



30 JULY – 3 AUGUST *Los Angeles*  
**SIGGRAPH**2017

# Post-production for 360 Video

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**FOUNDRY.**

F.

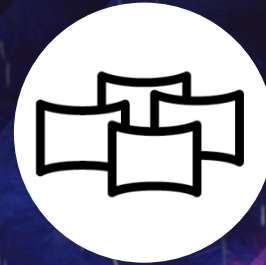
# Challenges for 360 video



Camera rig setup



Colour correction



Stitching



Stitch correction



Stabilisation



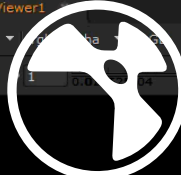
Match-move



Headset review



with thanks to Ryan Cummins  
VR VFX Supervisor, Legend3D



NUKE

Input footage

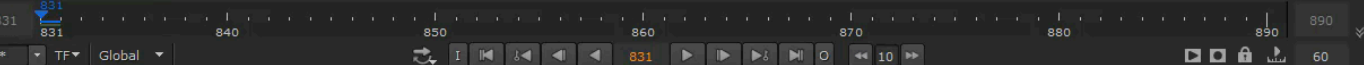


# CARAVR

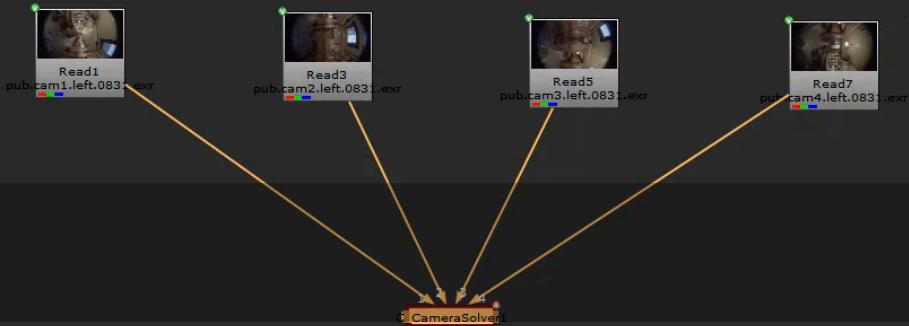


UHD\_4K 3840x2160 bbox: 0 0 3840 2160 channels: rgb

x=4612 y=96



Node Graph Curve Editor Dope Sheet



Properties

C\_CameraSolver1

C\_CameraSolver Cameras Settings Python Node

Input Views  
Left Views left Right Views right Stereo

Rig  
Cameras 8  
Rig Size 0.30000001

Camera  
Lens Type Rectilinear  
Sensor Size x 0 y 0

Focal Length 0 0.0012 4 6 8 10 12 14 16 18 20 22 24

Position 0 0 0 0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1

Rotation 0 0 0 0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1

Centre Shift 0 0 0 0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1

Distortion 0 0 0 0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1

Mask  
Shape Rectangular  
Size 0 0 0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1

Feather 0 0 0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1

Links

Output  
View All

e	name	lens	size_x	size_y	focal	X	Y	Z	R>
1	camera1	1	35.6	23.8	9	0	0	0	0
2	camera2	1	35.6	23.8	9	0	0	0	0
3	camera3	1	35.6	23.8	9	0	0	0	0
4	camera4	1	35.6	23.8	9	0	0	0	0
5	camera5	1	35.6	23.8	9	0	0	0	0
6	camera6	1	35.6	23.8	9	0	0	0	0
7	camera7	1	35.6	23.8	9	0	0	0	0
8	camera8	1	35.6	23.8	9	0	0	0	0

Set as Default

## Camera geometry

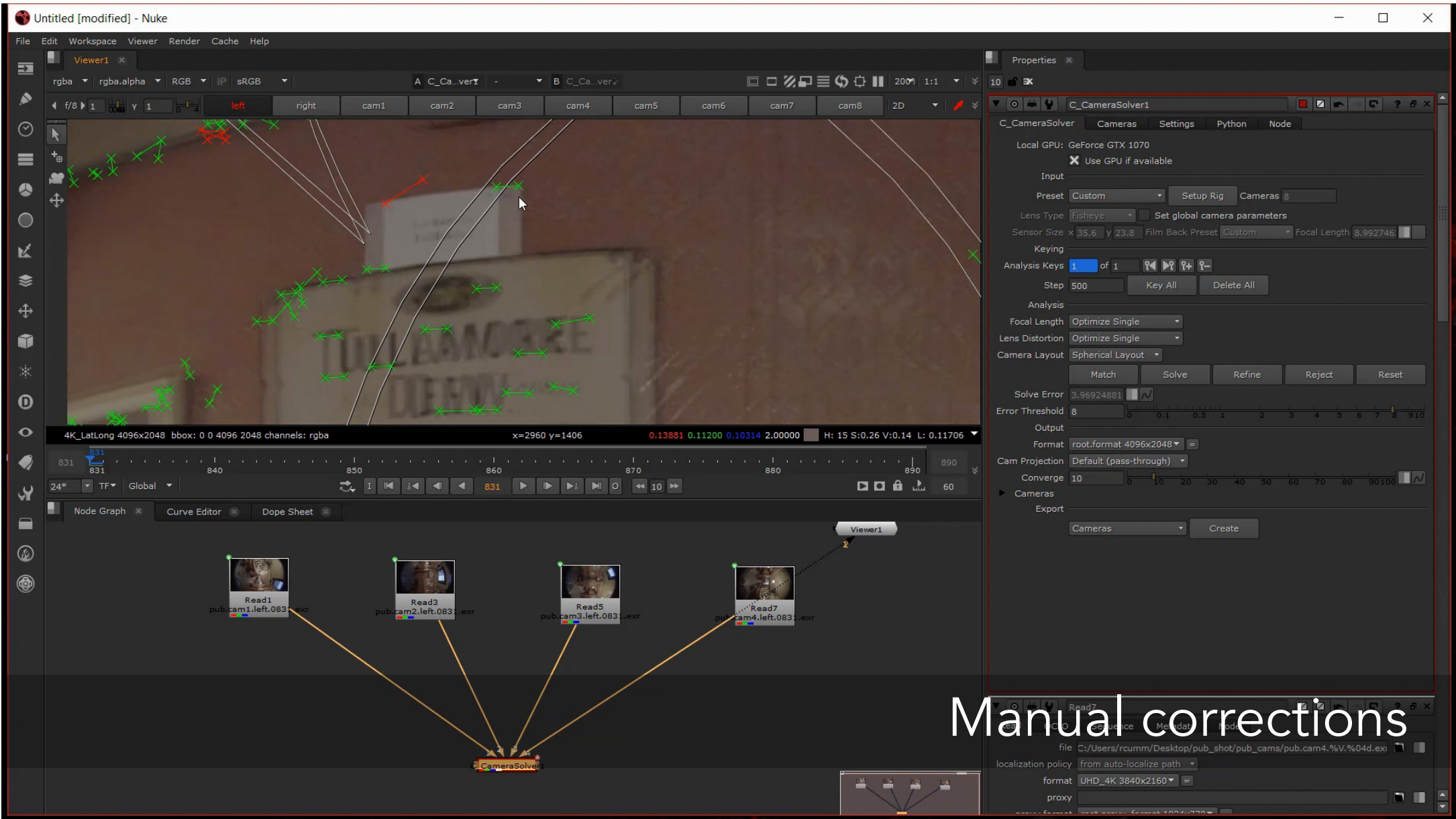
Read7

file C:/Users/rcumm/Desktop/pub\_shot/pub\_cams/pub.cam4.%V.%04d.e

localization policy from auto-localize path

format UHD\_4K 3840x2160

proxy




Untitled [modified] - Nuke

File Edit Workspace Viewer Render Cache Help

Viewer1

rgba rgba.alpha RGB IP sRGB A\_C\_Stitcher B\_C\_Stitcher2 17.9' 1:1

f/8 left right cam1 cam2 cam3 cam4 cam5 cam6 cam7 cam8 m1\_lk n1\_ri m2\_lk n2\_ri m3\_lk n3\_ri m4\_lk n4\_ri m5\_lk n5\_ri m6\_lk n6\_ri m7\_lk n7\_ri m8\_lk n8\_ri 2D overlay off



Progress

C\_Stitcher Computing Vectors [using frame 831] 56% Cancel

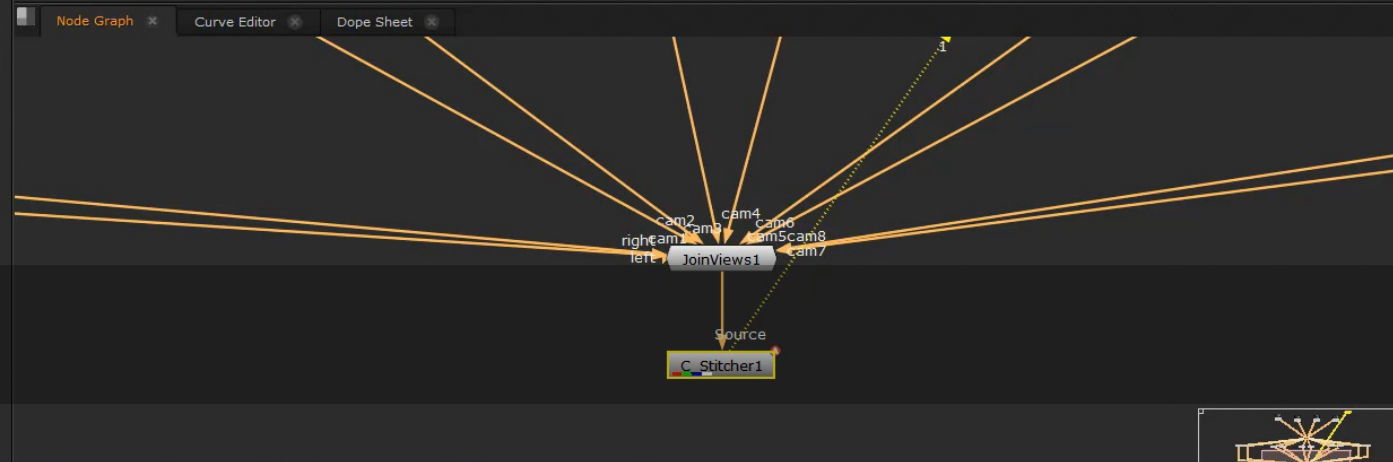
Time to go: 16 seconds.

4K\_LatLong 4096x2048 bbox: 0 0 4096 2048 channels: rgba

831 831 840 850 860 870 880 890 60

24\* TF Global

Node Graph Curve Editor Dope Sheet



Properties

C\_Stitcher1

C\_Stitcher Cameras Stereo Vectors Node

Local GPU: GeForce GTX 1070

Use GPU if available

Input

Projection Default (source)

Stitch

Enable Warps

Override Cameras

Enable Stereo Stitch

Keying

Stitch Keys 1 of 1

Step 30 Key All Delete All

Output

Format root.format 4096x2048

Blend Alpha

Suppression 0.125 Expand

Filter Cubic

Converge 10

Export STMaps (split) Create

C\_CameraSolver1

C\_CameraSolver Cameras Settings Python Node

Local GPU: GeForce GTX 1070

Use GPU if available

Input

Preset Custom Setup Rig Cameras 8

Lens Type Fisheye Set global camera parameters

Sensor Size x 35.6 y 23.8 Film Back Preset Custom Focal Length 9.091175

Keying

Analysis Keys 1 of 1

Step 500 Key All Delete All

Analysis

Focal Length Optimize Single

Lens Distortion Optimize Single

Camera Layout Optimize Single

Match Solve Refine Reject Reset

Solve Error 3.58508135

Error Threshold 8

Output

# Stereo stitching

Untitled [modified] - Nuke

File Edit Workspace Viewer Render Cache Help

Viewer1

rgba rgba.alpha RGB IP sRGB

A C\_Stitcher B C\_Stitcher

100% 1:1

f/8 1 1 left right cam1 cam2 cam3 cam4 cam5 cam6 cam7 cam8 cam1\_left cam1\_right cam2\_left cam2\_right cam3\_left cam3\_right cam4\_left cam4\_right cam5\_left cam5\_right cam6\_left cam6\_right cam7\_left cam7\_right cam8\_left cam8\_right



Stitch QC

4K\_LatLong 4096x2048 bbox: 0 0 4096 2048 channels: rgba

x=2035 y=944 0.09966 0.04626 0.04231 0.97059 H: 4 S:0.58 V:0.10 L: 0.05732

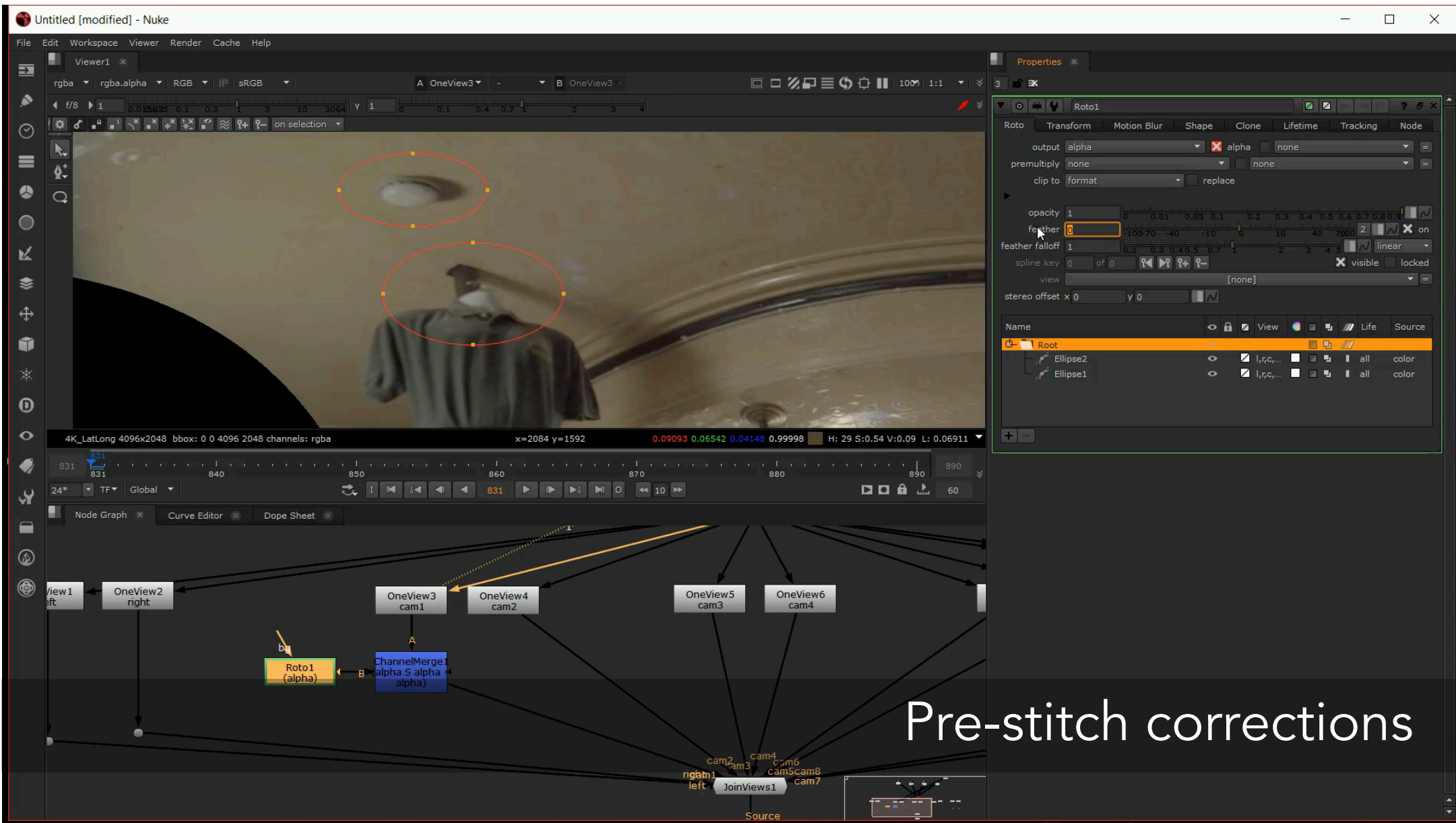
831 831 835 840 845 850 855 860 865 870 875 880 885 890 890

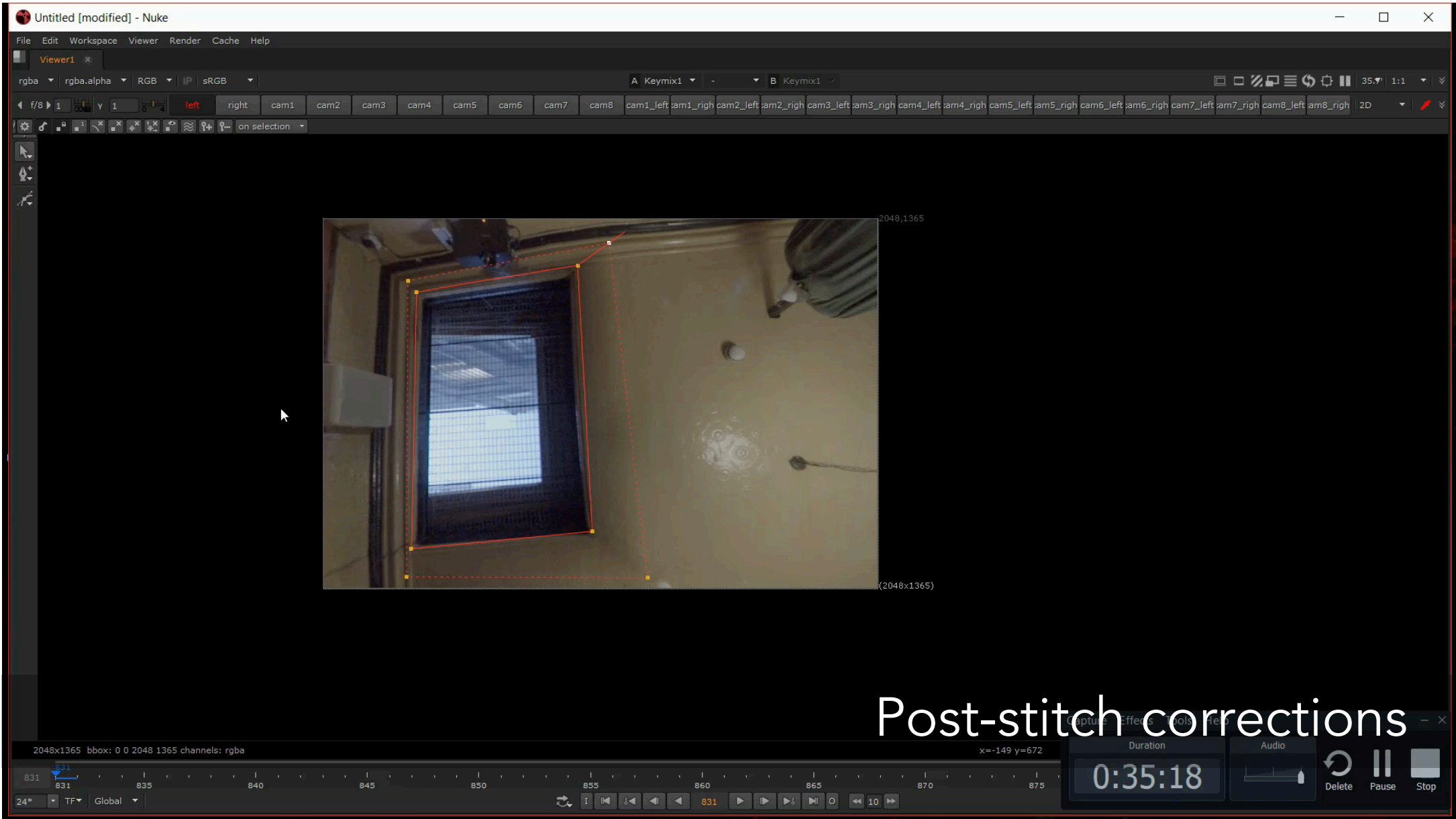
24\* TF Global

831

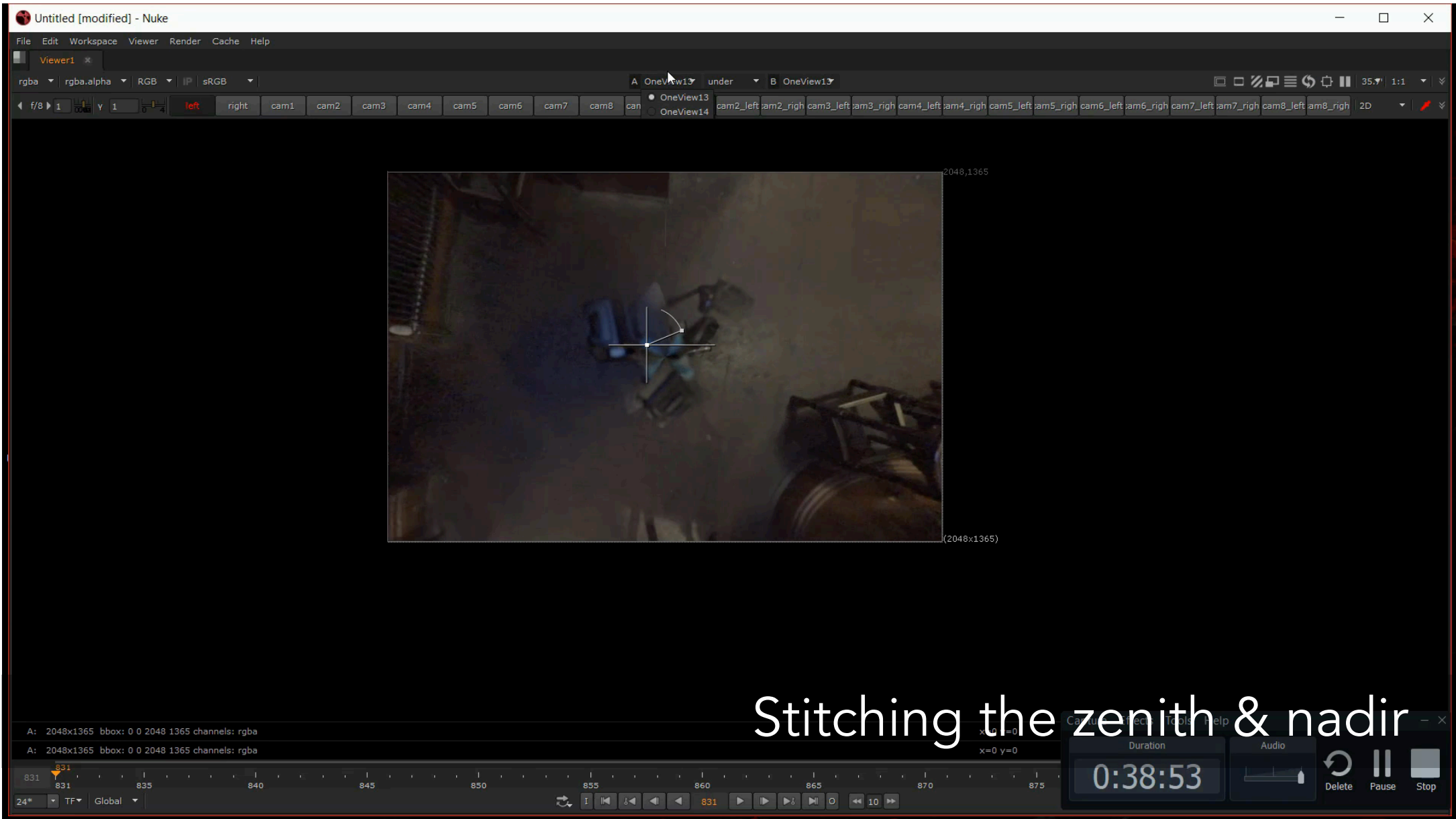
60



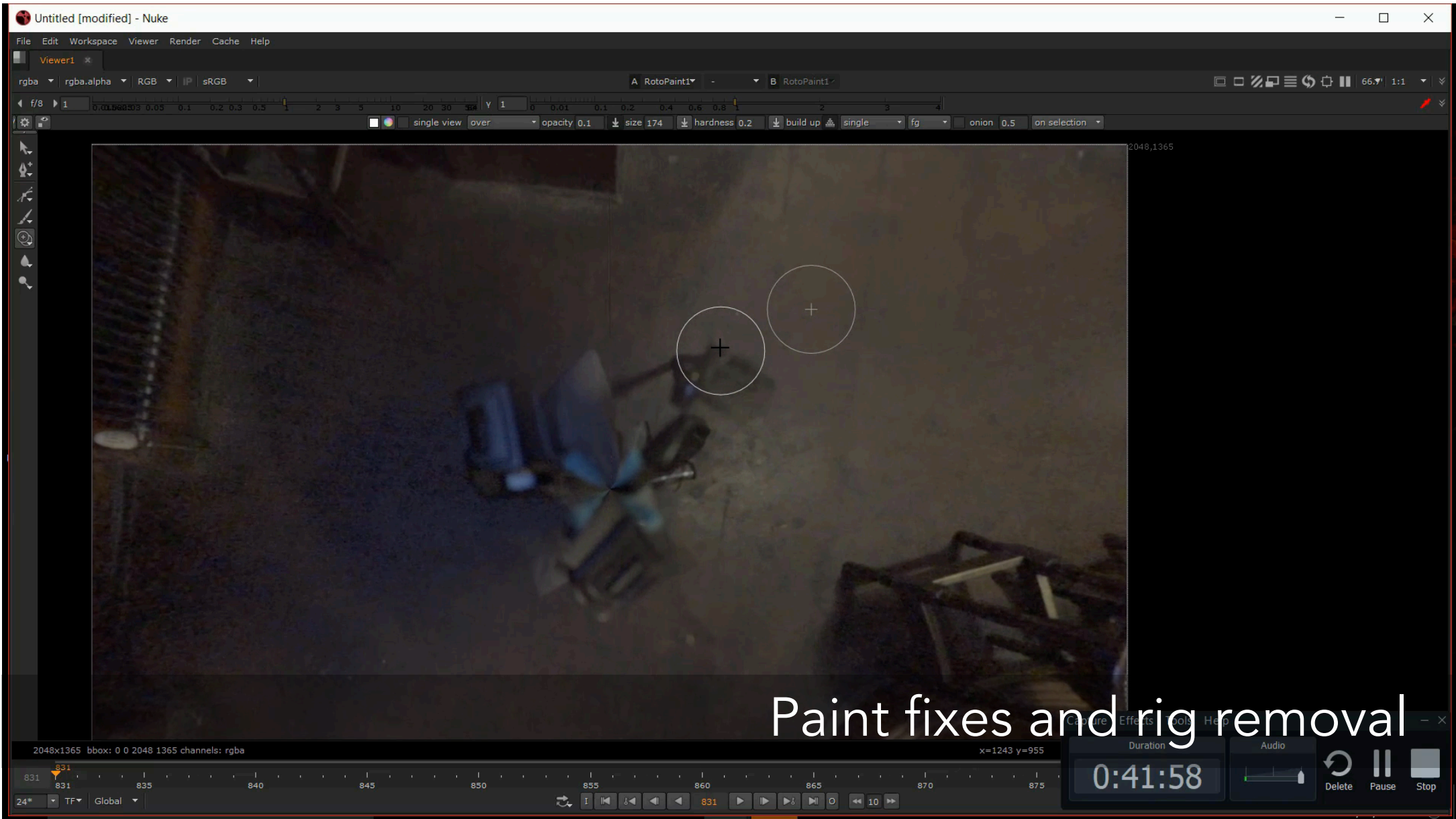


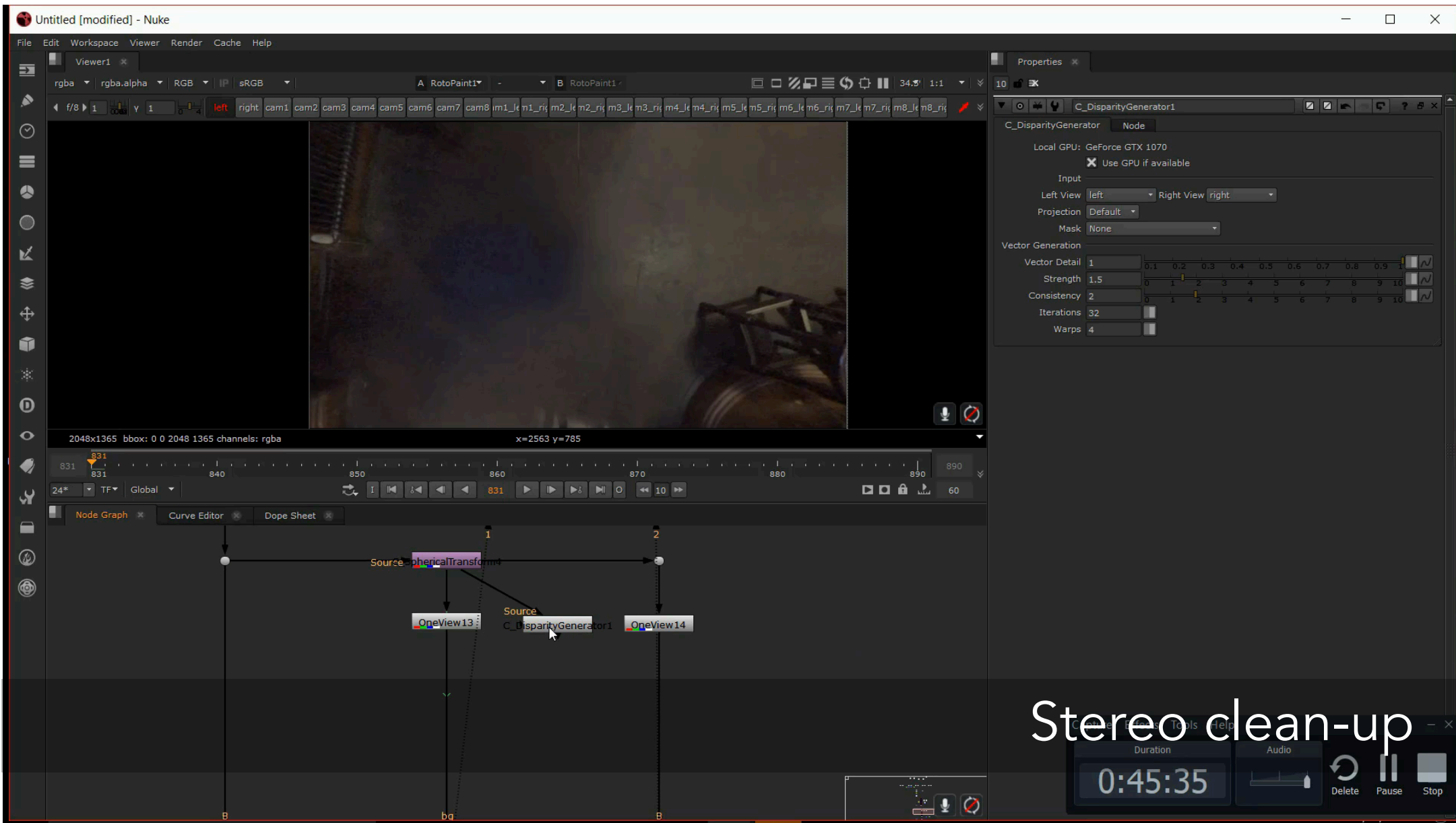


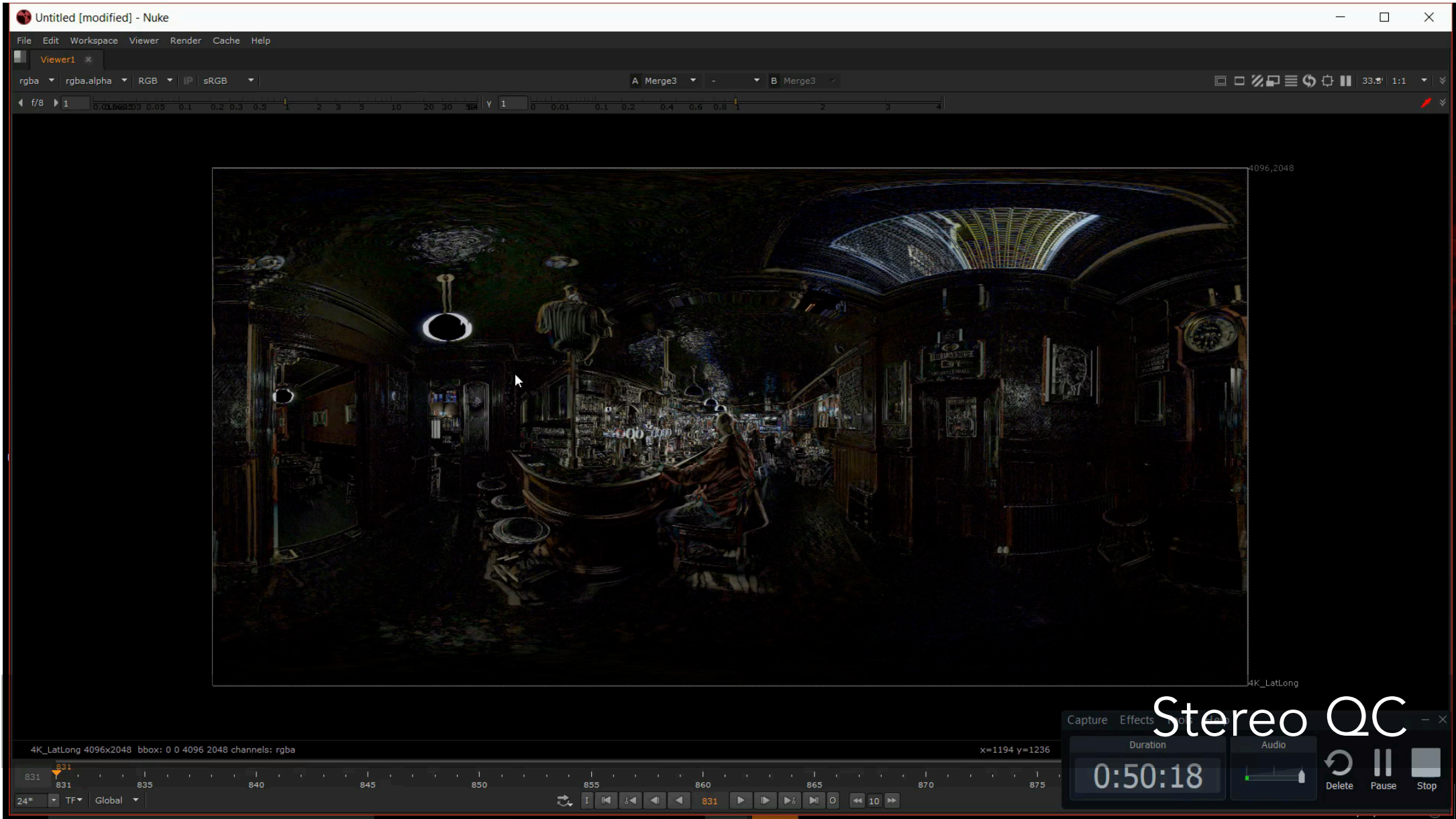
# Post-stitch corrections



# Stitching the zenith & nadir







Stereo QC

Duration  
0:50:18

Audio

Delete Pause Stop

# We covered

- Tasks in post-production
- Node-based compositing
- Setting up a “stitch”
- Stitch corrections
- Stereo corrections
- QC steps

**FOUNDRY.**

imagination engineered