DADISICK®

LDS TYPE FILPS User Manual

V.201904

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1. Document description

1.1 Reminders

This manual provides methods and considerations for the use of the DADISICK LiDAR Diagnostic and Configuration Software (FILPS). In order to use the software safely and properly, users should also note:

- Proper installation and electrical connection of equipment for Endeavour's lidar products.
- Comply with the safety operation regulations and general safety norms in the workplace for lidar products.

This manual is intended for equipment installation and debugging engineers.

Important note	Before using the FILPS to operate the DADISICK lidar product, please read the lidar product manual and user manual carefully, and be familiar with the features and functions of the product.

1.2 Software Description

FILPS is used for equipment management, functional configuration and operational status checking of DADISICK lidar products.

The requirements of FILPS for the operating environment are as follows:

- Operating system:
  - Microsoft Windows 7 / 8.1 / 10 (32/64 bit Chinese and English operating system).
  - Windows XP SP3 (32 bit Chinese and English operating system).
  - Windows Server 2008 (64 bit Chinese and English operating system).
- CPU: Intel Pentium4.3.0@1.4 GHz or higher.
- Memory: 1GB or more.
- Memory: 256MB or higher.
- Display resolution: 1024*768 or higher

1.3 Description of engagement

In this manual, the following agreements have been made to simplify the narrative：

- Lidar: Measurement Lidar and Intelligent Obstacle Avoidance Sensor Products from AkuSense, Shenzhen.
- FILPS: Lidar diagnostic and configuration software provided by Shenzhen AkuSense.
- Click: click the left mouse button.

- Double click: double click the left mouse button.
- Right click: right click on mouse.
- Double-click the right: Double click the right mouse button.
- Drag and drop: hold the left mouse button, drag and drop.
- Roll - up: mouse wheel scrolling up.
- Roll down: mouse wheel scrolling down.

Description	Some of the pictures in this manual are schematics. Please refer to the actual FILPS interface.

1.4 Software application

The FILPS software functions described in this manual apply to the following lidar products:

LDS TYPE

Please contact our sales personnel for the appearance, technical information and methods of use of the above products, please refer to the product manual, user manual and concise user manual for each type of product.

1.5 Description

The purpose of this manual is to provide technicians with information on the software installation and functional operation of FILPS. Please read the chapters of this manual sequentially. This manual (In order) includes:

- Software installation and operation
- Software function description
- Online device discovery
- Project management
- Device Configuration
- Data display
- Regional monitoring configuration
- Running status monitoring
- Troubleshooting

1.6 Description of graphic symbols

Prudent operation	**Meaning:** Potentially dangerous situations, if not prevented, may cause general bodily harm.
Attention	**Meaning:** Potentially harmful situation, if not prevent, may cause equipment damage.
Important note	**Meaning:** Useful advice and tips for efficient and smooth use of equipment and software
Main points	**Meaning:** Information about equipment and software critical features.
Explanation	**Meaning:** Background knowledge of technical issues.
Description	**Meaning:** Additional information.
Related reading	**Meaning:** Relevant documentation that can provide more information.

1.7 Customer services

If you have any questions about FILPS, please feel free to contact us. Our technical support contacts are as follows:

Tel：0769-81108586

Fax：0769-81177455

E-mail：dadidgljc@126.com

2. Software installation and operation

The installation and operation of FILPS are as follows:

- Unzip the package to the current folder under the working path, and the "FILPS" directory will appear in the current folder.
- Access to the "FILPS" directory and find the "FILPS.EXE" file.
- On Windows 10, right-click on "FILPS. EXE" and select "Run as Administrator".
- For other Windows systems, double-click " FILPS.EXE " directly.
- The FILPS startup screen will appear, and after a few seconds, the FILPS will start up and run.

Main points

When the FILPS is first run on a Windows10 system, the following image pops up:

Please check "Public network,..." Option and press the “Allow Access” button.

3. Software function description

Main points	This chapter briefly describes the functions, software interface and key terms of FILPS. Please read this chapter carefully before using FILPS.

3.1 Overview

FILPS is used for equipment management, functional configuration and operational status checking of DADISICK lidar products. Its various functions are briefly described below:

- Online device discovery: automatic discovery of lidar on the network.
- Project management: Cluster management of lidar by deployment area or application function.
- Equipment Management: Configure and monitor the lidar in the current project. Specific functions include:
  - Device configuration: display and configuration of the basic operating parameters of lidar.
  - Regional monitoring configuration: Configuration of lidar with Regional monitoring function
  - Operational Status Monitoring: Real-time Monitoring of Operational Status of Lidar.

3.2 Online device discovery

FILPS automatically discovers networked DADISICK laser radars, which are called online devices. After the lidar is activated, its configuration information is broadcast on the network. FILPS automatically listens to the online lidar and lists all online DADISICK lidar devices in the “Online Device” form.

The "Online Device" form is located in the main window of the FILPS, as shown in "**Figure 3.1 Online Device Form**".

Figure 3.1 Online Device Form

3.3 Project Management

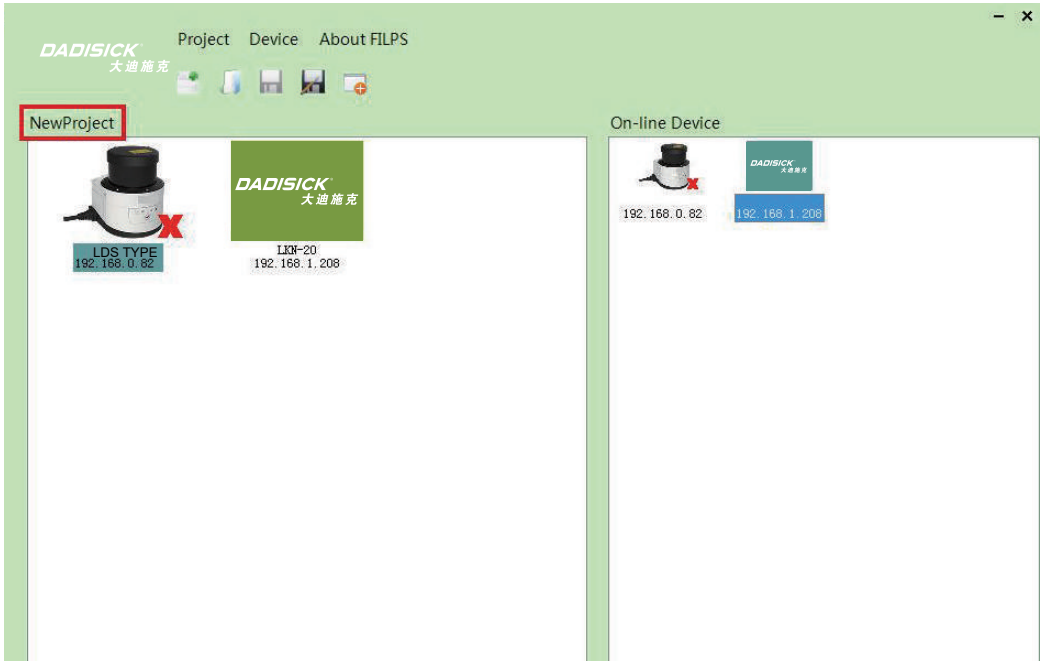
FILPS manages lidar on a project-by-project basis, which can be planned according to the deployment area of lidar. For example, in the security precaution application, the lidar deployed in “SD2” is uniformly divided into SD2 projects. It can also be planned according to the application functions of lidar, for example, in highway traffic monitoring applications, all speed measuring lidar are uniformly divided into the "Speed measuring LiDAR" project.

You can choose to join the lidar in the project from the on-line lidar discovered automatically by FILPS, or you can input the IP address of the lidar manually and add it to the project, and the lidar in the project can be deleted.

Established projects can be saved locally, and you could use maintenance can be opened directly to manage and maintain the lidar in the project.

The device information in the current project is displayed in the Project window, and the Project form is located in the main window of the FILPS, as shown in “**Figure 3.2 Project Form**”.

Figure 3.2 Project Form



3.4 Device management

For the lidar in the current project, FILPS completes the configuration and operation monitoring of the lidar in the "Device" Window. Double-click the lidar icon in the current project, and if the FILPS is able to connect to the lidar network, a “Device” form will pop up, as shown in “**Figure 3.3 Device Window**”.

The function of the device window consists of three parts, namely:

- Device Configuration: This is done by the "Device Configuration" form, which is

opened by double-clicking the "Device Configuration" entry in the function selection form.

- Regional monitoring configuration: Through the "Regional Monitoring Configuration" form, double-click the "Regional Monitoring Configuration" item in the function selection form to open this form.
- Run Monitoring: This is done by the "Run Status" form, which is opened by double-clicking the "Run Status" entry in the function selection form.

You can click on the function form tab at the bottom to switch between the various functional forms that have been opened.

Figure 3.3 Device Window

3.4.1 Device Configuration

For lidar online in the current project, FILPS displays its device configuration parameters in the “Device Configuration” form in the “Device " window, as shown in “Figure 3.4 Device Configuration Form” .At the same time, edit and modify the modifiable items (such as scan frequency, function switch, network configuration, zone selection mode of area monitoring function) in its running configuration parameter. The modified device configuration parameters can be uploaded to the device and will take effect when the device restarts.

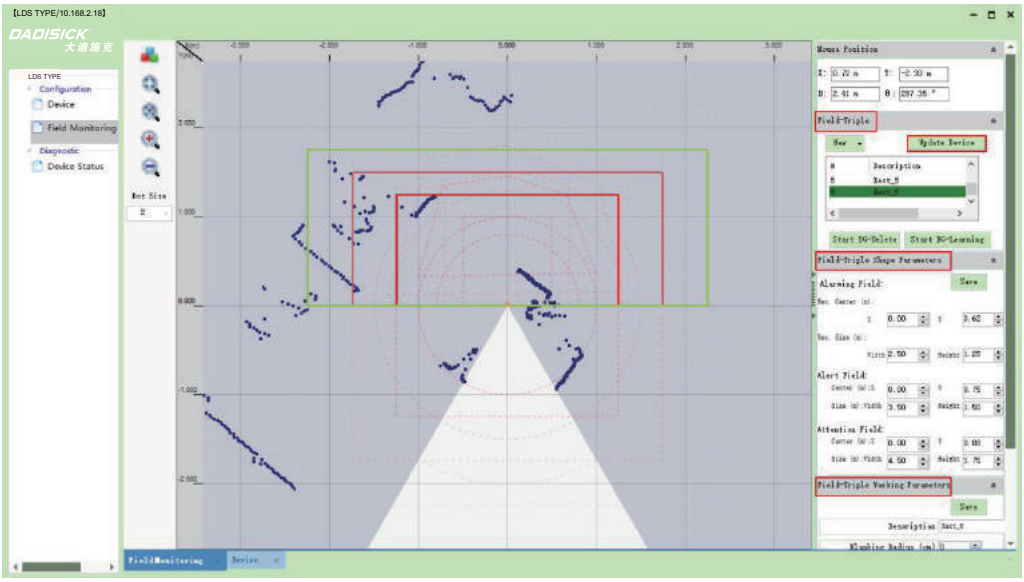
Figure 3.4 Device Configuration Form

3.4.2 Regional monitoring configuration

For lidar online in the current project, FILPS displays its device configuration parameters in the “Device Configuration” form in the Device window, as shown in “**Figure 3.5 Regional monitoring configuration form**”, At the same time, edit and modify the modifiable items (such as scan frequency, function switch, network configuration, zone selection mode of area monitoring function) in its running configuration parameter. The modified device configuration parameters can be uploaded to the device and will take effect when the device restarts.

The modified operating parameters can be uploaded to the device and will take effect after the device is restarted.

Figure 3.5 Regional monitoring configuration form

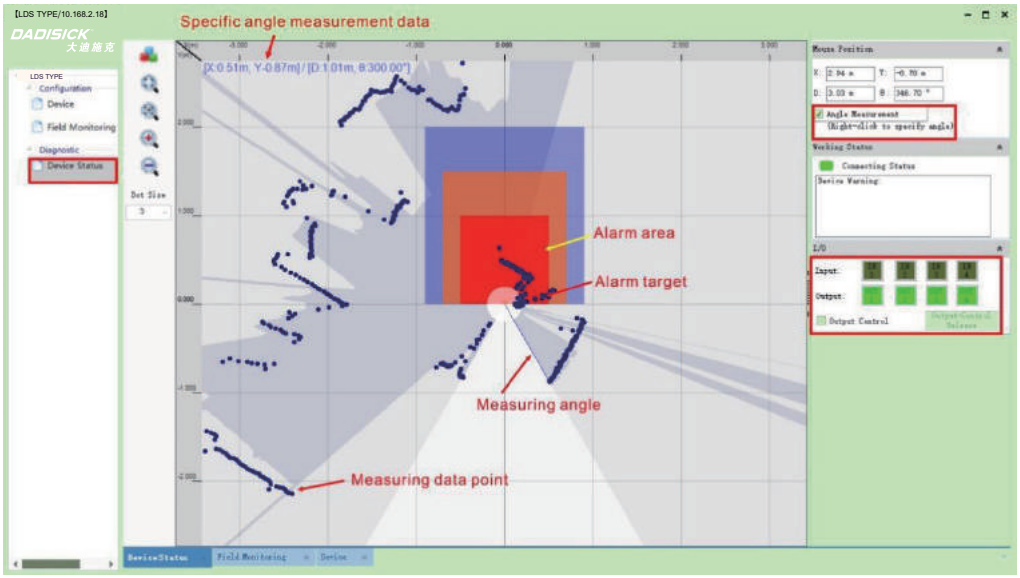


3.4.3 Operational status monitoring

For the laser lidar on-line in the current project, FILPS displays its current measurement data and its current running state in the “Device” window, (Such as "**Figure 3.6 Running status form**"), There are Including the I/O interface”, the connection state of the device and the alarm state of the device, the I/O interface can be controlled directly.

If the lidar has zone-monitoring features and the function is enabled, the output status of zone-monitoring is also displayed in the “Run State Form.”

Figure 3.6 running status form



4. Online device discovery

When the lidar starts, it automatically broadcasts its device configuration information on the network, which the FILPS listens for and displays in the online device form. The display includes the device icon for the lidar, the device description, the IP address and the current network connection status, The device icon is a radar model appearance diagram, the device description default is device type, the current network connection status includes "online" and "off-line" as shown in "**Figure 4.1 Online Devices**".

When the mouse moves to the device icon, the pop-up float displays more information about the lidar, including the device description, IP address, device model and serial number, as shown in "**Figure 4.2 on-line device information**".

Figure 4.1 Online Devices

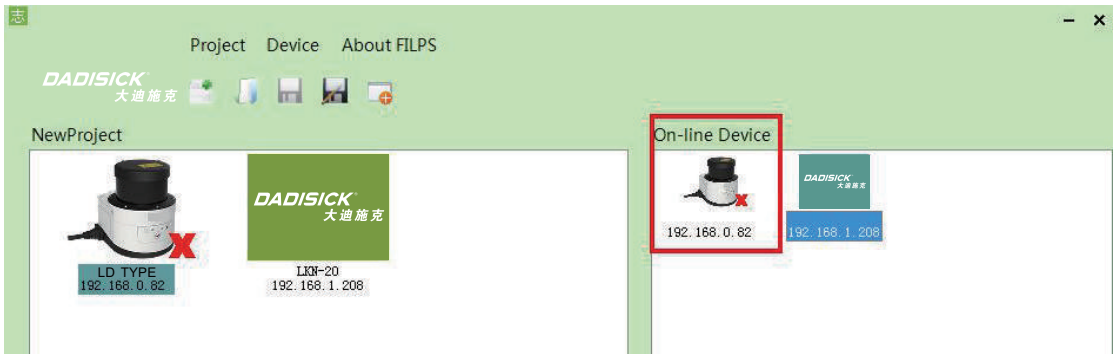
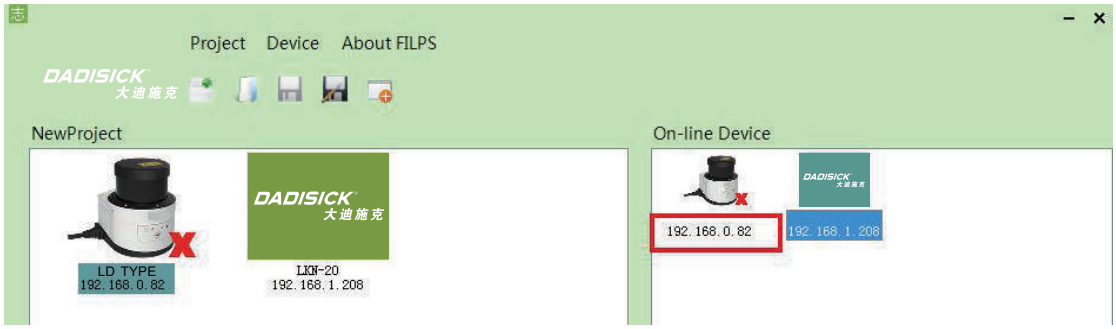


Figure 4.2 on-line device information



During the lifetime of the FILPS, if the FILPS no longer receives the broadcast of the equipment information of the laser radar that was found, the network state of the lidar will be "disconnected".

Main points	• For more information on the broadcasting and receiving/controlling mechanism of equipment information on the Internet, please read the "Product Application" - "Network Configuration and Device Detection" section of the Operational Manual for Various Types of Lidar. • To ensure that the PC running FILPS is able to receive equipment information from the lidar broadcast, There is a need to ensure that the multicast address "237.1.1.200" and the UDP port "2111" used by the lidar for equipment information broadcasting are operational on the network. To do this, the PC/ Windows network security settings need to be configured properly to enable the FILPS to receive the UDP network packet normally on the UDP port "2111". If the PC and lidar are connected over a network switch, it is also necessary to ensure that the network switch supports the multicast address and UDP multicast on the UDP port as described above.

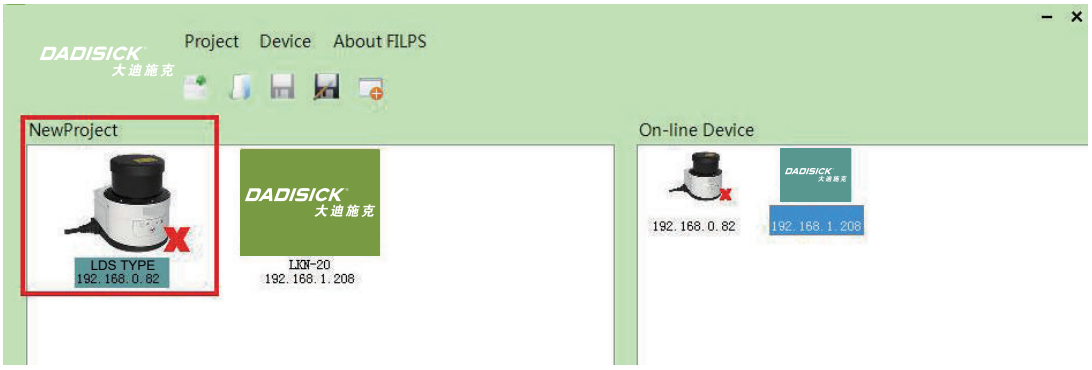
5. Project management

5.1 Project management content

The specific content of the project is all the laser radars belonging to the project. The display content in the project form is the device icon, device description, IP address and network connection status of the laser radar, as shown in “**Figure 5.1 Project Display Content**”. The device is described as a brief name for the lidar, such as the “Northeast Angle Radar”, which can be edited, see “5.4 Editing Device Descriptions”. When the mouse is moved over the device icon, the lidar information displayed in the pop-up floating window is the same as in the online device form.

First you need a new project, see "5.2 New Project". The lidar in the project can be added and deleted, see "5.3 Added Equipment" and "5.5 Deleted Equipment". You can save the project after editing it, see "5.6 Saving Project". Existing projects can be opened, see "5.7 Open Projects". The method for deleting items is shown in 5.8 Delete items.

Figure 5.1 Project Display Content



5.2 New Project

After the FILPS is started, the current project defaults to “New Project”. As shown in “**Figure 5.2 New Project**”, the project management operation can be performed in the new project and the project can be saved.

You can create a new project in the main window at any time during the run of the FILPS by:

- Use the menu item "Project" → "New" of the FILPS main window, as shown in "**Figure 5.3 Creating a New Item Using Menu Items**".
- Press the "New" button in the shortcut button, as shown in "**Figure 5.4 Using the shortcut button to create a new project**".

Figure 5.2 New Project

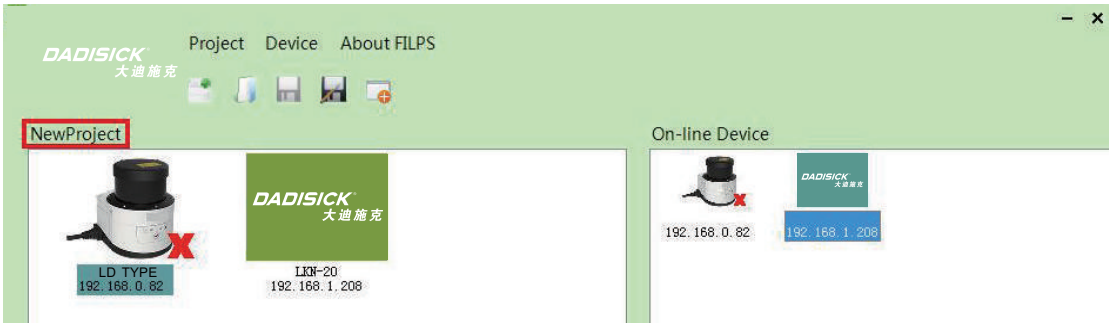


Figure 5.3 Creating a New Item Using Menu Items

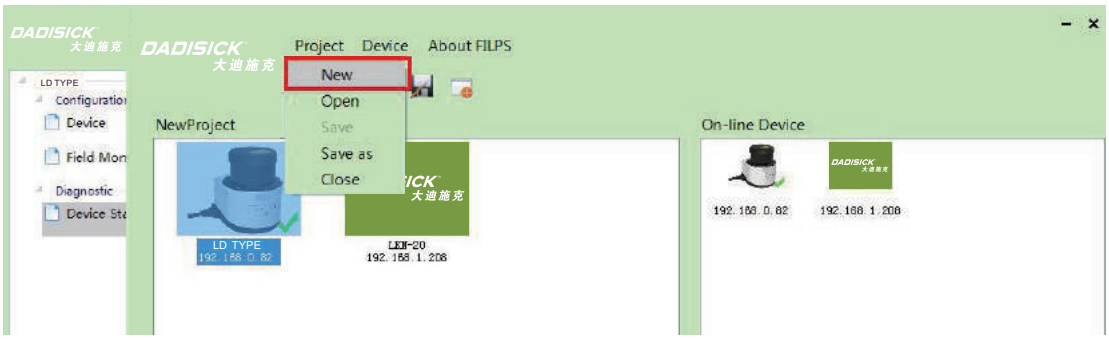
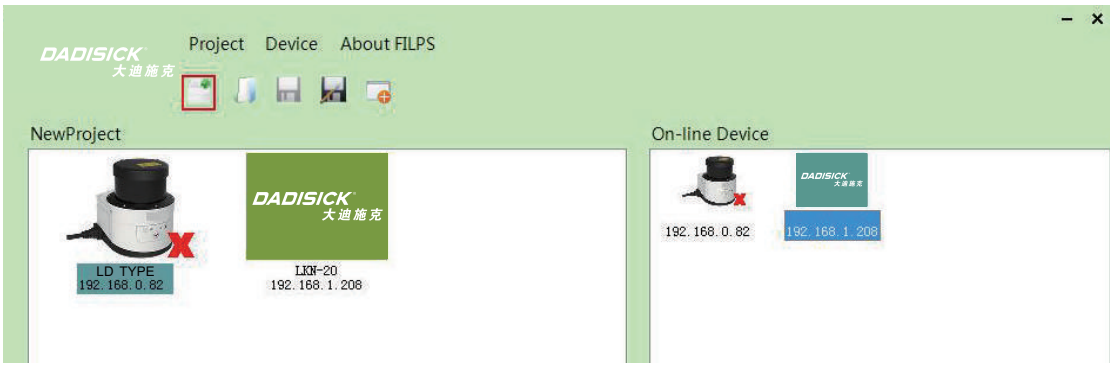


Figure 5.4 Using the shortcut button to create a new project



5.3 Additional equipment

There are two ways to add lidar to a project:

- Double-click the icon of the lidar you want to add in the “online device” form, when the selected lidar is added to the project.
- If the network problem causes the lidar that is working properly on the network to be found in the "Online Device" form, you can add the item manually. Use the menu item "Device" → "Manually Add" in the main FILPS window, or press the "Add Device " button in the shortcut menu bar and enter the IP address of the lidar to be added, at which point the lidar is temporarily added to the project, as shown in "**Figure 5.5 Manually Add Device**". The new device is named Unknown Device, as shown in “**Figure 5. 6 Unknown Device**”. After double-clicking its icon, if the FILPS is able to

establish a network connection with the lidar, its icon and device description in the project form are updated.

Related reading

Please read the "Product Application" - "Network Configuration and Device Detection" section of the Laser Radar's Out-of-Factory Network Configuration Information in the User Manual for Various Types of Lidar.

The device description for the new device is defaulted to the device type and can be edited. See "5.4 Edit Device Description".

Figure 5.5 Manually Add Device

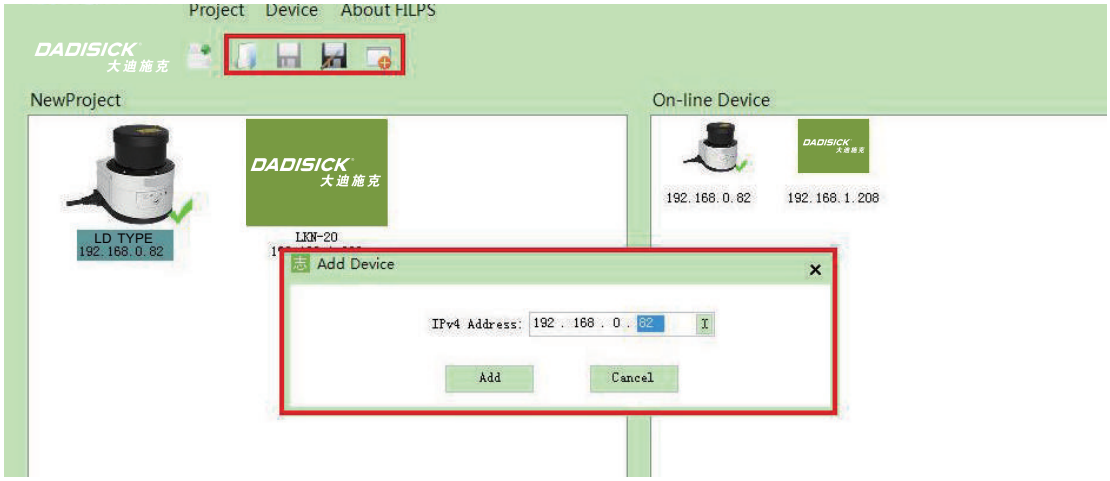
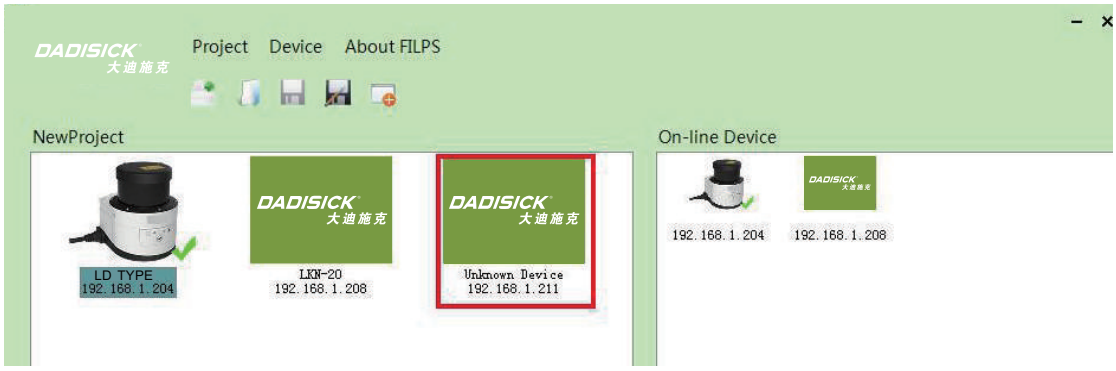


Figure 5. 6 Unknown Device

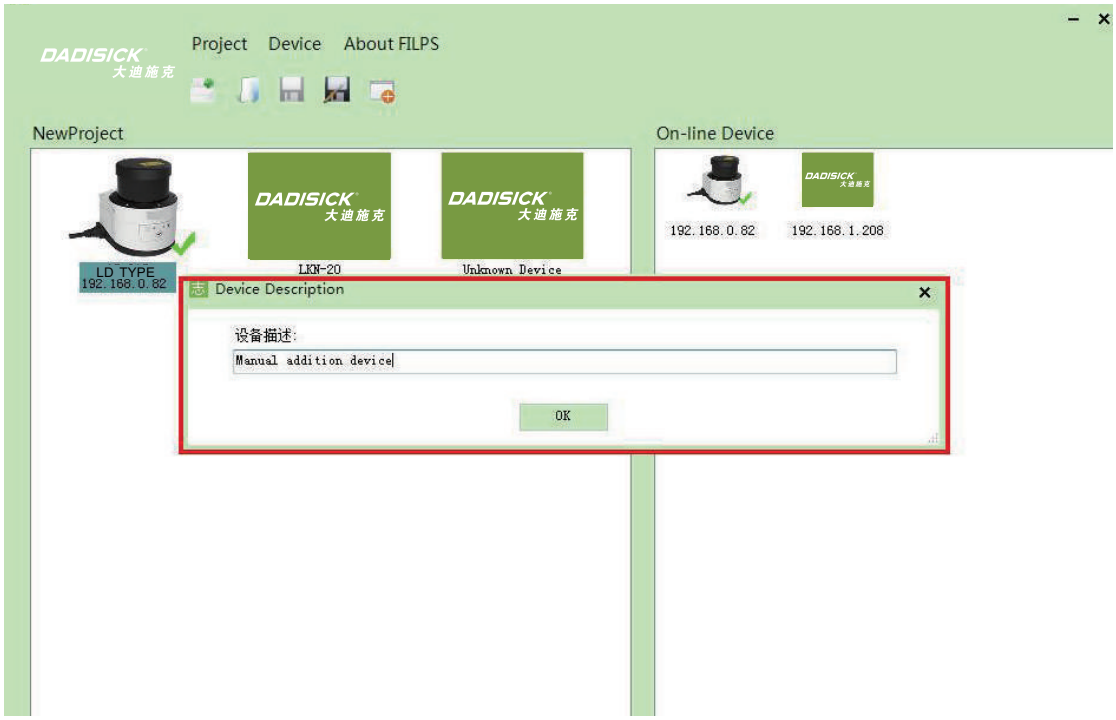


5.4 Edit Device Description

The equipment description for the laser lidar is edited in the project by:

- Right-click on the device icon, the floating menu bar appears, and select the “Edit Device Description” item in it, as shown in “**Figure 5.7 Edit Device Description**”.
- After entering a new device description in the Device Description Edit dialog and validating it, the device description of the device is modified and takes effect.

Figure 5.7 Edit Device Description

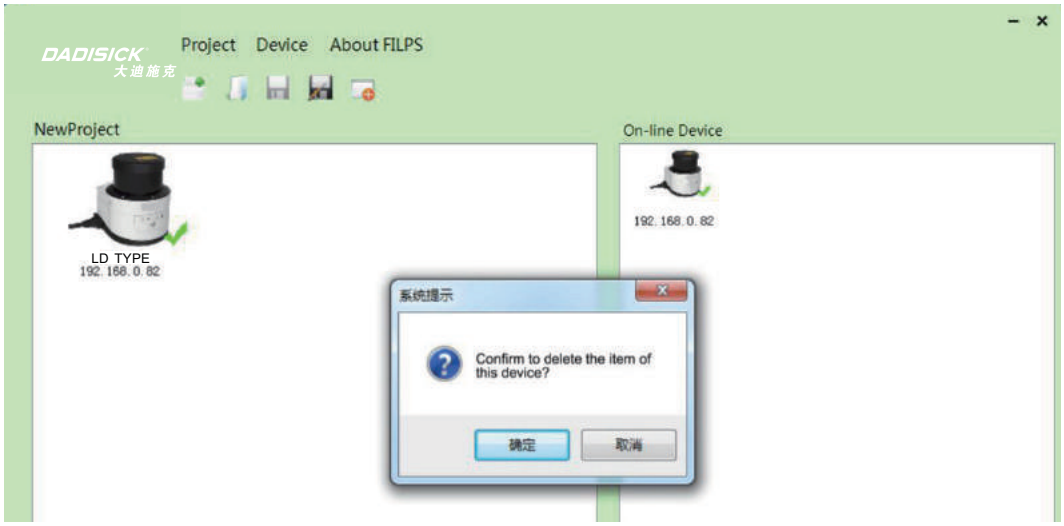


5.5 Deletion of equipment

The method for removing the lidar from the project are:

- Right-click on the device icon, a floating menu bar appears, and select one of the “Delete” items, as shown in “Figure 5.8 Delete Devices”
- After you confirm the deletion, the device is removed from the current project.

Figure 5.8 Delete Devices



5.5 Save project

The method for saving the project in the FILPS as follow:

- Use the menu item "Project" → "Save" of the main window of FILPS, as shown in "**Figure 5.9 Saving items using menu items**"
- Use the menu item "Project"→ "Save As" in the main FILPS window, as shown in "**Figure 5.10 Use Menu Item Save Item**", and then you can enter a name for the additional item.
- To save a new project, use the menu item “Project”→”Save As “in the main FILPS window and enter the project name.
- Press the “Save” button in the shortcut button, as shown in “**Figure 5.11 Use the shortcut button to save the project**”.
- Press the “Save As” button in the shortcut button, as shown in “**Figure 5.12 Use the shortcut button to save the item**”.

The suffix for the saved project file is "filps",which is located in the path selected during the project save process.

Figure 5.9 Saving items using menu items

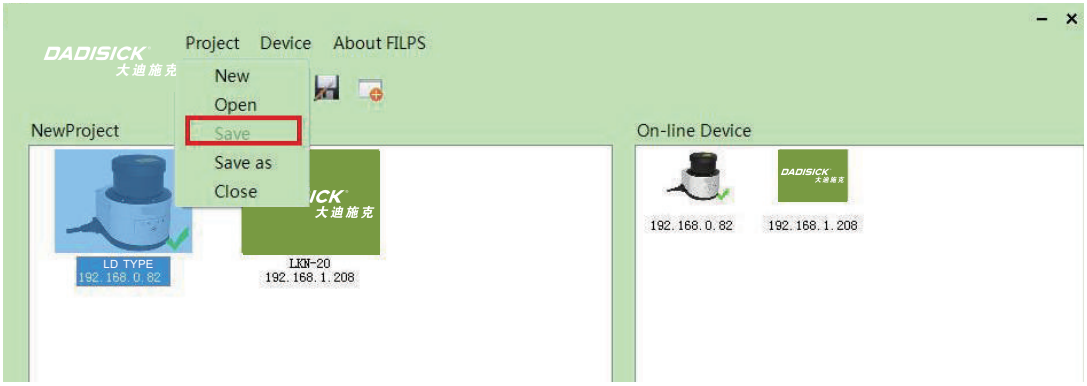


Figure 5.10 Use Menu Item Save Item

Figure 5.11 Use the shortcut button to save the project

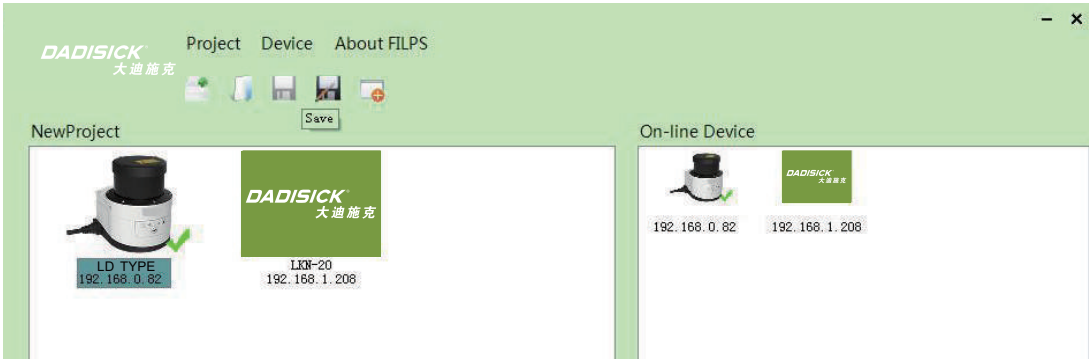


Figure 5.12 Use the shortcut button to save the item

5.7 Open projects

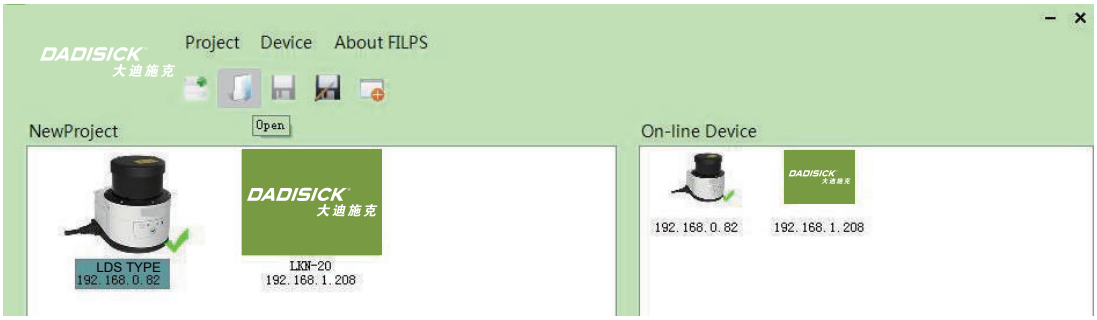
The way to open a project in FILPS is:

- Use the menu item "Project" → "Open" of the main FILPS window, as shown in "**Figure 5.13 Open Project with a menu item**".
- Press the "Open" button in the shortcut button as shown in "**Figure 5.14 Opening a Project with a Shortcut Button**".

  FILPS will list all ".filps" files in the selected path for opening.

Figure 5.13 Open Project with a menu item

Figure 5.14 Opening a Project with a Shortcut Button



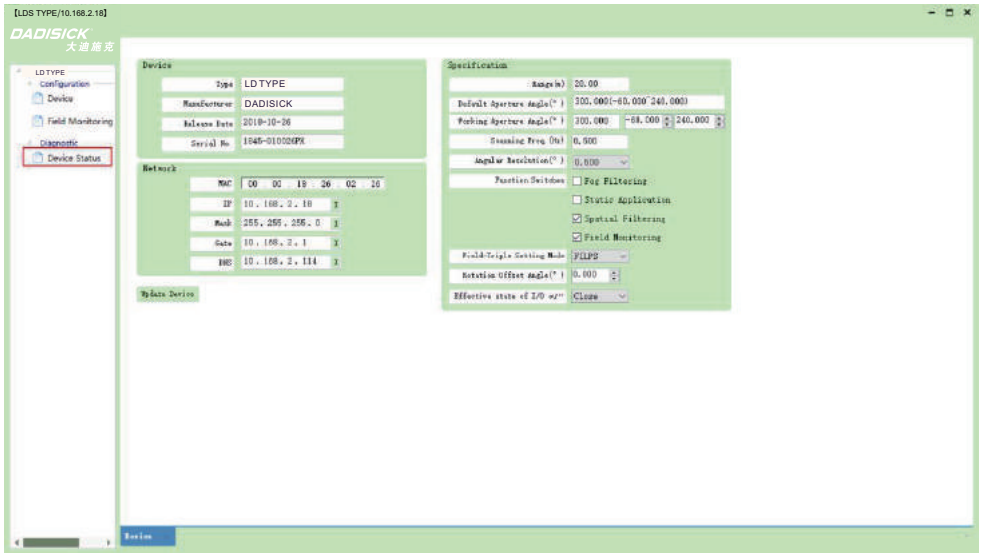
5.8 Delete items

To delete the FILPS project, use the resource manager to enter the file directory where the project file is located, and delete the ".filps" project file directly.

6. Device configuration

Double-click the laser lidar icon in the current project, and if filps can establish a network connection with the device, the corresponding device window will be opened.Double-click the “Device configuration” entry in the feature selection form on the left side of the device window, and the “Device Configuration” form will be opened if the form has been opened, you can switch to the Device Configuration form using the Device Configuration form tab at the bottom of the device window, as shown in “**Figure 6.1 Open Device Configuration Form**”. In this form you can browse to check the device configuration parameters and modify the configuration parameters, and then upload to the device, it will be effective after the device restart.

Figure 6.1 Open Device Configuration Form



Important note

- If the same IP address exists in an online device, the FILPS cannot reliably connect to the lidar network.
- Double-click the on-line device to check that the IP address of the online device is the same, If the same needs to first cut off the network connections of other people with the same IP, then connect to the online device and modify its IP address, please see "6.2 Network Configuration".

6.1 Product information

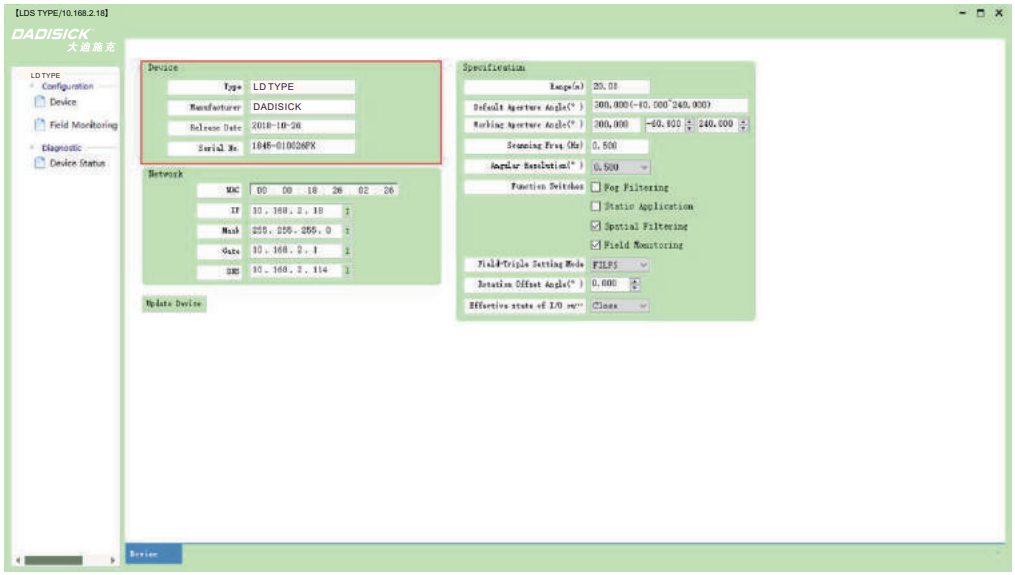
The basic information of the lidar is displayed in the “Product Information” column, as

shown in “**Figure 6.2 Product Information**”, including:

- Product type: model code for lidar.
- Manufacturers: manufacturers of lidar.
- Ex-factory date: original or returned factory date.
- Serial number: a unique identification code for the product.

The above information cannot be modified.

Figure 6.2 Product Information



Related reading

For information on product serial numbers, please read the "Product Description" - "Equipment Serial Number" in the User's Manual for Various Types of Lidar.

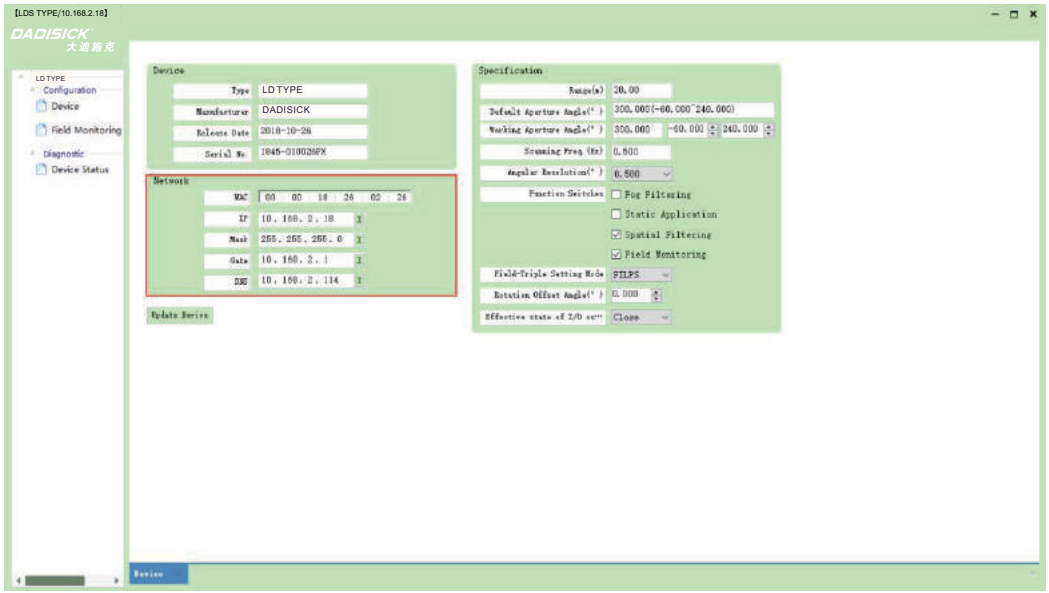
6.2 Network configuration

Display the TCP/IP network configuration information for the lidar in the Network Configuration column, as shown in “**Figure 6.3 Network Configuration**”,there are including:

- MAC address
- IP address
- Sub-net mask
- Default gateway
- DNS

All of the above configurations can be modified directly within the corresponding edit box for each project.

Figure 6.3 Network Configuration



6.3 Running Configuration Parameters

Prudent operation

Before modifying the running configuration parameters of the device, be sure to fully understand the operating characteristics of the device and the actual meaning of the parameters. Incorrect parameter configuration may result in the device not functioning properly and may even require a return to factory for repair.

The running configuration parameters of the lidar are displayed in the “Run Configuration Parameters” column, as shown in “**Figure 6.4 Operation Configuration Parameters**”, there are including:

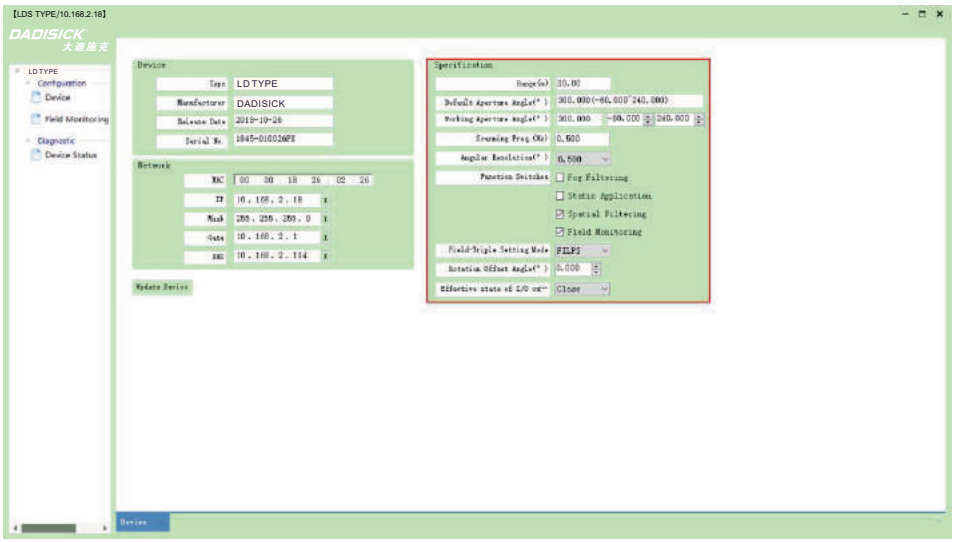
- Range: The maximum value of the effective range measurement data of the lidar, in cm, can not be modified.
- Equipment scanning angle range: the basic scanning angle range of Lidar, the unit is °, can not be modified
- The range of effective scanning angle: The range of effective scanning angle of lidar under the condition of on-site installation is °, which can be modified according to the actual operating conditions, and can't exceed the range of scanning angle of the equipment.
- Scanning frequency: the number of scans per second of the lidar, which cannot be modified.
- Scanning angle resolution: Lidar's scanning angle resolution in °, some models can be modified.
- Function switch: Optional function switch related to measurement, there are

including:

- Rain and fog filtration:If enabled, the lidar filters measurements that may have been triggered by rain, smoke and dust to prevent the measurement data from interfering with the measurement data of the actual target.
- Static application:If started, the lidar will perform temporal filtering on the measured data to improve the stability of the background data in the scene.
- Spatial filtering: If started, the lidar will perform spatial filtering on the measured data, eliminating most of the unstable edge point measurement results.
- Regional monitoring: If the current model of the lidar has Regional monitoring, it can be activated via this switch. At this time, the lidar performs regional monitoring according to the configuration of the regional monitoring function, and outputs monitoring signals through I/O interfaces and TCP/IP network messages.

- Regional Group Selection Mode: If the current model of lidar has a regional monitoring function, the selection model of the regional group used for area monitoring can be configured by this selection box, there are including:
  - FILPS: The area group number used by the regional monitoring function is determined by the FILPS software settings.
  - Input port: The zone group number used by the regional monitoring function is determined by the current input value of the input port.
  - Scanning rotation offset angle: The rotation angle of the equipment coordinate system for measuring data can be fine-tuned to make the measurement data easy to use, for example, the measurement data on the ground can be parallel to the X axis of the equipment coordinate system.
  - I/ O output signal valid state: I/ O output signal (not including device ready signal) can be configured to specify "on" or "off" as valid signal state.

Figure 6.4 Operation Configuration Parameters



Important note

- For the setting method of "effective scanning angle range", please read the "Device Installation" - "Adjusting the Scanning Angle Range" section of each model of the Lidar User Manual.
- The setting of "scan frequency" should be determined according to the requirements of the application. The higher the scan frequency, the lower the scanning angle resolution and the sparseness of the measurement data. However, the shorter the time interval of each scan is, the more suitable for the rapid application.
- The measurement data of close-range small target after "rain fog filter" is likely to be filtered. The measurement data should be carefully selected according to application requirements, For technical information, please read the "Product Application" - "Subject of Technical Application" - "Smoke Penetration of Rain and Fog" section of the Laser Radar User Manual for each model.
- "Static Applications": The laser radar that measures from a stationary position can enable this switch, where the measurement data in the scene background is more stable and the sensitivity of the application algorithm is improved.
- "Spatial Filtering": Used to eliminate unreliable edge

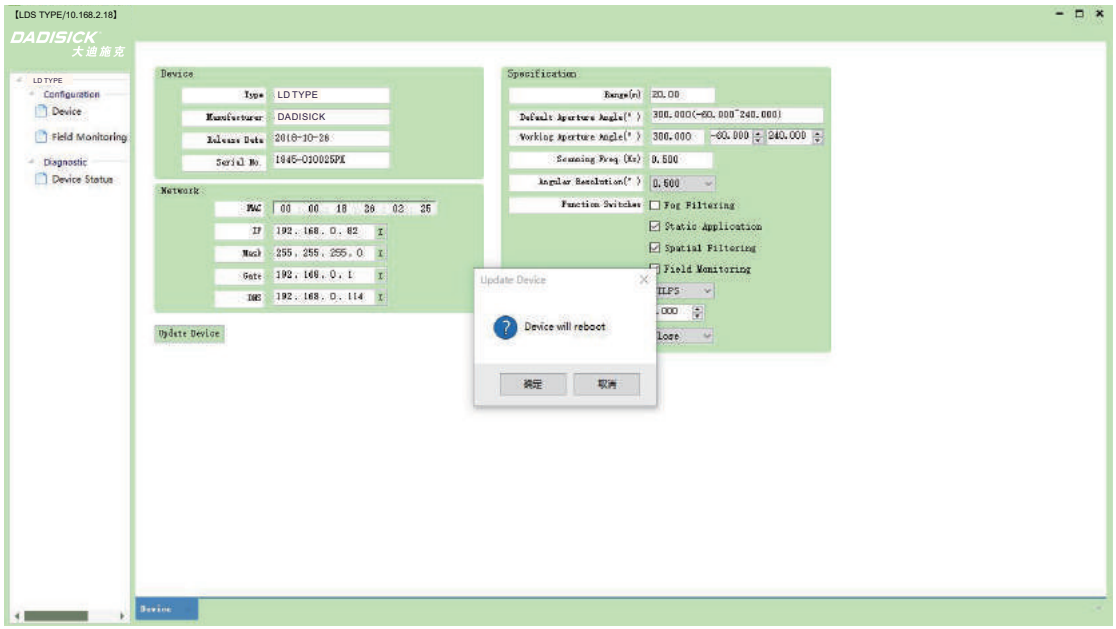
point measurement data in measurement data, which should be enabled under normal circumstances. For technical information on edge point measurement, please read the section "Product Application" - "Technical Application Topics" - "Pseudo Edge Points" in each model laser lidar user manual.

- "Regional monitoring": Please read "technical specifications" in the product manual of the lidar product used to determine whether the lidar has a regional monitoring function. For technical information and methods of use of regional monitoring functions, please read the section "Product Application" - "Description and Application Development of Regional Monitoring Functions" in the Operational Manual for Various Types of Lidar.
- “Regional group selection mode”: Please read the “Product Application” - “Regional Monitoring Function Instructions and Application Development” - “Regional Group and Monitoring Area Group” section of each model of the Lidar User Manual.

6.4 Uploading device

When the device is configured, press the "Upload Device" button, as shown in "**Figure 6.5 Upload Operation Configuration Parameters**", and the current configuration data will be uploaded to the lidar, which will reboot after saving the configuration data. When the device network connection state in the project form and the online device form changes from "off-line" to "online", the lidar is running with the new configuration parameters.

Figure 6.5 Upload Operation Configuration Parameters



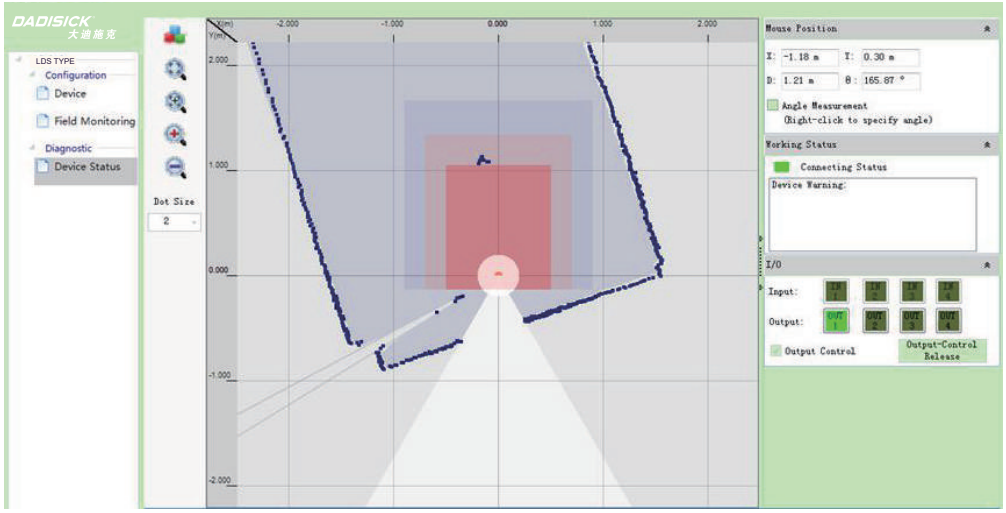
7. Data Display

When the "regional monitoring configuration" or "running status" form is opened, the FILPS will display the radar measurements and the location of the mouse. If laser radar has regional monitoring function, FILPS shows the shape of the monitoring area group (" regional monitoring configuration "form) and the operation of the regional monitoring function (" status" form). The user interface layout shown in the measurement data, the regional monitoring configuration, and the regional monitoring operation status is shown in "**Figure 7.1 display interface layout**".

The description of the display interface is as follows:

- Display area: used to display current measurement data, regional group shape and area monitoring function operation state.
- Display function area: function button used to adjust and control display area contents.
- "Coordinate information" TAB: display the coordinate information of the mouse in the display area, and can check the measurement data of the specific scan Angle.

Figure 7.1 display interface layout



7.1 Display Region Content

The display region is used to display the current measurement data of the laser LiDAR, the shape of the monitoring rigional group and the running state of the regional monitoring function. The layout is as shown in “**Figure 7.1 Display region layout**”, the display mode is as follows :

- Meaurement data: Displayed with dark blue dots in data image region.
- Monitoring Regional Group Shape Data: Displayed in the “Regional Monitoring

Configuration" form, displayed in the data image region along with the measurement data, and the boundaries of attention region, warning region and alarm region are indicated in green, orange and red dots respectively, The boundary of the currently edited regional group is a solid line, while the boundary of the other regional groups is dotted line, as shown in "**Figure 7.3 Monitoring regional group shape data**" .

- regional monitoring function operational status: displayed in the "Running State" form and in the Data image region with the measurement data, The active attention region, warning region and alarm region are in blue, orange and red respectively， the triggered region is bright and the unlighted region is dark；
- Ruler: At the top of the data image region and at the left side of the radar device coordinate system, the general position of the measuring point and monitoring region can be seen intuitively through the ruler.

Figure 7.2 Display region layout

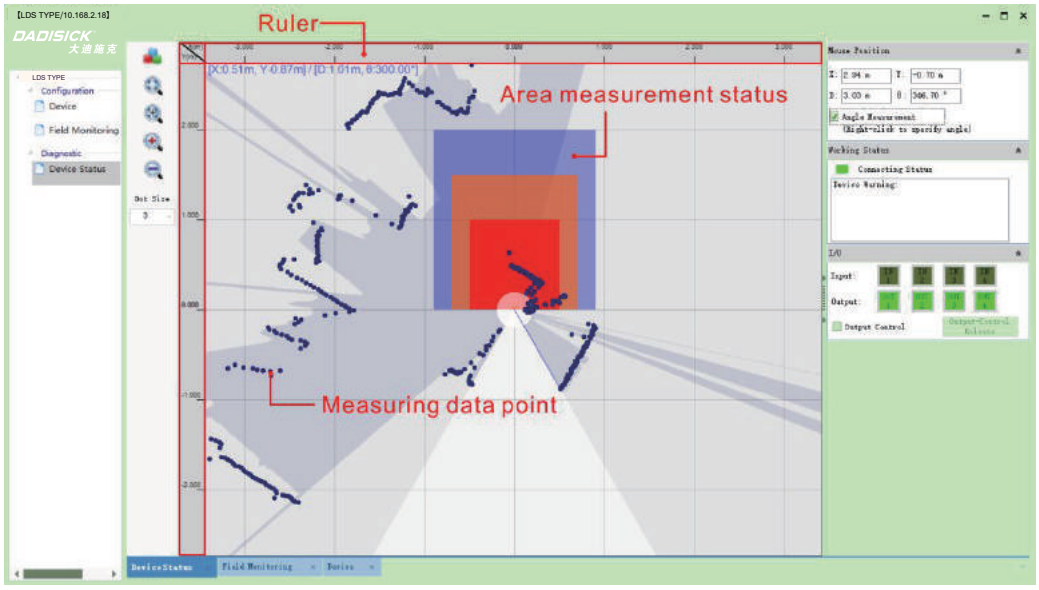
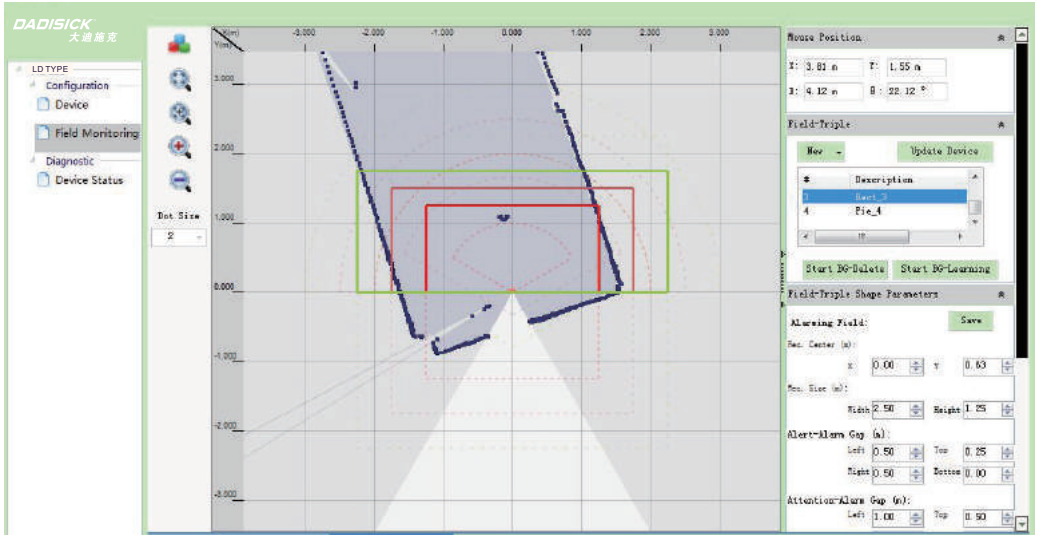


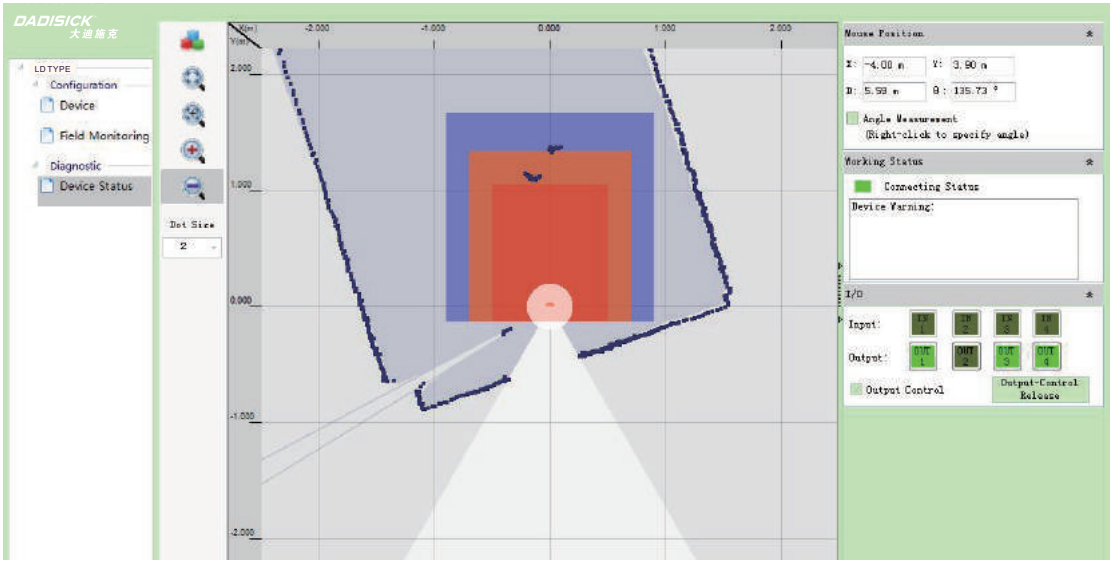
Figure 7.3 Monitoring regional group shape data



7.2 Roaming

Hold down the left mouse button to drag up, down, left and right in the data image region to roaming the diplay content within the data image region，as shown in“Figure 7.4 Display content roaming”

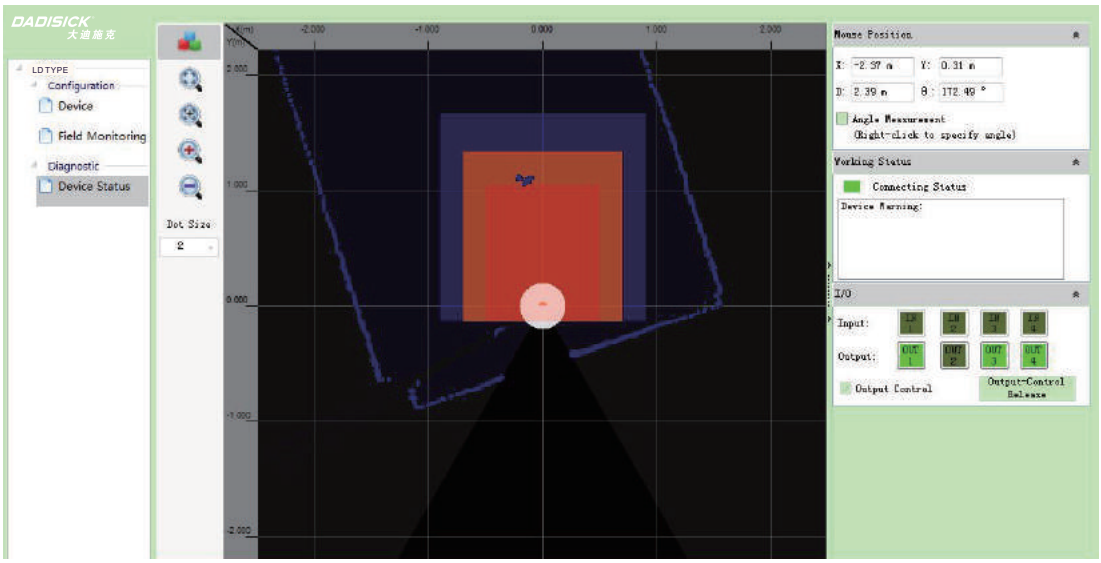
Figure 7.4 Display content roaming



7.3 Background Color Switching

Using the “Style” button in the display region, you can switch the background color of the data image display region between black and white, as shown in **“Figure 7.5 Display background color switch”.**

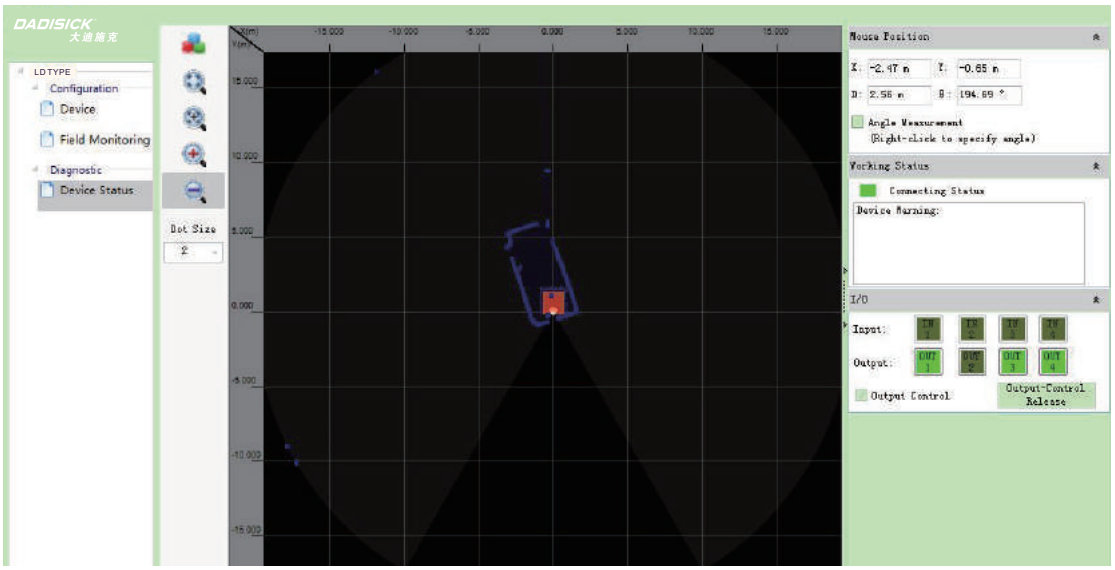
Figure 7.5 Display background color switch



7.4 Reveal All

Using the "Auto" button in the display region, the display range of the display region can be adjusted to the meauring range of laser LiDAR. In this case, all the measured data and regional monitoring information will appear in the data image region, as shown in **“Figure 7.6 Display all”**

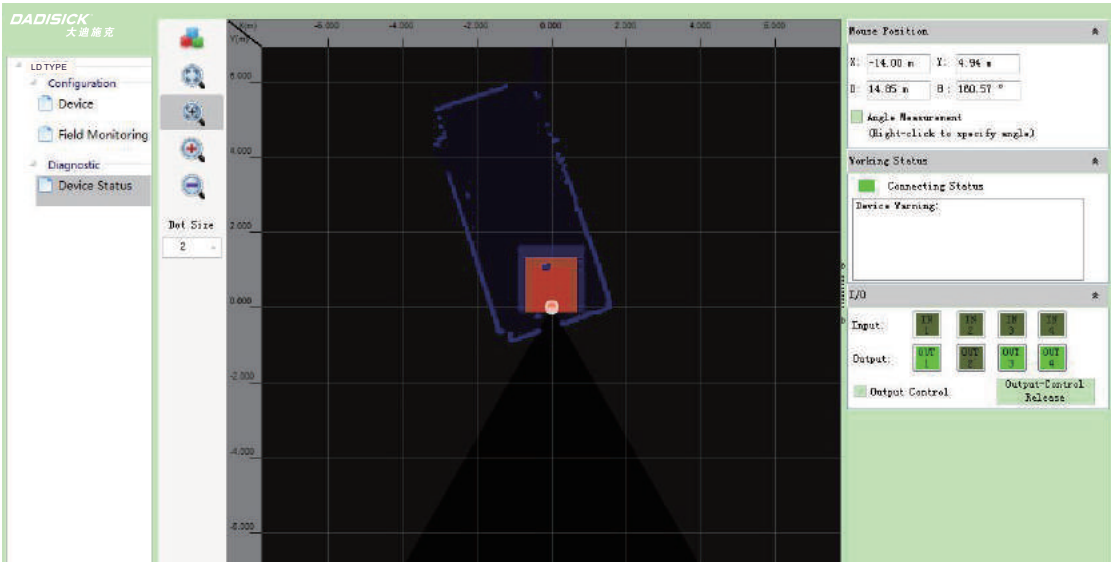
Figure 7.6 Display all



7.5 Center Display

Using the “Center” button in the display region, you can directly adjust the coordinates of the currently displayed proportion of the display to the central location of the data image region, as shown in **“Figure 7.7 Center display”**.

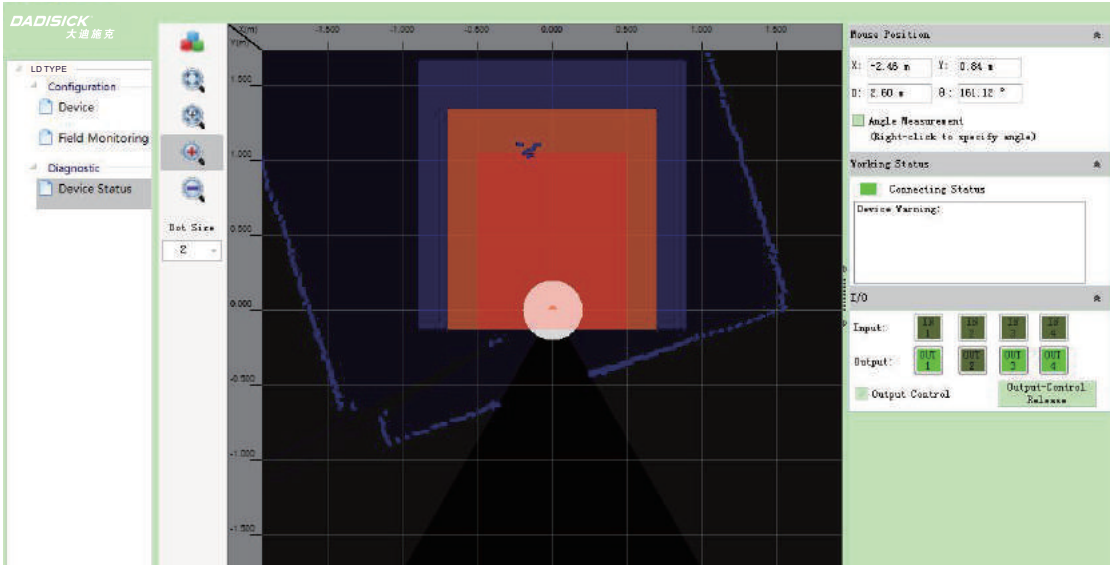
Figure7.7 Center Display



7.6 Zoom In

Using the “Zoom in” button in the Display region, or scrolling down the mouse pulley, you can reduce the display ratio and zoom in the display content, as shown in **“Figure 7.8 Display content enlargement”**.

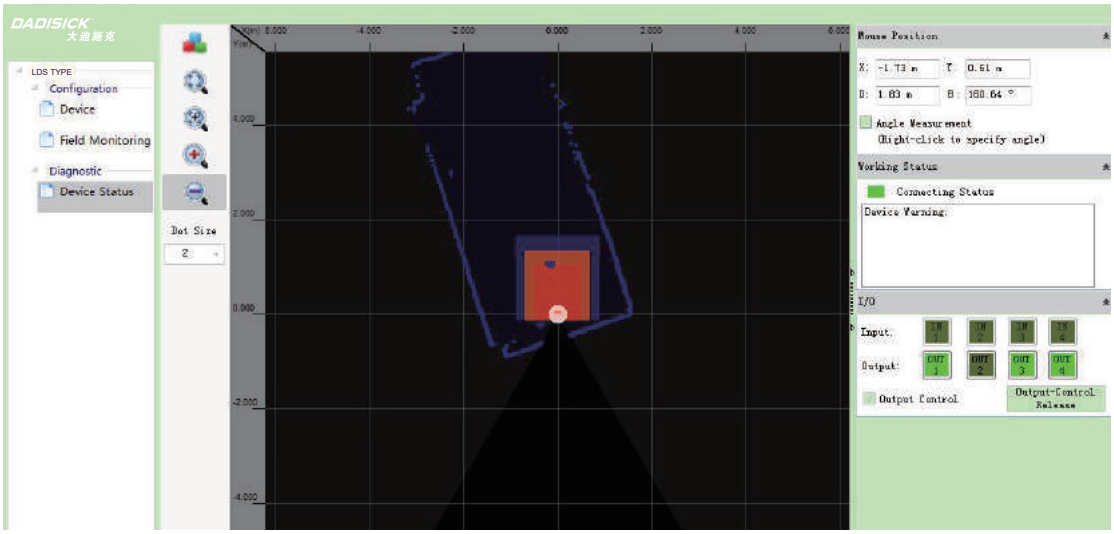
Figure 7.8 Display content enlargement



7.7 Zoom Out

Using the “Zoom out” button in the display region, or scrolling up the mouse pulley, you can increase the display ratio and shrink the display, as shown in **“Figure 7.9 Display content reduction”**.

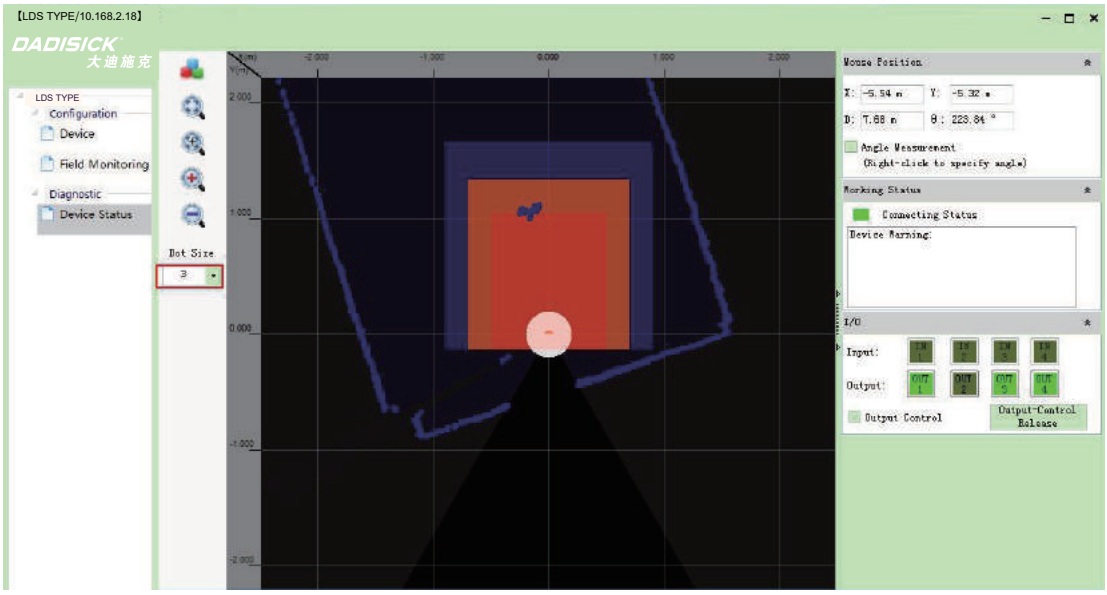
Figure 7.9 Display content reduction



7.8 Adjust the Size of Measuring Data Points

Using the “Measurement Point Size” selection box in the display region, you can adjust the pixel size of the measurement data points in the display region. In pixels, the option is 1-5 pixels, as shown in “**Figure 7.10 Adjust the size of measuring data points**”.

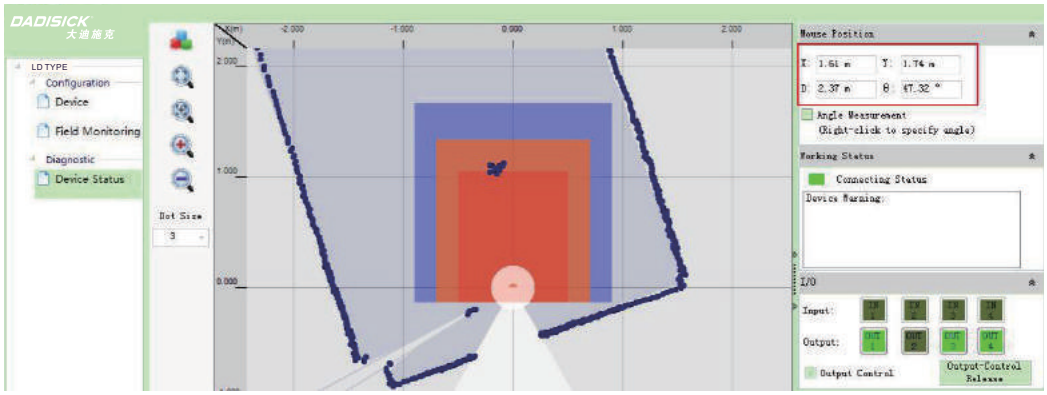
Figure 7.10 Adjust the size of measuring data points



7.9 Mouse Position Coordinates Display

The “Coordinate Information” pagemark displays the corresponding coordinate information for the mouse position in the data image region in the current display scale, Where [X, Y] is a right angle coordinate, [D, θ] is a polar coordinate, as shown in **"Figure 7.11 Mouse position coordinates information".**

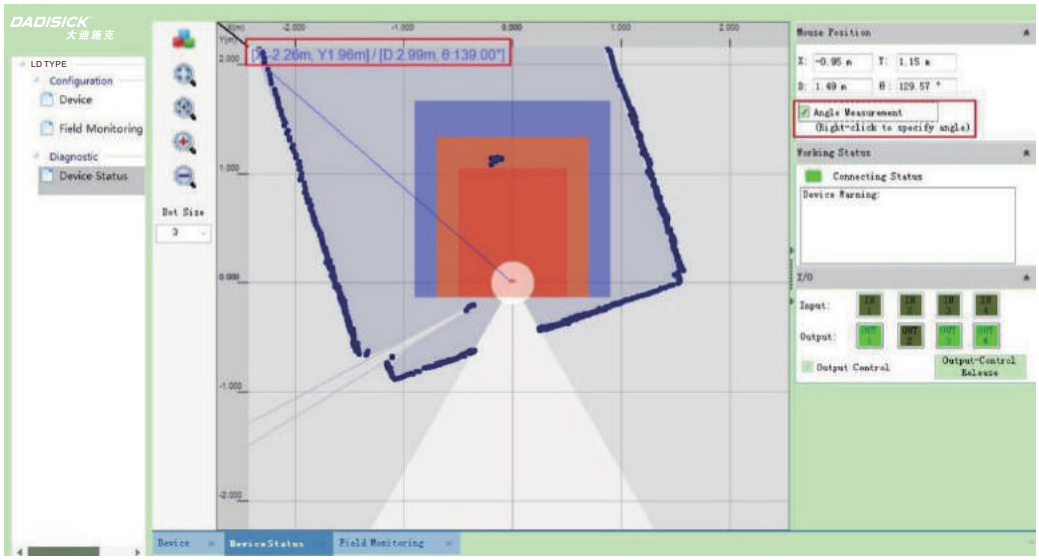
Figure 7.11 Mouse position coordinates information



7.10 Measurement Data for Specific Angles

The "Specific Angle Measurement Data" in the "Coordinate Information" tab is used to display the measurement data on the scanning angle (θ) corresponding to the current position of the mouse, as shown in **"Figure 7.12 Specific angle measurement data checking"**. When this option is enabled, right-click in the data image region, and the upper-right corner of the data image region displays the measured data at that scan angle in real time, The display content include the cartesian and polar coordinates of the measured data points, and the RSSI of the measured data points if the output data of the LiDAR is a composite measurement data.

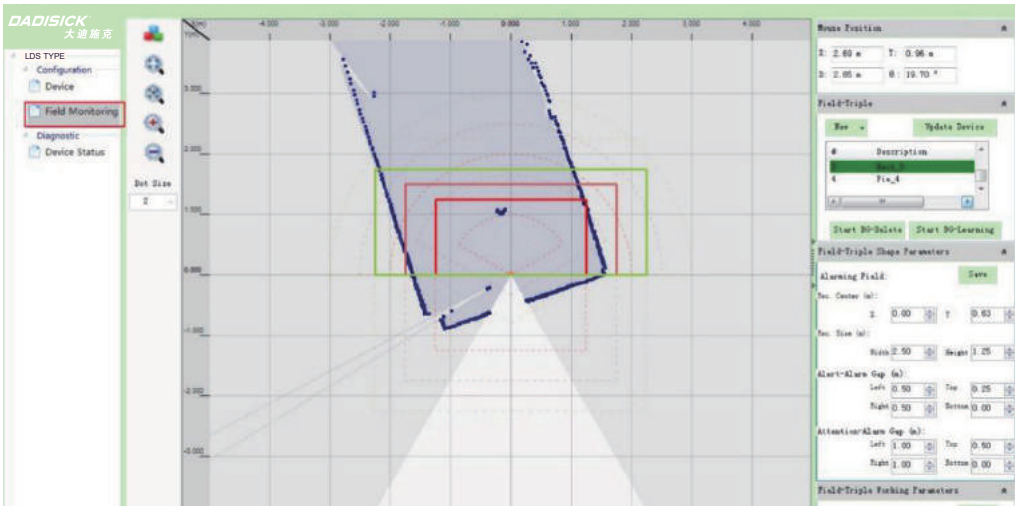
Figure 7.12 Specific angle measurement data checking



8. Regional monitoring configuration

Double-click on the LiDAR icon in the current project, if the FILPS is able to establish a network connection with the selected device, The corresponding device window will be opened, and , double-click the “regional monitoring configuration” entry in the function selection form on the left side of the window, the “regional monitoring configuration” form will be opened, If the form is already opened, you can switch to the “regional monitoring configuration” form using the “regional monitoring configuration” form at the bottom of the device window, as shown in **“Figure 8.1 Open regional monitoring configuration form”.** In this form, you can browse the regional monitor function configuration parameters of the checking device, and modify the configuration parameters in the regional monitor, which can be uploaded to the device after the device restarts.

Figure 8.1 Open regional monitoring configuration form



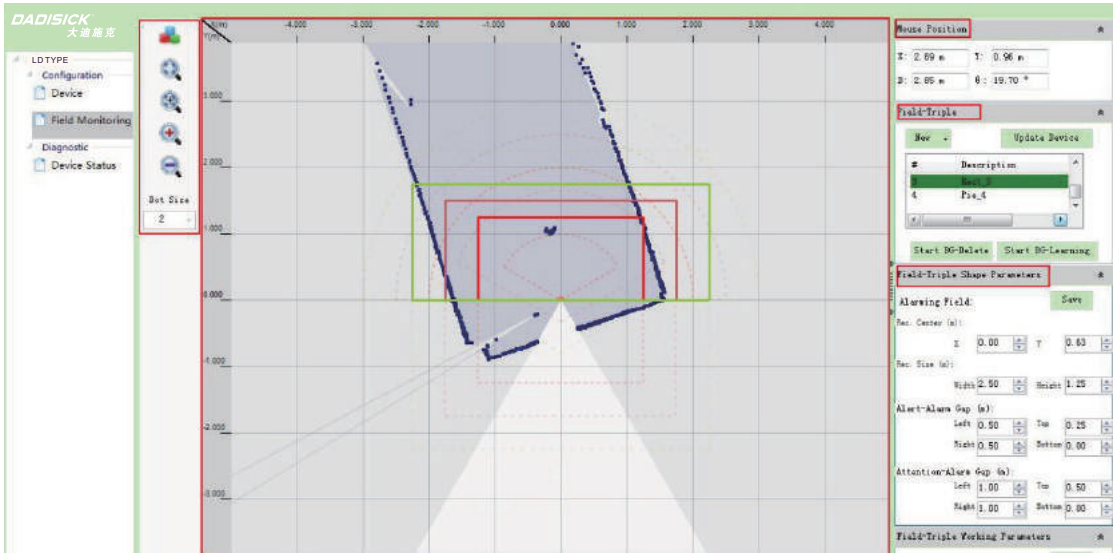
The layout of “regional monitoring configuration” form is as “**Figure 8.2 Regional monitoring configuration form layout**", including:

- Display region: To display current measurement data and regional group shape data；
- Display function region: Function buttons for adjusting and controlling the display of measurement data and regional group shape data ；
- "Coordinate Information" tab: Displays the coordinate information corresponding to the position of the mouse in the display region.
- “Regional Group” tab: a list of all the regional group that have been generated.
- “Regional Shape Parameters" tab: Displays and configures the shape parameters of the currently selected regional groups.

"Regional Group Run Configuration" tab: Sets the working mode and operating

parameters of the selected regional group. For the contents and usage of “display region”, “display function region”, and “coordinate information” tab, please read “7 data display”.

Figure 8.2 Regional monitoring configuration form layout



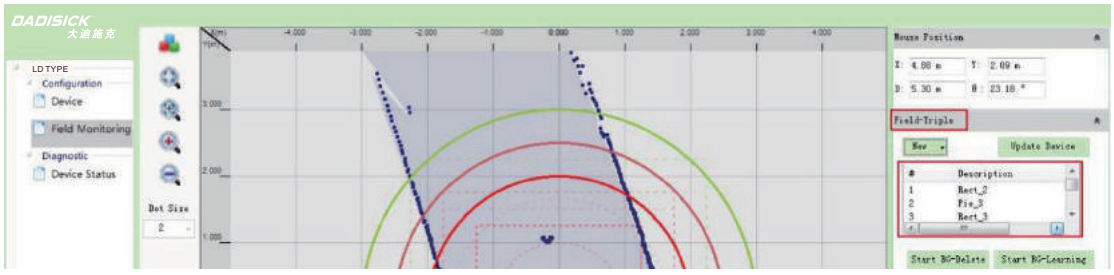
Related reading

- Please read the "Technical Specifications" in the product manuals of the laser LiDAR used to determine whether the LiDAR has a regional monitoring function.
- Technical Information and Usage of regional Monitoring Function, please read the “Product Application”-“regional Monitoring Function Description and Application Development” Part in the user manual of each Laser LiDAR.

8.1 Regional Monitoring Group

A LiDAR can define multiple regional groups, which can have multiple simultaneous working groups, each of regional groups can define different shape parameters and running configuration parameters, The entire defined reginal group is listed on the” regional group” of “regional monitoring configuration” form, as shown in **“Figure 8.3 Regional group list”**.

Figure 8.3 Regional group list



The FILPS monitoring regional group configuration features including：

- Monitoring regional group creating, deleting and information displaying
- Monitoring regional group shape definition, run configuration and configuration takes effect；
- Background self-learning and background deletion of regional monitoring

8.2 Create Regional Groups

There are two methods：

- Use regional group template: Click the “creat” drop-down box in the “regional Group tab”, and you can create a new regional group based on the regional group template, as shown in “**Figure 8.4 Use regional group template to create a new regional group**”. FILPS has built-in 10 regional group shape template, including 1 polygon, 3 rectangles, 3 fan shapes and 3 circles, Select a template in the “creat” drop-down box to generate a new regional group.
- Regional group copy: Select an existing regional group in the list of regional groups in the “regional group” tab, then right-click it and select “copy” in the pop-up menu, A new regional group wil be generated. The shape and running configuration parameters of the new regional group are exactly the same as the original regional group, as shown in **“Figure 8.5 Use regional group copy to create a new regional group”**.

The new regional groups are added to the list of regional groups and are automatically selected for further edits.

Figure 8.4 Use regional group template to create a new regional group

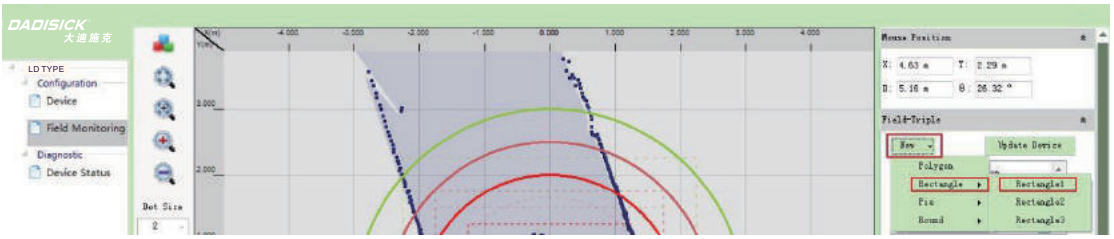
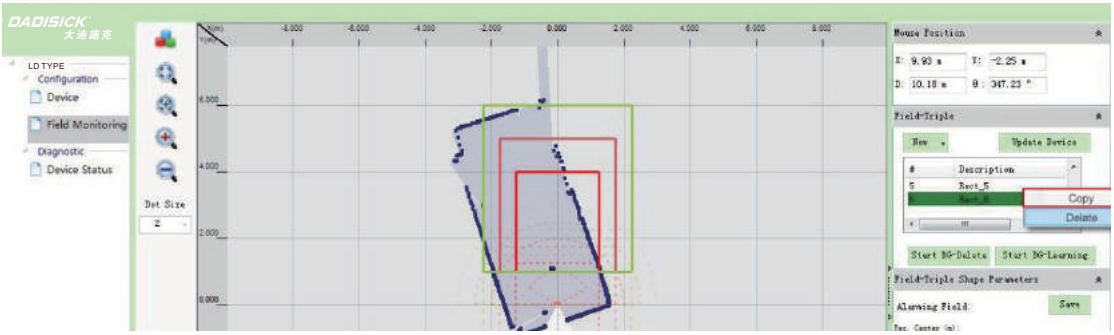


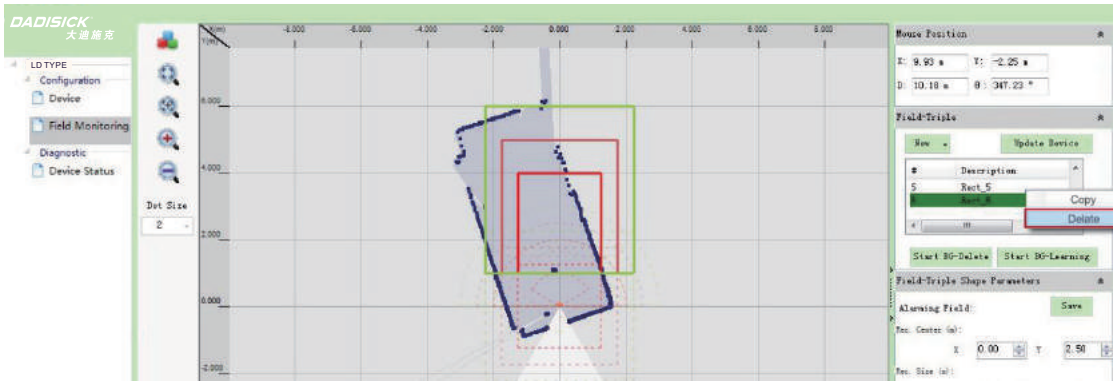
Figure 8.5 Use regional group copy to create a new regional group



8.3 Delete Regional Group

Click to select a regional group in the regional group list of “regional group” tab, then right click to select “Delete” in pop-up menu to delete the selected regional group, as shown in “**Figure 8.6 Delete Regional Group**”.

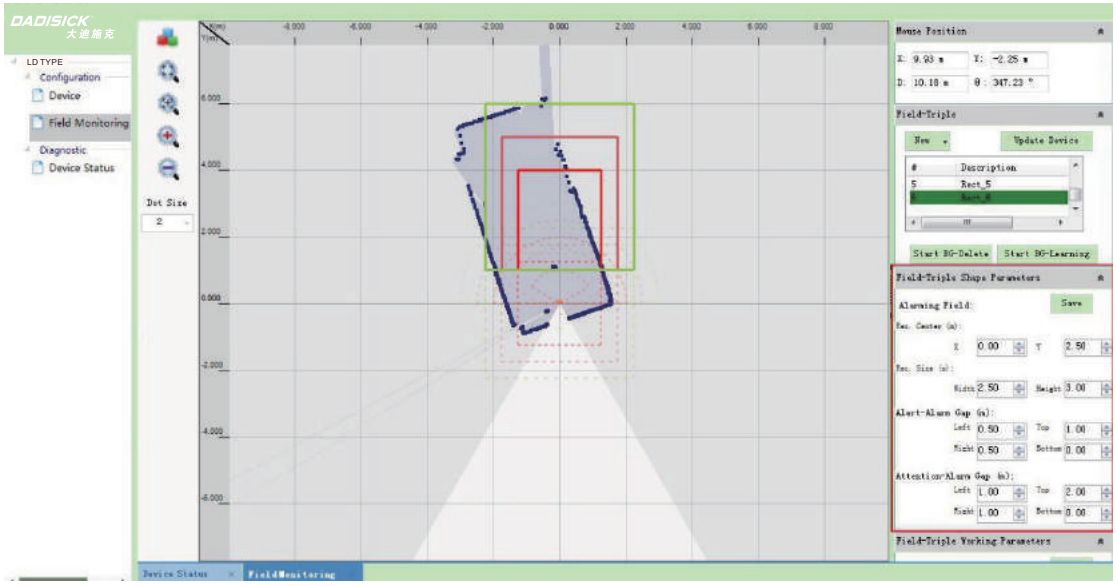
Figure 8.6 Delete Regional Group



8.4 Regional Group Information Display

Double-click a regional group in the regional group list of the “regional group” tab, then the “Regional Group Shape Parameters” tab and the “Reginal Group Running Configuration” tab appear, the shape parameters and running configuration parameters of the currently selected regional groups are displayed, respectively, and the boundaries of the three regions of the regional groups are displayed in solid lines in the data image regional, as shown in **“Figure 8.7 Regional group information display”**.

Figure 8.7 Regional group information display



8.5 Regional Group Shape Editing

Edit and modify the shape of the current regional group in the “Regional group shape

parameters" tab, and the edit and modify method are related to the basic shape of the zone group. In the process of region group shape editing, the edit result is displayed synchronously in the data image region.

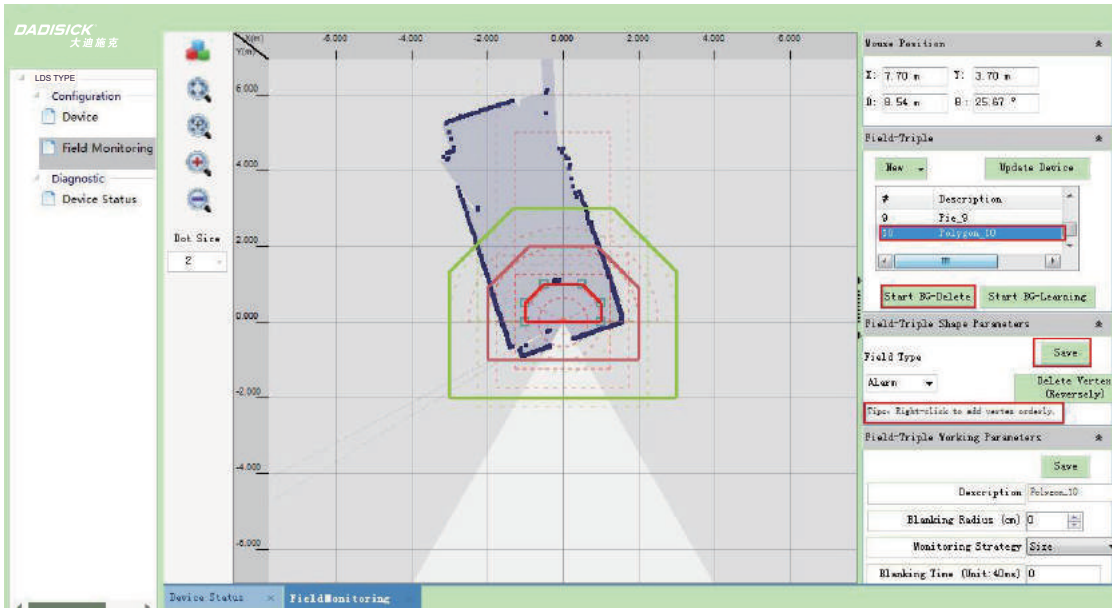
8.5.1 Polygon regional group shape editing

Each region of a polygon regional group is defined by the vertex of the polygon. To avoid shape ambiguity, the setting mode of vertex are added sequentially and deleted in reverse order, as follows：

- Region Selection: Select the region you want to edit (Alarm region / Warning region / Attention region), where the vertex of the selected area is displayed in the data image region in the form of "□".
- Add vertices: right-click in the data image region, it will generate a new vertex at the click position, the order of the newly generated vertices is the last one. You can ensure the accuracy of the new vertex by observing the mouse position coordinates information displayed in the "coordinate information" tab.
- Delete Vertex: press the " Reverse Delete Vertex " button in the "Regional Group Shape Parameter" tab to delete the last one in the current vertex.

"8.5.1 Polygon regional group shape editing" shows a shape editing instance of a polygon regional group.

Figure 8.8 Polygon regional group shape editing

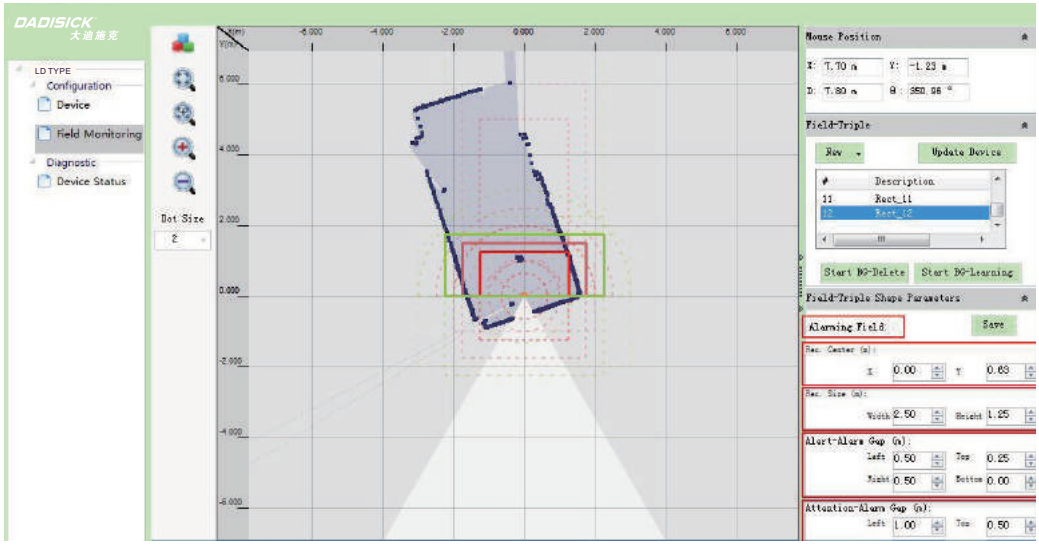


8.5.2 Rectangular Regional Group Shape Editing

The rectangular region group is defined by the center position and width and height parameter. when editing the shape of the rectangular regional group, only need to modify the parameters in " regional group shape parameter " tab, as shown in **" Figure 8.9**

Rectangular regional group shape editing ".

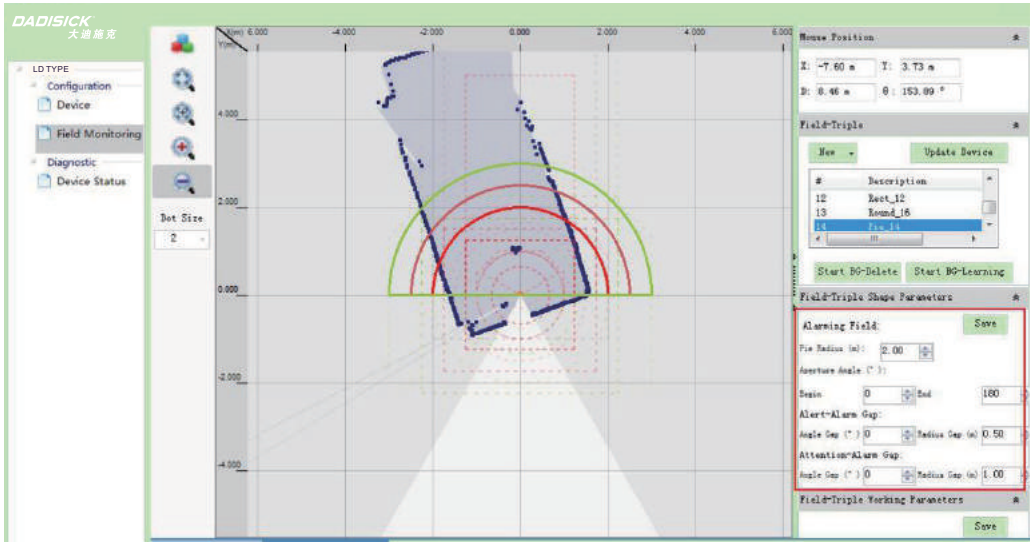
Figure 8.9 Rectangular regional group shape editing



8.5.3 Sector regional group shape editing

Sector regional group are defined by the shape parameters of alarm region and the radius and angle difference between regions. The shape parameters are the radius and angle range of sector, Interregional radius and angle difference include radius of difference of warning region and alarm region, angle difference of starting/ ending, redius difference of attention region and alarm region, angle difference of starting/ ending. When editing the shape of a sector regional group, you can simply modify the shape parameter and radius/angle difference in the Area Group Shape Parameters tab, as shown in **"Figure 8.10 Sector regional group shape editing"**.

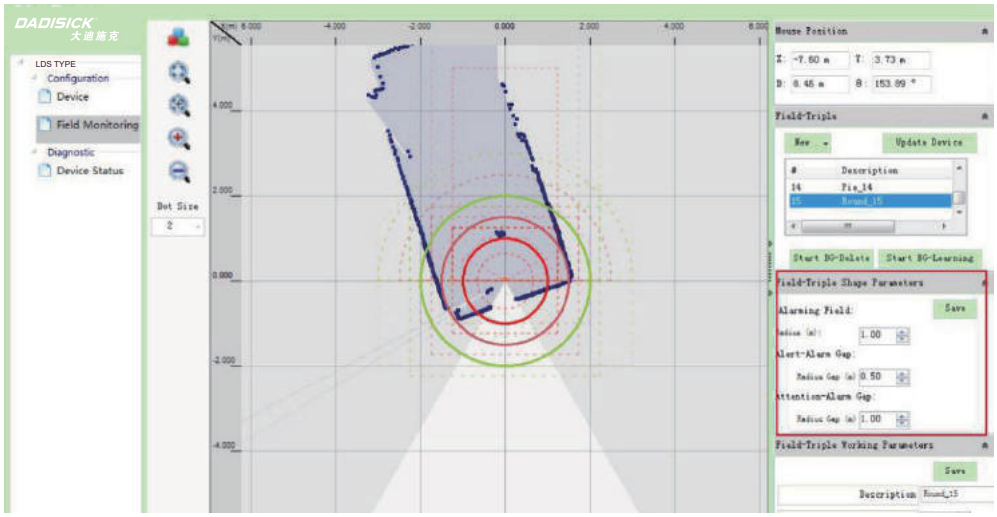
Figure 8.10 Sector regional group shape editing



8.5.4 Round Regional Group Shape Editing

The round regional group is defined by the shape parameter of alarm region and the radius difference between regions, the shape parameter is the radius of circle, the radius difference between regions includes the radius difference between warning region and alarm region and the radius difference between warning region and alarm region. When you edit the shape of a circular regional group, you can simply modify the shape parameter and radius difference in the “RegionI Group Shape Parameters” tab, as shown in **“Figure 8.11 Round regional group shape editing”**.

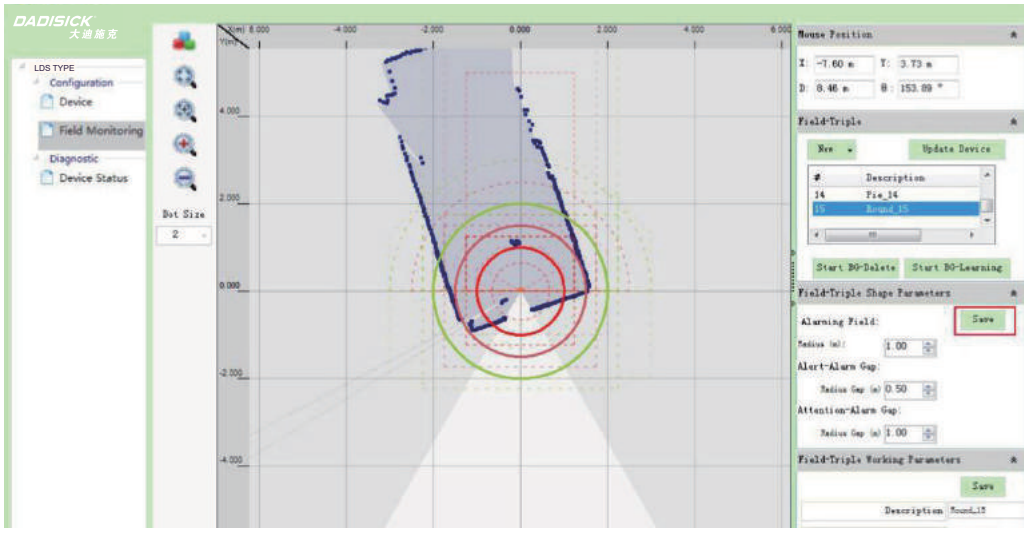
Figure 8.11 Round regional group shape editing



8.5.5 Storage Regional Group Shape Parameters

Once the shape of a regional group has been edited, it needs to be temporarily stored in the FILPS. otherwise, the edited regional group shape parameter will be lost when switching the current regional group on the “Monitor regional Group” tab. The Storage button in the “regional Group Shape Parameters” tab is used to store the shape edit results for the current regional group, as shown in **“Figure 8.12 Storage Regional Group Shape Parameters”.**。

Figure 8.12 Storage regional group shape parameters



8.6 Regional Monitoring Function Running Configuration

8.6.1 Running configuration parameters

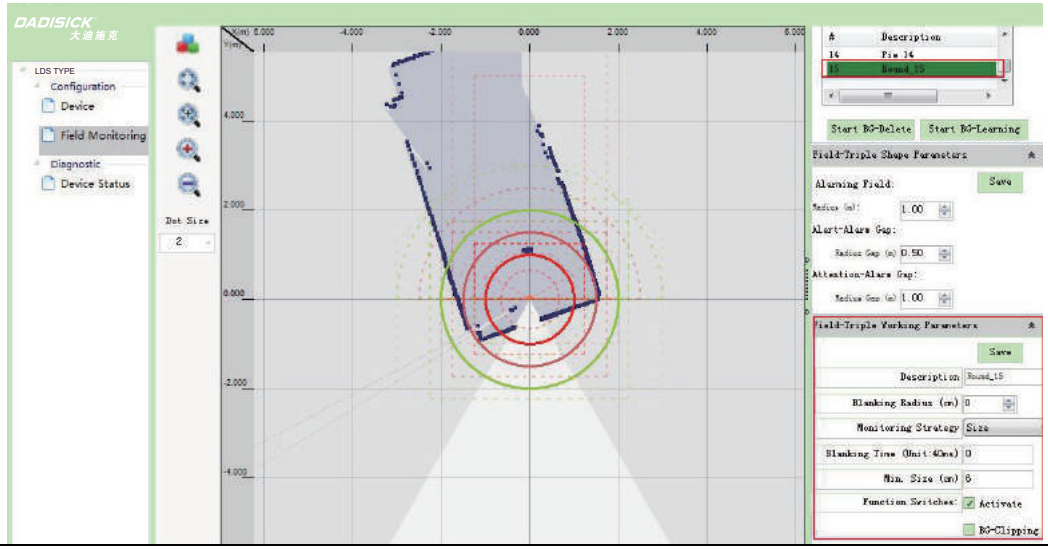
Edit and modify the running configuration parameters of the current regional group in the “RegionI Monitoring Running Configuration” tab, as shown in Figure 8.13” Regional Monitoring Running Configuration”, including:

- Regional group description: current regional group description information, which can be modified.
- Shielding Region Radius: Set the shielding region radius of the current regional group
- Monitoring model: set the monitoring model for the current regional group, including "target width monitoring", "point monitoring" and "contour line monitoring".
- Duration: Set the retention time of the trigger condition before the current regional group is triggered, in milliseconds (ms) of the scan period of the current device.
- Minimum target width: set target width trigger threshold in the monitoring model of "target width monitoring".
- Number of points: set trigger thresholds for the number of target points under the monitoring model "point monitoring"；
- Contour moving distance: setting the threshold value of contour line moving distance under the monitoring mode of "contour line monitoring".
- Function switches: Optional function switches related to regional monitoring functions, including:
  - Activation: The current regional group is activated and operational after

activation.

- Background clipping: If it was started, the current regional group will tailor the background by self-leaning.

Figure 8.13 Regional monitoring running configuration



Important note

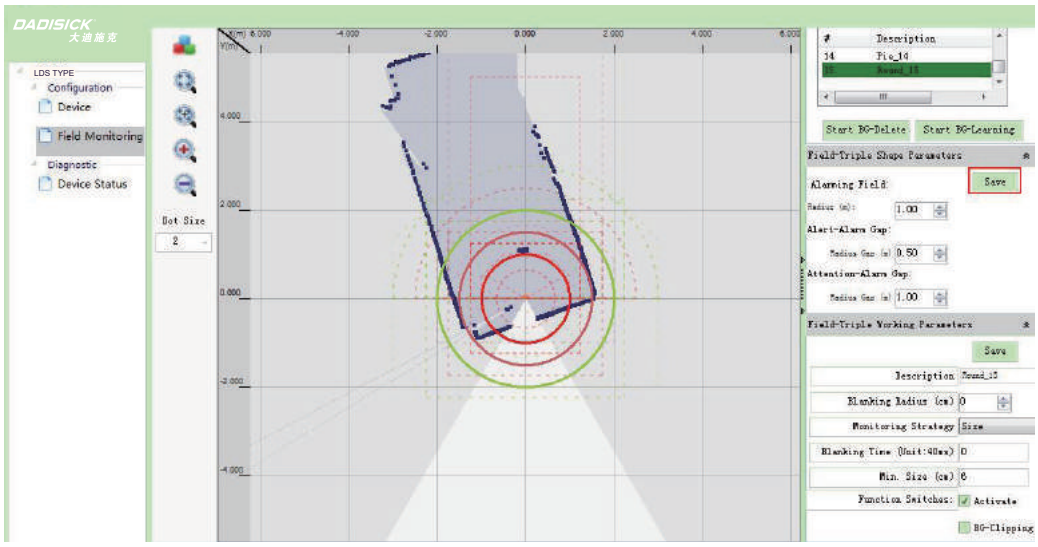
- For the setting method of "shielding region radius", please read "Product Application" - "Description and Application Development of Regional Monitoring Function"-"Regional Group and Monitoring regional Group" in the User's Manual for Various Types of LiDAR.
- For the setting method of “Monitoring mode”、“Duration”、“Minimum target width”、“Number of points”、“Contour moving distance”, please read "Product Application" - "Description and Application Development of Regional Monitoring Function" - "Monitoring Mode" in the User's Manual for Various Types of LiDAR.
- For the setting of "Activate", please read "Product Application" - "Description and Application Development of Regional Monitoring Function" - "Regional Group and Monitoring regional Group" in the User's Manual for Various Types of LiDAR.

8.6.2 Storage Running Configuration Parameters

After the monitoring regional group running configuration parameter setted, it needs to be stored temporarily in the FILPS, otherwise the setted running configuration parameters will be lost when switching the current regional group on the “monitoring regional group” tab. The “Storage” button in the “monitor regional group running

configuration" tab is used to store the results of configuration parameter setting for the current regional group, as shown in **"Figure 8.14 Storage running configuration parameters"**.

Figure 8.14 Storage running configuration parameters

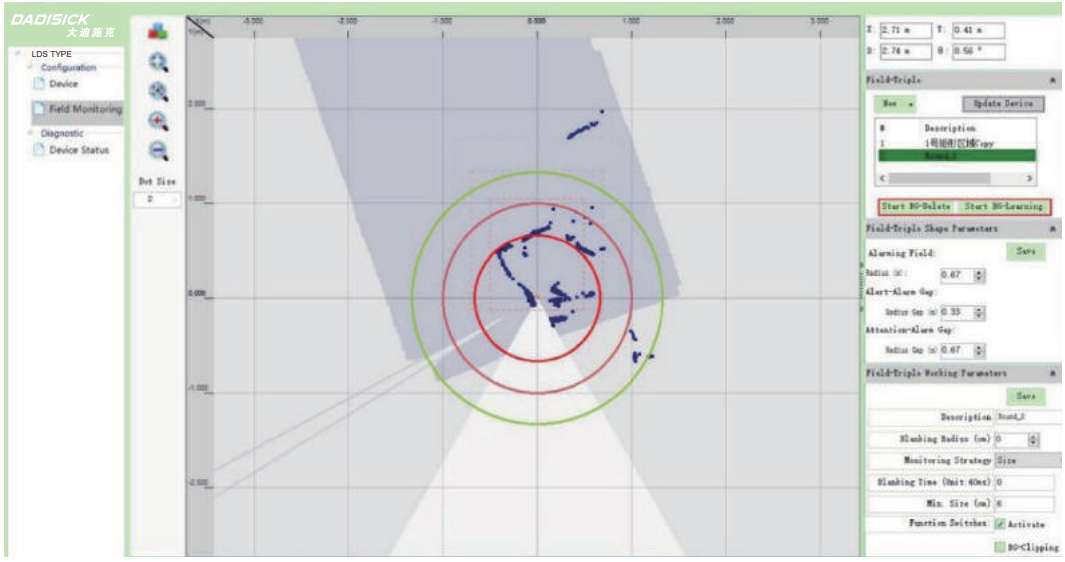


8.7 Background Self-learning

The "Start Background Self-Learning" and "Delete Background" buttons in the "Regional Group tab" are used for self-learning and clearing background data used by the regional monitoring function, as shown in **"Figure 8.15 Background self-learning and background deletion"**, the process is as follows:

- Start Background self-learning Learning: Start learning background when press, the button will be switched to "Background Self-learning" and show the rest of the time it takes to learn. After learning, the background data needed for background clipping of the monitoring regional group is generated and the button is switched to "Start Background Self-learning".
- Delete background: The current background data is deleted after pressing, and the background clipping is no longer in effect

Figure 8.15 Background self-leaning and deletion



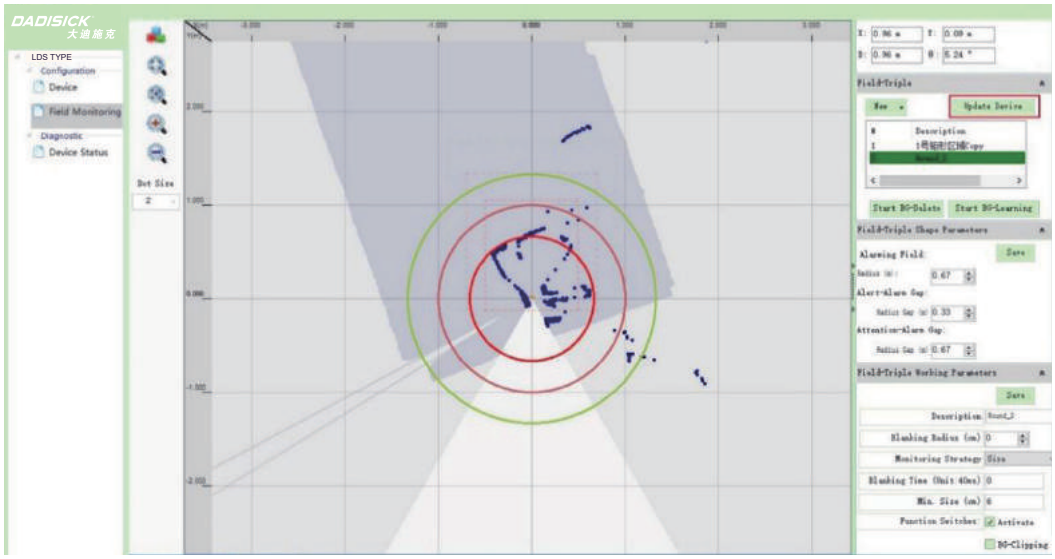
Important note

- For the setting of “Background clipping”, “Start Background Self-learning”, “Delete background”, please read "Product Application" - "Description and Application Development of Regional Monitoring Function" - "Background Self-leaning and Regional Group Background Clipping" in the User's Manual for Various Types of LiDAR.

8.8 Upload to Devices

After completing the shape editing and running configuration for all monitoring regional groups, press the “Upload to Devices” button in the “monitor regional group” tab, As shown in the **"Figure 8.16 Upload regional monitoring running configuration parameters"**, the shape parameters and running configuration parameters of all monitoring regional groups will be uploaded to the LiDAR, then LiDAR will be restarted after all the datas saved. When the network connection state between the project form and the online device form changes from "off-line" to "on-line", the LiDAR will run with the new regional monitoring running configuration parameters.

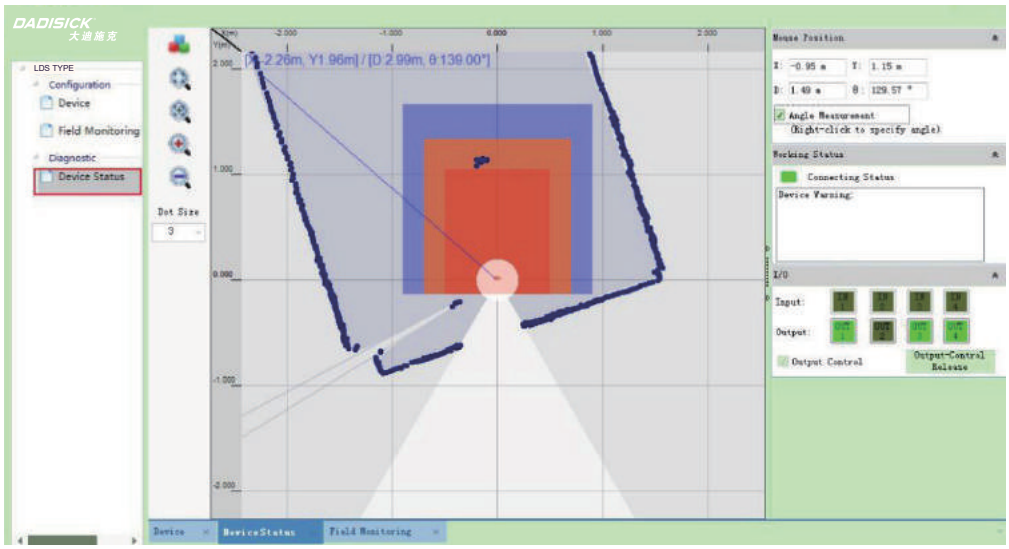
Figure 8.16 Upload regional monitoring running configuration parameters



9. Running status monitoring

Double-click on the LiDAR icon in the current project. If the FILPS is able to connect to the selected device, the corresponding device window will be opened. Double-click the "Running Status" entry in the function selection form on the left side of the window, the “Running state” form will be opened. If the form has been opened, you can switch to the “Running Status” form using the “Running Status” form tab at the bottom of the device window, as shown in **“Figure 9.1 Open running status form”**. In this form, it can display the current measurement data, as well as the current running status, including the I/ O interface, the connection status and the working status of the device. The I/O interface can be controlled directly. If the LiDAR has regional monitoring function and the function is enabled, the output status of regional monitoring is also displayed in the “Running Status” form.

Figure 9.1 Open the running status form



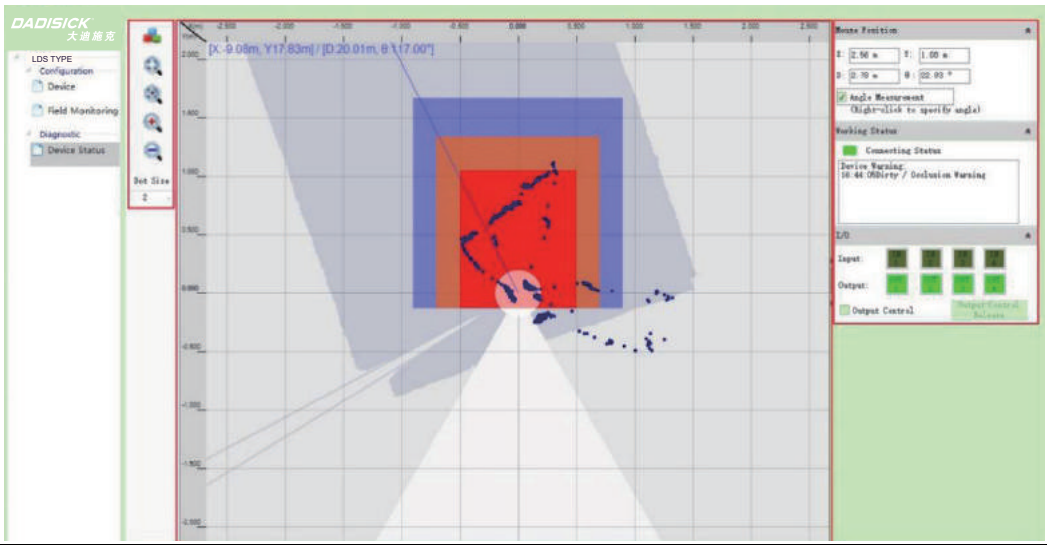
The layout of the “Running Status” form is shown as “**Figure 9.2 Running status form layout**”, including：

- Display region: Used to display the current measurement data and regional monitor the running status.
- Display function region: A function button for adjusting and controlling measurement data and regional monitoring running status display.
- ”Coordinate Information” Tab: Display the coordinate information corresponding to the position of the mouse in the display region and it’s able to check the measurement data at a specific scanning angle.
- "Working Status" tab: Display network connection status and working status, including working mode and bnormal status information.

- "I/O interface" tab: Inspect and control the I/O interface.

For the contents and usage of “display region”, “display function region”, “and coordinate information” tab, please read “7 data display”.

Figure 9.2 Running status form layout



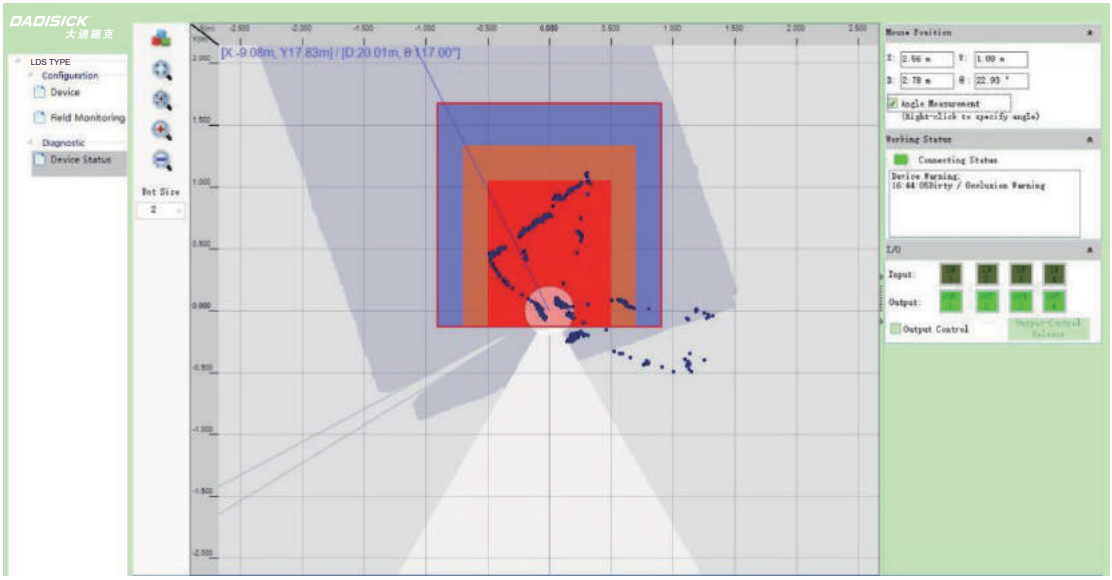
Related reading

- For technical information and usage of the I/O interface, please read the relevant parts of the "Product Description"-"Equipment Interface" and "Product Application"-"I/O Interface Usage Description and Application Development" in the User Manual for each model of LiDAR.
- For the related informaton of equipments working status, please read "Product Description" - "Equipment Control and Operational Status Display" in the Operational Manual for Various Types of LiDAR.

9.1 Regional Monitoring Running Status Display

The regional monitoring running status is displayed in the data image region, and the currently activated attention region, early warning region, and alarm region are expressed in blue, orange, and red region respectively. The triggered region is bright, and the untriggered region is dark, as shown in " **Figure 9.3 Regional monitoring running status display** ".

Figure 9.3 Regional monitoring running status display



9.2 Working Status Display

Displays the current working state information of the LiDAR in the “Working Status” tab, as shown in **“Figure 9.4 working status display**”, the display content including：

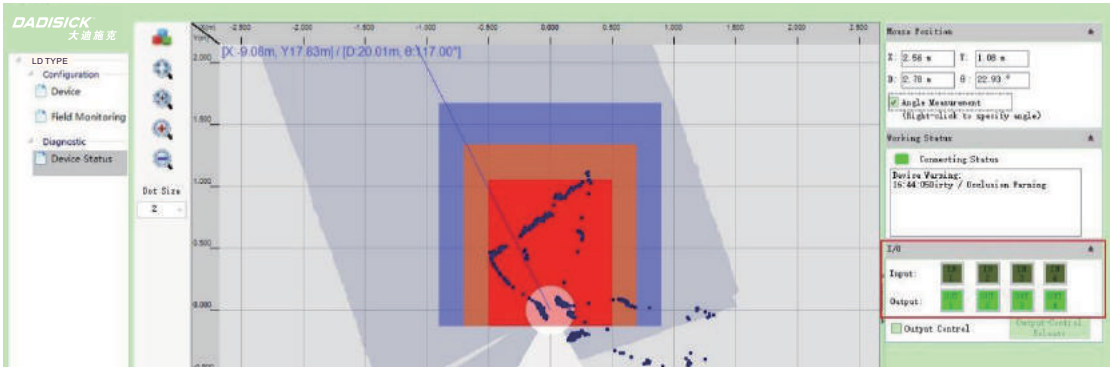
- Network connection status: If it’s bright green, it indicates that the FILPS is connected to the LiDAR network properly and it’s in the process of data transmission. If it’s dark green, it means that the FILPS is connected to the LiDAR's network but it has no data transmission. If it’s black, it means that the FILPS network connection with the LiDAR is broken and the device is "disconnected".
- Working Status: The current running status information of the LiDAR is displayed in rolling mode, including working mode information ("Normal Work"/"Monitor Signal Output"/"Ready to Restart") and abnormal status information ("Diffuser Dirt or Device Shaded"/"High Temperature Alarm"/"Low Temperature Alarm"/"Internal Error").

9.3 I/O Interface Status

Different models of LiDAR have different I/O interface configurations, the "0/1" status of the input port and output port is shown in the "I/O interface" tab, As shown in “**Figure 9.5 I/O interface status**”, the display is as follows:

- Input terminal: In the “input terminal” field, it is displayed as a text box, and each input terminal corresponds to a text box.
- Output terminal: In the “Output terminal” column, it displayed in s a two-state button, each output terminal corresponds to two double-state buttons, and the button in the “Press” state is the current state of the output terminal.

Figure 9.5 I/O interface status



9.4 Output Terminal Status Control

In the "I/O interface" tab, the output terminal can be controlled in the "Output terminal" section, I.e., switching the output status of the output terminal. Select the “Output Interface Control” option box to begin control of the output terminal.

For each output terminal, press the button in its corresponding two-state button in the "pop-up" state to set the command on the output terminal state of the LiDAR, If the command is responded to and executed correctly, the state of the output terminal will be switched and the “Press”/”Pop-up” state of the two double-state buttons will be also changed, as shown in **“Figure 9.6 Output terminal control”.**

Figure 9.4 Working status display

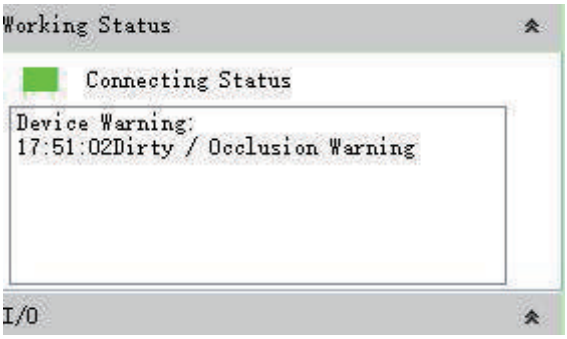
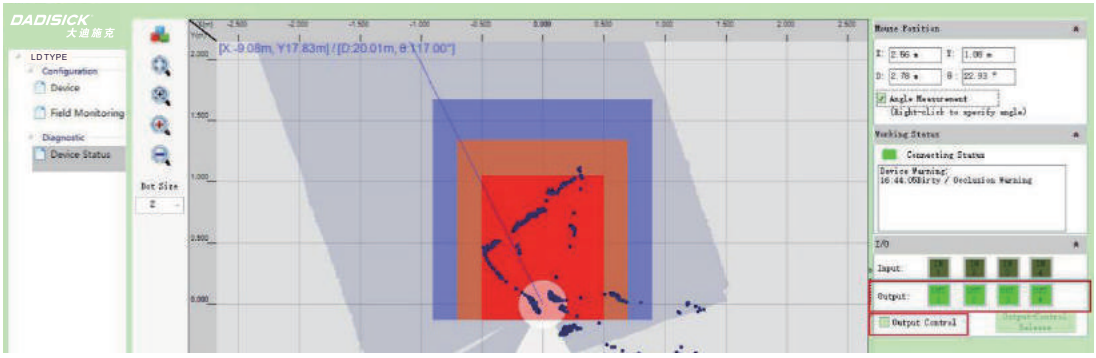


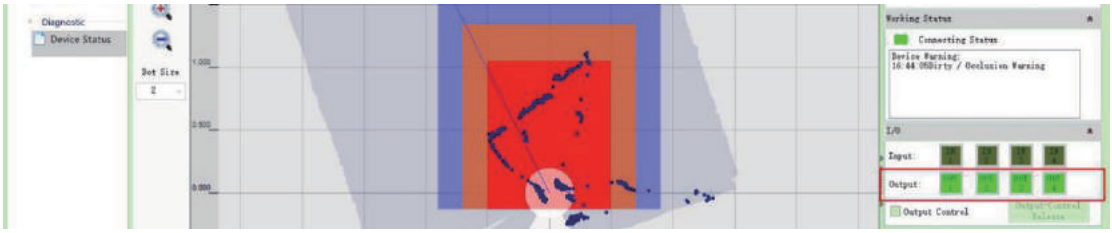
Figure 9.6 Output terminal control



9.5 Output Terminal Control Release

The "Release Output Control" button in the "I/O Interface" tab is used to release FILPS control to the output terminal of the LiDAR, as shown in **"Figure 9.7 Release the output terminal control"**. After the output terminal state of the LiDAR is controlled by FILPS or network message, the control right of the output terminal is transferred to FILPS or the application system which sends the network message. After the control is released, the state control of the output terminal is taken over by the regional monitoring function or other application functions built into the LiDAR.

Figure 9.7 Release the output terminal control

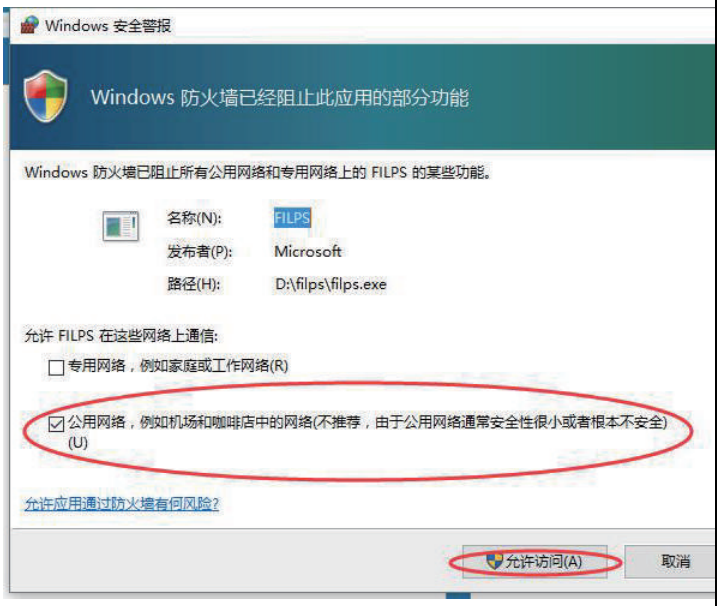


Main points	If the output terminal control is performed in the "I/O interface" tab, but the output control is not released before closing the device window, the FILPS will release the output control automatically.

Related reading	For technical information about the output terminal control and usage, please read the relevant parts of "Product Application" - "I/O Interface Usage and Application Development" in each model laser radar user manual

10. Trouble shooting

1. The “online device” form cannot find a running LiDAR on the network：

Reason	Solution
Windows10 system blocks the FILPS receiving device information multicasting message.	• Right-click on the FILPS icon, and choose "Run as an administrator” in the pop-up menu. • Related reading: "2 Software installation and operation
The network firewall blocks the FILPS receiving device information multicast message.	• When FILPS run on Windows10 in the first time, the following image pops up:  Please select "Public network,...” Option and press the “Allow Access” button. • Or add the FILPS to the network firewall's trust list manually and allow the FILPS to receive network packets on the UDP port "2111". • Related reading: "4 online device discovery", manual "product application" - "network configuration and device detection".
The network switch intercepts the device information multicast	• Configure the network switch to allow UDP network packets which sent to the multicast address "237.1.1.200" and UDP port "2111" to pass；

message of the laser LiDAR.	• Related Reading: "4 Online Device Discovery", Manual "Product Application" - "Network Configuration and Device Detection"

2. A Laser LiDAR shown as “Online” in “Online device” or a hand-added LiDAR cannot be connected:

Reason	Solution
LiDAR with the same IP address exists on the network.	• First cut off the network connections of other people who share the same IP, then connect the LiDAR and modify its IP address； • Related reading: "4 online device discovery", "6.2 network configuration"
The network firewall blocks FILPS to establish the TCP connection with the Laser LiDAR	• Add FILPS to the network firewall's trust list and allow FILPS to send and receive network packets on the TCP port "2112". • Related Reading: User Manual "Product Application" - "Network Configuration and Device Detection"。
The network switch blocks the FILPS to establish the TCP connection with the Laser LiDAR	• Configure a network switch, allow the FILPS on PC establish a TCP connection with the LiDAR via the TCP port "2112". • Related Reading: User Manual "Product Application" - "Network Configuration and Device Detection"。

3. When the LiDAR is moving, the contour of the stationary object in the scene is drag-shadowed：

Reason	Solution
Mobile Working LiDAR was incorrectly set to "Static Working Mode"。	• Cancel “Static Operation Mode” Settings for LiDAR； • Related Reading:“6.3 Run configuration parameters”。

4. Significant trailing point on edge of close-range target：

Reason	Solution
The "spatial filtering" function of the LiDAR was incorrectly switched off.	• Enable the "spatial filtering" function of LiDAR； • Related reading: "6.3 Run Configuration Parameters", Manual "Product Applications" - "Technology Application Topics" - "Pseudo Edge

	Points"。

5. Tiny target of close range can't be found:

Reason	Solution
The LiDAR enabled the "rain and fog filtration" function.	• Turning off the "rain and fog filtering" function of the LiDAR. • Related reading: "6.3 Run Configuration Parameters", Use Manual "Product Application" - "Technical Application Topics" - "Rain Fog Smoke Penetration".

6. Editing regional group can't be found in data image regional when making the monitoring regional groups configuration.

Reason	Solution
The display ratio or roaming position of the data image display regional is not appropriate.	• Using the "Zoom in"/"Zoom out" function to adjust the display ratio until the monitoring regional group apear in the data image regional, then use "roaming function" to adjust monitoring regional group to the center of the data image region, and adjust the display ratio to a appropriate level, so that the monitoring regional group will be filled with the data image region. • Related reading: "7.2 Roaming", "7.6 Zoom in", "7.7 Zoom out".
The monitor regional group shape parameter is not correct and the regional group shape is empty.	• Check and modify regionl group shape parameters; • Related reading: "8.5 Regional Groups Shape Editing".

7. Monitoring regional groups are always triggered:

Reason	Solution
Interfering targets exit in the monitored regional.	• Use "Zoom in" and "Roaming" functions to adjust the display ratio and location of the monitoring regional, and examine carefully whether any measurement points are exit in the region. • If the measuring point is very close to the LiDAR, the "shielding region radius" configuration parameter of the monitoring regional group can be adjusted to make the jamming target located in the shielding region.

	• Alternatively, the monitoring regional group could be split into two regional groups so that the jamming target will lay outside of the regional group； • Related reading: "7.6 Zoom in", "7.2 Roaming", "8.6 Regonal Monitoring Function Running Configuration", "8.5 Regional Group Shape Editing".
The input terminal IN1 is set to high level by mistake, and the "forced alarm" working mode is set incorrectly, which makes the alarm regional always be in alarm state.	• Check the input state of the input terminal IN2 and set it to low level； • Related Reading: User Manual "Product Application" - "I/O Interface User Description and Application Development" - "I/O Input Terminal Functional Definition".

8. The alarm area of the Regional Monitoring Group could not be alerted at all：

Reason	Solution
The monitor area group shape parameter is not correct and the regional group shape is empty.	• Check and modify regional group shape parameters； • Related reading: "8.5 Regional Group Shape Editing".
The input terminal IN2 is set to high level by mistake, and the working mode of "Disarming" is set incorrectly, so the alarm region can alarm.	• Check the input state of the input terminal IN2 and set it to low level； • Related Reading: Use Manual "Product Application" - "I/O Interface User Description and Application Development" - "I/O Input Terminal Functional Definition".
Incorrect running configuration parameters for monitoring regional groups.	• Check and correct the operating configuration parameters of monitoring regional groups； • Related reading: "8.6 Regional Monitoring Function Run Configuration", User Manual "Product Application" - "Reginal Monitoring Function Usage Description and Application Development".

9. The monitoring regional is triggered, but the output terminal does not output the monitoring signal：

Reason	Solution

The "Output Interface Control" select box in the "I/O Interface" tab is checked, and the output terminal control is performed, which cause the built-in regional monitoring function of the LiDAR loss the control of output terminal.	• Press the "release output control" button on the "I/O Interface" tab. • Related reading: "9.5 Output Terminal Control Release".
An output terminal control was performed in a FILPS session cycle, but the session did not exit normally and the output control was not released normally.	• Check the “Output Interface Control” selection box in the “I/O Interface” tab, and then press the “Release Output Control” button. • Related reading: "9.5 Output terminal controlled release”.

11. Update

November 3, 2018

1. Figure 3.4, Figure 6.1, Figure 6.2, Figure 6.3, Figure 6.5.
2. 6.3: Added several useful features.
3. 8.5.2: Modifying the definition of a rectangular area group.
4. 8.7: "Background Self-Study" function adds countdown display

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