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Optimizing your VR pipeline

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Learning Objectives

- Data Optimization using VRED
- Data Simplification
- UV Mapping
- Texture painting
- Stingray VR
- VRED VR

Description

The course will take designers through the process of importing many forms of 3D data (IGEs, STEP, scan data, CATIA). Then we'll look in depth at optimizing large 3D models to enable efficient virtual reality (VR) experiences. First we'll explore VRED functionality for both file optimization and VR execution. Next, we'll take that same data into Maya software and prepare it for use in the Stingray gaming engine. That preparation will include using Mudbox software to create textures. Finally, we'll show the Stingray workflows to create a VR experience.

Speaker(s)

Hello…I'm Barry Kimball…

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Data Optimization

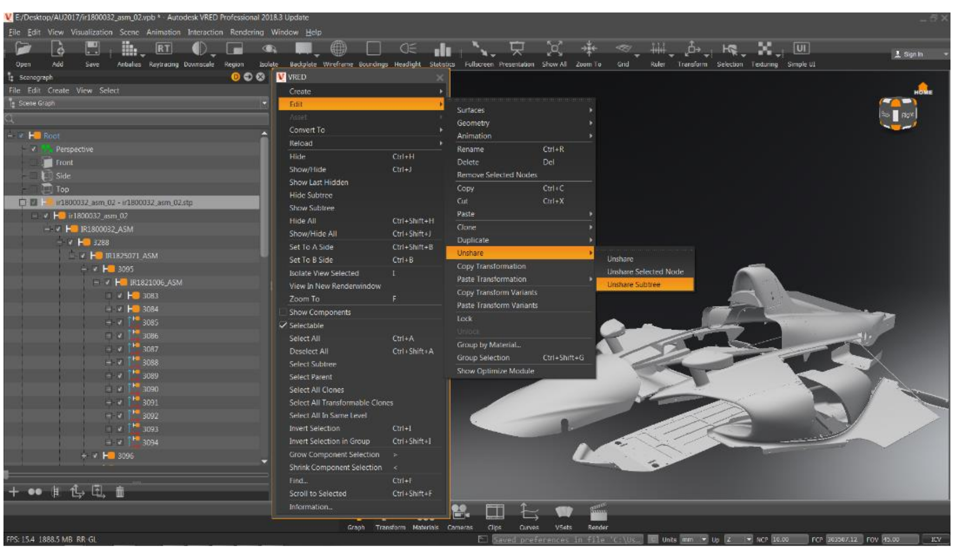
Understanding how a scenes complexity can affect the performance in VR. We will use VRED's optimization tools to simplify a scene tree and combine geometry.

Explore the scene tree

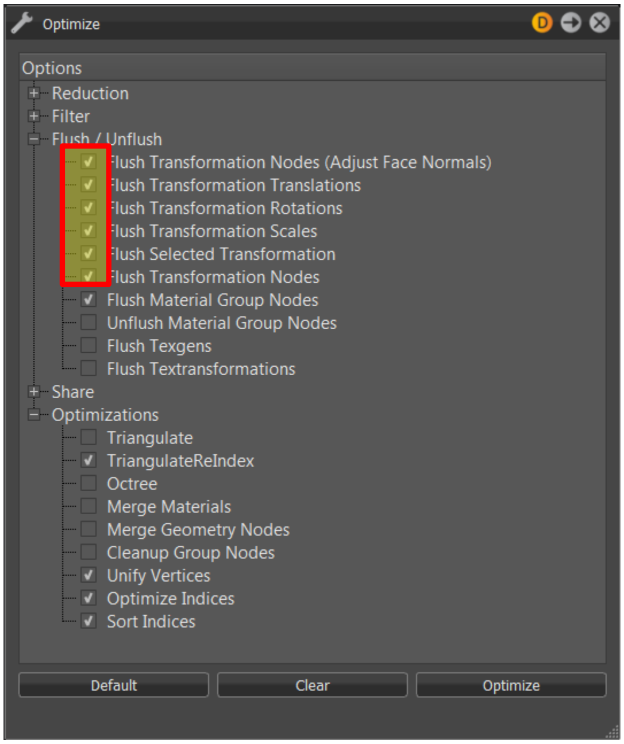
Use the scene tree to explore the file contents. Get familiar with the scene and understand its contents. Look for transformations, subfolders, and similar geometry. Then make a plan to simplify the geometry based on materials and similarity.

Data Imported into VRED

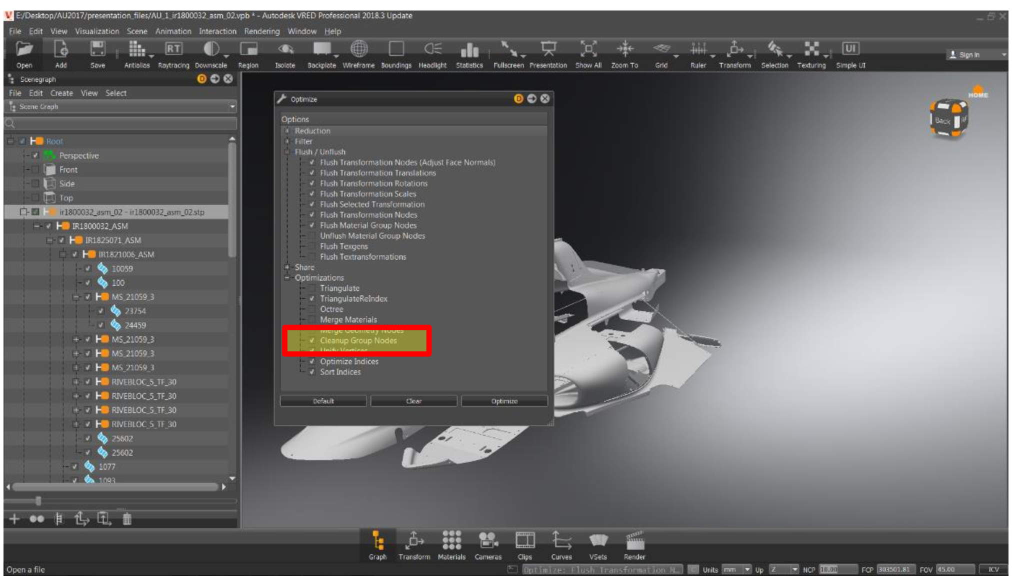
Use the unshare nodes function to convert cloned geometry to actual geometry. This allows the elimination of transformations on objects in the scene and improves performance.



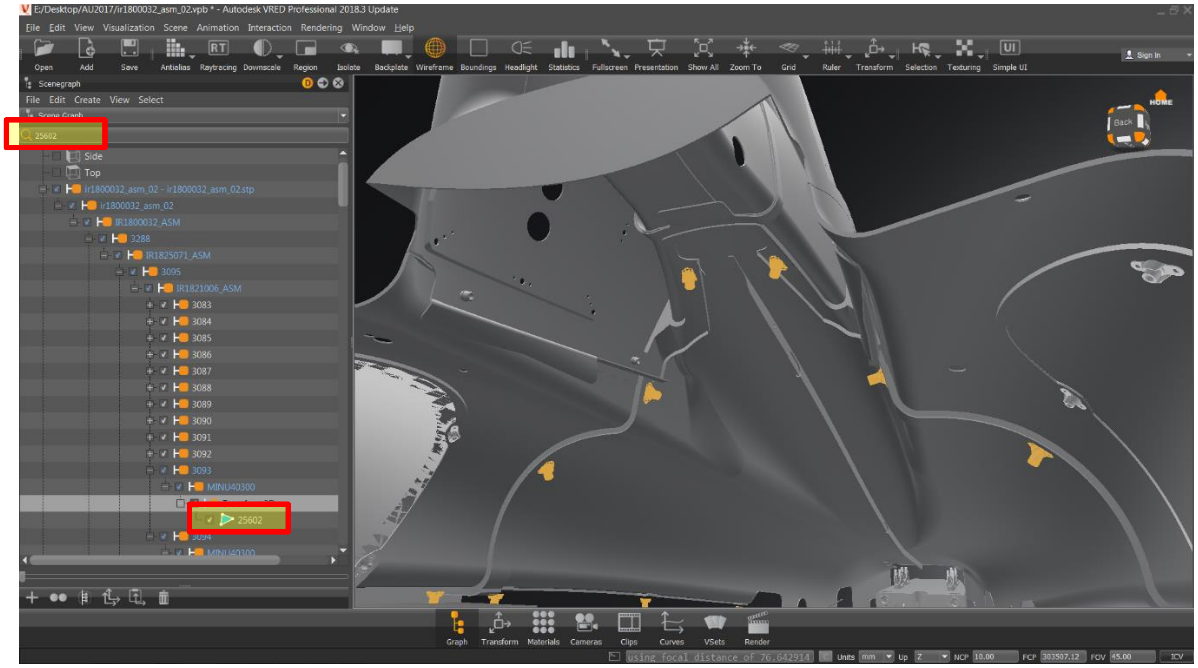
Use the Scene -> optimization tool to eliminate transformations in the scenegraph.



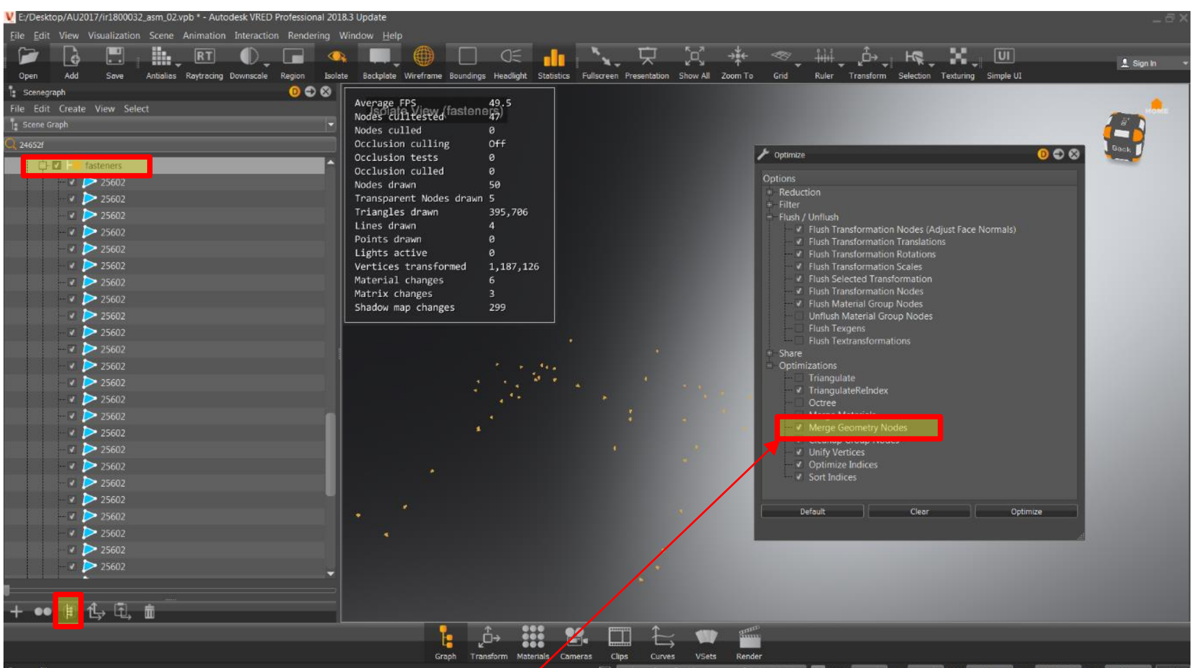
Use the Optimize module to cleanup group nodes that result in long and complex scenegraphs.



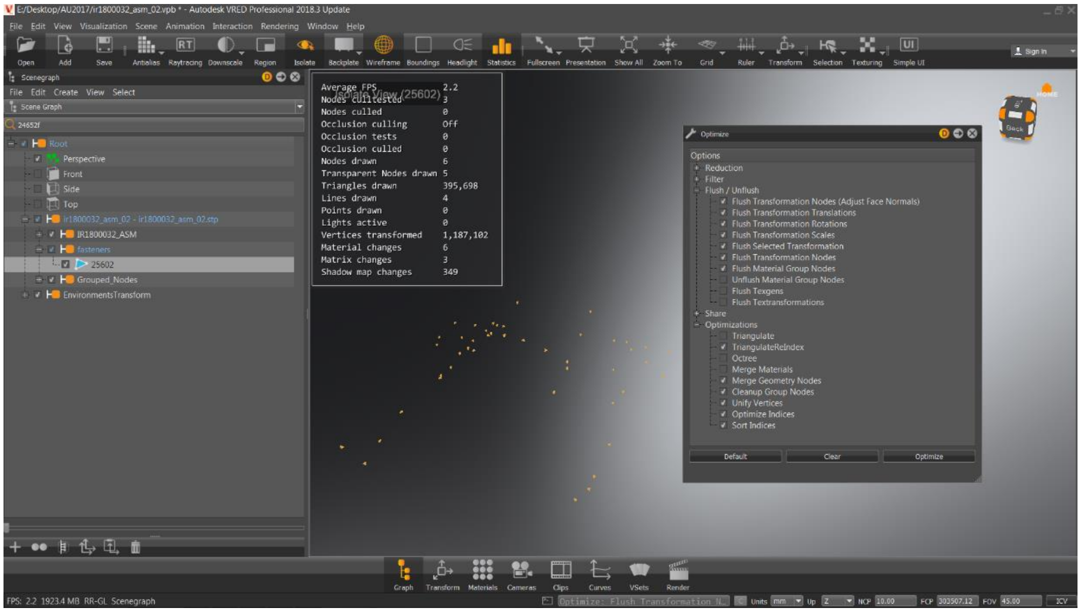
Now let’s combine similar geometry and reduce the total node count. this can be done using the search tool and grouping.



Once selected, use the group tool to assign the selected objects to 1 group, ready to be combined to 1 object.

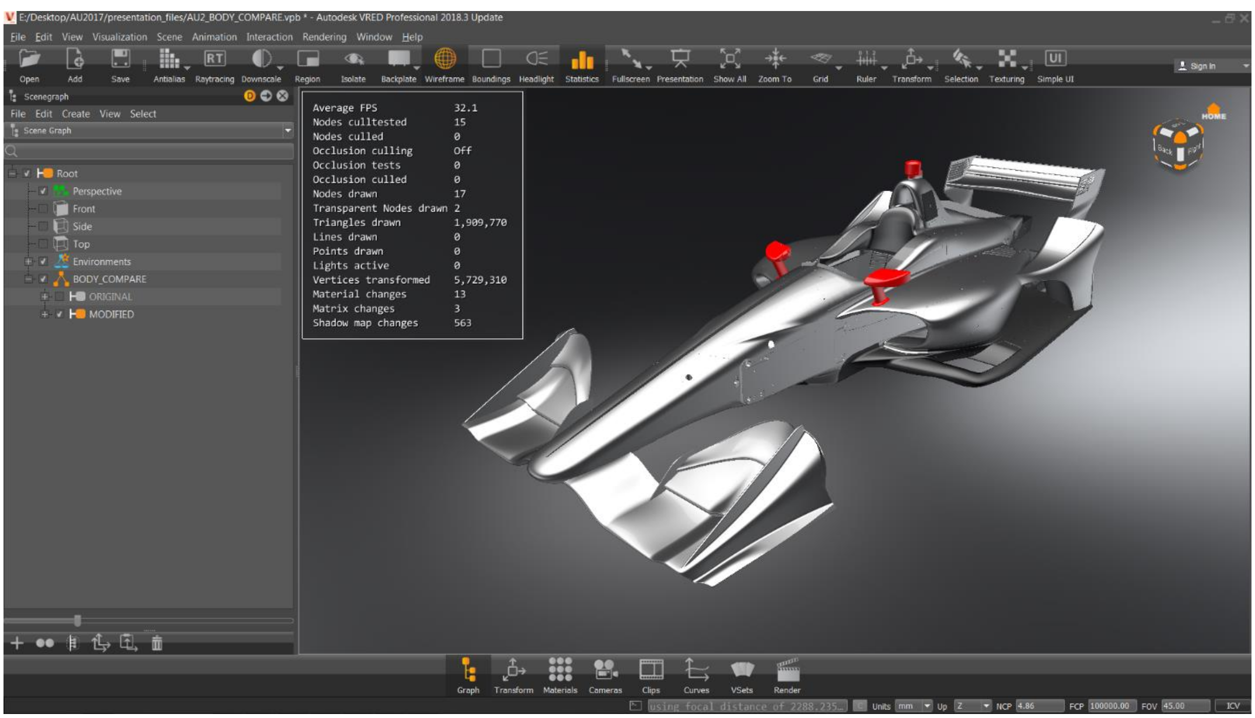


Now use the optimize module to combine the individual components into 1 component



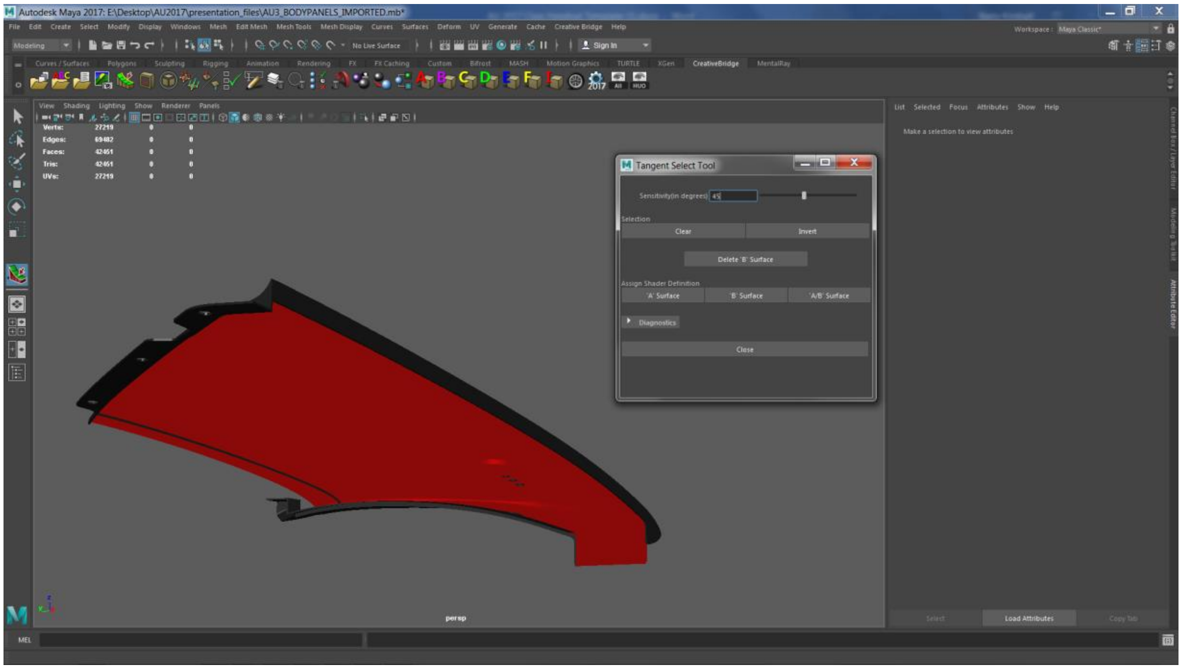
Data Simplification

Once the data structure is simplified it is time to eliminate non-visible information. This can be done very quickly and efficiently using MAYA->Creative Bridge



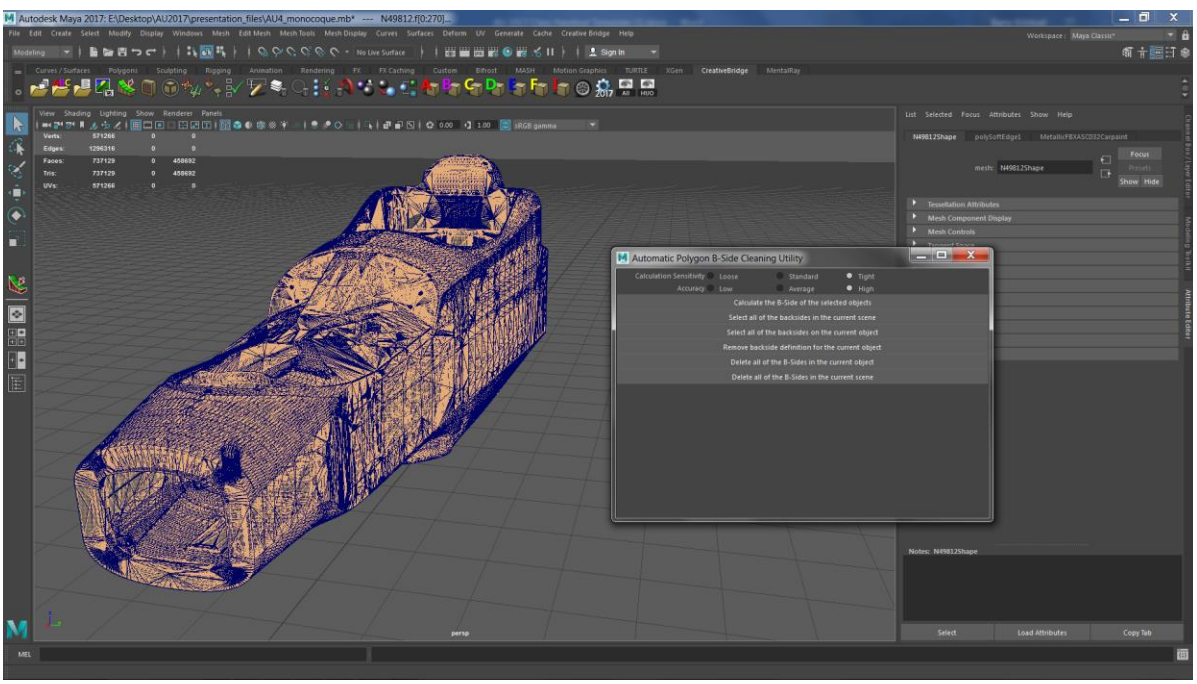
Select the data and export to Maya via fbx format

Use the Creative Bridge tangent select Tool to assist in removing the non-visible data. This step can dramatically improve VR performance without rebuilding the original content.

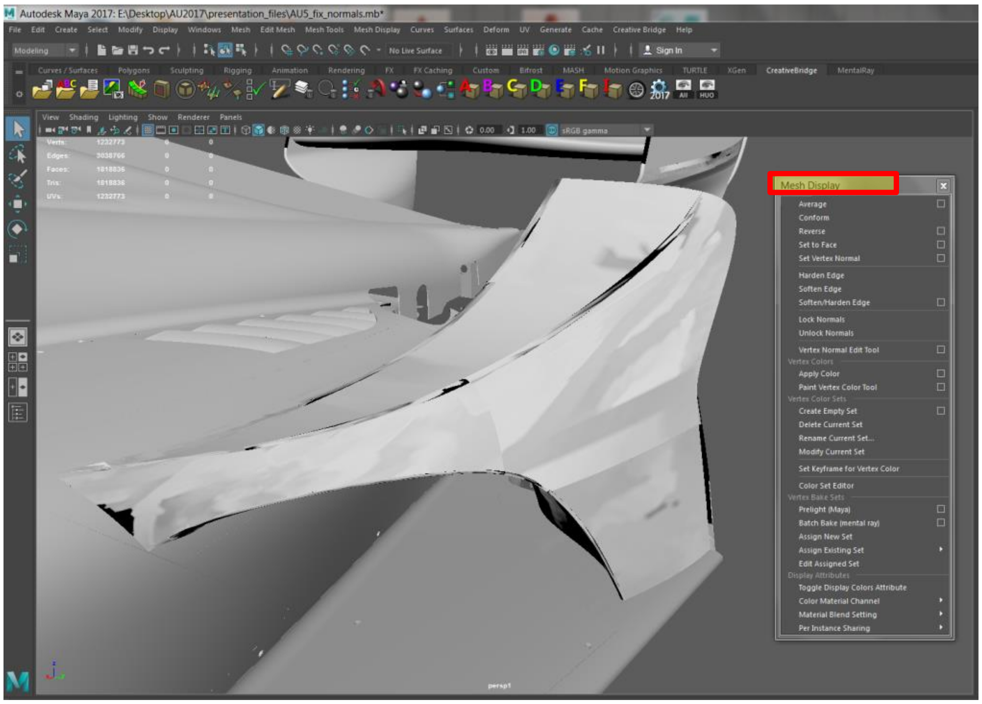


Tangent select

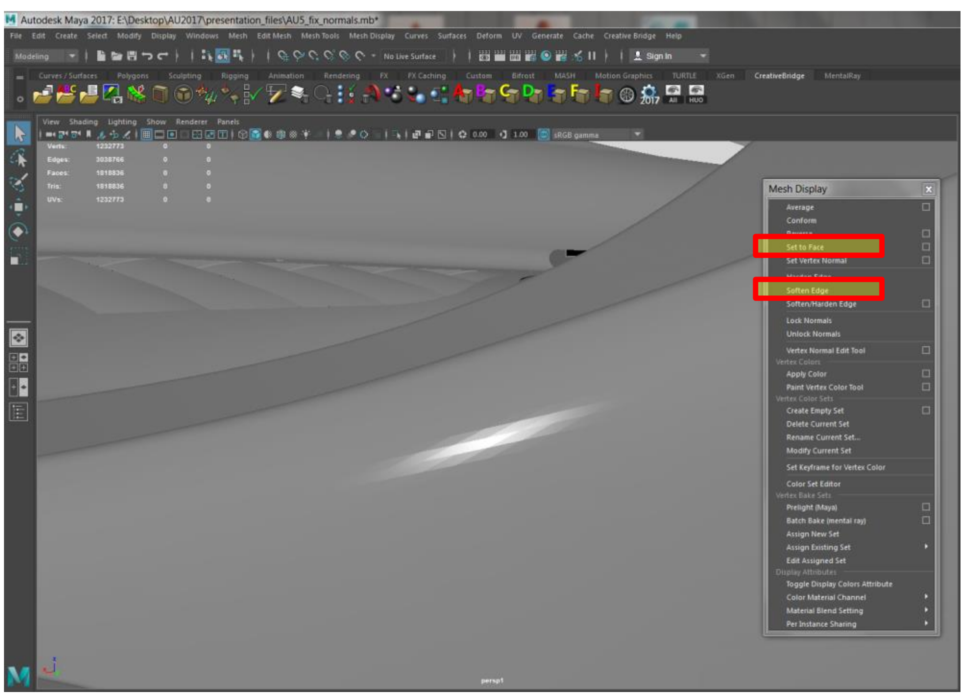
Use the Creative Bridge backside removal tool to eliminate non visible geometry when the component is a closed volume with many internal pieces.



During the process of data translation, backside removal and simply saving, can cause issues with the vertex normal in the polygonal model. Repair the normal using the following tools.

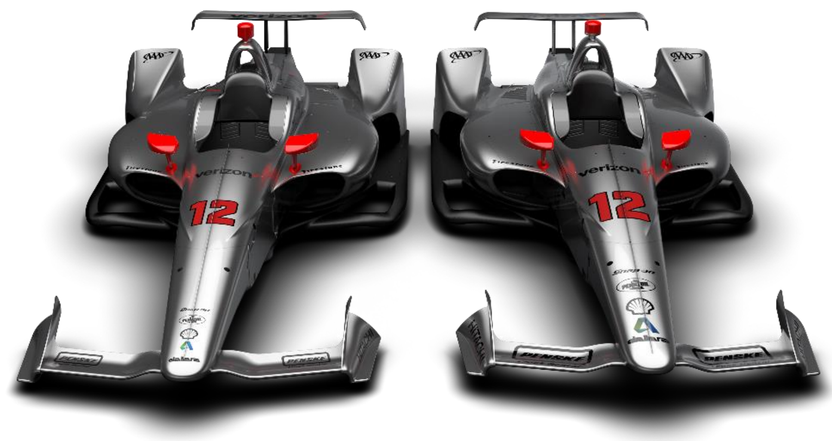


Use the mesh->display->set to face tool to unify the normal, then soften edge to smooth the display.

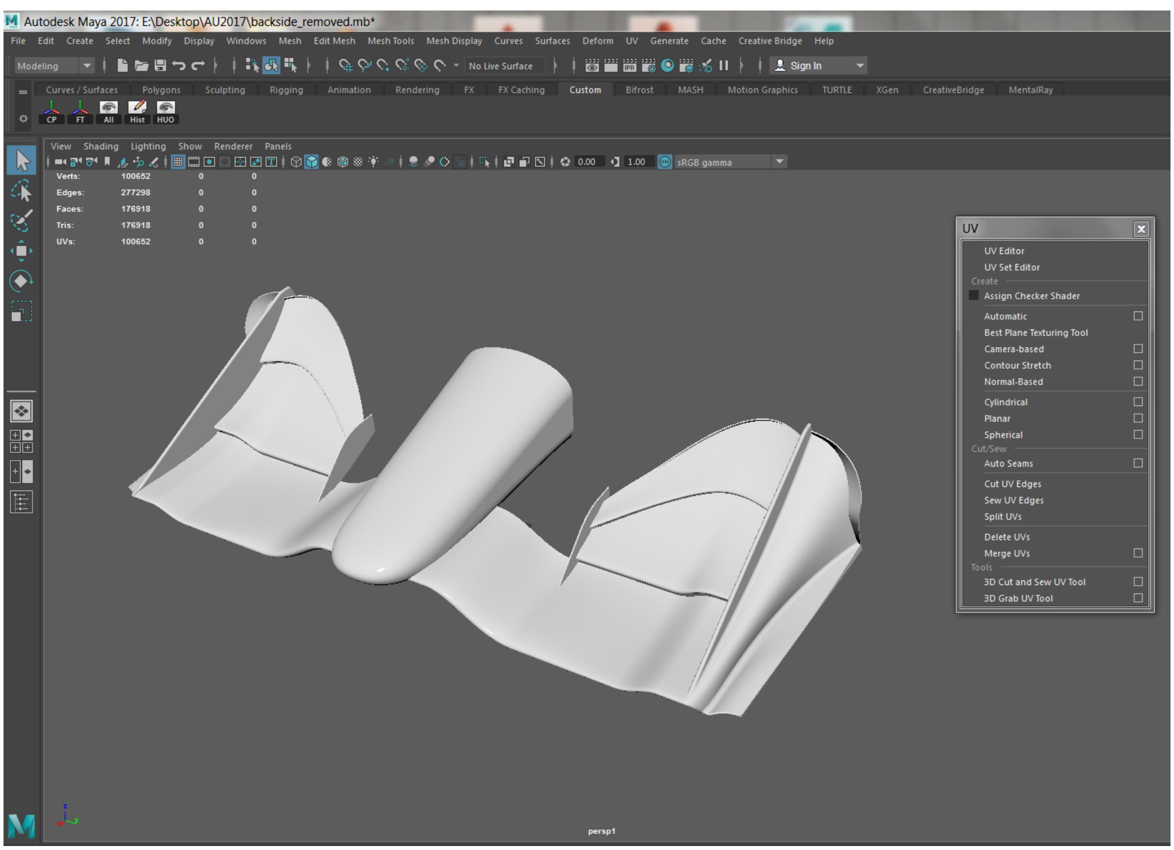


UV Mapping

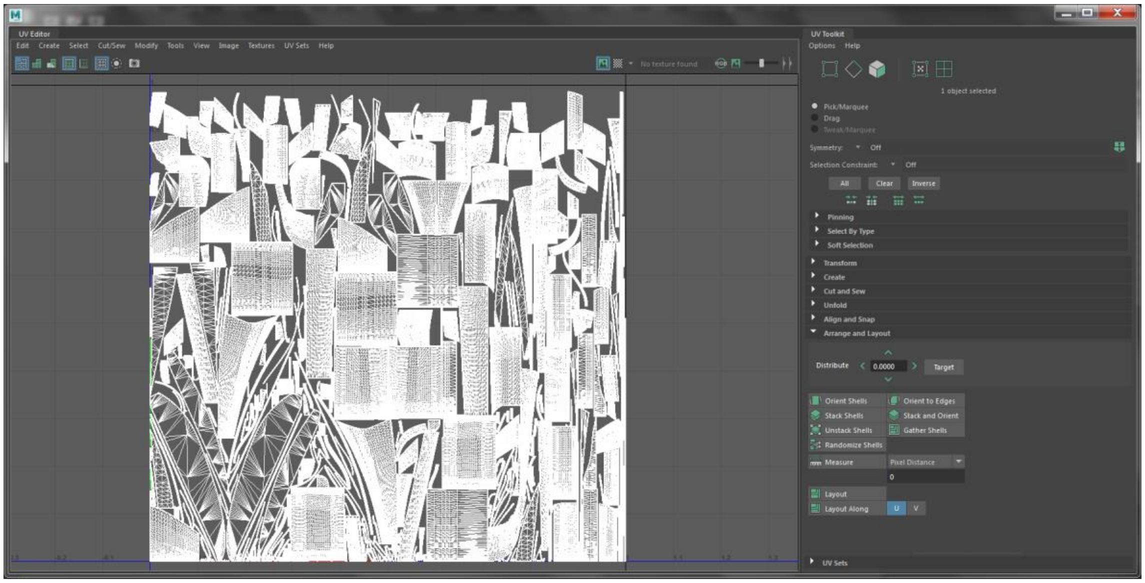
UV mapping is a technique that flattens individual pieces of a 3D part. The UV maps can then be used in visualization tools to efficiently show decals, materials and calculate shadows.



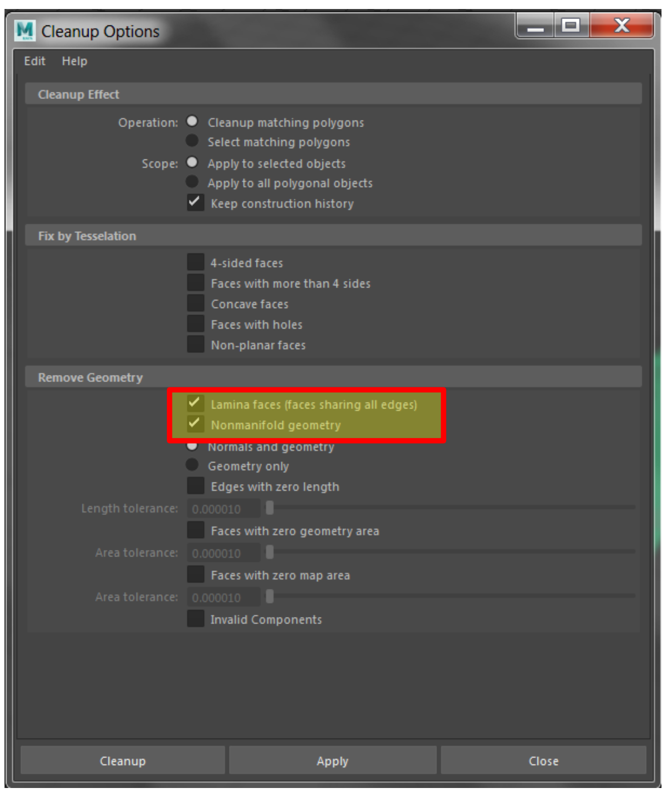
Maya offers some quick simple tools to create UV’s on data for use in VRED and Stingray.



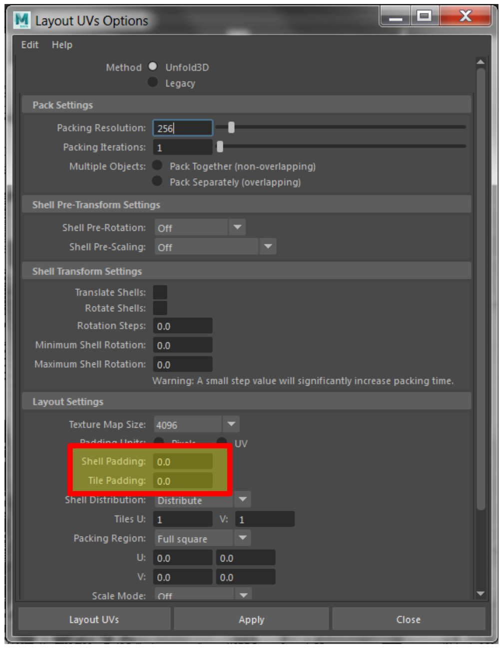
Use the automatic function to quickly create UV's – use the UV->UV editor to see the results.



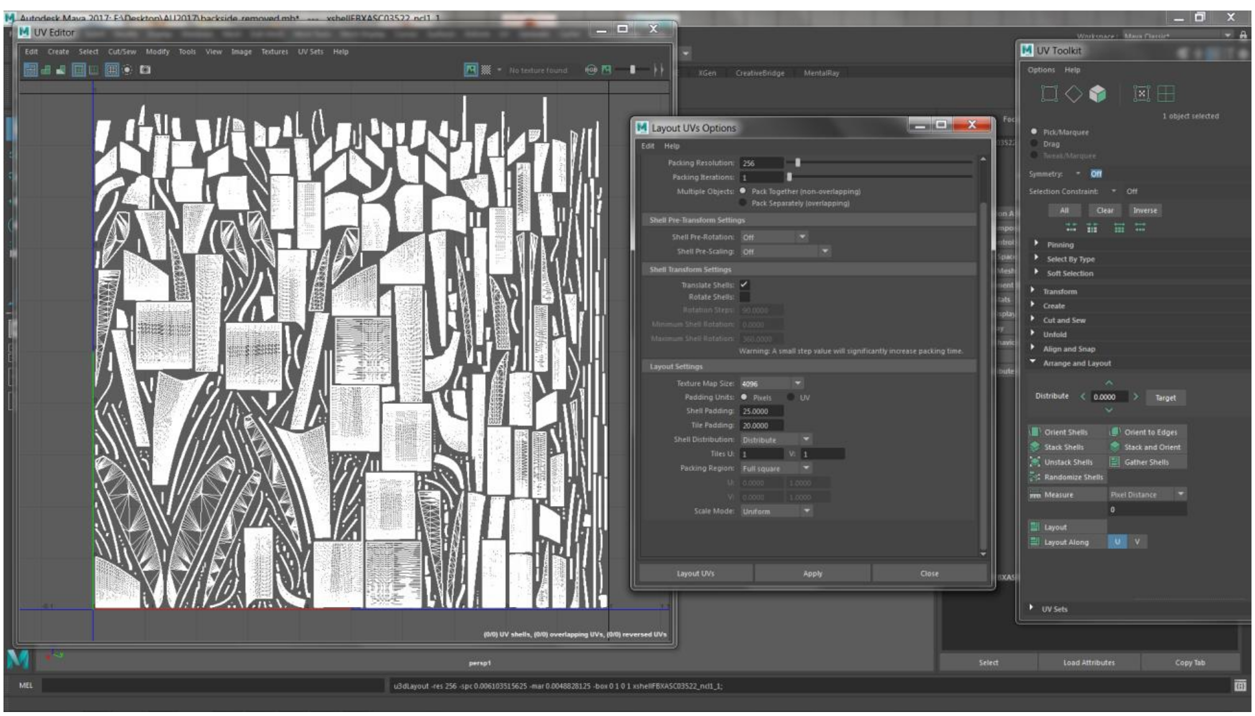
Often when importing tessellated surface data there can be errors and inefficiencies in the mesh. Those issues can cause errors when trying to modify the automatic UV layout. The errors can be cleaned up using the Mesh -> cleanup utility. Select the mesh and then the cleanup options. Be sure to check Lamina faces and NON-manifold geometry…



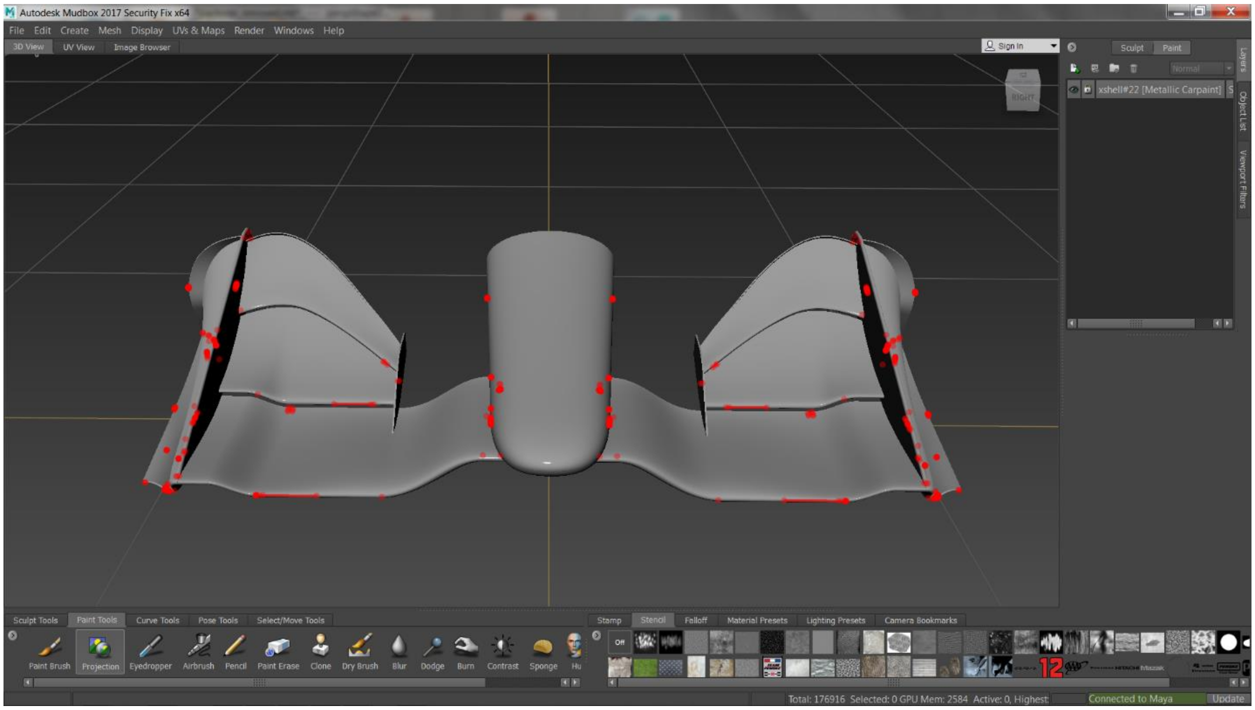
For best results when painting UVs, each flattened component needs to have an open space between one another. This is referred to as padding, padding can be set in the UV editor-> modify layout options.



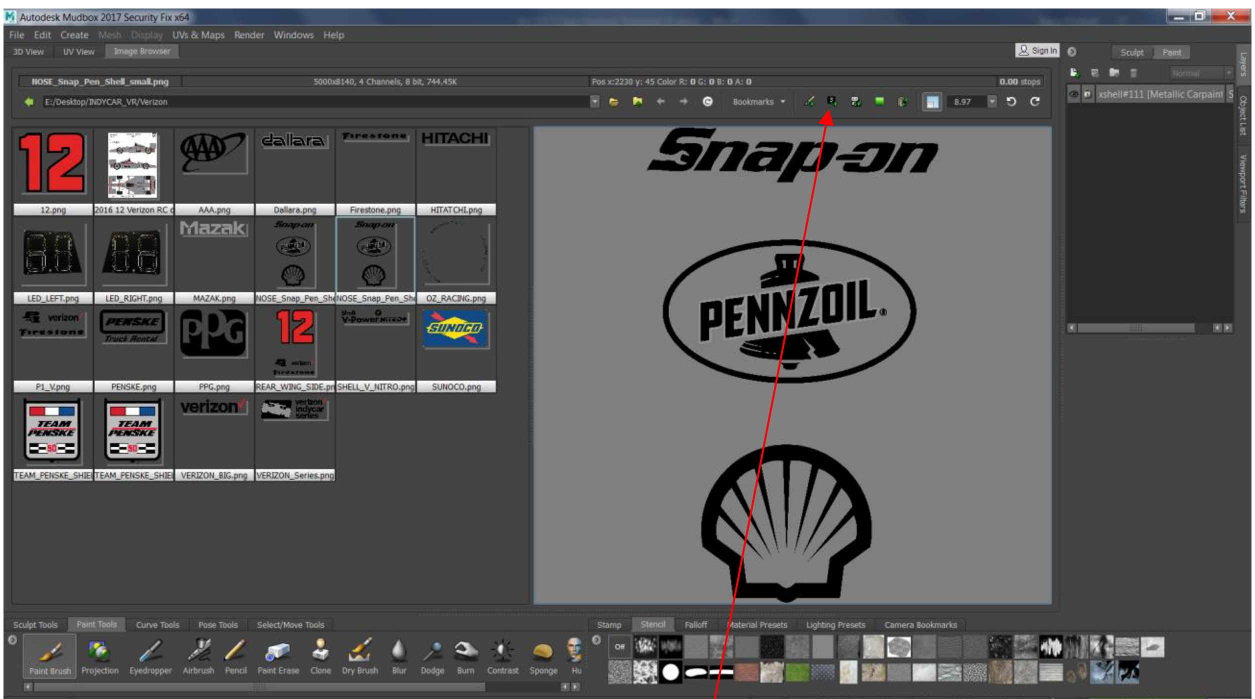
After setting the layout padding distance, click layout UVs and look at the results.



Once the UV mapping has been completed, use the file->send to mudbox to add decals.



Select the image browser to select a decal (stencil)



Select the set stencil icon to use the displayed stencil

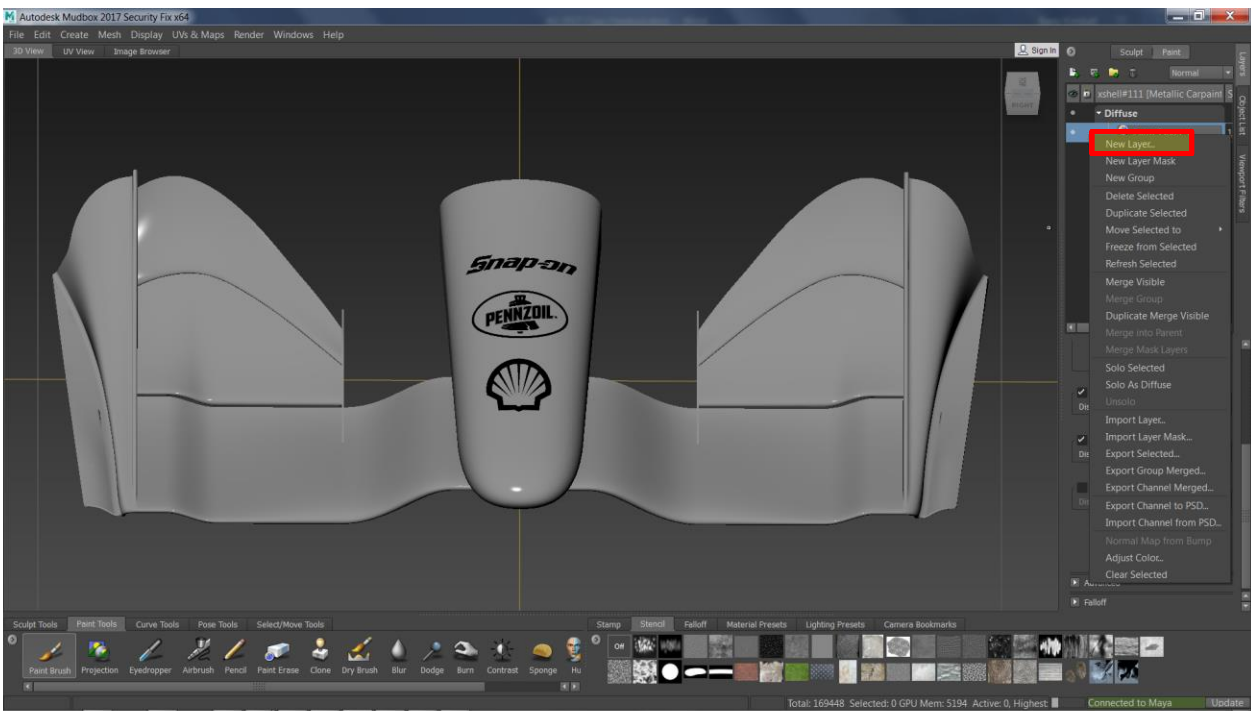
It typically works best to use orthographic viewing to paint the stencil…switch to ortho mode using the view cube.

Translate scale and rotate the texture to an appropriate position and move the model to its correct location.

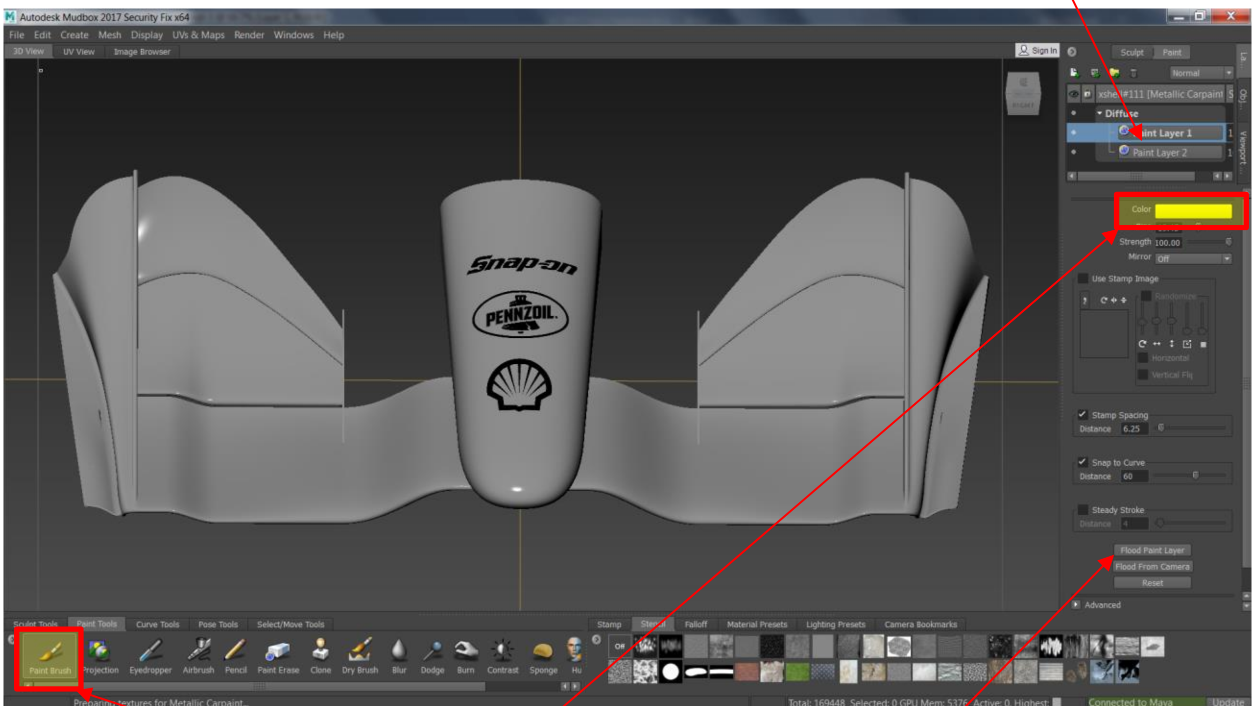
You can now rotate the model to see the 3d texture.

Once the texturing is completed, color can be assigned if the model is going to Stingray.

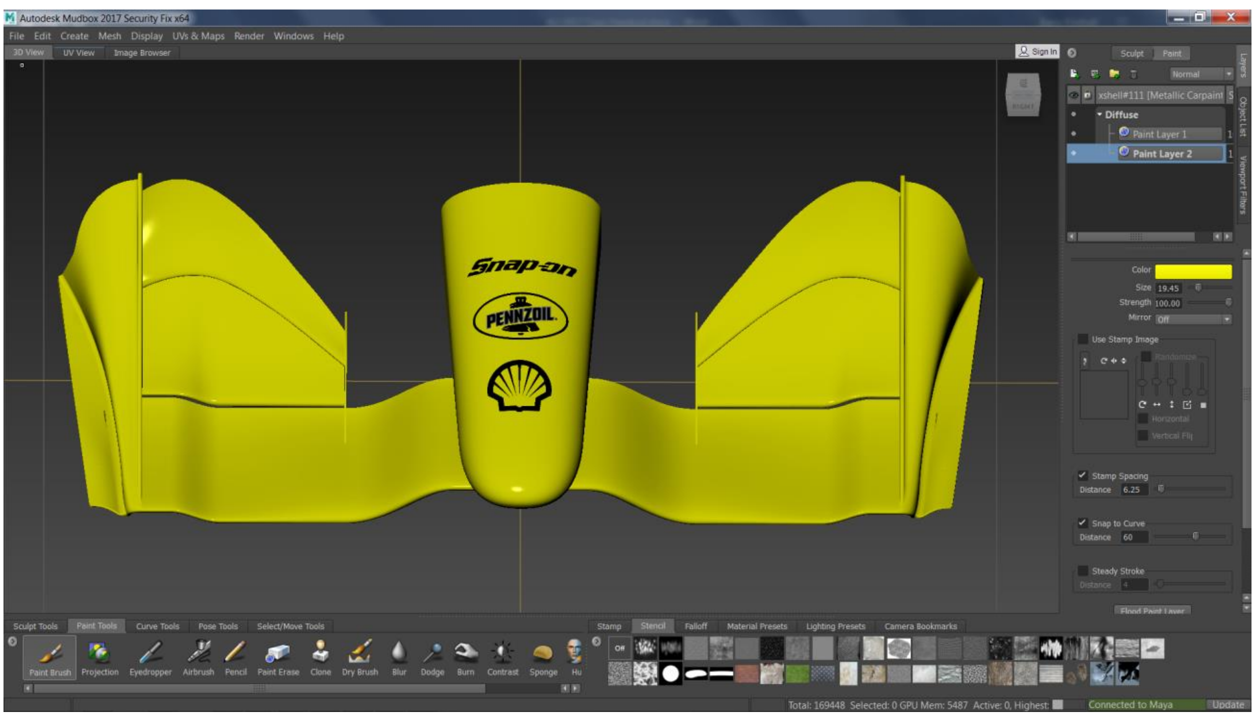
Assign a color to the model using another layer and the paint->flood tool.



Rearrange the layers (drag&drop) to put the stencil layer above the paint layer…

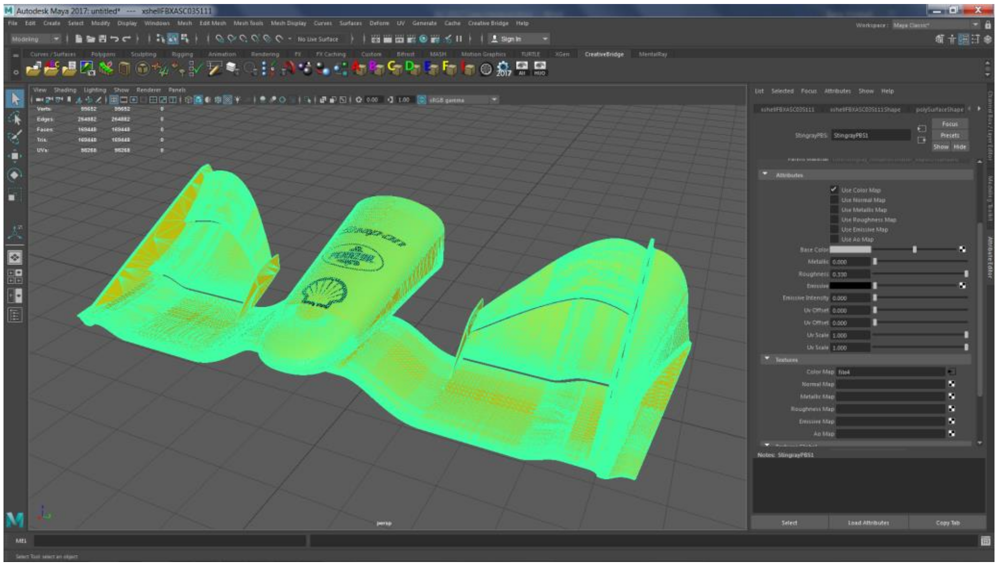


Select the paint brush tool, set the color, and select flood paint layer…



Using the RMB on the layers, export the layers for use in MAYA or VRED.

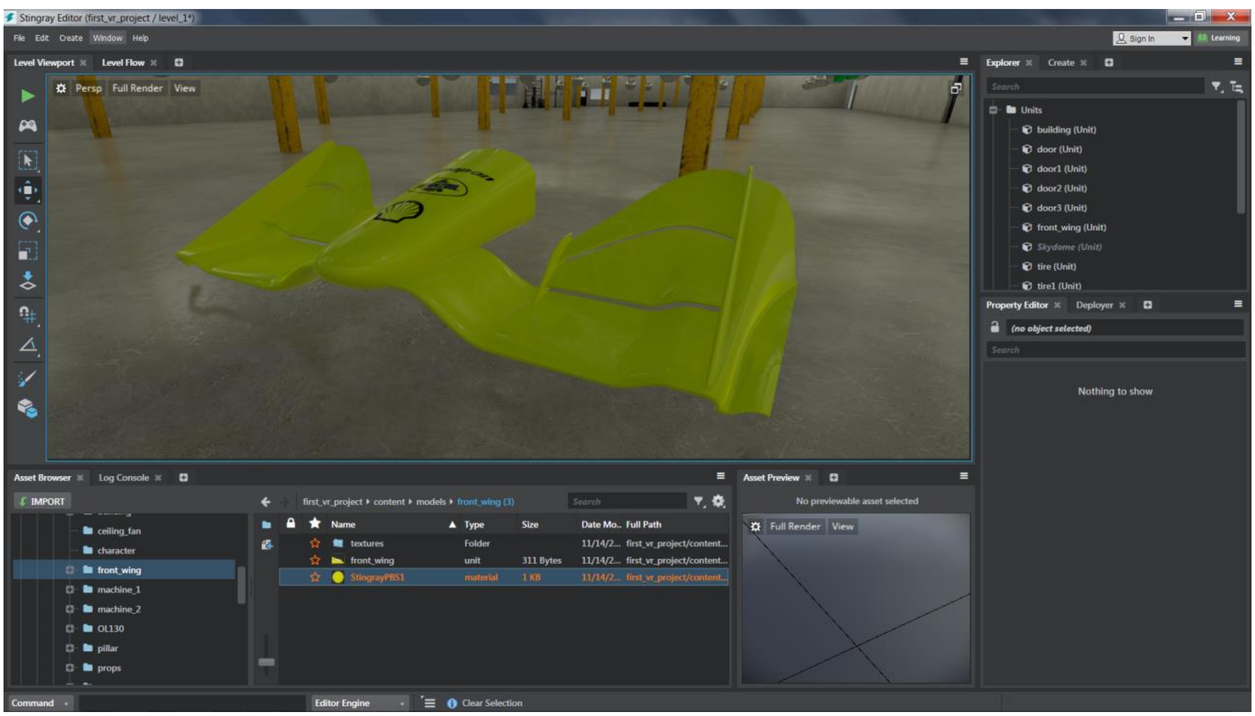
Add a Stingray PBS (Physically Based Shader) in MAYA by RMB pressing on the object.



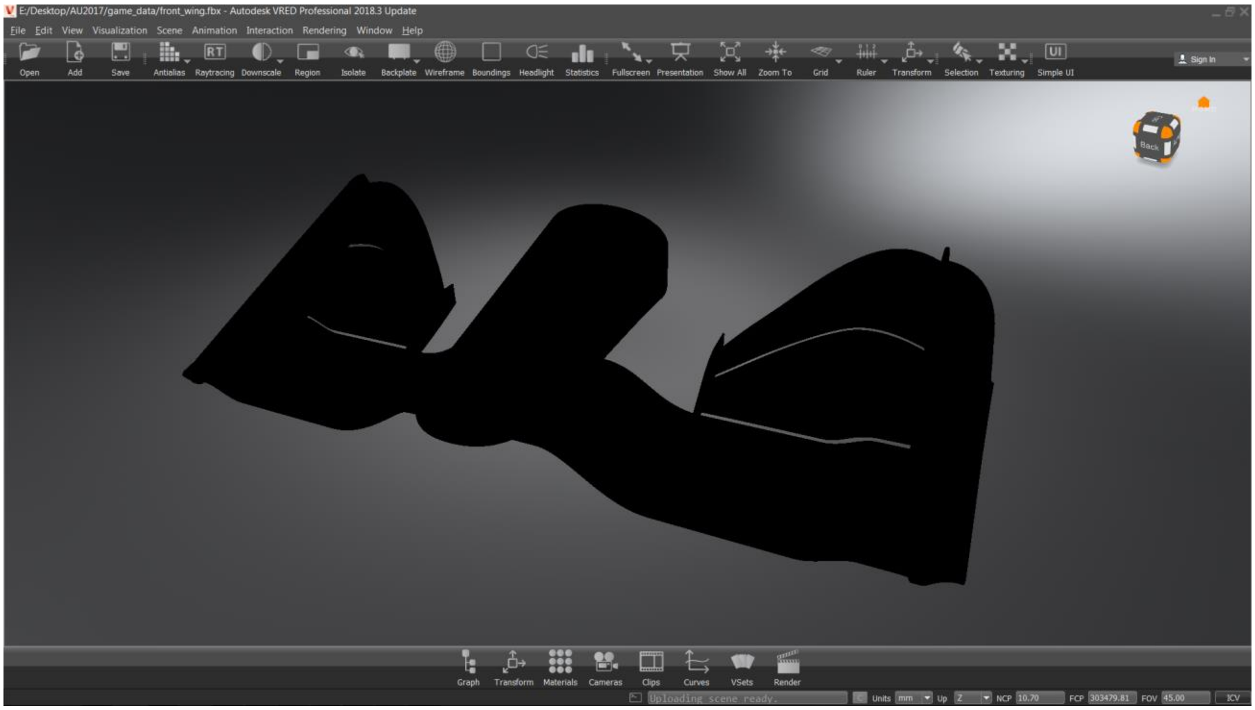
Check the use color map box.

Map the colored texture via the color map field.

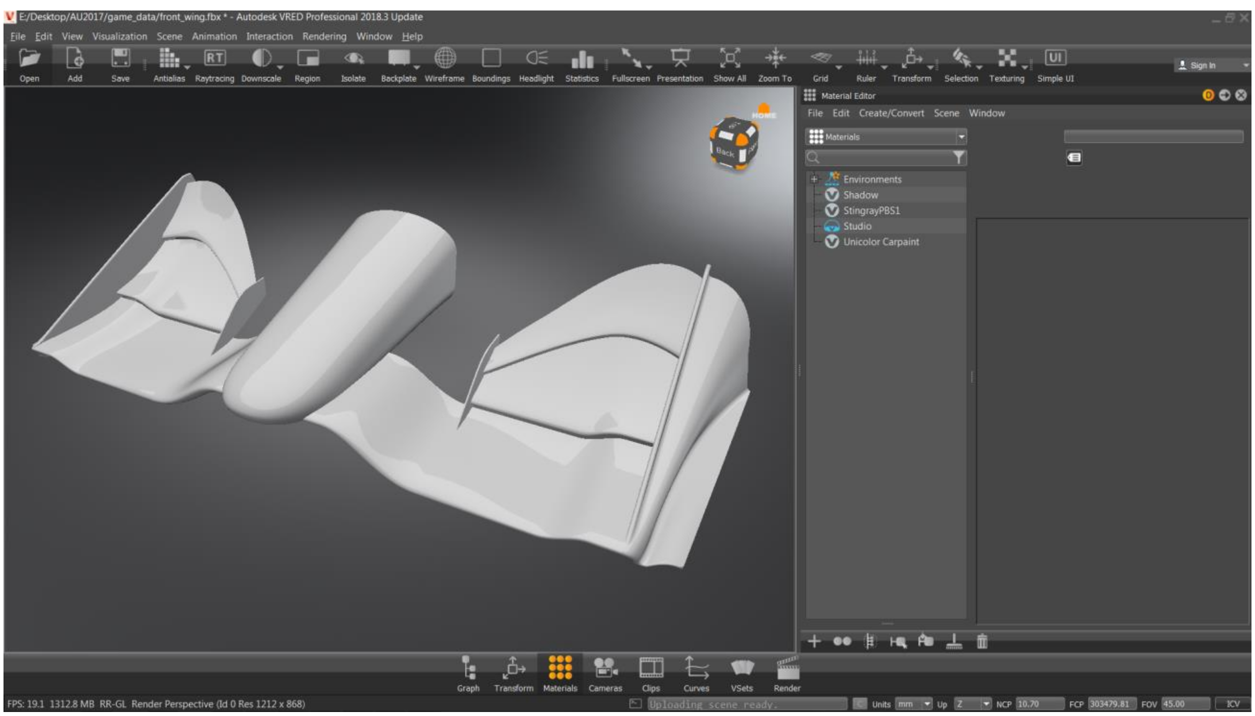
Finally press the #6 key to display textures in the Viewport window. The data is now ready for use in Stingray. Export to Stingray using the Game Exporter tool under File.



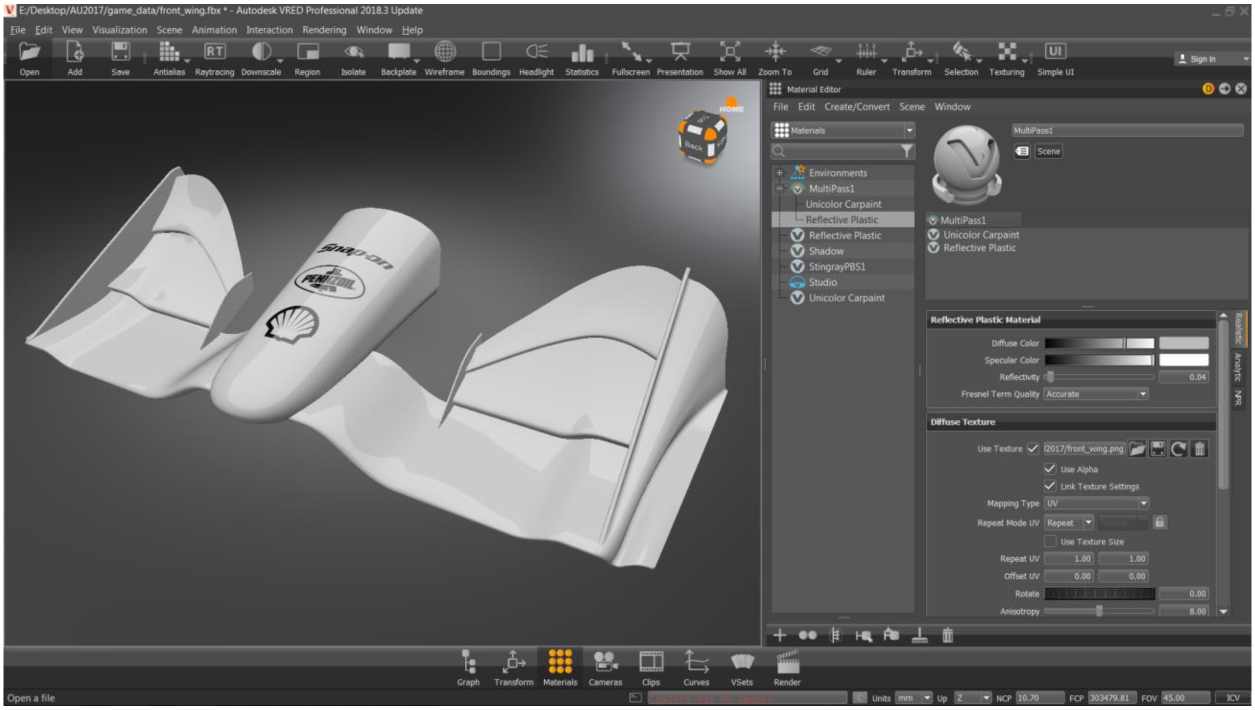
For use in VRED export the MAYA model in FBX format, then add to a VRED scene.



Add VRED Truelight Material to the model.



Create a reflective plastic material and add it as a multipass material.



For use in VR the VRED scene can be added to a predefined Autodesk provided VR template. The VR templates can be found @ knowledge.autodesk.com