

IPS User Manual V1.3

Indoor Positioning System User Manual



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Disclaimer

Document Information

Nooploop reserves the right to change product specifications without notice. As far as possible changes to functionality and specifications will be issued in product specific errata sheets or in new versions of this document. Customers are advised to check with Nooploop for the most recent updates on this product.

Life Support Policy

Nooploop products are not authorized for use in safety-critical applications (such as life support) where a failure of the Nooploop product would cause severe personal injury or death. Nooploop customers using or selling Nooploop products in such a manner do so entirely at their own risk and agree to fully indemnify Nooploop and its representatives against any damages arising out of the use of Nooploop products in such safety-critical applications.

Regulatory Approvals

The IPS series, as supplied from Nooploop, has not been certified for use in any particular geographic area by the appropriate regulatory body governing radio emissions in that area although it is capable of such certification depending on the area and the manner in which it is used. All products developed by the user incorporating the IPS must be approved by the relevant authority governing radio emissions in any given jurisdiction prior to the marketing or sale of such products in that jurisdiction and user bears all responsibility for obtaining such approval as needed from the appropriate authorities.

1. Introduction

The primary purpose of this document is to provide guidance on how to use the IPS (Indoor Positioning System) and highlight important considerations during usage. Additionally, it is recommended to review the following documents:

- IPS Datasheet
- IPS XXX Datasheet(Replace XXX with the specific device model)
- IPS PClient API Manual

Download links for the materials are available at:

www.nooploop.com/ips/download

2. Basic Introduction

2.1 Hardware Preparation

A complete set of IPS system requires the hardware components listed in Table 1, as shown below:

Table 1:IPS Hardware Preparation List

Hardware	Requirements
Server	<ul style="list-style-type: none"> Memory Size: $\geq 4G$ Disk Size: $\geq 50G$(determined by historical data storage time and size) Network Interface: $\geq 100Mbps$ CPU Architecture: x64 or amd64 preferred
Switch	100Mbps POE Switch
Ethernet Cable	Cat5e Ethernet Cable
Anchors	Nooploop provided standard anchors
Tags	Nooploop standard tags, third-party tag suppliers, or user-developed tags

2.2 Power Supply

Refer to Table 2 for detailed information on the power supply methods for various components of the IPS system, and consult Table 3 for power supply details for different tag models.

Table 2:Power Supply Information for IPS Hardware Devices

Hardware Device	Server	Switch	Anchors
Description	Servers typically come with a built-in power adapter and are usually powered by 220V AC.	Switches typically come with a built-in power adapter and are usually powered by 220V AC.	anchors are powered by Power over Ethernet (POE).
Example Image			

Table 3:Power Supply Information for IPS Tags

Tag Model	T01	T02	T03	T04
Description	T01 tags have a built-in rechargeable lithium battery and do not require external power.	T02 tags have a built-in rechargeable lithium battery and do not require external power.	T03 tags have a built-in rechargeable lithium battery and do not require external power.	T04 tags have a built-in button cell battery and do not require external power.
Example Image				

Tag Mode	T05	T06	T07
Description	T05 tags require external power.	T06 tags require external power.	T07 tags require an external power source, such as a power bank, phone charger, or car power supply.
Example Image			

3. IPS System Deployment

The deployment of the IPS system consists of three parts: device deployment, software deployment, and software configuration.

3.1 IPS Device Deployment

IPS device deployment primarily involves anchor deployment. This document provides equipment deployment instructions using the A01 anchor as an example.

3.1.1 Single Anchor Installation

All anchors in the IPS system are installed in a consistent manner. This document provides instructions for the installation of a single anchor, and the required installation accessories are shown in Figure 1. The installation method can be selected based on Table 4 for reference.

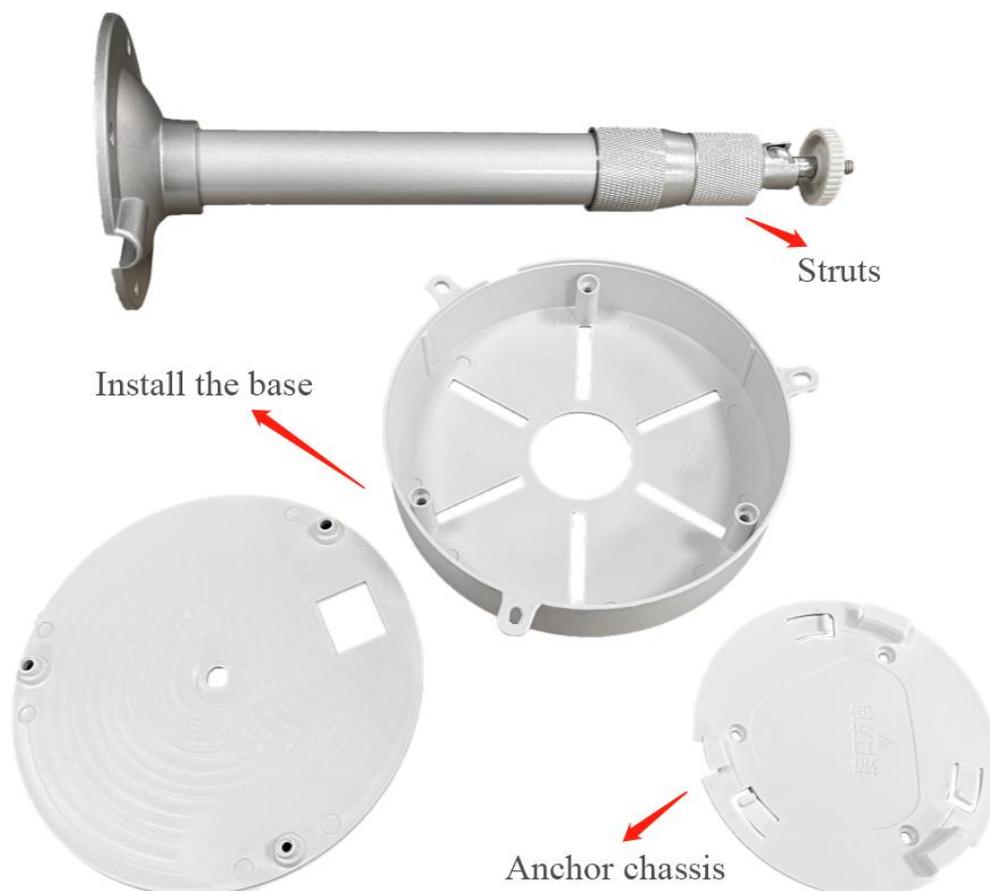


Figure 1: Illustration of Anchor Installation Accessories

Table 4: Anchor Installation Diagram

Scene	Description	Illustration
Pole Mounting (Recommended)	Utilize M3 bolts, nuts, and M4*9 washers to attach the anchor chassis to the mounting base. Secure the mounting base to the pole's top using screws. Subsequently, fasten the pole to the ceiling. The anchor is then securely affixed to the base using a buckle.	
Ceiling Suspension	Employ M3.5 self-tapping screws to directly secure the anchor chassis to the ceiling. Affix the anchor securely to the chassis using a buckle.	



Figure 2: Illustration of A01 Anchor and Chassis Buckle Installation

When the gap between the anchor and the ceiling exceeds 30cm, the positioning performance is superior compared to ceiling suspension installation. Therefore, using a pole to mount the anchor is

highly recommended.

3.1.2 2D Area Deployment

This document provides an example of device deployment for the IPS system, using a basic two-dimensional area as a reference.

- (1) The deployment of the IPS system begins by identifying the localization area and conducting an initial planning of anchor positions based on this area. .

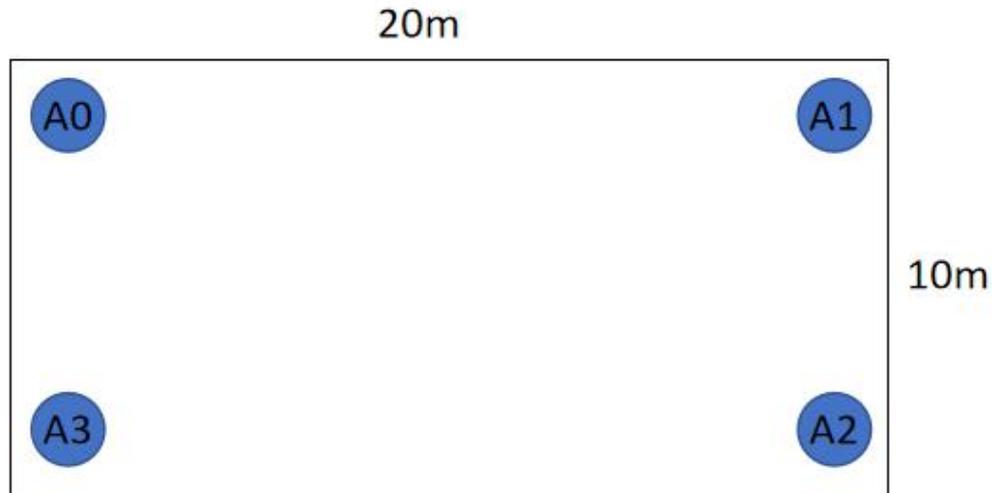


Figure 3: Illustration of Anchor Positions in a Two-Dimensional Area

For a minimum two-dimensional IPS system, four anchors are required, providing a maximum positioning range of 50m * 50m. Assuming the room illustrated in Figure 3 needs localization and has dimensions of 10m * 20m, the deployment positions for the four anchors would be at the corners of the room.

When selecting deployment positions for anchors, it is advisable to choose open locations, avoiding significant obstacles around the anchors. Ideally, the distance between the anchor and the wall should be at least 20cm during deployment. To ensure positioning accuracy, within each localization area, it is crucial to maintain unobstructed line-of-sight between at least one anchor and the others.

- (2) After completing the planning of anchor deployment positions, the next step is to proceed with the deployment of Ethernet cables.

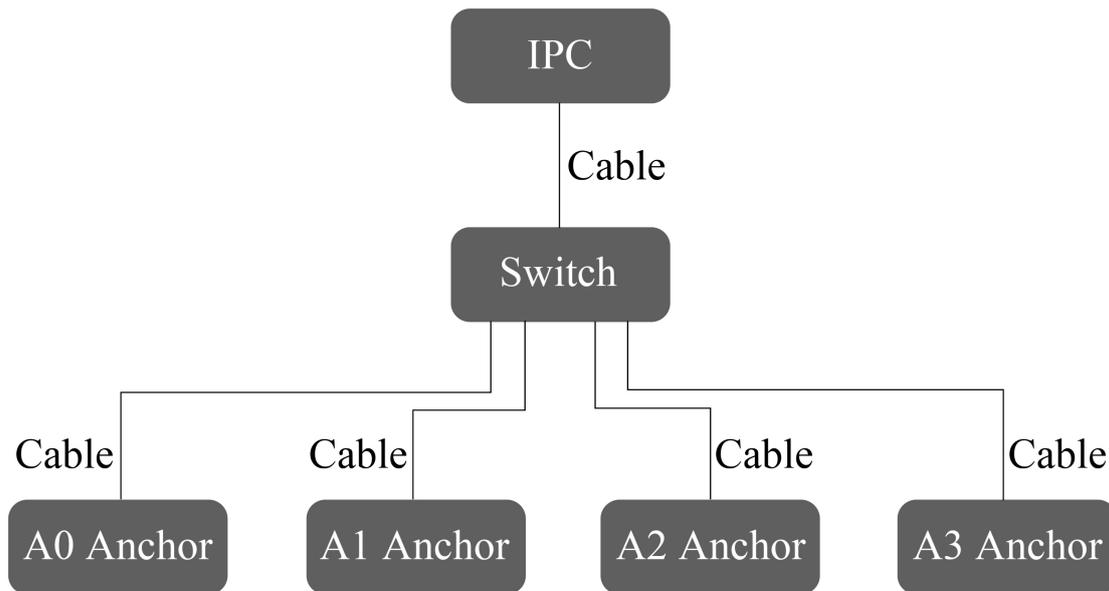


Figure 4: Framework Diagram for IPS System Equipment Deployment

As shown in Figure 4, the IPS system requires connecting the anchors and the industrial control computer to the same switch (in the same network segment) using Ethernet cables. Therefore, the deployment of Ethernet cables involves connecting the four anchors and the industrial control computer to the location of the switch using Ethernet cables.

(3) After the network cable is deployed, the anchor can be installed.

For detailed instructions on the installation of a single anchor, please refer to section 3.1.1. To optimize positioning effectiveness, it is generally recommended to install the anchors within the same area, with the rear side (where the anchor network port is located) facing towards the corners of the installation location.

(4) Connect the anchors to the switch using Ethernet cables.

With this step, the device deployment for the two-dimensional area is complete.

3.1.3 One-dimensional Area Deployment

The device deployment method for a one-dimensional area is essentially the same as for a two-dimensional area, with the key difference being that the IPS one-dimensional positioning minimum system requires only two anchors.



Figure 5: Illustration of Anchor Positions in a One-Dimensional Area

The illustration of anchor deployment positions is as shown in Figure 5, placing two anchors at

the corners of the one-dimensional positioning area.

3.1.4 Multiple Area Deployment

Multi-area deployment, meaning the deployment in multiple regions, typically consists of multiple two-dimensional areas and one-dimensional areas. In any given two-dimensional or one-dimensional area within this deployment, the anchor deployment method is the same as in a single area.

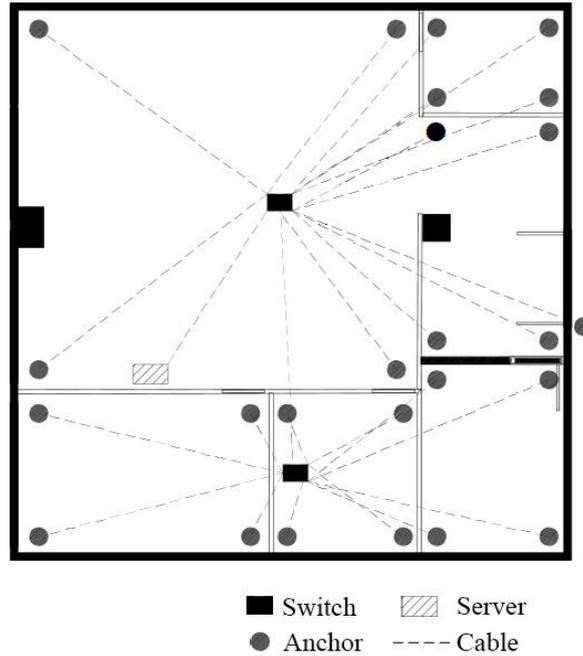


Figure 6: Planar Illustration of Multi-Area Anchor Deployment

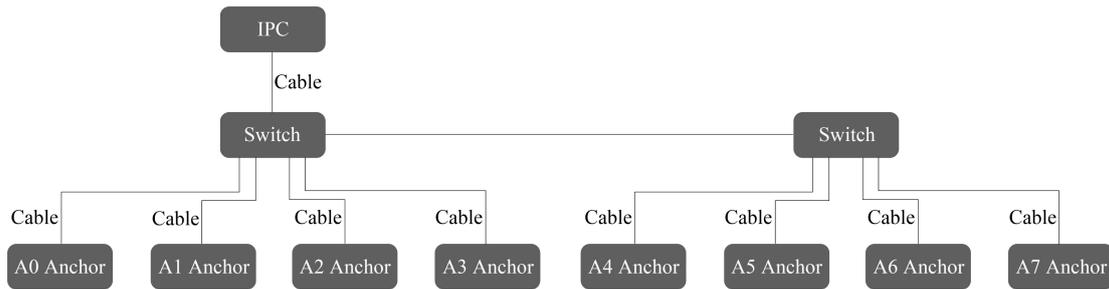


Figure 7: Framework Diagram for Multi-Area Anchor Deployment

As shown in Figure 6 and Figure 7, in the case of multi-area deployment, if the number of anchors is considerable and a single switch is insufficient to connect all of them, it is possible to connect anchors based on their deployment positions to different switches. It is essential to note that all the switches connected to anchors or industrial control computers should be interconnected. In other words, for the same system, it is required that all anchors are on the same network segment.

3.1.5 Attention

(1) Avoid Obstructions

anchors should be installed in open areas to avoid having numerous obstacles around them, which may cause multipath effects and subsequently reduce positioning accuracy. In each positioning area, it is necessary to ensure that at least one anchor has an unobstructed line of sight to the others.

(2) Avoid Reflection

Generally, reflections have a minor impact on positioning. However, some special cases may be affected because reflective surfaces, especially those with materials like metal, can influence positioning.

Ceiling: It is recommended to maintain a distance of more than 30cm between the anchor and the ceiling, and the use of support poles for installation is recommended.

Walls: For anchor installation positions, it is advised to install them at least 20cm away from the wall.

(3) Anchor Orientation

Optimize the orientation of anchors to enhance positioning effectiveness. It is generally recommended to install anchors within the same area, with the rear side (where the anchor network port is located) facing towards the corners of the installation location.

(4) Anchor Deployment

Range: The installation range for a single area anchor. For example, the A01 anchor has a maximum range of 50m * 50m at 6.5GHz.

Shape: The shape of anchor installation directly determines the size of geometric accuracy factors. It is generally recommended to install in a square shape to achieve the highest average geometric accuracy factor. Considering 4 anchors as the minimum positioning unit, installing in a square with a 1:1 aspect ratio results in consistent accuracy for X and Y coordinates. Installing in a rectangle with a 2:1 aspect ratio causes the shorter side to have Y coordinates almost twice as different as X coordinates.

(5) Configuration

For the same system, it is required that all anchors are on the same network segment.

(6) Interference

anchors should be installed away from high-power wireless transmitters to avoid interference.

3.2 IPS Software Deployment

After completing the deployment of IPS system hardware, the next step is to deploy the software for the IPS system. The software for the IPS system needs to be installed on a dedicated server (industrial control computer), which should run a Linux operating system. This document provides

instructions for the software deployment of the IPS system using Ubuntu as an example.

- (1) Connect the server to the network.
- (2) Change the computer's IP address to the local network segment, such as 192.168.xx.254 (the default address for the anchors is 192.168.xx.254).
- (3) Install docker

1. # Install and start the docker script
2. sudo ./docker-install.sh

```

● docker.service - Docker Application Container Engine
   Loaded: loaded (/lib/systemd/system/docker.service; enabled; vendor preset: enabled)
   Active: active (running) since Mon 2023-08-07 15:42:51 CST; 8s ago
 TriggeredBy: ● docker.socket
   Docs: https://docs.docker.com
  Main PID: 66596 (dockerd)
    Tasks: 16
   Memory: 25.4M
   CGroup: /system.slice/docker.service
           └─66596 /usr/bin/dockerd -H fd:// --containerd=/run/containerd/containerd.sock

8月 07 15:42:51 user-Default-string systemd[1]: Starting Docker Application Container Engine...
8月 07 15:42:51 user-Default-string dockerd[66596]: time="2023-08-07T15:42:51.467376783+08:00" level=info
8月 07 15:42:51 user-Default-string dockerd[66596]: time="2023-08-07T15:42:51.468159533+08:00" level=info
8月 07 15:42:51 user-Default-string dockerd[66596]: time="2023-08-07T15:42:51.542924700+08:00" level=info
8月 07 15:42:51 user-Default-string dockerd[66596]: time="2023-08-07T15:42:51.769084174+08:00" level=info
8月 07 15:42:51 user-Default-string dockerd[66596]: time="2023-08-07T15:42:51.787751044+08:00" level=info
8月 07 15:42:51 user-Default-string dockerd[66596]: time="2023-08-07T15:42:51.787848484+08:00" level=info
8月 07 15:42:51 user-Default-string dockerd[66596]: time="2023-08-07T15:42:51.826576696+08:00" level=info
8月 07 15:42:51 user-Default-string systemd[1]: Started Docker Application Container Engine.

~
~
~
~
~
~
~
lines 1-20/20 (END)

```

Figure 8: Example screenshot of Docker installation completion interface.

- (4) Run the ips-server software

1. # Install and launch the ips-server script.
2. sudo ./ips-server-run.sh

- (5) After completing the above steps, the interface shown in Figure 9 indicates that the IPS system software has started running.

It is important to note that the two displayed service URLs allow access to the IPS service interface. The first service URL is only accessible for local login on the server, while the second service URL can be used for login from any computer within the same or a sub-local network.

```
[sudo] password for nooploop-ips:
当前目录为/home/nooploop-ips/Desktop/ips-software
当前ip为192.168.0.70
当前latest images version为1.11
当前latest image file version为1.11
nooploop-ips-server
nooploop-ips-server
67c31a49f741b6d7ad8ae685681f8ede9d0205e450e3100912caafe03d1fc5c9
服务启动成功, admin用户名: admin 密码: nooploop
服务网页地址: localhost:8080或192.168.0.70:8080
nooploop-ips@nooploopips-KP01:~/Desktop/ips-software$
```

Figure 9: Example screenshot of the IPS software configuration completion interface.

- (6) Opening the web page and entering `http://localhost:8080/license`, then pressing Enter, will return the following JSON string. Users should send the characters within the double quotes at the location of "xxxxx" to Nooploop.

```
1. {
2.   "code":200,
3.   "data":"xxxxxx"
4. }
```

- (7) Nooploop will provide the corresponding license, such as `a123456ab`, to the user.
- (8) The user should configure the provided license into the configuration file (`~/Desktop/ips-software/data/config.yaml`) at the location of the license (replace only the line containing the license).

```
1. web:
2.   port: 8080
3.   externalIp: 192.168.xx.254
4.   admin:
5.     name: admin
6.     password: nooploop
7.     license: a123456ab
```

- (9) Run the following command to restart the software and complete the deployment.

```
1. cd ~/Desktop/ips-software
2. sudo ./ips-server-run.sh
```

The IPS suite includes an industrial control computer, which comes with Docker pre-installed. Users should follow the steps mentioned above, changing the IP address and then rerunning the `ips-server` software (steps 2 and 3, extracting and installing Docker, can be skipped).

3.3 IPS Software Configuration

Before the customer uses the IPS system, it is necessary to complete the basic configuration of the

system.

(1) Adding Maps:

① Hover the mouse over the Configuration Management Route Figure icon on the left side of the page and click on the Map Figure Management Route Figure icon to open the Map Figure Management interface.

② In the top-left corner of the Map Management interface, click the "+" button. This will prompt a file dialog to appear, allowing you to select the map file (in JPG or PNG format) that you want to add.

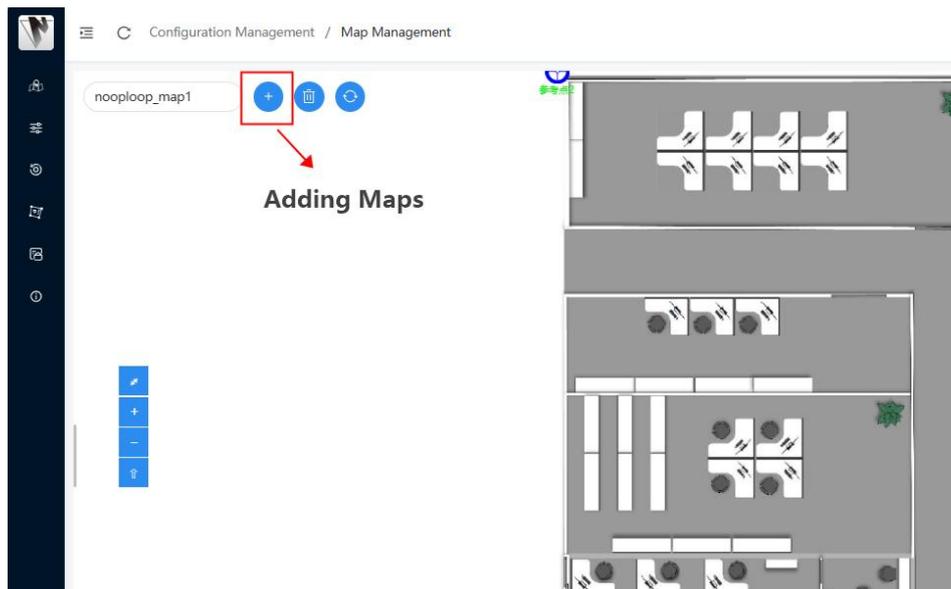


Figure 10: "Add Map" Button

③ After clicking the "OK" button, you will be redirected to the map addition page.

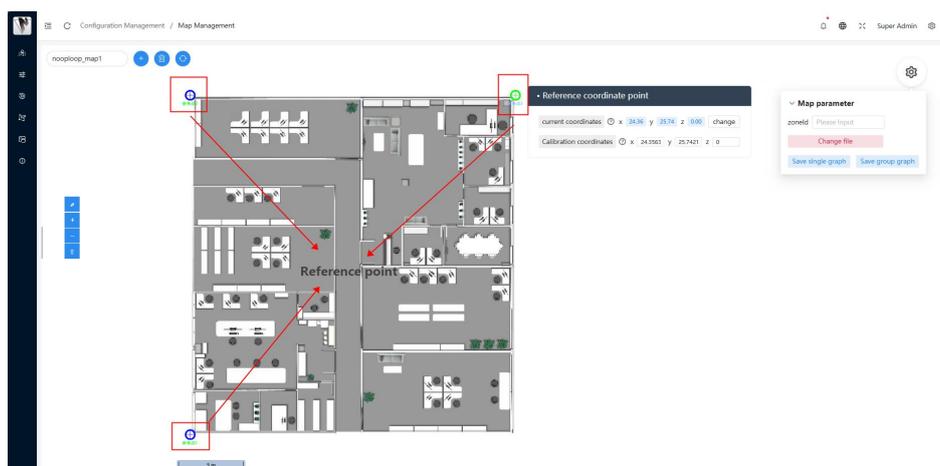


Figure 11: Illustration of the Map Addition Page

④ At the corresponding position, you can modify the map name and the floor displayed in the Map Table.

⑤ On the map interface, three reference points will randomly appear. You can map the

coordinates of these three reference points by configuring their actual corresponding positions.

- a. Click on a reference point to view its current coordinates (Table shows the coordinates of the reference point on the map) and calibration coordinates (Table shows the actual position coordinates of the reference point).
- b. Click the "Change" button to enter edit mode. Now, you can directly modify the values in the input boxes (ensure the format remains unchanged), or move the cursor to the reference point icon on the map, long-press, and drag it to the corresponding position to adjust the current coordinates of the reference point.
- c. After determining the position of the reference point on the map, enter the corresponding measured coordinates of this map location in real space into the calibration coordinate input box (ensure the format is correct), and click the "quit" button to exit edit mode.
- d. Once the current coordinates and calibration coordinates of the three reference points are modified, click the "Save single graph" button in the top-right corner of the tool window to complete the mapping of map coordinates.

(2) Adding a floor is similar to adding a map; it will not be reiterated here.

(3) Adding Anchors:

① Move the mouse to the Configuration Management Route Figure icon on the left side of the page and click on the Device Management Route Figure icon to open the Device Management interface.

② Double-click to open the tool window in the top right corner. On the Positioning Configuration tab, click on the checkbox for adding anchors, select the desired anchors, and the cursor will turn into a blue dot. Move the cursor to the corresponding location on the map where you want to add the anchor (the bottom left corner of the map will display the real-time coordinates of the cursor on the map).

③ After confirming the cursor's position, click the left mouse button to add the anchor. At this point, the anchor icon will appear on the map, and the anchor device information box will pop up. You can view the basic information of the anchor and correct its accurate coordinates (modify the anchor coordinates in the information box or long-press the left mouse button to drag the anchor icon). Click the Save button to save the anchor's location information to the

server.

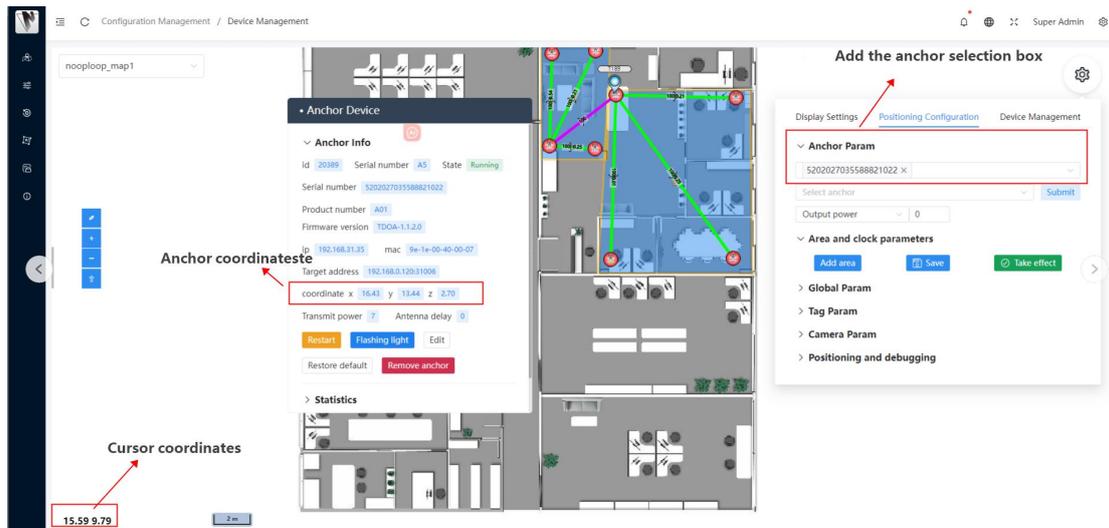


Figure 12: Illustration of Adding Anchors

(4) Configuring Anchor Positioning Parameters:

① On the Positioning Configuration tab, click on the Area and Clock Parameters. Click the "Add area" button, and a small blue dot will appear as the cursor. At this point, you can draw the first polygon on the map (the starting address point of the polygon should coincide), and this first polygon will serve as the boundary of the positioning area.

② Inside the first polygon, you can draw multiple holes (polygons) where positioning is not needed or where tags will not appear, such as around pillars. Note that the holes should be within the positioning area and should not overlap.

③ Click the "Edit" button. Move the cursor near the polygon boundary, and when the cursor comes with a small blue dot, long-press the left mouse button to drag and modify the polygon boundary.

④ Once the positioning area is confirmed, click the "Save" button to save the data, completing the addition of one region.

⑤ If it is a multi-areapositioning, repeat steps ①to④to add other regions. Pay attention to the connected positions between two regions (e.g., doors), ensuring that the boundaries of the regions coincide. For positions where the regions are not connected (e.g., walls), the boundaries should not intersect, and the areaboundaries should be as accurate as possible.

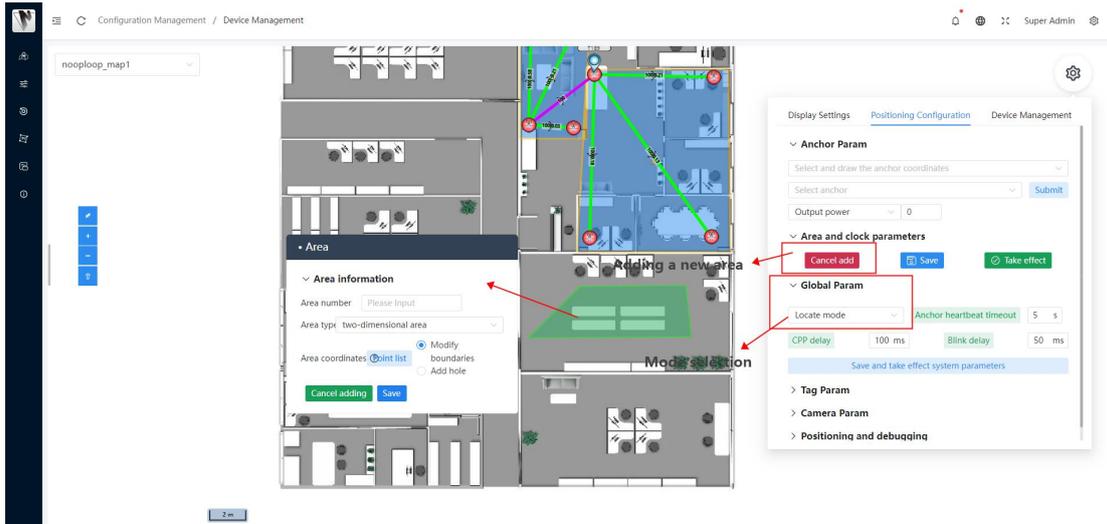


Figure 13: Illustration of Adding a New Region

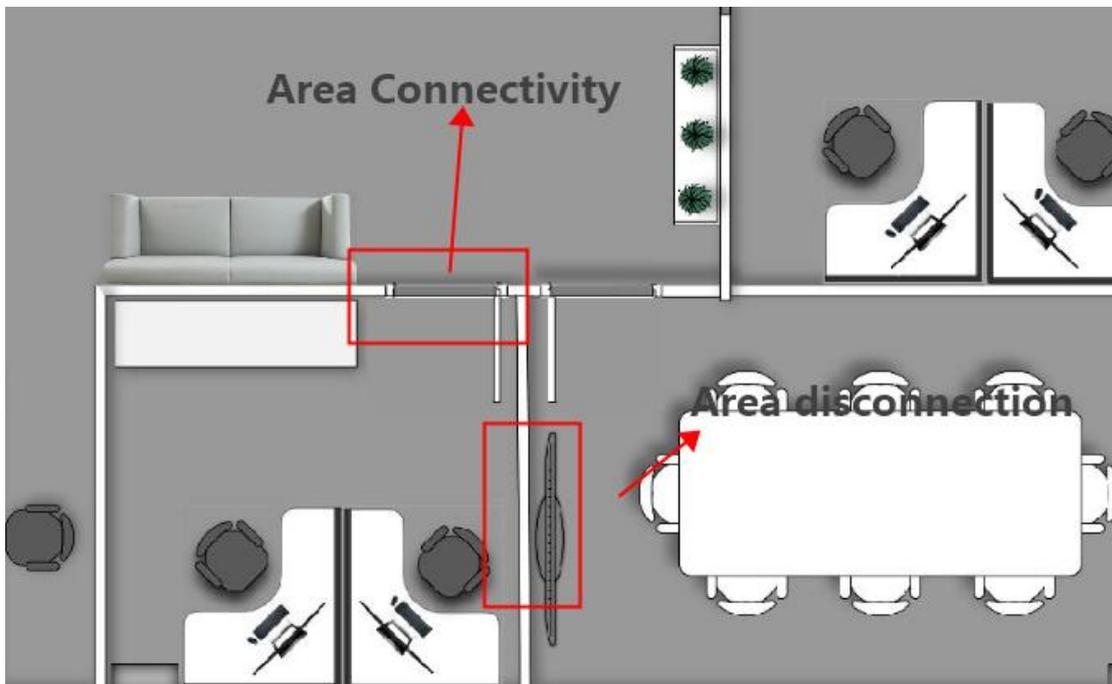


Figure 14: Illustration of Multi-Region Boundaries

⑥ Click on the polygon of the corresponding region, and an area properties box will pop up (as shown in Figure 15). Edit and change the relevant information for the region. In the "Anchors" box, add all the anchors needed for positioning calculation within this region. Select the main anchor, which should have an unobstructed line of sight to all other anchors in the region.

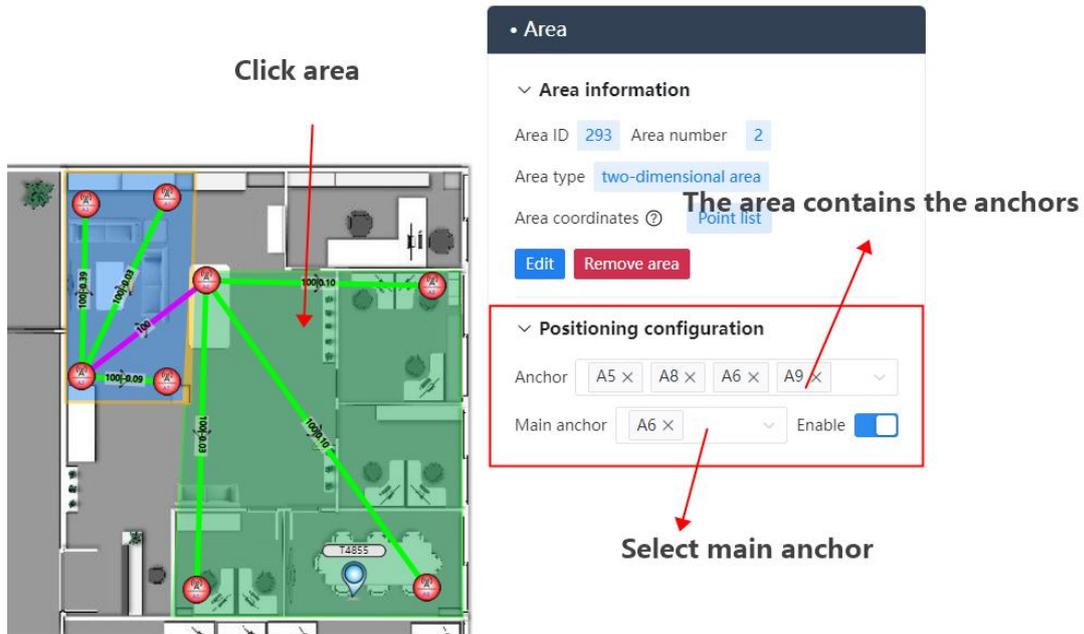


Figure 15: Illustration of the Region Properties Box

- ⑦ In a multi-areasetup, select the main clock anchor for all regions and the anchors used for clock transfer between regions (either the main clock anchor or a secondary anchor within the area can be chosen, but it is preferable to select the main clock anchor for inter-area clock transfer).
- ⑧ From the chosen main clock anchor within each area and the anchors used for inter-area clock transfer, select one as the root main clock anchor (there should be only one root main clock anchor, and the shorter the link to all other anchors, the better).
- ⑨ Click on the root main clock anchor icon, and a station properties box will pop up. Then click on the "Slave anchor" box in the popup, and choose all anchors that need to transfer clocks across regions.
- ⑩ Follow the clock transfer across regions by clicking on all anchors that need to transfer clocks between regions, and select all anchors that need clock transfer in the "Select From Anchors" box. Ensure that there is a complete clock transfer link from the root clock anchor to the main clock anchor in each area (make sure there is no loop in the clock transfer link).

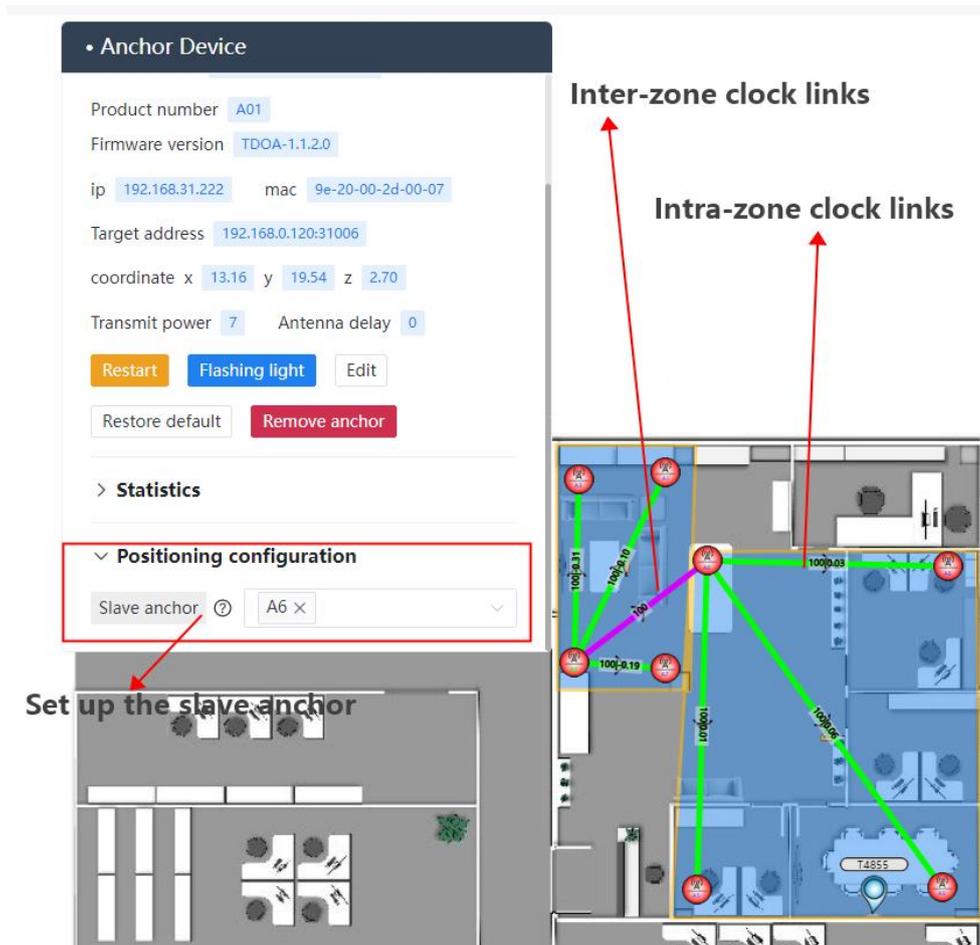


Figure 16: Illustration of Clock Linkage Settings

① After configuring the clocks, click on the "Area and Clock Parameters" in the Positioning Configuration tab. Click the "Save" button to save the data to the server. Then, click the "Make Effective" button to activate the parameters.

② Click on "Global Param," select the locate mode in the system mode selection box, and click the "save and take effect system parameters" button. The system will enter positioning mode, and you can now see the complete clock linkages (including automatically generated intra-area clock linkages). The green lines represent intra-area clock linkages, and the purple lines represent inter-area clock linkages.

(5) Updating Anchor Target Addresses:

① In the Device Management tab, click on Anchor Management. Select the anchors that need to have their target addresses updated by checking the associated anchor selection box.

② In the target address input box, enter the target address in the correct format (e.g., 192.168.xx.254:31006).

③ Click the "Commit property changes" button to update the anchor addresses.

④ The default anchor address is 192.168.xx.254. After modification, the anchor will prioritize connecting to the server with the target address after restarting. If it cannot connect to the server with

the target address, it will still connect to the server with the default address.

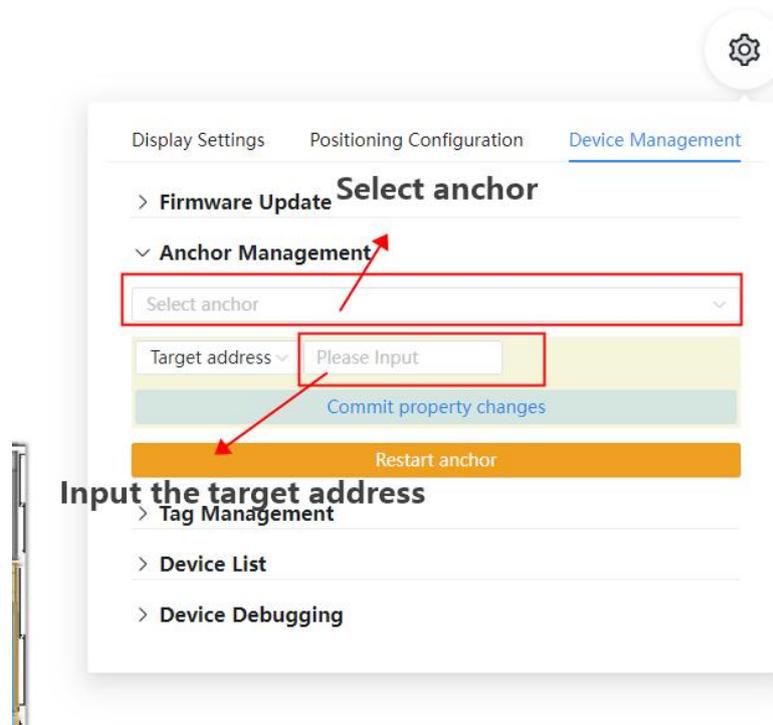


Figure 17: Illustration of Updating Anchor Addresses

4. IPS System Operations

The IPS system operations can be divided into IPS Client (backend) operations and device operations.

4.1 IPS Client Operation

All IPS Client operations are performed on the IPS service webpage. The service webpage address can be found in the displayed address after completing the IPS service deployment.

4.1.1 Home|首页

Function: Supports real-time display of tag positions and trajectories on the floor plan, video linkage, and electronic fence area alarm delineation.

- (1) **Floor Plan Selection:** Choose the floor plan to view tag positions.
- (2) **Tag Position:** The positions of tags in working mode are displayed in real-time on the floor plan.
- (3) **Tag Trajectory:** When the Display Track button is enabled, tag trajectories are shown, with adjustable length in seconds.
- (4) **Tag Search:** Search for the location of a specific tag and navigate to its position.
- (5) **Video Linkage:** Click on the tag for which video linkage is desired, toggle the video linkage switch, and the camera will follow the specified tag's position, displaying real-time footage.
- (6) **Electronic Fence Alarm:**
 - ① Click the "Add Fence" button in the quick operations.
 - ② The cursor enters drawing mode; click to start drawing a polygonal area, making sure the last point coincides with the starting point.
 - ③ Click the drawn area, select the fence trigger type, click "Modify Boundary" to adjust the area boundary, and click "Add Hole" to draw multiple holes within the polygonal area.
 - ④ Click the settings dropdown to configure electronic fence trigger parameters. Set the fence trigger blacklist (no event triggering inside the fence) and whitelist (event triggering inside the fence, empty indicates all).
 - ⑤ Choose fence trigger actions; IPS system supports Modbus, TCP, and UDP protocols. Set protocol addresses and event trigger IO data as per the format.
 - ⑥ Click "Save" to successfully add the area.
- (7) **Tag Collision Alert**
 - ① Click on the tag, then click on the "Edit Parameters" button in the popped-up tag card.
 - ② Click the drop-down menu and configure the parameters for the tag collision event. Set up the collision trigger blacklist (tags within the radius will not trigger collision events) and whitelist (tags

within the radius will trigger collision events; leave it empty to include all). Fill in the collision contour radius (unit: meters) and other parameters.

③ Choose the collision trigger action. IPS system supports Modbus, TCP, and UDP protocols. Set the protocol address and event trigger IO data according to the format.

④ Click the "Save" button, and the collision contour will be displayed in real-time at the bottom of the tag.

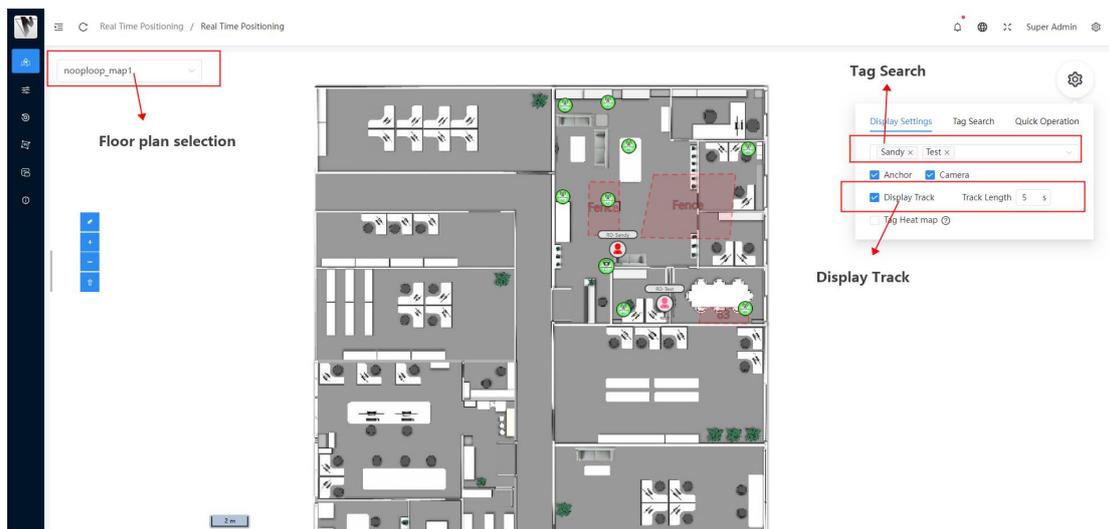


Figure 18: Home Page Illustration

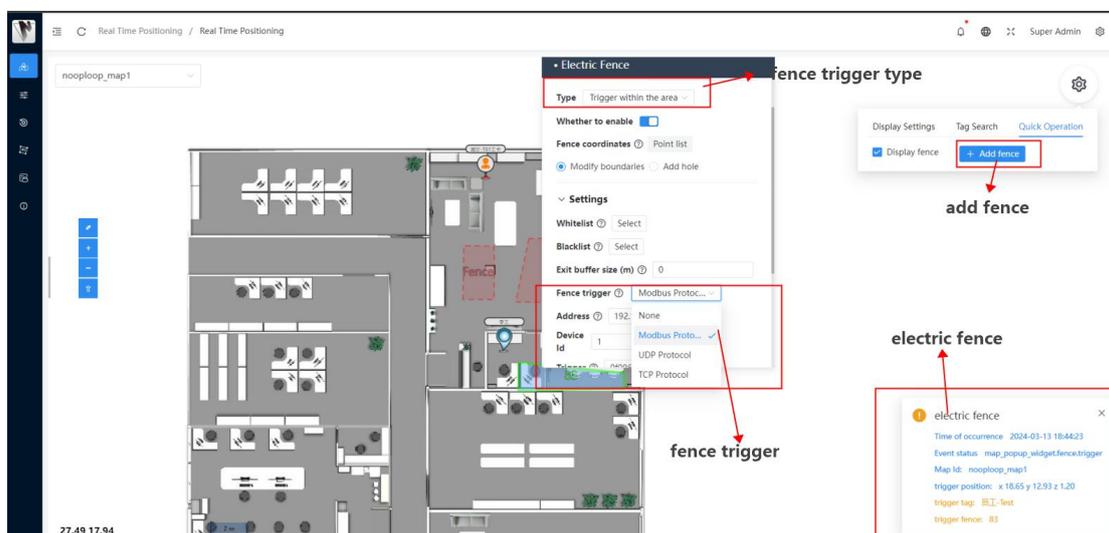


Figure 19: Illustration of Adding Fenced Areas

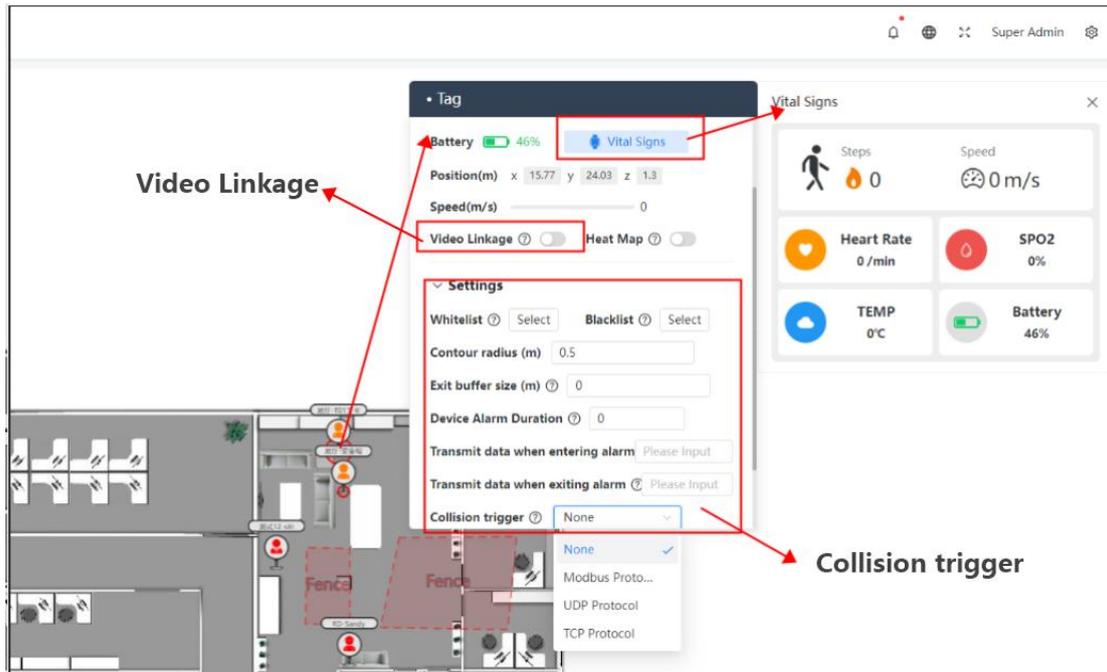


Figure 20: Tag Card Illustration

4.1.2 Device Management

(1) **Display Settings:** Supports tag display, tag search, map zooming, etc.

Function: Supports adding new regions, configuring anchor parameters, updating firmware, modifying anchor addresses, etc.

① **Tag maps:**

- a. Hovering over the map and scrolling the mouse wheel zooms in/out.
- b. Hovering over the map, holding the left mouse button, and dragging moves the map.
- c. Hovering over the map, holding down the shift key, and simultaneously holding the left mouse button and dragging zooms and rotates the map.

② **Device Parameters:** Left-click on a device on the map to open the device information page. Click the edit button to modify device parameters. Click save to apply the changes.

③ **Tag Call:** Click on a tag on the map, then click the call button in the tag's device information page to send a call command to the tag from the server.

④ **Tag Search:** Click on the tag search box, search for a specific tag, and jump to its location on the map.

⑤ **Tag Information Display:** Click on the tag parameter search box, search for a specific tag, and display detailed information about the selected tag.

⑥ **Display Tail:** Enable the display tail button to show the tag tail. The length is adjustable in seconds.

⑦ **Hide Offline Tags:** Enable the hide offline tags button to automatically hide tags when they go offline on the map.

⑧ **Map Ruler:**

- Enable the ruler button, and the cursor becomes a drawing tool
- Single-click the left mouse button to draw the measuring area
- Double-click the left mouse button to calculate the distance of the measuring bounda
- Move the cursor near the measuring area boundary. When the cursor comes with a small blue dot, hold down the left mouse button and drag to modify the measuring boundary.

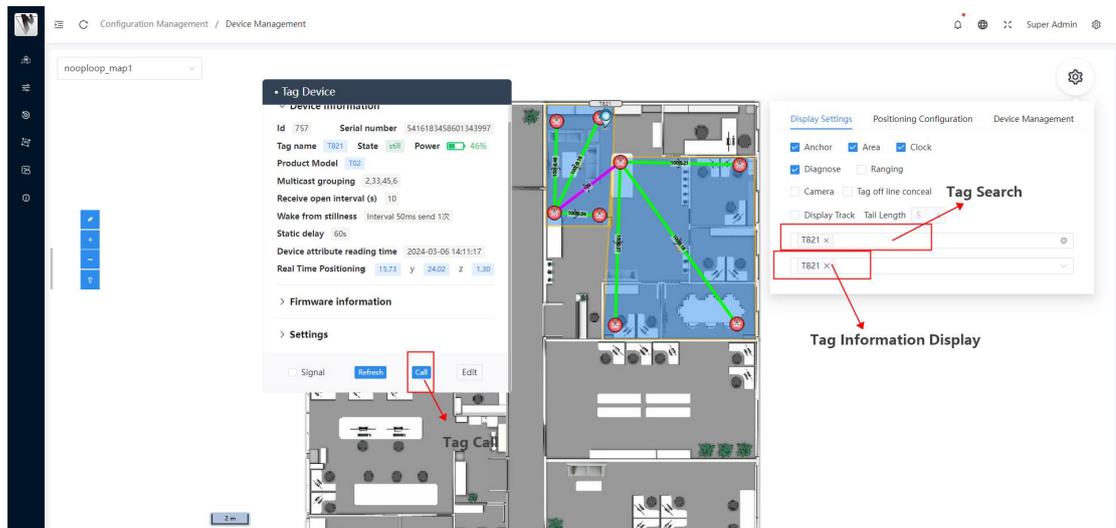


Figure 21: Tag Display Settings Illustration

(2) **Positioning Configuration:** Supports adding anchors, adding regions, configuring positioning parameters, and positioning debugging.

① Adding anchors, adding regions, and configuring positioning parameters were explained in Section 3.3 IPS System Software Configuration and will not be reiterated here.

② **Tag Parameters:** Click on the tag selection box, choose the tag whose parameters you want to modify, click on the tag parameters box, select the parameter to modify, enter the parameter value, click the submit button, and the parameter changes will take effect.

③ **Positioning Debugging:**

- Export Parameters:** Export parameters as a file, including map parameters, anchor configuration parameters, region parameters, etc.
- Import Parameters:** Upload the exported parameter file.
- Record Data:** Click on the recording duration box, enter the recording time in seconds, click the start recording button, and after recording, click the download recording button to save the recorded data locally.

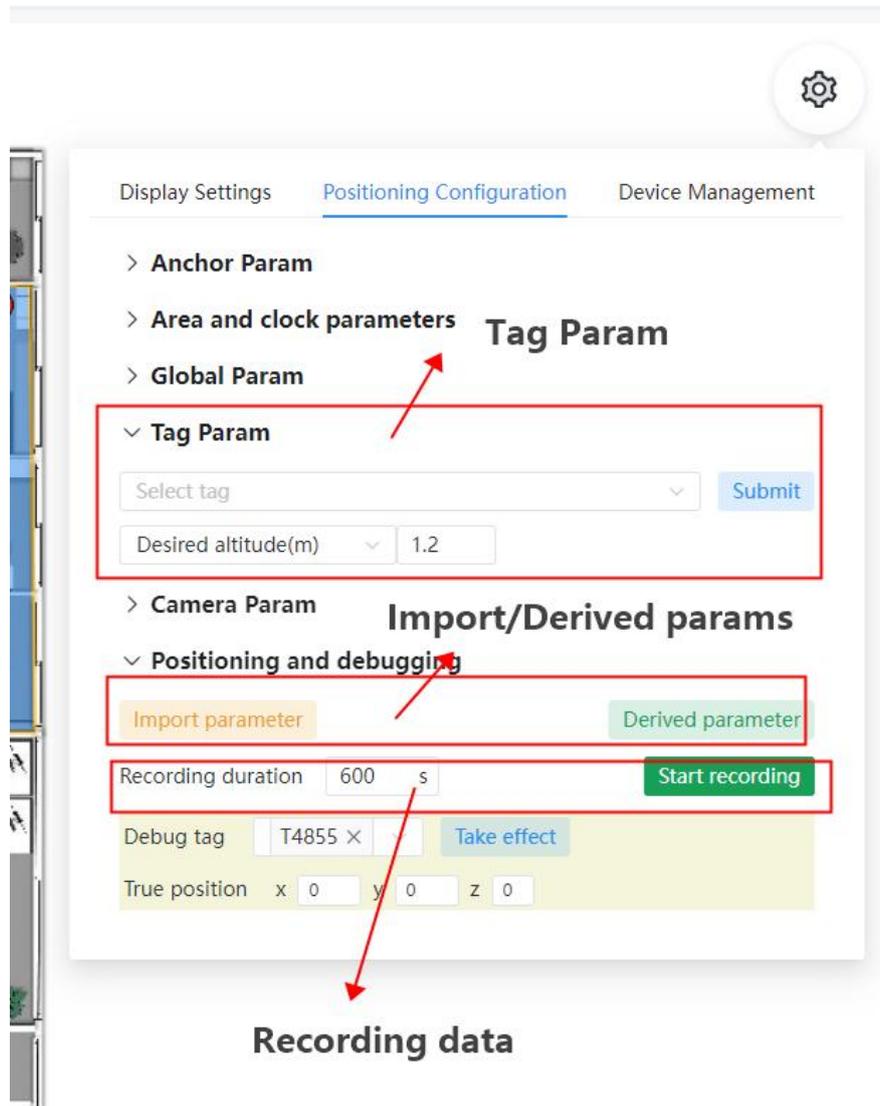


Figure 22:Positioning Configuration Illustration

(3) **Device Management:** Supports batch modification of anchor addresses, batch restart of anchors, firmware updates, etc.

① The function of modifying anchor addresses has been described in Section 3.3 IPS System Software Configuration and will not be reiterated here

② **Firmware Update:**

- a. **Upload Firmware:** Click the "Upload Firmware" button, and a window for uploading firmware will appear. Choose the firmware file, enter the firmware information, and click the "Confirm Upload" button to save the firmware information to the server.
- b. **Upgrade Firmware:** Select the firmware model and version, click the "Upgrade Firmware" button, and the server will start wirelessly updating the firmware for the devices.

③ **Anchor Management:** Click the dropdown box for operation-related anchors, select the corresponding anchor, click the "Restart anchor" button to restart the anchor. Click the "Run/Standby" button to switch the anchor's operating status.

④ **Tag Management:** Click the dropdown box for selecting tags, choose the corresponding tag, select the parameters to be modified, click the "Submit Property Change" button to batch modify tag parameters.

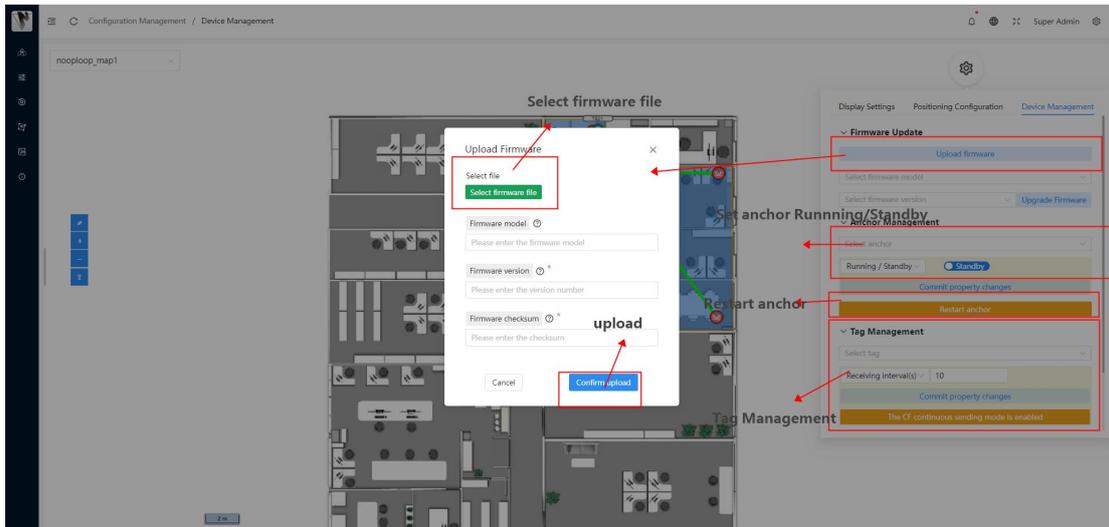


Figure 23:Device Management Illustration

⑤ **Device List Table:** Clicking the "Tag List Table" button will display all tag information on the server, and clicking the "anchor List Table" button will display all anchor information on the server.

Tag List

ID	Product Model	Serial number	Serial number	State	Firmware version	Firmware version read time	Power	dynamic frequency	static period	high expectations	Filter duration	Groupcast	Receive open interval (s)	Property read time
165313	T02	8825890823886381244	TS309	Offline	UP_TDOA3-1.0.0.238	2024-03-11 14:10:39	94%	10	60s	1.2	1		10	2024-03-11 15:23:1
165305	T02	8770178273894786235	TS308	Offline	UP_TDOA3-1.0.0.238	2024-03-11 14:07:37	92%	10	60s	1.2	1		10	2024-03-11 15:10:4
165252	T02	8418806215580321905	TS307	off	UP_TDOA3-1.0.0.146	2024-03-12 10:40:17	195%low power	10	60s	1.2	1			
165251		14712206729074236900	TS306	Offline	UP_TDOA3-1.0.0.146	2024-03-08 16:07:55		10	60s	1.2	1			
164732	T02	4450704859702144805	TS305	Offline	UP_TDOA3-1.0.0.238	2024-03-11 15:11:01	94%	10	60s	1.2	1		10	2024-03-11 15:11:3
...	...	...	...	...	UP_TDOA3-	...	...	...	...	...	...	...	...	...

Total 5321 | Page size: 50

Serial number: Please Input

Device List, Tag List, Anchor List, Device Debugging

Figure 24:Tag List Table Illustration

Anchor List

ID	Serial number	Map Id	Serial number	online	Firmware version	ip	mac	Target address
19713	5202027035580493341	21	A1	Running	TDOA-1.1.2.0	192.168.31.221	9e-1d-00-20-00-07	192.168.0.120:31006
19712	5202027035589083173	21	A9	Running	TDOA-1.1.2.0	192.168.31.236	9e-25-00-44-00-07	192.168.0.120:31006
19676	52020270355866854950	21	A5	Running	TDOA-1.1.2.0	192.168.31.105	9e-26-00-22-00-07	192.168.0.120:31006
19711	5202027035587249166	21	A7	Running	TDOA-1.1.2.0	192.168.31.136	9e-20-00-20-00-07	192.168.0.120:31006
19674	5202027035589082647	21	A6	Running	TDOA-1.1.2.0	192.168.31.153	9e-27-00-5f-00-07	192.168.0.120:31006
20389	5202027035588821022	21	A5	Running	TDOA-1.1.2.0	192.168.31.25	9e-1e-00-40-00-07	192.168.0.120:31006
20392	5202027035588886557	21	A3	Running	TDOA-1.1.2.0	192.168.31.251	9e-1d-00-41-00-07	192.168.0.120:31006
20391	5202027035587575840	21	A2	Running	TDOA-1.1.2.0	192.168.31.222	9e-20-00-20-00-07	192.168.0.120:31006

Current map only Serial number

Total 8 Page size 50

Figure 25:Anchor List Table Illustration

⑥ **Device Debugging:** Click on the Data Transparent Test button to open the Data Transparent Test window.

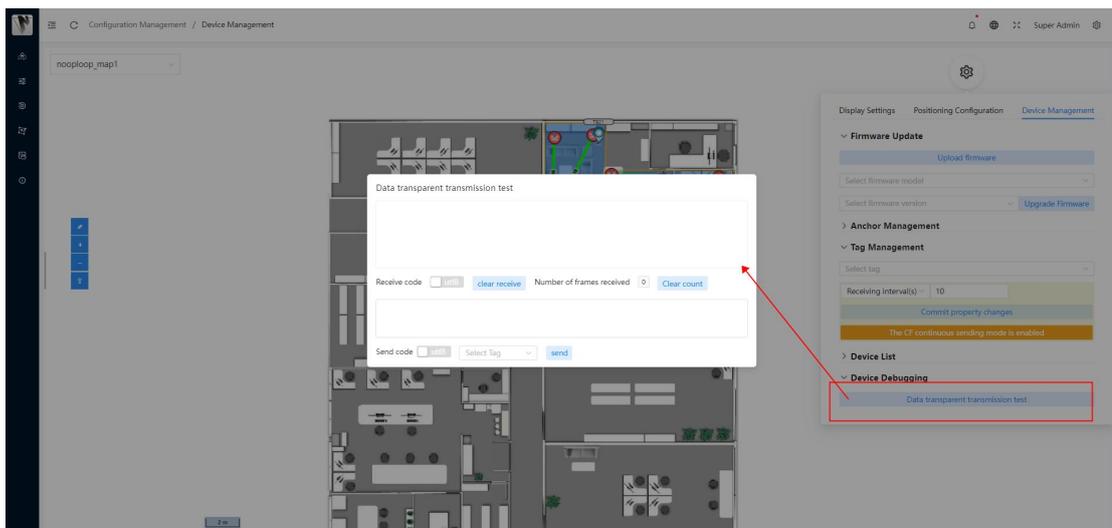


Figure 26:Data Pass-through Test Illustration

4.1.3 Track Of History

Function: Supports historical trajectory playback for tagged devices.

(1) **Tag Playback:** View the historical trajectory of a specific tagged device.

- ① Select the tagged device for which you want to view the historical trajectory.
- ② Choose the time period for reviewing the tag's trajectory.
- ③ Click the play button below to start playing the historical trajectory of the selected tag.



Figure 27: Illustration of Historical Trajectory

- (2) **Map Playback:** View the historical trajectories of all tags within a specified map. The operation is similar to tag playback and will not be reiterated here.

4.1.4 Incident Record

Function: Alarm records for electronic fences, crowd gathering, and area overcrowding

- (1) **Alarm Record Table:** View the historical records of alarm events.

Details	Event type	Event status	Warning time	Operate
>	electric fence	In progress	2024-03-13 19:19:33	Alarm track Real-time position
>	electric fence	In progress	2024-03-13 19:18:33	Alarm track Real-time position
>	electric fence	In progress	2024-03-13 19:17:33	Alarm track Real-time position
>	electric fence	In progress	2024-03-13 19:16:33	Alarm track Real-time position
>	electric fence	In progress	2024-03-13 19:15:33	Alarm track Real-time position
>	electric fence	In progress	2024-03-13 19:14:33	Alarm track Real-time position
>	electric fence	In progress	2024-03-13 19:13:33	Alarm track Real-time position
>	electric fence	In progress	2024-03-13 19:12:33	Alarm track Real-time position
>	electric fence	In progress	2024-03-13 19:11:33	Alarm track Real-time position

Figure 28: Incident Record Management Illustration

4.1.5 Organization Management

Function: Supports the addition of departments for the segmented management of employees and assets.

(1) **Department Management:** Establish departments included in the IPS system for convenient departmental management.

- ① Click the "Add Department" button, enter department information, and add the department.
- ② Click the edit button in the department column table to modify department information.

Click the delete button to remove the corresponding department.

- ③ Click the "Switch to Organizational Structure Figure" button to display the organizational structure figure, supporting right-click editing of department information.

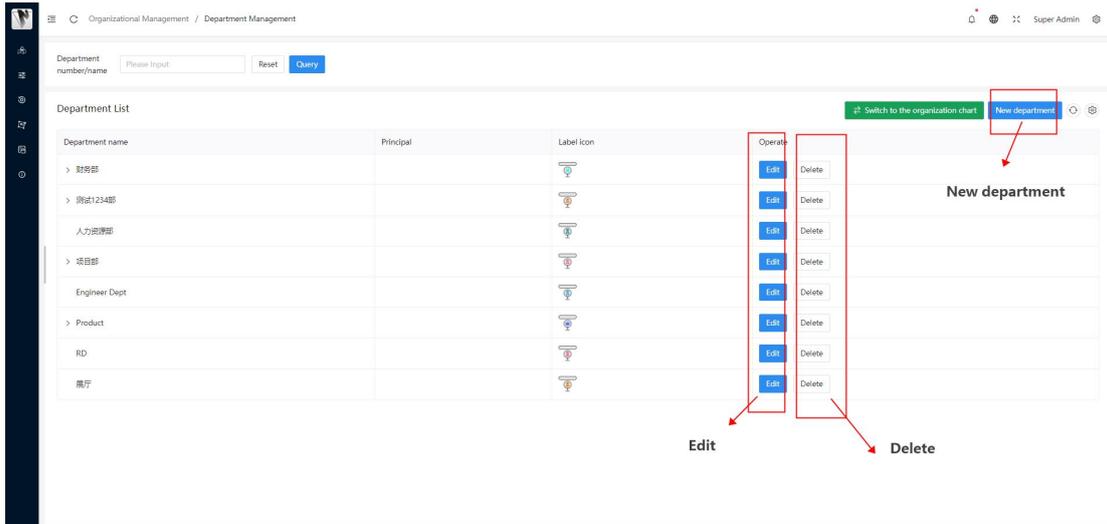


Figure 29:Department management Illustration

(2) **Employee Management:** Managing employee information.

- ① Click the "Add Employee" button to add new employee information.
- ② Click the "Bind/Unbind Tag" button to establish or remove the association between employees and tags.

employees and tags.

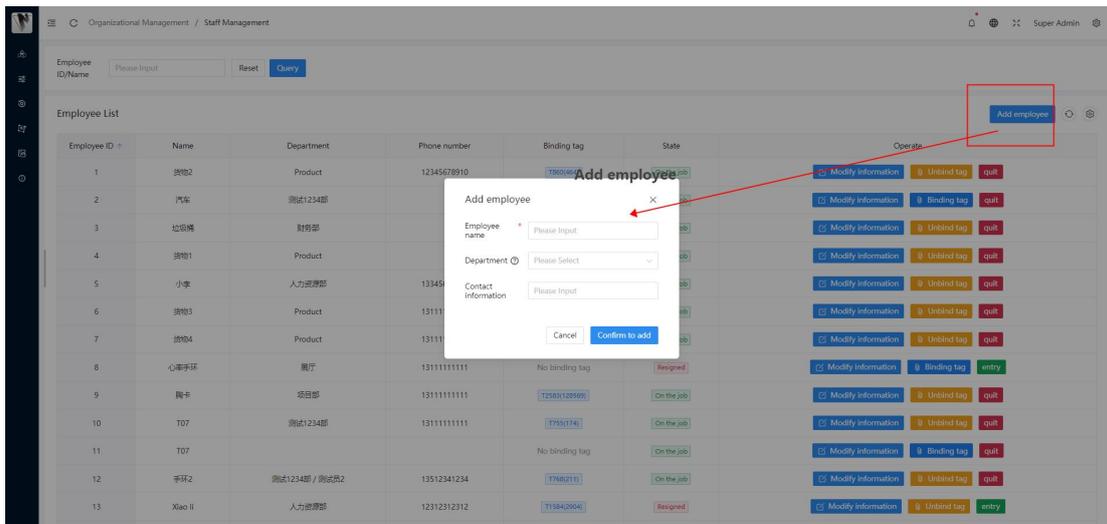


Figure 30:Asset Management Illustration

(3) **Asset Management:** Management of departmental assets.

- ① Click the "Add Asset" button to add new asset information.
- ② Click the "Bind/Unbind Tag" button to establish or remove the association between the asset and the tag.

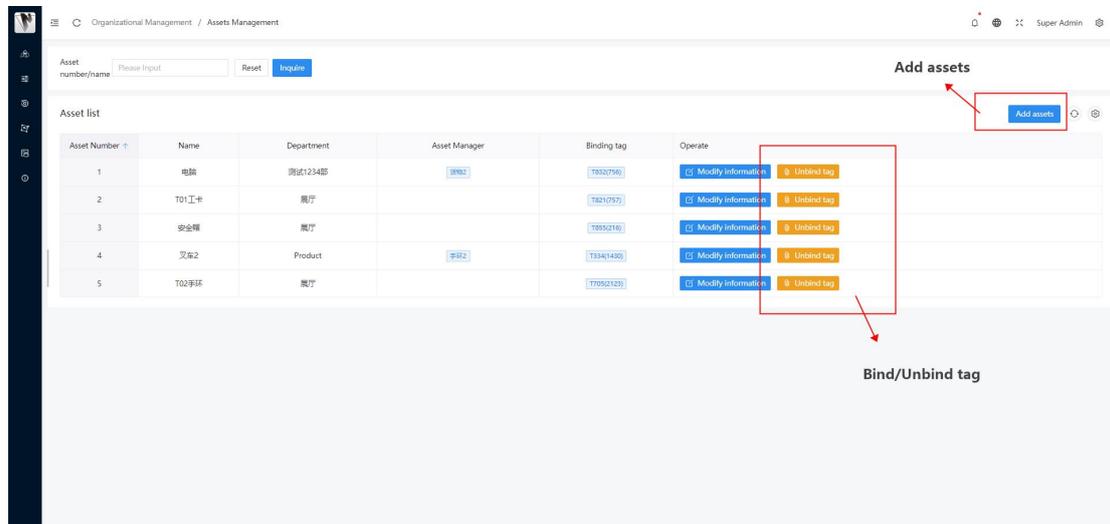


Figure 31: Asset Management Illustration

5. FAQ

Q1. How is the anchor coordinate system determined?

It is realized by constructing a anchor coordinate system, specifically defining the origin of the anchor coordinate system (generally taking the lower left corner of the room ground Figure as the origin), X, Y, and writing the coordinates relative to the anchor coordinate system to the anchor.

6. Update Log

Table 5:Update Log

Version	Date	Description
1.0	20221118	● Release of the first edition of the manual
1.1	20221205	● Add license configuration and video linkage configuration
1.2	20230817	● Update IPS system deployment, IPS system configuration, IPS system operation section
1.3	20240312	● Update IPS label power supply instructions, IPS system software configuration, IPS system operation section

7. Further Information

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