

MR2000 Integrated Counter-UAS Command and Control (C2) Platform

User Manual V1.2

**Multi-Sensor Fusion and
Unattended Operation**

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Legal Notice

Manual Instructions

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This manual provides instructions for the installation, configuration, operation, and maintenance of the MR2000 Integrated Counter-UAS Command and Control (C2) Platform. Users are responsible for losses or damage resulting from improper use of the platform or this manual.

The screenshots in this manual are provided for reference only. Interface layouts and displayed information may vary depending on the software version and system configuration.

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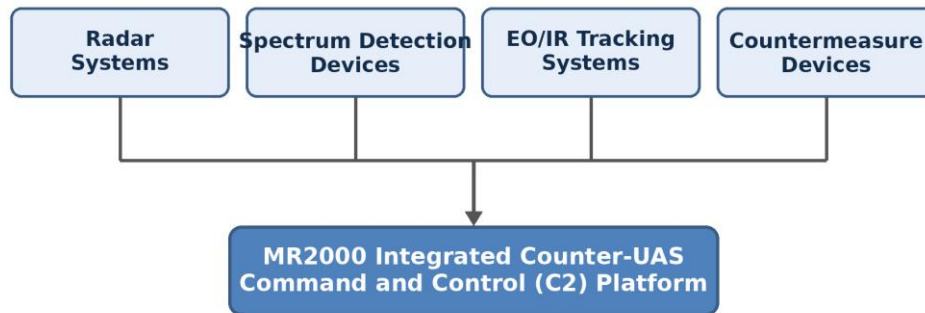
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1 Product Overview

The MR2000 Integrated Counter-UAS Command and Control (C2) Platform, hereinafter referred to as "MR2000," is a unified software platform for integrating and coordinating radar systems, spectrum detection devices, electro-optical/infrared (EO/IR) systems, and countermeasure devices. It provides centralized user and role management, device management, real-time video monitoring, target localization, alarm management, target identification and tracking, multi-source track fusion, and countermeasure device control.

By combining intelligent detection, network communication, video processing, data fusion, and visualization technologies, MR2000 supports continuous monitoring of low-altitude and unmanned aerial targets, real-time alerts, precise tracking, radar-to-EO/IR cueing, unattended operation, and coordinated target handling. The platform is designed for applications including national defense, border protection, prisons, airports, and large-scale events.

MR2000 integrates and coordinates four main functional elements: the C2 platform, detection sensors, EO/IR tracking devices, and countermeasure devices, as illustrated below.



Key platform capabilities include:

- Multi-level user management and role-based access control
- Unified management of radar, spectrum detection, EO/IR, and countermeasure devices
- Real-time video monitoring, recording, playback, and historical record retrieval
- Target detection, identification, tracking, handling, and multi-source track fusion
- Electronic map display, device positioning, and target track visualization
- Radar-to-EO/IR cueing and synchronized track and video playback
- Automatic target search, tracking, and unattended operation
- Electronic fence, alarm-zone, whitelist, and threat-level management
- Countermeasure device control and coordinated target response
- Integration of external devices through multiple communication protocols

2 Installation Instructions

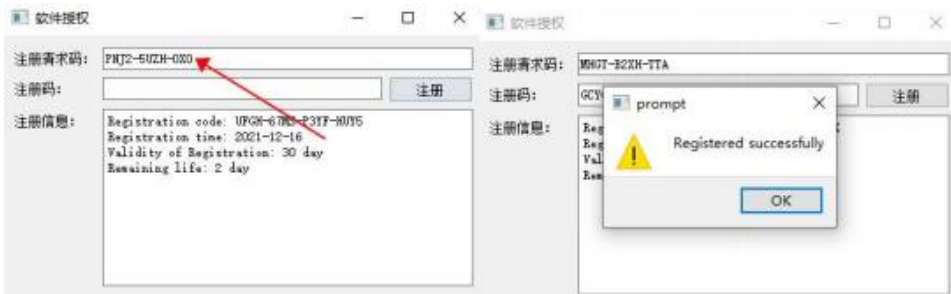
The system employs a C/S architecture, comprising three layers: the database layer, server layer, and client layer. It integrates multiple middleware components and external devices for seamless connectivity. The server layer provides account management, device monitoring, and integration services, while the client layer handles data visualization and user interface interactions.

2.1 System Requirements

Type	Requirements
Client	operating system : Microsoft Windows 10 (64-bit Chinese operating system) Windows Server 2008 R2 (64-bit Chinese operating system) CPU: Intel i5 10th Gen or later Memory: 8 GB or higher GPU: 2060 or higher

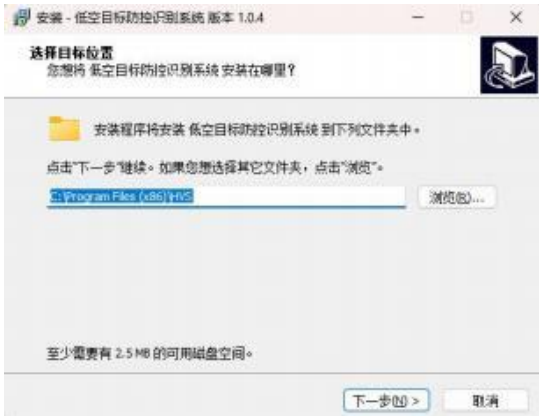
2.2 Registration

After installation, the software requires registration and authorization. Click the icon in the upper-right corner of the login screen to open the authorization interface as shown below. Send the registration request code to midradar technical support to obtain a registration code. Enter the code and click Register to see a success message. The first month of free trial is available for new installations.



2.3 Installation

1. Double-click the software installation file to open the Installation Wizard. Follow the system prompts to install the software (make sure to uninstall antivirus programs like 360 before installation).



2. The software is installed by default on the system drive. After installation, an icon will appear on the desktop.

2.4 Uninstallation

You can uninstall the software using the uninstaller or the Programs and Features section in the operating system Control Panel.

- Uninstallation Method

Double-click [uninstall.exe] in the program installation directory C:\Program Files (x86)\HVS\DF300 and follow the prompts to complete the uninstallation.

2.5 Start Services

After installation, the AIS, CMS, ECS, RGS, and MySQL services will start automatically, as shown below. If a service does not start, locate it under Services on Task Manager to initiate operation.

DevicePickerUserSvc_7...	DevicePicker_78b1d65	已停止	DevicesFlow
DevicesFlowUserSvc	DevicesFlow	已停止	DevicesFlow
DevicesFlowUserSvc_7...	8164 DevicesFlow_78b1d65	正在运行	DevicesFlow
DevQueryBroker	2308 DevQuery Background Discovery Broker	正在运行	LocalSystem...
DF300.AIS	4708 DF300.AIS	正在运行	
DF300.CMS	6668 DF300.CMS	正在运行	
DF300.ECS	6676 DF300.ECS	正在运行	
DF300.RGS	4764 DF300.RGS	正在运行	
Dhcp	2896 DHCP Client	正在运行	LocalService...
MSDTC	Distributed Transaction Coordinator	已停止	
MSISCSI	Microsoft iSCSI Initiator Service	已停止	netsvcs
msiserver	Windows Installer	已停止	
MySQL	4672 MySQL	正在运行	
NaturalAuthentication	自然身份验证	已停止	netsvcs
NcaSvc	Network Connectivity Assistant	已停止	NetSvcs
NcbService	1972 Network Connection Broker	正在运行	LocalSystem...

3 User Login and Configuration

3.1 Login

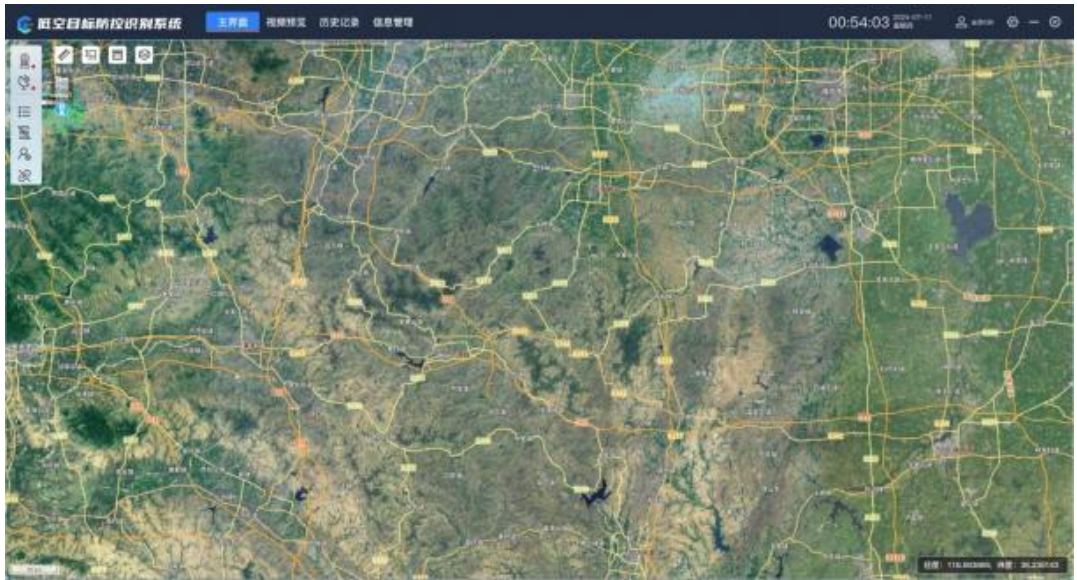
- 1. After installing the client, double-click the  client icon to enter the login interface.
- 2. Log in using the default administrator account "admin" with password "Abc.12345".
- 3. You can check the options to remember passwords and sign in automatically as needed.



- 4. After clicking Login, the login interface will appear with the login progress displayed in the bottom-right corner.

3.2 Main Interface

After initialization is complete, you will enter the main interface as shown below.



3.3 Password Change

After logging in, the default account name will appear in the top-right corner of the client  admin. Click the account name icon to change your password.



3.4 Parameter Configuration

Click the upper-right  corner of the main interface to enter the parameter configuration page. Parameters include: system basic settings, automatic zoom settings, target processing settings, unattended operation settings, recognition settings, automatic search settings, platform communication settings, and map settings.

3.4.1 Basic System Configuration

The system's basic configuration is as follows: It allows you to set common functions such as map path, video save path, radar angle display, video mode, and operating mode, as shown below:

Configuration Parameters

Parameter	Configuration Details
RTK Port	Port for receiving positioning data (optional for vehicle installation)
Operating Mode	Normal mode, Unattended mode, Automatic linkage mode, Auxiliary calibration mode.
Keyboard Port / Baud Rate	Configure the joystick keyboard port number and baud rate settings
Map Path	Configure the electronic map path on the main interface
Save Path	Configure local screenshot and video file storage paths
Automatic Login	Auto-login activation/deactivation settings after client launch
Angle Display	Video window overlay switch for displaying photoelectric azimuth angle
Radar Angle Display	Calculation: Convert the radar-reported target coordinates (latitude and longitude) to horizontal and vertical coordinates using photogrammetric methods. Original: Radar reports the original level and pitch
Region Display	Display switches for closing and opening fences, protected areas, etc.
Audible Alarm	Sound alarm on/off settings.
Connection Method	Connection Method: Default Direct Connection
Video Type	Video recording type: Default - Regular recording
Video Mode	Main interface: Electronic map page - Photoelectric video window mode settings. For dual displays, use dual videos.
Cruise Tracking	Cruise tracking target switch
Preset Position Tracking	Preset Position Tracking Target Switch

3.4.2 Automatic Zoom Configuration

The auto-zoom setting allows you to configure whether radar-guided electro-optical systems should perform automatic zooming, enabling targets to enter the field of view more quickly.

参数配置

系统基础配置

自动变焦参数

目标处理参数

无人值守参数

识别参数

自动搜索参数

平台通信参数

地图参数配置

目标类型: 无人机

首次联动变焦: ☒ 开启 ☐ 关闭

目标宽度(m): 0.35

目标高度(m): 0.35

热成像像素: 12

可见光像素: 16

默认类型: 无人机

最小视场角: 0.5

变焦步长(度): 2

Parameter	Configuration Details
Target Type	Configure the target type; different types correspond to different target sizes.
Target Height and Width	Set the target size to track
Thermal imaging pixel	Number of pixels to display for the target in the thermal imaging channel
Visible Light Pixel	Number of pixels to display for the target under the visible light channel
Default Type	Select the corresponding type for automatic zooming
Minimum Field of View	Set the field of view for the maximum zoom focal length
First Linkup	First-time configuration of the photoelectric-linked zoom switch
Zoom Step (deg)	Default

3.4.3 Configuration of Target Processing Parameters

By configuring target processing parameters, the platform can automatically remove targets from the list at regular intervals (removal indicates target loss) when radar does not perform batch filtering.

参数配置

系统基础配置

自动变焦参数

目标处理参数

无人值守参数

识别参数

自动搜索参数

平台通信参数

地图参数配置

雷达刷新时间(s): 6

二维雷达俯仰: ☒ 计算 ☐ 不计算

频谱刷新时间(s): 5

联动录像: ☐ 开启 ☒ 关闭

打击时间(min): 2

识别目标航迹: ☐ 开启 ☒ 关闭

诱导时间(min): 2

联动多光电: ☐ 开启 ☒ 关闭

目标录像(min): 2

标牌位置: ☒ 动态 ☐ 固定

频谱区域范围(°): 6

删批丢失次数: 1

航迹名称类型: 批次

报警过滤高度: 关闭

报警过滤RCS: 关闭

Configuration Parameters

Parameter	Configuration Details
Radar, Spectrum Refresh Time	According to the radar target batch processing cycle configuration (for example, if the radar batch processing cycle is 5s, set it to 6s here, which is 1s longer than the radar cycle).

Parameter	Configuration Details
pact Time	Automatic Strike Time Setting in Unattended Mode
induction time	Automatic Guidance Time Setting in Unattended Mode
Target Video Recording	Automatic Video Recording Time Setting Under Spectrum Guidance
Spectrum Range	Spectrum Detection Angle Display Settings
Link Video Recording	Automatic recording switch settings after radar guidance linkage (stop recording when batch processing stops)
Two-dimensional radar pitch angle	Select whether to enable pitch direction guidance when using linked optical components
Number of batch deletions lost	Cumulative number of target loss events
Track Label Type	You can display it by batch or height, or hide it.
Alarm filtering height	Filter detection targets beyond the set height
Alarm Reporting Filter RCS	Filter virtual targets based on RCS size within the alarm area
Identify the target trajectory	The EO/IR tracking system identifies the target trajectory by activating the corresponding function switch.
Multi-EO/IR Linkage	Enable multi-optical tracking for multiple targets; disabled by default.
Label Position	The display location of target batch information can be dynamic or fixed

3.4.4 Unattended Parameter Configuration

By configuring unmanned operation parameters, the platform can operate autonomously without supervision to detect, identify, track, and handle targets.

Parameter	Configuration Details
Linked Tracking	Enable linked tracking after guiding in unattended mode?
Auto Zoom	Enable automatic zoom in unattended mode.
Auto Attack	Does the system automatically attack intrusion targets in unattended mode?
Auto Recording	Does the system automatically record videos of intrusion targets in unattended mode?
Response Conditions	Auto-defense conditions include threat level, optical confirmation, and spectrum region.

Parameter	Configuration Details
Angle Deviation Threshold	Track the EO/IR and radar angle deviation values; if they exceed the set threshold, redirect the course.
Deviation Count Threshold	Number of times during the tracking process where the optical and radar angle deviation values consistently exceed the set threshold
Linked Search Time	For this batch, set the target search time for Lian Dong Optoelectronics. No other targets will be guided until a target is found within this period.
Tracking Confirmation Time	Second-stage fusion of optical tracking confirmation time settings.
Firing Distance	Set the target distance for automatic strikes.
threat level	Set the target level for unattended operation.
Level Introduction	Level 1: The target has left the electronic fence warning zone. Level 2: Target intrusion within the electronic fence warning zone. Level 3: The target vehicle has departed from the general area of the electronic fence. Level 4: Target intrusion within the general area of the electronic fence. Level 5: The target has left the severely affected area of the electronic fence. Level 6: Target intrusion in a severely affected electronic fence area. Level 7: Invasion and departure targets within the protected area.

3.4.5 Automatic Search Parameters

Configure automatic search parameters to set the search area range for the optical sensor after radar guidance.

参数配置

系统基础配置

自动变倍参数

目标处理参数

无人值守参数

识别参数

自动搜索参数

平台通信参数

地图参数配置

搜索最低时间(s):

6

搜索模式:

☐ 单个视场
 ☒ 角度范围

水平范围(°):

2

俯仰范围(°):

2

二维雷达专用

高度下限(m):

100

高度上限(m):

150

Configuration Parameters

Parameter	Configuration Details
Search for the shortest time	Auto-search for the shortest duration of a cycle
Horizontal Range, Pitch Range	Set the horizontal and pitch angles for the automatic search target area

Parameter	Configuration Details
Search Mode	A single field of view searches only within the current field; the angle range searches across all available fields of view.
Upper and Lower Height Limits	Set upper and lower height limits for the target during search (for radars without height information)

3.4.6 Map Parameter Configuration

Configure map data parameters to display target information on the map and modify radar and electro-optical scale circles.

Configuration Parameters

Parameter	Configuration Details
Map Style	Select the map display type
Number of EO/IR and radar detection ranges	Number of circles displayed on the map
Photoelectric and radar range measurement techniques	Distance between adjacent circles
Center Point Latitude and Longitude	Latitude and Longitude of the Map Center Point
Photoelectric and Radar Background Color	Background color within the display range
Radar Track Color	The radar detects the target's trajectory color on the map
Spectrum Track Color	The spectrum detects the target's trajectory color on the map.
View Display	Show the current viewing direction of the EO/IR sensor
Photoelectric and radar distance measurement circles	Show scale circle on the map?
Vertical and Horizontal Scale	Show horizontal and vertical scales on the map?
EO/IR Angle Display	Optical Angle Information Map Display Switch

4 Information Management

The Information Management Module provides unified management and configuration for all resource information across the system, including departments, servers, users, roles, and optical-electronic devices.

4.1 Department Management

The system supports custom department addition with up to five levels of departments, each containing multiple sub-departments. The top-level department is automatically created during installation and can only be edited, not deleted.

4.2 Server Management

The system consists of multiple service components, and the client connects to various services. This module displays the connection status between the client and each service, as well as their IP addresses.

Generally, server information does not need to be modified or added.

4.3 User Management

During system installation, the super administrator account "admin" was automatically added. This account can only edit passwords and cannot be deleted.

Click to + 添加 create operator or observer accounts with different permissions. Log in with the created account to access the corresponding permission features.

Item	Description
Username	user name
password	password
department	User's Department
User Type	Three user types are available: Administrator, Operator, and Observer

4.4 Equipment Management

This module enables operations such as adding, deleting, modifying, and querying photoelectric, radar, spectrum, and countermeasure-inducing devices within the system, along with parameter configuration.

4.4.1 EO/IR Equipment Management

If optical devices are connected to the LAN, you can select "Search and Add". Click the device you want to add, fill in the actual information, and save it.

搜索增加设备

×

编号

设备信息

IP地址

设备编号

*部门:

顶级部门

前缀名:

video

☐ 快速添加

*名称:

可见光

单IP:

☒

*IP:

*端口:

8000

*用户名:

admin

*密码:

Abc.12345

*类型:

可见光

经度:

纬度:

高度:

*协议:

Ph07

串口服务:

4001

保存并继续

保存

Item	Description
department	Department to which the device belongs
Front-end Name	Device Name (Required. Enter different front-end names for multiple devices)
name	Default Visible Light
Single IP	Default Selection
IP	Device IP Address
port	Device port number: defaults to 8000
Username	Device username: Default is admin
password	Device password: Default is Abc.12345
type	Device Type: Visible Light/Thermal Imaging
longitude	The longitude of the device, formatted as 9 degrees 9', for example 117.223956
latitude	The device's latitude, formatted as 9 degrees 9 minutes, for example 36.669985
altitude	Device height, in meters
protocol	Device Configuration: Default Selection is ph07
Serial Port Service	Add the device's serial port IP address to enable remote power-on and power-off functionality (optional)

4.4.2 Radar Equipment Management

After adding radar equipment, you can receive target information reported by the radar on the main interface.

Note: When installing radar and optical components in the same location, ensure their latitude, longitude, and altitude values are consistent, with precision to the same number of decimal places.

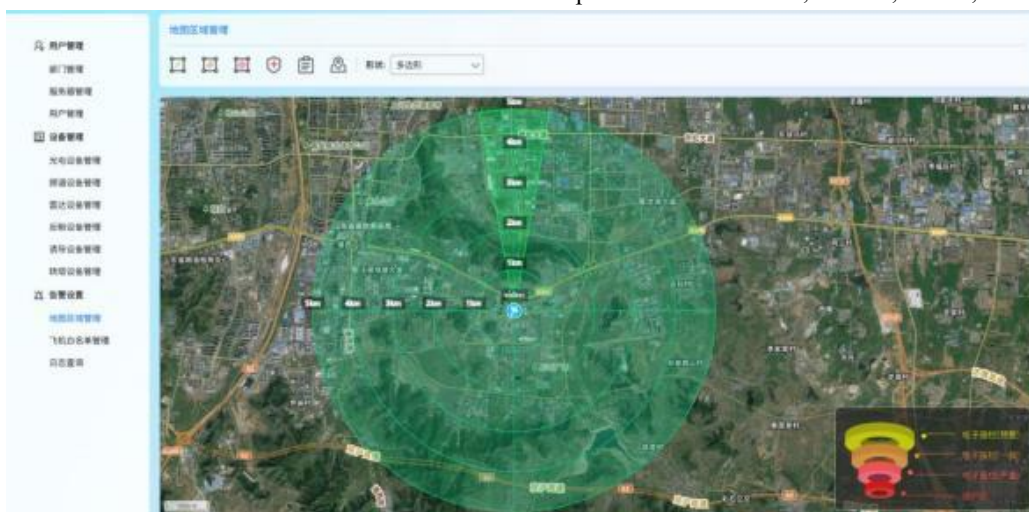
Item	Description
department	Department to which the device belongs
name	device name
IP	Device IP / Computer IP Address
Control Port	Do not control non-conflicting ports such as 12345
data port	Default data port: 16666
longitude	The longitude of the device, formatted as 9 degrees 9', e.g., 117.223956 (if the location is the same, it matches the optical measurement value)
latitude	The device's latitude in degrees, e.g., 36.669985 (if the location is the same, it matches the optical value)
altitude	Device height in meters (if the positions are the same, it matches the photoelectric value)
manufacturer	Device Protocol Selection

4.5 Alert Settings

This interface primarily includes map area management, aircraft whitelist management, and user operation log queries.

4.5.1 Map Region Management

You can add electronic fences with different defense levels on the map. The levels are: Alert, Normal, Severe, and Protection Zone.



Draw Electric Fence:

On the map, you can select the level and shape of the electronic fence.



After selecting the electric fence level and shape, click to choose a drawing point on the map and double-click to confirm the drawing area.



Edit and Delete:

Left-click within the target area to display options for editing or deleting the area:



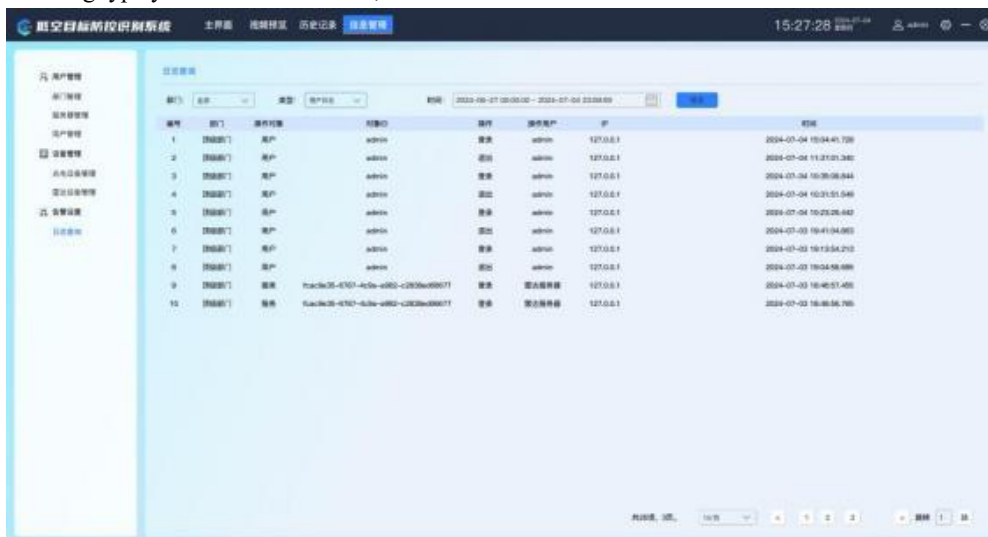
Click the editing area to open the dialog box where you can modify the area name and electric fence level.

Click Delete Area to remove the selected area.



4.5.2 Log Query

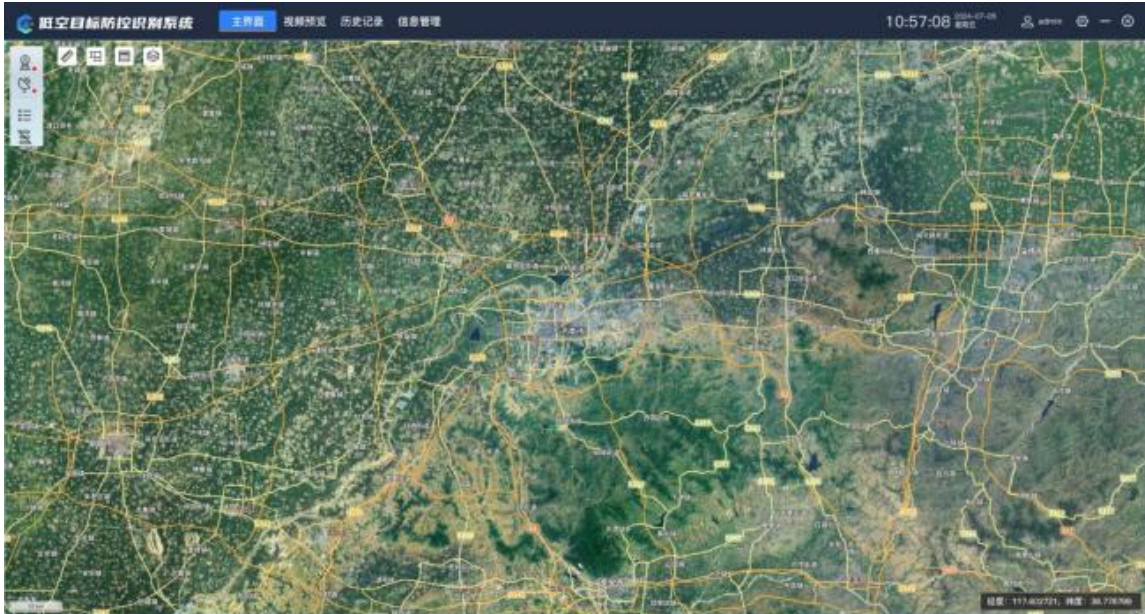
Select the user and log type you want to search for, then click Search as shown below.



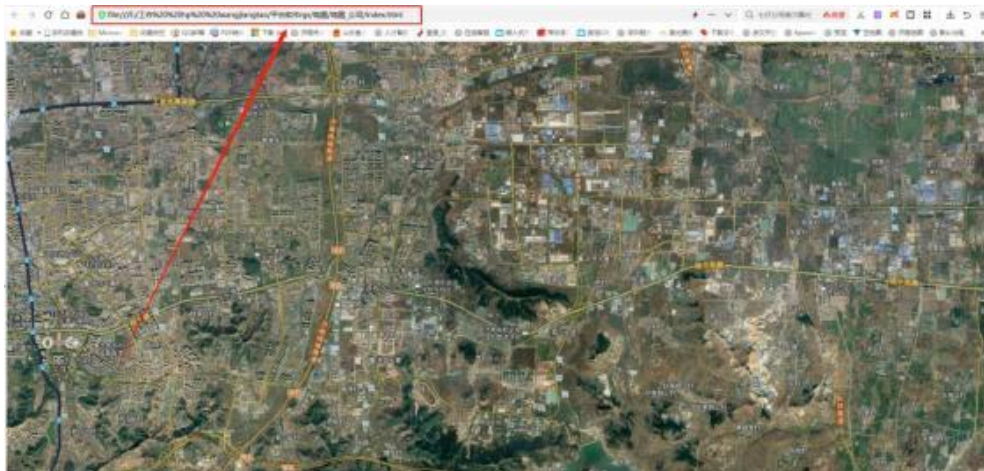
5 Main Interface

The main interface is the primary business interface where functions such as video synchronization, target detection, and trajectory display are handled. After adding optical or radar devices, maps can be automatically loaded at designated locations on the main interface when connected to a computer.

The electronic map is shown below.



Contact us for offline map services if needed. Usage: Place the prepared map package on your local computer, open `webgis/index.html`, copy the webpage link, and paste it into "Parameter Configuration / System Basic Configuration / Map Path," then save.



Electronic-map toolbar functions:

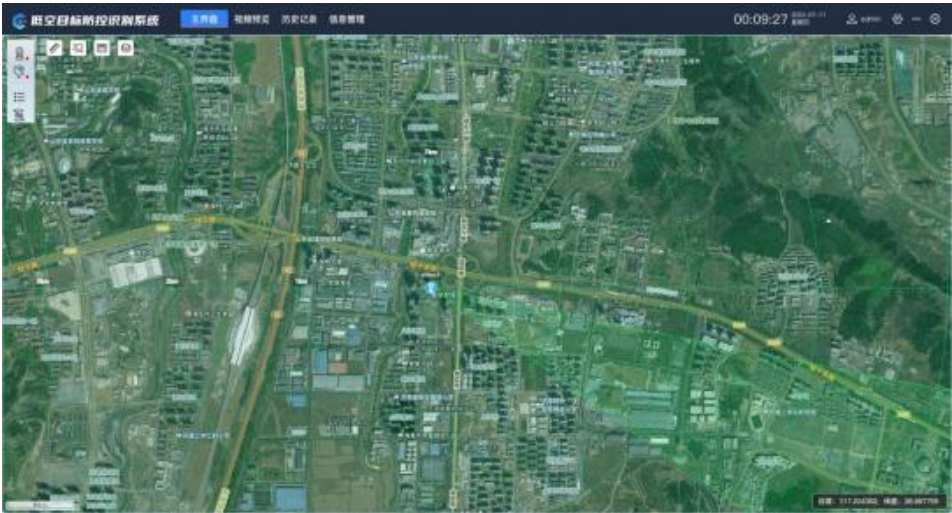
Item	Description	
		Online status monitoring and functional control of EO/IR equipment
		Online status monitoring of radar equipment, functional control (accepts only data; radar is not online by default)
		Radar Target List: Click to open the list and receive radar detection information
		Spectrum target list. Click to open the list and view spectrum detection information
		Data Fusion (After enabling, you can set the fusion value and filter short trajectory batches)
		Unmanned operation (for multiple target trajectories)
		Automatic Coordination (Unmanned Operation Under a Single Target Track)
		Distance and Angle Measurement (Start with a mouse click, end with a double-click)
		Area Measurement (Start with a mouse click, end with a double-click)
		Static calibration: calculates the target's azimuth and pitch using its local latitude, longitude, and altitude.
		Auxiliary calibration: Used to eliminate dynamic angular errors between radar and electro-optical systems.
		Video Recording (Starts recording raw video when enabled)

5.1 Equipment Installation Location

After adding a device and entering accurate latitude and longitude information, click the optical icon and double-click "Visible Light." The device will appear as an icon on the map. The icon descriptions are as follows.

icon	Description
	Optoelectronic equipment. The optical peripheral circle indicates the coverage area, with the current field of view displayed as a sectoral orientation.
	radar set

The device display is shown below.



5.2 Equipment Operation Configuration

5.2.1 EO/IR Equipment

- (1) Angle Reporting: Upon deployment, the optical equipment begins transmitting angle data. To the right of the device name fields for visible light and thermal imaging, the current horizontal and pitch angles are displayed: the visible light field view angle is

shown on the visible light side, while the thermal imaging field view angle appears on the thermal imaging side, as illustrated below.



(2) Quick Functions: Right-click the video to perform remote power-on/off operations on the device. Right-click visible light or thermal imaging to configure settings for photoelectric front-end web interfaces and back-end recognition shortcuts, as shown in the figure below.



Video quick-action functions:

Item	Description
Turn on, turn off, restart	Remote power on/off and restart of the device (optional; requires configuring the serial port IP when adding optical equipment)
Hide Device	Let the device quickly pitch down and fold
Image Stabilization Parameters	Quick on/off and zero drift adjustment for image stabilization devices (requires device support)
Horizontal Zeroing	Device automatically calibrates north orientation and zero point (requires sensor support)
Tilt Zero Adjustment	Automatic horizontal zeroing for pitch and roll (requires device sensor support)
Device Calibration	The optical level and pitch mechanical angle can be adjusted.

Visible-light and thermal-imaging shortcut functions:

Item	Description
Start	Turn on the visible light/thermal imaging lens
Shut Down	Turn off the visible light/thermal imaging lens
Device Web Page Parameters	Set the front-end web interface configuration for EO/IR equipment: User name: admin; Password: Abc.12345
Front-end Identification and Tracking	Quickly configure front-end recognition and tracking parameters (recognition requires front-end support)

Front-end recognition and tracking functions:



Item	Description
Recognition Box	Identification Box Display Switch
Front-end Recognition	Device Front-end Target Detection Function Switch
Target Type	Identification Box Target Type Display Switch
Identification and Range Measurement	Identify the reverse-distance switch button
Preset Size	Identify the preset switch button for determining the reverse calculation distance based on target size
target size	Identify the preset value for the reverse calculation distance target size
Detection Threshold	Target recognition detection sensitivity setting: the lower the value, the more sensitive it is
trace labelling	Switch to display the recognition box when tracking a target
Track Status Feedback	Device tracking status is sent back by default
Recognition and Tracking	Turn on/off the automatic tracking feature for target recognition, along with the "Automatic Tracking" button (requires enabling tracking and recognition)
Adaptive Target Tracking	Adaptive tracking based on object size; auto-zoom function switch
Target Pixel Size	Automatic Zoom Pixel Size Adjustment During Target Tracking

(3) Single or Dual Video

Users can choose single-video or dual-video mode. Dual-video mode is suitable for connecting two external monitors. To change the dual-video mode, navigate to Path: Parameters> System Configuration> Dual Video, then click Save. As shown in the figure below.

Single Video Effect:



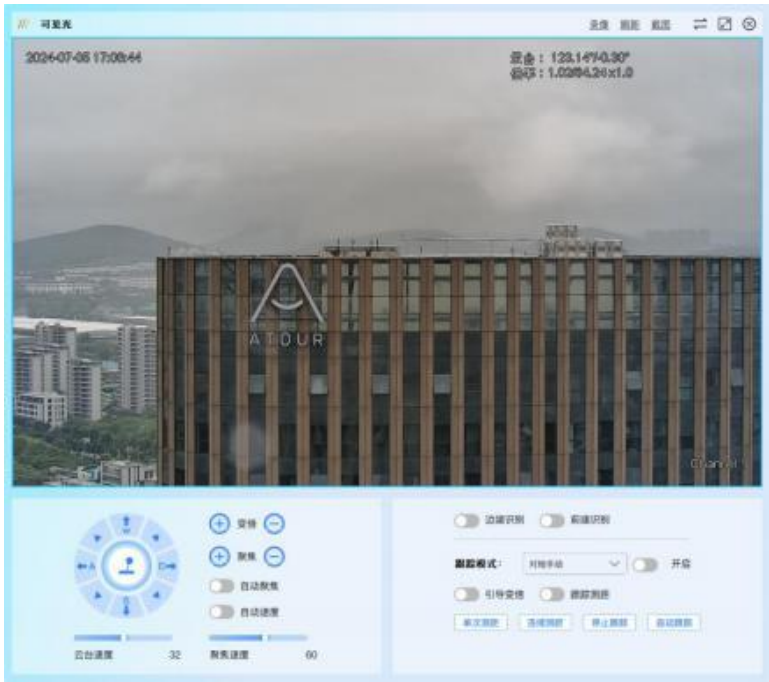
Dual Display, Dual Video Effects:



(4) Photoelectric Operation: Double-click a EO/IR device in the left equipment list to open the video connection window for tracking. Use the pan control buttons (WASD keys on keyboard) to rotate the photoelectric pan and adjust lens zoom/focus, while the tracking control button enables target tracking.

Once a drone target appears in the frame, select "Identify Adaptive" to activate tracking; simply click the screen with the left mouse button to initiate tracking.

The tracking page is shown below.



Tracking-page controls:

Item	Description
	Cloud Platform Control
	Turntable Speed Control
	Focus Speed Control
	Camera Zoom Control
	Focus Control
	Enable auto-focus on lens (disabling it is required for tracking)
	Enable field-of-view adaptive speed

Item	Description
	Manual Thermal Image Calibration
	Heat map background correction (must align with a cloudless sky)
	Recognition Function Switch (automatically checks status when the page opens)
	Enable tracking (drone defaults to semi-automatic air mode)
	Guide the auto-zoom switch (requires continuous radar guidance)
	Automatic ranging after tracking (requires optional laser ranging module)
	Perform one or multiple laser ranging measurements (requires a dedicated laser ranging module)
	Stop the current track (or right-click the video)
	Enable automatic tracking (activation of recognition and tracking is required)
	Video switching: Switch between visible light and thermal imaging videos
	Page Expansion (for dual video mode)
	Page closed

Tracking procedure:

Target tracking can select appropriate modes based on the target type. For aerial targets such as drones, use air-to-air mode or recognition-adaptive mode; for ground targets like people, vehicles, and vessels, use ground-mode tracking.

For Air Mode and Recognition Adaptive Mode, manual tracking begins only after recognition information appears or an object is automatically marked with a green box and then clicked with the left mouse button. For Ground Manual Mode, you can directly draw a frame around the target to start tracking manually.

Take adaptive recognition as an  example: Pattern selection. When a drone appears in the field of view, the target is marked or identified. Click the screen with the mouse to track the target, as shown below.



5.2.2 Radar Equipment

The radar can detect the drone's flight path, identify its landing point on the map, output target coordinates, and guide electro-optical detection for tracking.

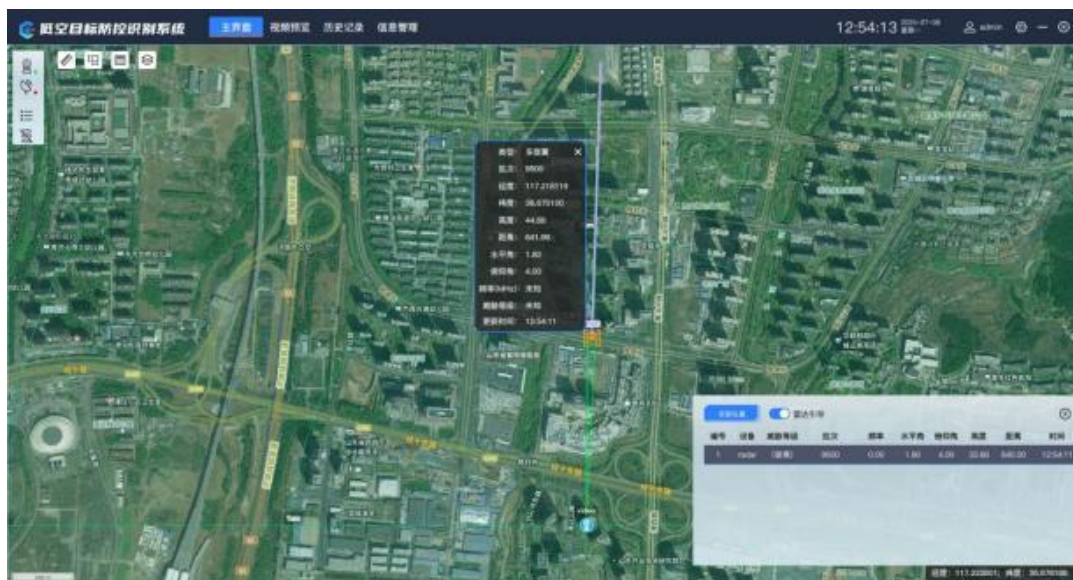
Note: Only some radars have control functions; most only receive radar data and do not require configuration of radar parameters. Radars are default offline.

5.3 Course Display

After adding radar equipment, the received radar data targets will form trajectories on the electronic map. Click the target list in the left function button.



Data information is displayed in the list. The resulting track display is shown below.



Target-list button functions:

Item	Description
Update Location	Update device locations on the map (for external RTK devices, optional)
Radar Cueing	Radar detection information guides the optical sensor; double-click to activate automatically

5.4 Coordination and Guidance

The electronic map page utilizes radar detection data to guide optical tracking.

· Instructions for using EO/IR devices:

Double-click a target list route or the route icon on the map to activate optical tracking for target identification.

Use unattended operation for automatic EO/IR tracking linkage. See Section 5.6 Unattended Operation for details.

5.4.1 Deployment Configuration

Note: When optical and radar devices are deployed in close proximity, the latitude, longitude, and altitude values for both should match on the information management page. You may use a unified latitude/longitude value for the radar device. On the "Parameter Configuration - System Basic Configuration" page, select "Original" for radar angle display.

When EO/IR and radar equipment are deployed at remote locations, the latitude, longitude, and altitude information for these devices on the information management page must reflect their actual locations. On the "Parameter Configuration - System Basic Configuration" page, select "Calculate" for radar angle display.

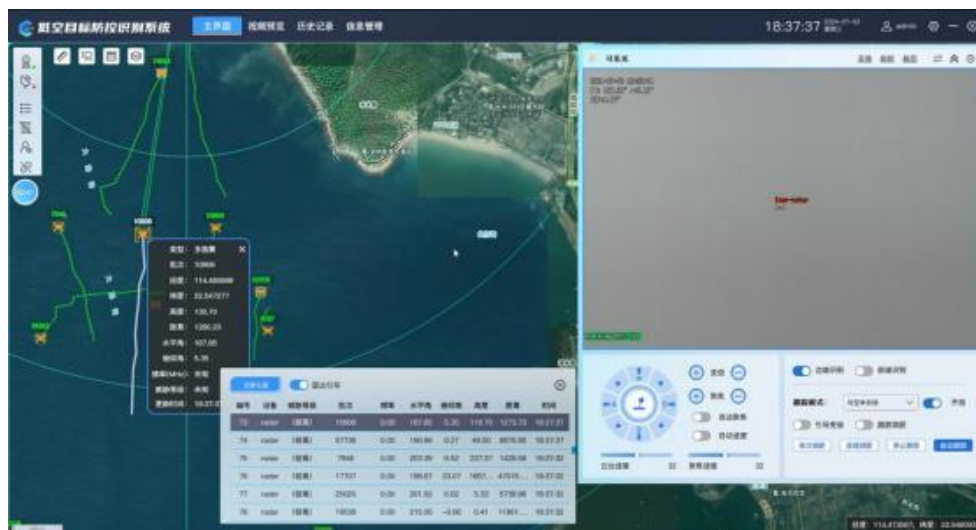


5.4.2 EO/IR Tracking

Double-click the point icon on the digital map or the target list entry to trigger synchronized optical rotation. The default parameter setting enables initial zoom adjustment during synchronization, allowing the drone to quickly enter the field of view.

After double-clicking the guidance option, the Target List "Radar Guidance" opens automatically. The system will continue guiding until the target is tracked before the sensor detects it; during this process, manually rotate the sensor to disengage the guidance, then double-click again to reactivate it. When enabled, selecting a target batch in the list via mouse click activates radar-guided tracking of that batch's targets.

Select "Adaptive Recognition" to enable tracking functionality. When a drone appears in the frame, tap the screen to initiate tracking; if "MA" is selected, automatic tracking will occur upon detection of the drone. The tracking interface is shown below.



Note: For detailed usage instructions for tracking, see Section 5.2.1 "How to Use Tracking Video".

5.5 Auxiliary Calibration

For accurate guidance by radar and electro-optical systems, separate north calibration procedures must be performed. After calibration, software-assisted calibration functions can be utilized to further eliminate errors between the radar and electro-optical components.

Note: The difference value set after auxiliary calibration does not change the EO/IR zero point, but adjusts the radar's positioning angle relative to the EO/IR sensor during guidance.

Auxiliary calibration procedure:

1. When the drone is tracked by the optical system and the radar detects the target, click to open the following window.

The screenshot shows the '辅助标校' (Auxiliary Calibration) window. It contains a table with four quadrants: 0-90°, 90-180°, 180-270°, and 270-360°. Each quadrant has a sub-table for ranges from 0-1km to >5km, with columns for 'Azimuth Error' (方位差) and 'Elevation Error' (俯仰差). The table is currently empty, showing zeros for all values. At the bottom, there is a 'Radar Device' (雷达设备) dropdown menu and buttons for 'Start' (开始), 'Stop' (停止), 'Apply' (应用), and 'Reset' (重置).

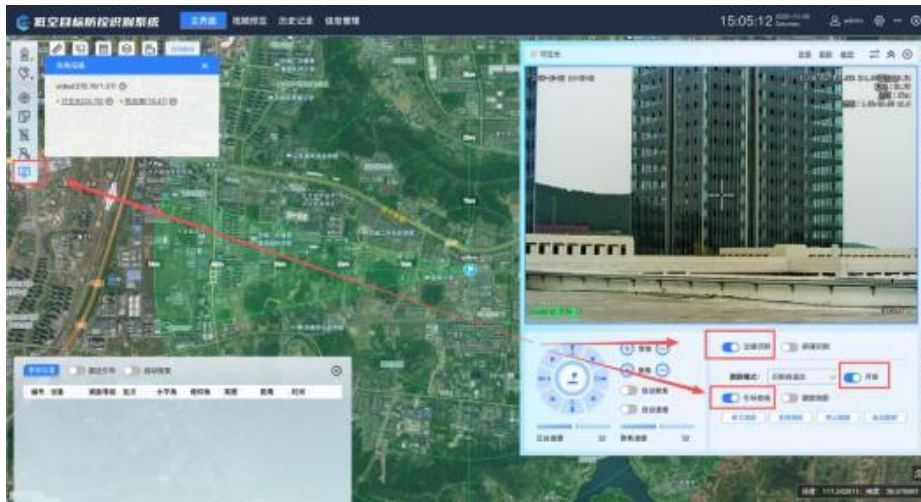
2. Double-click the trajectory icon  to select  it, then click "Change" to initiate calibration; when stopping calibration is required, click "Stop" for the module to calculate the radar-optical difference within that angle quadrant, then click "Apply" to activate the result.

For detailed calibration procedures, refer to the "MR2000 Auxiliary Calibration User Manual".

5.6 Unattended Operation

5.6.1 Automatic Linkage

This feature is designed for single radar target reporting. Simply press the corresponding button as shown in the figure to activate it; the EO/IR system will verify each reported target in order.



5.6.2 Unattended Operation

This function is intended for use when all radar targets have been reported.

- ① Advance mapping of the protected area boundaries requiring coordinated confirmation on the Map Area Management page;
- ② Parameter Configuration - Unattended mode: Auto-video recording is disabled. Alternatively, set the save path outside Drive C to prevent excessive recordings from filling up the disk.
- ③ Turn on the "Unattended" switch to activate the tracking function.

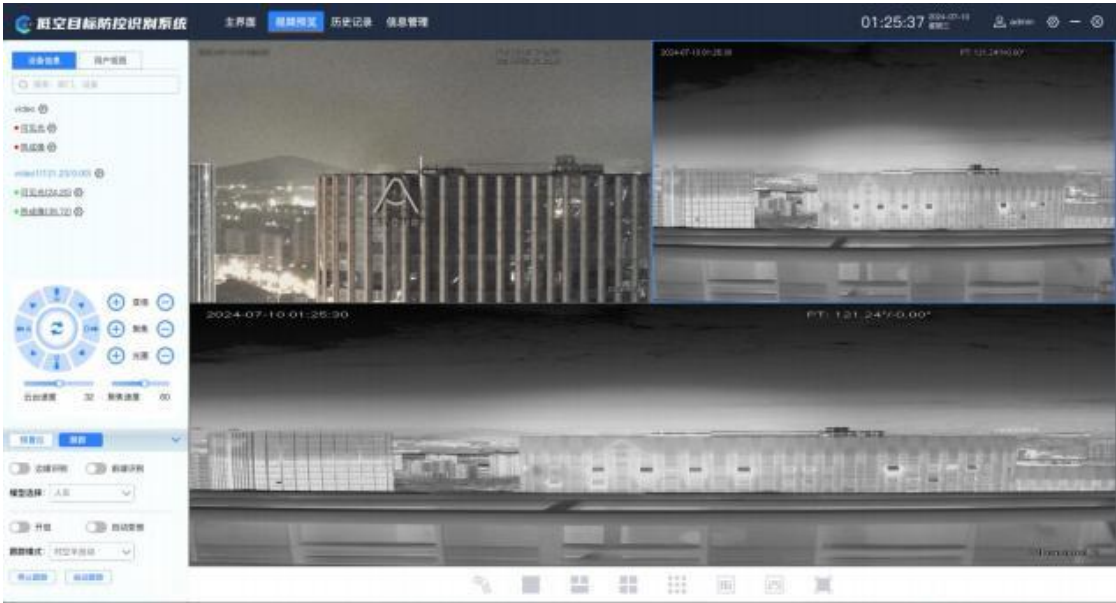
The resulting interface is shown below.



6 Video Preview

6.1 Video Connection

Click the video preview to open the optical video window; double-click to display it in full screen. Use the pan control buttons (WASD keys on the keyboard) on the left to rotate the optical pan and adjust focus between visible light and thermal imaging lenses. Use the tracking control button to track the target.



6.2 Preset Cruise Mode

In the bottom-left corner of the video preview page, you can enable the preset position feature (or  right-click the video window and select "Pan-Tilt Control" to open it). The software supports 2,048 preset positions and allows setting initial positions. The page appears as follows.



Preset position operation guide: After rotating the gimbal to the desired position, enter  the corresponding number and name, then click to add the preset position.

Button / Property	Description
Preset Position	Predefined position number (1–2048); unique per device.
Preset Name	Customize preset name
initial position	When adding a preset location, check the Initial Position  option. After setting it, click to return to the initial position.
	Set (Add) Preset Position
	Delete preset position
	Call the preset position. Upon reaching it, the current preset position number will be displayed overlaid on the video.
	Laser ranging: Upon successful execution, the target distance will be displayed overlaid on the video feed (device support required)

Button / Property	Description
	Wiper: Click to turn on, click to turn off (device support required)
	Thaw: Click to turn on, click to turn off
	visible light through fog; click to turn on, click to turn off.

Cruise control:

Route Configuration:

Add multiple preset points. Select a cruise route and click to  add preset points in the specified order. Then click Start Cruise.



6.3 Right-click Shortcut Buttons

You can perform quick video actions in the bottom-right corner of the page. The page is shown below.



Button descriptions:

Button / Property	Description
	Disconnect from preview video
	Control the pan-tilt unit and perform preset position settings.
	Perform field of view and gimbal angle positioning
	Click the screen to locate
 	Take a snapshot and start video recording
	Device Parameter Settings

7 Historical Records

This module records, searches, and displays radar tracks and video replays, along with identification data. Select a device type and click "Search" to view track records and video recordings within the alert area. The records are shown below:

航空目标航控系统

主界面 视频监控 历史记录 信息管理

01:34:52

2024-07-10 00:00:00

2024-07-10 23:59:59

搜索 刷新 删除

单位列表

目标历史记录

报警记录

编号	部门	设备	开始时间	结束时间	目标高度	航迹	速度	状态	操作
1	雷达部门	radar	2024-07-09 19:20:01.000	2024-07-09 19:24:19.000	10	24070	0	已处理	播放
2	雷达部门	radar	2024-07-09 19:25:05.000	2024-07-09 19:26:18.000	11	24004	0	已处理	播放
3	雷达部门	radar	2024-07-09 19:22:33.121	2024-07-09 19:23:47.000	14	24400	0	已处理	播放
4	雷达部门	radar	2024-07-09 19:22:27.000	2024-07-09 19:25:44.000	30	24434	0	已处理	播放
5	雷达部门	radar	2024-07-09 19:17:06.000	2024-07-09 19:18:26.000	7	23671	0	已处理	播放
6	雷达部门	radar	2024-07-09 19:17:35.379	2024-07-09 19:18:34.000	13	23646	0	已处理	播放
7	雷达部门	radar	2024-07-09 19:17:06.000	2024-07-09 19:17:07.107	10	23612	0	已处理	播放
8	雷达部门	radar	2024-07-09 19:17:06.000	2024-07-09 19:18:16.017	14	23610	0	已处理	播放
9	雷达部门	radar	2024-07-09 19:16:53.127	2024-07-09 19:17:06.000	6	23607	0	已处理	播放
10	雷达部门	radar	2024-07-09 19:16:42.000	2024-07-09 19:17:06.000	6	23606	0	已处理	播放

共10条, 2页

100页

1 2

播放

1

2

Double-click the alarm record and click Play to replay the flight path and video. The replay result is shown below.

轨迹回放

水平角: 326.745

俯仰角: 1.15063

高度: 32.5060

距离: 19036.64

时间: 07:10:15:58:44

播放结束

播放

Note: To play back synchronized videos, enable automatic recording linkage.

8 Appendix - Solutions to Common Questions

(1) Client login failed:

- Check if the account and password are correct
- Check whether the client has authorization.
- Check whether the server address and port configured by the client are correct.

(2) After modifying the computer's IP address, the client cannot log in:

A fixed IP address is recommended. To change your computer's IP address, restart the DF300.CMS service so the system can retrieve the updated IP configuration information.

(3) After adding the device, you cannot control the lens or gimbal:

- When adding visible light and thermal imaging data for the same device, they must be assigned to the same front-end. Is the • 8000 port correctly filled in?

(4) Unable to receive radar guidance data

- Check whether the radar monitoring data port is correctly specified or occupied.

(5) The orientation of the rotating platform is incorrect after synchronization.

- Check whether the radar data and electro-optical latitude/longitude and altitude information are consistent.

(6) The client does not receive radar detection information

- Check whether the computer firewall is enabled or disabled; it should be disabled.