Automatic Calibration Procedure

1 Prerequisites

1.1: calibration mats position

As shown in the figure below, put four calibration mats on the four diagonal areas of the vehicle. Place them 15cm out from the corners of the vehicle. Ensure the mats are placed flat on the ground with the QR code face up. Shown below:

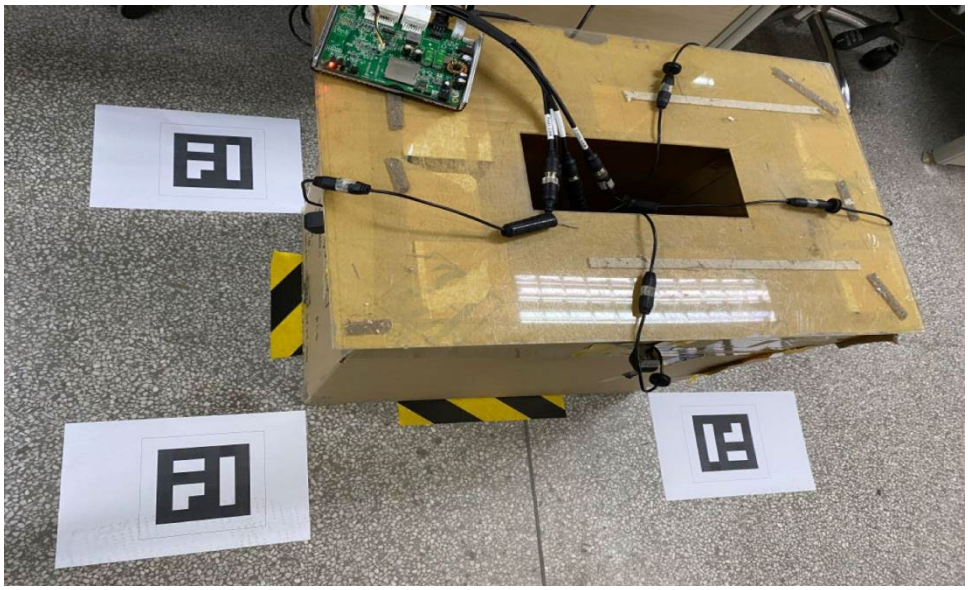


Photo 1.1

Photo 1.2

1.2 Ensure that the calibration mats in the diagonal area is completely visible in the two adjacent cameras, as shown in Figure 1.3.

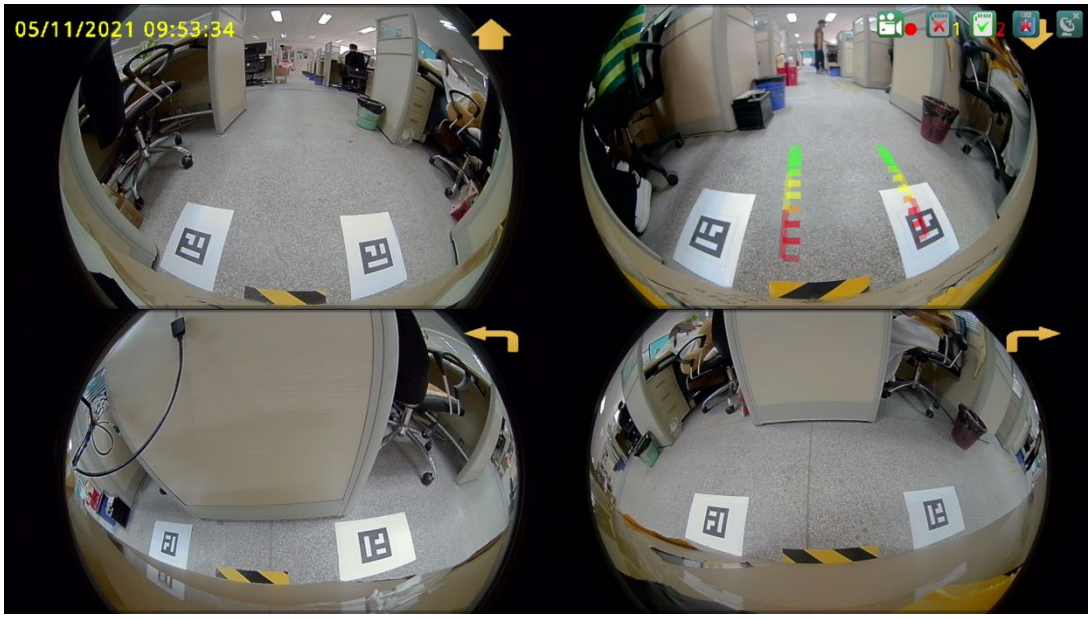


Figure 1.3

Notice：When calibrating, it is recommended to stick zebra tape (or other marks) close to the periphery of the vehicle and adjust the parameters of the car model until you can see the zebra tape all around

2 Automatic Calibration

2.1main interface

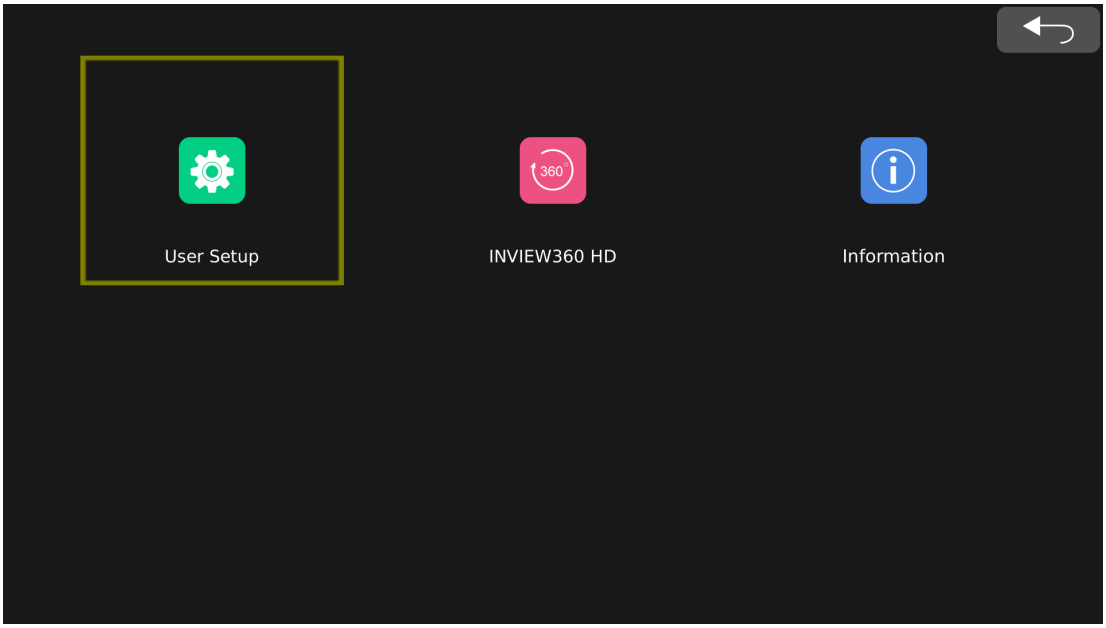


Photo 2.1

Click INVIEW360 HD icon to enter calibration interface, as Figure 2.2 shown:

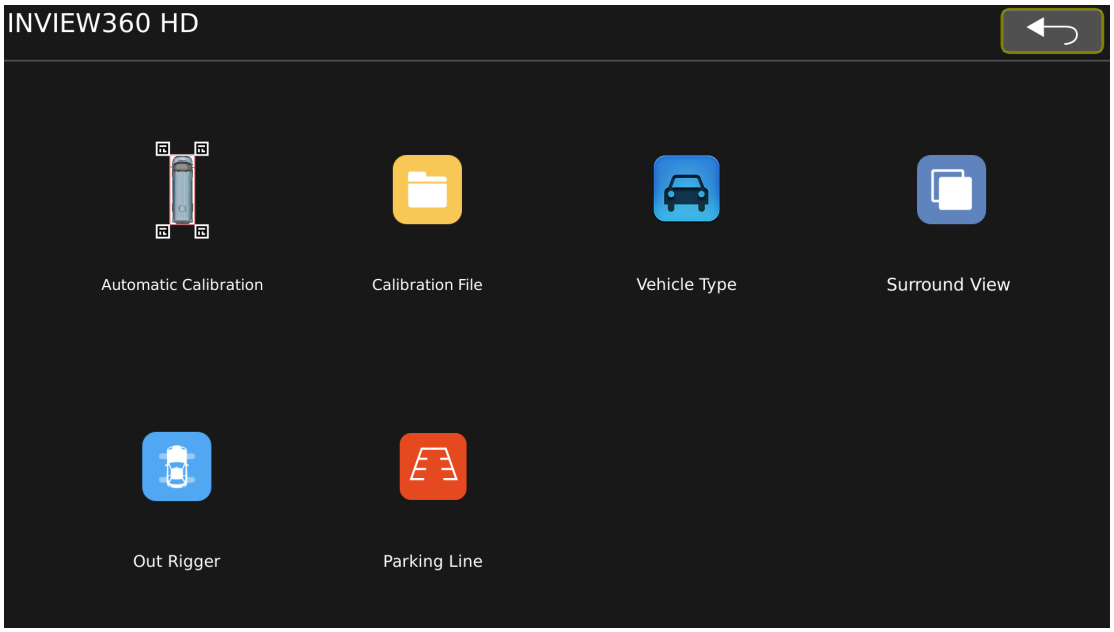


Photo 2.2

Click Automatic Calibration，to enter interface 2.3。

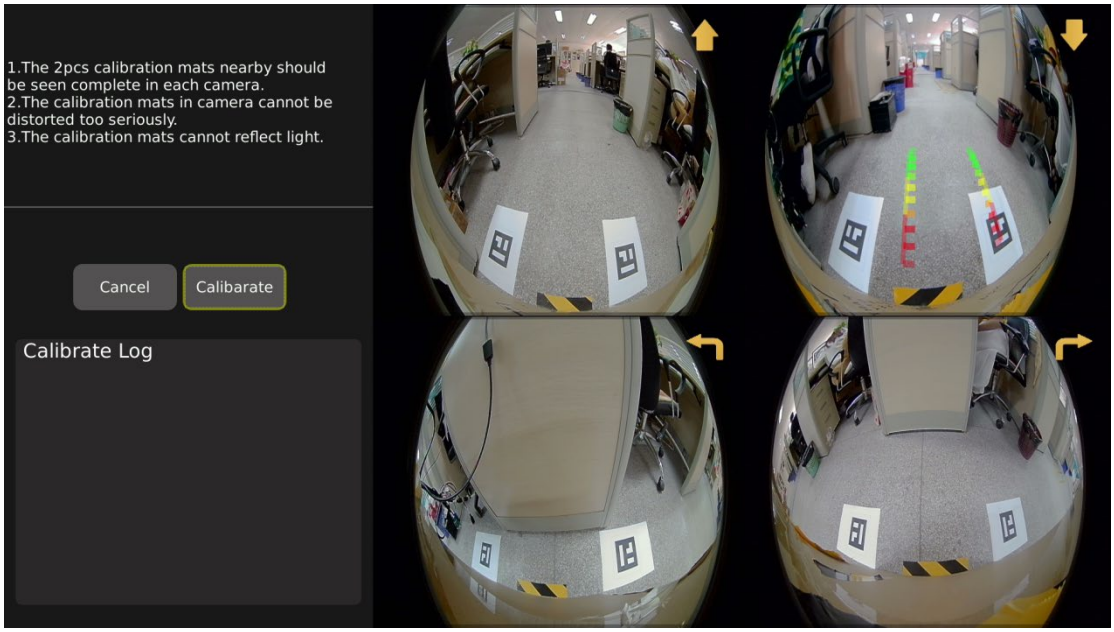


Photo 2.3

Ensure that in each camera image, two adjacent calibration mats are completely visible. Click Calibration icon to start automatic calibration. Enter the interface as shown in Figure 2.4.

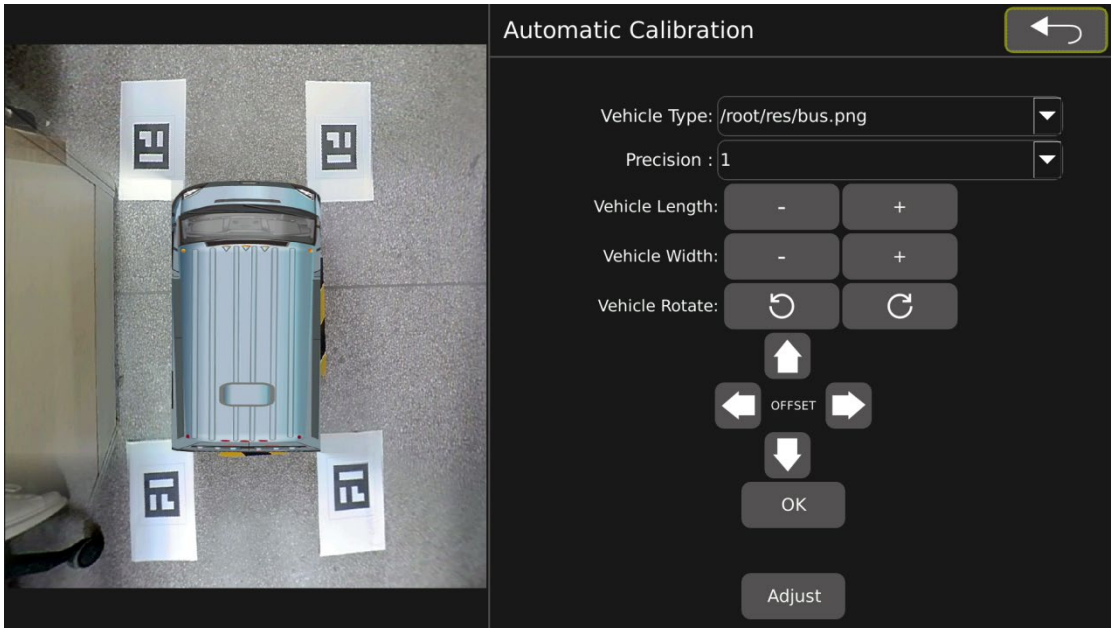


Photo 2.4

- Vehicle Type：Used to modify the type of car model (note that the car model here is only for auxiliary calibration reference and does not need to be saved)
- Precision : Accuracy adjustment of vehicle length, width and model movement, default value is 1. (optional values 1, 5, 10, 15 pixels).
- Vehicle Length：Used for vehicle length adjustment. Click "-" to decrease vehicle length; Click "+" to increase vehicle length
- Vehicle Width：Used for vehicle width adjustment, Click "-" to decrease vehicle width; Click "+" to increase vehicle width
- Vehicle Rotate：Used for car model rotation (turn left or right).

For car model movement (up/down/left/right).

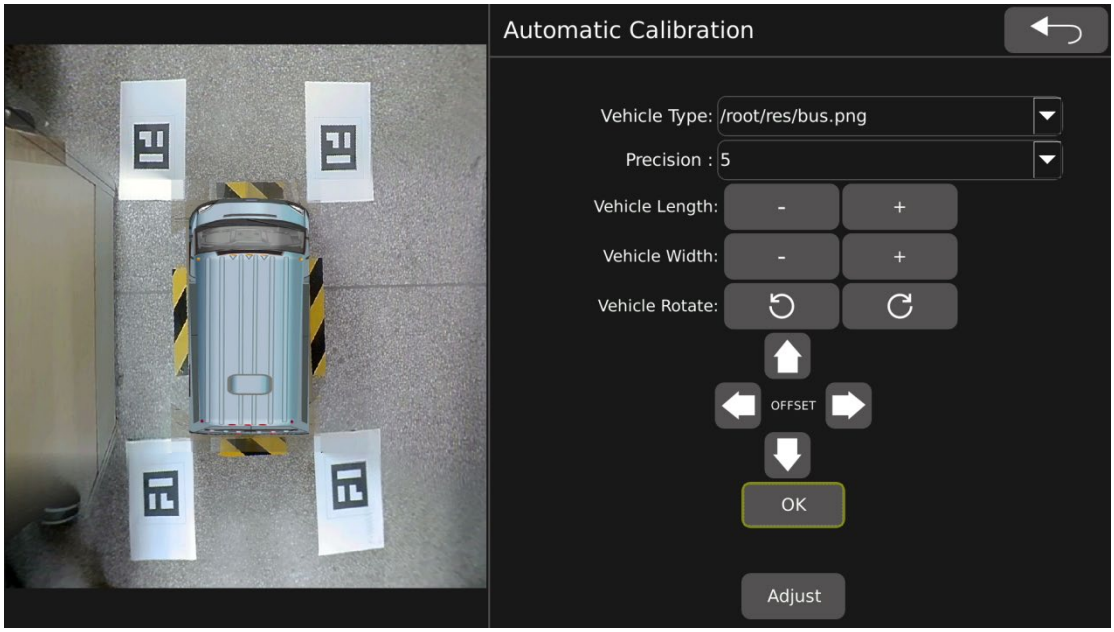


Photo 2.5

adjust the parameters of the car model until you can see the zebra tape all around,

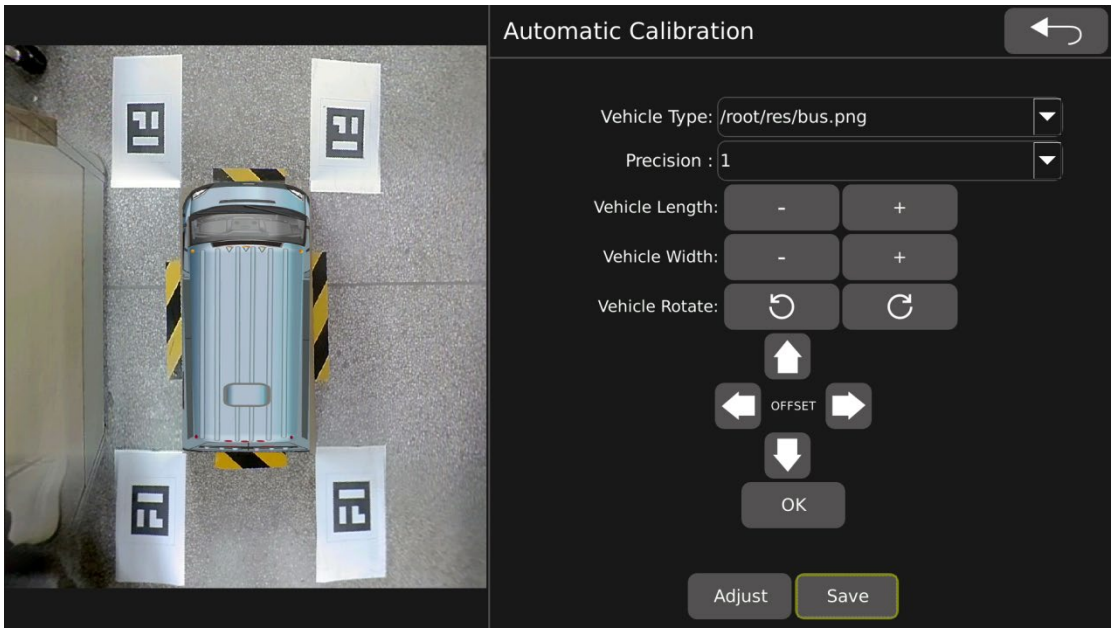


Photo 2.6

Click save icon to save calibration parameters and reboot the system.

Photo 2.7

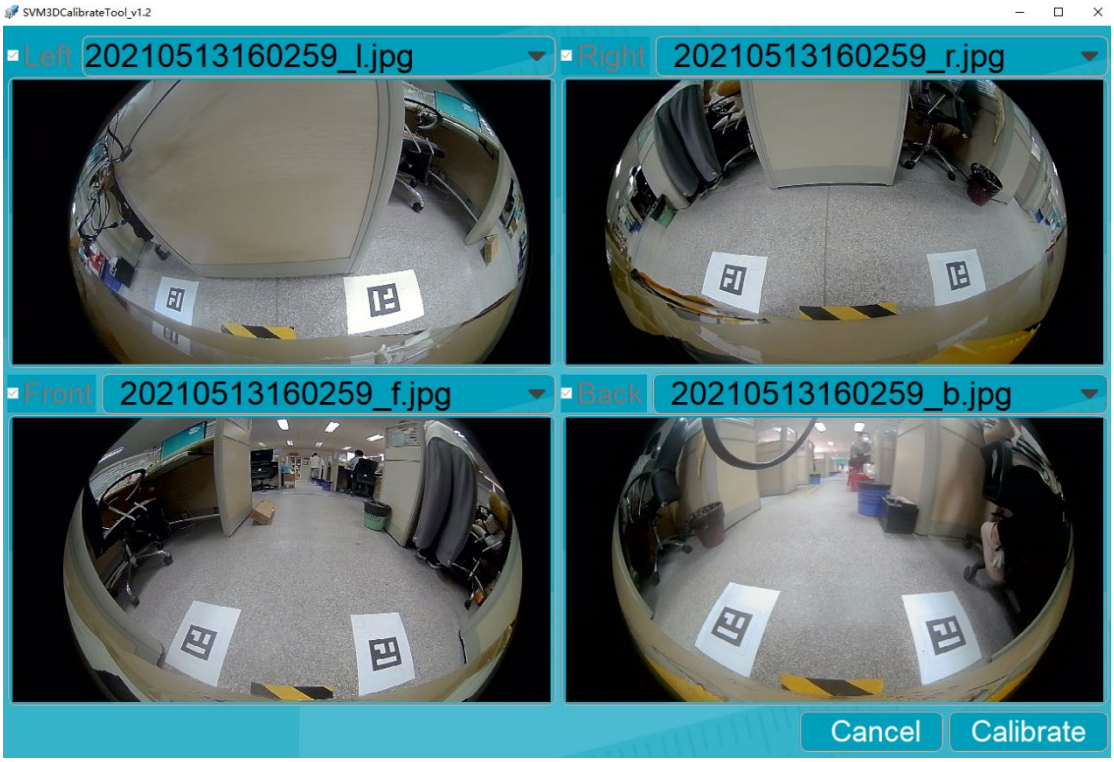
Note: If you are not satisfied with the effect of automatic calibration, please see the manual calibration settings.

* if you do the auto calibration on PC calibration tool, please refer to the below steps

Open SVM3DCalibrateTool_v1.3.exe 

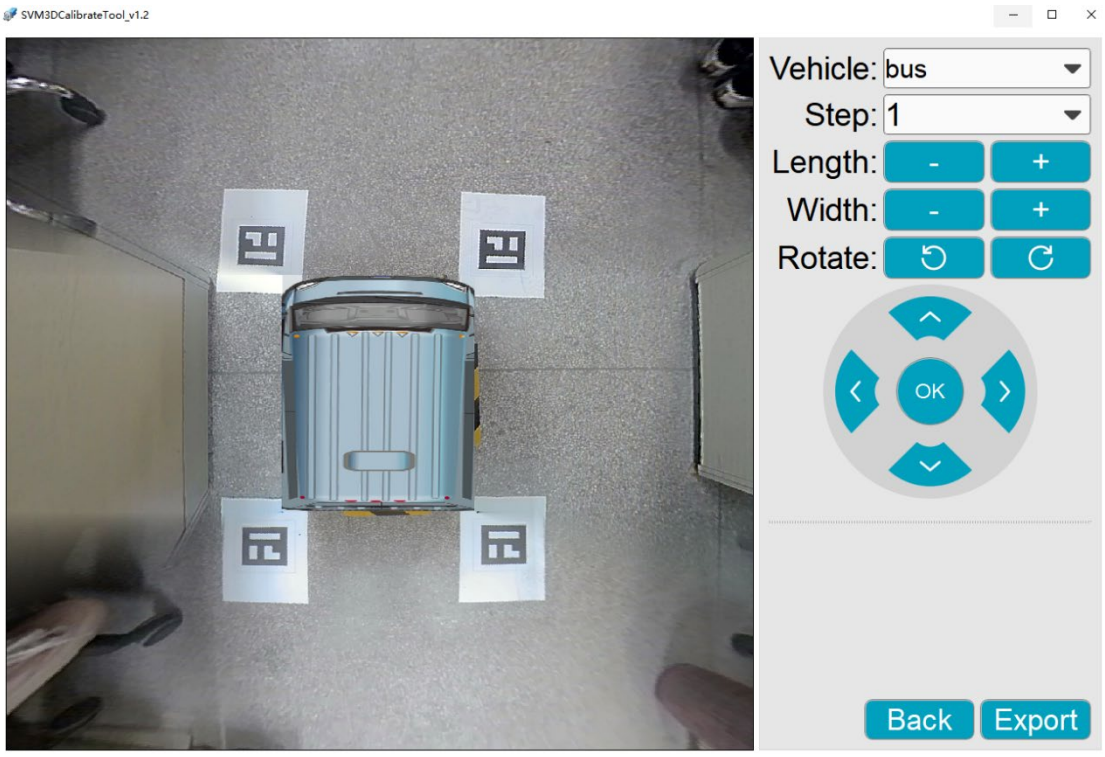
, as shown in Figure 2.3.

Photo 2.3

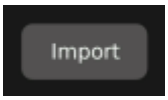


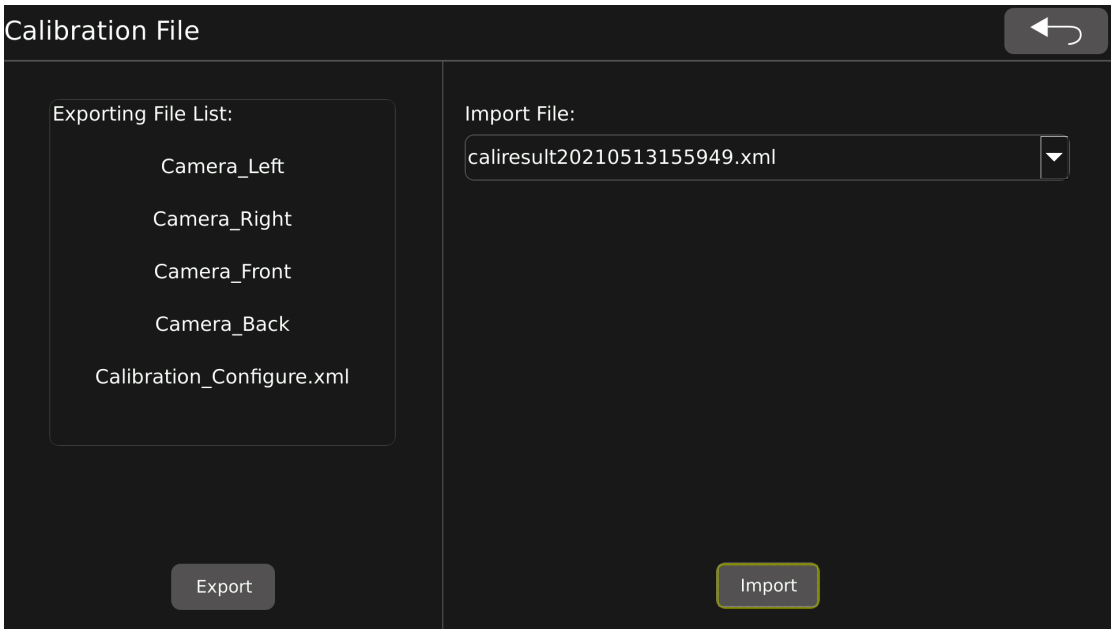
Click 

, Then the automatic calibration can be completed.



The car model can be adjusted. For details, please refer to the "Automatic





The system reboots and the calibration is successful.

3 car model type change

Click Vehicle Type to enter car model type interface.

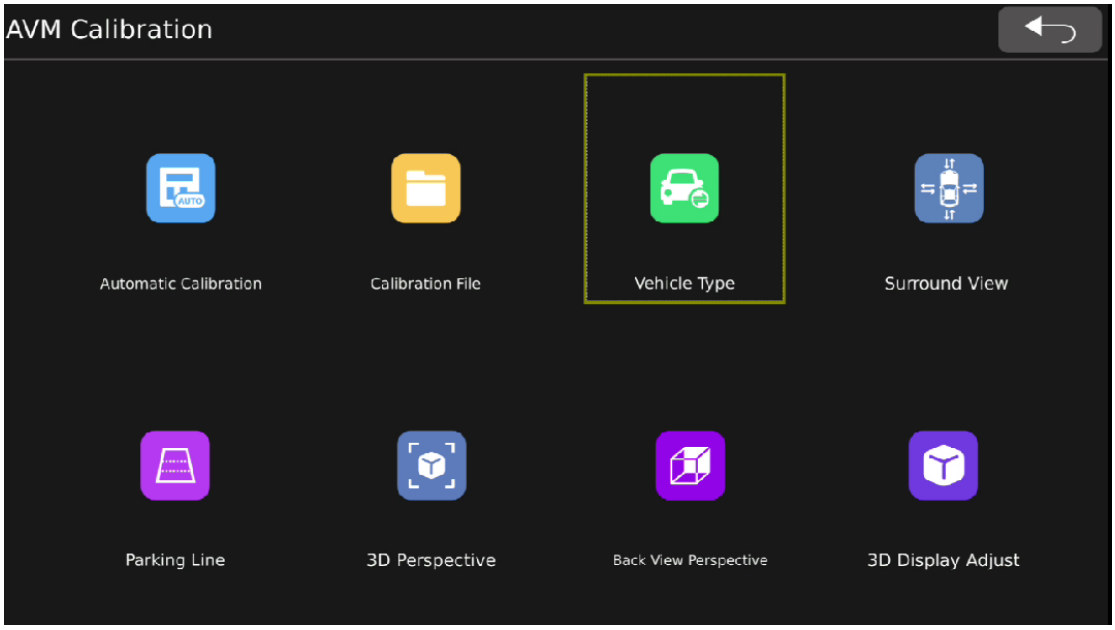
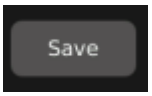


Photo3.1

Choose the car model, 

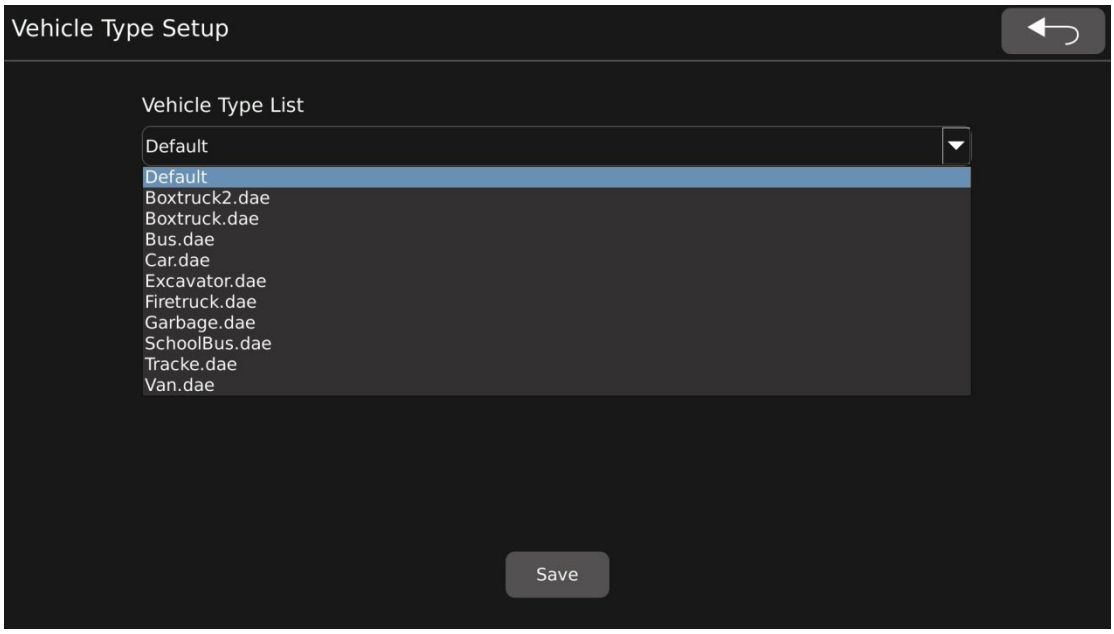


Photo 3.2

4 Surround View

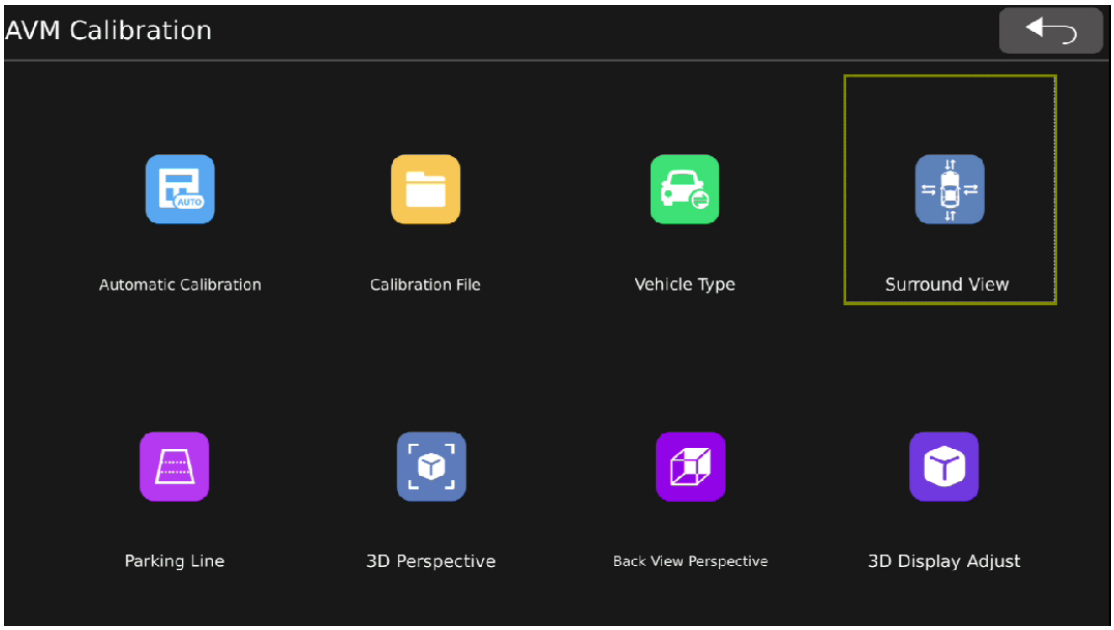


Photo 4.1

Click Surround View to enter for overlap angle and surround view range interface.

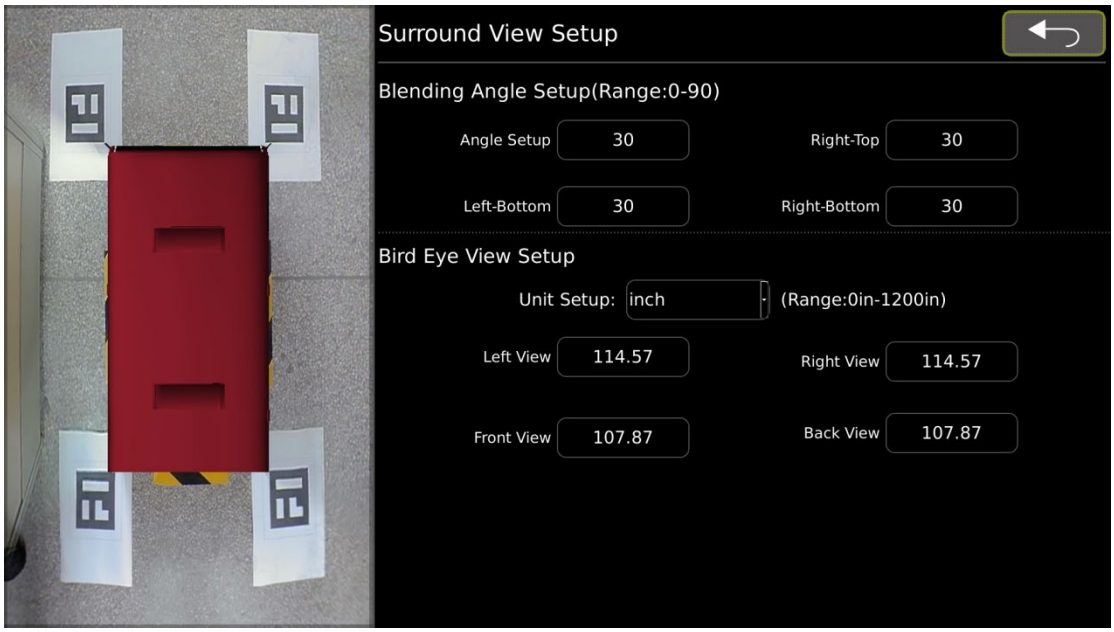


Photo 4.2

: blending angle setup, setting of left-top, left-bottom, right-top, right-bottom overlap angle, and the value can be set in the range of 0-90.

- 

: Unit configuration, the default is inch, can be set: inch/cm
- Left View/Right View/Front View/Back View: The visible width of the ring view can be set. The width of the ring view of each channel can be set individually.

4.1 Example of setting the overlap angle of the ring view

In order to see the size of the overlap angle more intuitively, the following figure shows the case where the overlap angle of the left camera is 30 and 80 respectively.

The overlap angle is 30:

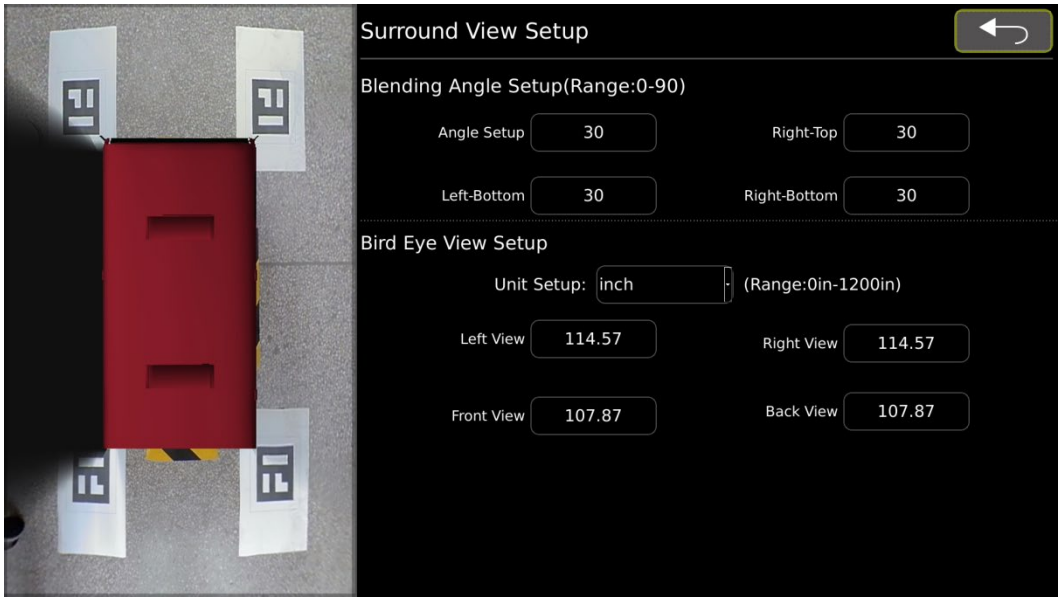


Photo 4.3

The overlap angle is 80:

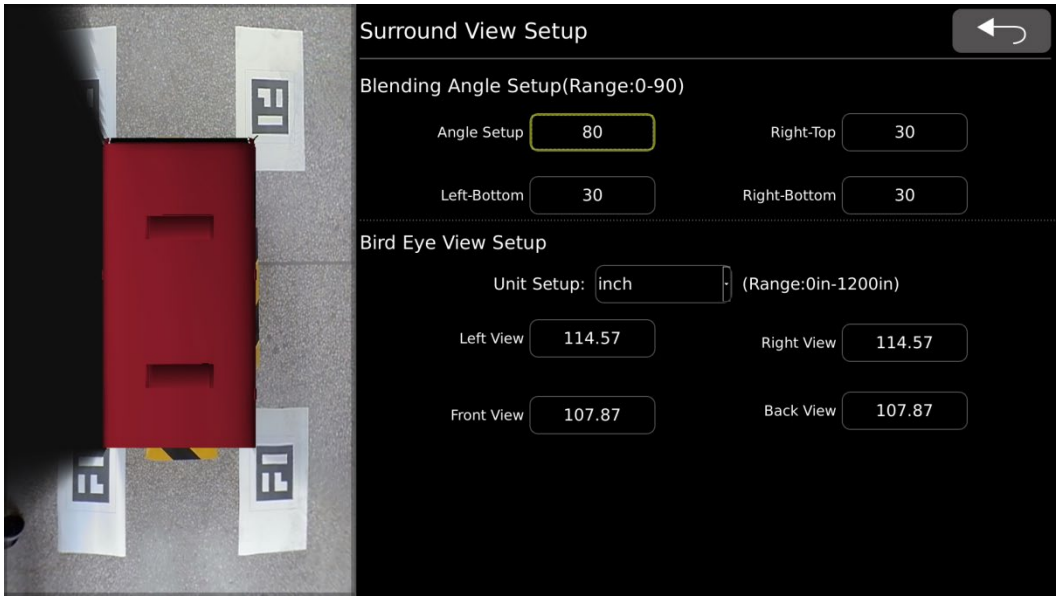


Photo 4.4

By adjusting the overlap angle, obstacles on the body can be removed. (Examples are as follows)

Assuming that there is an obstacle protruding from the upper right corner of the vehicle body (take the tape as an example), when the overlap angle is 90, the obstacle can be seen, as shown in Figure 4.5:

Photo 4.5

The car model renderings are as follows:

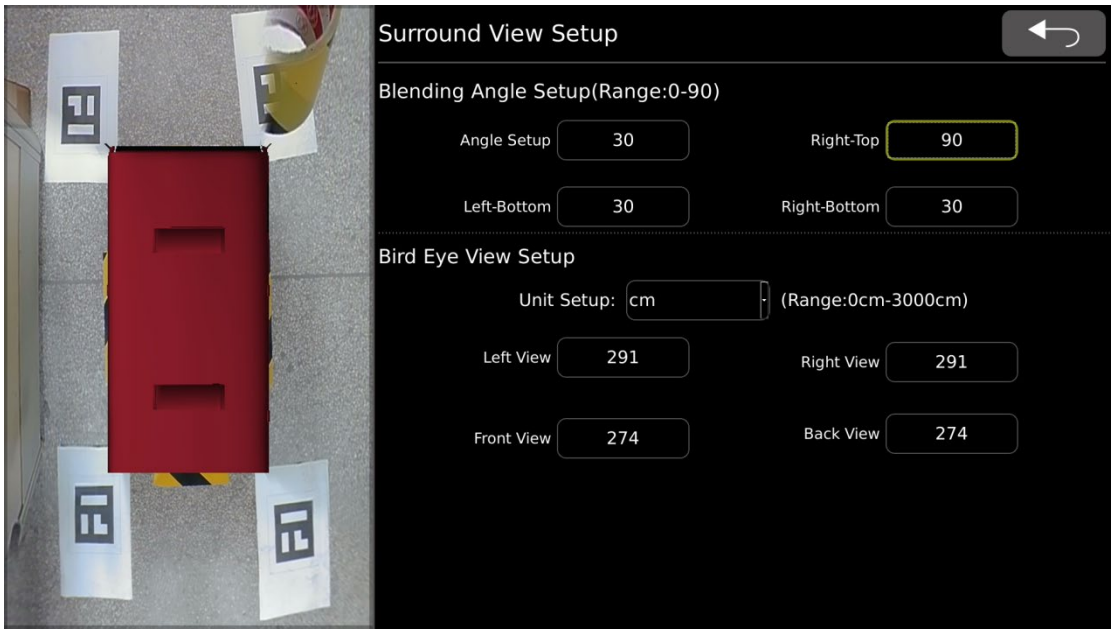


Photo 4.6

When the overlap angle is adjusted to 30 degrees, the obstacle can be removed, as shown in Figure 4.7.

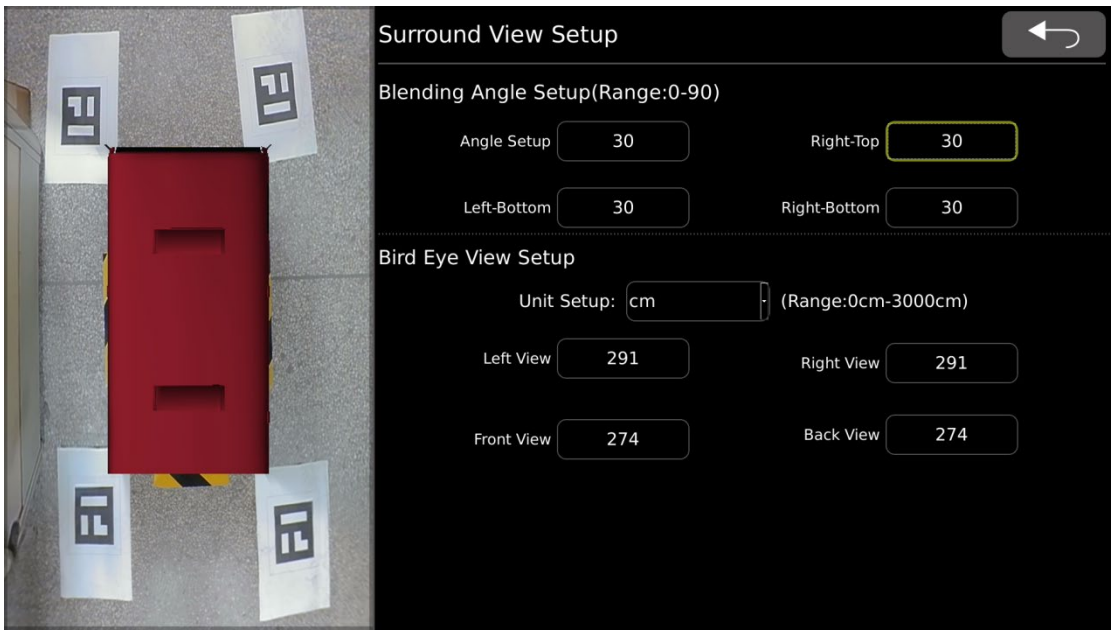


Photo 4.7

4.2 Example of setup the channel width of surround view.

In order to see the size of the channel width more intuitively, the following figure shows the case where the channel width of the left camera is 106cm and 306cm respectively.

The overlap angle is 106 cm:

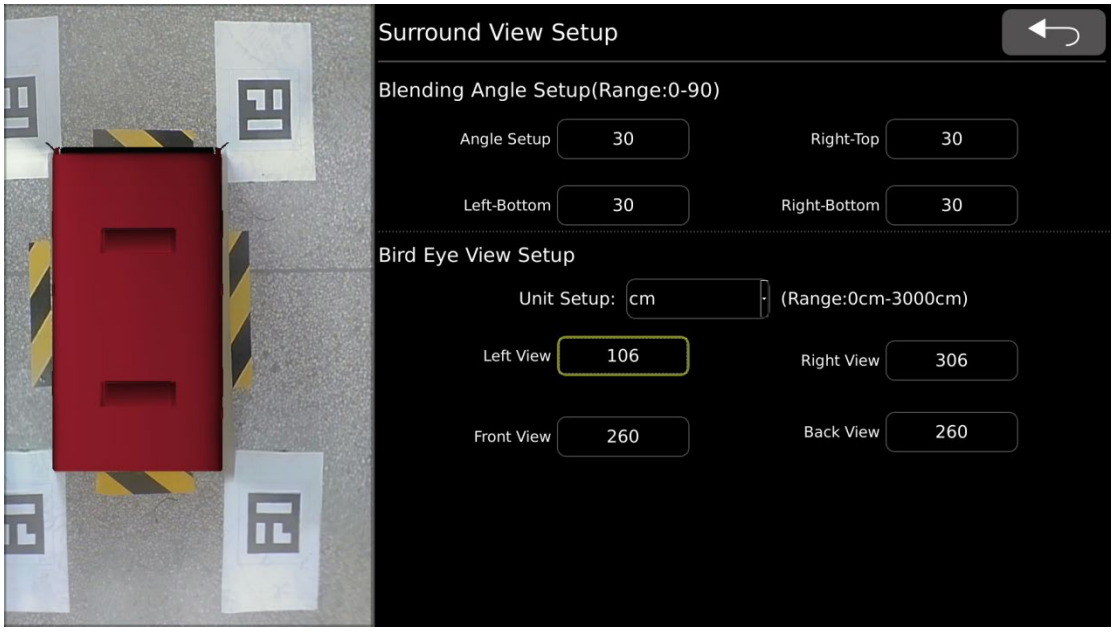


Photo 4.8

The overlap angle is 306 cm:

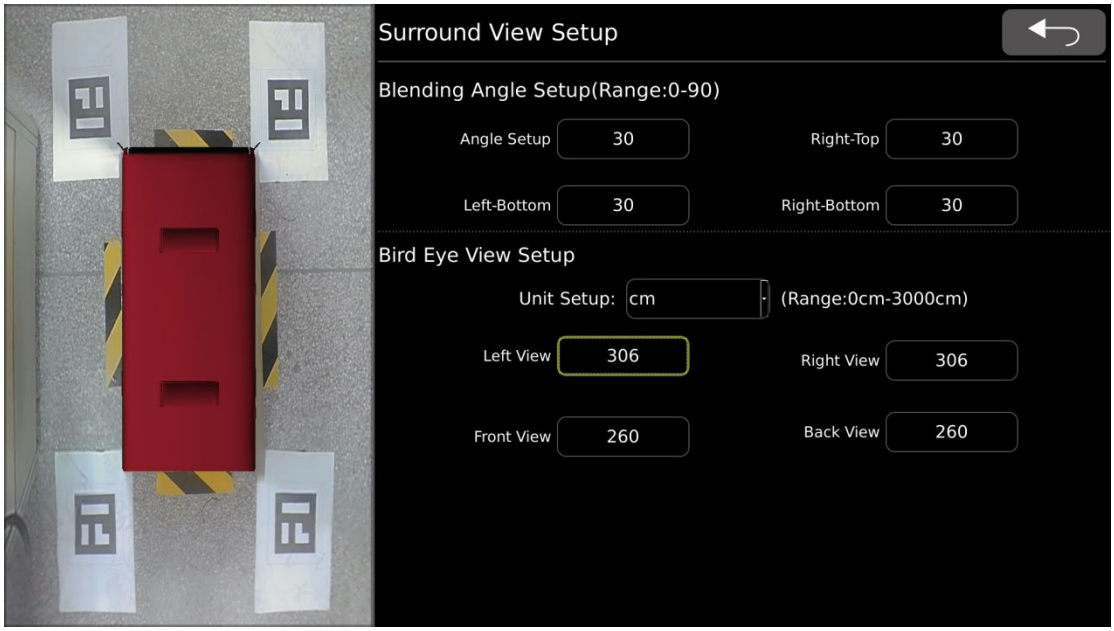


Photo 4.9

5 Parking Line

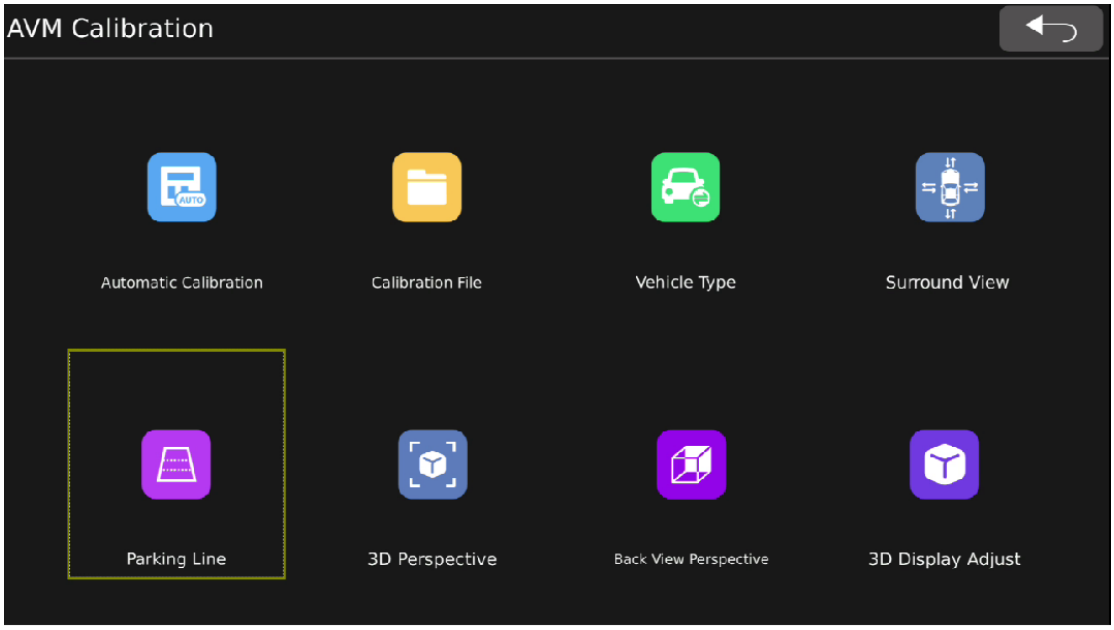


Photo 5.1

Click Parking Line icon to enter the adjustment interface of reverse cursor.

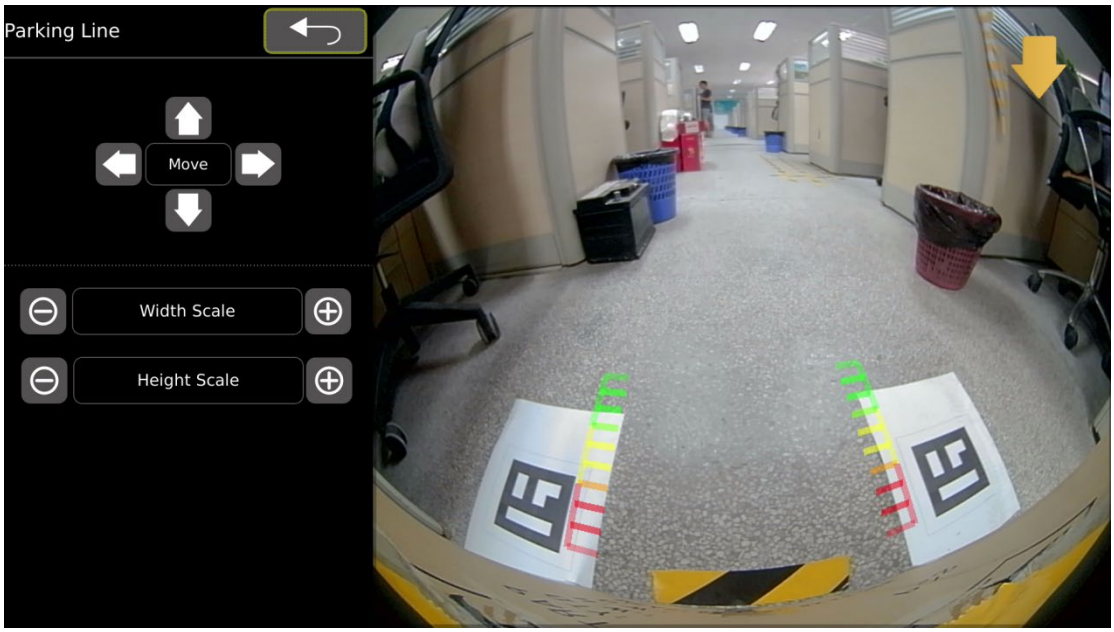


Photo 5.2

- Move：The reversing cursor moves up, down, left and right.
- Width Scale/Height Scale：Adjust the width / height of the reversing cursor

6 3D Perspective

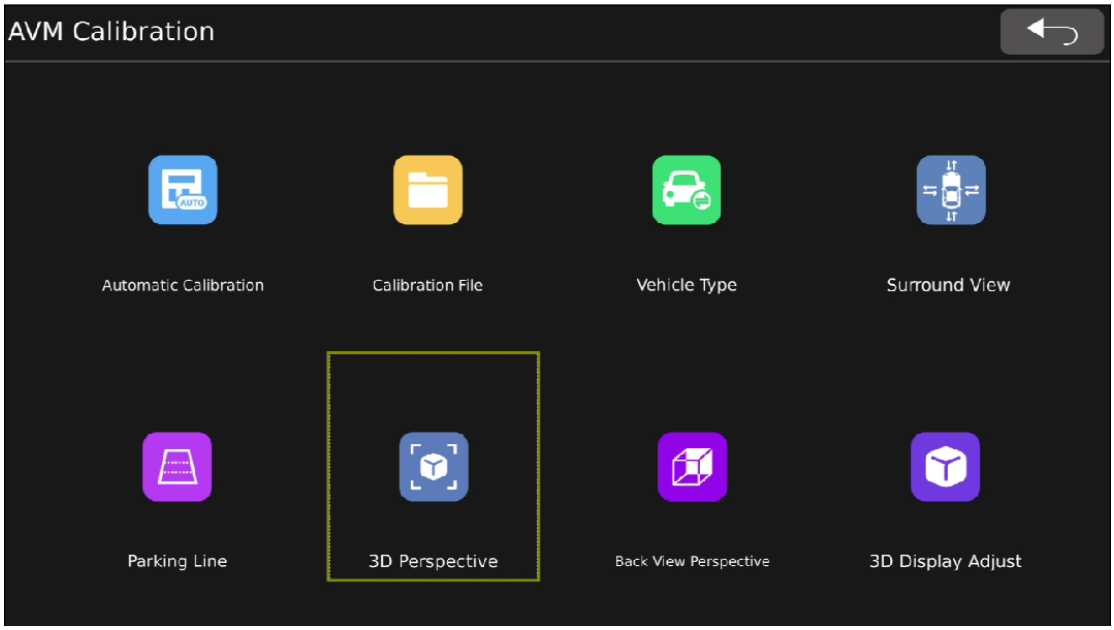


Photo 6.1

Click 3D Perspective to enter the 3D perspective setting page.

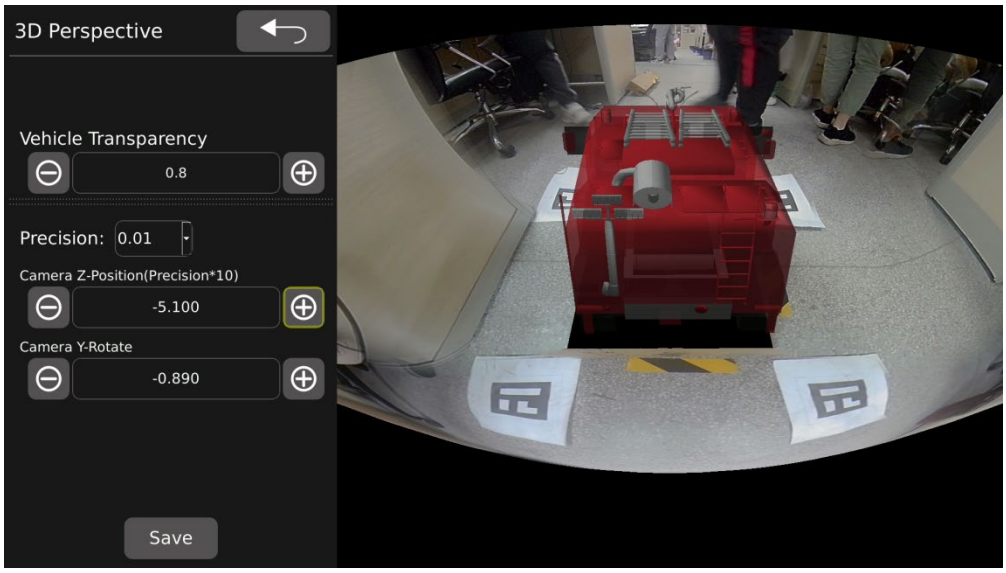


Photo 6.2

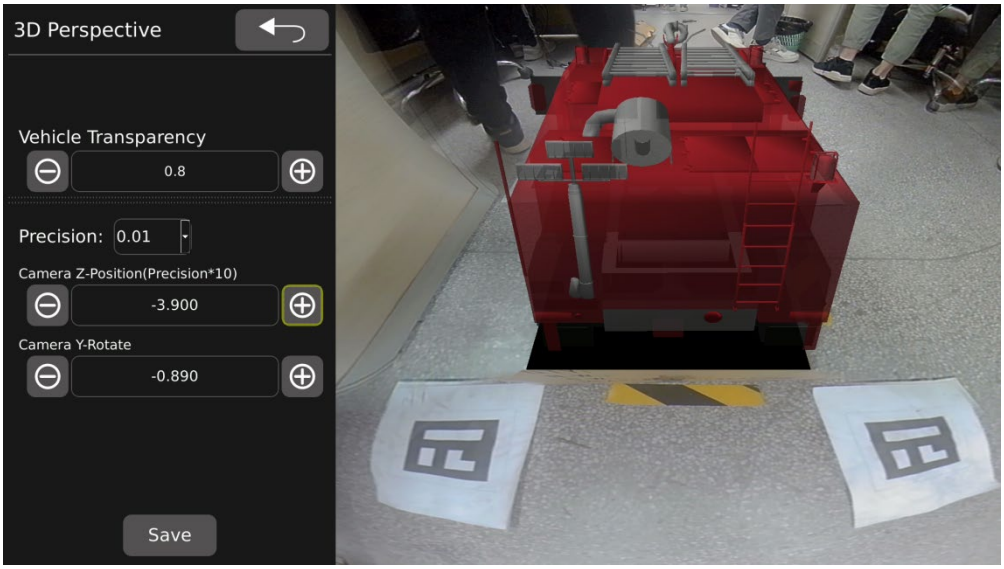


Photo 6.3

- Vehicle Transparency：Car model transparency setting（range: 0.1-1).
- Precision：Precision setting(0.01/0.02/0.04/0.08/0.1 is optional.
- Camera Z-Position：3D view zoom setting.
- Camera Y-Position：3D view up/down rotation setting.

7 3D Display Adjust

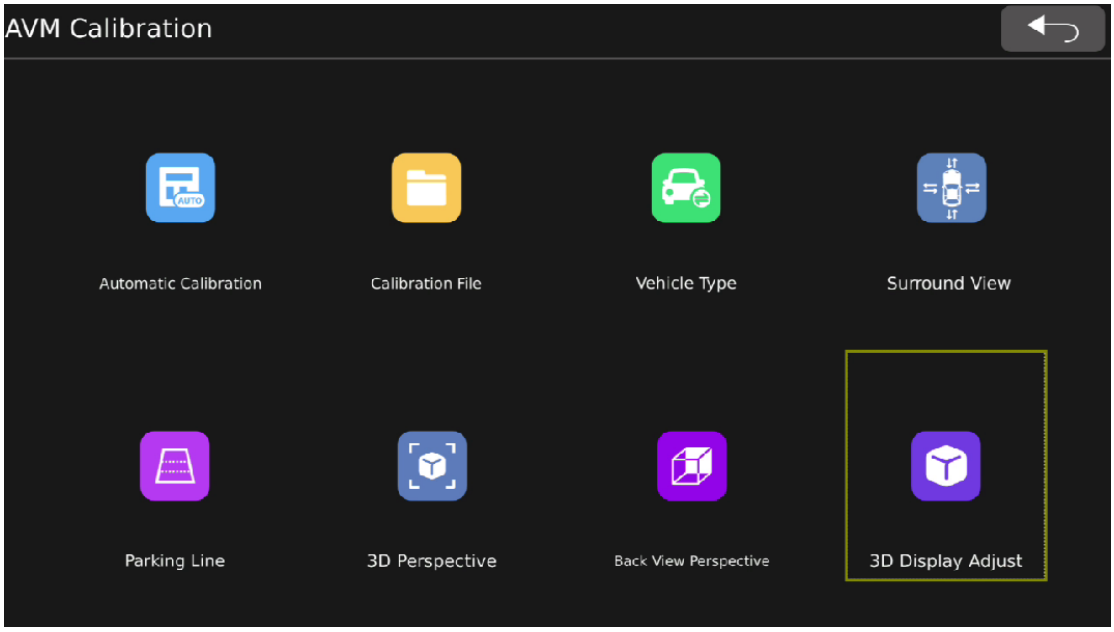


Photo 7.1

Click 3D Display Adjust to enter the 3D display setting page.

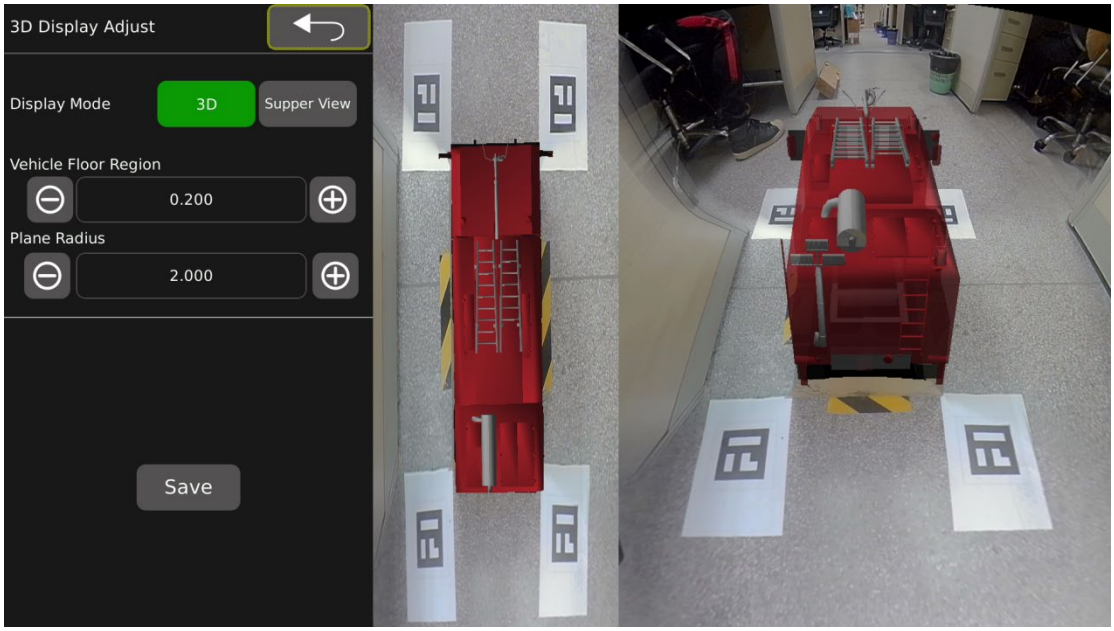


Photo 7.2

- Display Mode：3D or Supper View is optional.
- Vehicle Floor Region：Set the size of the floor region under the vehicle model，The

larger the value, the smaller the area of the black area.

- Plane Radius：Ground radius setting, the larger the radius, the smaller the 3D field of view. The smaller the ground radius setting, the better the display effect of nearby objects, but the effect of distant objects is relatively poor. Users can make adjustments according to their actual applications. To achieve better results, it can be combined with the overlap angle for matching settings. For example: when the ground radius is set to be small, it is best to increase the overlap angle, otherwise severe ghosting will occur. The specific effect is better, and the user can adjust it according to the actual situation.

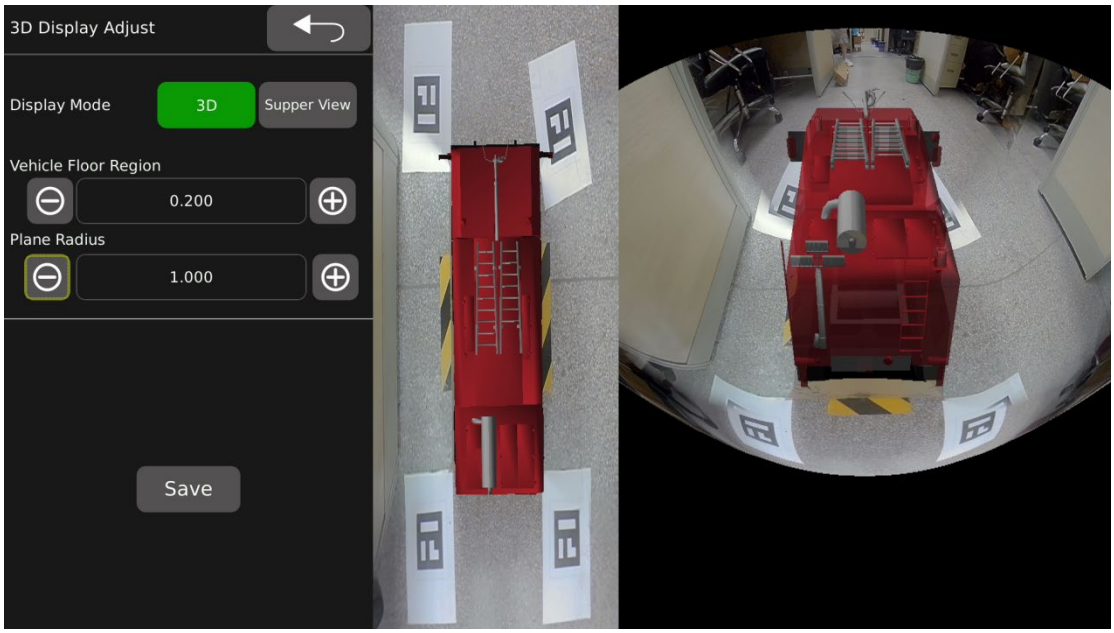


Photo7.3

When the ground radius is set to 1.9, the double image disappears.

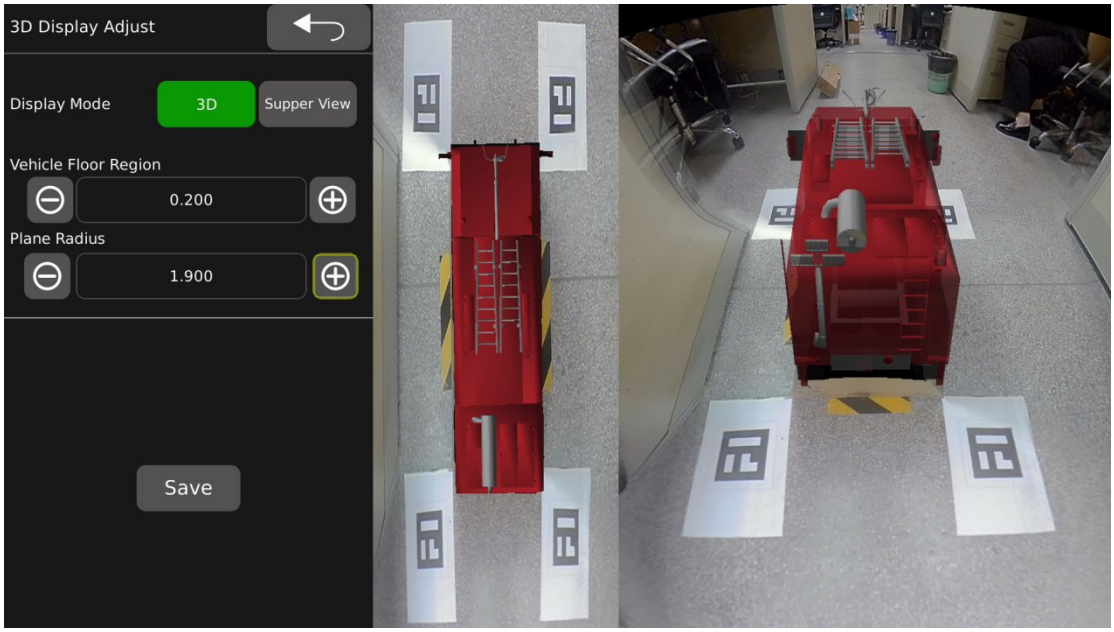


Photo 7.4

When Display Mode is set to Supper View mode:

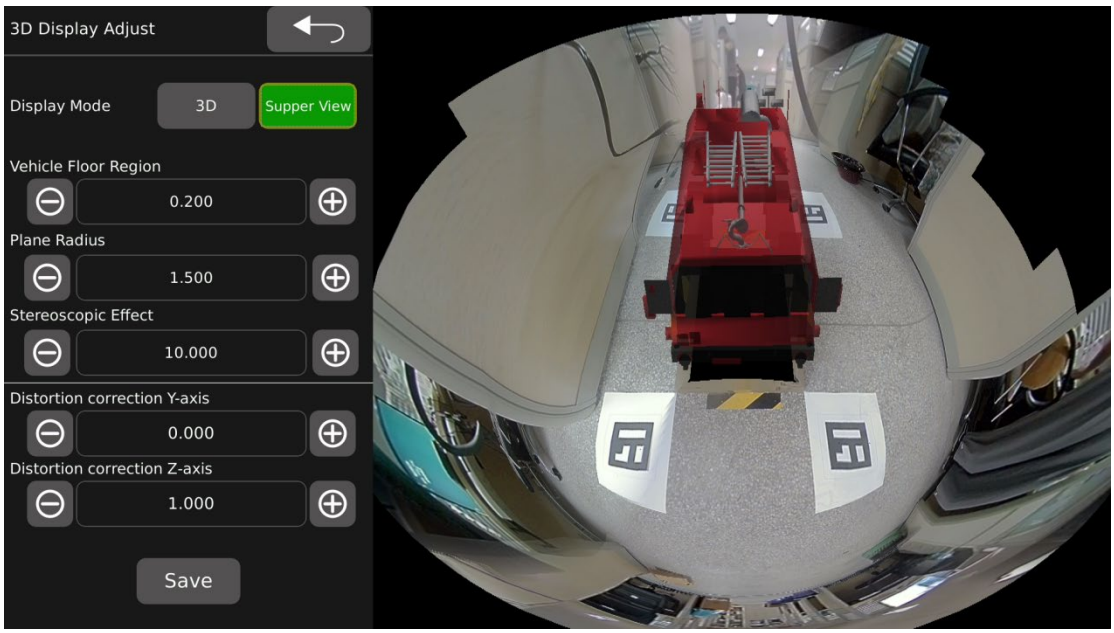


Photo 7.5

- Vehicle Floor Region：Same as above.
- Plane Radius：Same as above.
- Stereoscopic Effect：Object 3D effect settings.
- Distortion correction Y-axis：The Y direction offset setting of the virtual projection

camera.

- Distortion correction Z-axis：The height offset setting of the virtual projection camera.

The setting page here is used as a super rearview mirror. Observe the picture 7.5 and you can see that there are jagged edges. You can adjust the Distortion correction Z-axis parameter to adjust the height offset of the virtual camera to remove the jagged edges. As shown in Figure 7.6.

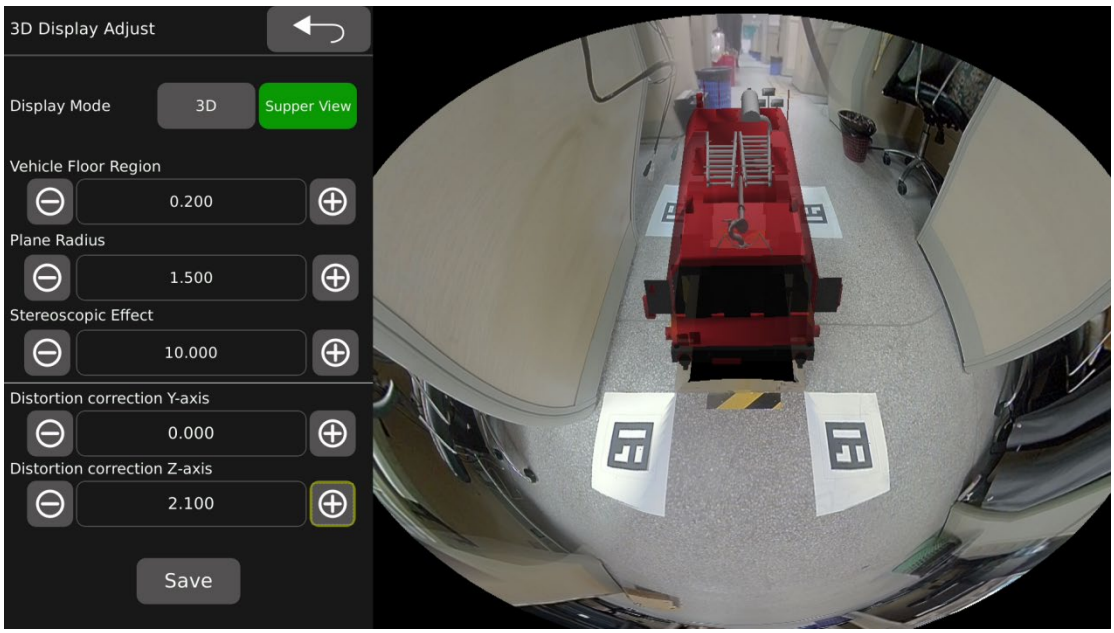


Photo 7.6

By adjusting the value of Stereoscopic Effect, the three-dimensional effect of the object can be changed. In Figure 7.7 and Figure 7.8, the parameter values are set to 3 and 20 respectively, and it can be clearly seen that the effect of the next three-dimensional object becomes better.

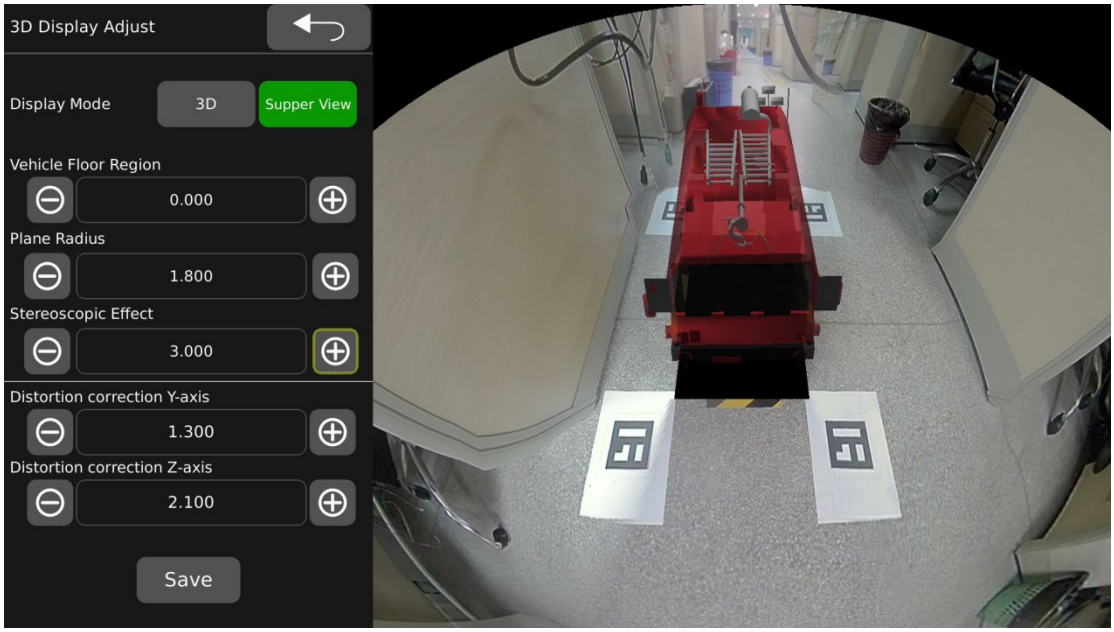


Photo 7.7

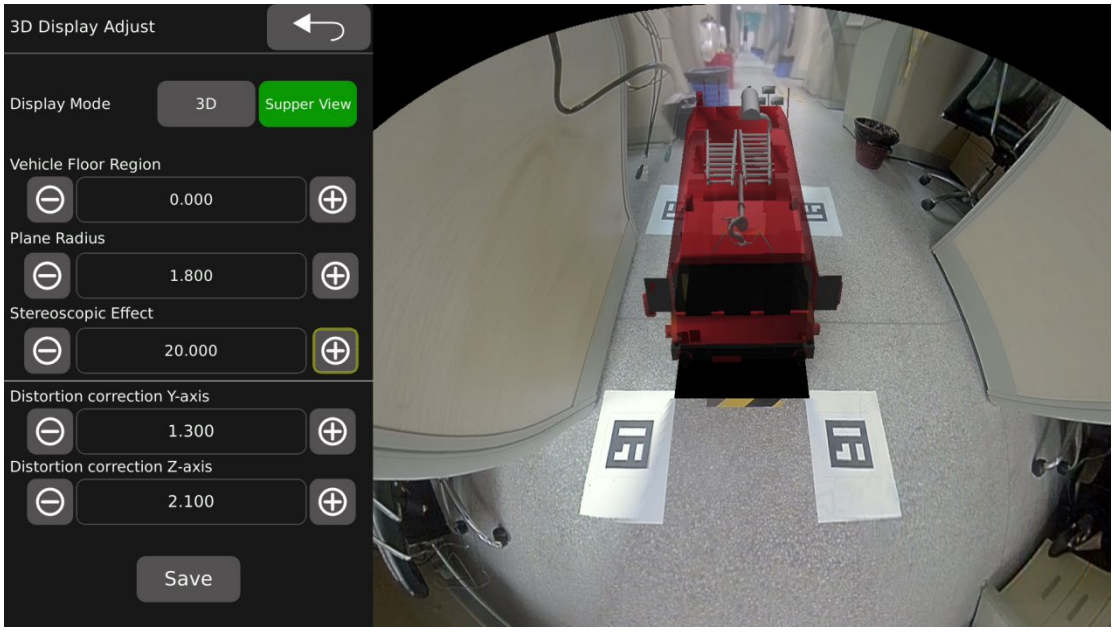


Photo 7.8

The degree of distortion of the three-dimensional object can be adjusted by adjusting the value of the Distortion correction Y-axis. In Figure 7.9 and Figure 7.10, the parameter values are set to -1.7 and 1.8 respectively. It can be clearly seen that the degree of distortion of the three-dimensional object next to it has been improved.

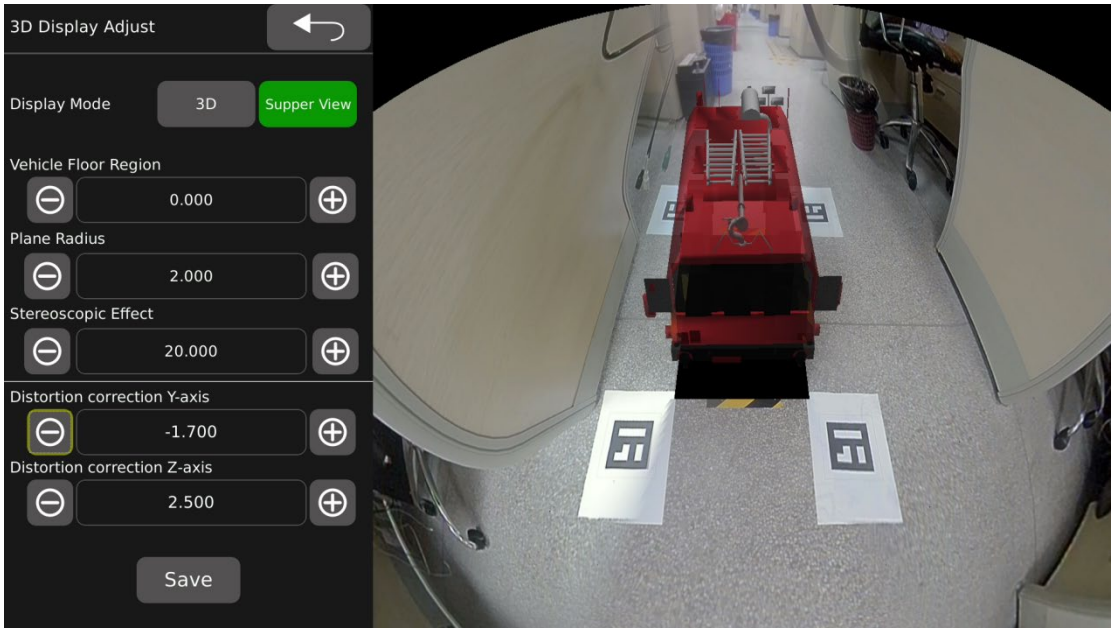


Photo 7.9

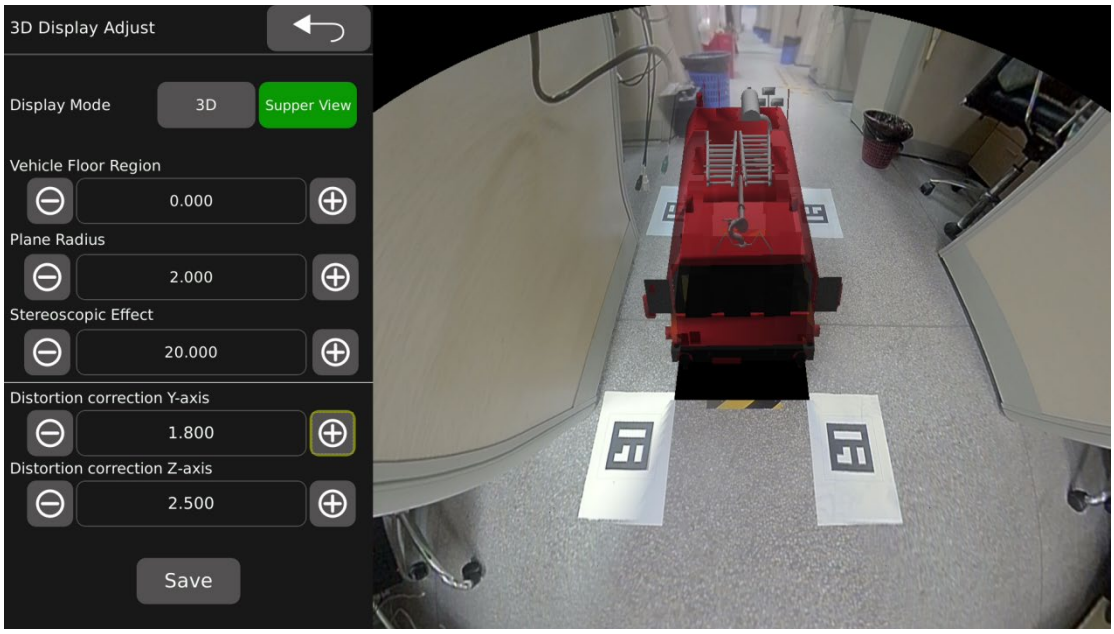


Photo 7.10

Warm reminder: Multiple parameters need to be combined with the actual situation and adjusted together to achieve the best results.8 Back View Perspective.

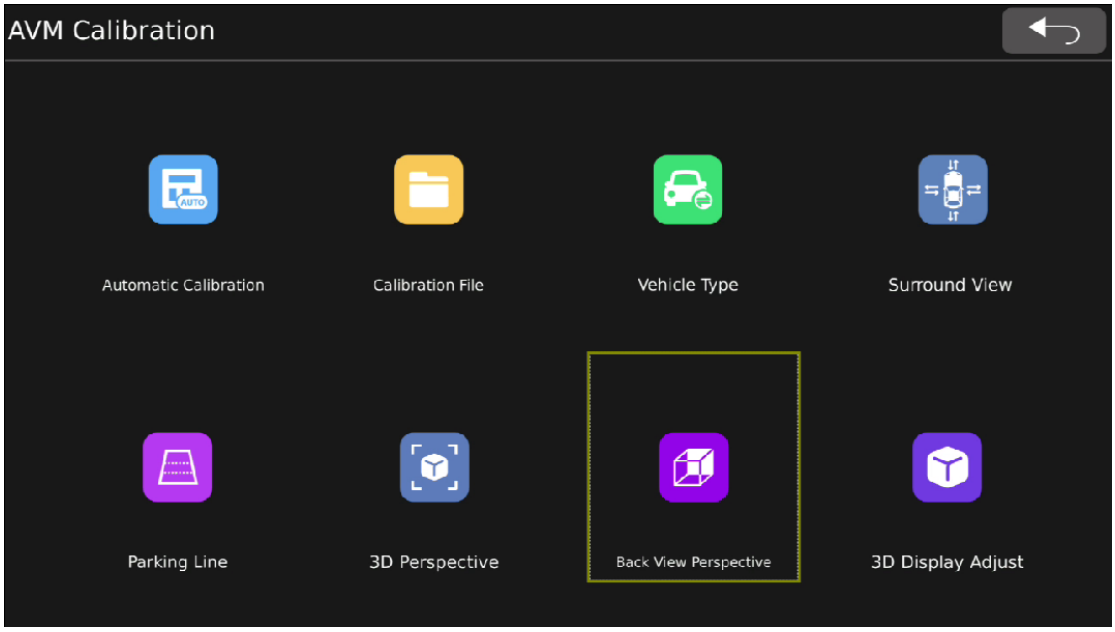


Photo 8.1

Click Back View Perspective to enter the 3D view perspective setting page.

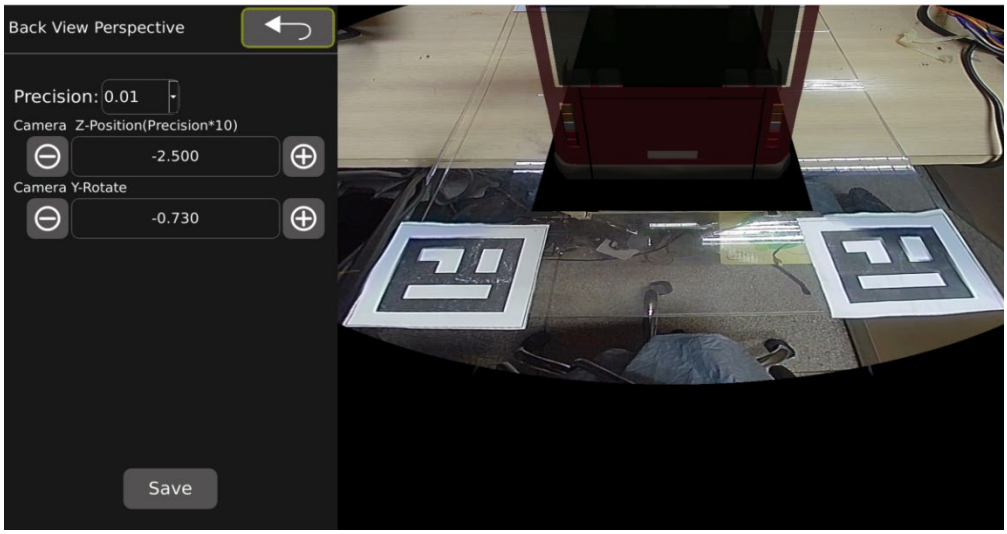


Photo 8.2

- Position：Adjust the precision setting. 0.01-0.1 is optional.
- Camera Z-Position：3D rear view zoom setting.
- Camera Y-Position：3D rear view up/down rotation setting.

Manual Calibration Procedure

When you are not satisfied with the effect of automatic calibration, the following three methods can assist in calibration.

1. Internal parameter adjustment

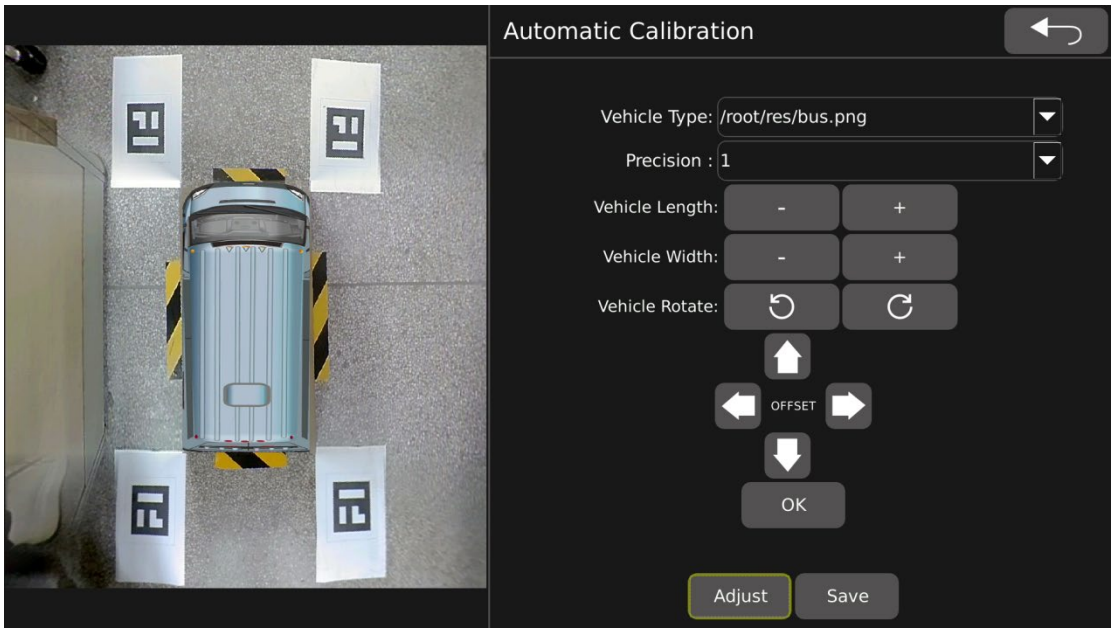
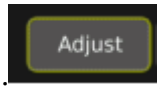


Photo 1.1

Automatic calibration will be affected by the environment. If you are not satisfied with the calibration effect, you can adjust the internal parameters. Press the SHIFT button on the remote control and select the Adjust function button. 

, After pressing the remote control ENTER to confirm, a prompt will pop up whether to return to the internal parameter adjustment page, press the remote control SHIFT key to select the Yes button, as shown in Figure 1.2.

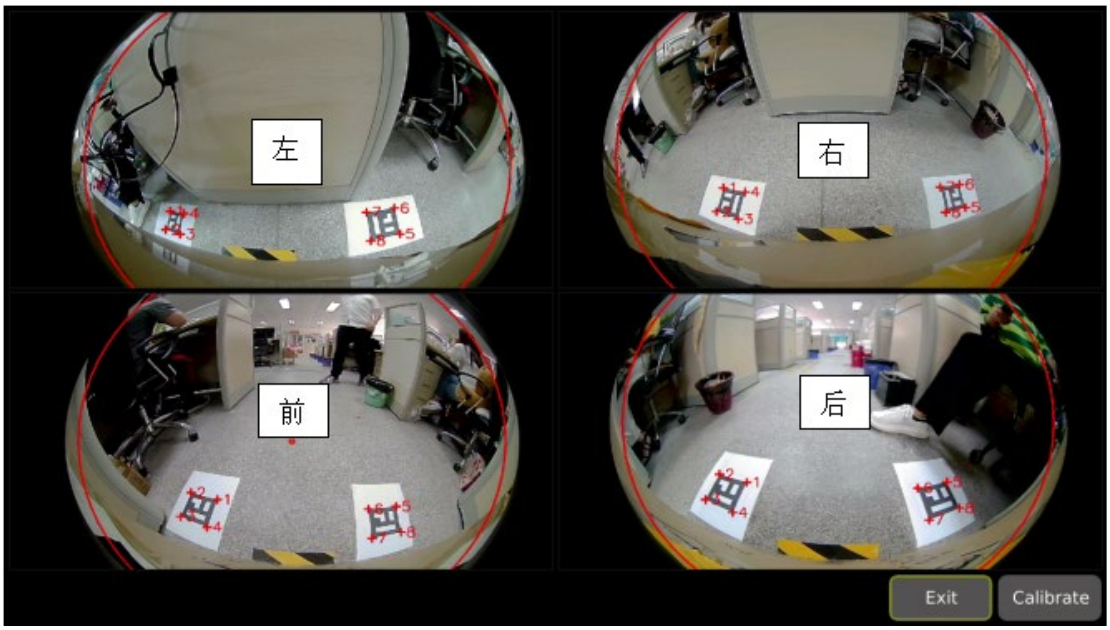


Photo 1.2

Press the remote control ENTER to confirm, jump to the internal parameter adjustment page, as shown in the figure below, press the remote control SHIFT key to select the corresponding view (left/right/front/rear), press the remote control ENTER key to enter the corresponding view The internal parameter adjustment page of the view.

Press the remote control SHIFT key to select the corresponding view, and press the remote control ENTER key to enter the view internal parameter adjustment page, as shown in Figure 1.3. The red arc in the figure is the internal parameter adjustment arc.

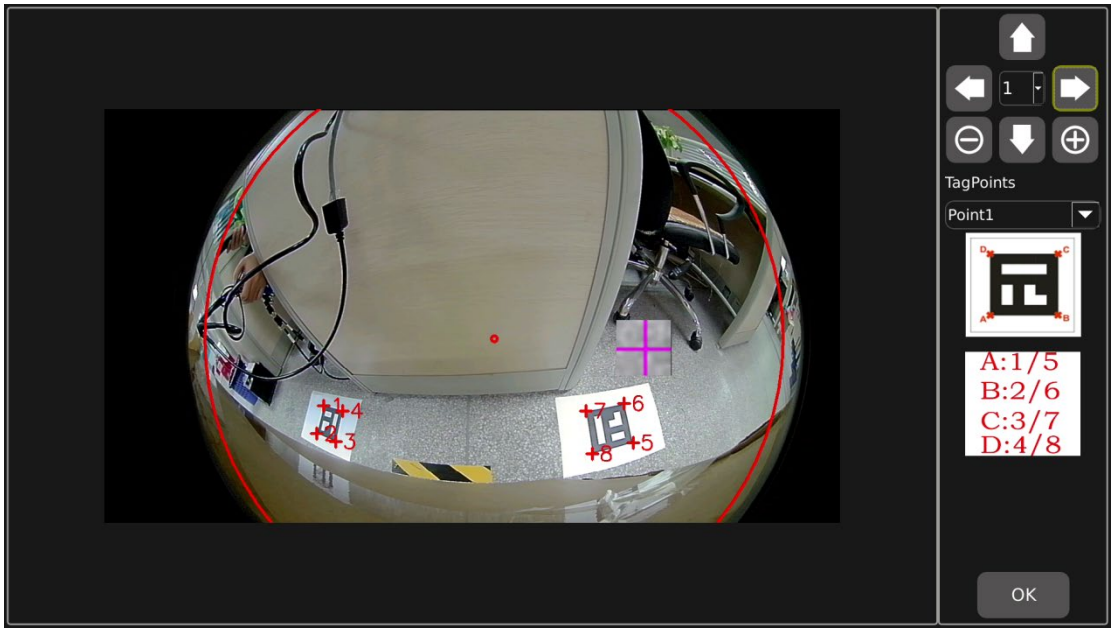
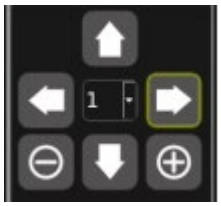


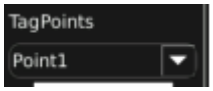
Photo 1.3

Description of function keys on the internal parameter adjustment page:



- Function key for moving arc up/down.

- Move the arc function key left/right.

- Press the SHIFT button on the remote control to select the left view, 

, Press the up/down/left/right button on the remote control to adjust the position of the corresponding point.

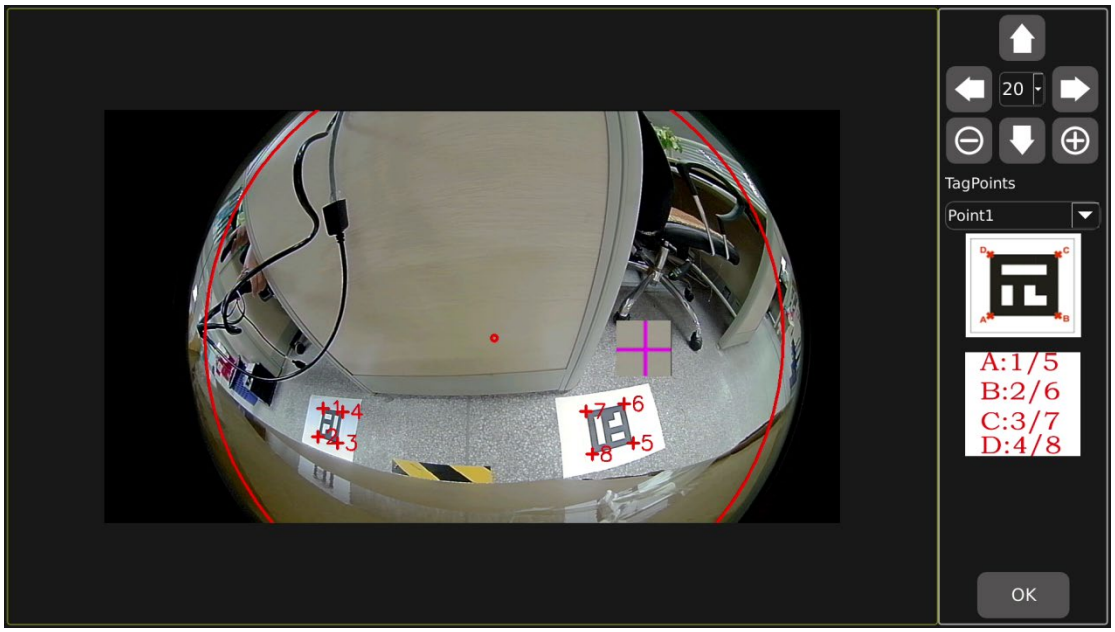
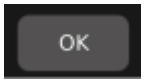
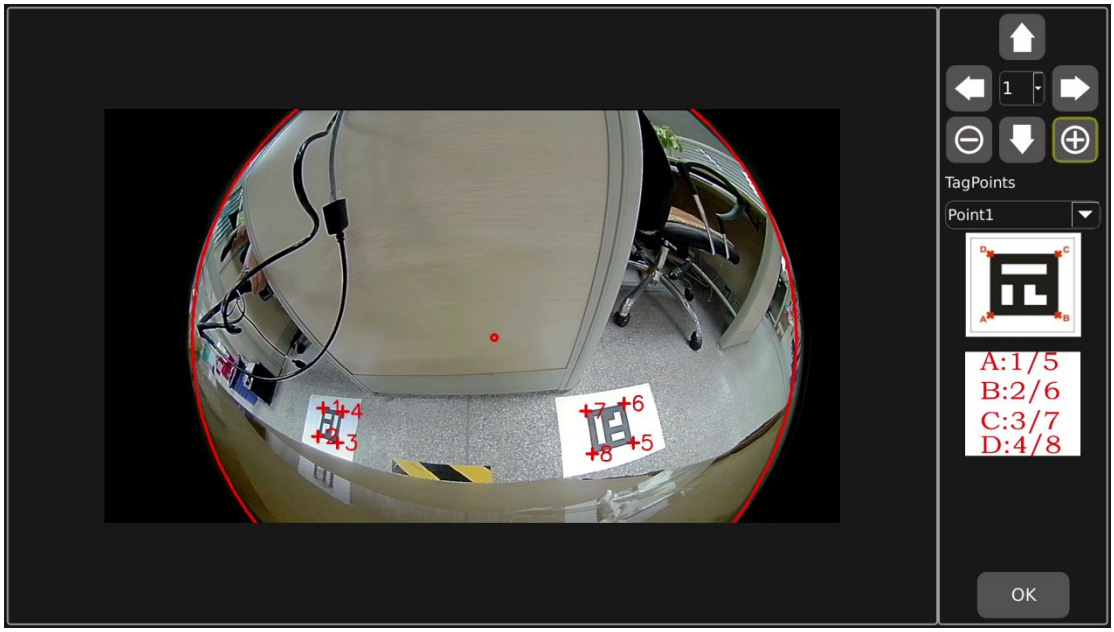


Photo 1.4

Press the remote control SHIFT key to select the corresponding function key, press the remote control ENTER key to adjust the internal parameter arc, and adjust the internal parameter arc to coincide with the arc edge of the view, as shown in the figure below. After adjustment, press the remote control SHIFT key to select 

, Press the remote control ENTER button to return.



Phpto 1.4

The left/right/front/rear view results after adjusting the internal parameters, as shown in Figure 1.5, press the remote control SHIFT key to select Calibrate, Press the remote control ENTER button to recalibrate.

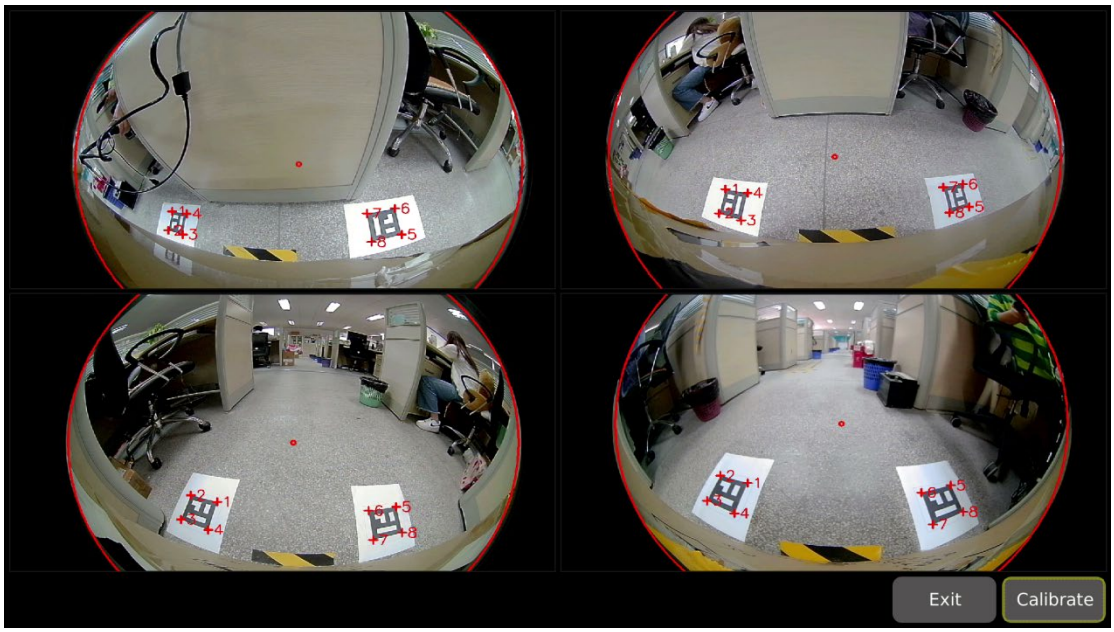


Photo 1.5

After the recalibration is completed, it will automatically jump to the calibration

success page, as shown in Figure 1.6.

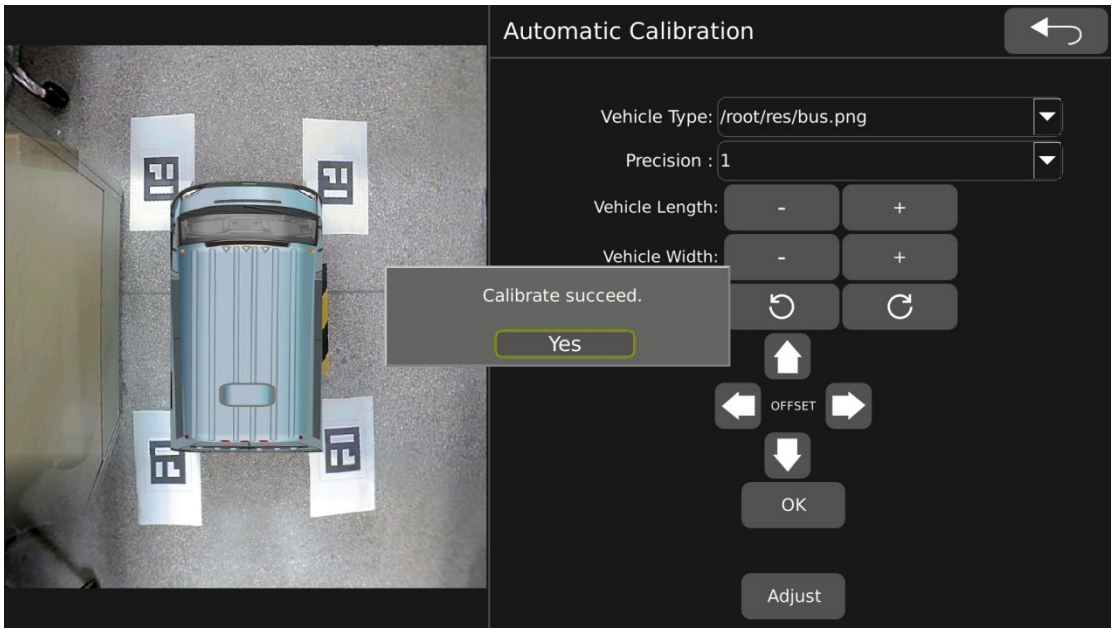


Photo 1.6

Export to computer for manual calibration.

Click Calibration File to enter the page of exporting calibration pictures and importing calibration files.

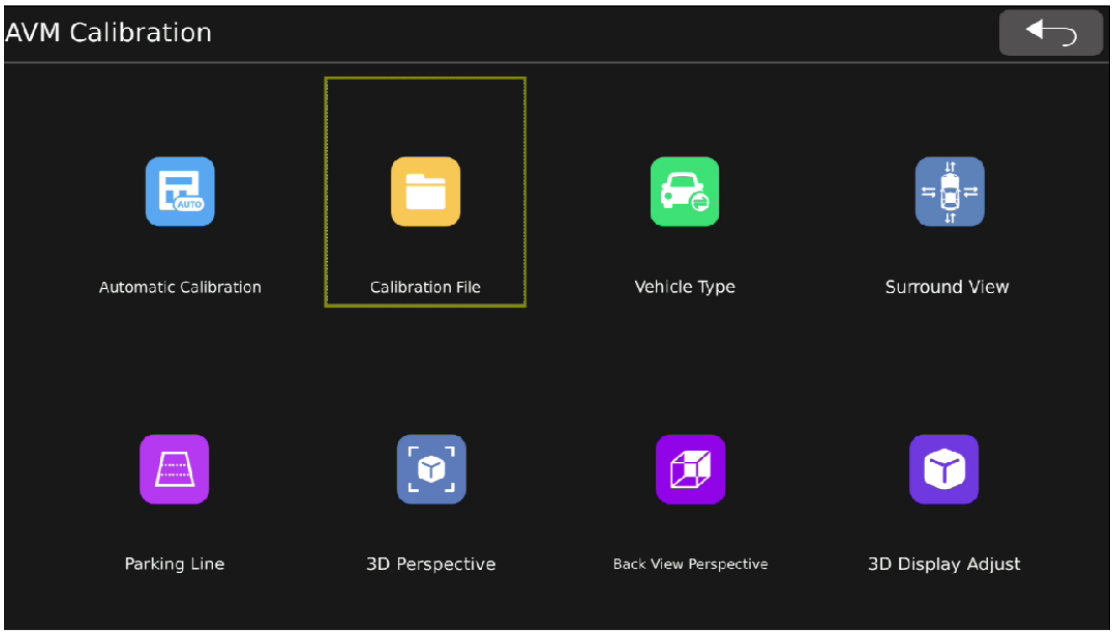


Photo 2.1

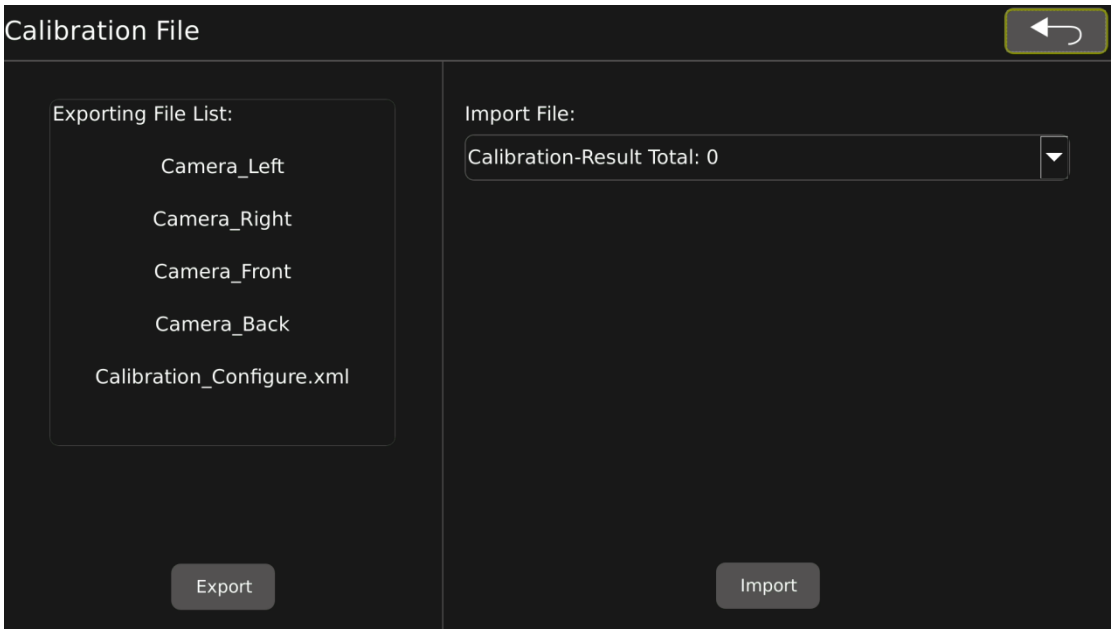


Photo 2.2

Please note: This page will not refresh the USB resources in real time. The user

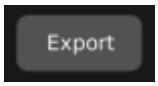
must first connect to the USB before entering this page.

- Export ： Export the calibration picture file to USB. Resources include: 4-channel image + xml file.

Import ： Import the calibrated file. Pay attention to the file naming and make sure that the calibration file is what you want.

Specific steps are as follows:

Connect the U disk and place the calibration cloth. For details, please refer to the precautions in the "Automatic Calibration Process". Click on

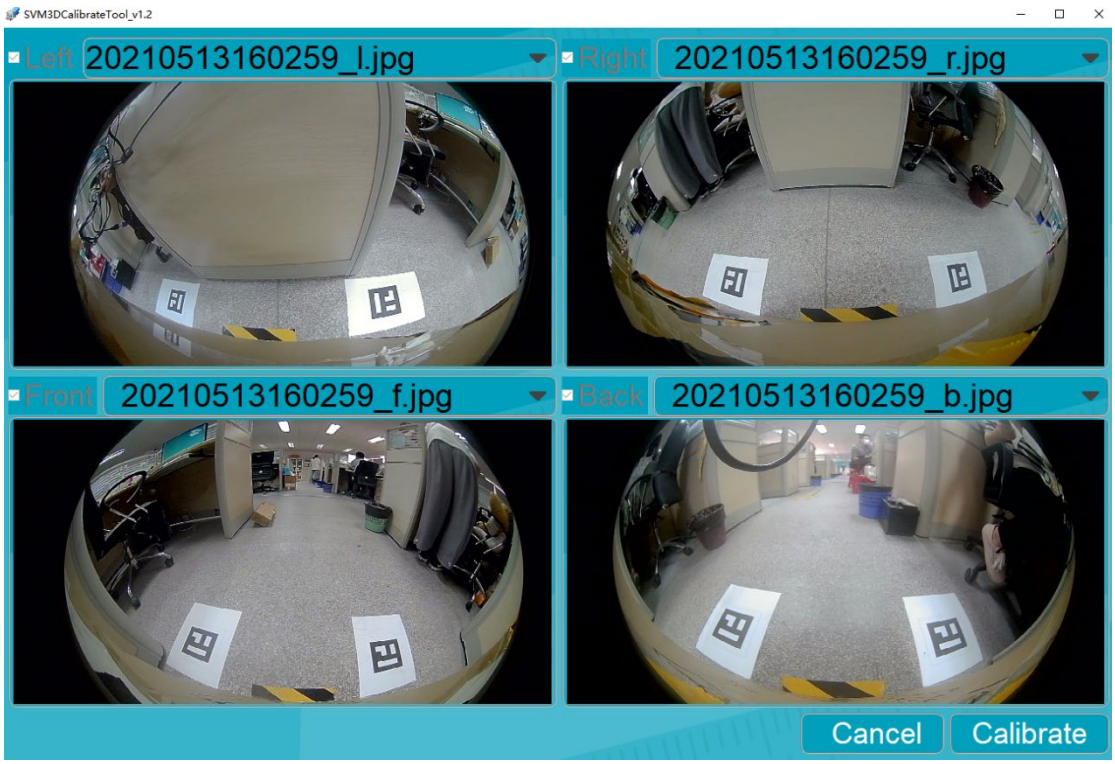


, Export the calibration picture to a USB flash drive.

Open SVM3DCalibrateTool_v1.3.exe 

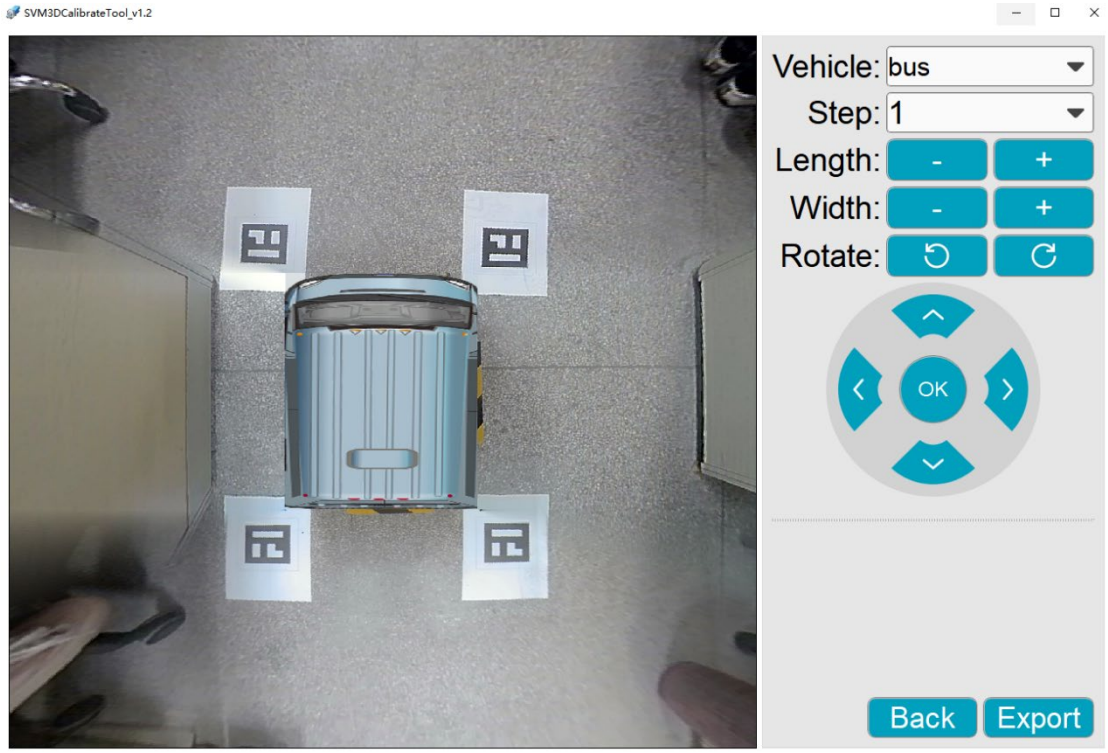
, as shown in Figure 2.3.

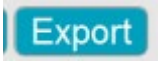
Photo 2.3

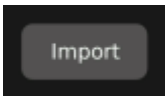


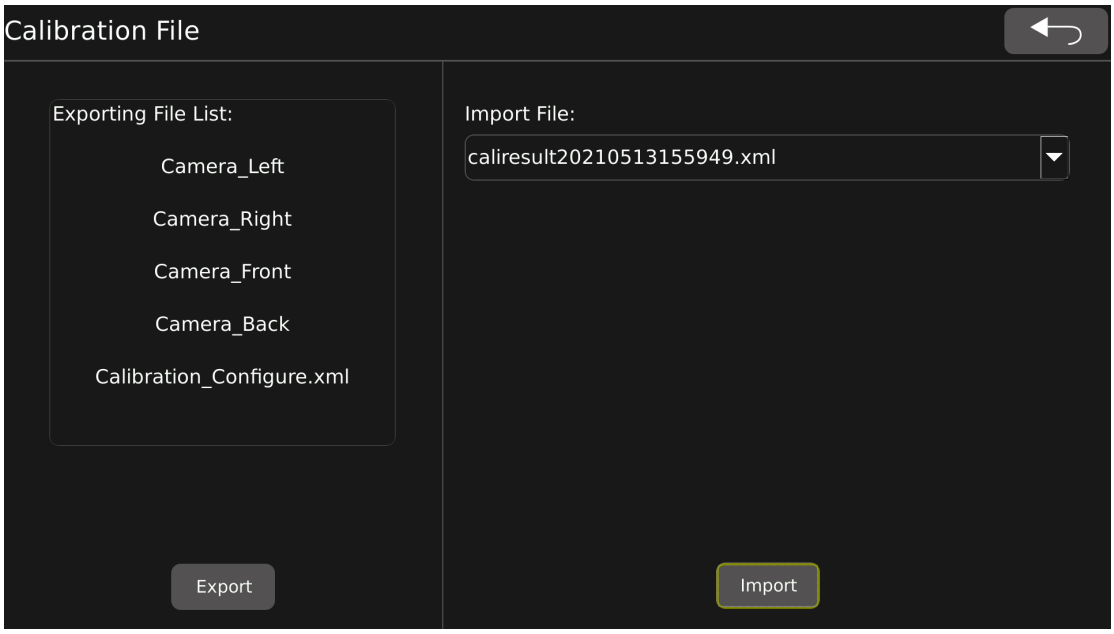
Click 

, Then the automatic calibration can be completed.









The system reboots and the calibration is successful.

End of document.