

User Manual



Version 3.5

8 SEP 2010 | Revision 3.5

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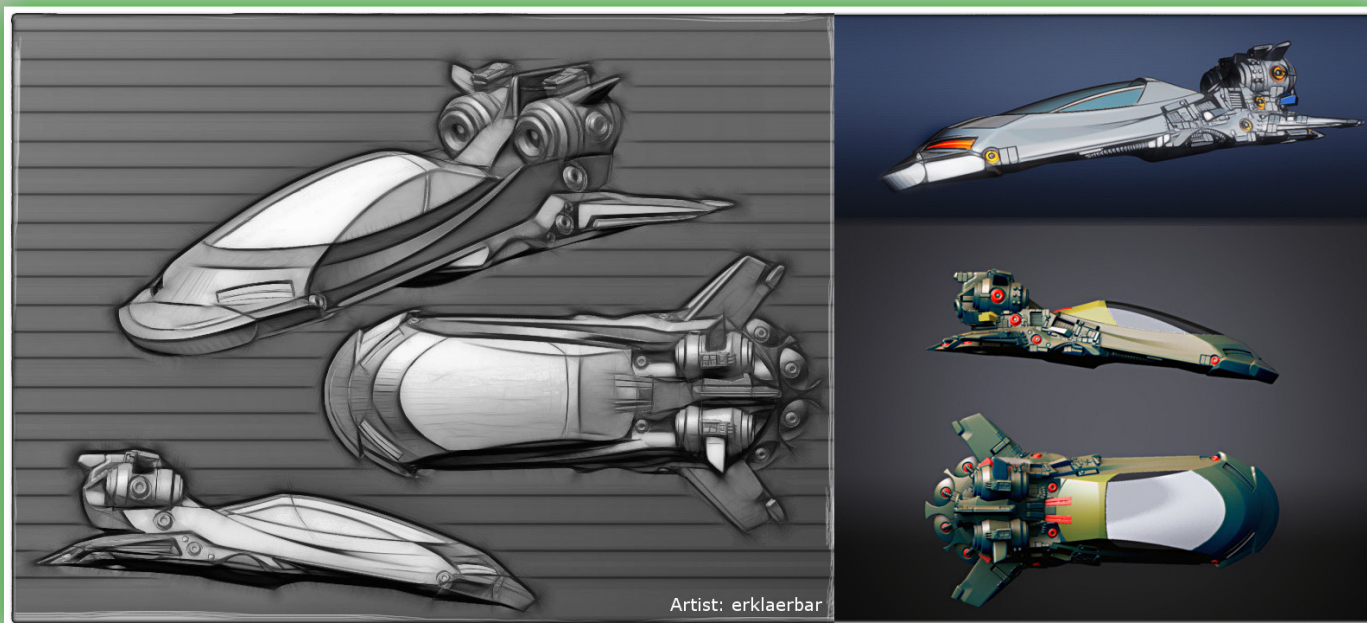
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1. What's New in 3D-Coat 3.5?

- Support for the creation and editing of multiple UV sets
- New multi-resolution & caching voxel tools! Sculpt and make changes on your low resolution version and the changes will be propagated to the high resolution version
- Multi-threaded merging! Any merging operation (ie., moving voxel objects between surface mode and voxel mode, move/pose tools, etc.) is now multi-threaded, allowing for a much faster sculpting speed with less hinderance in your work flow
- Color sampling via the clip board allows you to sample colors from Photoshop and Reference Image from Leigh Bamforth, for use in **3D-Coat**
- GTX 400 series video card support
- Improved support of Ptex to Renderman
- Custom texture resolution with Ptex
- Autopo. New auto retopology tool!
- Improved visual Spline preset viewer
- Create and upload turntables automatically
- Option to paint over disconnected objects
- Countless bug fixes and work flow improvements!



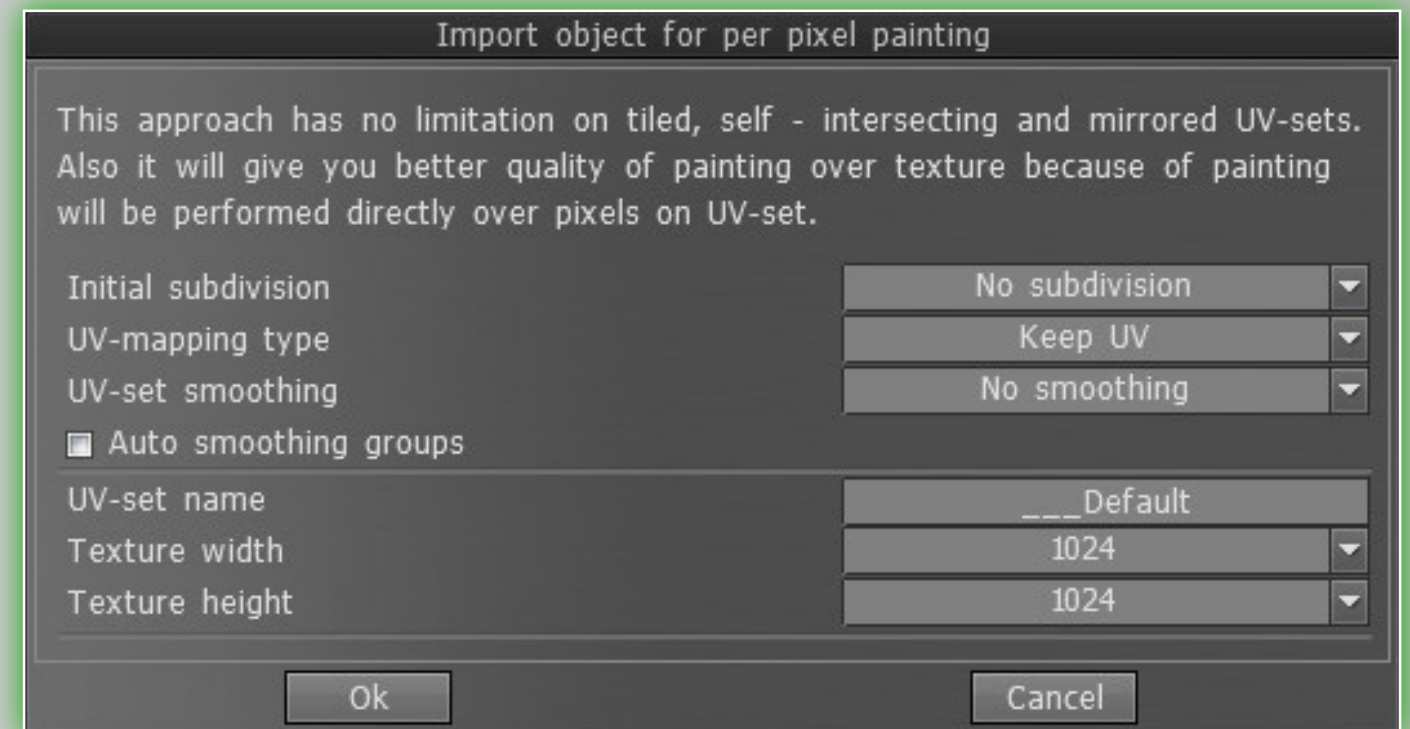
2. Getting Started

2.1 Importing Meshes

With the middle column select, pick one of these **.OBJ** files that you can see in the menu from the screenshot below. Or select file menu and click on **File->Import->Model for per pixel painting**, then choose the **"sample.OBJ"** file (it is in the Samples folder). Upon importing an object you will be prompted with the following image. There are many options you will see in this prompt. They are as follows:

Initial subdivision. Set initial subdivision of the object for a smoother look (if needed).

UV-mapping type. Keep the original UV or use **Auto-mapping**.



UV-set smoothing. This option works only if you have chosen to subdivide the model during import.

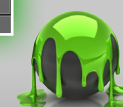
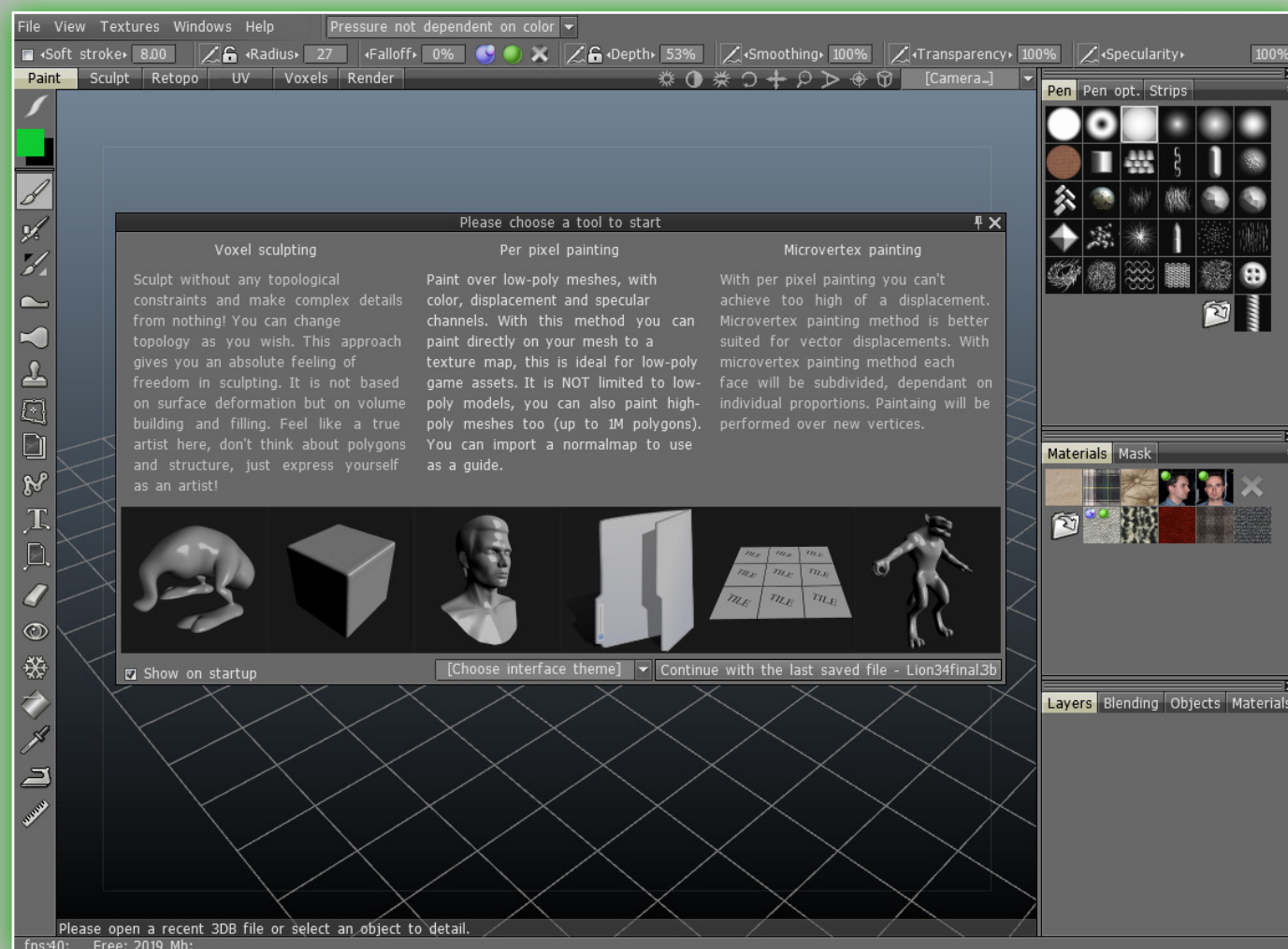
Auto-smoothing groups. This option allow you to create smoothing groups automatically. By specifying a value in the **Maximum angle** option responsible for the maximum angle between faces when the edge becomes sharp, it is necessary to activate the **Auto-smoothing groups** option. To use this option, turn the **Auto-smoothing groups** on.

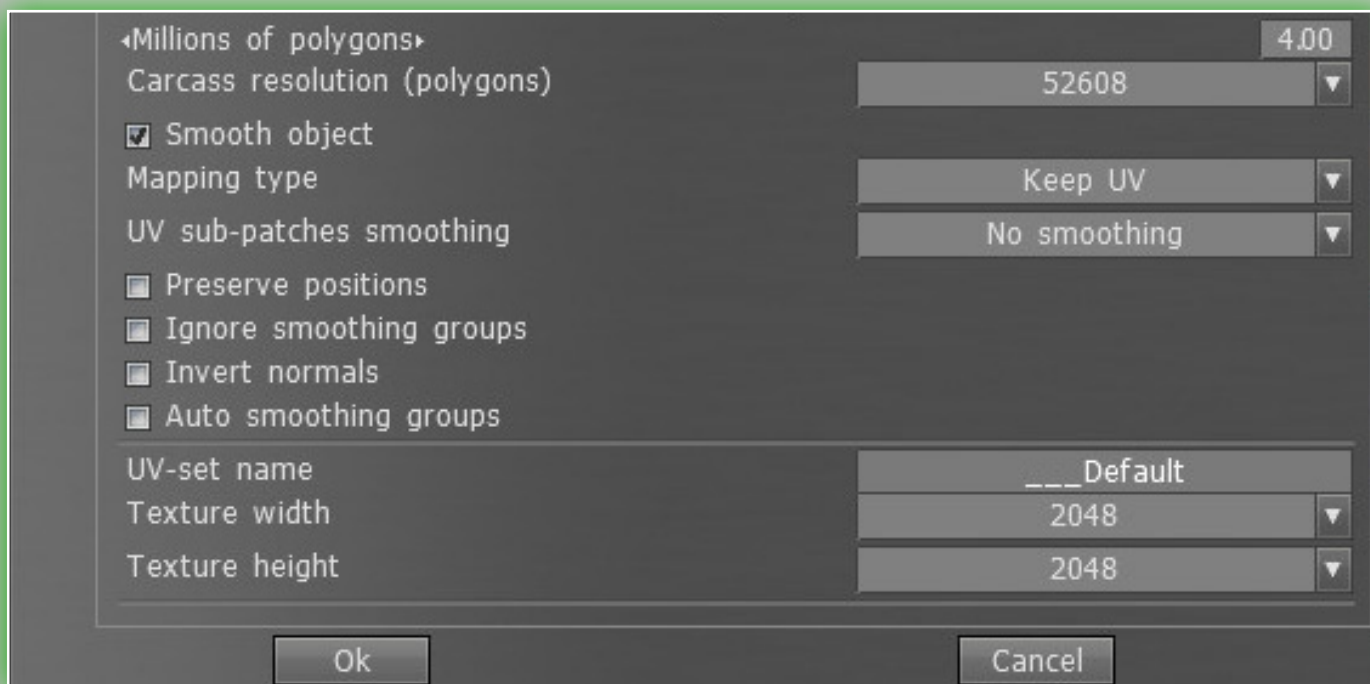
UV-set name. Enter UV-set name.

Texture width. Set the texture width.

Texture height. Set the texture height.

- **NOTE:** If your video card has less then 256 Mb of RAM you should avoid textures larger than 2000×2000.
- If you choose **File->Import->Model for microvertex painting** and you have selected a file (we recommend to start with **"sample.OBJ"** in the Samples folder). As with the previous





method, you will see a number of options which you can specify upon importing your object.

Millions of Polygons. This is responsible for mesh resolution, the number of millions of polygons after mesh smoothing during the loading. This amount should be greater than the amount of pixels in your texture image. These polygons are used to create normal maps on the fly.

Carcass Resolution (Polygons). The mesh consists of two levels of detail: *carcass mesh* (mid-poly mesh) and *high resolution mesh*. Usually you will see mid-poly mesh in the viewport with the normal map created using high-poly mesh.

Smooth Object. You can also “smooth” the object while opening the file. For this case, let’s tick **Smooth object**.

Mapping Type. By default, the UV-mapping type is **Keep UV**. For this option of course, you must have a pre-existing UV mapped mesh, and it remains unchanged – but if you want, you can change it. For this example, we will leave it as it is.

UV Subpatch Smoothing. This option lets you smooth sub-patched UVs.

Preserve Positions. With this option you can specify the initial vertex positions to be saved, compensating for their shift when smoothing by extra pressure.

Ignore Smoothing Groups. This lets you import meshes without normals data. In this case, the model will be smoothed *after* the import.

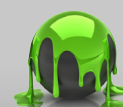
Invert Normals. Check this option if you want to invert the normals of the model.

Auto-Smoothing Groups. This option lets you create smoothing groups automatically. By specifying a value in the **Max. angle** option responsible for the maximal angle between faces when the edge becomes sharp, it is necessary to activate the **Auto-smoothing groups** option.

● **UV Set Name, Texture Width & Texture Height** are the same as above for per pixel painting.

2.2 Customizable Interface

Like many other applications, **3D-Coat** lets you customize your workspace to suit your needs. You can hide or show windows, move tabbed popup windows around and even dock/undock them, or turn them into floating windows. If you don’t need or want to see a particular window, simply close it. You can always restore it to the interface through the **Window** menu at any time. Customizing your workspace makes **3D-Coat** work for you in the way which best suits your needs and workflow.



2.3 Tabbed Popup Windows

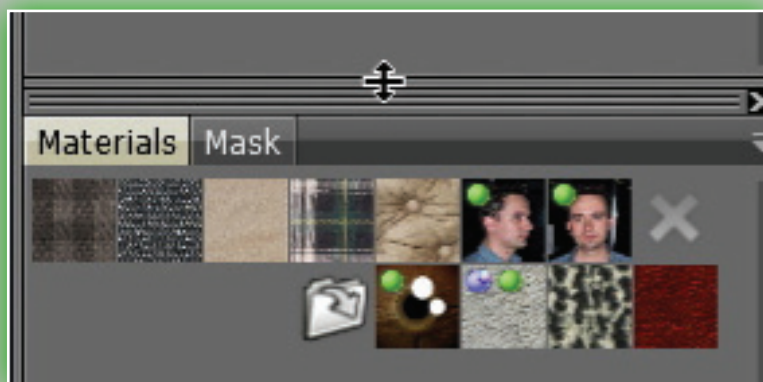
Let's take a look at how you can work with the interface. We'll start off by moving tabbed popup windows around. We will discuss how to undock and dock tabbed windows and even how to create floating windows. Tabbed windows are flexible in that you can change their *widths* and *lengths* and also their *locations*. This can be helpful if you're using **3D-Coat** on a notebook computer and need to have as much screen real estate as possible to model or to do texture work. Simply place your mouse along the edge or border of a tabbed window, and when your cursor turns into a double-headed arrow, drag your mouse to resize the window.

To show a tab that you may have closed, or to explore tabs available for your use, go to the **Window** menu. From here you can choose a tab to reveal in the interface. A great way to learn about the tools in **3D-Coat** is to open tabbed windows and to explore all of the functionality in them.

Moving a tabbed window to a new location is easy. You may want to move a tabbed window into another *cluster of tabs*. A good example may be to drag all windows that deal with colors or pens into their own cluster so you can quickly find them.

Place your mouse over the tab and drag it to a new location. Let go of the mouse when you see a blue outline. The position of the outline will determine which part of the window the

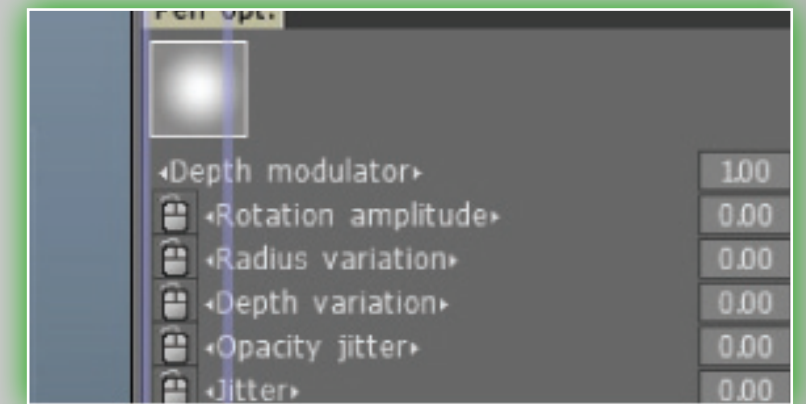
tab will occupy. Let go of the mouse and the tabbed window will dock where the blue outline appeared. Don't worry if you placed it in the wrong loca-



tion. You can always reposition tabbed windows until you're satisfied with their locations.

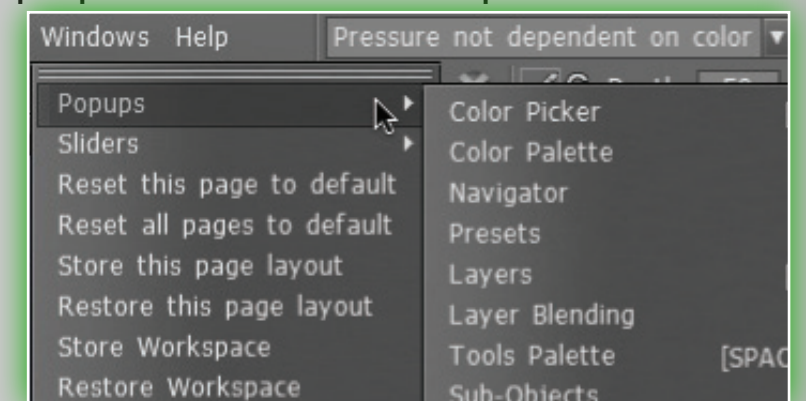
You can create a floating window by dragging the tab away from the tabbed window group it once occupied. Let go of the mouse and it will float as its own independent window.

You can dock a floating window back into any cluster of windows by dragging the window and dropping it when you see the blue line.



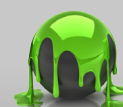
2.4 Popup Window Menus

Many menus in **3D-Coat** have a small downward-pointing arrow in their upper right hand corners. When you click and hold your mouse cursor on them, they pop open to reveal menu-specific options. Let's say that you prefer larger icons when viewing Pens. Open the popup menu on the **Pen** tabbed window and choose **Large** to change the display size of the preview icons.



2.5 Navigation Panel

The navigation panel is located on the top right corner of the viewport. You can do many things with it, but first let's take a look. **Adjust light ambient.** By holding **LMB** and moving the mouse.



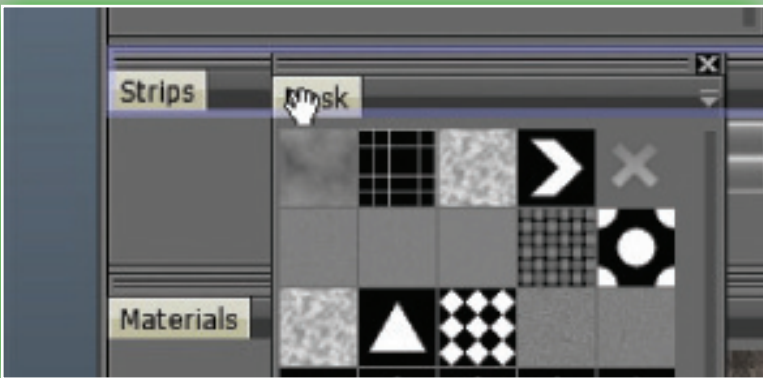
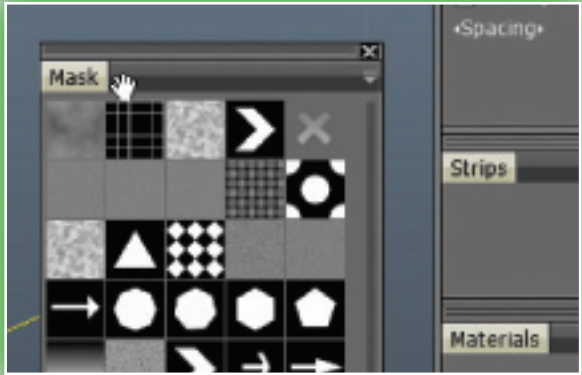
Adjust light brightness. By holding **LMB** and moving the mouse.

Move light. By holding **LMB** and moving the mouse.

Rotate camera. By holding **LMB** and moving the mouse. To rotate camera without this control, use **ALT+LMB** (or **LMB** pressed on an empty **SPACE**).

Zoom Camera. By holding **LMB** and moving the mouse. To scale the scene without this control, use **ALT+RMB** (or **RMB** pressed on an empty **SPACE**).

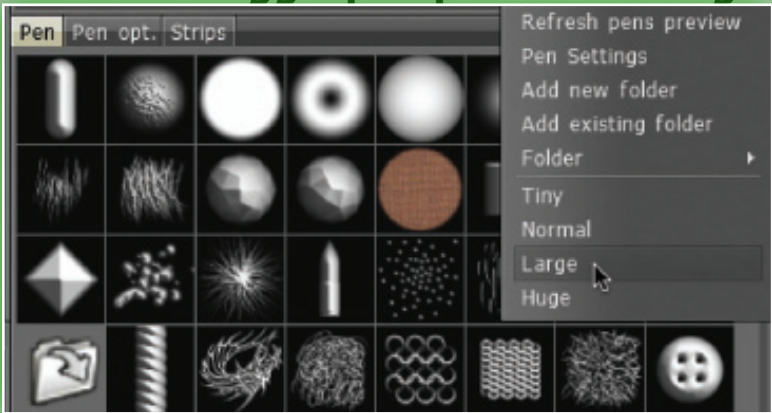
Vary field of view. **RMB** to reset it to default.



your brush.

Set camera to default position.

Toggle perspective/orthographic projection.



Frame Object. Will frame the bounding box of the current object.

Focus on Brush. This will focus on the area your brush is currently hovering over. The focus area depends on the size of

2.6 Camera Options

You can switch between two custom navigations: **3D-Coat** and Maya styles. By default the



3D-Coat style is set. With **3D-Coat** navigation style you can rotate your scene by moving your mouse with **LMB** pressed on the empty area. In the same way you can zoom your scene with **RMB** and pan with **MMB**. If you don't want to move your cursor aside you can always use **ALT+LMB**, **RMB**, **MMB** to navigate the scene.

There is a set of options to customize the background. You can also customize the navigation according to you own preferences. These options are mostly self-explanatory, but the ones that are not are detailed below.

Add camera shortcut. Information about the camera position and current material placement will be stored. It can be used for frame sequence rendering.

Delete camera shortcut.

Delete last used or added shortcut.

Switch to previous shortcut.

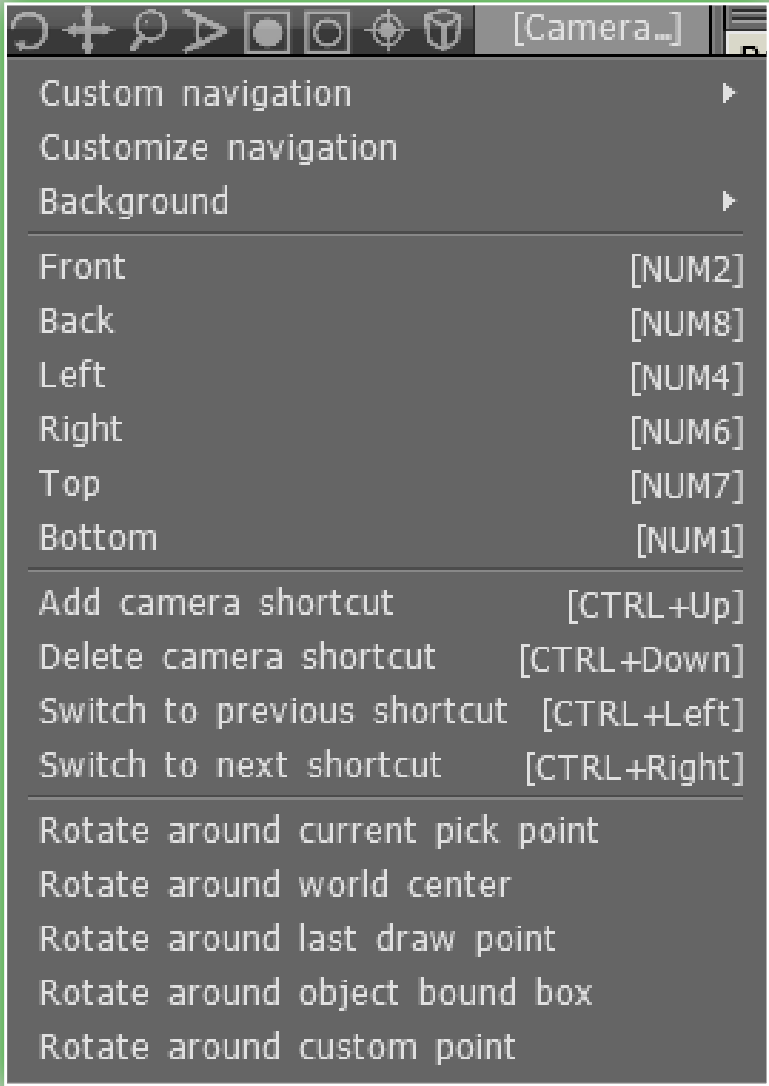
Switch to previous camera and material shortcut.

Switch to next shortcut.

Switch to next camera and material shortcut.

Pivot Points. There are a number of options to set a pivot point for scene rotation. Choose whatever best suits you.

Setting up Backgrounds. If you'd like to assign an



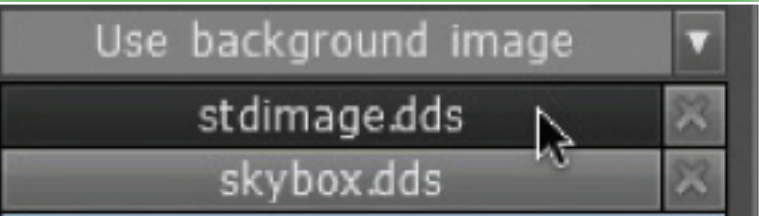
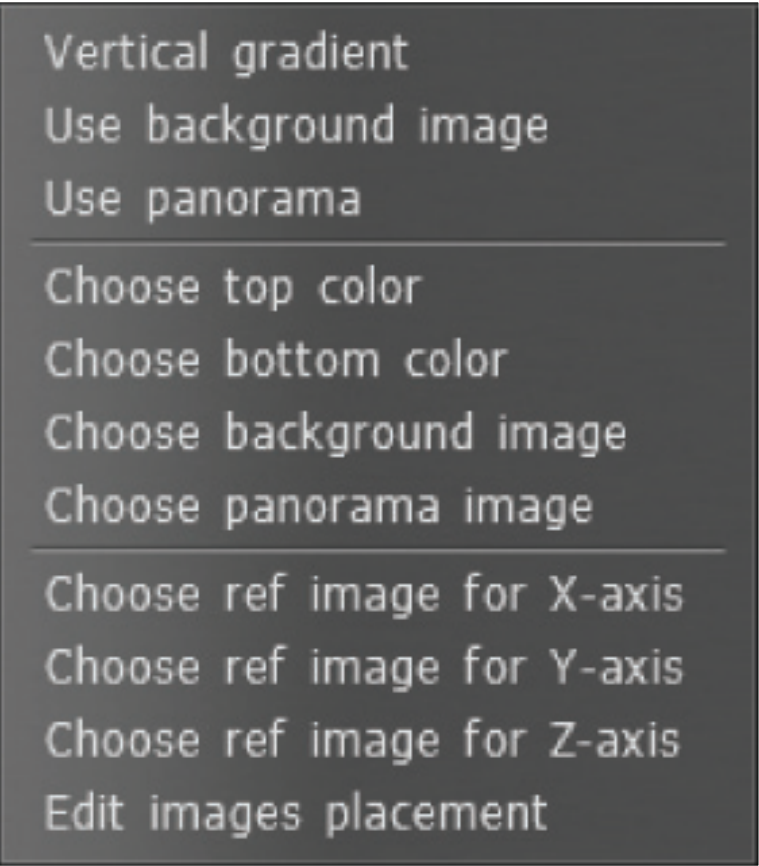


image to the background of the interface, you can choose one from your hard drive. Open the top menu, open **Edit->Preferences**. Scroll down and locate the **Background type** option and click the drop-down arrow to select the **Use Background image**. By default, you will see a backdrop that looks like a star field. You can of course choose your own file by clicking in the file requester field.

2.7 Viewport Reference Images

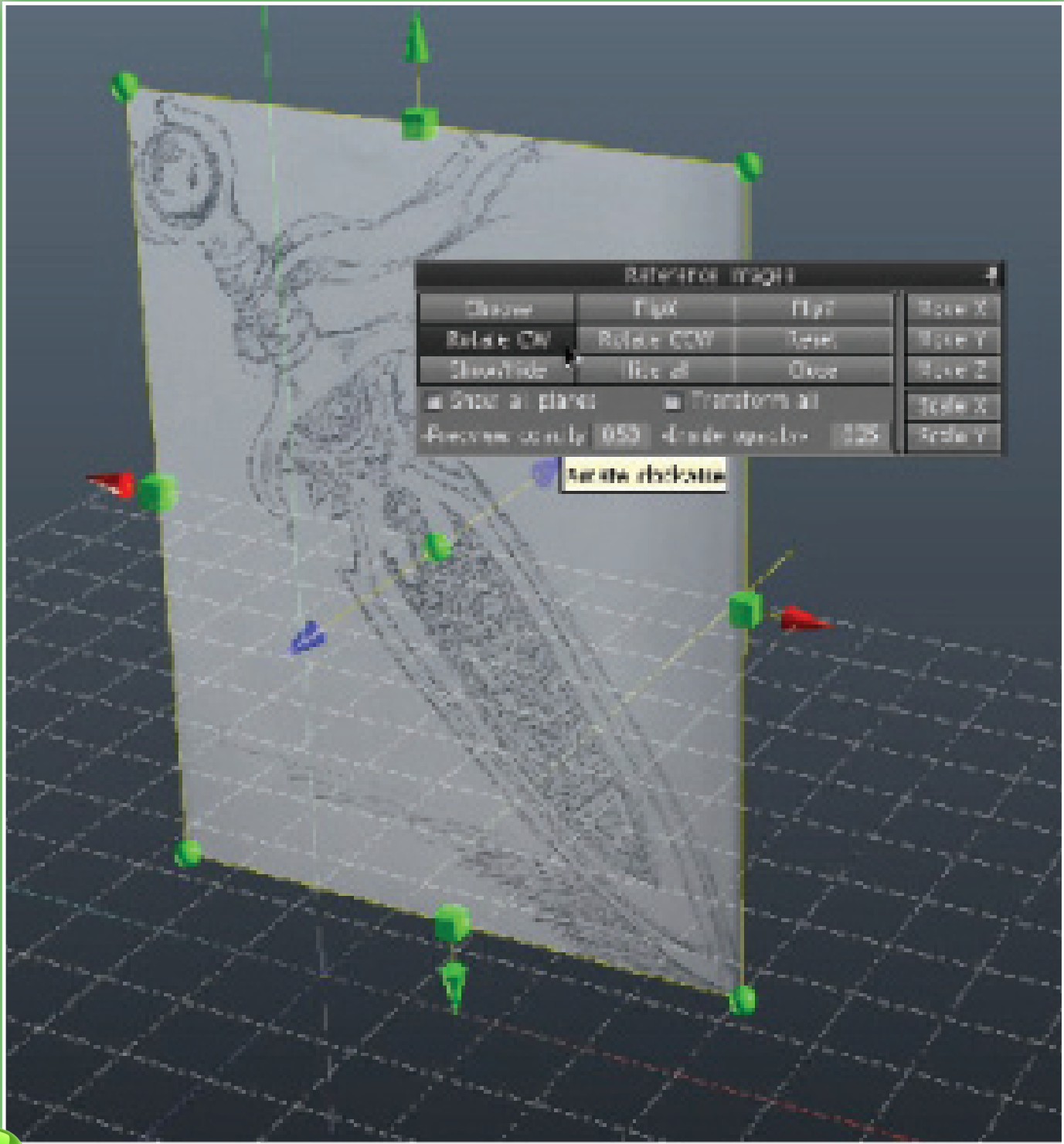
It's easy and fun to open up **3D-Coat** and, without any references at all, just start creating models, painting and sculpting to your hearts content. But sometimes you'll need to create a model that must to conform to exact specifications. Many times a client will provide turnarounds of characters or ask you to create them.



This is where placing the viewport reference images comes in handy. The reference image can be placed on any axis of your choosing, x, y, or z. You can even assign a different image to each axis so you can have a view of your artwork no matter which axis you happen to work from.

Let's take a look at how to assign images to the z axis. Click on the arrow next to the

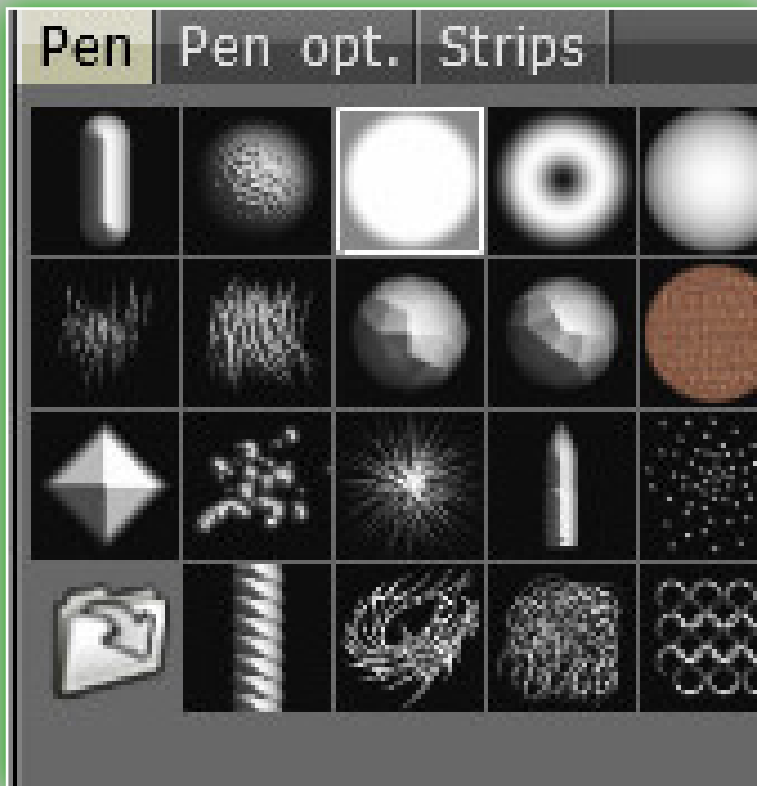
Camera controls, then select, **Background->Choose ref image for Z-axis**. Once you have clicked the menu, you'll then navigate your hard drive for an image to use along the z-axis. The image you select will appear in **3D-Coat's** main window. Also, a pop-up menu with positioning and scaling tools will appear. You can also change the opacity of the image so it's much easier to see.



3. Right Side Panel

3.1 The Pen Tab

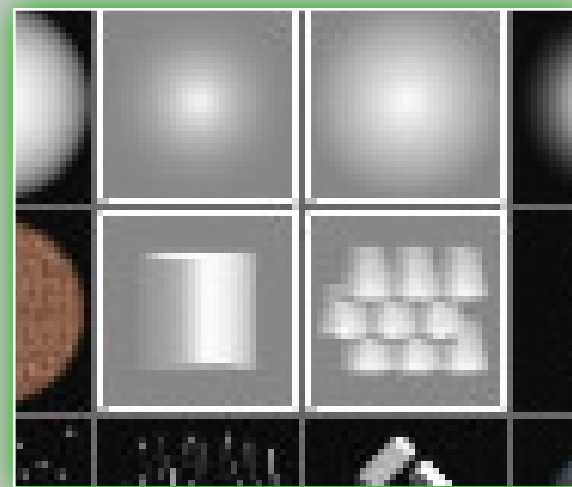
Let's take a look at the right side dockable panel. The first is the **Pen** tab. Choose a pen you like from the list of pens. This is a list



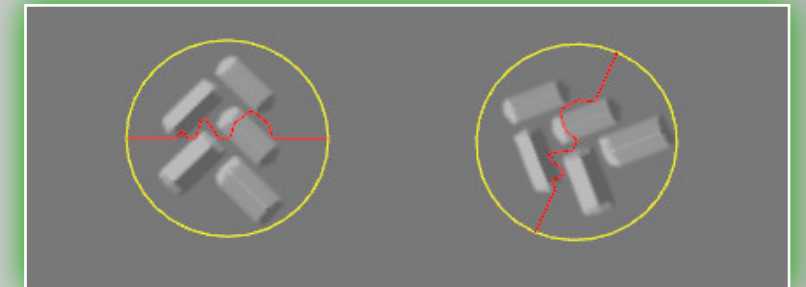
of all the default pens within 3D. You can add your own pens in **.TGA**, **.PSD** or **.ABR** format (the pen format used in Adobe Photoshop). Press on **the Folder** icon to add a pen. The pen added will appear in the list of pens available. You can use a 3D model as a pen. A pen can be colored, provided the image contains an alpha-channel. In this case the alpha-channel will be used as a mask for depth.

You can use **CTRL** or **SHIFT** to select several pens, and you will then see several pens selected in the preview, these will be used randomly.

In the pen selection mode you can adjust the pen further. To change the pen radius, use the keys "[" and "]" or the mouse wheel (provided the corresponding adjustments were made in the **Preferences** menu).



To change the pen depth, press "-" and "+" or the mouse wheel (provided the corresponding adjustments were made in the **Preferences** menu). You can do the same using the sliders in the top pen panel.

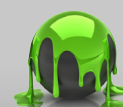


Choose a pen, set radius to **"20"** and try drawing on the object. Increase radius, choose another pen shape and draw a bit more. Use the **"T"** key to quick access the pen menu. First press **SHIFT** and draw again. You will see the surface become smoothed. Change the smoothing intensity using the **Smoothing** slider. First press and hold on **LMB**, then press **SHIFT** and draw again. You can now draw perfectly straight lines. Click **CTRL** to draw cavities – these cuts into the existing model.

You can rotate your pen. Rotation parameters are from 1 to 360 degrees. You may use hot keys "(" and ")" or the mouse wheel (under corresponding settings in the **Preferences** menu) to rotate the pen clockwise or counter-clockwise. You can see the red line rotating on the pen cursor when "(" or ")" is pressed. If you choose an asymmetrical pen shape, then this rotation shows the pen orientation.

3.2 The Pen Options Tab

Every slider has small mouse icon nearby. Change it to pen icon if you want that parameter to depend on pen pressure. Here is the list of parameters:

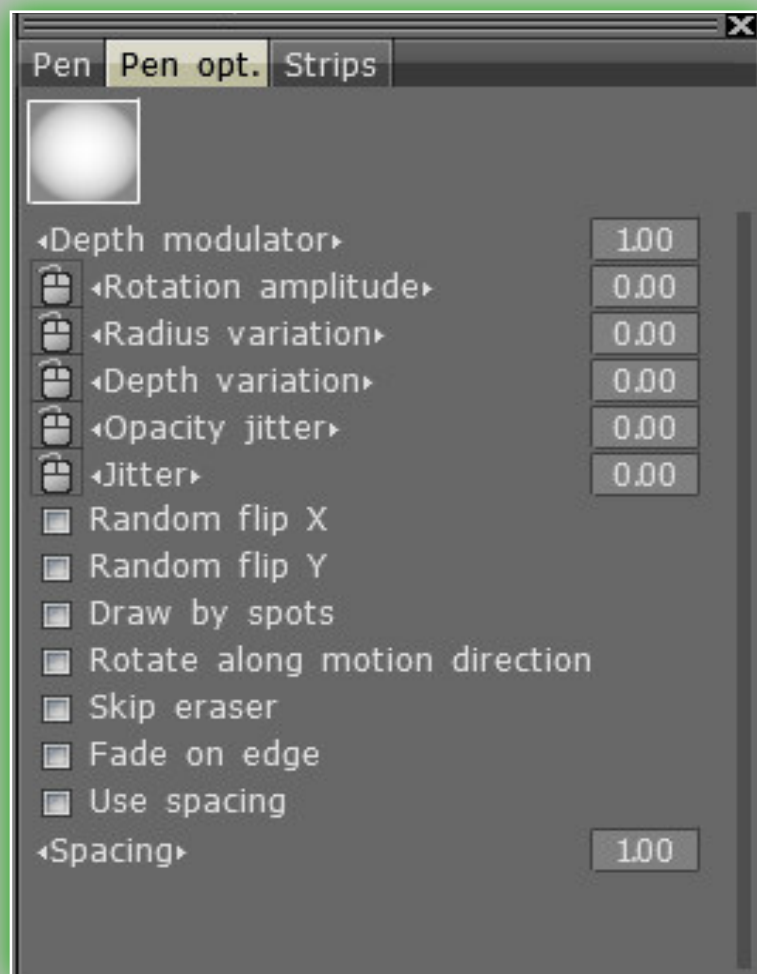


Depth modulator. It is used to specify the standard depth for each pen in use.

Rotation amplitude. The amplitude of additional random pen rotation.

Radius variation. The degree of random pen radius variation (in percentages).

Depth variation. The degree of random pen depth variation in percentages.



Opacity jitter. Jitter of Opacity.
Jitter. Jitter of the pen.

Random flip X. Flips pen randomly along its x-axis.

Random flip Y. Flip pen randomly along its y-axis.

Draw by spots. With this option a moving pen will draw with separate spots, as opposed to stretching lines.

Rotate along motion direction. With this option, the pen slopes in the direction of motion. If you rotate the pen manually, the angle of rotation will be added to the inclined

angle as a result of the pen's motion.

Skip eraser. Don't use eraser Layer of the pen.

Use spacing. With this option, drawing with pen movement will be done with patches placed at equal intervals from each other.

Spacing. Set spacing distance. By pressing **RMB** on any of the non-standard pens you will see the advanced menu, which allows further editing and options. These options are:

Pen settings. Go to the pen options tab.

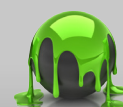
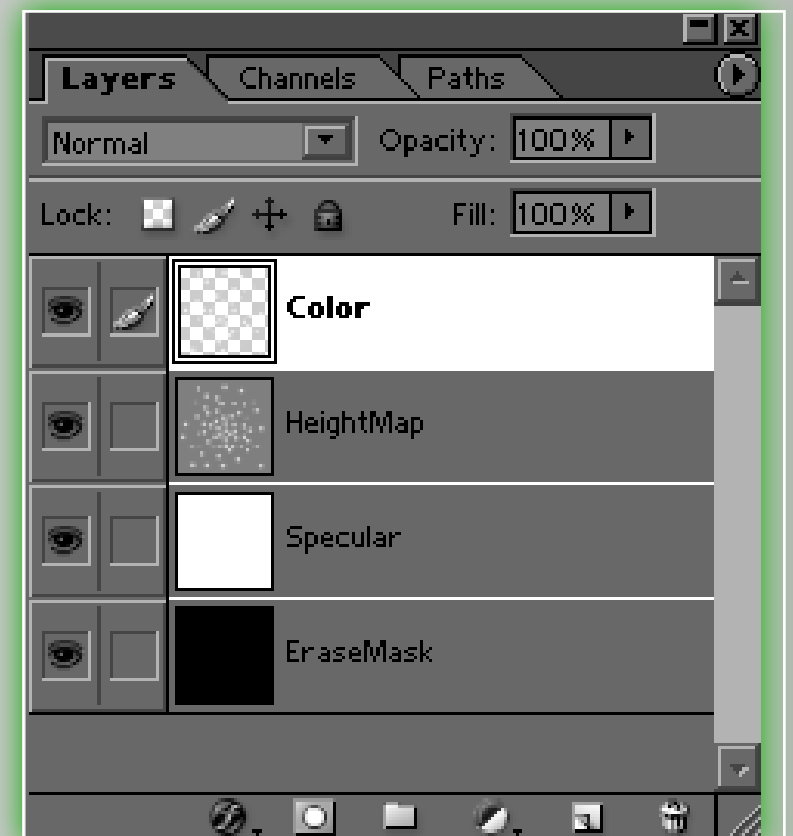
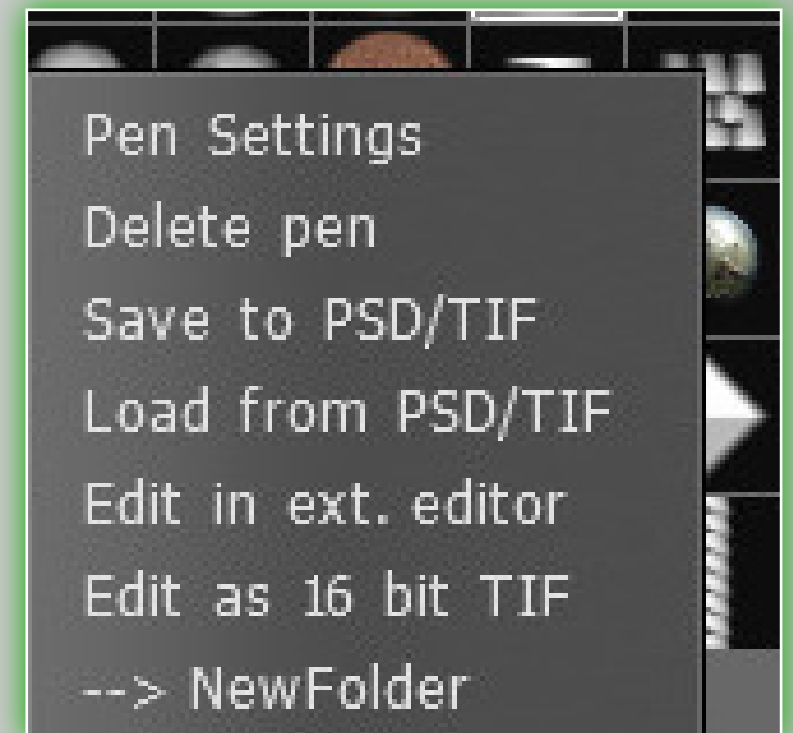
Delete pen.

Save to PSD/TIF. Store the pen to a **.PSD** or 16-bit **TIF** file. **.PSD** is more intuitive, **TIF** is more precise. The **TIF** file can contain 7 channels – RGB, Alpha, Height, Specular and Erase mask).

Read about this channel structure below.

Load from PSD/TIF. Load a pen from **.PSD** or 16-bit **.TIF**. **.TIF** files can contain up to 7 channels. The table shows how different numbers of channels will be handled: (CH = Channel, HT = Height, A = Alpha, Spec = Specular & Erase Mask)

1 CH: treated as A & HT



2 CH: 1 – A 2 – HT

3 CH: 1, 2, 3 – RGB, 2 – A, H

4 CH: 1, 2, 3 – RGB, 4 – A, H

5 CH: 1, 2, 3 – RGB, 4 – A, 5 – H

6 CH: 1, 2, 3 – RGB, 4 – A, 5 – H, 6 – Spec

7 CH: 1, 2, 3 – RGB, 4 – A, 5 – H, 6 – Spec, 7 – Erase mask

NOTE: In the case a .PSD file has no structure as described, it will simply be unrecognized by the program.

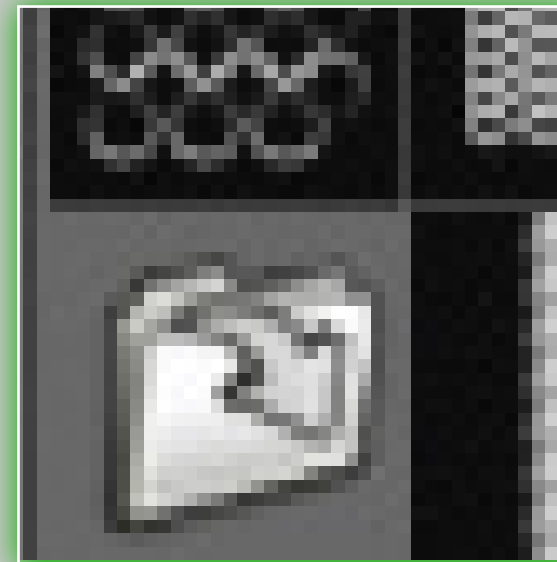
Edit in ext. editor. Edit the pen in an external image editor (Adobe Photoshop by default). A **.PSD** file will be saved and it will be loaded automatically after any changes. As soon as you save the file, **3D-Coat** automatically reloads the pen.

Each pen includes four Layers. **Color**, **Height Map** (Depth), **Specular Map** (Specular) and an **Erase Mask** (Erase). Let's take a look at these Layers individually:

Color. This contains the pen color and its transparency mask. The transparency mask affects the specular channel as well (Specular).

Height Map. This contains the pen height map. Middle grey RGB (127,127,127) corresponds to zero height. Darker colors correspond to concave areas, lighter colors to convex areas.

Specular. White color corresponds to *maximum* specularity, black color to the *absence* of specularity. Keep in mind that the color map transparency mask gets applied onto the specular map, too.



EraseMask. This mask lets you erase the Layer contents on the mask before pen drawing. This may be used to create pens which will not collide with each other when drawing. Keep in mind that the erase mask affects the lowest Layer.

Edit as 16-bit TIF. Edit the pen as a 16-bit **TIF** file in an external editor (Adobe Photoshop by default). A **.PSD** file will be saved and it will be reloaded automatically after every change.

-->**NewFolder.** This lets you copy the selected pen(s) to a different folder.

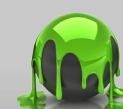
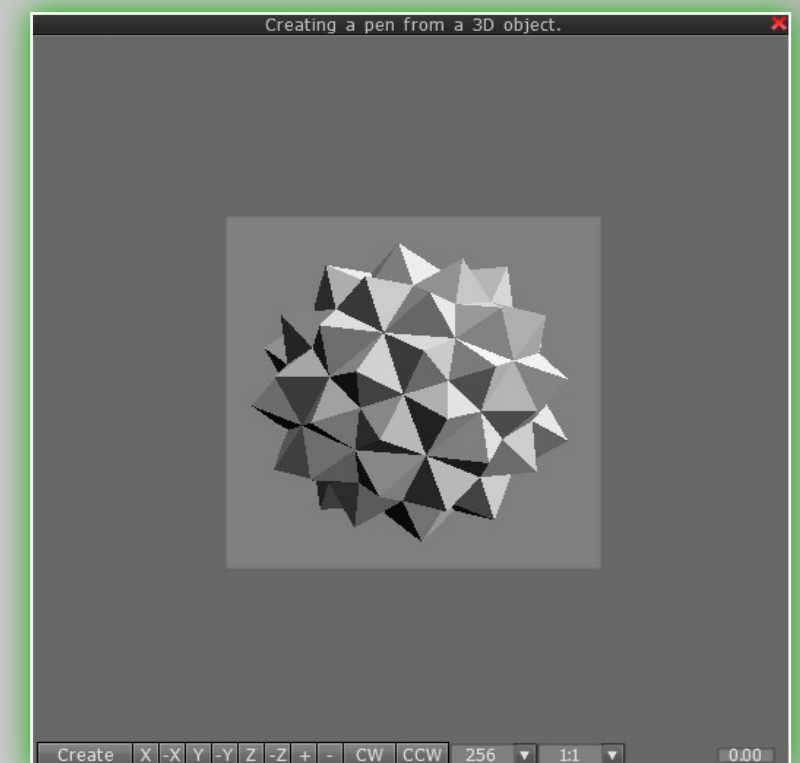
Pen Tab Drop-down List. On the right side of the tab, you'll see an arrow pointing down. By clicking this there will be many more advanced options:

Refresh pens preview.

Pen Settings. Goes directly to the **Pen opt.** tab.

Add new folder. Creates a new folder.

Add existing folder. Add images from a folder with pictures. A new pens/strips folder with the same name will be created. You should select at least *one* file in the



folder and all files from the folder will be added to list. **NOTE:** In Folder menu you can switch between folders you have created.

Icon Size. You can also change the size of the icons, to a number of sizes. They are: *Tiny, Normal, Large* and *Huge*.

Create a pen from a 3D Object. By clicking on the **Folder** icon in the **Pen Tab**, you can import a number of 3D file formats to be used as a pen. In the image on the right, you can see the editing viewport for importing a 3D mesh. The model can be rotated and scaled. Rotate the model by pressing **LMB**, move the model with **SPACE**, scale it with **RMB**, rotate within the screen frame with **ALT+LMB**. You can choose the texture size and the image proportions. The use of non-square pens is especially handy when creating *strips* – as described below. With the slider in the right lower corner you can adjust the model's level of "dipping" into the background plane – which determines the zero pen level.

3.3 Pen Options in the Tool Bar

Some pen options are on the top menu bar. You'll notice that as you change your tool, so will a portion of the menu bar. These options are: **Soft stroke, Pressure Dependencies, Radius, Smoothing, Depth**, etc.

Soft stroke. In this mode, strokes will be more accurate because of an additional smoothing of their trajectory.

Radius. This lets you change the size of your pen in the viewport with a slider, or by manually keying in a value.



Falloff. This lets you control the brush with a fall-off curve, giving tighter control over the area the brush will affect.

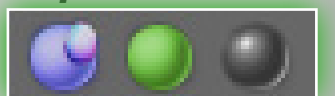
Depth. This lets you to change the intensity of the depth of your strokes with a slider, or by manually keying in a value.

Transparency. This lets you change the intensity of the color channels transparency up and down with a slider, or by manually keying in a value.

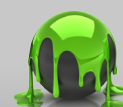
Specularity. This lets you change the intensity of the specularity channel up and down with a slider, or by manually keying in a value.

Smoothing. This lets you change the intensity of the smoothing up and down with a slider or by manually keying in a value.

Channel Toggle Icons. **3D-Coat** has three channels that you can paint at any given moment. They are from left to right: **Depth, Color and Specularity**. These icons will, upon **LMB** clicking, toggle the channel on or off. If the channel is off, you will see a large "X" over the respective icon. If you hover over each icon you will notice that there are a few more options for each, which can also be controlled with **RMB** + dragging up/down or left/right. **RMB** and dragging your mouse up/down will change the *intensity* of your pen. **RMB** and dragging your mouse left/right will change the *size* of your pen.

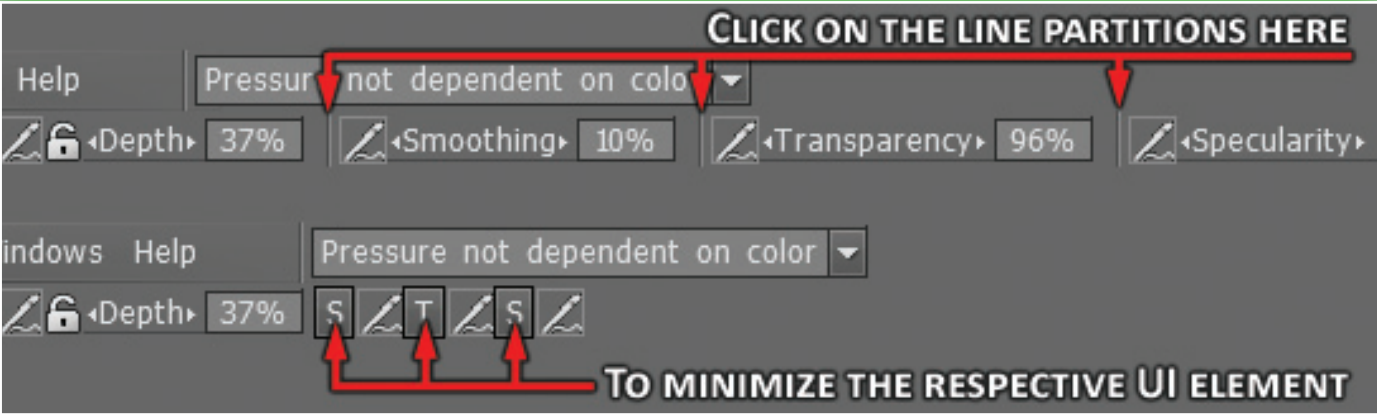


Mouse, Pen and Lock Icons. These two icons indicate what mode your style is currently in. You can toggle from one to the other simply by **LMB** clicking on the icon. The **Mouse** icon locks pen pressure to whatever value you have in the respective setting the icon is next to. The **Pen** icon allows



for pen pressure directly from your stylus. The **Lock** icon will lock the “on screen” size of the pen. It is convenient when you want to change radius of the pen by simply moving the model backward and forward in space. The **Lock** icon near depth slider lets you vary the pen radius without variation of absolute pen depth. In standard mode, radius and depth are proportional.

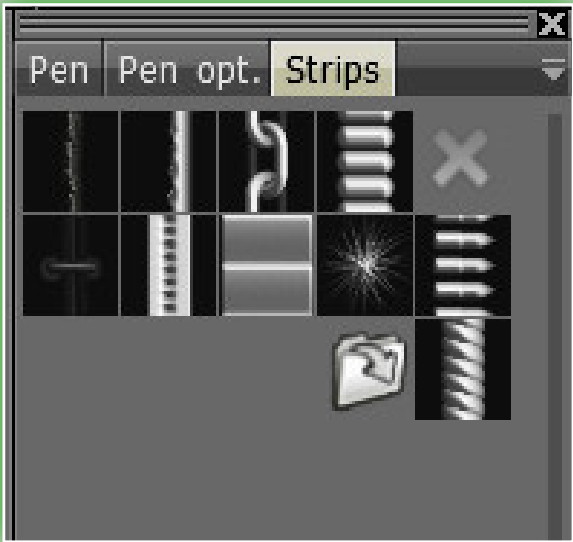
Minimizing on the Tool Bar. You can also change settings on the tool bar, such as falloff, specularity, etc. This can be done by clicking in the immediate area around the setting you wish to minimize. The image here shows the area to click to achieve this.



3.4 Strips Tab

With the help of the **Strip** menu you can select the shape of a strip to be applied along the drawing trajectory. This may be used to draw decorative edges or a chain. The red **X** sign means no strip will be applied along the trajectory. Just as with pens, you can click on the **Folder** icon to add a new strip.

There are a number of ways that you can apply a strip. You can simply brush them in with your pen manually, or you can create a spline curve and apply the strip to it. Of course, using



a spline is great for getting an accurate strip, so it is recommended you try it with a curve first. If it doesn't suit your needs, or you require something more “loose,” then you should try to manually brush it. It also helps to use the **Soft Stroke** feature

when manually brushing a strip.

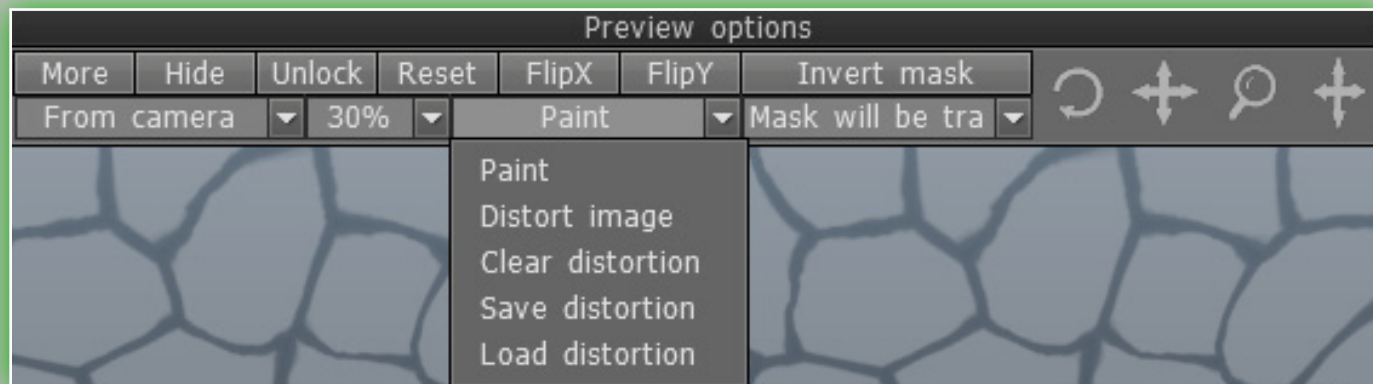
Here you can see an excellent image, with the proper use of a strip along a spline curve. The bandolier around the figure's shoulders was painted with the strip.

3.5 Masks Tab

Masks are used as a way to specify an area for sculpting or texture painting for pen depth and transparency. Masks are essentially stencils. The mask and materials can be moved and rotated independently using new navigation controls. Masks and materials can be rotated precisely 45 degrees by using **SHIFT**.

If you choose to display mask/material in at least one of the channels (depths and/or, colors and/or specular, see more detail about them below) a new panel shows up on top.





With the **Preview Options** panel you can adjust the **Masks** & **Material** preview parameters:

Hide/Show/Auto. *Hide/show/auto-hide* full-screen view of texture. You can switch mode with the hot key “H”.

Unlock/Lock. Lets you scale and texture automatically while scaling and moving the model.

Flip X. Reflect texture, mirror-like, across the horizontal axis.

Flip Y. Reflect texture, mirror-like, across the vertical axis.

Paint. This mode lets you paint with your material or mask.

Distort Image. In this mode you can distort your mask or material directly with your brush. You can do some very unique texture work with this feature. It is great when you have an image that doesn’t match the mesh exactly. You can then use this tool to shape the image to match the mesh more precisely – so that you can then paint with a material or mask. As you can see in the image, the jaw line, nose and silhouette of the head have been shaped with the distort image feature.

Reset. Places the texture in its initial position.

Clear/Save/Load Distortion. With these options you can clear, save and load your distortions.

Mapping Method. There are two methods you can use here. *From Camera* and *Cube Mapping*. *From Camera* lets you

project the method through the viewport. If the **Cube Mapping** application type is selected, the material preview will be displayed on the pen only, as opposed to full screen (when *From camera* is selected). On the right there is a slider responsible for transparency when viewing the Masks/material.

Opacity of preview. Percentile based opacity controls.

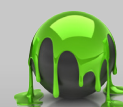
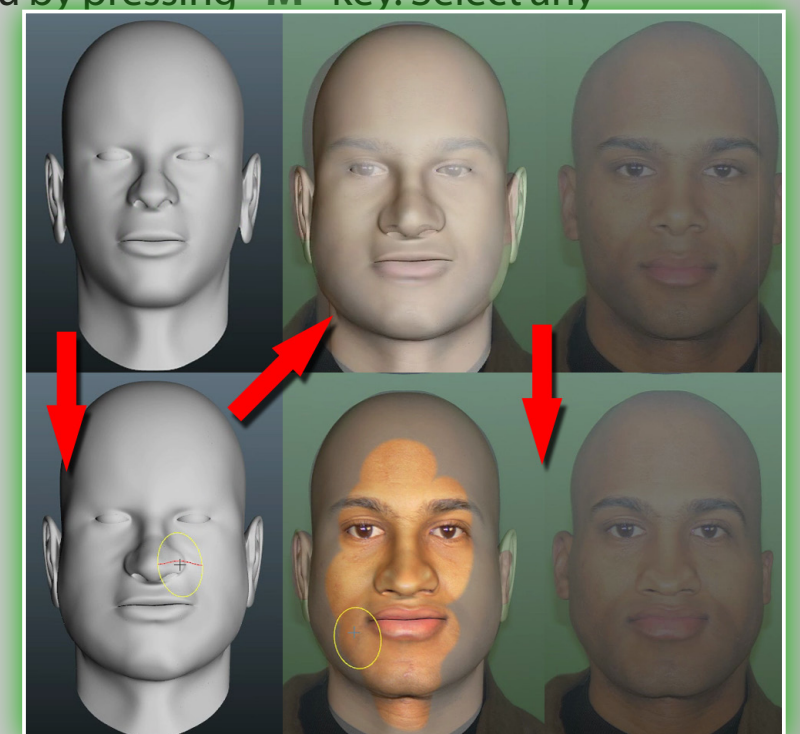
Adding a new mask or material is done exactly as you do with **Pens** and **Strips**.

3.6 Materials Tab

The **Materials** menu contains three channels: depth, diffuse and specular. On each channel you can put your own texture. By choosing a material and texture you will see the whole screen filled with this texture. You can add your own materials by choosing the **Folder** icon (material must be in format of **.BMP**, **.DDS**, **.JPG** or **.TGA**). The grey **X** sign means no using of the material. Quick-access the **Materials** menu by pressing “M” key. Select any

material from the list and do some drawing. (In the example below, we only want to paint color texture on the model, so depth and specular channels are disabled. You can enable every channel when needed.)

All of the controls for masks, as detailed in that section, are





exactly the same for both masks and materials alike.

You can see the power of the **Materials** in the picture below.

3.7 Blending Tab

This tab contains more parameters than the simple blending

drop-down list, allowing for more advanced use. Let's take a look:

Lock transparency. This lets you draw on a Layer without changing its transparency. Essentially, it lets you edit the current colors on a Layer without adding more.

Depth modulator.

Color opacity.

Emboss power.

Contrast.

Brightness.

Specular contrast.

Specular brightness.

Linked Layer. This drop-down list enables you to mask the current Layer with another Layer. The transparency and depth of the current Layer will be modulated by the selected Layer transparency.

Inverse linkage. An inverse Layer opacity will be used as a mask.

3.8 Layers Tab

Here we see the list of Layers (**Layer 0**, **Layer 1**, etc.), effects with Layers and modes of operations with a Layer. By painting on multiple Layers and stacking them together, you can achieve some very complex-looking texture work. Here you can drag and drop Layers to do a number of things, such as to the trash can to delete, as well as reordering. You can also rename a Layer by double-clicking it. If you know Photoshop's Layers functions, you already know much of this! Still, let's take a look at some of the parameters in the Layers tab:

Blending dropdown list. This offers a variety of **blending modes**, most of which exactly corresponds to Photoshop's.

Depth dropdown list. This allows a number of blending options between Layers for the depth channel. They are: **Add**, **Subtract**, **Choose Maximum**, **Magnify** and **Supress**. You are strongly encouraged to try each one out.



Visibility. By clicking on the *eyeball* you can toggle the visibility of a Layer to be on or off.

At the bottom of the Layers tab window we see six icons:

Add new Layer. Add a new Layer. It is automatically made the current one.

Delete this Layer.

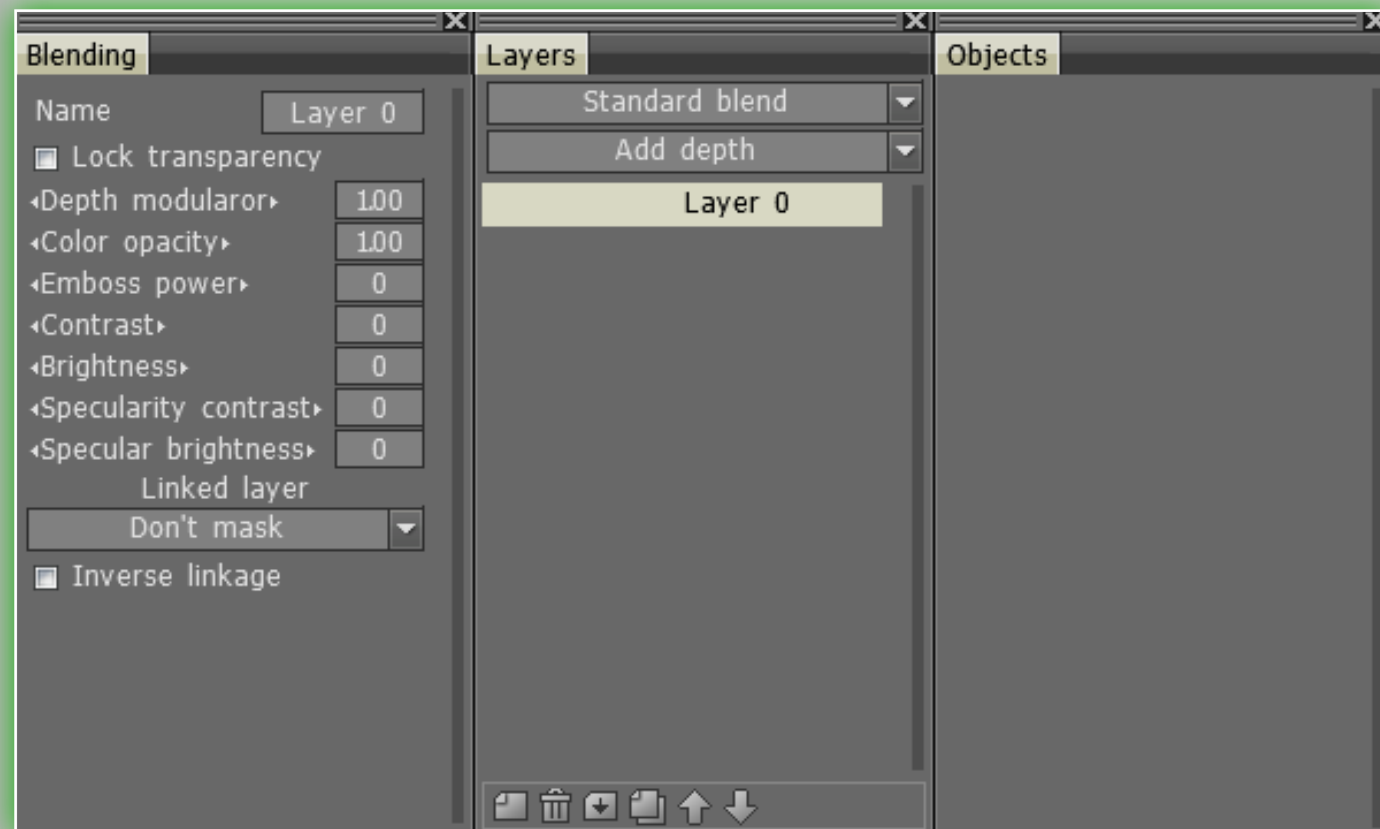
Merge the current Layer with the lower one. This operation cannot be undone.

Duplicate Layer.

Shift the Layer upward. Lifts the selected Layer up.

Shift the Layer downward. Lowers the selected Layer down.

Further more, if you click the **RMB** on a Layer, more options are available:



Layer Blending. Go to the *Blending* tab.

Duplicate. Duplicate the selected Layer.

Flip Layer and Duplicate and flip. Duplicate the Layer and flip it, using topological symmetry.

Flip Layer. Flip the Layer using topological symmetry.

Copy Blue to Red. Copy the blue part of a mesh to the red part. You can define blue and red parts in the topological symmetry tool.

Copy Red to Blue. Copy the red part of a mesh to the blue one. You can define the blue and red parts in the topological symmetry tool.

Merge Visible. Merges all visible Layers. "Undo" is unavailable.

Merge Up. Merge this Layer and the upper Layer. "Undo" is not available.

Freeze painted pixels. The freeze value will be set equal to the Layer's transparency.

Freeze Transparent Pixels. Freeze the transparent part of the Layer. It is important if you want use the transparency mask of the current Layer on another Layer. Use **CTRL+LMB** on the Layer to perform the same action.

Apply Layer Mask. Apply a Layer mask to Layer. The Layer mask is a reference to another Layer that masks this Layer.

Apply Blending.

Color to Specular. Transforms color brightness to the specular channel.

Invert Color. Inverts the color of this Layer.

Invert Specularity. Inverts the specularity of this Layer.



Fill Unfrozen. Fills the unfrozen parts of the Layer with the current color and specularity.

Fill by Mask. Fills the Layer with the current color and specular using its current transparency mask.

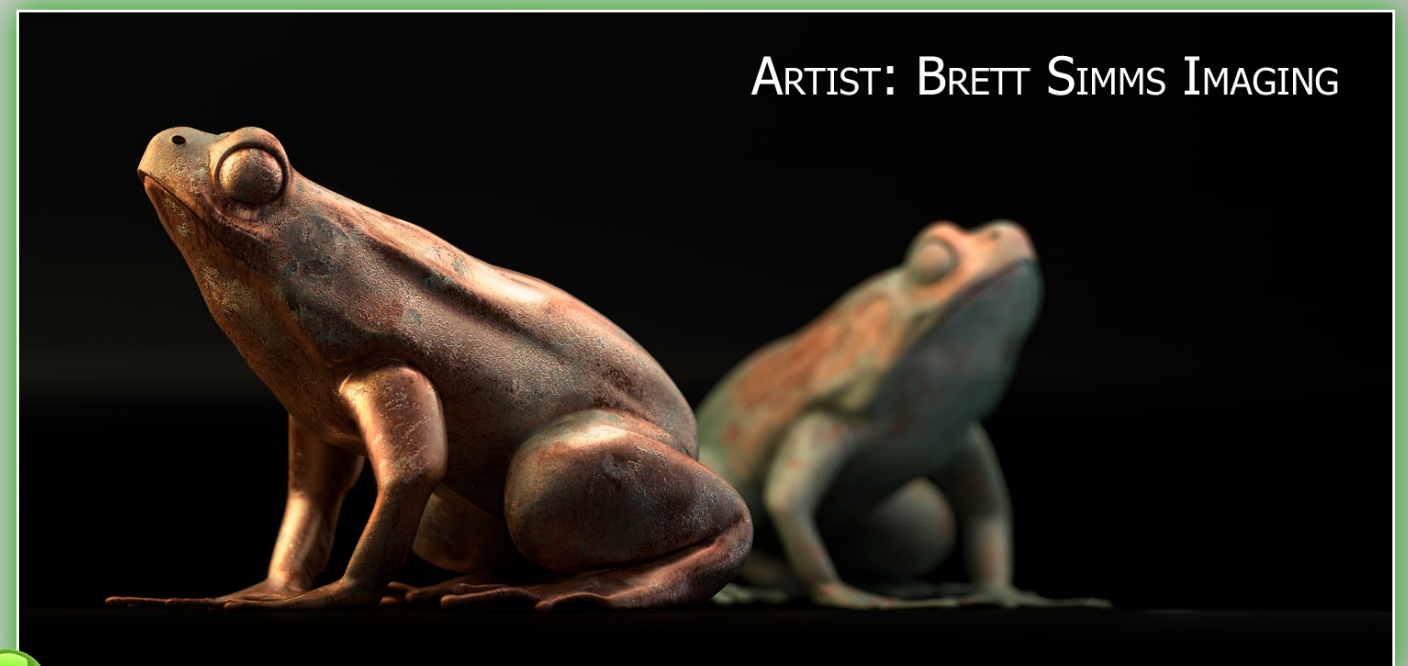
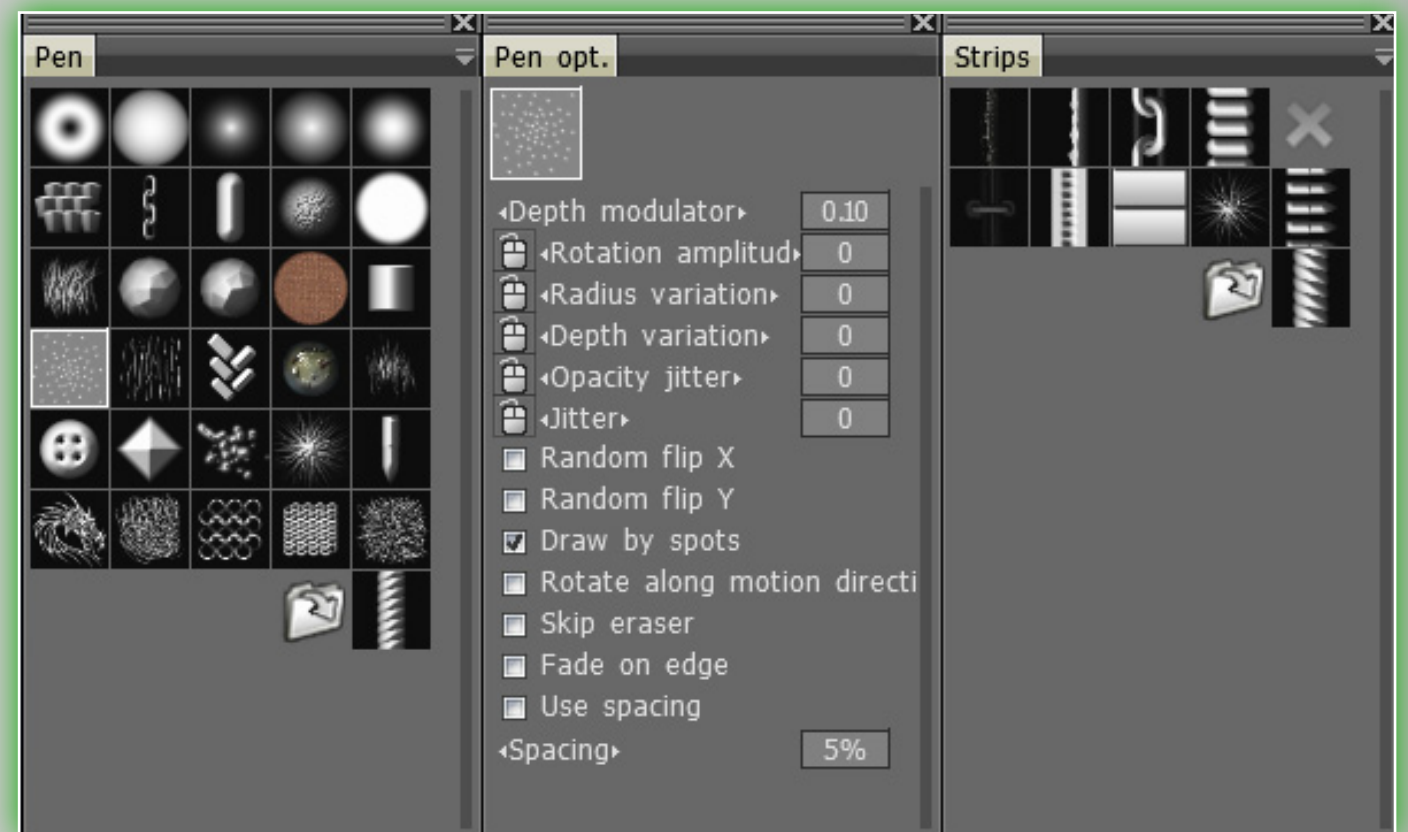
Set Height to Zero. Sets the height to Zero on all the Layers.

Make Transparent. The Layer will become fully transparent.

Remove Specularity. The specular channel will be set to Zero.

3.9 Sub-Objects Tab

This tab displays all imported meshes into a Layer system. If you are familiar with the way Lightwave deals with Layers, then this should be immediate apparent in its function. Essentially, each Layer is an object, and can be toggled on/off for a number of things, like its visibility or locked/unlocked for editing. Or you can also delete the object directly in this panel. You can also rename an object by double-clicking its name in the **Sub-Objects Tab**.



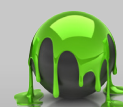
4. Panel Paint Mode

4.1 Per Pixel vs Microvertex

Before we start painting on any meshes, we should discuss some of the different methods for painting within **3D-Coat**. There are a number of them, each with their own positive and negative sides.

The first we'll talk about is *per pixel painting*. It was introduced into **3D-Coat** for the first iteration of version 3. Version 2 used *microvertex painting*. In the microvertex approach every face (quad only allowed) was represented as a patch N×M vertices (N and M could be different for every face). Every vertex had color and coordinates in space, so every kind of displacement was allowed. However this approach was limited because it was very difficult to edit meshes with non-quad faces, and projecting a patch to texture resulted in a loss of quality, so it was difficult to import a texture, edit it and then export because the after-export texture appeared to be slightly blurred. So we decided to implement per pixel painting. Here are the basic points of this technology:

- Painting is performed not over vertices but over pixels on the texture directly. It looks like every pixel on the texture is represented as a point in space.
- Every pixel contains any number of Layers of color, opacity, normal displacement and specularity.
- Every Layer can be blended with the previous one using well-known blending operations for color and displacement.



- Every texture point in space has its neighbors in a per-pixel representation. It is important because it lets you not only paint over the model but also to perform non-local operations – like blurring and sharpening with brush.
- Some operations are performed in space, like painting, filling, applying curves, some in projection, like smudge. All this is transparent to the user.
- Most operations can be performed (optionally) not only on the visible side of an object but on the invisible too, like applying curves, filling, painting rings, rectangles and polygons over the surface.
- Exchange with other applications becomes really fast and has no quality loss, so you can use **3D-Coat** in any stage of the pipeline for a final touch or to perform full texturing.
- You can import a normal map and use it as a reference for texture painting. Normal maps can be changed too, you can apply some smoothing (not over seams) or fade some areas.
- It creates seamless painting and smoothing over textures.

This technology can be used for any kind of texturing – low-poly or high poly. You can edit textures from 32×32 to 8192×8192 pixels large (if you have 1GB or more of video memory). It can be used in a very wide range of applications – from graphics for mobile phones to high-end game projects and films which require huge textures. This technology supports tiled, self-intersected and mirrored textures without any problems. Here is a list of the advantages of per-pixel painting over microvertex painting:

- Much faster than microvertex painting.
- Supports tiled, self-intersected and mirrored UV-sets (microvertex painting supports only non-overlapped texturing).
- Takes up less memory than microvertex approach.
- Gives good precision in painting operations without any additional blurring.

The only disadvantage in comparison to microvertex painting is that per-pixel painting *does not support vector displacement*, only *normal* displacement. Sometimes this makes it an essential point, so we leaved both approaches in place. For example, using the microvertex approach to paint on baked voxel sculptures gives



you better results. These are the advantages of per pixel painting over projection painting:

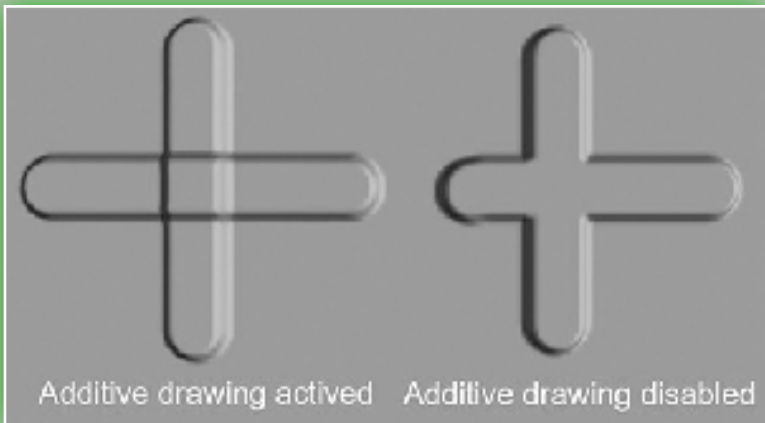
- The possibility of affecting pixels on the back of the model, for example filling, blurring and applying overall effects.
- The painting quality does not depend on the distance from the object to camera.
- More precise painting: what you see is what you get.

The key advantage over the usual texture painting in space is the possibility of blurring pixels under the brush — because every pixel has neighbors.

4.2 Depth

Before you find out how each tool works in **Paint Mode**, you should know about painting in Depth/Color/Specular channels, and also to know about color picking and types of drawing. Point the cursor at the purple hued sphere and click. By clicking here you can toggle between turning the depth on or off. If there is an “X” over the sphere, it will be toggled *off*.

The **additive drawing** option lets you activate/deactivate the additive application option when drawing lines. If **Additive**



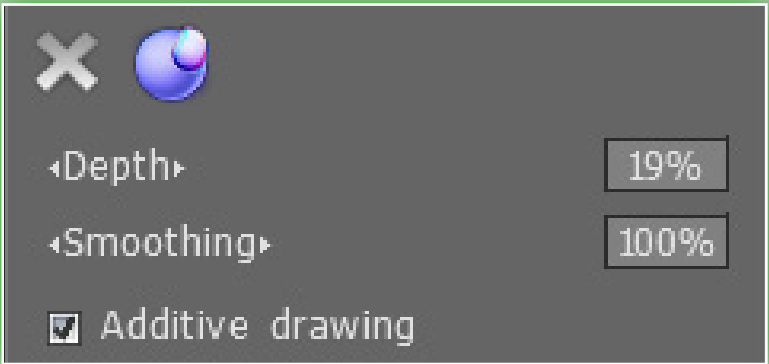
drawing is active, two lines are drawn one over another. Notably, if the option is disabled, a cross is made with objects drawn in the current Layer only. A red line on the pen cur-

sor displays the depth of relief lying. Press the “-” and “+” keys or mouse wheel (under corresponding adjustments in the **Preferences** menu) to see how the depth changes. If the pen is of complex shape, less pressure should be applied to prevent steep overfalls of image height. On a side note, it would make it hard to present the entire object as normal-mapped low-polygonal one, heavy geometry distortions will be seen.

With the help of “Smoothing” slider you can change the level of smoothing. By pressing **SHIFT** key green line will appear on the pen cursor and by pressing **SHIFT** “+” and “-” keys or mouse wheel (provided corresponding adjustments have been made in the “**Preferences**” menu) you can adjust the level of smoothing.

Pay attention, on the top panel there are inscriptions “Depth”, “Color”, “Specular”. Point the mouse cursor onto one of them. You will see the menu as follows:

Pressing on a the grey “X” sign (first in the list) you will forbid changing the correspondent channel when drawing, be it depth, diffuse or specular. By choosing the second icon in the list, you will enable editing in corresponding channel, however without overlaying additional texture in this channel. You will draw with a pen not distorted by material. If the texture is chosen there are also folder icon and material icon. Pressing the folder icon lets you set another texture in corresponding channel for the current material. If you set the texture for diffuse channel, bear in mind



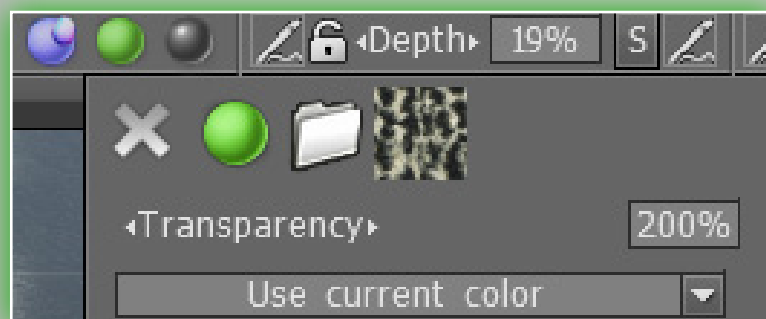
that the texture alpha-channel is used as additional mask when laying color.

Try choosing the first icon in the depth channel and draw a little, then opt for a square with texture and draw. The difference will be obvious.

To access these menus, press “D” (depth menu), “C” (color menu), “R” (specular menu). Use the “~” key to quick-access the semi-transparent panel containing the parameters for all the three channels in a compact form (you can pin it anywhere in your workspace).

On the right is a very good example of the use of depth to paint a displacement map (by Juan Carlos Montes).

4.3 Color



Place the cursor to the **Color** icon. By pressing the grey “X” sign you will prevent drawing color for the current texture. By pressing on the green sphere icon, you will enable editing of the

diffuse channel, but with no extra texture overlaid the channel. If the texture is selected, you’ll see also a folder icon and a texture-imbedded square. Press on the folder icon to replace your texture.

The **Transparency** slider is the transparency applied to the pen color while drawing. You can reduce or increase the transparency using the hot keys – “O” and “P” accordingly. You can see that, depending on transparency, the segment color changes

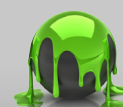


on the pen cursor. The segment acquires a blue color and its size depends on the transparency.

Place the cursor on the drop-down list to see the following. Here you can determine the rules of color selection for drawing. You can draw with a main color, or you can use a mixture of the main and background colors:

Use current color. Use the current color to draw.

Use current color
Use randomly one of two colors
Use random color between two



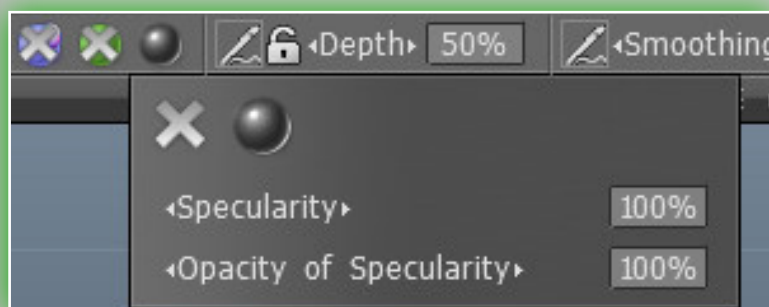
Use randomly one of two colors. Use one of two colors (current or secondary) randomly to draw.

Use random color between two. Use a random mix of two main colors.

Here is an example (by Juan Carlos Montes) which uses **Color**:

4.4 Specularity

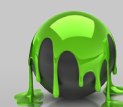
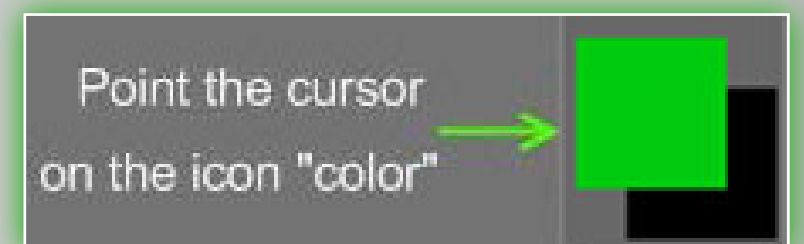
Point the cursor on the **Specularity** icon. By pressing on the red sign you will prevent drawing with specularity. By choosing the **shining sphere icon** you will enable drawing in the specular channel, but with no additional texture overlaid in the channel. The **question-mark folder** means that no extra specular channel texture is to be overlaid while drawing has been selected. If the texture is selected, the question-mark folder is changed into a **specular texture square**. Press on the folder to replace the specular texture for your current material. With the help of the **Specularity** slider you can change the reflective qualities which are applied while drawing. The hot keys "<" and ">" or mouse wheel (under the corresponding adjustments in the **Preferences** menu) allow changing the Specular parameter quickly. The **Opacity** of the specularity slider is responsible for changing the transparency applied to reflective qualities. The hot keys ":" and "/" or mouse wheel (under the corresponding adjustments in the **Preferences** menu) provide for decreasing or increasing the specular transparency.

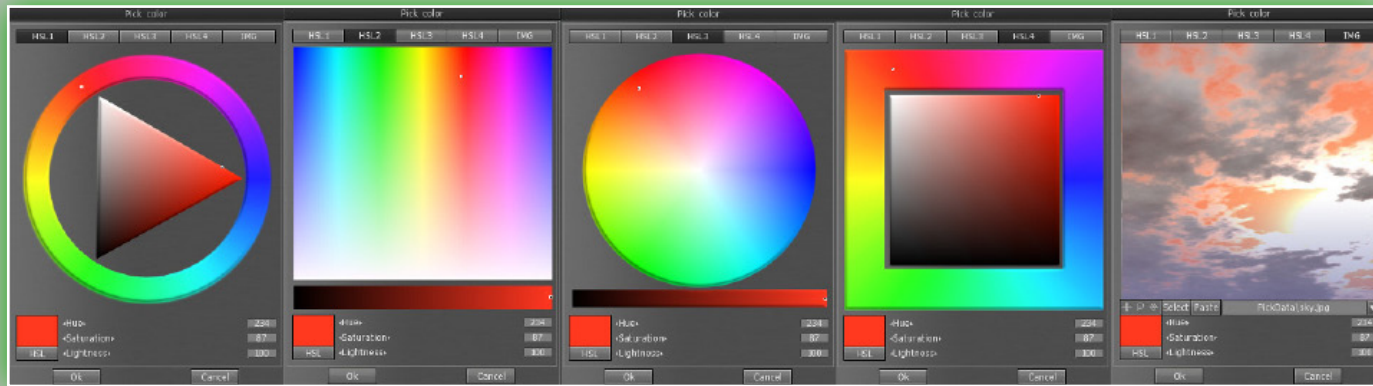


4.5 Color Picker

Now we need to learn how to use the color correctly. For this, point the cursor on the **"Color"** icon on the left tools panel and click on a square under the **"Color"** inscription. By doing so, you will see a panel which lets you pick a color. Within this panel are further options for other color pickers. You have five different color pickers, the last one lets you pick a color from any image you load.

This color will paint the square you pointed at. It shows the current color. You can choose the second color, too: click on an icon right next to the first color icon in **The color** box (on this picture the first color is green, the second is black). The second color is used in the diffuse channel while you work with the drop-down list. Apart from the stan-





dard set of color options, the **Pick color** window contains various color selection modes: HSL and IMG. For the latter, there are additional buttons available.

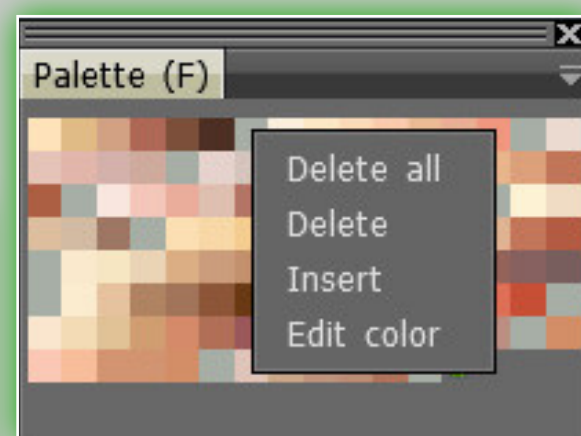
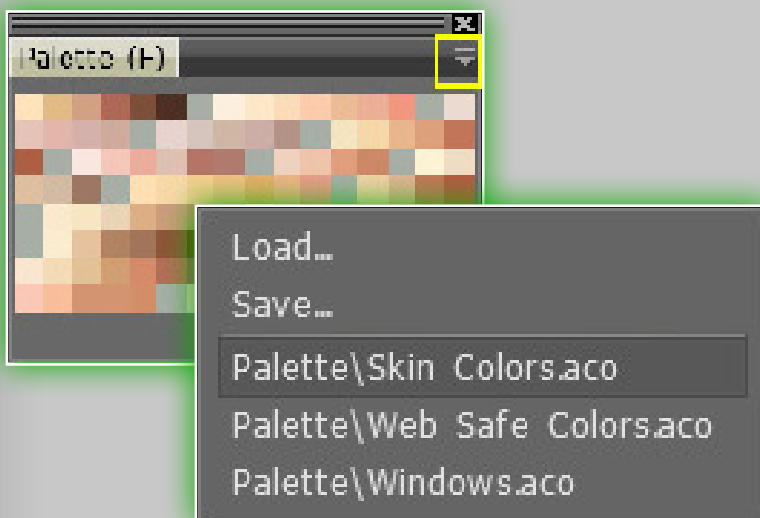
There are further options for the image color picker panel:

Manipulator Icons. With the icons on the left top of the image color picker, you can pan, zoom or reset the position of the image.

Select. Select an image from file.

Paste. Paste an image from the clipboard and use it like the custom picker.

Image Drop-down list. If you have more than one image, you can select them from each of these by clicking here in the list.



In addition, for a fast choice of color, you can press and hold the **"B"** key (when calling it this way, you open the downsize **Pick color** window, the same as when calling from the **Windows->Popups->Color picker. RMB** to disable/enable the use of color. It is equivalent to choosing a white color. You can pick color directly from a surface, point the cursor on a corresponding place and press **"V"**. You can also pick a color from a color Palette window, there are three preset palettes:

Click on the drop-down list, there are 3 preset palettes, and you can both load and save an .ACO color palette file. You can also right-click on a color to change the color's properties:

4.6 E-Panel

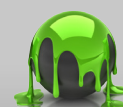
Place the cursor on the **E-Panel** menu, here you can see 15 drawing modes available. The first five modes are used with a Wacom tablet and most of them are self-explanatory:

Change pen width and depth. This depends on the pen pressure applied while drawing.

Depth only. Width remains the same, but depth differs.

Alter pen radius. This will change the depth and opacity depending on the pen pressure.

Droplet mode. Increasing pressure decreases radius and grows depth and opacity.





Same width and depth. Ignores pen pressure applied.

The next three modes are drawing with dots, lines and curves:

Draw with separate dots. This mode lets you draw point by point.

Draw straight lines from point to point. In this and the next mode, press **ESC** to start drawing a line from the beginning or **CTRL+Z** to return to the previous point.

Draw with splines from point to point. The lines and splines drawing mode always uses *crossing*, as opposed to *additive* drawing. This continues until you switch from the line drawing mode into another mode.

The next mode is unique in it's function and has no other sibling modes.

Stamp mode. In this mode the stamp follows the mouse (pen) without leaving traces. You can rotate the pen using "(" and ")" keys or **MOUSE WHEEL** to change pen size and see how the stamp is going to be applied onto an object. We recommend using the Stamp mode with the **Additive drawing** (located in the depth channel menu) option disabled.

The concluding five modes are all drawing with contours:

Draw with rectangle. Use a rectangle to define the drawn area. This mode works with almost every tool. You can paint, freeze, fill, or make planes with the rectangle.

Draw with contour of lines.

Press to add points. Press on the initial point or double-click to finalize the contour. Press **ESC** to cancel the contour, **BKSP** to delete the last point. Double-clicking will close the contour.

Draw with continuous contour. Press **LMB** to draw a contour.

Draw with ellipse. Use an ellipse to define the drawn area.

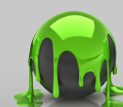
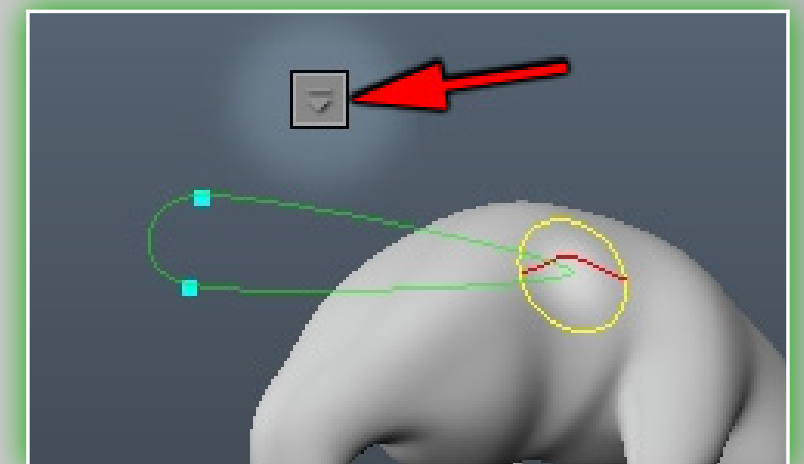
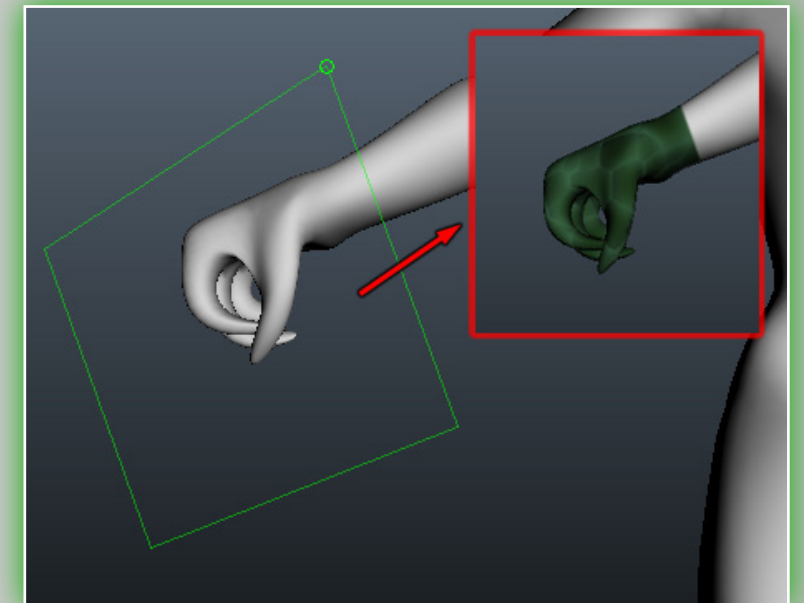
Draw by closed spline/B-spline. Add spline control points with the **LMB**. Press **ESC** to finish. Near the control points you will see a small spline menu button. Press it and you'll be able to choose different options:

Apply. Apply a spline action. You may use **ENTER** instead.

With **CTRL** pressed it will counteract.

Clear. Clear all control points.

Detach from surface. This command detaches any control point that is being attached to a surface (a control point becomes attached if you add it while the cursor is over the surface).



Add points. Use this command if you pressed **ESC** after adding control points and then you decided to continue. Press **ESC** to finish.

Edit points. This is a default mode after you've finished with adding control points. Hover over a spline in the place where you want to add another control point (when you see a red point, press **LMB** to add it). Drag any control point with **LMB**. Use **RMB** over any control point to toggle vertex sharpness.

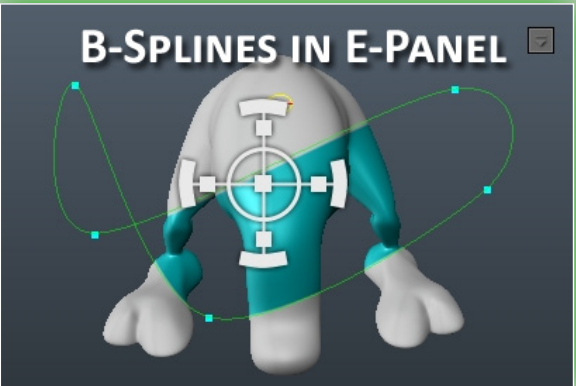
Transform all. Transform the whole spline with the manipulator (rotate, move, scale vertically, horizontally, proportionally).

B-Splines. Use B-Splines by default. In this mode the spline will be smoother and will not go through the control points. Use it with vertex sharpness to get various forms.

Edit points table. Set numerical values of each control point. In this window you can also set the type of each control point: **Sharp** (makes sharp corner at this point), **B-spline** (simple spline if unchecked).

Scale. Set the scale factor and press the **"OK"** button or **ENTER**.

Rotate. Set the angle of rotation and press the **"OK"** button or **ENTER**.



Flip horizontally. Flip the whole spline horizontally.

Flip vertically. Flip the whole spline vertically.

Save. Save the spline to a file.

Load. Load a previously saved spline from a file.

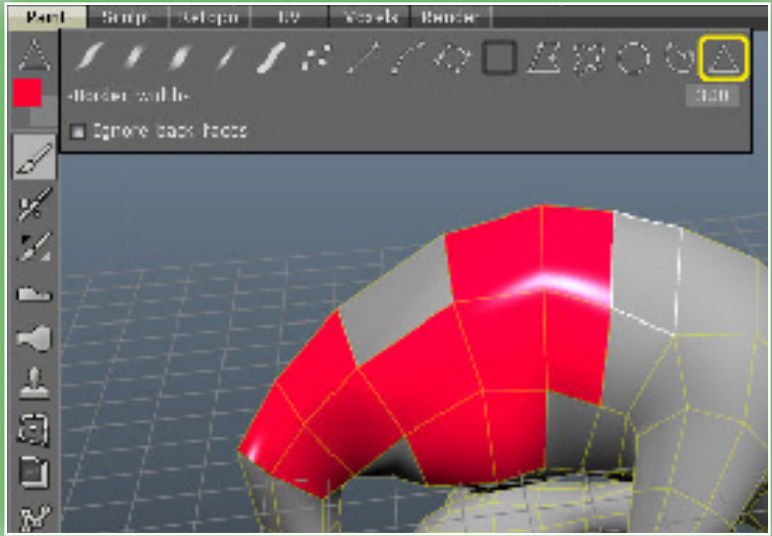
There is one final draw mode, it is unique in its function.

Paint over source polygons. This mode lets you fill in whole, single polygons.

A few more settings for the **E-Panel**:

Border width. This slider is responsible for the border width when drawing with the rectangle, ellipse or contour.

Ignore backfaces. This is a switch which toggles between drawing on the back side of surface polygons and not. This option is available only when drawing with the rectangle, ellipse or contour.



#1	491.000000	302.000000	<input checked="" type="checkbox"/> Sharp	<input type="checkbox"/> BSpline
#2	650.000000	320.000000	<input type="checkbox"/> Sharp	<input checked="" type="checkbox"/> BSpline
#3	455.000000	388.000000	<input type="checkbox"/> Sharp	<input type="checkbox"/> BSpline
#4	600.000000	444.000000	<input checked="" type="checkbox"/> Sharp	<input type="checkbox"/> BSpline
Ok Cancel				



Depth limit. Controls how “deep” the effects of your strokes effect the underlying surface/volume.

4.7 Paint Tools

While in Paint Mode you can use a set of tools located in the left side panel. You can also press **SPACE** for quick access (below right). Listed below are all of the painting tools in the left panel.



Draw with a pen. The Brush icon is the default drawing painting method.



Draw with expansion. The *Airbrush* icon is a mode of drawing with accumulation. It is highly dependent upon the *draw by spots* pen option.



Color Operations. This tool has 10 different color adjustment options. They are:

Desaturate. (color reducing) When you press **CTRL** the opposite action is performed, and it colorizes.

Saturate. (increment the chromatic level) When you press **CTRL** the opposite action is performed, and it desaturates.

Darken. (color darkening) When you press **CTRL** the opposite action is performed, and it lightens.

Lighten. (increment of brightness) When you press **CTRL** the opposite action is performed and it darkens.

Sharpen. (sharpen the color) Use **CTRL** to smooth.

Smoothing. (soft smoothing) Use **CTRL** to sharpen the surface.

Increase hue. Increase hue (use **CTRL** to decrease hue). The transparency determines the degree of hue change.

Decrease hue. Decrease hue (use **CTRL** to increase hue). The transparency determines the degree of the hue change.

Subst hue. Substitute hue from current color instead of hue in current Layer.

Hue&Saturation. Substitute alternate hue and saturation from current color instead of hue and saturation in the current Layer.

For example, draw on an object using color, then choose the *Darken* command. Draw again on the object in the same place to see how your current color darkens. Try different color operation modes, as this function is highly dependent on the color channel's transparency.





Magnification or reduction of Layer height. Choose the operations on the Layer height (increase or decrease). When drawing, it is only the current Layer height that is changed. Press **CTRL** to perform an inverted operation. As with the pen shape, so the line and material are taken into account when drawing. There are two operations for this tool (holding **CTRL** will invert their function):

Magnification. The Layer height is increased while drawing.

Reduction. The Layer height is decreased while drawing.

Degree of change slider. This is responsible for the degree of height change.



Shift Layer in tangent space. This tool lets you smudge, collapse and expand the area under your brush. All operations will be applied in screen space, so you should try to place modified place at the best view position. This tool is intended to move only small details over the Layer.

Smudge. Smudges the Layer along motion.

Collapse. Collapses the Layer.

Expand. Expands the Layer.

NOTE: You must click the **LMB** to apply the last two operations.



Clone tool. This tool is quite versatile, so please read and test it out carefully to learn more about it. Press **CTRL+LMB** to mark a source point for copying. Then draw using **LMB**. You can copy not only with a round pen, but also with the frame and contour pen (press **"E"** for brush types). Additional options

in the Clone tool men. You can clone with a number of methods, they are:

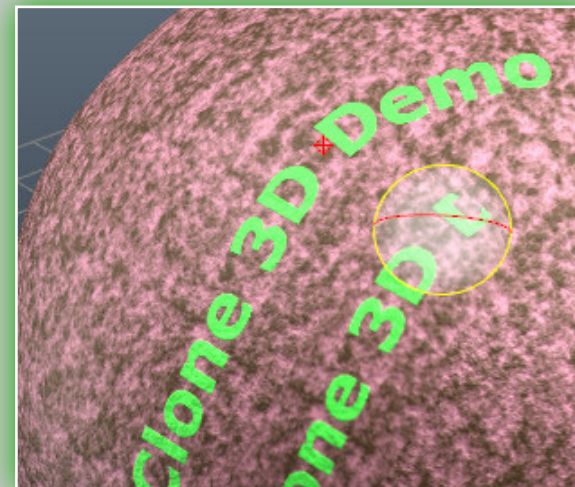
Translation. In this mode, press **CTRL+LMB** to select the source point.



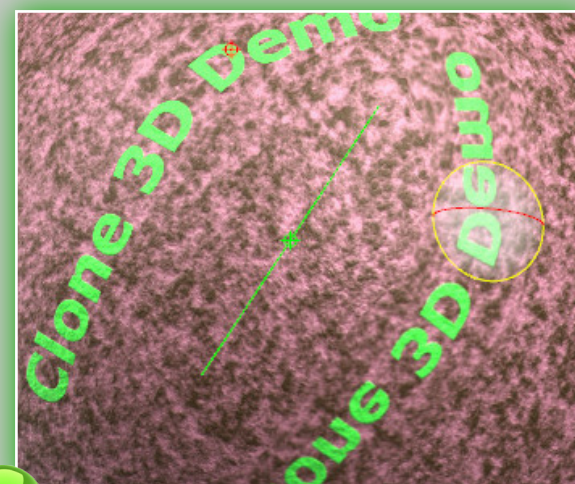
Dx – The horizontal shift of source point.

Dy – The vertical shift of source point.

Mirroring. Copying with mirror-reflection of a plane. Press **CTRL+LMB** to select the point for the plane to go through. (See below)



Inversion. Copying with inversion against the point. Press **CTRL+LMB** to mark the center point of inversion: Center X and Center Y – positions of pivot point on screen. Press **CTRL+LMB** in the corresponding places to change it.



Clone sector. Copy a sector rotated at a selected angle against the pivot point. Press **CTRL+LMB** to mark the rotation center point. This mode can be used to multiply a pattern drawn in one sector all





around. **Center X** and **Center Y** are the positions of the control point on the screen. To change its position, press **CTRL** and **LMB** in corresponding place.

Amount of sectors. Amount of sectors when cloning a pattern in a sector.

Counter clockwise. When enabled, the sector will be copied counter-clockwise.

Symmetrical copy. Symmetrical copy lets you to copy a surface from one side of a model

to make it symmetrical. Press **"S"** and activate symmetry before using this tool. This tool can be used on any of the three axes to copy symmetry. (Image left)

Copy using pen. This lets you copy using topological symmetry. You should set up topological symmetry before using this tool. Topological symmetry can be defined in the **Topological symmetry** tool by selecting two symmetrical faces.



Transform/copy tool. Drag the frame and select an area to be transferred. The frame acquired can be dragged, or rotated. Use **SHIFT** to preserve proportions. Use **CTRL** to drag vertices independently of each other. Press **ESC** to cancel the transformation and **ENTER** to apply it. This mode is good to use in combination with frame, circle and curve drawing (press **"E"** to open the draw types menu). The border width deter-

mines the edge softness when transforming. By disabling channels (depth, diffuse, specular) you can transform the remaining channels only. In the transform mode the surface area is erased from its old place and copied onto the new one.

In order to simply copy without deleting, do not tick the **Erase old position** option. It is possible to transform whole block of visible Layers and paste them merged or separately. You can select what to copy not only with a rectangle but also by using the freehand selection, drag rectangle, etc. The options for this tool are:

Depth modulator. Additional depth modulator for the transformed area.

Opacity modulator. Additional opacity for the transformed area.

Specular modulator. Additional specular modulator for transformed area.

Export. Export selection to a **.PSD** file.

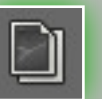
Import. Import a selection from a **.PSD** file.

Edit. Edit image with an external editor that supports **.PSD** files. By default it is Adobe Photoshop.

Save. Save transform parameters and image to **InstallDir\User-Data\StoreData\Rects**

Load. Load transform parameters.

Copy/Paste. You can copy parts of a surface to the clipboard by using **CTRL+C** and then paste them using **CTRL+V**. If the cursor is not on an object, it will be pasted to the same place it was copied from. Images in the clipboard can be edited in another graphics editor, then copied back to the clipboard



and pasted onto the object surface. If the color channel is open for editing, the color texture is placed into the clipboard; if it is disabled, then the depth texture will be placed into the clipboard; in case the depth is disabled for editing, then the specular texture will be placed there. Hence, you can copy and edit in a different graphics editor any of the channels depth, color or specular. If you press **CTRL+SHIFT+C** a new pen is made from a surface part and added to the pen list. When you press **CTRL+SHIFT+V** the mirror reflected part is pasted. Bear in mind that copying and pasting are pen-turn sensible. Copying and pasting objects with the help of hot keys is not limited to Copy/Paste tool, but is possible in any other mode.

Save. Save the clipboard image into a file.

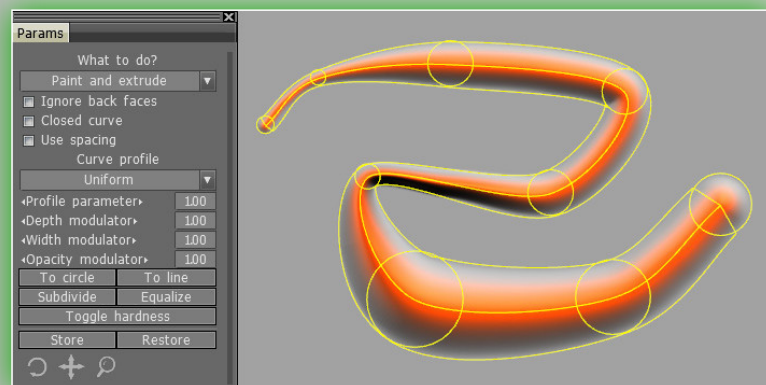
Load. Loads the clipboard image from a file. Using these functions, you can create a library of stamps. Load a plane or a cube, for example, draw a button or a rivet, then save it to a file. As with depth, so the color and specular will be saved, too.



Draw with spline. Upon activating the tool, the *Param* tab will be activated. There are many parameters for the curve tool:

Curve profile. First let's take a look at the *Curve* profiles.

- **Uniform.** The curve with no linear modulation.
- **Sharp.** The curve sharp on edges.



- **Obtuse.** (flatten) The curve flattened on edges.
- **Arrow.**
- **Arrow back.**
- **Double arrow.**

Arrow.

Back arrow.

Double arrow.

Arrow.

Back Arrow.

Double arrow.

Sinuous.

Ignore back faces. When this option is activated, you draw only on the visible part of the surface.

Closed curve. Close the curve.

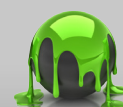
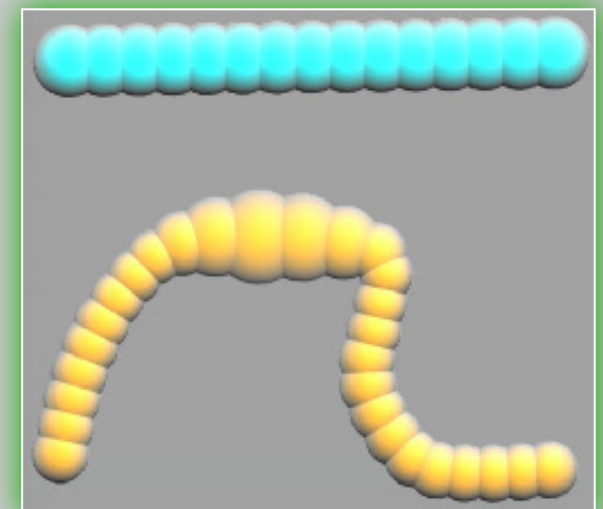
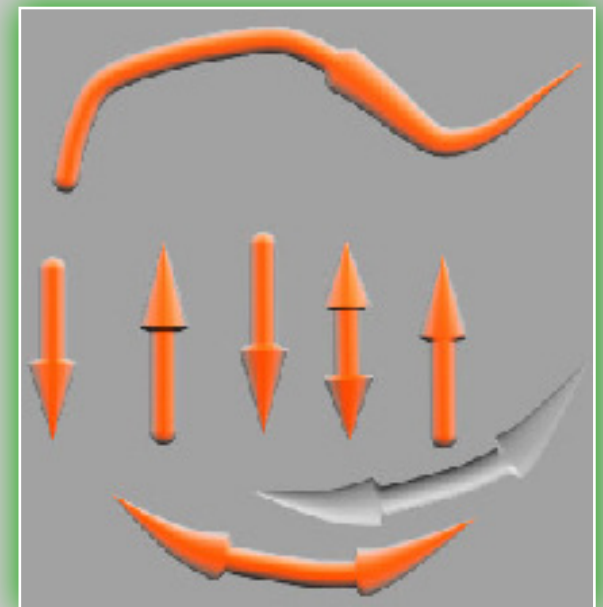
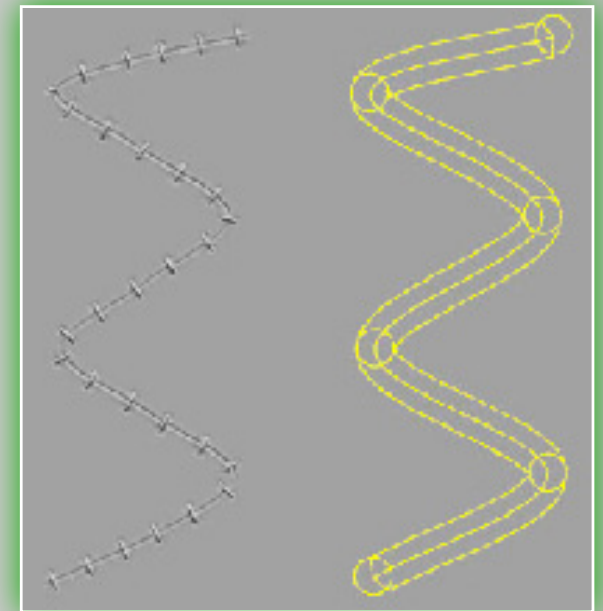
Use spacing. Points will be set along curve with some spacing and jittering. It lets you make new effects with curves.

Toggle hardness. This mode lets you toggle hardness of the vertex in spline by click on he vertex. **ESC** cancels this mode.

Profile parameter. This parameter affects the linear curve profile in case you selected the sharp or obtuse profile.

Depth modulator. Modulator, impacting the entire curve depth.

Width modulator. Modulator, impacting the entire curve width.

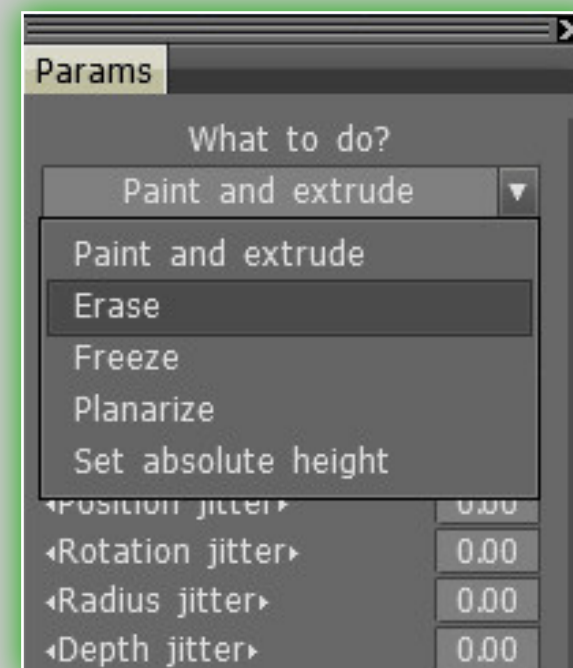




- **Opacity.** Transform current combination of points to circle if possible.
- **To line.** Transform the current set of points to a line if possible.
- **Subdivide.** Subdivide curve.
- **Equalize.** Set equal distances between points.
- **Store.** Save curve to a file with *.curve extension, placed into: *InstallDir\UserData\StoreData\Curves* by default.
- **Restore.** Load curve from a file with CURV extension, located in: *InstallDir\UserData\StoreData\Curves* by default.
- **Moving the whole curve.** Use the 3 icons on the right bottom of *Params* menu; You can rotate/move/scale the entire curve. (**NOTE:** You can use **CTRL** and dragging a point to rotate the whole curve and you can also use **SHIFT** and dragging a point to move the entire curve.)

In order to draw with a spline, we shall determine a spline of several points first. When pointing the cursor onto one of the blue dots, it gets highlighted. By mouse-clicking you can capture it and drag into a new position. Click again to release the control dot. Splines are handy to use together with stripes to carefully draw a chain or a string of riveting. Click **ENTER** to apply the spline onto the object. **LMB** to add new points to the spline. Use **ENTER** to draw a curve, **CTRL+ENTER** to draw a curve with inverse depth. Use **BKSP** to delete the last point, **ESC** to delete all points.

Curve Profile. There are many curve profiles, you are encouraged to test them all out. They range from arrows to rounded ends, but of course there are many more.



Use spacing. Points will be set along the curve with some spacing and jittering. It lets you make new effects with curves. Curves will be drawn correctly, even if their knot points are far from each other and the surface between them are quite curved.

With the *Draw with spline* tool, you are not only able to paint and extrude, but you also can:

Erase. Erase the current Layer along the curve.

Freeze. Freeze along the curve. **CTRL+ENTER** to unfreeze.

Planarize. Planarize the surface along the curve.

Set absolute height. Apply the plane tool along the curve and then apply the usual extrusion. It looks like setting the absolute (not relative) depth along the curve.

Placing text along a curve. Using this tool you can select the font for text, input the text so as to change the parameters of the curve the text is applied along:

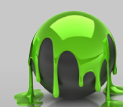
Ignore back faces. When this option is activated, you draw only on the visible parts of the surface.

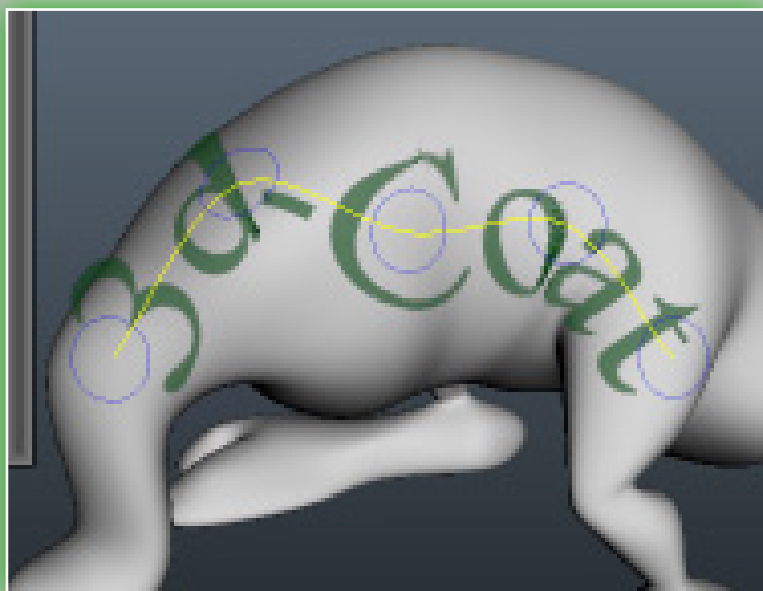
Closed curve. Draw a closed curve.

Flip text. Flip the whole text.

Depth modulator. Modulator, impacting the entire curve depth.

Width modulator. Modulator, impacting the entire curve width.





Opacity modulator. Transform the current set of points to circle if possible.

To circle. Transform the current set of points to a circle if possible.

To line. Transform the current set of points to line if possible.

Subdivide. Subdivide the

curve.

Equalize. Set an equal distances between the points.

Toggle hardness. This mode lets you toggle the hardness of the vertex in a spline by clicking on the vertex. **ESC** cancels this mode.

Save. Save text and font in a .txt file, placed into *InstallDir\UserData\StoreData\Texts* by default.

Load. Load text from a .txt file, located in *InstallDir\UserData\StoreData\Texts* by default.

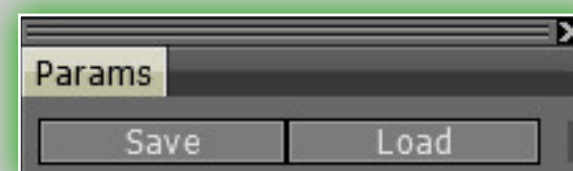
Add new points into the spline by pressing **LMB**. Use **ENTER** to apply, with depth, upon applying the text will be convex over the curve, **CTRL+ENTER** for concave. Use **BKSP** to delete the last point, **esc** to delete all points. Click on the blue sphere to move it. With the *Putting text on the curve* tool you are not only able to paint and extrude, but you also can *Erase/Freeze/Planarize/Set* the absolute height. You can place text along any polygonal surface and along any contour.

Place picture along spline. You can apply an image along a spline curve with this tool. With this tool you can select images used for *Depth texture/Color texture/Specular* texture, put pictures along spline. There are several settings and functions:

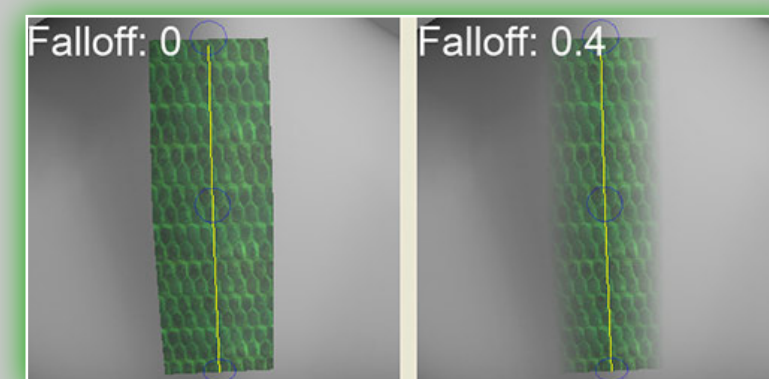
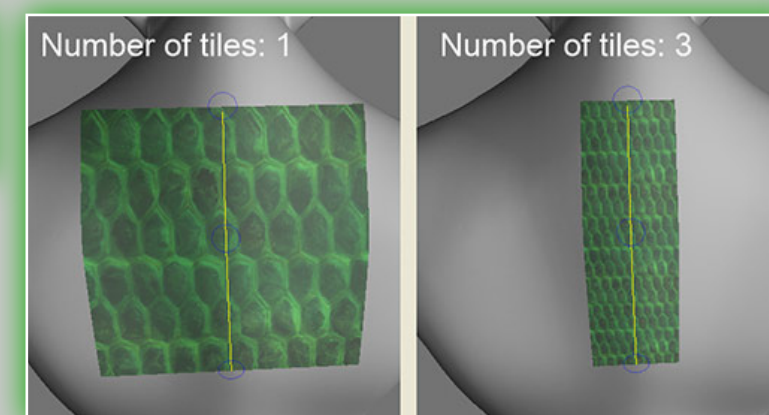
Number of tiles. Specify the number of tiles. You can see the difference with number of tiles higher or lower:

Falloff. Opacity falloff.

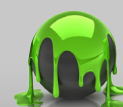
Extrusion. Extrusion of the whole texture.



The other parameters are the same as in *Draw with spline*. With the *Place picture along spline* tool, you are not only able to paint and extrude, but you also can *Erase/Freeze/Planarize/Set* absolute height. Here is an example of using an image along a spline to freeze an area.



Erase. Erasing the color, depth or specular in the current Layer. The range of erasing depends on the slider for *Eraser transparency*. Erasing only effects your currently active Layer.



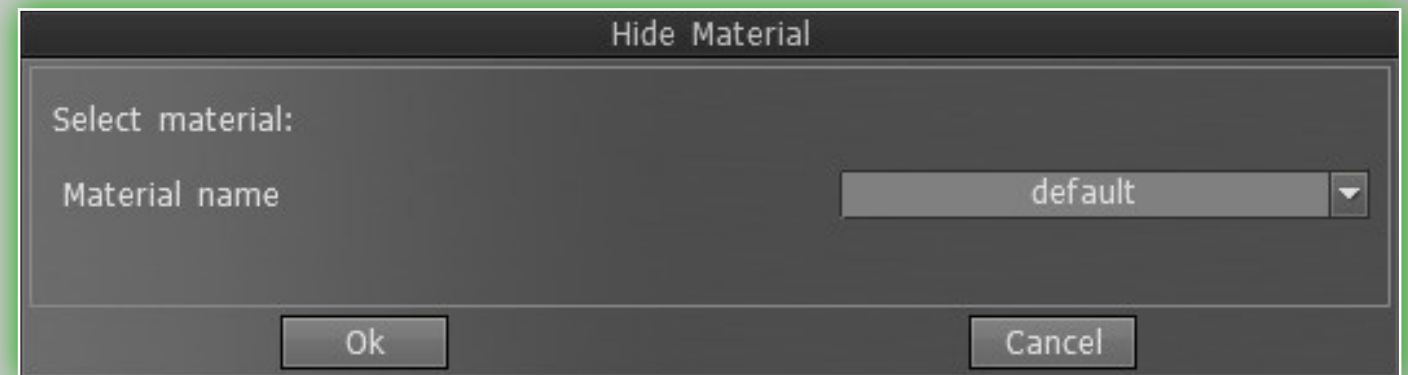
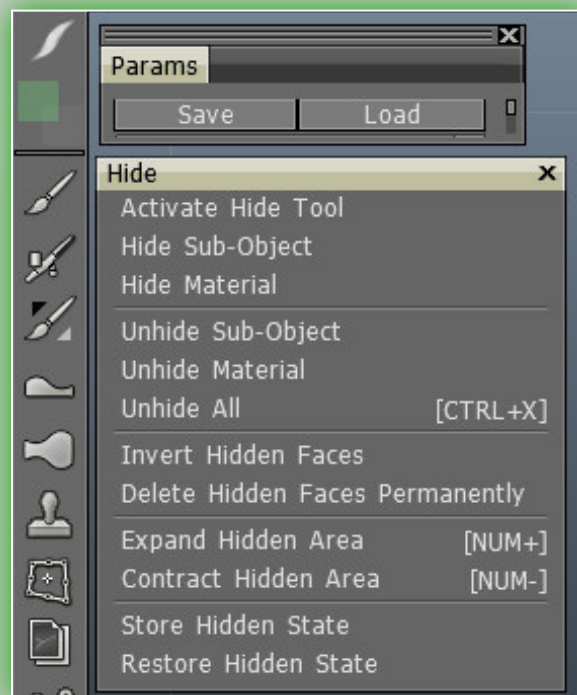
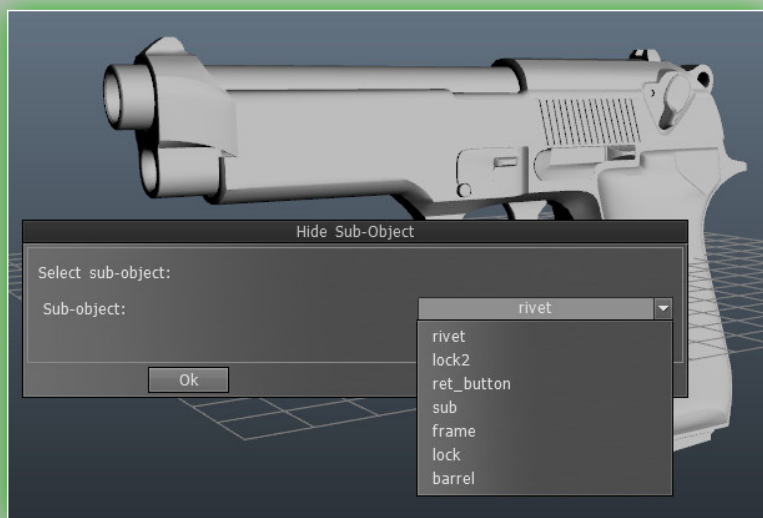


Hide. Makes selected polygons hidden. To hide the necessary parts of a surface, use this command. Pressing a pen hides parts of the surface by painting on the model. Pressing with **CTRL** shows previously hidden surface areas. **CTRL+“X”** to unhide all. **NUM+** or **NUM-** makes the hidden area wider or narrower.

Hide Parameters. Using the additional **Hiding** menu you can save/load hidden areas as presets. In these instances you will also have a drop-down list so that you can select between these presets.

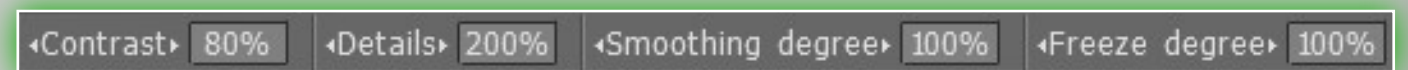


Hide Menu. Furthermore, you can access the more advanced functions of the **Hide** tool in the main menu in the top tool bar. For convenience, you can also undock this menu (like any other menu) and place it in an easy to access area. With this menu, you are not only able to hide surfaces by painting on the model, but you also can hide the whole object by selecting the object you

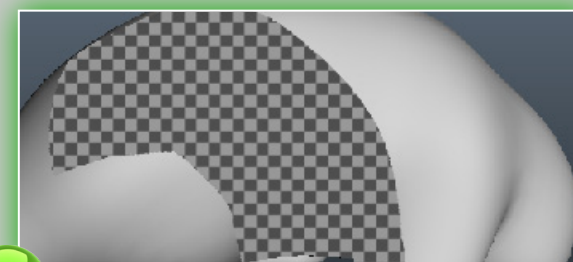


want to hide. For example, if there are several sub-objects in the scene, you can use “Hide Sub-Object” to hide a specific object, as in the picture below. If there is only one object in the scene, **Hide Sub-Object** will hide that object. You can also hide faces by their specific material, use **Hide Material**. Select one material from this menu and all the surfaces with that material will be hidden. The other commands are self-explanatory.

Freeze Surface tool. This is a mode of freezing surface parts to prevent their subsequent change. Freeze mode can be conditional, for example for relief, flat or colored parts depending on mode selected. Blocking masks the action of feathers. Freeze mode is an operation opposite to selection. Press **SHIFT** to smooth out the edges of blocking. This drop-down list provides for a surface freeze mode selection. When the pen goes along the surface, it gets blocked in accordance

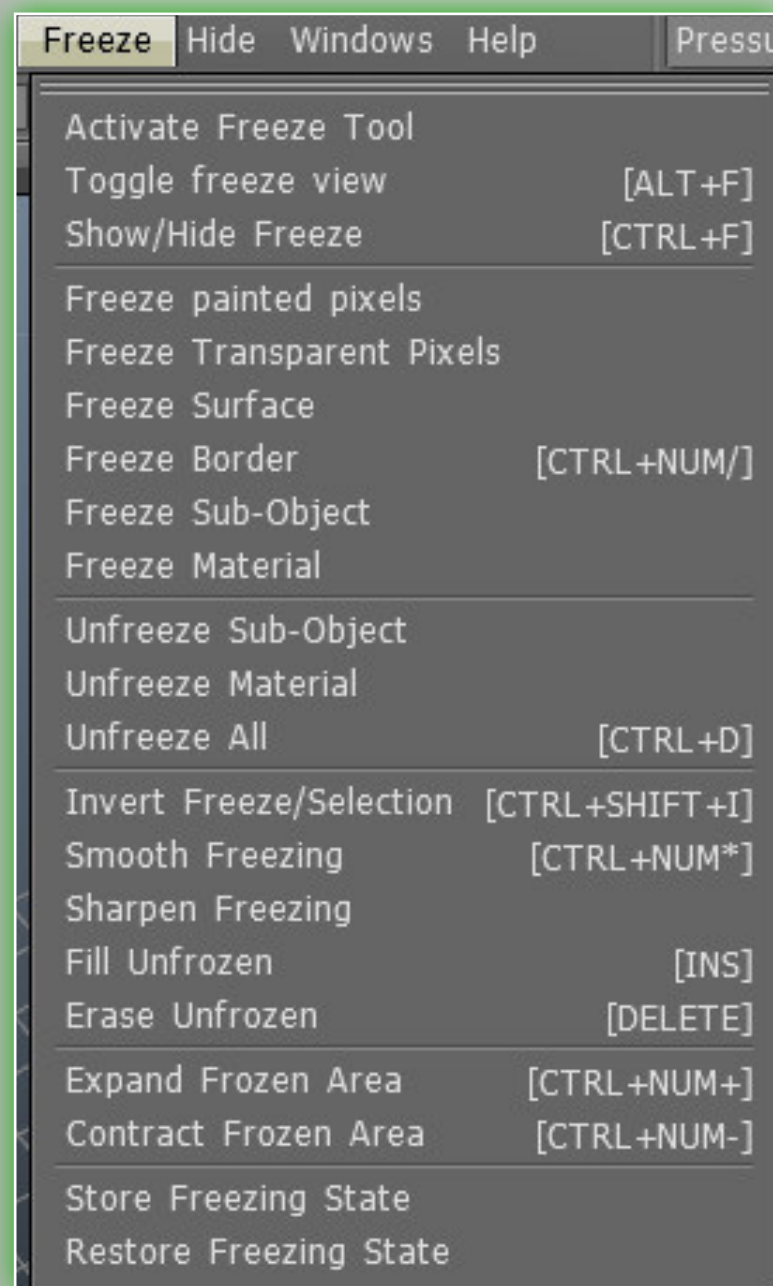


with the condition you choose in this menu. There are five blocking modes in total.



Freeze all. Block with a touch of pen or mouse-click (default mode).





Convexity. Block the convex parts of the surface.

Concavity. Block the concave parts of the surface.

Not key color. Block all, except the color currently selected.

Key color. Block the color currently selected.

There are four sliders on the top bar for the freeze tool:

Contrast. This parameter increases the contrast of freezing.

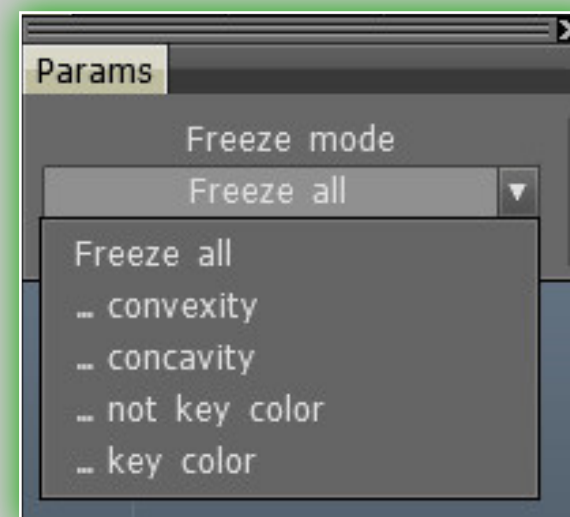
Details. Level of details when blocking relief parts. When this value decreases, the freeze tool will be more sensible to details.

Smoothing degree. Sets the

smoothing degree.

Freeze degree. Controls the level of the opacity of freezing.

Blocking can be saved to a file and loaded. In this way you can create a set of handy blocking outlines for your model. If you saved at least one file, subsequently you will have a drop-down list offering a selection of files. Of course you can also access many more options for the **Freeze** tool in the main menu of the top tool bar.



Freeze the surface. Freeze all the surfaces with the current condition.

Invert freeze/selection. The frozen surfaces will be unfrozen and the surfaces which were not frozen will be frozen.

Toggle freeze view. There are six modes with which you can view the frozen area. Many of the other commands are self-explanatory as well, and you are strongly encouraged to explore each one.

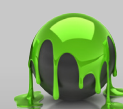
Fill. If you are familiar with the fill tool in Photoshop or other photo-editing programs, then you should be quite familiar with this tool already. It lets you fill in self-contained areas based on a number of parameters you can specify. There are three main parameters by which you can fill:

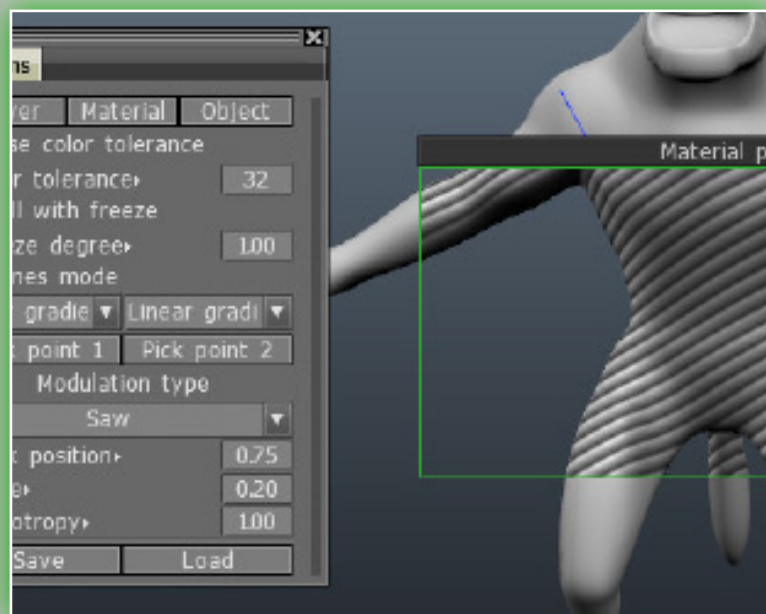
Layer. Fill the whole Layer.

Material. Fill the material of the object.

Object. Fill the sub-object.

There are sub-options for this tool as well, that you can use with each of the three main filling methods:





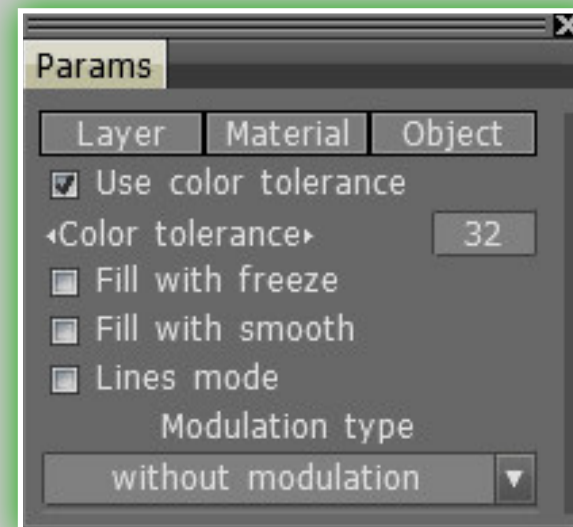
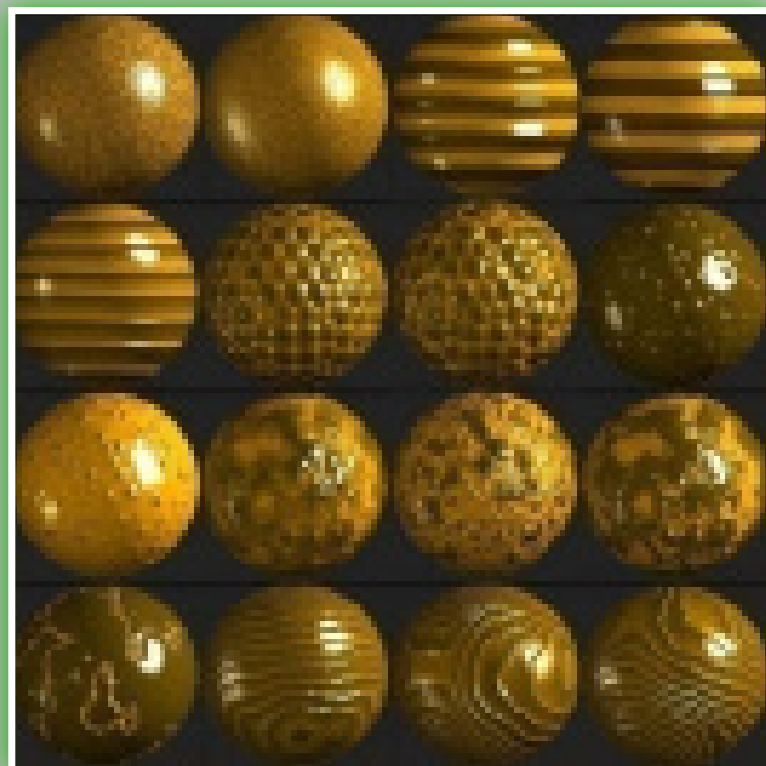
Use color tolerance. This lets you fill in your color or material based on its “closeness” to another color. By using the slider you can adjust this value. The higher the tolerance, the larger area and/or more existing colors it will fill.

Fill with freeze. Instead of a color fill-in, the surface will be filled by freezing. The **Freeze degree** slider is responsible for maximal freeze values.

Lines mode. Lets you fill-in by setting two points. The vector between them is considered the main direction when using distortions. If you have chosen the **Fill with gradient**, the surface will be filled with color gradient from the main color to secondary one. Otherwise, the main color is used for filling-in. If the pen radius differs in the starting and final point of the line,

then the modulation scale will smoothly change from the start to the final point. You can use gradient filling in the fill tool in a much more intuitive way.

Modulation type. In case the **Use in other tools** option is selected, the modulation acts not only in the fill-in mode, but with the standard pen too.



There are a number of basic and user-adjustable types of modulations available:

Without modulation. Filling will be done without additional modulation.

Noise. Random noise.

Gaussian noise. Random modulation with Gaussian noise applied.

Wavy surface. Wavy surface $y=\sin(x)$.

Strips. Strips that are perpendicular to the main axis.

Saw. Saw-like shape.

Hexagon. A correct hexagonal grid will be used as the volume texture when modulating.

Random spheres. Space filled with random spheres will be used as the volume texture when modulating.

Pores. Generation of pore-like surface.

Spots. Generation of “pimpled” surface.

Fractal N1. Volumetric Perlin noise.

Fractal N2. Square of Perlin noise.

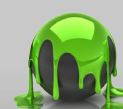
Fractal N3. Perlin noise limited by planes.

Fractal N4 (cracks). Resembles cracks.

Fractal wood N1. A set of distorted planes perpendicular to the view direction.

Fractal wood N2. A set of distorted cylinders. To set the cylinder axis, go into the lines mode.

Fractal tree N3. Wood with knot imitation.



Custom. Rough skin.

Add custom. This lets you create your own custom modulation type.

Depending on the modulation chosen in the **“Modulation type”** menu you will have the ability to adjust a number of parameters for each one. They are as follows:

Peak position. The position of maximum.

Scale. Scale of modulation.

Anisotropy. The degree of stretching or compression of details along the direction selected. If no direction is set, then it is a vertical axis. Switch into the lines mode to specify the direction.

Width of jag. The relative width of jag.

Pores size.

Spots size.

Cracks width.

Edge contrast. This parameter determines the smoothness of the edges in cube mapping.

Bump texture. The bump texture to be used in cube- mapping.

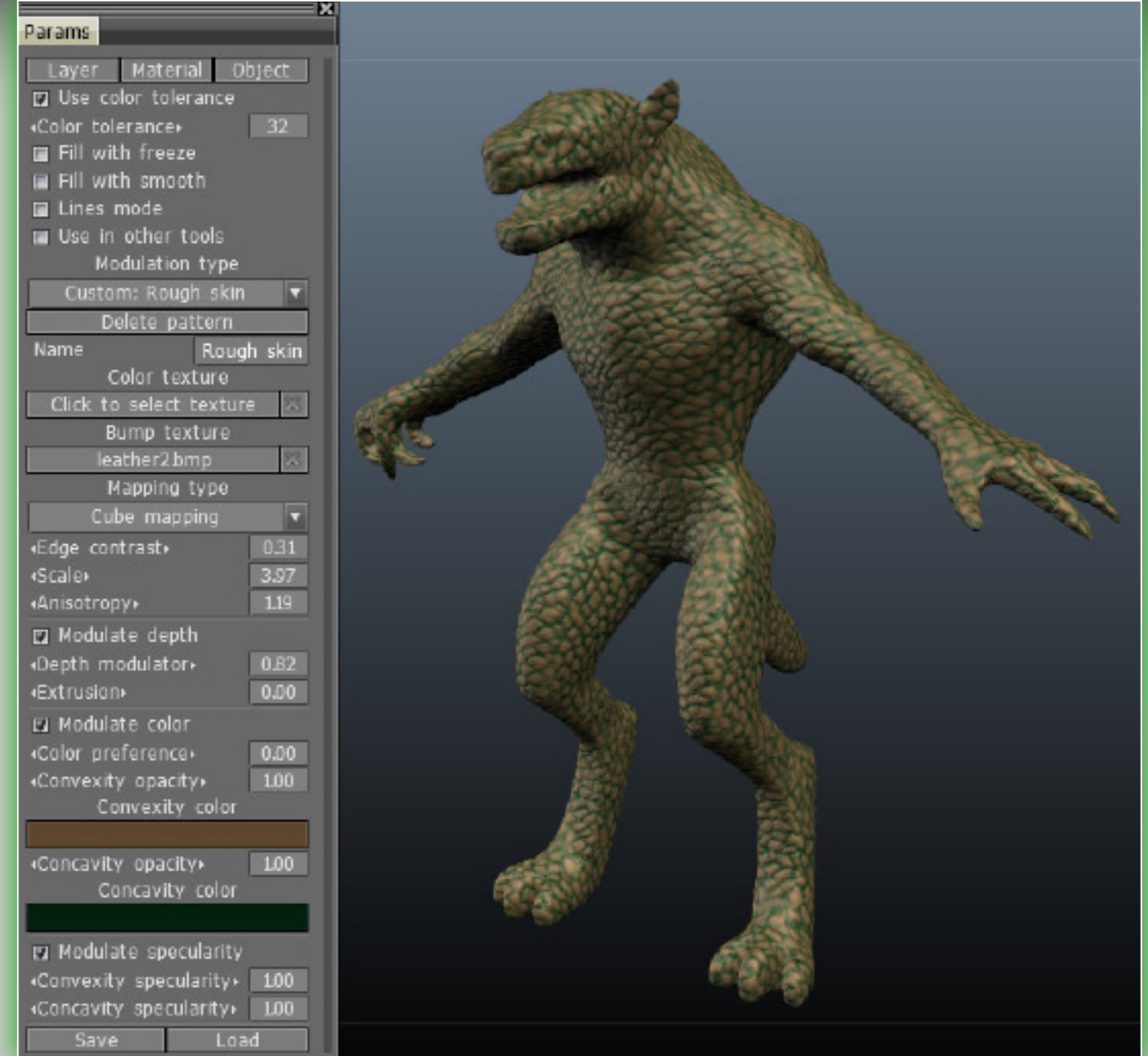
Color texture. The color texture to be used in cube-mapping.

Name. The name of a custom pattern.

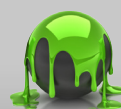
Delete pattern.

Modulate depth. Select this point if you want to modulate the depth when filling-in. The parameters are:

- Depth modulator. Modulation value.



- Extrusion. The addition extrusion. **“-1”** means that surface will only press in, **“1”** – only press out.
- Modulate color. Select the corresponding color operation and paint with it. Vary the opacity to make the effect stronger or weaker. Parameters:
- Color preference. This slider determines the preference of color use between color for convexity and concavity.
- Convexity opacity. Convexity opacity modulator.
- Convexity color. This color corresponds to convexity.
- Concavity opacity. Concavity opacity modulator.
- Concavity color. This color corresponds to concavity.

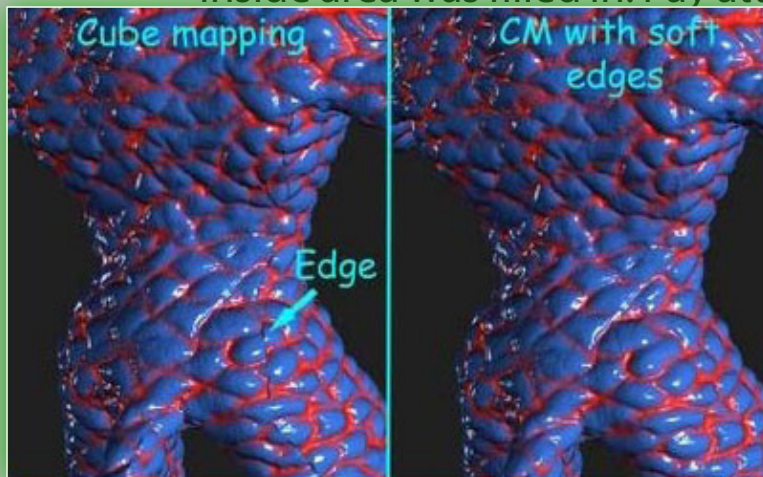


- Modulate specular. Select this option if you want to modulate specular channel. Parameters:
- Convexity specular. Convexity specular modulator.
- Concavity specular. Concavity specular modulator.

To apply the new fill pattern you should specify texture of bump and texture of color (optional). They will be mapped on object using cube mapping with soft edges. The screenshot below show the difference between usual cube mapping and mapping with soft edges. In this way you can texture objects seamlessly very easily. It is easy to create materials like skin or pores.

Save/Load fill parameters. Using menu Store/Restore you can store parameters of fill-in to file, located in *InstallDir\User-Data\StoreData\Fillers* folder by default.

Here are a few things that are worth noting about the **Fill** tool. You are not only able to use **Fill** tool separately, but also can use it in combination with other methods. For example, we can use the **Fill** tool in combination with **Material**. In the picture below we have filled in a certain area with **Material**, using cubic mapping method. On the edges we created freeze areas, while the inside area was filled in. Pay attention when lines modes and **Fill**



tools are used in combination, you can fill closed spaces with color gradient.

Another thing to note is that if your fill area is very large you may get a warning prompt

from **3D-Coat** letting you know that it may take a while to fill. If that does happen, please be patient! The application may appear to be frozen for a little while.

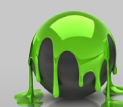
Eye dropper. Pick the color and specularity from the surface of an object. Use the hot key **"V"+LMB** to pick the primary color and **"V"+RMB** to pick the secondary color outside this tool. Use **"H"** to pick top Layer. Use **"G"** to pick depth of pen.

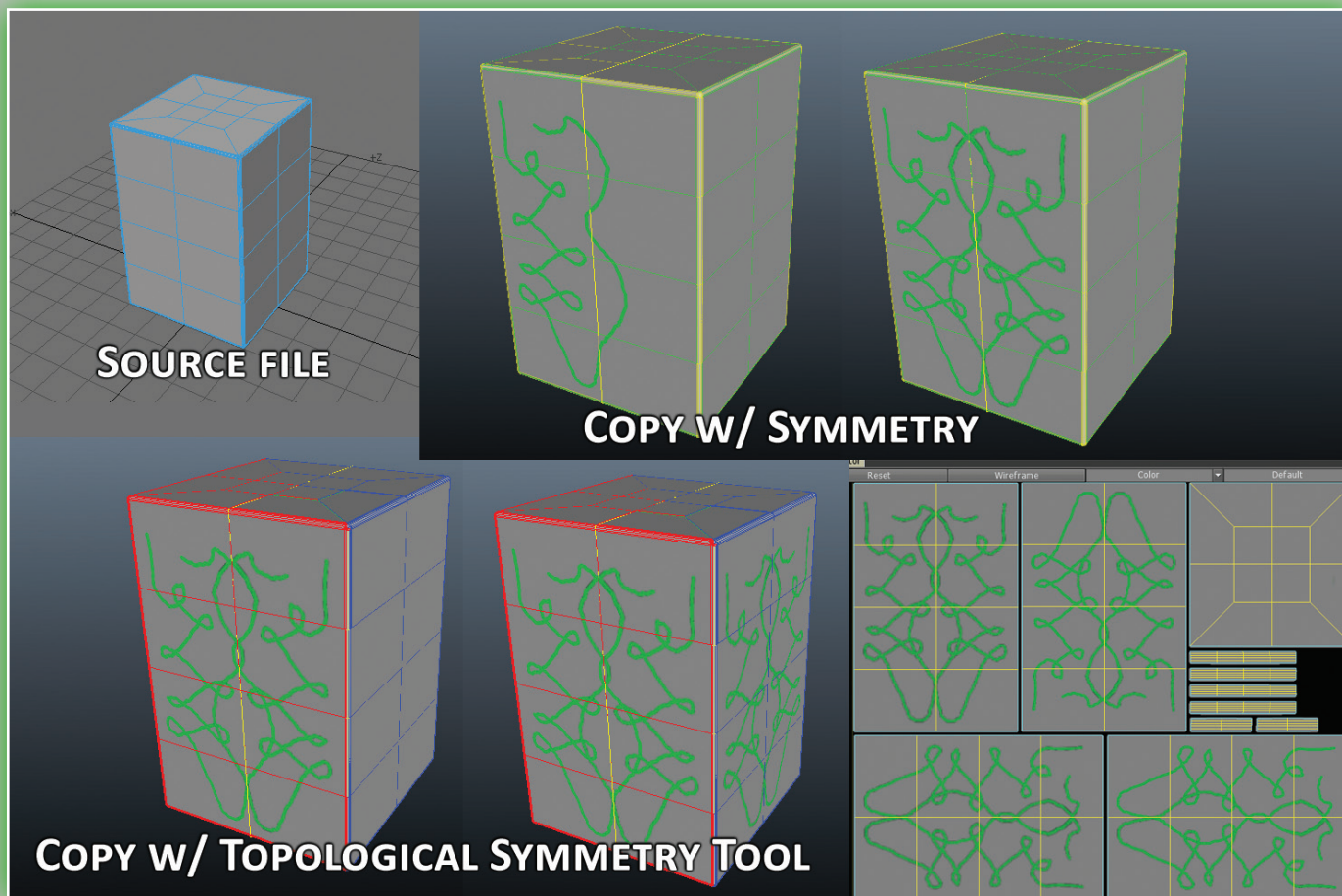
Make planar. This tool flattens the geometry on the object. Use the **LMB** to make the surface inside the pen flat. The pen shape is stored. With a call of the **"Smoothing"** command the advanced

Plane tool menu with a set of options opens:

- Normal source. This option determines if the normal and point of the plane should be taken from the first click position or from the current point.
- Plane extrusion. Lets you make additional extrusions while making the plane. It works like a clay brush.
- Make planar. Makes the surface planar.
- Cut off. Cut off parts over the plane.
- Fill mode. Fill holes under the plane.

Topological symmetry tool. Topological symmetry lets you copy surface pieces if they have symmetrical face structure even if they are not symmetrical geometrically. Select the red face with left-click and then select the blue face. It is better if they are adjacent. Either way, they should be symmetrical





to each other. This lets you define the topological symmetry. The settings for this tool are as follows:

- Work mode. Lets you choose between two modes: setup symmetry by picking two symmetrical faces or copy from one side to another using the pen.
- Copy red to blue. Copy the red part of mesh to the blue one. You should define them before using this tool.
- Copy blue to red. Copy the blue part of mesh to the red part. You should define them before using this tool.
- Flip Layer. Flip Layer using topological symmetry.
- Copy freeze mask. This is pretty self-explanatory. It lets you copy a freeze mask from one side to another using the topological symmetry tool.
- Save. Store symmetry state to **.SYMM** file.

- Load. Restore symmetry state from **.SYMM** file.

Measuring tool. This tool lets you measure distance between two user specified locations. Here are the parameters:

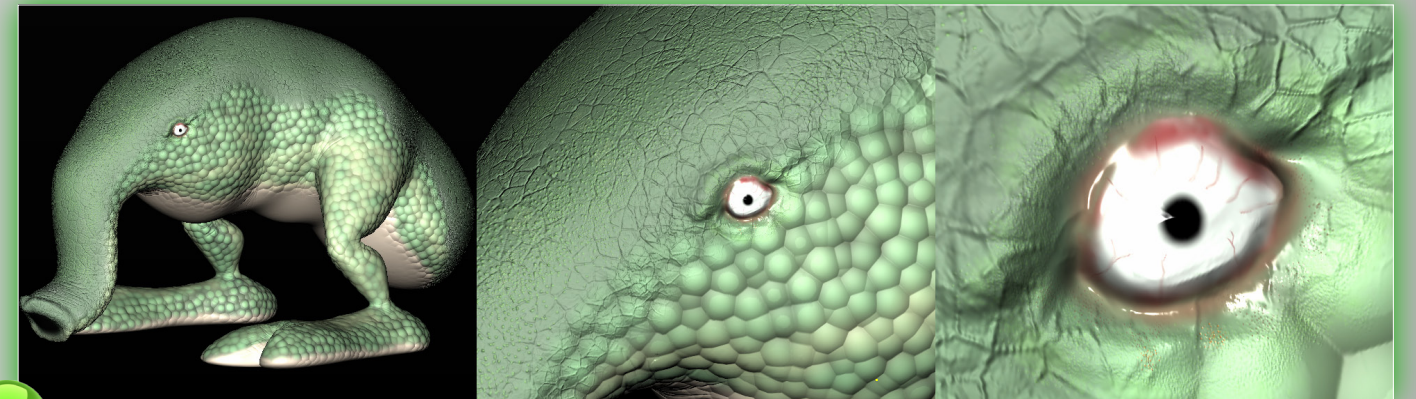
- Original mesh units. You can define the units of measurement and measure line length.
- Units to display. You should choose the units to display. There are parameters in these combo boxes: **Meters (m)**, **Millimeters (mm)**, **Centimeters (cm)**, **Kilometers (km)**, **Feet (ft)**, **Inches (in)**, **Yards (yr)** and **Miles (mi)**.
- Scale. The scale can be used to transform units. Usually you don't need to enter this value manually.
- Length. The length of the red line.

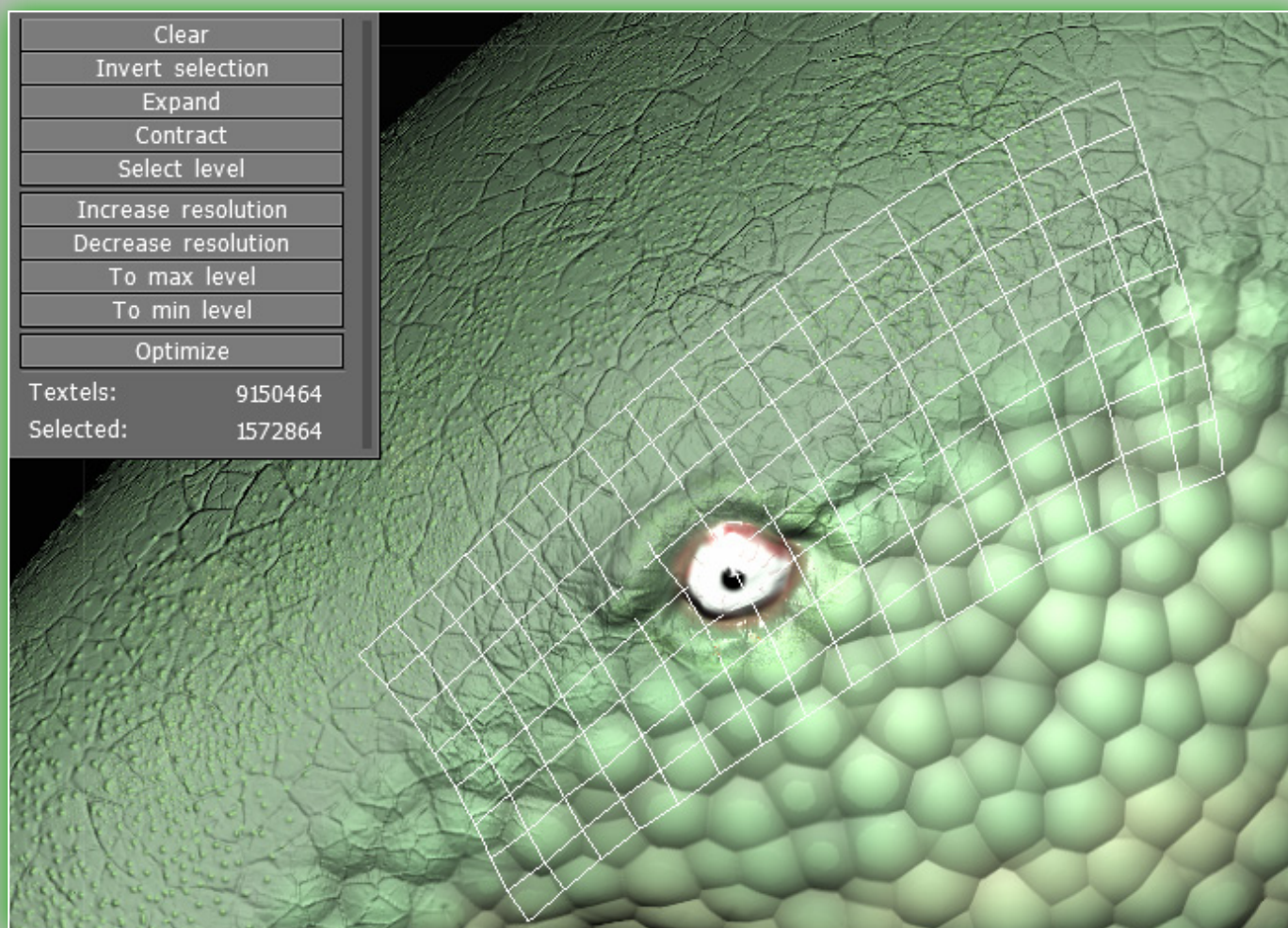


4.8 Ptex

Ptex is one of the more amazing technologies since sliced bread. With Ptex you can paint extremely high resolution textures on a per polygon basis, as well as completely bypassing all UV work as it does not require any manual input on the creation of the UV maps. Ptex, in it's current implimentation, only supports quad polygons, no triangles or N-gons.

It's important to note that when using Ptex in **3D-Coat**, you can increase the resolution of individual polygons if you require more

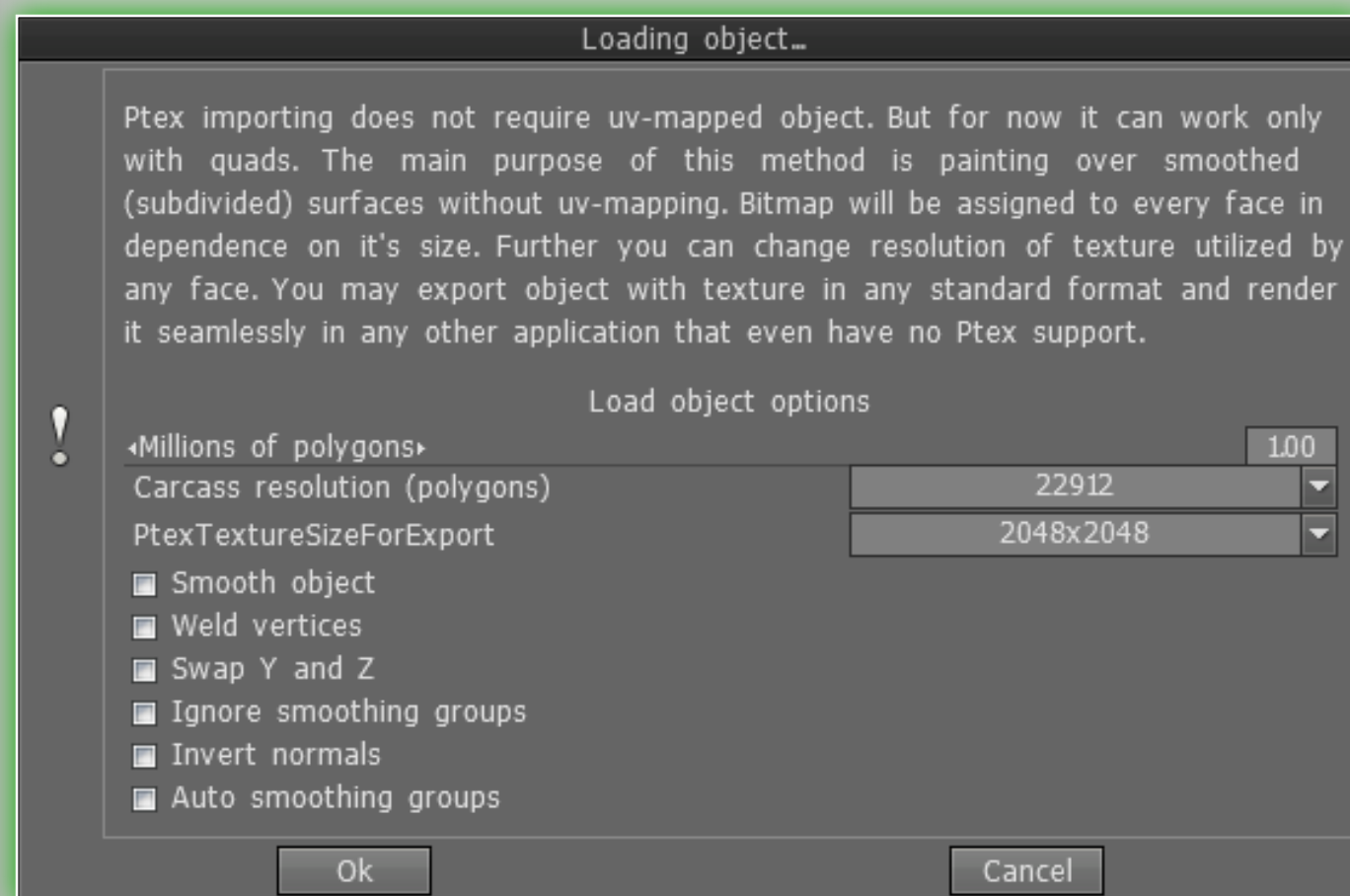




texture details in the local area of that polygon. By increasing the resolution of a polygon, it is effectively increasing the size of that polygon on the auto generated Ptex UV map. For example, you could paint very small details inside of areas on a mesh for which calls for a very close up shot or just flat out requires more detail in one area, but you don't want to create a bunch of very high resolution texture maps. In this case Ptex works quite well.

What is more, the .ptex format can store hundreds of thousands of textures directly with in the .ptex file. Thus any external application that supports the .ptex format will be able to import/export the .ptex file for use. You can also, if your application of choice doesn't support the .ptex format directly, export out all the .ptex texture image files in the **.TGA, .BMP, .PNG**

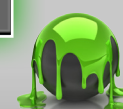
Upon importing a mesh for Ptex painting, you will be prompted to select a number of options:



Millions of polygons. This is the mesh resolution as sub-divided after the "Smooth object" operation is performed. This should be higher than the number of pixels of your texture map.

Carcass resolution. This is the mid-poly resolution, it only effects the viewport performance and display of the mesh in the viewport.

Ptex Texture Size for Export. You can select a texture resolution between 512x512 and 8192x8192. You can also change this at any time you need to scale up or down your texture resolution.



Weld vertices. This will weld any vertices which share the same position.

Swap Y and Z. This will swap the Y and Z axes. This allows for an easier time when bring meshes from applications such as Rhino or 3DSMax.

Ignore smoothing groups. Ticking this will ignore any smoothing groups which you have on your mesh.

Invert normals. This will flip the normals of each polygon.

Auto smoothing groups. Will automatically scan the mesh for sharp angles between polygons, and apply smoothing groups to them automatically, and maintains any sharp edges which were on the mesh.

Each of the following Ptex functions requires a selection. To make a selection, simply activate the **Ptex Local Resolution** tool and click on the polygons in the viewport. Now let's take a look at the **Ptex Local Resolution** parameters:

Clear. Clear any selection.

Invert selection. Invert your selection.

Expand. Expands your selection by one contiguous polygon.

Contract. Contracts your selection by one contiguous polygon.

Select level. Manually key a local polygonal subdivision level.

Increase resolution. Increases the local resolution of the currently selected polygons. This effectively increases the polygon size on the auto generated Ptex UV maps.

Decrease resolution. Decrease the local resolution of the currently selected polygons. This effectively decreases the poly-

gon size of the auto generated Ptex UV maps.

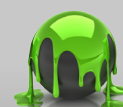
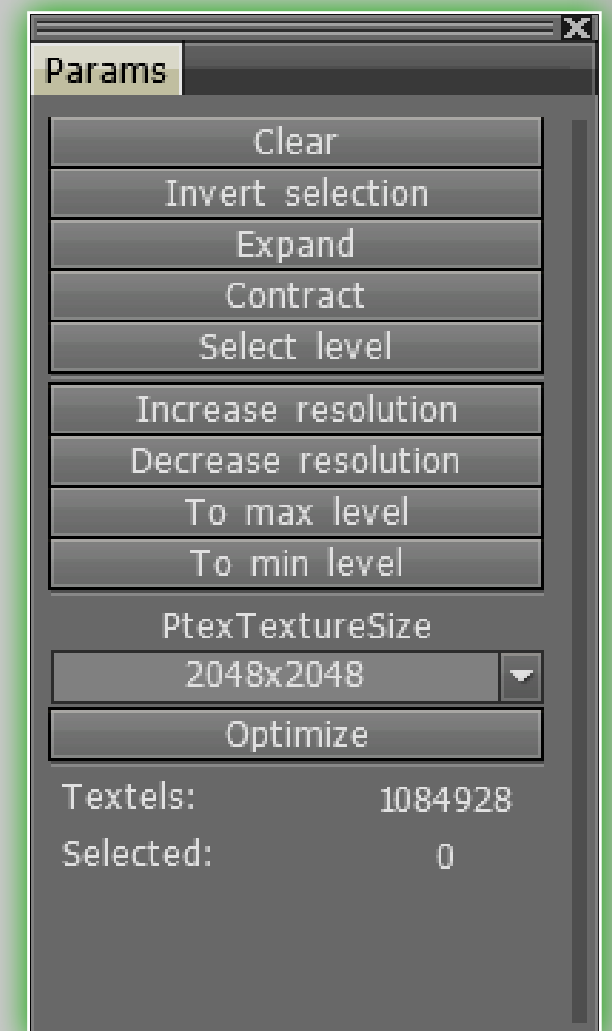
To max level. Sets your current selection to the maximum level allowed for Ptex. Effectively increasing selected polygons nearly taking up their own UV map.

To min level. Sets your current selection to the minimum level allowed for Ptex. Effectively shrinking selected polygons, allowing more polygons per UV map.

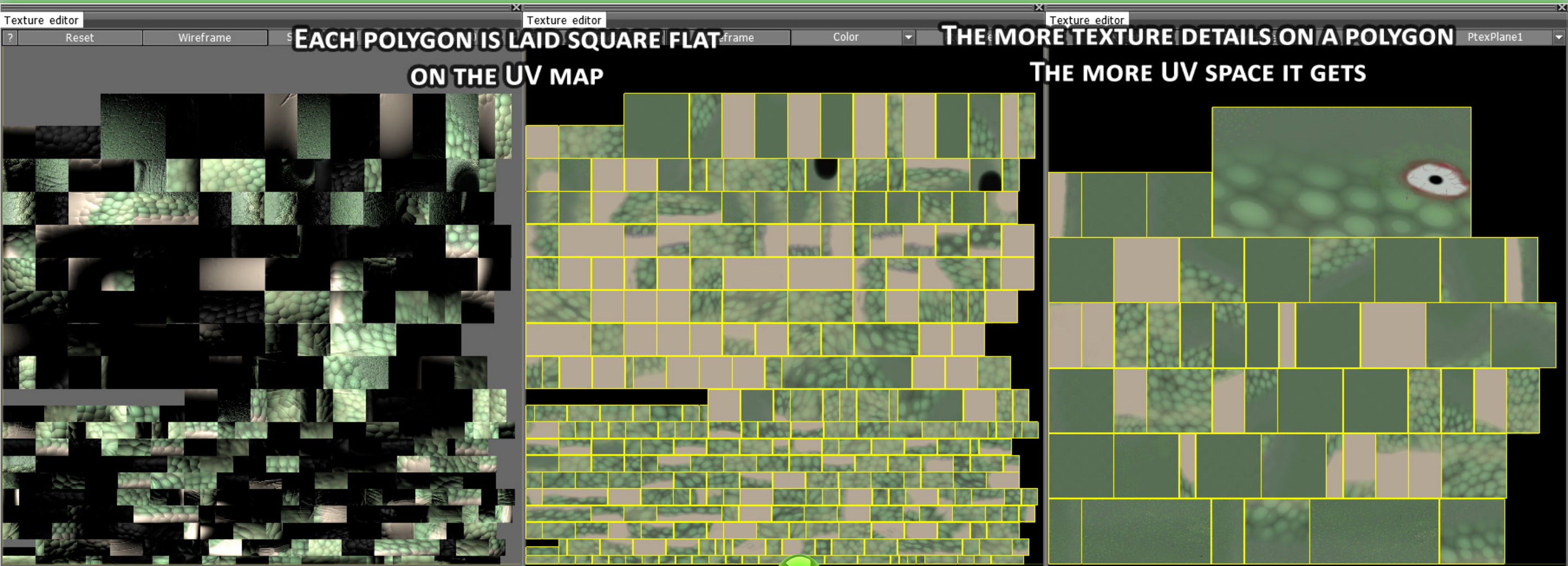
Ptex Texture Size. You can pick the texture resolution for each ptex generated texture. Selectable resolutions range from as low as 512x512 to as high as 8192x8192. You can change this at any time to suit your needs, as well as upon importing the mesh for ptex painting.

Optimize. Organizes polygons on every auto generated Ptex UV map to fit more polygons, based on local resolution (poly size per UV space).

NOTE: When using this do keep in mind that if you have been using a mesh with specific auto generated Ptex UV maps, it will completely reorganize the polys on all UV maps, rendering your previous auto generated UV maps useless. That said, you can always bake the details from one mesh to another. Just be sure to save two meshes: Your original and the baking target mesh.



For more information on Ptex, please visit the official Ptex website at <http://ptex.us/>



5. Sculpt Mode

The sculpt mode has a number of tools to move your mesh with some basic deformers. This lets you reshape your mesh.

5.1 The Tools

Move. Drag the surface piece.
Use **CTRL** to drag along the average normal.

Select/Move. Select surface parts and modify them (move, rotate or scale). The available parameters for this tool are as follows:

Select with pen or rectangle.
Select with pen, rectangle or curve. Use **CTRL** to subtract a selection, **SHIFT** to add a selection.

Select with gradient. Selection is done with a gradient. Click to determine the start position of the gradient and then click again to determine the end point.

Select objects. Select the whole object with **LMB**.

Move. Move the selected area.

Rotate. Rotate the selected area.

Scale. Scale the selected area.



Smooth. Smooth selection.

Expand. Expand selection.

Clear. Clear selections.

Wide. Make the intermediate area of a selection wider.

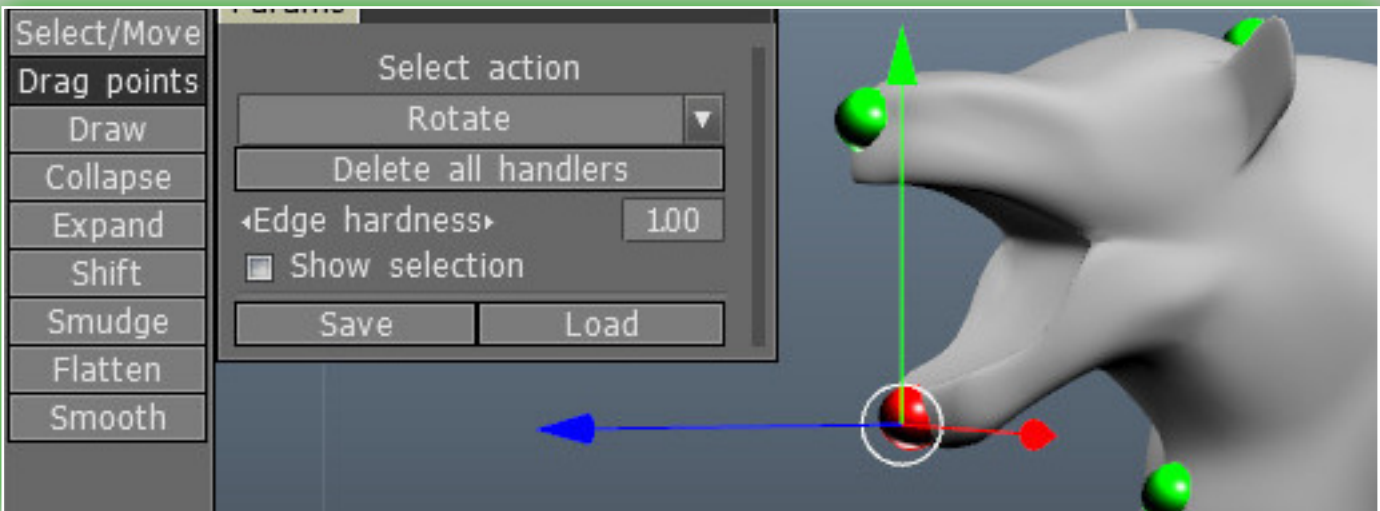
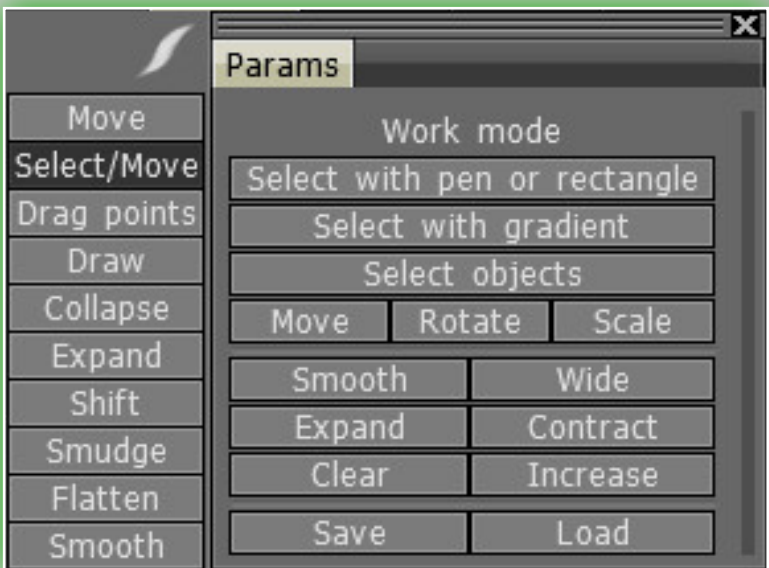
Contract. Contract selection.

Increase. Grow selection value by 10%.

Save. Save the selection to file.

Load. Load a selection from file.

Drag points. In this mode you can add control points and drag



them (rotation and scaling can be done also). Each point limits the surface modification. Use the **DELETE** key to delete a selected point. Select several points simultaneously using the **SHIFT** key. The available parameters for this tool are as follows:

Move (Hot key SHIFT+“W”). Move the selected area.





Rotate (Hot key SHIFT+"E"). Rotate the selected area.

Scale (Hot key SHIFT+"R"). Scale the selected area.

Delete all handlers.

Edge hardness. Increase this value if you want to transform more hard-edged pieces.

Show selection. Show which selection corresponds to the selected point.

Save. Save the handlers positions to file.

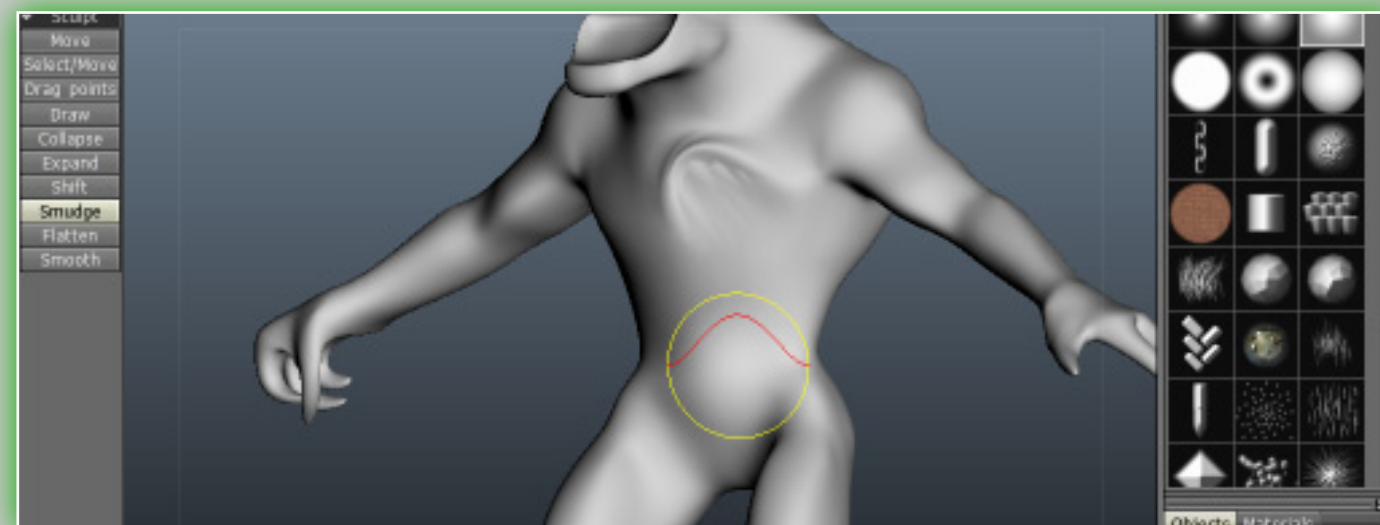
Load. Load handlers position from file and add the handlers to the existing handlers.

Draw. Draw with pen. Use **CTRL** to cut into and **SHIFT** to smooth the surface.

Collapse. Collapse a part of the surface. Use **CTRL** to expand the surface.

Expand. Expand a surface part. Use **CTRL** to collapse.

Shift. Shift the surface along pen motion in screen space.



Tangent Shift. Shift the surface along pen motion in normal plane.

Smudge. Smudge along the surface under the pen.

Flatten. Flatten the surface under the pen.

Smooth. Smooth the surface with the pen.



ARTIST: BRETT SIMMS IMAGING



6. Retopo Mode

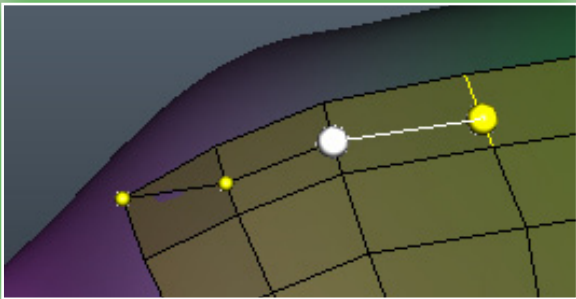
3D-Coat offers the most powerful set of retopology tools in the 3D industry. These tools let you quickly and easily change the existing topology of a model. **3D-Coat** can be used purely as a retopology tool. Just open a reference mesh and start retopologizing it by covering it with new polygons. If the reference mesh is textured, **3D-Coat** will be able to bake not only the geometry but also all texture maps onto the new topology.

6.1 Create & Commands

This tool section lets you create a newly retopologized mesh. Each tool in the retopology section will be covered here, as well as most of the commands for each tool.

Add/split. This tool lets you simply add edges by pointing and clicking in the location you would like to add the edge.

Select. This tool has three primary modes, allowing you to select Points, Edges and Polygons. Each of these modes has further functions.



They are as detailed for Points (these are also the general commands for most of the other tools):

- Import. This lets you import a mesh for retopologization.
- Export. This lets you export your retopologized mesh in **.OBJ**, **.LWO**, **.STL** and **.PLY** formats.
- Snap. This snaps the retopologized mesh to the underlying mesh, if you have modified the underlying mesh in anyway.
- Subdivide. This tool is self-explanatory. It subdivides the mesh. For example, each polygon is divided by 4.
- Clear. This will clear the retopologized mesh in the scene.
- Relax. This relaxes the current retopologized mesh.
- Symmetry. This will apply symmetry for the current retopologized mesh, allowing you work on one side of the mesh.

The settings for the **Select** tool for **Edges** are as follows:

Spin. Spins the selected edge counter-clockwise.

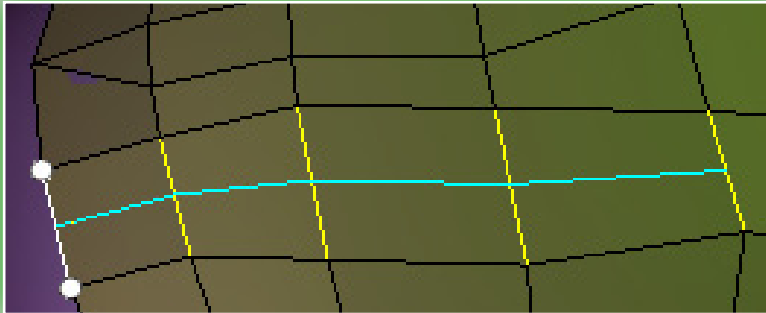
Spin back. Spins the selected edge clockwise.

Extrude. This will extrude a selection of edges. It can only be used on edges on the exterior of the retopologized mesh.

Split. Lets you run an edge loop along a selection of edges.

Delete. Point and click to delete edges.

Edge loop. Quickly add an edge loop, by hovering



over edges to get a preview. Use the **LMB** and clicking to add the edge.

Edge ring. This is the same as **Edge loop**, however it runs perpendicular to the direction of the edge loop function.

And finally we have the **Select** tool for Polygons:

Delete. Deletes selected polygons. You can also achieve this by hovering over a polygon and hitting the **DELETE** key.

Subdivide. This is the same as for polygon mode, or any other subdivide option in **3D-Coat**.

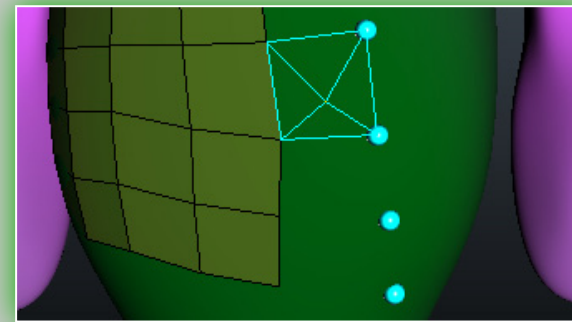
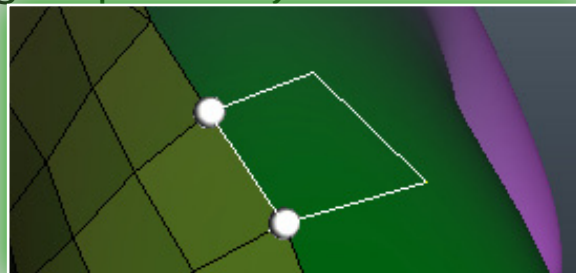
Hide. This tool makes it easier to retopologize in very tight areas. If you are running into a problem, simply select the polygons in question, and hit the hide button.

Invert hidden. This will invert the polygons you may have previously hidden.

Unhide. This will unhide all polygons previously hidden.

Quads. The basic use of this tool lets you select an edge of a polygon, and then drag out and click the placement of the edges for a new polygon. There are four different methods of use for this tool, and they are fairly similar. You are encouraged to try each one. They are: **2-clicks method**, **Parallel**, **Direct** and **Trapezoid**.

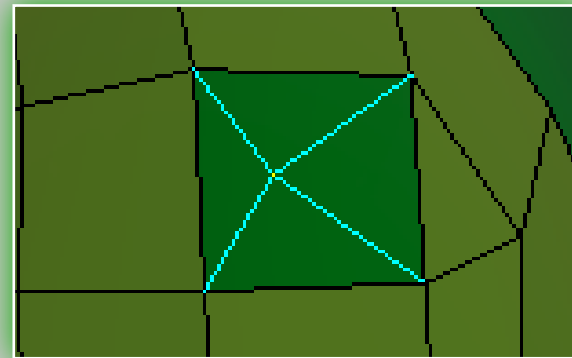
Points & Faces. This method is quite handy when starting out on your retopologization. You place points with the **LMB**, and once there are qualifying areas to place polygons, you



only need to use the **RMB** to place the polygons. You will see a blue outline of where the polygon will be placed. You can move the points by using the

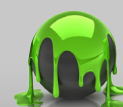
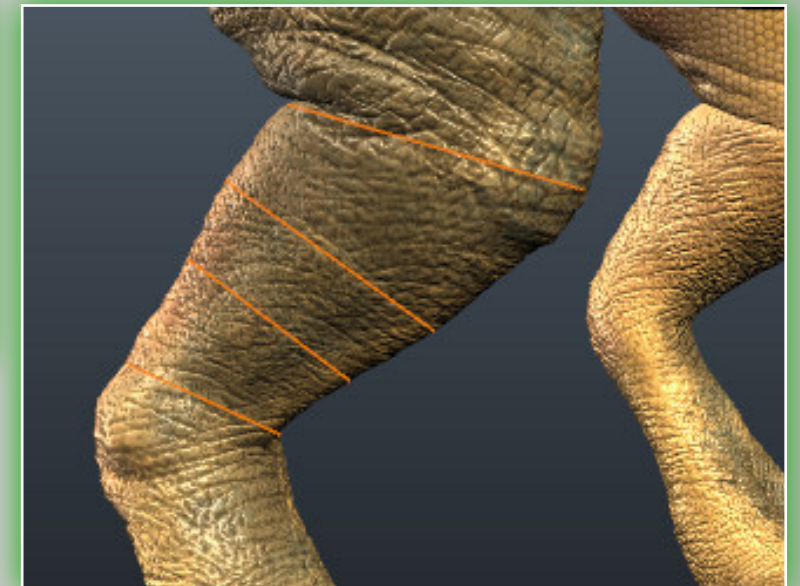
RMB to click and drag it around. You can also delete a point by hovering over it and hitting the **DELETE** key. This tool will only work with tris and quads.

Cap. With this you can cap any existing hole in your polygonal mesh by pressing the **RMB** over it. It will create triangles only.



It is best used for the end of a pointy object, such as the tip of a sword or spear, pointy ears or tails.

Strokes. This is a very powerful tool in the retopology arsenal. With it you can quickly retopologize cylindrical objects such as arms, legs and other similar items. You can draw lines by click-

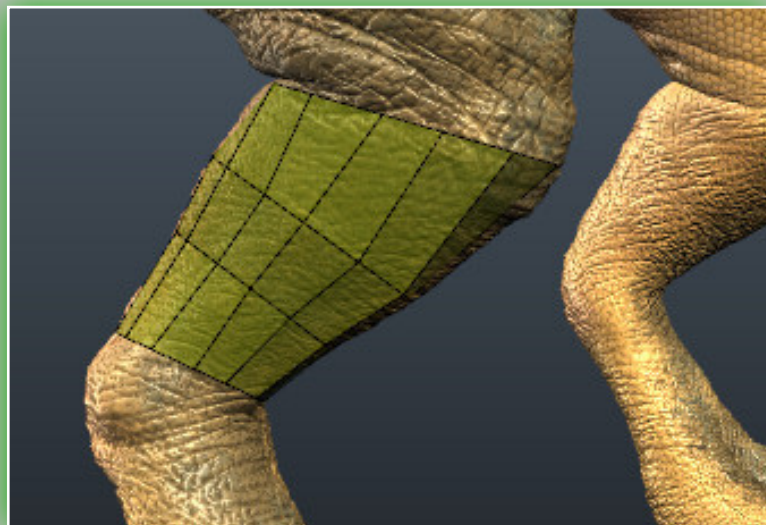


ing and dragging the **LMB**. There are a few commands local to this tool:



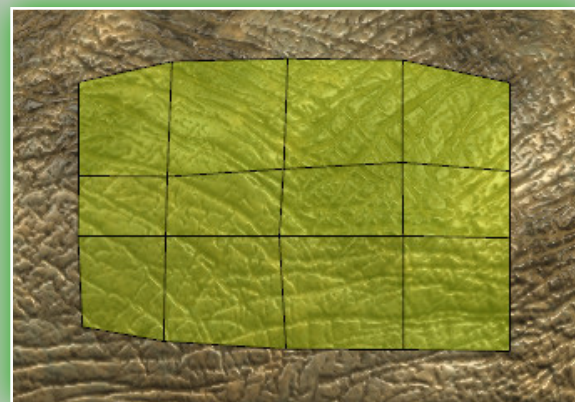
Clear. Clear all the drawn lines.

Smooth. Smooth all current drawn lines.



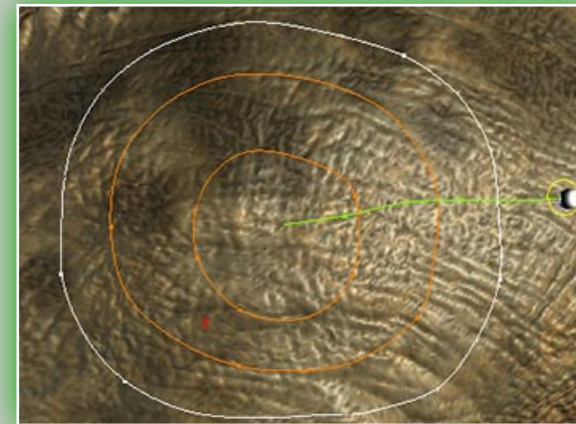
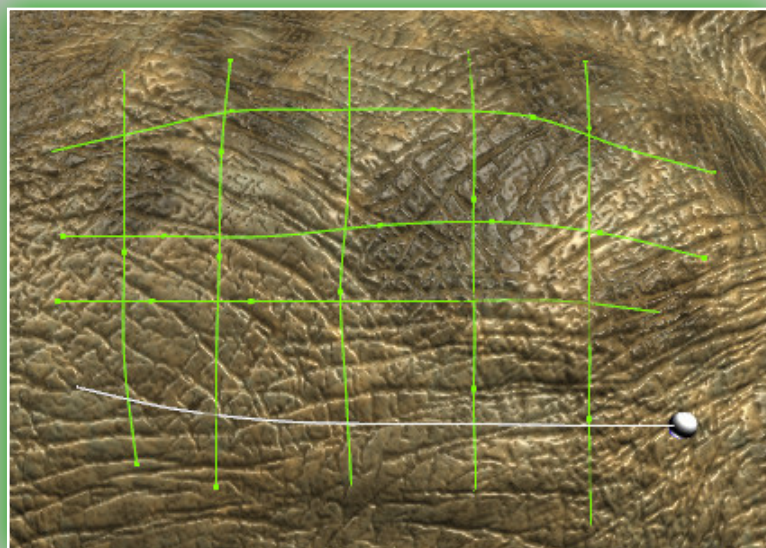
Delete. Delete your currently selected line.

Here is a more in depth look at it all. Firstly we'll start by making some strokes in the view-



port to cover the whole of this leg. When that is done, a spline will loop around. We'll create a few loops to have some area to create polygons in.

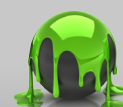
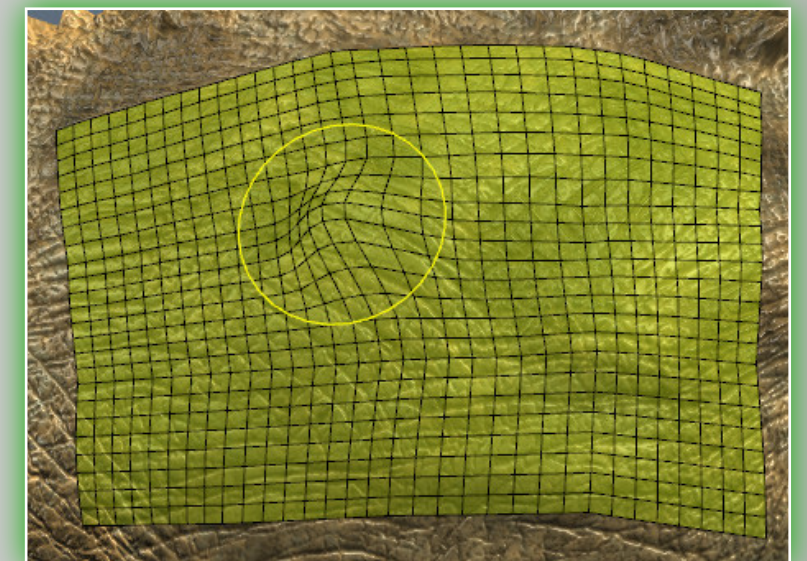
Next we'll create a perpendicular line within the confines of the area of the mesh, opposed to the previous lines. You'll notice that line is a green color instead of orange.



Green lines mean that it is discontinuous. Orange lines mean that it is continuous and makes a full loop around to connect back to itself. Now let us take a look on the top toolbar, we'll need to select a number of segments. You will get ring of polygons with corresponding number of segments. Now we'll try something a little different: instead of drawing lines around a mesh, let us draw a grid look

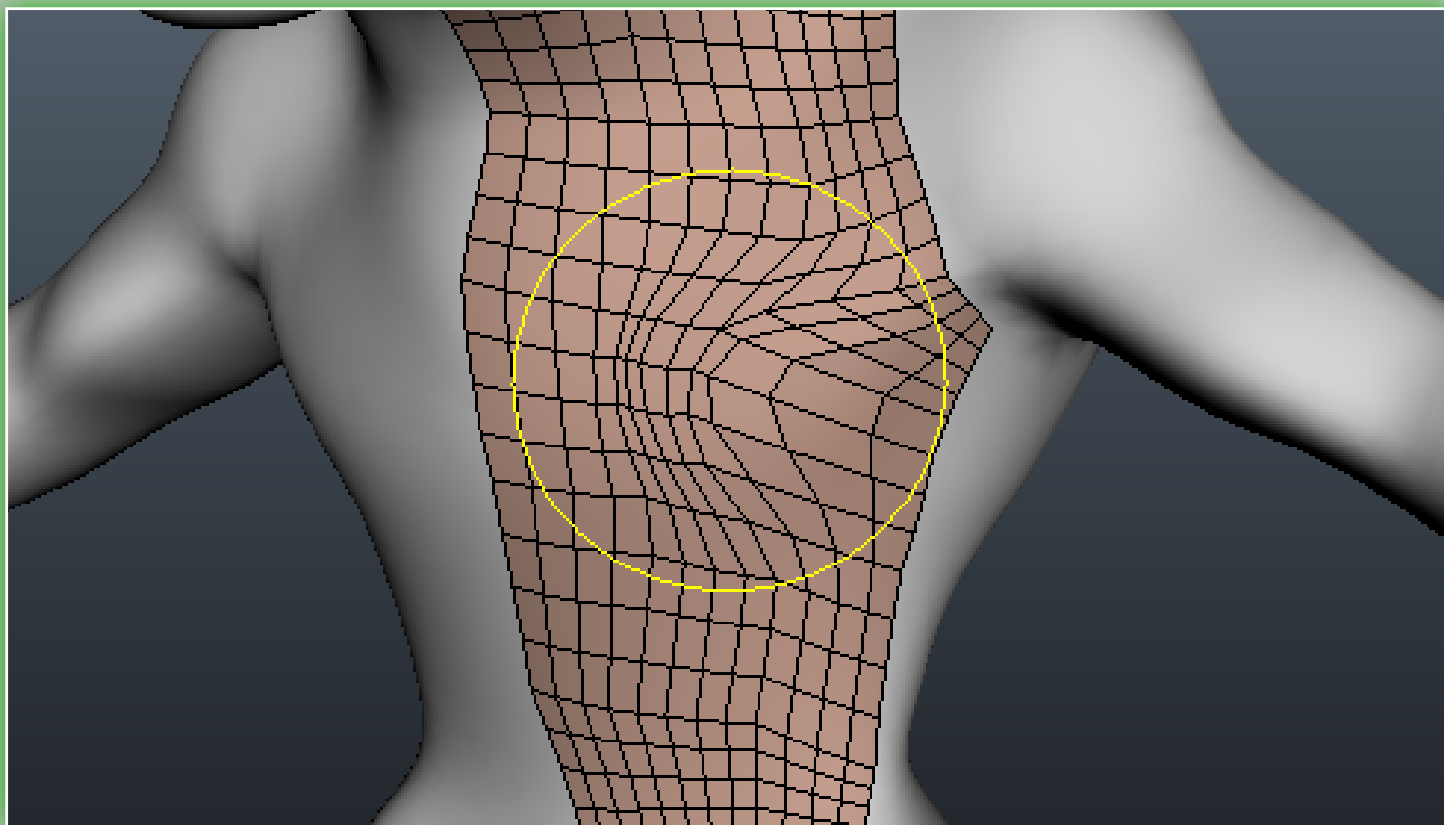
within the mesh, instead of slices as before. Now press the **Enter** key and you will have the area you surrounded with the strokes created as polygons.

Now let's demonstrate one more method here. We're going to draw a circle within the confines of the mesh, to create edge loops, or circles. Then we'll draw a perpendicular stroke to the circles that we previously created and then hit the **ENTER** key. You'll notice that it automatically created our entire loop based on the **Number of segments** setting in the top tool bar, similar as before with the first demonstration we gave for cylindrical objects. These are just some of the methods with this tool that



you'll soon discover. You are encouraged, as with all other tools in **3D-Coat**, to dive in and find out what tools and techniques work best for you.

Brush. This tool lets you move vertices based on your brush size and intensity, using the **LMB**. You can also smooth the vertices with your brush using **SHIFT+LMB**.



6.2 Tweak & Commands

This set of retopology tools lets you tweak the current retopologized mesh in the viewport. Please notice that the commands for each tool in this **Tweak** section have very similar commands to those listed above in the **Create & Commands** section. If there is a unique command, it will be listed with its respective tool.

Delete polygons. You can delete polygons with this tool simply by clicking them. With the **CTRL** key you can also delete all *connected* polygons.

Delete edges. With this you can quickly delete edges, edge loops and edge rings. Hover your mouse over the desired selection and click the **LMB**.

Collapse. Hover your mouse over a selected edge and click the **LMB** to collapse all connected points of that edge to one location. With **CTRL+LMB** to apply this to an entire edge ring.

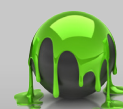
Split rings. This is exclusively an edge loop tool. Hover the cursor over an edge where you would like to apply a new edge loop and click your **LMB**.

Move vertices. Also known as a “tweak tool” in some packages, it lets you quickly move a point, edge, polygon, edge loop or edge ring. Select the mode you would like to use in the top tool bar, size your brush accordingly and move around your selection.

Slide edges. Slide a selected edge between its two parallel edges by clicking the **LMB** and dragging.

6.3 Retopo UVs

The UV tools for the Retopo room have been expanded to include every UV tool from the UV room in **3D-Coat**. You can find information on each of the UV tools inside the Retopo room in the UV section of this manual.



6.4 Retopo Menu & Tool Bar

Of course any good tool has more to it than meets the eye. The retopology tools are no exception. You can find the menu in the top tool bar, under **Retopo**. Below are listed all of the functions in this menu.

Import retopo mesh. Import an external mesh to continue a retopologization started in another 3D modeling program.

Export raw object. Export a retopo mesh to continue work in another 3D-modeling program.

Use current low-poly mesh. A reference mesh can be imported to retopologize big objects made in another 3D modeling program. They can contain reference to textures. In this case the objects will be colored; color will be used in baking and merging into the scene.



Unwrap. The same as *Unwrap* in *Mark* seams mode.

Clear mesh. Clear the whole mesh.

Subdivide. Subdivide the whole mesh.

Apply symmetry. Apply symmetrical mirroring.

Merge into scene. Lets you merge a retopologized mesh into scene. All details from the reference mesh will be baked into a new object. Additional extrusion can also be applied. A UV-set is required, but if you have not assigned a UV-set it will be generated automatically.

Merge hull in scene. Merges outer mesh over reference object into scene. This function works like *Merge into scene* but is optimized for a multi-object reference mesh. It prefers outer points while baking surface.

Merge raw patch. Merge a raw patch into the scene. No baking will be performed. This command can be used to merge a new object without projecting details from the reference mesh.

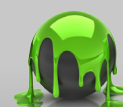
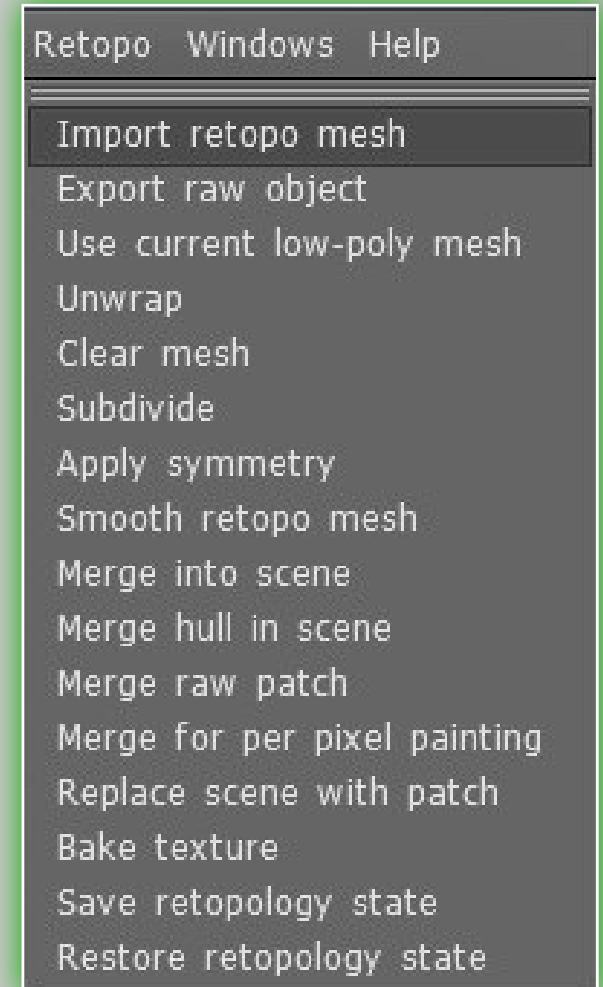
Merge for per pixel painting.

Replace scene with patch.

Bake texture. Bake texture onto patch. This operation requires a UV-set.

Save retopology state.

Load retopology state.





And we have these items in the top tool bar for the **Retopo** tab:

Z-bias. Adjust the z-bias to get a better look at the retopologized mesh preview.

Additional extrusion. You can extrude the retopologized mesh. This is a great way to make clothing for your characters.

6.5 Retopology Groups (Layers)

3D-Coat has a Layer system for retopologizing meshes. This makes it easier to retopologize your meshes with problem areas and to have multiple retopology versions of the same object. Much like all the other Layer tabs in **3D-Coat**, they function like the Layers in Photoshop. You can click and drag Layers to reorder them, drag them to the **Trash** icon to delete them, hide & show them with the **Visibility** icon, etc. Let's take a look at the **Retopo Layer** tab.

Layers. As you see in the screenshot, you can have more than one Layer to retopologize, if you wish. They can be reordered by drag and drop, they can be dragged to the trash if you



no longer need one. Double-clicking a Layer will allow you to rename it.

Visibility. Each Layer has its own visibility icon, allowing you to toggle them on or off.

There are icons along the bottom of the tab as well, and they are:

New Layer. Creates a new layer.

Trash can. Deletes the selected layer.

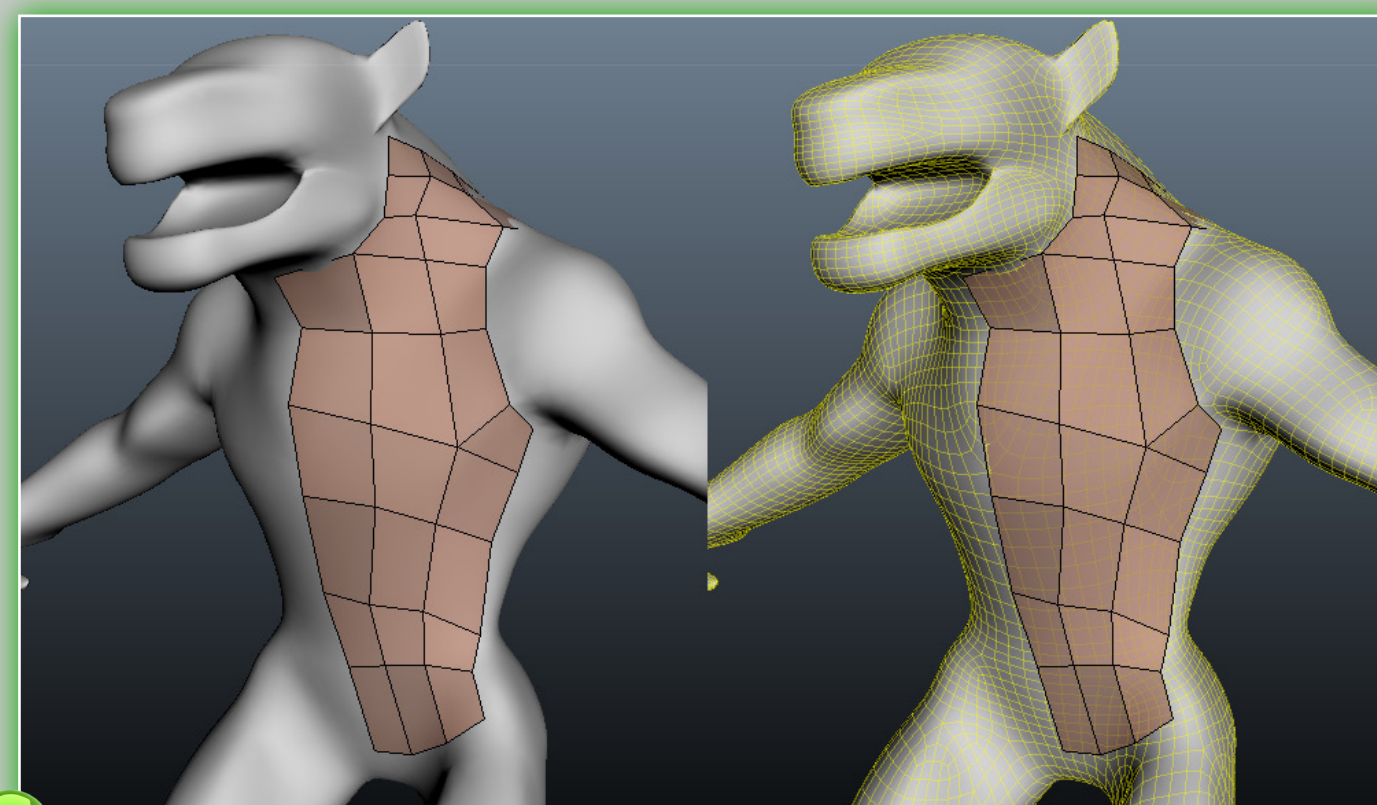
Subdivide. Lets you to subdivide the whole selected Layer.

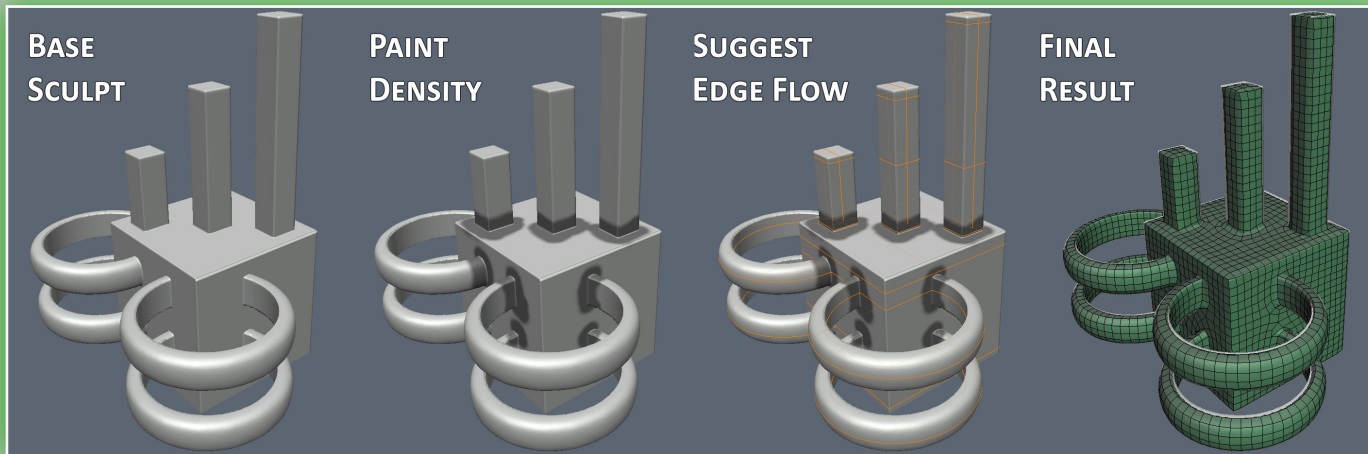
Symmetry copy. Copies an entire Layer symmetrically. Symmetry must be active for this to work.

Select all faces. Selects all polygon faces of the current Layer.

Move selected faces to current Layer.

Delete Layer. This will delete your currently active Layer.





6.6 Autopo (Auto Retopology)

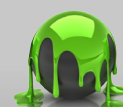
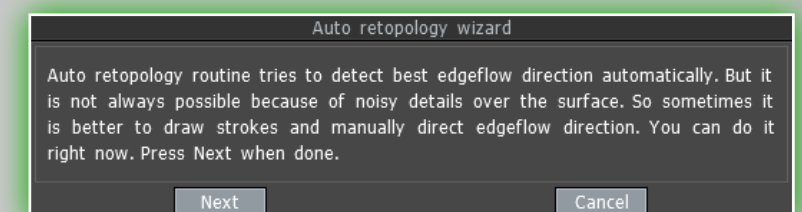
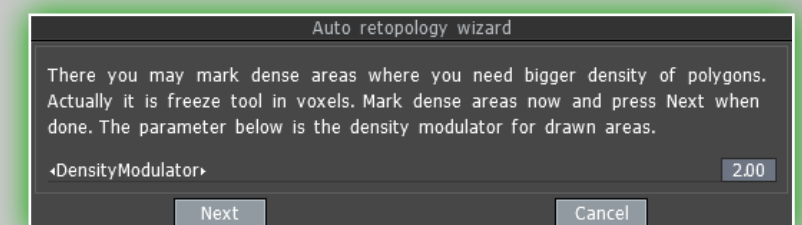
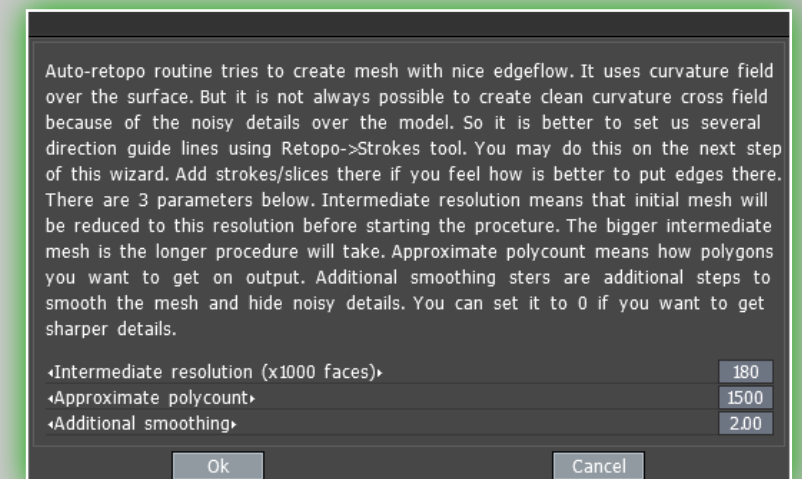
Manual retopology is great, when you need a very specific mesh. But what if you don't need an exact, extremely precise mesh topology? This is where Autopo comes in. With Autopo you can let 3D-Coat determine where edge loops are placed. Or, you can manually specify where you wish the edge loops to be, as well as paint in the density of the mesh. One thing to note, however, is that Autopo doesn't work directly on polygons; Only voxels! So keep this in mind if you wish to use the Autopo tool on a mesh, to do so, you must first merge the mesh as voxels and then apply the Autopo tool. That all said, the meshes generated with Autopo are usually fairly clean, even with little user input on the guides and density painting.

To use the Autopo tool, you must **RMB** click on the particular layer you wish to auto retopologize in the VoxTree (which can be accessed in the Retopo room via the top menu under **Windows>Popups>VoxTree**), and select any of the Quadrangulation options. Doing so will start the Autopo "wizard", this wizard will run you through the Autopo options for creating an

auto-generated mesh or a semi-auto-generated mesh (where you suggest edge flow and local mesh density).

The first step of the wizard will have you specify an approximate polygon count of the mesh. The second, you can paint areas where you wish more density in the mesh. The third and final step of the wizard, you can place spline guides upon the object to suggest where you wish to have the edge loops/flow. Of course both the density painting and spline guide topology "suggestions" are optional, if you wish 3D-Coat to generate a mesh entirely with little input from the user, that is also very much something that can be done.

Once complete the mesh will be placed into one of the various rooms you have previously chosen to place it into (Paint room if you selected a painting method, or Retopo room if you selected to simply Autopo the object with out painting).



7. UV Mode

In **3D-Coat** version 3.2, the UV tools have undergone a very serious change! You can now edit not just islands in this mode, but also polygons, edges and vertices themselves. There is also now a brush mode, so you can tweak your UVs to your liking with a brush, allowing for smoothing and other quick manual UVs. You may have noticed that these tools covered in this section are also in the Retopo mode section. This is because the Retopo room requires it's own set of UV tools for editing "Retopo" meshes. Do note that each of these tools are in the Retopo room as well, and are discussed here in this section of the manual to eliminate redundancy.

You can specify which unwrapping algorithm you wish to use. There is the older LSCM unwrapping, and the newer ABF++

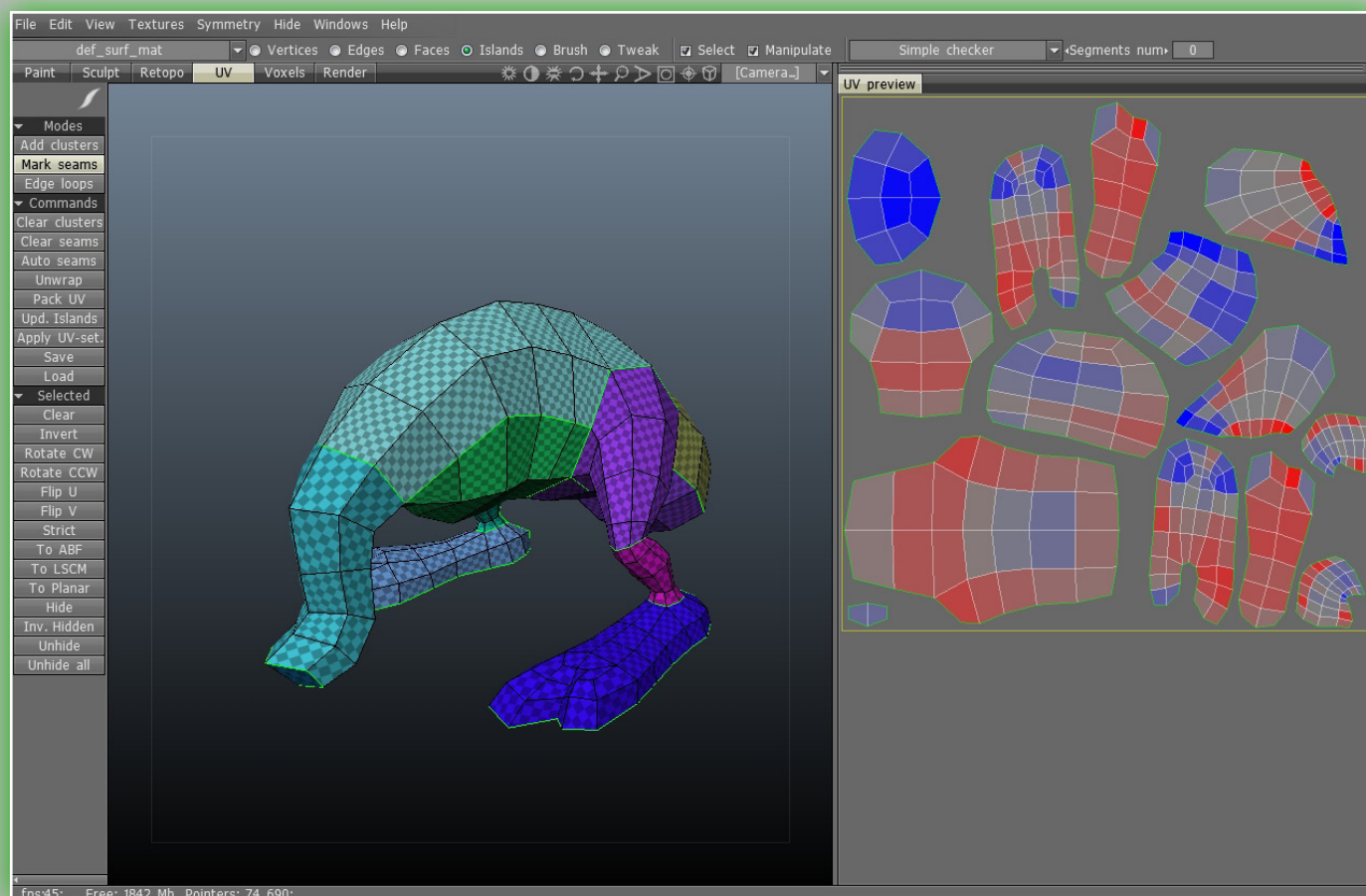
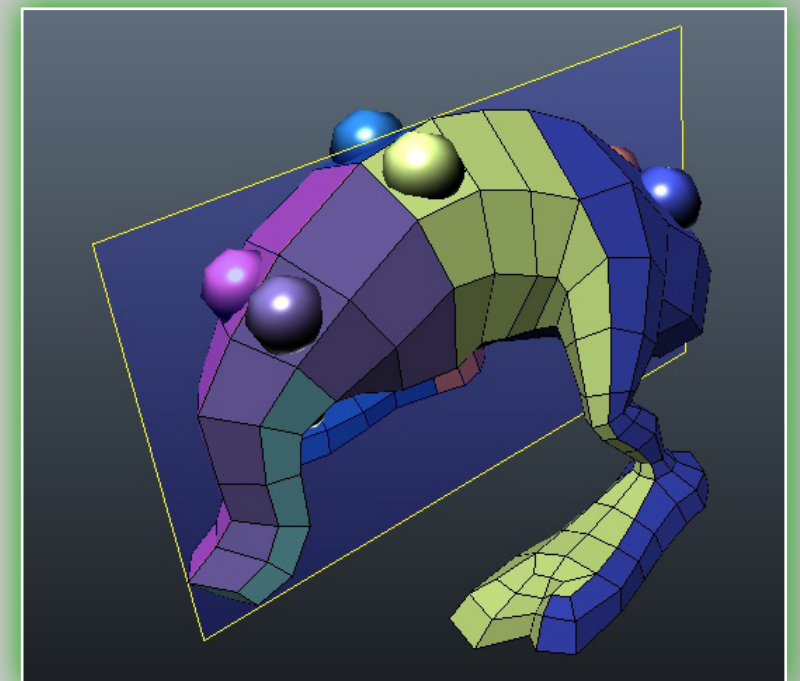
unwrapping. When you mark a new seam 3DC unwraps new clusters in real-time and shows you the preview of unwrapped clusters immediately, so that you can see the degree of distortion for every part. You can see new clusters appearing in real-time, lest you should forget some seam before unwrapping. **3D-Coat** also supports the creation and editing of multiple UV maps on a single mesh.

7.1 Modes

Add clusters. Click the **LMB** to add a cluster center directly on a polygon face. Clicking again on the same face will remove it. This tool lets you "mark" a seam without actually marking it as one, allowing for a whole UV island to be split into parts without actually splitting them.

Mark Seams. When you are ready to unwrap your mesh to create a UV map, you must first of course select your seams. That is where this tool comes in. You can select edges with the **LMB**, edge loops with **SHIFT+LMB** and deselect with **CTRL+LMB**.

Edge loops. This tool is no different then holding down **SHIFT+LMB** with the "Mark seams" tool. The difference here is that you are not required to hold down the **SHIFT** key to select your desired edge loops.



7.2 Commands

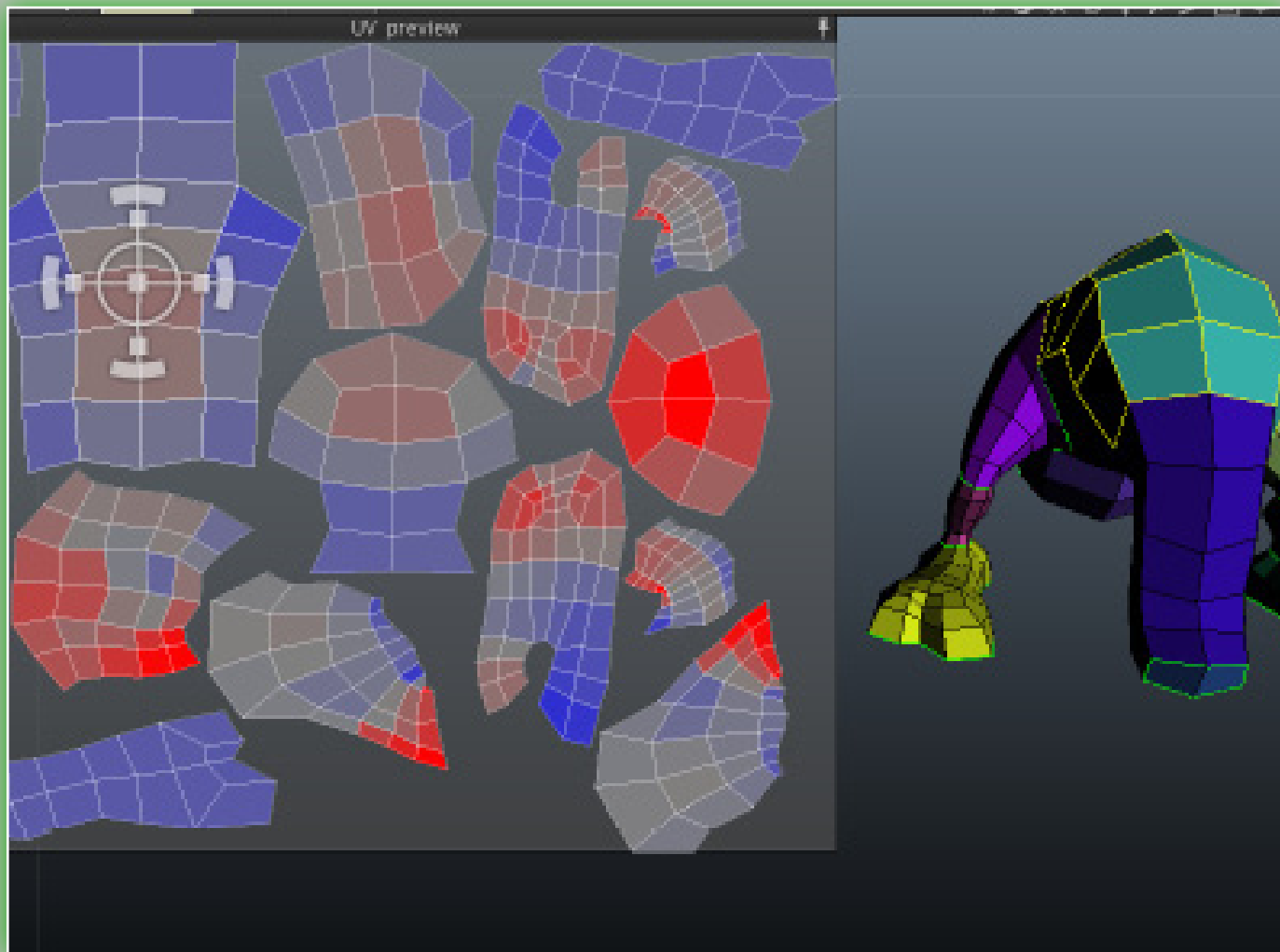
Clear clusters. Clears all UV clusters (also called UV islands) and seams.

Clear seams. Clears only the seams of the current mesh.

Auto seams. This function is mostly self-explanatory. It will essentially create seams automatically with a “best guess” on what edges to select as the seams.

Unwrap. Fits all clusters into the UV space.

Pack UV. This will pack all unwrapped UV clusters onto the UV map. When this operation is complete, you can then edit the islands on the UV map. At this point you can perform many essential functions which require a UV map.



Update Islands. When you have an existing island, and further mark a seam on that island causing it to become two, you will need to perform the Upd. Islands command to carry that information to the UV Preview Tab so that you will then have those two UV islands selectable, in the UV Preview Tab.

Apply UV-set. Clicking this will apply the currently defined UV set to the current mesh.

Save/Load. You can also save and load seam and cluster information of the current scene so it can be edited later. Note that this does NOT export or import a UV map.

Further advanced tools for editing your UV maps directly reside in the “Selected” portion of the of the retopology tools. These tools all require a selection in the UV Preview window. To select a cluster (or island) simply click on one with the **LMB**.

7.3 Selected (General)

Clear. Clears the selection.

Invert. inverts the selection.

Rotate CW. This will rotate the selected island clock-wise.

Rotate CCW. This will rotate the selected island counter clock-wise.

Flip U. This will flip the U of the UV map.

Flip V. This will flip the V of the UV map.

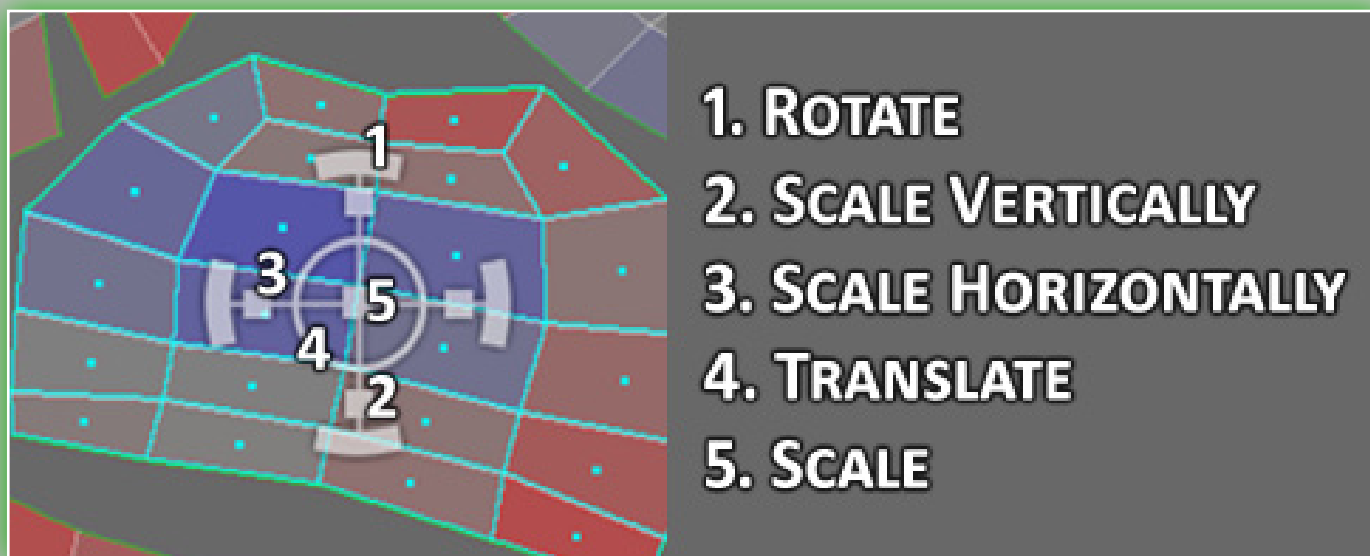
Relax (or Strict). Applies a light smoothing across the selected cluster (or island) to relieve stretching or pinching.

UV Preview Tab. Inside of the UV preview window you can also manipulate your UV islands & more directly. By clicking the **LMB** on an island, you’ll then see a manipulator gizmo.



Selected islands will then highlight all edges of it's respective polygons inside the 3D viewport.

UV Preview Manipulator. This manipulator lets you scale, stretch, rotate and translate whichever cluster you currently have selected. You can manually place your clusters as you see fit before packing them into a UV map. You must have the "Manipulator" tick box turned on to use this. It can be used Vertex, Edge, Poly & Island modes.

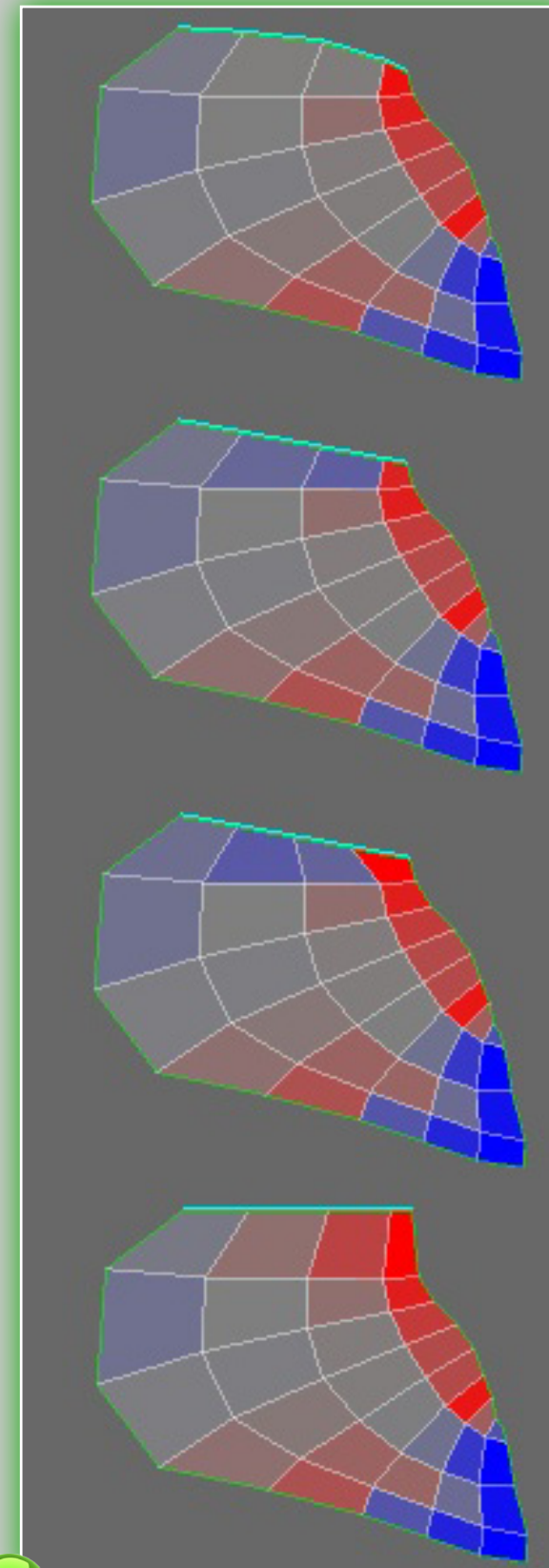


In block Selected you will find a set of commands that are related to the selections made in the UV preview window. After applying the Unwrap command you may want to edit UV island in the UV preview window.

On the top panel you can choose selection types: Vertices, Edges, Faces, Islands, Brush and Tweak. Select vertices, edges or faces (depend on what type have you chosen) with **LMB**. If you hold **LMB** and drag the mouse you can select several vertices/edges/faces. Use **SHIFT** to add an item to selection, use **CTRL**

☐ Vertices ☐ Edges ☐ Faces ☒ Islands ☐ Brush ☐ Tweak

to subtract an item from selection. Depending on selection type operations in the Selected block may change.



Vertices Mode. Lets you *Clear, Invert, Rotate CW, Rotate CCW, Flip U, Flip V* and *Relax*.

Edges Mode. In Edges selection mode there are a few new tools. They are: To line, Equidistant, Horizontal, Vertical.

The following tools are for edges mode:

Select Edge Loop. You can select an edge loop by double-clicking on an edge or you may simply use an Edgeloop command in the Selected block. With Edgering command you can select edge rings.

To Line. This command places all selected edges along the line.

Equidistant. This command places all selected edges along the line and sets equal distance between points.



Horizontal. This command puts all selected edges horizontally.

Vertical. This command puts all selected edges vertically.

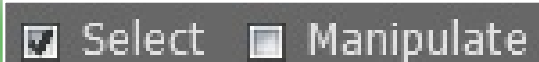
Set seams. This command marks selected edges as seams.

Del seams. This command unmarks selected seams if there are such.

Faces Mode. This selection mode differs from Vertices selection mode in four additional commands: Hide, Inv. Hidden, Unhide, Unhide all. Use this commands to show only selected faces in the viewport. All other commands work the same as for Vertices.

Islands Mode. This selection mode lets you operate with separate UV islands. You can translate, rotate and scale (vertically, horizontally and proportionally) an island with the help of Manipulator.

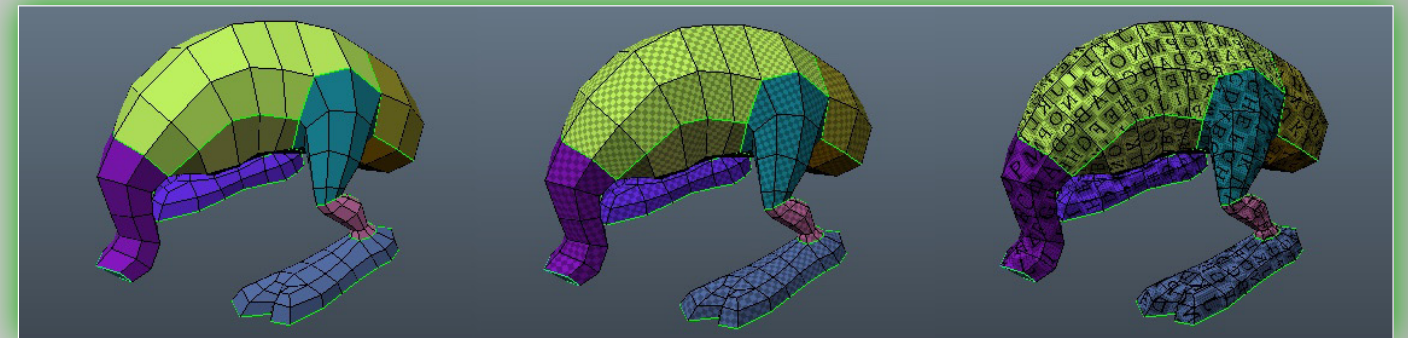
NOTE: that you need to activate the manipulator on the top bar. Check the Select and Manipulate check-boxes. Also, Keep the Select check-box always checked unless you don't want to select anything.



Unwrapping Methods. These commands are important, as any mesh you create will need to be unwrapped if you wish to paint a texture, or do any such work. They are:

ABF (Angle Based Flattening). ABF is a newer unwrapping method and is better used for organic meshes.

LSCM (Least Squares Conformal Maps). Meshes in *3D-Coat* are unwrapping with LSCM by default. This method is also used for organic meshes, but unwraps inorganic meshes quite well too.



Planar. This projects across the arbitrary axis, so you may use it if you need.

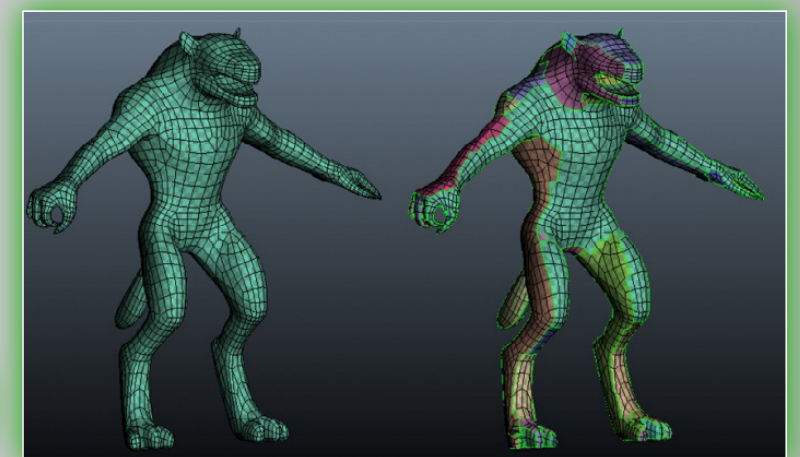
Brushes mode. In this mode you operate with the brush which size and be changed by holding **RMB** pressed and moving the mouse aside. With the **LMB** click and drag you can manipulate the mesh under brush. Use **SHIFT+LMB** to smooth the mesh. Use **CTRL+LMB** to pinch the area under the brush. Use **SHIFT+CTRL+LMB** to expand the area under the brush.

Tweak. It lets you drag vertices, edges or faces around in a very easy way. Simply move the cursor over a vertex/edge/face until it becomes highlighted and then drag it with **LMB**.

Checker Options. The mesh can be displayed in one of three ways: with no checker, with simple checker, with complex checker.

Multi-UV Support. Another drop-down list on the left of the top bar is to choose a UV-set list. If the mesh has a multiple UVs you can switch them in that drop-down list.

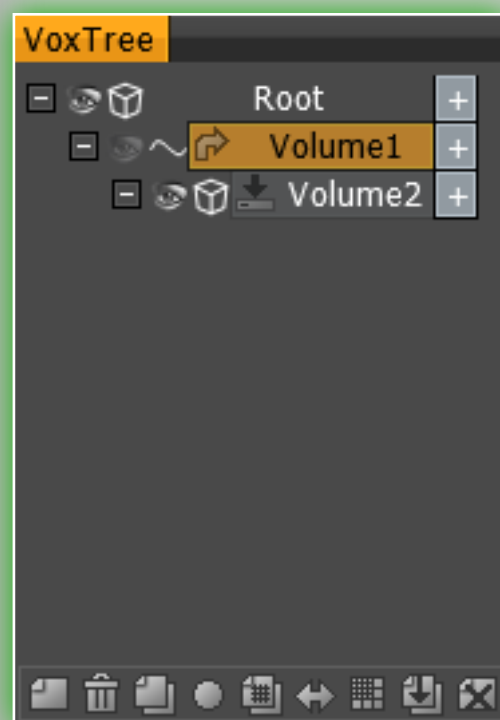
Overlapping UVs. You can have overlapping UVs within *3D-Coat* with no problems occurring.



8. Voxels Mode

8.1 What are Voxels?

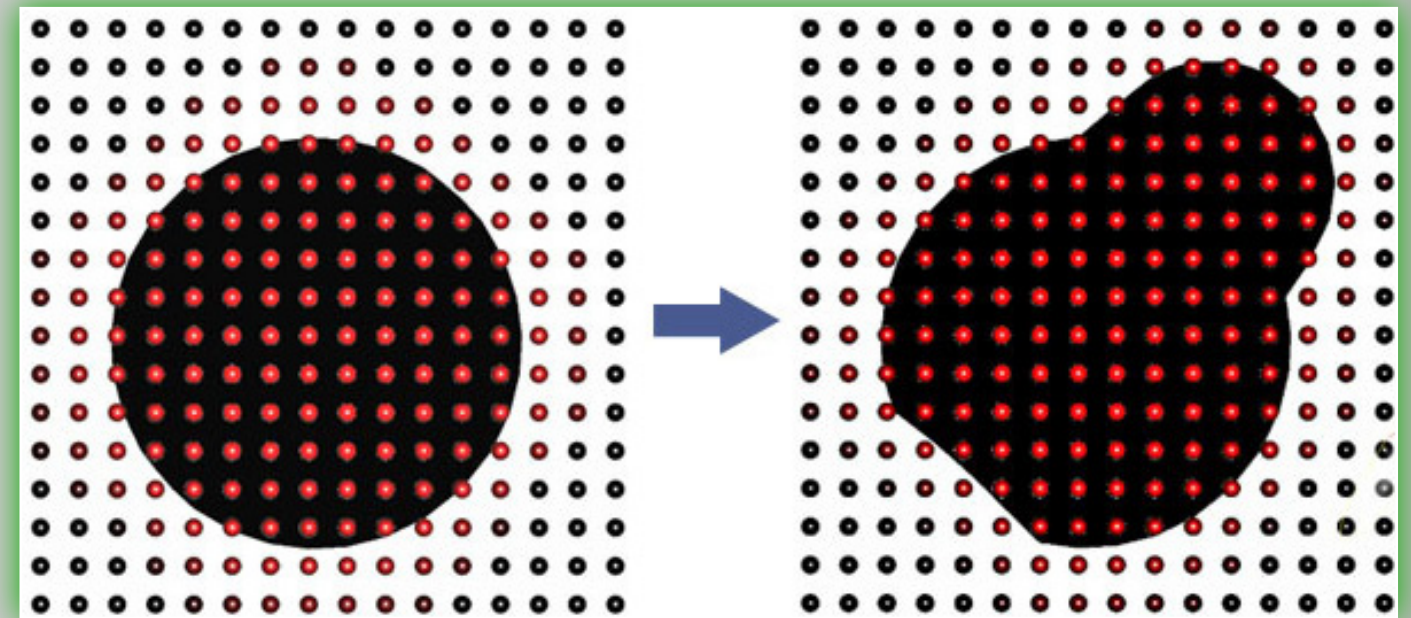
Almost all other 3D-sculpting programs are *polygon-based*, which means that they work only with the *surface* of 3D objects -- they manipulate a “skin” which has no thickness. But *voxel-based* sculpting programs work with the *volume* of 3D objects -- they manipulate a kind of “solid mass”. This approach lets you sculpt without *any* topological constraints: it lets you build up complex objects from “nothing” and to endlessly add and subtract volume “mass” -- and easily punch *holes* in the objects. This approach gives you *total freedom* in your 3D sculpting. With voxels, you can work like an old-fashioned, real-world, clay-based sculptor -- one who *never needs to think about dreary technical things like polygons and topology* and who therefore can just freely and easily express himself. If you need to sculpt an ear, an arm, or a leg, simply start putting together lumps of digital clay!



So what are these voxels, anyway? The word “voxel” itself is a contraction of “volumetric pixel.” Mathematically, voxels are numerical values $[0..1]$ placed in a *cubic grid*. The object’s surface is located where the value is equal to 0.5. The picture on the upper left illustrates this principle.

In summary, voxels are points in 3D space that contain information on volume and color.

Great as voxels are, you should also understand some of the limitations of this technology. For instance, objects can’t be too thin in

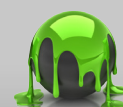
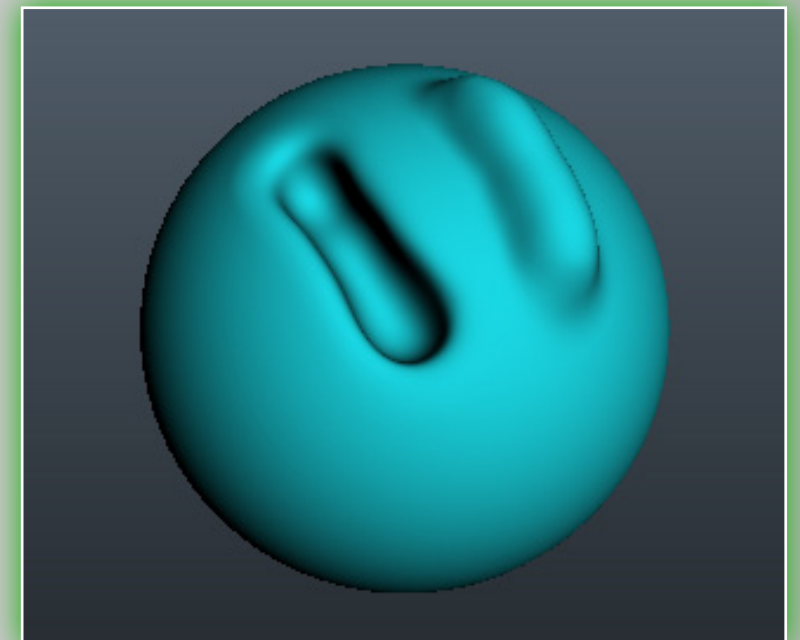


a voxel form. If you want to make a very thin surface, like cloth, you should increase the resolution of the voxel object -- or use the new **Surface mode** for voxels. This can be done by clicking on the **Cube icon** next to the particular Layer you would like to work on -- and it will then change to a wavy line. The wavy line represents the **Surface mode**.

8.2 Volume Sculpting Tools

When you’re in **Voxel Mode** there is a robust set of tools that you can use for sculpting and to perform different operations. They are located on the left-side tool panel. You can always call the tools panel by pressing **SPACE** anywhere on the screen. As with any other panel, you can pin it for your convenience.

Increase. Increases or decreases the surface beneath the cursor. None



- Voxels
- Increase
- Smooth
- Fill
- Clay
- Carve
- Airbrush
- Build
- Extrude
- Sphere
- 2D-Paint
- Planar
- Scrape
- Vox pinch
- Vox follow
- Adjust
- Measure
- Pick
- Pose
- Move
- Hide
- Cell hide
- Copy
- Transform
- Wrap
- Axial
- Barelf
- Objects
- Logo
- Cut&Clone
- Split
- Merge
- Sketch
- Curves
- Snake
- Spikes
- Toothpaste
- Muscles
- Primitives
- Text
- Cloth
- Surface
- Draw
- Pinch
- Shift
- Flatten
- Sf.Clay
- Rapid
- Commands
- Inc. res
- Clear
- Smooth all

of the pens having any effect on it -- just the brush size and the intensity. Press **LMB** and move the mouse to increase. **CTRL+RMB** to decrease. On the top panel, the **Growth** power controls the intensity of the increase and the **Thaw** power controls the intensity of the decrease.

Fill. Fills any cavities that you apply the brush to. It's useful when you want to make cavities less deep but not fully level with the rest of the surface. It sometimes requires very high intensity settings to fill areas.

Clay. Lets you place strokes quickly onto your voxel sculpt. It will also simultaneously smooth the surface after you've brushed it (as does the carve tool).

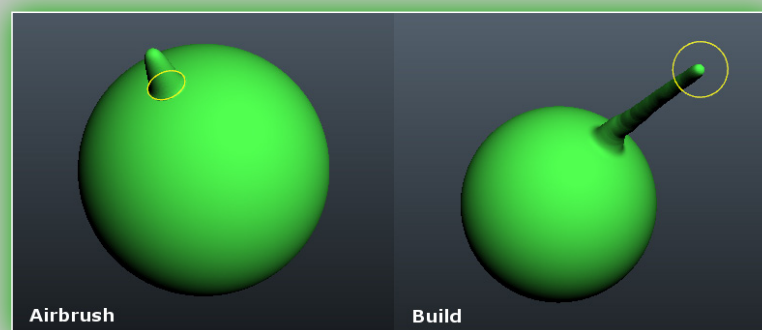
Carve. Lets you place high peaks and deep gauges quickly on your mesh, but with no smoothing.

Airbrush. This tool is great for very quickly placing horns and other protruding elements. Unlike the **Airbrush**, the **Increase** and the **Clay** tool, it constantly grows underneath your brush as you press the **LMB**, regardless of forward motion.

Build. This tool is similar to the **Increase** and the **Airbrush** tool. But while the **Airbrush** will continue to build while holding down your cursor, **Build** doesn't do that. You have to move it, like the **Increase** brush. However, with the **Build** tool you can use *alpha pens* -- and it doesn't smooth.

Extrude. This tool is very similar to the **Carve** tool, but it is also strongly smoothed.

Sphere. This tool is a very quick way



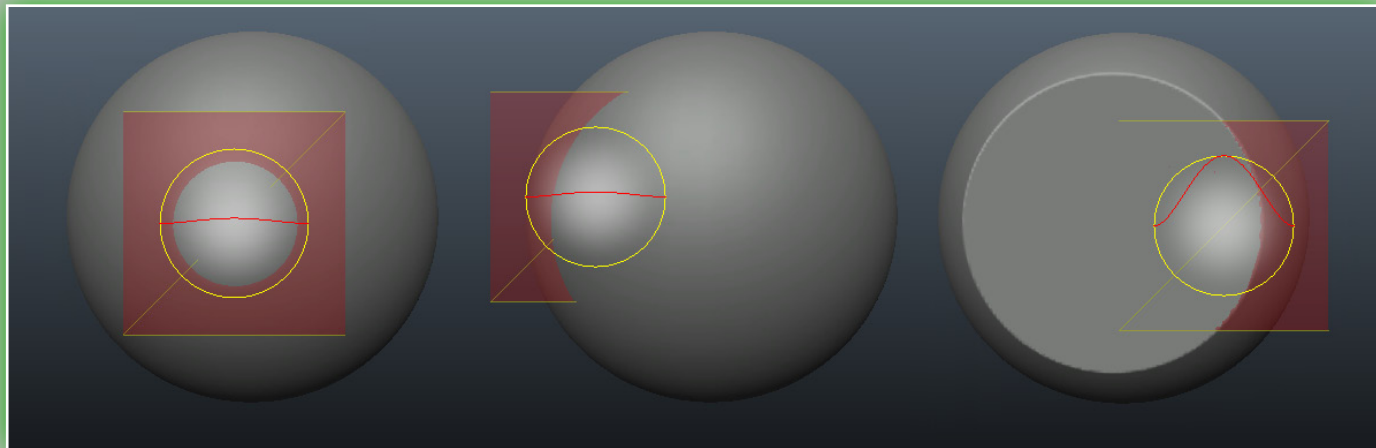
to create bubbles, bodies, etc. The size of the sphere is dependent on the size of the brush. You can also make it dependent on the pressure: click on the icon near the **Sphere extrusion** slider. The maximum size will be the maximum size of the brush. You can create separate spheres and long, "pill-shaped" cylinders rounded at the ends.

2D-Paint. This tool paints on two axes which you specify by right-clicking anywhere. Notice first that, as you rotate the view and move the brush, it's moving along the two axes. When you change it, it will always face the camera. Pick any pen you like and just draw! It also has an important option on the top tool bar: **Double sided**. With this checked you can paint double-sided strokes.



Planar. This tool, new in version 3.2, acts just like a carpenter's wood plane does. It will scrape the volume from the set set position & normal of the brush cursor. You set the brush cursor's position & normal by clicking and holding the **RMB** and then dragging along the surface of a voxel object. There are five modes by which you decide the position of the brush:





Pick point & forward direction. This will place the cursor at the last location you used the **RMB**, facing toward the camera.

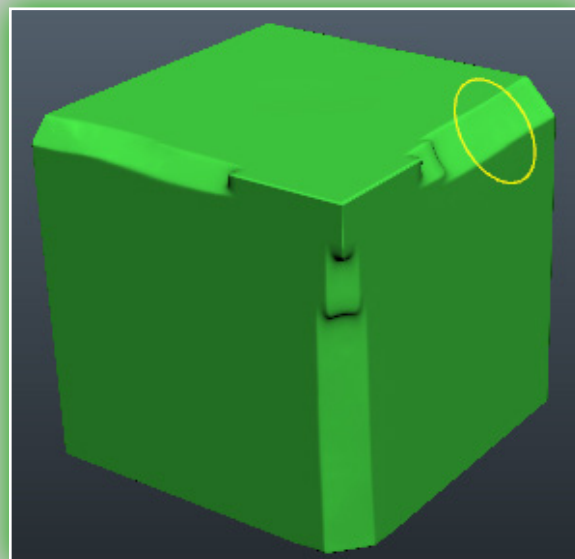
Pick point and forward direction
Pick point only
Pick point and direction
Pick point and direction (local)
Navigate

Pick point only. This will place the cursor at the last location you used the **RMB** only. Its direction is based on the settings in the parameters tab.

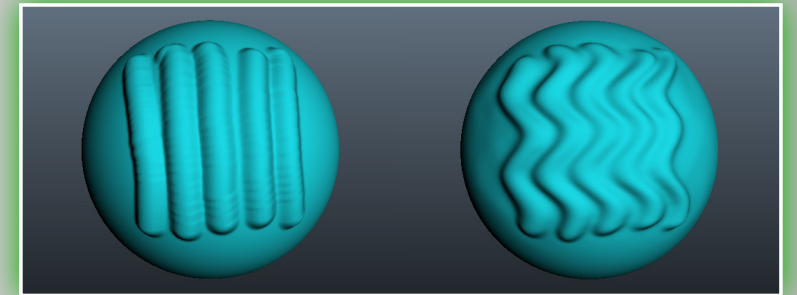
Pick point & direction. This will place the cursor at the last location you used the **RMB**, and its direction will be based on the average normals of the voxels that your brush covers.

Pick point & direction (local). This will place the cursor at the last location you used the **RMB**, and its direction will be based on the single normal of the voxel your brush is centered on.

Navigate. Lets you navigate the viewport. This can also be done while holding the **ALT** key.



Now we'll continue with the other tools:



Scrape. This tool is not affected by pens, just the **Size** of the brush and the **Intensity**. It's very similar to the **Flatten** tool: it flattens the surface beneath the brush.

Vox pinch. This is great for making very nice tight edges, cavities and peaks.

Vox follow. This tool drags the surface topology along with the brush. It's great for producing wrinkles on a character or a piece of clothing.

8.3 Adjustment Tools

Measure. By clicking and dragging with the **LMB** you can measure from the beginning to the end of your stroke allowing you to more accurately sculpt to scale.

Pick. Sometimes when you have more than one object in the **VoxTree**, it can become a tad cumbersome to know which layer has what object. With the **Pick** tool you can visually select the object (and therefore the **VoxTree** layer) simply by clicking on the one you wish to work on.

Pose. This tool is great for quickly changing the rotation, scale and translation of a selection. You can determine the selection in several ways. You can use a line, ring, sphere -- and you can even paint on it with a pen or an object. Check the **Airbrush** mode when using **Select with pen** to increase the



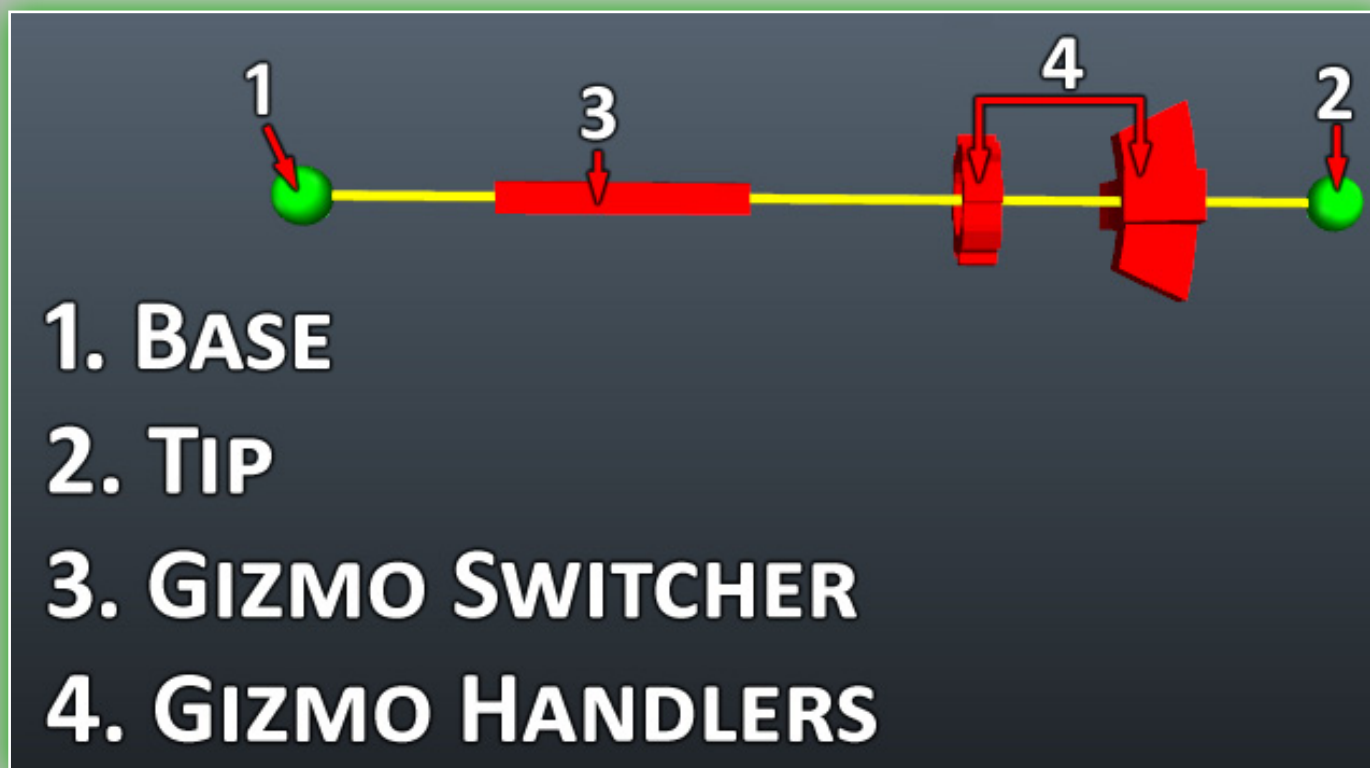
selection area smoothly. After a selection is made, a special posing gizmo will appear. It has three states: **Rotate**, **Scale** and **Translate**. You can switch modes by clicking on the long red rectangular bar at the base of the gizmo. In each state the gizmo has set of parameters in the **Params** window. Finally, as with all tools in **3D-Coat**, the pose tool respects symmetry, as well as all selection modes, like drag rectangle, lasso, etc.

Let's now take a look at some of the pose tool parameters:

Line. This mode lets you draw a line-based gradient for use with the pose tool gizmo. It starts with your initial **LMB** click and ends with the release of the **LMB**.

Ring. This selects a ring-based gradient. It starts with your initial **LMB** click and ends with the release of the **LMB**.

Sphere. This selects a spherical gradient. It starts with your initial **LMB** click and ends with the release of the **LMB**.

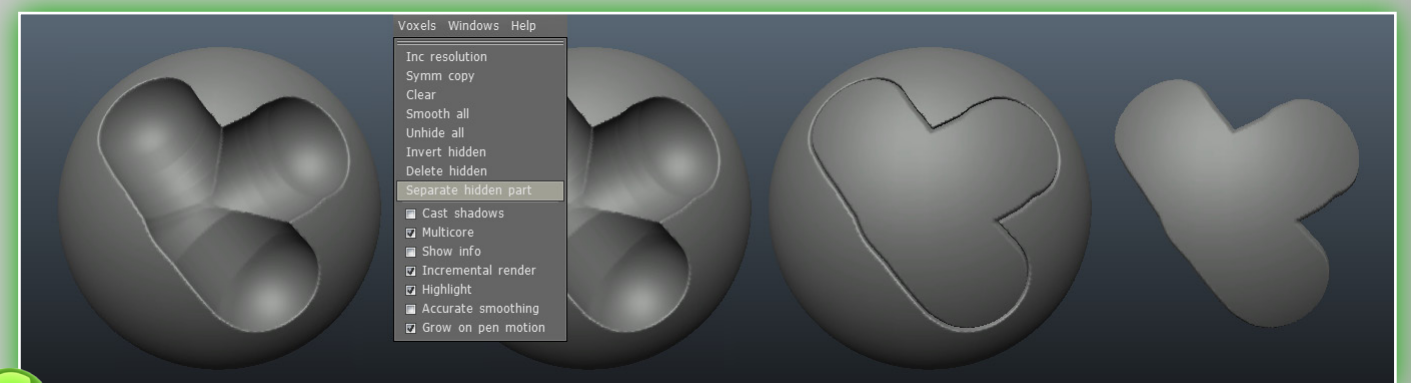


Select with pen. Selecting with pen mode lets you directly brush on your selection. The pen size directly affects the selection area. Furthermore, you can also smooth your selected area by holding **SHIFT+LMB**. This is a great way to select things quickly if you just need tiny little details selected. This mode also has a special option, **Airbrush mode**. By using airbrush mode you can also smoothly selected areas instead of having a hard edged selection. It makes for tidy deformations around the edges of your selection.

Special note for **Select with pen**: This is worth mentioning twice, as it is very useful. With the **Pose** tool, you can use almost any of the selection methods in the Pen mode bar, like drag rectangle, lasso, etc. You can also *subtract* your selection by using the tool normal while holding the **CTRL** key.

Object. If you have multiple objects in your **VoxTree**, this mode can come in very handy. Simply click on the object you want to deform using the **Pose** tool and it will place the entire volume as your selection.

Move. With this tool you can literally move the surface area within your cursor. Press and drag **LMB** to move the surface within the cursor, relative to the screen view. Use **CTRL** to move the





surface along the normal. It also works with the alphas of a pen -- so then different alphas give different result.

Hide. This tool has undergone a massive change. You can now hide on a *per voxel* basis. This lets you the sculpt with your brush the areas you wish to hide, while it also respects other selection methods, like drag rectangle, drawn contours, etc. This new method of hiding makes it much easier to create all hard edged surfaces for objects. The tool also has a few other functions, which you will find in the **Voxel** menu. They are:

Unhide all. Unhides any hidden voxels.

Invert hidden. Inverts hidden voxels.

Delete hidden part. Deletes any voxels you have hidden.

Separate hidden part. Creates a new Layer in the vox tree and places the previously hidden voxels into the newly created Layer.

To continue with the other tools, they are:

Cell Hide. This hides “cells” of voxels based on your brush size. Unlike the other **Hide** tool, it does not allow sculpting or seperating hidden parts to create seams and other objects.

Copy. To use this you must have two Layers in the vox tree. It is preferable if one of the Layers is empty, but it doesn't need

to be. In your other Layer there must be a portion of a volume object you wish to copy: with this Layer visible and your empty Layer active, you can brush along the surface of the background object. This will copy the brushed areas to the previously empty Layer. It is a really quick way to create objects based on a character's surface topology, like body armor, clothing, etc.

Transform. This tool lets you rotate, scale and transform your currently selected Layer. By grabbing one of the gizmo handles you can *constrain* to whatever axis you clicked on. You can also perform a *screen-based rotation* using the large outer circle. A few of the other options for this tool are:

Move only gizmo. Lets you make adjustments exclusively to the gizmo. This helps when you need to place the gizmo in another location.

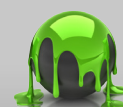
Leave rotated axis. This is great for when you need to rotate an object multiple times while retaining its previous rotations.

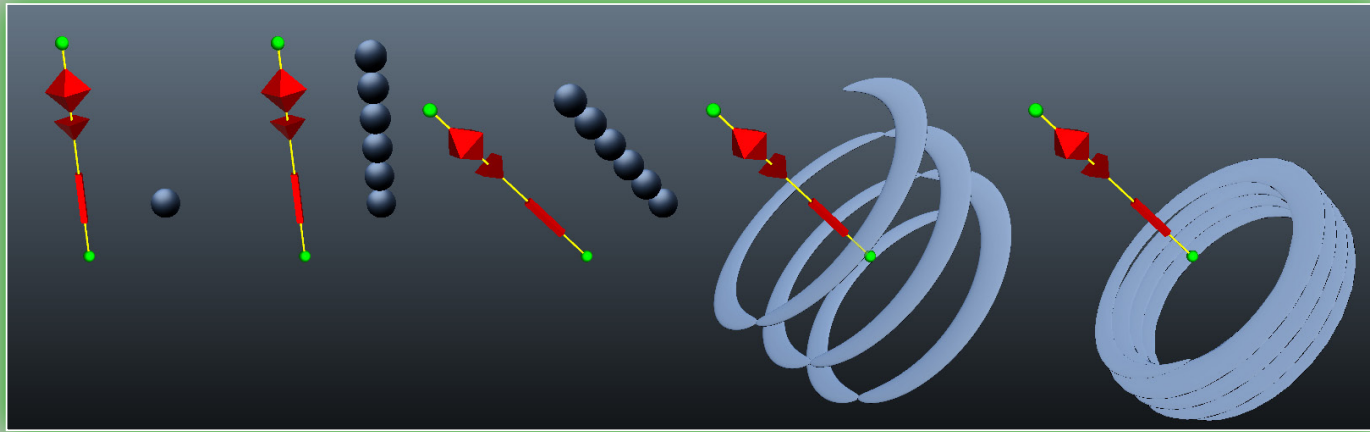
Position & Axes (1,2 & 3). These parameters let you manually key in the position and rotational coordinates.

Scale (X, Y & Z). These parameters allow you the manually key in *scalar* modulations.

Reset axis/space. These two functions let you reset an object's axis or local space.

Wrap. You'll find this tool is quite versatile! It lets you twist and bend the currently selected object Layer in the **VoxTree**. This is *very* important: each function of each of the **WrapType's** will *alter* any of the other types end functions. So you are strongly encouraged to test this tool out, to find out what





best works for you. That said, the following descriptions are based on the use of a default sphere, so let's take a look:

WrapType. Drop-down list with two methods: **Bend** and **Twist**. **Bend** will bend or wrap the current Layer around the base of the gizmo. **Twist** will rotate the current Layer around its pole.

The following functions are for the **Bend** type:

Segments count. Increases the number of segments.

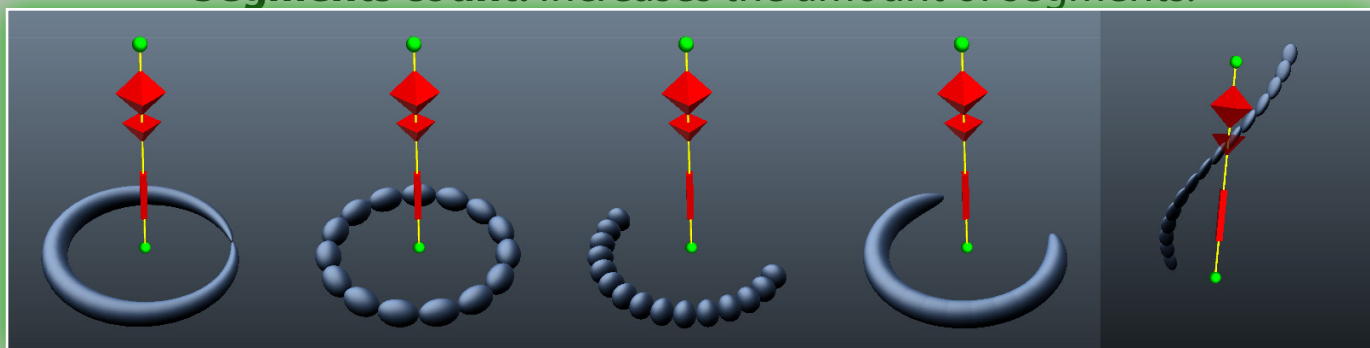
Start/Final angle. Adjusts the beginning and end of the wrap.

FowardStep. Create a "spiral staircase" look: it will literally spiral the object upward.

Overlap. This tapers each segment where they meet. The effect will vary depending on the object.

The following functions are for the **Twist** type:

Segments count. Increases the amount of segments.

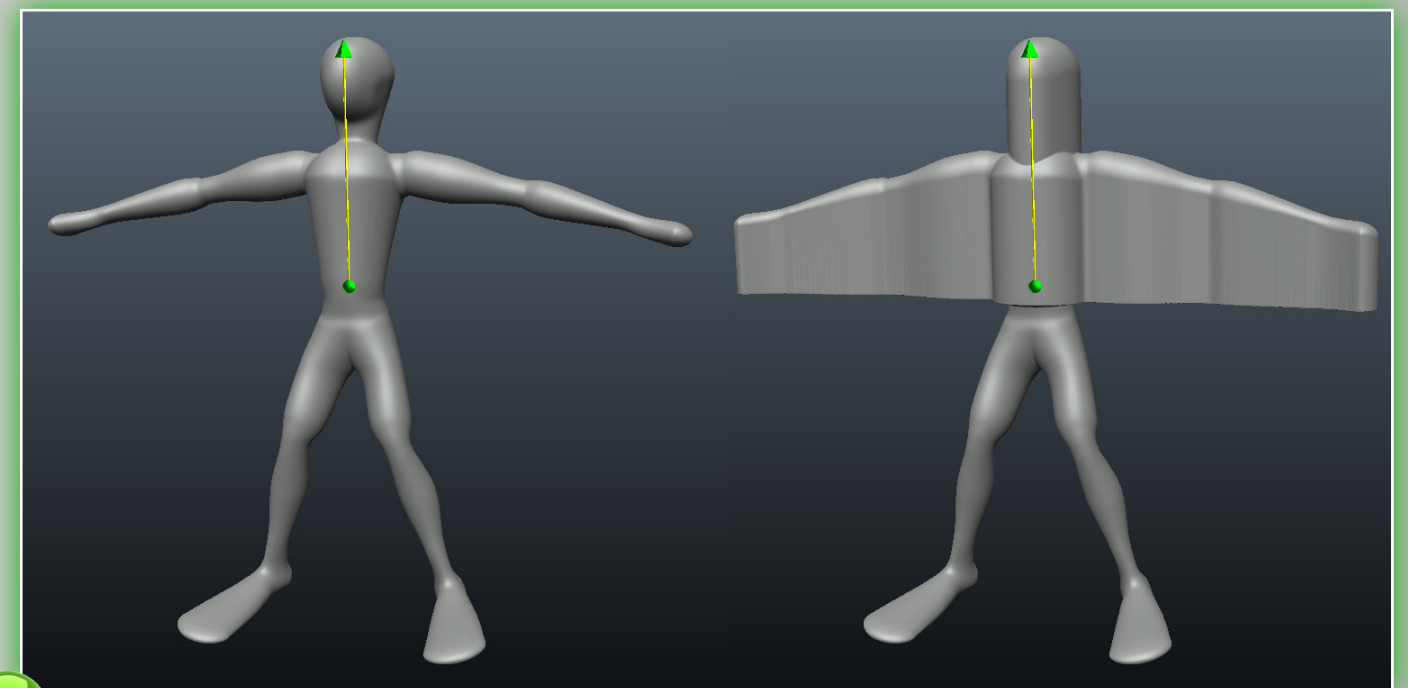
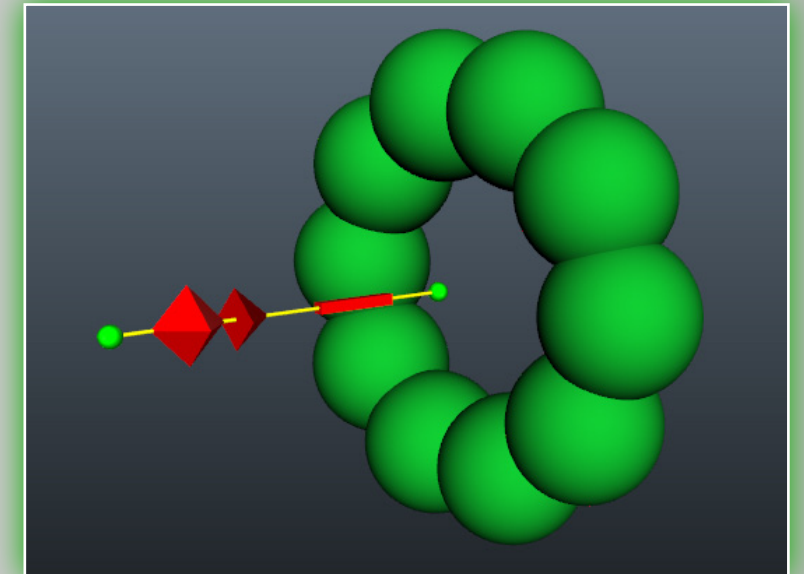


Twist angle. Twists the current object around the gizmo.

Overlap. Tapers each segment where they meet each other, simultaneously increasing/decreasing the space between each spiral.

Axial symmetry. This tool lets you clone the active Layer from the **Vox Tree** with axial symmetry. You can set the number of copies in the **Params** tab. The gizmo works just like all the other gizmos. Move the *translate handler* (octahedron-like) to get an idea of similar things you can do with it. You are strongly encouraged to explore this tool's possibilities.

Barelfief. This looks at the existing volume of an object, and *extrudes* to create new volume based on the position of the gizmo. The area at the base (sphere) of the gizmo from the



tip is the area that will be affected. It is great for creating coins and jewelry.

8.4 Object Tools

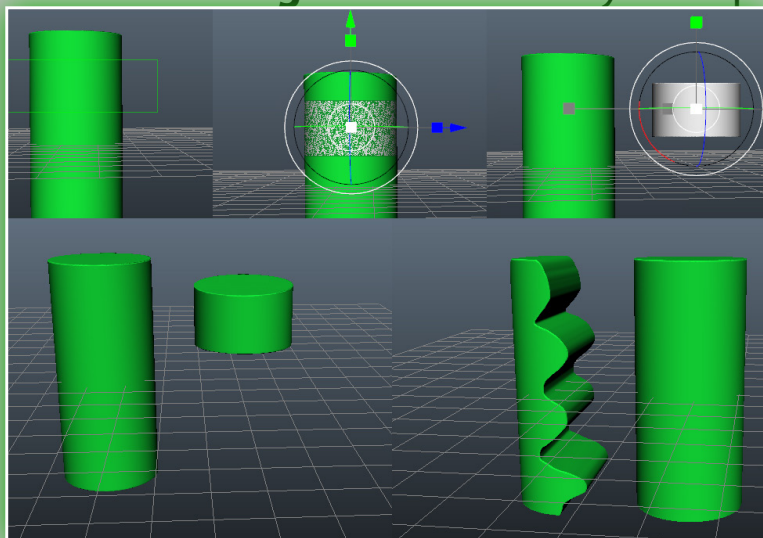
Logo. The logo tool lets you import any black and white picture and convert it to voxels. You can convert images that are in the **.BMP**, **.TGA**, **.jpeg** and **.PNG** formats. Click on the **Logo** tool and select an image. When imported, voxels will be created on the basis of grayscale image. It will default to the merge tool, so you can use the standard merge gizmo here.

Cut&Clone. This tool will let you cut and clone the volume of a voxel object based on the type of brush parameters. It defaults to the drag rectangle pen mode and will copy the whole volume of the object underneath. You can also adjust your border parameters with three different types: **Round**, **Plane** and **Sharp**.

Split. This tool is very similar to the **Cut&Clone** tool. It has the exact same border settings. The difference is that it tears a chunk of the object that you are operating on and creates its own object Layer in the **VoxTree**.

Merge. This tool lets you import polygonal meshes to convert into voxels. Let us first go over some of the basic functions of this tool:

Select mesh. Selects a mesh stored on your hard drive.



Pick from retopo. If you have something retopologized in the **Retopo** tab, then you can use the mesh to merge to voxels.

On pen. Turns any merged mesh into a pen to sculpt with. (**NOTE:** If you are using a high-res object and then click that, you'll be painting high-res objects all over, which will cause a lot of lagging.)

Subdivide. Subdivides your un-merged mesh.

Transform. Will change to the transform gizmo, allowing you to transform the un-merged mesh.

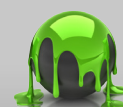
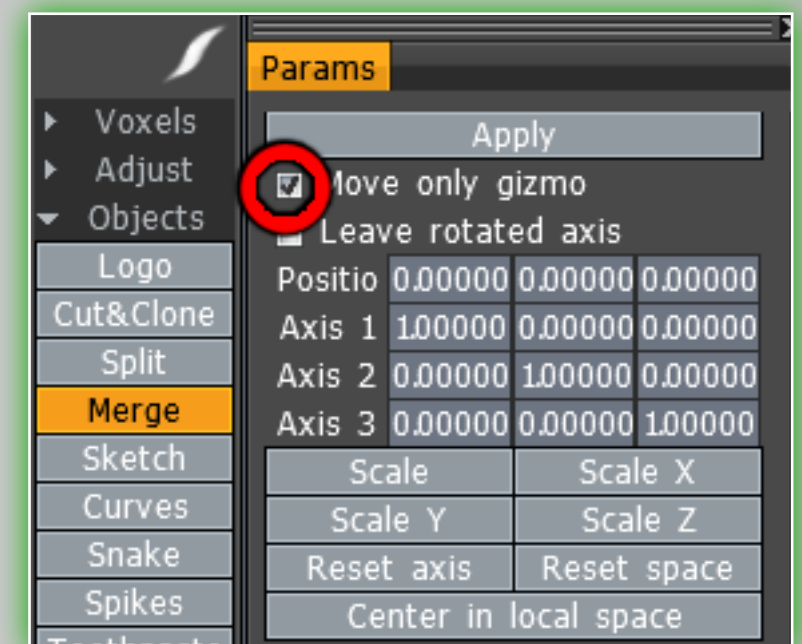
Shift (X, Y & Z). Shifts the un-merged mesh along the selected axis inside a bounding box in local space.

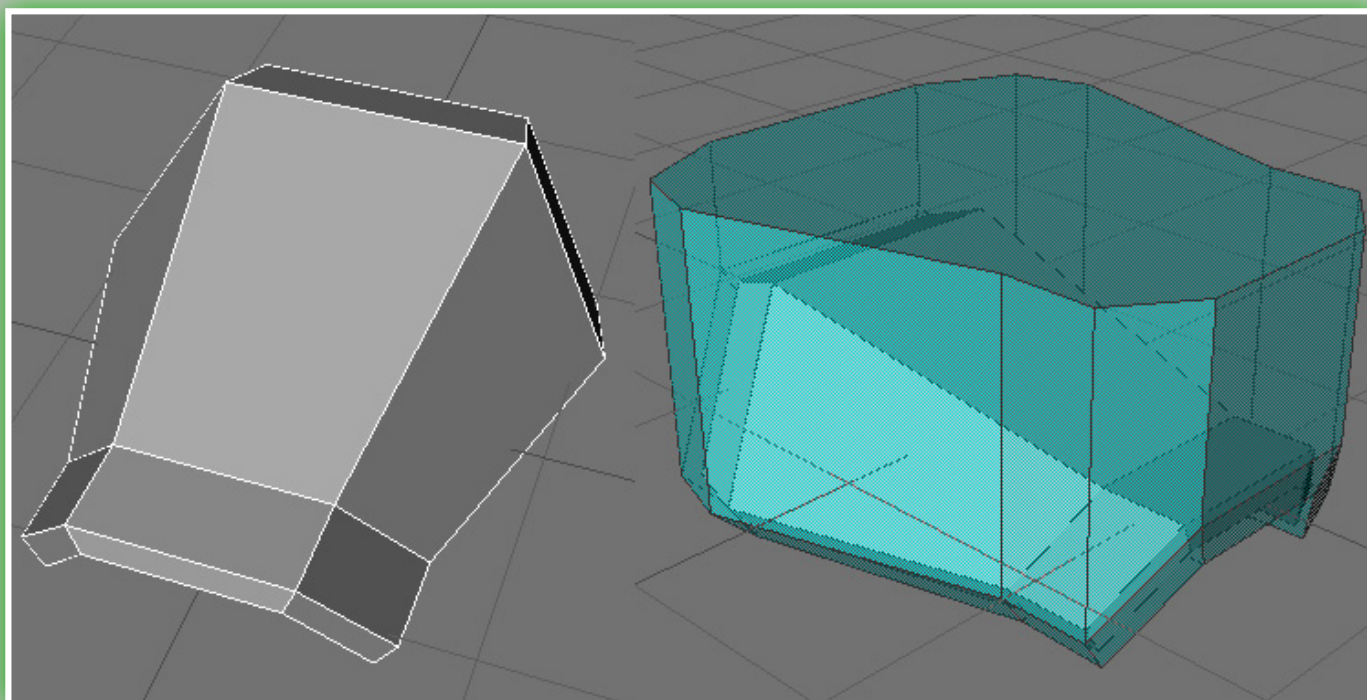
Presets. This tool has a number of presets, you are encouraged to explore them.

Some of the more advanced functions of this tool are:

Merge separate volumes. Merges each sub-object to its own unique Layer in the **VoxTree**.

Respect negative volumes. If an un-merged object has “_negative” somewhere for a sub-object inside the file, this function will *subtract* this volume when merging it with other sub-objects. You should know in advance when you are going to use

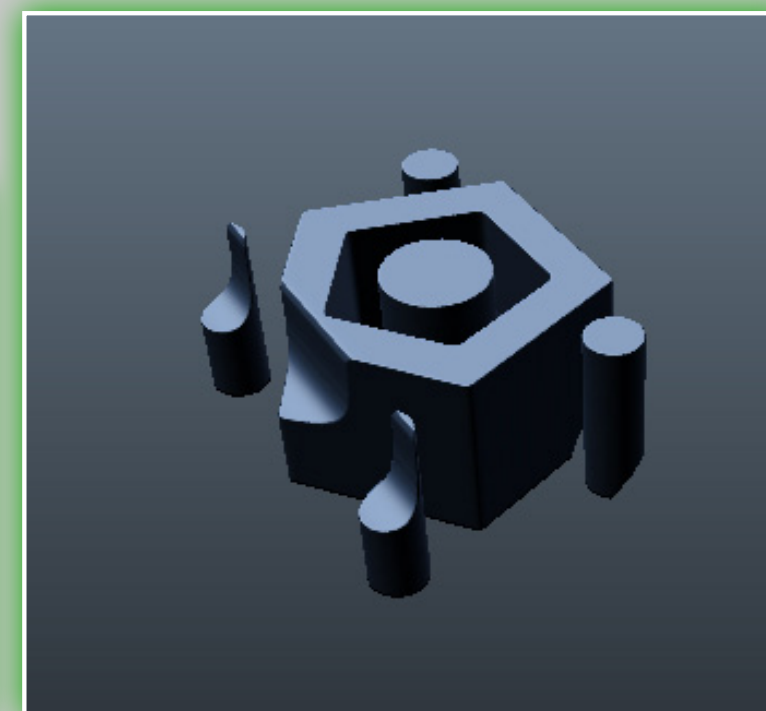
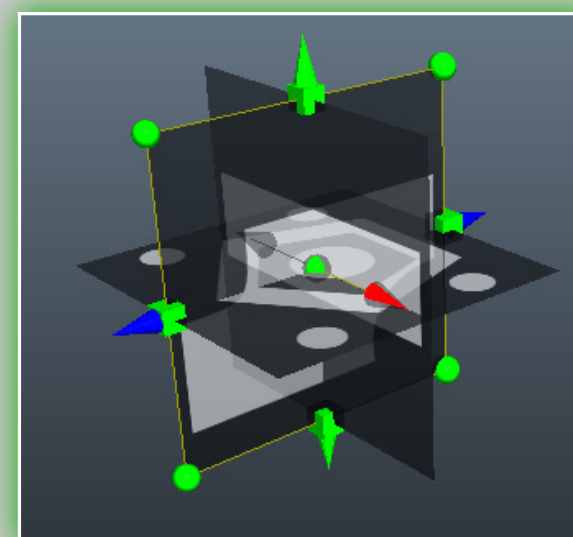
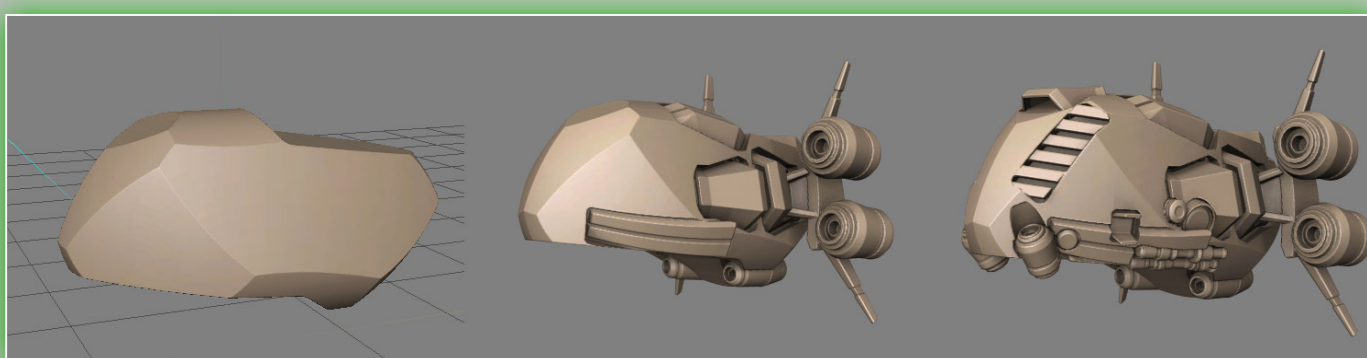
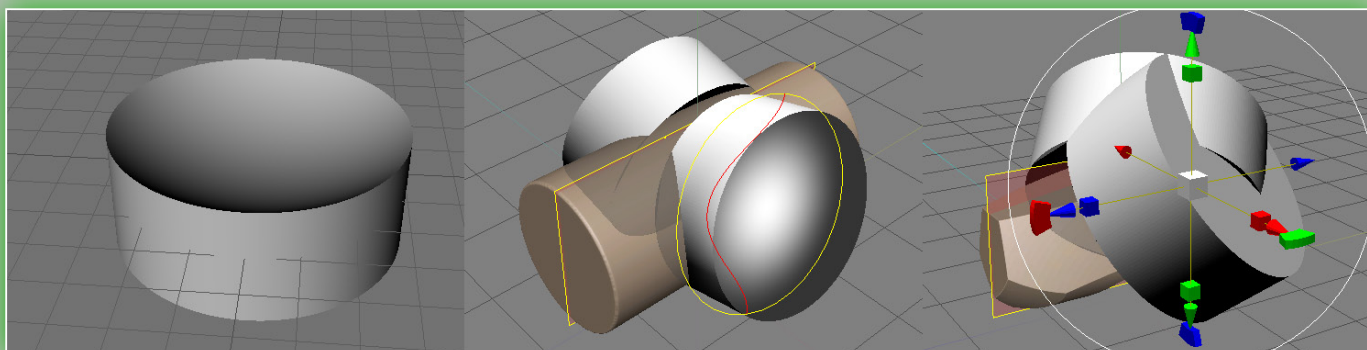




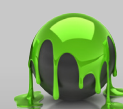
this feature, as “*_negative*” is a prerequisite. It is great for creating greebles and nurnies.

Let’s take a more detailed look at this feature. (Thanks to our users Tinker and Daniel Yarmak for the descriptions).

Greebles or nurnies can be created in any 3D modeling application, usually with a series of arbitrary extrusions. To make your

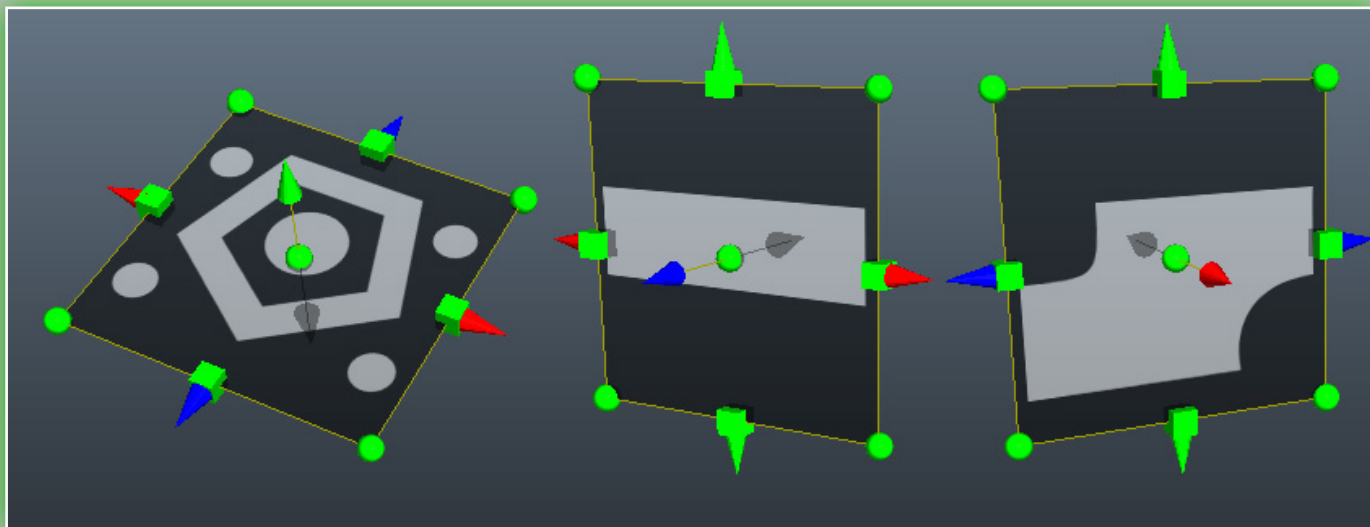


models look more interesting and unique you would probably want to create your own greebles. Details with angled surface look better than surfaces all-parallel. For easier placement of details on a model, create a contour for the detail -- an object with the name “*_negative*” which subtracts automatically from the model and leaves a slot for the detail. It’s important to turn on **Respect negative volume** in the **Merge Params** tab to permit contour exclusion. Because the “negative volume” width is larger



than width of the detail, we get an interesting effect. There is a joint between the body and the object. Load the greebles using the **Merge** tool. Use the **On pen** mode and the “9” and “0” keys to rotate the brush.

Sketch. This new tool is a very important addition to the toolset. It lets you create a volume object with 2 or 3 images -- if you use 3 images, the voxel object will be more detailed. Please try this new tool out, it is great for creating basic shapes for a more detailed objects very quickly. This tool has a few operations, all of which are self-explanatory -- please explore the options for this tool.



Curves. The Curves tool is easily one of the most powerful tools in the voxel arsenal, as it lets you place spline points directly into your scene with the **LMB**. To edit an existing point, simply click with the **LMB**. To **ESC**ape from editing a point, hit your **ESC** key. This tool also uses a gizmo for transformations. The arrows will translate, the boxes will scale or stretch, the inner white ring will translate on all axes. When using the function **Apply to whole curve** there will be an outer white

ring which allows for viewport based rotations. In addition to the standard curve tools described above, there are now 4 modes:

Extrude. Lets you extrude new hierarchies from the existing point of a curve. Simply click and hold the **LMB**, then drag in the direction you want to create the extrusion. Holding **SHIFT** will default to the new **Rotate** mode. It can also be activated with the “Q” key.

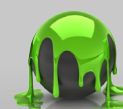
Move. Lets you move points of a curve individually. Adding the **SHIFT** key will move its child or parent hierarchy, depending on the direction of the manipulator arrow. It can also be activated with the “W” key.

Rotate. Lets you rotate the child or parent hierarchy of a point with viewport based rotations. It can also be activated with the “R” key.

Scale. Lets you scale the child or parent hierarchy of a point. It can also be activated with the “E” key.

NOTE: You need to click the **LMB** to edit a point, esc to stop editing a point. When using one of the four new edit modes, you do not need to have a point selected. Simply hold **SHIFT** (or turn on **Invert SHIFT action**) and you’ll see *green cones* -- they let you edit the point and its hierarchy. Finally, the affected direction of the hierarchy is the larger side of the green cone.

These tools allow for quite a number of things, including pipes, chains, basic character or creature shapes and bodies, and so on. Here are some of the parameters of this tool:



Fill Inside. Fills the entire space between all points to create a solid volume object throughout the entire space.

Run brush along curve. Lets you perfectly indent or protrude areas along the spline. It has a number of options which are all self-explanatory -- please explore these settings.

Stick to ground. Forces the points of your curve to be constrained to the surface of a volume object you click on.

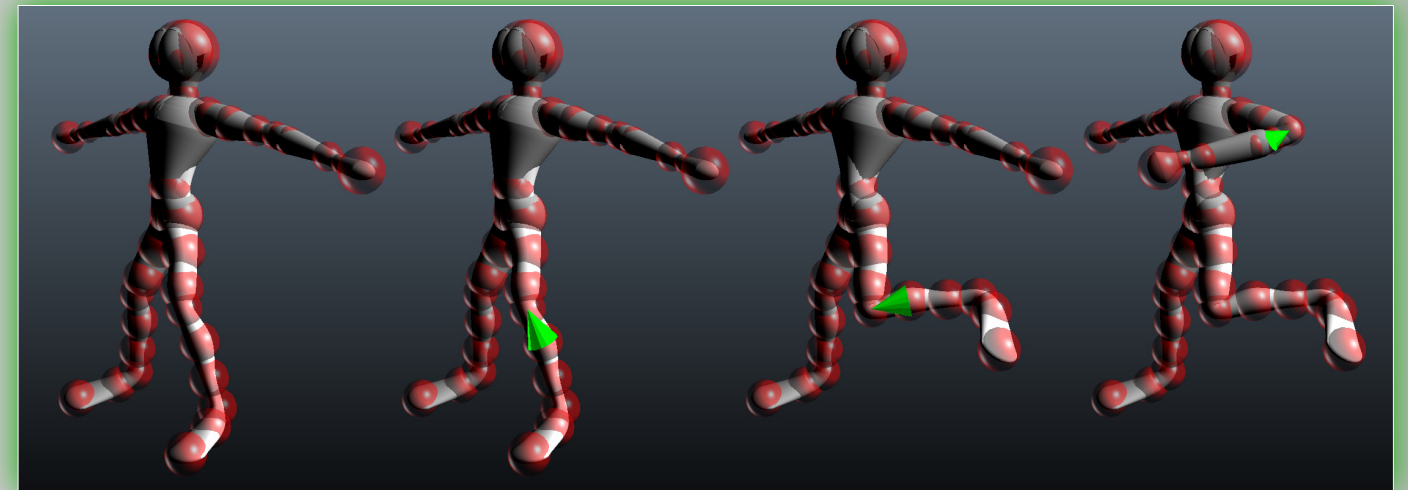
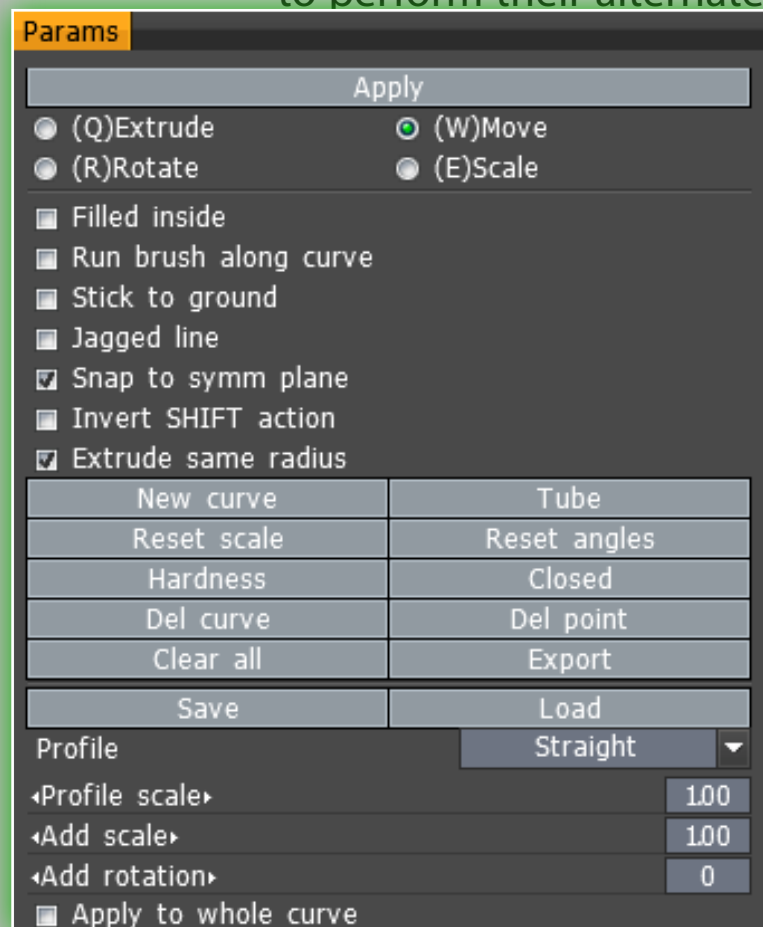
Jagged line. By default the curves tool will create a smooth TCB-spline. But with this option you can create a *linear* spline, essentially creating “pointy” intersections.

Snap to symm plane. Forces newly created points to be created on the symmetry plane when you click on or near the plane.

Invert shift action. This exclusively effects the four new curve modes. By default in any of these modes you must hold **SHIFT** to perform their **alternate** functions. This option will invert

this setting, so that by default you use the alternate functions, and the normal default methods require you to hold the **SHIFT** key.

Extrude same radius. In the **Extrude** mode, this option creates a new point with the same size as the point that you extruded from. By default a newly created point is the size of your pen cursor.



New curve. Adds another curve to your scene, in addition to your existing curve(s).

Tube. Resets the curve back to its default state.

Reset scale/angles. These two tools will reset any scaling or rotations you have applied to the selected curve.

Hardness. To use this you must have a point on a curve selected, then, by pressing this button, the selected point will become sharp and pointed.

Closed. Closes the spline curve between the first and last points on the spline. You can of course still add or remove points while using this function.

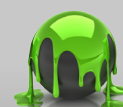
Del curve/point. These two functions allow you to delete curves and points on a curve. You can also hover over a point on a curve and hit the **DELETE** key.

Clear all. Clears all curves from the scene.

Save/Load. You can save and load entire sets of curves for use at a later time, or for distribution to other users.

Profile. This drop-down list contains a number of profiles, each will change the overall shape of the spline curve.

Apply to whole curve. With this any rotations, scaling or translation will apply to the whole curve centered from your cur-





rent selected point on the spline. The gizmo for the point will change, adding a new large, white circle around the rest of the gizmo. This new circle will allow for viewport based rotations.

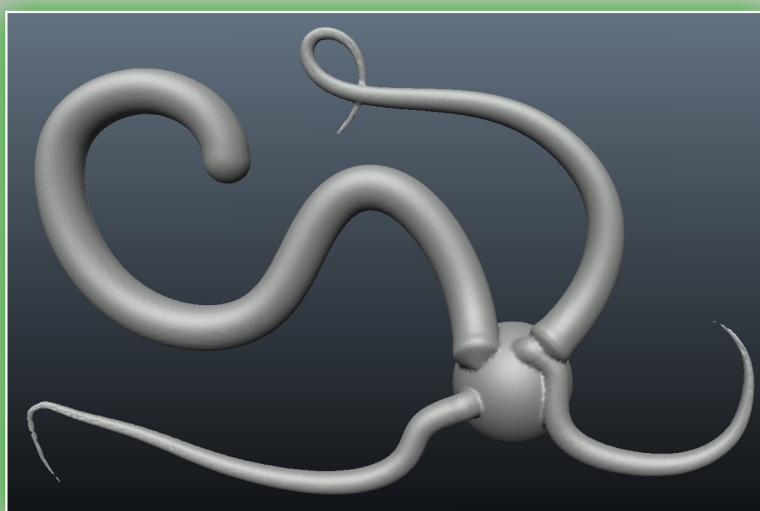
Spline presets. There are other, and hopefully self-explanatory, settings for this tool. But one thing you should definitely explore are the spline presets. These let you perform many unique voxel sculpting techniques and styles. You can also add your own by using external files in the **.OBJ** or **.LWO** formats.

Snake. Clicking and dragging with the **LMB** creates a snake-like shape in your viewport. Its position is based on your first click and your viewport perspective. As with the curves tool, you can reset it with the **Tube** button. You can select a number of profiles and of course also use spline presets.

One unique parameter for this tool is the **Smoothing speed**. The snake will smooth along its entire length, causing it to move. The higher the value, the more smoothing. (Min/max values: 1-5)

Spikes. Functions exactly like the snake tool, except that it *tapers* on the end point, causing a spike-like appearance.

Muscles. Lets you easily sculpt muscle- and tendon-looking shapes. You can achieve many different effects by, for instance,

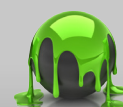
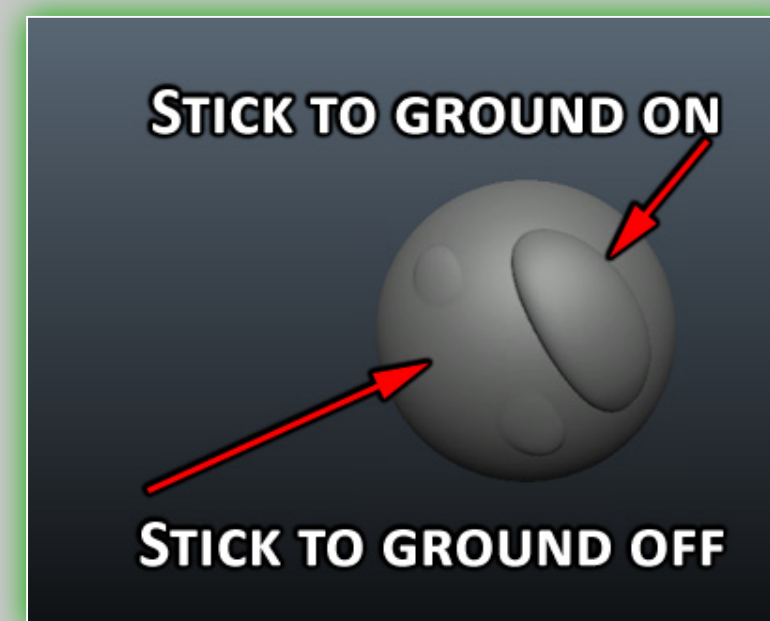


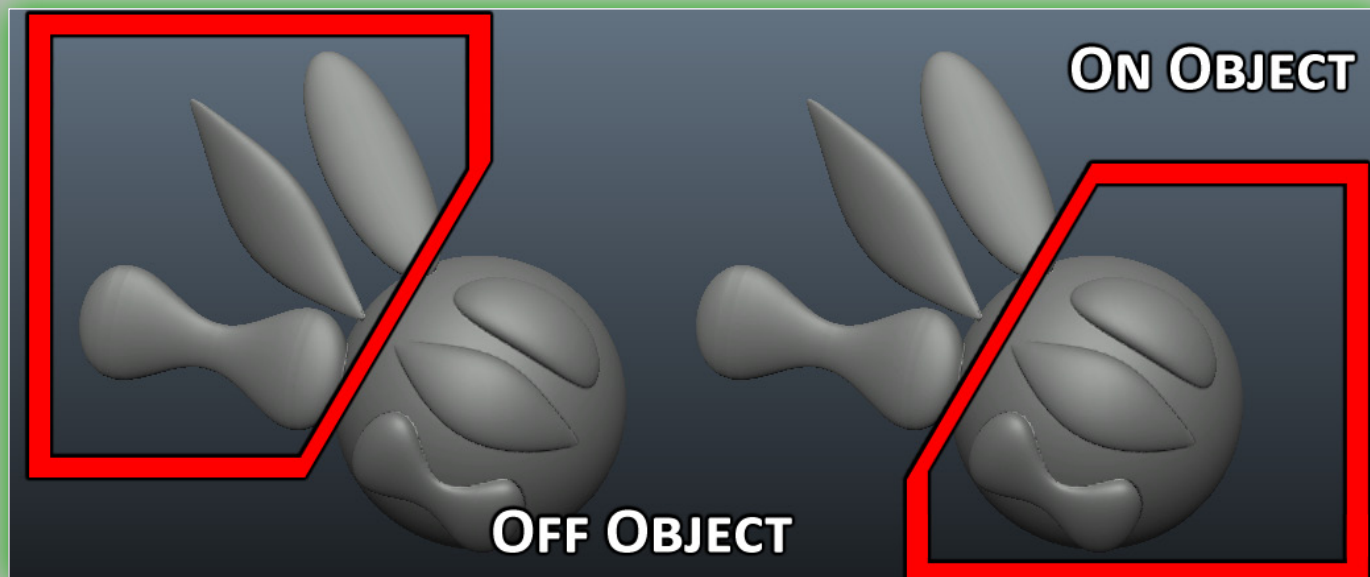
sculpting with this tool *outside* of a volume to create objects that look like wings.

There are a number of settings in this tool:

Smoothing Speed. Lets you adjust the rate at which your stroke is smoothed.

Stick to ground. Forces your stroke to append to the *surface* of the object, instead of smoothing right through it.



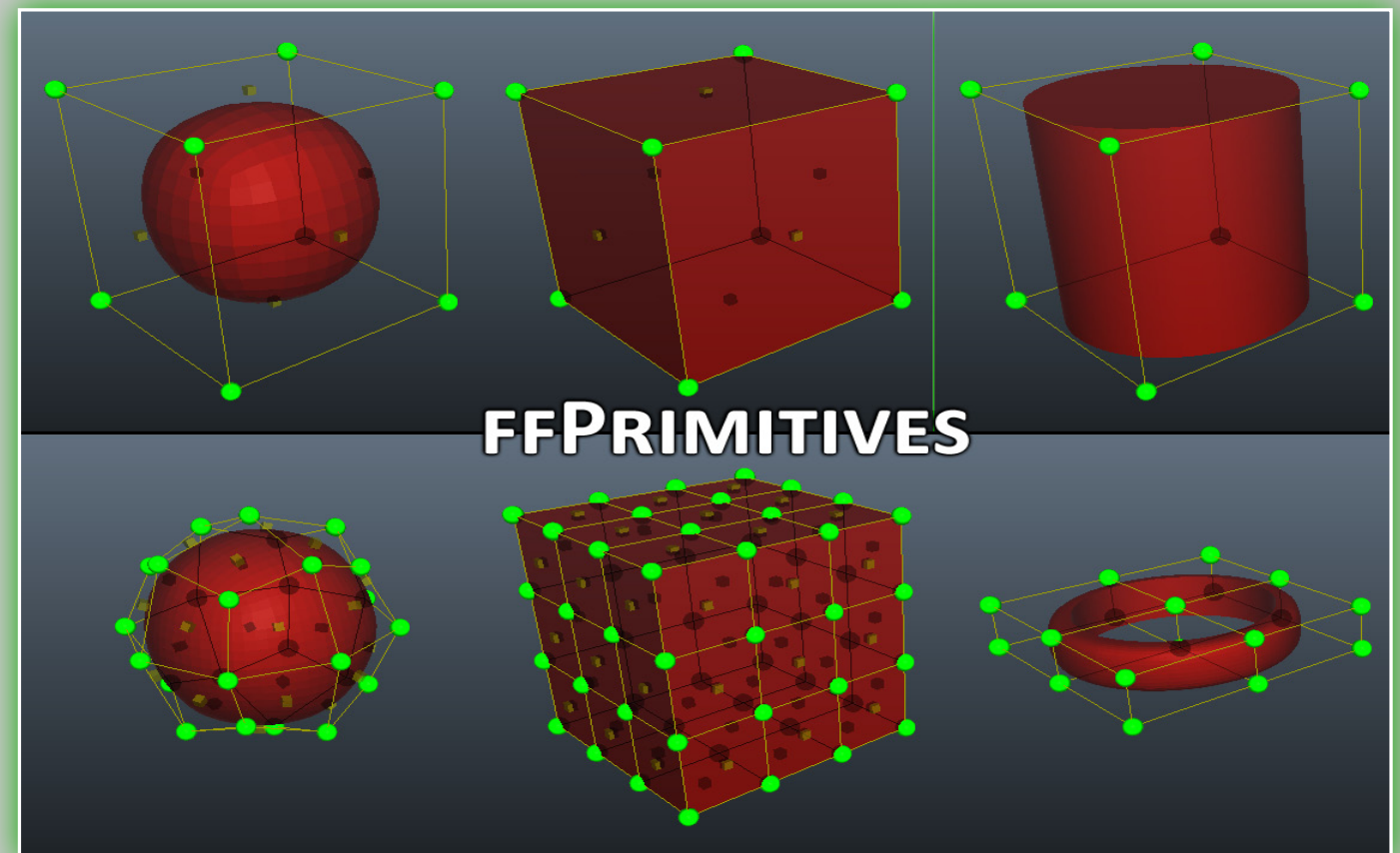
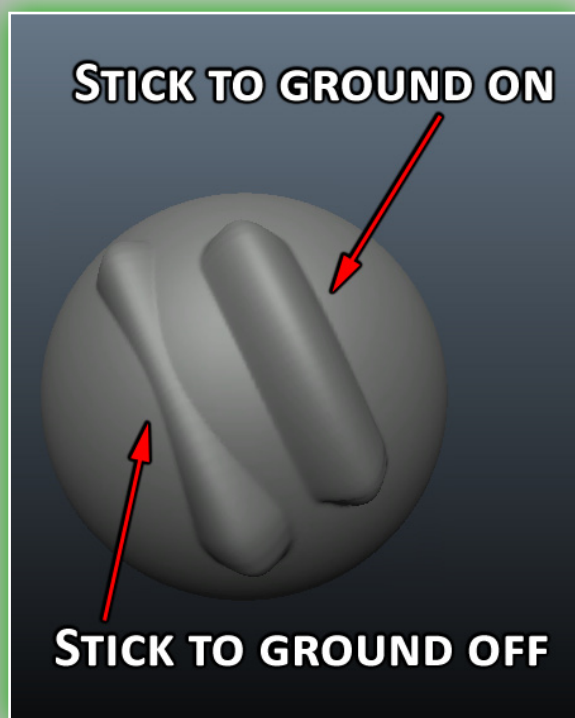


Muscle types. Select between two different types: *Muscle* and *Tendon*.

Toothpaste. This tool shares all of the options with the *Muscles* tool except the muscle types. Its function is similar to its name: it is just like applying toothpaste to a surface. A big advantage is that it respects *Pen alphas*, so you can use it to create some rather unique rake brushes.

Primitives. This tool has undergone a big change in version 3.2. While retaining the older primitives (*Sphere, Cube, Ellipse, Cylinder, Cone, Capsule, Tube, N-Gon* and the *Gear*), there

are now *Free Form Primitives (ffPrimitives)*! These robust and powerful primitives let you create very complex shapes with just a few easy tweaks of the vertices, edges or faces of the *lattice cage*. There are a number of preset *ffPrimitives*, and you can also create your own using *.OBJ* files -- see more on that below. A few of the parameters for the new *ffPrimitives* are as follows:

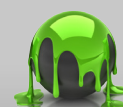
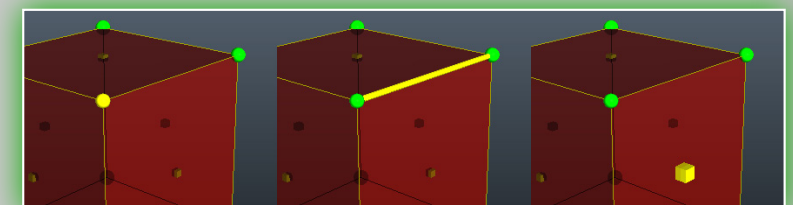


Transform as whole. Gives you the ability to translate, rotate and scale using the default transform tool.

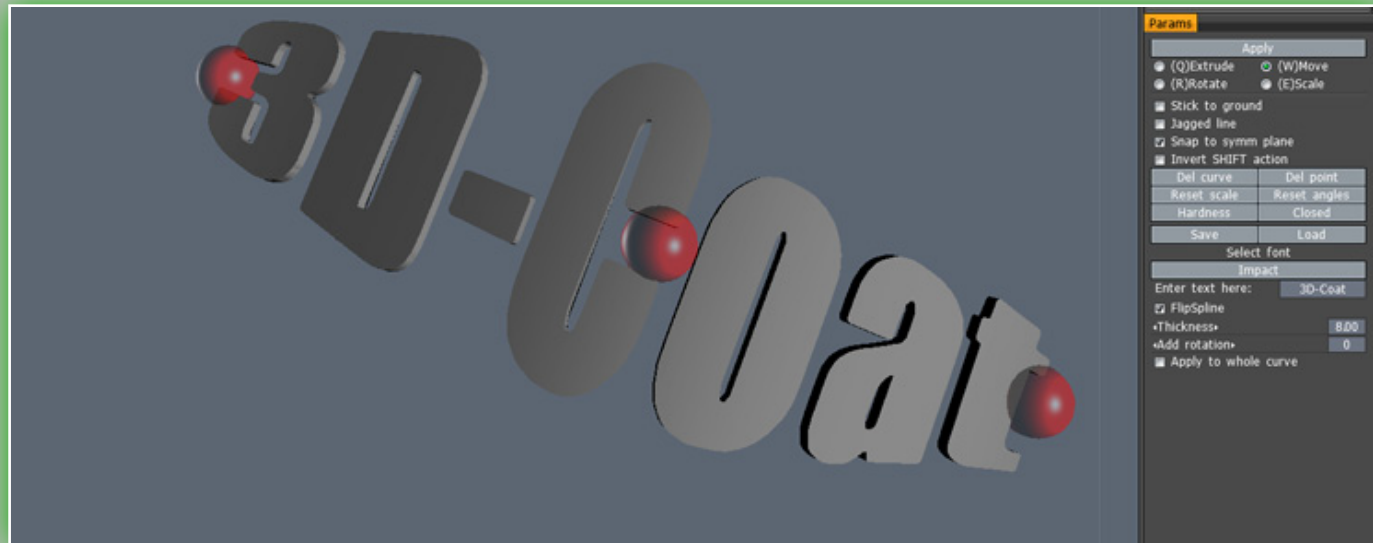
Local Symmetry. Enables local symmetry of the *ffPrimitive*, which gives you more creative freedom and control.

Misc. ResetPrim. Lets you reset any changes you've made to the object.

EditPoints. Allows numerical values for each visible point of the lattice cage. *Inner/Outer Radius & Thickness* are only applied to some of the *ffPrimitives*, such as *ffDisc* and *ffTube*, they allow for the radius of the inner section or outer section of the tube and the thickness of some of the primitives with keyable values. The dropdown list also has a few more options, usually different *.OBJ* files with different cages for similar shapes, such as *ffDisc*. When hold-



ing **CTRL** you can constrain the movement of your selection along its normal.



Text. Lets you place text along a spline curve, and create text in voxel form. Its parameters are identical to that of the **Curves** tool, so you should already be familiar with it after reading that section above. It has a few unique features: You can select a *font* for your text, you can of course type in the *text* you would like to make volumetric, and you can adjust the *thickness* of this volumetric text.

Cloth. This tool is a *cloth simulator* which you can use to drape a polygon mesh over another object. There is a default **Cloth** with which you can test, but you are not limited to this as you can also import an external polygonal mesh. The parameters for this tool are:

Select mesh. Prompts you with a file-open dialog which lets you select a file (**.OBJ**, **.LWO**, **.FBX**, **.STL**, **.PLY**, and **.3B**) on disk to use as the object to be draped.



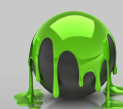
Subdivide. Subdivides the object you have imported. It can be used before or after you run the simulation.

Start/Reset. These two buttons starts and resets the simulation.

Pick from retopo. If you have retopologized something and it is in the **Retopo** tab, then you can use this button to select that mesh as the object to drape.

To retopo. Sends the recently draped mesh to the **Retopo** tab for further retopologization.

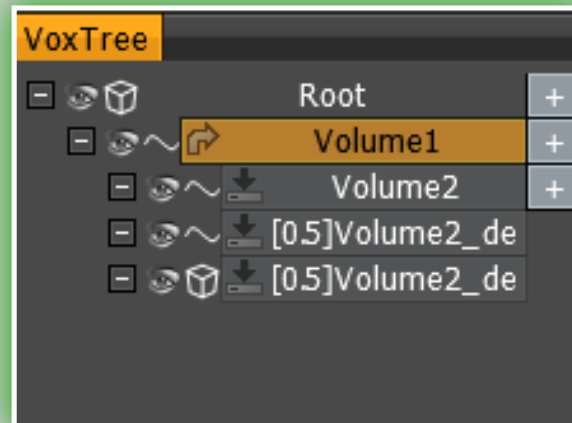
Other. Sets a number of other parameters, such as the **Gravity**, and the **Friction** of the draped object on the object you are draping over, as well as the **Cloth thickness**. For thickness, the higher the value, the thicker the cloth.



8.5 Surface Mode & Tools

In version 3.2 of **3D-Coat** the surface tools have undergone some major changes. Most notably there are new tools and speed improvements. To change to surface mode, you must click on the **Cube icon** in the **VoxTree** for the Layer you would like to edit in surface mode, you will then see a **Wavy line icon** which represents surface mode. Surface mode is *much* faster for sculpting than the regular volume mode.

Only the surface mode tools will be available while editing in this mode, plus with the **Pose, Move** and **Transform** tools. Some of the surface tools have counter-parts from the

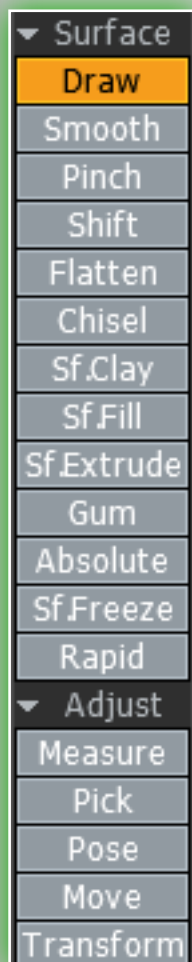


volume sculpting tools. There are a number of unique tools in this mode as well, which we shall discuss below:

Draw. The draw tool is great for quickly sculpting horns or things like that. It is similar to the the **Airbrush** tool, but it only operates on the *surface* of a volumetric object.

Pinch. This is great for making tight edges, cavities and peaks, as shown on the picture below. It is identical to the **Vox Pinch** tool, but it only operates on the *surface* of a volumetric object.

Shift. This tool drags the surface topology along with the brush. It's great for producing wrinkles on a character or for making cloth. It is identical to the **Vox Follow** tool, but it only operates on the *surface* of a volumetric object.



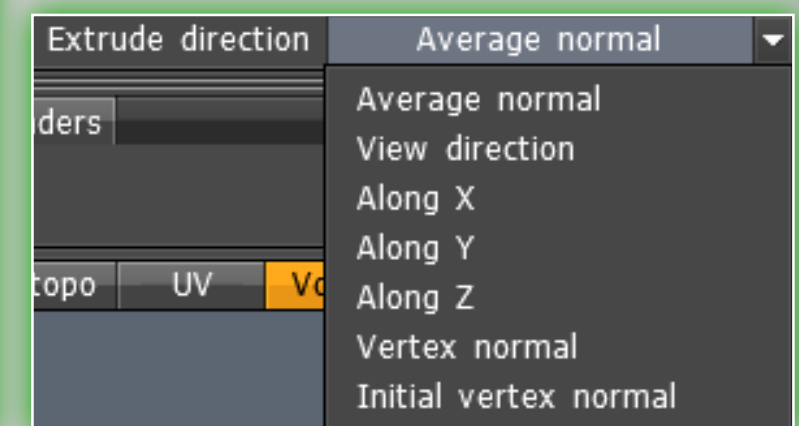
Flatten. This tool has been improved in version 3.2, and now allows for a more predictable behavior. It flattens the area underneath your brush, based on brush size and intensity.

Chisel. As you stroke along the object with your brush it will “**Chisel**” away at the surface.

SfClay. Surface Clay lets you quickly place strokes onto your voxel sculpt. The difference between this tool and the **Carve** brush is that it will also simultaneously *smooth* the surface after you've brushed it. It is identical to the volume **Clay** tool, but it only operates on the *surface* of a volumetric object.

SfFill. Surface Fill is a great way to fill in small holes and gaps in your objects. The higher the intensity, the more it will quickly fill the area under your brush.

Extrude Direction Settings. This allows for *user definable extrusions*. The extrusion methods are: **Average normal, View direction, Along axis** (X, Y or Z), **Vertex normal & Initial**



vertex normal. This setting is unique to the following three tools:

SfExtrude. Extrudes along the surface under your brush, based on your pen **Size**, **Depth** and **Extrude direction** settings.

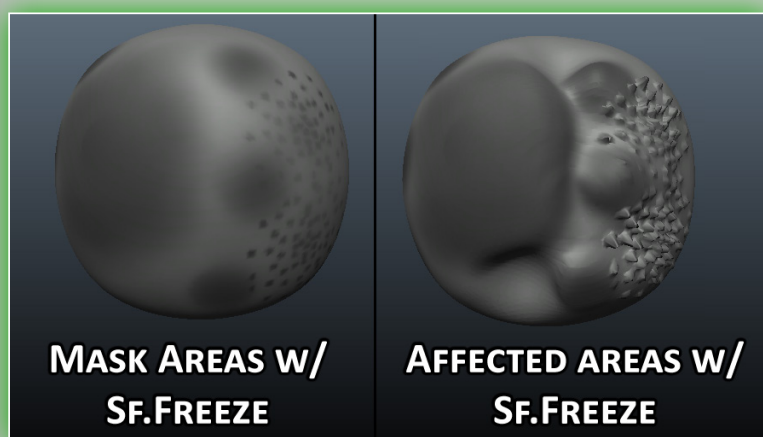
Gum. This tool is great for making nice details on a mesh. It is unique for the surface tool set. It's the *fastest way* to make skin, pores and wrinkles. The higher the resolution of your object, the better the details look. This tool is commonly used to sculpt minute details onto an object. It is affected by the **Extrude direction** settings.

Absolute. Extrudes the surface based on your pen **Size**, **Depth** and **Extrude direction** settings, while also maintaining the underlying surface details and topology.

SfFreeze. This tool, which is new in version 3.2, is a very important addition to the toolset in **3D-Coat**! It lets you *mask* with your brush, a mask which you can then use with any of the surface sculpting tools. It's simple to use and powerful. You can also use common shortcuts: **CTRL+SHIFT+"I"** inverts your selection, **CTRL+"D"** deselects.

Rapid. This tool's name is very descriptive, as it's one of the fastest tools in **3D-Coat** to sculpt general shapes. It is almost the opposite of the **Gum** tool in this regard, as it doesn't respect

pen alphas but only brush **Size** and **Intensity**. Another great thing about this tool is that if you have two voxel object in the viewport that are overlapping each other in space, it will



try its best to compensate by building up the area between the two.

8.6 Commands

There are only a few **Commands** in the sidebar, but they are all

very important. Let's look at them.

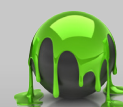
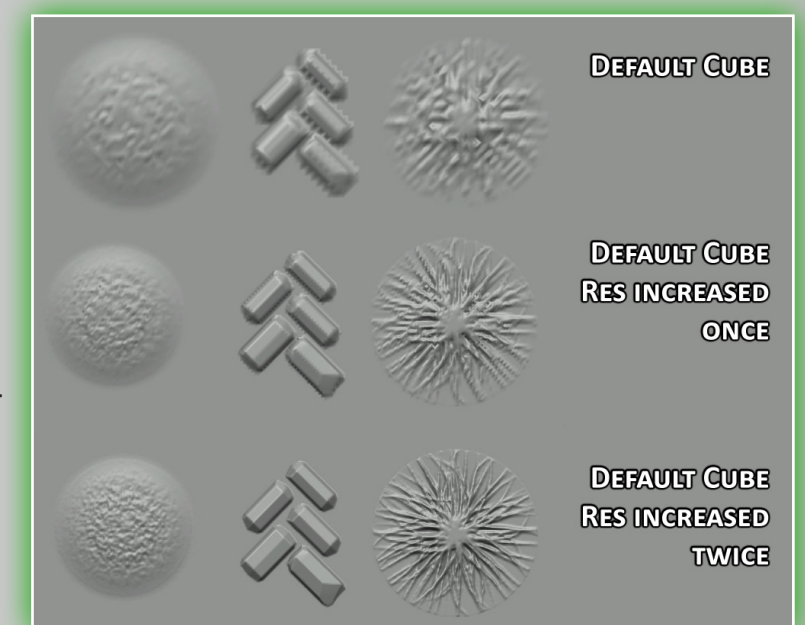
Increase resolution. This command *quadruples* the number of voxels in the current object Layer. This lets a Layer have much more detail. You can view the resolution of a Layer in the **VoxTree** directly before the Layer's name. If it has *only* the name, that means the Layer's resolution has *not* been increased.

Clear. This command clears the current Layer in the **VoxTree** of all voxels. It is useful when you wish to keep the current Layer's name and resolution -- but not the voxels.

Smooth. This command uniformly smooths all of the voxels of the currently selected object Layer in the **VoxTree**.

8.7 VoxTree

You have the ability to drag and drop Layers to do many things, such as moving a Layer to the trash, reparenting by dragging to a Layers + sign, or simply reordering the Layers to organize them. Let's look at this.



Collapse child Layers. The minus next to any Layer lets you collapse any *child* Layers it may have.

Root. This is the base file or scene. You cannot edit this.

Visibility. By clicking the **Eyeball icon** you can toggle the visibility of a Layer on or off.

Cube/Wavy line. These icons toggle between volume mode and surface mode. Volume mode is represented by the **3D cube icon**, surface mode by the **Wavy line icon**.

Cache/Uncache. Represented by two icons, which toggle when clicked. One looks like a hard disk drive with an arrow pointing

downward to it, the other and upward arrow which curves to the right. These icons will toggle proxy mode and will apply

any changes made from the low resolution proxy to the high resolution sculpture.

Add Layer. The plus sign next to any Layer will add a new child Layer. If you add a Layer to the root, it will have no parent.

Layer name. Each Layer is represented by a horizontal bar. By double-clicking the bar you can change the Layer's name.

Layer resolution. If you have changed the resolution of a Layer, there will appear a number representing this change, like [2x], [4x], etc.

Now let us look at the icons on the bottom of the VoxTree:

Empty note. Creates a new child.

Trashcan. Deletes your currently selected Layer.

2 empty notes. Duplicates your currently selected Layer.

Ball. Edits the currently selected Layer's shader properties.

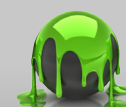
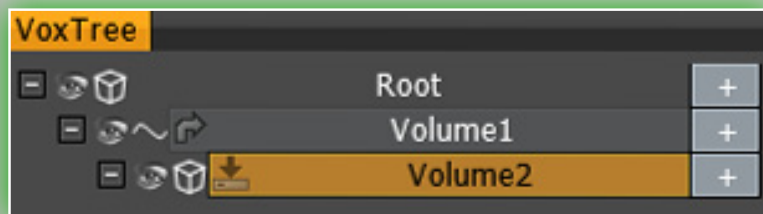
2 empty notes w/grid. Duplicates the currently selected Layer's resolution and transformation settings. Nothing else will be duplicated. This is useful when you need a new Layer with the same settings but not the same voxels.

Double-sided arrows. This icon is for the **Symmetry copy** tool. If you have sculpted on one side of a volume object you can use this function to copy all your work to the other side of the object. It works on any axis, as long as you have symmetry turned on along the preferred axis.

Grid. Increases resolution.

Down arrow note. This icon *duplicates* your currently selected Layer and *decreases* its resolution by a factor of 2. This is useful if you have an object Layer with too high resolution and you need to reduce it for easier editing. Be aware that you will lose details!

X-note. Clears the selected object Layer in the **VoxTree** of all voxels. It is the same function as the **Clear** tool on the left side tool bar, as discussed in the **Commands** section.



8.8 VoxTree Right-click Menu

There are many functions in the right-click menu inside of the **VoxTree**. Some of them are unique to this menu, most however, are not. They are as follows:

Delete. Deletes the selected Layer.

Add sub object. This is the same as clicking the “+” icon near the Layer’s name. It adds a Layer that is a child of the current Layer.

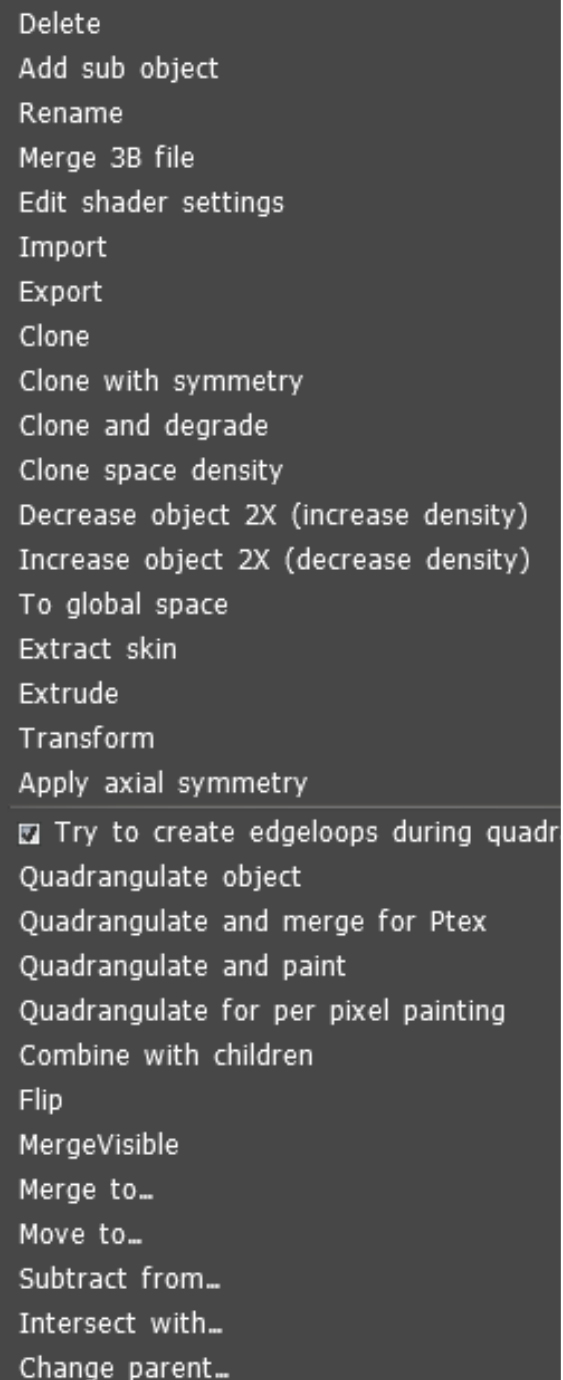
Rename. Type your own name for the Layer, instead of the default “Volume XXX”.

Merge 3B file. Merges an external **.3B** file (the native format) into the scene.

Edit shader setting. Edit custom shader’s parameters, if it has them.

Import:

- Merge points cloud. Merge set of points as a sequence of a small spheres.
- Merge object. Merge 3D object in any of these file formats: **.OBJ**, **.FBX**, **.LWO**, **.STL** and **.PLY**

A screenshot of the right-click context menu in the VoxTree interface. The menu is dark gray with white text. It lists various actions such as 'Delete', 'Add sub object', 'Rename', 'Merge 3B file', 'Edit shader settings', 'Import', 'Export', 'Clone', 'Clone with symmetry', 'Clone and degrade', 'Clone space density', 'Decrease object 2X (increase density)', 'Increase object 2X (decrease density)', 'To global space', 'Extract skin', 'Extrude', 'Transform', 'Apply axial symmetry', 'Try to create edgeloops during quadrangulate object' (checked), 'Quadrangulate object', 'Quadrangulate and merge for Ptex', 'Quadrangulate and paint', 'Quadrangulate for per pixel painting', 'Combine with children', 'Flip', 'MergeVisible', 'Merge to...', 'Move to...', 'Subtract from...', 'Intersect with...', and 'Change parent...'.

Delete
Add sub object
Rename
Merge 3B file
Edit shader settings
Import
Export
Clone
Clone with symmetry
Clone and degrade
Clone space density
Decrease object 2X (increase density)
Increase object 2X (decrease density)
To global space
Extract skin
Extrude
Transform
Apply axial symmetry
☒ Try to create edgeloops during quadrangulate object
Quadrangulate object
Quadrangulate and merge for Ptex
Quadrangulate and paint
Quadrangulate for per pixel painting
Combine with children
Flip
MergeVisible
Merge to...
Move to...
Subtract from...
Intersect with...
Change parent...

Export:

- Export scene. Exports the whole scene as a set of separate objects.
- Export object. Exports the current object.
- Export pattern for merge. Exports the current object to be used as a pattern for the **Merge object** tool.
- Export curve profile. Exports the current object as a profile for a curve.

Clone. Clones and transforms an object.

Clone with symmetry. Clones with symmetry and transforms.

Clone and degrade. Clones and decreases density twice.

Clone space density. Creates space with identical density and transformation. It is important if you want to use the **Copy** tool without losing quality.

Increase density 2X. Increases the selected object Layer’s density twice. Object will decrease twice.

Decrease density 2X. Decreases the selected object Layer’s density twice. Object will increase twice.

To global space. Moves the object to 0 on all axes. This is great when you need to move something directly into the center of world space to allow for a more perfectly symmetrical object when symmetry is active.

Extract skin:

- Make hull using voxels. Makes a hull using the voxel algorithm. It takes more time to calculate but works well for complex topologies.
- Make hull using surface. Makes a hull using surface extrusion. It is fast but can cause artifacts on complex topologies.



Extrude. Extrudes a whole object. You also have to set the *Extrusion* parameter:

Transform. Transforms a whole object using a special gizmo.

Apply axial symmetry. Applies axial symmetry of any kind to the object.

Try to create edgeloops during quadrangulation. Attempts to create edge loops based on the underlying surface topology, when using the Autopo tools various quadrangulation methods mentioned below.

Quadrangulate object. Quadrangulates an object and drops it to *Retopo Mode*.

Quadrangulate and merg for Ptex. Quadrangulates and drops the object into Ptex painting mode.

Quadrangulate and paint. Quadrangulates and drops the object to Paint Mode with microvertex painting mode.

Quadrangulate for per pixel painting. Quadrangulates and drops an object to *Pixel painting mode* with per pixel painting mode.

There are a few things to note about the quadrangulation tools. It is a good idea to enable symmetry planes to force symmetry during quadrangulation (assuming you want a symmetrical object). If the object is not fully symmetrical the program will keep symmetry only whenever possible. If you do not like the auto-retopologized mesh, you can always go to Retopo Mode to manually adjust the mesh to suit your needs. Also, when using this function, *3D-Coat* will automatically create a new sub-object in the *Paint* tab for each object layer in the *VoxTree*.

Combine with children. Combines all child layers of a parent layer, into a single layer.

Flip. Flips the current layer on any axis (X, Y, or Z).

Merge Visible. This will merge all objects in the *VoxTree* that are not hidden.

Merge to. Merges a copy of the current layer to another layer.

Move to. Moves the current layer to another layer.

Subtract from. Subtracts an object in the current Layer from the object in another layer that you select. This is a very powerful function in *3D-Coat*: it allows *boolean subtractions* of one object Layer from another.

Intersect with. Adds an object in the current layer from the object in another layer that you select. This is similar to *Subtract from*, but allows *boolean additions*.

Change parent. Changes the current Layer to another Layer or to the root.

8.9 Voxel Menu

Like most of the other major *Tabs* (or *Rooms* as they are also called), there is also an accompanying menu. We have already covered most of these options in previous sections. Any repeated functions are here only for your convenience. Let's take a look at them:

Define measurement units. Specify the measurement of units (Metric or Imperial standards) here in real world scale, and how many voxels per this unit scale.



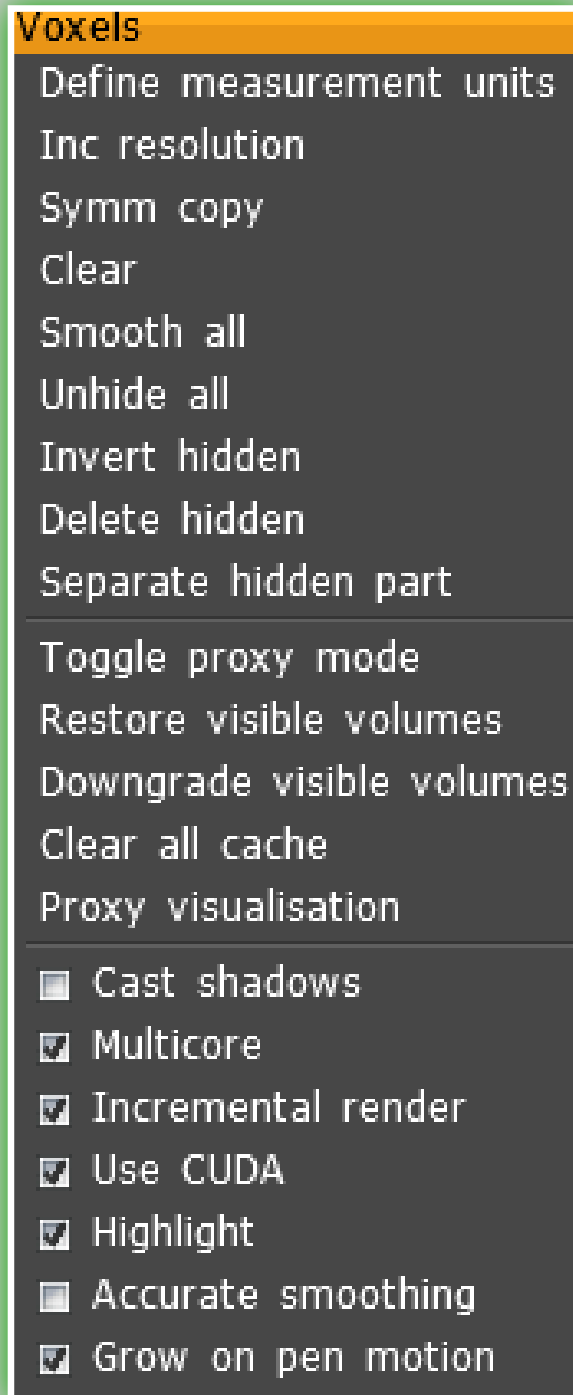
Increase resolution. This command *quadruples* the number of voxels in the current object Layer. This lets a Layer have much more detail. You can view the resolution of a Layer in the **VoxTree** directly before the Layer's name. If it has *only* the name, that means the Layer's resolution has *not* been increased.

Symmetry copy. If you have sculpted on one side of a volume object you can use this icon to copy all of that to the other side of the object. It works on any axis, so long as you have symmetry turned on along the preferred axis.

Clear. This command clears the current Layer in the **VoxTree** of all voxels. It is useful when you wish to keep the current Layer's name and resolution -- but not the voxels.

Smooth. This command uniformly smooths (or relaxes) all of the voxels of the currently selected object Layer in the **VoxTree**.

Unhide all. Unhides any hidden voxels.



Invert hidden. Inverts any hidden voxels.

Delete hidden part. Deletes any hidden voxels.

Separate hidden part. Creates a new Layer in the **VoxTree** and place the previously hidden voxels into the newly created Layer.

Toggle proxy mode. Toggles on/off proxy mode.

Restore visible volumes. Will recover the high resolution voxel sculpt previously cached, into voxel surface mode. (This is a redundant feature. Using Toggle proxy mode or the icon for said feature, will achieve the same result)

Downgrade visible volumes. Caches the current high resolution voxel sculpt. (This is a redundant feature. Using Toggle proxy mode or the icon for said feature, will achieve the same result)

Clear all cache. Clears any cached proxy meshes. This cannot be undone, so use only when needed.

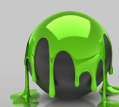
Proxy visualisation. Selects the resolution of the proxy mesh and how far downgraded the mesh is (You can downgrade from 2x, 4x and 8x).

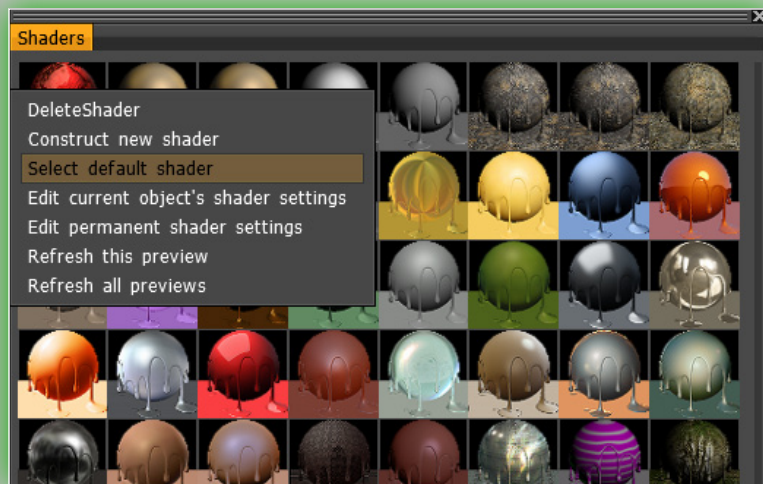
Multicore. Toggles on/off voxel multi-threaded functionality.

Cast shadows. Enables shadow casting based on the global light inside the viewport. It is purely aesthetic.

Incremental render. Renders only the parts of the object that have changed since your previous render, thus giving a large boost in performance. This option is *off* when shadows are *on*, as shadows are dynamic and change the appearance of the rendered object.

Highlight. Toggles highlighting, if it is turned on for your selected **VoxTree** object will be highlighted a different color. When off,





8.10 Shaders

The shaders tab is pretty straightforward. You simply **RMB** click to select a new shader to apply. If you **RMB** click a shader, you'll see a few options:

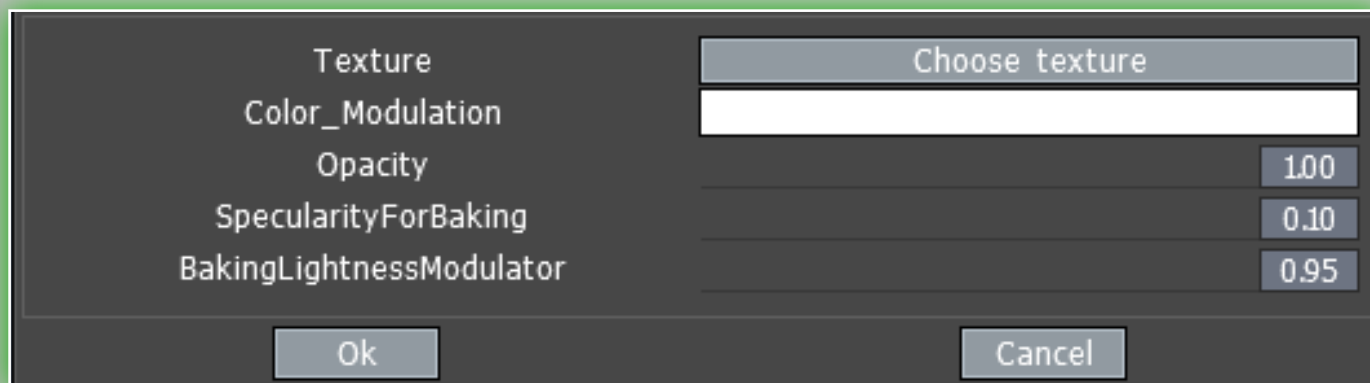
DeleteShader. Deletes the shader you clicked.

Construct new shader. Lets you create a new shader. The new shader will be based on the shader you clicked.

Select default shader. Applies the shader you clicked as the default shader. Whenever a new volume object is created, it will have this new default shader applied.

Edit current object's shader settings. This is pretty self-explanatory. Please check out each shader's specific settings.

Refresh (all) preview(s). These two options refreshes the shader tab. It is helpful if you have trouble with a newly created shader not showing up as a selection.



there will be no visible change. This effect is dependent on the shader.

Accurate smoothing. Provides more accurate smoothing, at the expense of performance.



8.11 Multi-Resolution & Caching

Using this method for sculpting allows for a much faster speed of work, and much less hindrance when your in a working mindset, allowing for minimal interruption. Essentially, you cache your high resolution voxel sculpt to disk, then proceed to sculpt on the low resolution proxy that **3D-Coat** automatically generates for you. Any changes made to the low resolution object will be propagated upward to the high resolution sculpture. This method is quite similar to what you can achieve now with voxel surface mode, however, using this method you can choose the



resolution of the proxy mesh. In this section is placed all relevant information regarding Multi-resolution and caching. Some of this information may be redundant, but is all compiled in this section for your convenience.

Toggle proxy mode. Toggles on/off proxy mode.

Restore visible volumes. Will recover the high resolution voxel sculpt previously cached, into voxel surface mode. (This is a redundant feature. Using Toggle proxy mode or the icon for said feature, will achieve the same result)

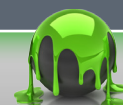
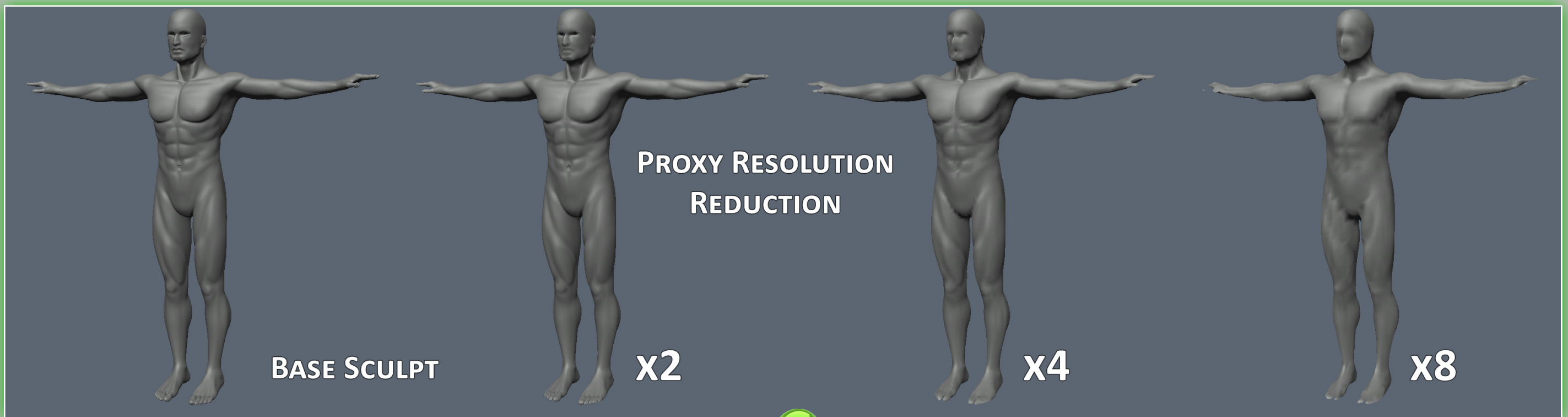
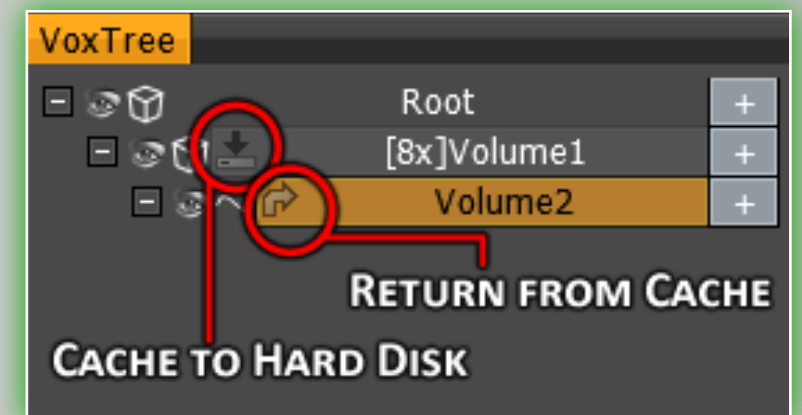
Downgrade visible volumes. Caches the current high resolution voxel sculpt. (This is a redundant feature. Using Toggle proxy mode or the icon for said feature, will achieve the same result)

Clear all cache. Clears any cached proxy meshes. This cannot be undone, so use only when needed.

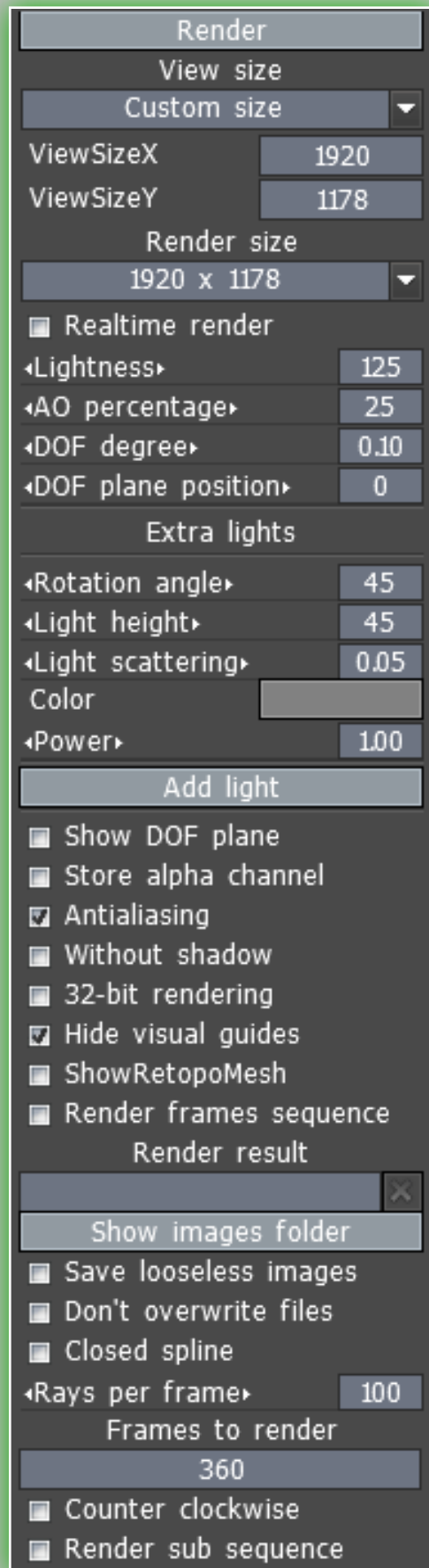
Proxy visualisation. Selects the resolution of the proxy mesh and how far downgraded the mesh is (You can downgrade from 2x, 4x and 8x).

Multicore. Toggles on/off voxel multi-threaded functionality.

Cache/Uncache. Represented by two icons, which toggle when clicked. One looks like a hard disk drive with an arrow pointing downward to it, the other and upward arrow which curves to the right. These icons will toggle proxy mode and will apply any changes made from the low resolution proxy to the high resolution sculpture.



9. Render Mode



In this section we shall discuss all that relates to the **Render** tab in **3D-Coat**. First, one important point: do *not* hit esc to cancel a render if you still wish to use the image! You *must* wait until it is complete if you wish to have a final, useable image. Cancelling the render will not do this. The render engine must be allowed to continue its work until the render is complete!

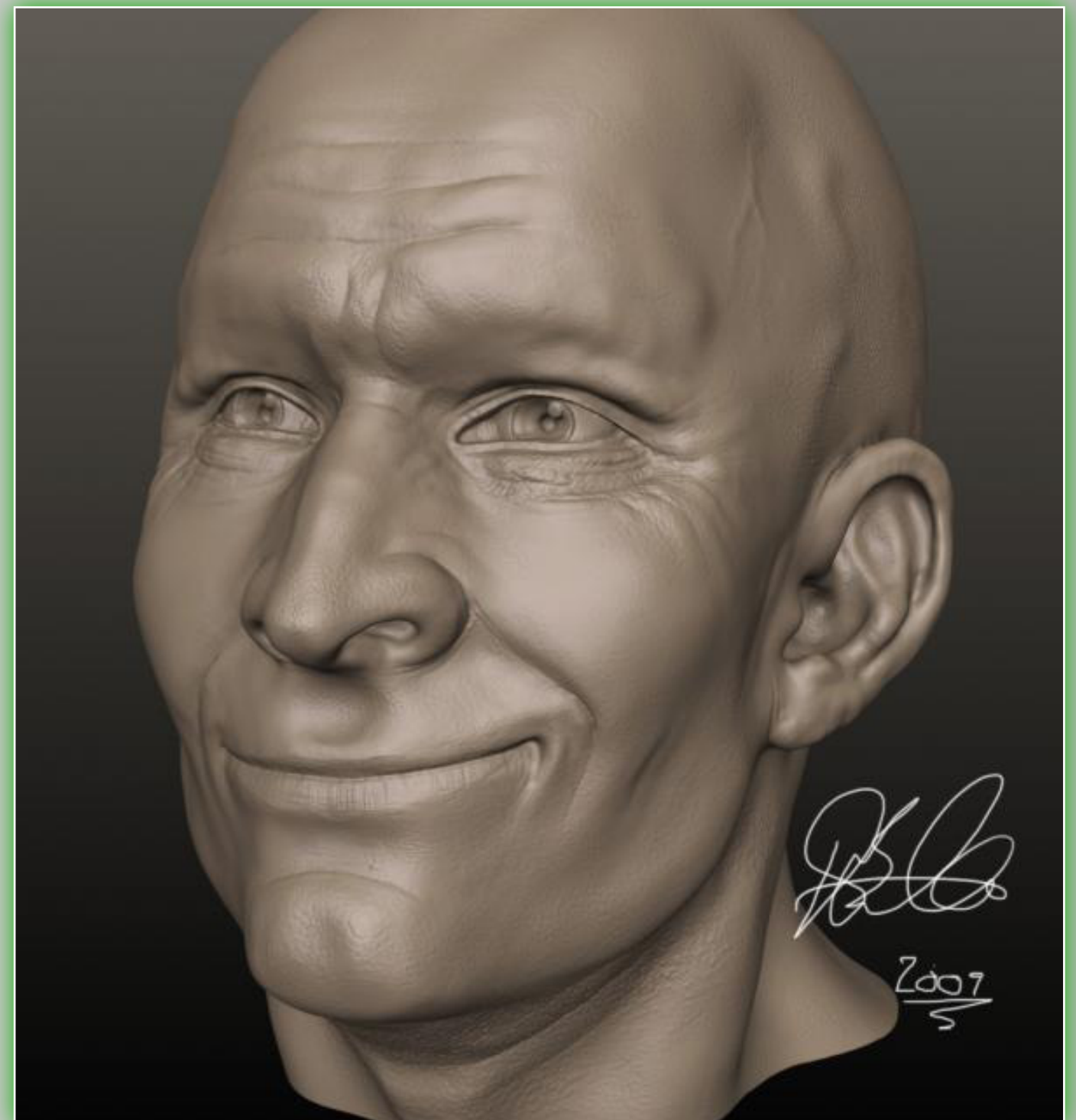
9.1 Render Panel Functions

Render. Initiates the render of your frame or frame sequence.

View size. Lets you choose between rendering the **Whole screen** or a **Custom size**. If you choose a custom size you can then key in the X and Y values of the area you wish to render.

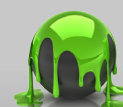
Render size. Lets you select a size for the rendered image. It is only active if you are using a custom size from the **View size** drop-down list. It will always be in *multiples* of the size you choose as the custom size.

Lightness. If you increase the value of the **AO percentage** you will probably need to also increase the **Lightness** of your scene, or it be too dark.



AO percentage. The *ambient occlusion* changes your lighting type. A value of 0 gives you direct lightening, a value of 100 gives you completely "overcast" lighting.

Light scattering. Adjusts the amount of light that will be scattered. Higher values will give you softer shadows and softer specularities on shiny objects.





DOF degree. Depth of field focus. Produces a “lens focus effect” on your image. Set the distance from the DOF plane where objects remain in focus.

DOF plane position. Moves a red plane forward or backward to set the *center* of the depth of focus. Use the slider above to set the distance from the plane

(in front and back) where objects should remain in focus.

Show DOF plane. Shows a focus plane where the details will look most sharp during DOF rendering.

Store alpha channel. Renders also an *alpha channel*. To use this option you must choose **.TGA** as the output file format. If you are rendering an image sequence, the **.TGA** format will be chosen automatically.

Anti-aliasing. Smooths the edges of your rendered objects. Keep it checked!

32-bit rendering. Use this option *only* if have good enough graphic card (GeForce 8, 9 or better). 32-bit rendering provides a higher quality render by allowing for an “infinite” number of rays.

Render result. Choose the image format and a folder to store your rendered scene. Only applies if **Render frame sequence** is unchecked.

Render frame sequence. Renders a frame sequence rotating around the object or along the camera path. If checked, an additional parameter will appear:

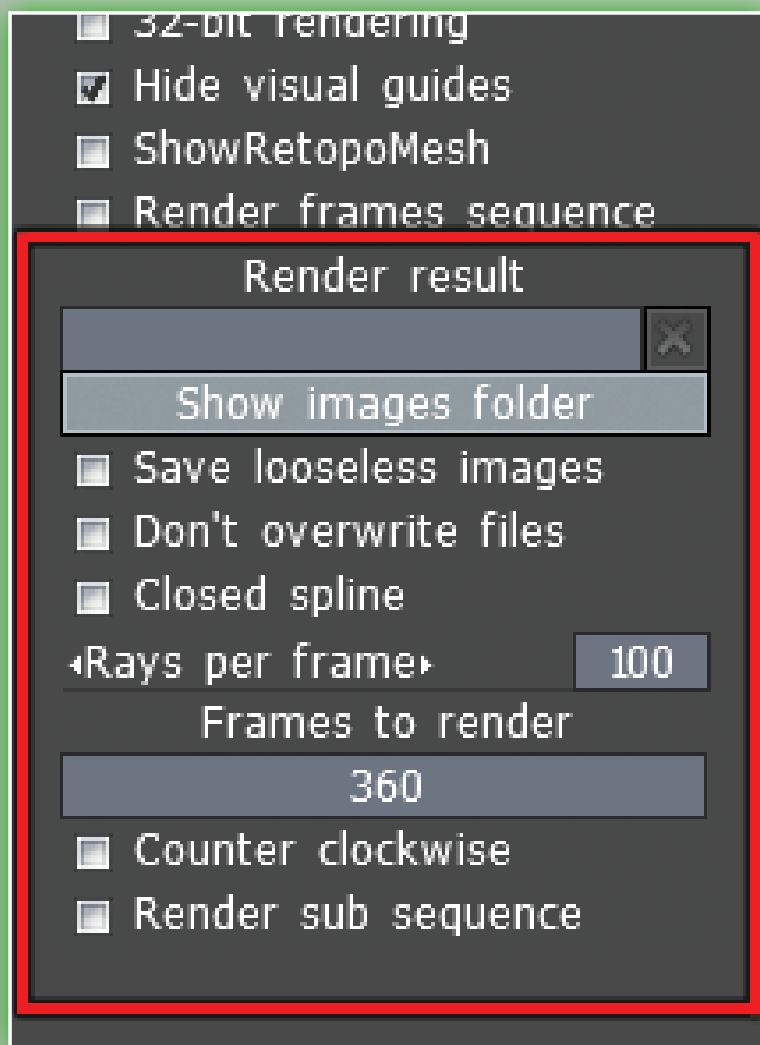
Folder to store images. The name of a folder that will be created to store rendered frames. The folder is placed into **Install dir/RenderedImages/...** Please note that you cannot change this default path.



Save lossless images. Saves images in lossless formats, namely **.TGA** and **.bmp**.

Don't overwrite files. Prevents overwriting of files during a sequence rendering.





Closed spline. Use if you have several camera shortcuts set up in the scene. In this case the *Camera flight* trajectory will be closed.

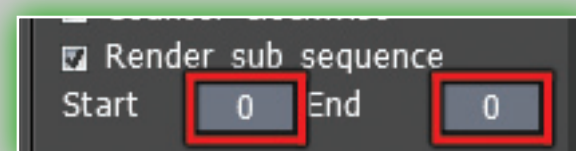
Rays per frame. Sets the maximal number of rays per frame during rendering. The rendering time is proportional to this value.

Frames to render. Sets the number of frames to render.

Counter clockwise. Sets trajectory direction: *clockwise* or *counter-clockwise*.

Render sub sequence. Check if you want to render or re-render only some frames of a sequence. You must set the *first* and the *last* frame to render.

As mentioned in the beginning of this section: do *not* hit esc to cancel a render if you still wish to use the image! You *must* wait until it is complete if you wish to have a final, useable image. Canceling the render will not do this. *Patience is a Virtue!*



10. Menu Panel

10.1 File

New. Clears the current scene and creates a new one.

Open. Opens *3D-Coat*'s native **.3B** format.

Open Recent. Displays recently open files.

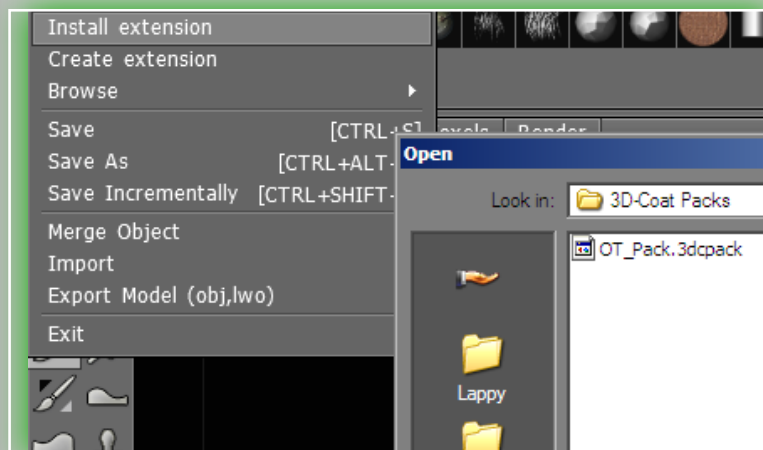
Install/Save Extension. You can create whole packs of resources , from brushes, masks, materials and more, into one single file. The format is **.3DCPACK**. This allows for easy distribution of said files, to other users! To create a pack, use the **Save Extension**. It will run a wizard to help you create such packs, and also prompt you for a **.txt** file which contains any licensing you wish users to adhere to for your 3DCPack. Using the **Install Extension** prompt you to select a **.3DCPACK** file to install.

Save. Saves file.

Save As. Saves files in **.3B** format. You can rename the file or place it into another directory.

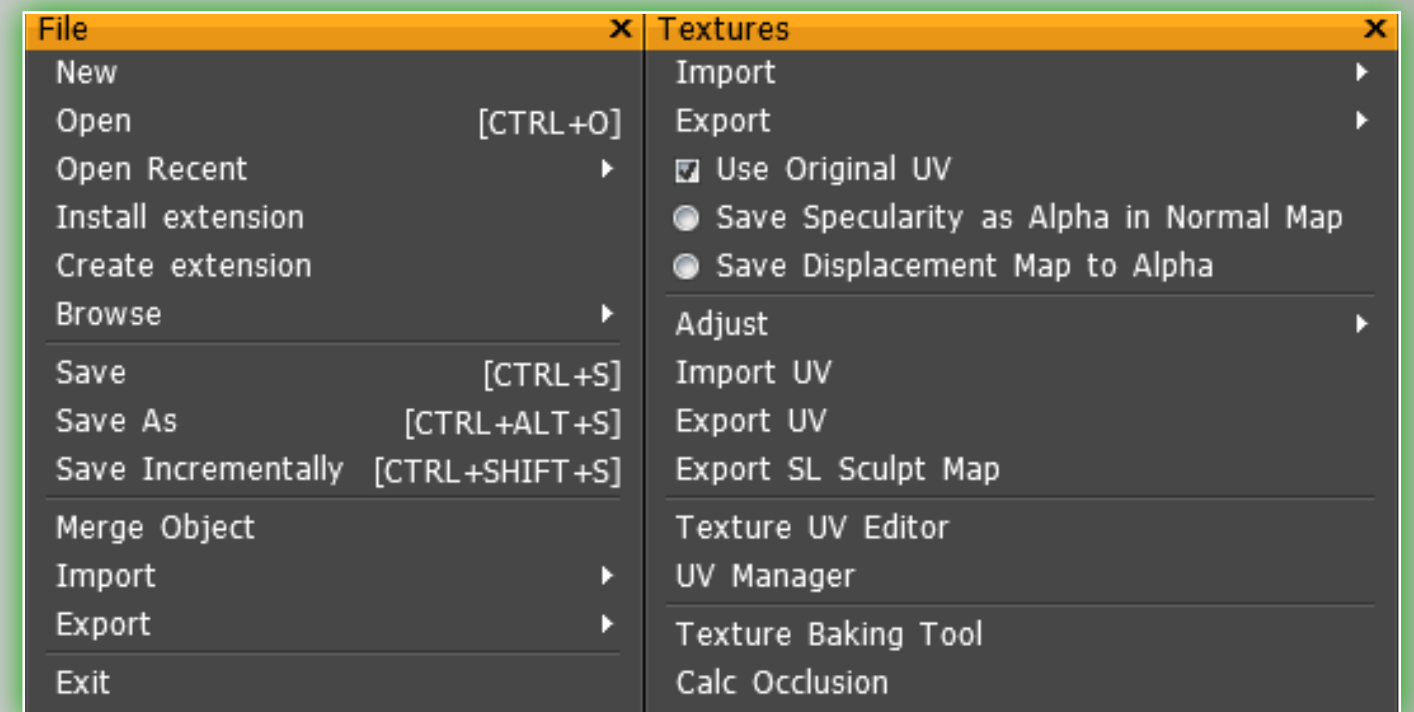
Save Incrementally. Saves the file with an iterative file name, for example, "file_001.3B", "file_002.3B".

Merge Object. Merges additional objects into the scene. *Caution:* Don't merge objects with very different scales!



10.2 Import

Model for per pixel painting. Imports a mesh to paint directly over pixels in a UV-set. This approach will give better



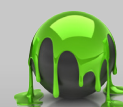
quality of painting over a texture because the painting will be performed directly over pixels in a UV-set. Use this for normal maps and texture maps.

Model for microvertex painting. Imports a mesh for use with the microvertex sculpting and texturing tools. Use this for displacement maps and vector maps.

Model for Ptex painting. Imports a mesh for use with the Ptex texture painting and UV tools. Use this if you wish to paint extremely high resolution details and not worry about UV mapping. Ptex is a new method for texture painting and UV mapping. For more information on Ptex, see the Ptex section of this manual.

Reference Mesh. Imports the mesh to use as a reference for the retopology tool.

Big Mesh. Imports a large mesh (up to 16 million polygons). This function requires two meshes; a *low-poly reference mesh* and a *high-poly* mesh. Both should have the same non-overlapped



UV-set. First import the low-poly mesh into scene using the usual import dialog, then load the high-poly mesh using this option.

Image Plane. Loads a flat square object and applies color and depth images for bump mapped tiled textures. Edit 2D images and add relief to them. Using the *Image Plane* tool together with *Textures* and the *Offset tool* you can loop the textures. Currently only square textures are supported. This option is very useful to make tiled displacement textures.

SL Object. Import sculpt map from *Second life*.

10.3 Export

Export Mode. Export the current object to **.OBJ**, **.LWO**, **.STL** and **.PLY** formats. You will be prompted to select either a low-poly mesh, or a mid-poly mesh with 30k to 80k polygons and the normal map. If you're in the *Microvertex painting mode*, the *Export* menu will have additional options:

High-poly Mesh (Export w/Microvertex). Exports a high-poly mesh with the number of polygons shown in brackets (x4, x16, x64 times bigger).

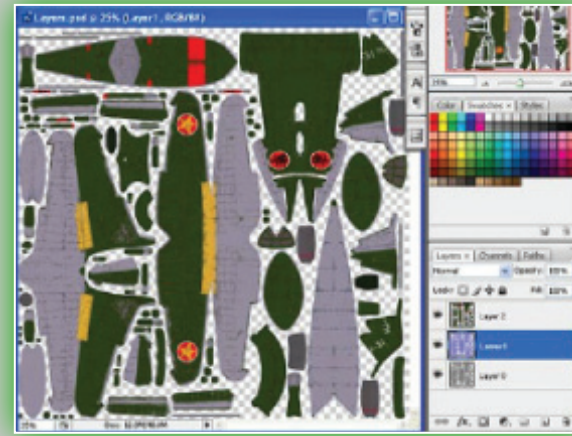
Exit. Exits the program.

10.4 Edit

Undo.

Redo.

Mesh and Texture Resolution. Changes the number of polygons in the object and the size of the texture. You can change mesh resolution multiple times (like with other 3D software), but



you can also do it in percentages, for example 50%.

Sync Layers with Ext. Editor.

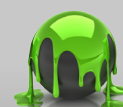
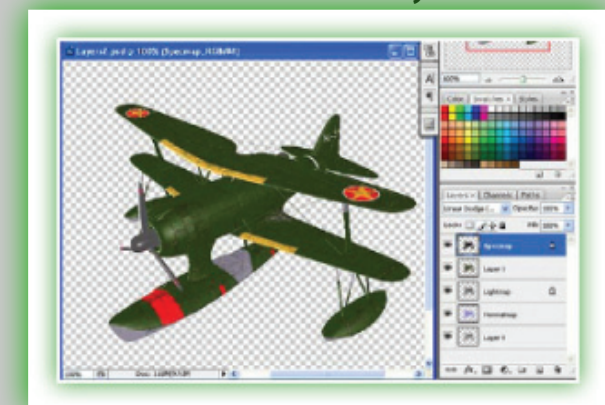
Lets you synchronize the current Layer with an external editor. You can set the file path to

the editor in the *Preferences*. By default it is Adobe Photoshop. The alpha channel will contain the transparency mask. With this command the image editing program will open automatically with your file. Then you can edit it and jump back to *3D-Coat* by pressing "**CTRL+S**".

Edit All Layers in Ext. Editor. Edits all Layers in an external editor.

You can set the file path to the editor in the *Preferences*. By default it is Adobe Photoshop. This image editor should be able to edit **.PSD** files. The texture will be stored with Layers to the **.PSD** file, then the image editor will start. You can edit the texture and even add new Layers. When you save the file, *3D-Coat* will automatically reload it.

Edit Projection in Ext. Editor. Edit the current projection in Adobe Photoshop, or any image editor, using Layers. You can set the file path to the editor in the *Preferences*. By default it is Adobe Photoshop. This image editor should be able to edit **.PSD** files. The projection will be stored with Layers to the **.PSD** file, then the image editor will start. You can edit the projection. When you save the file, *3D-Coat* will automatically reload it.



Preferences

Autosave. The slider **“Autosave time”** adjusts the time interval for autosaving. The autosaved file has the name *“autosave.3B,”* which is located in the folder *“User Data”*.

External 2D-editor. The application in this file path is used to edit 2D-images. This editor must be able to edit **.PSD** files, so usually it would be Adobe Photoshop (but it could also be Corel Painter, for instance). This editor will be called by the functions **“Edit,” “Sync Layers with Ext. Editor, Edit All Layers in Ext. Editor** and **Edit Projections in Ext. Editor”**.

Near plane modulator. Tweaks the camera *near plane* to be able to move it closer to the surface.

Show hints. Hides or shows hints. Hints are located at the bottom of the viewport.

Axis. Shows or hides the axis.

Show “Focal shift” in the top panel (Show **“Focal shift”** slider in top panel).

Show “Falloff” in top panel (Show **“Falloff”** slider in top panel).

Compact interface. Toggles between compact/full interface.

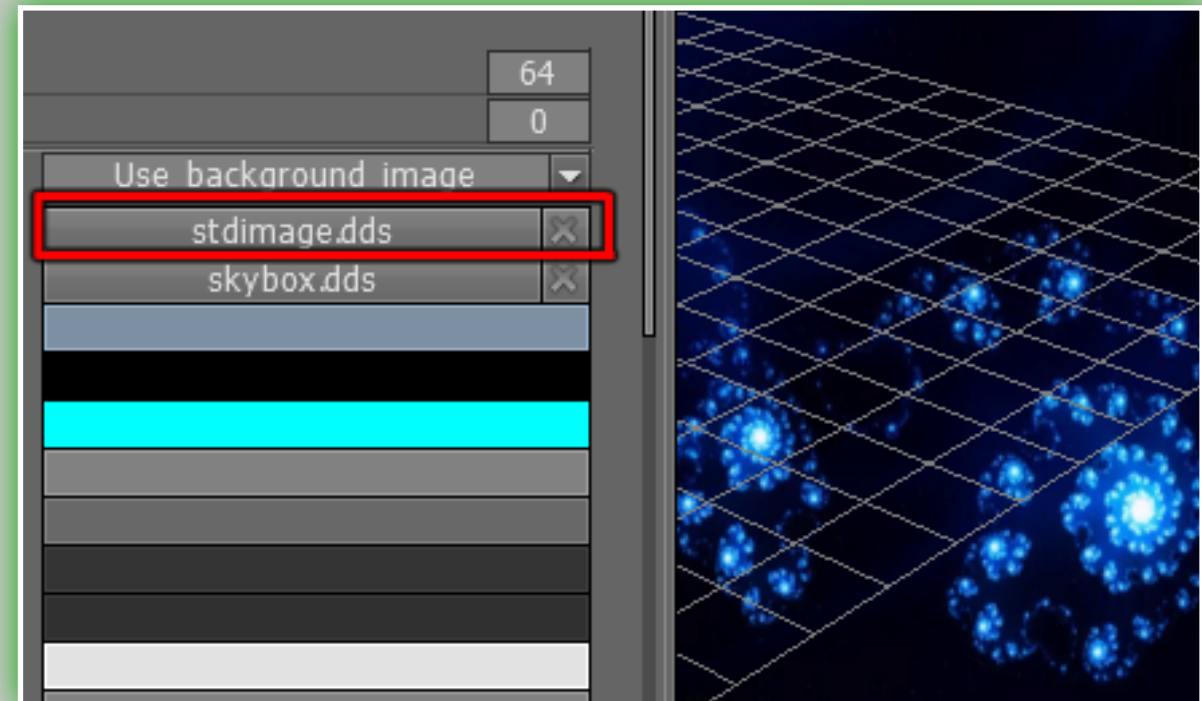
Show import thumbnails on start page.

Show interface thumbnails on start page.

Also you can specify:

Screen space grid size. 2D-grid size.

Grid subdivision. 2D-grid subdivision.



Background type. *Vertical gradient/Background image/Panorama.*

Background image.

Sky box image.

Top background color.

Bottom background color.

Screen grid color.

Grid color. 3D-grid plane color.

Interface color.

Headers color.

Text and white icons color.

Edit area color.

Edit area border color.

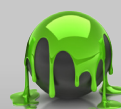
Edit area highlight color.

Active tab color.

Passive tab color.

Tab background color.

Active tab font color.



Headers font color.

Buttons color.

Highlight color.

Hint background.

Hints text color.

3D button style. Uses 3D style for buttons.

Gradient in menu. Uses gradient style for menu.

Environment sphere map. Chooses a sphere map used for *Show model with environment map*.

Slightly lower shader quality. Select this option if you experience performance problems.

Use multi-core optimization.

Use MRT. Uses multiple render targets to speed up real-time normalmap updates.

Pen sensitivity. Adjusts Pen sensitivity if you are using a digital pen.

Camera zoom speed.

Camera rotation speed.

Freeze pattern scroll speed. Freeze pattern scroll speed. You can change the freeze preview patterns in the freeze menu.

MOUSEWHEEL. Which parameter to change with **MOUSEWHEEL**.

CTRL+MOUSE WHEEL. Which parameter to change with **CTRL+MOUSE WHEEL**.

SHIFT+MOUSE WHEEL. Which parameter to change with **SHIFT+MOUSE WHEEL**.

ALT+MOUSE WHEEL. Which parameter to change with **ALT+MOUSE WHEEL**.

Here is a list of suggested parameters for the last four options:

Normal maps export. Selects the standard for normal maps exporting: *3D-Max* or *Maya*.

Padding. When you export textures you will be asked if you need a border around the texture clusters (padding). This option lets you answer the question automatically.

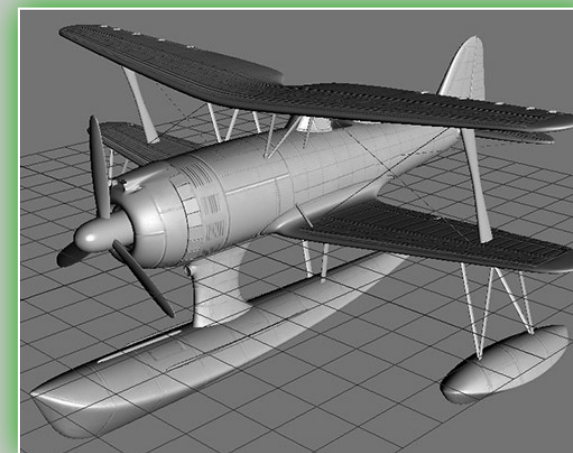
Padding width. Used when texture exporting.

3DConnexion options. *3D-Coat* supports the 3D SpaceNavigator from 3DConnexion. You can find all the options to control your 3D mouse here.

10.5 View

Relief only. Displays relief maps only in the viewport.

Flat shade. Displays a flat shaded view in the viewport.

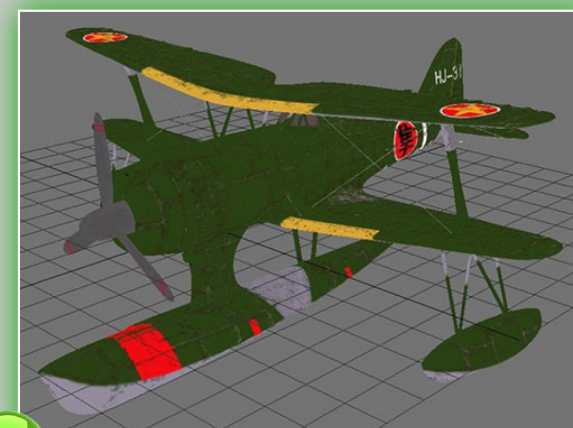


Specular only. Displays only your specular maps in the viewport.

Show displaced mesh. Shows actual mesh displacement. The vertices of the mesh will be displaced along the normal in correspondence with the displacement map.

Wireframe. Shows the wireframe of the model.

Low-poly. Views and edits low-poly model with normal map.



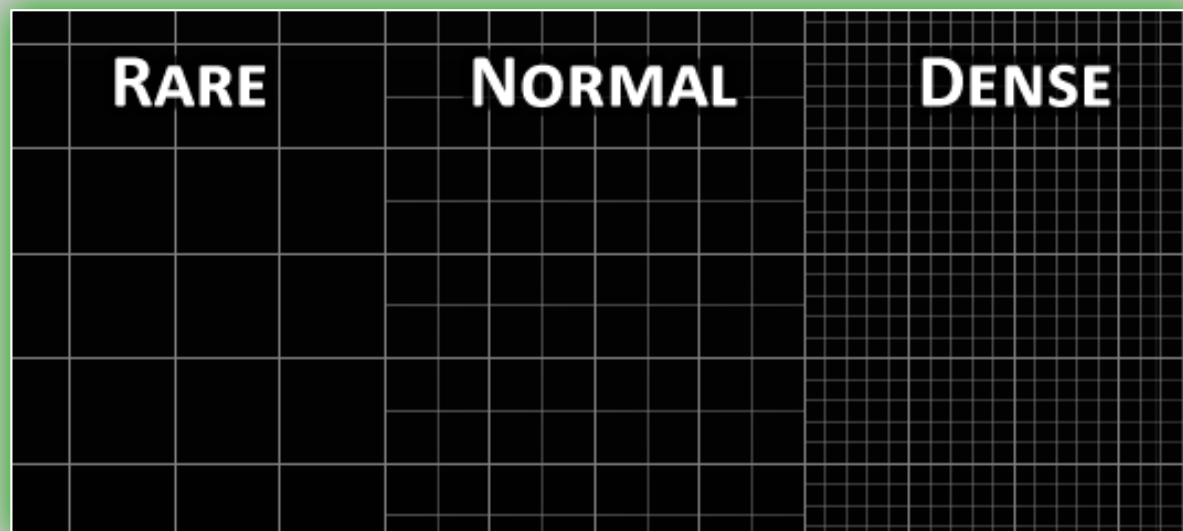
Smooth Shade. Enables *Smooth shade* (hot key "5").

Low Smooth Shade. Enables *Low Smooth Shade* (hot key "7").

Environment Shade. This is the default. It displays all the maps you have applied in the viewport.

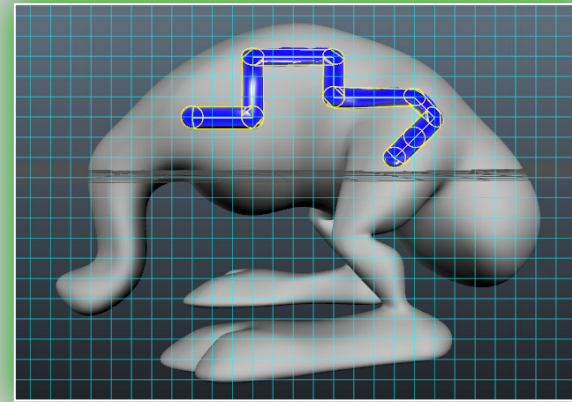
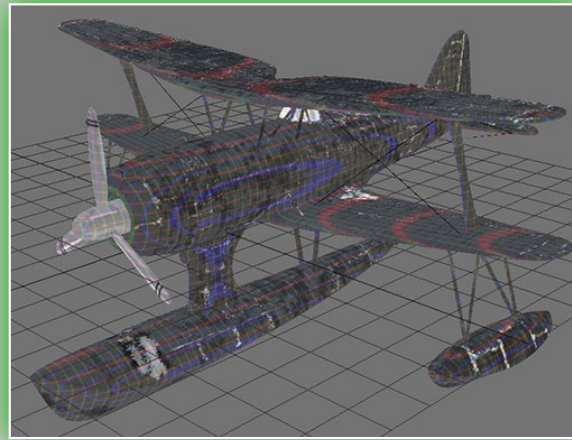
Grid. Turns on/off the 3D-grid plane in the 3D viewport.

Gid density. There are 4 levels of density for the grid. Rare, Normal, Dense and Custom. With custom, you can set the number of major lines and the number of minor lines between the major lines.



Axis. Shows/hides the axis.

Grid 2D mode. Turns on/off the 2D-grid of the screen. You can key in values for rotation, pan and zoom for more accurately grid placement.



Snap to Grid. Snaps to the 2D grid. This is usually used in conjunction with the *Curve* tools (draw with spline, putting text on curve and putting picture along spline). With *Snap to grid*

on you can snap the points of the curve to the 2D-grid and draw very exact shapes.

Snap to low-poly vertices. Snaps your pen to low-poly vertices. Helpful when you are retopologizing or texturing.

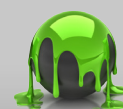
Orthographic Projection. Toggles perspective/orthogonal projection.

Adjust subpatching. Improves the visual appearance of mesh displacement using subpatches. Subpatching is a grid NxN on every face. Use this option *only* if you are certain your video card is powerful enough.

10.6 Textures

Import. Import color/diffuse in **.TGA**, **.BMP**, **.PNG**, **.JPG**, **.DDS**, and **.PTX** formats and layers color in **.PSD** format. Import specular in, **.TGA**, **.BMP**, **.PNG**, **.JPG**, **.DDS** and **.ptex** formats and specular layers in **.PSD**. Import normal maps in **.TGA**, **.BMP**, **.PNG**, **.JPG** and **.DDS** formats. Import displacement in **.TIF**, **.TGA**, **.EXR**, **.BMP**, **.PNG**, **.JPG**, **.DDS**, and **.PTX** formats. Vector displacement in **.TIF**, **.EXR**, **.TGA**, and **.BMP**. Lastly Depth layers in **.EXR**.

Export. Export color/diffuse in tga, **.BMP**, **.PNG**, **.JPG**, **.DDS** and **.ptex** formats and layers color in **.PSD**. Export specular in tga,



.BMP, .PNG, .JPG, .DDS and .ptex and specular layers in **.PSD**. Export normal maps (World & Tangent space) in **.TGA, .PNG .BMP** and **.DDS**. Export displacement for current layer or all layers in **.TIF, .EXR .BMP** and **.PTX**. Depth layers in **.PSD**. Vector displacement in **.EXR, .BMP, .TIF** and **.TGA**.

NOTE: When you choose *Import/Export* displacement a context window will appear.

In the drop-down list there are four items for map type:

Use Original UV. This option is important for models with *overlapped UV clusters*, for example with mirrored UV's. In this case you should load the model with the *“Keep clusters”* option on UV-coordinates will be changed in such a way that texture clusters will not overlap each other. Models and textures will be exported with the original UV-set if the option *“Use Original UV”* is checked, otherwise they will be exported with the new UV-set.

Save Specularity as Alpha in Normal Map. Saves the specular channel to a normal map as an alpha-channel.

Save Displacement Map to Alpha. Saves the displacement to the alpha channel of the normal map.

Adjustments. There are many Layer adjustments commands, such as: *color to specular, invert color, invert specularity, set height to zero, make transparent, remove specularity, smooth current Layer, sharpen current Layer, hue/saturation/lightness, CMYK, transform color space, brightness/contrast, RGB*. All of them can be viewed with real-time

preview and they can be applied not only to the current Layer but also to all the Layers.

Import UV. Imports an object that contains a UV-set. The new UV-set will replace old one.

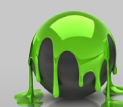
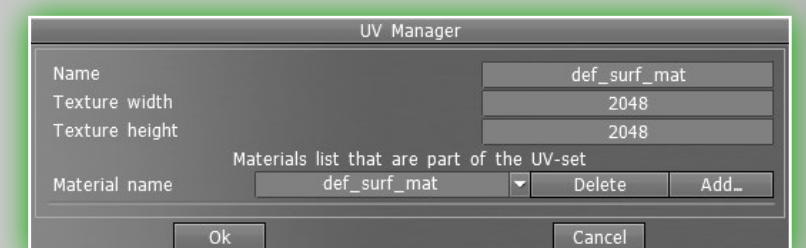
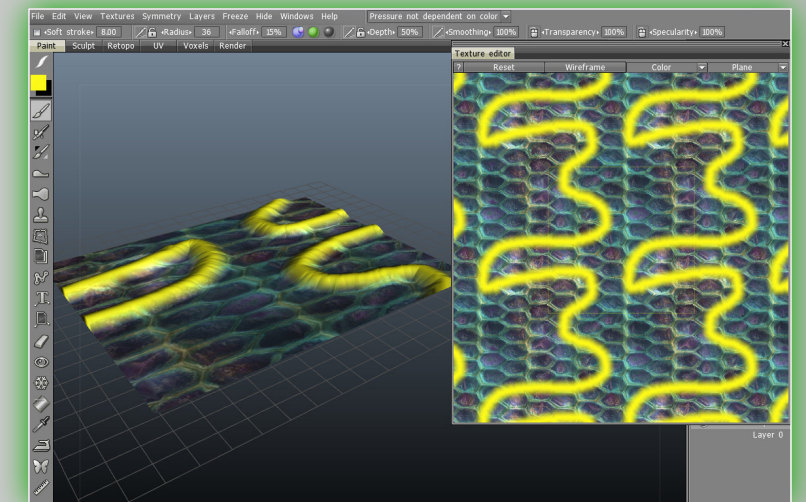
Export UV. Exports an object without textures. This command could be used in pair with *Import UV*. You can export a UV-set, adjust it externally and then import it again.

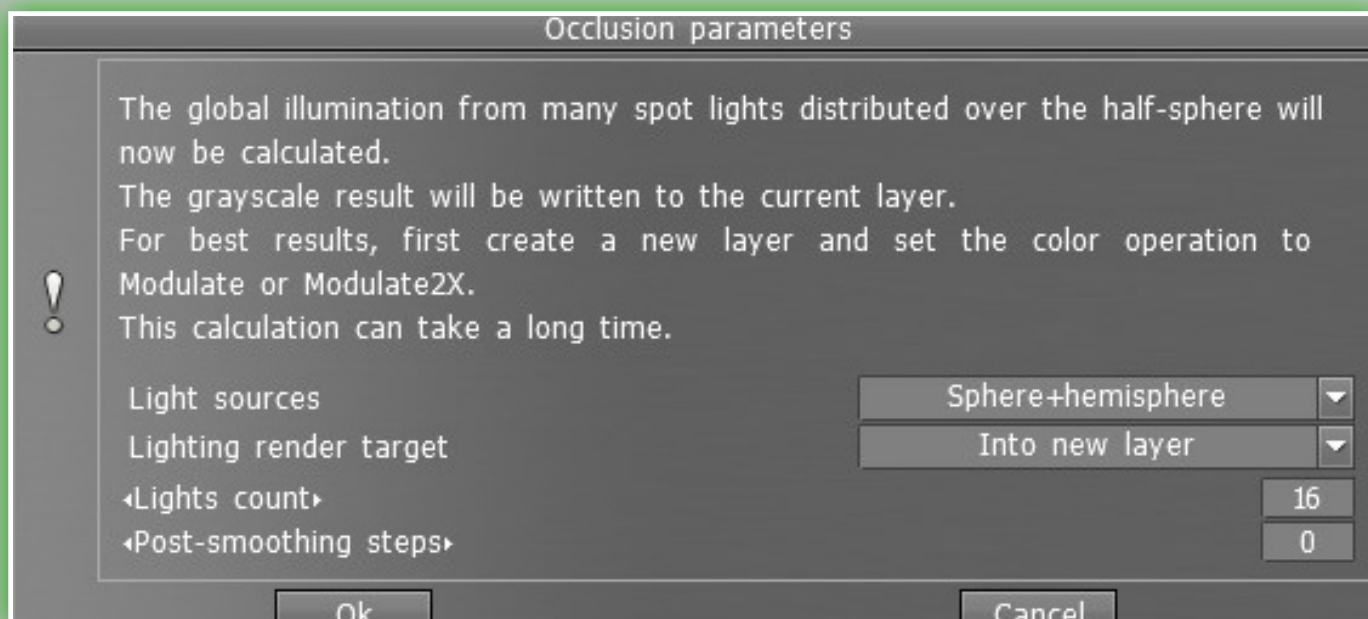
Export SL Sculpt Map. Export a *“Second Life”* sculpt map.

Texture UV Editor. With the built-in 2D texture editor, you can draw in 2D and 3D windows simultaneously. You can paint in 3D and the results will be shown in the 2D window simultaneously and vice versa. You must select a UV-set in drop-down list left-top of the 2D Texture editor window to paint in it.

Offset tool. You should load only square images with this tool. It comes in handy to create tiled textures with bump and specular. Once a square object is loaded, you will be offered the *“Offset tool”* window where offset values can be specified: *U offset, V offset* and texture shifting horizontally and vertically in accordance.

UV Manager. If there are several objects in the scene, separate objects can have a separate UV. Use this command

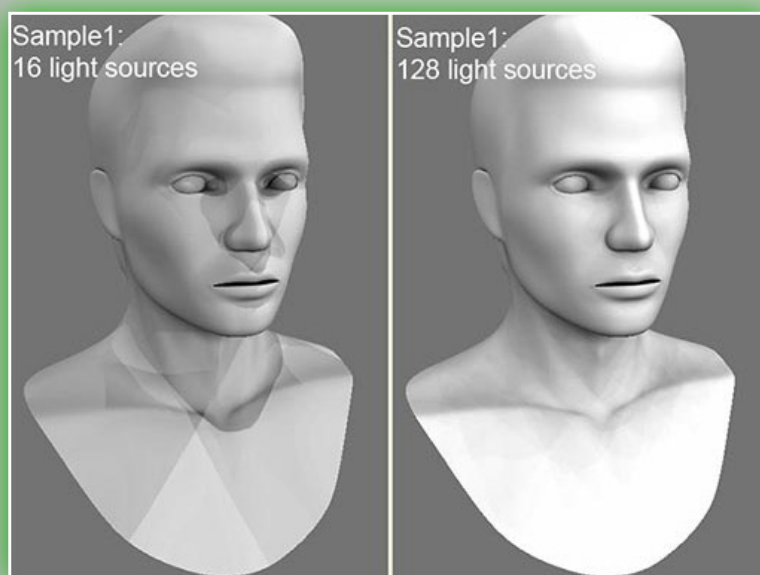




to manage them. You can group several materials into a single UV-set.

Texture Baking Tool. This lets you bake details to a normal or displacement map. This can be used even when the surface topology doesn't match perfectly between your reference mesh and low-poly mesh. This tool is quite detailed and has it's own section below, please see that section for further information.

Calc Occlusion. Allows calculating the *global illumination* from many spotlights that are distributed over the half-sphere. The grey scale results will be written to the current Layer.



So it is better to create a new Layer and set the color operation "**Modulate**" or "**Modulate2X**". The **Calc Occlusion** tool is especially optimized for high polygons (several millions), it is fast but it still need some time with high polygon counts:

Light sources (distribution of lights).

- 1) over hemisphere
- 2) over sphere
- 3) over hemisphere + sphere

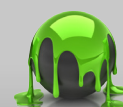
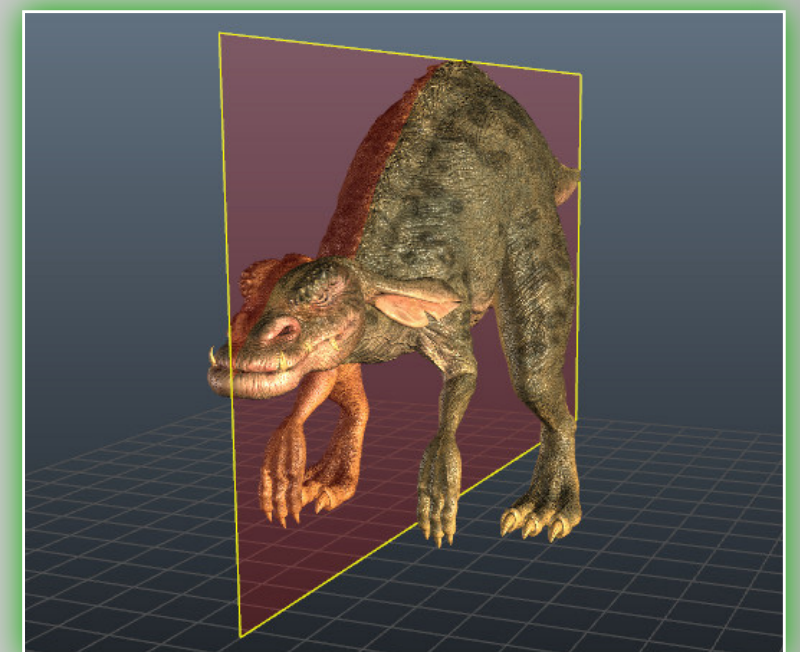
Lighting render target. You must choose a Layer where the occlusion calculation is placed. You can choose to add a new Layer automatically or overwrite the current Layer. In the first case, do *not* forget to delete a new Layer for the light calculation. Also a new color option "**To time**" is added for a new Layer. In the case of rendering the former Layer, all of its color information will be deleted.

Lights count. The more lights, the longer the calculation. The more light sources, the better the quality of lighting but the longer its calculation. The maximum value is 256, the minimum value is 16.

Post-smoothing steps. Sets the amount of post-smoothing steps after occlusion calculation.

10.7 Symmetry

Symmetry in **3D-Coat** is used when drawing, sculpting or retopologizing on objects. For quick access, press the "**S**" key. In this menu you will find a number of settings. You can toggle on/off symmetry, turn on a specific axis for symmetrical work (X, Y or Z axes), or sim-

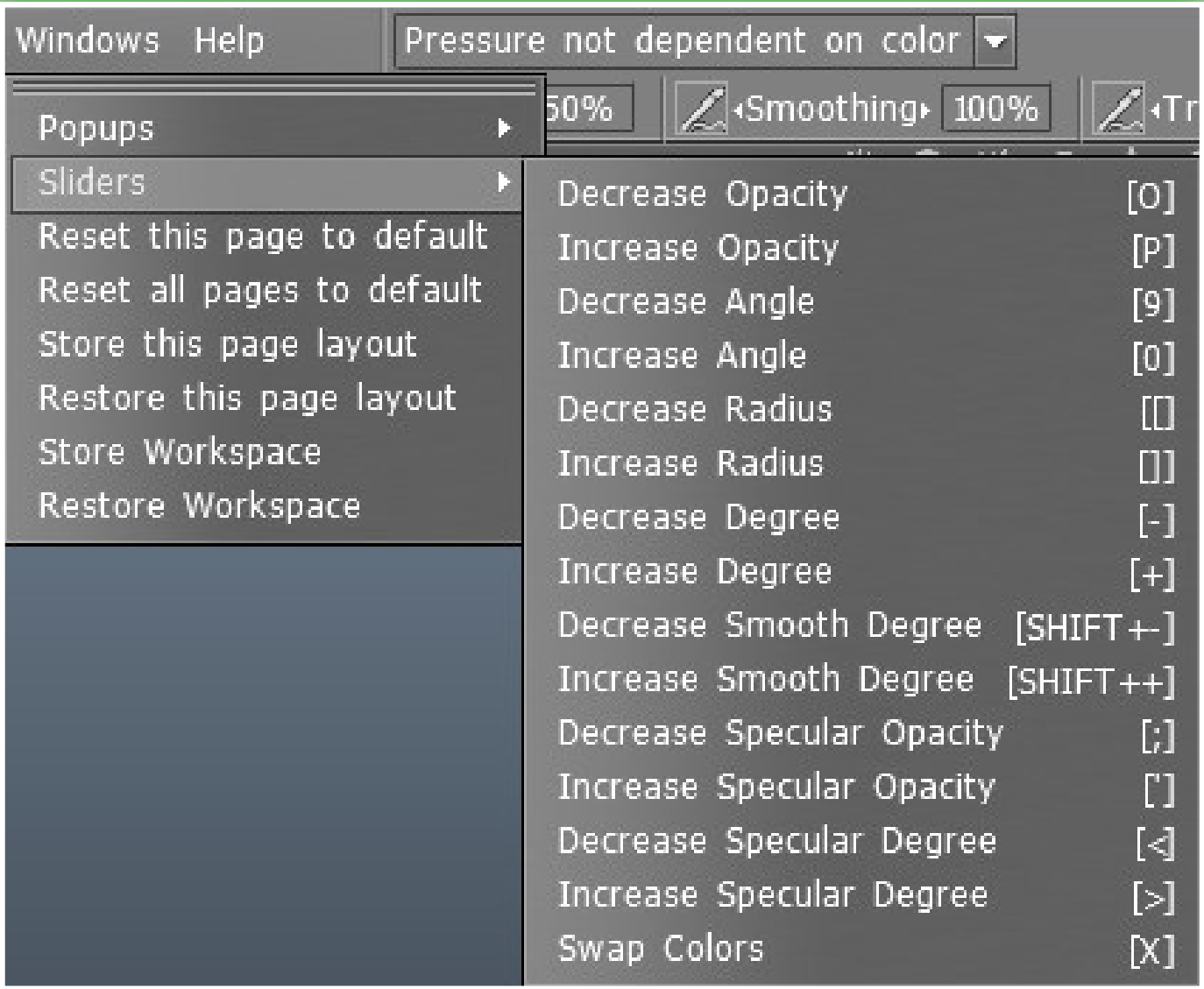


ply toggle the visibility of the symmetry plane. By default, symmetry is not activated. You can also change the position of the symmetry plane by pressing and holding the tab key.

10.8 Windows

Popups. With Popups you can show any popup window in the viewport easily. There are many popup windows -- and all of them are useful. Some of the popups are already located in their tabs in the right side panel.

Sliders. View any of the available sliders for all tools that use one.



The rest of the options are self-explanatory. You can reset the current **Page** or all pages to their defaults, save your page or whole **Workspace layout** to a file, and also load it when needed.

10.9 Help

Uninstall license. Clicking this will uninstall the license on the current machine you are using.

3D Coat Manual. Will pull up this manual.

Upload screenshot. Great for bug reporting directly to pilgway, especially if you have trouble uploading images to the forums or other locations to show others your screen. Using a yellow bounding box to select the area to capture and upload.

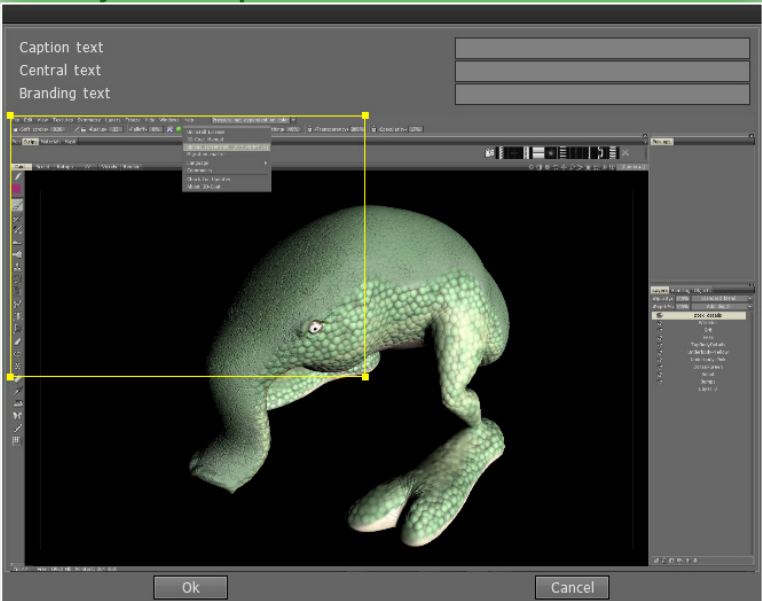
Migration master. Allows you to copy pens, strips, etc. from one installation of **3D-Coat** to another.

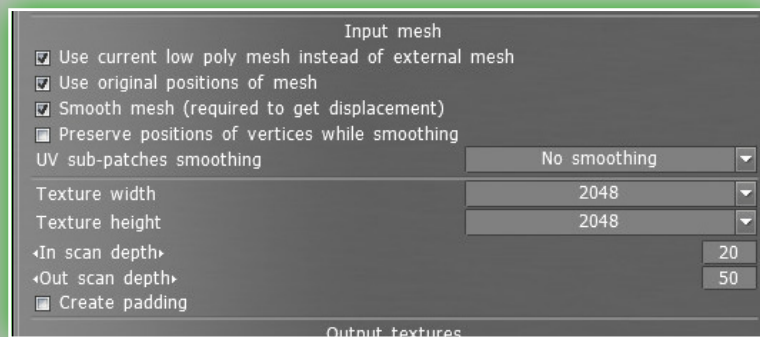
Language. Change the interface language of **3D-Coat**. The current languages translated to are: Chinese, English, French, German, Japanese, Russian, Spanish and Traditional Chinese.

Community. Will load the URL of the **3D-Coat** forums. If you need help right away, this is the *best* way to get help quickly. The users are friendly and always ready to help.

Check for Updates. Will check to see if any updates to **3D-Coat** are available.

About 3D-Coat. Lists the staff, personal thanks and the story behind **3D-Coat**.





10.10 Texture Baking Tool

This tool lets you bake details to a normal or displacement map, even if the surface topology

doesn't match between the two meshes you wish to bake -- the reference mesh and the low-poly mesh. Here are some detailed steps to use this tool:

For a Displacement map.

Turn on.

Uses current low-poly mesh

Smooths mesh

Preserves positions

Turn off.

Uses original positions

For a Normal map.

Turn on.

Uses current low-poly mesh

Turn off.

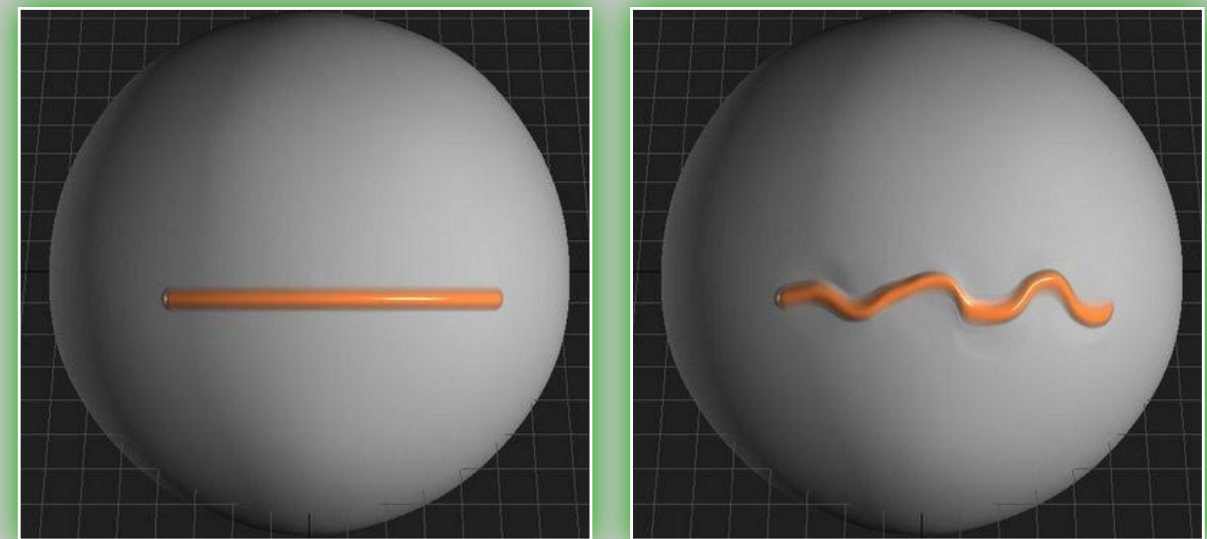
Uses original positions

Smooths mesh

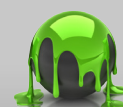
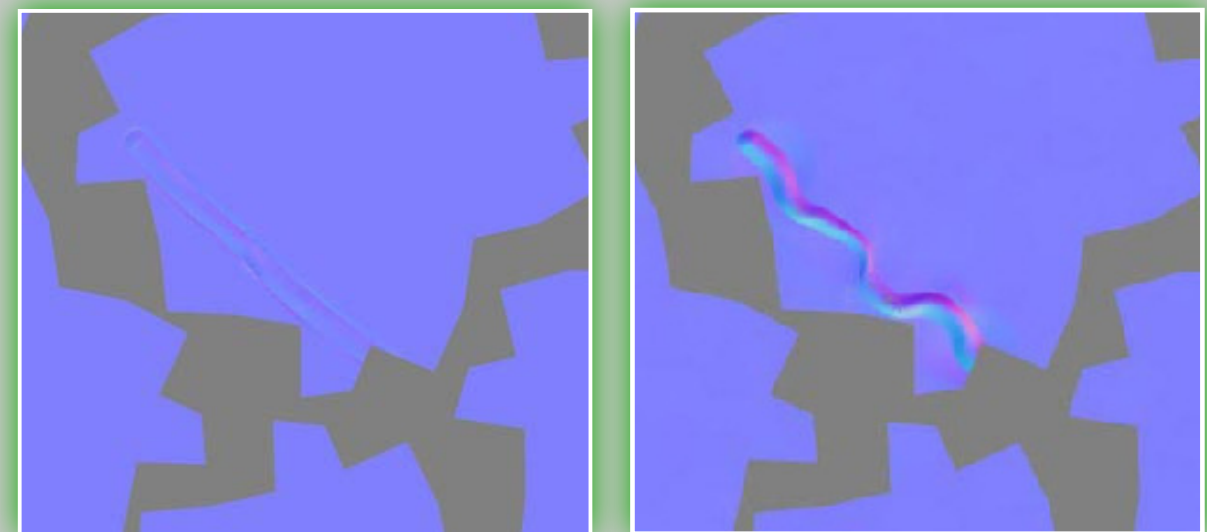
You'll need to have *"Use current low-poly mesh"* and *"Smooth mesh"* turned on, with *"Use original positions"* turned off. To get a displacement map you should set the *"Smooth mesh"* option, because displacement is calculated as the difference between the object in the scene and the sculpted geometry. Check *"Use*

current low-poly mesh..." option if you want to project on the current mesh. In this case it is better to check *"Use original positions..."* and *"Smooth mesh"* if you want to have displacement and uncheck them if you want a normal map only.

As you can see by the normal maps images here, the right one is more detailed then the other. It was generated using the



Texture Baking tool, the left one was done with a simple export function.





Legend:

LMB="left mouse button"
RMB="right mouse button"
MMB="middle mouse button"
WHEEL="mouse wheel scrolling"

Standard:

Open (.3b extension): Ctrl + O
Import for Microvertex painting : Ctrl + Shift + O
Import image plane: Ctrl + Shift + M
Save: Ctrl + S
Save as: Ctrl + Alt + S
Save incrementally: Ctrl + Shift + S
Undo: Ctrl + Z
Redo: Ctrl + Y
Copy: Ctrl + C
Paste: Ctrl + V
Apply operation: Enter
Escape from operation: ESC
Swap background and foreground color: X

Viewport:

Rotate: (Alt + LMB) or (LMB on empty space)
Zoom: (Alt + RMB) or (RMB on empty space)
Pan: (Alt + MMB) or (Alt + LMB + RMB)
Fit items to viewport: Shift + A
Reset camera to default position: Home
Toggle Full screen/ standard: Alt + Enter
Toggle Orthographic/ Perspective view: NUM5
Turn on/ off 2D Grid: Ctrl + '
Front view: NUM2
Back view: NUM8
Left view: NUM4
Right view: NUM6
Top view: NUM7
Bottom view: NUM1
Add camera shortcut: Ctrl + Up
Delete camera shortcut: Ctrl + Down
Switch to previous camera shortcut: Ctrl + Left
Switch to next camera shortcut: Ctrl + right

Navigate Screen Materials/ Mask:

Move Materials/ Mask: RMB on empty space
Rotate Materials/ Mask: Ctrl + RMB on empty space
Scale Materials/ Mask: Shift + RMB on empty space
Change aspect ratio of Materials/ Mask:
Ctrl + Shift + RMB on empty space

Model display in paint mode:

View relief only: 1
View non shaded: 2
View specular only: 3
View wireframe: 4
View shaded: 5
View low poly: 6
View low shaded: 7

Model display in voxel mode:

View wireframe in voxel mode: W (hold on)

Quick menu:

Hot box: Space
Draw mode panel: E
Symmetry menu: S
Color picker panel: B
Color channel panel: C
Depth channel panel: D
Specular channel panel: R
Quick panel: ~
Brush panel: T
Material panel: M
Layer panel: L

Brush control:

Hide/show brush circle: Capslock
Turn on/off Soft stroke: Alt + S
Clockwise rotate brush: 9
Anti-Clockwise rotate brush: 0
Pressing out: LMB
Pressing in: Ctrl + LMB
Smoothing: Shift + LMB
Decrease brush size: (I) or (WHEEL down) or
(Right click on model surface and drag left)

Increase brush size: (J) or (WHEEL up) or
(Right click on model surface and drag right)
Decrease brush depth: (-) or (Ctrl + WHEEL down) or
(Right click on model surface and drag down)
Increase brush depth: (+) or (Ctrl + WHEEL up) or
(Right click on model surface and drag up)
Decrease brush smooth degree: (Shift + -) or
(Shift + WHEEL down) or
(Shift + Right click on model surface and drag down)
Increase brush smooth degree: (Shift + +) or
(Shift + WHEEL up) or
(Shift + Right click on model surface and drag up)
Decrease Transparency: O
Increase Transparency: P
Decrease Specularity: <
Increase Specularity: >
Decrease Opacity of Specularity: ;
Increase Opacity of Specularity: '

Pick tool:

Pick color: V
Pick layer: H

Symmetry:

Change the position symmetry plane:
TAB + moving your mouse

Draw with spline in Paint/ Curves in Voxels:

Add point to a spline: LMB
Draw pressed out curve: Enter
Draw pressed in curve: Ctrl + Enter
Delete all points: ESC
Delete the last point: Backspace

Copy and paste part of surface:

Insert a copied part: Ctrl + V
Copy a part: Ctrl + C
Creation of a new pen from a site: Ctrl + Shift + C

Sync with photoshop:

Edit all layers in Ext.Editor: Ctrl + P
Edit projections in Ext. Editor: Ctrl + Alt + P

Layers operation:

Create new layer: Ctrl + Shift + N
Duplicate layer: Ctrl + Shift + D
Merge down: Ctrl + E
Merge visible layers: Ctrl + Shift + E
Fill unfrozen: Insert
Erase unfrozen: Delete
Fill by mask: Ctrl + Insert

Freeze operation:

Toggle freeze view: Alt + F
Freeze transparent pixels: Ctrl + D
Invert freeze/selection: Ctrl + Shift + I
Show/hide freeze: Ctrl + F
Expand frozen area: Ctrl + NUM+
Contract frozen area: Ctrl + NUM-
Freeze border: Ctrl + NUM/
Smooth freezing: Ctrl + NUM*

Hide operation:

Unhide all: Ctrl + X
Expand hidden area: NUM+
Contract hidden area: NUM-

Retopo operation:

In "Add/split" mode:
Add new polygon: LMB
Split faces/edges, Connect vertex: LMB
Escape from current snapped point: ESC
Tweak edges/vertex: RMB

In "Select" mode:

Select single element: LMB
Add select: Shift + LMB
Subtract select: Ctrl + LMB
Select edge loops: L
Select edge rings: R
Slide selected edges: RMB
Tweak selected vertex: RMB
Subdivide selected faces: Insert

Split selected edges: Insert
Collapse selected edges: Backspace
Delete selected element: Delete

In "Point&faces" mode:

Add points: LMB
Tweak points/Generate faces: RMB
Force generate triangle face: Shift + RMB

In "Strokes" mode:

Draw freehand strokes: LMB
Draw spline: Ctrl + LMB
Connect/ break existing strokes: Ctrl + LMB
Generate faces based on strokes: Enter
Clear strokes: ESC

In "Brush" mode:

Smooth vertex spacing: Shift + LMB

PC keyboard



(updated to 3.1.00)

3D-Coat 3.1 default hotkeys



Legend:

LMB = "left mouse button"
RMB = "right mouse button"
MMB = "middle mouse button"
WHEEL = "mouse wheel scrolling"

Standard:

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Redo: Command + Y
Copy: Command + C
Paste: Command + V
Apply operation: Return
Escape from operation: ESC
Swap background and foreground color: X

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Pan: (Option + MMB) or (Option + LMB + RMB)
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Reset camera to default position: Home
Toggle Full screen/ standard: Option + Return
Toggle Orthographic/ Perspective view: NUM5
Turn on/ off 2D Grid: Command + `
Front view: NUM2
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Navigate Screen Materials/ Mask:

Move Materials/ Mask: RMB on empty space
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Scale Materials/ Mask:
Shift + RMB on empty space
Change aspect ratio of Materials/ Mask:
Command + Shift + RMB on empty space

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View non shaded: 2
View specular only: 3
View wireframe: 4
View shaded: 5
View low poly: 6
View low shaded: 7

Model display in voxel mode:

View wireframe in voxel mode: W (hold on)

Quick menu:

Hot box: Space
Draw mode panel: E
Symmetry menu: S
Color picker panel: B
Color channel panel: C
Depth channel panel: D
Specular channel panel: R
Quick panel: ~
Brush panel: T
Material panel: M
Layer panel: L

Brush control:

Hide/show brush circle: Capslock
Turn on/off Soft stroke: Option + S
Clockwise rotate brush: 9
Anti-Clockwise rotate brush: 0
Pressing out: LMB
Pressing in: Command + LMB
Smoothing: Shift + LMB

Decrease brush size: ([) or (WHEEL down) or (Right click on model surface and drag left)
Increase brush size: (]) or (WHEEL up) or (Right click on model surface and drag right)
Decrease brush depth: (-) or (Command + WHEEL down) or (Right click on model surface and drag down)
Increase brush depth: (+) or (Command + WHEEL up) or (Right click on model surface and drag up)
Decrease brush smooth degree: (Shift + -) or (Shift + WHEEL down) or (Shift + Right click on model surface and drag down)
Increase brush smooth degree: (Shift + +) or (Shift + WHEEL up) or (Shift + Right click on model surface and drag up)
Decrease Transparency: O
Increase Transparency: P
Decrease Specularity: <
Increase Specularity: >
Decrease Opacity of Specularity: ;
Increase Opacity of Specularity: '

Pick tool:

Pick color: V
Pick layer: H

Symmetry:

Change the position symmetry plane:
TAB + moving your mouse

Draw with spline in Paint/ Curves in Voxels:

Add point to a spline: LMB
Draw pressed out curve: Return
Draw pressed in curve: Command + Return
Delete all points: ESC
Delete the last point: Backspace

Copy and paste part of surface:

Insert a copied part: Command + V
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Creation of a new pen from a site:
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Sync with photoshop:

Edit all layers in Ext.Editor: Command + P
Edit projections in Ext. Editor:
Command + Option + P

Layers operation:

Create new layer: Command + Shift + N
Duplicate layer: Command + Shift + D
Merge down: Command + E
Merge visible layers: Command + Shift + E
Erase unfrozen: Delete

Freeze operation:

Toggle freeze view: Option + F
Freeze transparent pixels: Command + D
Invert freeze/selection: Command + Shift + I
Show/hide freeze: Command + F
Expand frozen area: Command + NUM+
Contract frozen area: Command + NUM-
Freeze border: Command + NUM/
Smooth freezing: Command + NUM*

Hide operation:

Unhide all: Command + X
Expand hidden area: NUM+
Contract hidden area: NUM-

Retopo operation:

In "Add/split" mode:
Add new polygon: LMB
Split faces/edges, Connect vertex: LMB
Escape from current snapped point: ESC
Tweak edges/vertex: RMB

In "Select" mode:

Select single element: LMB
Add select: Shift + LMB
Subtract select: Command + LMB
Select edge loops: L
Select edge rings: R
Slide selected edges: RMB
Tweak selected vertex: RMB

Collapse selected edges: Backspace

Delete selected element: Delete

In "Point&faces" mode:

Add points: LMB
Tweak points/Generate faces: RMB
Force generate triangle face: Shift + RMB

In "Strokes" mode:

Draw freehand strokes: LMB
Draw spline: Command + LMB
Connect/ break existing strokes:
Command + LMB
Generate faces based on strokes: Return
Clear strokes: ESC

In "Brush" mode:

Smooth vertex spacing: Shift + LMB

Notice:

There is no Insert key on Mac keyboard. But there are 4 items were mapped with Insert key. To use those items via hotkey, please redefine hotkey for them.

In layers operation:

Fill unfrozen: Insert
Fill by mask: Command + Insert
In "Select" mode of Retopo operation:
Subdivide selected faces: Insert
Split selected edges: Insert

Mac keyboard



(updated to 3.1.00)
3D-Coat 3.1 default hotkeys

12. Customize Hot Keys & User Interface

3D-Coat is fully customizable, and it is quick and easy to do. All UI settings, hot keys and other customized information are stored in a small **XML** file, allowing for easy distribution of all customized presets.

12.1 Customize Hot Keys

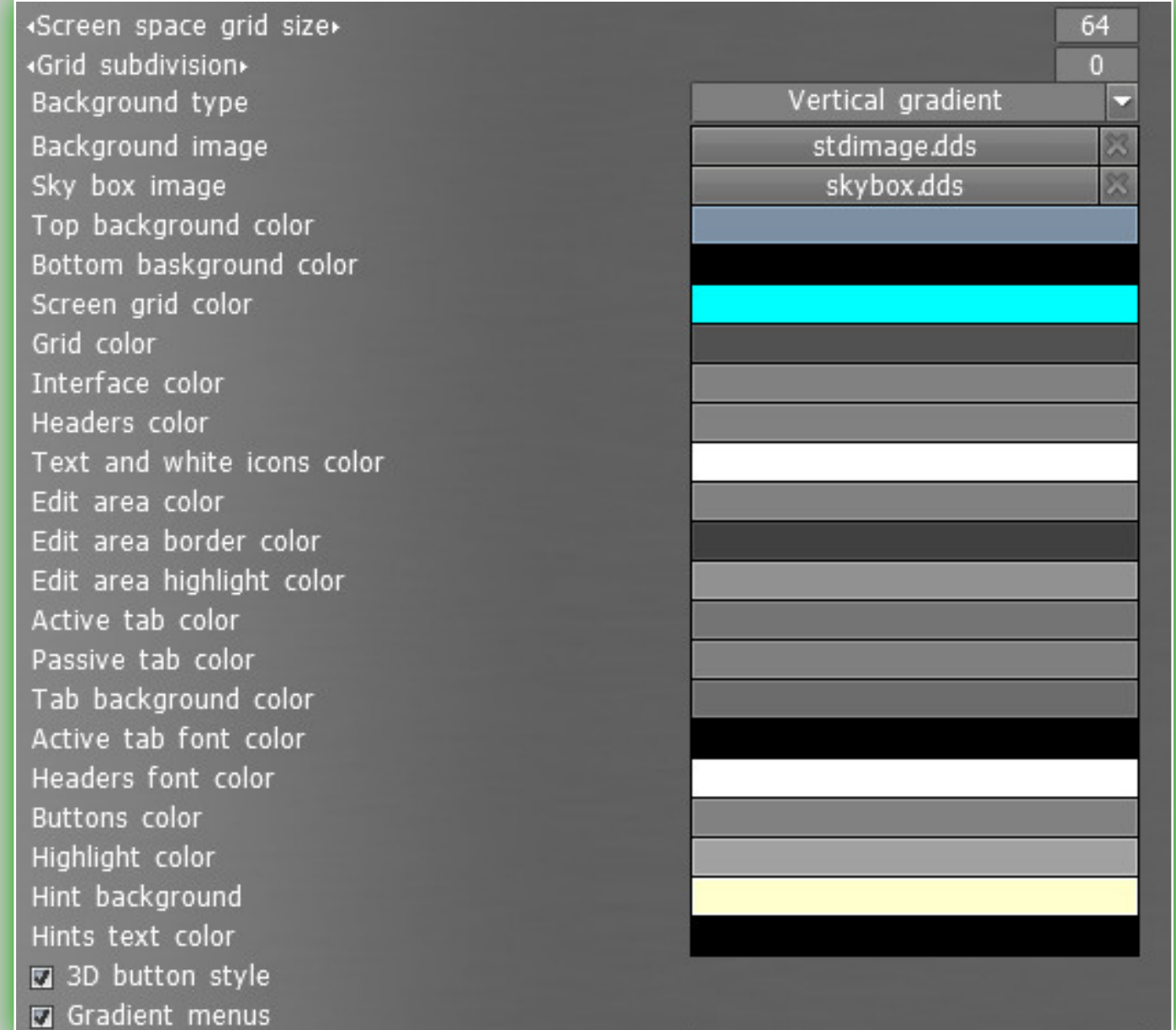
To define a hot key is very simple. All you need to do is point your cursor over the item you would like to set a hot key for and press the **END** key -- you will then see this prompt:

Press key combination to define new hotkey. Press ESC to cancel.

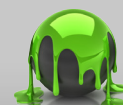
You can now press the key(s) you would like to assign to the function. Keep in mind that nearly every button or menu item you see in **3D-Coat** already have a custom hot key. If a hot key is already used, it is no problem to re-assign the hot key to whatever new hot key you would like.

12.2 Customize User Interface

The UI layout of **3D-Coat** is fully customizable. By default there are three UI themes included in the installation. They are **"Dark"**, **"Grey"** and **"Light"**. You can change this by going to **Edit->Preferences->Load**, and you will then be directed to a folder named **"OptionsPresets"**.



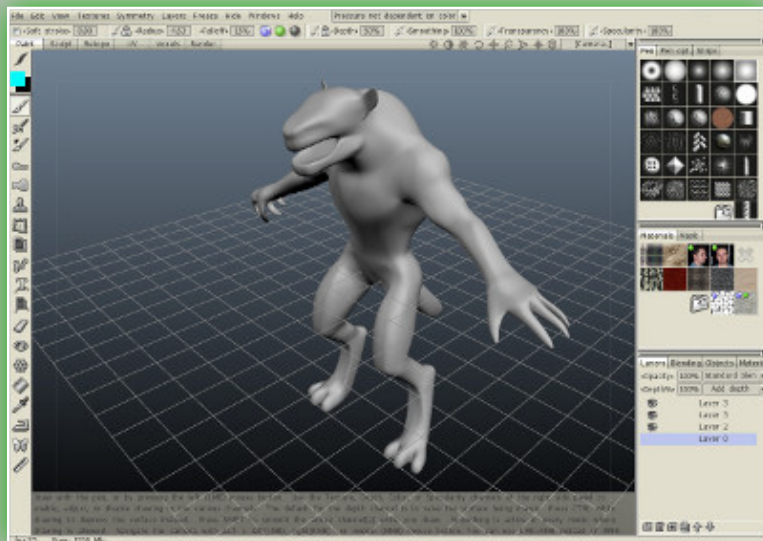
There are 3 **.XML** files in it, and each of them corresponds to an interface theme. To load the themes, simply select one **.XML** file and click **Open**. You can of course edit many more parts of the UI and create your own UI theme and save it as an **.XML** file. Just go to **Edit->Preferences**. Here you can customize the color of text, interface background, header, buttons, grid, background, and so on. You can also turn on/off 3D button style, Gradient menus.





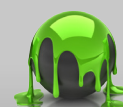
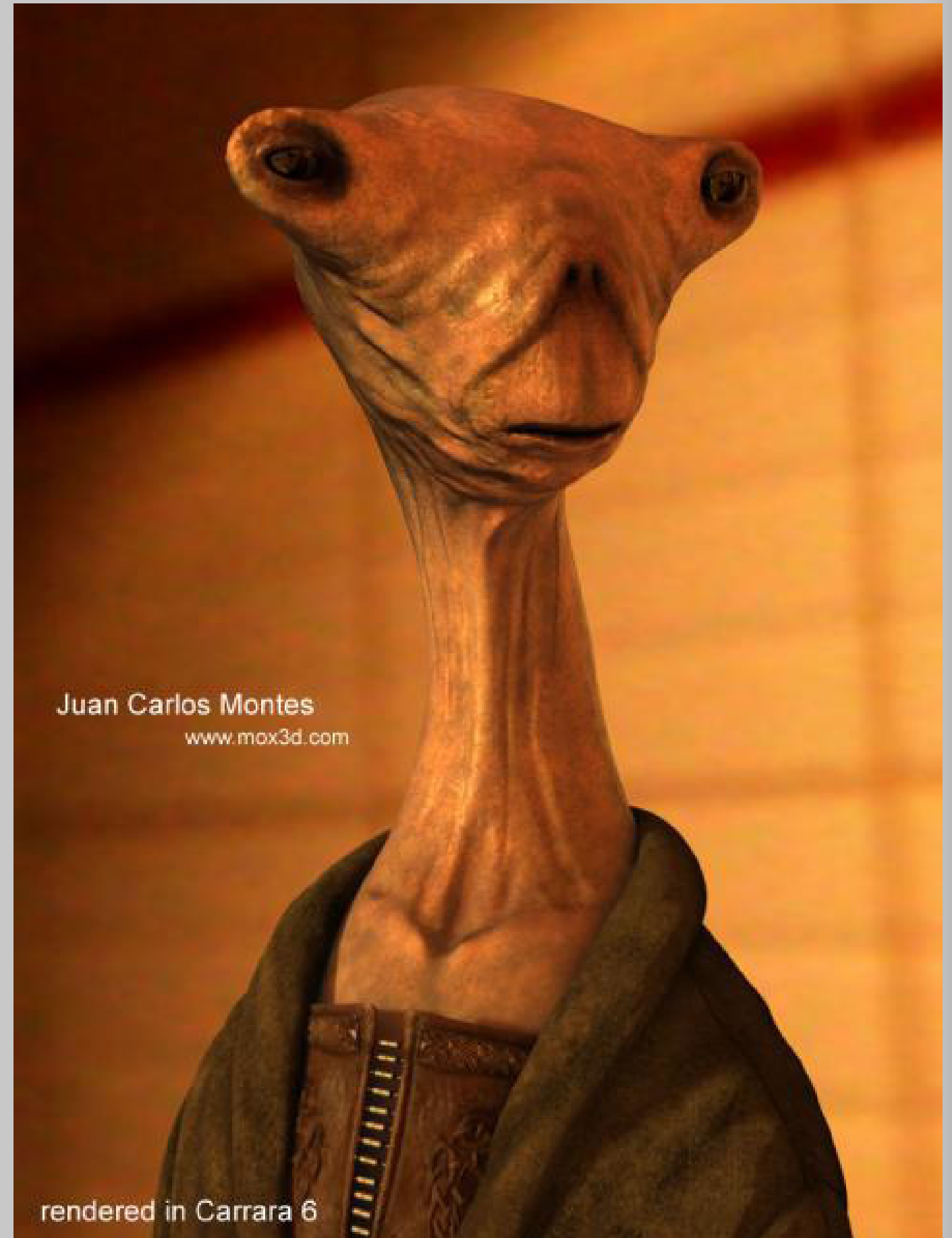
panel.

You can even change the icons of the tools to your own, just go to the installation folder of **3D-Coat**. In the subfolder path **textures\icons** you will find the source **.PSD** files of the icons, they are **Baseicons..PSD** and **SmallIcons..PSD**, open the **.PSD**



After all these done, just save the **.XML** file, and all the new customized information are stored. You can load it any-time on your own systems or share it with your friends and colleagues. Simply press the button **Save** in the **Preferences**

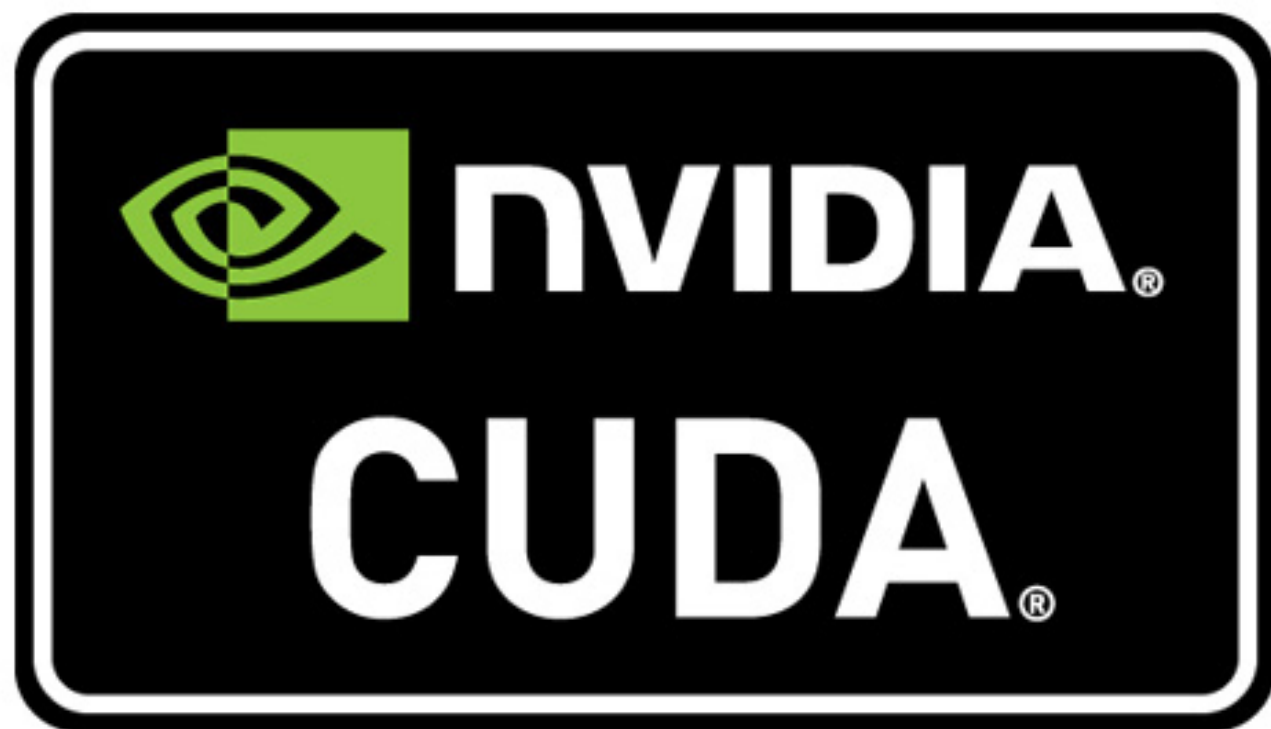
file in Photoshop and create your own icons. When finished, save them in the **.DDS** format, keep the name and replace the original **Baseicon.DDS** and **SmallIcons.DDS**. The next time you start **3D-Coat** it will load all the new custom icons.



13. CUDA

13.1 CUDA Basics

3D-Coat uses CUDA acceleration for voxel sculpting only. Voxel sculpting requires more computing resources because it handles pictures in volume. So we decided to use CUDA to speed up volume operations. CUDA is supported by all the recent NVidia cards, starting with the 8-series.



However the acceleration is hugely dependent on the number of processors available on the card. The real advantage of CUDA over a 4-core CPU can be achieved *only* if the GPU has more than 64 processors, otherwise the 4-Core CPU alone will yield a better speed. So there is no reason to use CUDA acceleration with some video cards, even though they support the technol-

ogy -- like the GeForce 8400/9400, 8500/9500, G100, G120, G130 and QuadroFX 1700 -- because they have less than 64 processors.

We can recommend any card from GeForce 9800GT (it's very inexpensive) and higher. Acceleration speed is dependent not only the number of cores number but also on memory bandwidth.

CUDA gives the best speed advantage if you are applying masks and materials over voxel sculpture with big brushes. The speed advantage depends considerably on the tool used.

13.2 The Benchmark

Here is the benchmarking info for a standard PC with a 4-core CPU (Q6600, 2.4 GHz, GPU 9800GT). We ran 6 tests, using several types of drawing with a mask either enabled or disabled.

Draw with sphere: CUDA+thin pen(10) Avg. **FPS:31.3**

Draw with sphere: CPU+thin pen(10) Avg. **FPS:30.5**

Carve: CUDA+thin pen(10) Avg. **FPS:34.1**

Carve: CPU+thin pen(10) Avg. **FPS:30.5**

Carve with mask: CUDA+thin pen(10) Avg. **FPS:31.0**

Carve with mask: CPU+thin pen(10) Avg. **FPS:26.4**

Draw with sphere: CUDA+thick pen(40) Avg. **FPS:13.6**

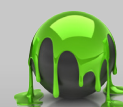
Draw with sphere: CPU+thick pen(40) Avg. **FPS:10.4**

Carve: CUDA+thick pen(40) Avg. **FPS:18.3**

Carve: CPU+thick pen(40) Avg. **FPS:10.3**

Carve with mask: CUDA+thick pen(40) Avg. **FPS:14.3**

Carve with mask: CPU+thick pen(40) Avg. **FPS:7.2**



The largest advantage of CUDA over CPU-only is visible when a mask is used. The faster FPS numbers means, of course, more speed. 9800GT is a very low-priced card, but using a GTX260 or later or a QuadroFX with a large amount of cores will give the best speed.

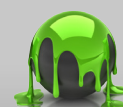
It is cheaper to buy a good video card than, for example, a Core i7 processor.

We can also recommend buying a video card with 1GB or more of memory, because it will allow you to edit really large textures in **3D-Coat**.

CUDA's efficiency is limited on very large brushes, so, when reaching a particular radius, CUDA will be automatically disabled in tools like the **Airbrush**, **Increase**, **Build** and **Smudge**. On a scale of 1:1 it is a radius of around 65. The surface and object tools are not getting any advantage from CUDA.

13.3 Multi-Threading

A few operations in **3D-Coat** are now multi-threaded! At the moment only "merging" functions, such as the voxel Merge, Move and Pose tools, as well as converting your voxel sculpt to surfaces in the voxel room to use the surface sculpting tools. What is more, using the cache function in the voxel room is also multi-threaded. These functions are now quite fast, where as previously they were painfully slow in previous versions of **3D-Coat**. At the moment multi-threading is limited to a handful of functions, however, in the near future many more functions will be added to the list of multi-threaded tools, where applicable.



14. FAQ & Additional Tips

14.1 For Your Information!

Sometimes my painting operations become very slow. How can I best avoid it?

- Painting over large single faces will be much slower than over divided faces. So try to avoid too big faces in UV-space. Divide large faces whenever possible.

I am getting the error message "The application failed to start because d3dx9_38.dll was not found". What should I do?

- Go to the Download page of the official **3D-Coat** website, then download DirectX 9c and install it. Even if you have DirectX 10 installed you need to update DirectX 9. DirectX 9 and 10 are independent, so this procedure is quite safe.

I want to upgrade my video card to speed up 3D Coat. What should I choose?

- Using modern nVidia cards is best, due to CUDA. You can choose from NV 8800GT (lowest price) to GTX 285 and higher. There is no reason to use multiple GPU cards (SLI) for **3D-Coat**. The most important factor for CUDA performance is the number of cores -- it should be 120 or more. Video RAM is important also, because it determines the maximum texture size that can be edited in **3D-Coat**. Every pixel takes 8 bytes, so you can easily calculate the maximum size of the texture that can fit into the GPU's memory. We recommend you buy cards with at least 1 Gb of RAM, even more is even better.

Do I need to uninstall 3D Coat every time I install your new software upgrades?

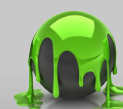
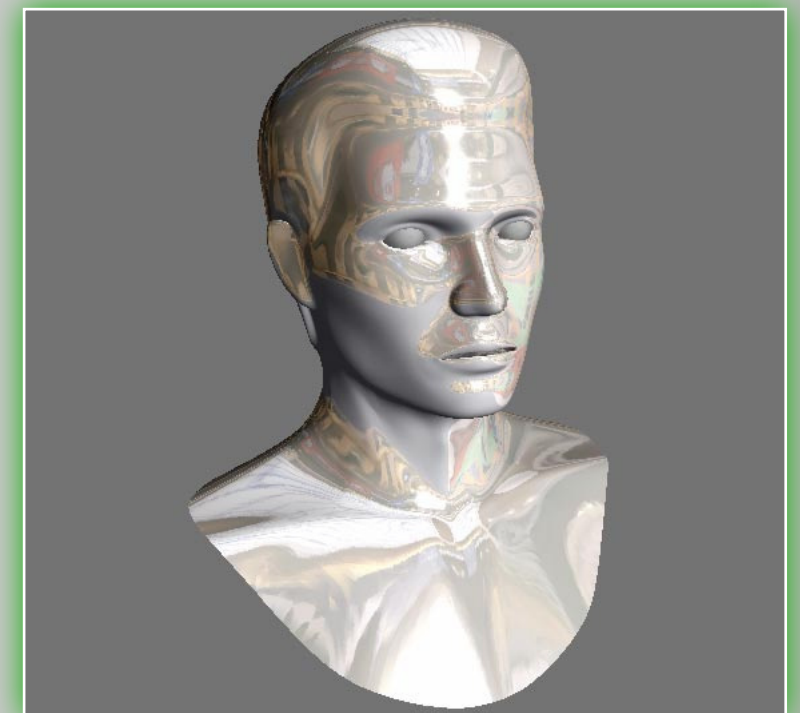
- No, you can install the update simply by overwriting the existing installation (at least until we release a major, non-free version upgrade).

I am unable to register – every time I enter serial number and press Register, 3D Coat restarts and asks for the serial number again. How can I exit this loop?

- Check if you might have copied to the clipboard extra characters -- or missed some characters
- Check that the serial number is for **3D-Coat** Version 3 -- often users are entering serial numbers for Version 2. Version 3 serial number begins with 3DC3SN-.
- If you are under Vista x64, please ensure that you are running **3D-Coat** as an administrator.
- If the problem still persists try to delete the file *License.dat* from the **3D-Coat** installation folder manually.

There are too many text hints in the interface, is there a way to hide them?

- If you are new to **3D-Coat**, it isn't recommended that you hide the hints, because these will really be helpful for your study. But you can hide the hints anytime you want, just go to the menu **Edit->Preferences->Show hints** and uncheck that



checkbox. You can turn on or off the big bottom hints separately by using **“Show big hints on the bottom panel”**.

I am using Vista/XP 64-bit and 3D Coat does not respect my Wacom pen pressure. What should I do?

- **3D-Coat** works well with 64-bit drivers. Get the latest Wacom driver here: www.wacom.com/downloads/drivers.php

Can I move/rotate/scale the objects but not the camera?

- Yes, you can. In the **“Sculpt mode”** of tools panel, select the **“Select/Move”** command -- then you can select the object you want to move/rotate/scale.

How can I adjust the pivot point?

- In **3D-Coat**, the pivot point is dynamic and based on the currently picked point (where you cursor last pointed on the model). But you can set the pivot point manually using the **“F”** key. Also, please see the **Camera** menu -- it lets you pick the best pivot mode.

What’s the difference between the normal maps standard used in 3ds Max and Maya?

- The green channel is reversed. You can select the normal maps standard in the menu **View->Options**.

When should I use the DX version and when the GL version?

- It depends on your hardware. **3D-Coat** has two Graphics Modes: DX (DirectX) and GL (OpenGL). the GL mode usually runs much faster than DX mode on professional Quadro graphics card, while the DX mode will run faster on consumer-level game graphics card.

What’s the difference between “Depth” and “Sculpt mode”?

- In **3D-Coat** there are two types of sculpting modes: one is image-based and another is mesh-based. **“Depth”** is image-based sculpting -- in this mode you are drawing the depth by creating a vector displacement, the normal map and displacement map is generated “on the fly.” If you want to get hold of the normal map, just save it -- it’s not necessary to wait a long time for baking, because the normal map is generated in real-time.

- When you enter **“Sculpt mode”**, you enter the mesh-based sculpting mode. In this mode you you’re really changing the vertex positions of the mesh. If you want to get correct normal map in this mode, you may use **Textures->Texture Baking Tool**.

What’s the use of the Cavity painting?

- **Cavity** painting lets you paint in the *crevices* of the surface without affecting the rest of the area, and vice versa.

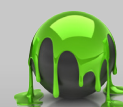
I selected the command “View->Environment Shade”, but there seems to be no change, why?

- You can only use **“Environment Shade”** if you have a specular map in the model. That means if you haven’t painted specular on the model, you will not see any change.

Why is drawing with the SHIFT key so confusing?

- Different sequences of the **SHIFT** key and the **LMB** will result in different effects. If you first press and hold **SHIFT** and then draw with **LMB**, the surface will be smoothed. But if you first press and hold **LMB** and then press **SHIFT** and draw, you will get straight lines -- just like in Photoshop.

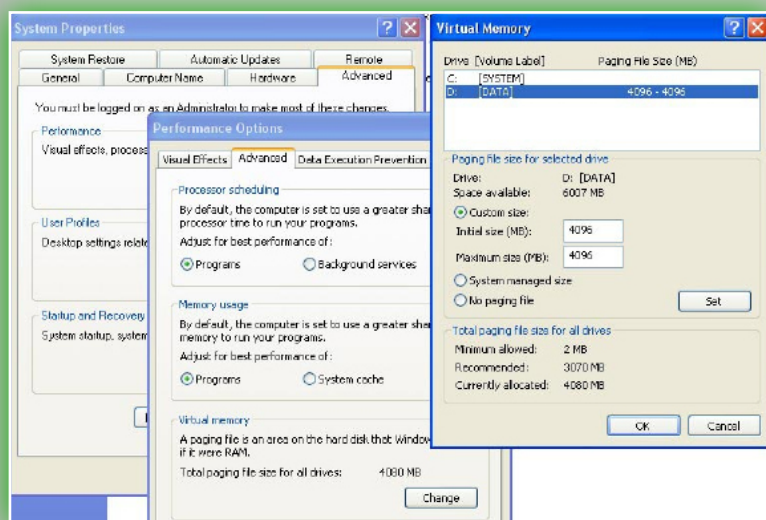
How can I create a seamless texture using 3D Coat?



- It is easy to use **3D-Coat** to create seamless textures and bump maps. Just go to menu **File->Import->Image Plane**, you may want to use **Textures->Offset tool** as well. You can read more about it on page.

What are the best practices regarding memory management and increasing stability?

- When **3D-Coat** is run you can see the amount of free memory in the left bottom corner. If this value becomes too low (200-300 MB), the program can become unstable. These tips will help you to increase stability.
- **3D-Coat** consumes much memory for highly detailed objects, so it is important to allow **3D-Coat** to use as much virtual memory as possible. So, please adjust your virtual memory settings as shown on this picture (this is taken from 32-bit



Windows XP, things will be similar with other OS versions). Go to **MyComputer->Properties->Advanced->Performance->Advanced->Virtual Memory->Change**. Please set this number to 4096KB. **3D-Coat** supports even larger virtual memory ranges. If you are using

64-bit Windows you will be able to use up to 4GB of virtual memory. So, using 64-bit Windows with 3DC is the best choice. If you are using 32-bit Windows, you can ordinarily use only 2 GB of virtual memory -- but you can increase that

size using the special `/3GB` option in the file `boot.ini`. With that option you will be able to use 3GB of memory with 3DC.

How can I find and safely edit the file “boot.ini”?

- Right-click **My Computer->Properties**. The System Properties dialog box will appear.
- Click the **Advanced** tab.
- In the **Startup and Recovery** area, click **Settings**. The **Startup and Recovery** dialog box will appear.
- In the **System startup** area, click **Edit**. This will start Notepad and open `“boot.ini”`.
- In the [Operating Systems] section, add the following switches to the end of the startup line that includes the `/fastdetect` switch: **/3GB**
- Save the changes and close Notepad.
- Click **“OK”** twice to close the dialog boxes, and then restart the computer for the change to take effect.

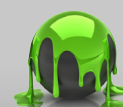
You can read more about the /3GB option here:

- <http://technet.microsoft.com/en-us/library/bb124810.aspx>
- http://www.vfxpedia.com/index.php?title=FAQ/3GB_Switch

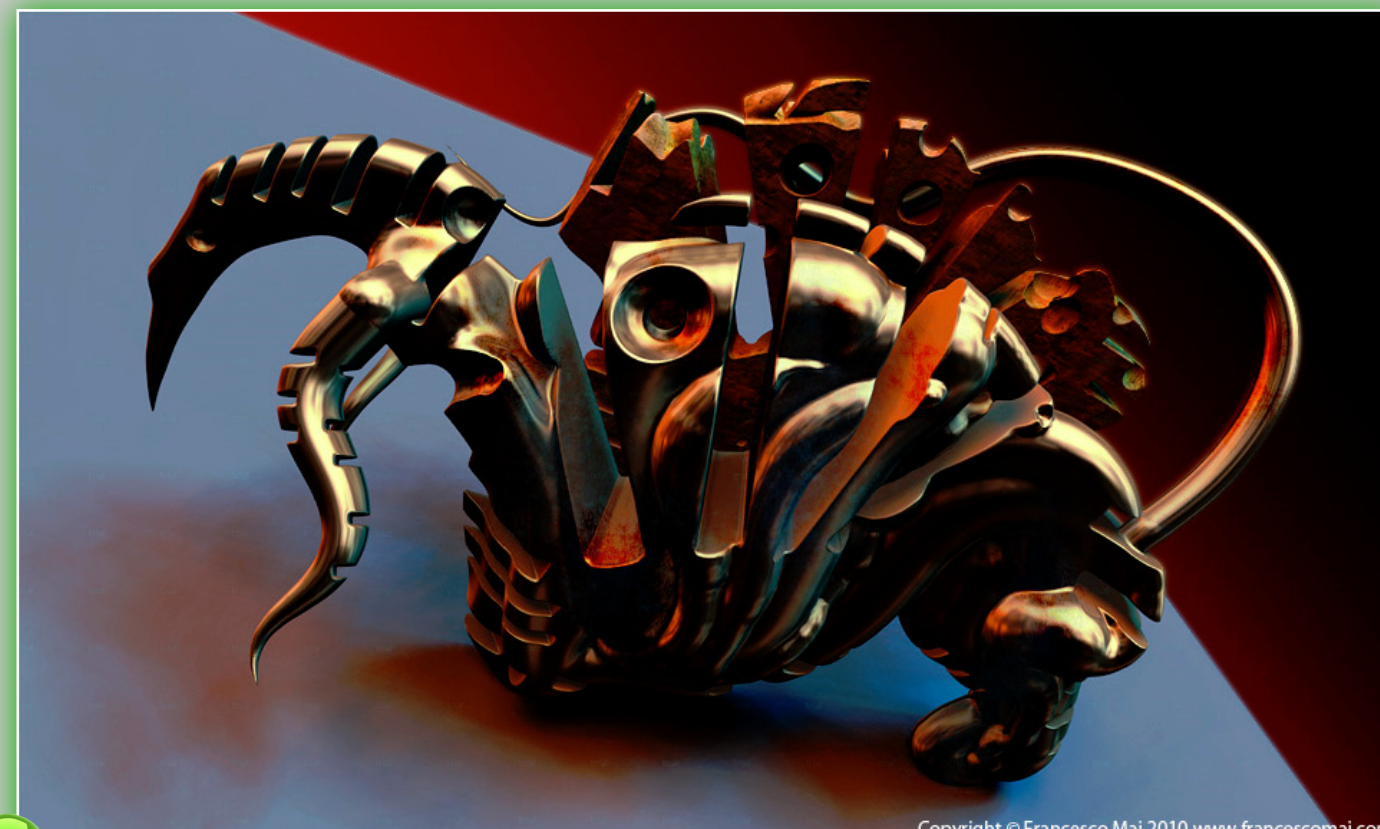
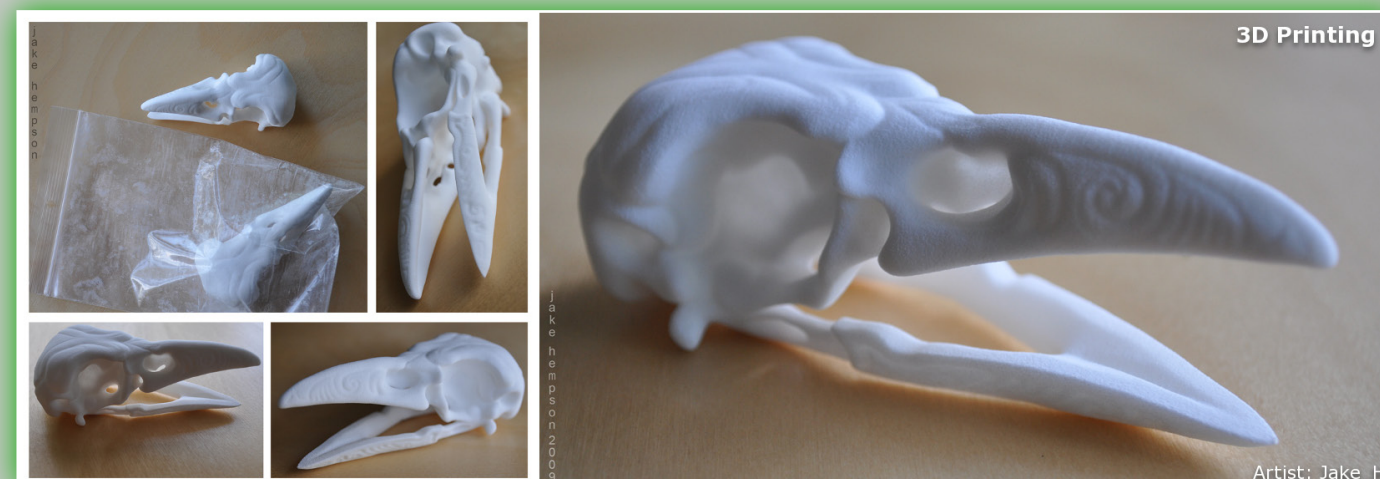
14.2 Video Tutorials

There are many video tutorials out there for **3D-Coat**. If you're looking an answer to a specific question, or just want to get some idea of what **3D-Coat** is capable of, check out the video training at some of the links below:

- <http://www.3d-coat.com/tutorial/>



- <http://vimeo.com/channels/3dcoat>
- <http://vimeo.com/channels/3dctraining>
- <http://vimeo.com/user2003041/videos>
- <http://www.vimeo.com/gregwhedon/videos>



15. Contacts & Credits

Official **3D-Coat** web-site:

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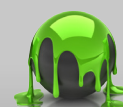
**Luo Chen, Marina Shpagina, Dwayne Ferguson, Daniel Yarmak,
Klaus Nordby and Jarvis Jones**

Manual design:

Klaus Nordby

Editors:

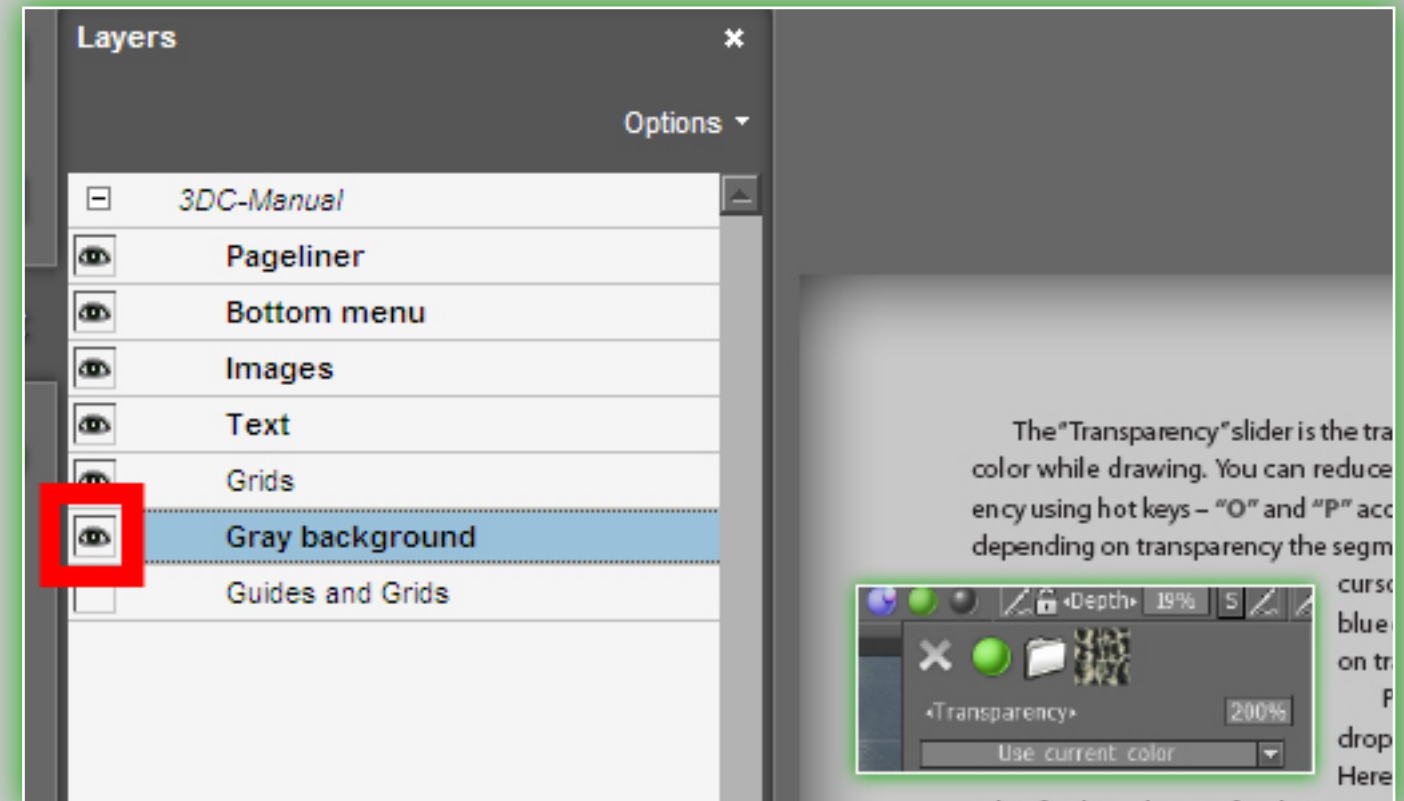
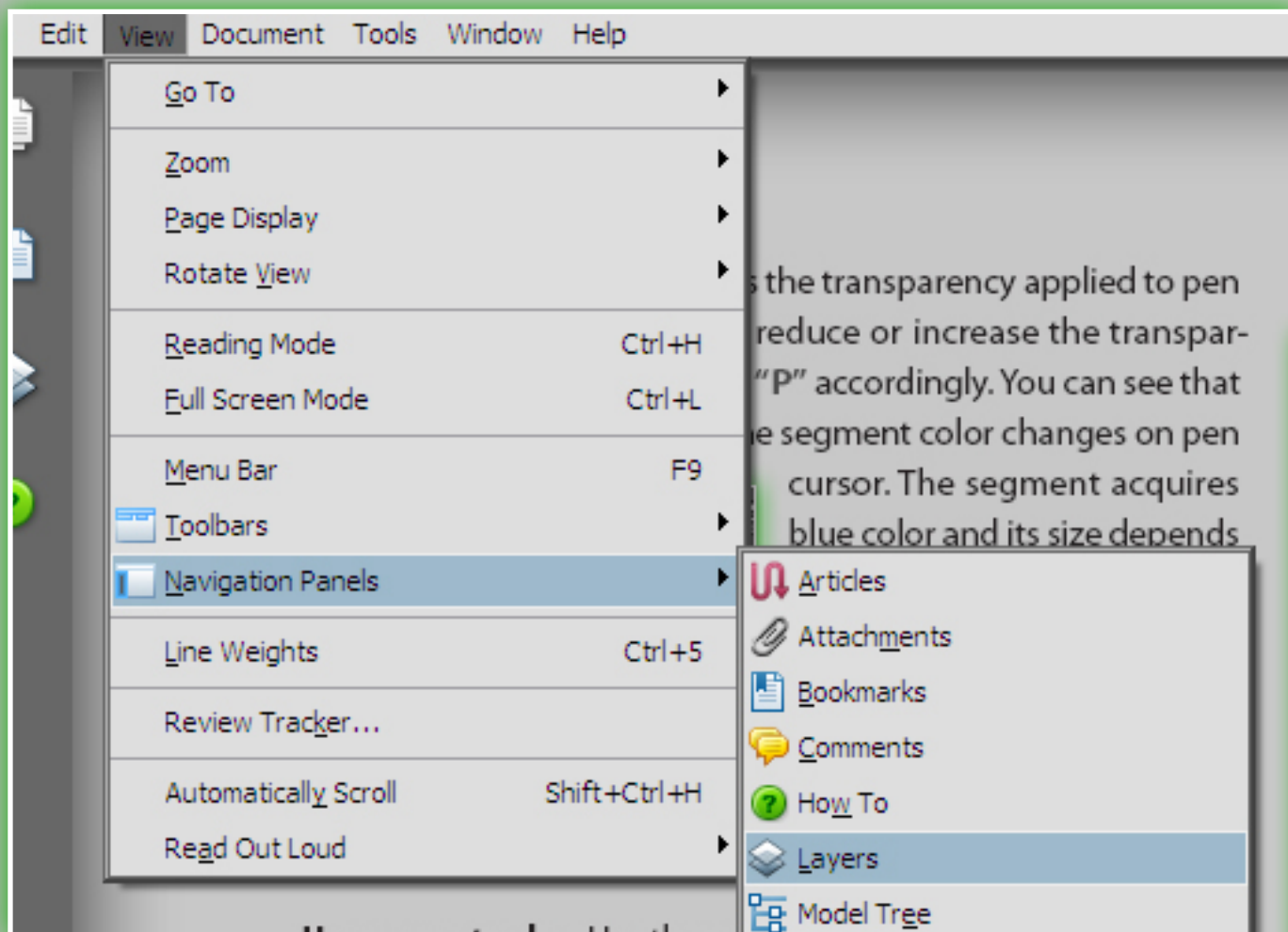
Sharon Helms and Gideon Klindt



16. Printing This Manual

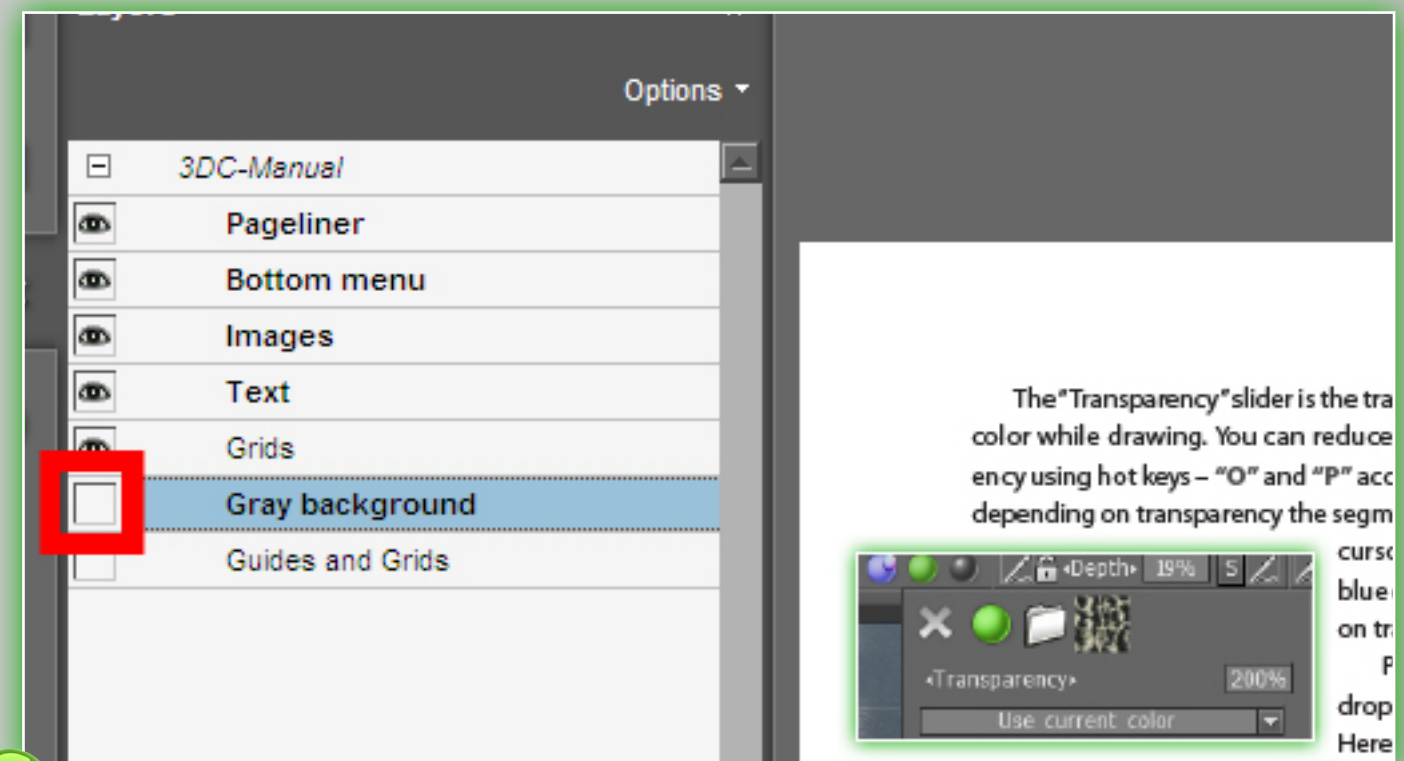
You may of course also print this manual! But you probably don't want to waste unnecessary ink. Please follow these simple instructions to remove the grey background in this PDF document.

In Adobe Reader, first move your cursor to **View->Navigation Panels->Layers**. You should then see, on the left side, a new panel called "Layers". You will only see "3DC-Manual" or something similar. Then click next to the "+" icon to expand the Layer system. You should see a layer named "**Gray background**", and right next to it a visibility icon, represented by an eyeball. Click the eyeball to toggle the visibility off. All this is clearly shown in the images on this page.



You should now see a white background in this document, and can print it using much less ink.

If you want to save even more ink, you can also hide the layer named "Images" -- and only print the text parts of this manual.





We hope you enjoyed our manual!