

R5

PASSIVE DETECTION SYSTEM



User Manual

V1.0

Reading Tips

This manual applies to the UAV radio detection equipment developed and produced by the company. The manual provides comprehensive specifications, functional design, structure and specification requirements of the system, as well as installation, deployment, and operational requirements, serving as an operational guide for end users.

Symbol Legend

	Supplementary Notes: Additional explanations and annotations to the main text of the manual.
	Safety Notices: Important operational warnings and risk prevention guidelines for users.
	DANGER: Indicates imminent hazards which, if not avoided, will result in death or serious injury and major property damage.

Manual Usage Recommendations

1. Before using the product, please read this manual thoroughly. Retain this manual for future reference to address any operational inquiries.
2. All photographs, graphics, charts, and illustrations in this manual are for explanatory purposes only and may differ from the actual product. Refer to the physical product for exact specifications. The company reserves the right to update this manual due to product version upgrades or other requirements, with the latest electronic version to be distributed to users.
3. The company recommends using this manual under the guidance of qualified personnel.

Safety Notice

Before using the product, please carefully read the following precautions and operate the product correctly as required.

Installation Precautions

Environmental Requirements

Do not install or store the product in any of the following locations:

- Extreme environments: places where temperatures exceed the range of the device operating temperature or where frost may form.
- Near strong electromagnetic interference sources or equipment with large current fluctuations.
- Areas with flammable, explosive, corrosive gases or dust.
- Damp or water-exposed areas. Liquid ingress may cause electric shock or fire hazards.

Operational Guidelines

- Only qualified personnel or designated maintenance staff may open the chassis.
- All antennas must be fully connected and tightened according to the labels. Powering on the device without antennas installed is strictly prohibited.

Usage Precautions

Power and Electrical Safety

- Use only the specified AC 110 V–220 V power supply.
- Do not pull or bend the power cord. Avoid crushing or twisting it, and stop using it if damaged.
- Do not operate the equipment during thunderstorms. Avoid touching power lines or device connectors during lightning to prevent electric shock.

- Always unplug the power cord before moving the device.
- Do not touch the power plug with wet hands.
- When unplugging the power cord, hold the plug body firmly.

Operational Risk Warnings

- If abnormal conditions such as smoke, unusual noises, or burning smells occur, shut off power immediately and contact our after-sales service department.
- Do not install any software unrelated to the software platform; system issues caused by such software are not covered under warranty.
- Do not connect unauthorized USB drives or external hard drives to avoid malware infection. Do not delete server files arbitrarily, change the system time, or shut down or restart the server without authorization.
- Unauthorized personnel are prohibited from disassembling the device to avoid damaging internal components or compromising your rights. If the device malfunctions during use, contact our after-sales service department.

Regulatory Compliance

- This device may cause radio interference during operation. Users must take feasible measures to mitigate such interference.
- If suspected interference occurs with civil-aviation or military frequencies, stop using the device immediately, investigate the cause, and report the incident.

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1 Product Introduction

The R5 is a stationary drone Remote ID reception device designed to receive, decode, and monitor broadcast remote identification information from drones in real time. By capturing RID messages, it extracts critical data such as the drone's serial number, brand and model, latitude and longitude, altitude, speed, and the pilot's (remote controller's) position coordinates. This enables precise positioning and trajectory tracking of both the drone and its pilot. Equipped with a built-in multi-array high-gain receiving antenna, it is suitable for multi-scenario low-altitude protection in urban, suburban, and remote areas.

1.1 Main Functions

Passive Detection

Passively receives only and does not emit any electromagnetic signals.

Compliance Standards

Supports major standards: Chinese GB 42590-2023, U.S. ASTM F3411-22a, and European ASD-STAN PrEN4709-002.

Target Identification

Displays real-time flight trajectories, generates electronic fences, and can integrate with jamming devices for jamming countermeasure.

Network Coordination

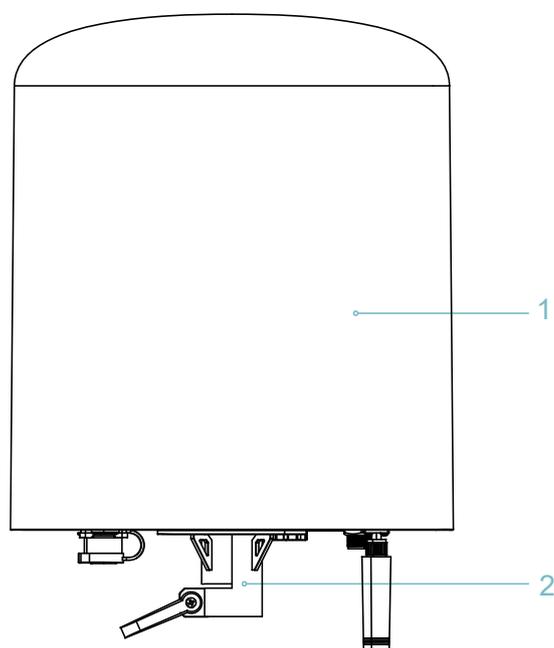
Allows large-scale deployment within designated areas to meet monitoring and protection needs across wide regions.

Unattended Function

Capable of automatic 24/7 detection and identification of drone intrusions.

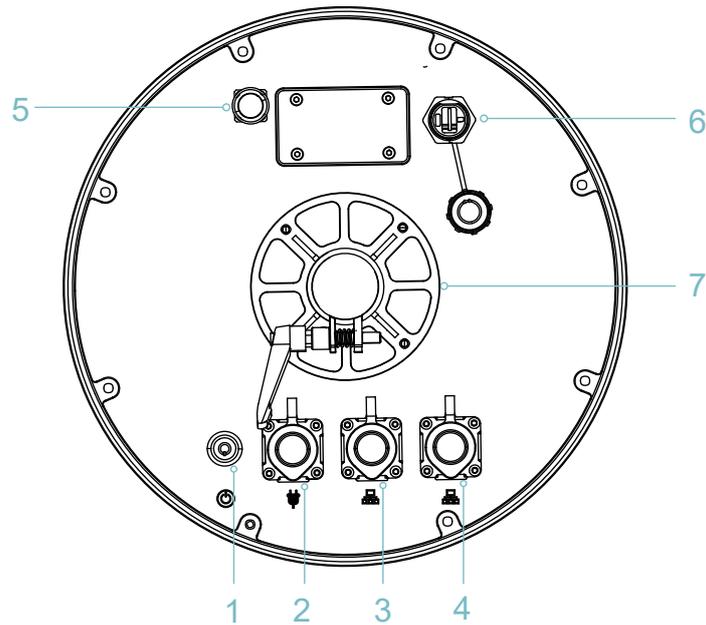
1.2 Product Appearance

The equipment appearance is shown as follows:



- | | |
|----------------------------|--|
| 1. Main unit: | Fiberglass protective housing, with built-in detection module and array antenna. |
| 2. Fixed Mounting Bracket: | Specification: $\text{Ø}35.5\text{mm}$ (Recommended mounting pipe diameter: between $\text{Ø}34.5\text{mm}$ and $\text{Ø}35\text{mm}$). |

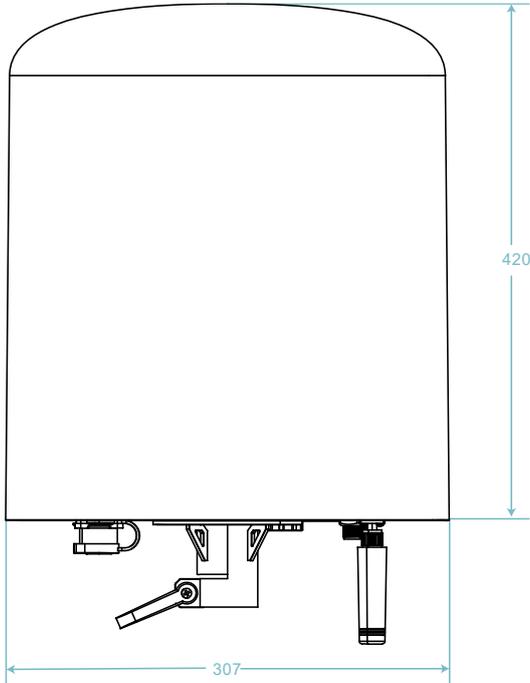
1.3 Ports and Connectors



Position	Description	Identification	Connector Type
1	Power On/Off button		—
2	Power connector		AC220V aviation power connector
3	Ethernet port 1		RJ45
4	Ethernet port 2		RJ45
5	4G receiving antenna port	—	N-type
6	SIM card slot	—	nano-SIM
7	Device base & Fixed mounting bracket	—	—

1.4 Mechanical Characteristics

Item	Specification
Size	
Diameter	307mm
Height	420mm
Weight	
Weight	6kg



2 Equipment Deployment Preparation

Choose a wide-view area to erect the device. First check the specifications and quantity of all parts and standard parts according to the equipment list, and then assemble them step by step according to the following installation steps.

2.1 Site Selection

The equipment is typically deployed outdoors. A comprehensive site survey must be conducted prior to installation and deployment. Site the equipment should pay attention to the following factors:

Visibility environment:	Choose a flat, open highland or building rooftop, ensuring a 360° unobstructed view for the antenna placement.
Electromagnetic environment:	Avoid electromagnetic interference zones such as microwave stations, radio transmission towers, and high-voltage power line crossings, as well as areas near glass curtain wall clusters and large metal structures (e.g., bridges, transmission towers).
Natural environment:	<ul style="list-style-type: none">● Avoid the wind to reduce the equipment antenna wind load.● When deploying in thunderstorm-prone areas, avoid locations susceptible to water accumulation and lightning strikes. Install a lightning rod for protection; its height must exceed the overall equipment height by at least 50 cm.
Electrical Environment:	Avoid areas near electrified railways, base stations, or any other sources prone to signal interference.
Infrastructure:	Ensure the site has mains power access and supports connection to public or dedicated communication networks.
Additional Requirements:	The deployment site must be legally designated for construction. The building structure or mounting bracket must have sufficient load-bearing capacity to meet the equipment's weight requirements.

2.2 Delivery Checklist

Check the specifications and quantity of all parts and standard parts according to the equipment delivery list.

Part	Quantity	Description
Main Unit	1	Used for real-time reception, decoding, and monitoring of drone broadcast remote identification information.
Waterproof Power Cable	1	Connects the device to a power supply.
Waterproof Ethernet Cable	2	Connects the main unit to the control terminal.
Packaging Box	1	Used for transportation of the device.

3 Deploy the Equipment

Before assembling the equipment, check all spare parts, standard parts specifications, quantity according to the equipment packing list. Read and understand this User Manual and other supporting information.

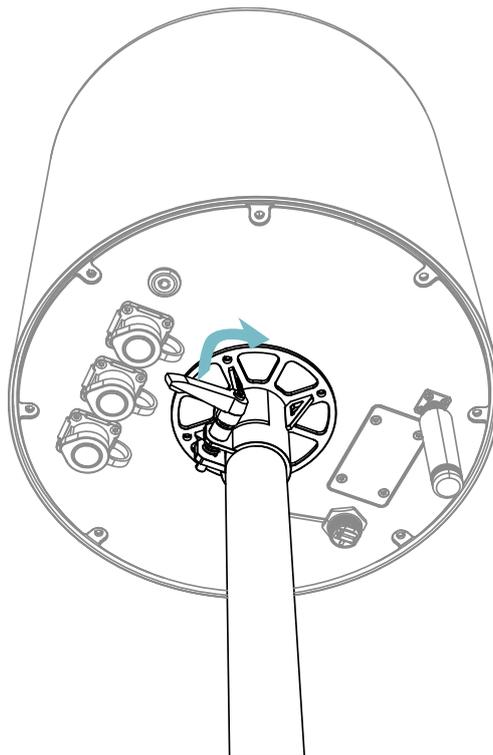
3.1 Deploy the Equipment

The single set of equipment adopts integrated design, requiring no manual assembly and can be directly deployed for use.

1. Secure the device base to the steel pipe tripod mount by rotating the hex nuts.



The 35mm outer diameter steel pipe or tripod mount is required.



3.2 Connect to the Network

Connecting to Wired Network

1. Use an Ethernet cable to connect the device's RJ45 ethernet port to the control terminal's network port.

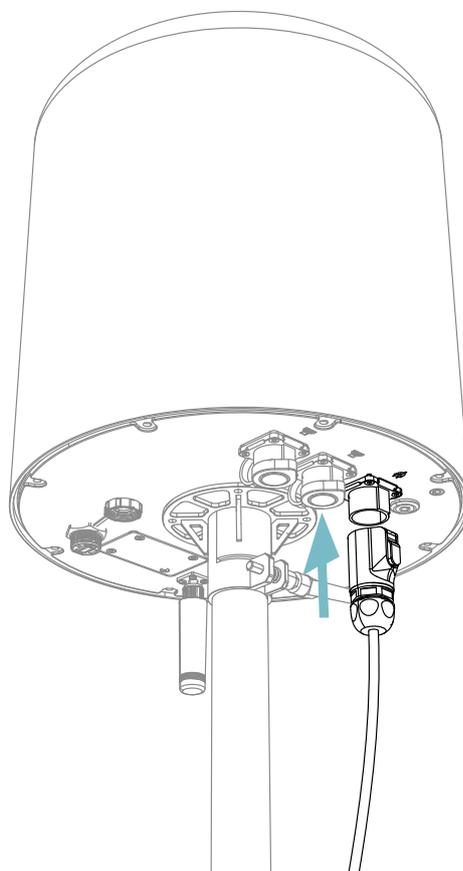
Connecting to 4G Network

1. Connect the 4G receiving antenna to the corresponding antenna port.
2. Insert a nano-SIM card into the SIM card slot.

3.3 Connect Power Supply

The device can be connected to 110V-220V AC power via power cable using either fixed power supply or UPS.

1. Connect the input end of the power cable to the fixed power supply and insert the output end into the device's power connector. The power connector features a snap-fit design, apply steady pressure until you hear an audible click, confirming a secure connection.



4 Drone Defense Software Platform

Drone defense software platform, which integrates situational awareness, information display, decision-making assistance, command and control. It supports browser access and control of other devices on the LAN, and supports multi-screen and multi-device monitoring.

4.1 Log in to the System

Configure the Network

Before logging into the system, it is necessary to configure the network settings of the drone defense software platform. The IP address should be set within the 192.168.100.x subnet, which is the same subnet as the default access IP of the system: 192.168.100.100.

1. Configure the IP subnet to 192.168.100.x according to the system platform, e.g., Windows, Linux, or macOS.



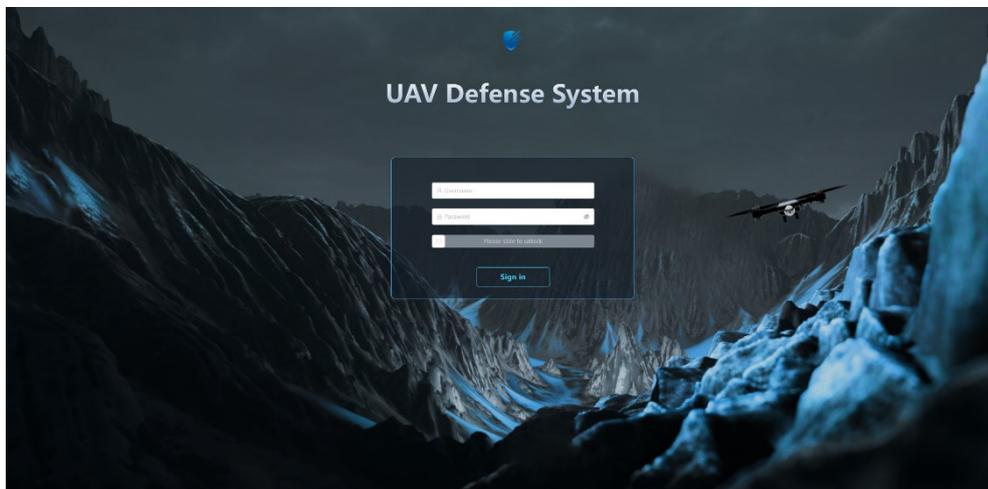
Avoid setting the IP subnet to 192.168.100.100 to prevent an IP conflict.

Log in to the System

1. Open a browser and enter the device's IP address <https://192.168.100.100> to access the login page.



Google Chrome is recommended for use.

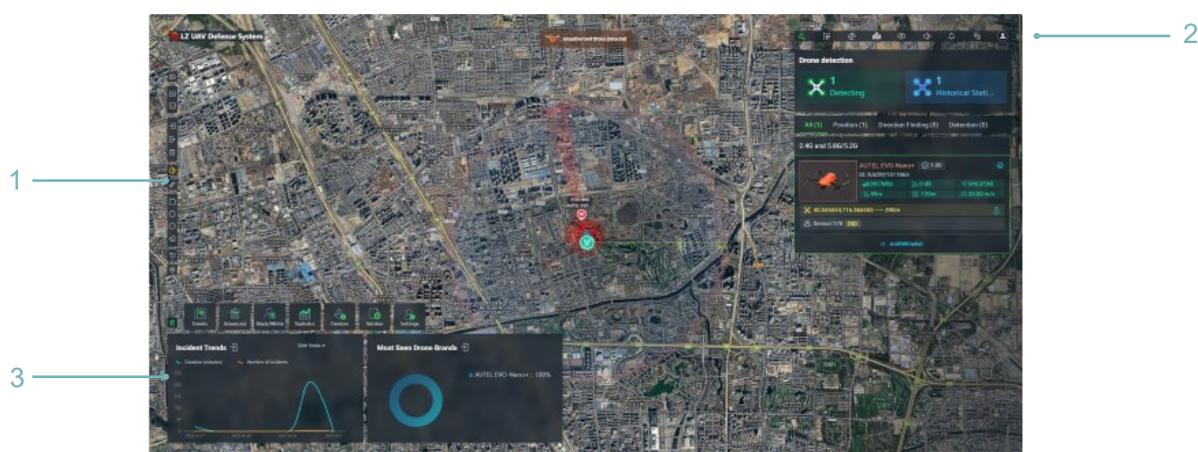


- Enter the system account and password, drag the verification slider to verify, and then click the “Sign in” to enter the main interface of the system.

Account:	admin
Password:	lzno1

4.2 Main Interface

The main interface is distributed in three functional areas.



- Operation menu area
- Information display area
- Function display area

Operation Menu Area

The operation menu area includes options such as map mode switch and defense-zone settings.



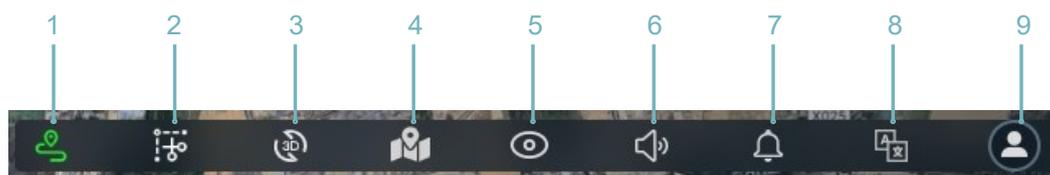
1 Map mode switch	Switch between Google satellite and Google vector.
2 Zoom In	Zoom In the map.
3 Zoom Out	Zoom Out the map.
4 Import map	<p>Import offline map files into the system. When the network disconnected, it will automatically switch to the loaded offline maps.</p> <div data-bbox="558 1478 1420 1624" style="background-color: #f0f0f0; padding: 5px;">  <p>The offline map file must be named and formatted as mapTiles.db.</p> </div>
5 Export map	Export the offline map files that have been imported into the system. View the exported map files in the browser's download list.
6 Clear offline map files	Delete the imported offline map files.
7 Set center point	Sets the center point coordinates for networking. Not applicable for single-device operation.

8 Measuring distance	Measure the distance and angle between two points on the map, allowing for the measurement of distances and angles between multiple endpoint positions and a starting point.
9 Draw defense zone or warning zone	<p>Set Defense Zone/Warning Zone on the Map.</p> <p>Defense Zone: Once set, the defense zone appears as a red inner circle. If a drone enters this zone, it will be highlighted in orange, and audible/visual alarms will activate.</p> <p>Warning Zone: Once set, the warning zone appears as a blue inner circle. If a drone enters this zone, it will be highlighted in orange, and audible/visual alarms will activate. Unauthorized drones entering the warning zone will trigger continuous alerts while their position and flight path are monitored.</p> <div data-bbox="560 824 1417 965" style="border: 1px solid #ccc; padding: 5px; background-color: #f9f9f9;">  The minimum allowable area for drawing defense/warning zones is 100 square meters. </div>
10 Eraser Defense Zone	Delete the defense zone or warning zone drawn on the map.
11 Locate the air defense zone	If the device moves too far and loses the defense/warning zone, perform rapid repositioning.
12 Return to center	Return to the center point.

Information Display Area

The information display area includes options such as hiding/displaying the menu bar of the main interface, volume, notification switch, language switch, system logon/logoff and other operations.

In addition, this area is mainly responsible for the real-time detection information display and control functions of drones, which can display the number of current detection and historical detection drones, as well as the detailed information of currently detected drones.



- | | |
|------------------------|------------------------------|
| 1 Show/Hide trajectory | Hide or show the trajectory. |
|------------------------|------------------------------|

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2	Display/Hide Past Flight Trails / Drone Trace Cut Off	Display of hide past flight trails.
3	3D Map	Switch between 3D map view and 2D map view.
4	Historical Drones Detection Setting	Display the historical drone-detection locations on the map and marked with yellow. The date range can be configured by start time and end time.
5	Hide/Show panel	Hide or show the detection area, function area, and map area of the interface.
6	Sound settings	Adjust the alarm volume.
7	Notifications	Display device status notifications.
8	Change language	Change system language.
9	Account login	Account login/logout.



1 Currently Detected Drones

2 Cumulative number of drones detected

3 Drone Current Status Displays detected drone information including reference distance and position

- 4 Drone/Pilot Location Click to navigate to current drone/pilot position
- 5 AddWhitelist Click to add the selected drone to the whitelist; whitelisted drones entering the defense zone will not trigger alerts

Function Display Area

The function display area includes options such as checking the events, checking the whitelist, checking the statistic, checking the device status and other operations.

Click the button  to expand the function display area menu. Click the same button again to hide the menu.



1 Events The Drone Events list shows drone details such as type, ID, detection time, duration, and frequency. It supports sorting, time-based expansion, history replay, export drone events, clear drone events on the main screen.

2 Advanced Includes the unknown WiFi detection, General Detectors, Custom Models modules.

3 Black/White Drones added to the blacklist will be flagged with an alert once they enter the defense zone. Drones on the whitelist will not trigger any alarm when they enter defense zone.



Whitelist/blacklist exports are saved in UTF-8 format. View the exported files in the browser's Downloads list.

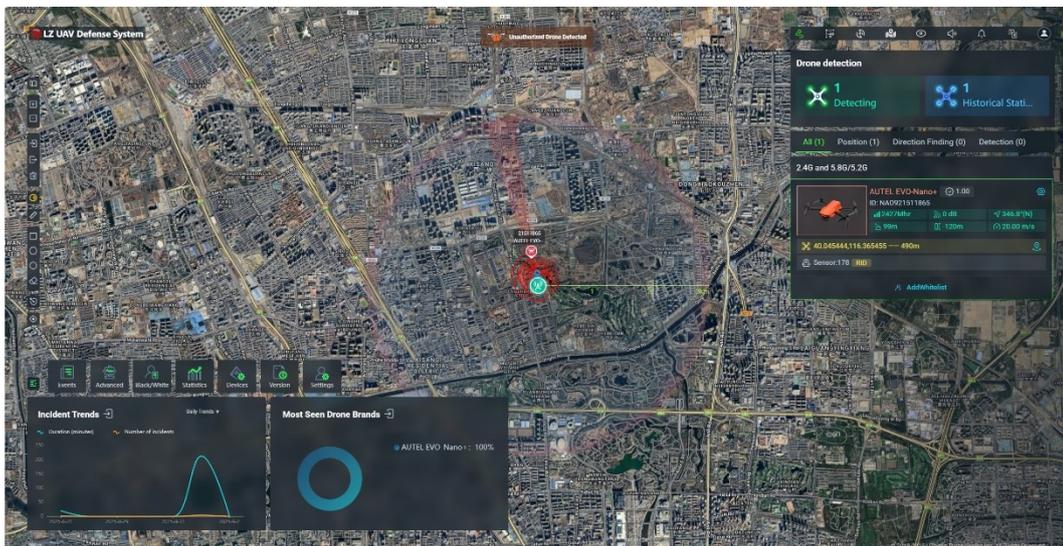
4 Statistics The Drone Statistical Report includes Incidents/Drones, Most Seen Drone Brands, Common UAV, Incident Trends and Critical Incidents. It supports date range configured by start time and end time, and export PDF of the statistics.

<p>5 Devices</p>	<p>The device management window displays the operational status information.</p> <ul style="list-style-type: none"> ● Controller: Display the information such as operation status, and detection bands. ● Sensors: Display the information such as operation status, detection bands, and version of the two sensors.
<p>6 Version</p>	<p>Display the version information of UI version, cm, sensor.</p>
<p>7 Settings</p>	<p>Modify passwords and do user management, such as add, edit and delete.</p>
<p>8 Function display area</p>	<p>The functional display area primarily shows the Spectrum, Incident Trends, and Most Seen Drone Brands. The spectrum feature visualizes signals currently detected by the device as a spectrum.</p>

4.3 Check Detection Information

When a drone is detected, the system triggers an automatic alarm.

1. View the detected drone model information on the main interface, while an intrusion alert message pops up at the top of the screen.



2. In Information Display Area, it displays the position and direction of the drone. Additionally, the drone model, electronic ID and approximate location information are marked on the electronic map in the main interface.



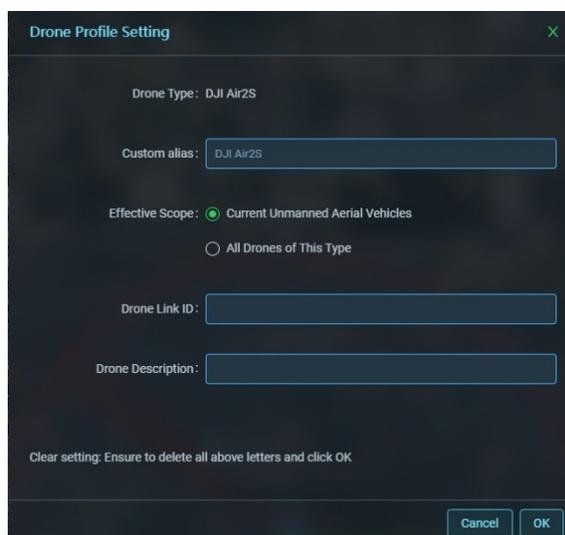
Add to/Delete from Whitelist

Drones added to the whitelist will not trigger any alarm when they entering the defense zone.

1. Select a drone.
 - a) Click **AddWhitelist** button to add the drone to whitelist.
 - b) Click **DeleteWhitelist** button to delete the drone from whitelist.

Set Drone Profile

1. Select a drone. Click  button and select **Profile**.
2. On the Drone Profile Setting page, configure the Custom alias, Effective scope, Drone Link ID, and Drone Description.



4.4 Check the Events

1. In Function Display area, click **Events**, view the drone events.



This feature allows one-click expand/collapse of the “Incident Trends” panel on the main interface.

Drone Type	Signature	Signal Times	Detection Start	Duration (ms)	Frequency	First Position	Last Position	RMS position	Confidence Level	Seen Success	Operation
RADOLAN-ATIS	120992750	25	2025-08-21 17:31:47	01.56	2423 MHz				100	1	
ARKFLIGHT Ground	02000019	63	2025-08-21 13:11:52	01.00	104.1 MHz				100	1	
1187M Mode	2304262424	4	2024-08-21 14:31:45	07.2876	3433 MHz				90	1	
RADOLAN-TER 881	076403147	23	2025-08-21 13:48:35	02.21	2447 MHz				90	1	
FM Video	80942	13	2025-08-21 11:08:58	17.41	0855 MHz				69	1	
FLYSKY 126	124881987	26	2025-08-20 14:31:21	02.46	2427 MHz				100	1	
SHUREX 01	1762381284	100	2024-08-20 01:08:30	08.58	3441 MHz				40	1	
RADOLAN-TPB	222208884	77	2025-08-19 14:48:35	08.44	2447 MHz				100	1	
FM Video	80942	26	2025-08-19 11:18:05	02.92	0794 MHz				73	1	
FLYSKY 126	124881987	30	2024-08-19 08:38:16	01.88	2423 MHz				100	1	

2. Click **Export Drone Events** button to export drone events.

4.5 Mark Danger WiFi Drones

The device can display the drone-like WiFi signals detected in the current environment and allow users to mark them.

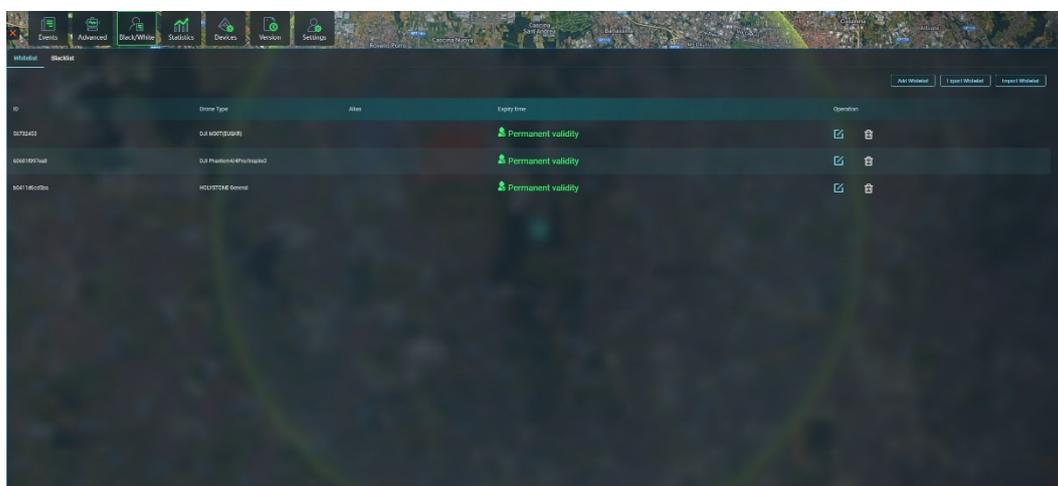
1. In Function Display area, click **Advanced**.
2. Select Unknown WiFi panel to enter the WiFi list.

Active	SSID	MAC Index	Reliability	Danger	Safe
Inactive					
Unknown WiFi					
	752214	7		●	●
	746402	0		●	●
	774608	0		●	●
	4d356d	23		●	●
@Bj@Bnc	6c731c	19		●	●
	748702	0		●	●
	748800	0		●	●
	5c3547	99		●	●
Edongbao7	5c3547	28		●	●
Edongbao7	5c3548	0		●	●
Edongbao7	5c3548	18		●	●
	4d356d	4		●	●
Edongbao7	4d356c	64		●	●

3. Mark the WiFi signal.
 - a) Users may mark an identified non-drone WiFi signal (e.g., a common wireless hotspot) as “Safe.” Once marked, the system will ignore this signal and not trigger alarms.
 - b) If a WiFi signal is confirmed to originate from a drone, users can mark it as “Danger”. After marking, the system will trigger an alarm whenever this signal is detected.

4.6 Manage the Whitelist/Blacklist

Drones added to the blacklist will trigger visual alerts when entering the defense zone, while whitelisted drones will not trigger any alarm when they appear.



Export Whitelist/Blacklist

1. In Function Display area, click **Black/White**.
2. Click **Export Whitelist/Blacklist** button to export whitelist or blacklist.



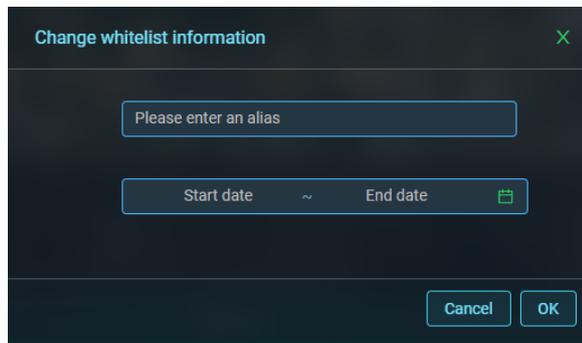
Export format is UTF-8. View exported lists in the browser's download list.

Add Whitelist/Blacklist

1. In Function Display area, click **Black/White**.
2. Click **Add Whitelist/Add Blacklist** button, enter the ID, Drone Type, Alias, set Effective time, then click  to add.

Update Whitelist/Blacklist

1. In Function Display area, click **Black/White**.
2. Select a list formation to be updated, click  button, update information.
 - a) For whitelist, update alias, and effective time range.



- b) For blacklist, update alias.

Delete Whitelist/Blacklist

1. In Function Display area, click **Black/White**.
2. Select a whitelist or blacklist to be deleted, click  button and information will be deleted directly.

4.7 Check the Statistic Report

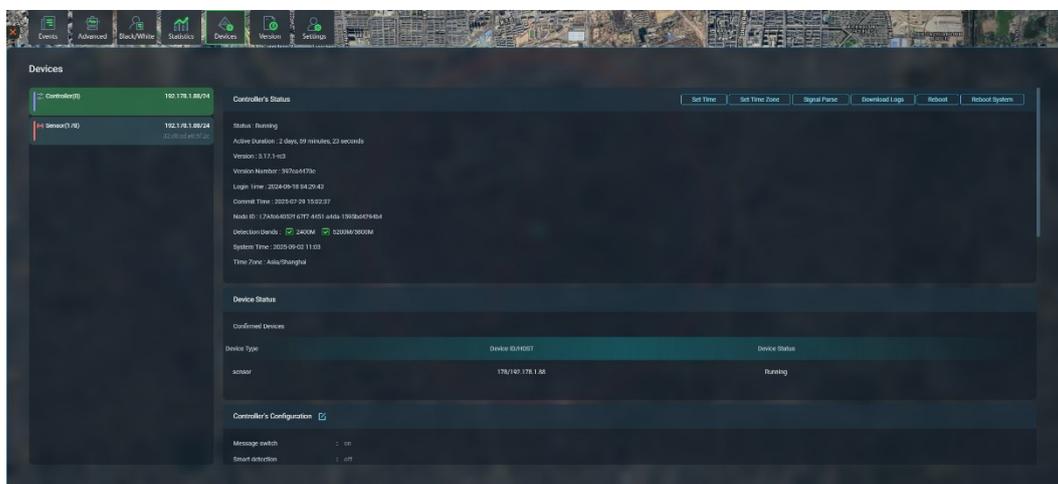
1. In Function Display area, click **Statistics**. View the drone event statistics report.



2. Click **Export PDF**, set the time range and export the statistical report in PDF format.

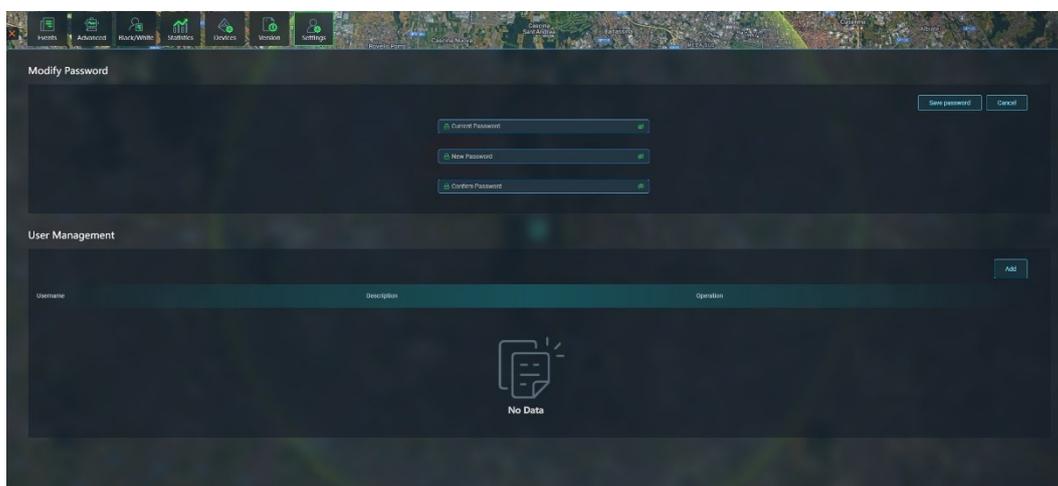
4.8 Check the Device Status

1. In Function Display area, click **Devices**. View the information of Controller, Engine, Sensors and Defender.



4.9 Change Password

1. In Function Display area, click **Settings**.



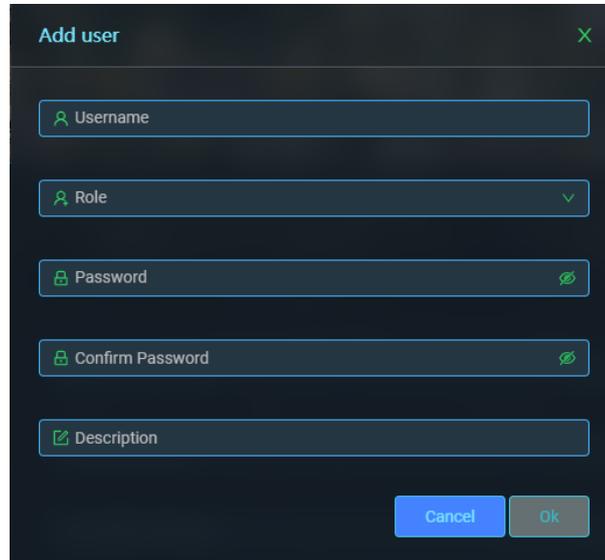
2. Enter the current password and the new password, then click **Save Password** button to set the new password.

4.10 Manage Users

This functionality is restricted to Admin accounts for user management. Normal accounts do not have these permissions.

Add Users

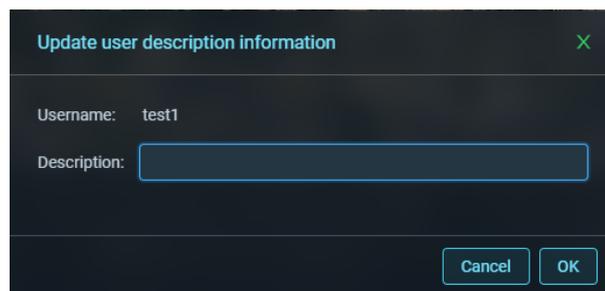
1. In Function Display area, click **Settings**.
2. Click **Add** button, enter the new user's username, role, password, and description information, then click "OK" to add the new user.



The screenshot shows a dark-themed dialog box titled "Add user" with a close button (X) in the top right corner. It contains five input fields: "Username" (with a person icon), "Role" (with a person icon and a dropdown arrow), "Password" (with a lock icon and an eye icon), "Confirm Password" (with a lock icon and an eye icon), and "Description" (with a checkmark icon). At the bottom right, there are two buttons: "Cancel" and "OK".

Update User Description Information

1. In Function Display area, click **Settings**.
2. Select a user to be updated, click **Update** button, update the user's description information.



The screenshot shows a dark-themed dialog box titled "Update user description information" with a close button (X) in the top right corner. It displays "Username: test1" and a "Description:" label followed by a text input field. At the bottom right, there are two buttons: "Cancel" and "OK".

Delete User

1. In Function Display area, click **Settings**.
2. Select a user to be deleted, click **Delete** button, click **Confirm** to delete the user.

5 Equipment Maintenance

To ensure stable operation of the equipment, please comply with the following maintenance specifications.

5.1 Routine Maintenance

Maintenance Type	Maintenance Method
Interface protection	Seal unused interfaces with protective covers.
Cable maintenance	<ul style="list-style-type: none"> ● Do not replace antennas without authorization after deployment. ● Ensure cables and interfaces are fully engaged and securely locked. ● Immediately replace any feeder/power/Ethernet cables with damaged jackets or exposed wires. ● Ensure plug pins are not bent or damaged.
Power inspection	Verify that the device is powered normally.

5.2 Basic Troubleshooting

Fault Type	Troubleshooting Method
Power-related fault	<ul style="list-style-type: none"> ● Restart the power switch, boot the server, and launch the related services. ● Power off the device, wait for 30 seconds, and then restart it.
Network disconnection	<ul style="list-style-type: none"> ● Use the <i>ping</i> command to test connectivity between the device and the server. ● Unplug and reconnect the network cable, then verify that the port indicator light is on and stable.
System Process	Log in to the "Device" interface to check the process status of the

Exception	controller, engine, and sensors.
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If the issue persists, contact our technical support team.



Unauthorized personnel or non-designated maintenance personnel are prohibited from disassembling the chassis.

6 Packaging, Transportation and Storage

The equipment shall comply with the following requirements for packaging, transportation, and storage:

6.1 Packaging

The packing boxes shall be moisture-proof and shock-proof, and contain the following items:

- Delivery list
- Product Inspection Certificate
- User manual.

6.2 Transportation

In the process of transportation, avoid throwing, sun and rain, avoid mixing corrosive substances.

6.3 Storage

The storage shall meet the following requirements:

- Products should be stored in a cool, ventilated, dry warehouse.
- Do not put together with oil, away from heat sources.
- Stacking should be 20cm from the ground and 20cm from the wall.