
RT CAMP LX

HAKO-1.0

MASSIVE VOXEL RENDERER

USHIOSTARFISH

CONCEPT

- Massive number of voxels
- No Triangles, only voxels
- A stupidly simple GPU (HIP/CUDA) renderer
  - Only diffuse material
  - No even MIS
    - Only IBL importance sampling

WORKFLOW

Input Scene (Triangles)

Voxelize

Voxels (Morton code + Color)

Radix sort

Bottom-up octree build

Octree

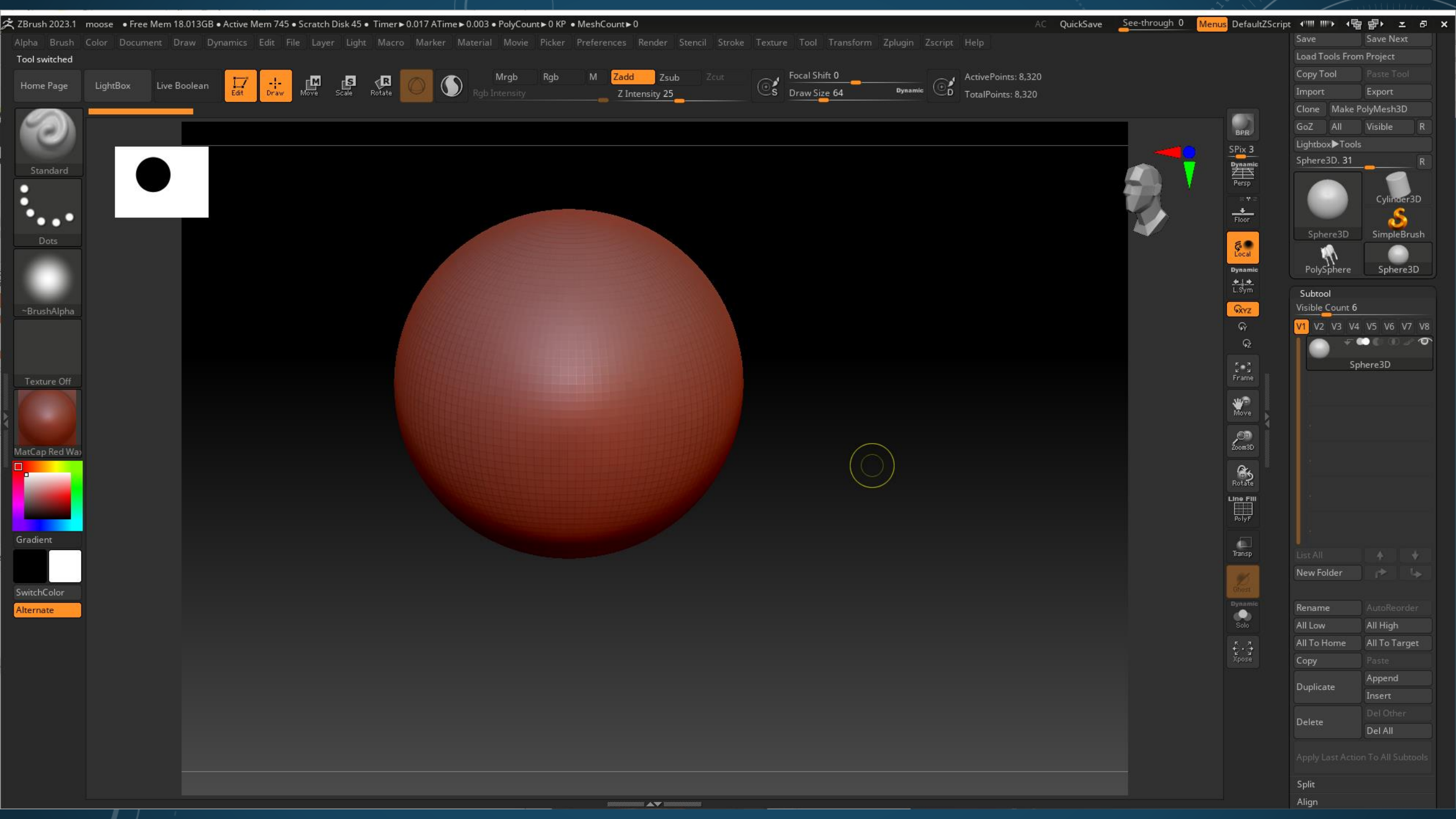
Render

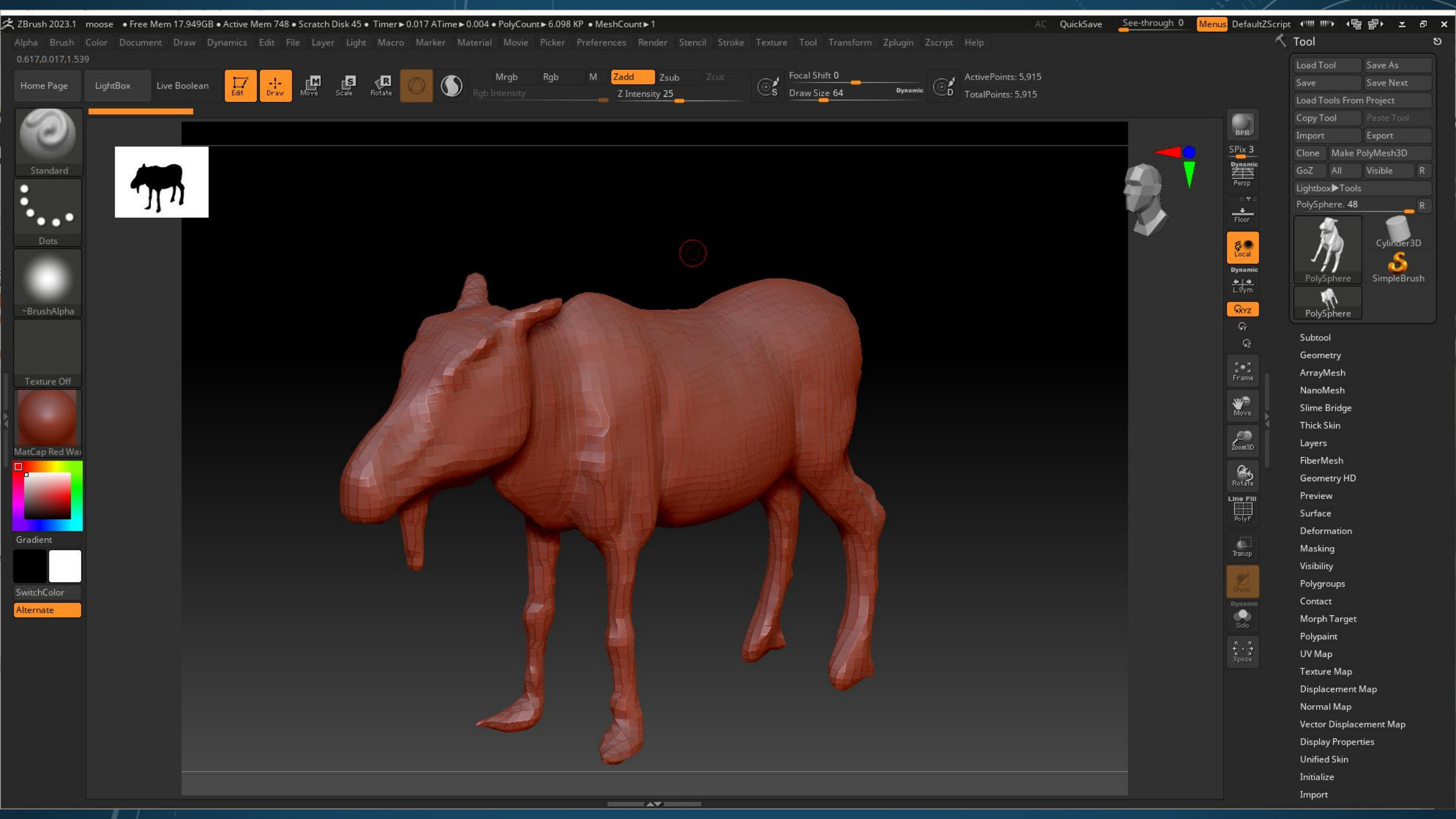
ALL tasks are done on the GPU

SPEC

- 1440 x 900
- 24 fps (240 frames)
- 128 sample per pixel
- Voxel Resolution 256 to 7000

The scene – moose making


ZBrush 2023.1 moose • Free Mem 18.013GB • Active Mem 745 • Scratch Disk 45 • Timer►0.017 ATime►0.003 • PolyCount►0 KP • MeshCount►0
QuickSave
See-through 0
Menus
DefaultZScript
Alpha Brush Color Document Draw Dynamics Edit File Layer Light Macro Marker Material Movie Picker Preferences Render Stencil Stroke Texture Tool Transform Zplugin Zscript Help
Tool switched
Home Page
LightBox
Live Boolean
Edit
Draw
Move
Scale
Rotate
Mrgb
Rgb
M
Zadd
Zsub
Zcut
Rgb Intensity
Z Intensity 25
Focal Shift 0
Draw Size 64
Dynamic
ActivePoints: 8,320
TotalPoints: 8,320
Standard
Dots
~BrushAlpha
Texture Off
MatCap Red Wax
Gradient
SwitchColor
Alternate
BPR
SPix 3
Persp
Floor
Local
L.Sym
Frame
Move
Zoom3D
Rotate
Line Fill
PolyF
Transp
Ghost
Solo
Xpose
Save
Save Next
Load Tools From Project
Copy Tool
Paste Tool
Import
Export
Clone
Make PolyMesh3D
GoZ
All
Visible
Lightbox▶Tools
Sphere3D. 31
Cylinder3D
Sphere3D
SimpleBrush
PolySphere
Sphere3D
Subtool
Visible Count 6
V1 V2 V3 V4 V5 V6 V7 V8
Sphere3D
List All
New Folder
Rename
AutoReorder
All Low
All High
All To Home
All To Target
Copy
Paste
Duplicate
Append
Insert
Delete
Del Other
Del All
Apply Last Action To All Subtools
Split
Align


ZBrush 2023.1 moose • Free Mem 17.949GB • Active Mem 748 • Scratch Disk 45 • Timer►0.017 ATime►0.004 • PolyCount►6.098 KP • MeshCount►1
QuickSave
See-through 0
Menus
DefaultZScript
Alpha Brush Color Document Draw Dynamics Edit File Layer Light Macro Marker Material Movie Picker Preferences Render Stencil Stroke Texture Tool Transform Zplugin Zscript Help
0.617,0.017,1.539
Home Page
LightBox
Live Boolean
Edit
Draw
Move
Scale
Rotate
Mrgb
Rgb
M
Zadd
Zsub
Zcut
Rgb Intensity
Z Intensity 25
Focal Shift 0
Draw Size 64
Dynamic
ActivePoints: 5,915
TotalPoints: 5,915
Standard
Dots
~BrushAlpha
Texture Off
MatCap Red Wax
Gradient
SwitchColor
Alternate
BPR
SPix 3
Persp
Floor
Local
L.Sym
Frame
Move
Zoom3D
Rotate
Line Fill
PolyF
Transp
Ghost
Solo
Xpose
Tool
Load Tool
Save As
Save
Save Next
Load Tools From Project
Copy Tool
Paste Tool
Import
Export
Clone
Make PolyMesh3D
GoZ
All
Visible
R
Lightbox▶Tools
PolySphere. 48
PolySphere
Cylinder3D
SimpleBrush
PolySphere
Subtool
Geometry
ArrayMesh
NanoMesh
Slime Bridge
Thick Skin
Layers
FiberMesh
Geometry HD
Preview
Surface
Deformation
Masking
Visibility
Polygroups
Contact
Morph Target
Polypaint
UV Map
Texture Map
Displacement Map
Normal Map
Vector Displacement Map
Display Properties
Unified Skin
Initialize
Import

ZBrush 2023.1 moose20_posing_recolor • Free Mem 17.962GB • Active Mem 2120 • Scratch Disk 45 • Timer ▶ 0.015 • PolyCount ▶ 307.343 KP • MeshCount ▶ 3

AC QuickSave See-through 0 Menus DefaultZScript

Alpha Brush Color Document Draw Dynamics Edit File Layer Light Macro Marker Material Movie Picker Preferences Render Stencil Stroke Texture Tool Transform Zplugin Zscript Help

Home Page LightBox Live Boolean Edit Draw Move Scale Rotate

Mrgb Rgb M Zadd Zsub Zcut

Rgb Intensity 37 Z Intensity 25

Focal Shift -64 Draw Size 15.55142 Dynamic

ActivePoints: 179,702 TotalPoints: 306,856

Standard Spray ~BrushAlpha Texture Off MatCap Red Wa

Gradient SwitchColor Alternate

BPR SPix 3 Dynamic Persp Floor Local Dynamic L.Sym Xyz Frame Move Zoom3D Rotate Line Fill PolyF Transp Ghost Dynamic Solo Xpose

ZRig#4_body_rer 2 TPose5_body_rer

ZRig#5_body_rer TPose6_body_rer

ZRig#6_body_rer SimpleBrush

Subtool

Visible Count 6

V1 V2 V3 V4 V5 V6 V7 V8

body_remesh

hone_remesh

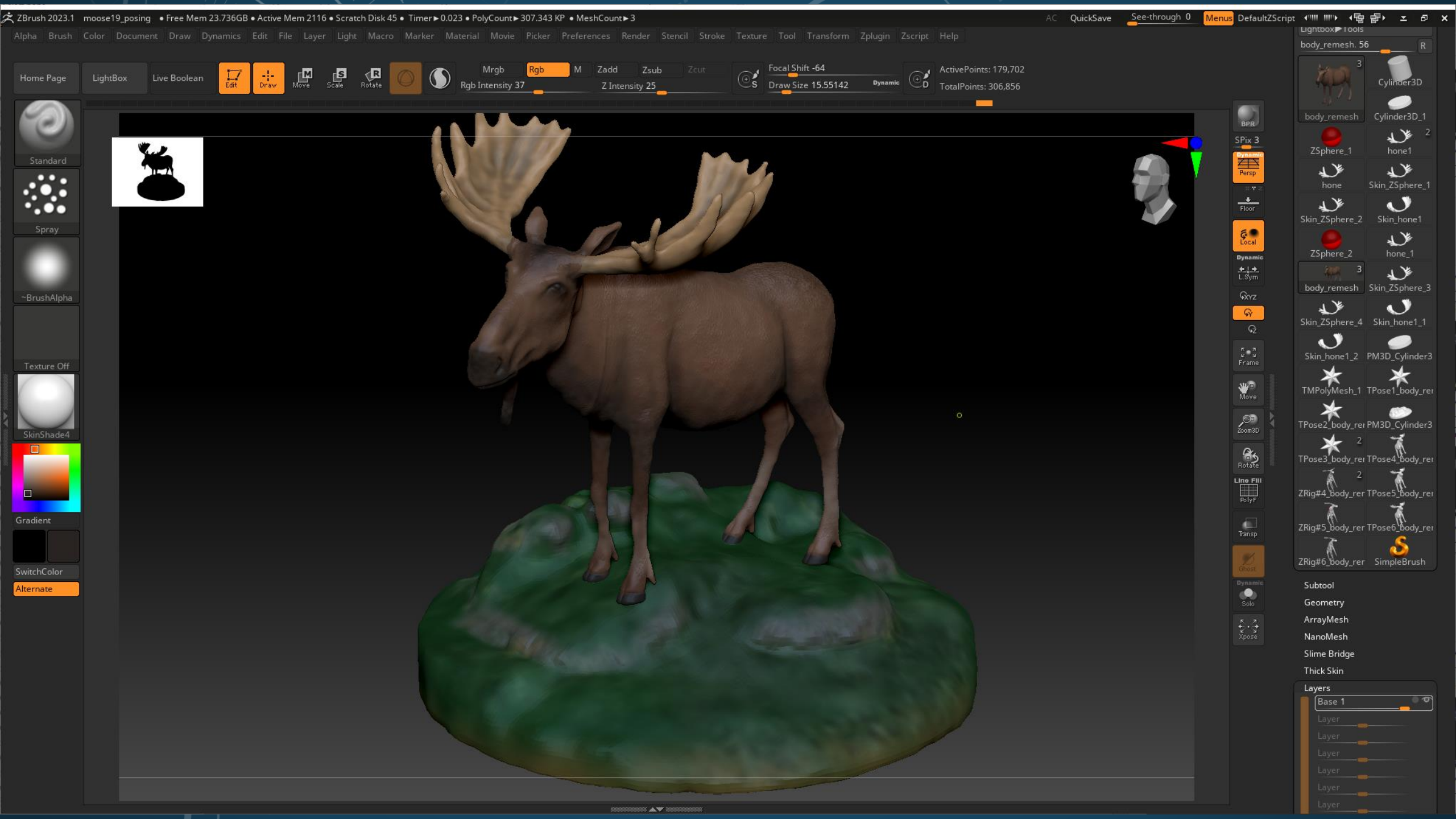
Base

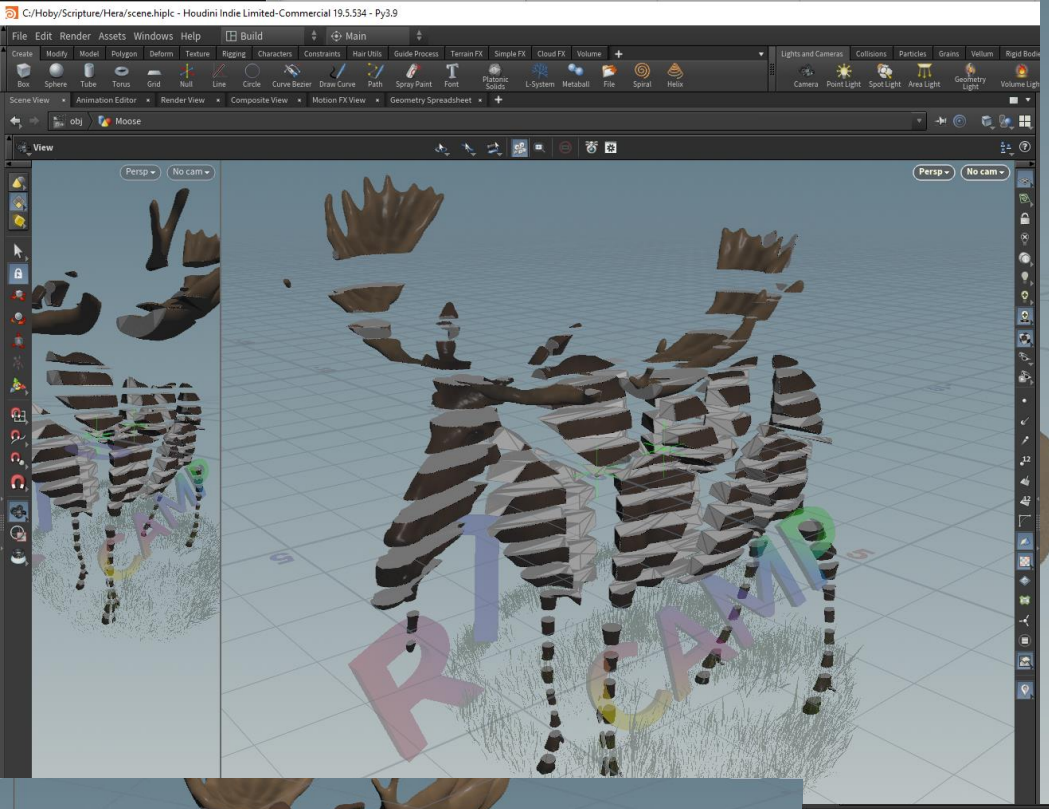
List All New Folder

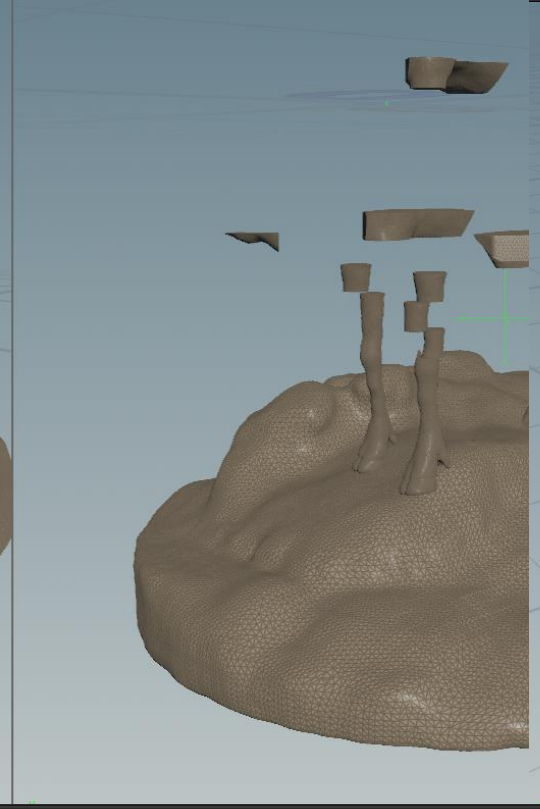
Rename AutoReorder All Low All High All To Home All To Target Copy Paste Duplicate Append Insert Delete Del Other Del All

Apply Last Action To All Subtools

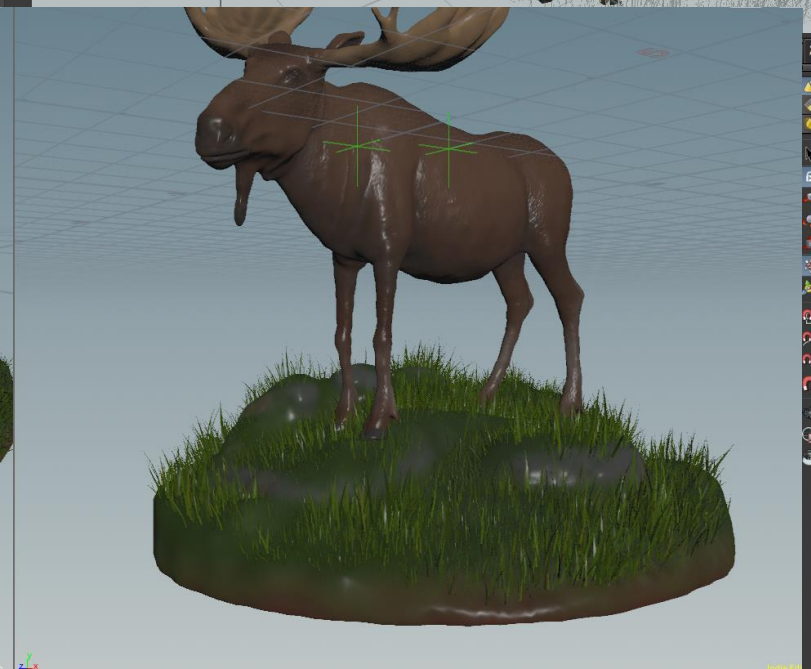
Split Merge Boolean Bevel Pro Align Distribute Remesh Project Project BasRelief Extract Redshift Properties

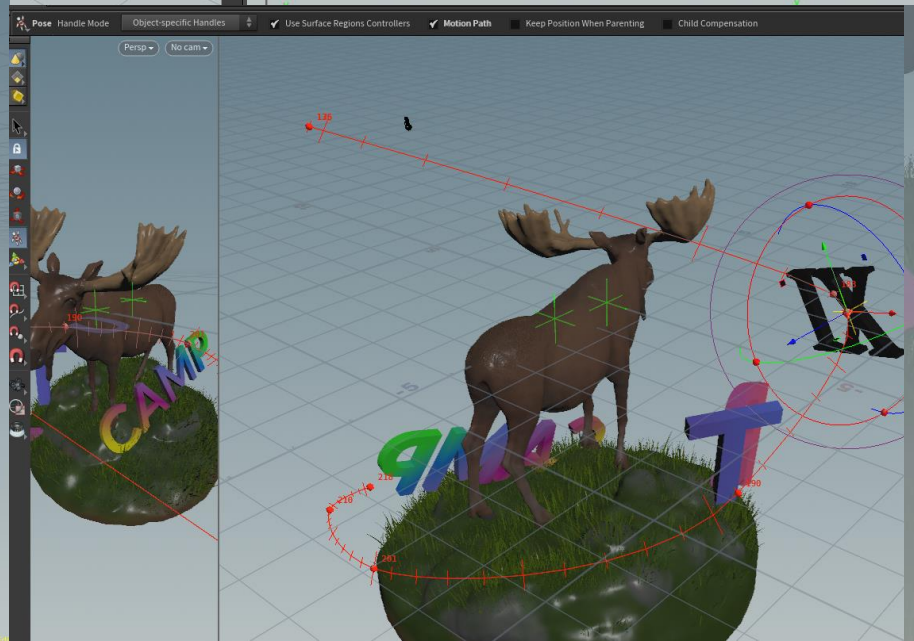

ZBrush 2023.1 moose19_posing • Free Mem 23.736GB • Active Mem 2116 • Scratch Disk 45 • Timer▶0.023 • PolyCount▶307.343 KP • MeshCount▶3
QuickSave
See-through 0
Menus
DefaultZScript
Alpha Brush Color Document Draw Dynamics Edit File Layer Light Macro Marker Material Movie Picker Preferences Render Stencil Stroke Texture Tool Transform Zplugin Zscript Help
Home Page
LightBox
Live Boolean
Edit
Draw
Move
Scale
Rotate
Mrgb
Rgb
M
Zadd
Zsub
Zcut
Rgb Intensity 37
Z Intensity 25
Focal Shift -64
Draw Size 15.55142
Dynamic
ActivePoints: 179,702
TotalPoints: 306,856
Standard
Spray
~BrushAlpha
Texture Off
SkinShade4
Gradient
SwitchColor
Alternate
BPR
SPix 3
Persp
Floor
Local
L.Sym
Frame
Move
Zoom3D
Rotate
Line Fill
PolyF
Transp
Ghost
Solo
Xpose
Lightbox▶Tools
body_remesh. 56
R
body_remesh
Cylinder3D
Cylinder3D_1
ZSphere_1
hone1
hone
Skin_ZSphere_1
Skin_ZSphere_2
Skin_hone1
ZSphere_2
hone_1
body_remesh
Skin_ZSphere_3
Skin_ZSphere_4
Skin_hone1_1
Skin_hone1_2
PM3D_Cylinder3
TMPolyMesh_1
TPose1_body_rer
TPose2_body_rer
PM3D_Cylinder3
TPose3_body_rer
TPose4_body_rer
ZRig#4_body_rer
TPose5_body_rer
ZRig#5_body_rer
TPose6_body_rer
ZRig#6_body_rer
SimpleBrush
Subtool
Geometry
ArrayMesh
NanoMesh
Slime Bridge
Thick Skin
Layers
Base 1
Layer

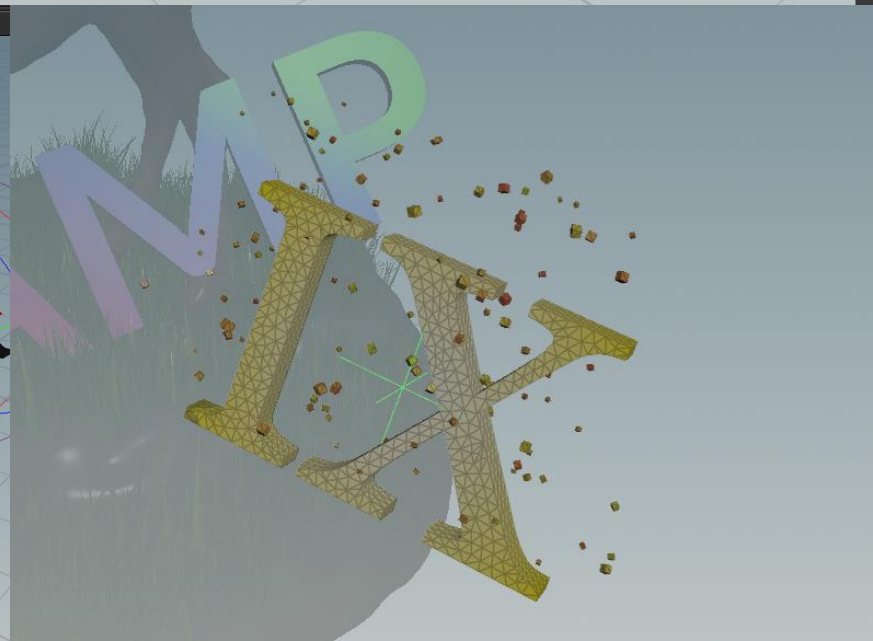

C:/Hoby/Scripture/Hera/scene.hiplc - Houdini Indie Limited-Commercial 19.5.534 - Py3.9
File Edit Render Assets Windows Help
Build
Main
obj
Moose
View
Persp
No cam



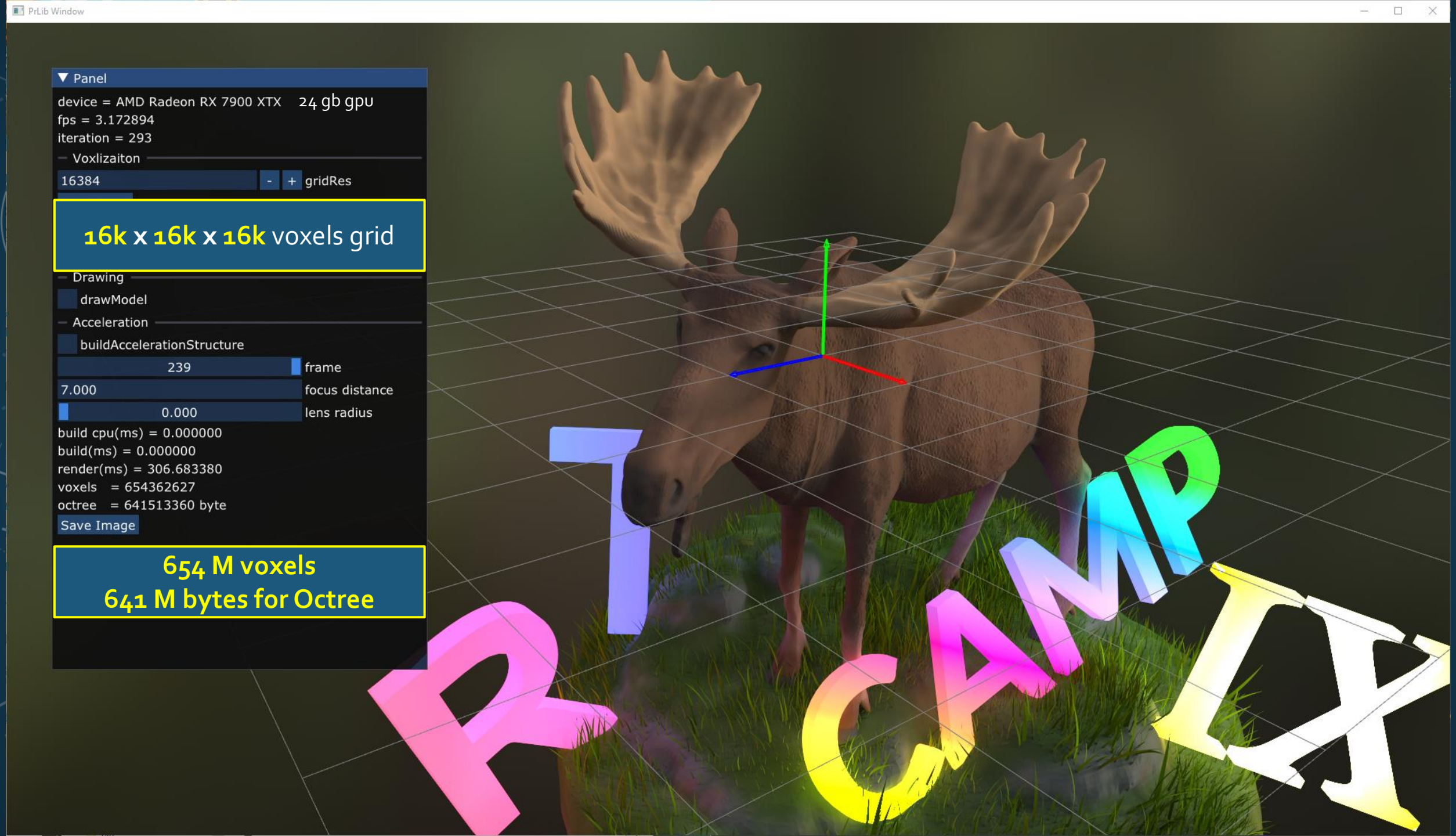

Persp
No cam

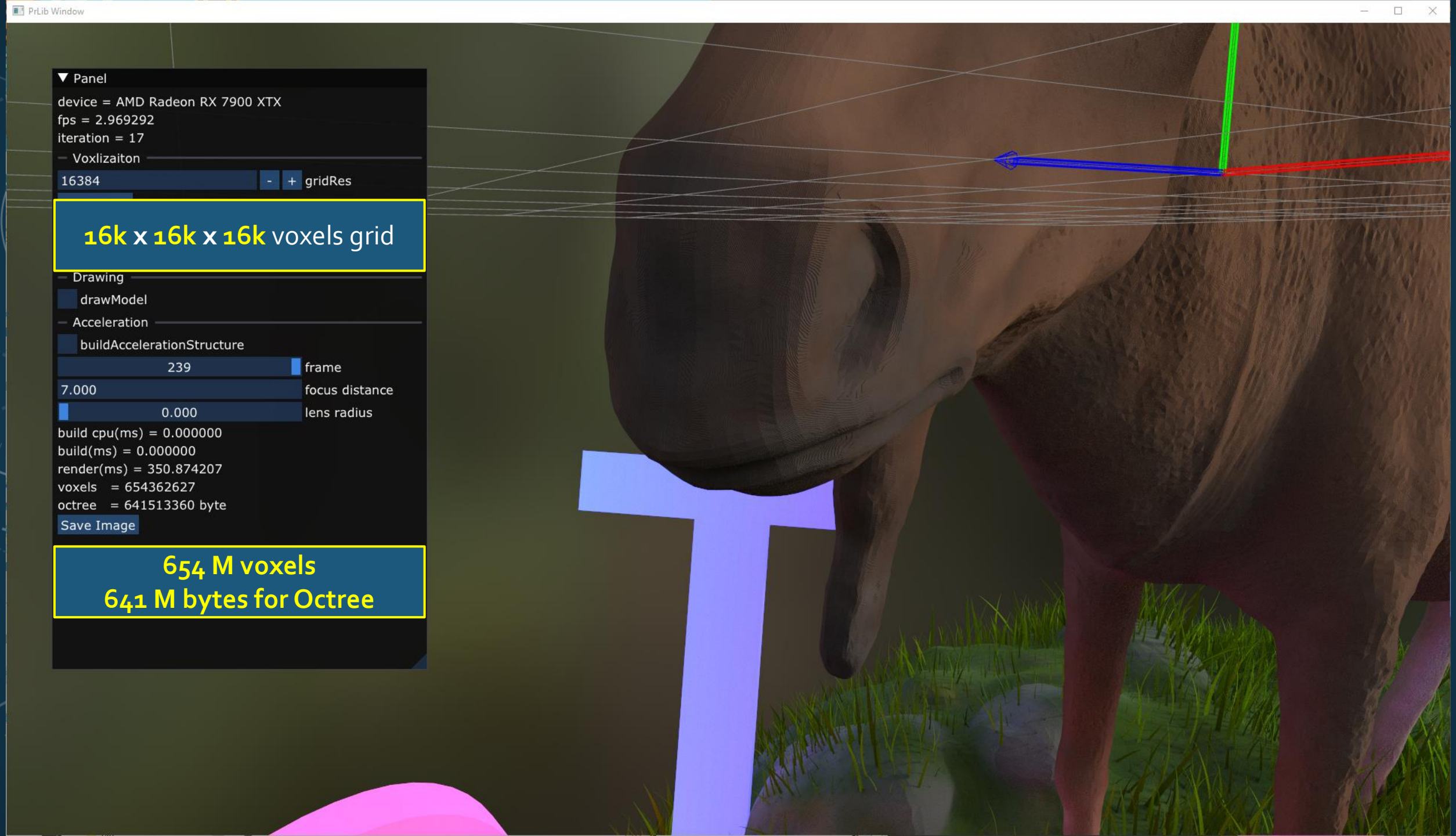


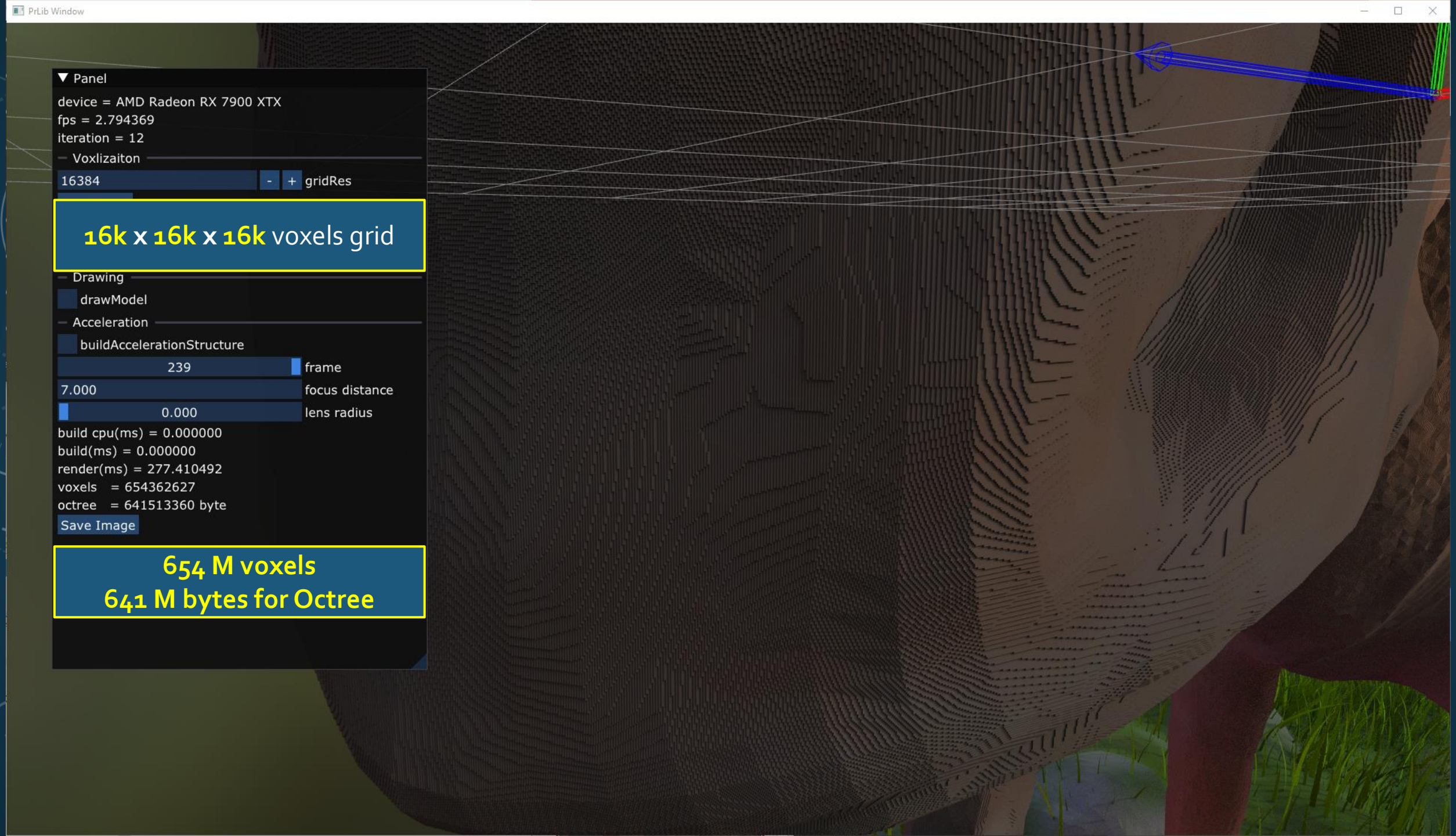

Pose
Handle Mode
Object-specific Handles
Use Surface Regions Controllers
Motion Path
Keep Position When Parenting
Child Compensation
Persp
No cam

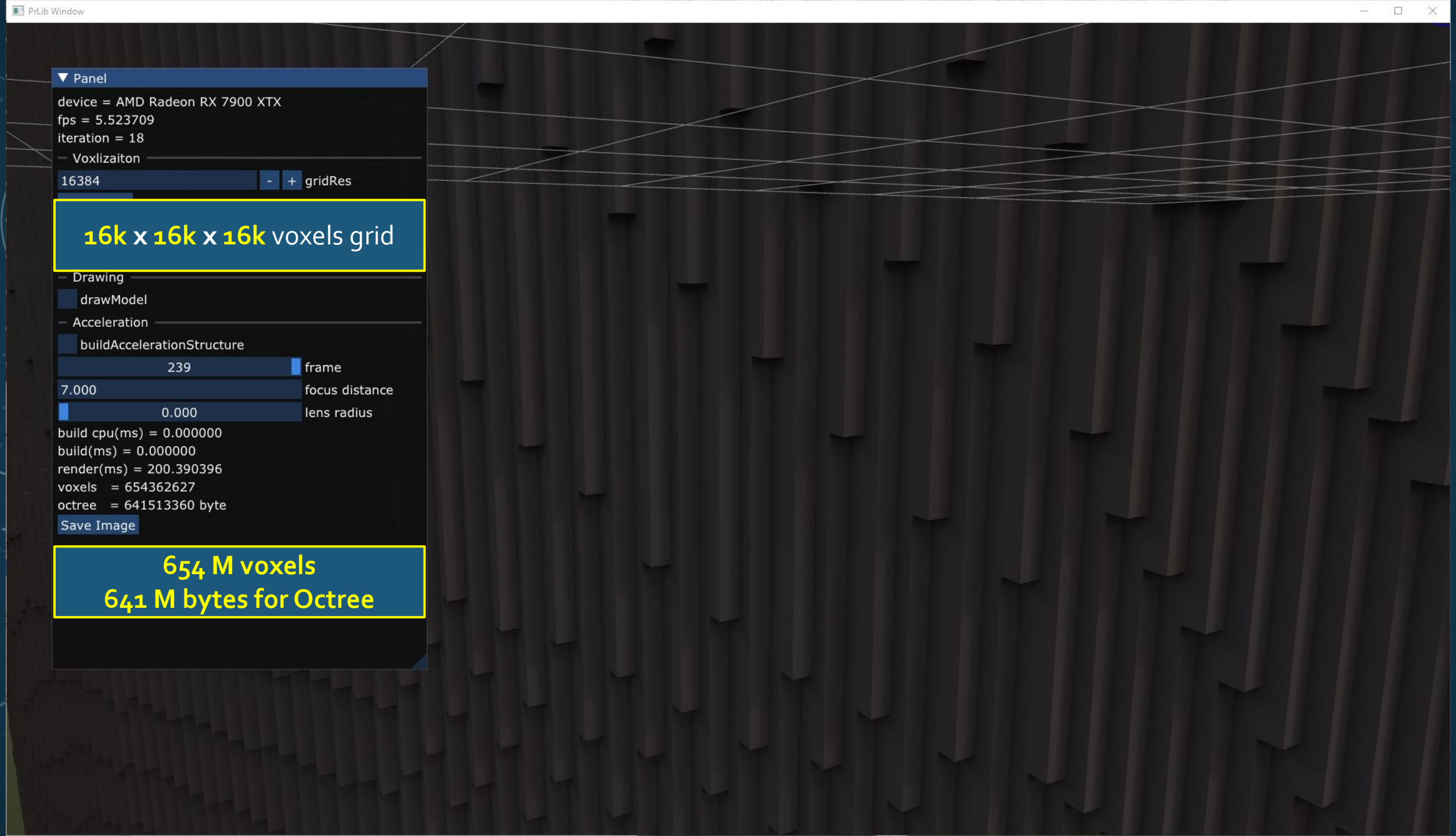


MORE VOXELS?


PrLib Window
Panel
device = AMD Radeon RX 7900 XTX 24 gb gpu
fps = 3.172894
iteration = 293
Voxlizaiton
16384
-
+
gridRes
16k x 16k x 16k voxels grid
Drawing
drawModel
Acceleration
buildAccelerationStructure
239
frame
7.000
focus distance
0.000
lens radius
build cpu(ms) = 0.000000
build(ms) = 0.000000
render(ms) = 306.683380
voxels = 654362627
octree = 641513360 byte
Save Image
654 M voxels
641 M bytes for Octree
RTCAMP
LX


PrLib Window
Panel
device = AMD Radeon RX 7900 XTX
fps = 2.969292
iteration = 17
Voxlizaiton
16384
-
+
gridRes
16k x 16k x 16k voxels grid
Drawing
drawModel
Acceleration
buildAccelerationStructure
239
frame
7.000
focus distance
0.000
lens radius
build cpu(ms) = 0.000000
build(ms) = 0.000000
render(ms) = 350.874207
voxels = 654362627
octree = 641513360 byte
Save Image
654 M voxels
641 M bytes for Octree


PrLib Window
Panel
device = AMD Radeon RX 7900 XTX
fps = 2.794369
iteration = 12
Voxlizaiton
16384
-
+
gridRes
16k x 16k x 16k voxels grid
Drawing
drawModel
Acceleration
buildAccelerationStructure
239
frame
7.000
focus distance
0.000
lens radius
build cpu(ms) = 0.000000
build(ms) = 0.000000
render(ms) = 277.410492
voxels = 654362627
octree = 641513360 byte
Save Image
654 M voxels
641 M bytes for Octree


PrLib Window
Panel
device = AMD Radeon RX 7900 XTX
fps = 5.523709
iteration = 18
Voxlizaiton
16384
-
+
gridRes
16k x 16k x 16k voxels grid
Drawing
drawModel
Acceleration
buildAccelerationStructure
239
frame
7.000
focus distance
0.000
lens radius
build cpu(ms) = 0.000000
build(ms) = 0.000000
render(ms) = 200.390396
voxels = 654362627
octree = 641513360 byte
Save Image
654 M voxels
641 M bytes for Octree