frequency bands. It is crucial to use them legally, and any modification of communication modules is strictly prohibited.
- If flying in any countries not listed in the above table, please consult the local communication management authorities to ensure that the aircraft communication frequency bands comply with local regulatory requirements.
- Please note that UAS will automatically match legal frequency bands according to GNSS positioning.

■ Ground Control Device

Including being paired with base station and remote controller, the aircraft can be also used with Autel smart tracking antenna so as to remotely control the communication of the aircraft.

Table 3-14 Aircraft remote controller device support list

Control device information	Dragonfish Ground control station	Dragonfish base station	Autel smart tracking antenna
Part number (EAN)	6924991123699	6924991127680	6924991124016
Part number (UPC)	889520203692	889520207683	889520204019
Manufacturer information	Autel Robotics	Autel Robotics	Autel Robotics
Controlling software	Autel Voyager App	Autel Voyager App	Autel Voyager App
Software version requirements	V1.0.0.0 or higher	V1.0.0.0 or higher	V2.0.80 or higher

Aircraft firmware version	V02.05.01.110 or higher	V02.05.01.110 or higher	V02.05.01.110 or higher
Additional information	Standard configuration	Standard configuration	Optional

Tips

- Please note that Autel smart tracking antenna is not included in the aircraft kit. Users need to purchase it separately.
- When remotely controlling the aircraft flight through the above equipment, ensure that the control software version meets the above requirements.

3.2 Gimbal Camera

The Dragonfish Standard aircraft can be equipped with 4 types of Autel DG-series Gimbal cameras to ensure the stability and clarity of aerial photography at high altitudes and at high speeds.

Features of relevant adapted gimbal cameras are as follows:

- Z2: Equipped with a 4K 20x optical zoom lens and a 12-megapixel wide-angle lens.
- T3: Equipped with a 4K 20x optical zoom lens, a 12-megapixel wide-angle lens, and a 640×512 infrared thermal imaging lens.
- T3H: Equipped with a 12-megapixel wide-angle lens, a 1280×1024 infrared thermal imaging lens, and a laser rangefinder.
- L20T: Equipped with a 4K 20x optical zoom lens, a 12-megapixel wide-angle lens, a 640×512 infrared thermal imaging lens, and a laser rangefinder.

Table 3-15 List of compatible gimbal cameras

Gimbal Camera Model	Z2	T3	T3H	L20T
(EAN)	6924991101796	6924991101802	6924991102274	6924991102281

(UPC)	889520011532	889520011549	889520012010	889520012027
Manufacturer information	Autel Robotics	Autel Robotics	Autel Robotics	Autel Robotics
Maximum size of Gimbal	145×81×138 mm	112.4×137.4×162 mm	138×91×164 mm	151×97×172 mm
Maximum weight of Gimbal	702 g	806 g	802 g	810g
Functional compatibility requirements	Aircraft firmware version: V02.05.01.110 or higher Remote controller version: V1.0.0 or higher Autel Voyager version: V2.0.80 or higher			

3.2.2 Gimbal Structure

The Dragonfish Standard aircraft uses a three-axis stabilizing gimbal with a high-precision motor structure to ensure that the camera can capture stable images when the aircraft is in flight.

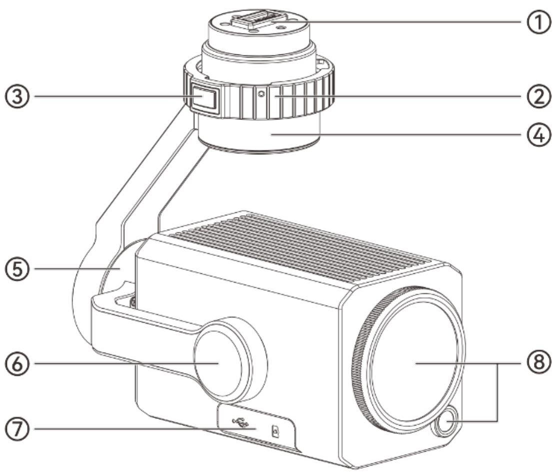


Fig 3-8 Gimbal structure (Z2 as an example)

Tips

- Please know that except for the difference in camera lens layout, the gimbal structures of Z2, T3, T3H, and L20T are all the same or similar.

Table 3-16 Gimbal structure description

Number	Name	Description
1	Gimbal interface	When installing a gimbal camera on an aircraft, you need to lock the connection between the gimbal camera and the aircraft through the gimbal interface.
2	Pan/Tilt Lock Ring	Install the gimbal camera: After the gimbal interface is docked in place, press the lock mark to rotate the gimbal locking ring to lock the gimbal camera on the aircraft body. To disassemble the gimbal and camera: Press the gimbal unlock button on the gimbal lock ring and press the unlock mark to rotate the gimbal lock ring to remove the gimbal camera.
3	Gimbal unlock button	After the gimbal camera is locked to the aircraft body, you need to press the gimbal unlock button to rotate the gimbal locking ring.
4	Yaw axis motor	Used to control the range of left or right rotation of the gimbal on its own axis. The mechanical range is: -320°~+320°, and the controllable movement range: -270°~+270°.
5	Roll axis motor	Used to control the range of the gimbal rolling left or right. The mechanical range is: -90°~+45° (Z2, T3H, and L20T), -45°~+45° (T3).

6	Pitch axis motor	Used to control the range of the gimbal 's upward or downward rotation. Mechanical range: -135°~+45°, controllable movement range: -90°~+0°, -100°~+20° in tracking mode.
7	Gimbal camera interface area	The surface is protected by a rubber protective cover and has a built-in USB Type-C interface and TF card slot. The Type-C interface can be used for gimbal debugging and data transmission; the gimbal camera must be inserted into a TF card to work.
8	Camera lens	Different models of gimbal cameras have different lens layouts. Please refer to '3.2.2 Camera Layout' in this chapter for specific layout.

3.2.3 Camera Layout

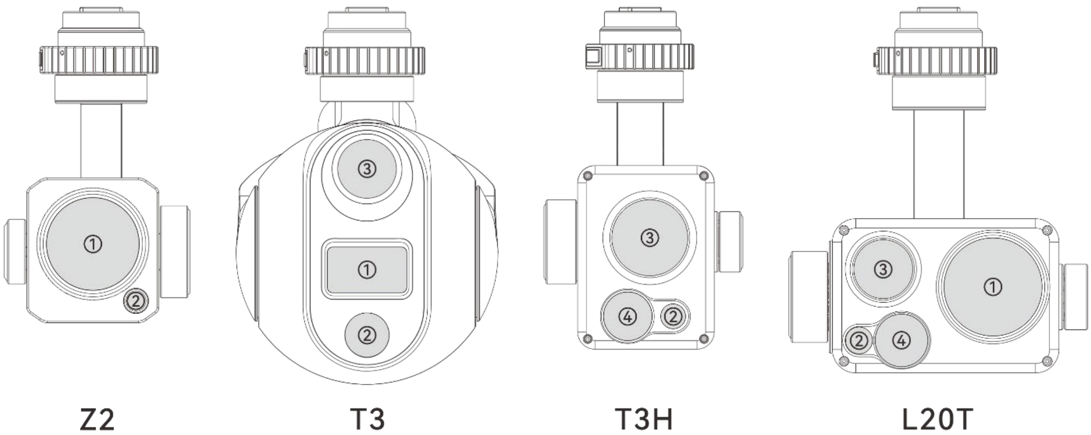


Fig 3-9 Gimbal camera adapted for Dragonfish Standard aircraft

Table 3-17 Instructions for Dragonfish Standard aircraft gimbal camera

Number	Name	Description
1	Zoom lens	Zoom lens is used to take long shots, allowing clear shots of distant scenes.

		1/2.5” CMOS, 8 million effective pixels, 20x continuous optical zoom, 12x digital zoom, 240x hybrid zoom.
2	Wide-angle lens	Wide-angle lens is used to capture a larger field of view within a shorter shooting distance. 1/2” CMOS, effective pixels 12 million.
3	Infrared thermal imaging lens	The infrared thermal imaging lens is used for temperature measurement and night vision. It can monitor the temperature distribution of the measured target in real time to determine the status of the target. Temperature measurement range: -20℃ ~ +150℃ (high gain mode), 0 ~ +550℃ (low gain mode).
4	Laser rangefinder	The distance is accurately determined by measuring the time it takes for the laser beam to travel back and forth to observe the target. Ranging range: 10-1200 meters, measurement accuracy: ±1 meter within 400 meters, ±0.4% outside 400 meters.

⚠ **Warning**

- Never aim the infrared thermal imaging camera at strong energy sources, such as the sun, lava, laser beams, molten iron, etc., to avoid damaging the infrared detector.
- The temperature of the measured target should be less than 600°C. Observation exceeding this temperature will cause burns and damage to the infrared detector.

Tips

- The laser rangefinder is a Class 1 laser product and does not cause any harm to human eyes and skin. Please feel free to use it.

3.2.4 Camera Operation

■ Control via remote controller function keys

● Zoom toggle key: Controls the zoom factor of the selected camera. Push it up to expand the zoom factor; push it down to reduce the zoom factor.

● Photo/video button: When setting the camera to photo mode in the Autel Voyager App, tap to take a photo; when setting the camera to video mode, tap to start/end recording video.

Tip
● For the control operation of the remote controller, please refer to Chapter 3, "**3.4.1 Remote Controller Components**".

■ Control By Autel Voyager Application

For the control and functions of the camera on the Autel Voyager App, please refer to Chapter 3, "**3.4.10.4 Camera interface**".

3.2.5 Gimbal Mechanical Rotation Range

The mechanical rotation ranges of the gimbal's pitch axis (Pitch), yaw axis (Yaw) and roll axis (Roll) are as follows: The following figure shown.

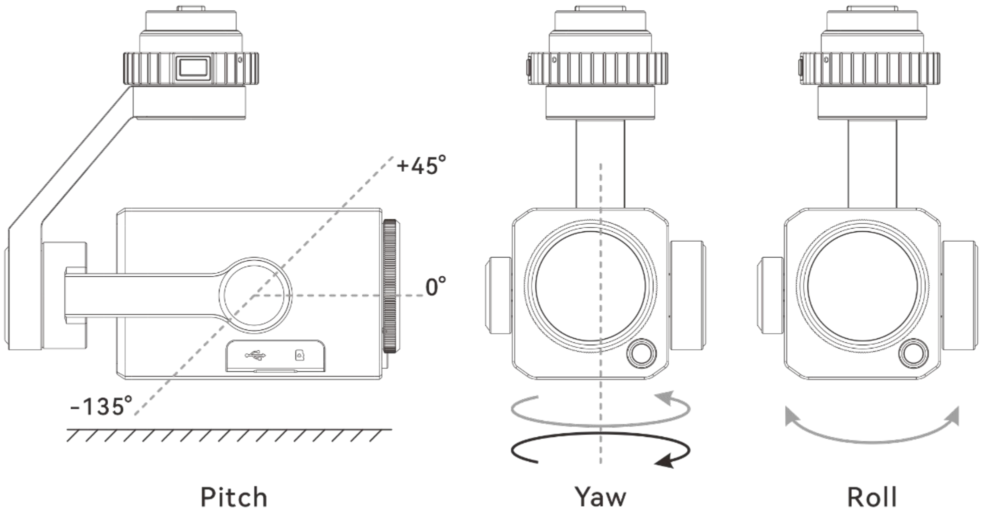


Fig 3-10 Description of the mechanical rotation range of the gimbal (the picture above shows the Z2)

Table 3-18 Description of the mechanical rotation range of the gimbal

Model	Z2	T3	DT3H	L20T
Pitch axis	-135°~+45°	-135°~+45°	-135°~+45°	-135°~+45°
Yaw axis	-320°~+320°	-320°~+320°	-320°~+320°	-320°~+320°
Roll axis	-90°~+45°	-45°~+45°	-90°~+45°	-90°~+45°

Remarks

- The actual user-controllable gimbal rotation range is the yaw axis: -270°~+270°, and the pitch axis: -90°~0° (-100°~+20° in tracking mode). For specific settings, please refer to Chapter 4, "**4.1.7.6 Creating a route mission**".

3.2.6 Replacing the Gimbal Camera

The gimbal camera of the Dragonfish Standard aircraft adopts a quick-detachable design, which allows users to quickly replace the gimbal camera to meet the needs of flight operations in different scenarios.

Important

- Please follow the following operating guidelines to replace the gimbal camera, otherwise the gimbal interface may be damaged or have poor contact.
- Do not change the gimbal camera frequently. The gimbal interface is a precision device. Frequent plugging and unplugging may cause poor contact between the aircraft and the gimbal camera due to wear and tear.
- Please use the gimbal camera model officially designated by Autel Robotics for replacement. Incompatible gimbal cameras can damage the aircraft.

⚠ **Warning**

- It is prohibited to install or remove the gimbal camera while the aircraft is powered on, and you must wait for 15 seconds after the aircraft's power is turned off before proceeding.

■ Install the gimbal camera

1. Make sure the aircraft is powered off, and remove the protective covers from the gimbal interface of the gimbal camera and the gimbal interface of the aircraft. Align the red dot on the gimbal lock ring with the red dot on the gimbal interface on the aircraft body.

2. Hold the gimbal camera upward, align the gimbal interface and insert it into the gimbal interface on the body, ensuring that the two are well connected.

3. Rotate the gimbal lock ring according to the locking direction of the gimbal interface on the fuselage until the red dot on the gimbal lock ring aligns with the lock mark on the gimbal interface on the fuselage. After the gimbal camera is locked, you will hear a click from the gimbal unlock button.

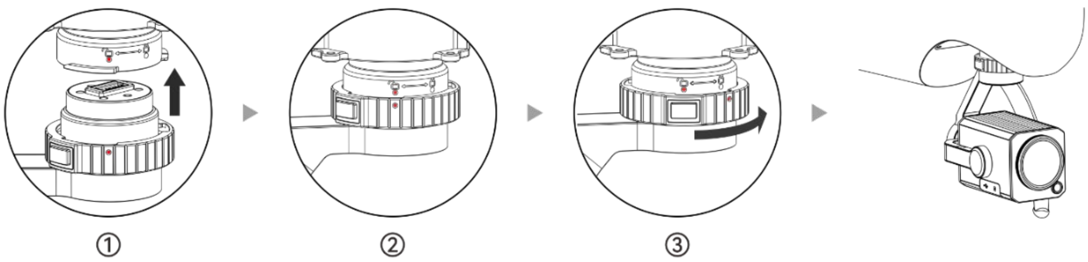


Fig 3-11 Install a gimbal camera on the aircraft

❗ **Important**

- After completing the installation of the gimbal camera according to the above steps, you can try to reversely rotate (do not press the gimbal unlock button) the gimbal locking ring. If the gimbal camera has been locked with the body's gimbal interface, the gimbal locking ring will not be able to be rotated.
- After installing the gimbal camera, please remove the gimbal camera lens protective cover in time.
- After installing the gimbal camera, please turn on the power of the aircraft and conduct self-test to ensure that the gimbal camera can work normally. During the self-test, the gimbal

camera will automatically rotate for calibration. Please ensure that there are no objects near the gimbal camera that hinder its movement.

■ Remove the gimbal camera

1. Make sure the aircraft is powered off, hold the gimbal camera with one hand, and press the gimbal unlock button with the other hand.

2. Rotate the gimbal lock ring according to the unlocking direction of the gimbal interface on the fuselage until the red dot on the gimbal lock ring aligns with the unlock mark “🔓” on the gimbal interface on the fuselage.

3. After being unlocked, the gimbal camera will automatically detach from the aircraft gimbal interface under the action of gravity.

⚠ Warning

- When removing the gimbal camera from the aircraft, be sure to support the gimbal camera to prevent damage to the gimbal camera from falling.

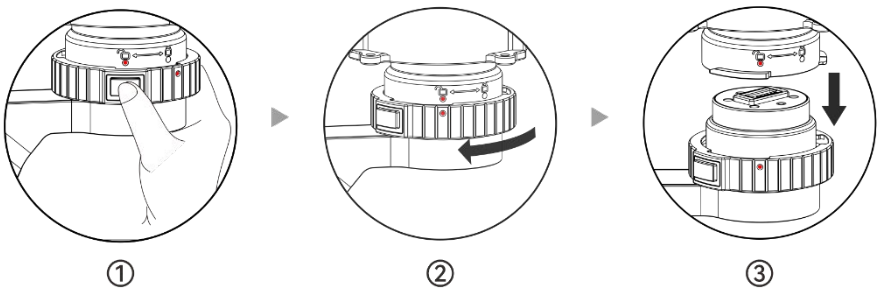


Fig 3-12 Remove the gimbal camera from the aircraft

❗ Important

- After removing the gimbal camera, be sure to install the lens protective cover and gimbal interface protective cover (or aircraft gimbal interface protective cover) of the gimbal camera in time to avoid damage during transportation and storage.

3.2.7 Installing a TF card on a Gimbal Camera

The gimbal camera has a TF card installed by default before leaving the factory. If the user needs to replace the TF card with a larger capacity, please refer to the following operations.

1. Remove the rubber protective cover from the gimbal camera interface area and pop out the installed TF card (if any).
2. Insert the new TF card into the TF card slot of the gimbal camera with the correct orientation, and secure the rubber protective cover.

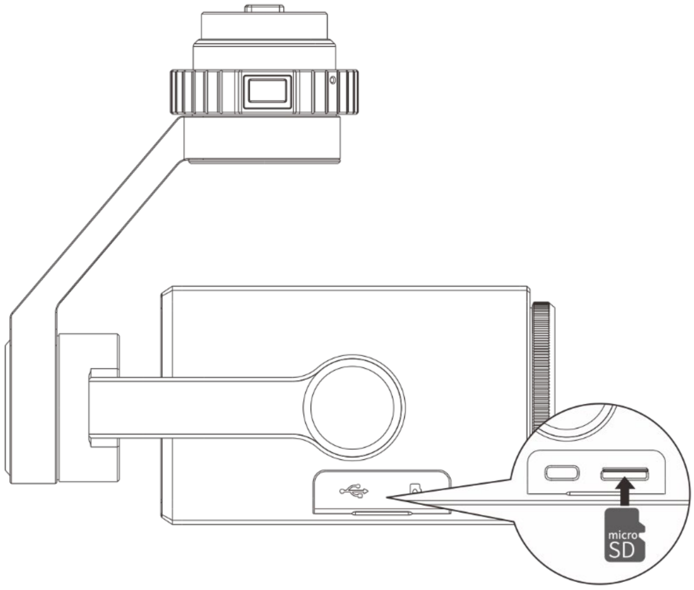


Fig 3-13 Install a TF card on gimbal camera

Tips
● If you want to shoot high-definition videos, it is recommended to use a Class 10, UHS-3 or higher TF card. ● Autel DG-series gimbal cameras support a maximum TF card size of 512GB.

Warning
● To prevent data loss, please turn off the power of the aircraft before removing the TF card. ● After installing the TF card, please promptly cover the rubber protective cover of the gimbal camera interface area to avoid affecting the protective performance of the gimbal camera.

3.3 Base Station

The Dragonfish base station (base station) is a signal enhancement device with a built-in lithium battery. It has strong anti-electromagnetic interference capabilities. When used in combination with a remote controller and an aircraft, its image transmission distance can be extended to 30 kilometers. The base station has a built-in high-precision satellite signal receiver, which can be used as an RTK base station to achieve centimeter-level positioning accuracy for aircraft flight operations.

Tips

- The complete base station consists of the main body of the base station, the base station antenna (including feeder), the base station tripod and the tray. It needs to be assembled completely before use.

3.3.1 Base Station Component

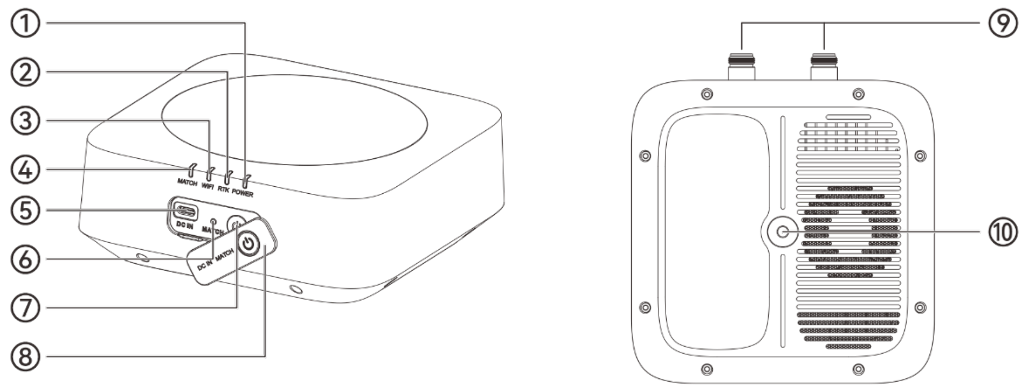


Fig 3-14 Base station main appearance

Table 3-19 Base station component description

No.	Name	Description
1	Power Indicator	After the base station is powered on, the power range of the base station can be determined by the status of

		the indicator light. For details, please refer to "**3.3.4 Checking the base station power**" in this chapter.
2	RTK indicator light	Display base station RTK signal status. In normal mode, the green light is always on when the RTK signal is good, and it is not on when there is no signal; the yellow light is always on when the RTK signal is poor.
3	Wi-Fi indicator light	After the remote controller is connected to the base station Wi-Fi, the indicator light is solid green; when not connected, the indicator light is off.
4	Match indicator light	Before the base station and the aircraft are frequency-linked, the indicator light flashes green on and off at a frequency of 1.5 seconds/ 1.5 seconds. After the base station is linked to the aircraft, the indicator light flashes green on and off at 0.1 seconds/ 2.0 seconds. For details, please refer to "**4.1.4 Matching and Connection**" in chapter 4.
5	Charging interface	USB Type - C interface, used to charge the built-in battery of the base station.
6	Match button	Short press the linking button for 1 second to start base station frequency matching.
7	Power button	When the base station is powered off, press the power button for 1 second to turn on the power of the base station. When the base station is powered on, press the power button for 1 second to turn off the power of the base station.

8	Interface protective cover	After the base station is powered on and frequency bound, be sure to cover the interface protective cover.
9	Antenna feeder interface	Used to connect the image transmission antenna feeder.
10	Pallet mounting holes	Used to install fixed base station tray.

3.3.2 Communication Frequency

The frequency band of dragonfish base Station meets the regulatory requirements around the world. Please feel free to use, and the relevant used frequency band is shown in the table below.

Tips

- After the aircraft is connected to the base station and the remote control, the radio communication frequency bands of the three will be automatically and accurately controlled by the Autel Voyager Application according to the geographical information of the aircraft by default, in order to ensure that the frequency bands comply with local regulations.
- Prior to flight, ensure that good GNSS signals are received when the aircraft is turned on, so that Autel Voyager Application can select the correct communication frequency band.
- When the aircraft is using ATTI function, the radio communication frequency of the aircraft, the base station and the remote controller will default to the frequency used in the previous flight. In this scenario, it is recommended that the user starts up the aircraft in the area with good GNSS signal in advance, and then fly to the actual operation area.

Table 3-20 Global Frequency Bands Used (image transmission)

Classification	Detailed frequency	Supported country and region
900M	902 - 928MHz	■ US (FCC) ■ Canada (ISED)
2.4G	2.400 – 2.476GHz	■ Chinese Mainland (SRRC)
2.4G	2.400 – 2.4835GHz	■ US (FCC) ■ Canada (ISED) ■ EU (CE) ■ Australia (RCM)
5.2G	5.15 – 5.25GHz	■ US (FCC) ■ Australia (RCM)
5.8G	5.725 - 5.829GHz	■ Chinese Mainland (SRRC)
5.8G	5.725 - 5.850GHz	■ US (FCC) ■ Canada (ISED) ■ EU (CE) ■ Australia (RCM)

Table 3-21 Global Frequency Bands Used (Wi-Fi)

Classification	Supported Country and Region
5.8G (5725 – 5829MHz)	■ Chinese Mainland (SRRC)
5.8G	■ US (FCC)

(5725 – 5850MHz)	■ Canada (ISED) ■ EU (CE) ■ Australia (RCM)

Remarks

- Some countries and regions have strict restrictions on the use of radio communication frequency bands. It is crucial to use them legally, and any modification of communication modules is strictly prohibited.
- If flying in any countries not listed in the above table, please consult the local communication management authorities to ensure that the aircraft communication frequency bands comply with local regulatory requirements.
- Please note that UAS will automatically match legal frequency bands according to GNSS positioning.

3.3.3 Turning the Base Station on/off

■ Turning the Base Station on

When the base station is powered off, press the power button of the base station for 1 second to turn on the base station.

■ Turning the Base Station off

Press the power button of the base station for 1 second to turn off the base station.

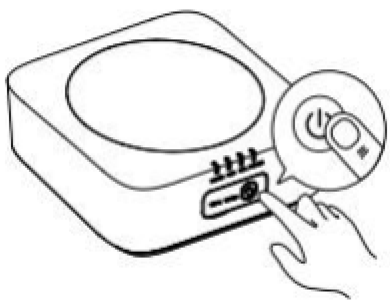


Fig 3-15 Turn the base station on/off

3.3.4 Checking the Base Station Power

When the base station is used in combination with an aircraft and a remote controller, you can check the remaining power of the base station through the following methods:

- After entering the Autel Voyager App, you can check the current accurate remaining battery power in the status bar of the map interface or camera interface.
- Check the current approximate remaining power range through the base station power indicator.

Table 3-22 Check the battery level with the power indicator light

No.	Power light status	Power range
1	Green light is always on	60% ≤ Power
2	Yellow light is always on	30% ≤ Battery ≤ 60%
3	Red light is always on	10% ≤ Battery ≤ 30%
4	Red light is flashing	Power ≤ 10%

3.3.5 Charging the Base Station

Use the official standard double-ended USB to Type-C cable to connect the Type-C port of the base station charger and the base station charging interface and connect the two-pin plug end of the charger to the AC power supply (100-240V ~ 50/60Hz).

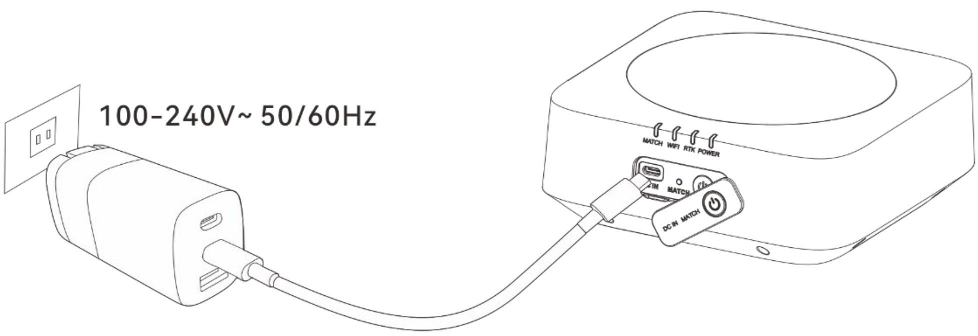


Fig 3-16 Charge the base station via base station charger

⚠ Warning

- Please use the charger officially provided by Autel Robotics to charge the base station. Using a third-party charger may damage the battery of the base station.
- After charging is completed, please disconnect the base station from the charging device in time.

Remarks

- Before taking off the aircraft, it is recommended to charge the base station to a fully charged state.
- Under normal circumstances, it takes about 60 minutes to fully charge the base station battery, but the charging time is related to the remaining power.

3.4 Remote Controller

The Dragonfish Ground Control Station (DFRC-2 Remote controller) is installed with the Autel Voyager Application by default, allowing users to operate and set the aircraft and the gimbal camera and transmitting high-definition videos from the gimbal camera in real time.

When the controller is used with aircraft, its 5.8G data transmission distance is 1km and the image transmission range is 8-10 km; when the RC is used with base station and aircraft, it offers a maximum communication distance of 30 kilometers.

Remarks

- The maximum communication distance of the remote controller is measured under unblocked and interference-free conditions and is for references only.
- It supports adaptive frequency hopping transmission, selects the optimal channel according to the electromagnetic interference situation, and has strong anti-interference ability.
- The whole link data storage between the aircraft and the remote controller adopts the AES-128 encryption method to ensure end-to-end data communication security.
- For more detail information about base station, please refer to “**3.3 Base Station**“.

3.4.1 Remote Controller Components

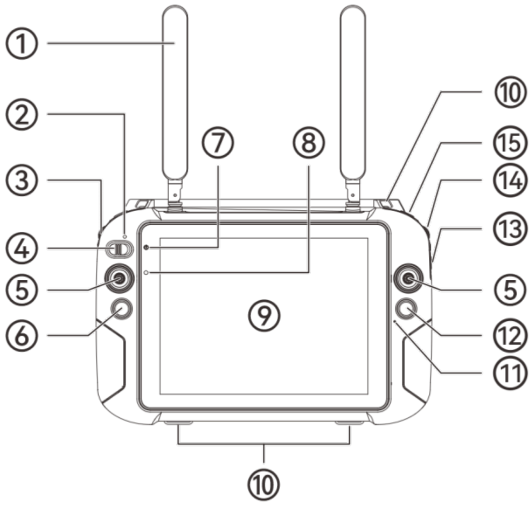


Fig 3-17 Remote Controller Front View

Table 3-23 Remote Controller Front View Details

No.	Name	Description
1	Antenna	Transmits the control signals of the remote controller and receives the image transmission information of the aircraft.
2	Mode Switch Indicator	If you switch to manual mode, the green light is on, if you switch to Auto mode, the red light will on.
3	Left Dial Wheel	The wheel for gimbal pitch: Turn the dial wheel to adjust the gimbal pitch.
4	Mode Switch Button	A: Auto Mode;M: Manual Mode
5	Sticks	Controls the state of motion of the aircraft. The default stick mode is Mode 2. In this mode, you can use the sticks to control the ascent, descent, and heading of the aircraft. You can set the stick mode in the Application.

6	Return-to-Home Button	Press and hold the button for 3 seconds, and the aircraft will automatically begin the return-to-home process.
7	Power Status Indicator	When the RC is being charged, it shows red, if fully charged, it shows green.
8	Optical Sensor	Detects ambient light and adjusts the screen brightness automatically.
9	Display	Displays real-time image transmission views with 2048×1536 resolution. Touch operation is supported.
10	Hook	Used to connect and fix the remote controller lanyard.
11	Audio Input	Receives information from an external audio source near the remote controller.
12	Shooting/Video Recording Button	Press to take photos or start/stop recording.
13	Zoom Switch	Adjust the zoom factor of the camera. W: wide;T: tele。
14	Right Dial Wheel	Turn the dial wheel to adjust the gimbal course angle.
15	F1 Button	Customizable button, available in future update.

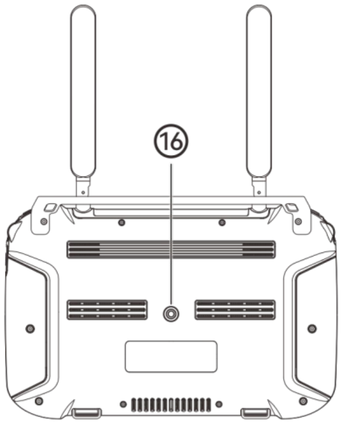


Fig 3-18 Remote Controller Rear View

Table 3-24 Remote Controller Rear View Details

No.	Name	Description
16	Tripod Interface	Used for attaching tripods.

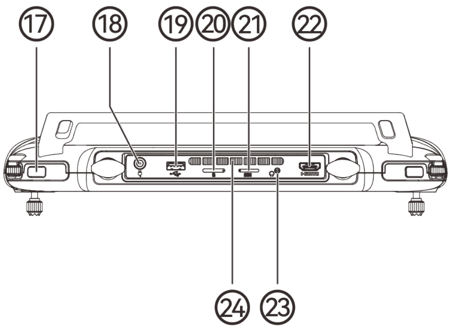


Fig 3-19 Remote Controller Top View

Table 3-25 Remote Controller Top View Details

No.	Name	Description
17	Power button	Press to turn on/off the remote controller. When the remote controller is on, quickly press the power button to switch between Screen On and Screen Off.

18	USB interface	Used for remote controller charging.
19	USB Type-A Interface	Connects to external USB device for data transmission.
20	TF Card Slot	Insert a TF card to expand RC storage space.
21	Nano-SIM Slot	Reserved for future use.
22	HDMI Interface	Outputs the live view of the remote controller to a supported display device.
23	Headphone Jack	Compatible with 3.5mm headphones.
24	Air Inlet	Used for heat dissipation of the remote controller. Please pay attention to whether there are foreign objects blocking the air inlet when using it.

3.4.2 Communication Frequency Bands

The image transmission frequency bands of RC comply with regulatory requirements worldwide. Please refer to the table below for the relevant used frequency bands.

Tips

- After the aircraft is paired with the remote controller and base station, the frequency bands between them will be automatically controlled by the Autel Voyager Application based on the geographical information of the aircraft. This is to ensure compliance with local regulations regarding frequency bands.
- Before flight, please ensure that the aircraft receives a strong GNSS signal after powering on. This allows the Autel Voyager Application to receive the proper communication frequency band.

- When users adopt visual positioning mode (such as in scenarios without GNSS signals), the wireless communication frequency band between the aircraft and remote controller will default to the band used in the previous flight. In this case, it is advisable to power on the aircraft in an area with a strong GNSS signal, then start flight in the actual operational area.

Table 3-26 Global Frequency Bands Used (Image Transmission)

Operating Frequency	Detailed Frequency	Countries & Regions
900M	902-928MHz	■ US (FCC) ■ Canada (ISED)
2.4G	2.400−2.476GHz	■ Chinese Mainland (SRRC)
2.4G	2.400−2.483.5GHz	■ US (FCC) ■ Canada (ISED) ■ EU (CE) ■ Australia (RCM)
5.2G	5.15− 5.25GHz	■ US (FCC) ■ Australia (RCM)
5.8G	5.725-5.829GHz	■ Chinese Mainland (SRRC)
5.8G	5.725-5.850 GHz	■ US (FCC) ■ Canada (ISED) ■ EU (CE) ■ Australia (RCM)

Table 3-27 Global Frequency Bands Used (Wi-Fi)

Operating Frequency	Countries & Regions
2.4G (2400 – 2476MHz)	■ Chinese Mainland (SRRC)
2.4G (2400 – 2483.5MHz)	■ US (FCC) ■ Canada (ISED) ■ EU (CE) ■ Australia (RCM)
5.2G (5150 – 5250MHz)	■ US (FCC) ■ Australia (RCM)
5.8G (5.725-5.829GHz)	■ Chinese Mainland (SRRC)
5.8G (5725 – 5850 MHz)	■ US (FCC) ■ Canada (ISED) ■ EU (CE) ■ Australia (RCM)

Remarks

- Some countries and regions have strict restrictions on the use of radio communication frequency bands. It is crucial to use them legally, and any modification of communication modules is strictly prohibited.
- If flying in any countries not listed in the above table, please consult the local communication management authorities to ensure that the aircraft communication frequency bands comply with local regulatory requirements.
- Please note that UAS will automatically match legal frequency bands according to GNSS positioning.

3.4.3 Turning the Remote Controller on/off

■ Turning the Remote Controller on

Press and hold the power button at the top of the remote controller for 1 second until the controller emits a “beep” sound to turn it on.

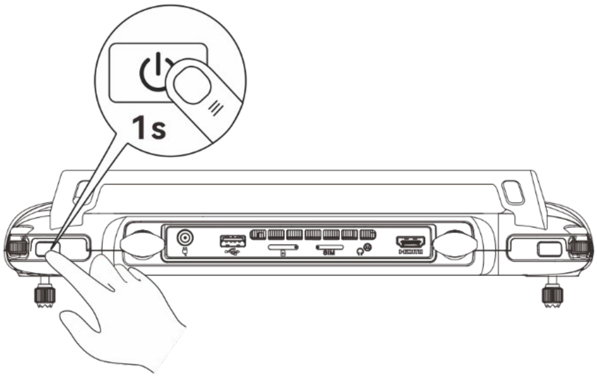


Fig 3-20 Turning the Remote Controller On

Tips
● When using a brand-new remote controller for the first time, please follow the on-screen instructions to complete the relevant setup. ● When the remote controller is on, quickly press the power button to switch between Screen On and Screen Off.

■ Turning the Remote Controller off or Restarting the Controller

When the remote controller is on, press and hold the power button at the top of the remote controller until the “Off” or “Restart” icon appears at the top of the controller's screen. Tapping the “Off” icon will turn off the remote controller. Tapping the “Restart” icon will restart the remote controller.

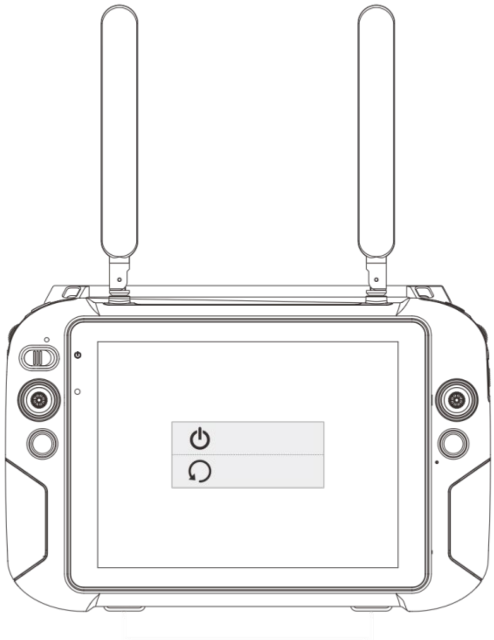


Fig 3-21 Turn The Remote Controller Off or Restart

Tips
● When the remote controller is on, you can press and hold the power button at the top of the remote controller for 10 seconds to forcibly turn it off.

3.4.4 Flight Control Mode

With the remote controller, users can control the aircraft in Auto mode or Manual mode. Refer to "**3.1.5 Flight Modes**" for details.

■ Automatic Flight Control

Switch the Mode Switch Button on the remote controller to the "A". The mode switch indicator will turn green and the remote controller will not respond to stick commands. After planning the flight route in the Autel Voyager App, users may execute takeoff, and the aircraft will automatically follow the planned path. During this process, users can control the gimbal camera by turning the dial wheels or using the zoom switch.

■ Manual Flight Control

Switch the Mode Switch Button on the remote controller to the "M". The mode switch indicator will turn red. In this mode, users can manually control the aircraft by using sticks during flight.

⚠ Warning

- If users are not fully skillful in controlling the aircraft, it is not suggested to use the manual mode.
- When users are controlling the aircraft with the remote controller, it is recommended to use the auto mode.

3.4.5 Checking the Battery Level of the Remote Controller

When the remote controller is on, you can check the current battery level of the remote controller in the following ways:

- Check it on the top status bar of the Autel Voyager Application.
- Check it by swiping down from the top of the remote controller's screen to access the Control Center to check the battery level.
- Go to the system settings of the remote controller and check the current battery level of the controller in "Battery".

3.4.6 Charging the Remote Controller

Connect the round output end of the charger to the interface of the remote controller and connect the plug of the charger to an AC power supply (100-240 V~ 50/60 Hz).

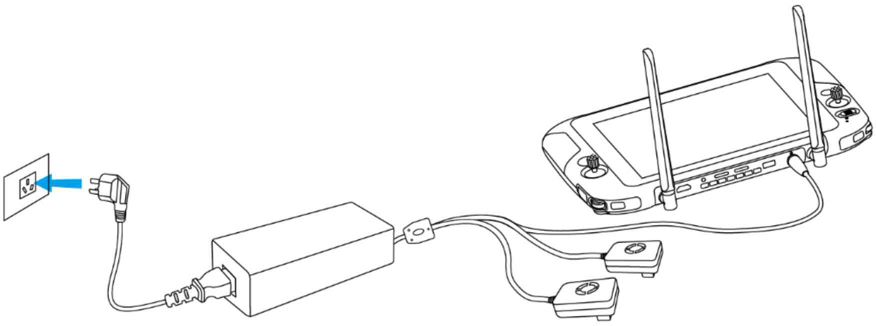


Fig 3-22 Use the charger to charge the remote controller

⚠ Warning

- Please use the official charger provided by Autel Robotics to charge the remote controller. Using third-party chargers may damage the battery of the remote controller.

- After charging is completed, please disconnect the remote controller from the charging device promptly.

Remarks

- It is recommended to fully charge the remote controller battery before the aircraft takes off.
- Generally, it takes about 120 minutes to fully charge the aircraft battery, but the charging time is related to the remaining battery level.

3.4.7 Adjusting the Antenna Position of the Remote Controller

During flight, please extend the antenna of the remote controller and adjust it to an appropriate position. The strength of the signal received by the antenna varies depending on its position.

When the angle between the antenna and the back of the remote controller is 180° or 270°, and the plane of the antenna faces the aircraft, the signal quality between the remote controller and the aircraft can reach its best state.

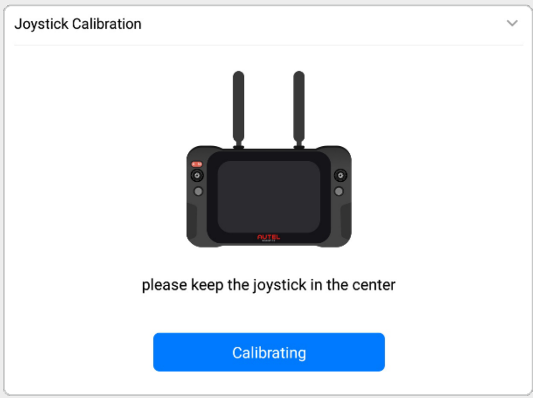
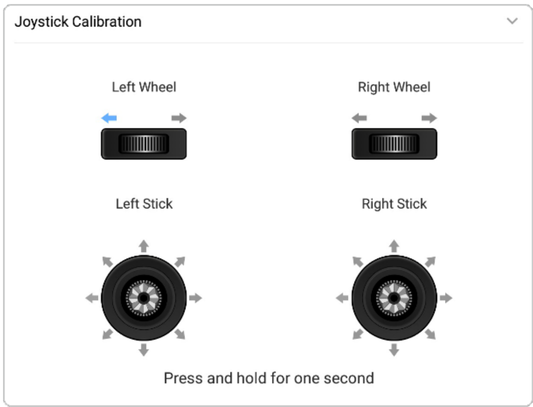
Important

- During flight, it is suggested to use the remote controller with base station to enhance the connection.
- When users operate the aircraft, make sure that the aircraft is in the place for the best communications.
- Do not use other communication devices of the same frequency band at the same time to prevent interference with the signals of the remote controller.
- During flight, if there is a poor image transmission signal between the aircraft and the remote controller, the remote controller will provide a prompt. Please adjust the antenna orientation according to the prompt to ensure that the aircraft is in the optimal data transmission range.

3.4.8 Calibrating the Remote Controller

If the remote controller is abnormal, it is recommended to calibrate it, as shown below.

Table 3-28 Calibrating the Remote Controller

Step	Operation	Diagram
1	Turn on the remote controller. ● After entering map or camera interface in the Voyager application, tap "⚙", tap "Remote controller", and then tap "RC Calibration". Follow the on-screen instructions to calibrate the remote controller.	
2	● Calibration of the wheels and sticks: According to the calibration guide interface of the remote controller, move the left and right dial wheels and the left and right sticks according to the directions shown in the figure and hold for 1 second. At this time, a beep will be heard, and the calibration direction icon will be change from gray to dark blue, indicating that the orientation calibration was successful. ● There is no order in which directions are calibrated, until all directions are calibrated, the remote controller calibration is done.	

3.4.9 HDMI Screen Output

The remote controller is equipped with an HDMI interface. The interface allows users to output the real-time screen of the remote controller to supported digital devices such as display screens.

3.4.10 Autel Voyager Application

Autel Voyager Application is an industrial flight software developed by Autel Robotics especially for the Dragonfish series vertical take-off and fixed-wing aircrafts, and is installed on the Dragonfish ground station (remote controller). The Autel Voyager Application integrates multiple professional functions, is simple to operate, and easy to get started. Users can achieve highly intelligent operations of the aircraft through various built-in intelligent flight functions, empowering industrial applications.

When used with the Autel Voyager, the aircraft can be widely used in security, inspection and other industries, and supports a variety of mission modes such as waypoint missions, polygon missions, and quick missions.

Remarks
• This chapter is based on version V10.3.3.21 of Autel Voyager Application. In practical use, due to application version update, some UI interfaces and functions may change. Please conduct operations according to the actual version.

3.4.10.1 Main interface

Autel Voyager Application consists of map interface, camera interface, [Aircraft Settings], [New User Tutorials], [Flight Records], [Mission Library] and [Album]. Relevant interface functions are as follows:

- Map interface: Users can create route missions on the map interface and save them to the mission library; they can also perform other flight missions.
- Camera interface: When performing a flight mission, it displays the real-time transmission image of the gimbal camera. The camera interface can be switched between the zoom lens interface, wide-angle lens interface, infrared lens interface, and split-screen (infrared + zoom) interface.

Tips

- When the aircraft is equipped with different gimbal camera, the lens interface displaced in camera interface will vary as well.

- [Aircraft Settings]: Provides access to software and hardware functionality settings related to flight safety.
- [New User Tutorials]: Provides access to teaching videos and user manuals for the aircraft, and supports downloading to local for management.
- [Flight Records]: You can view the flight records of the aircraft (total flight mileage, total flight time, number of flights), and it supports downloading from the cloud to local for viewing.
- [Mission Library]: You can view saved route missions and geofences and manage them.
- [Album]: You can view all photos and videos taken by the gimbal camera.

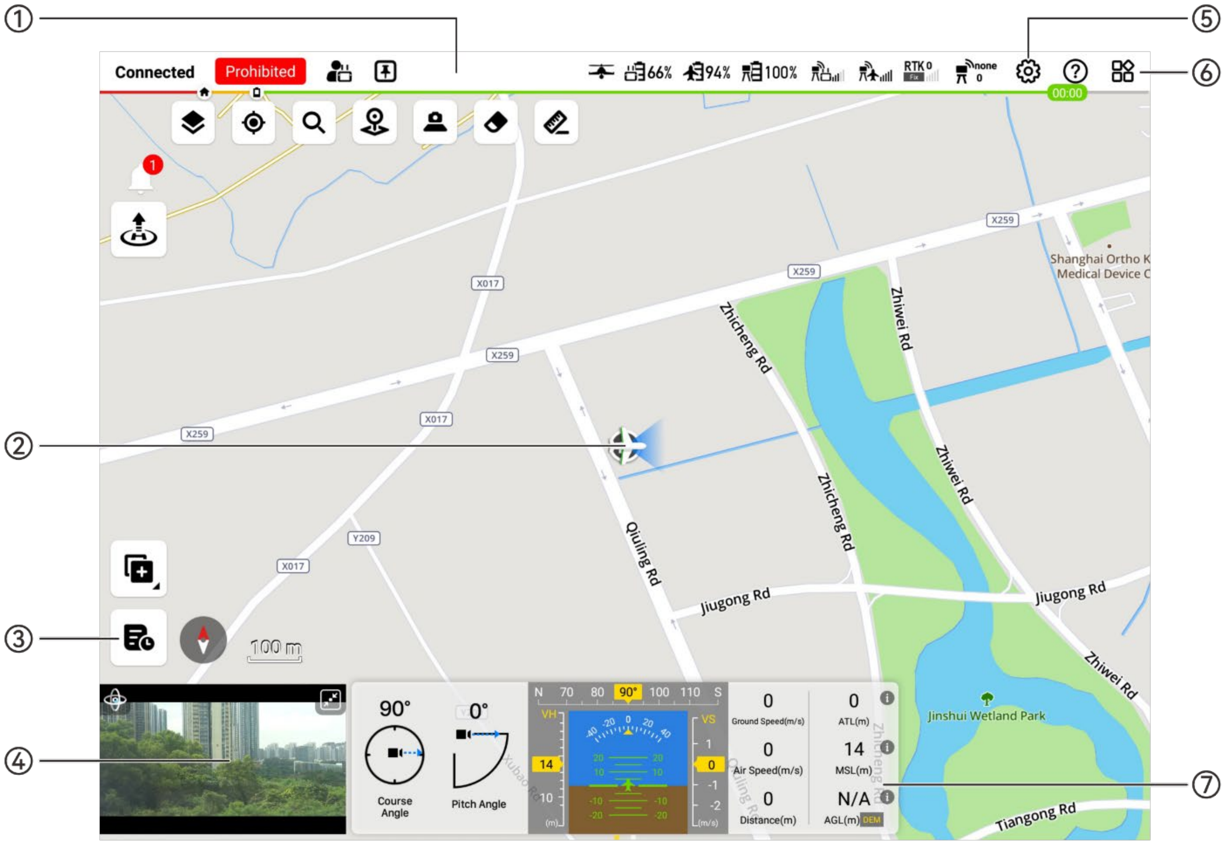


Fig 3-23 Interface layout (map interface)

Fig 3-24 Interface layout (camera interface)

Table 3-29 Interface layout description

No.	Layout/Icon	Description
1	Status bar	Mainly displays flight status information and device status information of the aircraft, the base station, and the remote controller.
2	Battery bar	Real-time display of the remaining battery level of the aircraft and the estimated remaining flight time.
3	Map Interface	Users can create waypoint missions and geofences on the map interface, and when performing missions, relevant information about the mission (route, track, mission execution status) will be dynamically displayed.

4		Tap this icon to check saved route missions or geofences in [Mission Library].
5	Camera interface preview	Preview the live image transmission of the currently selected camera lens in a small window. Tap to enter the full-screen camera interface.
6		Tap this icon to go to [Aircraft Settings] interface where you can set parameters on Autel Voyager Application, aircraft, remote controller and base station.
7		Tap this icon to go to [New User Tutorials] or [Flight Records] interface.
8	Professional Panel	Dynamically display the telemetry data of the aircraft, including the gimbal attitude, aircraft attitude, and flight data. Switch to the telemetry data panel by holding and sliding the professional panel to the left.
9	Camera interface	Users can view the full-screen transmission images of each lens of the gimbal camera on the camera interface and set the camera.
10	Map Interface Preview	Preview the current aircraft's track information on the map in a small window. Tap to enter the full-screen map interface.
11	Other Lens Previews	Preview the live image transmission of other lenses of the current gimbal camera in a small window. Tap to switch with the current full-screen lens image.
12	Camera Lens Switch	Tap the corresponding lens icon to enter the full-screen image transmission screen of the corresponding lens of the gimbal camera.

3.4.10.2 Status bar

The status bar is located at the top of the map interface and camera interface. It is mainly used to display flight status information and device status information of the aircraft, the base station, and the remote controller. At the same time, it provides users with access to the “Aircraft Settings” interface, “New User Tutorial” interface, and “Flight Records” interface.

Fig 3-25 Status bar

Table 3-30 Status bar icon description

No	Icon	Description
1	Connected	Display the connection status between the remote controller and the aircraft, as well as the mission execution status.
2	Prohibited	Display the current device status. If the device status is abnormal, a warning prompt will appear.
3		When two remote controllers are connected to a base station at the same time, the current remote controller is the pilot role.
4		When two remote controllers are connected to a base station at the same time, the current remote controller is the observer role.
5		The current base station's working mode is fixed mode, and the Dragonfish base station only supports fixed mode.
6		The no-fly zone is in lifted state.
7		Fixed-wing mode, indicating that the aircraft is currently in a horizontal flight phase.
8		Multi-rotor mode, indicating that the aircraft is currently in a vertical take-off and landing phase.

9		The current battery level of the remote controller.
10		The current battery level of the aircraft.
11		The current battery level of the base station.
12		The signal strength between the base station and the remote controller.
13		The signal strength between the base station and the aircraft.
14	RTK Float	The RTK signal strength and positioning accuracy level.
15		GNSS signal strength.
16		Base station signal strength.
17		Obstacle avoidance function, turned on as green, and turned off as red.
18		Tap this icon to enter the “Aircraft Settings” interface.
19		Tap this icon to provide hints for related functions of the interface elements.
20		Tap this icon to enter the “New User Tutorials” interface or “Flight Records” interface.

3.4.10.3 Map interface

After tapping the Autel Voyager Application, you will enter the map interface by default.

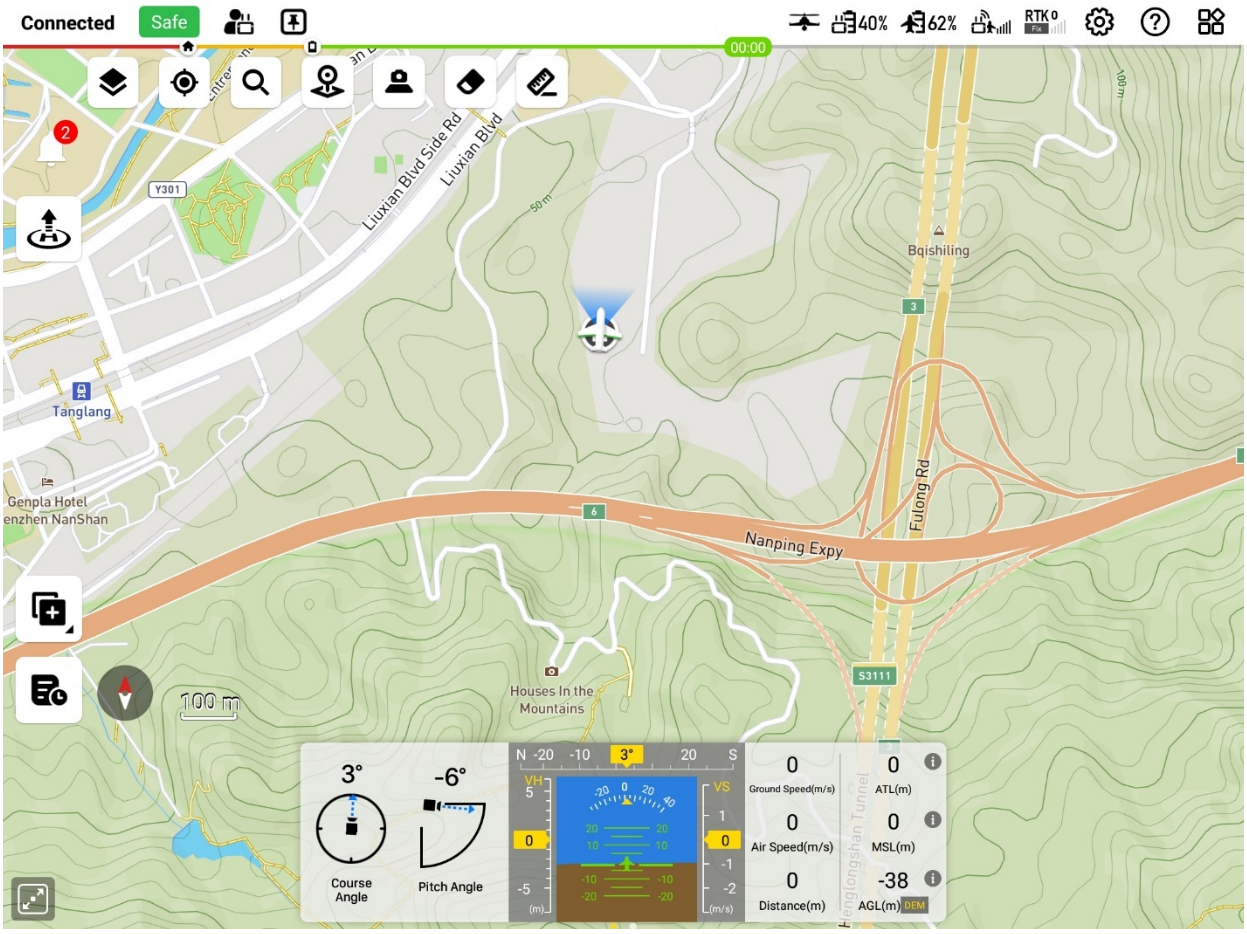


Fig 3-26 Map Interface

Table 3-31 Map interface icon description

No.	Icon	Description
1		Tap this icon to view the specific alarm content when an alarm icon appears.
2		Tap this icon to select the map layer as “Standard”, “Hybrid”, or “3D” in three display styles, and support managing marked points and downloading offline maps.
3		Tap this icon to select quick location to “RC”, “Aircraft”, or “Route”.
4		Tap this icon to search for an address or coordinates.

5		Tap this icon to place marked points on the map.
6		Tap this icon to project the gimbal image onto the map, including three types of projection: “Stopped “, “Real-time “, and “Incremental”.
7		Tap this icon to select clearing the overflew routes or projection.
8		Tap this icon to measure the distance between two points on the map, supporting continuous marking for measurement.
9		After editing and saving the route mission, tap this icon to perform a pre-flight check and then select to start the mission.
10		Tap this icon to complete the pre-flight check and perform takeoff, and the aircraft will take off vertically and hover.
11		During the mission: Tap this icon on the map interface to select auto landing or precise diversion. Tap this icon on the camera interface, and the aircraft will automatically descend and turn off the motor after landing.
12		During the mission, tap this icon on the map interface, and the aircraft will vertically land from the current location.
13		During the mission, tap this icon on the map interface and set a temporary alternate point on the map, and the aircraft will precisely land at the alternate point.
14		During the mission, tap this icon, and the aircraft will automatically return.

15		During the flight of the aircraft, tap this icon to exit the current mission and perform a quick mission.
16		Before the aircraft takes off, tap this icon to select creating waypoint missions, polygon missions, and geo fences. After the aircraft takes off, tap this icon to select creating temp missions, such as waypoint missions, polygon missions and figure-8 missions.
17		Tap this icon to create a waypoint mission.
18		Tap this icon to create a polygon mission.
19		Tap this icon to create a geofence.
20		Tap this icon to create a figure-8 mission.
21		Tap this icon to preview the route and terrain or set whether to enable the terrain obstacle avoidance function.
22		Tap this icon to enter the “Mission Library” interface.
23		Compass, indicating the true north direction of the map.

3.4.10.4 Camera interface

On the map interface, tap the camera interface preview window at the lower left corner to enter the camera interface.

Fig 3-27 Camera interface

☀ Tips
● When the aircraft is equipped with different gimbal cameras, the lens interface displayed on the camera interface will also be different.

Table 3-32 Camera interface icon description

No.	Icon	Description
1		Tap this icon to enable gimbal lock. After locking the target point by tapping or tapping and dragging to select, the target point remains in the center of the image transmission screen.

2		Tap this icon to realize quick return-to-center of the gimbal, including "pitch horizontal return to center", "horizontal return to center pitch down", "horizontal return to center" and "pitch return to center".
3		Tap this icon to keep the gimbal pitch angle horizontal and the gimbal heading to follow the aircraft heading.
4		Tap this icon, the gimbal's pitch angle will be 90°downward , and the gimbal's heading will follow the aircraft's heading.
5		Tap this icon to keep the gimbal pitch angle in its current state and the gimbal heading to track the aircraft heading.
6		Tap this icon to keep the gimbal pitch angle horizontal and the gimbal heading to the current state.
7		Tap this icon and enter the RTMP address to start the gimbal transmission live broadcast.
8	AF	Automatic zoom. Tap this icon to switch to manual zoom (MF).
9	MF	Manual zoom. Tap this icon to switch to automatic zoom (AF).
10		Tap this icon to set parameters and functions of the current camera lens.
11		Photo button. Tap this icon, the corresponding lens will take a photo.
12		Recording button. Tap this icon, the corresponding lens will record, tap it again to stop recording.
13	20x	Displays the lens focal length. Tap this icon to manually adjust the zoom factor.

14		Tap this icon to enter the photo album to view the photos and videos you have taken.
15		Displays the current lens working mode and the number of images. Tap this icon to switch back and forth between photo mode/video mode.
16		Tap this icon to achieve linked zooming of the zoom lens and infrared lens.
17		Tap this icon to turn off the infrared temperature measurement function.
18		Tap this icon to turn on the area temperature measurement function, which can measure the temperature range of the specified area.
19		Tap this icon to turn on the point temperature measurement function, which can measure the temperature of a specified point.
20		Tap this icon to turn on the center point temperature measurement function, which can measure the temperature of the center point of the image transmission screen.
21		Tap this icon to perform Flat-Field Calibration. After calibration, the thermal imaging picture quality will be optimized and temperature changes will be easier to observe.
22		In the split-screen interface, the two-split screen image of the zoom lens and infrared lens is displayed in a 5:4 ratio. Tap this icon to switch to full screen display.
23		The split-screen interface displays the zoom lens and infrared lens in full screen. Tap this icon to switch to 5:4 ratio display.

■ Zoom lens settings

On the “Zoom” lens interface, tap the “ ” icon to configure relevant settings for the zoom lens.

1. Exposure settings:
   - Exposure mode: Can be set to “Auto”, “A”, “S “, “M”.
     - Auto: Adjustable exposure compensation.
     - A: Adjustable aperture and exposure compensation.
     - S: Adjustable shutter speed and exposure compensation.
     - M: Adjustable shutter speed, aperture and sensitivity.
2. Photo settings:
   - Photo mode: Can be set to “Single”, “Burst”, and “Time Lapse”.
     - Single: Take only one photo at a time.
     - Burst: You can set to take 3 or 5 photos continuously each time.
     - Time Lapse: Take pictures continuously at a certain interval. The interval can be set to “2s”, “5s”, “7s”, “10s”, “20s”, “30s”, or “60s”.
   - Check the photo resolution and photo format (JPG).
   - White Balance: Can be set to “Auto”, “Indoor”, “Outdoor”, “Sodium Lamp”.
3. General settings:
   - Grid: Can be set to “None”, “Grid”, “Grid + Diagonal”. Setting up a grid can help with composition when shooting.
   - Center point: can be set to “None”, “Square (Without Center Point)”, “Square (With Center Point)”, “Cross”, “Circle (Without Center Point)”, “Circle (With Center Point)”. After setting, the center point of the image will be displayed on the camera interface.
   - Save location: can be set to “Flash memory” or “SD card”. After setting, the captured image files will be stored in the corresponding location.
   - Histogram: Enable or disable the histogram function. The histogram can show the distribution of pixels in the image captured by the camera, thereby reflecting the exposure of the image.

Tips

- If the histogram is turned on, a floating "histogram" window will be generated in the remote controller screen. The user can drag the "histogram" window to any area on the screen. Tap the "Close" button at the upper right corner of the window to turn off the histogram function.

- Lock Gimbal While Shooting: You can enable or disable the gimbal lock when taking pictures.
- ICR: ICR (dual filter switcher) can be enabled or disabled.
- Image stabilization: Electronic image stabilization can be enabled or disabled.
- Subtitle: Enable or turn off video subtitles.
- Tap to begin metering/focus: Turn metering /focus on or off.
- Check the camera model and camera version.
- Reset camera settings, format SD card or format flash memory.

■ Wide angle lens settings

On the "Wide Angle" lens interface, tap the "" icon to make relevant settings for the wide angle lens.

1. Exposure settings:

- Exposure mode: Can be set to "Auto", "S", "M".
  - Auto: Adjustable exposure compensation.
  - S: Adjustable shutter speed and exposure compensation.
  - M: Adjustable shutter speed and sensitivity.

2. Photo settings:

- Photo mode: Can be set to "Single", "Burst", and "Time Lapse".
  - Single: Take only one photo at a time.
  - Burst: You can set to take 3 or 5 photos continuously each time.
  - Time Lapse: Take pictures continuously at a certain interval. The interval can be set to "2s", "5s", "7s", "10s", "20s", "30s", or "60s".
- Set photo resolution: It can be set to "4000×3000" or "3840×2160".
- Check the photo format (JPG).

- White balance: Can be set to “Auto”, “Sunny”, “Cloudy”, “Fluorescent”, “Incandescent”, “Custom”.
  - Custom: Set the color temperature by yourself, which can be set between 2 000K~10000K.

3. General settings:

- Grid: Can be set to “None”, “Grid”, “Grid + Diagonal”. Setting up a grid can help with composition when shooting.
- Center point: can be set to “None”, “Square (Without Center Point)”, “Square (With Center Point)”, “Cross”, “Circle (Without Center Point)”, “Circle (With Center Point)”. After setting, the center point of the image will be displayed on the camera interface.
- Save location: can be set to “Flash Memory” or “SD card”. After setting, the captured image files will be stored in the corresponding location.
- Histogram: Enable or disable the histogram function. The histogram can show the distribution of pixels in the image captured by the camera, thereby reflecting the exposure of the image.
- MF Focus: You can enable or disable MF auxiliary focus.
- Lock Gimbal While Shooting: You can enable or disable the gimbal lock when taking pictures.
- Image stabilization: Electronic image stabilization can be enabled or disabled.
- Subtitle: Enable or turn off video subtitles.
- Tap to begin metering/focus: Turn metering /focus on or off.
- Check the camera model and camera version.
- Reset camera settings, format SD card or format flash memory.

■ IR lens settings

On the “Infrared” lens interface, tap the “ ” icon to make relevant settings for the infrared lens.

1. Image settings:

- Color: Can be set to “White Hot”, “Black Hot”, “Rainbow”, “RainbowHC”, “Ironbow”, “Lava”, “Arctic”, “Glowbow”, “Graded Fire”, “Hottest”.
- Gain Mode: Can be set to “Auto”, “High gain”, “Low gain”.
  - High gain mode (-20℃-150℃): The temperature measurement accuracy is higher than the low gain mode, and the temperature measurement range is smaller.

  - Low gain mode (0℃-550℃): The temperature measurement range is larger than the high gain mode, and the temperature measurement accuracy is lower.
- Brightness and contrast adjustment: Can be set to "Manual", "Auto 1", "Auto 2".
  - Manual: Set brightness and contrast manually.
- Detail enhancement: can be set from 1 to 8.
- Noise reduction: Noise reduction can be turned on or off.

2. Photo settings:

- Photo mode: Can be set to "Single", "Burst", and "Time Lapse".
  - Single: Take only one photo at a time.
  - Burst: You can set to take 3 or 5 photos continuously each time.
  - Time Lapse: Take pictures continuously at a certain interval. The interval can be set to "2s", "5s", "7s", "10s", "20s", "30s", or "60s".

3. General settings:

- Grid: Can be set to "None", "Grid", "Grid + Diagonal". Setting up a grid can help with composition when shooting.
- Center point: can be set to "None", "Square (Without Center Point)", "Square (With Center Point)", "Cross", "Circle (Without Center Point)", "Circle (With Center Point)". After setting, the center point of the image will be displayed on the camera interface.
- Save location: can be set to "Flash Memory" or "SD card". After setting, the captured image files will be stored in the corresponding location.
- Histogram: Enable or disable the histogram function. The histogram can show the distribution of pixels in the image captured by the camera, thereby reflecting the exposure of the image.
- Lock Gimbal While Shooting: You can enable or disable the gimbal lock when taking pictures.
- Image stabilization: Electronic image stabilization can be enabled or disabled.
- Subtitle: Enable or turn off video subtitles.
- Tap to begin metering/focus: Turn metering /focus on or off.
- Check the camera model and camera version.
- Reset camera settings, format SD card or format flash memory.

⚠ Warning

- When shooting, do not point the infrared thermal imaging camera at strong energy sources, such as the sun, lava, laser beams, and molten iron, to avoid damaging the infrared detector.
- The measured target temperature should be within 600 ° C. Over-temperature observation will cause burns and damage to the infrared detector.

3.4.10.5 Aircraft settings interface

Tap the "⚙" icon at the top of the map interface or camera interface in the Autel Voyager Application to access the [Aircraft Settings] interface for parameter settings for the Autel Voyager Application, as well as the aircraft, the remote controller, and the base station.

Important

- If the remote controller belongs to the observer role, some settings will not have operating permissions. Please refer to Chapter 2 "2.13 Dual Control Function"for details.

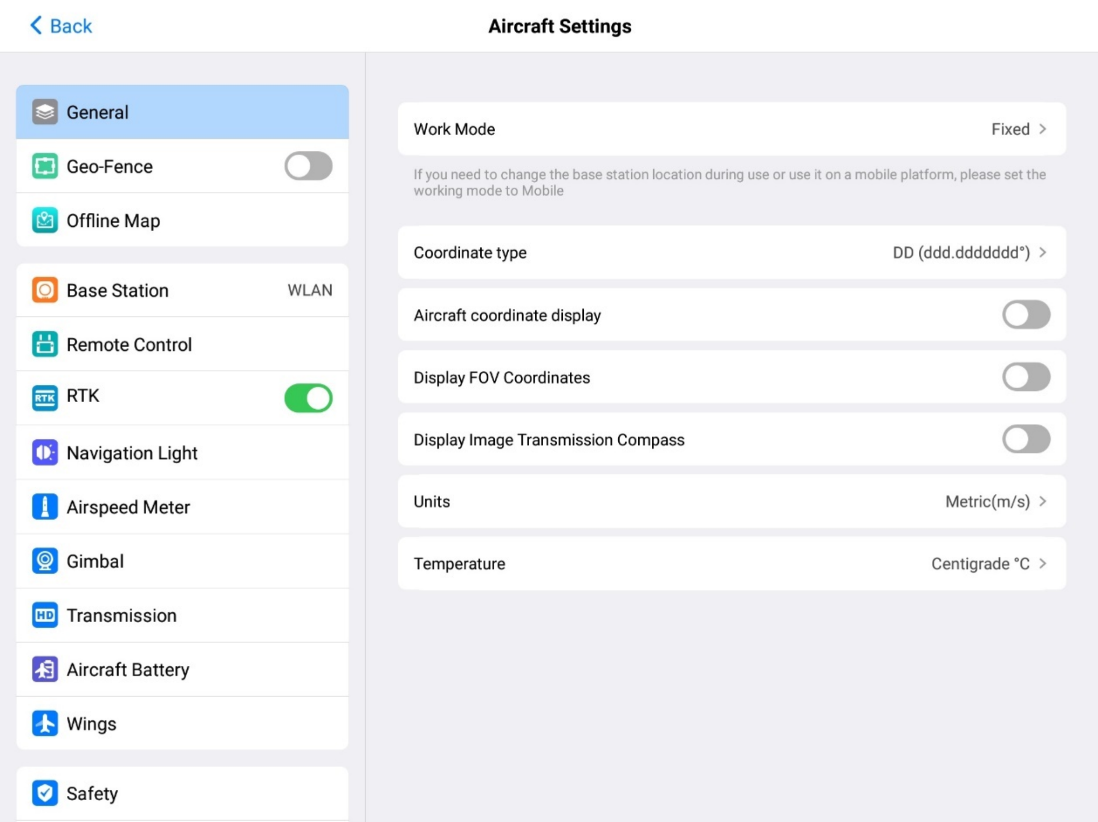


Fig 3-28 Aircraft settings interface 1

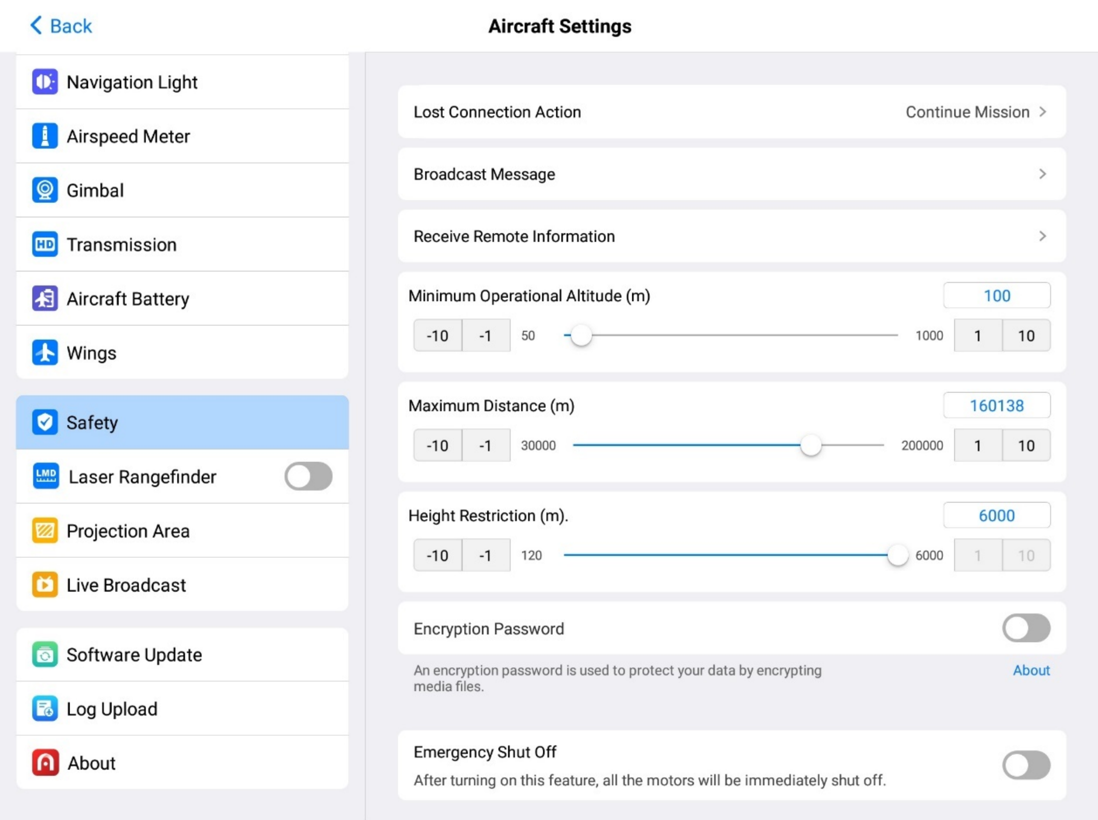


Fig 3-29 Aircraft settings interface 2

Table 3-33 Setting items in aircraft interface

No.	Setting Entry	Setting Item
1	General	● Work Mode: Can be set to “Fixed” or “Mobile”. ● Coordinate type: Can be set to “DMS”, “DD”, “UTM” or “MGRS”. ● Aircraft coordinate display: Turn on or off this function. ● Display FOV Coordinates: Turn on or off this function. ● Display Image transmission compass: Turn on or off this function. ● Units: Can be set to “Metric (m/s)”, “Metric (km/h)”, “Imperial (mph)”. ● Temperature: Can be set to “Celsius ℃” or “Fahrenheit ℉”.
2	Geo-Fence	● You can enable or disable this function.
3	Offline Map	● Manage and download offline map.
4	Base Station	● Manage and connect base station Wi-Fi.
5	Remote Control	● Joystick Calibration: calibrate sticks or dial wheels of the remote controller. ● Control Mode: Select Mode 1, Mode 2, or Model 3. ● Datalink frequency matching: match frequency with the aircraft.
6	RTK	● You can enable or disable RTK service.
7	Navigation Light	● Navigation light master control: All navigation lights can be set when it is turned on, and navigation lights can be set individually when it is turned off. ● All navigation light settings: "Close", "Solid", "Solid in

		reverse", "Flash". ● Left navigation light settings: "Close", "Solid", or "Flash". ● Right navigation light settings: "Close", "Solid", or "Flash". ● Rear navigation light settings: "Close", "Solid", or "Flash".
8	Airspeed Meter	● Perform Airspeed Meter Calibration.
9	Gimbal	● PTZ mode: "Course following" or "Attitude lock". ● Gimbal pitch EXP: can be set from 1 to 100. ● Adjust Gimbal: "Roll axis fine tuning", "Yaw axis fine tuning" or "Pitch fine tuning". ● Automatic Gimbal Calibration: Calibrate the three-axis movement of the gimbal.
10	Image Transmission	● Image Transmission Mode: "HD" and "Smooth" can be set.
11	Aircraft Battery	● Check the temperature, remaining power, number of discharges, serial number, and battery firmware version number of the front and rear batteries. ● Self Discharge Time: Set the battery self-discharge time to protect the battery. ● Intelligent Low Battery Return: This function can be turned on or off. ● Intelligent Low Battery: The remaining power after landing can be set between 15% and 50%.
12	Wings	● Check the number of times the wing has been used and the number of cycles on the front and rear batteries.
13	Safety	● Lost Connection Action: "Continue mission" and "Go Home" can be set. ● Broadcast Message: Send aircraft related information through Remote ID.

		● Receive Remote Information: When it is turned on, corresponding risk prompts can be received within a set distance through the ADS-B receiver. ● Safety Altitude (m): The safety height value can be set within 50~1000. ● Maximum distance (m): The limit distance value can be set within 30000~200000. ● Height Restriction (m): The limit height value can be set within 120~6000. ● Encryption Password: This function can only be turned on after a TF card is inserted. ● Emergency Shut off: When turned on, the aircraft motor will be powered off and shut down.
14	Laser Rangfinder	● This function can be turned on or off (only appears when the aircraft is equipped with a gimbal camera with a laser rangefinder).
15	Projection Area	● Projection Area Display: This function can be turned on or off. ● Projection Center Coordinate Display: This function can be turned on or off.
16	Live Broadcast	● Live Broadcast Shortcut Switch: After turning on this function, enter the RTMP address for live image transmission.
17	Software Update	● Android System Update: Displays the remote controller operating system version number, and will give a prompt if there is an update. ● APP Update: Displays the Autel Voyager Application version number and will give a prompt if there is an update. ● UAV firmware: Displays the aircraft firmware version number and will give a prompt if there is an update.

		● Wi-Fi Update: Displays the base station firmware version number, and will give a prompt if there is an update.
18	Log Upload	● After the RC is connected to the Internet, flight logs can be synchronized to the Autel cloud.
19	About	● View total flight time. ● Check the Application version number. ● Check the firmware version of each aircraft hardware. ● Check the gimbal serial number, aircraft serial number, base station serial number and remote controller serial number.

■ Image transmission compass display

The aircraft supports displaying a compass on the camera interface to indicate the current orientation of the aircraft's gimbal camera. Users can turn on the “Display Image Transmission Compass” function in the “General” of the [Aircraft Settings] interface. After turning on the image transmission compass function, users can clearly distinguish the orientation of the gimbal camera and can adjust the gimbal camera heading according to the compass instructions.

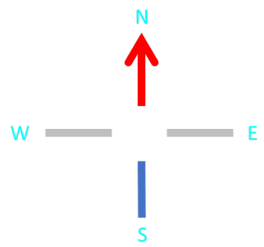


Fig 3-30 Image transmission compass display

N/S/W/E marks on the compass represent the four directions of north/south/west/east respectively. These four marks will dynamically rotate based on the actual orientation of the gimbal camera to represent the current orientation.

Tips
● If the gimbal camera is facing north, the “N” will be directly above the remote controller,

indicating that the aircraft is currently facing north.

- When gimbal camera changes its orientation during actual operation, the N/S/W/E mark on the compass will rotate in the opposite direction accordingly. For example, if the gimbal camera yaws 45° to the right, the "N" on the compass will also rotate 45° to the left.

■ Livestream Function

The aircraft supports RTMP livestream function. After the ground control station (RC) connects the network which can visit upstreaming server, and the RC connects the aircraft normally, the image captured by the aircraft can be sent to the designated upstreaming address. The detailed procedures are as follows:

1. In "Aircraft Settings" interface, tap "Live Broadcast" on the left navigation column, enable the "Live Broadcast Shortcut Switch" to turn on livestreaming.

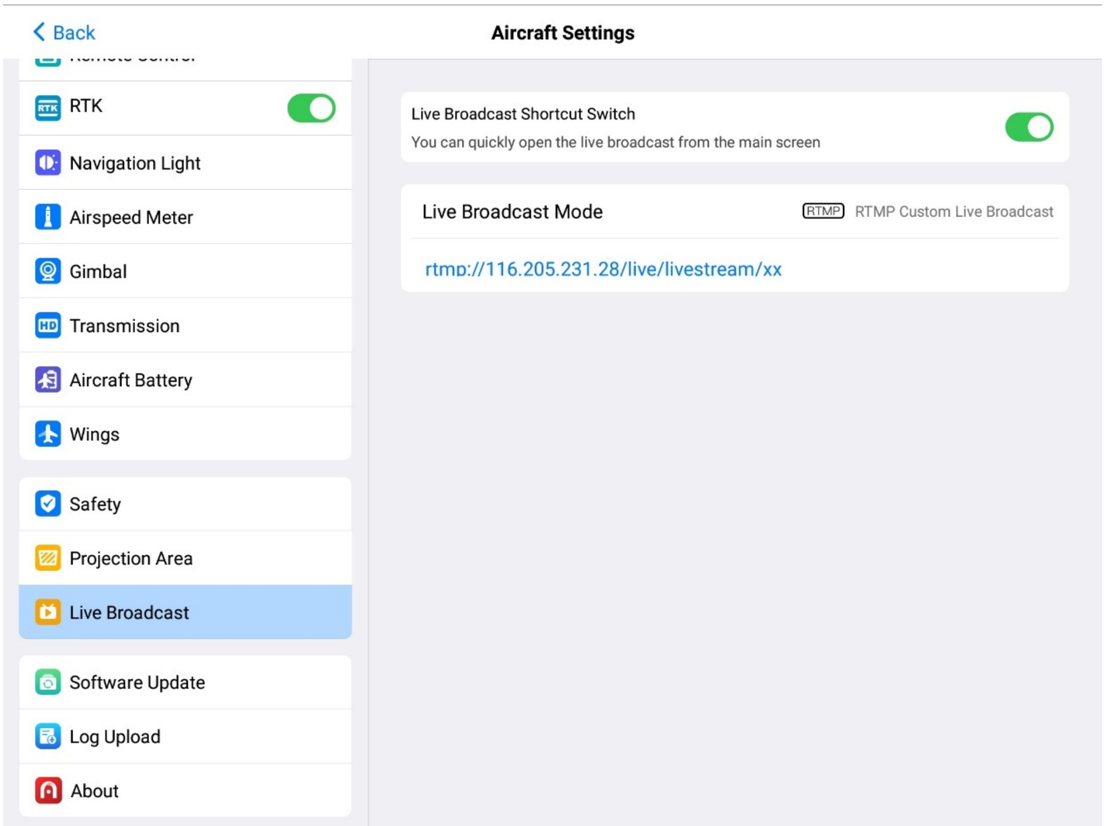


Fig 3-31 Enable Livestreaming

2. After turning on the livestreaming switch, tap the RTMP Address under Live Broadcast Mode, enter the RTMP address in the pop-up window and tap "Save" button to save the RTMP address.

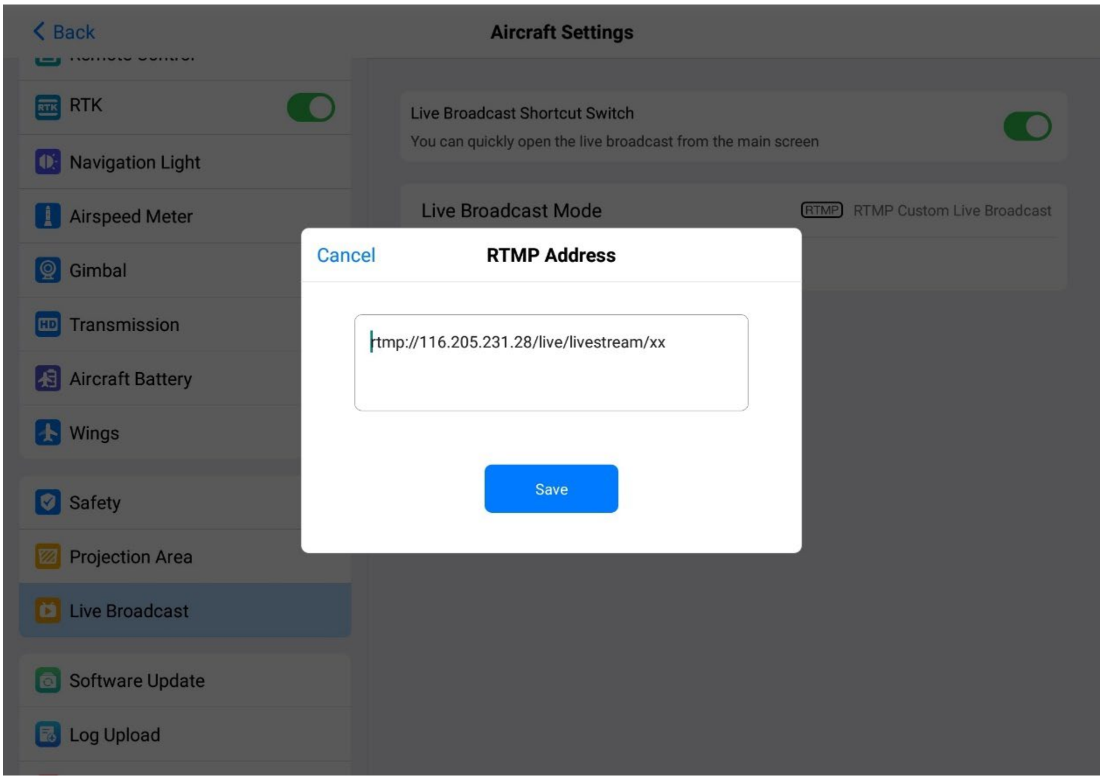


Fig 3-32 Enter RTMP Address

3. After completing the RTMP setting, tap the livestream shortcut switch icon “ ” in the camera interface to start livestreaming.

Tips
● If you have not set the address for RTMP streaming on the settings interface, when you click the livestreaming shortcut switch, an interface will pop up for you to enter the address. After entering, you can start livestreaming. If livestreaming still cannot be started normally, you need to check if the entered address is correct and whether the network connected by the current remote controller can access the streaming address.

4. After successfully starting the livestreaming, you will see a prompt “The aircraft live broadcast picture has been connected to the live broadcast room” in the interface, and the livestream shortcut switch icon will be highlighted and current total livestream time will be displayed synchronously at the left side of the icon.

Tips

- During the livestreaming process, you can tap the livestreaming shortcut switch icon to end the livestreaming.

■ Projection Area

Users can enable the projection area display function in the following two ways:

- Turn on the “Projection Area Display” or “Projection Center Coordinate Display” function in the “Projection area” column on the [Aircraft Settings] interface.
- Tap the “ ” icon at the upper left corner of the map interface to select the projection area display method (including stopped display, real-time display, and incremental display) and whether to turn on the “Projection Center Coordinate Display function.
  - Stopped display: Turn off the projection area display.
  - Real-time display: Displays the real-time projection area of the gimbal camera when the aircraft is flying. When the aircraft position or gimbal camera status changes, the displayed projection area and projection center coordinates will also be updated in real time.
  - Incremental display: Displays the projection area swept by the gimbal camera within a period of “incremental display time”. An “incremental display time” refers to the time from when the user turns on the “incremental display” to when the “incremental display” is turned off.

Remarks

- The projection area refers to the two-dimensional image area projected by the gimbal camera in three-dimensional space. When the camera captures a three-dimensional scene, it projects the points in the scene onto the imaging plane through light to form a two-dimensional image. The range of this two-dimensional image is the camera projection area.
- The shape and size of the projection area depends on the parameter settings of the gimbal camera, including focal length, angle of view, and size of the imaging plane. Different camera parameters will lead to different projection areas, thus affecting the viewing angle, perspective effect and depth of field of the final image.
- The projection center refers to the center point of the gimbal camera's projection area, which

can also be understood as the viewpoint or optical center of the gimbal camera. During the projection process of the gimbal camera, the light starts from the projection center, is processed by the lens or optical system, and is finally projected onto the imaging plane to form an image.

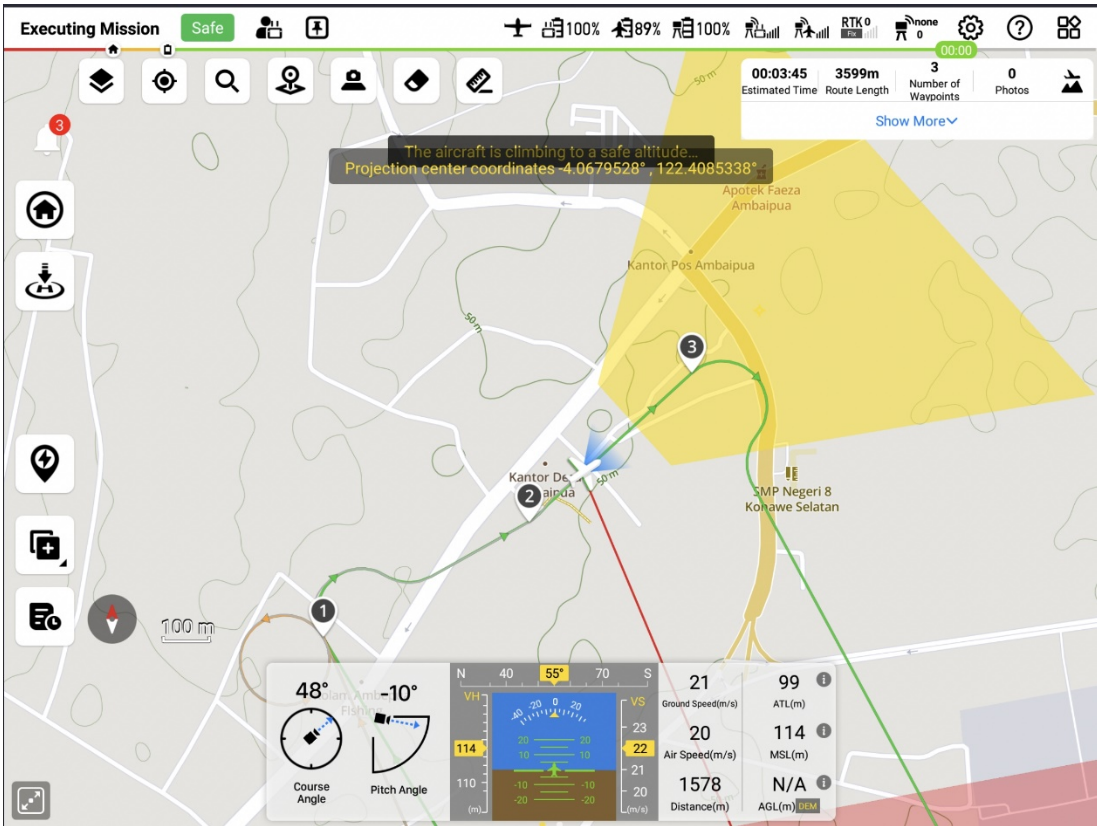


Fig 3-33 Projection area display is on

Users can also clear the projected area on the map interface by:

- Turning off the projection area display function to clear the projection area.
- Tapping the “ ” icon at the upper left corner of the map interface and select “Clear Projection” to clear all projection areas on the current interface. Note that this method does not turn off the projection area display function.

Important

- Projection area is displayed only when the gimbal pitch angle is -90°~-3°. When the observation center is too far away from the aircraft, or the height is too tall, causing the gimbal pitch angle to be greater than -3º, the projection area will not be displayed.

- The above two projection area setting methods are related. Only "real-time display" will activate the "Projection Area Display" function in the aircraft settings. Neither "stopped display" nor "Incremental display" will activate the "projection area display" function in the aircraft settings.

3.4.10.6 Other interfaces

On the map interface or the status bar at the top of the camera interface of the Autel Voyager Application, tap the "" icon to access the [New User Tutorials] interface and [Flight Records] interface.

The [New User Tutorials] interface provides instructional videos and manual downloads about aircraft functions. Users must watch the instructional video and read product instruction manuals in detail before using the aircraft.

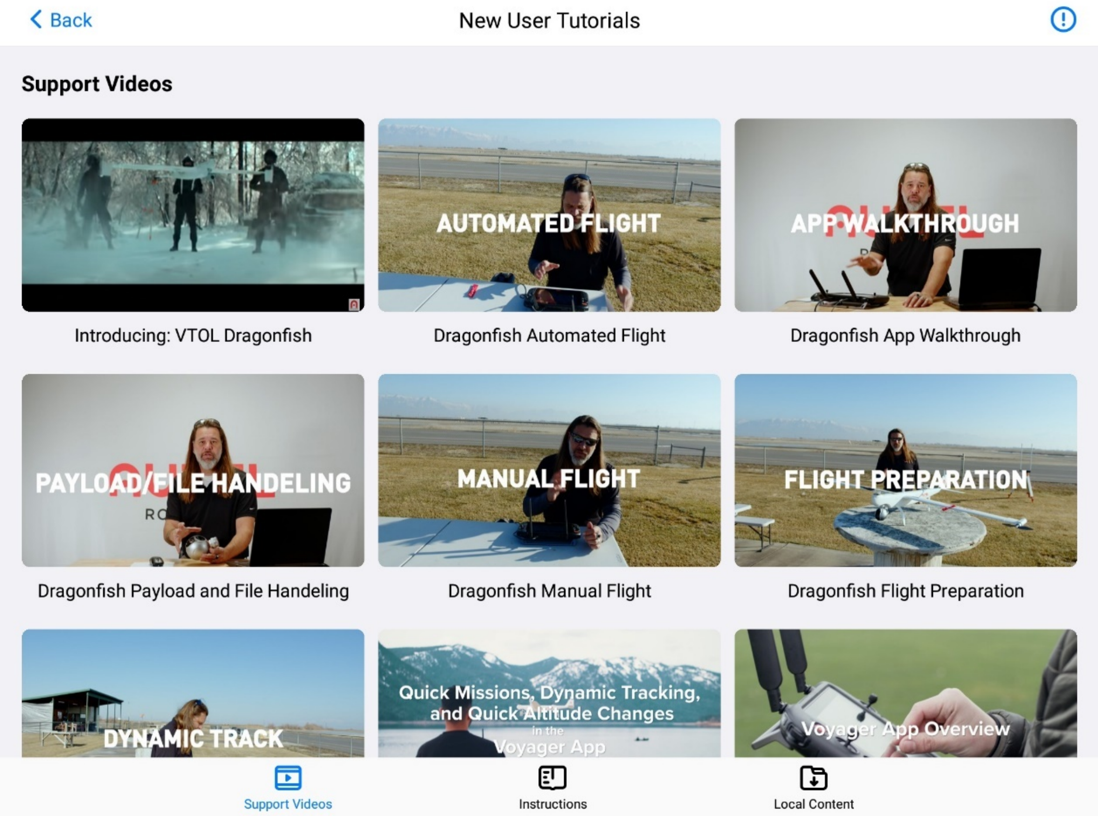


Fig 3-34 New User Tutorials

Tips

- Before accessing the [New User Tutorials], please ensure that the remote controller can connect to the Internet normally.

The Autel Voyager Application supports data recording of flight operations using the remote controller, and counts the total flight duration, total flight mileage and number of flights of all flight records stored on the remote controller. It also supports playback of information such as flight time, flight trajectory, aircraft attitude, and flight speed and flight altitude of each flight.

The remote controller supports uploading locally stored flight records to Autel cloud or third-party platforms (currently supports uploading to Airddata and Drone logbook) to achieve data synchronization. After logging into the Autel cloud account, flight records uploaded to the Autel cloud can be downloaded and synchronized to other remote controllers. Users can also download the flight records uploaded to the Autel cloud to the local for viewing.

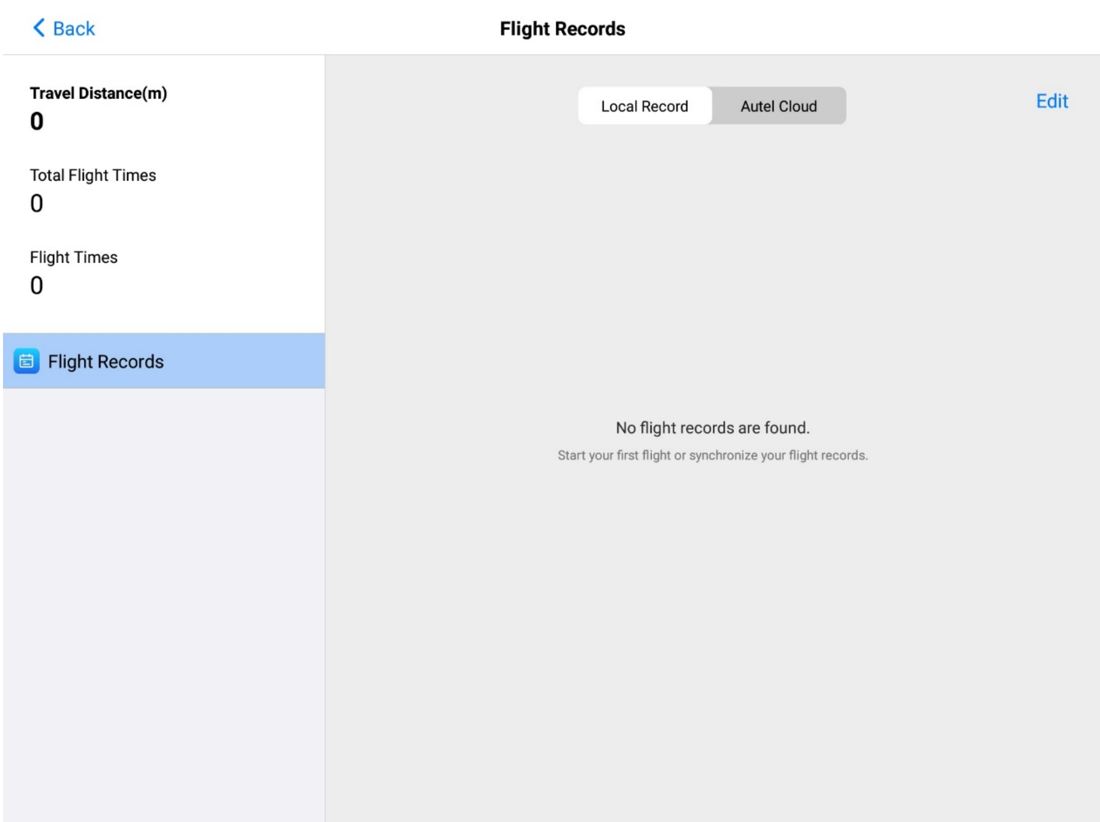


Fig 3-35 Flight records

Tips

- The flight record statistics function can only count the flight records stored locally on the remote controller. Even if the user logs in to the Autel cloud, the data in the cloud cannot be directly counted. If there is cloud data that needs statistics, please download the cloud flight records to the remote controller.
- If the flight records are not uploaded to the cloud and deleted directly from the remote controller, the flight records will be permanently lost, so please operate with caution. For flight records that have been uploaded to the cloud, when you delete them on the remote controller, only the local flight records will be deleted, and the flight records in the cloud will not be deleted.
- For data uploaded to the two platforms Airddata and DroneLogBook, currently only uploading flight records to the corresponding platforms is supported, and downloading data back to the remote controller from these two platforms is not currently supported.
- After completing the flight, the remote controller will automatically generate a flight record. This recording function can be used without an Internet connection. However, if you need to synchronize the flight records generated by the remote controller to the cloud or download the flight records from the cloud to the local computer, the remote controller needs to be connected to the network.

In the camera interface of Autel Voyager Application, tap the “” icon to access the [Album] interface. Users can view, edit, or download images captured by the aircraft on the [Album] interface.

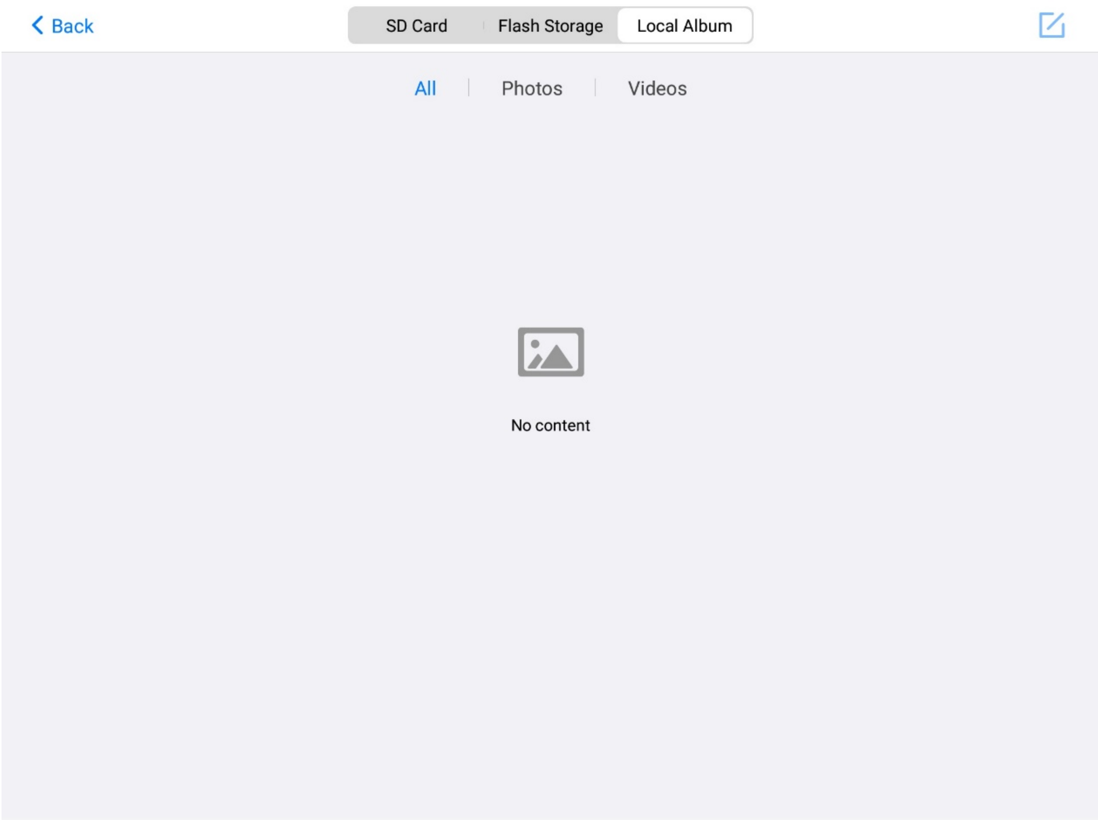


Fig 3-36 Album

In the map interface of the Autel Voyager Application, tap the “ ” icon to access the [Mission Library] interface. The [Mission Library] interface contains all saved waypoint missions, polygon missions and geofences. Users can search, filter and edit saved missions through the mission library, which supports import, export and delete operations.

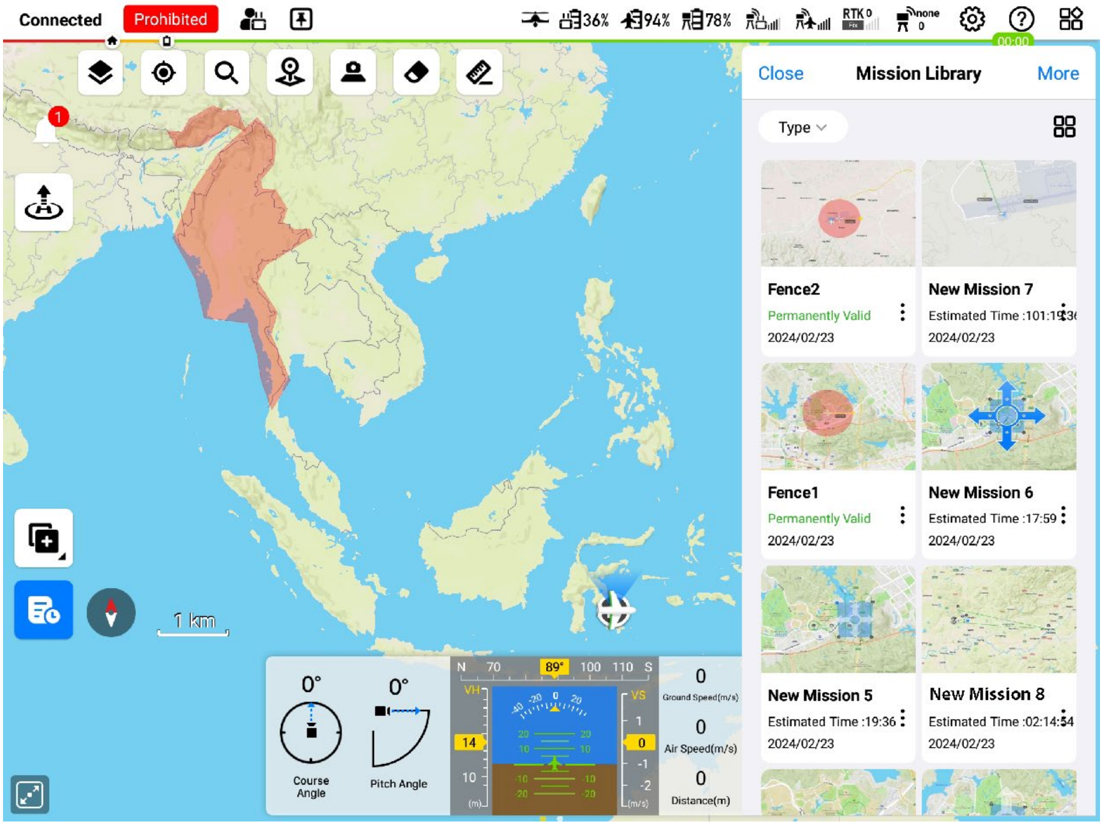


Fig 3-37 Mission library

Users can directly tap the mission card to enter the corresponding editing interface. The relevant operation instructions are as follows:

- If the aircraft is on the ground, tapping on the waypoint mission card will bring up the waypoint mission editing interface; if the aircraft has already taken off, tapping on the waypoint mission card will bring up the temporary waypoint mission editing interface, which does not include departure routes and arrival routes.
- If the aircraft is on the ground, tapping the polygon mission card will bring up the polygon mission editing interface; if the aircraft has taken off, tapping the polygon mission card will bring up the temporary polygon mission editing interface, which does not include departure routes and arrival routes.
- If the aircraft is on the ground, tapping the geo-fence card will directly enter the geo-fence editing interface; if the aircraft has already taken off, you will not be able to enter the geo-fence editing interface by tapping the geo-fence card, but the map interface will automatically locate the geo-fence location.

Tips

- Currently importing/exporting files in KML format are supported.
- For a permanently effective geo-fence, “Permanently Valid” will be displayed on the geo-fence card; for a time-limited geo-fence, “To be effective + start effective time” will be displayed when it is not in effect, and “Effective + effective end time” will be displayed when it is in effect. When it has expired, it will display “Expired + effective end time”.
- The created temp mission will also be in the mission library after being saved. However, since it does not contain departure route and arrival route information, if the temp mission is called through the mission library on the ground, the Autel Voyager Application will, according to the current location of the aircraft, generate default departure and arrival routes. If you need to perform the mission, please pay attention to adjusting the attributes of the default generated departure route and arrival route.
- After the aircraft takes off, if the mission created on the ground is called through the mission library, the departure route and arrival route parts will be automatically removed, and the mission finish action of the temporary route will be added to the route by default. Therefore, when calling, please be sure to confirm the mission finish action of the generated temporary route.
- While the aircraft is flying, users will not be allowed to add, delete or edit geofences through the route library.

Chapter 4 Flight Operations

This chapter introduces the flight operation procedures and cautions, as well as manual check lists. To ensure flight safety, please go through this chapter.

4.1 Pre-Flight Operations

4.1.1 Assembling the Aircraft

During transportation, the aircraft needs to be disassembled into parts and placed in an industrial box. For details, please refer to Chapter 1, "**1.3 Product Acceptance Checklist**". Before performing flight operations, each component must be assembled into a complete aircraft according to the following process. The entire process is expected to take 3 minutes.

⚠ Warning
● Do not use incompatible parts or attempt to modify the aircraft in any way that does not comply with official instructions.

■ Install the left and right wings

Take the aircraft fuselage out of the industrial box and place it on flat ground. Then take out the left and right wings, insert the wings into both sides of the fuselage, and fasten the wing locks to ensure that the two are firmly connected. The wings cannot be pulled out.

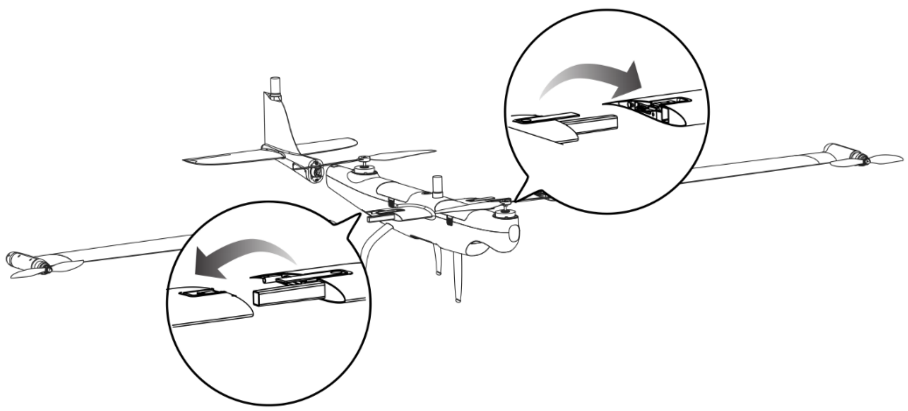


Fig 4-1 Install the wings

■Install the rear wing

Take out the aircraft tail, remove the rubber protective cover at the tail interface, press and hold the lock button, correctly insert the tail into the interface at the rear of the aircraft fuselage, release the lock button, and ensure that the tail is firmly connected to the fuselage.

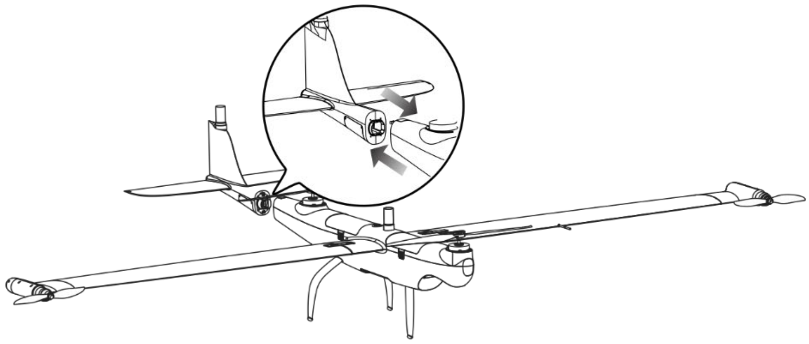


Fig 4-2 Install the rear wing

■Install wingtip propellers*

The wingtip propellers are installed by default before shipment. Generally, users do not need to install them. If you need to replace them, please contact Autel Robotics After-Sale department.

Remarks

- The propellers on the front and rear fuselage of the aircraft are fastened with screws and are installed by default at the factory. Generally, users do not need to install them.
- If the front and rear fuselage propellers are damaged, please stop flying and contact Autel Robotics to purchase new fuselage propellers. Users can replace them with the maintenance tools provided in the kit.
- When replacing the fuselage propeller, please pay attention to the installation position of the propeller. The fuselage propeller must be installed in the correct position. The corresponding installation positions are marked on the surface of the fuselage propeller blades.

⚠ Warning

- The maximum speed of the aircraft's fuselage propellers can reach 9,000 revolutions per minute, and the maximum speed of the wingtip propellers can reach 15,000 revolutions per minute. Please pay attention to safety when dealing with them.

- Before each flight, be sure to check that each propeller is in good condition. If it is aged, damaged or deformed, please replace it before flying.
- Before each flight, be sure to check that each propeller is installed correctly and securely.
- Before each flight, be sure to remove the blade fixing clips from the propellers on the front and rear fuselage of the aircraft, and ensure that the motors can rotate normally without any lag or abnormal noise.
- Please use propellers provided by Autel Robotics. Propellers of different models cannot be mixed.
- Before replacing the propeller, make sure the power of the aircraft is turned off.
- The edges of the propeller are sharp, so it is recommended to wear protective gloves when replacing the propeller.
- Do not get close to or touch the rotating propeller or motor to avoid injuries.
- Before conducting ground testing of the aircraft, make sure the propellers have been removed.

■ Install the gimbal camera

Before installing the gimbal camera, make sure the aircraft is turned off. For detailed installation procedures, please refer to "**3.2.5 Replacing the Gimbal Camera**".

■ Install the smart battery

When installing the smart battery into the aircraft, please align the battery with the battery interface on the fuselage as shown in the following figure and push it down. If the battery is in place, you will hear a click sound.

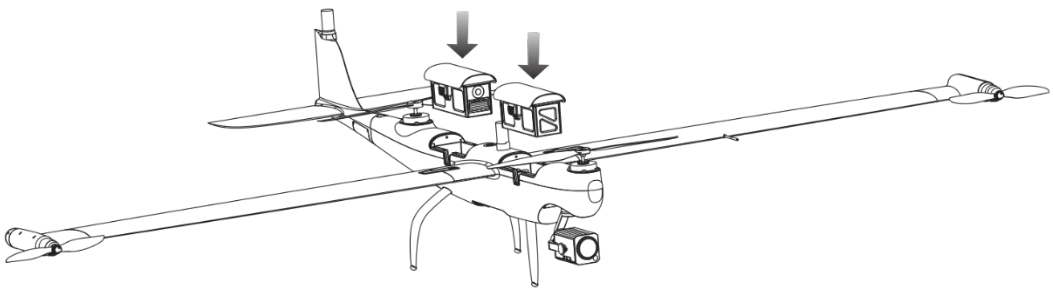


Fig 4-3 Install the Smart Battery

⚠ **Warning**

- Before installing the smart battery on the aircraft, make sure that there are no foreign objects in the aircraft's battery compartment and on the battery interface, avoid damaging the shell of the battery or leading to unsecure battery installation.
- If the smart battery is not installed properly, it may cause the battery to fall off during the flight, damage the aircraft, or even cause personal injury.

Remarks

- If the aircraft needs to be paired, the battery in the rear battery compartment can be installed after matching.
- Before installing the smart battery, ensure that the battery is fully charged and the power difference between the two batteries does not exceed 12%.

■ Remove the Smart Battery*

Turn off the smart battery before removing the battery. Press and hold the unlock buttons on both sides of the smart battery and slowly pull out the battery.

Important

- The unlock buttons of the smart battery are consumable parts. Please do not press them hard to avoid any possible damage to the internal structure of the battery.
- After the smart battery is installed, if you do not press the battery unlock button, the battery cannot be taken out.

4.1.2 Turning the Aircraft on

After installing the smart battery on the aircraft, press and hold the power button on the top of the aircraft for 3 seconds to turn on the power of the aircraft.

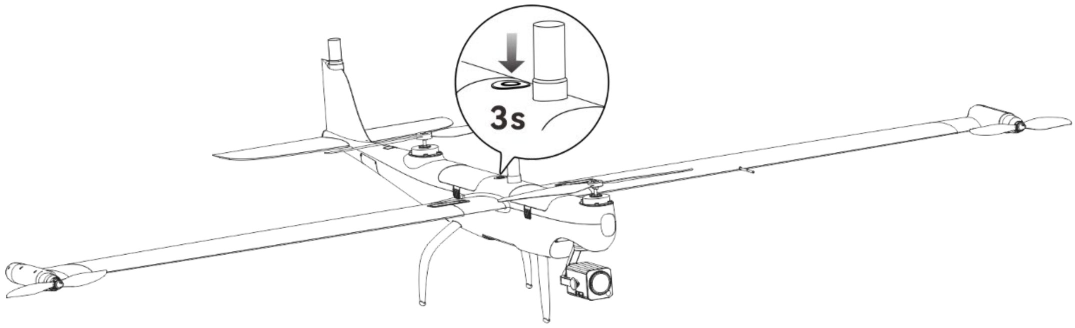


Fig 4-4 Aircraft powering on

Tips
● After the aircraft is powered on, if you need to perform matching, you can remove the smart battery from the rear battery compartment of the aircraft and press the match button in the battery compartment for 1 second. The matching indicator light will flash quickly. For details about matching, please refer to "**4.1.4 Matching and Connection**" in chapter 4. ● If any smart battery is removed while the aircraft is powered on, the aircraft will not be able to take off.

4.1.3 Assembling the Base Station

Before assembling the base station, please check whether the base station components are complete:

- Base station main body × 1, tripod × 1, base station tray × 1, image transmission antenna × 2, and antenna feeder × 2.

■ Installation steps

1. Expand the tripod that is included in the standard kit to an appropriate angle and adjust the telescopic rod and foot nails of the tripod so that the tripod stands firmly on the ground and the fulcrum of the tripod (the base station tray mounting point) is in a horizontal state.
2. Lock the base station tray on the tripod's fixing screws in the correct direction and unfold the antenna mounting arm of the tray.
3. Lock the base station main body on the base station tray and tighten the locking nut of the base station tray to ensure that the antenna mounting arms of the tray are distributed on both sides of the antenna feeder interface of the base station main body.

4. Lock the two image transmission antennas on the antenna mounting arms on both sides of the tray and connect them to the antenna feeder interface on the back of the base station through the antenna feeder.

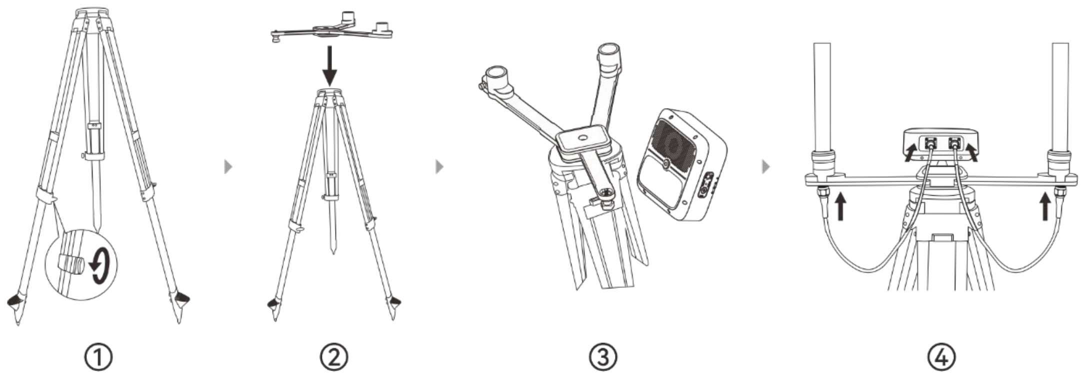


Fig 4-5 Base station assembly

Important
● When assembling the base station, you should choose a solid and stable ground to place the tripod to prevent the base station from tipping due to geological instability during use, resulting in flight safety accidents.

Warning
● At the flight operation site, after the base station is assembled and the aircraft takes off, do not move the base station to avoid positioning deviation of the aircraft and triggering a flight accident.

4.1.4 Matching and Connection

Matching and connection refers to building up linkage communication relation among the aircraft, the base station and the ground control station (the remote controller). It has two connection methods:

1. the combination of the aircraft, the base station and the remote controller;
2. the combination of the aircraft and the remote controller;

Before shipment, the aircraft, the base station and the remote controller have been already matched in frequency and connected using the first method.

■ Combination of the aircraft, the base station and the remote controller

➢ Introduction

The aircraft, the base station and the remote controller can be used only after matching and connection. The whole process includes the image transmission frequency matching between the base station and the aircraft, Wi-Fi connection between the RC and the base station, and 5.8G frequency matching between the aircraft and the RC. After the aircraft connects with the base station and the RC, the positioning accuracy and anti-magnetic interference capability of the aircraft will be enhanced, ensuring safe and reliable mission flights in environments with high voltage cables or around metallic buildings and thereby achieving more precise positioning flights.

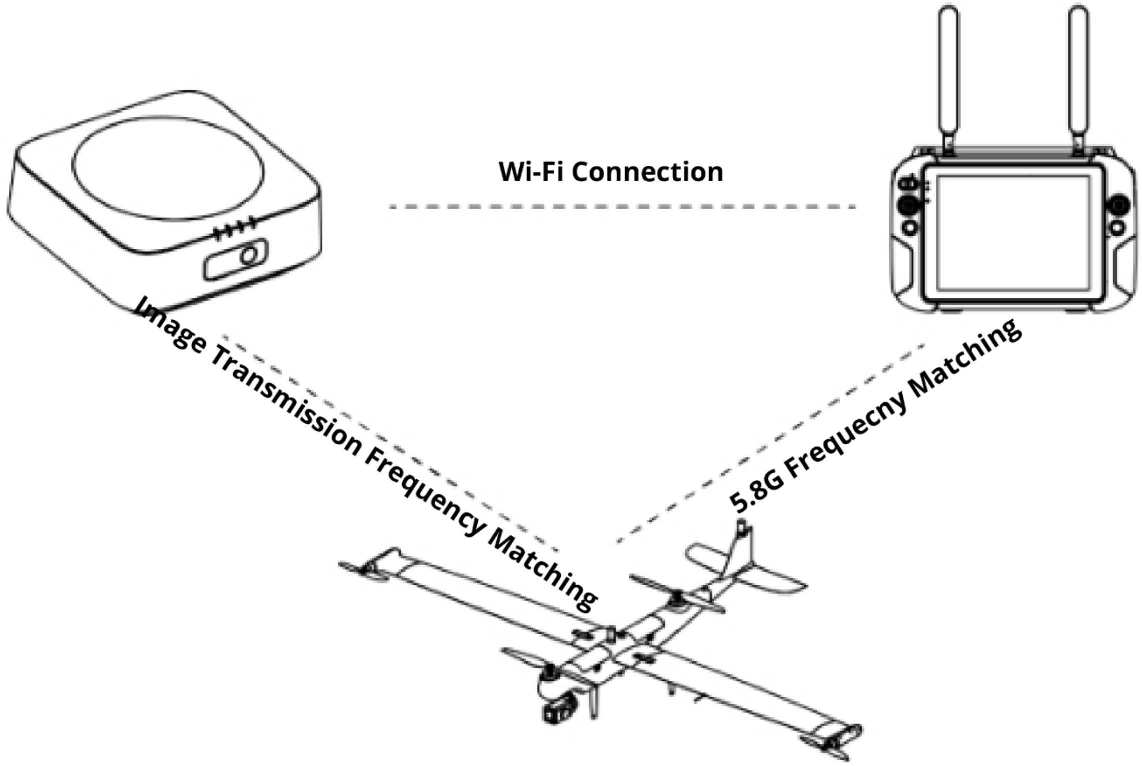


Fig 4-6 Matching and Connection

➢ Matching and Connection Procedures

- Image transmission matching between the base station and the aircraft

1. Turn on the power of the base station and press the base station match button for 1 second. At this time, the match indicator light will flash green on and off at a frequency of 0.1 seconds/0.1 seconds.

2. Turn on the power of the aircraft, wait for the aircraft self-check to be completed, remove the smart battery from the rear battery compartment of the aircraft, and briefly press the match button in the battery compartment for 1 second to put the aircraft into the matching state. During the matching process, the match indicator light will flash quickly.
3. After the matching is successful, the match indicator on the base station will flash green on and off at a frequency of 0.1 seconds/2.0 seconds; finally, install the smart battery back into the rear battery compartment of the aircraft.

Table 4-1 Base station match indicator status table

No.	Match indicator status	Status description
1	Green light flashes on and off for 1.5 seconds/ 1.5 seconds	Image transmission not frequency linked
2	Green light flashes on and off for 0.1 seconds/ 0.1 seconds	Video linking in progress
3	Green light flashes on and off for 0.1 seconds/ 2.0 seconds	Image transmission normal connection
4	Green light flashes on and off for 2.0 seconds/ 0.2 seconds	Upgrade download data
5	Green light is always on	Firmware upgrade in progress

- Remote controller connected to base station Wi-Fi

1. Confirm that the power of the base station is on, and then turn on the power of the remote controller.
2. Run the Autel Voyager Application and tap " "> "Base Station" on the map interface or camera interface of the Application.
3. Confirm that the base station name is the one specified by the user, tap the base station name, enter the Wi - Fi password (default: 12345678), and wait for a few seconds until the remote controller is successfully connected to the base station.

Tips

- If there are multiple base stations at the same time, before the remote controller connects to the base station Wi-Fi, be sure to confirm the name of the base station Wi-Fi to avoid flight risks caused by connection errors.
- When the base station works, two RCs can be connected to the base station Wi-Fi at the same time. One of them, as the control role, has all the operational rights of the aircraft; As an observation role, it can view the flight status of the aircraft and the picture transmission screen, and it can also control the gimbal camera, but it cannot control the flight of the aircraft. For details, please refer to Chapter 2, "**2.13 Dual Control Function**".

- **5.8G frequency matching between aircraft and remote controller**

After the above process of frequency matching between the base station and the aircraft, and the remote controller connecting to the base station Wi-Fi, wait a few seconds. The system will automatically complete the 5.8G frequency matching process between the remote controller and the aircraft, without manual operation by the user.

Warning

- When performing the combination frequency matching or connection of the aircraft, the base station and the remote controller, please keep the distance between the three within a small range (no more than 5 meters is recommended) to avoid the frequency matching or connection failure due to the distance.
- Avoid synchronizing or connecting with other aircraft, RCs and base stations that are synchronizing or connecting at the same time, so as to avoid security risks caused by connection errors.

Remarks

- Please be aware that the frequency band used here [5.8G frequency matching between aircraft and remote controller] complies with Japanese radio frequency band requirements.

- In the scenario where the aircraft, the remote controller and the base station are used together, if the base station is disconnected, the user can only use the remote controller to control the aircraft for a short distance through the 5.8G link, in which case there is no picture signal or data signal transmission.

■ Combination between the aircraft and the RC

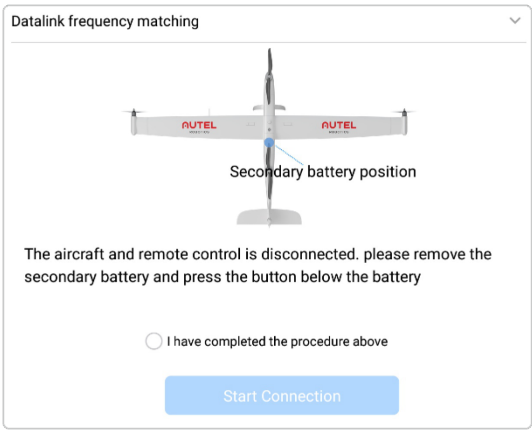
➢ Introduction

When the base station is not in place, only after the remote controller and the aircraft are paired can users operate the aircraft using the remote controller.

Tips

- When the base station is in place, it is suggested to use the remote controller, the base station and the aircraft at the same time and follow the operations below to pair.
- For matching when using the remote controller with the base station and aircraft, please refer to “**4.1.4 Matching and Connection**” in chapter 4.

Table 4-2 Frequency Matching Process

<table>
<tr><th>Step</th><th>Operation</th><th>Diagram</th></tr>
<tr><td>1</td><td>Turn on the remote controller and the aircraft.
Enter Autel Voyager App, tap “ ”-> “Remote Control” -> “Datalink frequency matching” and follow the procedures.</td><td rowspan="2">
</td></tr>
<tr><td>2</td><td>● Follow the prompts to remove the battery from the rear of the aircraft, press and release the button below the battery,</td></tr>
</table>

and make sure the indicator is quickly flashing.

- Tap “I have completed the procedure above” on the Application interface, and then tap “Start connection”.
- After frequency matching succeeds, the battery indicator will flash slowly.
- Place the battery in the back battery compartment.

Remarks

- The aircraft included in the aircraft kit is paired with the remote controller and the base station provided in the kit at the factory. No matching is required after the aircraft is powered on. Normally, after completing the aircraft activation process, you can directly use the remote controller to operate the aircraft.
- If the base station is not in place, or the remote controller become unpaired with the aircraft due to other reasons, please follow the above steps to pair the aircraft with the remote controller again.
- When the aircraft is matching with the remote controller, the aircraft can be available for both image transmission frequency matching and 5.8G frequency matching with the remote controller.

Warning

- When the remote controller and the aircraft are matching, please keep them close together, at most 5m apart.
- Avoid matching with other aircraft and remote controller that are matching or connected.
- Avoid matching with incompatible aircraft and remote controller to prevent safety issues.

4.1.5 Aircraft Activation

It is necessary to activate the Dragonfish Standard aircraft after unpacking it for the first time before starting flight operations. The aircraft has been linked to the ground control station (remote controller, base station) by default before leaving the factory. After turning on the aircraft, remote controller, and base station, an activation prompt will appear when entering the Autel Voyager Application. Please follow the prompts in the Autel Voyager Application to activate the aircraft.

Tips
● Before the aircraft is activated, users will be unable to control it. The Autel Voyager Application will display a pop-up alert stating "Aircraft inactivated".

Important
● Make sure the remote controller is connected to the Internet before activation, otherwise the activation will fail. ● If activation fails, please contact Autel Robotics User Support for resolution. ● For frequency binding operations between the aircraft, remote controller, and base station, please refer to "**4.1.4 Matching and Connection**" in chapter 4.

4.1.6 Installing the Remote Controller Lanyard

Tips
● The remote controller lanyard is an optional accessory. You can choose whether to install it as required. ● When holding the remote controller for a long time during flight operations, we recommend that you install the remote controller lanyard to effectively reduce the pressure on your hands.

■ Steps

1. Clip the two metal clips on the lanyard's shorter straps to the two metal rings on the bottom side of the controller.
2. Clip the two metal clips on the lanyard's longer straps to the metal rings on both sides of the metal handle at the top of the controller.
3. Wear the lanyard around your neck, as shown in the figure below, and adjust it to a suitable length.

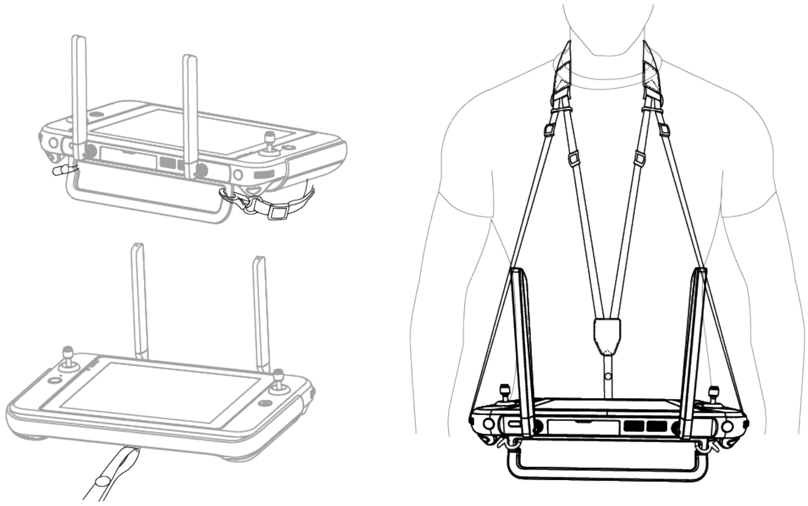


Fig 4-7 Install The Remote Controller Lanyard (As Required)

4.1.7 Pre-Flight Inspection and Preparation

To ensure flight safety and provide great flight experience to users, it is recommended that users should conduct pre-flight inspection and preparation before every flight. The pre-flight inspection includes inspections on the aircraft, components and the gimbal and the pre-flight preparation includes offline map download and caching, geofencing function, creating route missions and inspection monitoring system.

4.1.7.1 Pre-flight inspection

Before the aircraft performs a flight mission, it is necessary to conduct a pre-flight inspection. Pre-flight inspections are divided into manual inspections and automatic inspections. Manual inspections mainly include visual inspections of the appearance of the entire aircraft and components, component assembly inspections, actuator inspections, and communication link inspections. After confirming that all conditions are normal, use "Aircraft Status Monitoring" in the application and the aircraft's "One-tap self-check" function to confirm the safety status of the aircraft before flight. Users can use the "Pre-Flight Manual Inspection Checklist" provided for pre-flight inspections.

■ Visual Inspection on the entire aircraft and components

➢ Appearance Clean Inspection

Check that the surface of the fuselage and each installed component is clean without stains. For the cleaning procedure, please refer to the maintenance manual. Although the appearance cleaning condition that is not extremely bad will not seriously affect flight safety, it may reduce product performance and user experience.

➢ Appearance Paint Inspection

Examine the paint condition of airframe and installed components to ensure that there are no damages, obvious scratches, cracks, or peeling. Although non-extreme paint conditions will not seriously affect flight safety, they may reduce product performance and user experience.

➢ Structure Status Inspection

Check the structural condition of airframe and installed components to ensure that there are no cracks, deformations, or fractures, no delamination or de-bonding in the composite materials, and no damage such as indentations or grooves caused by foreign objects on the surface. Structural damage can seriously affect the flight safety of the aircraft, so if there is any structural damage found during the inspection that needs to be repaired, please repair by referring to the maintenance manual or contacting the after-sales engineer.

Before flight, the following parts/components should be checked for structural integrity:

1) Landing gear structure;
2) Fuselage structure, including the fuselage body and bottom mounting access covers;
3) Power system structure, including the front and rear fuselage rotor blades and left and right wingtip rotor blades;
4) Wing structure, including the wing body, wingtip structure, wing-body connection carbon tubes, and locating pins;
5) Tail structure, including the tail body, tail-wing connection hooks, and horizontal tail structure.

➢ Installation Interface Inspection

Check the condition of the interface surfaces to ensure they are clean with no dirt or damage. Dirty or damaged interfaces will seriously affect the flight safety of the aircraft. If any dirt or damage is found during the inspection, please refer to the maintenance manual or contact the after-sales engineer for guidance on cleaning or repair.

Before flight, the following interfaces should be checked:

1) Wing-to-fuselage interface;
2) Tail-to-fuselage interface;
3) Gimbal-to-bracket interface;
4) Battery-to-battery compartment interface.

■ Components Assembly Inspection

During operation, the various connecting components of the aircraft may experience assembly loosening due to vibration and alternating stresses. Additionally, after quickly assembling detachable components, an assembly status check is required. Improper connection or loose installation can seriously affect the flight safety of the aircraft, and it is necessary to refer to the maintenance manual or contact after-sales personnel for tightening or repair.

➢ Tightening Inspection

Check the following components for tight installation to ensure that the fasteners are in place without missing, the installation is tight without looseness, and the components are firmly connected:

1) Motor and blade connection: including the front and rear fuselage motors, blades, and left and right wingtip motors and blades.
2) Installation of the belly and tail fairings.
3) Landing gear stability without shaking: including the front landing gear and main landing gear.

➢ Quick-release Component Assembly Inspection

Perform an assembly inspection on the installed quick-release components to ensure that their connection status is intact.

1) Connection between the wing and the fuselage: Confirm that the lock is intact, the fastening force is moderate, and there is no obvious shaking after the wing and body are connected.
2) Connection between the tail and the fuselage: Confirm that the hook is intact, the tail pops up normally after insertion, and there is no obvious shaking after the tail and body are connected.
3) Connection between the gimbal and the bracket: Confirm that the gimbal is in place and locked, with no obvious shaking or loose connection.

4) Battery connection: Confirm that the disassembly button pops up after the battery is installed, and it is firmly installed without shaking.

■ Actuator Inspection

Defects in an actuator, such as excessive clearance, loose connection, or stuck movement, can seriously affect the flight safety of the aircraft, and it needs to be repaired or replaced by referring to the maintenance manual or contacting the after-sales staff.

The inspection of the actuator mainly includes:

1) Wingtip mechanism: Check the gap size along the span direction in static condition, shake the wingtip up and down to check the state of the servomotor; after power-on, shake the wingtip lightly to check the excessive clearance of the servomotor.
2) Horizontal tail mechanism: Shake the horizontal tail surface up and down in static condition to check the state of the servomotor; after power-on, shake the horizontal tail surface lightly to check the excessive clearance of the servomotor.
3) Motor: Rotate the fuselage and wingtip motors to confirm there is no stuck and abnormal noise.
4) Gimbal camera: After power-on, check that the attitude change is consistent with the control command.

■ Communication Link Inspection

The combination of the communication links between the aircraft, the base station, and the ground control station is an important condition for ensuring fly safety. Before flight, it is necessary to confirm that the communication status between the three is normal to ensure that the aircraft can fly more safely and accurately.

4.1.7.2 Pre-flight gimbal check

Dragonfish series aircrafts can carry a variety of industry application mounts to meet the needs of complex tasks, greatly improving the reuse value of the product. A comprehensive inspection of the gimbal camera is required before flight to ensure that it can meet task requirements.

■ Visual Inspection

Perform a visual inspection of the gimbal camera to confirm that there are not following defects:

1) Paint peeling or fading;
2) Dirty or foggy lens;
3) Structural defects, especially the gimbal connection mechanism;
4) Dirty connection interface.

■ Assembly Inspection

Connect the gimbal camera to the gimbal bracket, and confirm that the gimbal dial has been rotated to the lock icon, and the left and right rotation joints are not loose (be careful not to press the unlock button).

■ Power-on Inspection

Power on the aircraft, and the gimbal starts self-checking. Users need to pay attention to the gimbal self-checking process. If the self-checking fails, refer to Chapter 5 "**5.3 Troubleshooting Guide**" or contact the after-sales service for processing.

■ Adjustment and Fine-Tuning

The gimbal of the aircraft performs a self-check every time the aircraft is turned on. If you find that the rotation angle of the gimbal is abnormal during use, please follow the steps below to perform an automatic calibration:

1. After turning on the aircraft and remote controller, make sure that the aircraft and remote control are connected in frequency.
2. Place the aircraft horizontally on the ground and keep it still.
3. On the map interface or camera interface of Autel Voyager App, tap "" > "Gimbal" > "Gimbal Auto Calibration" > "Start".
4. On the calibration interface, tap the "OK" button to start calibration. Wait for the calibration progress bar to reach 100%, and the screen will prompt "Calibration successful", indicating that the gimbal auto calibration is successful.

4.1.7.3 Selecting stick mode

When using the remote controller to operate the aircraft, you need to know the current stick mode of the remote controller and fly with caution.

Three stick modes are available, that is, Mode 1, Mode 2 (default), and Mode 3.

- Mode 1

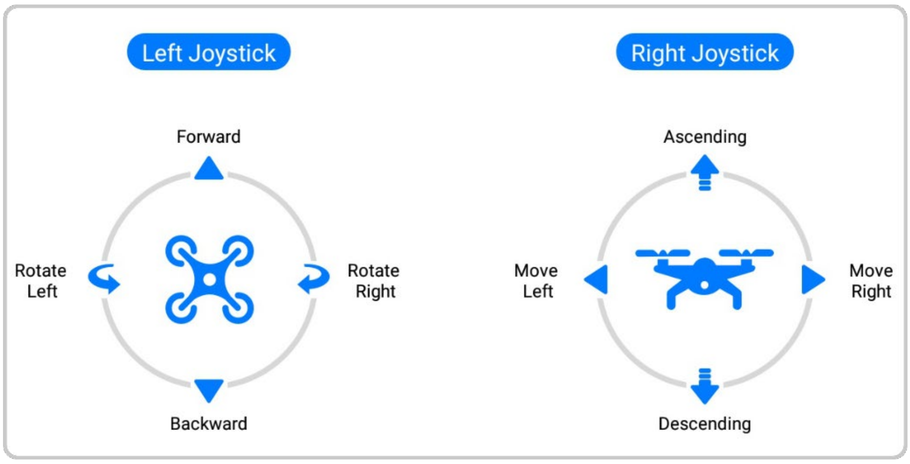


Fig 4-8 Mode 1

Table 4-3 Mode 1 Details

Stick	Move Up/Down	Move Left/Right
Left Stick	Controls the forward and backward movement of the aircraft	Controls the heading of the aircraft
Right Stick	Controls the ascent and descent of the aircraft	Controls the left or right movement of the aircraft

- Mode 2

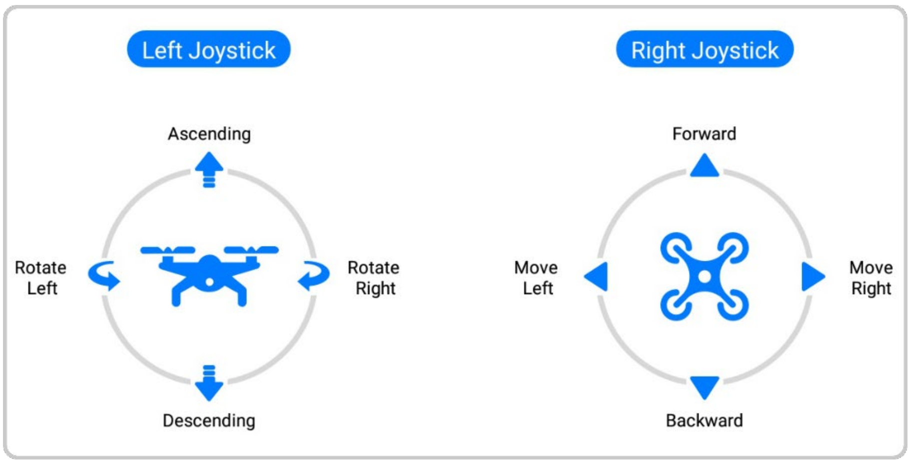


Fig 4-9 Mode 2

Table 4-4 Mode 2 Details

Stick	Move Up/Down	Move Left/Right
Left Stick	Controls the ascent and descent of the aircraft	Controls the heading of the aircraft
Right Stick	Controls the forward and backward movement of the aircraft	Controls the left or right movement of the aircraft

- Mode 3

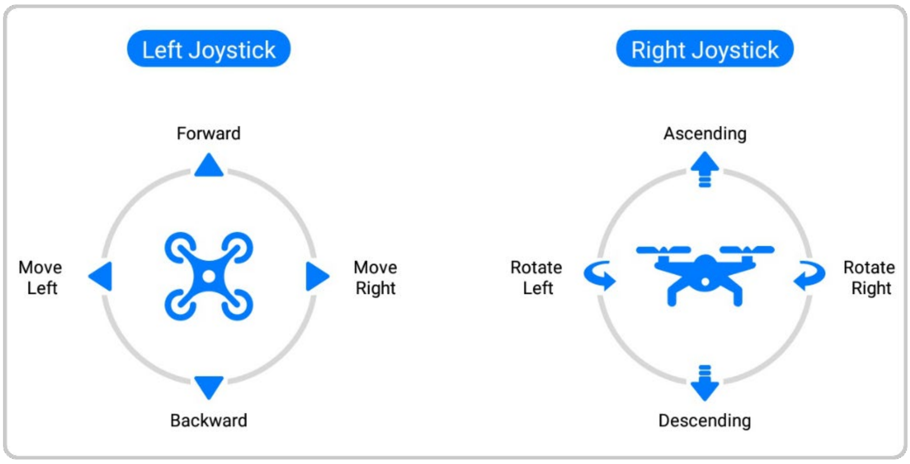


Fig 4-10 Mode 3

Table 4-5 Mode 3 Details

Stick	Move Up/Down	Move Left/Right
Left Stick	Controls the forward and backward movement of the aircraft	Controls the left or right movement of the aircraft
Right Stick	Controls the ascent and descent of the aircraft	Controls the heading of the aircraft

Tips

- Setting of Stick Mode: In Autel Voyager Application tap “ ”> “Remote Control” >”Control Mode”.

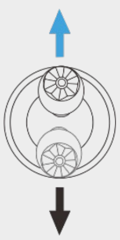
Warning

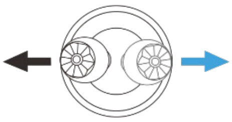
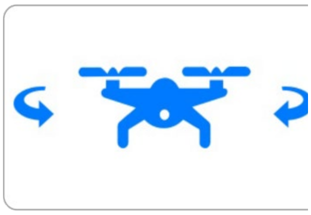
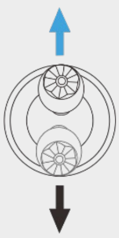
- Do not hand over the remote controller to persons who have not learned how to use the remote controller.
- If you are operating the aircraft for the first time, please keep the force gentle when moving the sticks until you are familiar with the operation.
- The flight speed of the aircraft is proportional to the degree of the stick movement. When there are people or obstacles near the aircraft, please do not move the stick excessively.

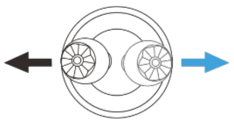
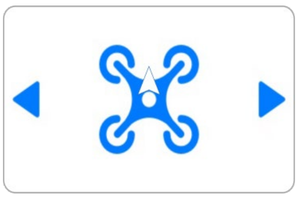
■ Setting stick mode

You can set the stick mode according to your preference. The default stick mode of the remote controller is “Mode 2”.

Table 4-6 Default Control Mode (Mode 2)

Mode 2	Aircraft Flight Status	Control Method
Left Stick Move Up or Down 		1. The up-and-down direction of the left stick is the throttle stick, which is used to control the vertical lift of the aircraft. 2. When the aircraft is in muti-rotor mode or fixed-wing mode, push the throttle stick up, and the aircraft will rise vertically; pull the throttle stick down, and the aircraft will descend vertically. 3. When the stick returns to the center, the vertical speed of the aircraft is expected to be zero.

		4. When the aircraft takes off, only by pushing the stick up to above the center, will the aircraft lift off the ground.
Left Stick Move Left or Right 		1. The left-and-right direction of the left stick is the yaw stick, which is used to control the heading of the aircraft. 2. When the aircraft is in muti-rotor mode or fixed-wing mode, push the yaw stick to the left, and the heading of the aircraft will change leftward; push the yaw stick to the right, and the heading of the aircraft will change rightward. 3. In fixed-wing mode, It is by mapping to the roll channel that using the yaw stick to change the aircraft heading is achieved. In other words, the aircraft changes its heading direction by rolling. 4. When the stick returns to the center, the rotational angular speed of the aircraft is expected to be zero. 5. The larger the degree of the stick movement, the greater the rotational angular speed of the aircraft.
Right Stick Move Up or Down 		1. The up-and-down direction of the right stick is the pitch stick, which is used to control the flight of the aircraft in the forward and backward directions. 2. When the aircraft is in muti-rotor mode or fixed-wing mode, push the pitch stick up, and the aircraft will produce a forward speed and fly forward; pull the pitch stick down, and the aircraft will produce a backward speed, and fly backward.

		3. When the stick returns to the center, the forward speed of the aircraft is expected to be zero. 4. The larger the degree of the stick movement, the faster the flight speed of the aircraft. 5. Please note that when the pitch stick is pushed to its fullest, the forward speed of the aircraft is expected to be the cruise speed; when the speed of the aircraft reaches the cruise speed, the aircraft will enter into fixed-wing mode for flight.
Right Stick Move Left or Right 		1. The left-and-right direction of the right stick is the roll stick, which is used to control the flight of the aircraft in the left and right directions. 2. When the aircraft is in muti-rotor mode or fixed-wing mode, push the roll stick to the left, and the aircraft will roll leftward; push the roll stick to the right, and the aircraft will roll rightward. 3. When the stick returns to the center, the side speed of the aircraft is expected to be zero. 4. The larger the degree of the stick movement, the faster the side speed of the aircraft.

Remarks

- When controlling the aircraft for landing, pull the throttle stick down to its lowest position. In this case, the aircraft will descend to an altitude of 1.0 meter above the ground, and then it will perform an assisted landing and automatically descend slowly.

4.1.7.4 Offline map download and caching

The aircraft supports an offline map function, which allows users to assist in mission planning by pre-downloading map data without a network connection.

Before flying, users can pre-download offline maps of different levels of detail in the desired area on the offline map download interface through the remote controller. The remote controller also supports reading offline maps from connected external storage devices.

In the “Offline Map” column of the [Aircraft Settings] interface, you can view the downloaded offline map area, or tap to enter the offline map download interface to select the area you want to download.

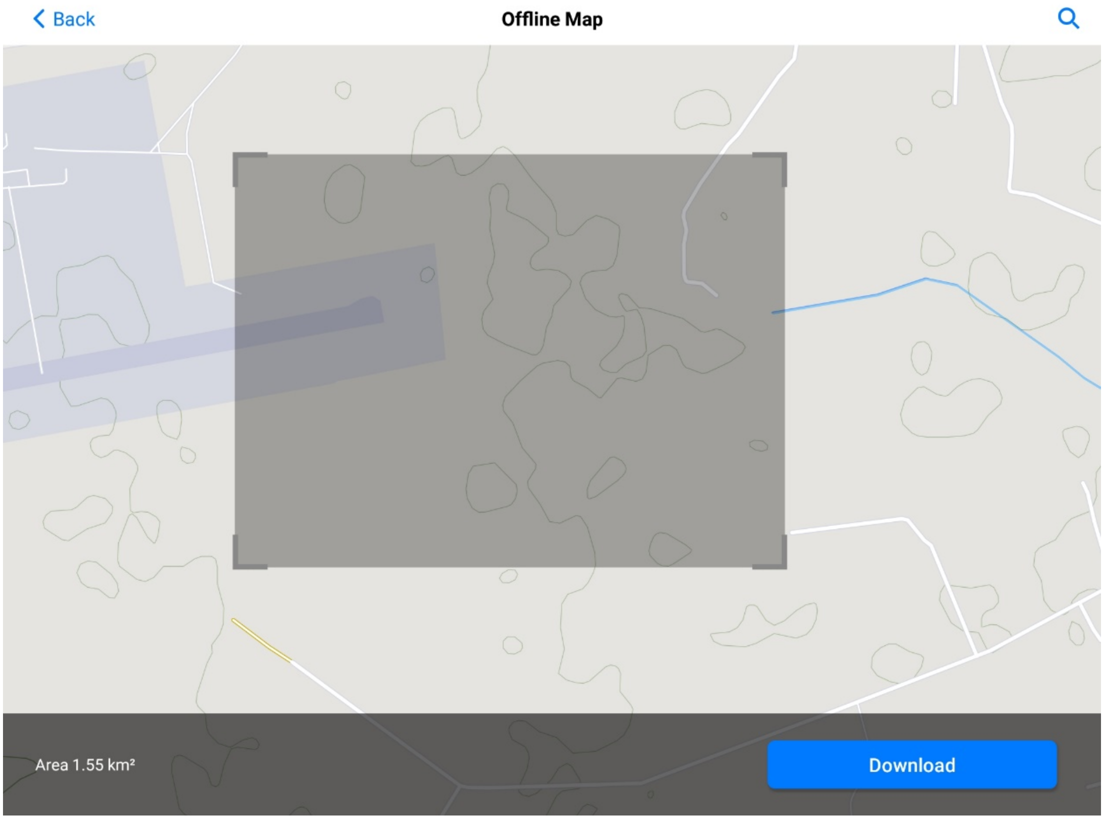


Fig 4-11 Offline map download interface

- Users can drag the gray box on the interface or zoom the map to adjust the offline map area to be downloaded.
- You can view the size of the selected area in real time at the lower left corner of the interface.
- Tap the “ 🔍 ” icon at the upper right corner of the interface to directly search for keywords or latitude and longitude and jump to the corresponding area.

- After tapping the “Download” button at the lower right corner of the interface, you can download the offline map of the area covered by the gray box. Users can modify the offline map name and select the map level (up to 1-17 supported) and map layer type (“Standard” and “Hybrid”) in the pop-up “Map Layer” window.
- After the download is completed, the interface will change to a preview interface of the downloaded offline map. The name of the area will be displayed at the top of the interface, and the level, size and download time of the currently downloaded offline map will be displayed at the bottom of the interface. If the downloaded offline map is incorrect, you can tap the “ ••• ” icon at the upper right corner of the interface to delete it.

The offline maps that have been downloaded will be displayed altogether in the “Offline Map” column on the [Aircraft Settings] interface, where users can view the name and size of those downloaded offline maps. You can also choose to delete a downloaded offline map. Tapping on an offline map will enter the preview interface of the offline map, making it easy to view the area covered by the offline map.

Tips

- Users can obtain map data through map data software (such as “Shui Jing Zhu”) and then access the remote controller through a USB flash drive to perform external import of offline maps.

4.1.7.5 Creating a geofence and unlocking a no-fly zone

To ensure the safe and legal operation of the Dragonfish series aircraft, Autel robotics has developed a geofencing system. This system allows for relevant constraints and limitations on the flight airspace of the aircraft during the flight. The geofencing system consists of two parts: Customized Electronic Fence and National No-Fly Zones.

- The Customized Electronic Fence enables users to add circular (or polygonal) no-fly zones or geofences. This ensures that the aircraft is restricted to the safe flight area planned by the electronic fence during the flight, providing users with customized flight safety assurance.
- The National No-Fly Zones ensure that the aircraft does not inadvertently enter flight-restricted areas specified by the laws and regulations of the country or region during the flight.

The geofencing system supports the unlocking of no-fly zones. If users need to carry out flight missions in restricted areas, the aircraft can have its flight restrictions lifted for the duration of the authorized unlock. The system does not guarantee full compliance with local legal requirements and regulations. Users are responsible for consulting and understanding local laws, regulations, and regulatory requirements before each flight to ensure their own flight safety.

The Dragonfish Standard aircraft's flight control system is equipped with a geofencing system. Before each flight, it is important to ensure that the remote controller can connect to the internet to automatically update legally restricted no-fly zone information and synchronize it with the aircraft. During the flight, relevant flight space restrictions will be displayed synchronously on the Autel Voyager Application to ensure the safe and legal operation of the aircraft.

⚠ **Warning**

- In the absence of GNSS signals, the electronic fence function of the aircraft will not function properly.
- The current electronic fence function does not support restricting the altitude of the aircraft. Before flying, users are advised to independently ensure that they are operating within the legally authorized safe flying altitude.

Tips

- Due to inherent delays in information retrieval, the no-fly zone information in the geofencing system may not necessarily align completely with the latest local laws and regulations. All information should be considered in accordance with local laws and regulations.
- For temporary airspace restrictions, users are strongly advised to synchronize the no-fly zone information when flying in the relevant areas.
- For information on the update mechanism of the electronic fence, please refer to mechanism part of this section.

■ Restricted zones

The geofencing system offers three different types of airspace restrictions: no-fly zones, customized geographical fences, and authorized zones. The Autel Voyager Application will provide different prompts based on the specific type of restriction in each area。

Table 4-7 Flight Restrictions of Restricted Zones

Restricted area	Flight restriction instructions
No-Fly Zones	Divided into national no-fly zones and custom no-fly zones. ● National no-fly zones: Built into the geofencing system at the factory, regularly updated. ● Custom no-fly zones: Added to the geofencing system by users themselves. Flight restrictions: If the aircraft is on the ground in the current area, it cannot take off; if the aircraft is in the air in the current area, it can only move outward at low speed until leaving the current area, and it cannot fly inward into the central area of that zone. If the aircraft is in the no-fly zone, the RC will prompt an alert "The aircraft is in the no-fly zone".
Geofence	Added to the geofencing system by users themselves. Flight restriction: The aircraft can fly within any geofence area but cannot fly outside that range.
Authorized zone	After users apply for the lifting of the ban (by obtaining an official airspace authorization document), the aircraft can legally operate within the restricted no-fly zone during the specified period of validity.

Remarks

- If an aircraft is simultaneously subject to restrictions from multiple electronic fences, the priority of different types of electronic fences is as follows: No-fly zones > Customized geographical fences, Customized geographical fences > Authorized zones, Authorized zones > No-fly zones. In other words, within a customized geographical fence, the priority of no-fly zones is higher than that of the customized geographical fence. The aircraft cannot enter the no-fly zones within the customized geographical fence. Authorized zones can be used to eliminate no-fly zone restrictions within their coverage, but customized geographical fences within the authorized zone still take effect. The aircraft cannot fly out of the customized geographical fences within the authorized zone.

When the aircraft is flying in the air, it possesses a certain initial velocity. To prevent the aircraft from entering restricted areas (before being authorized) and flying outside the geofence area and the authorized zone, the geofencing system has set up a 300-meter buffer zones outside the edge of the restricted area and inside the edge of the geofence and the authorized zone.

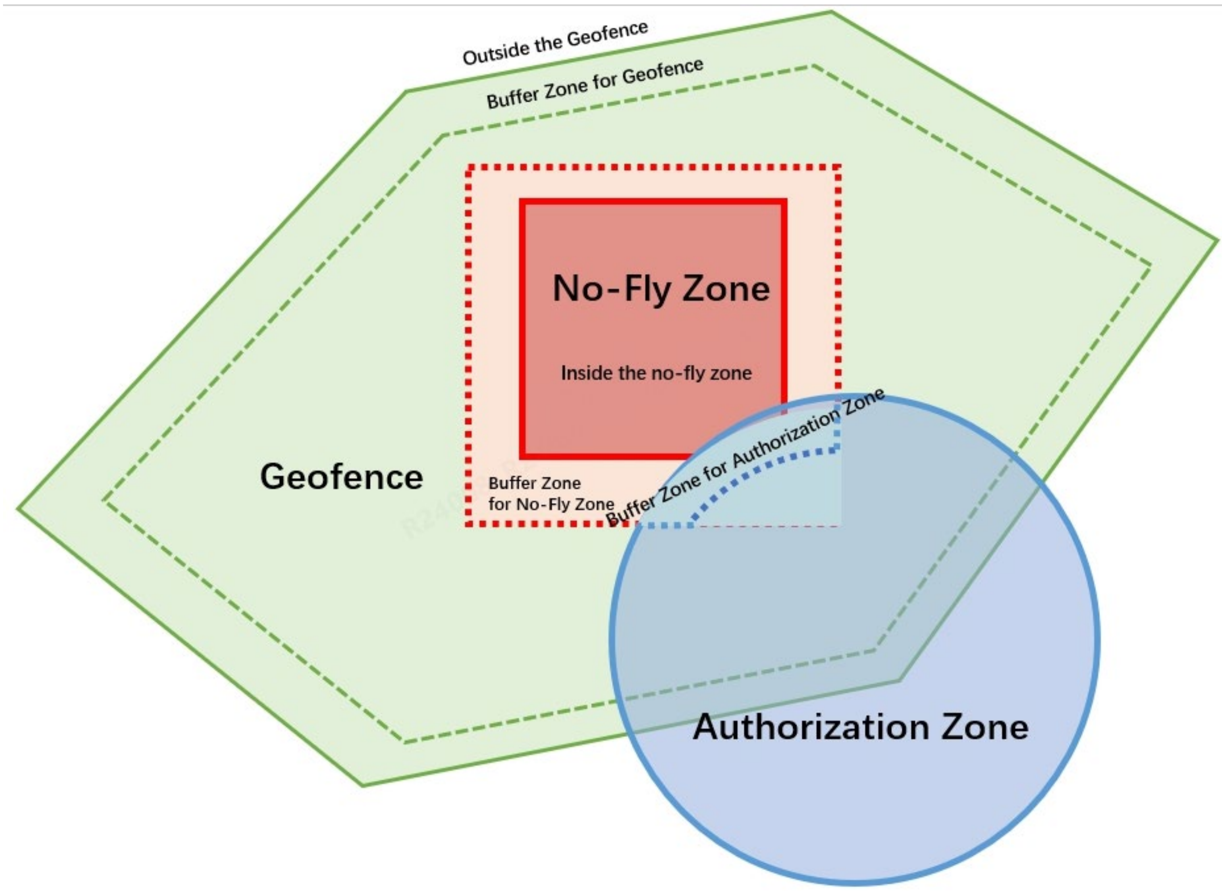


Fig 4-12 Buffer Zones

Table 4-8 Flight buffer Zone Description

Buffer Zone Type	Buffer Zone Description
Buffer Zone for No-Fly Zones	When an unauthorized aircraft approaches within a range of 300 meters near the edge of a no-fly zone, the remote controller will issue an alert "The aircraft is close to the no-fly zone". When the distance is reduced to a range of 200 meters, the speed of the aircraft will be restricted. ● If the aircraft is on the ground, it will be prohibited from taking off. ● If the aircraft is in the air, it can only move slowly outward within the buffer zone of the no-fly zone until it exits the buffer zone. It cannot fly inward into the no-fly zone.
Buffer Zone for Geofences	When an aircraft approaches within a range of 300 meters near the edge of the geofence, the remote controller will issue an alert "The aircraft is close to the edge of the geo-fence". When the distance is reduced to a range of 200 meters, the speed of the aircraft will be restricted. ● If the aircraft is on the ground, it will be prohibited from taking off. ● If the aircraft is in the air, it can only move slowly inward within the buffer zone of the geofence until it enters the geofence area. It cannot fly outward to leave the geofence.
Outside the Geofence*	When the aircraft is located outside the geofence, the remote controller will issue an alert "The aircraft is out of the geo-fence". ● If the aircraft is on the ground, it will be prohibited from taking off. ● If the aircraft is in the air, there are no speed restrictions, and the aircraft can re-enter the geofence area.

Buffer Zone for Authorized Zones	The buffer zone of an authorized zone only exists in an authorized zone and a no-fly zone and their intersection areas nearby. When the aircraft approaches within a range of 300 meters near the edge of the authorized zone from the inside, the remote controller will issue an alert “The aircraft is close to the edge of the authorized zone”. When the distance is reduced to a range of 200 meters, t the speed of the aircraft will be restricted. ● If the aircraft is on the ground, it will be prohibited from taking off. ● If the aircraft is in the air, it can only move slowly inward within the buffer zone of the authorized zone until it enters the authorized zone. It cannot fly outward to leave the authorized zone.

Remarks

- When conducting flights within an authorized zone, the aircraft can operate normally if it is within the authorized airspace and during the authorized timeframe. However, once it exceeds the authorized airspace or timeframe, the aircraft will be subject to the airspace restrictions of the current area it is in.

Warning

- During flight, if the aircraft comes too close to an area restricted by the electronic fence, it may result in the aircraft switching to the multi-rotor mode. In this mode, the power consumption of the aircraft will increase, and please pay close attention to flight safety.
- When the aircraft is in manual flight mode, it will respond accordingly based on the electronic fence restrictions in the airspace it traverses.

■ Create a (customized) geofence

Users can create a (customized) geofence accordingly. In the Autel Voyager Application, tap “ ” icon on the map interface, and then tap the “ ” icon to enter the “Editing Geo-fence” interface.

Users can place a rectangular or circular area on the map interface and perform operations such as dragging, adjusting the radius (circular area), adding and dragging vertices (polygon area) to adjust the location and size of the area; after adjustment, Autel Voyager Application will generate a customized no-fly zone or customized geofence based on the area type and valid period set by the user.

Remarks

- The area types of the customized electronic fence function on the Autel Voyager Application are divided into two types: "No Fly Zone" and "Geo-Fence". The definitions are as follows:
  1. No Fly Zone: An area planned by the user to restrict aircraft from flying into the area.
  2. Geo-Fence: Users plan an area to restrict the aircraft from flying out of the area.

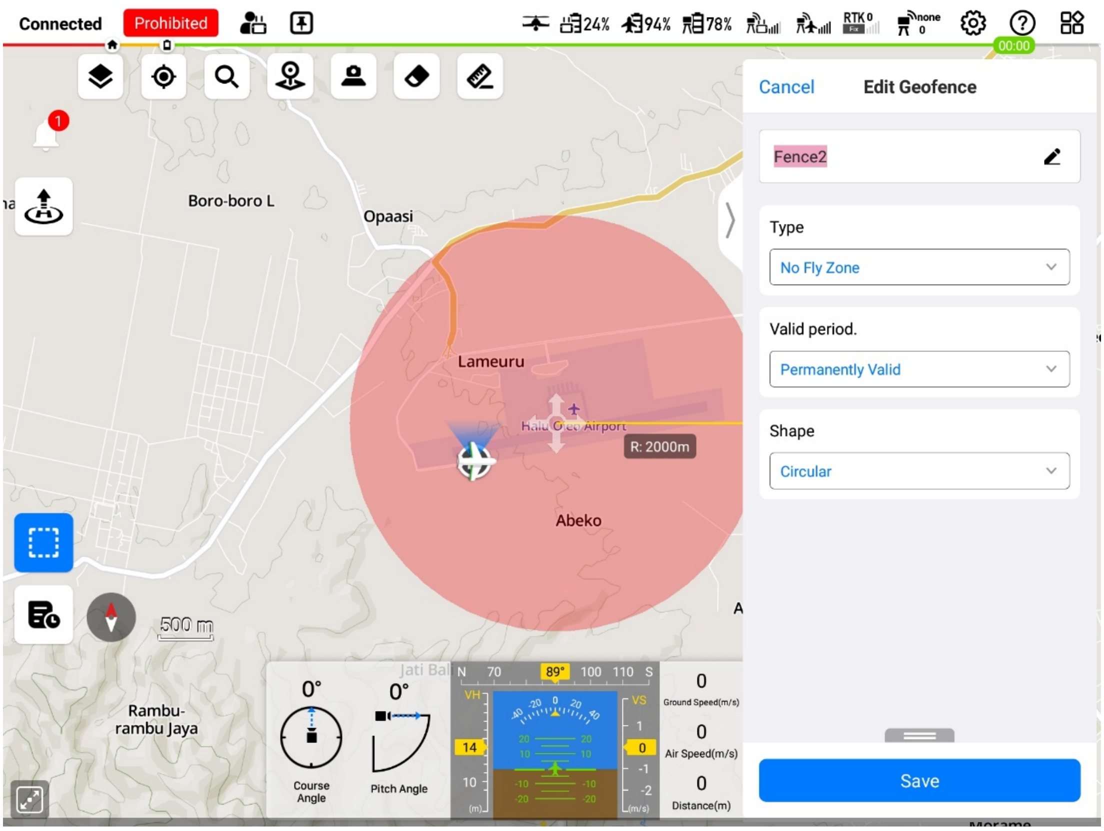


Fig 4-13 Create a (customized) geofence

■ Add a (customized) geofence

When creating a (custom) geofence, users can add a polygon or circular area by tapping anywhere on the map interface. After placing the area, if it is a circular area, you can adjust the area size by stretching the radius adjustment points; if it is a polygon area, you can tap the " " icon between the area edges to add vertices or stretch the vertices to adjust the area size.

Tips
● Select and drag an area on the map interface to quickly adjust its position on the map.

■ Edit a (customized) geofence

On the "Edit Geofence" interface on the right side of the electronic fence editing interface, you can perform the following operations:

- Type: can be set to "Geo-fence" or "No Fly zone".
- Validity period: can be set to "Permanently Valid" or "Effective Period (YYYY/MM/DD)".
  - When selecting "Effective Period (YYYY/MM/DD)", you need to set the start (date + time)/end (date + time), down to the minute.
- Shape: can be set to "Circular" and "Polygon".
  - Circular: Place a circular area on the map interface, support adjusting the radius of the circular area, and displaying the radius simultaneously.
  - Polygon: Place a polygon area (rectangle by default) on the map interface. You can view the length of the connection between adjacent vertices and set the longitude and latitude coordinates of each vertex. It supports three ways of expression of "DMS", "DD", and "MGRS".

Tips
● On the map interface, no-fly zones are displayed in red and geofences are displayed in green. ● After the (customized) electronic fence is edited and saved, you can tap the " " icon on the map interface to enter the "Mission Library" for viewing and editing.

Remarks

- After the Geo-Fence option of the [Aircraft Settings] interface of the Autel Voyager Application is enabled, the saved electronic fence will be displayed on the map. After turning off this function, the customized geo-fence set by the user will no longer be displayed on the map, and the customized geo-fence will not be enabled.
- Please note that the national no-fly zone is enabled by default and is not affected by the “Geo-Fence” function switch.

■ Import a geofence

Besides creating a geofence, the user can also import a geofence into the RC.

The aircraft supports the geofence import function, allowing users to obtain the restricted flight zone data file of their country or region and upload it to the flight control system of the aircraft. When the aircraft approaches the relevant airspace during flight, it will execute corresponding status responses (including alerts, deceleration, etc.) to ensure flight safety.

Tips

- The import function supports importing JSON-type no-fly zone data files. Users can import no-fly zone data files published by the aviation management department.
- Operation method: Copy the JSON file to the root directory of the RC, enter the Intelligent Photo mode, on the map interface of the Autel Voyager, tap "", then tap “More” in the “Mission Library” interface, and tap "Import" to select the JSON file.

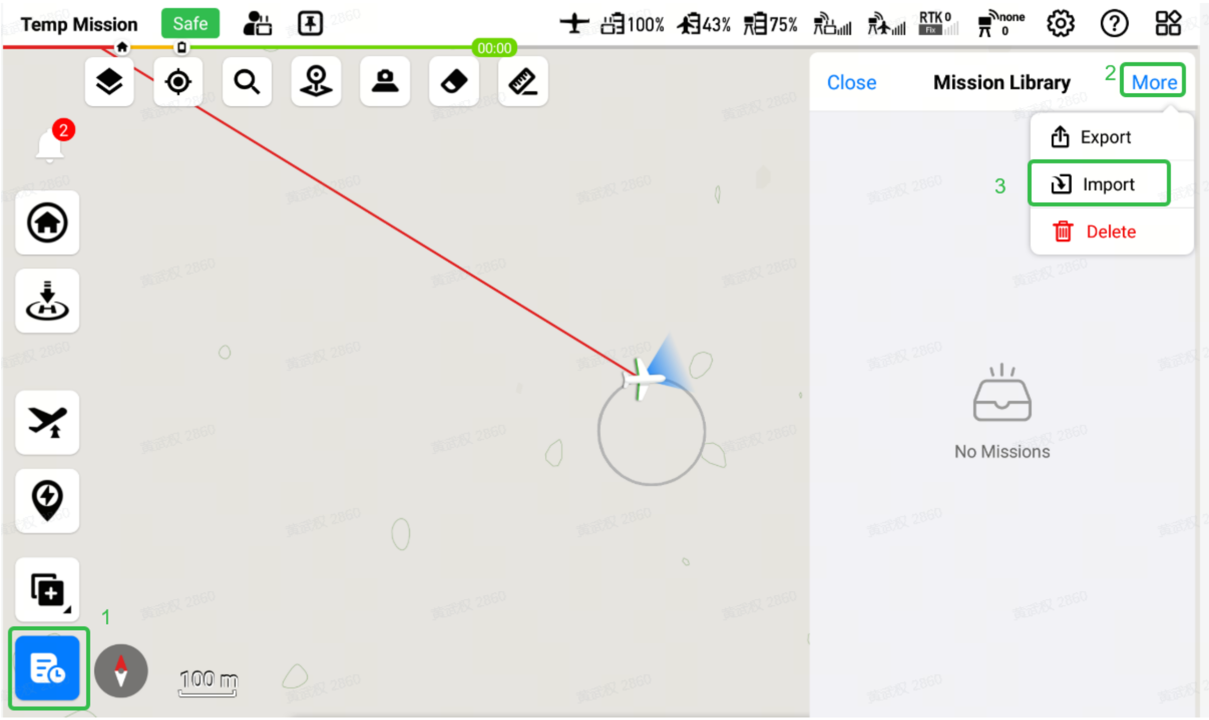


Fig 4-14 Import a geofence

■ Electronic fence update mechanism description

After turning on or off the "Geo-Fence" function switch, the remote controller will re-synchronize the geo-fence information with the aircraft. In order to ensure that the geo-fence information displayed on the remote controller is consistent with the geo-fence information stored in the aircraft, the remote controller will update the geo-fence information to the aircraft under the following circumstances:

1. The remote controller is connected to the aircraft and the aircraft is on the ground, and the current latitude and longitude positioning information of the aircraft can be obtained.
2. After the aircraft completes its flight mission and lands.
3. The remote controller is connected to the aircraft, the aircraft is on the ground and turn on or off the "Geofence" function switch on the remote controller.
4. The remote controller is connected to the aircraft, the aircraft is on the ground and save the "Geofence" content on the remote controller.

Tips

- When the remote controller updates the geo-fence information to the aircraft, a warning message “Flight data is being synchronized with aircraft and base station” will be displayed at the bottom of the Autel Voyager App, and the aircraft is prohibited from taking off at this time.
- During flight, the remote controller will no longer update the electronic fence information to the aircraft. Therefore, during flight, users cannot update the customized geo-fence information that has been synchronized to the aircraft by turning on or off the “geo-fence” function switch.
- During the flight, users cannot add, modify or delete (customized) electronic fence information.

■ Unlocking national no-fly zones

Users can unlock a national no-fly zone by obtaining airspace authorization from authority. if users need to operate their aircraft within national no-fly zones, they must provide valid airspace authorization documents approved by the local aviation authority to Autel Robotics to request the lifting of the aircraft's restrictions. If the approval is granted, the remote controller will update the aircraft based on its serial number to authorize it for operation within national no-fly zones.

The materials required for applying for the lifting of restrictions are as follows:

1. Applicant's personal information and contact details.
2. Approval Document: Scanned or imaged valid approval document from the local authorities (e.g., local public security bureau, aviation management department, or any relevant organization/agency) regarding the flight application.
3. Authorization Area: A cylindrical region containing the following information:
   - Name of the authorization area.
   - Coordinates of the center point of the flight airspace plan (latitude and longitude with six decimal places).
   - Radius of the flight airspace plan (in meters with two decimal places).
   - Flight altitude (in meters with two decimal places).
4. Authorization Date: To be filled in by the user based on the valid approval document, ideally down to the day/hour/second.

5. Aircraft S/N Serial Number: Multiple serial numbers can be applied for at once.

Remarks
● Unlock No-fly-zone Website: **https://www.autelrobotics.cn/service/noflight/**. ● Before creating a flight mission, please adhere to local regulations concerning drones and obtain the necessary airspace authorization, if required. ● After submitting the lifting request, it will be reviewed within 24 hours, and the lifting will be completed within 48 hours. Please plan your flight schedule in advance accordingly.

■ Geofence limitation function

After a geofence is created, it will limit the following missions or functions:

➢ Route flight

1. Route Editing

During the process of route editing, the editing and saving of a route will not be limited by geofencing information.

2. Mission Route Take-off Verification

Before a mission route is uploaded, the ground control station will verify the relation between the route and geofence. If there is a conflict (such as the route approaching a no-fly zone, the route being located within a no-fly zone, or the route being located outside a geofence), the aircraft will not be able to take off along that route.

3. During the route flight

After takeoff, the route that has passed the geofence verification on the RC will generally not trigger a geofence warning. However, in case of extraordinary circumstances where the aircraft severely deviates from the route and enters the restricted area of a geofence during flight, the aircraft will be restricted by the fence and may experience deceleration and hover.

➢ Quick Mission

After a quick mission on the RC is edited and tapped to execute, the RC will verify whether there is a conflict between the quick mission area and the existing geofences. If there is a conflict between the quick mission area and the existing geofences, the RC will prohibit the user from executing this quick mission. The RC only verifies the hovering area of the quick mission. If the aircraft is restricted by a geofence during its flight to the quick mission area, it may also result in deceleration and hover due to the fence restriction.

➢ Dynamic track

● When the tracking mode is synchronous tracking, the aircraft will select a suitable synchronous tracking point outside the no-fly zone, within the geofence, or within the authorized area, and fly to this synchronous tracking point for synchronous tracking.

● If the aircraft is in multi-rotor mode and the tracking mode is simple tracking, circling tracking, or figure-8 circling tracking, the aircraft needs to accelerate from the multi-rotor mode to the fixed-wing mode first. During the acceleration process, the aircraft will be restricted by the electronic fence, resulting in deceleration or Hover.

● If the aircraft is in fixed-wing mode and is performing simple tracking, circling tracking, or figure-8 circling tracking, the aircraft will automatically select a suitable hovering point outside the no-fly zone, within the geofence, or within the authorized area, allowing the aircraft to track the target electronically. When near the fence restricted area, it will not be restricted by the electronic fence and will slow down and hover (when the target point is within the no-fly zone or outside the geo-fence, the aircraft's tracking and hovering path will remain 200 meters away from the outside of the no-fly zone boundary or 200 meters inside the geofence boundary).

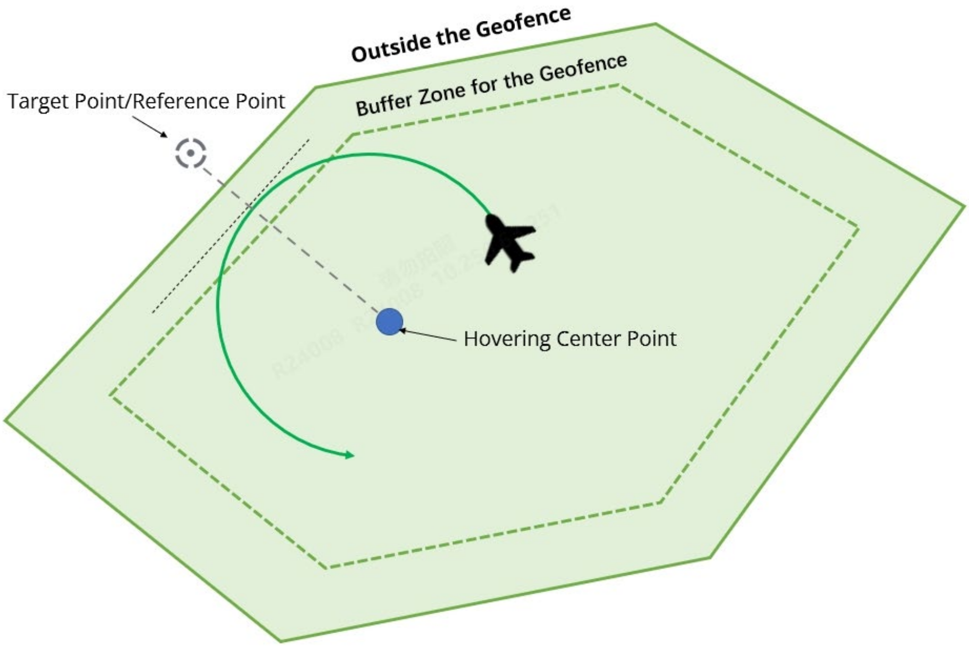


Fig 4-15 When the target point is outside the geofence

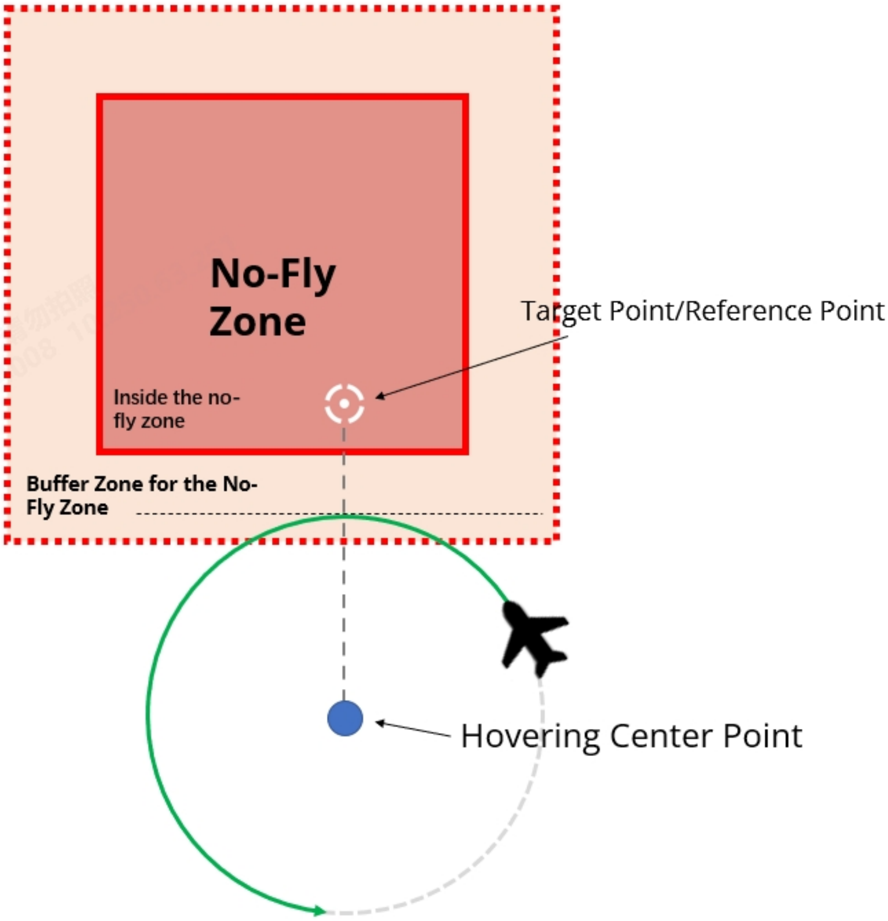


Fig 4-16 When the target point is inside the No-fly zone

Tips
● For more information about dynamic track, please refer to "**4.2.2.3 Dynamic track**" in this chapter.

➢ Return

During the process of return, the aircraft will be limited by geofences. For details, please refer to mechanism part of geofencing system.

➢ Manual Flight

During the process of manual flight, the aircraft will be limited by geofences based on the area that the aircraft is heading to. For details, please refer to mechanism part of geofencing system.

4.1.7.6 Creating a route mission

Dragonfish Series Aircrafts support mission planning (waypoint mission and polygon mission) before flight, which can meet the requirements from users. Users can create a waypoint mission or a polygon mission.

■ Create a waypoint mission

Tap the " " icon on the left side of the map interface, and then tap the " " icon to enter the "Waypoint Mission" interface.

Waypoint Mission is a basic function of the aircraft. Users can add one or more waypoints on the map interface, and each two adjacent waypoints are connected to form a flight segment, and one or more flight segments constitute a route. When users are placing waypoints, the Autel Voyager Application will automatically generate departure hovering point, arrival hovering point, and home point (the takeoff position of the aircraft by default).

After the editing of the waypoint mission is completed, upload the waypoint route to the aircraft through the remote controller and the base station. The aircraft will traverse the waypoints in the order of the waypoints when performing the waypoint route, perform the preset flight actions at the waypoints, and can cooperate with the mounted gimbal camera to implement tasks such as taking pictures and recording in flight.

The waypoint missions of the aircraft are divided into ordinary waypoint missions and observation area waypoint missions.

Remarks
• Observation area waypoint mission: That is, on the basis of the ordinary waypoint mission, a specified number of observation areas can be set, and the observation areas are associated with the flight path executed by the aircraft by covering or specifying the flight segment. When the aircraft flies through the effective range of the specified observation area on the route, the gimbal will always face the center position of the observation area until it flies away from the effective range of the observation area.

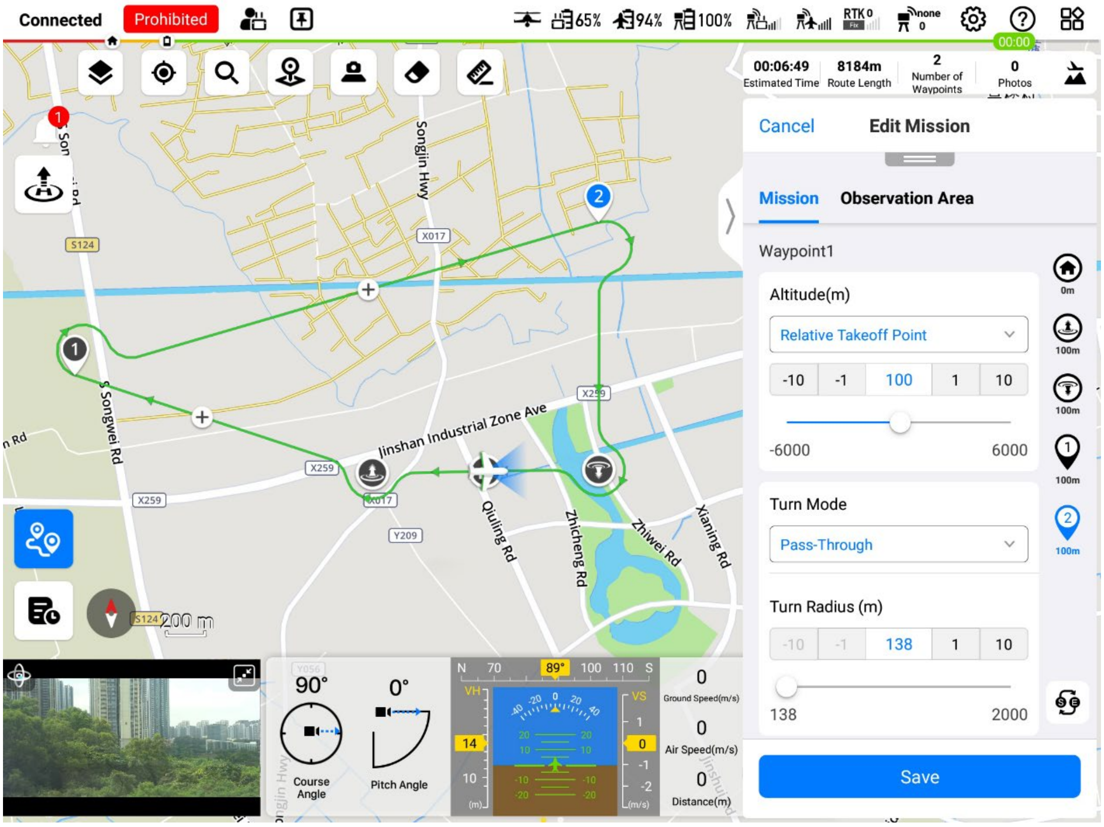


Fig 4-17 Create a waypoint mission

Table 4-9 Waypoint mission interface icon description

No.	Icon	Description
1		Home point position of the aircraft.
2		Departure hovering point position of the aircraft.
3		Arrival hovering point position of the aircraft.
4		Waypoint position (distinguished by numbers).
5		Observation area (center point) position (distinguished by numbers).
6		Tap this icon to reverse the order of waypoints on the route.

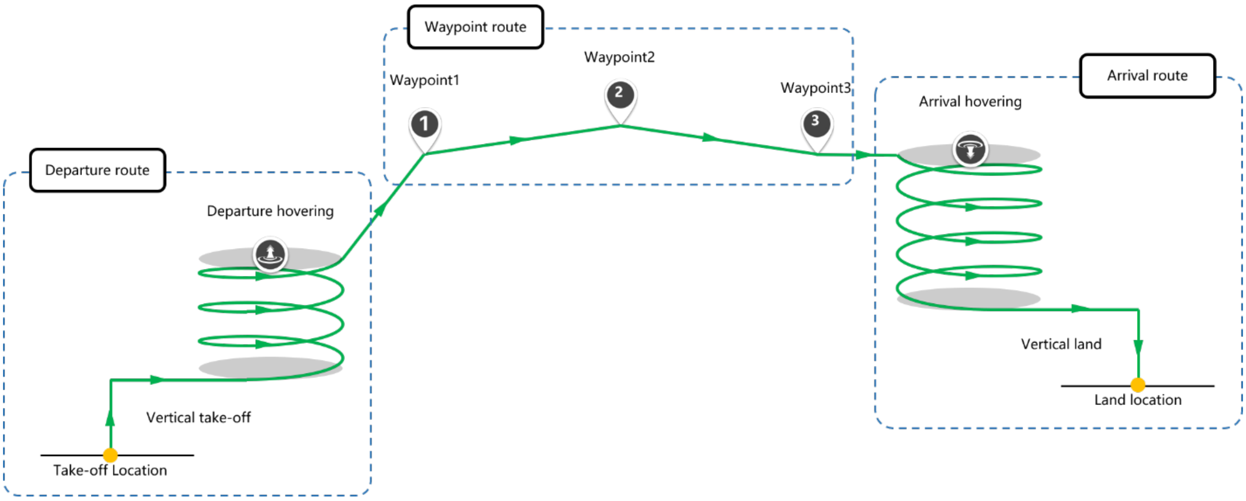


Fig 4-18 Waypoint mission route procedures

➢ Add waypoints

When creating a waypoint mission, users can add waypoints by tapping anywhere on the map interface, or after adding the first waypoint, they can tap the "+" icon between the flight segments to add waypoints.

💡 Tips
● Select and drag each waypoint, home point, departure hovering point, or arrival hovering point on the map interface to quickly adjust their positions on the map.

➢ Edit waypoints

On the "Edit Mission" interface on the right side of the waypoint mission interface, after selecting the "Mission" column, you can perform the following operations:

1. Tap the " " icon to edit the home point. The home point is the takeoff (UAV) position of the aircraft by default.

- If you cancel the default setting, you can set the home point position yourself (used to realize the long-range takeoff and landing function). The settings include:
  - ➢ Altitude Format: You can choose "ATL" or "MSL".
  - ➢ Home Point Altitude (m): Select "ATL" with a setting range of -6000~6000 and select "MSL" with a setting range of -410~9000.

- Coordinate: Enter the latitude and longitude coordinates of the home point, supporting 3 expressions: “DMS”, “DD”, and “MGRS”.

Important

- The setting of the landing point altitude will affect the landing speed control of the aircraft. When enabling the remote take-off and landing function, please fill it in according to the actual altitude.

2. Tap the “ ” icon to set the departure hovering point. Setting items include:

- Takeoff Mode Switching Height (relative to takeoff point) (m): the height value can be set from 40 to 500.
- Radius (m): The departure hovering radius value can be set from 200 to 2000.
- Departure Altitude (m): It can be set to “Follow Waypoint 1”, “ATL”, “MSL”. Among them, the setting range for “ATL” is 40~2000, and the setting range for “MSL” is -410~9000.
- Departure Hovering Point coordinates: Input the latitude and longitude coordinates of the departure hovering point by yourself, supporting three expression methods: “DMS”, “DD” and “MGRS”.

3. Tap the “ ” icon to set the arrival hovering point. Setting items include:

- Landing Mode Switching Height (relative landing point) (m): the height value can be set from 40 to 500.
- Radius: The arrival hovering point radius value can be set from 100 to 2000.
- Arrival Altitude (m): It can be set to “Relative Landing Point” or “MSL”. Select “Relative Landing Point” to set the range from 40 to 2000 and select “MSL” to set the range from-410 to 9000.
- Arrival Hovering Point Coordinates: Enter the latitude and longitude coordinates of the arrival hovering point by yourself, supporting three expression methods: “DMS”, “DD” and “MGRS”.

Tips

- Users can tap the “ ” icon after the departure route or the arrival route to learn about the relevant instructions of the departure hovering point and the arrival hovering point. Please refer to Chapter 2 “2.6 Aircraft Mode Switching“ for specific details.

- When placing departure and arrival hovering points on the map interface, please pay attention to the wind direction in takeoff and landing and be sure to choose the upwind direction to place the hovering points. When the aircraft takes off vertically from the take-off point to the take-off mode switching altitude and changes to a straight flight to the departure hovering circle, it needs to accelerate to a certain speed (airspeed) to switch from the multi-rotor mode to the fixed-wing mode. If there is a tailwind and the wind speed is high, the switching process requires a longer acceleration distance and time; when the aircraft flies out of the arrival hovering circle and flies straight over the landing point (landing mode switching height), it needs to decelerate to switch from fixed-wing mode to multi-rotor mode. If it is a tailwind state, insufficient resistance will make it difficult for the aircraft to decelerate. When the aircraft flies over the landing point, if the speed has not decelerated to zero, it may cause it to overshoot the landing point. The higher the wind speed, the farther it travels .
- When setting the take-off point and home point, be sure to pay attention to the ground conditions and ensure that the home point is flat and not in a densely populated area.
- When placing departure and arrival hovering points, be sure to pay attention to the surrounding building distribution and airspace height. The terrain obstacle avoidance function does not take effect during the departure route and arrival route phases. Please set a reasonable height to ensure that there are no obstacle conflicts on the route.

4. Tap the “ ” icon to set the designated waypoint and corresponding flight segment. Setting items include:

- Altitude (m): It can be set to “ATL” or “MSL”. Among them, the setting range for “ATL” is -6000~6000, and the setting range for “MSL” is -410~9000.
- Turn Mode: Set the turn method of the aircraft at the waypoint, which can be set to “Early Turn”, “Pass-Through”, “Timed Orbit”, “Circular Orbit”.
  - Orbit Parameters (s): Set this when “Timed Orbit” is selected. The orbit time can be set from 10 to 3600.
  - Orbit parameters (revs.): Set this when “Circular Orbit” is selected. The number of orbit circles can be set from 1 to 60.
- Turn Radius (m): Set the turn radius of the aircraft at the waypoint. The turn radius value (at the waypoint) can be set from 100 to 2000.

- Payload Action: Set the gimbal camera action corresponding to the waypoint, which can be set to “None”, “Time Lapse”, “Dist. Lapse”, or “Record”.
  - Interval (s): Set this when selecting “Time Lapse”. You can set the photo interval from 1 to 120.
  - Interval (m): Set this when “Dist. Lapse” is selected. The photo interval can be set from 1 to 100.
- Gimbal Pitch (°): Set the gimbal camera pitch angle for the route segment corresponding to the waypoint. The gimbal pitch angle value can be set from -90 to 0.
- Gimbal Relative Heading Angle (°): Set the offset angle of the gimbal relative to the waypoint corresponding to the course of the flight segment. The angle value of the relative heading can be set from -180 to 180.
- Coordinates: Input the longitude and latitude coordinates of the waypoint by yourself, supporting three expression methods: “DMS”, “DD” and “MGRS”.
- Delete Waypoint: When the number of waypoints in the route exceeds 1, you can tap this button to delete the corresponding waypoint.

➢ Supplementary instructions for waypoint altitude

The waypoint altitude of each waypoint is the altitude when the aircraft leaves this waypoint. If the aircraft is limited by the climbing rate and fails to reach the altitude set for this waypoint when it arrives at this waypoint, the aircraft will hover and climb to the set waypoint altitude, then leave this waypoint and fly to the next waypoint.

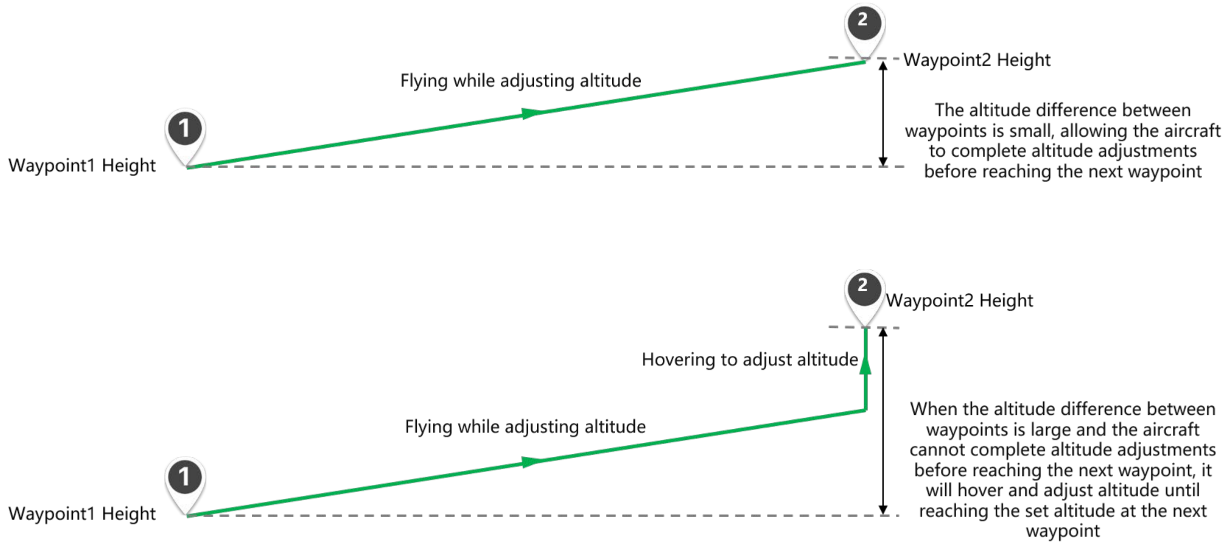


Fig 4-19 Waypoint route flight altitude transfer

Tips

- If the aircraft flies from the previous waypoint to a certain waypoint, it needs to adjust its altitude by hovering at the waypoint. The hovering radius is the turn radius set at the waypoint.
- Number below each waypoint icon at the right side of the “Edit Mission” interface is the altitude of the corresponding point.

➢ Supplementary descriptions for turn mode

- Early Turn: Used when the aircraft does not need to strictly pass the coordinates of a certain waypoint, but only needs to plan a relatively smooth route. When “Early Turn” is set, the set waypoint position is used as an intermediate position to plan a smoother and shorter route. However, it should be noted that there are certain requirements for the distance between the waypoint and the previous and subsequent waypoints, as well as the connection angle between the waypoints. It is not always possible to plan an advance turning route without passing through the waypoints. When using it, please pay attention to the actual route planned on the remote controller and adjust it as needed.
- Pass-Through: used when the aircraft needs to pass the coordinates of a certain waypoint before flying to the next waypoint.
- Timed Orbit/Circular Orbit: used when the aircraft needs to hover at a certain waypoint to perform the corresponding task. The aircraft will complete the set hovering action at the waypoint according to the set hovering attributes (such as orbit parameters and turn radius). Then fly to the next waypoint. Timed Orbit/Circular Orbit is mostly used when the aircraft is required to stay at a specific location of a certain waypoint for a period of time for observation operations.

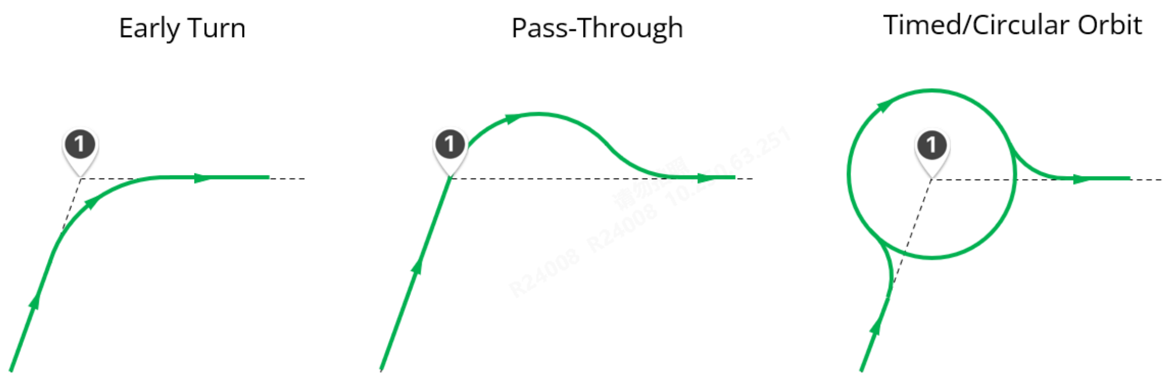


Fig 4-20 Turn mode description

Tips

- In the same waypoint mission, different turn modes can be set for different waypoints.
- Please know that if the turn type is set to "Early Turn" or "Pass-Through", the "turn radius" set at the corresponding waypoint is the radius corresponding to the arc of the aircraft when turning.
- Please know that for Timed Orbit/Circular Orbit, the set number of circles and circle time are the minimum number of circles and the shortest time spent on the circle. In actual flight, the aircraft needs to complete the altitude adjustment on the hovering circle first. It will not start counting the number of hovering circles until the altitude is adjusted to the height set by the waypoint and the aircraft reaches the exit point of the hovering circle. The timed circle will first convert the set circle time into the minimum number of circles set by the aircraft to reach the time and use this calculated number of circles as the judgment condition for the aircraft to leave the circle. Therefore, the actual flight time of the aircraft on the hovering circle will be different from the set hovering time.

➢ Supplementary descriptions for flight segments

Each waypoint has its own corresponding flight segment, where the starting position of the flight segment is the location where the aircraft completes the flight of the previous waypoint and adjusts the aircraft's course to the position facing the current waypoint. The end position of the flight segment is the location where the aircraft completes flying at the current waypoint and adjusts the aircraft's course to the next waypoint.

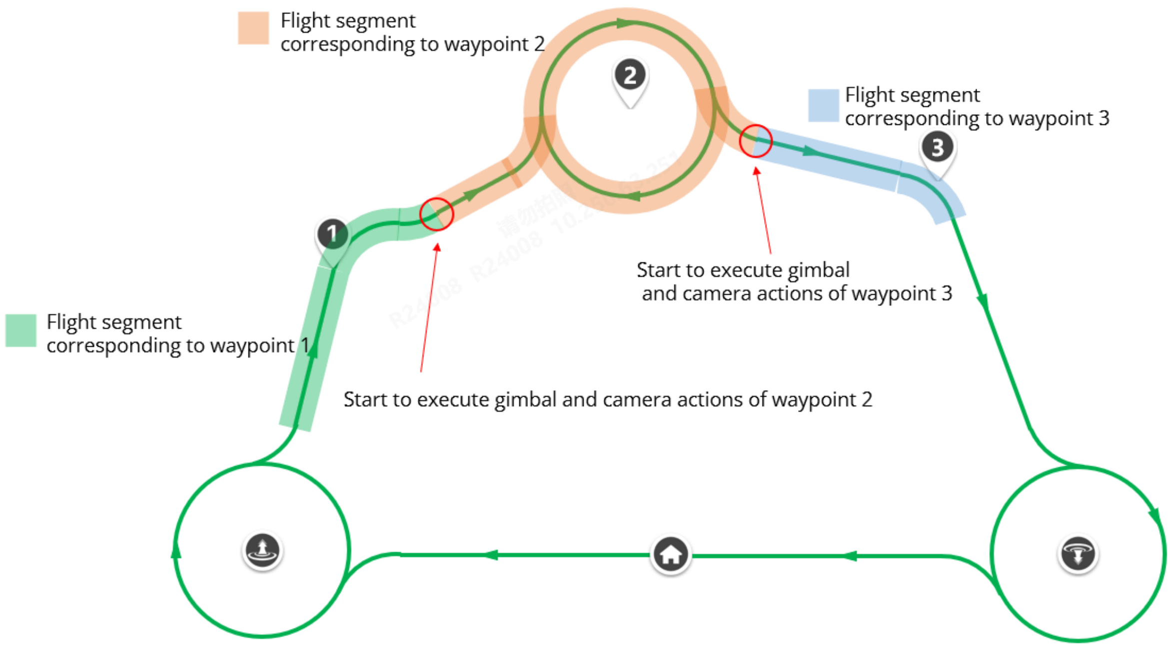


Fig 4-21 The flight segment corresponding to the waypoint

➢ Supplementary descriptions for gimbal movements

- Gimbal Pitch Angle: When the aircraft enters the segment corresponding to the waypoint, it will automatically adjust the gimbal pitch angle to the set angle value. It is defined that 0° means the gimbal is facing forward horizontally, and -90° means the gimbal is pointing vertically downward.
- Gimbal Relative Heading Angle: The offset angle of the gimbal's heading relative to the heading of the current segment when the aircraft enters the segment corresponding to the waypoint. The current route heading is the connection direction from the previous waypoint to the current waypoint. 0° to 180° corresponds to the right side of the route and heading, and 0° to -180° corresponds to the left side of the route and heading.

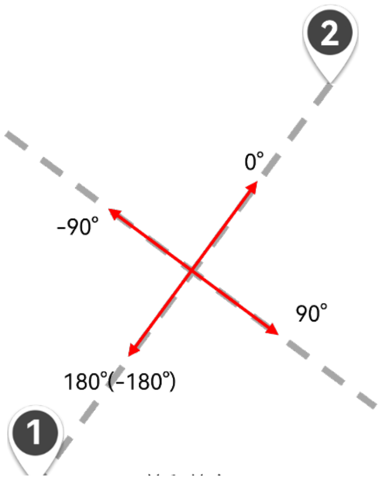


Fig 4-22 The heading corresponding to the route segment No. 2

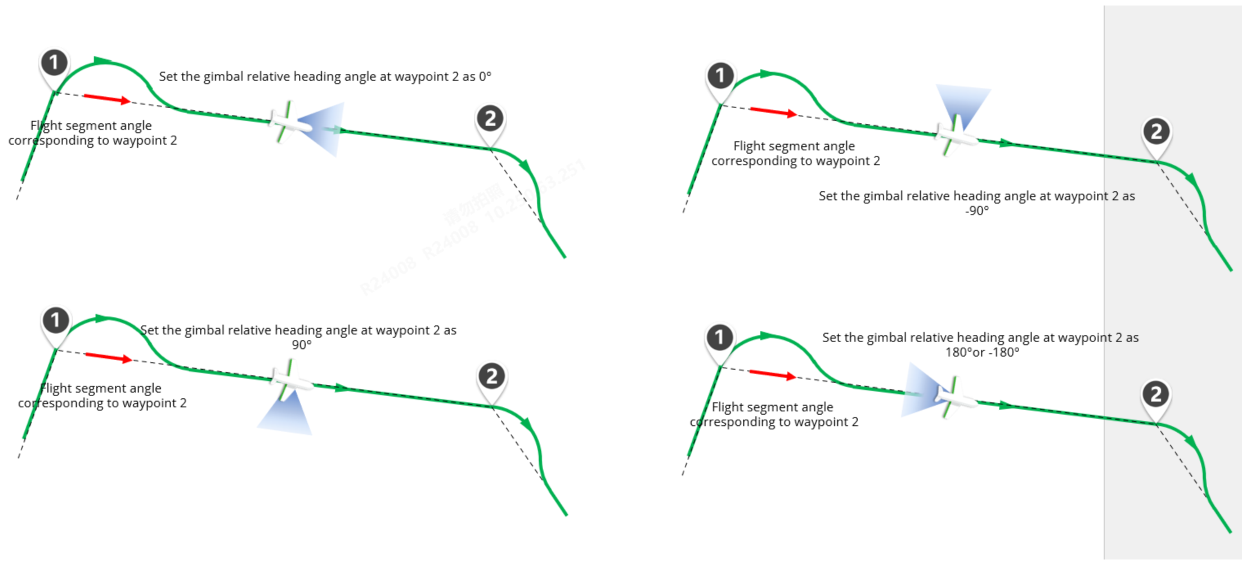


Fig 4-23 Description of gimbal relative heading angle

Remarks

- The gimbal movement (gimbal pitch angle and gimbal relative heading angle) will only take effect once at the beginning of the flight segment corresponding to the waypoint. After entering the flight segment corresponding to the new waypoint, the aircraft will adjust the pitch angle and the relative heading angle of the gimbal once based on the gimbal action set for the new waypoint. During the flight segment, the user can manually control the angle of the gimbal.
- The camera action (payload action) will always be effective during the flight segment

corresponding to the waypoint.

- Please note that in the waypoint mission, the gimbal and camera actions set at waypoint 1 will not take effect. The gimbal and camera actions will only take effect starting from waypoint 2.

➢ Batch edit waypoints

The remote controller supports batch editing of waypoints, which can improve the efficiency of waypoint adjustment when there are many waypoints in a waypoint mission.

After placing the waypoints, the user can tap the “Batch Edit Waypoints” button on the “Edit Mission” interface on the right side of the waypoint mission interface to enter the “Batch Edit Waypoints” window.

Tips

- Before placing waypoints, the “Batch Edit Waypoints” button is unclickable; after placing waypoints, the user can tap the interface expansion button “ ” (located under the interface title bar) in the “Edit Mission” interface to expand and display “Batch edit button”.

After entering the “Batch Edit Waypoints” window, you can modify the attributes of the selected waypoints in batches. The batch editing waypoint function supports the selection of all waypoints for batch editing, or only selects some waypoints for batch editing.

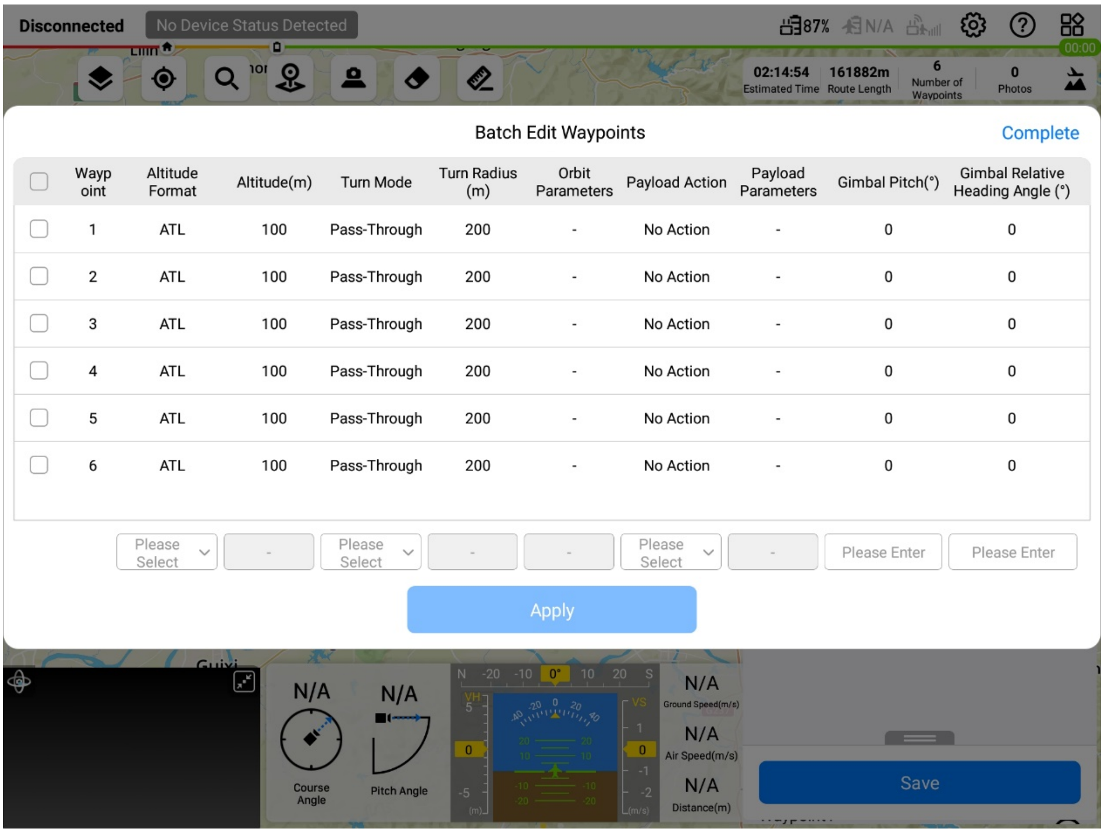


Fig 4-24 "Batch Edit Waypoints" window

Important
● When waypoints in batches are being edited, some attributes need to be set at the same time as their dependent pre-properties before the modification can be applied in batches, such as load actions and load parameters, altitude type and altitude. ● Please note that you can tap the "Apply" button at the bottom of the window to batch apply the modifications after completing the waypoint selection and editing of the waypoint attributes that need to be modified in batches; after completing all batch application modification operations, you can tap the "Finish" button at the upper right of the window to exit "Batch Edit Waypoints" window.

➢ Add observation area

On the “Edit Mission” interface on the right side of the waypoint mission interface, after selecting the “Observation Area” column, you can add a circular area observation area by tapping anywhere on the map interface.

> **Tips**
>
> - Select and drag the observation area on the map interface to quickly adjust its position on the map.
> - After adding an observation area and associating it with the corresponding flight segment, you can execute the observation area waypoint mission.

➢ Edit observation area

On the “Edit Mission” interface on the right side of the waypoint mission interface, select the “Observation Area” subpage, and then select an observation area to perform the following operations:

- Link Flights Points: Enter the serial numbers of two waypoints and tap the “Add” button. The flight segments between the two waypoints will be associated with the observation area.

> **Tips**
>
> - You can choose whether to link the flight segment with the observation area. If the linked flight segment is not set, when the aircraft flies through the segment covered by the observation area, the aircraft gimbal will keep locked on the center point of the observation area; if the associated segment is set, when the aircraft flies through the associated segment, the aircraft gimbal will keep always locked on the center point of the observation area.
> - If multiple observation areas are set up, each observation area can be associated with multiple flight segments, but one flight segment can only be associated with one observation area. If the associated flight segment settings are repeated, the subsequent observation area settings will overwrite the previous settings. When two or more circular observation areas overlap, the gimbal will face the observation area with the smallest number.
> - The priority of the aircraft gimbal control in the observation area is higher than the gimbal action set by its waypoint. The gimbal will give priority to the gimbal instructions required in

the observation area.

- Temporary observation missions and gimbal locking have a higher priority for aircraft gimbal control than the priority of the observation area set on the route. Therefore, when performing a temporary observation mission or gimbal lock, even if the aircraft enters the range of the route observation area, the gimbal will not face the center point of the route observation area.

- Elevation correction: can be set to “None”, “DEM correction”, or “Manual correction”.
  - Elevation (m): Set this when “Manual Correction” is selected. The elevation correction value can be set from 0 to 5000.
- Effective radius (m): The effective radius of the observation area can be set from 100 to 1000.

Tips

- When the observation area is not associated with a flight segment, if the aircraft flies within the radius of the observation area, the aircraft gimbal will always face the center point of the observation area; after leaving the observation area, the aircraft gimbal will return to the original flight segment settings angle.
- Elevation correction is used to correct the altitude of the ground in the observation area to prevent the camera from being unable to align the target point due to errors in the pitch angle during gimbal observation caused by errors in the target height.

- Coordinates: Enter the latitude and longitude coordinates of the center point of the observation area by yourself, supporting three expression methods: “DMS”, “DD” and “MGRS”.
- Delete Observation Area: You can tap this button to delete the observation area.

After the user completes editing the waypoint and observation area, please tap the “Save” button under the “Edit Mission” interface to check and save the waypoint mission. When saving, please check and modify the route according to the prompts on the “Save Mission” interface to ensure that the route settings are qualified and conflict-free.

After saving the waypoint mission, the relevant information of the waypoint mission (estimated time, route length, number of waypoints, photos) will be displayed in a small window at the upper right corner of the map interface.

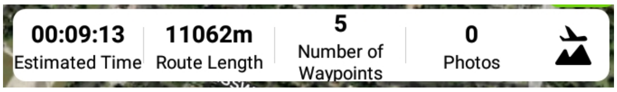


Fig 4-25 Waypoint mission information window

On the map interface, you can perform the following operations:

- Tap the “ ” icon in the small window at the upper right corner to display the current route and terrain preview. The user can choose whether to turn on the terrain obstacle avoidance (terrain following) function on this interface.

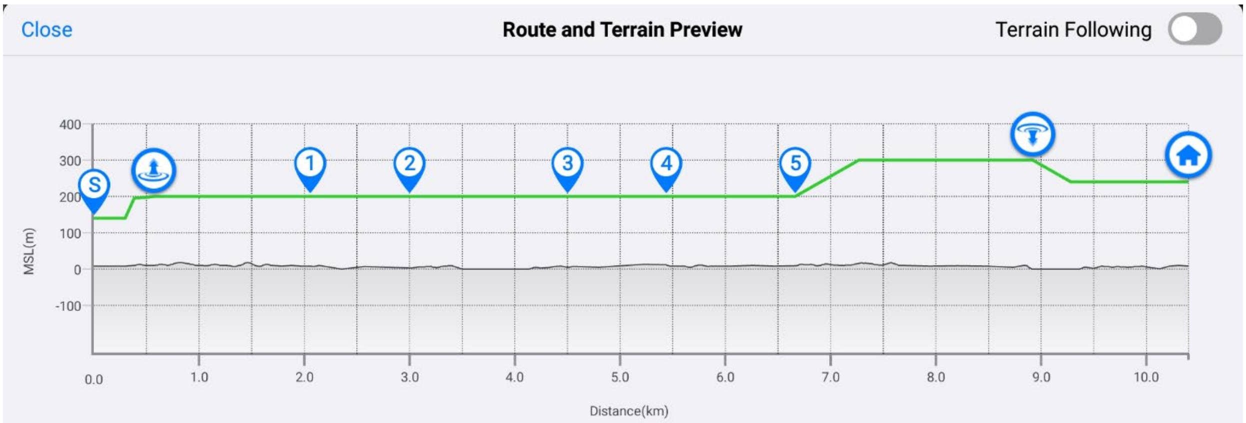


Fig 4-26 Route and Terrain Preview

- Tap the “ Edit ” icon in the small window at the upper right corner to re-edit the waypoint mission.
- After the aircraft performs pre-flight inspection, you can choose to tap the “ ” icon to take off and perform waypoint missions.

Important

- When planning a route, the length of the entire route cannot exceed the limit of 100 kilometers, otherwise an error will be reported, and the generation will fail.
- When setting a route, be sure to pay attention to the airspace conditions, weather conditions, and aircraft battery level along the entire route:

  1. The entire route should not pass through densely populated areas or areas with tall

buildings.

2. The entire route should not pass through severe weather areas, such as lightning, rain, snow, hail, tornadoes, etc.
3. Make sure that the aircraft's power can meet the requirements of the route mission. If the aircraft's power is insufficient, it will automatically interrupt the route mission and trigger a return.

- During the editing process of route missions (waypoint missions and polygon missions), the remote controller will not restrict the editing and saving of routes based on the electronic fence information.
- Before uploading the route mission to the aircraft, the remote controller will verify the relationship between the route and the electronic fence. If the route conflicts with the set electronic fence (such as the route is close to the no-fly zone, the route is within the no-fly zone, or the route is outside the geo-fence, etc.), the aircraft will not be able to take off through the route. After the route that has passed the geo-fence verification is uploaded to the aircraft and takes off, the geo-fence alarm will generally not be triggered. If the aircraft encounters special circumstances while flying on the route, causing it to seriously deviate from the route and enter the restricted area of the electronic fence, the aircraft will be restricted by electronic fences and may slow down and hover.

■ Create a polygon mission

Tap the “ ” icon on the left side of the map interface, and then tap the “ ” icon to enter the “Polygon Mission” interface.

Users can place a polygon area (a rectangular area by default) on the map interface and perform operations such as dragging, adding vertices, and dragging vertices on the polygon area to adjust the location and size of the area; after adjustment, the Autel Voyager Application will automatically, based on the user-set side overlap rate and route angle, generate a continuous equally spaced route in the polygon area. When placing a polygon area, the Autel Voyager Application will automatically generate departure hovering points, arrival hovering points, and home point (the default one is the takeoff position of the aircraft).

Tips

- Polygon missions are mostly used in mission scenarios such as surveying and modeling. Before performing this mission, please plan your own reasonable emergency support measures (such as planning reasonable airspace, safe flight time periods, obtaining official authorization, etc.) to avoid abnormal flight situations that may cause collateral damage to people or buildings on the ground.

Fig 4-27 Create a polygon mission

Table 4-10 Polygon mission interface icon description

No.	Icon	Description
1		Polygon mission route settings.
2		The aircraft's home point position.

3		The position of the aircraft's departure hovering point.
4		The position of the aircraft's arrival hovering point.
5		Polygon vertex positions (identified by numbers).

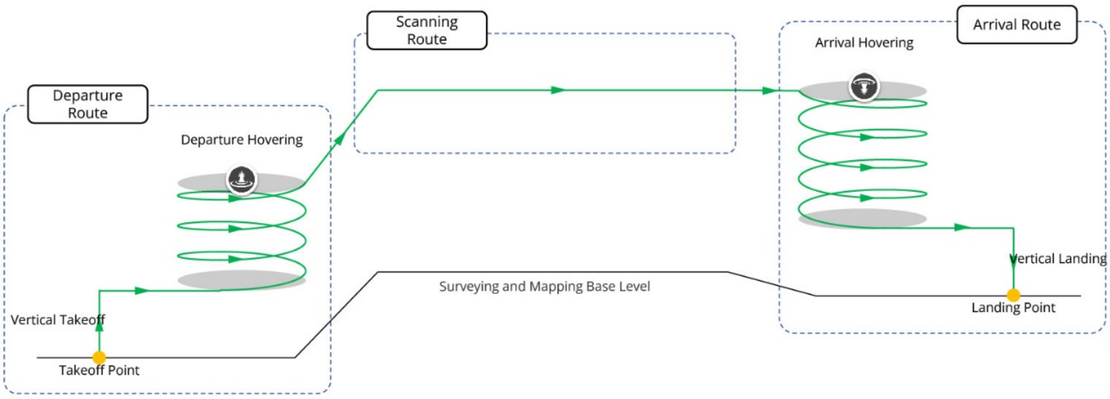


Fig 4-28 Polygon Mission Route Procedures

➢ Add polygon regions and vertices

When creating a polygon mission, users can tap anywhere on the map interface to add a polygon area (the default one is a rectangular area). After placing the area, tap the “+” icon between the area edges to add area vertices.

Tips
● Select and drag each vertex, home point, departure hovering point or arrival hovering point on the map interface to quickly adjust its position on the map.

➢ Edit polygon region and vertices

In the “Edit Mission” interface on the right side of the polygon mission interface, you can perform the following operations:

1. Set the safe height of the polygon mission (m): the safe height value of the mission can be set from 50 to 1000.
2. After placing the polygon area on the map interface, tap the" " icon in the" Route" column on the "Edit Mission" interface on the right to set the basic parameters of the polygon area. Setting items include:
   - Course Angle: The route angle value can be set from 0 to 359.
   - Reference Surface altitude (m): The reference surface altitude value can be set from - 400 to 6000.
   - GSD (cm /pix): The ground resolution value can be set from 0.1 to 20.0.
   - Relative Reference Surface Flight Altitude (m): The flight altitude value can be set from 16 to 3200.
   - Side Overlap Ratio (%): The side overlap ratio can be set from 10 and 90.
   - Front Overlap Ratio (%): The front overlap ratio can be set from 10 and 90.

Remarks

- Course Angle: The angle between the aircraft and true north (clockwise) when it starts executing the scanning route portion of the polygon mission.
- GSD and Relative Reference Surface Flight Altitude are related to each other. Adjusting one will cause the other to change accordingly.
- Side Overlap Ratio: refers to the image overlap rate between two adjacent photos taken when taking photos along two adjacent routes.
- Front Overlap Ratio: refers to the image overlap rate between two adjacent photos taken when taking photos along the heading.

Tips

- Please pay attention to the terrain drop, fill in the Reference Surface altitude according to the actual altitude of the surveying area, set the "Relative Reference Surface Flight Altitude" reasonably, and check whether the route elevation is safe before flying, otherwise there may be a risk of collision.

- When setting the side overlap ratio /front overlap ratio, you need to consider the operation accuracy requirements, and also take into account factors such as lighting conditions during surveying and mapping, survey area range, storage size, etc. While ensuring surveying and mapping accuracy and engineering margins, the number of photos taken can be reasonably reduced and work efficiency improved.
- When setting the front overlap ratio, you need to consider the shutter speed of the gimbal camera. The greater the front overlap ratio, the shorter the time interval between the two photos before and after, which may cause the gimbal camera to be too late to take photos. If this happens, it is recommended to adjust the “GSD/Relative Reference Surface Flight Altitude “or “Front Overlap Ratio” and other parameters.

3. Tap the “ ” icon to edit the home point. The home point is the takeoff position of the aircraft by default.
   - If you cancel the default setting, you can set the home point position yourself (used to realize the off-site takeoff and landing function). The settings include:
     - Altitude Format: You can choose “ATL” or “MSL”.
     - Home Point Altitude (m): Select “ATL” with a setting range of -6000~6000 and select “MSL” with a setting range of -410~9000.
     - Coordinate: Enter the latitude and longitude coordinates of the home point yourself, supporting 3 expressions: “DMS”, “DD”, and “MGRS”.
4. Tap the “ ” icon to set the departure hovering point. Setting items include:
   - Takeoff Mode Switching Height (relative to takeoff point) (m): the height value can be set from 40 to 500.
   - Radius (m): The departure hovering radius value can be set from 100 to 2000.
   - Departure Altitude (m): It can be set to “Follow Waypoint 1”, “ATL”, “MSL”. Among them, the setting range for “ATL” is 40~2000, and the setting range for “MSL” is - 410~9000.
   - Departure Hovering Point coordinates: Input the latitude and longitude coordinates of the departure hovering point by yourself, supporting three expression methods: “DMS”, “DD” and “MGRS”.
5. Tap the “ ” icon to set the arrival hovering point. Setting items include:
   - Landing Mode Switching Height (relative landing point) (m): the height value can be set from 40 to 500.

- Radius: The arrival hovering point radius value can be set from 100 to 2000.
- Arrival Altitude (m): It can be set to “Relative Landing Point” or “MSL”. Select “Relative Landing Point” to set the range from 40 to 2000 and select “MSL” to set the range from-410 to 9000.
- Arrival Hovering Point Coordinates: Enter the latitude and longitude coordinates of the arrival hovering point by yourself, supporting three expression methods: “DMS”, “DD” and “MGRS”.

6. Tap the “ ” icon to set the specified vertex. Setting items include:
   - Coordinates: Enter the latitude and longitude coordinates of the vertex by yourself, and supports three expression methods: “DMS”, “DD” and “MGRS”.
   - Delete Vertex: Tap this button to delete the vertex.

After editing the polygon area, please tap the “Save” button under the “Edit Mission” interface to check and save the polygon mission conflict. When saving, please check and modify the route according to the prompts on the “Save Mission” interface to ensure that the route settings are qualified and conflict-free.

After saving the polygon mission, the relevant information of the polygon mission (estimated time, area, photos) will be displayed in a small window in the upper right corner of the map interface. On the map interface, you can perform the following operations:

- Tap the “ ” icon in the small window in the upper right corner to display the current route and terrain preview. The user can choose whether to enable terrain obstacle avoidance on this interface.
- Tap the “Edit” icon in the small window in the upper right corner to re-edit the polygon mission.
- Tap the “ ” icon, and after the aircraft performs pre-flight inspection, you can choose to take off and perform polygon missions.

Important

- For safety and restriction requirements for home point, departure hovering point, arrival hovering point, and route, please refer to the descriptions in the relevant sections this section in this chapter.
- Do not perform polygon missions near crowded areas, densely built areas, or sensitive

locations unless you have special official authorization.

- When uploading and executing a polygon mission, if it conflicts with the set electronic fence, execution of the mission will be prohibited.

4.1.7.7 Real-time monitoring and one-key self-check

The aircraft is equipped with a one-key self-check function and a safety monitoring function, which, together with manual checks before and after flight, constitute a comprehensive inspection monitoring system to ensure flight safety. Users can monitor the aircraft status in real-time through the Autel Voyager Application.

■ Safety Monitoring

The aircraft is equipped with various types and quantities of sensor devices, and advanced fault detection algorithms enable real-time monitoring of various states throughout the entire flight. Key information is collected and analyzed, identifying necessary faults promptly. Through measures such as warnings, isolation, handling, and recovery, flight safety is ensured. The real-time safety monitoring items during the entire flight cycle mainly include:

- Sensor information.
- Navigation status information such as attitude, speed, and position.
- Remote controller and telemetry link information.
- Smart battery level and battery safety status information.
- Actuator connection and communication information.
- Electronic fence information.
- Some important hardware connection states.
- Some important hardware health states.
- Overall maintenance status information.
- Instruction sending status information, etc.

■ One-Key Self-Check

The one-key self-check function is used for process testing of certain actuators before the aircraft takes off. During the self-check, the left and right tilt servos, as well as the tail servo, will actuate according to the predetermined program under the drive of the design command. The actuation results are recorded and evaluated in real-time. Before performing a one-key self-check, the following pre-checks must be completed:

- Check if the wing locks are securely fastened.
- Check if the tail is securely connected to the fuselage.
- Verify if the wingtip propeller blades are installed correctly.
- Confirm if the smart battery is securely installed.
- Ensure that the airspeed tube protective cover has been removed.

Important

- During the execution of the one-key self-check, the tilt servos on both sides of the aircraft's wingtips and the elevator will deflect. Please pay attention to the safety of personnel and equipment.

Tips

- The safety monitoring function is automatically enabled and remains active continuously after the aircraft is powered on. On the other hand, the one-key self-check function is used for ground checks before takeoff and troubleshooting checks in case of malfunctions.
- Key status and alarm information from safety checks will be displayed on the left side of the remote controller's status bar. During use, it is important to constantly monitor the equipment status. If the equipment status shows "Warning", "Device Abnormal", "Flight Prohibited" or similar alarms, promptly check the abnormal situation and take appropriate actions. For more details, please refer to Chapter 3, "**3.4.10.2 Status Bar**".
- The triggering mechanism for the one-key self-check function depends on the aircraft's takeoff method (manual takeoff, one-key takeoff, or mission takeoff). For details, please refer to "**4.2.1.1 Manual takeoff**", "**4.2.1.2 One-tap takeoff**", and "**4.2.1.3 Mission takeoff**" in chapter 4.

4.2 Flight

A complete flight comprises takeoff, during-flight and landing.

4.2.1 Takeoff

Autel Dragonfish Series aircrafts provide different types of takeoff methods for users to choose accordingly, which include manual takeoff, one-key takeoff and mission takeoff.

Important
● Before taking off, please do a pre-flight inspection to ensure that the aircraft is in a safe and flyable condition. ● When preparing to take off, please stand behind the aircraft and maintain a safe distance of at least 10 meters. ● Under certain abnormal circumstances, even if the aircraft passes the self-inspection, the motors may not be unlocked during takeoff. If you encounter an abnormal situation that cannot be unlocked, please troubleshoot according to the prompt information on the Application. If you still cannot solve the problem, please contact Autel Robotics or an authorized dealer. ● After the aircraft motor is unlocked, a status check will be performed while the motor is idling. If the motor status check fails, the aircraft will not be able to take off. In this case, the aircraft motors will automatically lock after a period of time. If you encounter this type of problem, please contact Autel Robotics or an authorized dealer.

4.2.1.1 Manual takeoff

When choosing manual takeoff, users can conduct aircraft manual flight by taking following steps:

1. Power on the aircraft, the base station and the remote controller and complete matching. For details about matching and connection, please refer to "4.1.4 Matching and Connection".
2. Switch the mode on the remote controller to M mode, now the mode indicator will turn red.

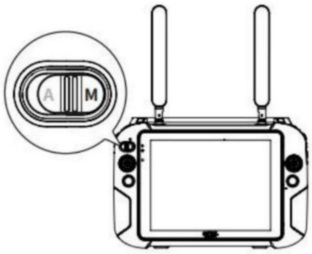


Fig 4-29 When the RC mode is M mode

3. Simultaneously move the left and right sticks inward or outward for 2 seconds and finish the pre-check list as shown in the remote controller, then simultaneously move the left and right sticks inward or outward to start the aircraft motor.
4. Push the throttle stick up, and the aircraft will ascend vertically.

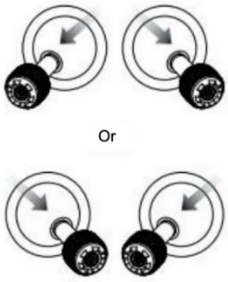


Fig 4-30 Start The Aircraft Motor

⚠ Warning
● When taking off and landing the aircraft, stay away from people, vehicles, and other moving objects.

❗ Important
● Before manual take-off, please ensure you have chosen and set the stick modes of the RC properly and know the corresponding control method. For details, please refer to "4.1.7.3 Selecting stick mode" in chapter 4. ● If the aircraft completes the self-check, the motors cannot be activated, please follow the troubleshooting prompts on the Application. If the issue cannot be solved, please contact

Autel Robotics service team.

- The position of the throttle stick differs in different stick mode, please refer to "4.1.7.3 Selecting stick mode" for details.

4.2.1.2 One-tap takeoff

In addition to manually taking off the aircraft, users can also perform one-tap takeoff operation in the Autel Voyager Application. The relevant steps are as follows:

1. Power on the aircraft, base station and remote controller and connect them to the frequency.
2. Move the flight mode switching button on the RC to the "M" position. At this time, the mode switch indicator light will turn red.

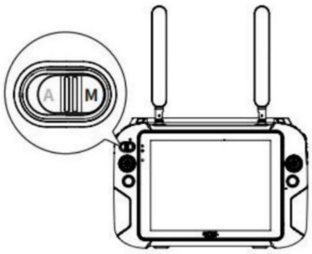


Fig 4-31 When the RC mode is M mode

3. Tap the "" icon in the upper left corner of the map interface of the Autel Voyager Application. After completing the check items in the pop-up pre-flight pre-check window, drag the "" icon to the right to take off. The aircraft will take off vertically in multi-rotor mode.

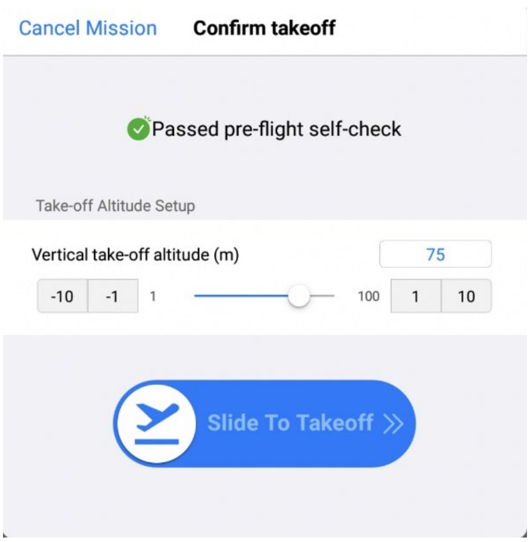


Fig 4-32 One-tap takeoff confirmation

Tips

- Tap the “Cancel Mission” button in the upper left corner of the window to exit the one-tap takeoff process.
- During the one-tap takeoff process, the user can interrupt the one-button takeoff process by operating the remote controller stick at any time and manually take over the aircraft.
- Users can also choose manual takeoff and mission takeoff (the remote controller flight mode needs to be switched to A). For relevant operation details, please refer to Chapter 4 “4.2.1.1 Manual takeoff“ and “4.1.7.6 Creating a route mission“ in this chapter, please note that the aircraft will not be able to take off if it does not pass the pre-flight check.

4.2.1.3 Mission takeoff

Users can also choose mission takeoff. The steps are as follows:

1. First ensure the mode of the RC is auto mode (A);

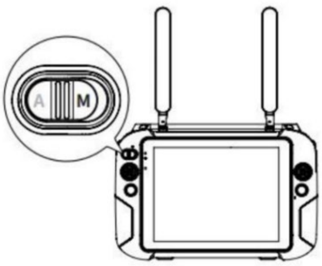


Fig 4-33 When the mode of the RC is auto mode

2. After creating a route mission in the Autel Voyager Application, or tapping the mission library icon, tap “ ” to perform one-tap self-check after uploading a route mission. After the self-check is completed, slide the button to confirm takeoff. Then the aircraft will execute the corresponding mission automatically.

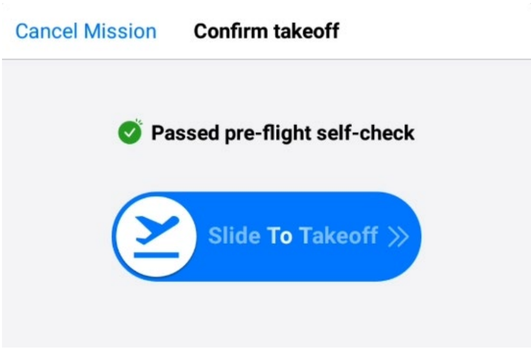


Fig 4-34 Confirm takeoff (mission takeoff)

Tips

- For details about creating a route mission, please refer to "**4.1.7.6 Creating a route mission**".

Important

- Before flight, it is required to do pre-flight check so as to ensure the aircraft is safe to fly.
- When preparing for taking off, please keep a safe distance from the aircraft.

4.2.2 During Flight

4.2.2.1 Quick mission

The quick mission function is used to plan a simple mission in a certain area through the remote controller during flight and then the aircraft immediately goes to the designated area to perform the mission.

During the flight of the aircraft, the user can exit from the current flight (or mission) and perform quick missions in the following two ways:

- Tap the " " icon on the left side of the map interface, wait for the "Edit Quick Mission" interface to appear on the right side of the interface, and then tap an area of the map to set a quick mission point. Users can drag the quick mission point icon on the map, or accurately set the location of the quick mission point by entering coordinates on the "Edit Quick Mission" interface.

- Tap the “ ” icon in the upper left corner of the map interface, place a marked point at a certain location on the map, and select the quick mission icon “ ” in the marked point to edit the quick mission.

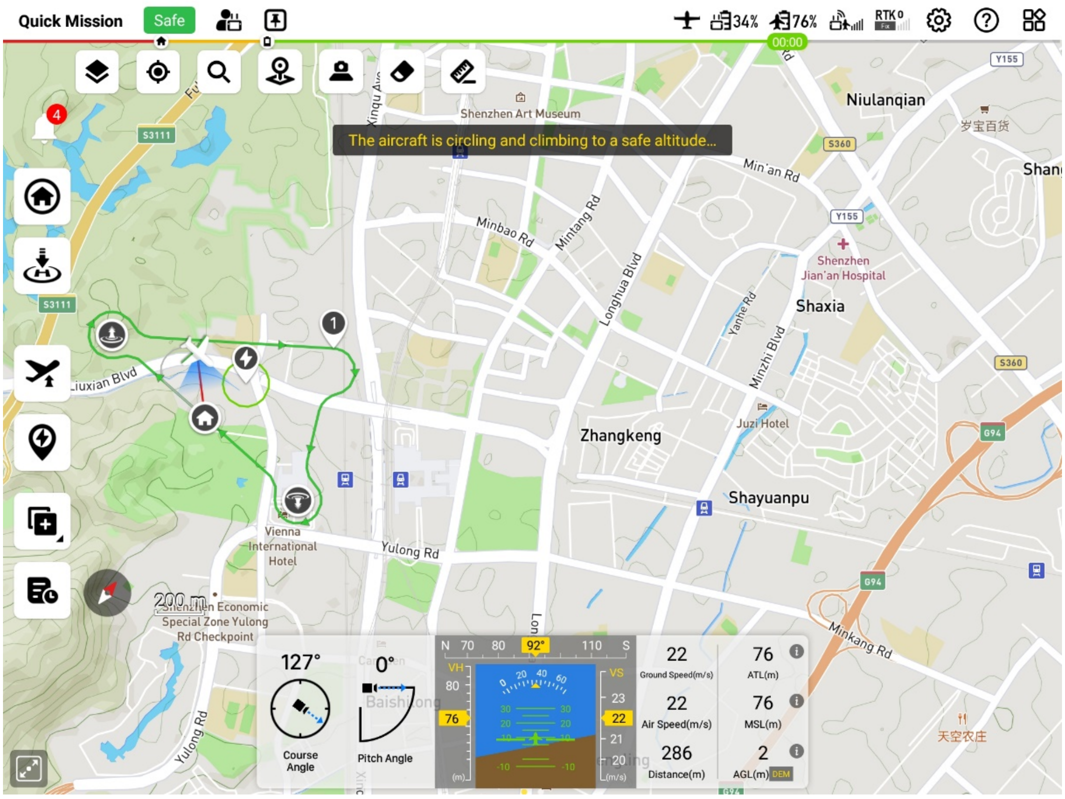


Fig 4-35 Quick Mission

Tips

- The aircraft can create and switch to a quick mission when it is in manual flight, mission flight, quick mission, dynamic track, alternate landing or automatic return.
- The quick mission is an infinite loop of circular routes. After executing the quick mission, the user's manual intervention is required to exit the quick mission.

After placing the quick mission point, the user can make the following settings for the circular quick mission in the “Edit Quick Mission” interface on the right side of the map interface:

- Safety height (m): The safety height value can be set from 50 to 1000.
- Flight altitude (m): Can be set to “relative takeoff point” or “altitude”. Select “Relative Takeoff

Point" to set the range from -6000~6000 and select "Altitude" to set the range to -410~9000.

- Circle radius (m): The circle radius can be set from 100 to 500.
- Coordinates: Enter the longitude and latitude coordinates of the center point of the circular quick mission by yourself, supporting three expression methods: "DMS", "DD" and "MGRS".

Tips

- The safety height is related to the terrain obstacle avoidance function. For details, please refer to Chapter 2 "2.7 Terrain Obstacle Avoidance".
- When editing quick mission parameters, the default altitude is the aircraft's current flight altitude when editing the quick mission.
- After the quick mission is executed, the user can tap the one-tap altitude change icon " " on the left side of the map interface to adjust the height. For details on the height adjustment related logic, please refer to "4.2.2.7 One click to change attitude" in this chapter.

Warning

- After the user completes quick mission editing on the remote controller, when saving the quick mission, the remote controller will verify whether there is a conflict between the quick mission area and the existing electronic fence. If there is a conflict between the quick mission area and the existing electronic fence, the remote controller will pop up a prompt box to prohibit the user from performing this quick mission.
- The remote controller only checks the circle area for quick missions. If the aircraft is restricted by an electronic fence when flying to a quick mission area, it may be restricted by the electronic fence, causing the aircraft to slow down and hover.
- When making negative altitude adjustments, be sure to pay attention to the current flight altitude to ensure flight safety.

When performing a quick mission, if the aircraft is not restricted by electronic fences, when the aircraft accelerates to fixed-wing mode, the expected diversion route will appear on the map, and the route will be displayed in orange.

■ Mission execution logic

- If the aircraft is in multi-rotor mode, it will decelerate to near zero in speed, and then adjust the altitude while adjusting the heading to point to the fast mission center point. If the current height relative to the take-off point is lower than the mode switching height, it will rise to the mode switching height; if the current height relative to the take-off point is higher than the mode switching height, it will maintain that height. After the aircraft completes altitude and heading adjustments, the aircraft will accelerate and switch to fixed-wing mode. After entering the fixed-wing mode, if the quick mission flight altitude exceeds the current aircraft altitude, the aircraft will hover and climb to the nearest fast mission flight altitude, and then transfer to the quick mission hovering circle; if the quick mission flight altitude is lower than the current aircraft altitude, the aircraft will maintain the current altitude and fly toward the quick mission hovering circle. After reaching the quick mission hovering circle, according to the flight altitude and hovering radius set for the mission hovering circle, lower the altitude while hovering.
- If the aircraft is in fixed-wing mode, and if the quick mission flight altitude exceeds the current aircraft altitude, the aircraft will hover and climb to the nearest quick mission flight altitude, and then transfer to the quick mission hovering circle; if the quick mission flight altitude is lower than the current aircraft altitude, then the aircraft maintains its current altitude and flies toward the fast mission circle. After reaching the quick mission hovering circle, it will fly in a circle while lowering its altitude according to the flight altitude and circle radius set for the mission hovering circle.

Tips

- When the aircraft is conducting a quick mission, the terrain obstacle avoidance function is forcefully turned on.
- The quick mission only changes the aircraft route, and the gimbal will maintain the original mission status.

4.2.2.2 Gimbal operations

During flight, users can control the gimbal by setting gimbal mode or performing gimbal operations, so as to complete specified gimbal actions.

■ Gimbal mode

- ➢ Attitude lock

The roll direction of the gimbal is maintained at 0°. The user can specify the gimbal heading by operating the dial, centering the pointing point, and returning the gimbal heading to the middle. The gimbal heading remains at the fixed orientation specified by the user and does not deflect with the aircraft heading. The user can adjust the gimbal heading. The tilt angle of the platform enables observation, photography and video recording of the current heading.

- ➢ Course following

The roll direction of the gimbal remains at 0°, and the gimbal 's heading deflects along with the aircraft's heading. The user can remotely control the gimbal's pitch angle.

Tips
● Operation path: Tap"⚙">" Gimbal "on the map interface or camera interface of the Autel Voyager App, and expand "Gimbal Mode" to set the mode.

■ Gimbal operation

During flight operations, users can quickly control the gimbal through the dial wheels on the remote controller or control the gimbal through the Autel Voyager Application. Operating the gimbal will not affect the normal flight of the aircraft.

Tips
● The priority of gimbal operations from high to low is "Gimbal Lock" > "Observation Mission" > "Quick Return to Center" > "Point to Center" > "Dial Wheel Operation" > "Gimbal Mode".

The following operations are performed through the left and right dial wheels of the remote controller.

- ➢ Dial operation

- Left dial wheel: Control the pitch angle of the gimbal. Turn it to the left and the gimbal will rotate downward; turn it to the right and the gimbal will rotate upward.
- Right dial wheel: Control the course angle of the gimbal. Push it to the left and the gimbal will rotate to the left; push it to the right and the gimbal will rotate to the right.

Tips
● For the control operation of the remote controller, please refer to Chapter 3, "**3.4.1 Remote Controller Components**".

Remarks
● When the gimbal is locked or the aircraft is executing an observation mission, the dial wheels are not supported to operate the gimbal. If you need to operate the dial wheels, please confirm that the gimbal is in an unlocked state on the camera interface of the Autel Voyager App and the aircraft is not executing an observation mission. ● The stroke of the dial wheel operation is directly related to the rotation speed of the gimbal. The greater the stroke, the greater the rotation speed of the gimbal. ● The gimbal rotation speed operated by the dial wheels is related to the zoom factor. The greater the zoom factor, the smaller the gimbal rotation speed caused by operating the dial wheels.

The following gimbal operations need to be performed in the Autel Voyager Application:

Tips
● For operations in Autel Voyager App, please refer to Chapter 3, "**3.4.10.4 Camera interface**".

➢ Gimbal lock

Lock the selected target point on the camera interface to keep the target point at the center of the image transmission interface.

1. Tap the gimbal lock icon " " on the camera interface to enable gimbal lock.
2. Tap and drag to select the target point on the camera interface or tap the target point automatically recognized by vision, and the gimbal will lock the target point.
3. You can tap and drag to select or tap the target point multiple times to achieve precise locking of the target.

➢ Point to center

Tap the target point on the camera interface to place the target point in the center of the interface to quickly observe the target point.

1. Open the camera interface, tap the target point, and the gimbal will display the target point in the center of the camera interface.
2. You can point and center multiple times to achieve manual tracking and precise observation of the target point.

Tips

- After the pointing and centering operation is performed when the gimbal is in an unlocked state, the gimbal will maintain the current pitch angle and heading angle. If you need to maintain observation of the target point, you need to perform pointing and centering operations multiple times.
- After the pointing and centering operation is performed in the gimbal locked state, the gimbal will keep pointing to the latitude and longitude of the target point. If you need to lock the moving target point, you need tap and drag to select the target and enter the gimbal locked state.
- When using a gimbal camera to point and center a target that is far away, the first estimated position of the target point may be inaccurate. You can improve the accuracy by pointing and centering multiple times.

➢ Quick return to center

Quickly return the gimbal angle to the specified position, including "pitch horizontal return to center", "horizontal return to center pitch down", "horizontal return to center" and "pitch return to center".

1. Open the camera interface and make sure the gimbal is unlocked.
2. Tap the quick return to center icon “” on the camera interface.
3. Select one of the gimbal's "Pitch Level Return to Center", "Level Return to Center Pitch Down", "Pitch Return to Center", or "Level Return to Center".
   - Pitch level return to center means the gimbal pitch angle remains level and the gimbal heading follows the aircraft heading.

- Horizontal centering and pitching downward: means that the gimbal pitch angle is downward and the gimbal heading follows the aircraft heading.
- Horizontal centering: means that the gimbal pitch angle remains in its current state and the gimbal heading tracks the aircraft heading.
- Pitch back to center means the gimbal pitch angle remains horizontal and the gimbal heading maintains the current state.

Remarks

- When the gimbal is locked or the aircraft is executing an observation mission, the quick return to center function is not supported. If you need to quickly return to center, please confirm that the gimbal is in an unlocked state on the camera interface of the Autel Voyager App and the aircraft is not executing an observation mission.
- When the gimbal is in attitude lock mode, when you select one of the gimbal's “Pitch Level Return to Center”, “Level Return to Center Pitch Down”, or “Level Return to Center”, the gimbal mode will automatically switch to “Heading Follow”. The gimbal mode will not be changed when selecting “tilt the gimbal back to center”.
- When the gimbal is in Course Following mode, the gimbal mode will not change after a quick return to center operation.

➢ Observation Mission

Observation missions are divided into observation area waypoint mission and temporary observation mission.

- **Observation area waypoint mission**

That is, on the basis of the ordinary waypoint mission, a specified number of observation areas can be set, and the observation areas are associated with the flight path executed by the aircraft by covering or specifying the flight segment. In an observation area waypoint mission, after associating the flight segment with observation area, when the aircraft is passing through the effective range of the designated observation area, the gimbal of the aircraft will always face the center of the observation area until it leaves the effective range of the observation area. For details, please refer to “**4.1.7.6 Creating a route mission**” in chapter 4.

- **Temporary observation mission**

The temporary observation mission function is used during flight. The user specifies a certain point on the map as the center point of the temporary observation area. After that, the aircraft's gimbal will always lock the center position of the temporary observation area and observe the observation area. For details about temporary observation mission, please refer to "**4.2.2.6 Temporary observation mission**" in chapter 4.

4.2.2.3 Dynamic track

During the flight, the user can interrupt the current flight (or mission) and perform dynamic track of the specified target point.

Table 4-11 Dynamic track icon description

No.	icon	Description
1		After selecting the dynamic track method, tap this icon to set the relevant tracking parameters of the corresponding tracking method.
2		Tap this icon to enable figure-8 tracking. The aircraft performs figure-8 tracking around a reference point at a specified distance and angle from the target point in a figure-8 hovering trajectory.
3		Tap this icon to enable simple tracking (or surround tracking). The aircraft tracks around the target point with the hovering radius and orbiting direction set by the user.
4		Tap this icon to enable circling tracking. The aircraft performs circle tracking around a reference point at a specified distance and angle from the target point with a hovering radius and orbiting direction set by the user.
5		Tap this icon to enable synchronous tracking. The aircraft will track the flight reference point. When the aircraft tracks within a small range of the flight reference point, it will keep in sync with the flight reference point and continue tracking.

Tips

- Dynamic track can be performed when the aircraft is in manual flight, mission flight, temp mission, quick mission, auto-return or diversion.
- During the execution of a certain tracking method, you can also switch to other tracking methods.
- When dynamic track is enabled, the terrain obstacle avoidance function will be forced to be turned on.

Important

- Before tracking is enabled, the gimbal must be in the gimbal locked state.

■ Dynamic track application scenario description

- Figure-8 hovering tracking: It is used in scenarios where the user is observing a target point and expects the aircraft to perform figure-8 hovering tracking at a specified distance from the target point.
- Simple tracking: Applicable to scenes where the user turns on the gimbal lock, performs fixed-range surround tracking and omnidirectional shooting of the target point, and there are no obvious obstructions around the target point.
- Circling tracking: It is used when the user locks and observes a target point and expects the aircraft to circle and track at a specified distance and direction from the target point, so that the aircraft can better always lock and observe the target from a certain direction and avoid the target from being blocked from some certain angles.
- Synchronous tracking: It is used in scenarios where the user turns on the gimbal lock to observe from the relative distance and at the relative orientation of the target point for a long time, such as a scenario where the target point needs to be observed at a certain orientation of the target at a specified angle.
- Pointing flight: Applicable to scenarios where gimbal lock is turned on and temporary target points are observed.

■ Enable dynamic track

1. Tap the “ ” icon on the camera interface to enable gimbal lock.
2. Tap and drag to select the target point on the camera interface.
3. Set the dynamic track method (tap the corresponding tracking method icon).
4. Tap the “ ” icon to set tracking parameters.

■ Simple tracking settings

Tap the “ ” icon, and then tap the “ ” icon to configure simple tracking settings:

- Tracking radius (m): The tracking radius value can be set from 100 to 3000.
- Surround direction: can be set to “Auto”, “Clockwise”, “Counter-clockwise”.

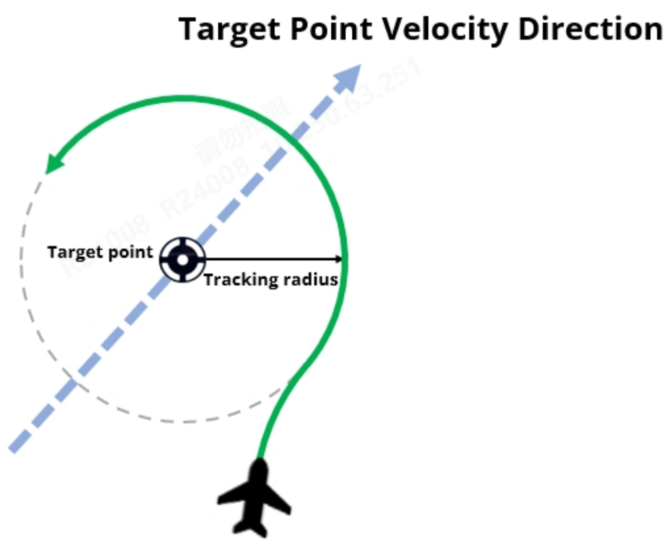


Fig 4-36 Simple tracking

■ Circling tracking settings

Tap the “ ” icon, and then tap the “ ” icon to configure circling tracking settings:

- Tracking radius (m): The tracking radius value can be set from 100 to 3000.
- Surround direction: can be set to “Auto”, “Clockwise”, “Counter-clockwise”.
- Reference point setting: You can set the reference point distance and reference point angle (choose absolute angle or relative angle).
  - ➢ Distance (m): The reference point distance value can be set within the range of 0~3000.

- Absolute angle (°): The absolute angle value of the reference point can be set from 0 to 360.
- Relative angle (°): The relative angle value of the reference point can be set from 0 to 360.

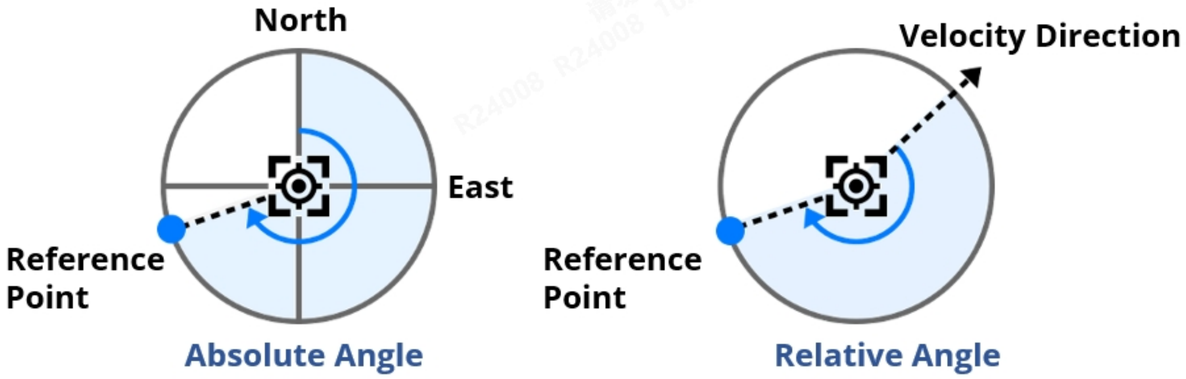


Fig 4-37 Absolute Angle and Relative Angle

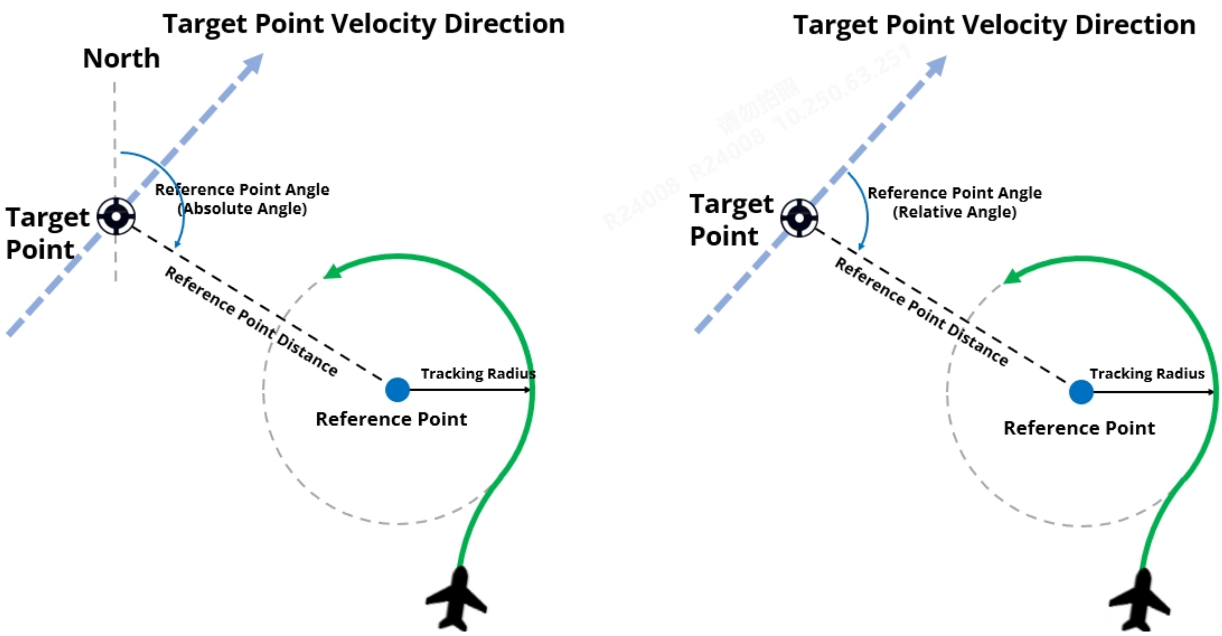


Fig 4-38 Circling tracking

Remarks
● The absolute angle refers to the angle that takes the target point as the origin of the

coordinates, the north as zero degrees, and rotates clockwise to the reference point.

- The relative angle refers to the angle of clockwise rotation to the reference point with the target point as the coordinate origin and the moving direction of the target point as zero degrees.
- It is not recommended that users use relative angles when tracking stationary objects. For an object that has been stationary, the direction of movement of the object at the last moment is difficult to determine, so the direction of the reference point cannot be directly and clearly determined.

■ Figure 8 circling tracking settings

Tap the "  " icon, and then tap the "  " icon to set up the figure-8 circling tracking:

- Tracking radius (m): The tracking radius value can be set from 100 to 3000.
- Surround direction: can be set to "Auto", "Clockwise", "Counter-clockwise".
  - Auto: If set to "Auto", the aircraft will automatically calculate the shortest flight tracking orbit direction based on the positional relationship between the current position and the target point. If the target point is on the left side of the aircraft's current route, the automatic orbit direction will be counterclockwise, otherwise it will be clockwise.
- Reference point setting: You can set the reference point distance and reference point angle (choose absolute angle or relative angle).
  - Distance (m): The reference point distance value can be set within the range of 0~3000.
  - Absolute angle (°): The absolute angle value of the reference point can be set from 0 to 360.
  - Relative angle (°): The relative angle value of the reference point can be set from 0 to 360.

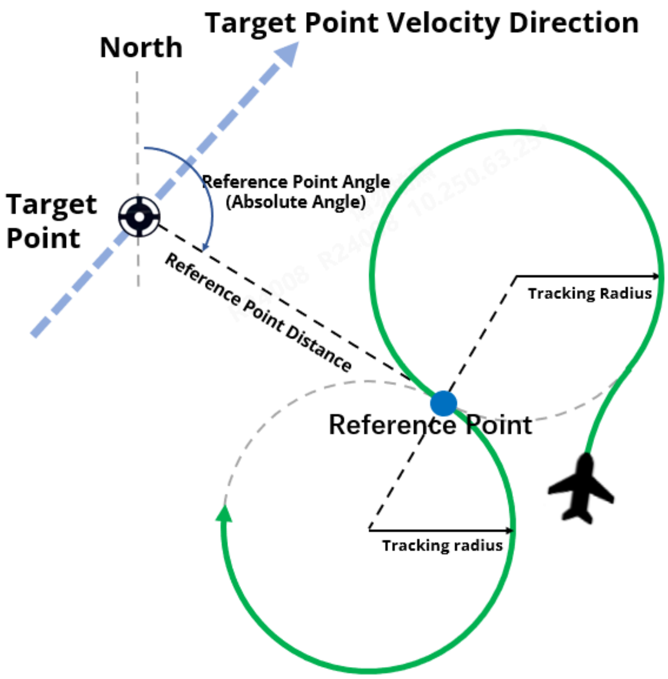


Fig 4-39 Figure-8 circling tracking

■ Synchronous tracking settings

Tap the "" icon, and then tap the "" icon to perform synchronization tracking settings:

- Reference point setting: You can set the reference point distance and reference point angle (choose absolute angle or relative angle).
    - ➢ Distance (m): The reference point distance value can be set within the range of 0~3000.
    - ➢ Absolute angle (°): The absolute angle value of the reference point can be set from 0 to 360.
    - ➢ Relative angle (°): The relative angle value of the reference point can be set from 0 to 360.

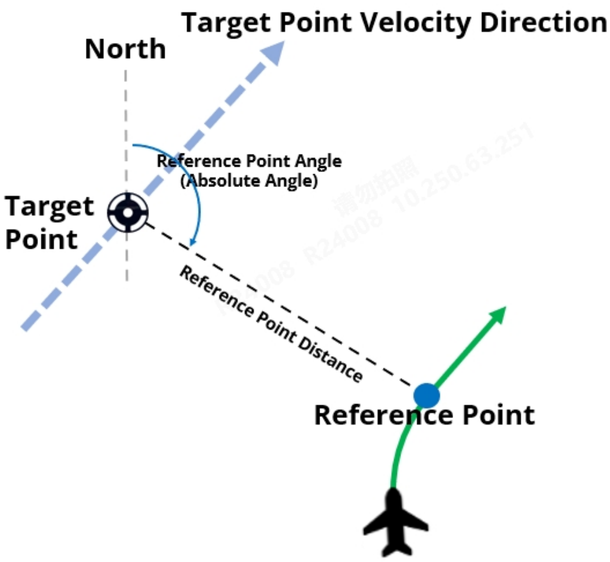


Fig 4-40 Synchronous tracking

■ Enable pointing flight*

Pointing flight means that the aircraft quickly tracks the target point estimated in real time on the camera interface.

1. Tap the “ ” icon on the camera interface to enable gimbal lock.
2. Tap and drag to select the target point on the camera interface.
3. Set up dynamic track methods (tap any tracking method icon).
4. Tap any point on the camera interface to start pointing and flying.

Tips

- Pointing flight is often used in conjunction with simple tracking.
- Pointing flight is actually tracking a certain specified coordinate. It is not bound to the target object, but to the coordinates.
- High-precision pointing and flying of the same target coordinate can be achieved by tapping the same target coordinate multiple times.

Important

- The aircraft must be in tracking status to enable pointing flight.

4.2.2.4 Laser position record

When the aircraft is equipped with a T3H gimbal camera or a L20T gimbal camera (the gimbal camera must have a laser rangefinder), the laser position record function can be realized. Through Laser position record, information such as distance, altitude, speed, longitude, and latitude of the target point can be obtained.

■ Laser position record process

1. Turn on the "Laser Rangefinder" on the [Aircraft Settings] interface of the Autel Voyager Application to enable this feature.
2. Tap the " " icon on the camera interface to enable gimbal lock.
3. Tap and drag to select, or tap or specify the target point to be measured on the camera interface. The camera interface will display the distance, altitude, speed, longitude and latitude of the target.
4. Tap the target point marking icon " " to mark the target point information.
5. Laser ranging can be performed on multiple targets in sequence. Multiple target point information will be recorded on the camera interface, and target point mark icons will be displayed on the map interface.

Important

- To use the laser position record function, you must first enable the laser ranging function on the [Aircraft Settings] interface. Otherwise, even if the gimbal is equipped with a laser rangefinder, laser position record still cannot be performed.
- Laser position record can only be performed when the gimbal is locked.
- As the laser rangefinder has a certain effective measurement range, please pay attention to the quality of the hardware when using it.
- If no target point is selected, the camera interface will display the distance, altitude, speed,

longitude and latitude of the center point of the screen.

4.2.2.5 Temp mission

The temp mission function is used for users to perform new waypoint missions, polygon missions and figure-8 missions during flight. After starting the temp mission, the system will automatically generate a transfer route from the current position to the temp mission. The aircraft will fly to the temp mission area and start flying from the first waypoint of the temp mission to perform the mission.

Tips

- Compared with quick missions, temp missions can adapt to more complex application scenarios, such as temporary area surveying and mapping operations, and temporary long-distance inspection operations.
- Through the temp mission function, users do not need to recall the aircraft already flying in the air to land and re-plan the mission route on the ground when the operation mission is temporarily changed. Users only need to upload a new temp mission in the air and the aircraft can immediately start execution. The new missions greatly shorten the redeployment time when missions change.

While the aircraft is flying, users can create temp missions in the following ways:

- Tap the “ ” icon on the left side of the map interface, and then tap the “ ” icon to enter the “Waypoint Mission” interface.
- Tap the “ ” icon on the left side of the map interface, and then tap the “ ” icon to enter the “Polygon Mission” interface.
- Tap the “ ” icon on the left side of the map interface, and then tap the “ ” icon to enter the “Figure-8 Mission” interface.

Remarks

- When the temp mission is generated, it will only include the waypoint route part of the waypoint mission or the route scanning part of the polygon mission or the figure-8 route but will not include the departure route and the arrival route.
- Please note that for temporary waypoint missions, if there is only one waypoint, this waypoint will be set to the hovering type by default; if there are more than one waypoints, you can set the turning type of each waypoint (if you need to set "Early Turn" as the turn mode of the waypoint, the waypoint must be neither the first nor the last waypoint, otherwise the planned route will still be a go-through route. For results of route planning under different settings, please refer to the route planning results on the remote controller).
- For the operation of creating a temporary waypoint mission or a temporary polygon mission, please refer to "**4.1.7.6 Creating a route mission**" in this chapter, which will not be described here. Only the figure-8 mission is introduced below.
- The created temp mission route is displayed as a blue route on the remote controller.

■ Edit figure-8 mission

After choosing to create a figure-8 mission and placing the mission center point on the map, in the pop-up "Edit Quick Mission" interface on the right side of the map interface, you can edit the following parameters:

- Safety height (m): The safety height value can be set from 50 to 1000.
- Flight altitude (m): Can be set to "relative takeoff point" or "altitude". The relative take-off point can be set in the range of -6000~6000, and the altitude can be set in the range of -410~9000.
- Circle radius (m): The circle radius can be set from 100 to 500.
- Reference distance (m): In the figure-8 mission, the distance between the centers of two hovering circles can be set from 205 to 10000.
- Reference heading (°): In the figure-8 mission, the angle between the normal line connecting the centers of the two hovering circles and the north direction (clockwise). The reference heading angle value can be set within the range of -180~180.
- Coordinates: Enter the longitude and latitude coordinates of the figure-8 mission center point by yourself, and they support three expression methods: "DMS", "DD" and "MGRS".

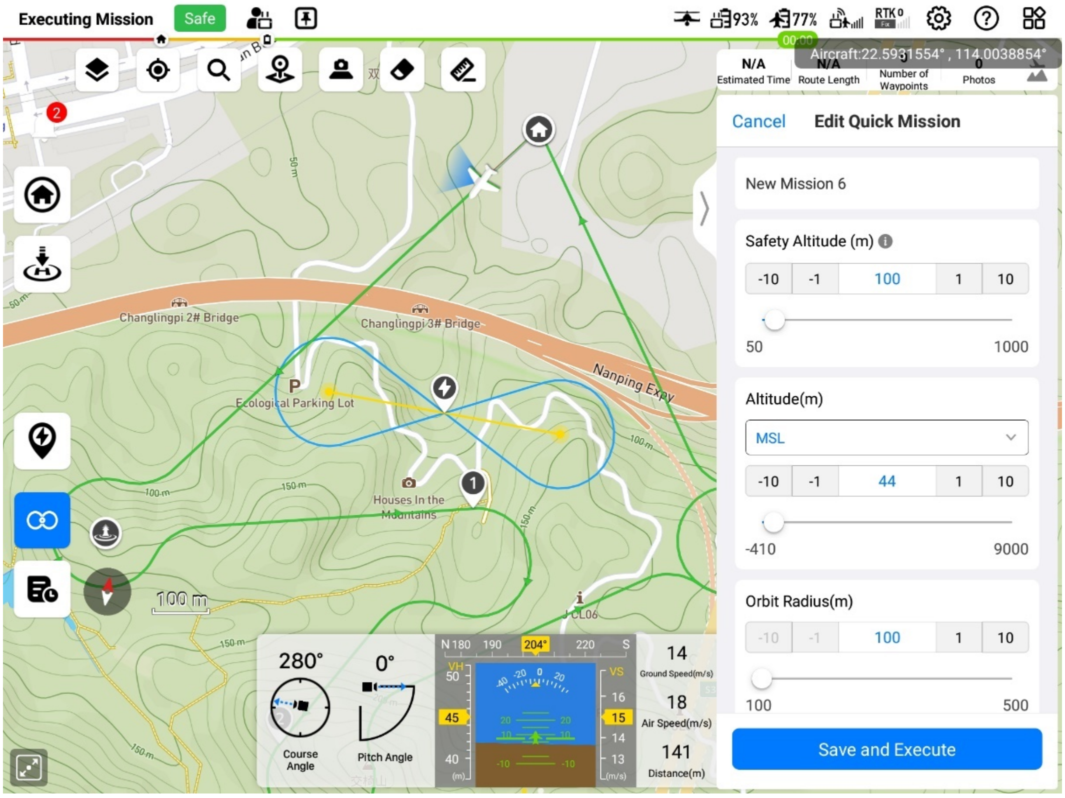


Fig 4-41 Edit figure-8 mission

Tips

- Users can drag the mission center point on the map interface to quickly adjust its location.
- After setting the figure-8 mission, the route information (estimated time, route length) displayed in the upper right corner of the map interface is N /A.
- When the figure-8 mission is enabled, users can turn on the terrain obstacle avoidance function.

Remarks

- When starting a temp mission, if the aircraft is in multi-rotor mode, the aircraft will first accelerate forward to the fixed-wing mode at the current flight altitude. After the aircraft enters the fixed-wing mode, a transfer route will be generated based on the current position of the aircraft and the starting point of the temporary route, and the aircraft will fly to the starting point of the temp mission according to the transfer route and perform the temp mission. Since in multi-rotor mode, the aircraft will maintain its original altitude and accelerate forward to fixed-wing mode, special attention needs to be paid to the flight altitude of the aircraft when it is performing temp missions, and whether there may be obstacles in front of the aircraft that may affect the aircraft's acceleration and switching to fixed-wing mode.

- If the aircraft is in fixed-wing mode, the aircraft will immediately generate a transfer route and fly to the starting point of the temp mission according to the transfer route to perform the temp mission.
- When executing a transfer route, the aircraft will not perform gimbal and camera movements at the target waypoint.

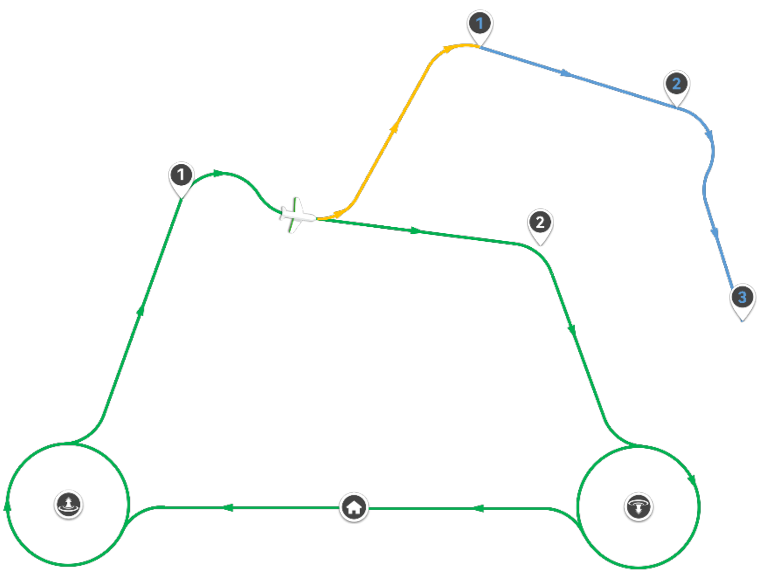


Fig 4-42 Perform temp missions by diverting routes (orange)

The terrain obstacle avoidance function will be enabled by default during the route transfer stage. The starting point altitude of the transfer route is the current flight altitude of the aircraft, and the end point altitude of the transfer route is the starting point altitude of the temp mission route. The aircraft will fly to the temporary route at the attitude which is the higher one between the aircraft's current flight altitude when the transfer route is generated and the altitude of the starting point of the temp mission route.

- If the current flight altitude of the aircraft is higher than the starting point of the temp mission route as the transfer route is being generated, the aircraft will fly to the starting point of the temp mission route at the current flight altitude and lower the altitude to the starting point altitude before starting to execute the temp mission route.

- If the current flight altitude of the aircraft is lower than the starting altitude of the temp mission route as the transfer route is being generated, the aircraft will first climb to the starting altitude of the temp mission route and then fly to the temp mission route to perform the mission.

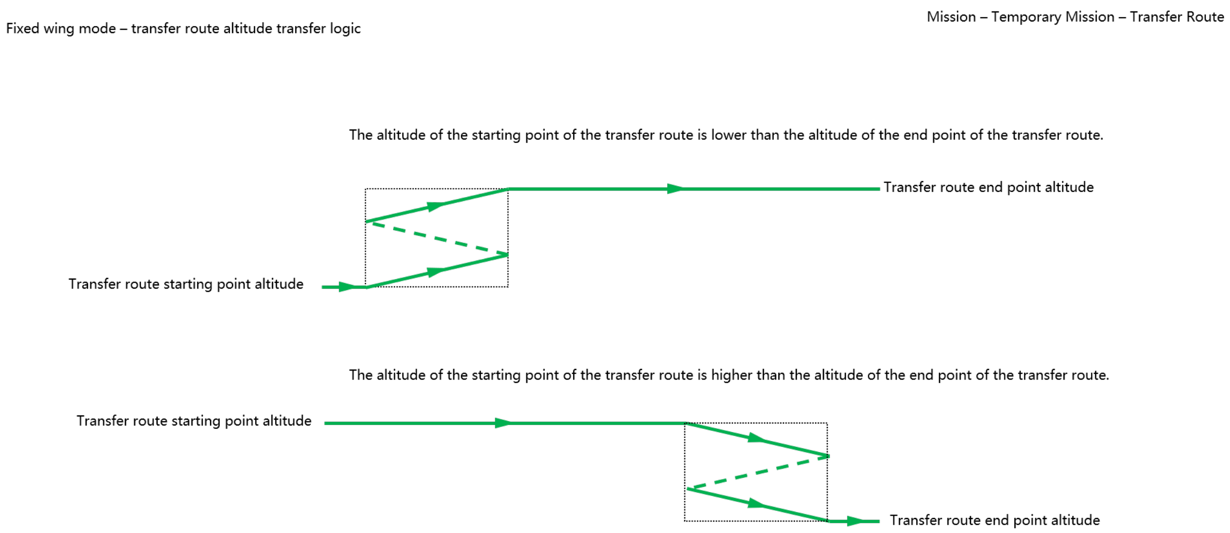


Fig 4-43 Transfer route altitude adjustment

Important
● Only one temp mission can exist at the same time. If you re-create an upload temp mission when there is already a temp mission, the original temp mission will be overwritten by the newly uploaded temp mission. ● In temporary waypoint missions and temporary polygon missions, it is required to set the mission finish action of the aircraft. If the mission finish action is set to hovering, the aircraft must take over in time after completing the temp mission. Even if the aircraft's mission finish action is set to hovering, after turning on the intelligent low battery return function, if the battery of the aircraft is too low, the aircraft will trigger an automatic return. ● After the user completes the temp mission editing and saves the mission on the remote controller, when executing the temp mission, the remote controller will verify whether there is a conflict between the temp mission area and the existing electronic fence. If there is a conflict between the temp mission area and the existing electronic fence, the remote

controller will pop up a prompt box to prohibit the user from performing this temp mission.

- Temp missions support waypoint adjustment. For related function details, please refer to "4.2.2.8 Waypoint adjusting" in this chapter.
- Temp missions support the one-click altitude change function, and the flight height can be adjusted freely during the flight of the aircraft. Tap the " " icon to make increment or decrement adjustments based on the original set height value. For details, please refer to "4.2.2.7 One click to change attitude" in this chapter.
- The transfer route is not included in the verification range of the electronic fence. Therefore, during the flight of the transfer route, the aircraft may get too close to the area restricted by the electronic fence, causing the aircraft to switch to multi-rotor mode. Therefore, when performing missions, please be sure to pay attention to whether the generated transfer route conflicts with the existing electronic fence.

➢ Temp mission finish action

For temporary waypoint missions and temporary polygon missions, since the temp mission does not include the arrival route, the user needs to specify the mission finish action of the aircraft after the aircraft completes the temp mission flight. The aircraft supports the following two types of mission finish action settings:

- Return: If the finish action is set to RTH, the aircraft will automatically trigger the return after completing the temp mission route.
- Hovering: If the finish action is set to hovering, whether it is a temporary waypoint mission or a temporary polygon mission, the last point of the route will be modified to the hover type. After the mission route is completed, the aircraft will continue to hover in the hovering circle at the end of the route, waiting for the user's next instruction.

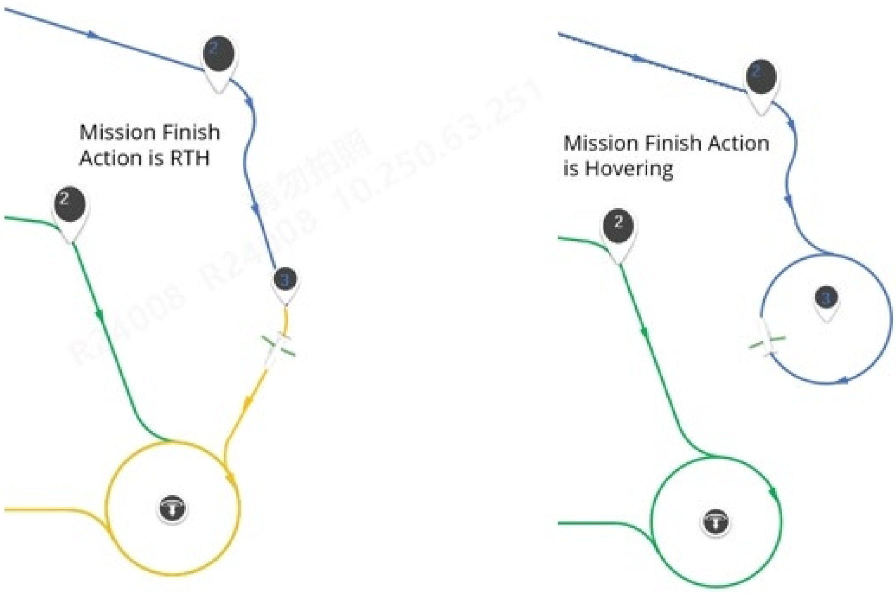


Fig 4-44 Temporary Waypoint Mission Finish Action

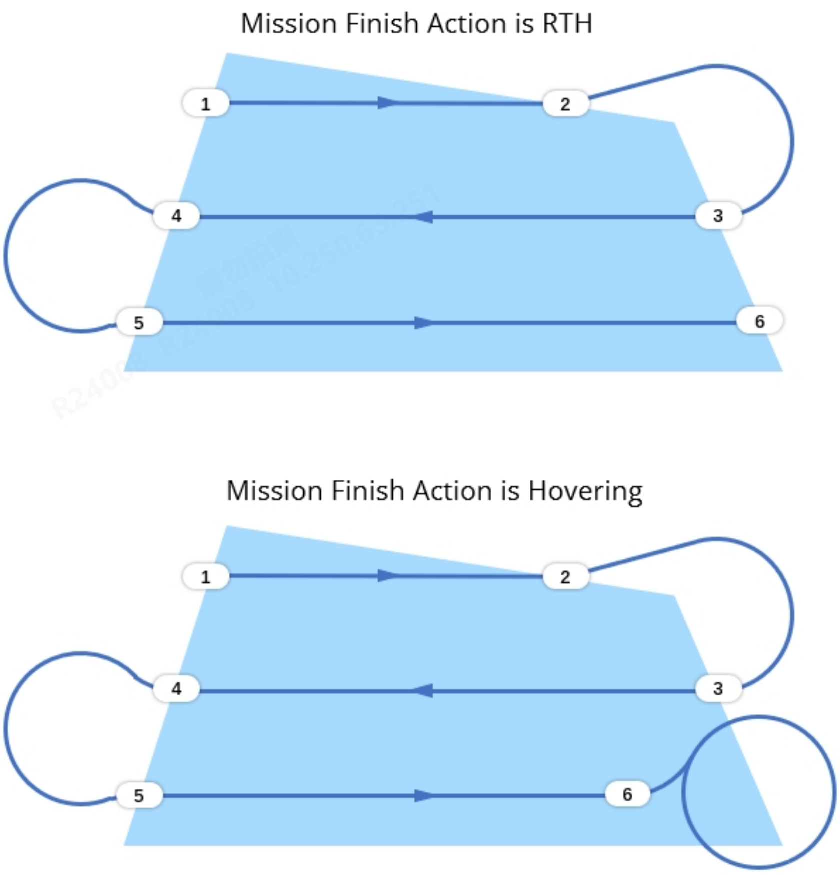


Fig 4-45 Temporary Polygon Mission Finish Action

Figure-8 mission is an infinite loop of ∞-shaped routes and does not support setting mission finish actions. After the aircraft executes the figure-8 mission, the user's manual intervention is required to exit the mission.

4.2.2.6 Temporary observation mission

The temporary observation mission function is used during flight. The user specifies a certain point on the map as the center point of the temporary observation area. After that, the aircraft's gimbal will always lock the center position of the temporary observation area and observe the observation area.

During the flight of the aircraft, the user can tap the “ ” icon at the upper left corner of the map interface, place a marked point at a certain location on the map, and then select the temporary observation area icon “ ” in the marked point to start the temporary observation mission.

When the aircraft performs a temporary observation mission, the gimbal will lock the center point of the temporary observation area and conduct temporary observation of the relevant area. Users can remotely control the aircraft to take photos and videos. You can also tap the “Exit Mission” button below the center point of the temporary observation area. After the second confirmation, the aircraft will exit the temporary observation mission and the gimbal will be unlocked. The user can freely adjust the gimbal angle or perform other tracking or observation missions.

Fig 4-46 Execute a temporary observation mission

Tips

- When the aircraft performs temporary observation missions, the gimbal will not support dial wheel operation and quick return-to-center functions. If you want to perform other gimbal operations, please exit the temporary observation mission and unlock the gimbal.
- If the temporary observation mission and route observation area exist at the same time, the aircraft will give priority to the temporary observation mission. When the aircraft flies through the route observation area which covers or is associated with a flight segment, if a temporary observation mission is set, the aircraft gimbal will prioritize locking the center point of the temporary observation area, instead of focusing on the center point of the route observation area; similarly, if the aircraft flies through the route observation area when it is executing a temporary mission, it will continue to perform the temporary observation mission.
- During the execution of a temporary observation mission, if you need to display the current observation range in real time, you can tap the projection icon “ ” at the upper left corner of the map interface , select “Real-time Display” and turn on “Projection Center Coordinate

Display", or go to [Aircraft Settings] and turn on the "Projection area display" and "Projection center coordinate display" functions in the "Projection area" column of the interface to display the projection area and projection center coordinates in real time during the temporary observation mission. For relevant details, please refer to "**3.4.10.5 Aircraft settings interface** "in this chapter.

Remarks

- The difference between the route observation area and the temporary observation mission is:

  1. The shape of the route observation area is circular, and each observation area can be chosen whether to be associated with a flight segment. If there is no associated flight segment, when the aircraft flies through the observation area covering the segment, the gimbal will stay locked on the center point of the observation area; if the observation area is set to be associated with a certain segment, when the aircraft flies through the associated segment, the gimbal will keep always locked on the center point of the observation area. After leaving the scope of the observation area, the aircraft's gimbal will return to the angle set on the original route.
  2. The temporary observation mission has no coverage area and associated flight segments. The aircraft will lock the center point of the temporary observation area throughout the flight until it exits the temporary observation mission, and the aircraft gimbal returns to the angle set on the original route.

4.2.2.7 One click to change attitude

The one click to change attitude function can be used to quickly modify the set flight altitude during the execution of time-sensitive missions such as quick missions, temp missions, and dynamic track.

During the execution of the above missions, the user can modify the flight altitude in the pop-up one-click altitude change window by tapping on the one-click height change icon "" that appears on the left side of the map interface on the remote controller.

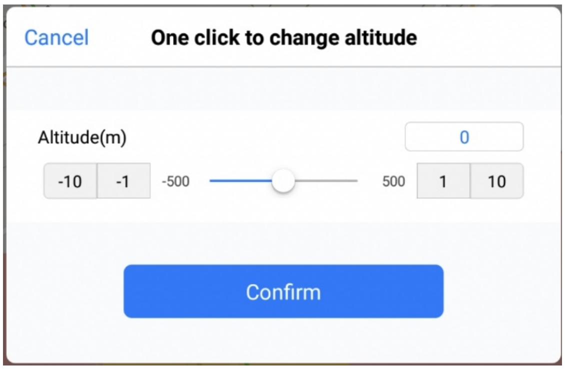


Fig 4-47 Change altitude with one click

Tips

- The one-click altitude change function can perform incremental or decremental adjustments based on the original mission setting altitude value. A single operation allows the mission setting height to be adjusted upward or downward up to 500 meters.
- If the one-click altitude change operation is performed multiple times, the aircraft's mission setting altitude will be modified multiple times. Each one-click altitude change will be based on the previously modified flight altitude setting value.

As shown in the figure below, assuming that the original mission height is set to 100 meters, the first time the height is changed to +10 meters with one click, the second time the height is changed to +20 meters with one click, and the third time the height is changed to -40 meters with one click, then quickly the final set altitude of the mission became 90 meters.

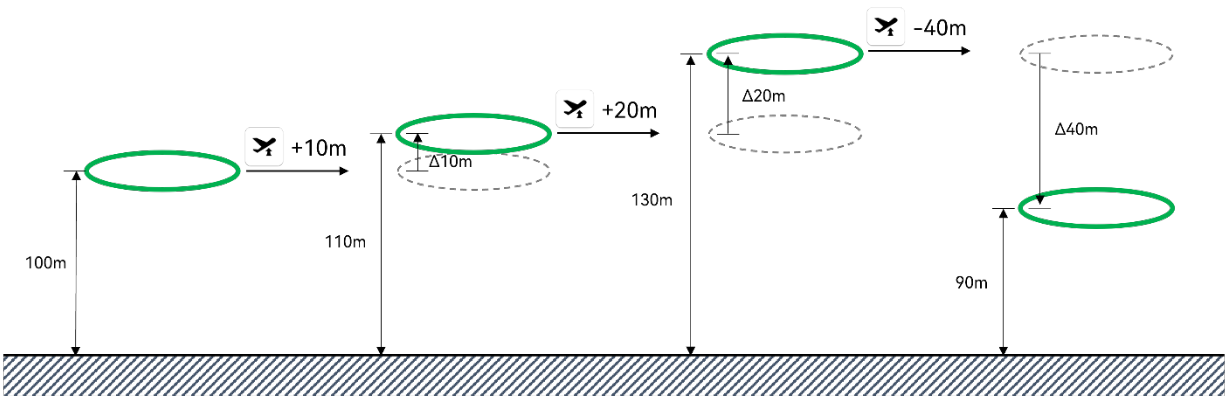


Fig 4-48 Change altitude logic multiple times with one click

Important

- When users are executing the one-click altitude change function, special attention needs to be paid to the set altitude of the current mission of the aircraft, especially when changing height in the negative direction, so as to prevent the aircraft from flying too low after changing the height.
- The one-click altitude change function only takes effect for the currently executing mission. If the aircraft switches from the current mission to another mission, the height change that has been performed will be invalid. For example, the aircraft performs an altitude change operation while performing a temporary route mission and switches to other flight modes midway; or the aircraft switches to an automatic return home after the temporary route mission is completed. At this time, if the waypoint adjustment function is used again (please refer to “4.2.2.8 Waypoint adjusting“) , it will return to the temporary route mission, and the set altitude of the temporary route mission will be restored to its original set altitude, not the set altitude after the last change.
- For quick missions and temp missions, if the aircraft is in multi-rotor mode or in an intermediate state between multi-rotor mode and fixed-wing mode, the one-click altitude change function will not take effect immediately. The one-click altitude change function will not take effect until the aircraft enters fixed-wing mode.
- For temp missions, the one-tap altitude change function will modify the altitude of the entire route (i.e., the flight set altitude of each waypoint in the temporary waypoint route mission, or the flight set altitude of the scanned route part of the temporary polygon mission). Changing the altitude with one click may result in the aircraft’s flight altitude not being adjusted when it reaches the waypoint. Therefore, additional altitude adjustment and hovering are required at the waypoint. For the specific location of the hovering circle, please refer to “4.1.7.6 Creating a route mission“ in this chapter.
- For temp missions, the one-click altitude change function will not change the route setting altitude in the “Route Preview” interface on the right. The original altitude of the temp mission will always be displayed in the “Route Preview” interface.
- For quick missions, dynamic track, or temp missions with terrain obstacle avoidance turned on, if the mission's flight altitude is set lower than the safe altitude plus terrain altitude, the aircraft's terrain obstacle avoidance function will still take effect, and the aircraft's actual flight altitude will not lower to the changed set height. If the aircraft fails to lower to the set altitude after performing a negative one-key altitude change, please check the current safe

altitude of the aircraft and the current altitude of the aircraft flying above the ground, and do not change the altitude in negative directions multiple times before checking the safe altitude and the current altitude.

4.2.2.8 Waypoint adjusting

During the flight of the aircraft, the user can flexibly adjust the waypoint currently being executed by the aircraft through the waypoint adjustment function, so that the aircraft can adjust to the selected target waypoint and continue to perform the mission. Its application scenarios are as follows:

- When the aircraft is performing a non-route mission (such as when performing a quick mission or a dynamic track mission), the waypoint adjustment function allows the aircraft to return to a specific waypoint of the route mission or temporary route mission to continue performing the mission.
- If the aircraft has completed a certain flight segment, but you want the aircraft to perform the flight mission of this segment again, you can use the waypoint adjustment function to return the aircraft to the starting waypoint of the segment and re-execute the flight mission of this segment.
- The aircraft is flying on a temp mission and is expected to start a temp mission from a certain waypoint; or the aircraft is flying on a temp mission and is expected to return to a certain waypoint on the mission and continue executing the mission.

Tips

- The waypoint adjustment function is applicable to waypoint missions, polygon missions, temporary waypoint missions, temporary polygon missions and figure-8 missions.
- If the aircraft is in a fixed-wing state, the system will automatically generate a transfer route from the current position of the aircraft to the target waypoint. For altitude switching of the transfer route, please refer to "**4.2.2.5 Temp mission**" in this chapter.

Users can trigger this function by tapping a waypoint in the route displayed on the map interface that supports waypoint adjustment. If the waypoint supports waypoint adjustment, after tapping it, the waypoint will be highlighted, and the "Switch Waypoint" icon will appear above it. After users tap the icon and confirm it twice, the aircraft will adjust to the waypoint and continue to perform the mission.

- For waypoint missions, it is supported to adjust the aircraft to a waypoint with a waypoint icon in the style of “ ”.

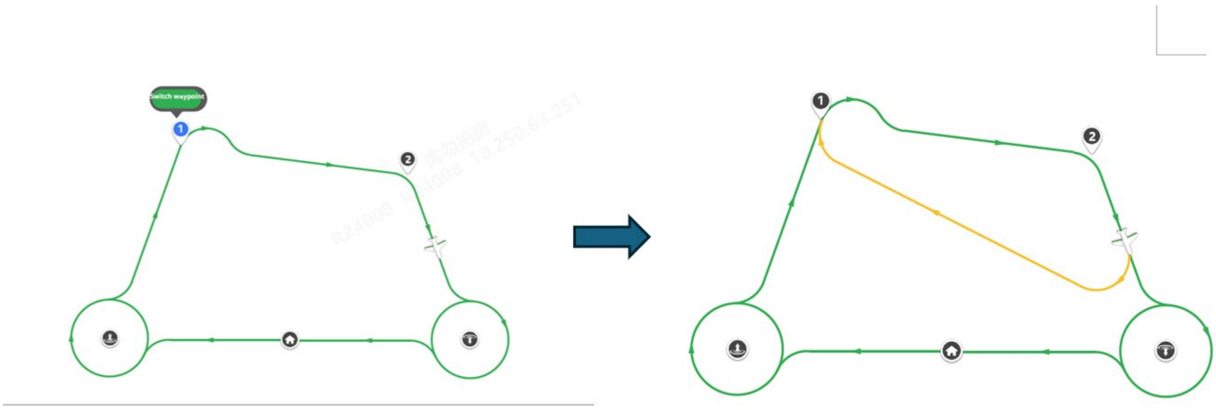


Fig 4-49 Waypoint adjustment (waypoint mission) instructions

- For polygon missions and figure-8 missions, it is supported to adjust the aircraft to a waypoint with a waypoint icon in the style of “1”.

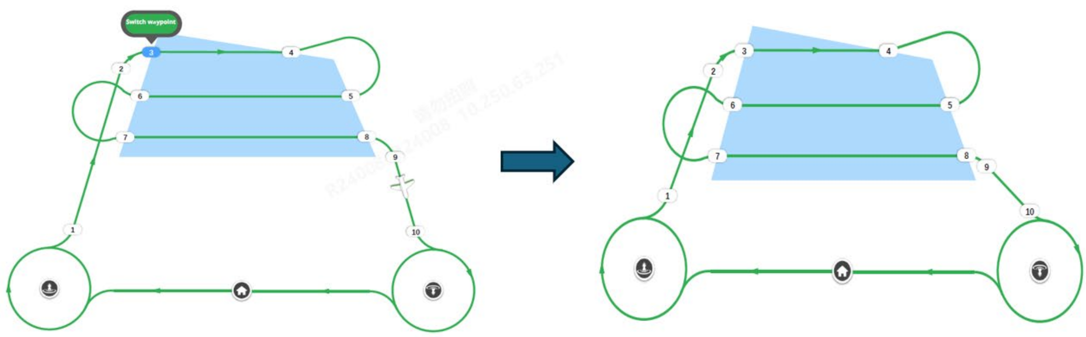


Fig 4-50 Waypoint adjustment (polygon mission) instructions

- If the aircraft has a temp mission in the air, it can also be adjusted to any waypoint of the temp mission. As shown in the figure below, a temporary waypoint mission is used as an example. During the flight of the mission route, the aircraft adjusts to a certain waypoint of the temp mission through the waypoint adjustment function to perform the temp mission.

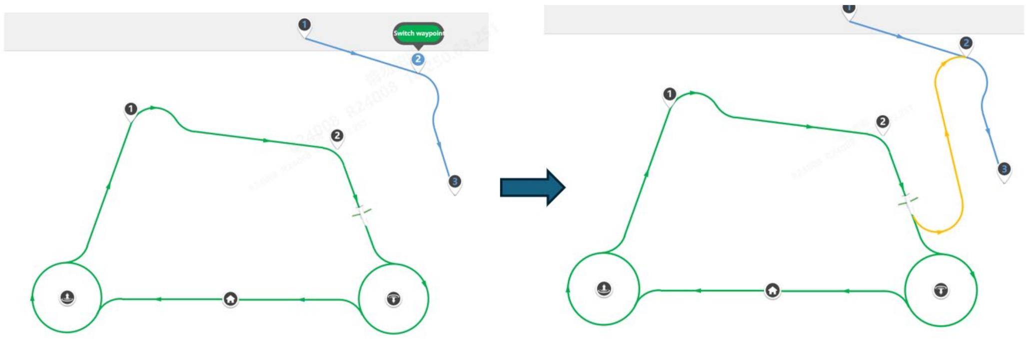


Fig 4-51 Waypoint adjustment (temporary waypoint mission) instructions

⚠ Warning

- When performing the waypoint adjustment function, although the aircraft will automatically turn on the terrain obstacle avoidance function, if the aircraft has previously turned off the terrain obstacle avoidance state and is flying in a ridge or valley area, you still need to pay special attention to the current flight of the aircraft when performing the waypoint adjustment.
- The waypoint adjustment function is applicable to waypoint missions, polygon missions, temporary waypoint missions, and temporary polygon missions.
- When executing waypoint adjusting, if the aircraft is in non-fixed-wing mode, the aircraft will accelerate at current height and switch to fixed-wing mode. Therefore, when executing temp mission, users need to pay special attention to the current height of the aircraft.
- The height of the ending point at the transfer route after waypoint adjusting is the original set height of the target waypoint. For instance, when one click to change attitude function is used to adjust the height in a temp mission, if at this moment, in waypoint adjusting with the waypoint of the temp mission as the target point, the height of the target point is still the preset height of the temporary route, not the height after one click to change attitude.

4.2.2.9 Marked points

The marked point function allows users to record key information on map and camera interfaces, and is used to generate quick missions, precise diversions, temporary observation points, and reference points. Users can add marked points to the favorite list and can also modify the style and edit attributes of marked points. The generated marked points will be included in the marked point list. Autel Voyager Application supports searching and batch processing of the generated marked points.

■ Create a marked point

Users can tap the map interface of the Autel Voyager Application to pinpoint points or generate marked points on the map interface by marking the coordinates of the center of the aircraft's field of view, marking the coordinates of tracked objects, or searching for map coordinate information (marked points are divided into several types: PinPoint, Quick Mission, Search Location, Track Object, and Field of View Center). The specific methods are as follows:

➢ Create a marked point (pinpoint) on the map

Tap the “ ” icon at the upper left corner of the map interface. Tap anywhere on the map to generate a marked point. The default icon is “ ” (“ ”style will appear around the selected marked point). After the marked point is generated, the operating circle of marking the point will be expanded by default.

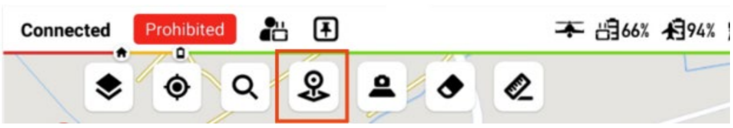


Fig 4-52 Tap the marked point icon

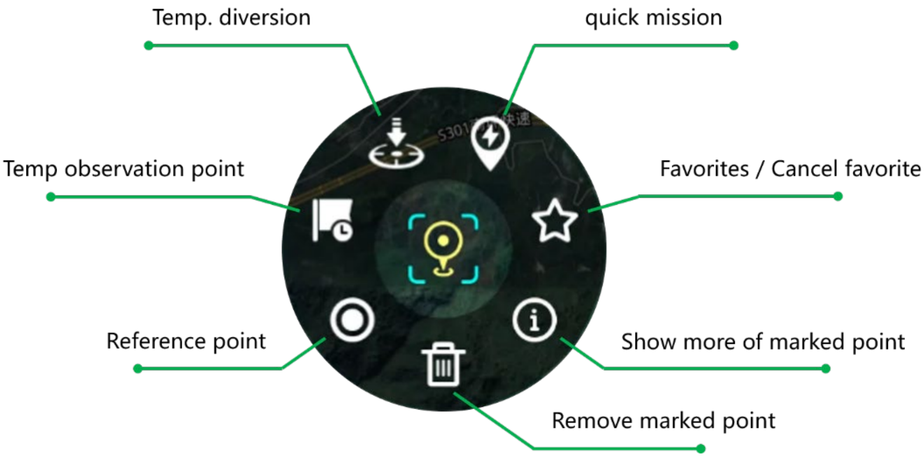


Fig 4-53 Marked point operation circle

Tips

- Users can turn on the display of marked points on the layer by tapping the " " icon at the upper left corner of the map interface. After marked point display is turned off, the marked point still exists but will not be displayed on the map interface.
- Users can tap the " " icon at the upper left corner of the map interface, and then tap "Marked Points List" to get an overview of all marked point information (icon, name, creation time, generation time) in the "Marked Points" interface that pops up on the right side of the map interface and can collect and remove marked points. After tapping a marked point in the list, the map screen will automatically locate the marked point.

Mark the coordinates of a tracked object to generate a marked point (track object)

When the aircraft is tracking an object and the aircraft's laser rangefinder works, users can mark the coordinates of the object point based on laser measuring distance information in image transmission interface. The target points marked in this way will also be transferred into marked points, which are displayed in the map. The icon of generated marked points is " " by default and the default name is "Track object#". Marked points generated in this way also record images taken at the moment when those points are marked.

Mark the coordinates of the field of view center to generate a marked point (field of view center)

After the FOV coordinate display is enabled, users can mark points by using the FOV coordinate displayed. The icon of marked points generated in this way is " " by default and the default name is "FOV#". Marked points generated in this way also record images taken at the moment when those points are marked.

Generate a marked point (quick mission) based on the quick mission coordinate

After a quick mission is completed, a temporary marked point is generated automatically. The icon of the generated target point is " " by default. The default name is "Quick Mission Point#".

Search a coordinate to generate a marked point (search location)

Users can also search a location by coordinate in the map to generate a temporary marked point. The icon of the generated target point is " " by default. The default name is the location name if there is the corresponding name or the coordinate if not.

■ Use a marked point to create a mission

After a marked point is created or generated, users can use the marked point to create a quick mission, a temporary diversion mission or temporary observation mission.

➢ Create a quick mission by using a marked point

When the aircraft is flying in air, select the marked point and tap the quick mission icon " " on the marked point operation circle. Then enter the editing mode of a quick mission. The marked point will be the center of the quick mission. For details about quick mission, please refer to " 4.2.2.1 Quick mission".

➢ Create a precise diversion mission by using a marked point

When the aircraft is flying in air, select the marked point and tap the precise diversion mission icon " " on the marked point operation circle. Then enter the editing mode of a precise diversion mission. The marked point will be the diversion point of the mission and a default arrival hovering point will be generated. When using a marked point to create a precise diversion mission, please carefully edit and confirm the relevant settings of the precise diversion. For details about precise diversion mission, please refer to "**4.2.3.4 Precise diversion**".

➢ Create a temporary observation mission by using a marked point

When the aircraft is flying in air, select the marked point and tap the temporary observation mission icon " " on the marked point operation circle, and then tap "Execute" to create a temporary observation mission at the location of the marked point. For details about temporary observation mission, please refer to "**4.2.2.6 Temporary observation mission**".

Important
● If the aircraft is not connected or has not taken off, some functions of the marked point, such as creating quick missions, creating precision diversion missions, creating temporary observation missions and converting to reference points, will be disabled. ● When generating precise diversion missions based on marked points, please note that the marked points are only used to generate the latitude and longitude information of the landing point. The altitude information of the landing point, including information about the landing arrival route, needs to be carefully adjusted and filled in according to the actual situation.

Remarks

- Users can collect the generated marked points. After collection, the marked points will be saved in the remote controller and will not be cleared due to shut down. A "⭐" icon will appear at the lower right corner of the collected marked points.
- Users can view the generated marked point details. After users select the marked point details card, the marked point details interface will expand on the right side of the map. Users can create quick missions, precise diversion, temporary observation points, and reference points based on the marked points in the interface. They can also edit the name, longitude and latitude, altitude, icon color, icon style, remarks and collection status of the marked point. When the altitude of the marked point is set to "Follow terrain", the altitude of the marked point will become the altitude of the marked point's longitude and latitude stored on the remote controller.
- While the aircraft is flying, the user can select a marked point and generate a reference point based on the location of the marked point.

4.2.3 Landing

Dragonfish series aircrafts offer landing functions of manual landing, automatic return, auto landing and precise landing, ensuring safe landing of the aircraft.

4.2.3.1 Manual landing

Manual landing refers to: in manual control mode, the user takes over and controls the aircraft to land safely by using the RC's sticks.

For safety reasons, it is recommended that users follow the following steps to land the aircraft manually:

1. Choose an open, flat, and well-lit area as the landing location for the aircraft;
2. Manually operate the sticks of the RC to control the aircraft to fly to the landing location. For details about the operation of the sticks, refer to "**4.1.7.3 Selecting stick mode**";
3. When the aircraft arrives above the landing location, check the flight speed on the parameter panel at the bottom of the RC interface (map interface or camera interface) to avoid collisions with buildings, trees, and other things;
4. When the aircraft arrives above the landing location, release the sticks to hover it above;

5. Manually operate the sticks to control the descending speed and height of the aircraft. During landing, the throttle will be automatically controlled. When the aircraft height is above 3m, the descending speed is fast, and it gradually slows down below 3m;
6. When the aircraft lands at the auxiliary take-off and landing height (1m), continuously pull the stick down for 1 second, and then the aircraft will enter the automatic landing program;
7. If users are using the sticks in manual mode during the automatic landing process, the aircraft will determine that the user has intervened in the operation, the automatic landing is stopped, and the user can manually control the landing.

Tips

- After the aircraft lands, if the ultrasonic sensor detects the ground, the propellers will automatically lock. If the aircraft lands in an area where the ultrasonic sensor's performance is affected, such as on grass, the propellers may not automatically lock. In this case, you can choose to takeoff again, retry landing, or land the aircraft in another location with a flat surface. If you have tried several times and still cannot stop the propellers automatically, you can use the emergency propellers stop function after confirming that the aircraft is on the ground. For details about the emergency rotor stop function, refer to Chapter 2, "**2.15 Emergency Propeller Stop**".
- Other operations such as auto return and auto landing can be performed during manual landing.

Warning

- Pay attention to whether the aircraft will collide with surrounding buildings, trees, or personnel during landing. Keep away from personnel, vehicles, and other moving objects to avoid affecting the flight safety.
- If the propellers do not lock after the aircraft lands, pull down the throttle stick and do not perform **lateral movements** to prevent the aircraft from tipping over.

4.2.3.2 Auto return

The aircraft is equipped with auto-return function. When the GNSS signal is good, once the auto-return condition is triggered, the aircraft automatically returns to the home point and lands to avoid possible accidents.

The aircraft provides three methods of activating the auto-return function: manual auto-return activation, low battery auto-return activation, and behavior auto-return activation.

Remarks

- Home Point: Refers to the landing point used when the aircraft executes an automatic return. The system allows users to modify the location of the home point after the aircraft has taken off.

In the case of a good GNSS signal, the settings for the home point are as follows:

- In automatic flight mode, users can set the takeoff point as the home point or manually input the latitude and longitude coordinates for the home point. They can also directly drag the "" waypoint icon on the map in the Autel Voyager App's mission editing interface to set the home point.
- In manual flight mode, the aircraft will automatically use the takeoff point as the home point. During the return, the center position of the arrival orbit's hovering point is located along the takeoff heading and at a distance of [√3 times the minimum hovering radius + 360 meters] from the takeoff point. The arrival orbit's hovering radius is the minimum turning radius of the aircraft. The arrival altitude (relative to the landing point) is set to 100 meters, and the landing mode switching altitude (relative to the landing point) is set to 100 meters.

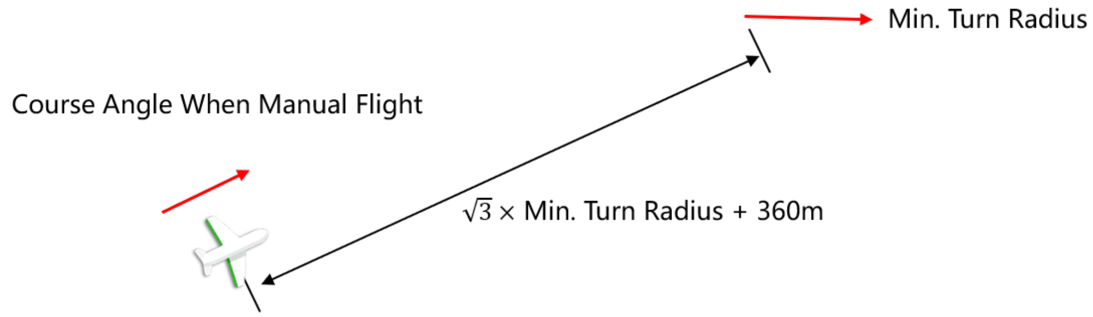


Fig 4-54 Position of arrival hovering point in return in manual flight

⚠ Warning
● If GNSS signal is poor, auto return will not be activated. ● During auto return, the aircraft will be affected by the electronic geo-fencing and may slow down or stop and hover as it is close to the edge of restricted zones or of geofence. If this kind of situation occurs, please take over the aircraft in time. For working mechanism of geofence, please refer to "**4.1.7.5 Creating a geofence and Unlocking a no-fly zone**" in this chapter. ● Please choose open and even region with great light conditions as the landing point of the aircraft. If the landing point for auto return does not qualify for aircraft landing (such as uneven floor or being crowded), please manually control the aircraft in landing.

Tips
● When the aircraft is in the process of automatic return, if it is necessary to interrupt the automatic return, you can perform the following operations: 1. In automatic flight mode, you can exit automatic return by creating a new quick mission or tracking mission or temp mission or by adjusting a waypoint. 2. In manual mode, you can exit automatic return by manipulating the remote controller sticks.

■ Manual Activation of Automatic Return

During the flight, users can manually activate the automatic return in any one of the following ways:

- Press and hold the return button "" on the remote controller for 3 seconds to activate the automatic return.
- On the Autel Voyager App's map interface, tap the "" icon on the left side, and then select the "Execute" option to activate the automatic return.
- On the Autel Voyager App's map interface, tap the "" icon on the left side, then select the "Edit Return Mission" option. After completing the return mission editing, tap the "Upload and Execute" button to activate the automatic return.

Tips

- When modifying the return route execution mode through the “Edit Return Mission” , the edited arrival route will be displayed in red on the map interface. After users tap the “Upload and Execute” button on the right side of the edit bar and tap the confirm button in the prompt, the return mission will be executed immediately. If the user interrupts the return by manually taking over the aircraft or using other methods, and goes back to and carries on the route mission, the aircraft will automatically trigger the return mission based on the new home points and arrival route after completing the waypoint mission or scanning part of the route (polygon mission) in the air. It will not land based on the arrival route and home points in the ground-planned route mission.
- After modifying the return route, the home points will be saved. Even if you exit the return mode to perform other missions, the return will be triggered again based on the modified home points when activated.

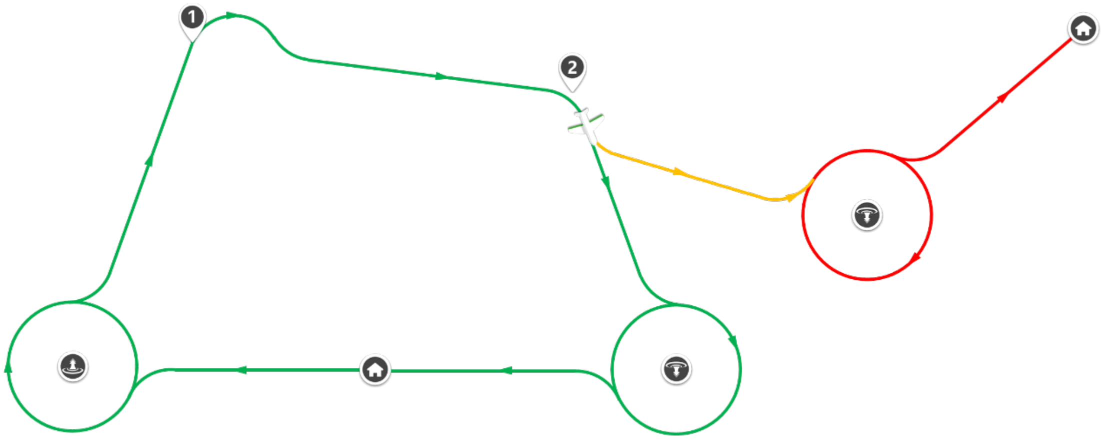


Fig 4-55 Modifying Aircraft Home points and Executing a New Arrival Route After Takeoff

■ Low Battery Activation of Automatic Return

During flight, to prevent unnecessary risks due to insufficient smart battery power, the aircraft will intelligently assess whether the current battery level is sufficient based on its current position.

If the "Current Aircraft Battery Level - Expected Remaining Landing Battery Level" is only sufficient to complete the return journey, the aircraft will automatically trigger automatic return, and the Autel Voyager Application will display a pop-up alert, prompting the user to initiate low battery automatic return.

⚠ Warning
● When the Autel Voyager Application displays relevant warning prompts, it is essential to promptly follow the provided instructions. ● If the aircraft triggers low battery automatic return, it is advised not to cancel the automatic return process. Otherwise, the aircraft may not have sufficient power to return to the designated home point, potentially leading to flight accidents and property damage. ● When the aircraft triggers low battery automatic return, switching to intelligent missions, including temp missions, quick missions, and dynamic track, is permitted but there are chances that the low battery automatic return will be triggered again.

Tips

- The trigger condition for low battery automatic return is calculated as follows: Current Battery Level - Required Battery Level for Return = Expected Remaining Landing Battery Level.
- To enable the low battery automatic return feature, you need to manually activate it. Here are the steps:In the Autel Voyager App, go to the map interface or camera interface. Tap -> Aircraft Battery->Intelligent Low Battery Return.
- You can also set the expected remaining landing battery level, which is the amount of battery remaining after the aircraft completes its flight and lands. This can be set within the range of 15% to 50%, with the default preset at 25%. Here's how to do it: In the Autel Voyager App, go to the map interface or camera interface. Tap -> Aircraft Battery->Expected Remaining Landing Battery Level.

■ Behavior Activation of Automatic Return

The automatic return feature of the aircraft will be activated in the following scenarios:

- While the aircraft is in the process of a waypoint or polygon mission, if the user edits the return mission and chooses to upload and execute, the aircraft will activate automatic return to the new home point position after completing the waypoint mission or scanning part of the route (polygon mission).
- After the completion of a temp mission, and if the finish action for the temp mission is set to "Return," the aircraft will activate automatic return.
- When the aircraft and the ground control station (RC or base station) have been disconnected for over 15 seconds, the aircraft will trigger auto return under any one of the following situations:

  1. If the aircraft is conducting a waypoint mission, and “Go Home” action is set as the response to a loss of connection,

2. If the aircraft is in quick mission, temp mission, dynamic track or manual flight mode.

For more details, please refer to Chapter 3, “3.4.10.5 Aircraft settings interface”.

Tips

- In the Autel Voyager App, the loss of connection action can be set to either "Continue Mission" or "Go home." When set to "Continue Mission" or when the aircraft is in a standby state for landing, the disconnection between the ground control station and the aircraft will not trigger automatic return.
- To configure the loss of connection action, go to the map interface or camera interface in the Autel Voyager Application and follow this path: "⚙>" - "Safety" - "Lost Connection Action".
- Within 15 seconds of the aircraft losing connection with the ground control station, the aircraft will attempt to reconnect to the ground control station. If the reconnection is not successful, the lost connection action will be executed.
- During the automatic return process triggered by loss of connection, if the aircraft re-establishes a connection with the ground control station, the aircraft will continue with the auto-return.
- When the aircraft loses connection with the ground control station, and if the GNSS signal is not available, the aircraft will execute failure protection program for landing, instead of return actions. For details about failure protection, please refer to "**2.10 Failure Protection**".

■ Auto-Return Mechanism

➢ Fixed-Wing Mode Return Logic

1. After triggering automatic return, the aircraft will return to the arrival hovering point at the higher altitude between the current flight altitude and the arrival altitude. It will then descend and hover to the landing mode switching height (relative to the landing point), followed by exiting the arrival hovering circle to fly towards the landing point.
2. Brake trigger distance is calculated based on ground speed, and deceleration begins when the distance from the Home point reaches the braking distance.
3. Fly to the Home point directly in multi-rotor mode.
4. Enter the landing procedure.

Tips
● Home Point: The automatic return setting specifies the home point (landing point) for the aircraft.

➢ Multirotor Mode Return Logic

The multi-rotor mode return logic is associated with the return areas as follows:

Return Area 1 Definition: Within a distance of 300 meters from the Home point and at an altitude lower than the sum of the landing mode switching height (relative to the landing point) and 50 meters.

Return Area 2 Definition: Beyond a distance of 300 meters from the Home point or at an altitude higher than the sum of the landing mode switching height (relative to the landing point) and 50 meters.

Remarks
● The determination criteria for the return area are divided into two cases: manual flight mode and automatic flight mode. The difference lies in the landing mode switching height (relative to the landing point): 1. In manual flight mode, the default landing mode switching height (relative to the landing point) is set to 100 meters. **2.** In automatic flight mode, the landing mode switching height (relative to the landing point) is configured based on the arrival route.

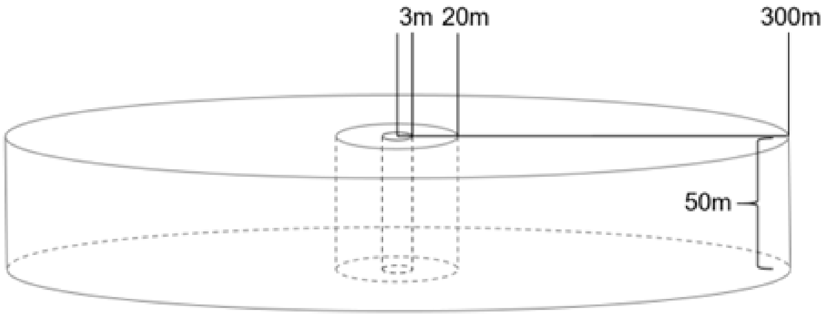


Fig 4-56 Return Area Diagram (Cylinder with the lower surface at the switching altitude)

1. When the aircraft is in return area 2, the following return logic is executed:
   - If the flight altitude is higher than the switching altitude (relative to the landing point), the aircraft first brakes, maintains the current altitude, turns toward the Home point, then accelerates, and switches to fixed-wing mode for the return.
   - If the flight altitude is lower than the switching altitude (relative to the landing point), the aircraft simultaneously climbs while turning the nose towards the Home point. Once it reaches the switching altitude (relative to the landing point), it accelerates and switches to fixed-wing mode for the return.
2. When the aircraft is in return area 1, within a range of 20 meters to 300 meters from the Home point, the following return logic is executed:
   - If the flight altitude is higher than the switching altitude (relative to the landing point), it maintains the current altitude while turning towards the Home point, then accelerates and switches to fixed-wing mode. The aircraft uses the Home point as a reference and flies directly toward it. When the distance from the Home point reaches the braking distance, it begins to decelerate.
   - If the flight altitude is lower than the switching altitude (relative to the landing point), the aircraft simultaneously climbs while turning the nose towards the Home point. Once it reaches the switching altitude (relative to the landing point), it accelerates and switches to fixed-wing mode. The aircraft uses the Home point as a reference and flies directly toward it. When the distance from the Home point reaches the braking distance, it begins to decelerate.
3. When the aircraft is in return area 1, within a range of 3 meters to 20 meters from the Home point, the aircraft first turns its head towards the Home point and then returns in multirotor mode while maintaining the current altitude.
4. When the aircraft is within 3 meters of the Home point in return area 1, it will directly enter the landing procedure.

- Landing Logic

1. First, turn and adjust the heading angle to align with the target heading angle, where the target heading angle corresponds to the heading angle at takeoff.

2. During the landing process, when the ultrasonic sensor is active, the descent speed is determined by the measurement values of the ultrasonic sensor. The lower the relative height to the ground, the smaller the descent speed.

3. In the landing process, when the ultrasonic sensor is inactive, the descent speed is determined by the relative height to the landing point. The lower the relative height to the landing point, the smaller the descent speed.

Remarks

- Since the aircraft will automatically plan return route when auto-return is triggered, please pay attention to the timing of activating auto-return and the surrounding environment so as to prevent the aircraft from being too close to obstacles, having not enough time and space to ascend to safety height and affecting flight safety.
- When the aircraft is switching from multi-rotor mode to fixed-wing mode, it will maintain its current height.

■ Automatic Return Obstacle Avoidance

During the execution of the automatic return process, the aircraft will activate the terrain avoidance function. For more details, please refer to the section '2.7 Terrain Obstacle Avoidance'.

4.2.3.3 Auto landing

Auto landing function is used for quick landing during flight when the aircraft encounters an emergency.

During flight, users can tap the auto landing icon to perform landing operation in map interface or camera interface: in map interface or camera interface, tap “ ” icon at the left side, and tap “ ” icon in the expansion bar, then the aircraft will automatically descend, hover and land before turning off motors.

Tips

- In the process of auto landing, users can interrupt auto landing function by using the sticks to control in manual control mode.
- In the process of auto landing, users can perform manual landing or return-to-home triggered by the user. Auto RTH will not be triggered.

4.2.3.4 Precise diversion

The Precise diversion function is used during flight, when the aircraft encounters special circumstances such as low battery power and is unable to continue flying or needs to make an emergency landing, and the preset home point is too far or does not meet the conditions for landing. Users can reselect a suitable location for safe landing.

During the flight of the aircraft, the user can perform a precise diversion in the following two ways:

- Tap the " " icon on the left side of the map interface, then tap the " " icon in the expanded item, wait for the "Edit Landing Mission" interface to appear on the right side of the interface, then tap a certain area of the map to set a temporary alternate point, and the remote controller will generate default arrival hovering point. Users can drag the icons of the arrival hovering point and landing point on the map, or accurately set the locations of the arrival hovering point and landing point by entering coordinates on the "Edit Landing Mission" interface.
- Tap the " " icon in the upper left corner of the map interface, place a marked point at a certain location on the map, and select the precise diversion icon " " in the marked point to edit the landing mission.

Tips

- The precise diversion function can only take effect when the aircraft's GNSS signal is good. During landing, please always pay attention to the aircraft status and signal connection.
- Auto landing: While the aircraft is flying, tap the " " icon on the left side of the map interface, then tap the " " icon in the expanded item, and the aircraft will land vertically at the current location.

After placing the precise diversion point, the user can edit the following settings for the precise diversion mission in the "Edit Landing Mission" interface on the right side of the map interface:

1. Tap the " " icon to edit the temporary alternate point (landing point).

- Altitude Format: You can choose "ATL" or "MSL". Select "ATL" with a setting range of -6000~6000 and select "MSL" with a setting range of -410~9000.
- Coordinate: Enter the latitude and longitude coordinates of the home point yourself, supporting 3 expressions: "DMS", "DD", and "MGRS".

2. Tap the " " icon to set the arrival hovering point. Setting items include:

- Landing Mode Switching Height (relative landing point) (m): the height value can be set between 40 and 500.
- Radius: The arrival hovering point radius value can be set from 100 to 2000.

- Arrival Altitude (m): It can be set to “Relative Landing Point” or “MSL”. Select “Relative Landing Point” to set the range from 40 to 2000 and select “MSL” to set the range from-410 to 9000.
- Arrival Hovering Point Coordinates: Enter the latitude and longitude coordinates of the arrival hovering point by yourself, supporting three expression methods: “DMS”, “DD” and “MGRS”.

After drawing the alternate route on the map, tap the “Execute” button at the bottom of the “Edit Landing Mission” interface, confirm the contents of the pop-up window and select Execute. The aircraft will follow the planned route (light green) to the designated landing point and prepare for landing accurately.

Tips

- The precise diversion route will not be stored and is only valid for a single precise diversion mission. If the aircraft exits the precision diversion function, it will need to re-edit the precise diversion route the next time it executes the precision diversion function.
- Refer to “2.6 Aircraft Mode Switching” for the logic of the arrival route.
- During the process of precise diversion, users are allowed to create quick mission or temp mission, or to use dynamic track or waypoint adjusting function so that the aircraft will exit from precise diversion, and switch to other flight modes.
- During the process of precise diversion, it is allowed to create, modify and execute new precise diversion and to use auto landing button to interrupt the precise diversion of the aircraft and switch to immediate landing.

Warning

- The precise diversion function is used in scenarios where users adopt rapid landing for emergency evacuation when encountering an emergency. When choosing a landing point, you should pay attention to the surrounding environment and try to choose a flat, open, obstacle-free ground. Avoid choosing densely populated, busy traffic or other dangerous areas as a landing point to avoid casualties or property losses.
- Users should set reasonable range for the remaining battery of the aircraft when using the precise diversion function, so that the landing point will not be so far that the aircraft will not have enough battery to arrive at landing point safely.

- During the precise diversion process, the user can interrupt the landing process by operating the sticks in manual flight mode.
- During the precise diversion process, the user can interrupt the landing process by triggering the automatic return-to-home, and the aircraft will instead fly to the home point for landing. The aircraft, when in backup landing, will enter the return mode only because of manual triggering by users, instead of low battery level, damaged battery or aircraft lost.

4.3 Post-Flight

4.3.1 Post-Flight Check

After each flight mission, the aircraft must go through a post-flight inspection. The postflight manual inspection mainly includes visual inspection of the appearance of the aircraft and components, inspection of component assembly and actuating mechanism. Users can use the "Postflight Manual Inspection Checklist" provided to conduct the postflight inspection.

4.3.1.1 Power-on inspection

■ Whole Aircraft Inspection

1) Check that the appearance of the whole aircraft is clean without stains, the structure is intact without damage, and there is no abnormal deformation;
2) Check that the wingtips on both sides, tail, and gimbal are installed normally without looseness, the connection gap does not expand, and the servo clearance does not expand after the wingtips and stabilizer are shaken slightly.

■ Battery Inspection

1) Check that there are no abnormal error messages on the battery interface in the APP. If there are error messages, please refer to Chapter 5 "**5.3 Troubleshooting Guide**" or contact the after-sales service for guidance and troubleshooting;
2) View the remaining battery power in the voyager application and replace the battery as needed. For the steps to replace the battery, refer to the section on installing and replacing the battery in "**4.1.1 Assembling the Aircraft**" in this chapter.

4.3.1.2 Static inspection

Before powering off the aircraft, conduct a static inspection on the aircraft. If the flight mission is completed or the location is changed, refer to the "Pre-Packing Inspection" in this section to complete the relevant inspection; if the flight mission continues, refer to the "Post-Flight Short Stop Inspection" in this section to complete the relevant inspection.

■ Pre-Packing Inspection

➢ Appearance Inspection

1) Appearance cleaning inspection: Check that the surface of the aircraft body and each installed component is clean without stains;
2) Paint layer condition inspection: Check the paint layer condition of the aircraft body and each installed component to ensure that the paint layer is in good condition without damage, obvious scratches, cracks, peeling, etc.;
3) Structural condition inspection: Check the structural condition of the aircraft body and each installed component to confirm that there are no cracks, no deformation, no breaks, no delamination of composites, and no damage caused by foreign objects on the surface;

➢ Assembly Inspection

Before packing, it is necessary to conduct a fastening inspection of the components to confirm that the fasteners are in place without missing, installed firmly without looseness, and the components are firmly connected. It mainly includes the following contents:

1) Motor and propeller connection: including the front and rear fuselage motors, propellers, and left and right wingtip motors and propellers;
2) Firmly connect the fuselage, belly and tail covers with the fuselage;
3) Landing gear is stable without shaking: including the front landing gear and main landing gear;

When disassembling the installed components, pay attention to the surface condition of the installation interface to confirm that it is clean without stains and the structure is not damaged. The following interfaces need to be checked:

1) Wing to fuselage docking interface;
2) Tail to fuselage docking interface;
3) Gimbal to bracket docking interface;
4) Battery to battery compartment interface

■ Post-Flight Short Stop Inspection

➢ Appearance Inspection

Refer to "**4.1.7.1 Pre-flight inspection**" for a general visual inspection of the aircraft body and each component.

➢ Assembly Inspection

Fasten the components for inspection to confirm that the fasteners are in place without missing, installed firmly without loose, and the components are firmly connected. Mainly include the following components:

1) Motor and propeller connection: including the front and rear fuselage motors, propellers, and left and right wingtip motors and propellers;
2) Landing gear is stable without shaking: including the front landing gear and main landing gear.

For quick-release components, perform an assembly inspection to ensure that the connection is in good condition, including:

1) Connection between wing and fuselage;
2) Connection between tail and fuselage;
3) Connection between gimbal and bracket;
4) Connection between battery and battery compartment.

■ Actuator Inspection

Examine the actuating mechanism, mainly including:

1) Wingtip mechanism: Check the size of the gap along the span, and shake the wingtip up and down to check the condition of the servo;
2) Horizontal tail mechanism: Shake the horizontal tail surface up and down to check the condition of the servo;
3) Motor: Rotate the fuselage and wingtip motor to confirm that there is no jamming and abnormal noise

4.3.2 Post-Flight Gimbal Check

After the aircraft lands, it is necessary to check the gimbal to determine if its condition meets the requirements for subsequent flights.

■ Short Stop Inspection

If the aircraft needs to continue to perform other flight missions, follow the steps below for a short stop inspection of the gimbal.

- Appearance Inspection

Examine the appearance of the gimbal camera to confirm that there are no following defects:

1) Surface structural damage, paint peeling or fading;
2) Dirty lens;

- Assembly Inspection

Confirm that the gimbal dial has been rotated to the lock icon, and the left and right turning joints are not loose (be careful not to press the unlock button).

■ Packing Inspection

If the flight mission is completed or the location is changed, follow the steps below to check the gimbal for packing.

- Gimbal Disassembly

Confirm that the gimbal disassembly process is smooth, and perform an appearance inspection on the removed gimbal:

1) The surface paint is in good condition and the lens is clean;
2) The structure is intact without damage, especially the gimbal connection mechanism.

- Gimbal Storage

Place the gimbal camera with the lens cap (if any) back in the industrial container.

Chapter 5 Upgrades, Maintenance and Checklists

In order to ensure the reliability and overall performance of the aircraft and related accessories and obtain the best operating experience, it is necessary to promptly upgrade the version of the aircraft and related accessories such as base stations and remote controls and perform related hardware maintenance regularly as required.

Important
● Online upgrade requires ensuring that the remote controller can normally access the Internet.

5.1 Equipments Upgrade

1. Turn on the power of the remote controller, base station and aircraft, and ensure that the aircraft, the base station and the remote controller are connected to each other, that the power of the aircraft and the remote controller is greater than 30%, and that the network connection of the remote controller is normal, and the gimbal has a TF card inserted.
2. Open the Autel Voyager Application. If there is a version update, you will be prompted in the application. Or tap "" > "Software Update" on the home interface of the application and follow the interface prompts to update manually.
3. After the upgrade is confirmed, the Autel Voyager will automatically download and upgrade the relevant firmware and the application.
4. After the upgrade is completed, please restart all devices.

Remarks
● Updates of Android system, Autel Voyager Application, aircraft firmware and base station Wi-Fi are available in "Software Updates".

Important
● Online upgrade requires ensuring that the remote controller can normally access the

Internet.

- During the upgrade process, please do not turn off the aircraft or base station and keep them connected to the remote controller.
- The entire upgrade process is expected to last 15 minutes (depending on the network conditions to which the remote controller is connected).
- Do not push the stick before and after the upgrade and ensure that the aircraft blades remain stationary.
- When the aircraft firmware is being updated, the firmware of the smart battery DF6_12000_2310 will also be upgraded to the latest firmware version.

5.2 Aircraft Maintenance

To ensure that the aircraft maintains optimal performance, all parts of the aircraft need to be maintained regularly. For details, please refer to the Maintenance Manual. If you have any questions, please contact User Support of Autel Robotics.

Table 5-1 Aircraft maintenance instructions

Check Type	Maintenance Type	Maintenance Cycle	Replacement Material	Quantity
A -check	Check the whole machine	Accumulated flight time of 20 hours or accumulative use of 1 month	/	/
	Clean the whole machine		/	/
B- check	Check the whole machine	Accumulated flight time of 100 hours or accumulative use of 6 months	/	/
	Clean the whole machine		/	/
	Update firmware			
	Test motor system		/	/

C -check	Complete B -check	Accumulated flight hours of 200 or accumulative use of 12 months	/	/
	Replace wingtip servos		wing tip servo	2
	Replace the tail servo		Tail servo	1
D -check	Complete B-check	cumulative flight hours or 18 months of cumulative use	/	/
	Replace the body motor		Front motor assembly	1
			Rear motor assembly	1
	Replace wingtip motor		wing tip motor	2

Tips

- After the aircraft reaches the maintenance period, users are required to contact Autel Robotics to provide maintenance services. If maintenance is not performed as required, the safety performance of the aircraft may be affected and flight safety accidents may occur.

Table 5-2 User-replaceable parts list

No.	Part	Quantity	Part Number	Manufacturer information
1	Forward fuselage motor propeller	1	E AN : 6924991123170	Autel Robotics

	Rear fuselage motor propeller	1	UPC : 889520203173	
2	Left wing tip motor propeller	1	E AN : 6924991123187 UPC : 889520203180	Autel Robotics
	Right wing tip motor propeller	1		
3	Z2 Gimbal Camera	1	E AN : 6924991101796 U PC : 889520011532	Autel Robotics
4	T3 Gimbal Camera*	1	EAN: 6924991101802 UPC: 889520011549	Autel Robotics
5	T3H Gimbal Camera*	1	E AN : 6924991102274 U PC : 889520012010	Autel Robotics
6	L20T Gimbal Camera *	1	EAN: 6924991102281 UPC: 889520012027	Autel Robotics
7	DF6_12000_2310 smart battery	2	E AN : 6924991123101 U PC : 889520203104	Autel Robotics

Tips

- Users can contact Autel Robotics to purchase the above parts and replace them according to the operating instructions.
- If you need to replace parts that are not in the list, please contact Autel Robotics. Damage caused by unauthorized disassembly and assembly will not be covered by the warranty.
- Please refer to the “Maintenance Manual” for the service life cycle of each component.

5.3 Troubleshooting Guide

Tips

- The following troubleshooting measures are limited to failure factors caused by use under normal limited conditions.
- For faults caused by abnormal use, please contact Autel Robotics directly for processing.

1. The remote controller cannot be turned on:

- Please check whether the battery power of the remote controller is sufficient. If the power is too low and the power cannot be turned on, please fully charge it before turning it on.
- Please confirm whether the ambient temperature is suitable. Low temperature will affect the battery output performance and may cause the remote controller to fail to turn on.
- If the remote controller is accidentally shut down during the upgrade process, it may not be able to power on normally, please contact Autel Robotics.
- If the remote controller has not been subject to external impact, liquid immersion or other destructive behavior, and does not meet the above conditions, it may be a hardware failure, please contact Autel Robotics.

2. The base station cannot be powered on:

- Please check whether the battery power of the base station is sufficient. If the battery power is too low and the power cannot be started, please fully charge it and then power it on again.
- Please confirm whether the ambient temperature is suitable. Low temperature will affect the battery output performance and may cause the base station to fail to power on.
- If the base station is accidentally shut down during the upgrade process, it may not be able to boot normally, please contact Autel Robotics.
- If the base station has not been subjected to destructive behaviors such as external impact or liquid immersion, and does not meet the above conditions, it may be a hardware failure, please contact Autel Robotics.

3. The aircraft cannot be powered on:

- Please check whether the smart battery has sufficient power. If the power is too low, it will shut down and cannot be started. Please fully charge the smart battery before turning it on.
- If the smart battery has sufficient power, please check whether the battery is in good contact with the aircraft body. If there is dirt, rust, etc. at the battery interface, it will cause poor contact and needs to be processed before reinserting the battery to start the aircraft.
- Please check whether the metal contacts at the aircraft battery interface and smart battery interface are missing or damaged. If so, please contact Autel Robotics.
- Please confirm whether the ambient temperature is suitable. Low temperature will affect the battery output performance and may cause the aircraft to fail to boot.
- If the aircraft or smart battery is powered off abnormally during the firmware upgrade process, it may fail to boot. Please contact Autel Robotics.
- If the above conditions are not met and the aircraft can be turned on after replacing the new smart battery, then the smart battery hardware is faulty; if the aircraft still cannot be turned on, the aircraft hardware is faulty, please contact Autel Robotics.

4. The aircraft displays a fault during self-check after powering on:

- Please follow the instructions of Autel Voyager Application to handle it accordingly. If it is a hardware connection failure (assembly failure), the aircraft should be shut down before handling to avoid personal injury.

5. The aircraft does not respond to the remote controller during the matching process:

- Please make sure that the distance between the two is kept relatively close.
- Please make sure there are no metal objects, mobile devices, signal interfering devices or other remote controllers nearby.

6. After the aircraft completes self-check, the motor cannot start:

- Please confirm whether the remote controller and aircraft are paired.
- In manual flight mode, please check whether the remote controller stick function is normal and whether the remote controller is correctly calibrated.
- Please check whether the aircraft smart battery is completely installed and whether the battery power is sufficient.

- Please pay attention to relevant prompts in the RC and troubleshoot accordingly before trying to start the motor again.
- If the problem cannot be solved with measures above, please contact Autel Robotics.

7. After the aircraft motor is started, the aircraft cannot take off:

- Please re-start the aircraft and try again, if it still cannot take off after trying many attempts, please contact Autel Robotics.

8. Aircraft flight time shortened:

- Low ambient temperature during flight, flying against the wind, airflow disturbance, and mounted flight will all reduce the normal flight endurance time to a certain extent.
- Please ensure that the number of cycles of the smart battery is within 200 times. The power of the smart battery will attenuate normally during its use cycle.

9. The image transmission received by the remote controller is unstable (such as stuck, lost or frequently disconnected):

- Please check whether the connection between the remote controller and the base station is stable and whether the antenna direction is adjusted to the appropriate direction.
- Please confirm that there are no strong magnetic fields or signal interference sources around the aircraft, the remote controller, and the base station.
- Please confirm that the distance between the aircraft, the remote controller, and the base station is within the effective communication range, and shorten the flight radius in time.

10. The gimbal camera automatically turns off during flight recording:

- Remove the TF card from the gimbal camera immediately. Try restarting the camera and wait until the video files are restored as completely as possible.
- Please check whether the TF card memory is full. If it is full, please replace it with a new TF card or transfer media files.
- Please check whether the gimbal camera is firmly connected to the aircraft. The gimbal camera may become loose due to flight vibrations, resulting in poor contact and failure to work properly.

11. The image transmission screen is disconnected when the aircraft is flying outside the visual range:

- Please activate the automatic return command to return the aircraft to the home point.

12. When it comes to aircraft obstacle avoidance?

- Terrain obstacle avoidance is not turned on when the aircraft is flying manually. When performing route missions, you can choose to turn on/off terrain obstacle avoidance. Terrain obstacle avoidance is only forcibly turned on during automatic return, Precise diversion, quick mission, waypoint adjusting and tracking missions.
- Before flying, please set a reasonable safe altitude for the aircraft.
- When flying, please pay attention to your surroundings and the safety tips of the Autel Voyager Application.

13. The image is tilted when recording video in flight:

- Place the aircraft horizontally and keep it stationary, and calibrate the gimbal according to the "Gimbal Automatic Calibration" function in the Autel Voyager Application.
- If the problem persists, adjust the gimbal according to the guidelines in the "PTZ Fine-tuning" function.

14. The aircraft lens is dirty:

- Please use a dry lens cleaning cloth to gently wipe the lens. It is recommended to use the lens cleaning cloth provided in the industrial box.

15. The aircraft, base station, and remote controller unexpectedly shut down during the upgrade process:

- Please restart the device. If it can boot normally, make sure the device has sufficient power before upgrading normally.
- If the device cannot be started, please contact Autel Robotics.

16. To restore the remote controller to factory settings:

- Tap the "Maxitools" application on the home interface of the remote controller to restore factory settings. Please back up important data before operating

17. Force restart after remote controller freezes:

- Press and hold the power button on the top of the remote controller for more than 10 seconds to force the remote controller to shut down.
- Restarting the remote controller during flight will trigger the aircraft to perform lost connection action.

5.4 Pre-Flight Manual Checklist

The following checklist is required before every flight operation. Please confirm the relevant contents carefully.

Table 5-3 Pre-flight Manual Checklist Reference Sheet

<table>
<tr><td colspan="7">Pre-flight checklist</td></tr>
<tr><td>Aircraft model</td><td></td><td>aircraft number</td><td></td><td>Flight date</td><td colspan="2"></td></tr>
<tr><td>mission</td><td colspan="6"></td></tr>
<tr><td rowspan="4">Environmental condition records</td><td>temperature</td><td>humidity</td><td>altitude</td><td>wind speed</td><td>wind direction</td><td>weather</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="2">Other environment descriptions</td><td colspan="4"></td></tr>
<tr><td colspan="2">Does the environment meet flight conditions?</td><td colspan="2">☐ Y ☐ N</td><td>signature</td><td></td></tr>
<tr><td rowspan="2">Static checking</td><td>No.</td><td>Inspection items and standards</td><td>checker</td><td>restricted release</td><td>test result</td><td>Abnormal results</td></tr>
<tr><td>1</td><td>Tripod inspection
● Component installation: Check that the tripod is installed firmly and without looseness or displacement.</td><td></td><td>1. The tripod structure is damaged, loose or displaced.</td><td>☐ Y
☐N</td><td></td></tr>
</table>

		● Structural status: Check that the structural status is normal and there is no damage such as deformation or breakage. ● Paint surface: Check that the surface is clean and free of stains, and that the paint layer is not peeling off.				
	2	Airframe motor and propeller inspection ● Component installation: Check that the installation screws are in place and fastened without missing parts, and that the fuselage motor and propellers are firmly fixed without shaking. ● Motor status: Check that the motor is in good condition, rotates		1. The motor or propeller installation is not tight. 2. The motor rotates abnormally. 3. The propeller structure is severely damaged or installed in the wrong direction.	☐ Y ☐ N	

		smoothly, has no lag or abnormal noise. ● Propeller status: Check that the appearance of the propeller is intact, with no obvious structural damage such as deformation, breakage, fracture, delamination, etc., and the surface is clean and free of stains. ● Propeller steering: Check that the propeller is installed in the correct direction.				
	3	Inspection of the bottom of the fuselage ● Heat dissipation holes and ultrasonic wave: Check that the surface of the ultrasonic wave is clean and free of stains, and that the heat		1. The ultrasonic surface is seriously stained. 2. The cooling holes are seriously blocked. 3. Protective cover is not	☐ Y ☐ N	

		dissipation holes are free of cracks and foreign matter clogging. ● Bottom protective cover: Check that the protective cover is in good condition and has no missing screws. The installation is tight. After installation, the protective cover is basically flush with the surrounding skin and the gaps are even.		installed tightly.		
	4	Wing body connection inspection ● Carbon tubes and positioning pins: Check that the carbon tubes and positioning pins at the wing end are firmly installed and not loose, and the appearance is in		1. The carbon tube and positioning pin are loose or structurally damaged. 2. The wing body interface is dirty. 3. The gap in the wing	☐ Y ☐ N	

		good condition without damage. ● Wing body interface: Check that the interface is clean and free of foreign matter and that there is no damage to the appearance. ● Lock and cover: Check that there is no structural damage or deformation in appearance, the installation is firm, and the base does not shift after being fastened. ● Wing body gap: After checking the wing body connection, the gap is even and the maximum gap does not exceed 1mm.		body is too large.		
	5	Tail and fuselage connection inspection ● Tail interface: Check that the interface between		1. The rear wing interface is dirty. 2. Cannot be reset and	☐ Y ☐ N	

		the tail and the fuselage is clean and free of foreign matter, and the appearance is intact and undamaged. After the tail is inserted into the fuselage, the upper and lower hooks are reset and locked normally, and the connection gap does not exceed 1mm. ● Flat tail rudder surface: Manually rotate the flat tail rudder surface slowly/quickly, and the rotation is smooth without jamming or abnormal noise.		locked properly after the tail wing is connected. 3. The steering surface is stuck or makes abnormal noise.		
	6	RTK module check ● Module installation: Manually rotate and check that the RTK module is firmly installed, shake gently and there is no		1. RTK module is loose .	☐ Y ☐ N	

		looseness, and the appearance is clean and free of damage.				
	7	Left and right wingtip inspection ● Wing tip installation: Check that the wing tip mechanism is installed firmly, with no looseness or displacement along the span, and that there is no jamming, no abnormal noise, and no interference with the wing when rotating the wing tip. ● Wingtip motor: Check that the motor is installed firmly without shaking, and that the rotation is free of stuck or abnormal noise. ● Wingtip propeller: Check that the propeller installation has no		1. Wing tip rotation is stuck, making abnormal noise or interference. 2. The motor and propeller installation are shaking. 3. The propeller structure was severely damaged.	☐ Y ☐ N	

		obvious false position or shaking, and the propeller has no obvious deformation, damage, aging, softening and other abnormal phenomena.				
	8	Pitot tube inspection ● Pilot tube: Check that the appearance is intact and there is no damage, the installation is secure, the air inlet is not blocked, and the pilot tube cover has been removed and put away before takeoff.		1. The pilot tube is clogged. 2. The pilot sleeve was forgotten to be removed.	☐ Y ☐ N	
	9	Battery check ● Appearance: Check that the battery surface is clean and free of damage and stains, and that the battery compartment and battery interface		1. The battery compartme nt and battery interface are dirty. 2. The battery unlock button	☐ Y ☐ N	

		are clean and free of foreign matter. ● Installation status: Check that the battery is installed firmly and the unlock button rebounds correctly.		cannot rebound.		
	10	PTZ camera inspection ● Installation status: Check that the connection between the gimbal and the body is stable, the gimbal is installed tightly and there is no empty position, and the protective cover is fastened normally after the Micro SD card is inserted. ● Appearance status: Check that the appearance is clean and free of stains, the structure is intact and free of damage, and the		1. The gimbal installation is unstable.	☐ Y ☐ N	

		camera lens is clear and free of dirt.				
	11	Whole machine surface inspection ● Inspection of the whole machine: Check that all components are installed and tightened, there is no abnormal sound when shaking gently, the surface of the whole machine is clean and free of stains, and the structure is not damaged.		1. There is shaking in the installation of components or abnormal noise for unknown reasons.	☐ Y ☐ N	
	12	Base station check* ● Appearance status: Check that the appearance is clean, without stains or deformations, the heat dissipation vents are not blocked, the tripod structure is not damaged, and		1. The antenna feeder is damaged. 2. The cooling vents are clogged.	☐ Y ☐ N	

		the installation is firm. ● Antenna feeder: Check that the structure is not damaged, the interface is clean and free of foreign matter, and the connection is stable.				
	13	Remote controller check ● Appearance status: Check that the surface is clean and free of foreign matter, the heat dissipation vents are not blocked, and the structure is intact without damage. ● Rocker inspection: Check that the rocker is in the neutral position, and that the rocker, gears, and dials move smoothly without jamming.		1. The stick, gear, and dial movements are stuck. 2. The cooling vents are clogged.	☐ Y ☐ N	

	No.	Inspection items and standards	checker	restricted release	test result	Abnormal results
Power-on inspection	1	Full machine status check ● Illustration gap: Slightly rotate the wingtips and tail, and check that there are no obvious gaps or gaps. ● Navigation light status: Check that the wingtip and tail navigation lights flash normally and synchronously. ● Propeller status: Check that the propeller rotation direction is correct and the rotation axis is vertical without deflection.		1. The wing tips or horizontal tail are in a false position and the gap is too large. 2. The propeller rotation direction is wrong or the rotation axis is deflected.	☐ Y ☐N	
	2	Battery check ● Battery capacity and cycle: Check that the battery capacity meets flight requirements and		1. Cycle times is too large. 2. The difference in battery power is no	☐ Y ☐N	

		the number of cycles is relatively consistent.		more than 12%.		
	3	PTZ camera ● Self-inspection and control: Confirm that the gimbal self-inspection is completed, the gimbal rotates normally, the camera screen is viewed normally on the app, and the ground control station can control the camera normally.		1. The movements of the gimbal and camera are uncontrolled.	☐ Y ☐ N	
	4	Remote controller system check ● Battery power and operation: Check that the battery power meets the flight mission requirements and the application can operate normally.		1. The battery is too low.	☐ Y ☐ N	

	5	Base station system ● Power and signal: Check that the power of the base station meets the flight mission requirements. The base station indicator light is normal: the linking indicator light flashes green slowly, the Wi - Fi indicator light is steady green, and the RTK indicator light is steady green. ● Signal strength: Check Wi - Fi, RTK, image transmission status and signal strength in the Application.		1. Signal strength is too low. 2. The battery is too low.	☐ Y ☐ N	
	6	Communication link system check ● Image transmission and 5.8G: Check the image transmission and 5.8G connection		1. The link connection is lost.	☐ Y ☐ N	

		status in the Application.				
	7	Navigation system check ● Initialization process: Check that the navigation initialization is completed and RTK positioning calculation can be performed normally. ● Attitude change: Rotate the aircraft along the three axes and confirm that the attitude change is normal.		1. An error occurred during the navigation initialization process. 2. Attitude feedback error .	☐ Y ☐ N	
	8	Whole machine system parameter inspection ● Version module: Obtain the version number of each module of the whole machine, confirm the match, and self-check without error		1. Version numbers don't match. 2. The flight control information is set incorrectly.	☐ Y ☐ N	

		message, the flight control system settings are normal.				
Inspector's signature						
Complete machine release instructions				signature		

5.5 Post-Flight Manual Checklist

The following checklist is required after every flight operation. Please confirm the relevant contents carefully.

Table 5-4 Post-flight Manual Checklist Reference Sheet

<table>
<tr><td colspan="7">Post-Flight Checklist</td></tr>
<tr><td colspan="2">Aircraft Model</td><td></td><td>Aircraft Number</td><td></td><td>Flight Date</td><td colspan="2"></td></tr>
<tr><td colspan="2">Mission</td><td colspan="3"></td><td>Flight Time</td><td colspan="2"></td></tr>
<tr><td colspan="2">Abnormal SiuRecord</td><td colspan="6"></td></tr>
<tr><td rowspan="2">Power-On Inspection</td><td>No</td><td colspan="3">Inspection items and standards</td><td>Test result</td><td>checker</td><td>Abnormal Results</td></tr>
<tr><td>1</td><td colspan="3">Complete machine inspection:
1. Surface structure... Check that the surface structure of the components is intact without damage and without abnormal deformation;
2. Connection status... Check that the wing tips on both sides, the tail, and the gimbal are installed normally without looseness, the connection gap does not expand, and the wing tips and the</td><td>☐ Y
☐ N</td><td></td><td></td></tr>
</table>

		horizontal tail are gently shaken, and the servo virtual position does not expand.			
	2	Battery inspection: 1. Abnormal information... Check that there is no abnormal error message on the APP battery interface; 2. Battery status... Check that the battery temperature is normal, check the remaining battery power, and charge as needed.	☐ Y ☐ N		
	3	Gimbal camera inspection: 1. Appearance structure... Check that the surface is clean without dirt and the structure is intact without damage; 2. Overall status... Check that the gimbal camera does not have unexplained movement and abnormal noise, and	☐ Y ☐ N		

		the APP can normally control the gimbal camera without abnormal operation.			
Static Check	No	Inspection items and standards	Test result	checker	Abnormal Results
	1	Servo and control surface inspection: 1. Wingtip servo... Manually rotate the wingtips on both sides, rotate smoothly without jamming, and there are no abnormal phenomena such as abnormal noise and stuck servos. 2. Horizontal tail control surface... Swing the horizontal tail control surface up and down, smooth without jamming, and the servo has no abnormal noise.	☐ Y ☐ N		
	2	Power system inspection: 1. Appearance structure... Check the appearance of the fuselage, wingtip motor and propeller to confirm that there	☐ Y ☐ N		

		is no damage such as cracking, deformation, etc.; 2. Installation status... Check that the motor and propeller mounting screws are not missing, and the components are installed and tightened; 3. Motor temperature... Check that the temperature of the fuselage and wingtip motor is normal.			
	3	Battery inspection: 1. Installation status... Check that the battery connection is stable without shaking, and the locking status of the side latches is normal. 2. Appearance... Remove the battery and check that the appearance is clean without stains, the structure is intact without damage, and the latch can pop up normally after pressing.	☐ Y ☐ N		

	4	Pitot tube inspection Pilot tube: Check that the appearance is intact and there is no damage, the installation is secure, the air inlet is not blocked, and the pilot tube cover has been removed and put away before takeoff.	☐ Y ☐ N		
Inspector's signature					
Note: If it is required to continue executing a flight mission, please check major components and system against “Pre-Flight Checklist”.					

Appendix A Specification

A.1 Aircraft

Aircraft	
Dragonfish Standard weight	7.5kg (incl. battery, propellers, excl. gimbal)
Max. takeoff weight	9.0 kg
Max. extra payload weight	1.5 kg
Size	1465×2496×483 mm (with propellers installed) 1290×2302×483 mm (without propellers installed)
Supported Gimbal	DG-Z2, DG-T3, DG-T3H, DG-L20T
Gimbal installation	Detechable (E-type)
Rotation speed of fuselage propeller	1200~9000 rpm
Rotation speed of wingtip propeller	2000~15000 rpm
Max. ascent speed	Multi-rotor Mode: 4 m/s Fixed-wing Mode: 5 m/s
Max. Descent Speed (vertical)	Multi-rotor Mode: 3 m/s Fixed-wing Mode: 5 m/s
Flight speed	0m/s~17m/s (Multi-rotor)

	17m/s~30m/s (Fixed-Wing)
Max. horizontal flight speed	30 m/s
Service Ceiling Above Sea Level	6000 m
Max. Flight Time	126 min
Max. Wind Resistance	12 m/s
Max. pitch angle	20°
Max. roll angle	35°
Max. angular velocity	Pitch:180°/s Yaw:60°/s
Operating temperature	-20°C ~ 50°C
Air sensing	ADS-B receiver (support 1090ES)
GNSS	GPS+Galileo+BeiDou+GLONASS
Hovering Accuracy (P-mode with GPS)	Vertical: ±0.5 m (GPS enabled) ±0.1 m (RTK enabled) Horizontal: ±1.5 m (GPS enabled) ±0.1 m (RTK enabled)
RTK Positioning Accuracy	When RTK enabled and fixed:

	Multi-rotor: 1 cm+1 ppm(Horizontal) 1.5 cm + 1 ppm(Vertical) Fixed Wing: 3 cm+1 ppm(Horizontal) 3 cm + 1 ppm(Vertical)
Image transmission	
Operating Frequency	**900M**: 902 - 928MHz* **2.4G**: 2.400 – 2.476GHz**, 2.400 – 2.4835GHz**** **5.2G**: 5.15 – 5.25GHz***, **5.8G**: 5.725 - 5.829GHz**, 5.725 - 5.850GHz**** *Only applies to FCC and ISED regions ** Only applies to SRRC regions *** Only applies to FCC and RCM regions **** Only applies to FCC, ISED, CE and RCM regions Note: Some frequencies are only available in some regions or in door. For details, please refer to local laws and regulations.
Max. signal distance	FCC: 30 km (use with base station)
Equivalent radiated power (EIRP)	**900M**: ≤30dBm（FCC/ISED） **2.4G**: ≤20dBm（SRRC/CE）; ≤30dBm（FCC/ISED/RCM）

	5.2G: ≤30dBm（FCC）； ≤24dBm（RCM） **5.8G**: ≤30dBm（FCC/ISED/RCM/SRRC）； ≤14dBm（CE）

A.2 Gimbal Camera

A2.1 Z2

Basic specs	
Supported aircraft	Dragonfish Lite/Standard/Pro
Weight	702 g
Size	145×81×138 mm
Ingress protection rating	IP43
Operating temperature	-20℃~+50℃
Storage temperature	-20℃~+60℃
Built-in memory	8GB
Gimbal	
Installation	Detechable (E-type)
Angular Vibration Range	0.005°

Mechanical Range	Yaw: -320°~~+320° Roll: -45°~-90° Pitch: -135°~+45°
Controllable Range	Yaw: -270°~+270° Pitch: -90°~0° (Tracking mode: -100°~+20°)
Stable system	3-axis mechanical gimbal (pitch, yaw, roll)
Max Control Speed	100°/s (Yaw); 100°/s (pitch)
Zoom camera	
Sensor	1/2.5“ CMOS, Effective pixels: 8MP
Lens	FOV:70.2°(H)*43.1°(V)~4.1°(H)×2.5°(V) Focal length: 4.4-88.4 mm 35mm equivalent focus range: 26.4-530 mm Aperture: f/2.0(Wide)-f/4.8(Tele) Focusing distance: 1m~∞
Focus method	CDAF
Exposure method	Auto, manual
Exposure Compensation	±3EV
Metering mode	Center measurement
Metering lock	support
Electronic shutter speed	1/10000s~1s

ISO range	ISO100~ISO12800
Video resolution	3840×2160@30FPS;1920×1080@30FPS
Video format	MP4
Video subtitle	Support
Max. photo size	3840×2160
Photo format	JPEG
Wide-Angle camera	
Sensor	1/2 “ CMOS, Effective pixels: 12MP
Exposure method	Auto
Exposure Compensation	±3EV
Metering mode	Center measurement
Metering lock	Support
Electronic shutter speed	1/8000s~1/30s
ISO range	ISO100~ISO6400
Video resolution	3840×2160@30FPS;1920×1080@30FPS
Video format	MP4
Video subtitle	Support

Max. photo size	4000×3000
Photo format	JPEG
Memory storage	
Memory card type	TF card
Max. expandable storage	512GB
Storage file system	FAT32/exFAT
Recommended memory card list	UHS-I speed level U3 or V30. The minimum writing speed: 30MB/s.

A2.2 T3

Basic spec	
Supported aircraft	Dragonfish Lite/Standard/Pro
Weight	806 g
Size	112.4×137.4×162 mm
Ingress protection rating	IP43
Operating temperature	When not measuring temperature: -20℃~+50℃ When measuring temperature: -10℃~+50℃
Storage temperature	-20℃~+60℃

Built-in storage	8GB
Gimbal	
Installation	Detechable (E-type)
Angular Vibration Range	0.005°
Mechanical Range	Yaw: -320°~~+320° Roll: -45°~-90° Pitch: -135°~+45°
Controllable Range	Yaw: -270°~+270° Pitch: -90°~0° (Tracking mode: -100°~+20°)
Stable system	3-axis mechanical gimbal (pitch, yaw, roll)
Max Control Speed	100°/s (Yaw); 100°/s (pitch)
Zoom camera	
Sensor	1/2.5” CMOS, Effective pixels: 8MP
Lens	FOV:70.2°(H)*43.1°(V)~4.1°(H)×2.5°(V) Focal length: 4.4-88.4 mm 35mm equivalent focus range: 26.4-530 mm Aperture: f/2.0(Wide)-f/4.8(Tele) Focus distance: 1 m~∞
Focus method	CDAF
Exposure method	Auto, manual

Exposure Compensation	±3EV
Metering mode	Center measurement
Metering lock	Support
Electronic shutter speed	1/10000s~1s
ISO range	ISO100~ISO12800
Video resolution	3840×2160@30FPS;1920×1080@30FPS
Video format	MP4
Video subtitle	Support
Max. photo size	3840×2160
Photo format	JPEG
Wide-Angle camera	
Sensor	1/2 “ CMOS, Effective pixels: 12MP
Exposure method	Auto
Exposure Compensation	±3EV
Metering mode	Center measurement
Metering lock	Support
Electronic shutter speed	1/8000s ~1/30s

ISO range	ISO100~ISO6400
Video resolution	3840×2160@30FPS;1920×1080@30FPS
Video format	MP4
Video subtitle	support
Max. photo size	4000×3000
Photo format	JPEG
Thermal camera	
Sensor	Uncooled VOx Microbolometer
Lens	FOV:24.7°×19.9° Focal length: 25 mm
sensitivity(NTED)	≤50mK@f/1.0, 25℃
Pixel size	12um
Wavelength range	8-14um
Temperature range	spot measurement, rectangular measurement
Temperature range	High gain mode: -20° to +150° Low gain mode: 0° to +550°
Temperature measurement accuracy	±3℃ or ±3% of reading (whichever is greater, observe at a distance of 4 meters from the black body in a windless laboratory environment at 25°C)

	@Environmental temperature-20℃~60℃
Temperature Measurement Range	1~25 m
Zoom	1~8x digital zoom
High temperature warning	Support
FFC	Auto/Manual
Palette	White Hot/Rainbow/Gradation/Black Hot/Heat Detection/Lava/Ironbow/Searing/Rainbow HC
Photo size	640×512
Photo format	JPEG+IRG/TIFF
Video resolution	640×512@30FPS
Video format	MP4
Memory storage	
Memory card type	TF card
Max. expandable storage	512GB
Storage file system	FAT32/exFAT
Recommended memory card list	UHS-I speed level U3 or V30. The minimum writing speed: 30MB/s.

A2.3 T3H

Basic spec	
Supported aircraft	Dragonfish Lite/Standard/Pro
Weight	802 g
Size	138×91×164 mm
Ingress protection rate	IP43
Operating temperature	When not measuring temperature: -20℃~+50℃ When measuring temperature-10℃~+50℃
Storage temperature	-20℃~+60℃
Eye safety level	Class 1M
Built-in storage	8GB
Gimbal	
Install method	Detechable(E-type)
Angular Vibration Range	0.005°
Mechanical Range	Yaw: -320°~+320° Roll: -90°~+45° Pitch: -135°~+45°
Controllable Range	Yaw: -270°~+270°

	Pitch: -90°~0° (Tracking mode: -100°~+20°)
Stable system	3-axis mechanical gimbal (pitch, yaw, roll)
Max Control Speed	100°/s (Yaw); 100°/s (pitch)
Wide-Angle camera	
Sensor	1/2 " CMOS, Effective pixels: 12MP
Exposure method	Auto
Exposure Compensation	±3EV
Metering mode	Center measurement
Metering lock	Support
Electronic shutter speed	1/8000s ~1/30s
ISO range	ISO100~ISO6400
Video resolution	3840×2160@30FPS;1920×1080@30FPS
Video format	MP4
Video subtitle	support
Max. photo size	4000×3000
Photo format	JPEG
Thermal camera	

Sensor	Uncooled VOx Microbolometer
Lens	FOV:24.7°×19.9° Focal length: 25 mm
sensitivity(NTED)	≤50mK@f/1.0, 25℃
Pixel size	12um
Wavelength range	8-14um
Temperature range	spot measurement, rectangular measurement
Temperature range	High gain mode: -20° to +150° Low gain mode: 0° to +550°
Temperature measurement accuracy	±3℃ or ±3% of reading (whichever is greater, observe at a distance of 10 meters from the black body in a windless laboratory environment at 25°C) @Environmental temperature-20℃~60℃
Temperature Measurement Range	1~25 m
Zoom	1~8x digital zoom
High temperature warning	Support
FFC	Auto/Manual
Palette	White Hot/Rainbow/Gradation/Black Hot/Heat Detection/Lava/Ironbow/Searing/Rainbow HC

Photo size	1280×1024
Photo format	JPEG+IRG/TIFF
Video resolution	1280×1024@30FPS
Video format	MP4
Laser finder	
Wave length	905 nm
Measuring accuracy	Within 400 m: ±1m, 400 m away: ±0.4%
Measuring range	10-1200 m
Memory storage	
Memory card type	Memory card type
Max. expandable storage	Max. expandable storage
Storage file system	Storage file system
Recommended memory card list	Recommended memory card list

A2.4 L20T

Basic spec	
Supported aircraft	Dragonfish Standard/Pro

Weight	810 g
Size	151×97×172 mm
Ingress protection rate	IP43
Operating temperature	When not measuring temperature: -20℃~+50℃ When measuring temperature-10℃~+50℃
Storage temperature	-20℃~+60℃
Eye safety level	Class 1M
Built-in storage	8GB
Gimbal	
Install method	Detechable(E-type)
Angular Vibration Range	0.005°
Mechanical Range	Yaw: -320°~+320° Roll: -90°~+45° Pitch: -135°~+45°
Controllable Range	Yaw: -270°~+270° Pitch: -90°~0° (Tracking mode: -100°~+20°)
Stable system	3-axis mechanical gimbal (pitch, yaw, roll)
Max Control Speed	100°/s (Yaw); 100°/s (pitch)

Zoom camera	
Sensor	1/2.5” CMOS, Effective pixels: 8MP
Lens	FOV:70.2°(H)*43.1°(V)~4.1°(H)×2.5°(V) Focal length: 4.4-88.4 mm 35mm equivalent focus range: 26.4-530 mm Aperture: f/2.0(Wide)-f/4.8(Tele) Focus distance: 1 m~∞
Focus method	CDAF
Exposure method	Auto, manual
Exposure Compensation	±3EV
Metering mode	Center measurement
Metering lock	Support
Electronic shutter speed	1/10000s~1s
ISO range	ISO100~ISO12800
Video resolution	3840×2160@30FPS;1920×1080@30FPS
Video format	MP4
Video subtitle	Support
Max. photo size	3840×2160
Photo format	JPEG

Wide-Angle camera	
Sensor	1/2 “ CMOS, Effective pixels: 12MP
Exposure method	Auto
Exposure Compensation	±3EV
Metering mode	Center measurement
Metering lock	Support
Electronic shutter speed	1/8000s ~1/30s
ISO range	ISO100~ISO6400
Video resolution	3840×2160@30FPS;1920×1080@30FPS
Video format	MP4
Video subtitle	support
Max. photo size	4000×3000
Photo format	JPEG
Thermal camera	
Sensor	Uncooled VOx Microbolometer
Lens	FOV:24.7°×19.9° Focal length: 25 mm

sensitivity(NTED)	≤50mK@f/1.0, 25℃
Pixel size	12um
Wavelength range	8-14um
Temperature range	spot measurement, rectangular measurement
Temperature range	High gain mode: -20° to +150° Low gain mode: 0° to +550°
Temperature measurement accuracy	±3℃ or ±3% of reading (whichever is greater, observe at a distance of 4 meters from the black body in a windless laboratory environment at 25°C) @Environmental temperature-20℃~60℃
Temperature Measurement Range	1~25 m
Zoom	1~8x digital zoom
High temperature warning	Support
FFC	Auto/Manual
Palette	White Hot/Rainbow/Gradation/Black Hot/Heat Detection/Lava/Ironbow/Searing/Rainbow HC
Photo size	640×512
Photo format	JPEG+IRG/TIFF
Video resolution	640×512@30FPS

Video format	MP4
Laser finder	
Wave length	905 nm
Measuring accuracy	Within 400 m: ±1m, 400 m away: ±0.4%
Measuring range	10–1200 m
Memory storage	
Memory card type	Memory card type
Max. expandable storage	Max. expandable storage
Storage file system	Storage file system
Recommended memory card list	Recommended memory card list

A.3 Remote Controller

DFRC	
Material	PC+ABS
Size	319×233×74 mm (antennas folded, sticks and bracket included) 319×233×220 mm (antennas vertical to screen, sticks and bracket included)

	319×398×74 mm (antennas unfolded, sticks and bracket included)
Endurance time	2.5 h (max. brightness) 4.5 h (50% brightness)
Operating temperature	-20℃~+40℃
Storage temperature	-20℃~+30℃ (in 1 year) -20℃~+45℃ (in 3 months) -20℃~+60℃ (in 1 month)
Built-in memory	128GB
TF extension	support
Operation system	Based on Android 7.0
Application installation	Support 3rd party application
HDMI	Support max. 1080P@60FPS
USB-A	Power supply: 5V/0.5A Data transmission: USB2.0
GNSS	GPS+Galileo+GLONASS
Wi-Fi standard	802.11a/b/g/n/ac
Wi-Fi operation frequency	**2.4G:** 2.400 – 2.476GHz*, 2.400 – 2.4835GHz** **5.2G:** 5.15 – 5.25GHz****

	5.8G: 5.725 – 5.829GHz*, 5.725 – 5.850GHz** *Only applicable for SRRC region **Only applicable for FCC, ISED, CE and RCM regions ***Only applicable for FCC and RCM regions Note: Some frequencies are only available in some regions or in door. For details, please refer to local laws and regulations.
EIRP	**2.4G**: ≤20dBm（SRRC/CE); ≤30dBm（FCC/ISED/RCM） **5.2G**: ≤30dBm（FCC/RCM） **5.8G**: ≤30dBm（FCC/ISED/RCM/SRRC）; ≤14dBm（CE）
5.8G data transmission frequency band	5.725 – 5.829GHz, 5.725 – 5.850GHz Note: In some regions, frequency ranges are specified. For details, please refer to local laws and regulations.
5.8G data transmission EIRP	**5.8G**: ≤30dBm（FCC/ISED/RCM/SRRC）; ≤14dBm（CE）
Max. effective signal distance (No interference, no obstruction)	2 km
Image transmission	
Antenna	Dual antenna, 1T2R
Operating frequency	**900M:** 902 – 928MHz*

	2.4G: 2.400 – 2.476GHz**, 2.400 – 2.4835GHz**** **5.2G:** 5.15 – 5.25GHz*** **5.8G:** 5.725 - 5.829GHz**, 5.725 - 5.850GHz**** *Only applicable for FCC and ISED regions **Only applicable for SRRC region ***Only applicable for FCC and RCM regions ***Only applicable for FCC, ISED, CE and RCM regions Note: Some frequencies are only available in some regions or in door. For details, please refer to local laws and regulations.
EIRP	**900M：** ≤30dBm（FCC/ISED） **2.4G：** ≤20dBm（SRRC/CE）； ≤30dBm（FCC/ISED/RCM） **5.2G：** ≤30dBm（FCC/RCM） **5.8G：** ≤30dBm（SRRC/FCC/ISED/RCM);≤14dBm（CE）
Max. effective signal distance (No interference, no obstruction)	FCC:10 km CE:5 km
Screen	
Type	TFT LCD
Size	9.7 inches

Max. brightness	1000 nits
Resolution	2048×1536
Refresh rate	60Hz
Touch	Support 10-point touch
battery	
Battery type	Li-Po 3S
Rated capacity	8200mAh
Nominal voltage	11.4V
Battery energy	93Wh
Charging time	Approx. 120 min
Hot swap	Not support

A.4 Base Station

Basic spec	
Size	193×177×73 mm (only main body)
Weight	1275 g
Endurance	> 7.5 h

Operating temperature	-20℃~+50℃
Storage temperature	+15℃~+25℃ (in 1 year) 0℃~+30℃ (in 3 months) -20℃~+35℃ (in 1 month)
Ingress protection rate	IP64
Positioning performance	
GNSS receiver	GPS:L1, L2 BeiDou: B1I GLONASS: G1, G2 Galileo:E1, E5b
Positioning accuracy	Single point: Horizontal: 1.5 m (RMS) Vertical: 3.0 m (RMS) RTK: Horizontal: 1cm+1ppm (RMS) vertical: 1.5cm+ 1ppm (RMS)
Positioning update rate	1Hz, 2 Hz, 5 Hz, 10 Hz and 20Hz
Cold start	< 40 s
Hot start	< 10 s
Recapture	< 1 s
Initialization reliability	> 99.9%

Differential data transmission format	RTCM 2.X/3.X
Image transmission	
Antenna	Dual antenna, 2T2R
Operating frequency	**900M:** 902 - 928MHz* **2.4G:** 2.400 – 2.476GHz**, 2.400 – 2.4835GHz**** **5.2G:** 5.15 – 5.25GHz*** **5.8G:** 5.725 - 5.829GHz**, 5.725 - 5.850GHz*** *Only applies to FCC and ISED regions ** Only applies to SRRC region *** Only applies to FCC and RCM regions **** Only applies to FCC, ISED, CE and RCM regions Note: Some frequencies are only available in some regions or in door. For details, please refer to local laws and regulations.
EIRP	**900M:** ≤30dBm (FCC/ISED) **2.4G:** ≤20dBm (SRRC/CE); ≤30dBm(FCC/ISED/RCM) **5.2G:** ≤30dBm (FCC/RCM); **5.8G:** ≤30dBm (SRRC/FCC/ISED/RCM)；≤14dBm (CE)

Max. effective signal distance (No interference, no obstruction)	FCC:30 km (used with aircraft together)
Wi-Fi	
Standard	802.11a/n/ac/b/g/n
Operating frequency	**5.8G:** 5.725 - 5.829GHz*, 5.725 - 5.850GHz** *Only applied to SRRC regions **Only applied to FCC, ISED, CE and RCM regions Note: In some regions, frequency ranges are specified. For details, please refer to local laws and regulations.
EIRP	**5.8G:** ≤30dBm（SRRC/FCC/ISED/RCM）； ≤14dBm（CE）
Max. effective signal distance (No interference, no obstruction)	FCC:200 m (used with RC together) *The erection height is 2 meters from the antenna to the end of the tripod. The height difference between the ground control station and the ground control station is within 10 meters. The height of ground control station is 1.2 meters from the ground.
Indicator	
Steady green light	60%≤Electric quantity
Steady yellow light	30%≤Electric quantity < 60%
Steady red light	10%≤Electric quantity < 30%
Red light flashing	Electric quantity < 10%

Battery	
Battery type	Li-Po 3S
Rated capacity	4950mAh
Nominal voltage	11.55V
Energy	57.1Wh
Charging time	90 min
Charging temperature	+5℃~+45℃
Hot swap	Not support

A.5 Smart Battery

Smart Battery DF6_12000_2310	
Operating temperature	-20℃~+40℃
Battery type	LiPo 6S
Rated capacity	12000mAh
Energy	277.2Wh
Nominal voltage	23.1V
Limited charge voltage	26.4V

Rated charging power	180W
Max. charging power	316W
Weight	1.3 kg
Charging temperature	+5℃~+45℃* (When the battery temperature is lower than 5 ℃, charging will stop and start self-heating. When the battery temperature is higher than 45℃, charging will stop)
Battery storage	
Ideal storage environment	+22℃~+28℃, 65±20%RH
Storage temperature	-20℃~+35℃
DF- Dual Charger	
Power input	100-240V~ 50/60Hz, 4.0A
Power output	26.4V⎓7.0A
Output power	184.8W Max

Appendix B EU Declaration of Conformity

Product: Dragonfish Standard

Model Number: DF-S

Class: C3

Batch: XXXXXXXX (8-digit number)

Manufacturer's Name: *Autel Robotics Co., Ltd.*

Manufacturer's Address: *601,701,801,901, Block B1, Nanshan iPark, No. 1001 Xueyuan Avenue, Nanshan District, Shenzhen, Guangdong, 518055, China*

We, *Autel Robotics Co., Ltd.*, declare under our sole responsibility that the above referenced product is in conformity with the applicable requirements of the following directives:

RED Directive: 2014/53/EU

RoHS Recast Directive: 2011/65/EU

UAS Delegated Regulation: 2019/945/EU 2020/1058/EU

Machinery Directive: Annex I 2006/42/CE

Conformity with these directives has been assessed for this product by demonstrating compliance to the following harmonized standards and/or regulations:

Safety	EN IEC 62368-1:2014+A11:2020 IEC 62368-1:2014 (Second Edition)
EMC	ETSI EN 301 489-1 V2.2.3 (2019-11) ETSI EN 301 489-3 V2.3.2 (2023-01) ETSI EN 301 489-17 V3.2.4 (2020-09) ETSI EN 301 489-19 V2.2.1 (2022-09) EN 55032:2015+A1:2020 EN 55035:2017+A11:2020 EN IEC 61000-3-2:2019 EN 61000-3-3:2013+A1:2019
Radio	ETSI EN 300 328 V2.2.2 (2019-07) ETSI EN 300 440 V2.2.1 (2018-07)

	ETSI EN 303 413 V1.2.1 (2021-04)
Health	EN IEC 62311:2020
RoHS	2011/65/EU
UAS Delegated Regulation	prEN 4709-001: 03.2023 with D5 WG8 EN 4709-002: 02.2023 with Edition P 1, February 2023 prEN 4709-003: 02.2023 with Edition P 1, February 2023 prEN 4709-004: 02.2023 with Edition P 1, February 2023
Machinery Directive	EN ISO 12100

The notified body, LGAI Technological Center S.A./Applus, notified body number: 0370,, performed the EU-type examination in according with Part III, Module B of Council Directive 2014/53/EU, and issued the EU-type examination certificate: 0370-RED-4848.

The notified body, CerTrust Inspection and Certification Limited, notified body number: 2806, performed the EU-type examination in according with Part 8, Module B of Regulation (EU) 2019/945, and issued the EU-type examination certificate: UB 009040 001.

Signed for and on behalf of: *Autel Robotics Co., Ltd.*

Place: Shenzhen, China Date: 2024-05-14

Name: Cheng Zhuanpeng Position: Legal Representative

Signature: Cheng Zhuanpeng

Appendix I

Product Mix. Description	Model	SW Version	Description	Serial Number
Dragonfish Standard	DF-S	V12.03.11	Quadcopter equipped with a Gimbal camera (DG-Z2, DG-T3, DG-T3H and DG-L20T are optional)	1748XXXXXXXXXXXXXXX /1748XXXXXXXXXXXXX

Dragonfish Base Station	DFMS-2	/	Drone Base Station	SDXXXXXXXXXX
Dragonfish Ground Control Station	DFRC-2	V10.3.3.18	Drone Remote Controller	TH9XXXXXXXXX
Battery	DF6_12000_2310	/	Drone Battery	1748CBXXXXXXXXXXX
Adapter	DF_CHARGER	/	Drone Adapter	/

*Note: Updated software will be released by manufacturer to fix bugs and improve the performance after the product placed on the market. All updated versions released by the manufacturer have been verified to be complied with the applicable regulations. All RF parameters (e.g., RF power, frequency) are not accessible to end users and cannot be changed by any third parties. Conformity of the product with EU requirements is ensured by evaluating the GNSS signals. The radio parameters are automatically set according to the detected region, the user does not have the capability to change these settings.

Appendix C EU Drone Pilot Information Notice

The following information is from EASA official website. During flight, please meet the relevant operation limitations as below.

EASA
European Union Aviation Safety Agency

3

This drone is an aircraft.
Aviation law applies.

As a drone pilot, you are responsible for flying your drone safely.

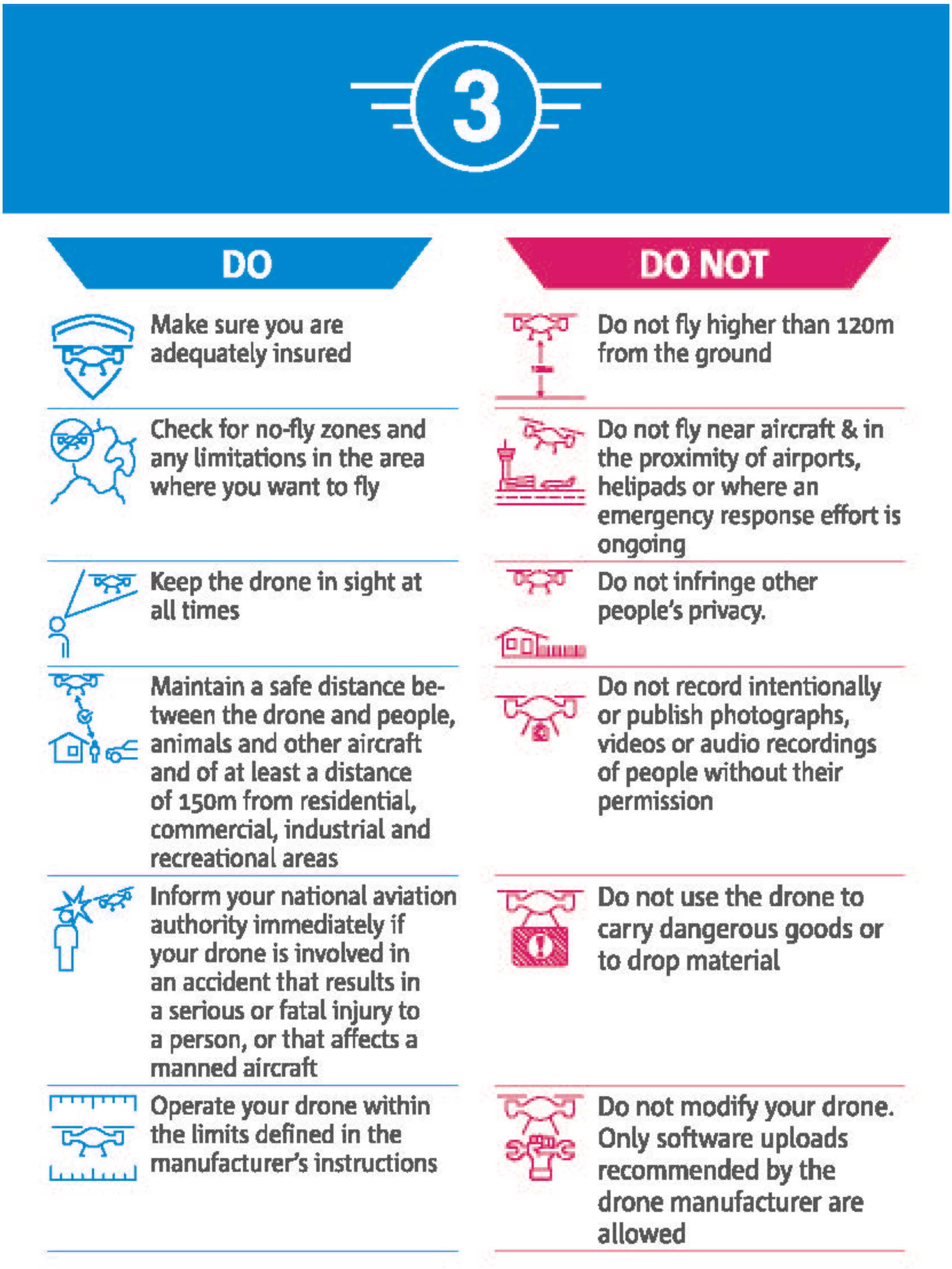
Before flying, as a drone pilot, you must

- make sure the drone owner is registered at his or her national authority (unless already registered)
- make sure the owner registration number is displayed on the drone and uploaded onto the remote identification system
- read and follow the manufacturer's instructions
- complete the mandatory online training and pass the test

Check how to register, train and where you are allowed to fly:

www.easa.europa.eu/drones/NAA

!
Offences are punishable by law.



For this document about EASA Class 3 in other languages, click the following link to download: **https://www.easa.europa.eu/en/document-library/general-publications/drones-information-notices**