



# VIRTUAL PRODUCTION SETUP IN PIXERA

## Setup guide for Unreal Engine

Virtual Production features are available for official PIXERA hardware as well as the Server license. It is not available for the Director and Player license.

By using the newest PIXERA beta, it is possible to utilize Unreal Engine, Unity as well as Notch in PIXERA for virtual production setups and other projects that would benefit from these powerful tools.

This workflow Guide focuses on the technical setup of Unreal Engine in PIXERA. It is a step by step guide. As long as you follow everything, you should be able to get a test setup running. We are currently in the closed beta stadium and were not able to test and validate all available features.

Here is a list of features we were able to test and can confirm they are working properly:

- ▼ Unreal Engine Preview
- ▼ Unreal Engine Playout scaled over 3 servers in sync
- ▼ Unity Preview
- ▼ Unity Playout (Currently we do not have any sync mechanism implemented for Unity. We are investing further R&D resources and will post regular updates if sync is possible, as there might be a chance)
- ▼ Notch Preview & Playout (Notch currently only supports one Viewport Render, therefore realising a setup is tricky and requires utilization of camera and back projection)
- ▼ Stage Precision direct API tracking integration with the new camera feature in PIXERA. Tracking with Vive and OptiTrack

We are grateful for any feedback we can receive from Beta users who are able to get their hands on a Stype or Mosys tracking system.

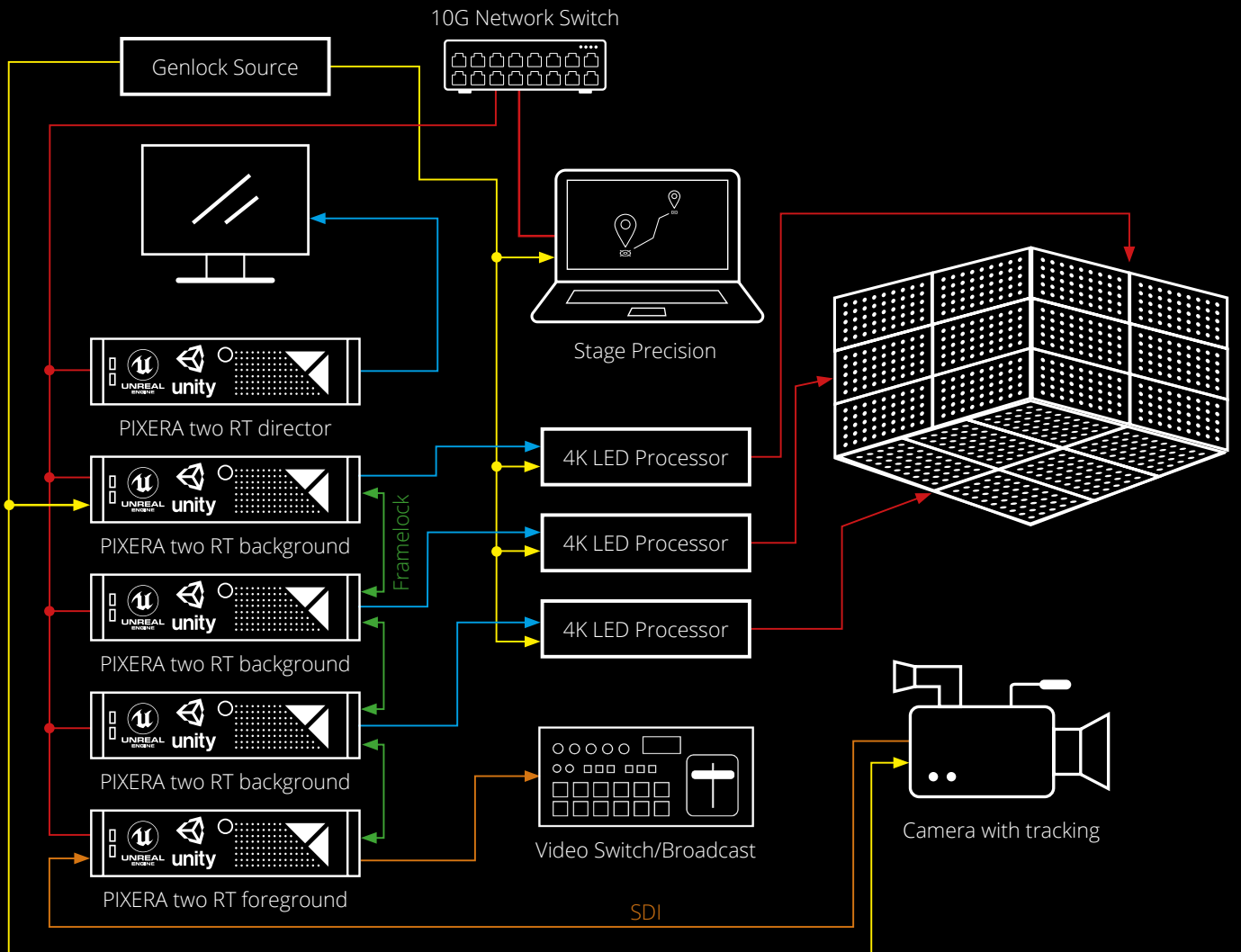
The following applications are necessary for a proper Unreal Engine setup in PIXERA:

- ▼ Pool\_texture.exe (or any other packed Unreal application)
- ▼ PIXERA Beta Branch (1.7.111 or newer)

Please note that it is not necessary anymore to launch ndisplay Listener or Launcher.

# SYSTEM DESIGN

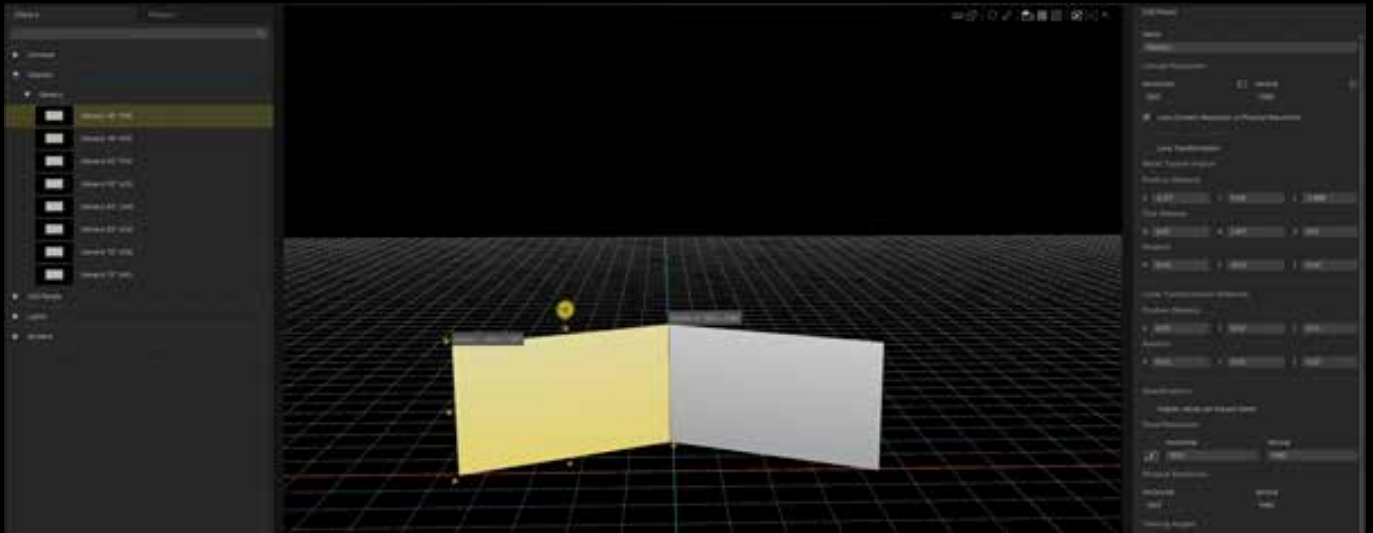
This chart shows a proper technical setup in a Virtual Production environment:



# PIXERA PROJECT

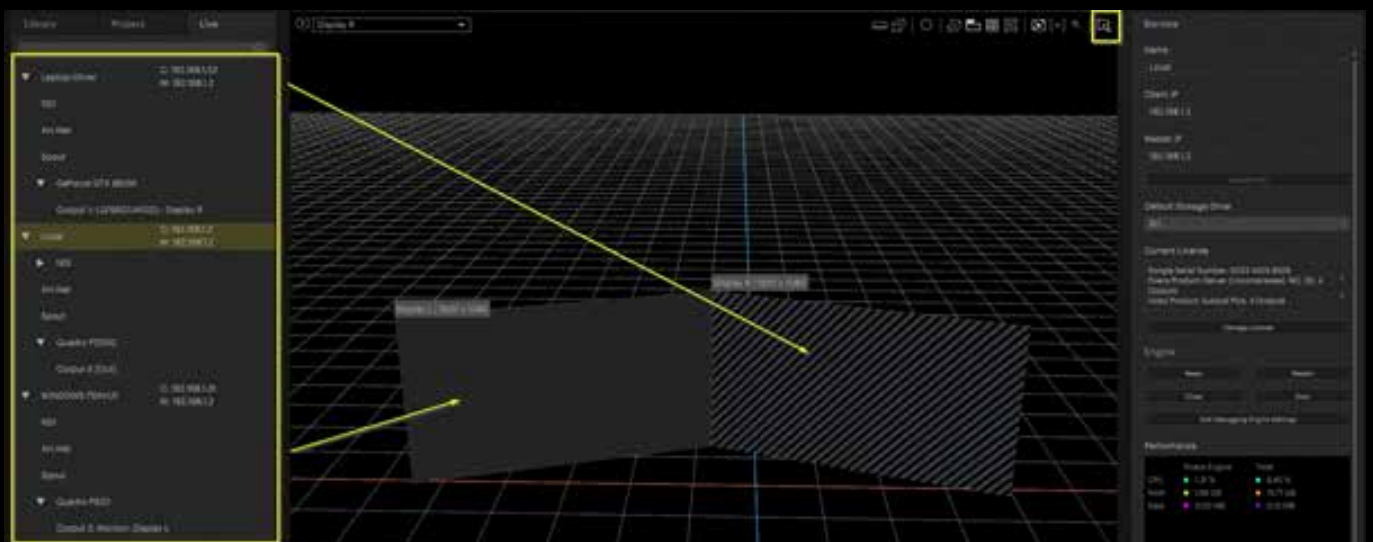
The steps are explained on a simple setup.  
Two 1080p displays. The size was increased to 5x2.81 meters.

For a proper setup, go ahead and connect physical outputs to your Screens/Displays/LEDs.  
Though for test purposes you don't have to have a physical output assigned to your setup. It is possible to only work from within the preview. For tests scenarios this is totally sufficient.



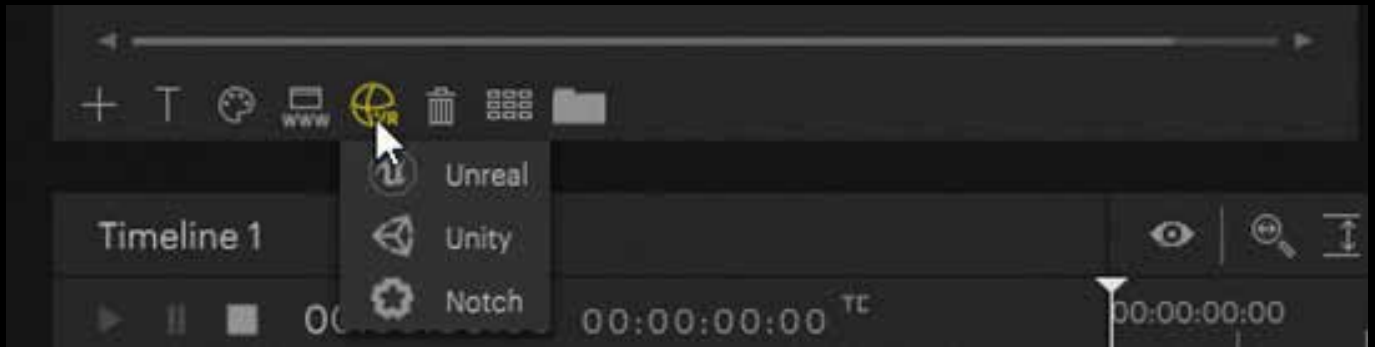
In case you want to play out on real outputs, you can find the output configuration in the Mapping tab. This setup looks different on each computer, as it depends on the system you are currently using. PIXERA will display the graphics card outputs of all your systems in the network. Here is an example of a possible network setup:

(make sure to have the selector on the top right set to Screens instead of projectors, otherwise you won't be able to select and assign outputs to your displays)



## IMPORTING UNREAL

Unreal has to be imported by using the new VR/AR button in the interface:

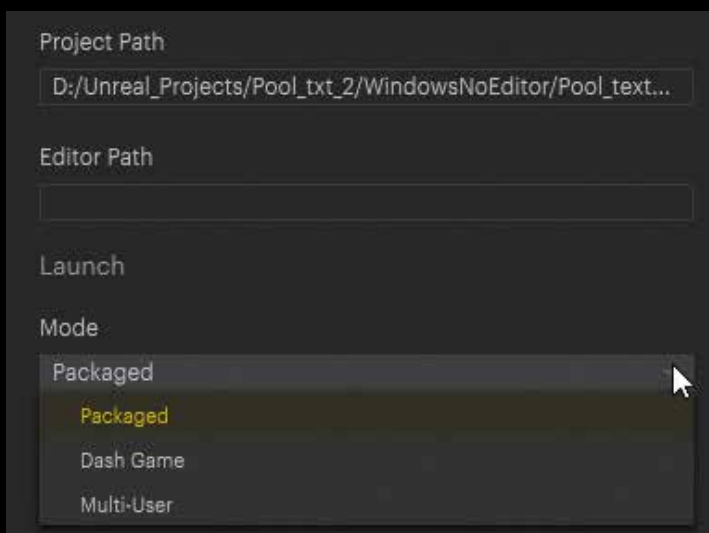


We do offer the same demo scene for download on our website here:  
<https://PIXERA.one/en/service/login>

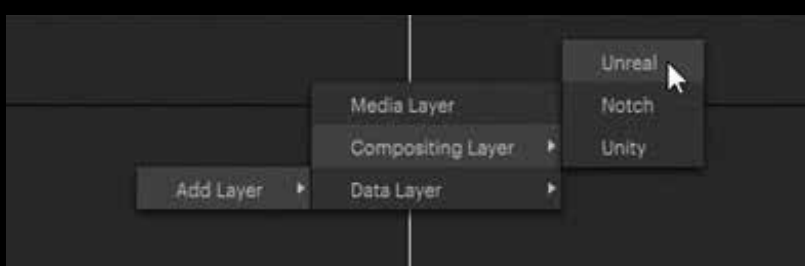
There are three options how to import your Unreal project :

- Packed project (.exe File packed in Unreal)
- Dash Game (.uproject file)
- Multi-User (.uproject with Multi-User Plugin)

In inspector you have to select the corresponding mode ot be able to launch it the right way. When using .uproject file you have to set the path for UE4Editor in **"EditorPath"** as well.



Once imported, drag and drop the scene on the empty timeline. If you already have regular layers in use, please be cautious. We implemented a new layer type for 3D engine applications:



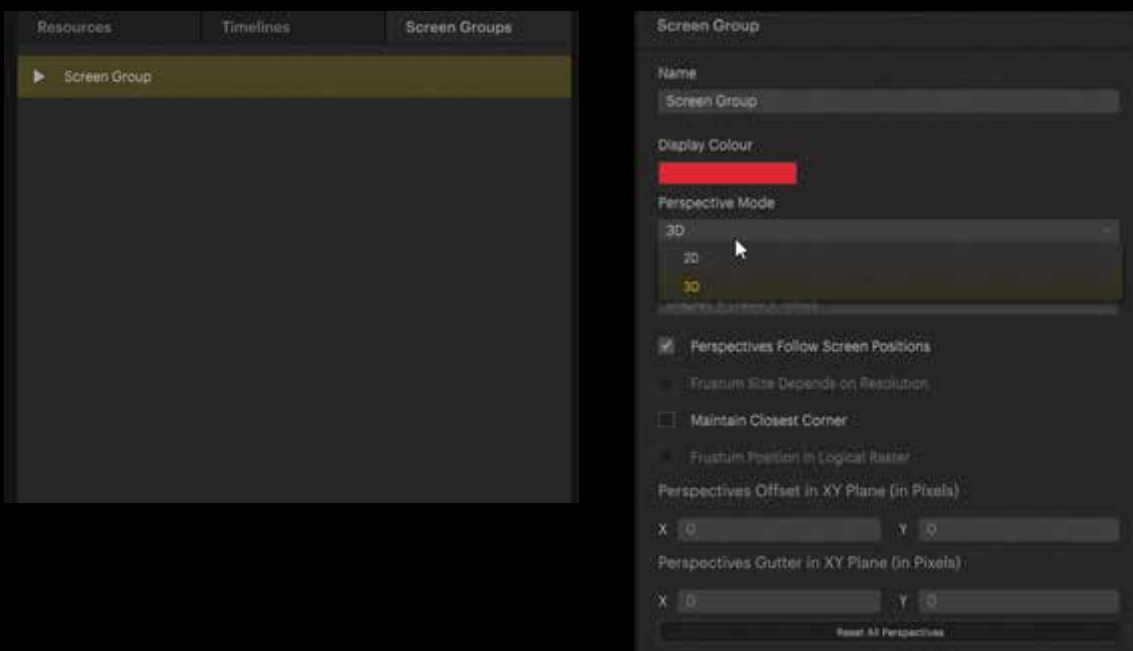
By simply dragging – and – dropping Unreal on an empty timeline, PIXERA will automatically create the correct Compositing Layer for you:



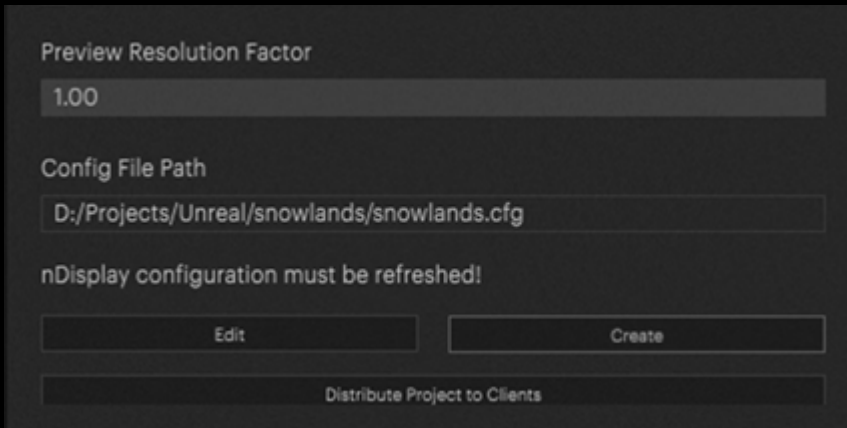
After assigning the scene to a layer, the so called Screen Presence has to be edited:



Inside the Screengroup, settings change from 2D to 3D:



**Preview Resolution Factor in inspecor** allows for lowering the resolution within the preview. We strongly suggest to turn down this value for the Preview machine. The value is displayed in percentages. 1.00 equals 100% whereas 0.50 equals 50%.



After finishing those steps you can distribute your project to your clients with **Distribute Project to Clients** button, and create a nDisplay config file by pressing **Create** button at the bottom in inspecor.

PIXERA will automatically generate a separate config file for the Render-Nodes and one for the Preview.

Please note that the Unreal project is copied to the exact same file path as it is on your master. So please make sure that the same drive letter is available on your clients.

If changes to the system setup have been made, you first have to **Kill** the scene, create a new config and **Run** your scene again. Please remember, you should refresh whenever you change something output screen or hardware related.

After following all steps, 2 config files should have been created:

Unreal_Pixera_01.cfg	✓	01.04.2021 10:46	CFG-Datei	2 KB
Unreal_Pixera_01_preview.cfg	✓	01.04.2021 10:46	CFG-Datei	2 KB

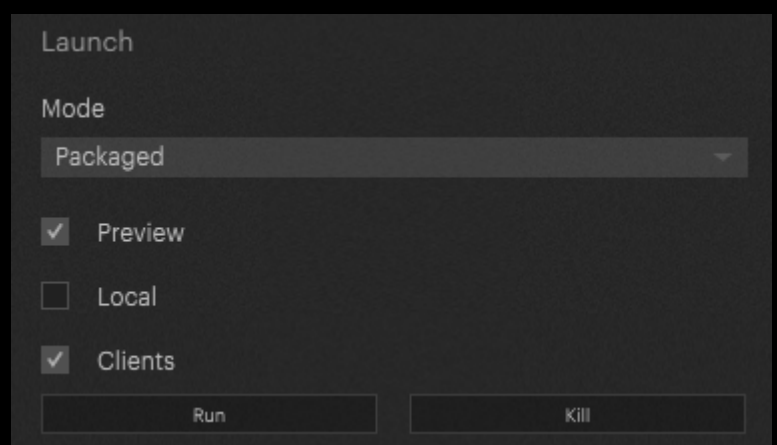
It is of course also possible to open the config files, in order to get a deeper understanding, although it is not necessary.

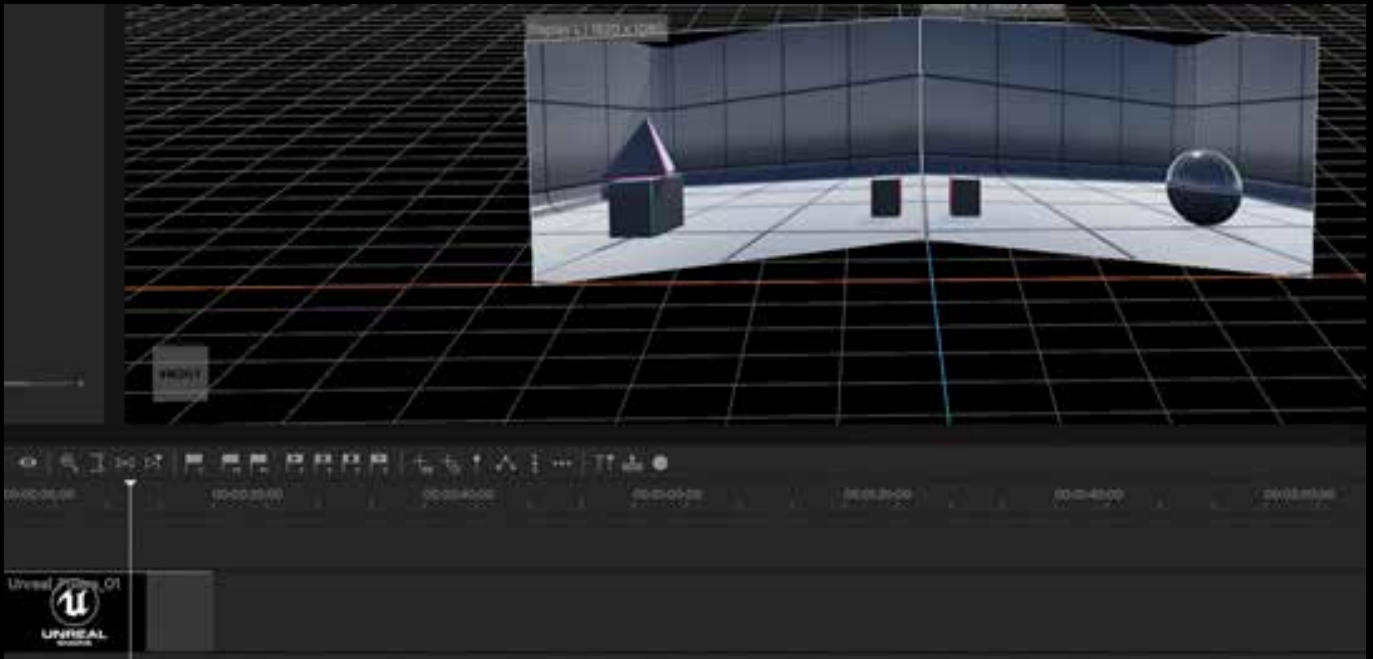
The last step is to run your project.

Therefore you have to select what instances of Unreal you want to launch.

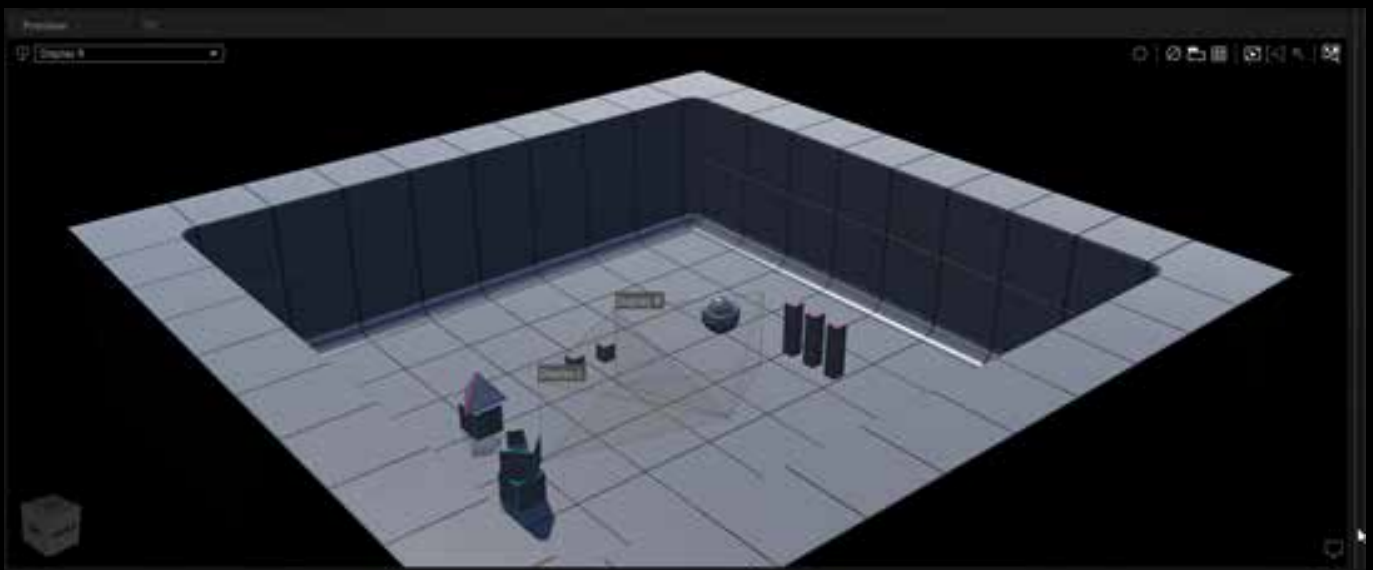
- Preview (for previewing in your PIXERA Workspace)
- Local (if outputs are running on your Director machine)
- Clients

PIXERA will automatically launch nDisplay in the background and run your scene on the selected instances when clicking **Run** button.

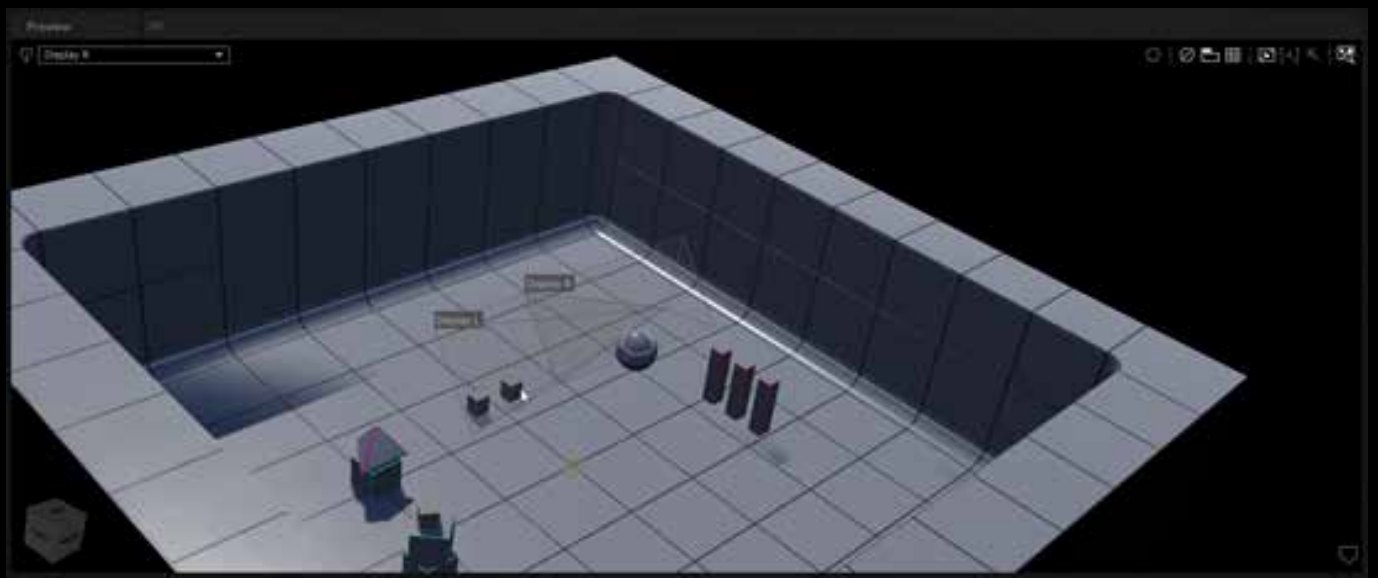
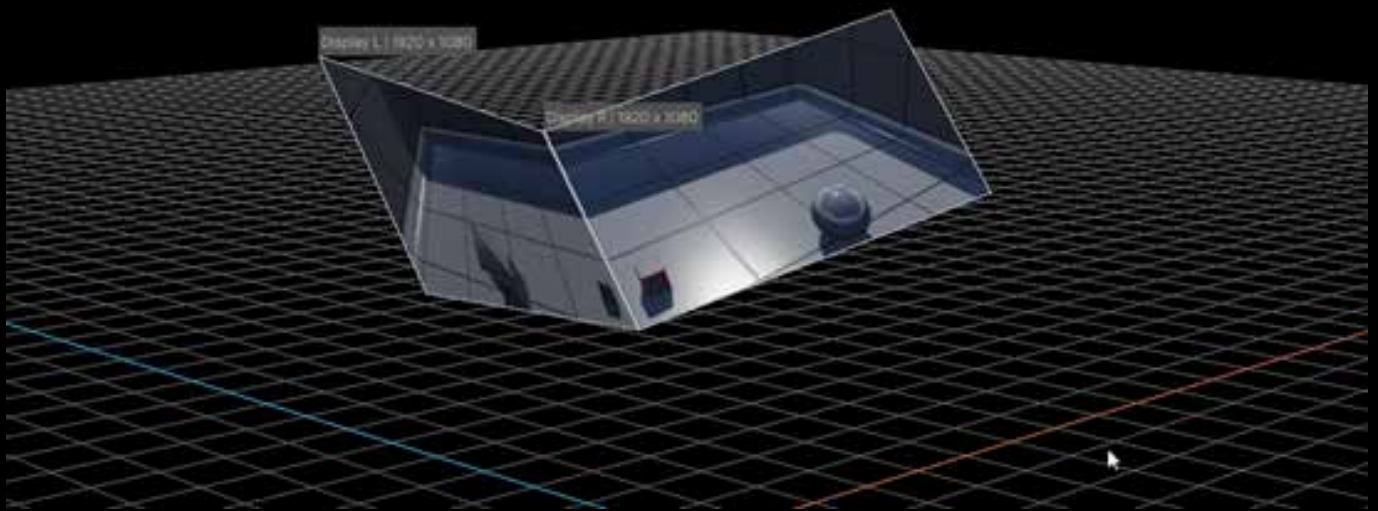




The complete Unreal scene is rendered inside PIXERA. You can press "D" on the keyboard or dive in via the "dive in" button in the compositing tab, in order to get into the 3D scene:



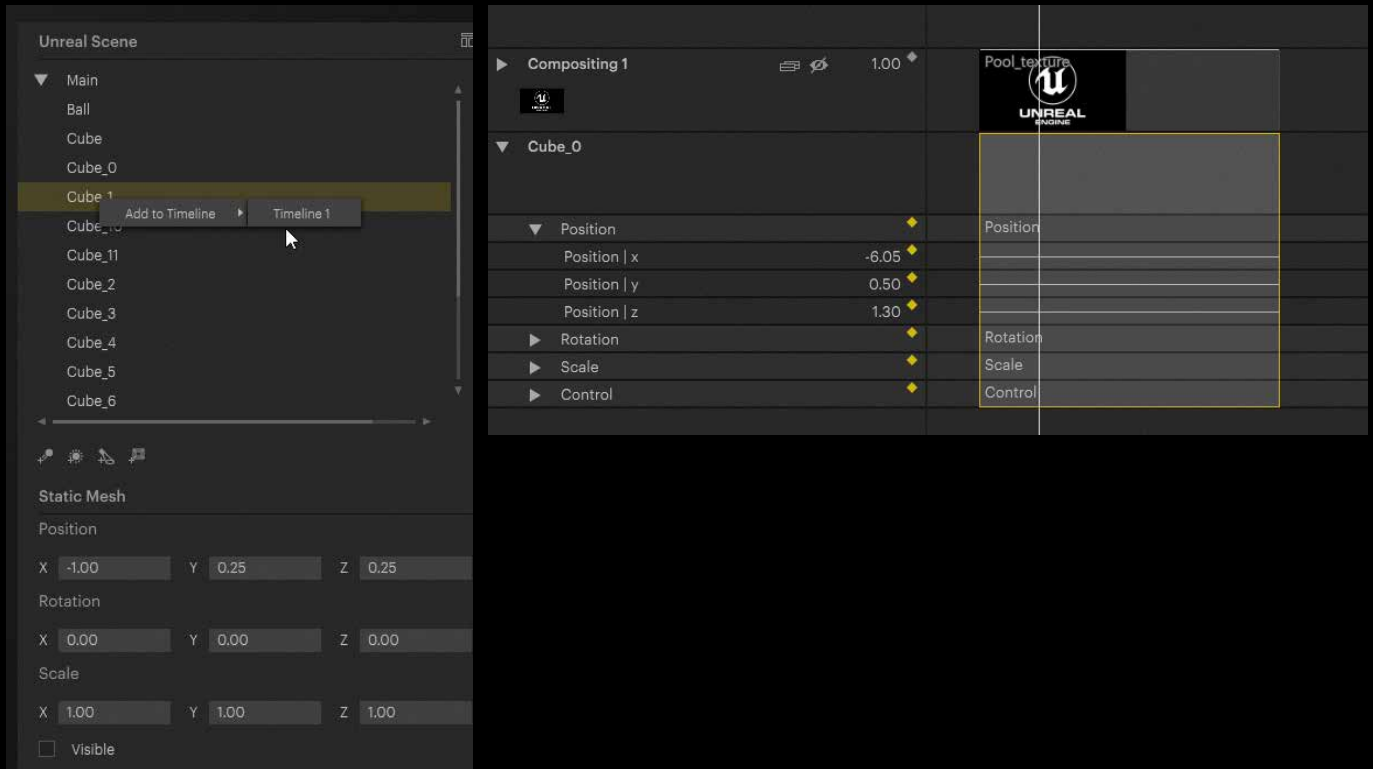
The displays act as viewports looking into the Unreal scene. Changing the position of the screen in PIXERA changes the viewport position in Unreal as well. In this example, I moved the screens up on the X axis as well as adding rotation:





If the used scene was created with our Unreal Plugin, you also have the possibility to manipulate objects in Unreal via PIXERA.

In inspector you can find a list of all available items. You can either manipulate them in inspector itself or you can add them to the timeline by right clicking an object. Further you can multiselect multiple object and add them to the timeline as group. This might be interesting e.g. when changing multiple lights simultaneously.

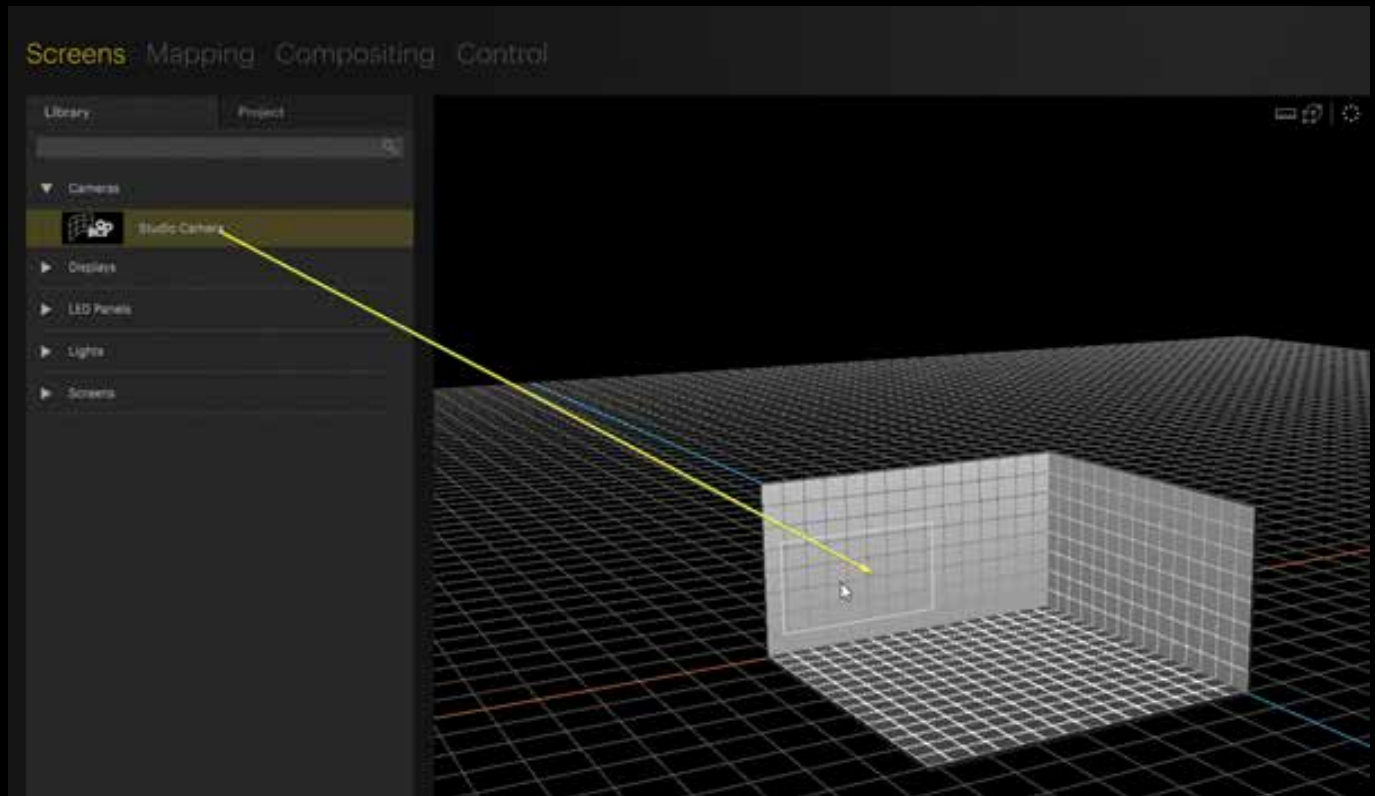


After a new layer is added to the timeline create a new object by doubleclicking in the layer. Then you can add keyframes to manipulate the object in your timeline.

## STUDIO CAMERA SETUP

The Studio Camera is needed if you are using a Camera and want to back project the camera frustum to your LED Wall, if you want to use foreground in your live input signal or for using set extension. Camera parameters can be manipulated in Realtime via tracking System.

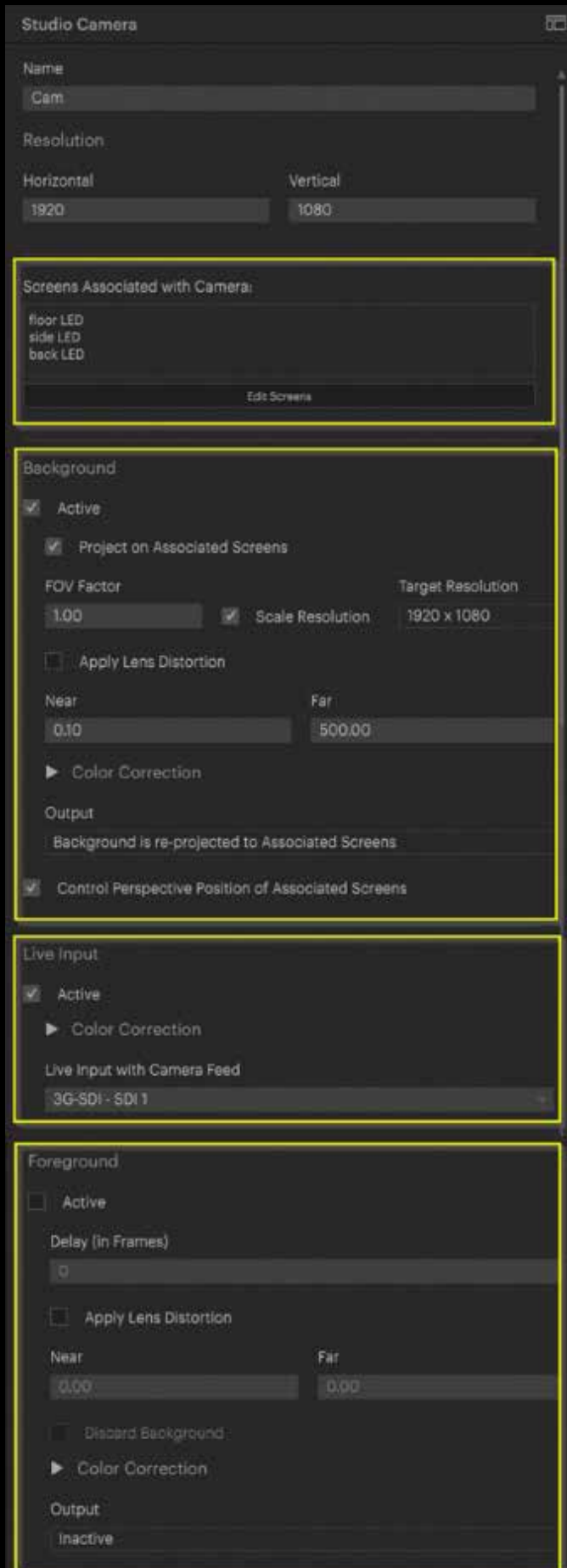
Navigate to Screens Tab – Cameras and drag & drop your Studio Camera to your workspace.



Select your camera in workspace and adjust the properties in Inspector.

Please note, that you have to edit the screen presence settings of your layer after adding or changing parameters of your Studio Camera.

# STUDIO CAMERA SETTINGS



## Screens Associated with Camera:

Select the Screen where you want to project your camera frustum Background

## Background:

Activate **Background and Project on associated Screens** to be able to project your frustum to the screens.

Activate **Control Perspective Position of associated Screens** to link the perspective of the screens to the camera position. This needs to be done to have realistic reflections in real world for camera movements.

## Live Input:

Select and activate the Live Input of your camera on your client that is used for mixing Real and virtual world.

## Foreground:

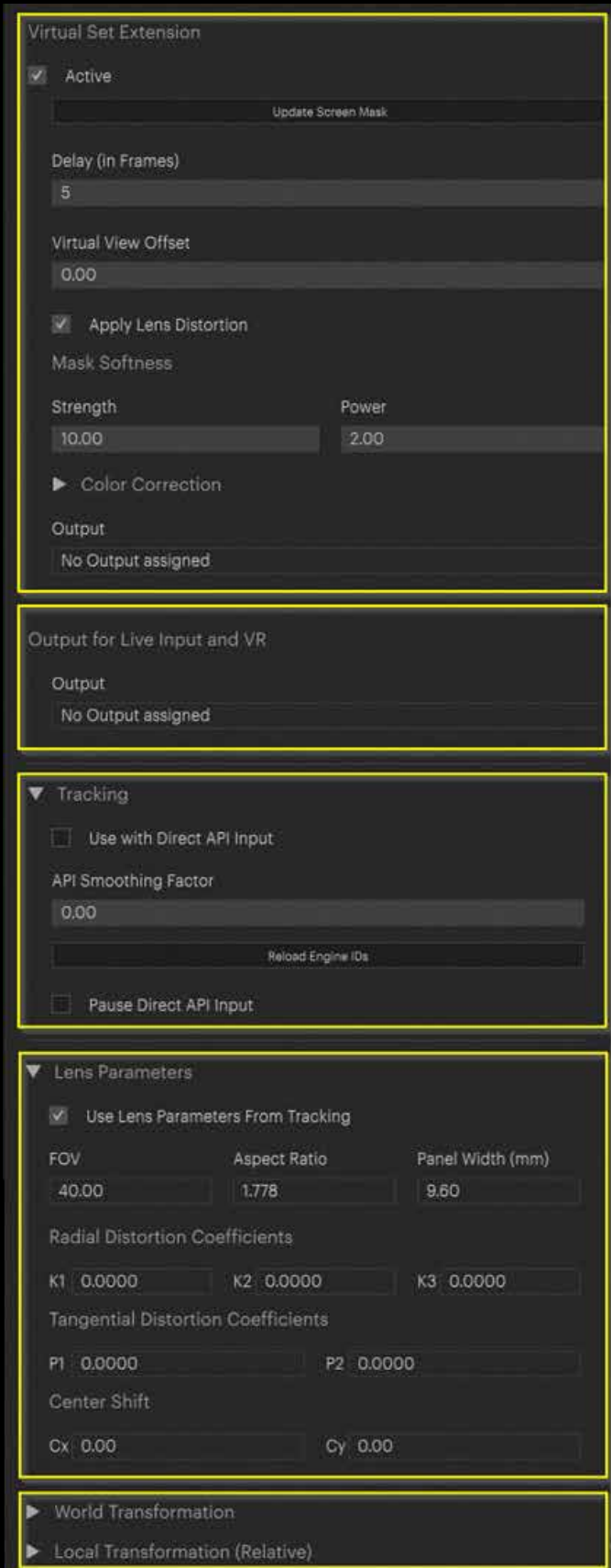
**Activate** Foreground to mix Camera image and virtual foreground together.

Adjust the delay of your camera to synchronize for and background animation.

Near and Far plane must be set separately for the foreground to adjust the depth visibility.

Activate **Discard Background** to make your Unreal scene transparent behind the far plane to be able to see the Live Input.

No output must be set here unless you want to route just the foreground on a separate output.



### Virtual Set Extension:

**Activate** to extend your camera view beyond the physical LED wall. This means that you can see the virtual world in your camera image beyond the boundaries of your physical LED wall.

**Update Screen Mask** must be applied after making changes of physical position and size of your screens in PIXERA.

Delay should be the same as in foreground settings.

Mask Softness can be applied to make a softened transition from physical live video to virtual world at the edges.

No output must be set here unless you want to route just the virtual set extension on a separate output.

### Output for Live Input and VR:

Select the output where you want the route the mixed signal of live input, foreground, and virtual set extension.

### Tracking:

Activate **Use with Direct API Input** to get maximum performance for you tracking. Click **Reload Engine IDs** after any changes you have done in the Camera or general setup settings to make sure, that the tacking input is passed to the right objects.

Please note, that most of the Camera parameters are driven by the tracking system. To adjust them manually, use **Pause Direct API Input** checkbox to temporary disable tracking input and adjust values manually.

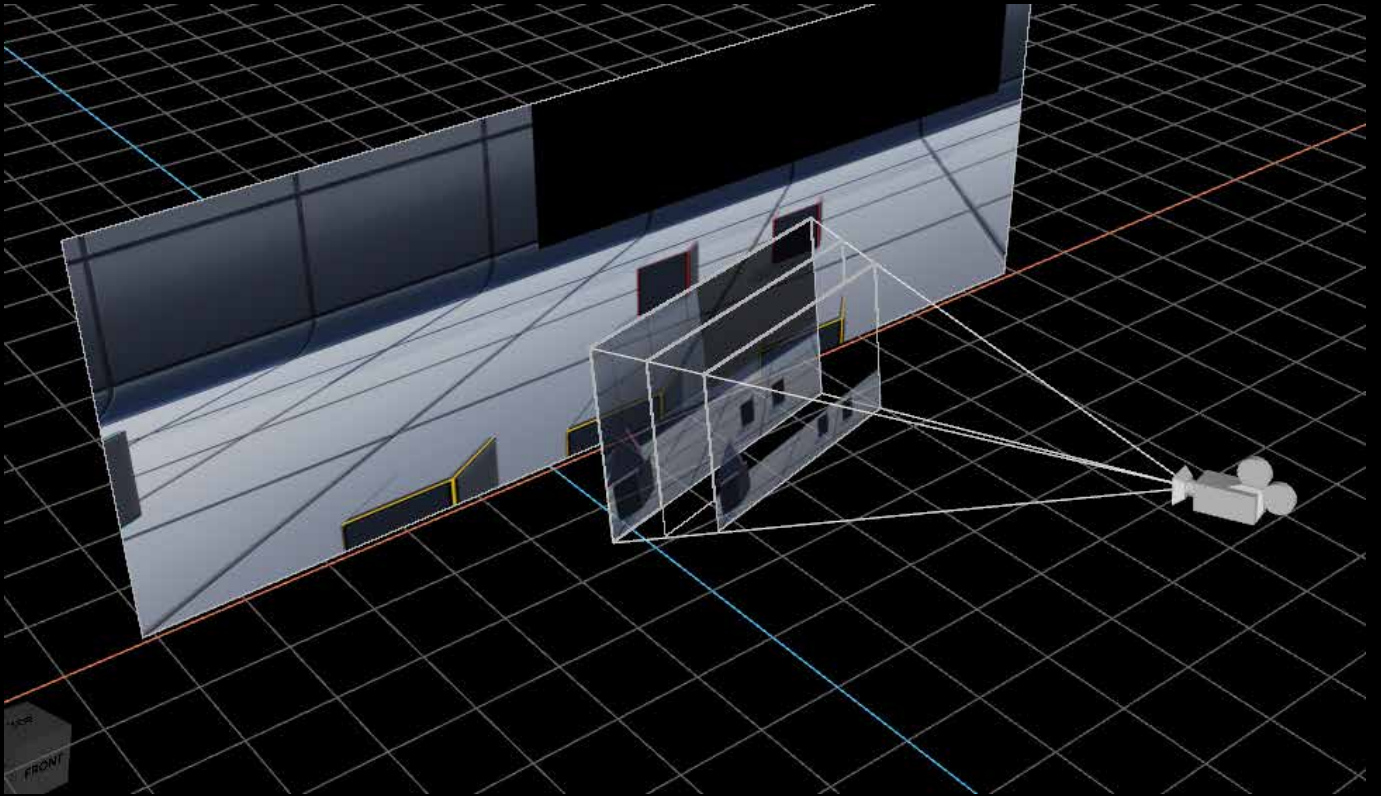
### Lens Parameters:

Those parameters can either be set manually or automatically by your tracking system.

### Transformation:

Those values can be adjusted for manual positioning of your camera.

After all settings are done, please **refresh** your nDisplay configuration. Your Studio Camera frustum should now follow your manual or tracked position.



After setting up your Camera, Screen presence, generating config files, and running your project you can see the Studio Camera with three planes in your preview and if activated on your output.

The plane next to your Camera represents the foreground.

The plane in the middle is your Live Input Plane.

The 3rd plane is for background that is projected to your associated screens.

On your assigned render output live input, foreground and set extension are rendered together to get one combined image.