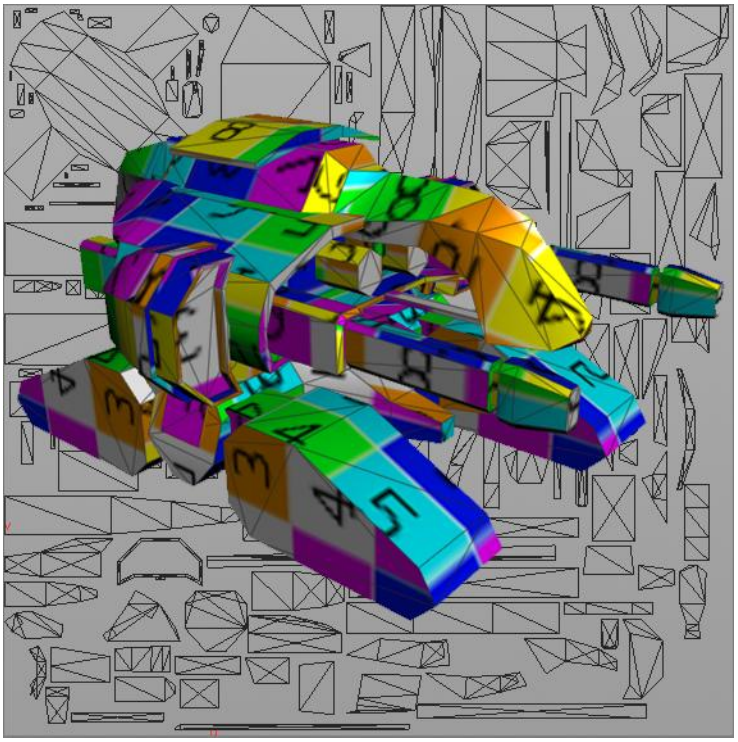
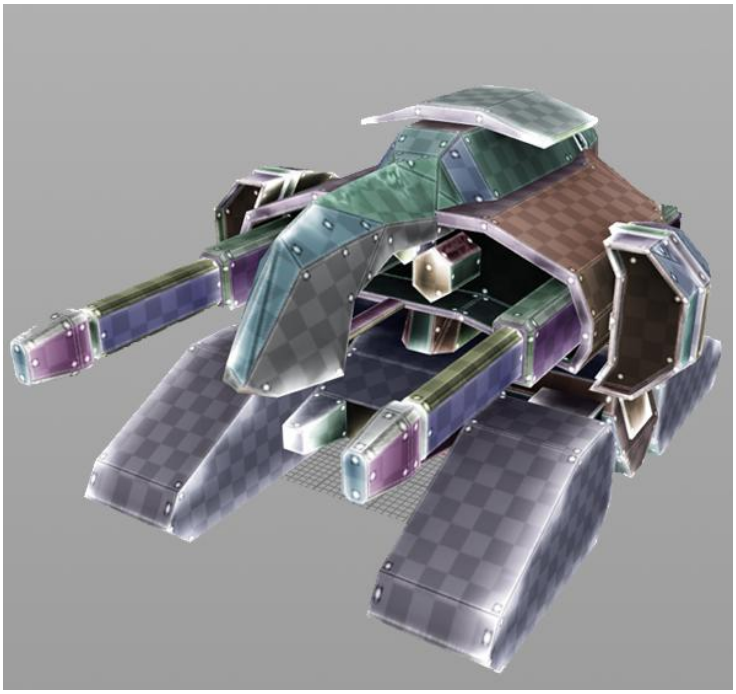
# TDG UVGEN

MANUAL





*By Twan de Graaf*

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# INTRODUCTION

This tool allows procedural UV mapping and texturing of Houdini nodes and model files.

The UV map generation is optimized for angular, low-poly, symmetrical objects. Such as simple vehicles, for the use in RTS games, even though it can still work for non symmetrical objects. The generator is probably less suitable for characters and other more organic shapes, it does however feature limited UV relaxing.

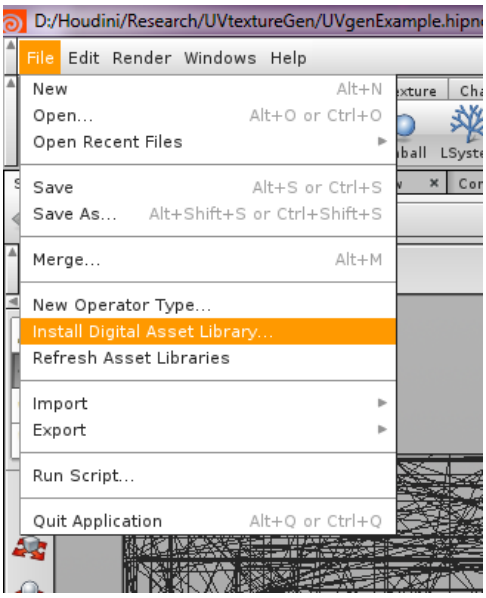
The texture side of the tool is optimized to use the procedural UVs that can be generated by the tool itself, but it is also able to use custom made/edited UV maps. The texture side of the procedure requires a bit of RAM, to have detailed Normal/Bump maps and Ambient occlusion/highlight maps a minimum of 4GB RAM is required, although 8GB or more is recommended.

Note that using the tool with a non-commercial license will limit the texture resolution and will feature a watermark on the textures. This can be solved in three ways: by texture editing, alternatively the UV mapping has a feature to avoid using the area in which the watermark is placed. This shown in the demonstration video. Finally the apprentice-HD license can be an alternative for buying a full-on commercial license.

# SETTING UP

Before starting, the tool needs to be installed placed.

## INSTALLING FROM OTL




< Step 1: Go to file: Install Digital Asset Library

**Figure 1: Installing From OTL step 1**

> Step 2: Find the .otl file. The Digital Assets to be installed should now display "Sop/TdG_UVgen". Then press accept.

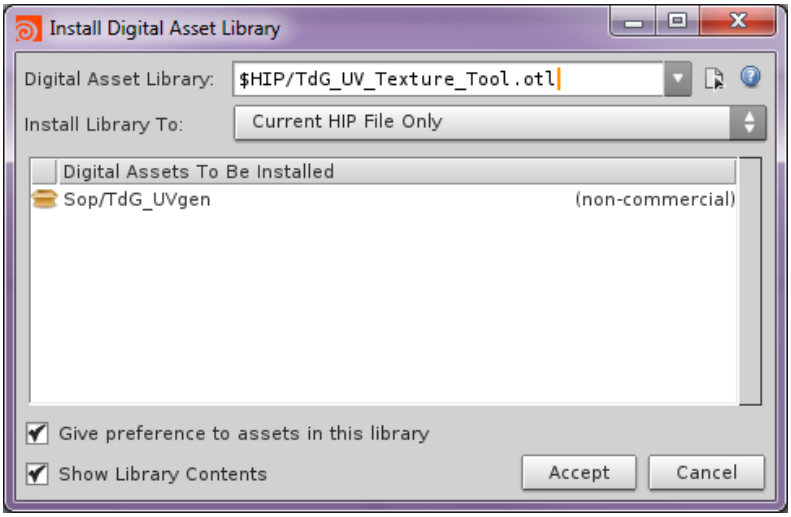
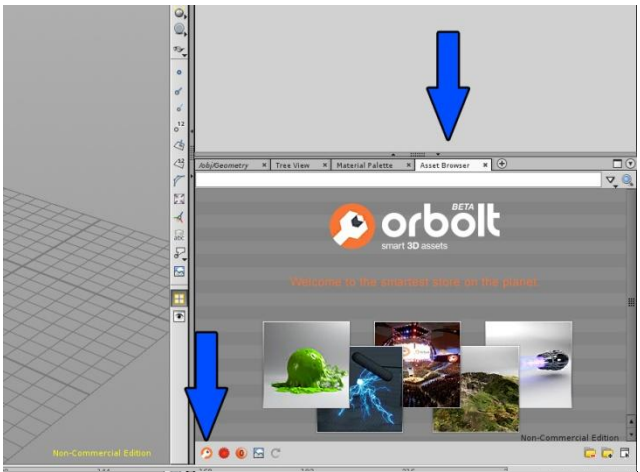



**Figure 2: Installing From OTL step 2**

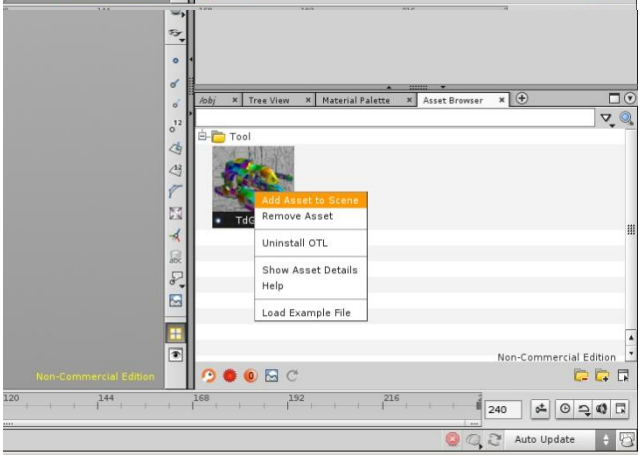
## INSTALLING FROM ORBOLT




< Step 1: Go to the asset browser and click on the "Visit asses store" button in the Orbolt window, a webpage should now open. Follow the instructions on this webpage. Alternatively you can find the page online without using the asset browser initially.

After a new Houdini session starts, the asset should be loaded and ready to go.

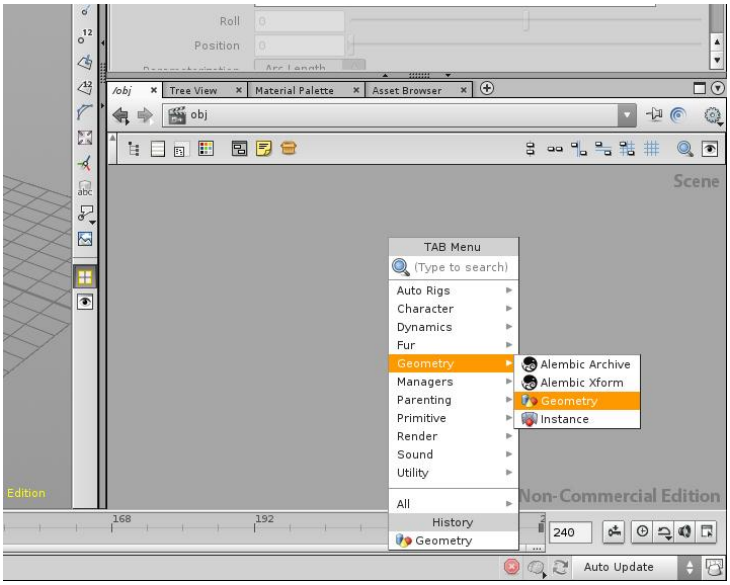
**Figure 3: Installing From Asset Browser step 1**




< Step 2: Alternatively, once downloaded the tool can be added to an existing scene. From the asset browser

**Figure 4: Installing From Asset Browser step 2**

## PLACING THE TOOL




<Step 1: create a Geometry or Primitive node in the /obj context and Enter the node. Remove what is inside.

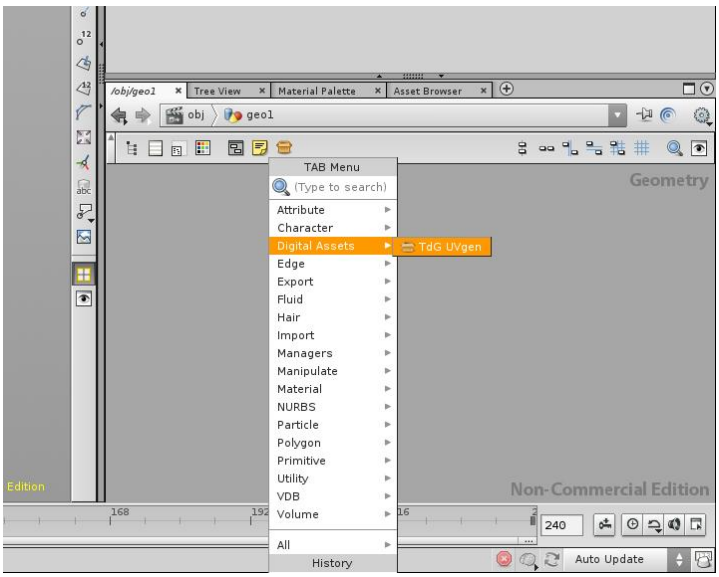
It is important that the node in which the tool is placed, is renderable. For this reason, the node should not be placed into a null node.

Alternatively it is possible to add the tool to an existing SOP network, in that case, this step can of course be skipped.

**Figure 5: Creating a Geometry node.**

>Step 2: Create a TdG_UVgen node.

**Figure 6: Creating a TdG_UVgen node.**



## MODEL LOADING FOR UVMAPPING

After creating the node the image below should be visible. Now it is possible to load in a different model or connect geometry to the left input.

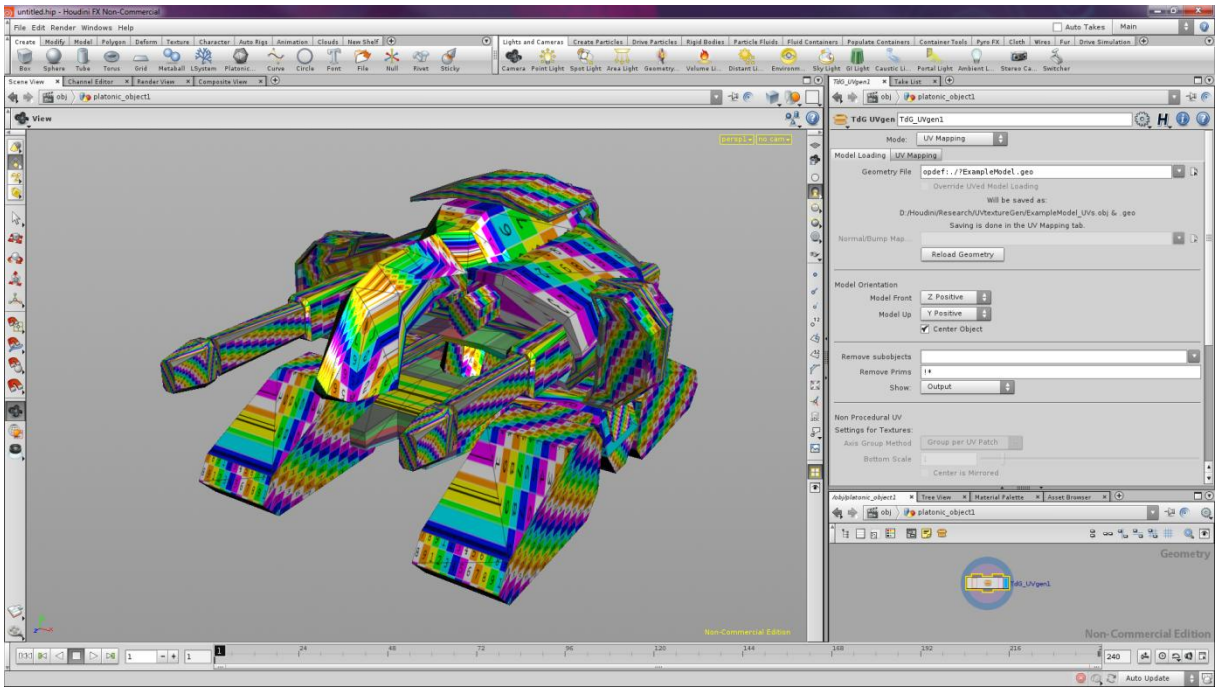
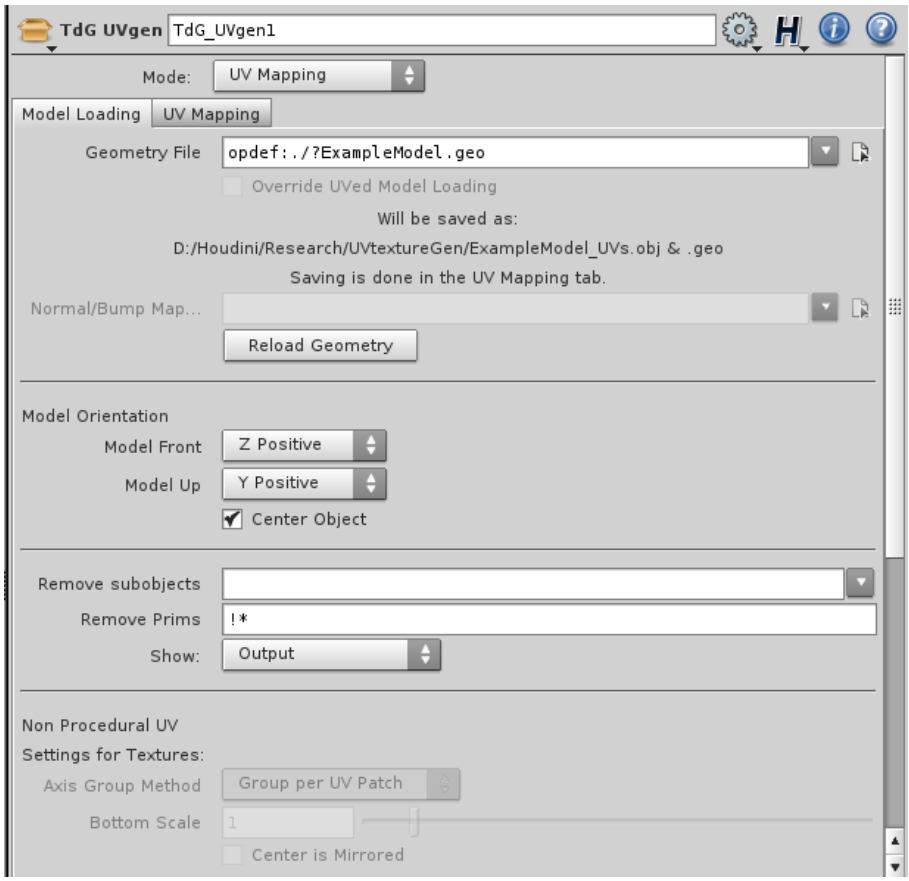


Figure 7: The default view of the node.




The model that is currently loaded, is embedded into the asset. It does not have proper UVs yet, for testing purposes. Note that in the interface a couple of options have been disabled, these are used for the texturing part of the procedure.

Figure 8: Model loading Interface for UV mapping.

## MODE:

Determines if the node is used as a UV mapping or Texturing Node.

## GEOMETRY FILE:

The file used as input when no node is connected to this node. If a node is connected this string is still used as the base for the output file names. Even if a node is connected, the texture generator will try to use the UV mapped object if it exists, Unless overridden. For texturing the file loaded will be {filename}_UVs.geo. For example when the model loaded for UV mapping is Example.obj, the model loaded for texturing is Example_UVs.geo .

## RELOAD GEOMETRY:

Reloads both the loaded model and the UV mapped version if available.

## MODEL FRONT:

Determines the Front facing axis of the model. This important for correctly overlapping UVs, when using mirroring. Additionally when using non-procedural UVs, this allows for better overlap prevention for Normal, Bump, Ambient Occlusion and Highlight maps.

## MODEL UP:

Determines the Up facing axis of the model. This important for correctly overlapping UVs, when using mirroring. Additionally when using non-procedural UVs, this allows for better overlap prevention for Normal, Bump, Ambient Occlusion and Highlight maps. Finally this also determines which side is the bottom to apply the proper "Bottom Scale".

## CENTER OBJECT:

Moves the center of the object to the center of the world for UV projections. The centering of an object also helps with normalizing its size for texture previewing.  When an object's plane of symmetry is not through the center of the object, this feature should not be used and should be centered manually.

## REMOVE SUBOBJECTS:

This can be used to remove groups that should not be included in the UV map, when using an .obj file as input each sub object is grouped as such.

## REMOVE PRIMS:

Removes a certain range of primitives, just like a delete node pattern.

## SHOW:

Output: Shows the object as it is UV mapped, groups and primitives that are not to be UV'ed are visible. This option should be selected when continuing to the UV mapping of the object.

Removed objects: Shows all the objects that are not taken into account when UV mapping.

## OTHER SETTINGS:

See: Model Loading for Texturing.

# UV MAPPING

The main goal of the tool is to create UV maps for relatively low polygon objects, mostly automatic. To open the UV window in Houdini, in windows, press control+4, then hover over one of the 2 scene view panes and press 5, press 1 to return to perspective view and control+1 to return to a single pane.

## GENERAL PARAMETERS

There are a couple of  parameters that guide the rest of the process.

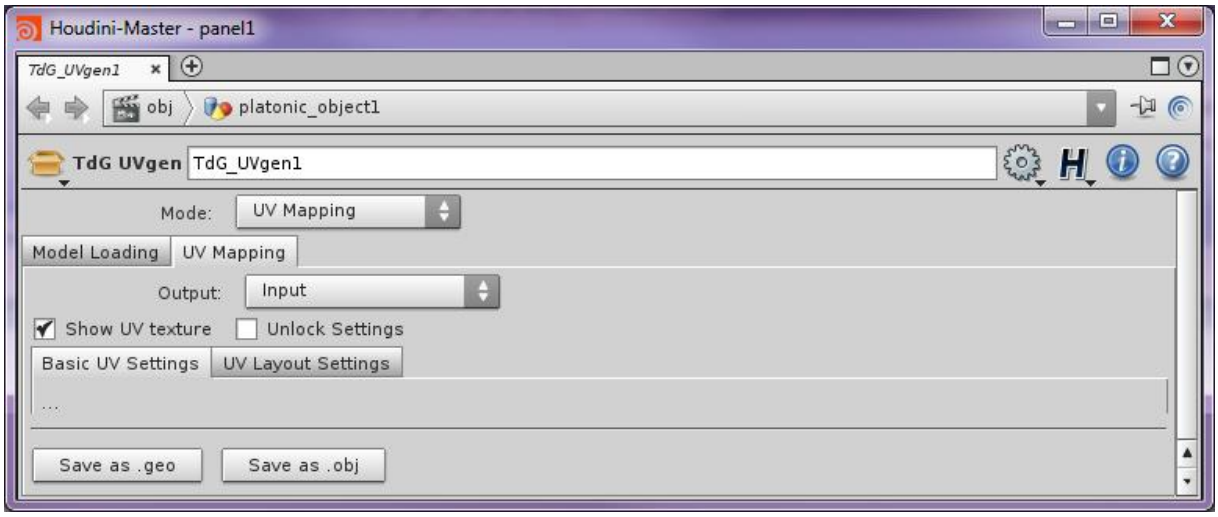



**Figure 9: General Parameters of the UV mapping interface.**

### OUTPUT:

Determines the intermediate steps of the UV mapping process. Each step unlocks the associated settings. The steps are:

Input, Smooth Groups, Projected UVs, Relaxed UVs, Welded UVs, Basic UV-Layout and Improved UV-Layout.

To continue through the UV process, the output has to be switched each time a step is completed. This way less re-cooking is needed.

### SHOW UV TEXTURE:

Shows the Houdini checkerboard texture on the model.

### UNLOCK SETTINGS:

This unlocks all settings that are normally locked per UV mapping step for clarity.

### SAVE AS .GEO (AT THE BOTTOM):

file will have "_UVs" as an after fix. For instance $HIP/example.obj will be saved as $HIP/example_UVs.geo . The file name and path are shown in the Model loading tab. Saving can be done at each UV mapping step.

### SAVE AS .OBJ (AT THE BOTTOM):

file will have "_UVs" as an after fix. For instance $HIP/example.obj will be saved as $HIP/example_UVs.obj . The file name and path are shown in the Model loading tab. Saving can be done at each UV mapping step.

## BASIC UV SETTINGS

These settings handle the generation of the UVs, the placement is done by the UV Layout Settings.

### SMOOTH GROUPS

Smooth groups determine the vertex normals for the model, when they do not exist yet, or to override the existing ones.

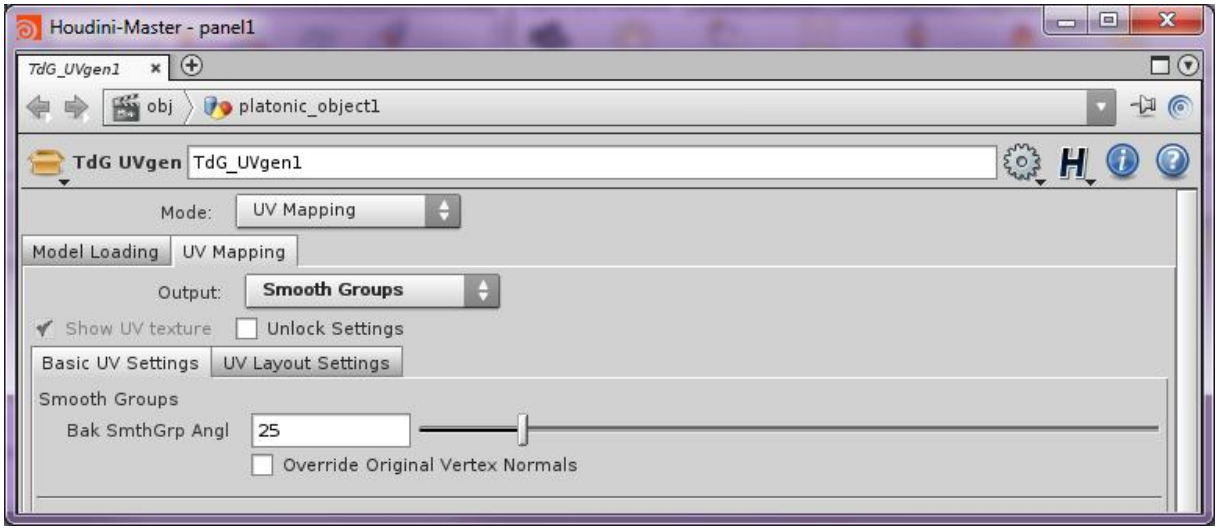



Figure 10: Parameters for Smooth Groups.

#### BAK SMTHGRP ANGL:

Backup Smooth group Angle works like a cusp normal operation. This value is only used if the loaded object does not have vertex normals. Smooth groups are used with the " UVs per smoothing group" UV projection method, see Projected UVs.

#### OVERRIDE ORIGINAL VERTEX NORMALS:

Enabling this will disregard existing vertex normals and use the Backup Smooth Group angle calculation instead.

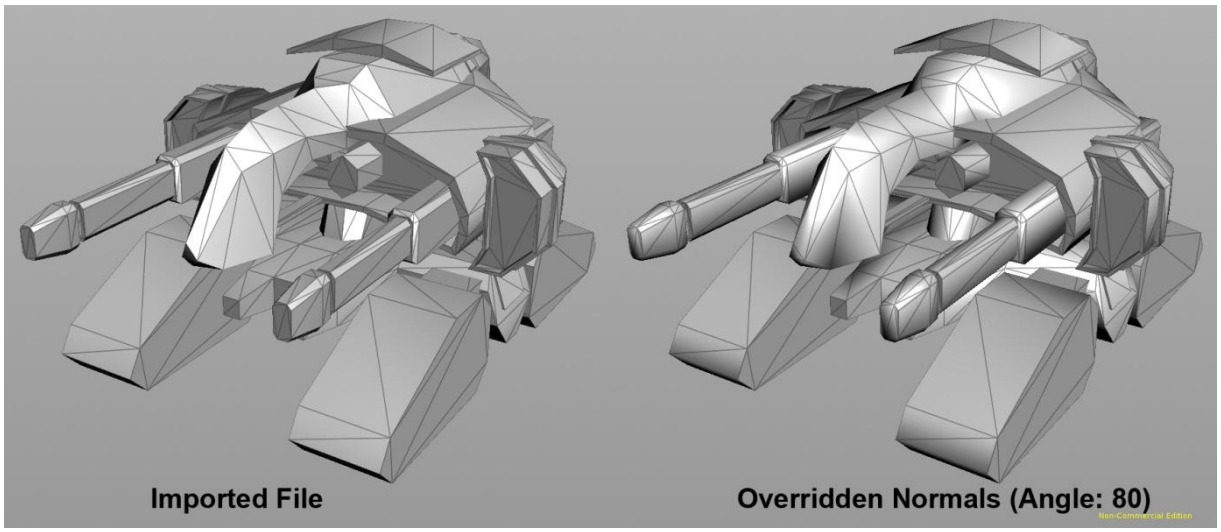



Figure 11: Overridden Vertex normals.

## PROJECTED UVS

UV projection deals with the initial creation of the UVs as well as symmetry mirroring. The tool also tries to indentify cylinders and unwrap them as such.

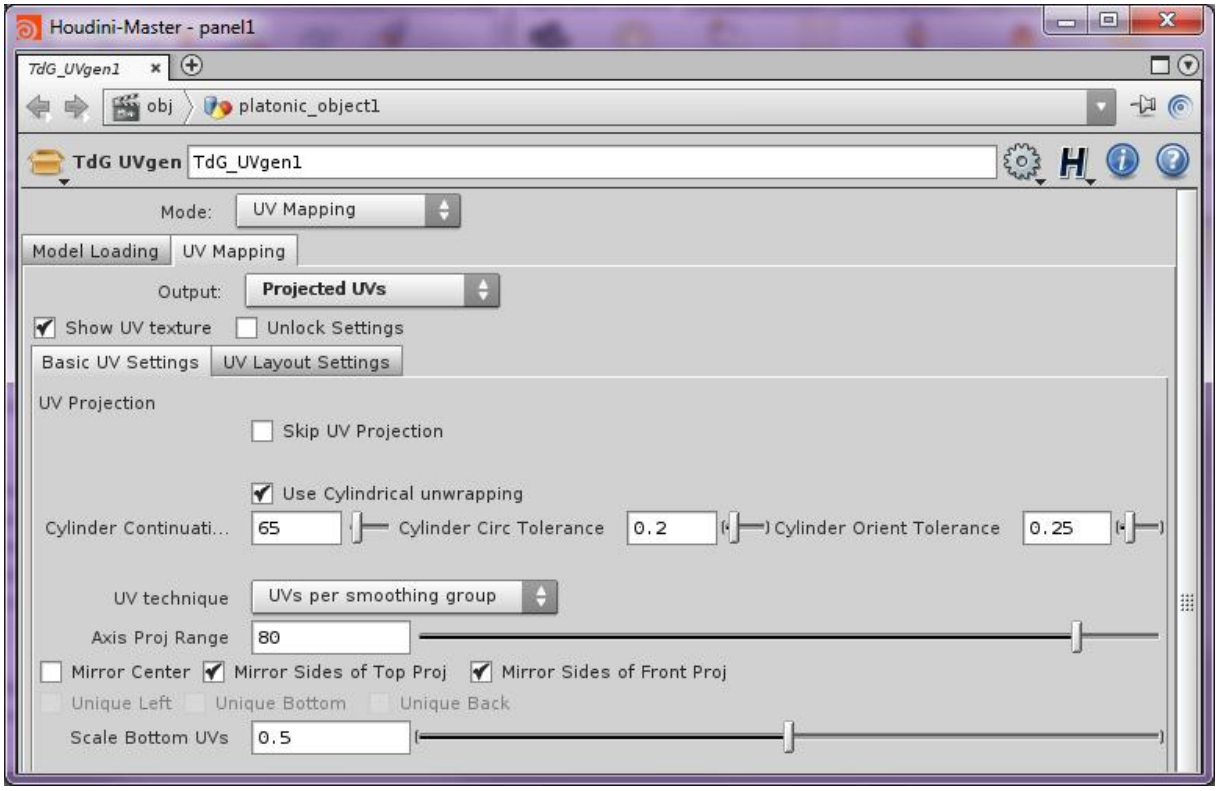



**Figure 12: Parameters for the UV projection interface.**

### SKIP UV PROJECTION:

This setting can be used if the object already has vertex UVs and only the Layout features are required.

### USE CYLINDRICAL UNWRAPPING:

Enabling this will try to identify cylindrical shapes and unwrap them cylindrically instead of orthogonally.

### CYLINDER CONTINUATION ANGLE:

The maximum angle at which connected shapes can be considered cylinders. Note that closed shapes like spheres and, when this value is high enough, toruses, do not count towards cylindrical shapes and will thus be handled by the standard UV mapping method below. This setting should only be changed if shapes are recognized as cylinders, which are not, or the other way around.

### CYLINDER CIRC TOLERANCE:

Tolerance for cylinders' circularity. 0 Will only accept perfectly circular shapes as Cylinders, 1 will accept all shapes as cylinders as long as they meet the other requirements. This setting should only be changed if shapes are recognized as cylinders, which are not, or the other way around.

### CYLINDER ORIENT TOLERANCE:

Tolerance for cylinders' orientation. 0 Will only accept cylinders perfectly oriented with one of the 6 axes, 1 will accept all shapes as cylinders as long as they meet the other requirements. This setting should only be changed if shapes are recognized as cylinders, which are not, or the other way around.

## UV TECHNIQUE:

This only applies to the geometry that is not handled by the cylindrical unwrapping, when used.

"UVs per axis" projects UVs over 6 axes, with settings for uniqueness and mirroring below.

"UVs per smoothing group" will try to use vertex normals, when present. Otherwise it uses the Backup Smooth Group Angle to calculate smooth groups. smooth groups should be able to fit within one projection axis. Smooth groups should only contain shapes that fit within the Axis Projection Range, for this reason. <,>,^ and v shapes are possible as long as they are not too extreme. Closed objects and object that go over this range are handled by a backup pelt system, which may give varying results.

## AXIS PROJ RANGE:

The Axis Projection Range is the maximum angle between UV projections and the 6 axes. All axes should overlap for a large part. At the end, per primitive the least distorted UV primitive is chosen.

## MIRROR CENTER:

This mirrors the UVs down the middle and adds an edge loop to do so if needed.

## MIRROR SIDES OF TOP PROJ:

Tries to mirror, all parts that are not connected through the center, left to right on the top projection.

## MIRROR SIDES OF FRONT PROJ:

Tries to mirror, all parts that are not connected through the center, left to right on the front projection.

## UNIQUE LEFT:

Requires "UVs per axis" Technique, makes sure there are unique UVs for the left side of the object. To accomplish this, "UV Overlap Identical Shapes" under UV Overlapping, may need to be turned off.

## UNIQUE BOTTOM:

Requires "UVs per axis" Technique, makes sure there are unique UVs for the bottom side of the object. To accomplish this, "UV Overlap Identical Shapes" under UV Overlapping, may need to be turned off.

## UNIQUE BACK:

Requires "UVs per axis" Technique, makes sure there are unique UVs for the back side of the object. To accomplish this, "UV Overlap Identical Shapes" under UV Overlapping, may need to be turned off.

## SCALE BOTTOM UVS:

Requires Unique Bottom setting or UVs per smoothing group technique, This modifies the scale of the UVs of the parts that face downwards, to save UV space for the rest. If the bottom should share the same UVs with the top projection, this scale needs to be 1 in "UVs per smoothing group" mode.

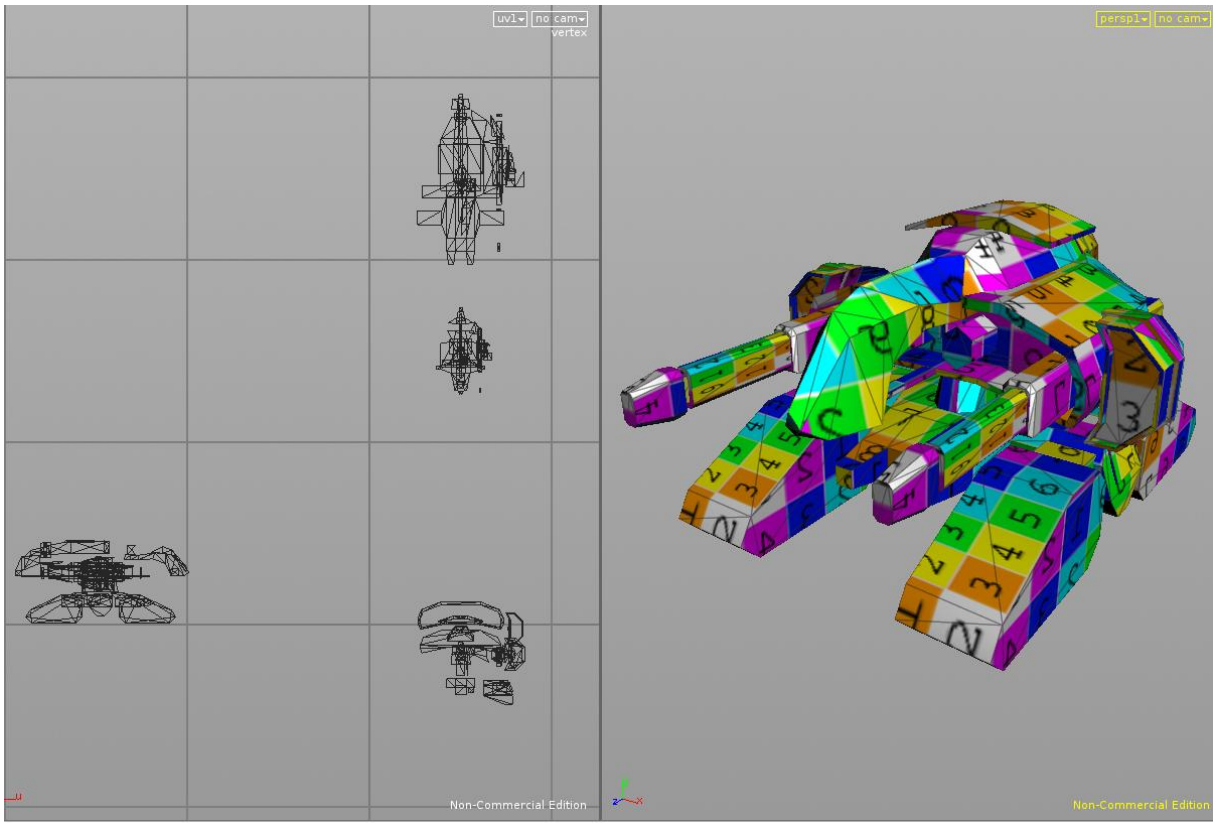



Figure 13: Projected UV.

## RELAXED UVS

This relaxes the UV map, slightly reducing distortion. UV relaxing is not applied on cylinders, to allow for easier texturing.

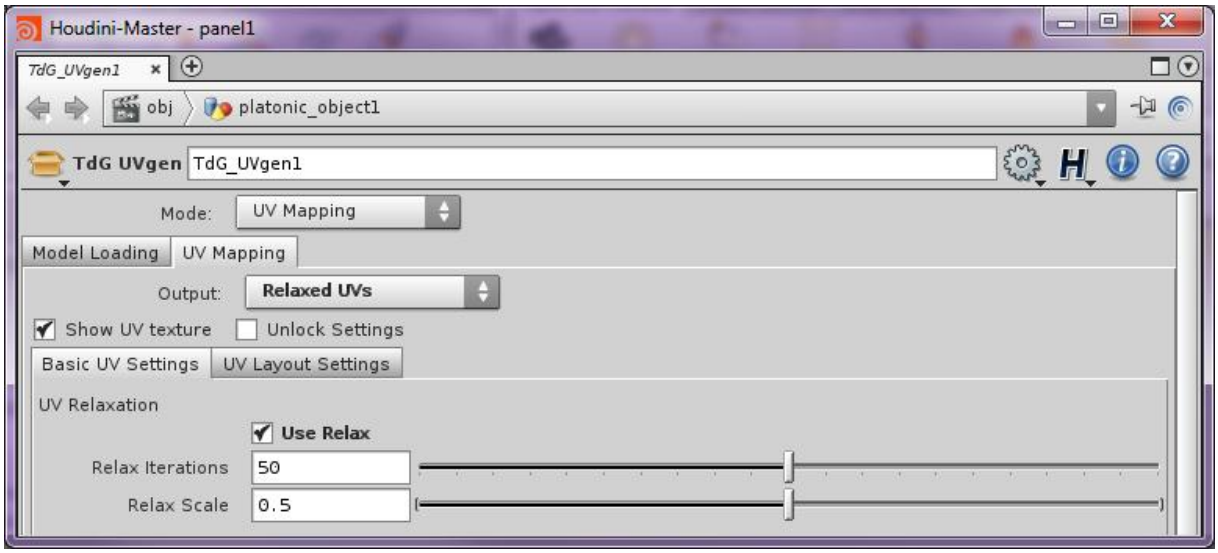



Figure 14: Parameters for the UV relax interface.

### USE RELAX:

Allows relaxation of UV patches. Note that patches handled by the cylindrical unwrapping are not relaxed.

### RELAX ITERATIONS:

The amount of iterations of relaxation per UV patch. Iterations are expensive in terms of time spent UV mapping.

## RELAX SCALE:

The amount UV patches are corrected each iteration. Higher values require less iterations, but may be less accurate.

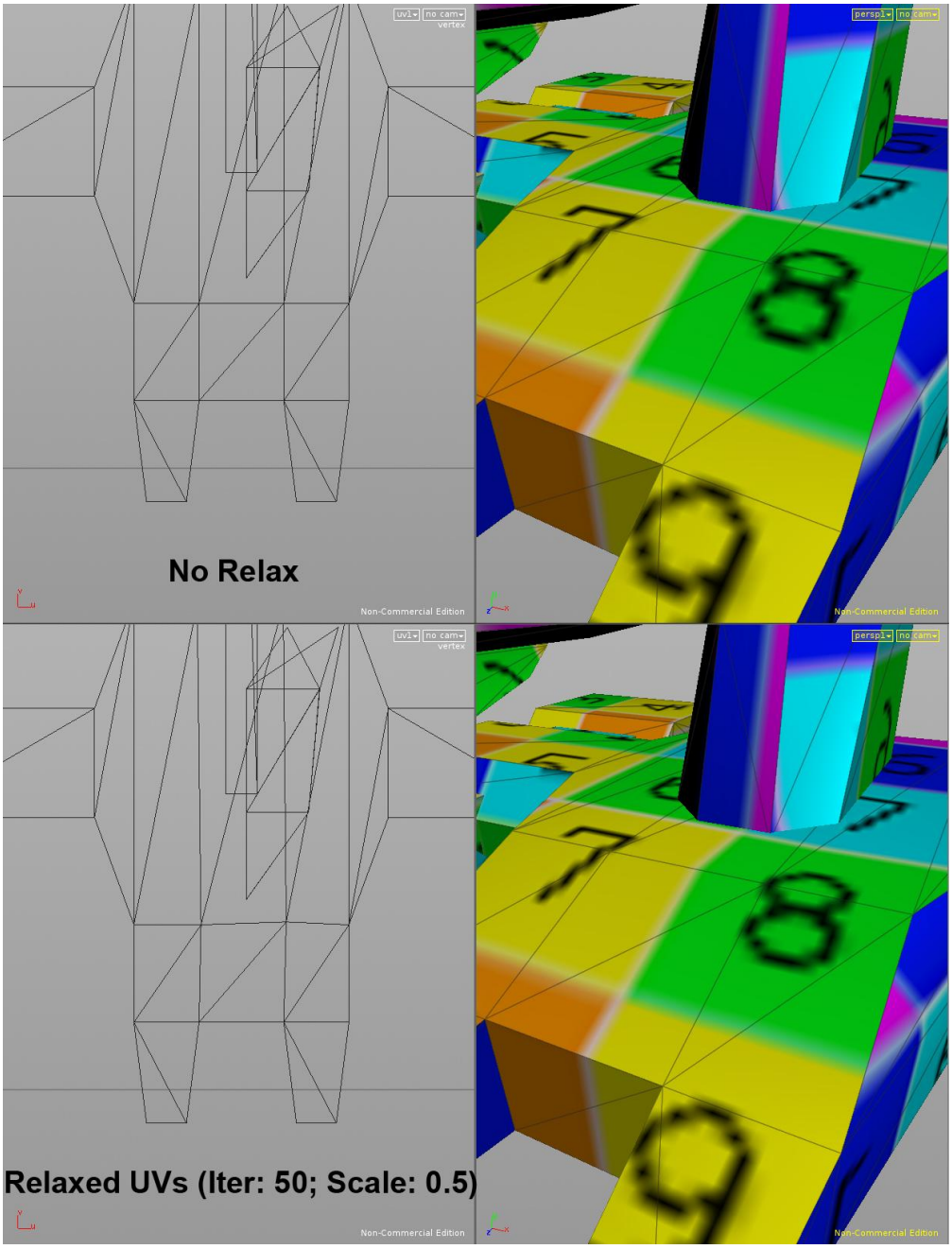



Figure 15: Relaxed UVs.

## WELDED UVS

This step tries to first find identical shapes and overlap them in UV space. After that it welds small UV patches to larger UV patches to reduce the total amount of them. This creates more efficient UVs and improves layout speed as well.

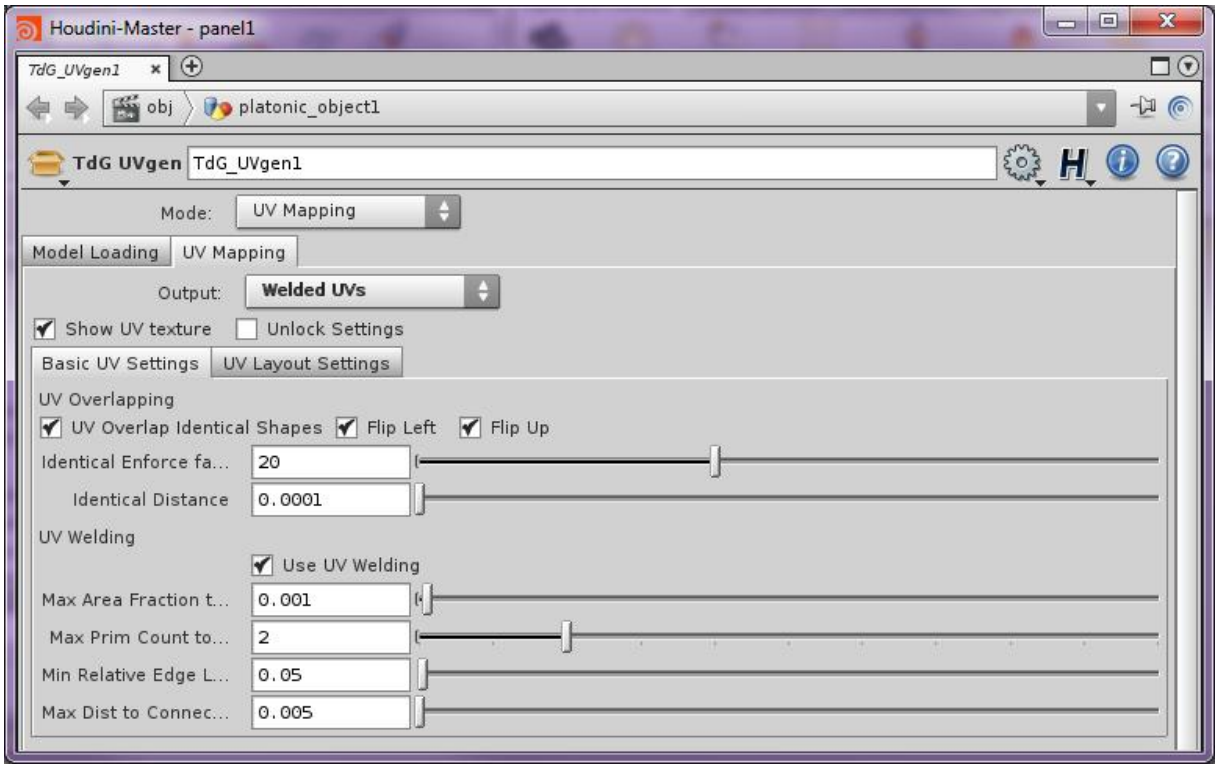



**Figure 16: Parameters for the UV Welding and Overlapping interface.**

### UV OVERLAP IDENTICAL SHAPES:

Tries to merge the UVs of shapes of the same size and point count. This may override Unique UV settings in some cases.

### FLIP LEFT:

Allows flipping from left to right to create identical UV patches that are then overlapped.

### FLIP UP:

Allows flipping from up to down to create identical UV patches that are then overlapped.

### IDENTICAL ENFORCE FACTOR:

This uses the sizes of each individual UV patch, The size difference times this value is used to determine if certain shapes are identical. This is used to differentiate UV patches with the same point count, but different sizes. Larger numbers will generate less overlaps. Smaller numbers may result in different shapes overlapping, especially with high-point-density parts.

### IDENTICAL DISTANCE:

The distance at which identical shapes are merged together. Only one point needs to be in the same position for this to occur.

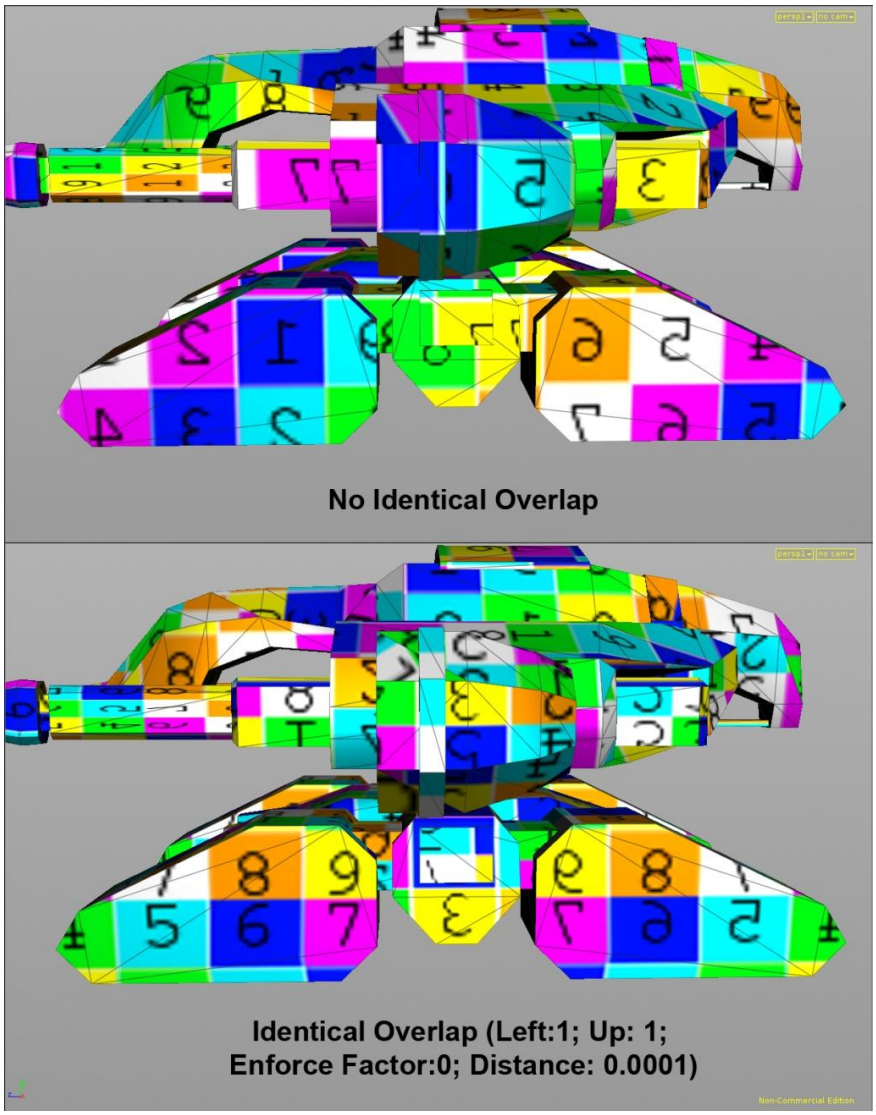



Figure 17: Overlapped UVs.

## USE UV WELDING:

This allows attaching small isolated UV patches to connect to larger pieces. This also reduces the total amount of separate UV patches which may make texturing easier and can speed up the UV-layout process.

## MAX AREA FRACTION TO WELD:

The maximum ratio of UV size to total UV size that is taken into account for UV welding. The larger this number, the more primitives are tried to be welded, however, the chance of overlapping will also increase.

## MAX PRIM COUNT TO WELD:

The maximum amount of primitives that may be separated to be welded to larger parts.

## MIN RELATIVE EDGE LENGTH:

The minimum relative edge length that is allowed to weld. Lowering this value can prevent UVs connecting with short sides of other UVs, which could create very tall or wide UVs.

## MAX DIST TO CONNECT SHARED UV EDGES:

This can connect the sides of already welded UVs, to prevent them both from overlapping and having gaps between them.

## UV LAYOUT SETTINGS

These settings handle placement of the UVs.

### BASIC UV-LAYOUT

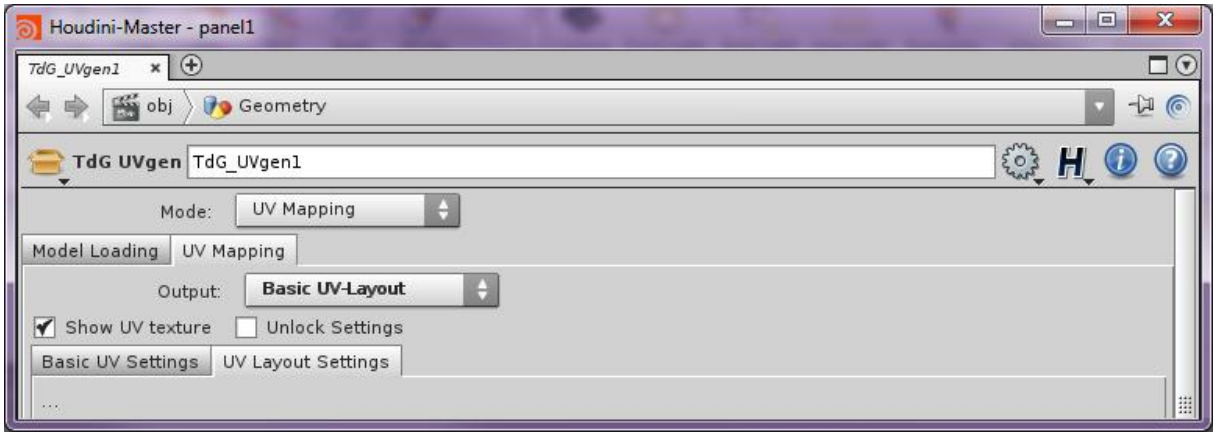



Figure 18: No parameters for the Basic UV-Layout interface.

This step moves all UV patches into the 0-1 UV space. It works with a relatively fast algorithm, but this algorithm also may leave a lot of gaps in the UV map, this can be solved by improving the UV Layout in the next step. This step has no further parameters.

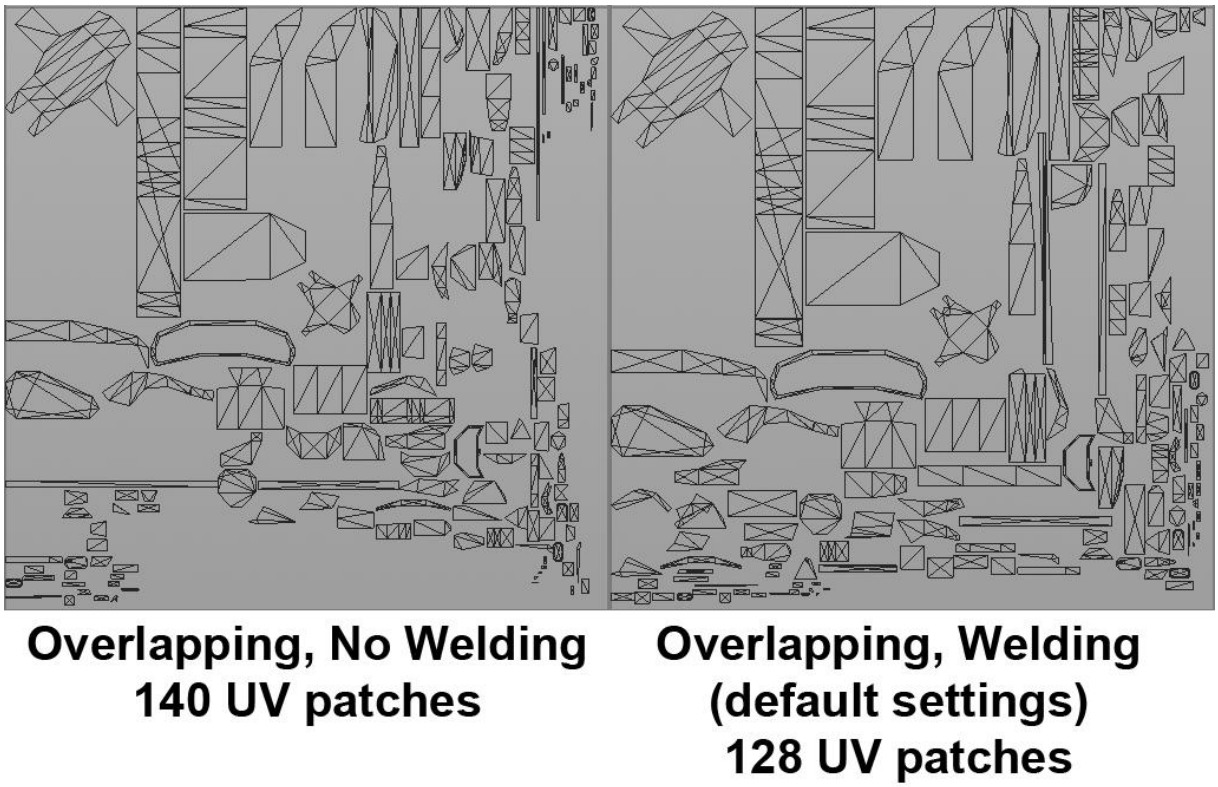



Figure 19: Effects of welding on the basic UV-Layout.

## IMPROVED UV-LAYOUT

The improved UV-Layout takes the basic Layout and tries to move patches from the bottom right, to the top left. It will also try to use in-between spaces whenever possible. The Improved UV layout also features manual tweaking to move the last couple of UV patches.

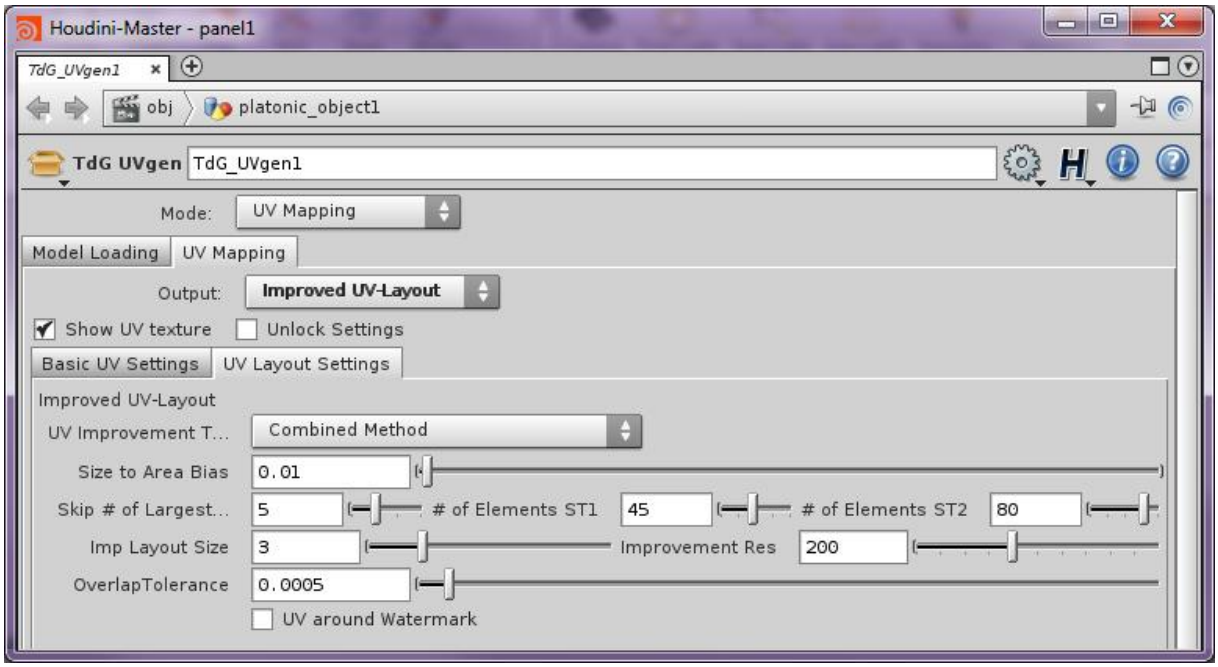



**Figure 20: Parameters for the Improved UV-Layout interface.**

### UV IMPROVEMENT TECHNIQUE:

The way in which the basic layout is improved. "Start with most Distant UV patches" will start with the patches most to the bottom right. "Start with larger UV patches" will start with the larger patches and then do a complete repositioning, this can take a long time but is the most accurate method. The "Combined Method" is a compromise between the two, first moving a number of larger objects and then a number of the furthest UV patches.

### SIZE TO AREA BIAS:

This value sets the preference of long UV patches over ones with large areas. This is taken in account when determining the order in which Improve the UVs.

### SKIP # OF LARGEST ELEMENTS:

Skips a number of the largest UV patches as they are unlikely to be able to compress any further.

### # OF ELEMENTS ST1:

This is the number of further objects that need to be improved. It is possible to  simply count the amount of UV patches in the basic UV layout in the bottom right and make a guess how many parts could be improved. When using the combined method, this number allows you to move larger objects first so the chance is greater that there is still room to fit them.

## # OF ELEMENTS ST2:

When using the "Combined Method" this is the number of further objects that need to be improved. You can simply count the amount of UV patches in the basic UV layout in the bottom right and make a guess how many parts could be improved. Note that there may already be some of the larger objects that have moved.

## IMP LAYOUT SIZE:

Make sure all the pieces from projected UVs fit within this size, Generally the more surface area an object has, the larger this number should be. The size of the object itself does not influence the surface area. It is relative to the normalized size.

## IMPROVEMENT RES:

The amount of sample points for the improvement over the Improved Layout Size. This number needs to be higher when the UV patches get smaller or thinner.

## OVERLAP TOLERANCE:

This value determines the accuracy at which the UV patches check if they fit in a certain new location. Lower values are more accurate. More accuracy is generally needed when shapes have very large or small height to width ratios. More accuracy can lead to less dense UV maps however.

## UV AROUND WATERMARK

This setting moves away the UVs from the area that would feature the Houdini watermark in the non-commercial version. Turn this on when on a non-commercial license if you want to use the built in texture generation.

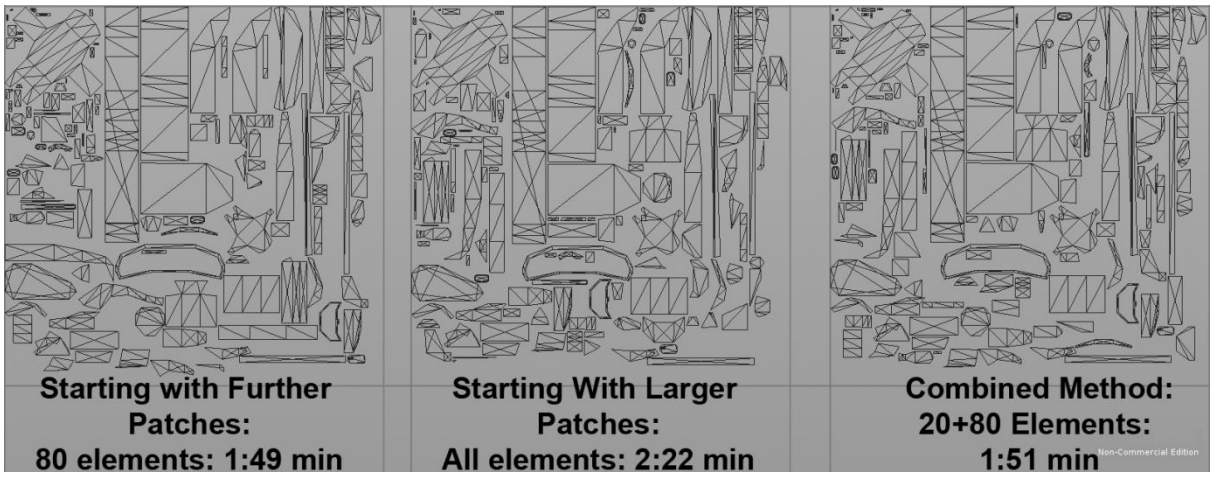



Figure 21: Different Modes of UV-Layout improvements

## USE MANUAL UV TWEAKING:

Enables the manually editing of the 10 UV patches that are the most towards the right and bottom.

## RESET EDITS:

will reset all the "Patch UV/Rotate" values back to 0.

## PATCH UV/ROTATE:

For each UV patch there are options to move them horizontally, vertically and rotate them.

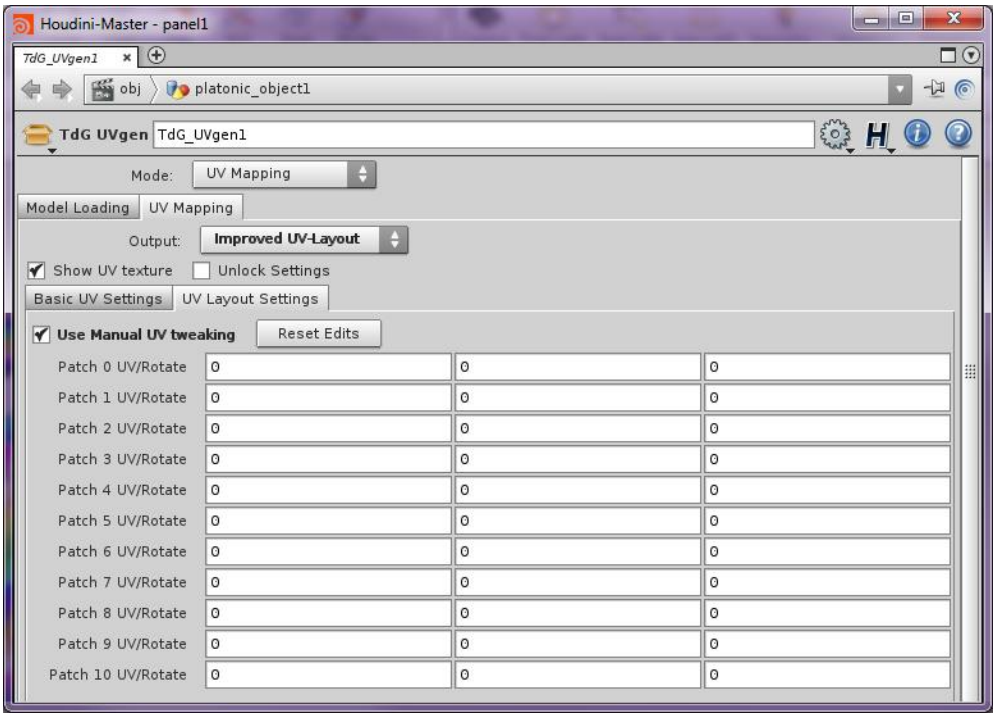



Figure 22: Parameters for manually tweaking the UV-Layout.

Note that the UVs are always normalized, so after tweaking the UV's will automatically fit within the 0-1 range.

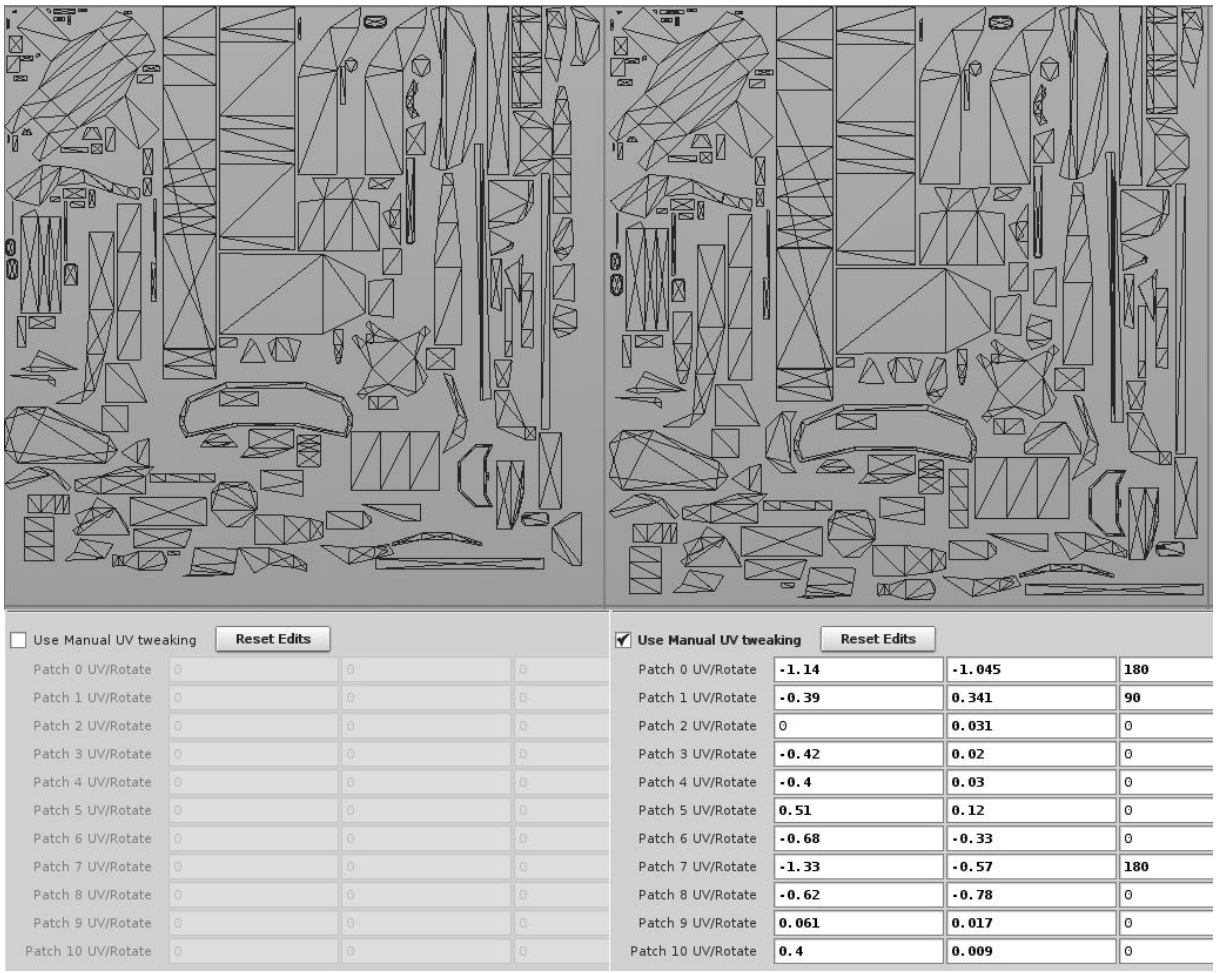



Figure 23: Manually tweaked UVs.

## MODEL LOADING FOR TEXTURING

When texturing a couple of additional options are available in the Model Loading tab.

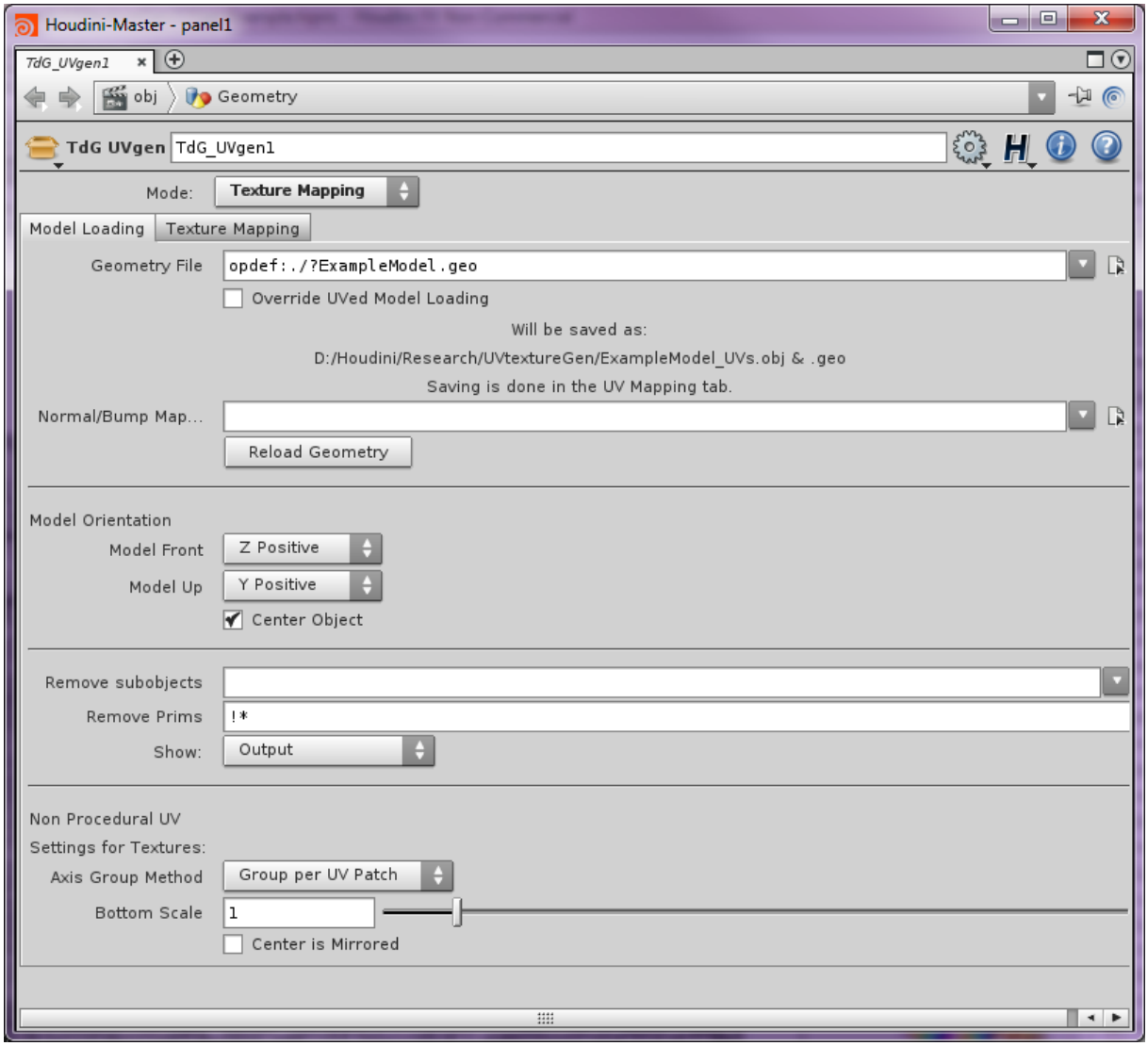



Figure 24: Model loading Interface for Texturing.

### GEOMETRY FILE:

The file used as input when no node is connected to this node. If a node is connected this string is still used as the base for the output file names. Even if a node is connected, the texture generator will try to use the UV mapped object if it exists, Unless overridden. For texturing the file loaded will be {filename}_UVs.geo. For example when the model loaded for UV mapping is Example.obj, the model loaded for texturing is Example_UVs.geo .

### OVERRIDE UVED MODEL LOADING:

Enable this to force the texture map generator to use the input of the node, rather than loading the UV mapped version from disk.

### NORMAL/BUMP MAP HI-RES FILE:

This file is used to calculate normal and bump maps. The tool measures the relative positions and normals of this file and the UV mapped model to calculate them. Alternatively it is possible to connect the model to the second input of this node, that will override this parameter.

## RELOAD GEOMETRY:

Reloads both the loaded model and the UV mapped version if available.

## MODEL FRONT:

Determines the Front facing axis of the model. This important for correctly overlapping UVs, when using mirroring. Additionally when using non-procedural UVs, this allows for better overlap prevention for Normal, Bump, Ambient Occlusion and Highlight maps.

## MODEL UP:

Determines the Up facing axis of the model. This important for correctly overlapping UVs, when using mirroring. Additionally when using non-procedural UVs, this allows for better overlap prevention for Normal, Bump, Ambient Occlusion and Highlight maps. Finally this also determines which side is the bottom to apply the proper "Bottom Scale".

## CENTER OBJECT:

Moves the center of the object to the center of the world for UV projections. The centering of an object also helps with normalizing its size for texture previewing.  When an object's plane of symmetry is not through the center of the object, this feature should not be used and should be centered manually.

## AXIS GROUP METHOD:

This setting determines in which way the model is divided per axis, mainly to find overlapping UVs. The options are: Group per UV Patch and Group per Primitive. This setting is only used, when the geometry already has UVs that were not generated by this Digital asset.

## BOTTOM SCALE:

This setting determines the relative scale of the UVs of the bottom side of the object. This setting is only used, when the geometry already has UVs that were not generated by this Digital asset.

## CENTER IS MIRRORED:

This should be turned on when the object is mirrored through the center (Over the front/up Plane). This setting is only used, when the geometry already has UVs that were not generated by this Digital asset.

# TEXTURE MAPPING

This part of the procedure allows creating procedural textures based on either previously generated UVs or a custom made UV map.

## GENERAL PARAMETERS

There are a couple of  parameters that guide the rest of the process.


Figure 25: General Parameters of the Texturing interface.

### MODE:

Determines if the node is used as a UV mapping or Texturing Node.

### WARNING:

If a loaded model does not have a saved UV mapped version, the following warning will be displayed and all other parameters will be hidden: "Make sure you either have saved the UV map generated in the UV tab, or connect a model with UVs in the left input of this node."

Note that this warning may also show if the update mode is set to manual. Switching between interface tabs may solve this problem after setting the update mode back to "auto update".

### TEXTURE TYPE:

Determines which texture is currently viewed or rendered. Types are: Reference Map, Tangent Space Normals, Object Space Normals, Bump, Ambient Occlusion, Highlights, Plating and Rivets. The options for each are in the corresponding tabs. Note that the Reference map has no special options.

### VIEW:

Allows to view the UV mapped model or texture maps with a bit more context. However this does not affect the rendering of textures, the normalized view may be useful for large objects, which may cause camera issues. Note that in certain previews, parts of the model have been removed. This is to prevent overlapping textures. The preview shows which polygons are taken into account for Normal, Bump, AO and Highlight maps. "Output" is used during the rendering process. "Preview" gives a texture preview on the model or in UV space. "Normalized Preview" gives a texture preview on the normalized model or in UV space. "Input" shows the model in its UV mapped state.

## DISABLE WARNINGS:

This disables warning messages and shows the options. This can be useful if you want to make edits in the "Manual" rather than "Auto Update" update mode.

## NORMAL AND BUMP MAPS

These settings deal with the Normal and bump maps that can be generated using this tool. Note that in the preview, overlapping UVs are removed. This way multiple UV patches should not interfere in the texture.

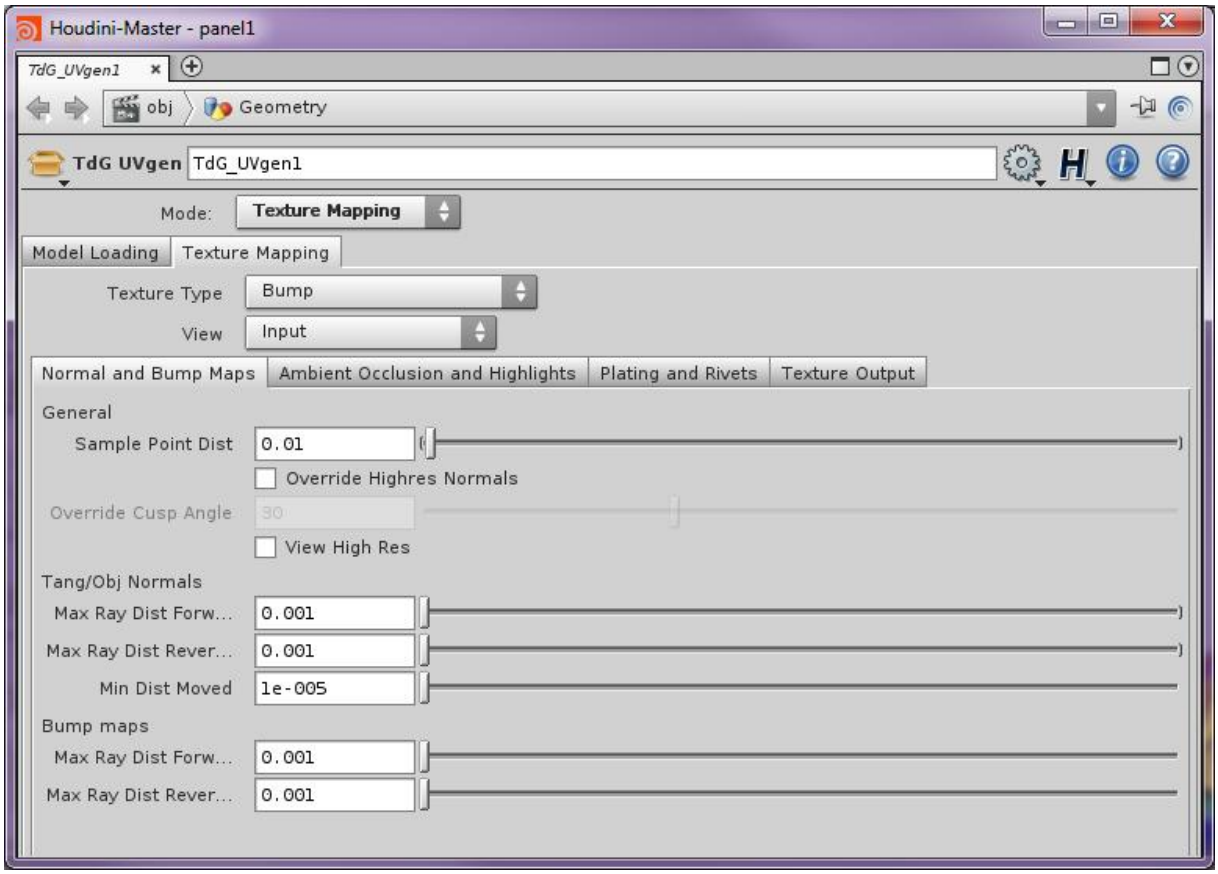



Figure 26: Parameters of the Normal and Bump maps interface.

## WARNING:

If the tool cannot find a high resolution mesh to use for the normal map and bump calculation the following warning will be displayed and the rest of the parameters will be hidden:

"Make sure you have a high resolution mesh loaded. Either by connecting a mesh to the second input or loading a file from disk under "Normal/Bump Map Hi-res File" in the Model Loading tab."

Note that this warning may also show if the update mode is set to manual. Switching between interface tabs may solve this problem after setting the update mode back to "auto update".

## SAMPLE POINT DIST:

Distance between each sample point used for calculating the Normal and Bump maps. This distance is calculated on the normalized model. This means very large objects may require a smaller sample point distance relatively. Note that very small sample point distances require a lot of system memory.

## OVERRIDE HIGH-RES NORMALS:

Enables recalculating normals of the high resolution geometry.

## OVERRIDE CUSP ANGLE:

Cusp angle for the high resolution geometry, when overridden.

## VIEW HIGH RES:

Views the high resolution mesh after possible editing the normals. View mode must be one of the preview modes to enable this view. The texture type must also be a Normal/Bump type.

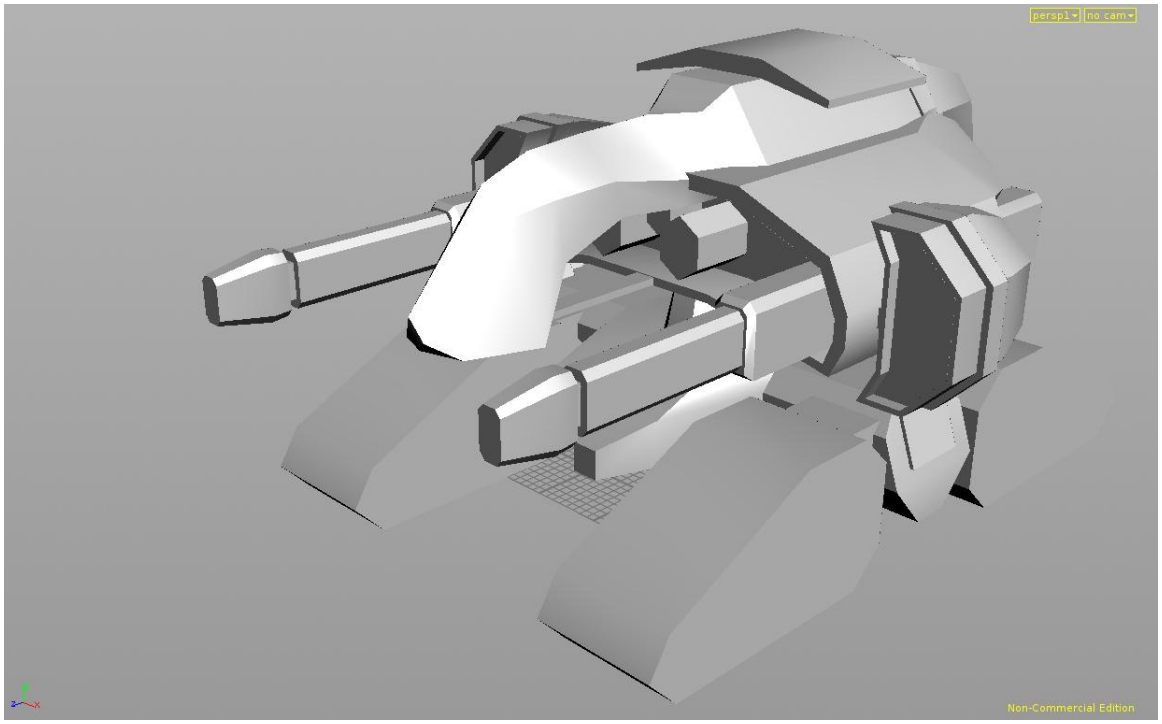



**Figure 27: The example model without UV reference texture.**

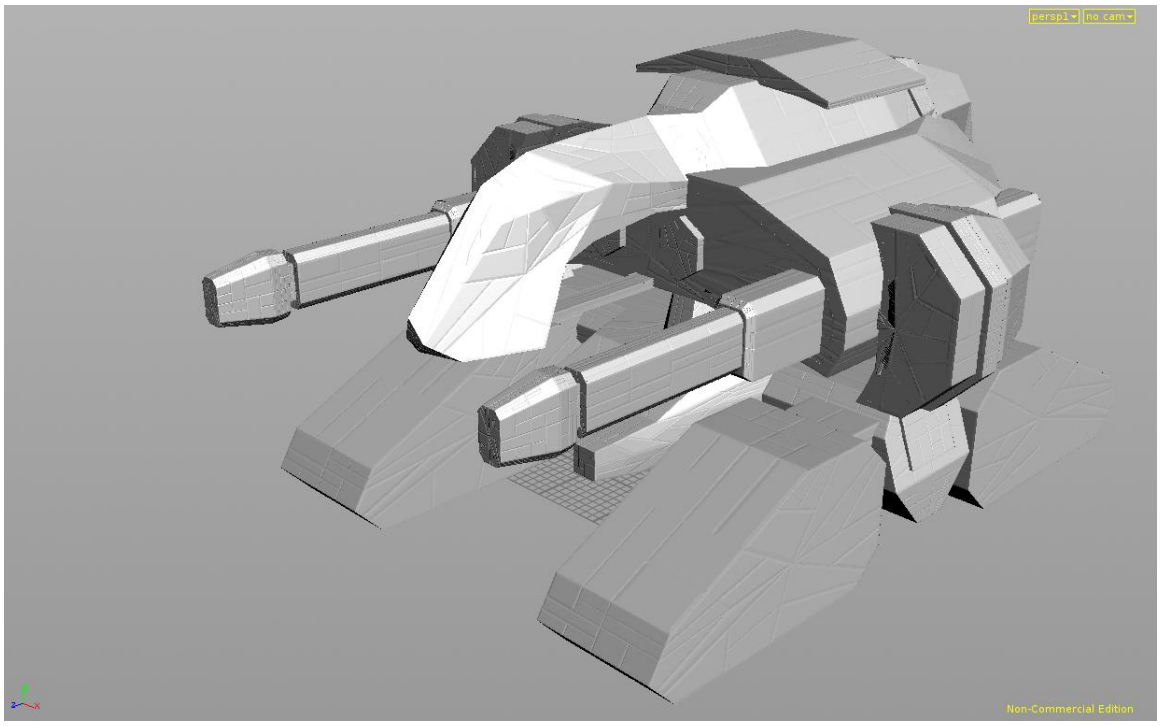



**Figure 28: High-Res example model.**

## NORMALS: MAX RAY DIST FORWARD:

The maximum, normalized distance additive details are detected. Lower this value to prevent self intersection.

## NORMALS: MAX RAY DIST REVERSE:

The maximum, normalized distance subtractive details are detected. Lower this value to prevent self intersection.

## NORMALS: MIN DIST MOVED:

The minimum distance of the ray intersection point. This value can prevent self-detection and this way maintain sharp corners.

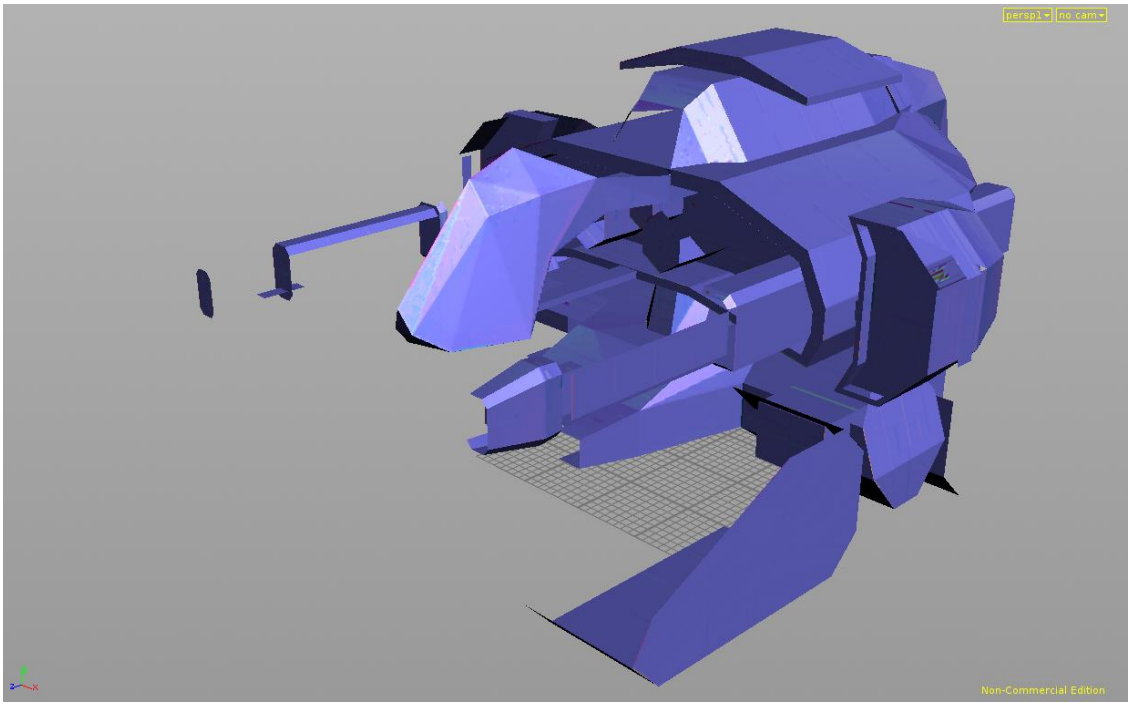



**Figure 29: Tangent space normal map preview.**

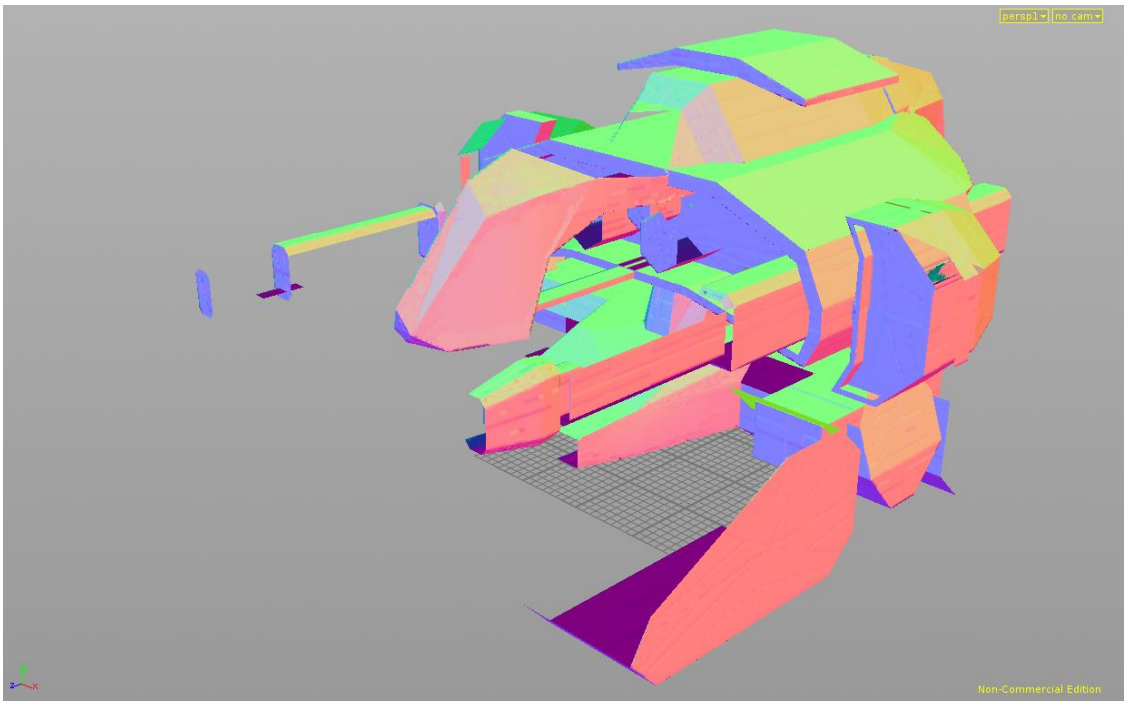



**Figure 30: Object space normal map preview.**

## BUMP: MAX RAY DIST FORWARD:

The maximum, normalized distance additive details are detected. Lower this value to prevent self intersection.

## BUMP: MAX RAY DIST REVERSE:

The maximum, normalized distance subtractive details are detected. Lower this value to prevent self intersection.

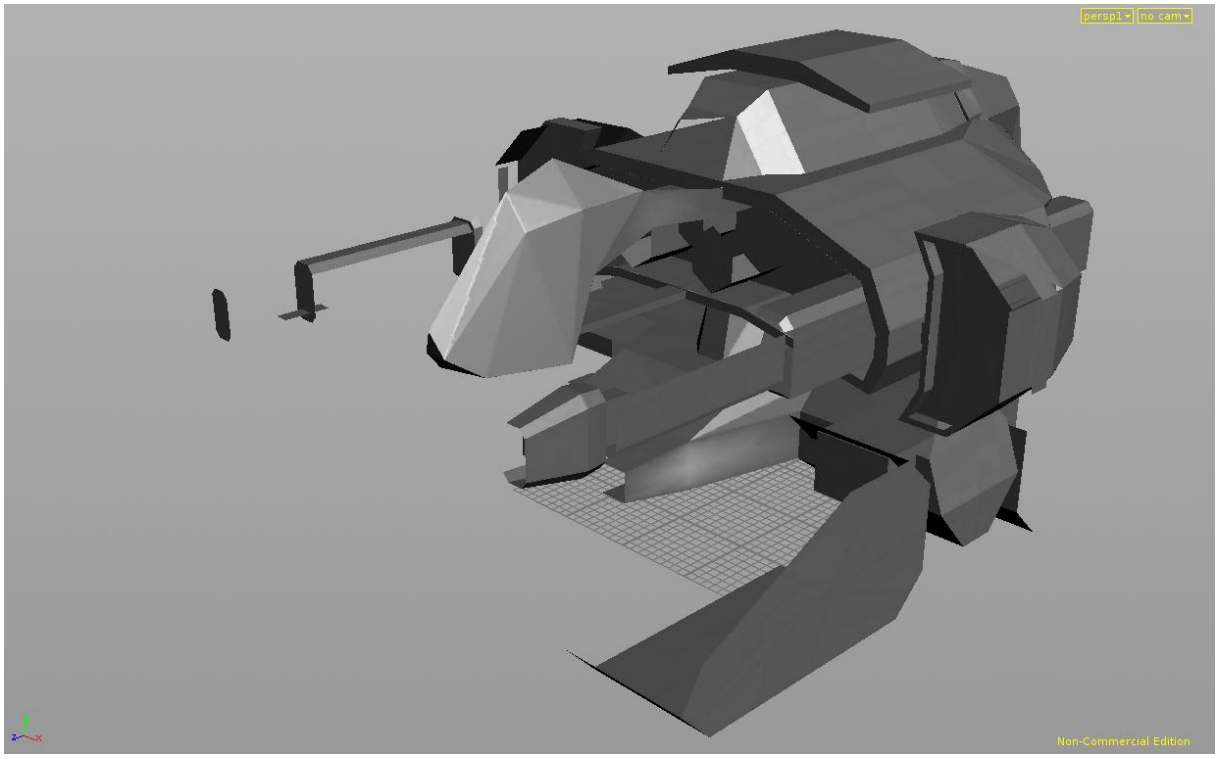



**Figure 31: Bump map preview.**

Note that parts of the model have been removed. These parts share UVs with other parts. They have been removed to prevent multiple texture parts interfering. The preview shows which parts are taken into account for the calculation.

## AMBIENT OCCLUSION AND HIGHLIGHTS

These settings are for calculating the Ambient occlusion and Highlights/weathering.

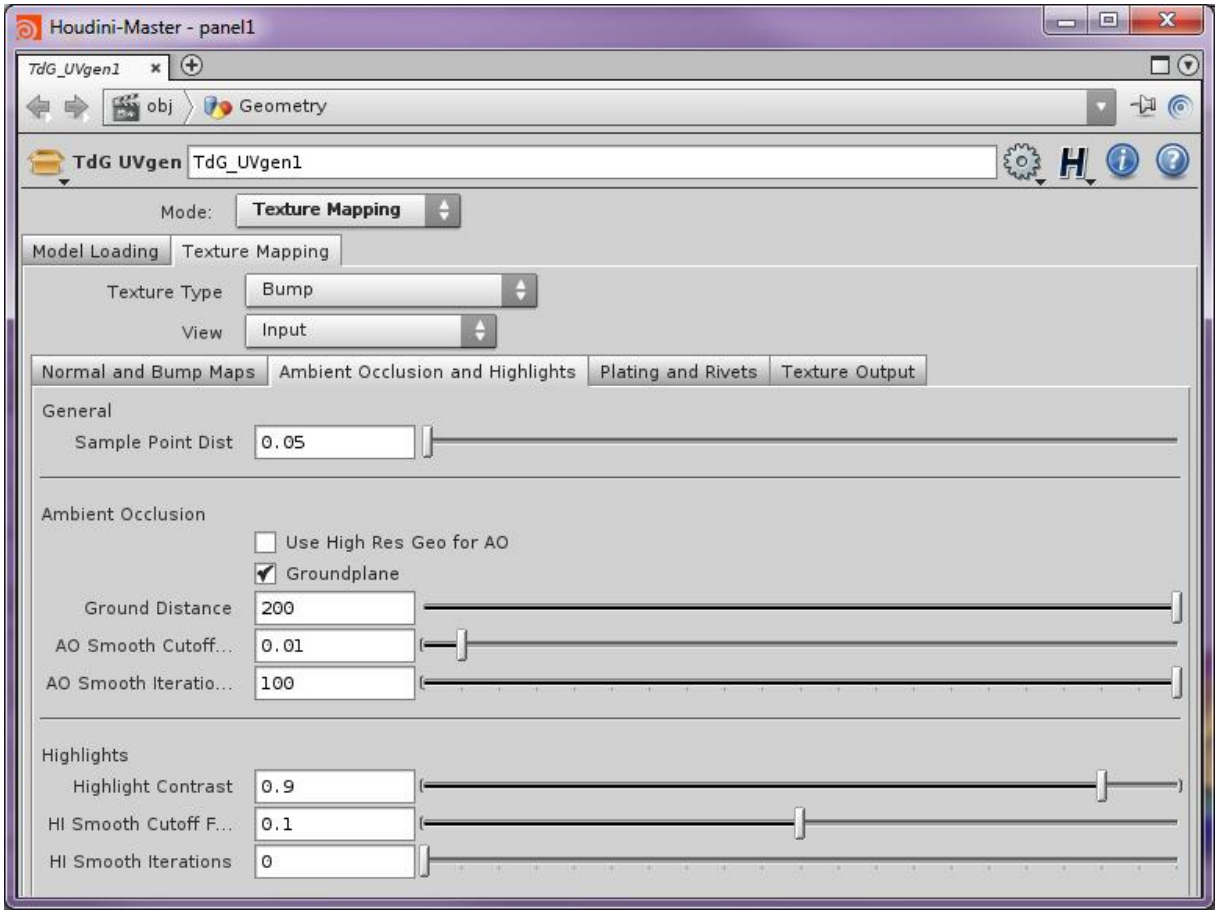



Figure 32: Parameters of the Ambient Occlusion and Highlights maps interface.

### SAMPLE POINT DIST:

Distance between each sample point used for calculating the Ambient Occlusion and Highlights. This distance is calculated on the normalized model. This means very large objects may require a smaller sample point distance relatively. Note that very small sample point distances require a lot of system memory. A distance that is too low, may also result in some spikes in the texture output.

### USE HIGH RES GEO FOR AO:

Tries to use the high resolution geometry, when available, to calculate the ambient occlusion. This mode may give unexpected results and usually not necessary.

### GROUND PLANE:

Enables a ground plane to add extra Ambient Occlusion at the bottom.

### GROUND DISTANCE:

The distance the object is above the ground. This value should be higher than the actual value to emulate the effects of indirect lighting on the bottom of the object.

## AO SMOOTH CUTOFF FREQ:

As in a Smooth SOP: Noise frequency to remove. The larger this value, the more it will keep the original color.

## AO SMOOTH ITERATIONS:

As in a Smooth SOP: Number of smoothing steps.

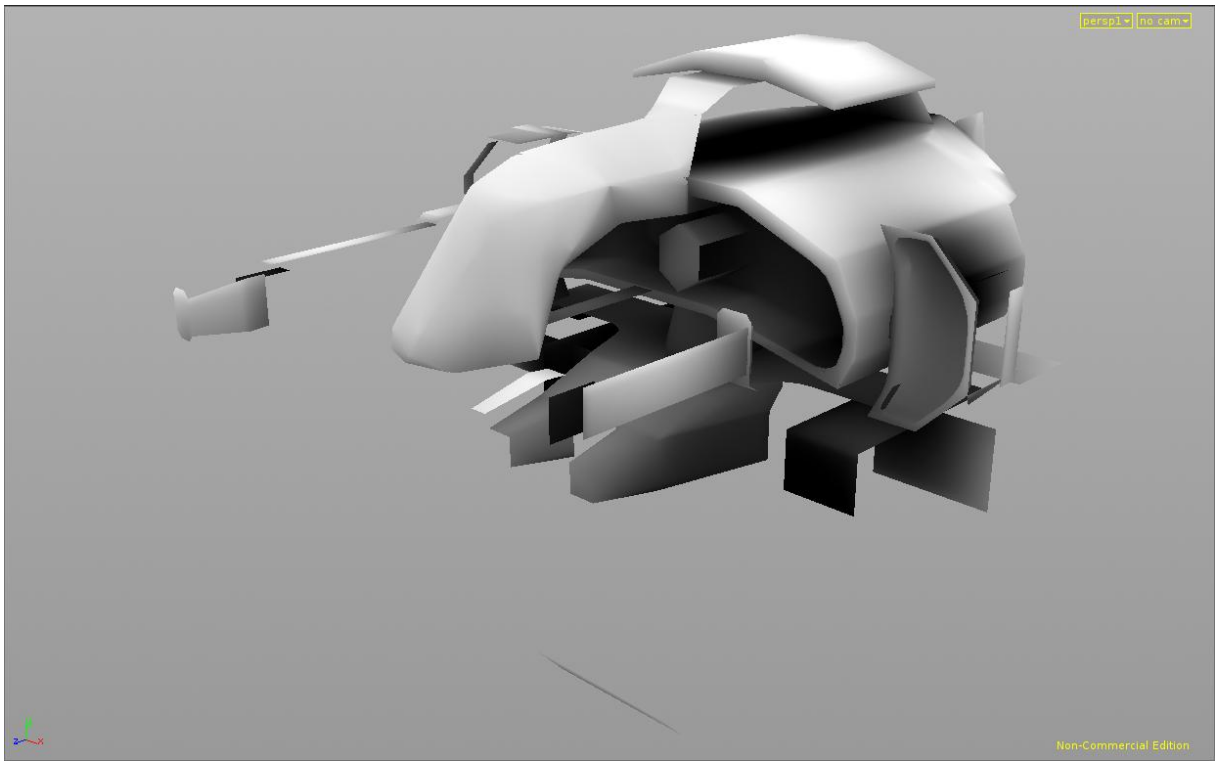



**Figure 33: Ambient Occlusion map preview.**

Note that parts of the model have also been removed in this preview and for the same reason: The parts share UVs with other parts. They have also been removed to prevent multiple texture parts interfering. The preview only shows which parts are taken into account for the calculation.

## HIGHLIGHT CONTRAST:

Sets the contrast of the highlights. 0.9 should give a gradual transition of highlights 0.9999 will give a more pixilated result.

## HI SMOOTH CUTOFF FREQ:

As in a Smooth SOP: Noise frequency to remove. The larger this value, the more it will keep the original color.

## HI SMOOTH ITERATIONS:

As in a Smooth SOP: Number of smoothing steps.

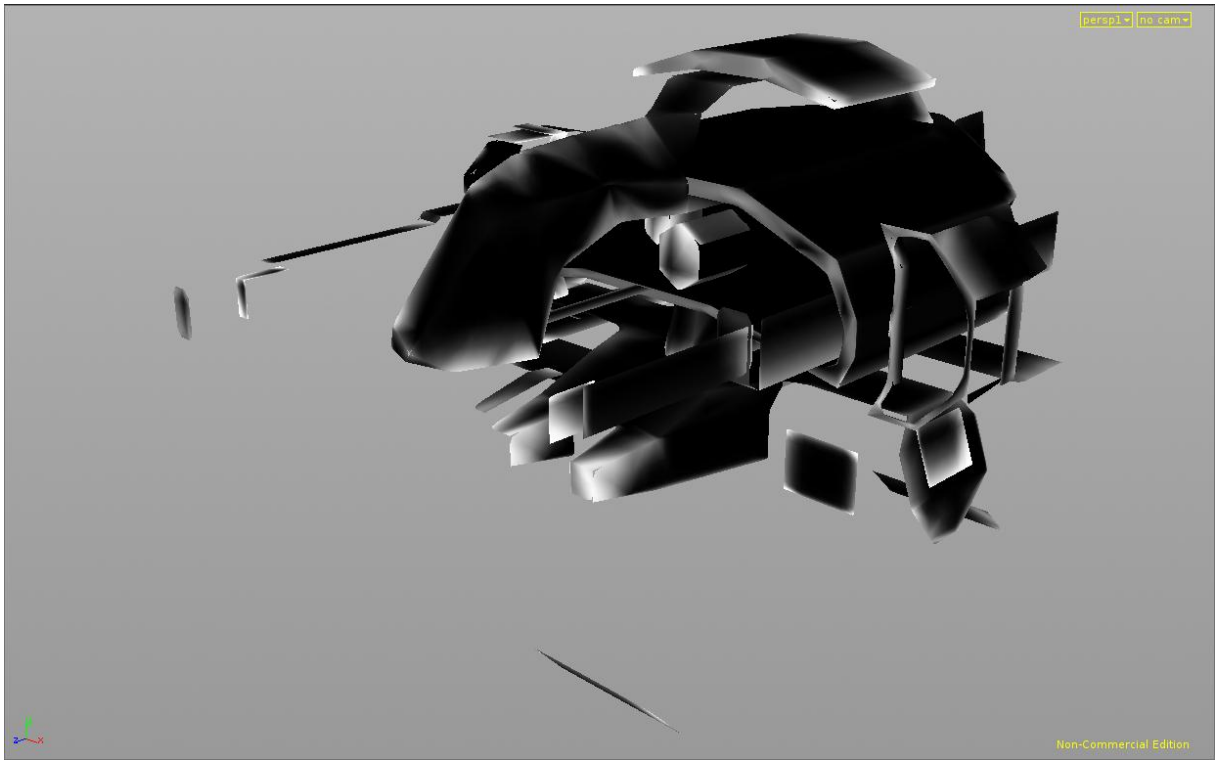



**Figure 34: Highlights map preview.**

## PLATING AND RIVETS

These settings deal with the settings for Plating and Rivets. These maps are a bit more specific to objects that require a metal texture.

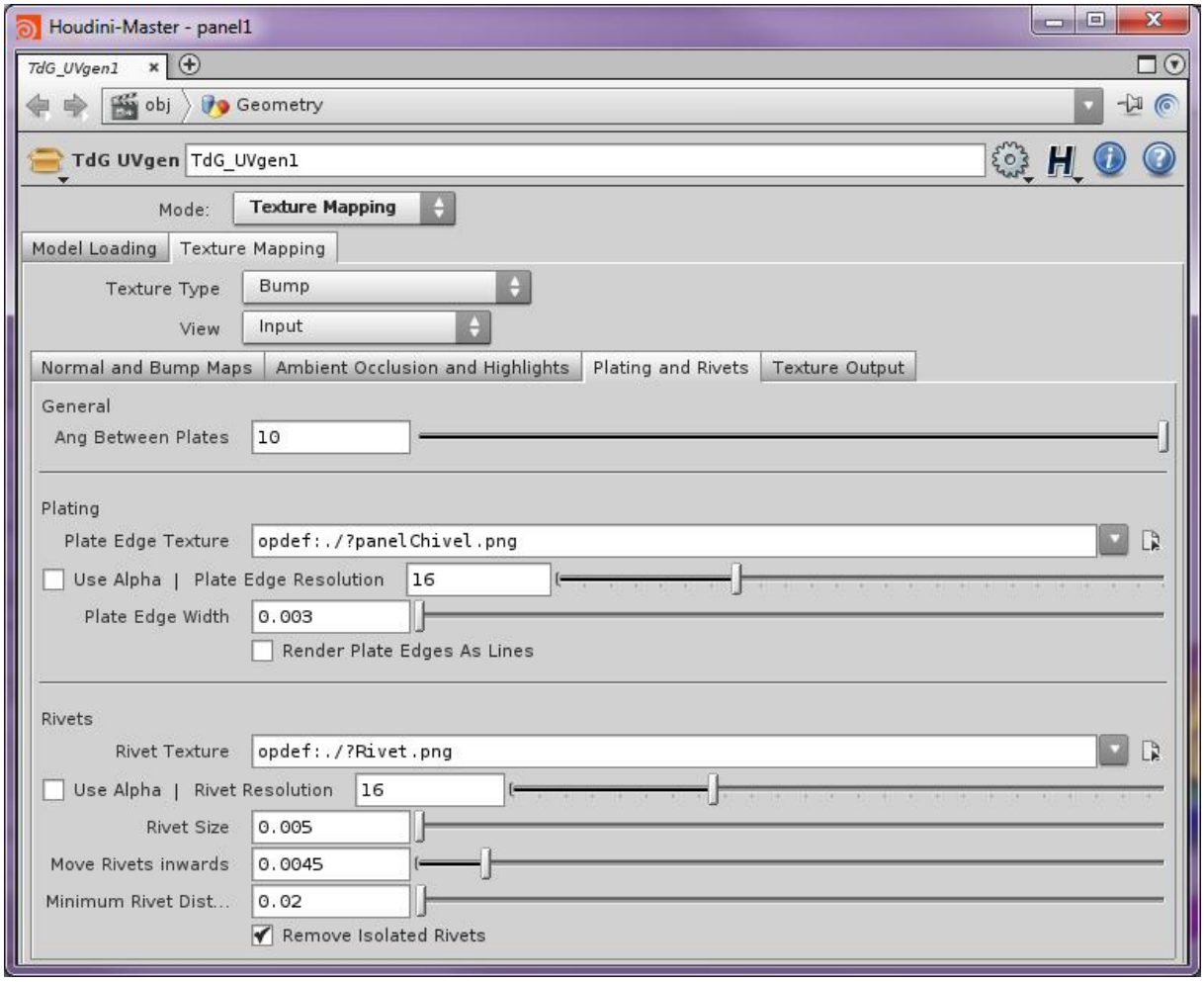



**Figure 35: Parameters of the Plating and Rivets maps interface.**

### ANG BETWEEN PLATES

Angle Between Plates works as a cusp. Higher values will create larger plates, lower values will create more smaller plates.

### PLATE EDGE TEXTURE

Texture used for each Plate Edge. Texture should be 1 pixel high and ideally a power of 2 wide.

### PLATE: USE ALPHA

Uses the alpha channel of the Plate Edge Texture.

### PLATE EDGE RESOLUTION

Amount of sample points used to read the texture data. Should be equal or larger than the texture width.

### PLATE EDGE WIDTH

The width of the texture across each plate edge in UV space. The bottom scale is taken into account.

## RENDER PLATE EDGES AS LINES

Renders the plate edges as pure white for manual coloring.

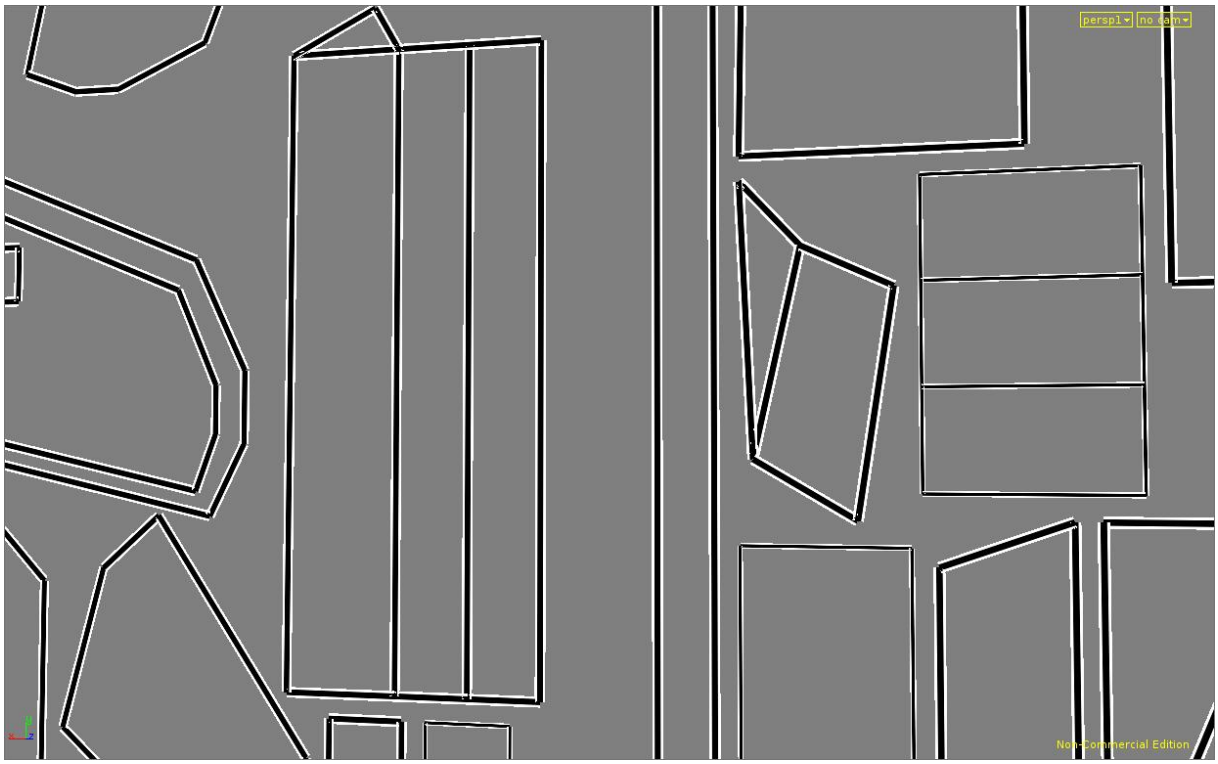



**Figure 36: Plating map preview.**

## RIVET TEXTURE

Texture used for each rivet. Texture should ideally be a square power of 2 pixel texture.

## RIVET : USE ALPHA

Uses the alpha channel of the Rivet Texture.

## RIVET RESOLUTION

Amount of sample points, squared, used to read the texture data. Should be equal or higher than the texture size.

## RIVET SIZE

Size of each rivet in UV space. The bottom scale is taken into account.

## MOVE RIVETS INWARDS

The distance at which the rivets are placed relative to the plates' corners in UV space.

## MINIMUM RIVET DIST

Rivets that are closer to each other than this value will merge at the center.

## REMOVE ISOLATED RIVETS

Removes all rivets on plates that only have one.

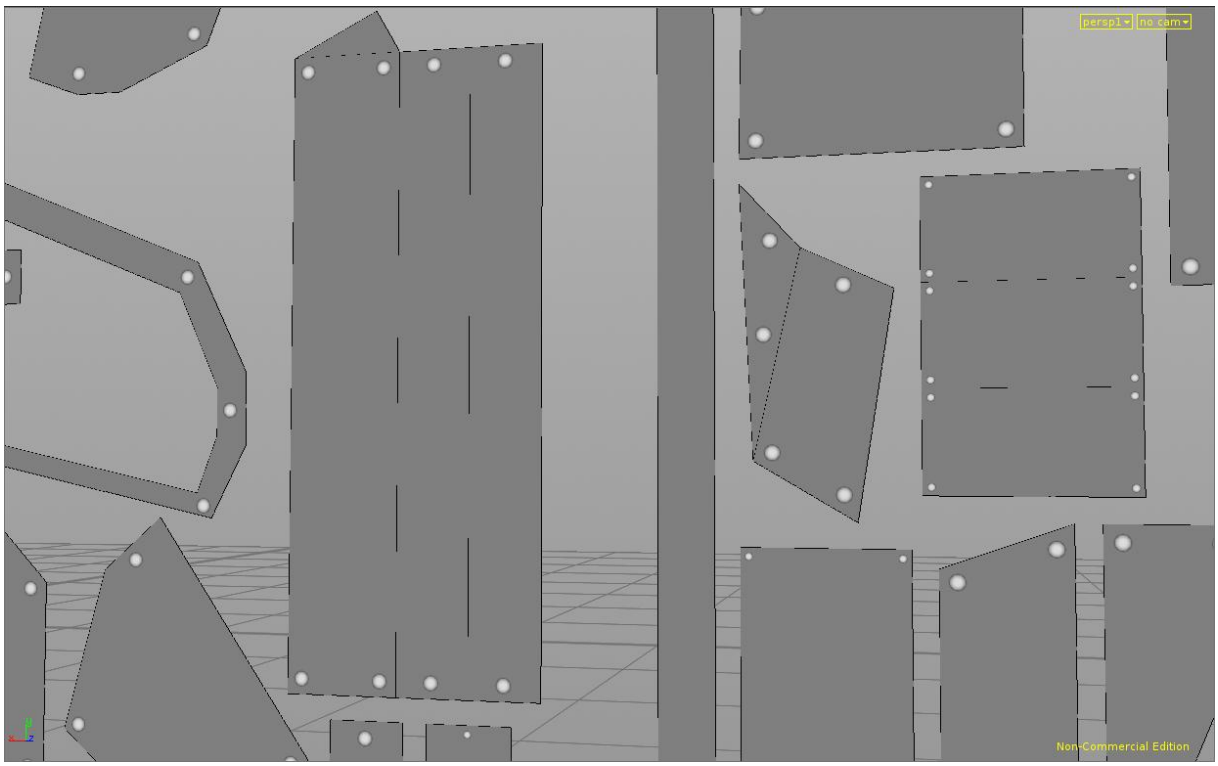



**Figure 37: Rivet map preview.**

## TEXTURE OUTPUT

These settings are used to set up the render pipeline and determine the textures that should be rendered.

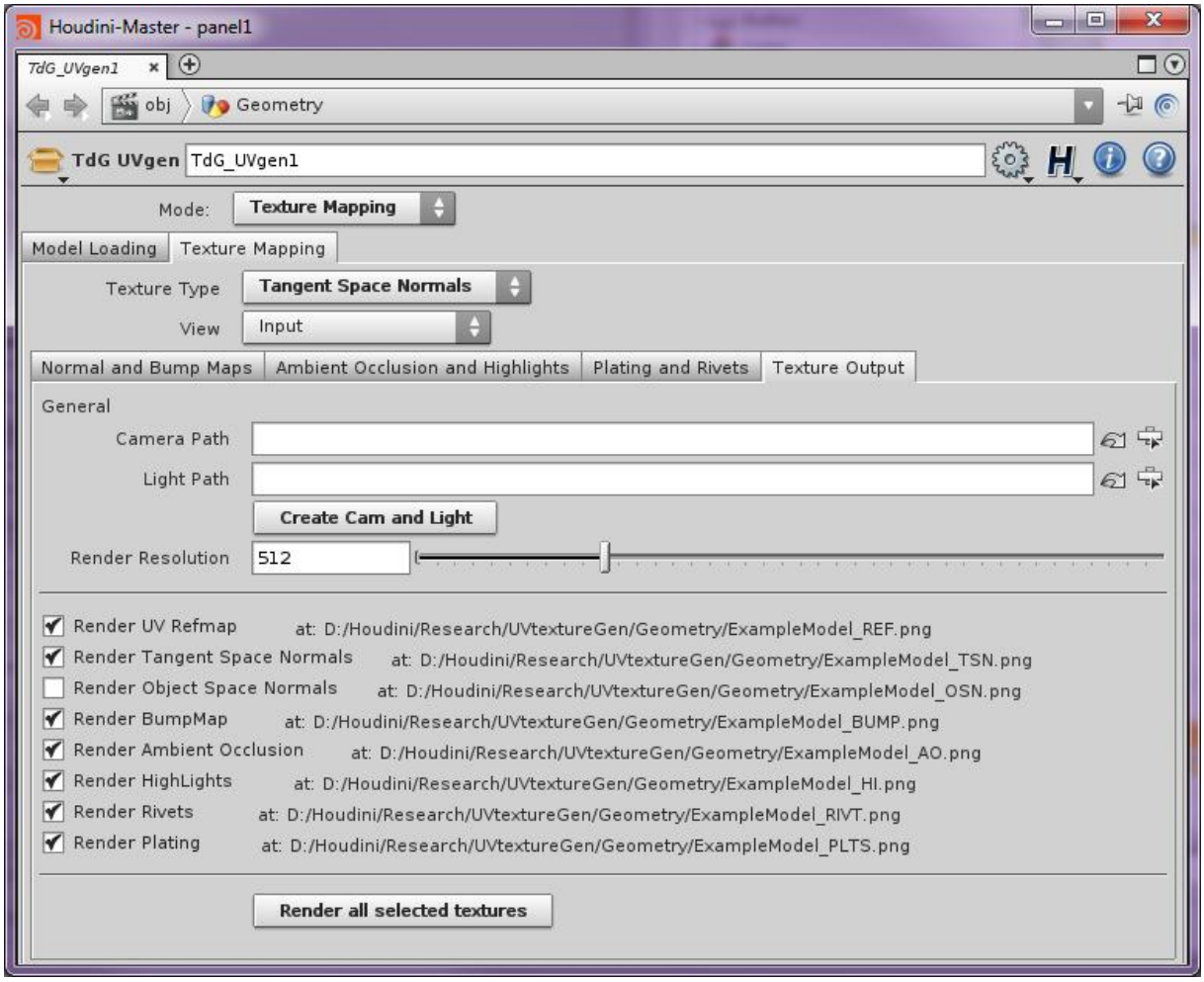



**Figure 38: Parameters of the Texture Output interface.**

### CAMERA PATH

Path of the render camera, this path is set automatically when rendering.

### LIGHT PATH

Path of the render light, this path is set automatically when rendering.

### CREATE CAM AND LIGHT

Creates a render camera and light and will set up links to them. Note that when "Render all selected textures" is pressed, the camera and light are created as well, if they do not yet exist. This parameter should give a conformation window when the camera and light are created. If not, both the camera and light should already exist.

### RENDER RESOLUTION

Resolution of the output textures in pixels squared. Note that 512 is the maximum resolution for non-commercial.

## TEXTURE SELECTORS

Each available texture has a checkbox to select them for rendering. On the right side the output path is displayed for each texture.

## RENDER ALL SELECTED TEXTURES

Creates a render camera and light and will set up links to them if they do not yet exist. This parameter should give a conformation window when the camera and light are created. If not, both the camera and light should already exist. Afterwards all the selected textures are rendered out to the path's shown. Note that this parameter automatically changes the "View" mode and "Texture Type" when rendering. Note that when using the tool with a non-commercial license, the Houdini watermark is rendered along with the textures, like shown below. This can be solved in three ways: by texture editing, alternatively the UV mapping has a feature to avoid using the area in which the watermark is placed. This shown in the demonstration video. Finally the apprentice-HD license can be an alternative for buying a full-on commercial license.

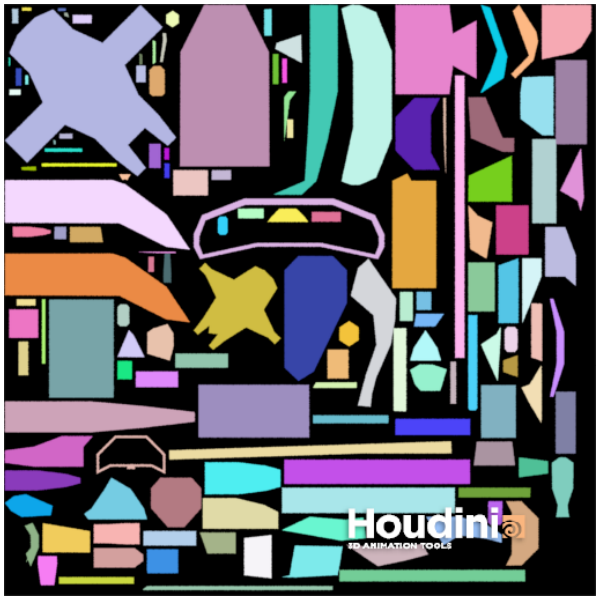



Figure 39: Reference map


Figure 40: Tangent space normal map

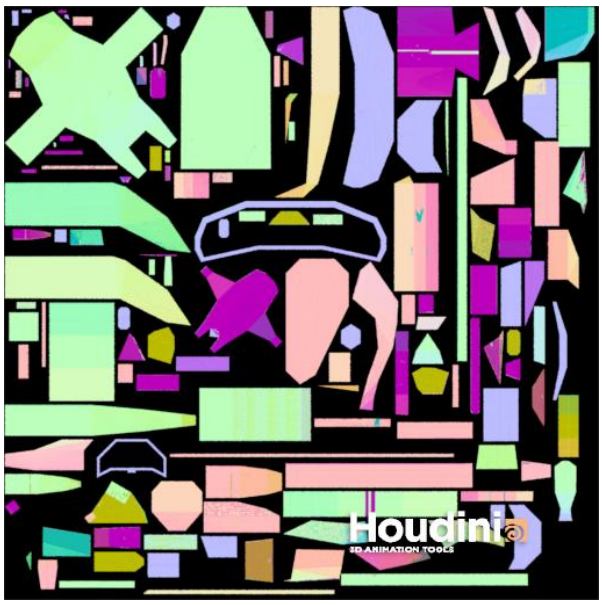



Figure 41: Object space normal map

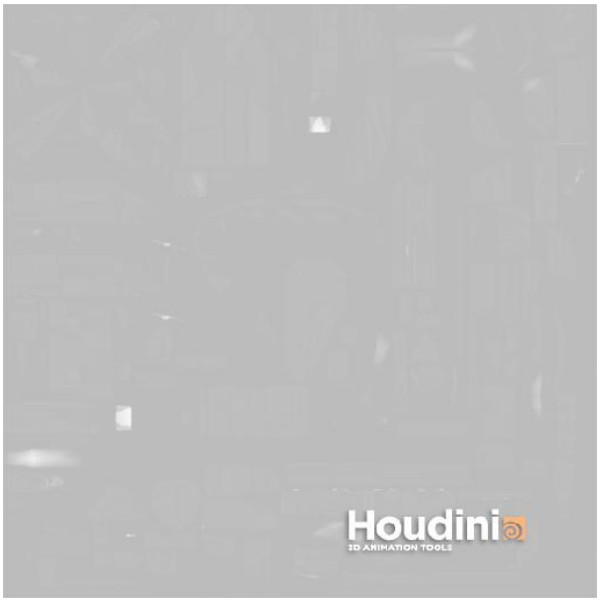



Figure 42: Bump map

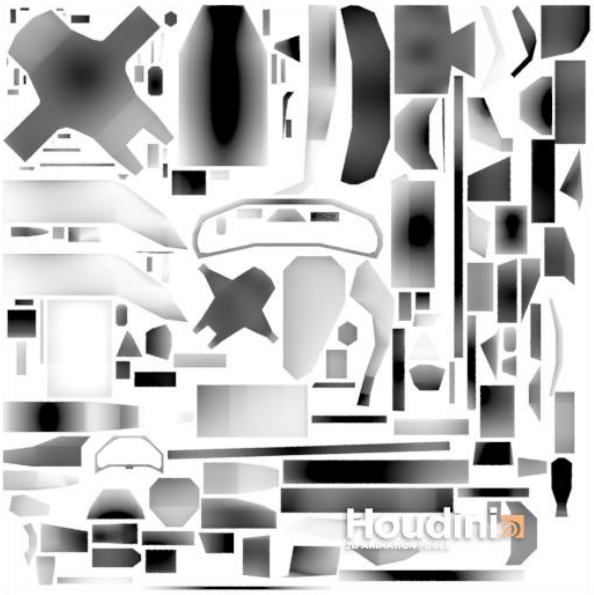



Figure 43: Ambient Occlusion map


Figure 44: Highlights map

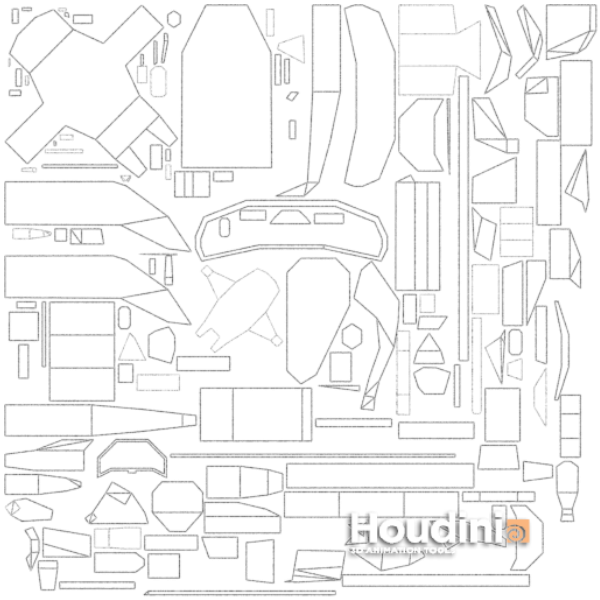



Figure 45: Plating map


Figure 46: Rivet map

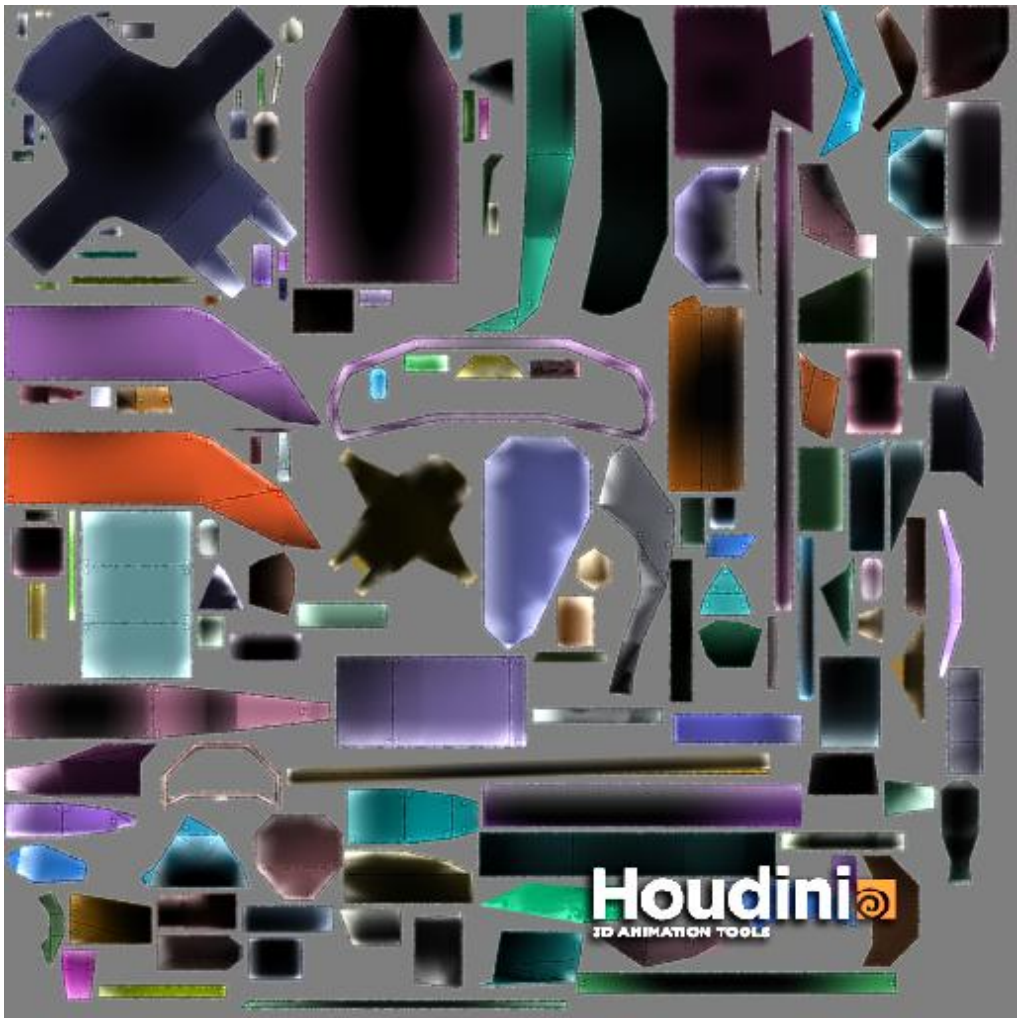



Figure 47: Composited diffuse map.


Figure 48: Composited map applied as a texture, note the watermark in the texture