CamSpace

User Manual
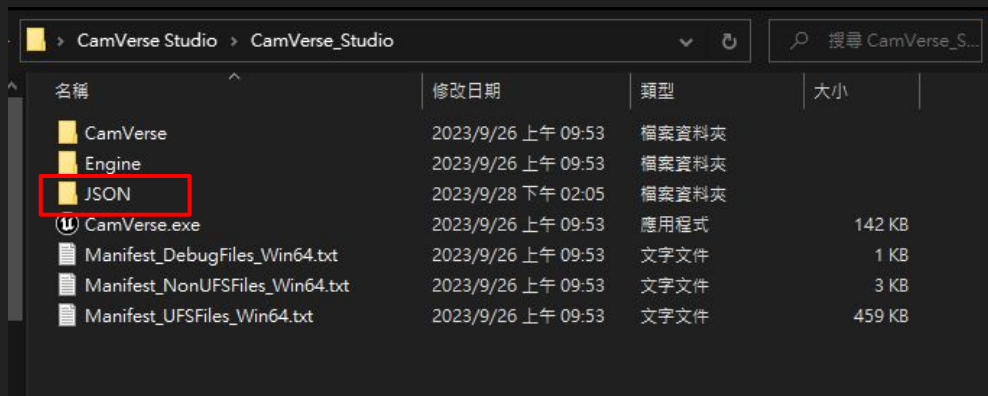
V1.0

Oct 2023

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Preparation Before Use

1. Before opening the software, please install the [NDI SDK for Unreal Engine](#).
2. Place the [PieChart.json](#) and [BarChart.json](#) files from the CamSpace/JSON folder in the C drive.

Open CamSpace

1. Open the folder and click on the CamSpace executable file to launch CamSpace.
2. If the background appears completely black with only the UI interface visible, click "Add" to create a new calibration file.
3. Then, click "Quit" to exit the program and restart CamSpace to run it normally
4. You can switch between Chinese and English on the bottom left corner.
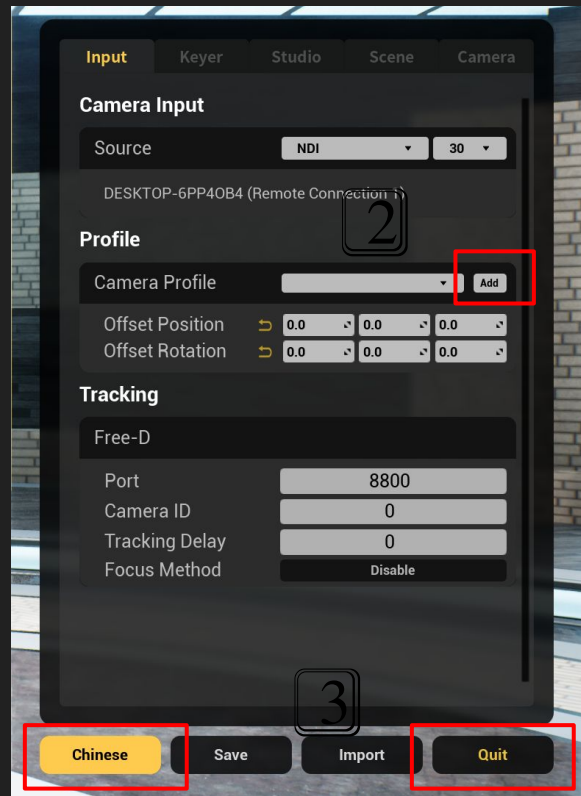
Input image, calibration file, and tracking signal

1. In the "Source" field, select the image source as either NDI or Blackmagic:

      i. If you choose NDI, a list of available NDI signals will appear. Click on the desired source.

      ii. If you choose Blackmagic, the program will automatically match the image input from the capture card.

2. Select the image frame rate.

3. Click "Add" in the "Camera Profile" section to add a new calibration file, and select the correct calibration file from the dropdown menu on the left.

4. Enter the correct Port and Camera ID in the "Free-D" field.

5. Adjust the "Tracking Delay" value by shaking the camera until the movement speed of the image matches that of the virtual background.

If the image and scene cannot be aligned, you can adjust the "Offset Position" and "Rotation" for fine-tuning.
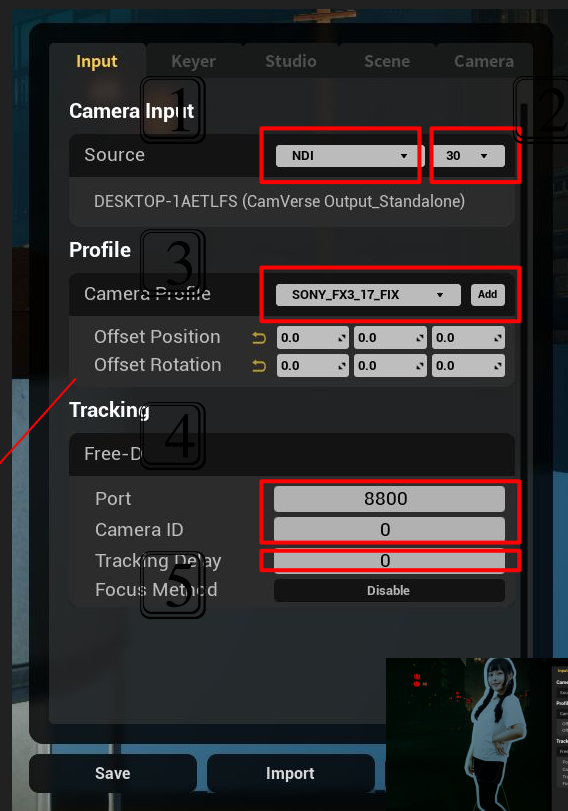
Activate Focus

1. Click the button to the right of the Focus Method to switch the focus mode to Enable. The focus information input field will appear below (make sure the tracking signal is sending Focus information).

1. Enter the current focal length in Min Focal Length.

1. Enter the closest focusing distance of the lens in the left column of Focus Dist. After positioning the lens to that distance, press the Set min button below and reset the encoder installed on the lens. Enter the farthest focusing distance in the right column, position the lens to that distance, and press the Set max button below to use the focus function in the scene.
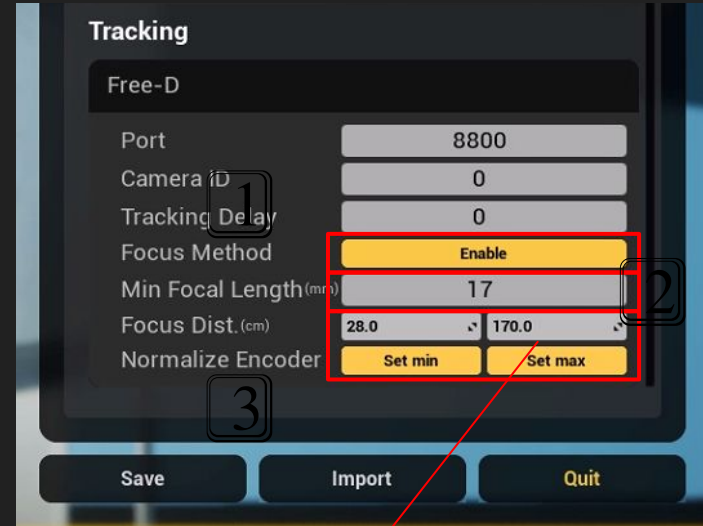
If the farthest focusing distance is infinity, try entering different values in the field above the Set max button, rotate the focus ring, and observe the focus changes in the scene to find the suitable value.

Keyer

1. Click on the Keyer field in the top row to access the Keyer interface.
2. Click on the On button to the right of Preview to switch the Preview field to On and see the current keying effect on the camera feed.
3. Switch Display As to Alpha to view the black and white matte.
4. Adjust the RGB sliders in the Key Color field to adjust the green screen color for keying.
5. Move the sliders in the Adjustment field to adjust the keying effect.
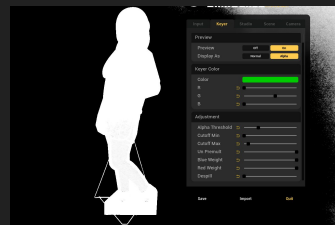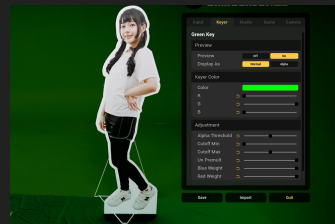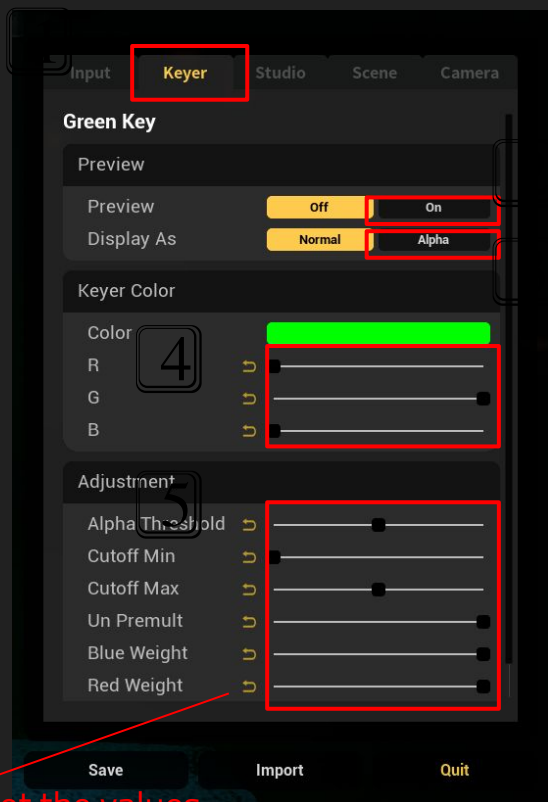
Click on the Reset icon next to the slider to reset the values.

Setting up Green Screen Range (Studio)

1. Click on the Studio field in the top row to access the Studio interface.
2. Click on the Preview button to the right of Studio Coordinate to see the colored box representing the green screen range.
3. The values in the Studio field can be adjusted to modify the size and position of the colored box.
4. The values in the Wall field can be adjusted to modify the left and right walls, floor, and ceiling. Adjust the colored box range to match the green screen range.

Switching Scenes and Scene Functions (Scene)

1. Click on the Scene field in the top row to access the Scene interface.

2. Click on the name of the scene under Select Scene to instantly switch to that scene.

3. The values in the Scene Controller field can be adjusted to modify the position and rotation of the scene.

4. The contents of the Scene Function field are the functions that the scene has.
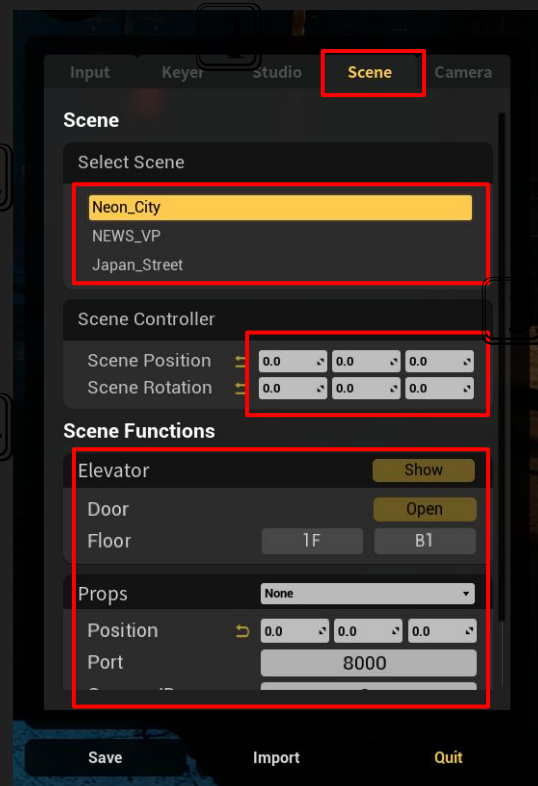
Scene Function: NEWS_VP

1. In the Image section, click the "Add" button on the right side of the Monitor to replace the image inside the upright screen in the scene. Recommended image dimensions will be displayed as a tooltip when hovering over the "i" icon.

1. Click the "Add" button on the right side of the Logo to replace the logo image that appears in the scene. Recommended image dimensions will be displayed as a tooltip when hovering over the "i" icon.
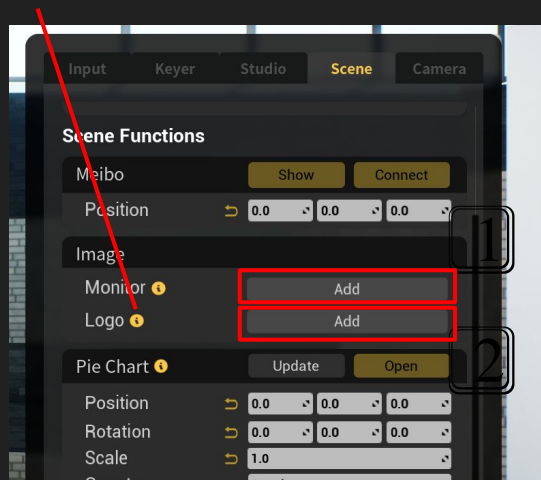
Scene Function: NEWS_VP

1. In the Pie Chart field, select the desired country to retrieve data from. Click on "Update" and then "Open" to open the pie chart. Position.Rotation and Scale can be adjusted to change the position, rotation, and size of the pie chart. When switching countries, the pie chart needs to be collapsed first, then click "Update" before expanding it again (a tooltip will appear when hovering over the "i" icon indicating the data location).

2. The Bar Chart field is used in the same way as described above.

3. In the Monitor field on the right side, you can switch the video source within the screen. You can choose between NDI or Video:

    i. Selecting NDI will display the available NDI signals. Click on the desired source to select it.

    ii. Selecting Video allows you to add a video to play by clicking on "Add" on the right side of the Source. The video will play automatically, and you can control playback or pause by clicking on the "Play" button on the right side.

Clicking on "Show" controls the raising and lowering of the screen. Position.Rotation and Scale can be adjusted to change the position, rotation, and size of the screen.
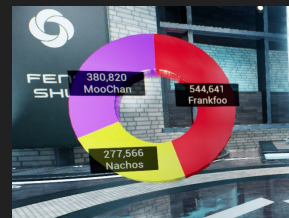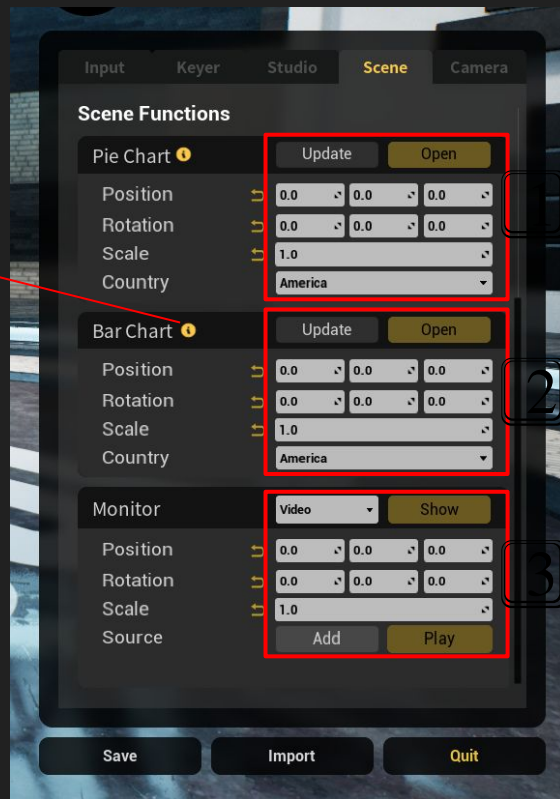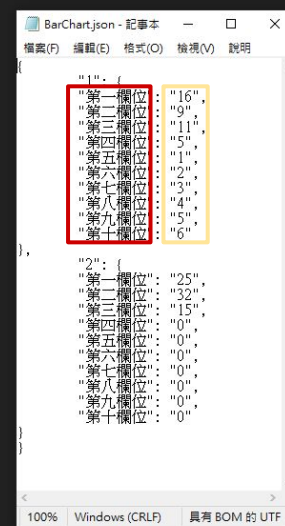
Understand the JSON File for Charts

1. "The PieChart.json file located in the C drive allows you to configure the values for the pie chart within the scene, divided into two groups. The group names cannot be changed, but you can modify the field names to display the desired text on the chart. The values next to the fields will automatically calculate and display as percentages on the chart. If a value is 0, the field will be automatically hidden. The default configuration includes three fields.
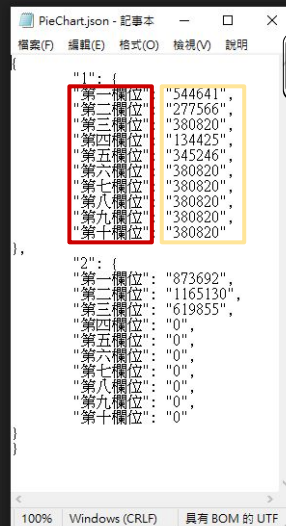
1. The BarChart.json file located in the C drive allows you to configure the values for the bar chart within the scene, divided into two groups. The group names cannot be changed, but you can modify the field names to display the desired text on the chart. The values next to the fields will be directly displayed on the chart and must be integers. If a value is 0, the field will be automatically hidden. The default configuration includes three fields.
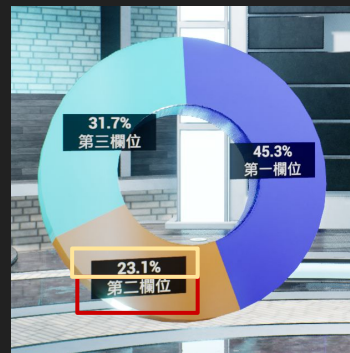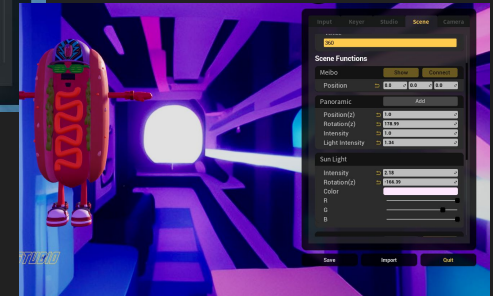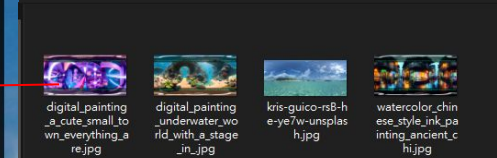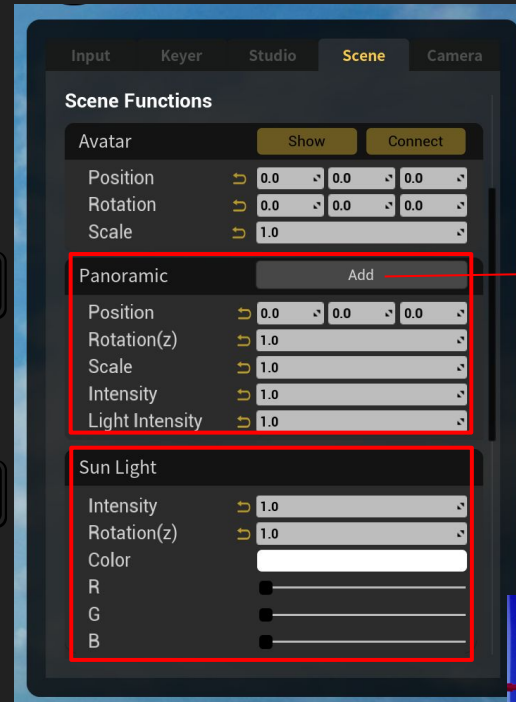
Scene Function: Studio

1. In the "Chair Trans" section, the values on the right side of the Orange column can be adjusted to change the position of the orange chair, while the values on the right side of the Blue column can be adjusted to change the position of the blue chair.
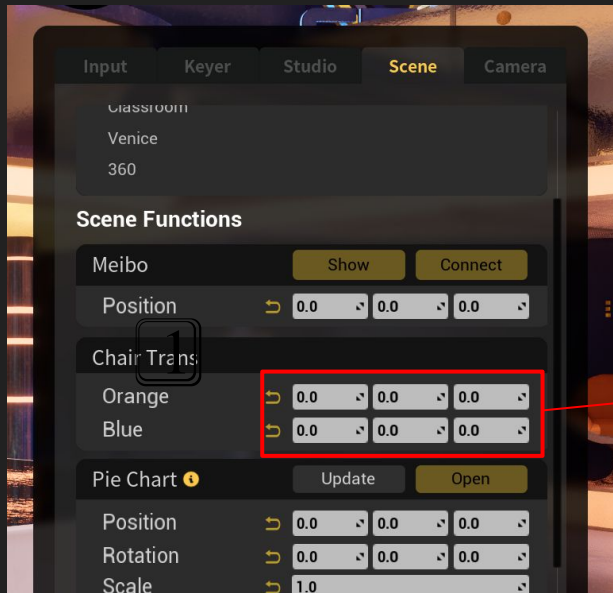
Scene Function: 360

1. Click the "Add" button next to the "Panoramic" section to choose a panoramic image for replacing the background sky sphere. Adjust the Position(z) value to control the vertical position of the sky sphere, and adjust the Rotation(z) to control the vertical rotation of the sky sphere (it automatically captures the background color and renders it onto objects during rotation). Intensity can be used to control the brightness of the background image, while Light Intensity can be used to control the brightness of the background light within the scene.

1. Within the "Sun Light" section, you can control the sunlight within the scene (assuming there are prominent 3D objects within the scene). Intensity can be used to adjust the brightness of the sunlight, Rotation(z) can be used for vertical rotation of the sunlight, and the RGB sliders under Color can be used to adjust the color of the sunlight.

The sky sphere background light is linked to the sunlight, and the sunlight value must not be set to 0. When the color of the sunlight changes, the background light will automatically adjust its color.

Scene Function: Virtual Human

1. Connect the mobile phone with the installed mocopi App to the same local network as CamSpace. Then, open the mocopi App, click on the symbol in the top right corner, and select "Settings".

1. Next, choose "PC connection settings". Enter the IP address of the computer running CamSpace and click "OK." Follow the app's instructions to connect the motion capture device, and finally, press the green button at the bottom of the screen to transmit the motion capture information.

1. Click the "Show" button next to the Meibo field to make the virtual character appear. Press the "Connect" button next to it to establish a connection to the motion capture signal. You can adjust the virtual person's position within the scene using the "Position" field.
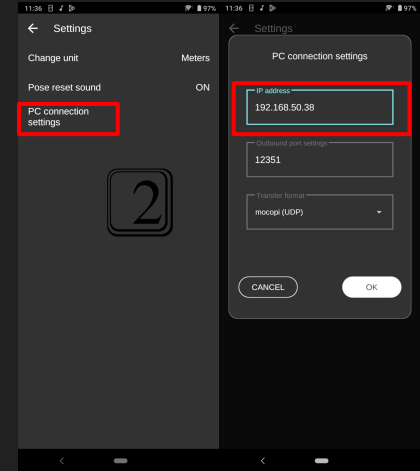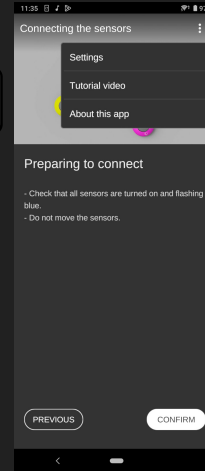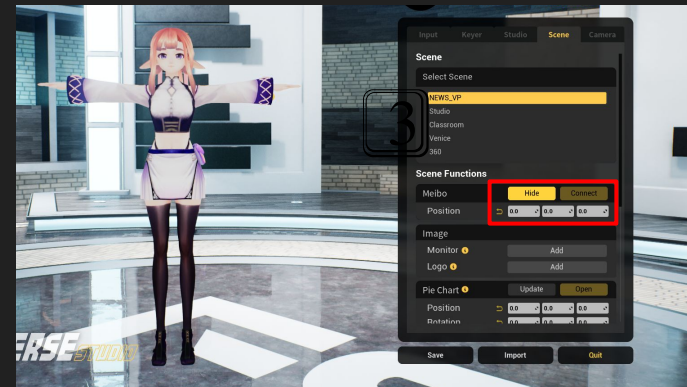
Switching Tracking Camera (Camera)

1. Click on the Camera field on the top row to jump to the Camera interface.
2. Click on "Tracking" to switch to the tracking camera.
3. Switching "Lit" and "Unlit" on the right side of the Mode controls whether the image is affected by the scene lighting.
4. The slider on the right side of "Brightness" can adjust the brightness of the image.
5. Pressing the "Preview" button next to "Billboard" displays the mesh representing the billboard.
6. Pressing "Look at camera" next to "Transform" locks the billboard to face the camera.
7. Position.Rotation and Scale can adjust the position, rotation, and size of the billboard, which can be used to set the foreground and background relationship.

Switching Virtual Camera (Camera)

1. Click on the Camera field on the top row to jump to the Camera interface.
2. Click on "Virtual" to switch to the virtual camera. The parameter section is shared with the tracking camera and is used in the same way.
3. The button on the right side of "Orientation" can switch the image mode. "Landscape" is for horizontal input, "Portrait" is for vertical input, and "Mirror" can switch the image mirroring.
4. The slider below "Crop" can crop the image.
5. "Virtual Path" can set the virtual camera position. There are nine cameras that can be set. Select the camera number and click on "Free Look" mode to use WASD to move the camera position. Holding down the left mouse button and sliding can rotate the angle. Click on "Auto Save" to save the camera position. Turning off "Auto Save" is free mode, and the position will not be saved. "Copy.Paste Path" can be used to copy and paste the position. Clicking on different camera positions can do different camera movements between cameras.
6. Different numerical inputs can control the camera movement speed.
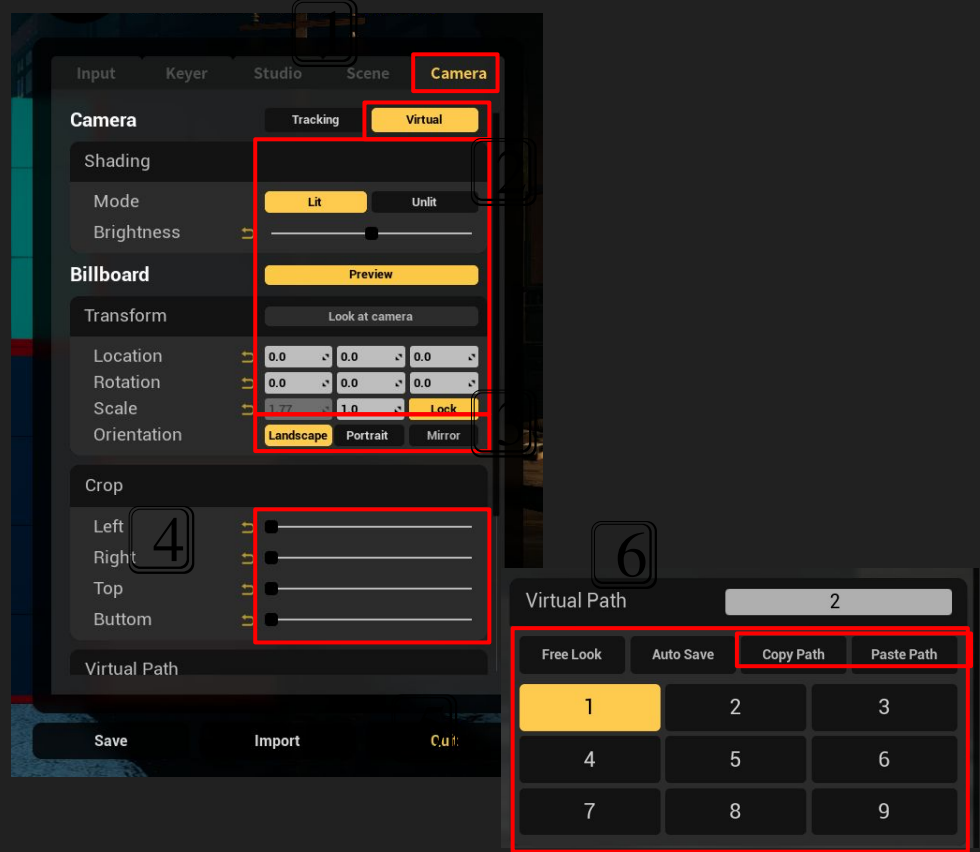
Save and load settings and interface configuration

1. When everything is set up, you can click the "Save" button to save the information as an .xml file. When you open the program next time, you can click "Import" to directly import the settings from the .xml file.
2. Clicking on the CamSpace logo on the left side of the CamSpace logo can collapse the UI. If you hover over the left half of the screen for more than three seconds, the icon will hide. To bring back the UI, move the mouse to the right half and click on the icon to make the UI reappear.
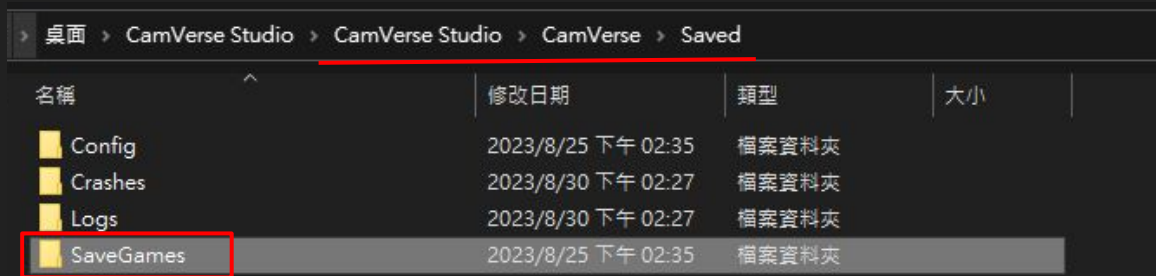3. Clicking on "Quit" allows you to exit the program.
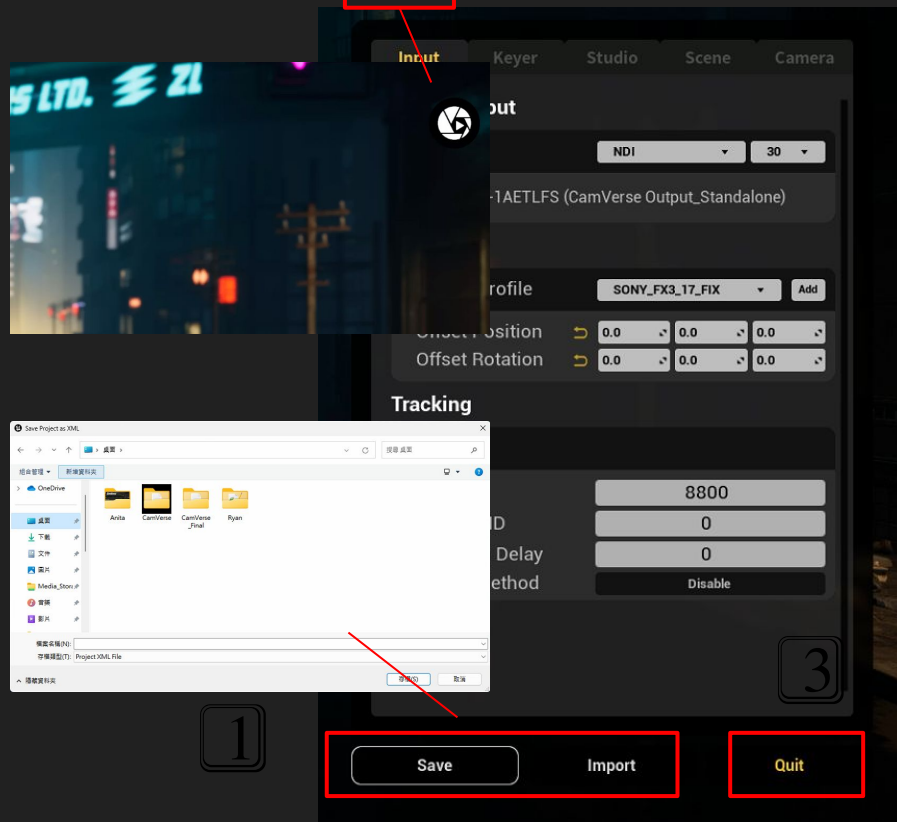
Hotkey Reference Chart

1. The commonly used keys in the scene are bound to hotkeys, as shown in the reference table on the right. You can bind hotkeys to the controller.

TYPE	FUNCTION	HOTKEY
SWITCH SCENE	NEWS_VP	Ctrl+1
	Studio	Ctrl+2
	Classroom	Ctrl+3
	Venice	Ctrl+4
	360	Ctrl+5
SWITCH CAMERA TYPE	TRACKING CAM	Ctrl+N
	VIRTUAL CAM	Ctrl+N
SWITCH BETWEEN VIRTUAL CAMS	1	Alt+1
	2	Alt+2
	3	Alt+3
	4	Alt+4
	5	Alt+5
	6	Alt+6
	7	Alt+7
	8	Alt+8
	9	Alt+9
PIE CHART	ON	Ctrl+A
	OFF	Ctrl+S
	UPDATE	Ctrl+D
BAR CHART	ON	Ctrl+F
	OFF	Ctrl+G
	UPDATE	Ctrl+H
MONITOR	ON	Ctrl+J
	OFF	Ctrl+K
AVATAR	ON	Ctrl+L
	OFF	Ctrl+Q
	CONNECT	Ctrl+W
	STOP	Ctrl+E

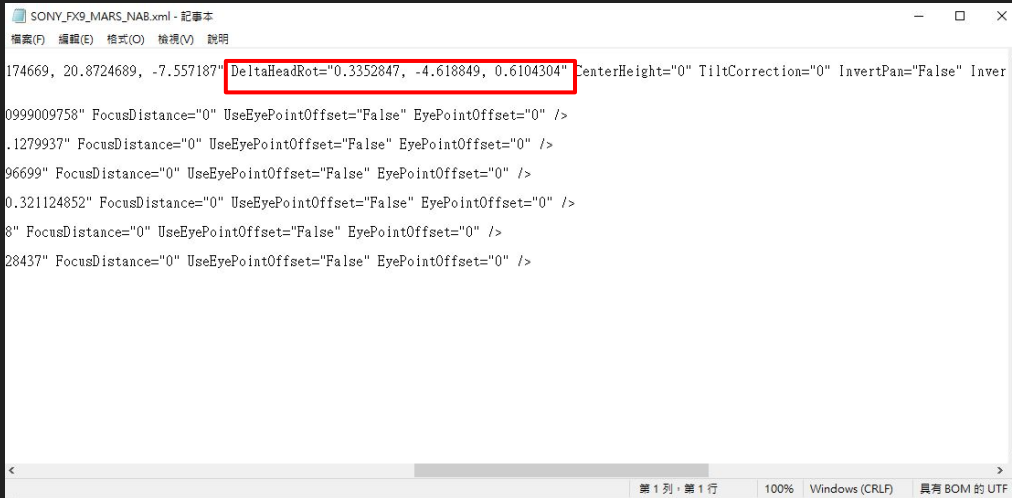# Lens Calibration File Guidelines

1. When different calibration files are applied, but the camera's perspective in the captured image does not change, it means that the calibration file has not been loaded. In this case, you can delete the SaveGames folder inside the Studio directory, then restart the application and add the calibration file again.

Lens Calibration File Guidelines

2. When the screen becomes distorted and does not align with the physical display after applying the correction file, open the correction file using Notepad. Set all three values of DeltaHeadRot to 0, delete the SaveGames section, and then reload the file.