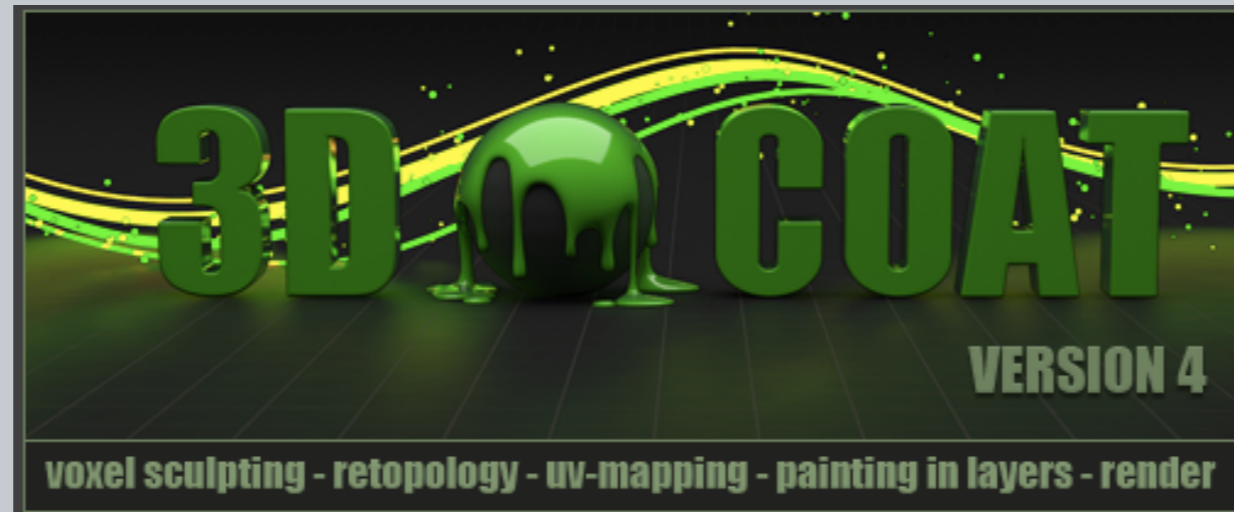


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# 3D-Coat Manual



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# Tour

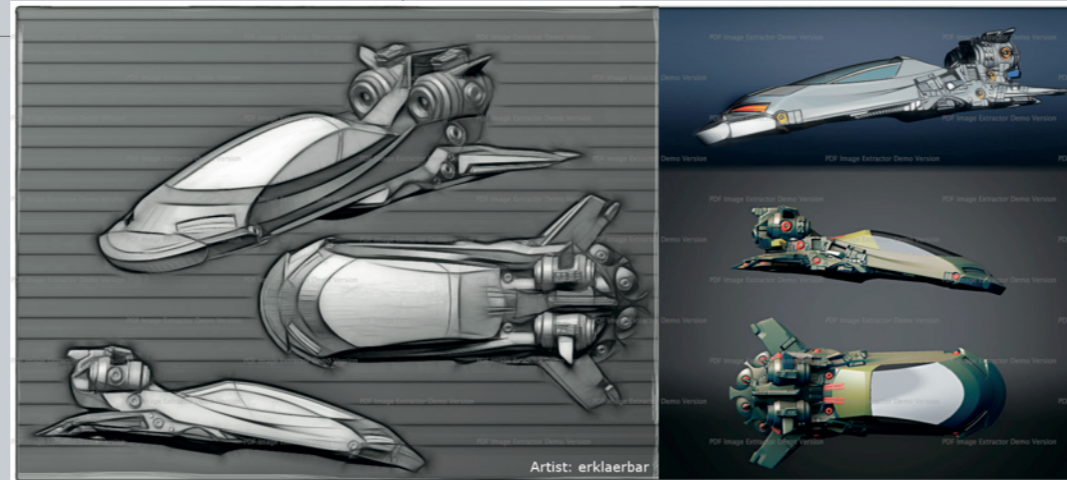
3D-Coat Version 4 represents a substantial upgrade to the application and in many cases a total re-write of existing functions, as well as the introduction of a number of innovative new features. The interface has changed and new customization features allow for a very subjective user experience.



# The Rooms

## ROOM FUNCTIONALITY

1. Voxel Room
2. Retopo Room
3. Tweak Room
4. UV Room
5. Paint Room
6. Render Room



3D-Coat is full of deep functionality. Having a large selection of tools, commands, functions and workflows, 3D-Coat is structured into clearly defined “Rooms” which house all of the

appropriate functions for any given stage of model development. Think of each room as a thoroughly connected “mini-application”.

This structure helps you concentrate on one set of operations at a time - making all of your working time the most productive it can be.



## 1.1 The Voxel Room

Probably the most unique set of tools and functions found in the 3D sculpting venue reside in this “Room”.

Nicely divided from other portions of the 3D-Coat environment - The **Voxel Room** contains a set of tools and functions that allow you to construct the most detailed and elaborate organic and mechanical models that one could conceive.

In essence, The Voxel Room is composed of 2 **working modes - Pure Voxels and Surface Mode**. Pure Voxels create models with **modifiable volume** - and Surface Mode allows you to work with only a “**skin**” - which can either be stretched and re-skinned or expanded and contracted with an **adaptive subdivision mesh (LiveClay)** - adding **extra geometry** only when you desire, and which you control the density of.

You can choose to begin in Pure Voxels and eventually move your sculpture into Surface Mode (for increased performance, memory preservation and very fine detail work) - or start from the beginning working with “**Surfaces**”.

Many of the **Voxel Room Tools** lend themselves to freeform “**Brush-Based**” sculpting operations - giving the artist the freedom of building with the equivalents of clay, wax, wood, stone and paint. 3D-Coat also makes full use of your **graphics tablet’s** abilities.

Other tools provide for **precision** required in constructing mechanical model forms. Notable among these are those tools found in the “**E**” **Panel** - a selection of spline and polygon based drawing tools which can be positioned and altered as you work.

Both varieties of tools give the user the fastest, most fluid and accurate ways of constructing any type of model you might conceive.

Since the Voxel environment is based largely on the use of “**Brushes**” - it is important to grasp their nature and composition - for it relates to many other areas and **Rooms** found within the 3D-Coat application.

**Brushes** consist primarily of the form of the Brush as defined by **Brush Alphas** found in the main “**Brush**” **Panel**, as well as their corresponding “**Options**” found in the **Options Panel**.



Voxel Brushes can be adjusted “on the fly” by means of the “**Right Mouse Button**” and horizontal or vertical gestures within the 3D Viewport.

Corresponding slider settings can be found within the “**Brush Parameters**” Panel, which show and augment the Mouse-Based parameters, and are found at the top of the 3D-Coat interface.

Brush strokes can also be modified by using functions from the “**Materials, Masks, Strips, Models and Splines** Panels, when the context is appropriate.

Since voxels are, by nature, memory and processor intensive - it is important to think of them as a beginning to the total range of steps needed to finalize a model initiated within 3D-Coat for final production and publishing to an external application. So, it is most practical to start

sculpting in voxels with the least amount of resolution required to capture the most basic form of the overall model.

Once basic form and structure are achieved, you can “**Resample**” or use the “**Res+**”

tool to advance to a higher level of detail.

If you’d like to preserve the different stages of modeling - as represented by resolution (from low to high) - simply duplicate a layer before applying “**Res+**” (Resampling) and proceeding with your sculpting operations.

Use the Voxel “**Layers**” Panel to store different versions of your sculpture, as well

as parts of the model that need different and separate features and detail. These can all be transferred into different “**Retopo Groups**” for adding unique topology to each - and ultimately to the “**Paint Room**” for final displacement, bump and color texture creation.

By **Right-Clicking** on any “**Voxel Layer**” - you obtain access to the most frequently used functions that deal with Voxels. More functions can be found in the main “**Voxel Menu**” at the top of the interface.

To view the current statistics of your Voxel Sculpture, or to obtain “**Tool Tips**” in expanded form, just look at the “**Statistics**” Panel located at the bottom left of the interface.



Use the “File” menu to access all “Import” functions for bringing in external creations into the Voxel environment - and use “Export” functions for producing various direct Polygonal and Raw Voxel versions of your sculpture - to be used and modified in external CAD and 3D printing applications.

## 1.2 The Retopo Room

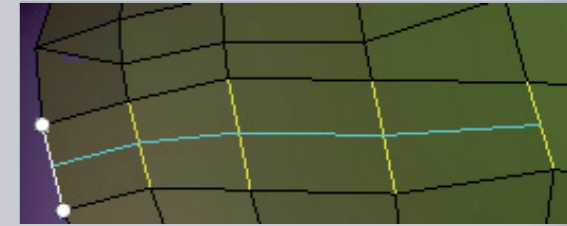
All Topology creation and modification tools and functions can be found in this Room.

Whether you are fine tuning topology created automatically with 3D-Coat’s **AUTOPO** routines, creating your model topology from scratch

- or adjusting and refining topology started in an external application, you can find what you need in the Retopo Room.



Every Voxel Layer can be worked on separately via the “Retopo Groups” Panel. These can be created automatically, (when AUTOPO is used), or manually as you isolate different areas of your model for different purposes and topology layouts.



Compared to the Voxel Room, the Retopo Room is quite easy to digest - having merely 4 main areas to learn and use:

- 1) The “**Tool Panel**” - where you find all of the tools for creating and adjusting topology - as well as the tools for creating UV seams and unwrapping your topology for further modification in the “UV Room”.
- 2) The Retopo “**Groups Panel**” - where you can isolate all of the areas and parts of your model that need specific topology and texturing.
- 3) The “**UV Preview Panel**” - which does just what it says - displays a preview of your UV map. Don’t mistake this for an area to edit UV’s - this is done in the “UV Room” after a model has been “Merged” into the “Paint Room”.
- 4) The “**Retopo Menu**” - which makes available all of the “Import/Export” functions, “Baking” and “Merging”

options - as well as “Saving” and “Restoring” of your specific Retopolgy work.

Make sure that you also pay close attention to the Options that present themselves in both the “Tool Panel” and the “Tool Parameters Panel” (the top, horizontal panel below the “Menu” area). The settings that are available for each type of work you are performing automatically change in both Panels.

The Retopo Tools allow you to construct totally new topology by means of working with individual polygonal vertices, polygon edges, polygon faces and polygon “strips” (rows of connected, polygons).

All created topology can automatically be set to “Snap” to the nearest Voxel surface. Entire loop networks can be created instantly by using a combination of “Through Strokes” and “Freehand Strokes”.

“Circular Loop Arrays” can also be made with a minimum of effort, by means of “Freehand Strokes”, as well.

The beginnings of true **Polygonal Modeling** are also beginning to appear, function by function, within the confines of the Retopo Room - as of verison 4 of 3D-Coat.

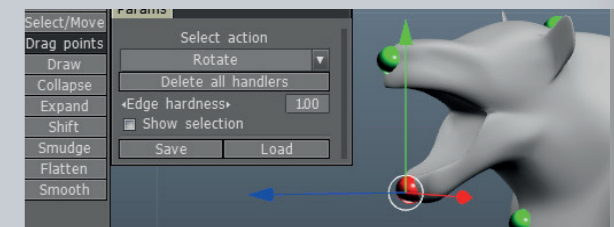
New “Extrude” and “Bevel” functions allow you to extrude and bevel both edges and faces of your topology - letting you add all new volume and detail to your original or imported models.

### 1.3 The Tweak Room

This Room is often overlooked and underused, yet it possesses some of the most simple and powerful means to create “after the fact” mesh modifications, model poses and morph targets.

All the changes you make here can occur even after you have created topology, UV maps and textures. Great for last minute changes of mind - without ruining all of your hard work.

Even minor “sculpting” can be done in the Tweak Room using “Brushes” and “Brush Options”.



As in other Rooms, the “**Brush Parameters Panel**” contains the common **Brush Settings**.

It is important to note that all of the Paint Room data relies on the existence of the “Objects” found in the “**Objects Panel**” in the **Tweak Room**.

If for any reason you wish to delete all of your model textures and start over - you also must delete any objects found in the “**Tweak Room Objects Panel**” by clicking on the “**X**” for each Object.

## 1.4 The UV Room

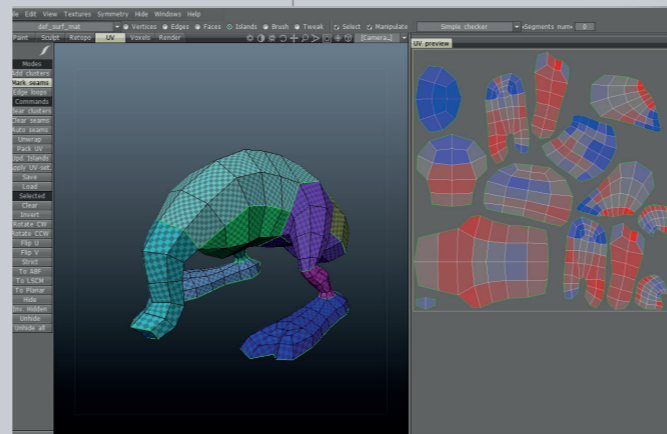
Once you have finalized your topology and are ready to start texturing your model (by “**Merging**” your mesh into the Paint Room) - the “**UV Room**” becomes available with a full arsenal of tools for modifying your “**UV Maps**”, themselves.

The UV map of a model is like the paper pattern used to cut out the cloth for your model’s clothing. (textures).

As with any decent garment, you would try to avoid making your pattern from scores of small pieces - but rather, a good piece of clothing tries to keep all of its component pieces as large as possible - and as near the same size as is practical.

The UV Room provides the precise set of tools that enable you to produce a “**balanced**” UV Map.

Like a paper pattern, each “**clothing**” part is separated from the others and economically laid out to make room for all the rest. The UV Room tools and functions are mainly designed to deal with positioning, sizing and the orientation of all the “**pattern**” pieces.



Since you may change your mind regarding the placement of “**pattern**” seams - many tools found in the Retopo Room that deal with UV Mapping are also found in the UV Room.

Tools are also present which help you prevent “**stretching**” of “**pattern**” pieces - and how all of the pieces are “**packed**” into the space of the overall Map.



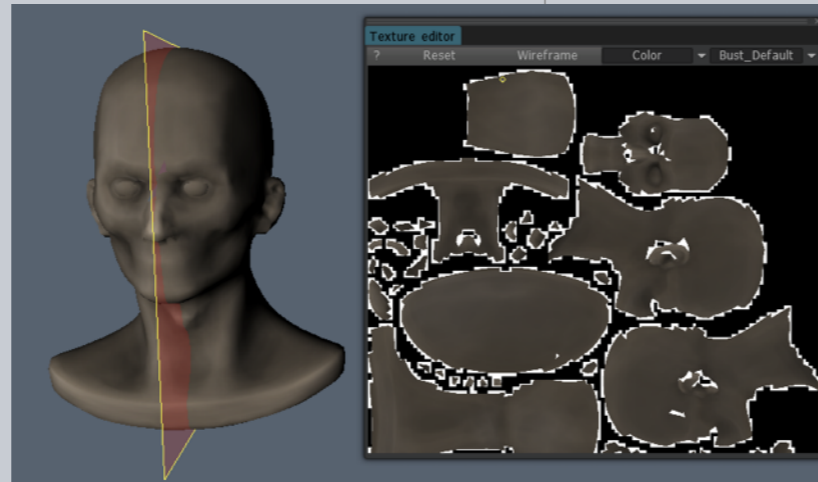
Since one model may have a variety of uses and may be viewed from various angles - you may find the need to have different Maps, each for its own unique purpose in your finished production.

3D-Coat allows you to make and modify as many different UV Maps as you need for any project.

Once you have completed your Maps and have **Merged** your model into the Paint Room, for texturing - you can use the “**Texture UV Editor**” to place details and labels which require precision that is difficult to obtain by Painting in the 3D Viewport, itself.

Use the **Texture UV Editor** to Paint and position precise details directly on the UV Map, itself - utilizing all the tools available in the Paint Room.

Moving back and forth between the UV Room and the Paint Room allows you to make all of the Seam and Island adjustments to obtain the optimal set of Texture Maps - ready for export to your external application of choice.



## 1.5 The Paint Room

Like a 3D version of Photoshop, 3D-Coat's Paint Room makes creating detailed textures for your models extremely fast and fun.

Maximizing productivity, The Paint Room allows you to create 3 or 4 kinds of textures, simultaneously - Diffuse Color, Bump, Displacement and Specular Maps.



Paint with any or all of these functions operating at the same time. Create layers to contain all the aspects of your texture map array. All the tools should be familiar to you, if you are familiar with Photoshop tools.

Create seamless textures for everything from organic characters, mechanical objects or landscape elements - all with a familiar Brush based interface.

Intuitive brush controls can be changed with the mouse, alone, on-the-fly. Paint with the aid of **Masks**, “**Strips**” of

repeating patterns and “**Materials**” composed of separate **Depth**, **Diffuse Color** and **Specular** textures which operate only when enabled by the appropriate buttons in the interface.

Use all the power in your tablet and stylus to produce the precise textures and effects you need for your models.

Whenever increased precision is required, use the “**E Panel**” Spline and Line based Brush tools. From this same Panel, utilize the “**Stamp**” tool to place repetitive Brush shapes.

Export each texture map in exactly the format you need with or without alpha channels - and with just the right amount of padding for your UV maps.

Use the “**Texture UV Editor**” to paint only with those aspects of your texture desired - directly on the UV Map, itself - for the utmost in precision.

Use Viewport reference images for enhanced guidance - as well as any image as a “**Paint Well**” for color duplication and reference.

Customize your **Brush Alpha Panel** with a complete arsenal of your favorite Brushes and Brush settings - ready to be used each time you start 3D-Coat.

See exactly what you are going to get, in real time, before you export to external applications for final production. Test your various UV unwrapping schemes within the Paint Room before you commit to any one of them for export.



Now you can also paint **vertex colors** directly on your Voxel Models as well as utilizing the newest texturing techniques with **Ptex**. Bake your vertex colors and **Ptex** textures to standard UV Maps for versatile usage anywhere.

When you need to paint very detailed and precise textures, but not displacement, choose the Per-Pixel texturing mode. When you need to paint with heavier displacement values, choose the **Micro-Vertex** mode. Or, you can paint without the concerns of UV Map seams with Ptex - and paint directly on your voxel creations with vertex color.

## 1.6 The Render Room

This Room allows you to test your model and its textures in an environment much closer to a 3rd party rendering environment - and to create animated “Turntables” and “Fly-throughs” of your model and scene.

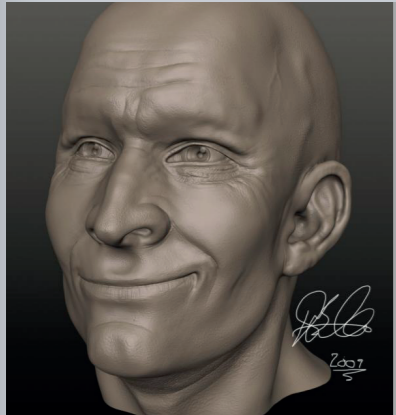
You can add multiple colored light sources, adjust the Camera **Depth of Field**, soften or accentuate shadow effects and define how many “**Rays**” will be traced in the final rendering.

Real-Time Rendering is also possible, making it quick and easy to see the many

Lighting, Focus and Ambient Occlusion possibilities - from any angle or view.

Once you have brought your model all the way to the Texturing phase, you can instantaneously view the results by simply defining your Render Settings and clicking on the “**Render**” button in the **Render Panel**.

Render out stills or Turntables



and **Fly-throughs** at any resolution, designating clockwise or anti-clockwise rotation with up to 32 bits of color information and choose whether to include the **Alpha Channel** in your finished rendering.

Upload your animated scenes directly to YouTube or Vimeo or choose to upload a Screenshot to the Pilgrimage servers for sharing with other users - all by means of the “**Help**” menu within 3D-Coat.

## 1.7 Customizing your 3D-Coat Experience

From directly in the interface, you can assign single and multi-key shortcuts to nearly every 3D-Coat function or tool. Simply press the “**END**” key while hovering the mouse over any item - followed by the keyboard combination of your choice.

If you find that you rarely or never use certain, more obscure functions of the application, choose “**Customize UI**” from the “**Edit**” menu and uncheck any items that you wish no longer appear in the interface - thus reducing unwanted clutter.

Use the “**Edit/Preference**” option to completely customize the color scheme and appearance of the overall 3D-Coat interface to whatever suits your fancy.

We want you to make 3D-Coat “yours” in every way possible.

# Cameras & Navigation

## GESTURES & CONVENTIONS &

1. Defaults
2. Camera Settings
3. Reference Images
4. View Panel Icons
5. Using a Pen Tablet

3D-Coat has a very intuitive and extensive set of **Mouse Gestures** and keyboard shortcuts which help you view your workspace and 3D scenes.

We've tried to include, also, the most common navigation conventions used in the most **popular 3D applications** - as well as the means for you to customize these to nearly anything you like.

## 1.1 Defaults

Common across all Rooms are the default methods of viewing your scene and individual models in the 3D Viewport. Since nearly all input devices use “mouse” navigation as a base for defining usage - let’s start with that:

1. When not engaging any of the “E” Panel tool modes, dragging in empty space in the Viewport while holding down the Left mouse button will rotate the Camera (your view) around the scene. When “E” Panel tools are being used (or some specific Voxel tools), add the “Alt/Option” key modifier to obtain the same effect. In general, when Left dragging in the Viewport does NOT rotate your view, engaging the “Alt/Option” key modifier will remedy this. Holding down the “Shift” key will snap the view in regular rotational intervals.
2. Dragging in empty space in the Viewport while holding down the Right mouse button will Zoom the view, in or out, depending on the direction of movement.

3. Dragging in empty space in the Viewport while holding down the Middle mouse button or Scrollwheel button will Pan the view.

## 1.2 Camera Settings (Drop-Down Menu)

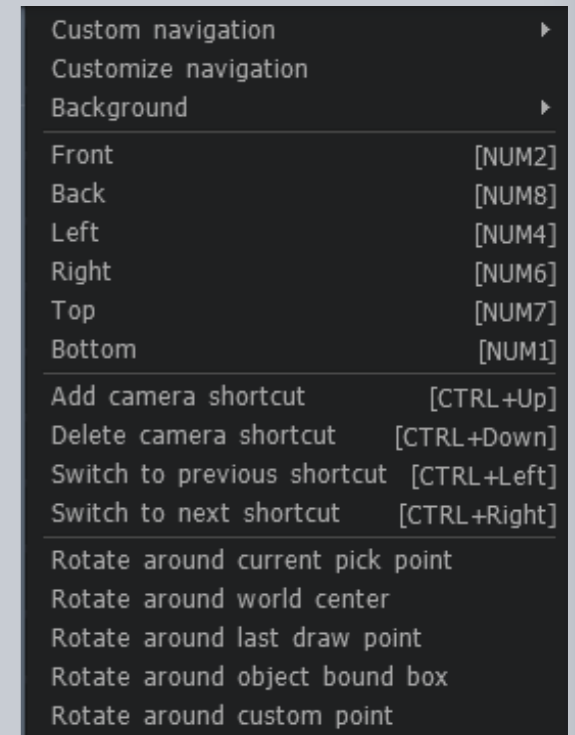
When clicking on the “Camera” drop down arrow located at the upper right side of the interface, the following options become available:

**Custom navigation:** Choose between 3 styles of navigation - 3D-Coat, 3D-Coat arrows, Maya or Zbrush style.

**Customize navigation:** Opens a panel that allows total customization of all navigation commands.

**Background:** A set of options that lets you set a variety of view backgrounds as visual references.

**Orthographic Views:** Front, Back, Left, Right, Top and Bottom.

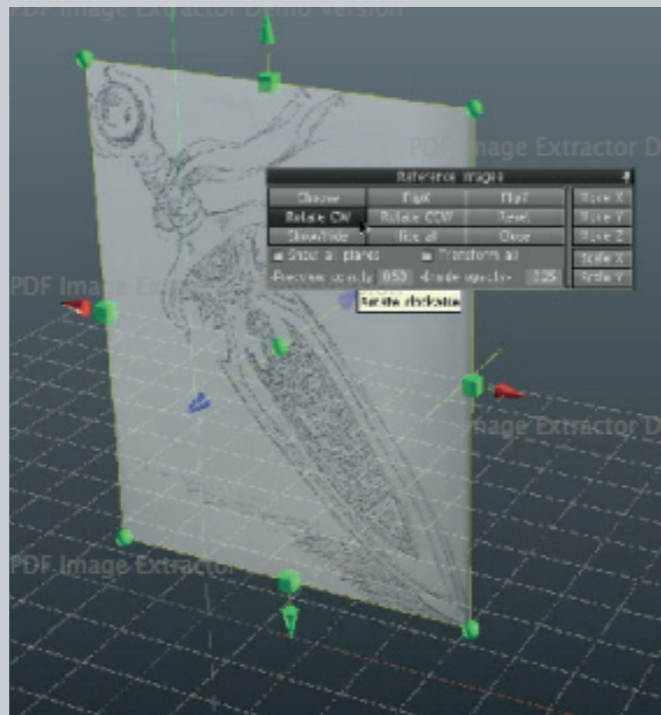


**Add camera shortcut:** Stores camera positions and current material settings for rendering fly-throughs and sequences. The other choices let you delete and switch these stored camera positions.

**Rotate . . . :** These commands set the pivot point for the view camera.

### 1.3 Reference Images

There are 2 different kinds of **Backgrounds**: those which simply fill the background of the 3D viewport, (and stretch to fill, if needed) - and those that are set up manually for use as sculpting or painting reference images.



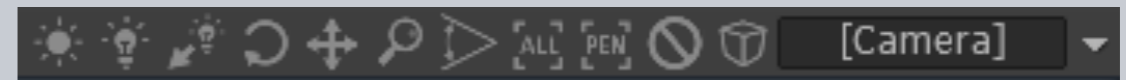
#### **Viewport Background:**

Select Use background image and choose your image from the opening dialog. The default image is a starfield.

**Reference Images:** The 3 bottom choices allow you to pick 3 separate images - 1 for each view axis, X,Y and Z.

**Edit image placement:** When selected, this option provides each image plane on each axis with a **Transform widget** and accompanying dialog settings for adjusting its **position, scaling, rotation and view opacity**.

### 1.4 View Panel Icons

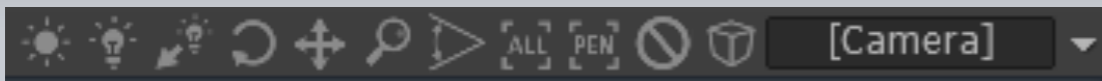


The Navigation panel is located on the top right corner of the viewport. This panel gives you access to the viewport navigation functions, all of the **Camera settings** and focus functions and viewport light positioning and intensity settings. From left to right, these are the functions of each icon:

**Ambient light intensity:** Dragging with the left mouse button, right or left increases or decreases the scene's ambient light property.

**Primary light intensity:** Dragging with the left mouse button, right or left increases or decreases the intensity of the primary scene light.

**Primary light direction:** Dragging with the left mouse button adjusts the position of the primary light in 3D space.



**Rotate the view:** Dragging with the left mouse button adjusts the user view by rotating the main camera around object in focus.

**Pan the view:** Dragging with the left mouse button adjusts the user view by moving the main camera right, left, up and down.

**Zoom the view:** Dragging with the left mouse button right or left moves the main camera closer or farther away from the object in focus

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

**Frame the View:** around all visible objects.

**Focus the View:** at the location of the Brush.

**Reset the View:** to the default

**Toggle:** between a **Perspective View** and an **Orthographic View**.

## 1.5 Using a Pen Tablet

**Navigation within the 3D Viewport** is also really intuitive and convenient when using a **Stylus**:

**Tap and Drag** outside the model (in empty space) to rotate the Camera view.

**Tap and Drag** right or left with the “**Right Mouse**” button held down (in empty space) to **Pan** the View.

**Hover over empty space** with the “**Right Mouse**” button held down and **Drag** to **Zoom** the View.

**Brush adjustments** are equally intuitive:

**Hover over the model** and **Drag** right or left with the button assigned to “**Right Mouse Button**” held down to change the **Size** of the **Brush**.

**Hover over the model** and **Drag** up or down with the “**Right Mouse**” button depressed to adjust the **Depth** of the **Brush**.



# Brushes & Their Options

## GENERAL USAGE

1. Brush Settings (Mouse Controls)
2. Brush Alphas
3. “E” Panel Brush Settings
4. Brush Options Panel
5. Brush Drop-Down Menu
6. Using a Pen Tablet

Many of 3D-Coats functions are implemented with a familiar “Brush” interface that both correspond to real world equivalents and go beyond and extend the abilities that real world tools of similar nature are capable.

Add and remove volume - extrude and imprint detail - add accurate hard surface features with the control of splines and curves, circles, ellipses and polygons - add realistic media textures and displacements - paint curve-based repetitive elements - precisely position and stamp relief elements and actual models - add appendages with freehand flexibility, as well as with the precision of adjustable curves - all these things are possible with 3D-Coat Brushes and their Options.

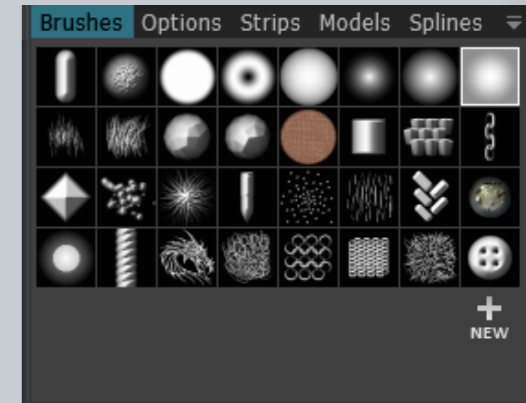
## 1.1 Brush Settings (Mouse Controls)

In general, in all Rooms, Brush behavior and control is **standardized**. 3D-Coat has provided a very fast, responsive and intuitive set of gestures which the mouse or stylus can utilize to apply many Brush attributes:

1. **Left dragging** with the mouse cursor over an object performs the primary function of any tool and its parameters.
2. **Right dragging** (left and right) with the mouse cursor over an object resizes the Brush. This value can be entered numerically, as well, in the “Brush Parameters Panel” located at the top of the interface.
3. **Right dragging** (up and down) with the mouse cursor over an object increases the operational depth of the Brush. This value can be entered numerically in the “Brush Parameters Panel” at the top of the interface.
4. Both Brush “**Falloff**” and “**Smoothing**”, as well as a spline-based, directional “**Interpolation**” can be applied by check box and numerical entry in the “**Brush Parameters Panel**”, at the top of the interface.

## 1.2 Brush Alphas

3D-Coat’s Brushes can be given a “profile” by means of the **Brush Alpha Panel**. These are default or custom made greyscale “**height maps**” which affect both the depth of the Brush application, but the shape of the “bristles”, as well. Brush Alphas can also be constructed from 3D .obj files - extracting the **view-based** height map from the model.



### Brush Alpha Right-Click Options:

Right clicking on any unselected Brush alpha invokes a comprehensive list of alpha editing functions.

**Brush Settings:** Opens the “Brush Options” panel.

**Delete brush:** Deletes the selected Brush alpha.

**Save to PSD/TIF:** Saves the selected Brush alpha to either file format. .PSD is more intuitive, while .TIF is more precise, giving you more channels.

to save and manipulate elsewhere. .TIF can contain 7 channels - RGB, alpha, height, specular and the “Erase mask”.

**Load from PSD/TIF:** This replaces the alpha that has been right- clicked on with an of your choice, save in either the .psd or .tif for- mats. To create a brush in a 2D painting application, you must have 4 layers each corresponding with the 4 main channels of a brush in 3DC, they are: **Color, Height Map, Specular and Erase Mask.**

If all the .tif channels are used, they will all be imported and used according to the table below. If you only use some of the available channels, those you do im- port will also be used according to the table below.

1 CH: A&H

2 CH: 1 – A 2 –H

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

**Edit in external editor:** Creates a “live” connection between 3D-Coat and the external editor you have specified in the

“**Preferences**” section. The default editor is **Photoshop**. Selecting this option opens the specified editor and any changes that you make and save from the editor are automatically loaded back into 3D-Coat.

**Each brush includes 4 Layers:** In 3D-Coat, the Layers that are imported and used arrange themselves into **Color, HeightMap, Specular and EraseMask**. The order of these **Layers**, in the external editor, are important. Looking at each of these individually:

**Color:** This contains the Brush color as well as its corresponding Transparency mask. This mask affects the Specular Layer, as well.

**HeightMap:** Depth is synonymous with this definition. The “zero” height of this Layer corresponds to “middle gray” or (127, 127, 127). Darker values correspond to concave area and lighter values correspond to convex areas.

**Specular:** White represents maximum specularity. Black represents absolutely no specularity, with shades of gray representing intermediate values. The Color Layer mask also interacts with this Layer.

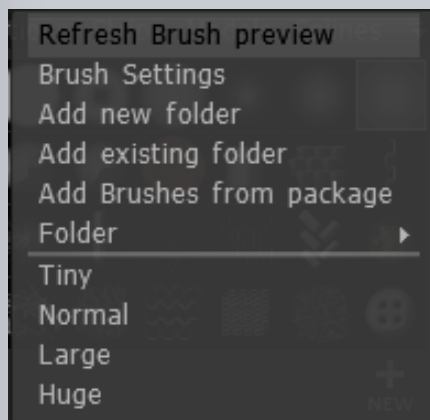
**EraseMask:** This Layer is used to create Brush alphas that ignore certain values, in other layers, while painting.

Remember that this mask affects the lowest Layer in the list.

**Edit as 16 bit TIF:** This allows you to save in 16 bit format, rather than 8 bit. Using this option causes the **Brush alpha** to be saved as a .psd file, allowing it to be reloaded automatically, each time it is edited and saved in the external editor.

**NewFolder, (etc.):** This option will allow you to copy the Brush alpha, (that you right-click on), to a folder named in the “Folder List” that you have previously defined. All the “New folder” names you have defined will appear here.

### Brush Alpha Drop-Down Menu:

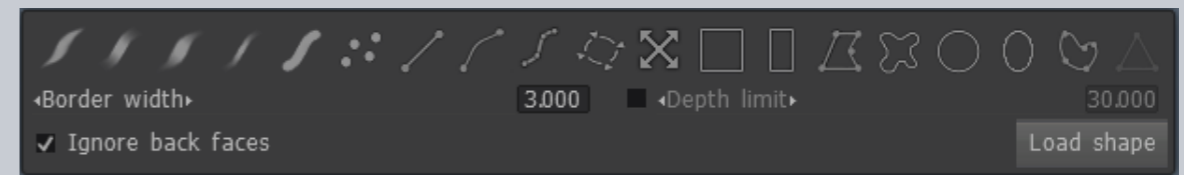


A set of functions allowing you to view and change the current Brush Settings, Add and Create new Brush Folders, Add Brush “Packages” - as well as choose a display size for your Brush Alphas.

### 1.3 “E” Panel Brush Settings

3D-Coat’s Brushes can be applied with an ordinary mouse, or with the enhanced behavior of a graphic tablet. Several Brush modes exist in the “E” Panel to help control the

application of **Brush strokes** - as well as an extensive array



of **spline and polygon based drawing modes**. The **first 5 icons** help you to control the interaction of your **Tablet or Mouse**.

When not sculpting, these tools work in 2D to define regions and “masks” or “frozen” areas (and relief in the Paint Room). Some sculpting tools use the shapes you draw as a means to clone, cut, or perform some form of boolean function.

Let’s examine all the functions present in the “E” Panel, starting from left to right, top to bottom:

**These first five icons** are the standard Brush modes and can be best understood by trying them out, one by one. A description of each mode appears when you hover your mouse over each icon (as is the case with all 3DC tools and functions - called “hints”).

**Apply Brush “Dabs” with Spacing:** This causes the current Brush to especially respond to the “Dabs, Jitter

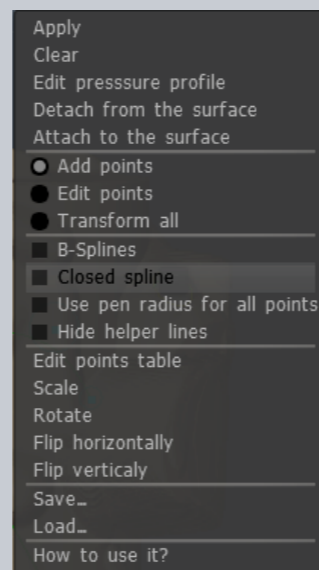
and Spacing” options found in the “**Brush Options**” Panel. Experimentation demonstrates this action best.

**Draw Connected Lines:** Does just that - and starts a new series of lines after pressing the “**Esc**” key.

**Draw Basic Curve:** Draws a connected series of spline curves which are not editable - the **Brush Width** and **Depth** can be controlled, on the fly, with the standard mouse gestures.

**Draw Comprehensive Curve:** Draws spline or **B-Spline** open or closed curved paths which are totally editable with regard to node size and depth - by means of the mouse. Adjust each node “on the fly” with ordinary mouse gestures - or press “**Esc**”, hover over a node until you see the node “radius” glow, resize both radius and depth - then **Left-Click** to confirm. Press “**Enter**” to apply the Brush and its settings to the model.

Use the **Drop-down** arrow to access all of the specific functions related to this tool, including saving and loading of curve files.



**Stamp tool:** Uses your selected **Brush Alpha** to add an impression or depression, mask or frozen area, based on this Alpha, at the location you **Left-Click** the mouse. **Left-Click dragging** the mouse resizes and rotates the **Stamp**.

**Movable Stamp:** Works similarly to the ordinary Stamp tool but, when you **Left-Drag** with the mouse, you can slide your Brush image (**Alpha**) along the surface of the model.

**Square tool:** Use the **Scroll Wheel** to resize the Brush. Based on your starting and ending points of the defined Square (or trapezoid), 3DC extrudes or indents a cubic or trapezoidal solid shape based on the Depth setting of the Brush. (Best to use **Orthographic** views with this Brush). Higher Voxel resolutions allow for sharper and cleaner shapes.

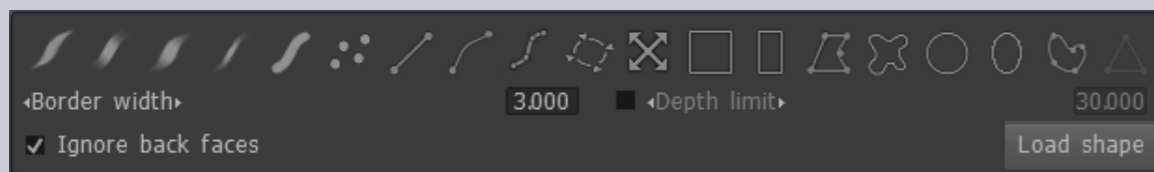
**Rectangle tool:** Same as the **Square** tool, but allows for long rectangular and long trapezoidal solid extrusions, indentations and masks. Higher Voxel resolutions allow for sharper and cleaner shapes.

**Polygonal Spline tool:** Based on the 2D polygonal shape that you draw, 3DC extrudes or indents, masks or freezes an area along the surface normal of the object. Hover Brush Cursor over the first point in the series until you see a small green circle - then hit “**Enter**” to confirm the shape.

Higher Voxel resolutions allow for sharper and cleaner shapes.

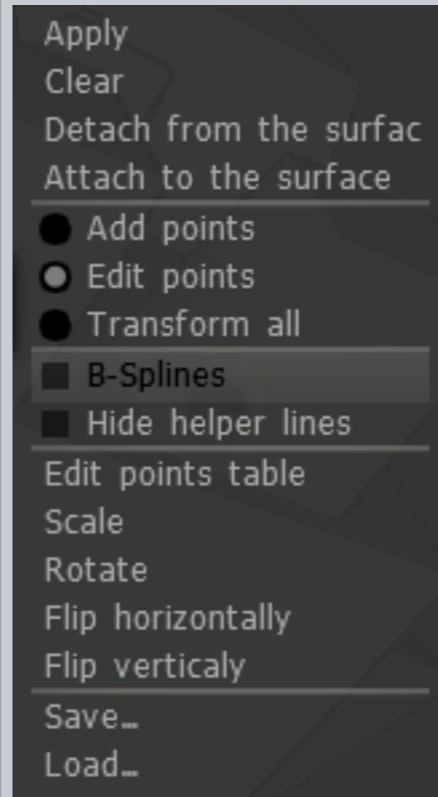
**Freeform Drawing Tool:** Use your mouse to draw a freeform shape and hover the Brush Cursor over the first drawn point until the small green circle appears - press “Enter” to confirm the shape. 3DC extrudes or indents, masks or freezes an area along the surface normal of your object based on the **Depth** setting of the Brush. Higher Voxel resolutions allow for sharper and cleaner shapes.

**Circle Tool:** Draws a perfect circle from the center to the edge of the circle and extrudes or indents, masks or freezes a circular shape along the normal of the object, based on the **Depth** setting of the Brush.



**Ellipse Tool:** Same as the Circle tool, except the shape extruded is based on the **Ellipse** that is drawn.

**Closed Spline Tool:** Extrudes or indents, masks or freezes an area as a closed regular spline or B-spline shape.



An extensive menu of commands exists under the **drop-down arrow** that accompanies the drawn spline. Draw regular or **B-splines**, closing the shape by pressing the “Esc” key. **Right-click** over any point to change from **smooth** interpolation or **angular**. You can **Load** and **Save** your defined shapes. Hover the mouse over any command to see the **Hint**.

**Border width:** At higher values this setting creates a kind of extruded **Brush Falloff**. A square shape, for example, becomes a curved pyramid - a Circle becomes a curved and tapering cylinder.

**Depth:** Defines that depth that controls all effects.

**Ignore back faces:** Allows the selected tool to work only on **visible surfaces**.

**Load shape:** Loads a pre-defined Curve shape from a **file**. Accepts Adobe Illustrator files. The imported curve is converted to a 3D-Coat spline, which you can manipulate in the standard ways.

## 1.4 Brush Options Panel

At the top of the panel is a preview of the Brush alpha shape followed by a series of behavior controls.

**Brush rotation:** This sets the initial orientation of the alpha at the beginning of the stroke.

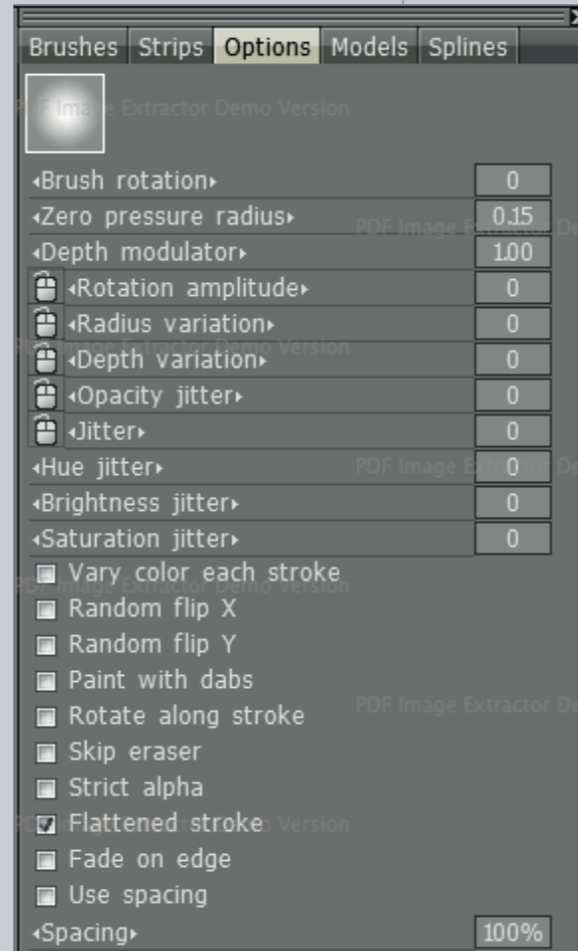
**Zero pressure radius:** When using a tablet stylus, this number indicates the default radius at the beginning of the brush stroke.

**Depth modulator:** The default depth for each brush being used.

**Rotation amplitude:** Sets the amplitude for additional brush rotation.

**Radius variation:** Sets the percentage of random brush radius variation.

**Depth variation:** Sets the percentage of random brush depth.



**Opacity jitter:** Defines the randomness of the brush opacity setting. **Jitter:** The overall randomness of brush behavior.

**Hue jitter:** Defines the randomness of the brush hue when used for painting color.

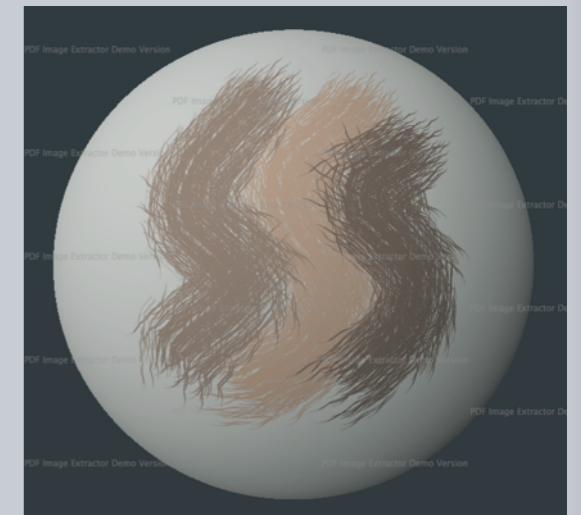
**Brightness jitter:** Varies the brightness, randomly, over the course of a stroke.

**Saturation jitter:** Varies the saturation of the primary color, randomly, over the course of the stroke.

**Vary color each stroke:** Use this option to produce painting effects, like fur or hair, when you need to either vary the **Hue/Saturation/Brightness** as you paint a single stroke, (**variegated strand color**), or when you want each stroke made to

have a slightly different **Hue/Saturation/Brightness** - as determined by the corresponding “Jitter” setting.

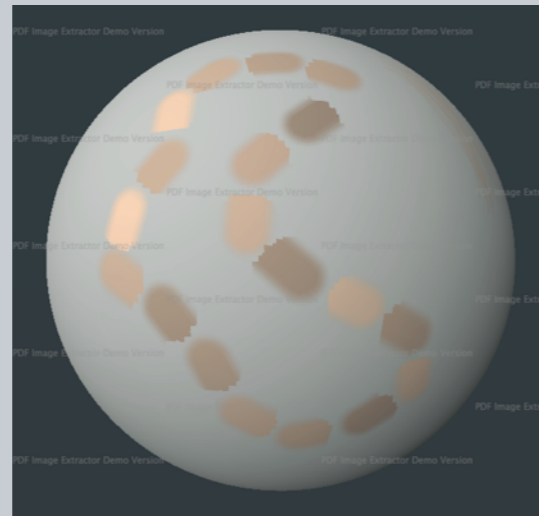
**Random flip (x, y):** This randomly flips the selected brush



either across its x or y axis while painting.

**Paint with dabs:** Creates paint or sculpting “dabs” which occur at some set spacing - as determined by the “Spacing” control.

**Rotate along stroke:** When using brush alpha shapes that you want to align like the bristles of a brush - so that they change relative direction as the brush changes direction, all along the stroke - use this option.



**Skip eraser:** Disables the “Erase Layer” of the Brush.

**Strict alpha:** Use this setting to cause both sculpting and painting brushes to strictly adhere to the shape defined by the **Brush Alpha**.

**Flattened stroke:** Use this brush setting to mimic Photoshop brushes for improved stroke overlapping with a truncated alpha shape.

**Fade on edge:** All strokes painted with this option checked will have a smoother edge transition.

**Use spacing:** When used with the “Paint with dabs” option, adjusting the “Spacing” percentage slider determines how close or far apart the paint dabs are applied.

## 1.5 Brush Drop-Down Menu

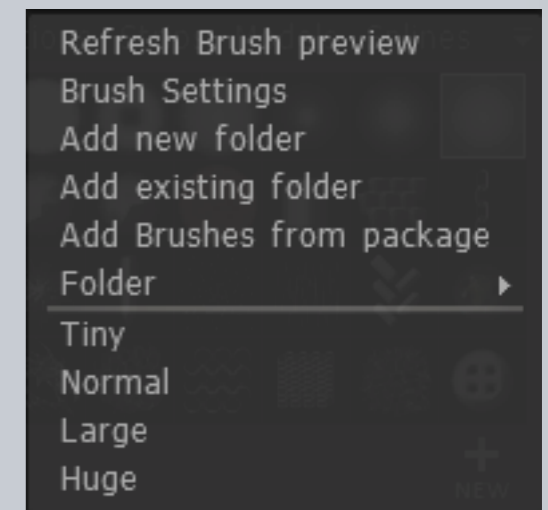
**Refresh brush preview:**  
Refreshes the Brush alpha icon.

**Brush Settings:** Opens the “Brush Options” panel.

**Add new folder:** Allows you to choose a pre-defined folder of Brush alpha shapes to be added to the “Folder” list.

**Add existing folder:** Allows you to choose a single Brush alpha from a folder, thus adding all the alphas in the folder to be included in the folder, now with the name of the chosen file, which is then listed in the “Folder” selection list.

**Add Brushes from package:** Adds Brush alphas that have been packaged into a “Penpack” file format.





**Folder:** A selection list of all folders you have enabled 3D-Coat to access. The icons from this chosen folder will then be visible in the “**Brushes Panel**”.

**Tiny:** Sets the Brush alpha icon set to a very small size.

**Normal:** Sets the Brush alpha icon set to the default size as seen when the program opens for the first time.

**Large:** Sets the Brush alpha icon set to a size larger than the default size. **Huge:** Well, you can guess the size of these - (better try it out and see).

## 1.6 Using a Pen Tablet

3D-Coat has been designed to work well with either a **Mouse** or a **Graphics Tablet (Wacom)**. A general overview of working with each input device would reveal that working with a **Mouse** allows for more precision - especially in areas like hard surface modeling.

However, for true artistic liberty and the feeling of working with “**real**” media - it’s hard to beat the result and experience of working with a **Graphics Tablet** and **Stylus**. In the **Voxel Room** and **Paint Room** you can really

experience an added subtleness and real world “**brush**” feeling to your strokes.

To get the most out of your Tablet experience, become familiar with the main parts of the interface that optimize the overall experience and result:

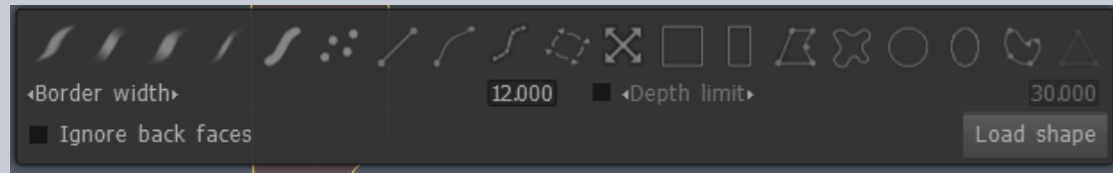


The upper **Brush Parameters Panel** contains toggles for functions like “**Depth, Smoothing, Opacity and Specularity**” in the **Paint Room** - in the form of a **switchable icon** (that switches between **Mouse** response and **Tablet Response**).

In the **Voxel Room**, there is the addition of the “**Radius**” toggle - which allows **stylus pressure** to dictate the **Size** of the Brush, as well as its **Depth**.

The results obtained with either setting are quite dramatic, in each case. Experiment to educate yourself about the “**tactile**” differences in each.

The 5 icons found in the “E Panel” on the far left also allow you to get profound differences in **Stylus** behaviour, as well



as **Mouse** behaviour. Try each one to see and experience the difference.

**Navigation** within the **3D Viewport** is also really intuitive and convenient when using a **Stylus**:

**Tap and Drag** outside the model (in empty space) to rotate the Camera view.

**Tap and Drag** right or left with the “**Right Mouse**” button held down (in empty space) to **Pan** the View.

**Hover over empty space** with the “**Right Mouse**” button held down and **Drag** to **Zoom** the View.

**Brush adjustments** are equally intuitive:

**Hover over the model** and **Drag** right or left with the button assigned to “**Right Mouse Button**” held down to change the **Size** of the **Brush**.

**Hover over the model** and **Drag** up or down with the “**Right Mouse**” button depressed to adjust the **Depth** of the **Brush**.

# Opening Dialog (Launch)

## GENERAL USAGE

1. Voxel Sculpting
2. Repair Scanned Mesh
3. Paint Over Model Vertices
4. Paint Over the Model with Deep Displacement
5. Perform Retopology
6. Product/Prototype Models
7. Surface Mode
8. Import Image as Mesh
9. Paint Directly Over UV'd Model
10. Paint With Ptex
11. UV Map Model
12. Open Recent Project

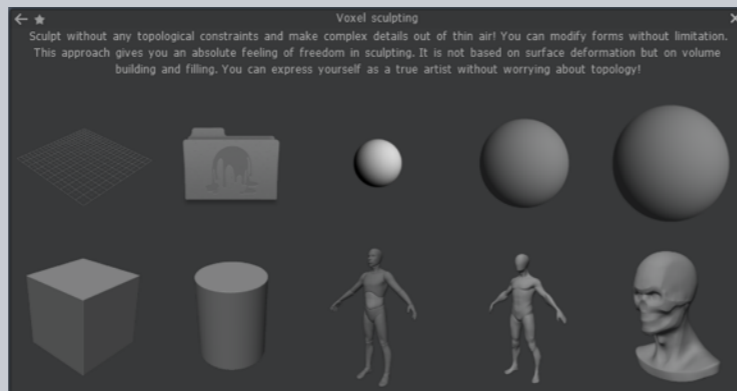
When you first launch 3D-Coat, you are presented with an opening dialog that attempts to categorize and anticipate what you would like to do with the program.

We'll explain and clarify the purpose of each of these options within the bounds of this chapter.



## 1.1 Voxel Sculpting

Start sculpting within 3D-Coat using some default shapes or choose to open an .obj file which will serve as a “base” that will be “Voxelized” at a resolution which you can determine by resizing the object preview with a “Gizmo”.



## 1.2 Repair Scanned Mesh

Use these options for (high res) meshes that are a product of being scanned.



**Import as voxels:** Very straightforward translation of a polygonal surface scan into a volume-based **Voxel object**. Depending on your choice, 3D-Coat will attempt to close small or all holes in the scan before “Merging” into the Voxel Room for further clean-up and modification.

**Import as shell:** The same as above except the result, as it appears in the Voxel Room, is a “hollow” object with designated “thickness”.

**Import as surface:** Delivers your mesh directly into “Surface Mode”, where the array of tools is optimal for cleaning up messy scanned meshes.

**Import as bas-relief:** Merges your mesh into the Voxel Room as an initial “Bas-Relief” sculpture.

### 1.3 Paint Over Model Vertices

Load a mesh which you wish to apply “**Vertex Color**” as a starting point.

### 1.4 Paint Over Model with Deep Displacement

Choose to “**Merge**” from a variety of sample models or open a mesh of your choice for **Painting** and **Texturing** using the “**Micro-Vertex**” method.

This method allows you to define a “**Viewport Mesh**” that is a **subdivided** version of your imported base mesh. **Painting** operations automatically produce “**real**” **displacement** if the “**Depth**” icon is enabled.

Upon **Export** of your textured **Viewport Mesh**, you can also save its corresponding **Displacement Map** (ordinary or vector).

You also have the choice to export only the **base mesh** (as it was before adjusting its **Viewport Density**) or the same mesh at some other **subdivided density**.

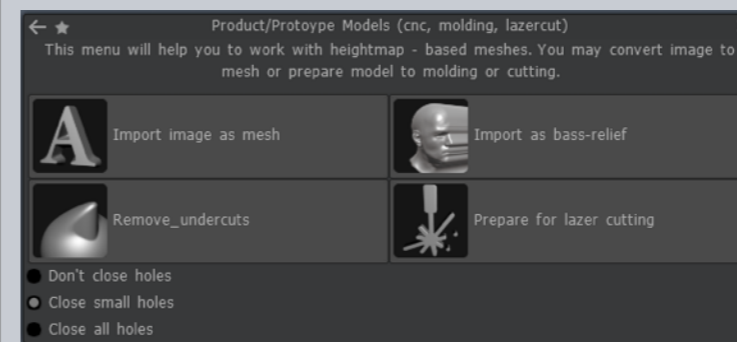
### 1.5 Perform Retopology

Import your mesh directly into the **Retopo Room** for the purposes of adjusting existing topology or creating a new version with all new topology.

The **Retopo Room** also provides the tools for creating **UV Seams** and temporary **UV Maps** - as well as laying out new topology.

The work which you perform in the **Retopo Room** becomes “**permanent**” at that time when you “**Merge**” the “**Retopo Groups**” into the **Paint Room** - for texturing operations.

Once made **permanent** - you can perform extensive adjustments to your **UV Maps** within the **UV Room** - using its deep set of mapping and layout tools.



### 1.6 Product/Prototype Models

Use height-map imagery to construct

a **Voxel** object, **remove undercuts** from an imported mesh, **close holes** in an imported mesh, “**Merge**” your base mesh into the **Voxel Room** as a “**Bas-Relief**” sculpture or prepare

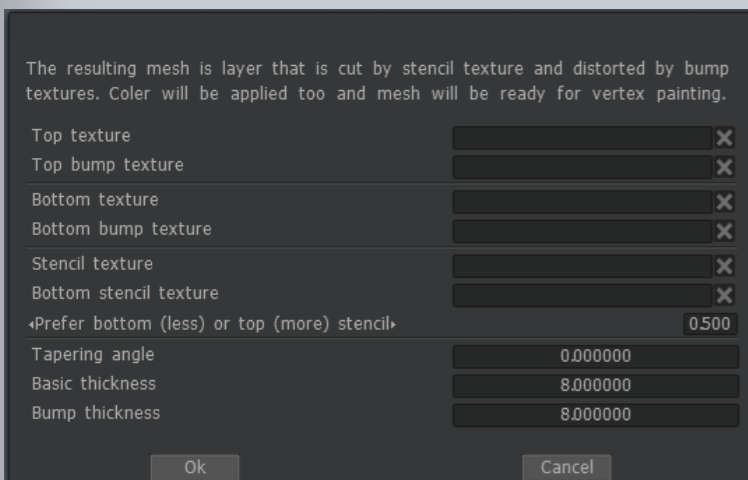
your “Merged” mesh for laser cutting operations with this set of options.

## 1.7 Surface Mode

Use this Import dialog to select a “base mesh” to be extensively altered using 3D-Coat’s large arsenal of surface-based and Live-Clay tools (dynamic tessellation).

If you wish to **Export** a version of your sculpture which will be rendered or animated in a 3rd party application - you will first need to create organized topology within the **Retopo Room** - and, if you wish to texture this model before exporting, you will need to create “**UV Seams**” and “**Unwrap**” your topology into a resulting **UV Map** - followed by “**Merging**” your “**Retopo Groups**” into the **Paint Room**

## 1.8 Import Image as Mesh

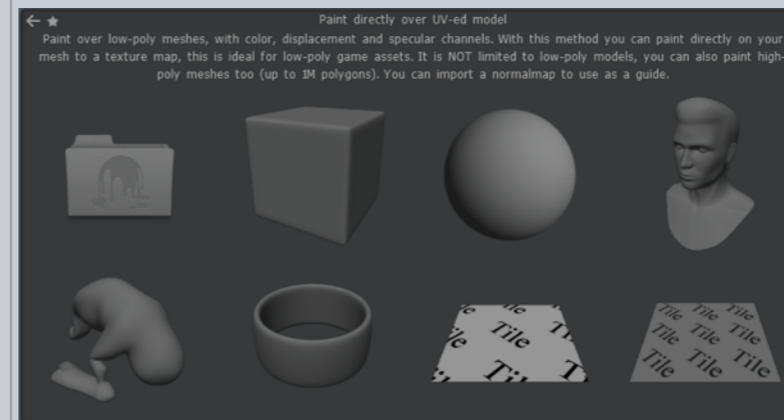


Provides a comprehensive set of Import options for “Merging” your model into 3D-Coat’s “**Paint Room**” - making it ready

for **Vertex Painting**.

The options provided in the opening dialog allow for some preliminary texturing using image maps as a basis for final **Bump, Stencil and Color** texture maps (available for export and use within 3rd party applications).

## 1.9 Paint Directly Over UV’d Model



**Open and Merge** your existing mesh into the **Paint Room** for texturing operations using the “**Per-Pixel**” method.

Ideal for low poly game assets, but not limited to these.

Use models with existing UV information or import allowing 3D-Coat to automatically **UV Map** your mesh.

An existing “**Normal Map**” can be used as a base for texturing.

## 1.10 Paint with Ptex

**Merge** a model from a selection of **default** meshes or use a model of your choice for texturing using the **Ptex** (experimental) **method**.

**Ptex** allows for texturing using an **optimal distribution** of surface space - thus creating a very different kind of **UV Map**. This kind of map, though capable of being translated and communicated to 3rd party applications (UV Maps can be correctly read), cannot be **practically** edited in a traditional **“Paint” application** - as other kinds of UV Maps allow.

## 1.11 UV Map Model

**Import** your mesh **directly** into the **UV Room**, **Tweak Room**, **Objects Panel** and **Paint Room** - simultaneously.

You can choose to re-organize existing UV Maps, create new UV Maps, **“Tweak”** existing geometry and begin texturing your imported mesh with this option.

## 1.12 Open Recent Project

Choose this option to open the listed **“recent”** project that you have worked upon.

# Customization

## MAKE 3DC “YOURS”

1. Eliminating Items From the Interface
2. Windows & Panels
3. Adding Keyboard Shortcuts
4. Preferences
5. The View Menu

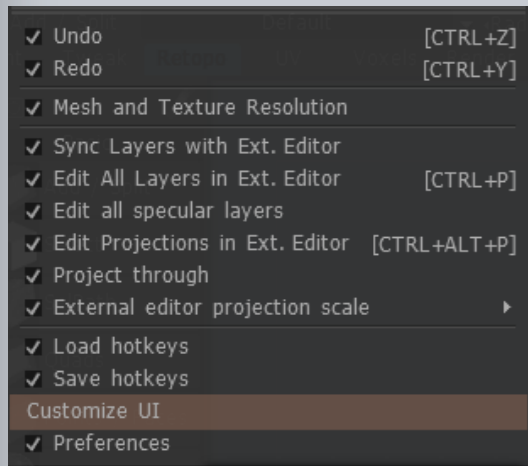
3D-Coat has been designed to allow you to make it “personal” and streamlined. No two people use it in the same way or for precisely the same things.

This Chapter shows you how to totally customize your 3D-Coat experience.

Though the options are extensive, actual customization is a quick and simple process.



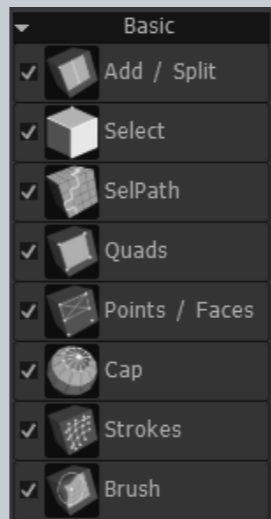
## 1.1 Eliminating Items from the Interface



From the “Edit” menu, choose “Customize UI”. You’ll notice that most menu items (of every category) and tools have a checkbox next to them - signifying that they can be made visible in the interface or not listed (unchecked).

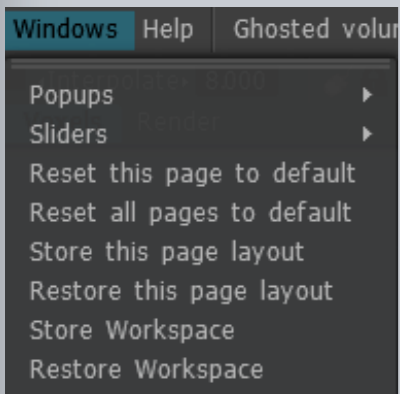
Without getting carried away and hiding things you may need at a later date - be judicious in the elimination process.

Some users only use 3D-Coat for very specific tasks - in which case it would make sense for them to hide many interface item to reduce the overall clutter of unnecessary functions and options.



## 1.2 Windows & Panels

Use this menu to choose which function Panels you want displayed in the overall interface scheme. These Panels can float



freely or be docked into any portion of the interface, simply by dragging the Title Bar and dropping the Panel after you see the highlighted preview of its new position. Any arrangement can be saved and reloaded.

## 1.3 Adding Keyboard Shortcuts

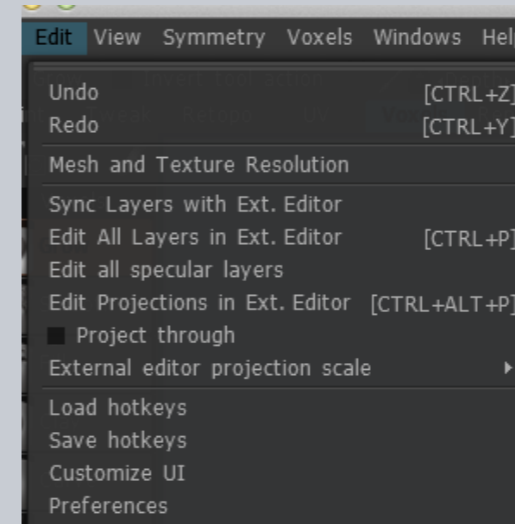


When you select a tool or menu item from one of the Rooms, you can enable the option to see short or long “Hints”. These appear as you hover your mouse over the tool

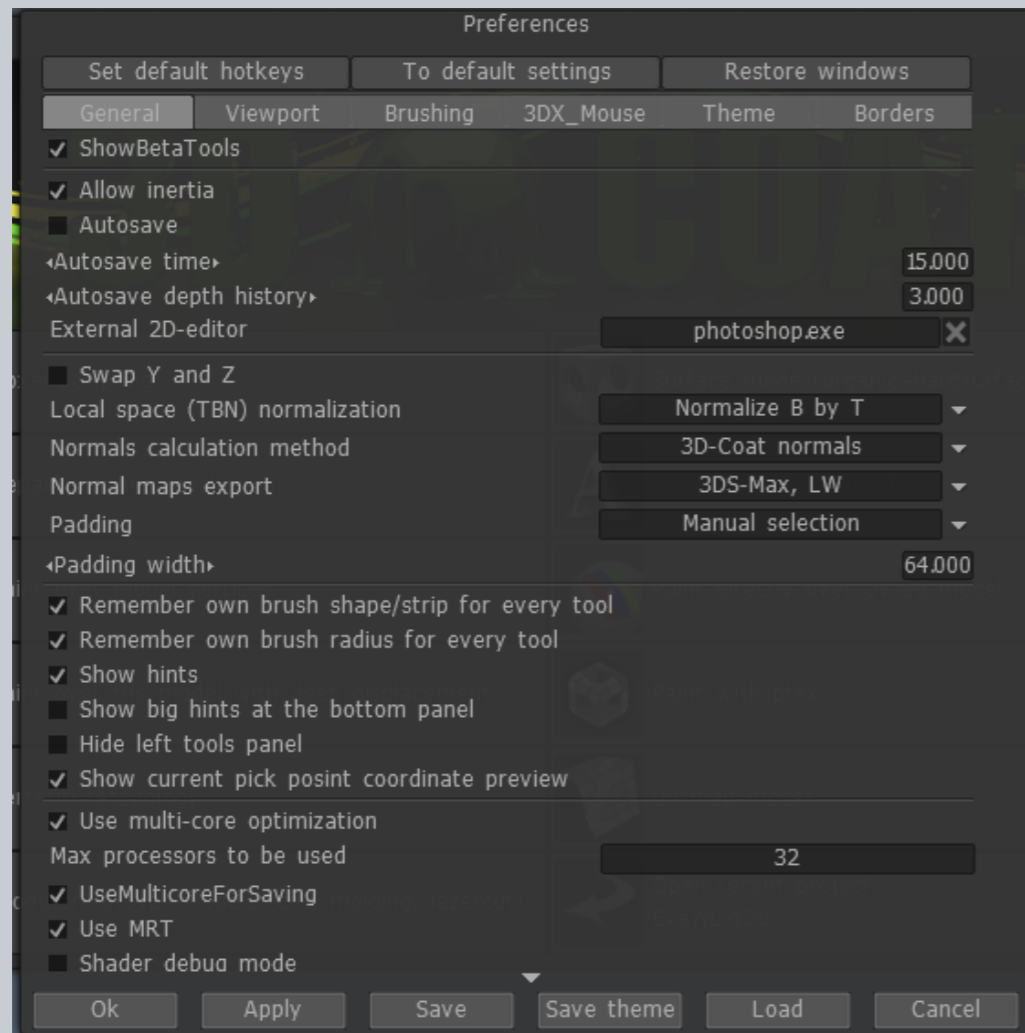
or function you are interested in, and you will see at the end of the hint the following:

“(‘END’ - Define hotkey). Simply press the “End” key on your keyboard, followed by the single or multiple keystroke

of your choice - to use this shortcut every time you use 3D-Coat. Very simple and straightforward.



## 1.4 Preferences



The last entry in the “**Edit**” menu is “**Preferences**”. Choosing this option opens up a very detailed dialog of settings which allow you to customize your 3D-Coat experience in ways that very few applications allow. We’ll give you a general overview of the categories and choices available.

**General Preferences:** At the top of this dialog are 3 constant options that appear in every category which allow you to return 3D-Coat to its “**factory**” default settings - **Hotkeys, General and Windows & their locations.**

**ShowBetaTools:** We recommend that you always enable this option, since 3D-Coat is in a constant state of improvement, **bug fixes** and other updates. Seeing and using the beta tools and functions allows you experience any new fixes and to get an advanced look at features which will not be present until the next major release of 3D-Coat.

**Allow inertia:** A new feature which allows you to use your **scroll wheel** to gain velocity in tool and dialog scrolling - in the same way the scroll wheel works in a web browser, for example.

**Saving & Editors:** Set “**autosave**” intervals and specify which external “**Paint**” application you wish to use (i.e. **Photoshop**).

**Normal Map Settings:** Use this array of options to precisely specify the way you want your **Normal Maps** to be dealt with, **internally** and **externally** in 3rd party apps.



**Brush Settings:** Specify whether you wish 3D-Coat to remember prior settings each time you use that Brush.

**Hints:** Specify which kind of hints you want to see displayed and where you want them displayed.

**Multi-processors & debug mode:** Set your preferences to correspond to your system hardware - and whether you want 3D-Coat to debug any problems.

**Viewport Preferences:**

**Near plane modulator:** Allows you to set how close the Viewport Camera can get to an object.

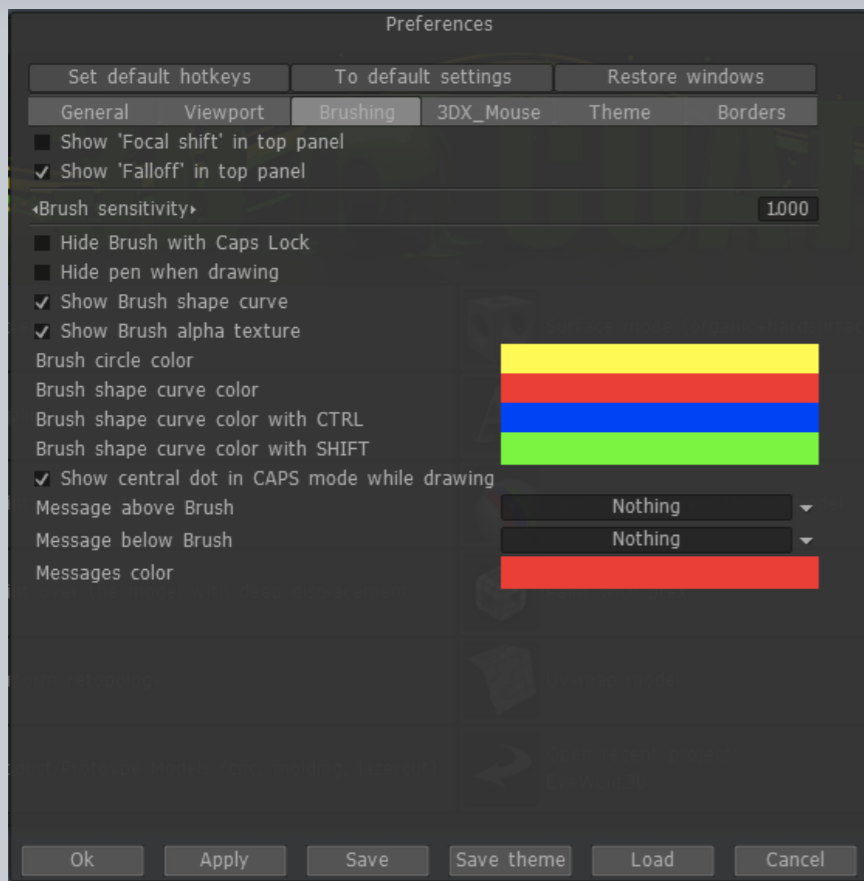
**Environment sphere map:** Specify which spherical image will be used in rendering any environmental effects.

**Shader quality and UI thumbnails:** Optimize shader resolution for speed and whether certain interface thumbnails appear in the interface.

**Grids, background images and sky box images:** Set grid characteristics, what kind of Viewport background you want - as well as the location of your scene "Skybox" image.

**Camera Gestural Controls:** Specify how you wish the Viewport Camera to behave.

**Mouse Control:** Specify how you wish your Mouse to behave in the Viewport.



### Brush Preferences:

**Top Panel Display:** If you are limited in screen space or you don't often use **Brush Falloff** or **Focal Shift**, you can choose to hide them in the **Top Panel** of the interface.

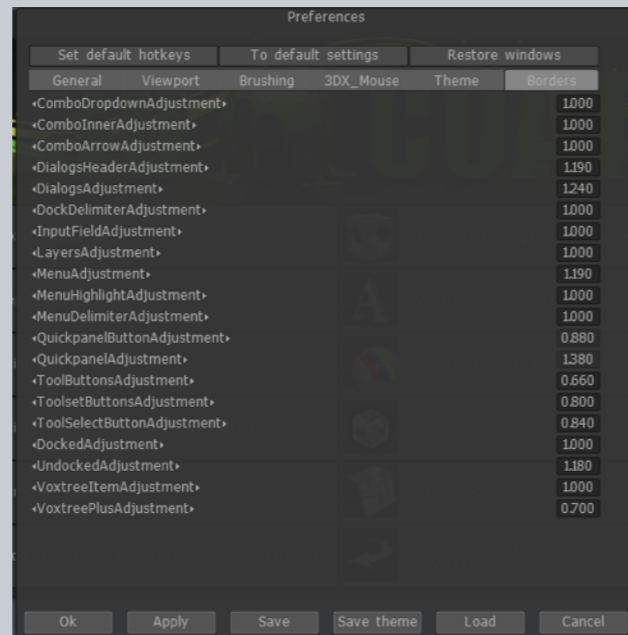
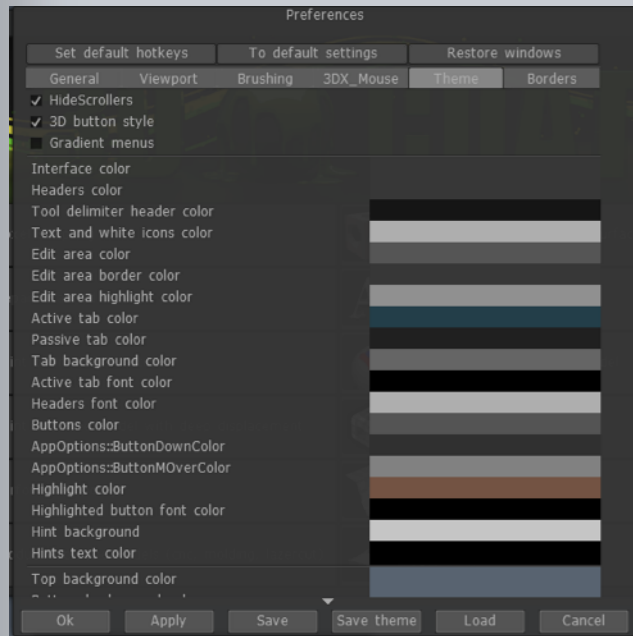
**Live Brush Display:** Use these setting to determine your real time Brush display within the Viewport.



**3D Connexion Control:** If you own one of these devices - use these settings to obtain the precise kind of control you need.

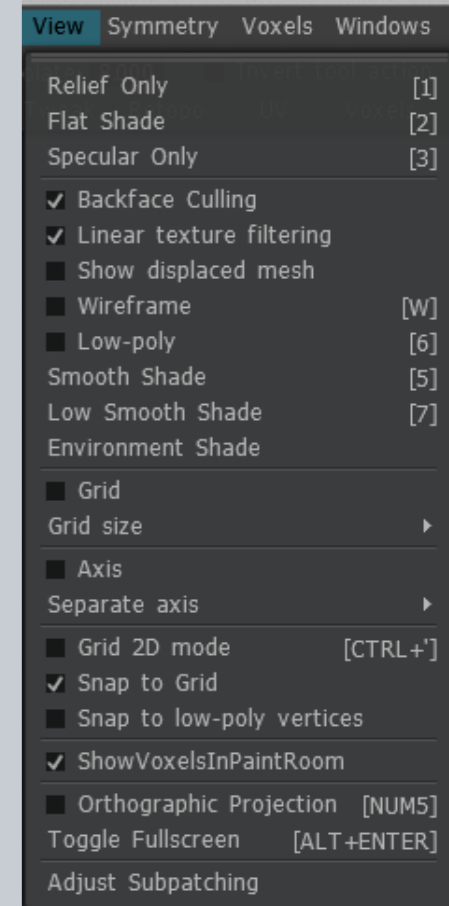
## Interface Theme and Layout: All of the options in these

two sections of the Preferences let you precisely design the look and layout of the entire interface. No two people like the same things - so these settings have been provided to let you set the “Look & Feel” of 3D-Coat - exactly the way you prefer.



## 1.5 The View Menu

Use the items in this Menu to adjust how your model appears in the Viewport (Flat Shade, Wireframe, etc.), whether the 3D Grid or 2D Grid is displayed (along with its increment settings), whether the coordinate axes are displayed, whether Snap is activated for Brushing operations, to toggle between Perspective and Orthographic Views, and to toggle between a full screen interface display or the default display.



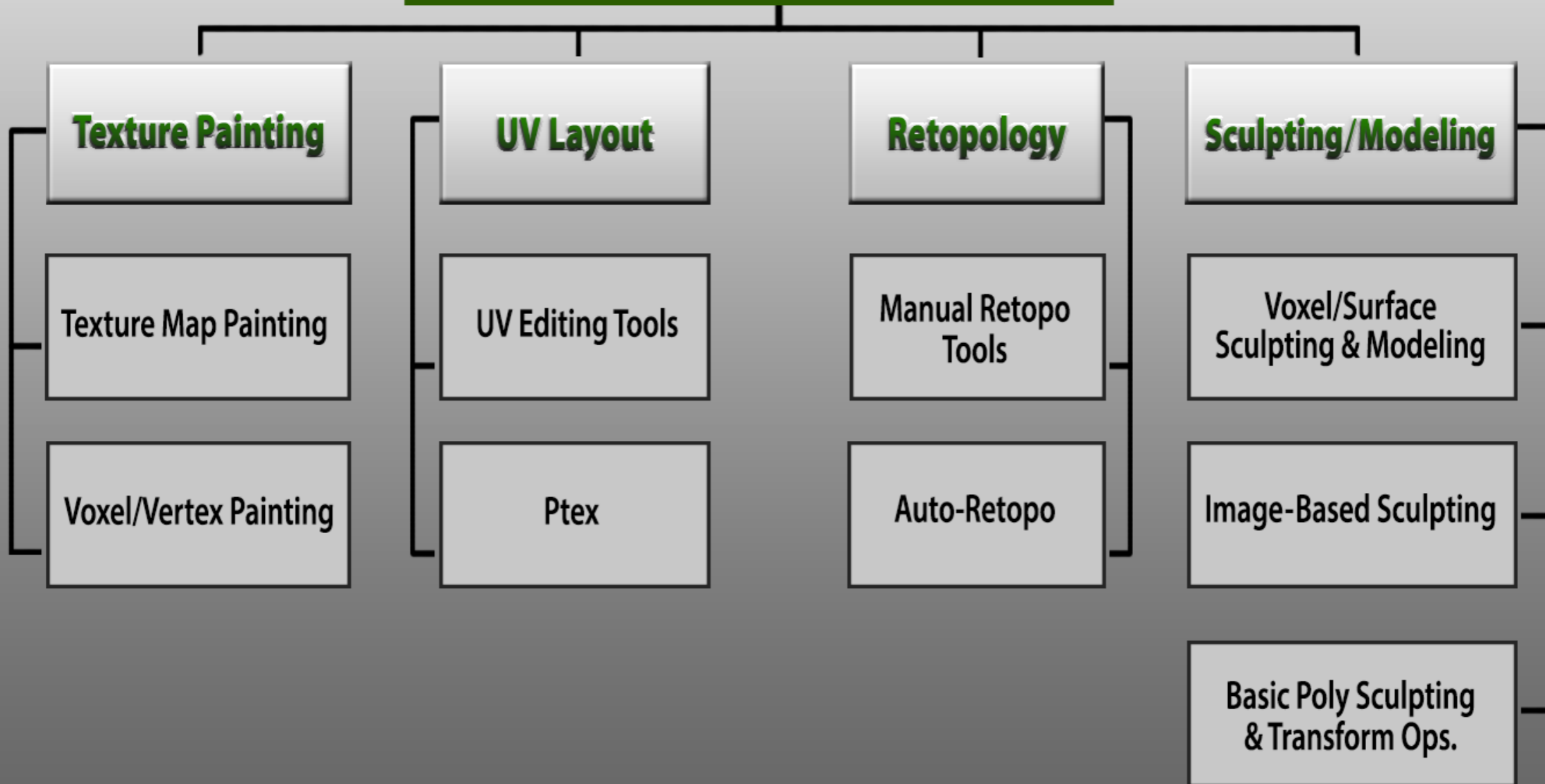
# Diagrams of Processes

## VISUAL REPRESENTATION

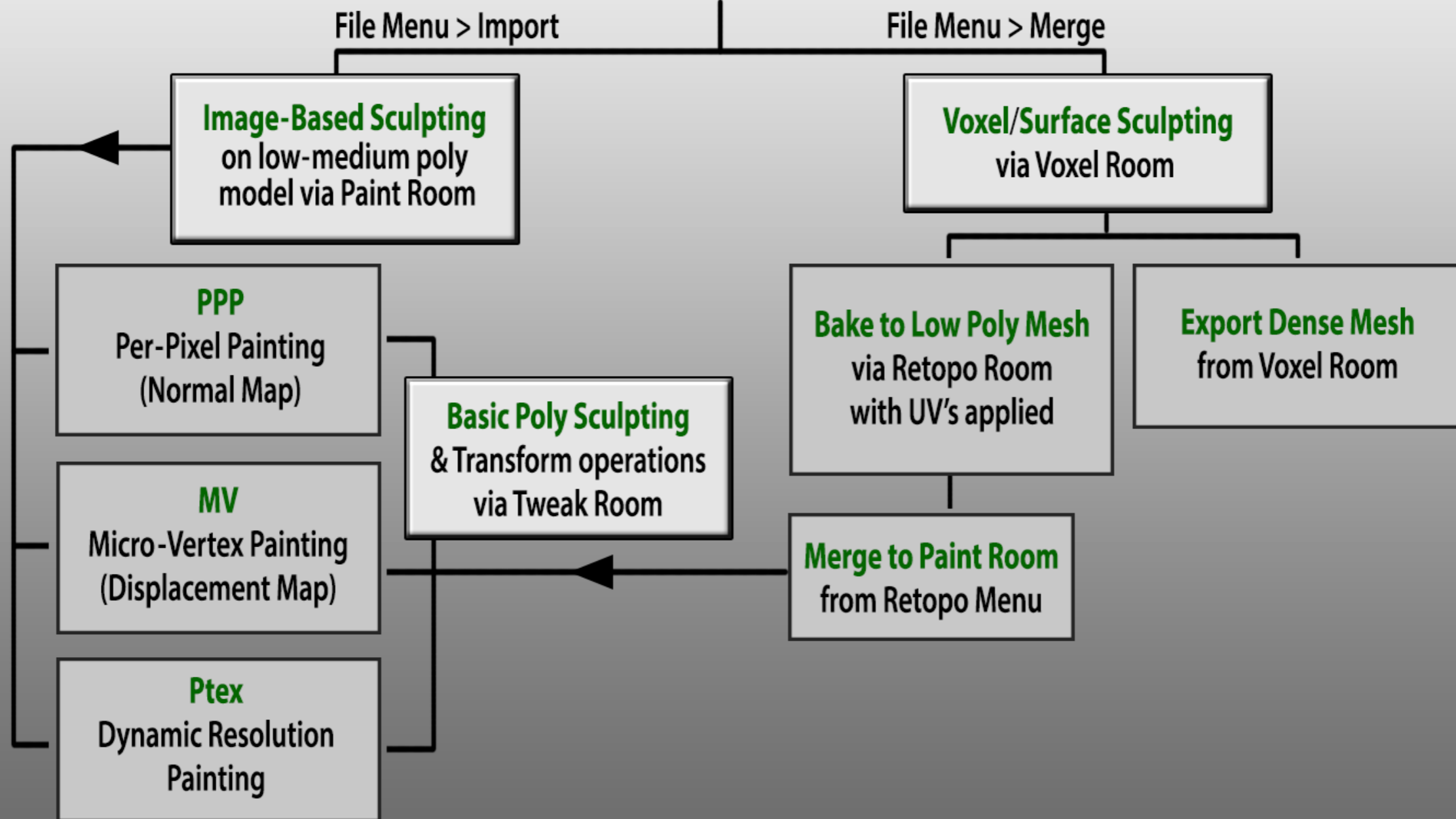
1. Features
2. Sculpting
3. Texture Painting

3D-Coat functionality runs deep. Sometimes a diagram can help describe otherwise hard to understand processes.

Here are the basic processes of 3D-Coat in “Flow Chart” style.

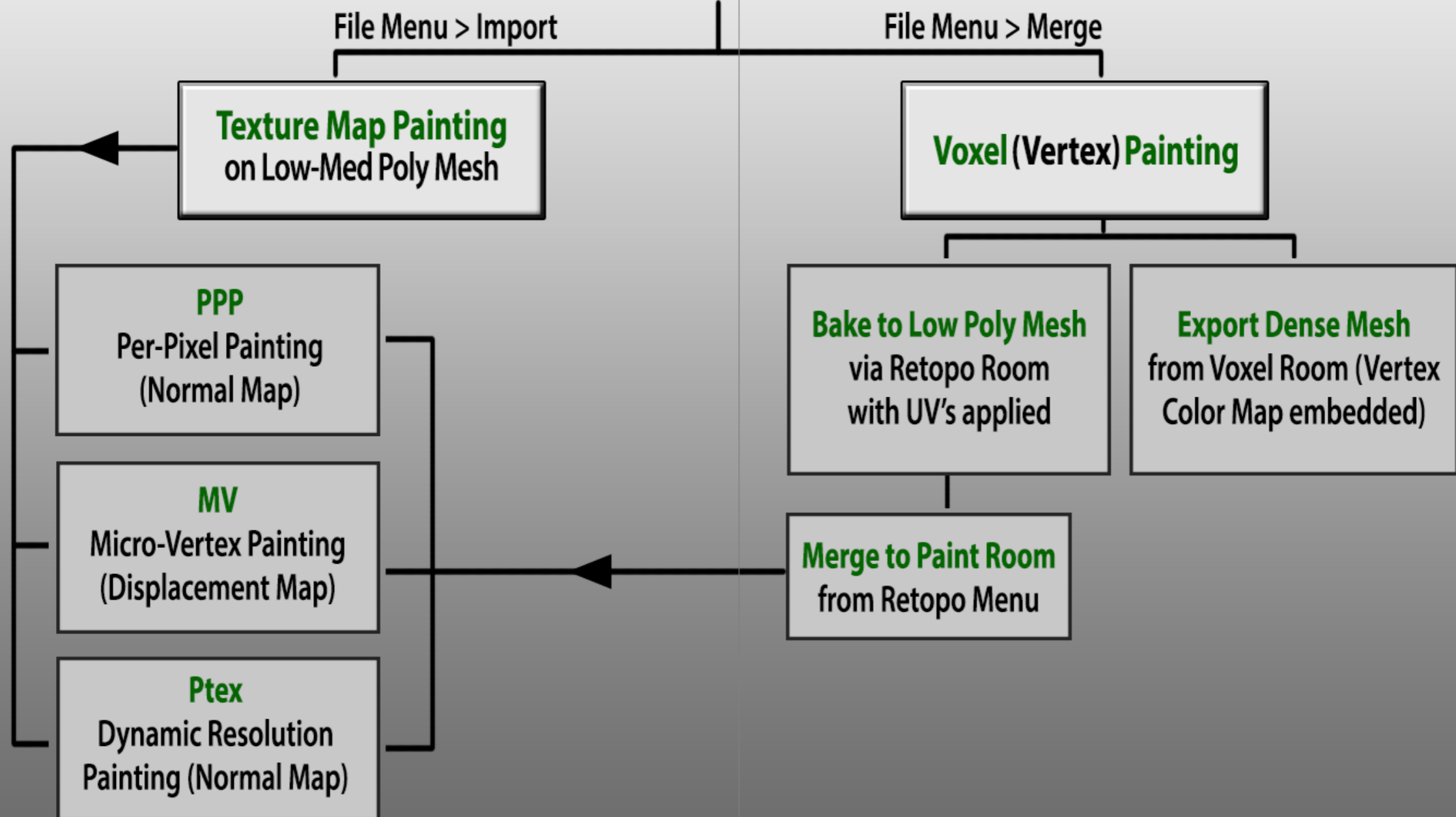


# Sculpting Pipeline





# Texture Painting Pipeline



# Voxel Sculpting

More powerful than traditional sculpting, 3D-Coat lets you create “matter” from nothing - simply by painting, extruding, adding Primitives or outlining your shape using curves. Most tools can also be used as subtractive elements, on the fly, as well. Never has 3D sculpting been so exciting and flexible!



# Using Primitives

## PRIMITIVE FUNCTIONS

1. Common Primitives
2. Free-Form Primitives
3. Merging & Positioning “On pen”

As with all modeling applications, the use of Primitives forms the basis for many and varied starting shapes.

Many mechanical models can be composed, almost entirely, from a positive and negative combination of basic primitive shapes.

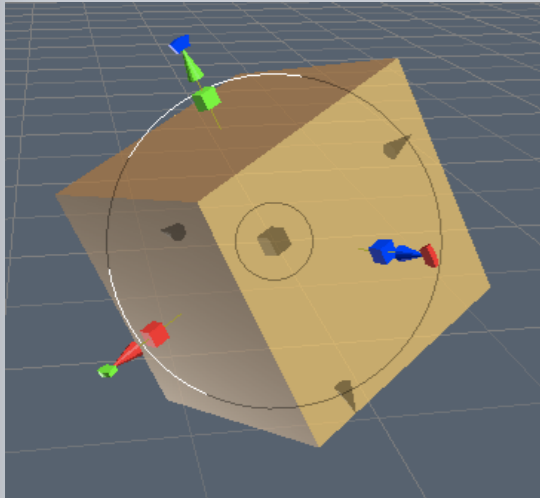
3D-Coat’s arsenal of usual and unusual Primitives proves itself to be the most powerful and flexible set available.

Each one can be modified, within the Primitive Workspace, by means of unique Transform, Placement and Distortion interface elements.

## 1.1 Common Primitives

When choosing from any of the Primitive varieties, you are presented with a temporary representation of that Primitive, complete with its unique “Gizmo” or

“Widget” for manipulating and placing this Primitive into the scene with the desired orientation, distortion, scale and position.



You can adjust all of these parameters visually, or, if you prefer using, the numerical entry fields provided in the **Primitives Panel**.

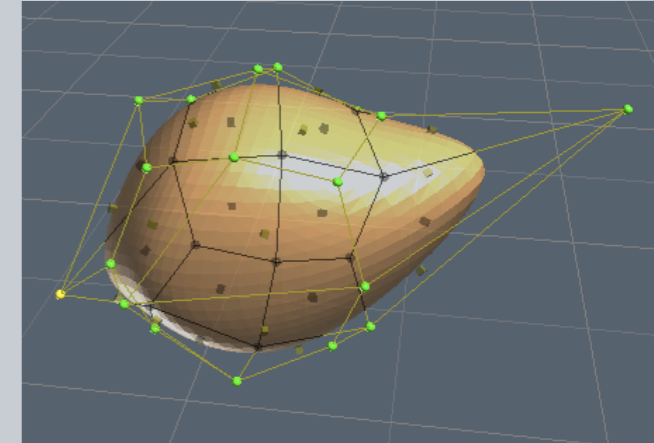
If you'd like to use another point in space to base your Primitive Transform value from, choose the “Move only gizmo” option - and then reposition that Gizmo.

At any time you may “Reset” any axis or position of your Primitive shape.

## 1.2 Free-form Primitives

Derived from the Standard Primitives, this variety allows

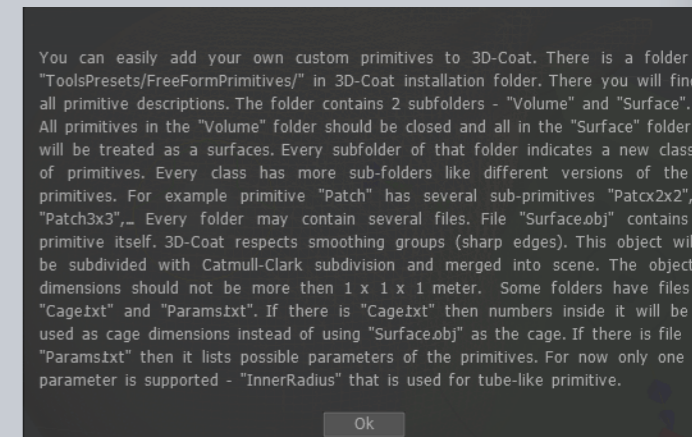
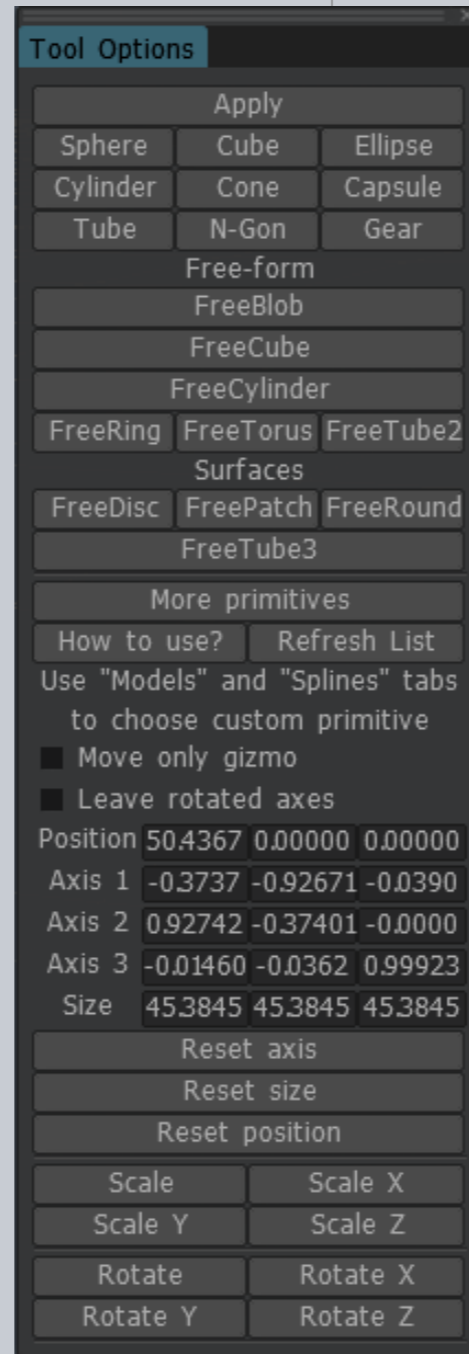
you to define and use a **Distortion Frame**, composed of rows and columns of movable **Points** and **Edges** that determine the nature of the distortion you wish to impose upon your Primitive.



It is possible to begin with a very basic Primitive shape and alter it substantially using the **Free-form lattice (or Distortion Frame)** - making extremely complex forms practical.

Add your own **Custom Primitives** by means of the “**More Primitives**” option. Adding your **.obj** files to a standard folder gives you access to all of your **Custom Primitives**.

It is important to note that the Primitives Panel is only one, fairly limited method of adding and subtracting



generic shapes from your Voxel sculpture. For even more convenience and flexibility, choose to use the “Merge Panel” and its functions to interactively add new basic and custom shapes to your scene or as boolean shapes to interact with existing forms.

Also, the “Models Panel” provides a visual interface and storage facility for your most

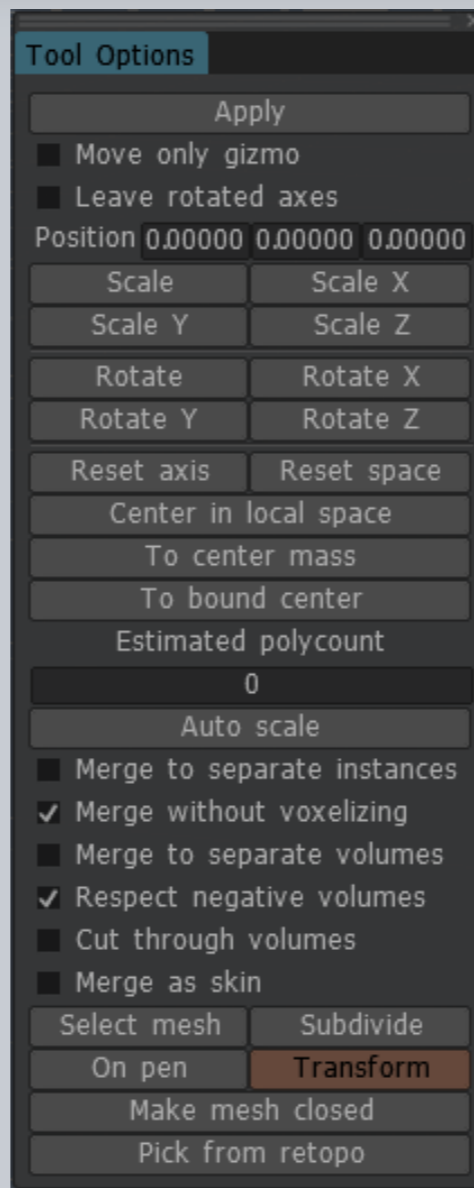
often used Custom models, shapes, greebles and nurnies.

### 1.3 Merging “On Pen”

One of the most fluid and spontaneous ways to add nearly any predefined shape, model, greeble or nurnie to your existing sculpture is to

use the “Merge Panel” or, for more frequently used elements, the “Model Panel”.

Just choose the “On pen” option to access this powerful set of functions.



When this option is chosen, you can literally assemble a composite of any number of shapes, on-the-fly - interactively changing the shape’s position, scale, rotation and “penetration” or “levitation” on, into or above the surface of another object or shape.

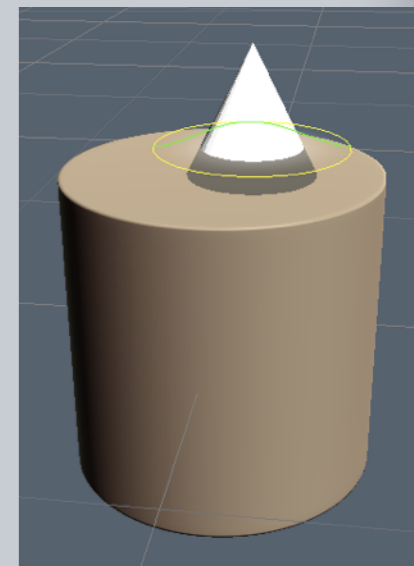
Each and every shape added in this way can be positively combined or negatively subtracted from any existing shape.

Mouse gestures are used to adjust the scale, position and penetration depth of your “Merged” object.

Use the “Right Mouse Button” and drag to the left or right to Scale the Merged object.

Use the “Right Mouse Button” and drag up or down to adjust the surface penetration of the Merged object.

Change the position of this object, respecting the orientation “Normals” of the object that is being added to - simply by moving the mouse cursor where desired - sliding its preview along the surface of the existing object.



Corresponding slider settings can be found within the **“Brush Parameters” Panel**, which show and augment the Mouse-Based parameters, and are found at the top of the 3D-Coat interface.

**Brush strokes** can also be modified by using functions from the **“Materials, Masks, Strips, Models and Splines Panels**, when the context is appropriate.

Since voxels are, by nature, memory and processor intensive - it is important to think of them as a beginning to the total range of steps needed to finalize a model initiated within 3D-Coat for final production and publishing to an external application. So, it is most practical to start sculpting in voxels with the least amount of resolution required to capture the most basic form of the overall model.

Once basic form and structure are achieved, you can **“Resample”** or use the **“Res+”** tool to advance to a higher level of detail.

If you’d like to preserve the different stages of modeling - as represented by resolution (from low to high) - simply duplicate a layer before applying **“Res+” (Resampling)** and proceeding with your sculpting operations.

Use the Voxel **“Layers” Panel** to store different versions of your sculpture, as well as parts of the model that need different and separate features and detail. These can all be transferred into different **“Retopo Groups”** for adding unique topology to each - and ultimately to the **“Paint Room”** for final displacement, bump and color texture creation.

By **Right-Clicking** on any **“Voxel Layer”** - you obtain access to the most frequently used functions that deal with Voxels. More functions can be found in the main **“Voxel Menu”** at the top of the interface.

To view the current statistics of your Voxel Sculpture, or to obtain **“Tool Tips”** in expanded form, just look at the **“Statistics” Panel** located at the bottom left of the interface.

Use the **“File”** menu to access all **“Import”** functions for bringing in external creations into the Voxel environment - and use **“Export”** functions for producing various direct **Polygonal and Raw Voxel** versions of your sculpture - to be used and modified in external **CAD and 3D printing** applications.

# Pure Voxel Sculpting

## TOOLS, FUNCTIONS & METHODS

1. Basic Principles
2. Sculpting Tools
3. Adjusting Tools
4. Objects
5. Surface Tools
6. Commands
7. Symmetry

Starting with empty space or starting with a volume of some sort are both options within the Voxel environment. Everything you add or subtract is done as you would expect when dealing with real materials like clay, wax, wood or stone.

What is more extraordinary are those tools and functions which actually create or subtract more volume from an object as you use them, like the Move or the Grow tool.

Appendages can be added and automatically joined to a base shape just by dragging or painting in real 3D space, without going through a series of complex commands and maneuvers.

Accurate organic and mechanical shapes can be created with the aid of splines and curves.

This tool set is an artist's dream.

## 1.1 Basic Principles

### What are Voxels?

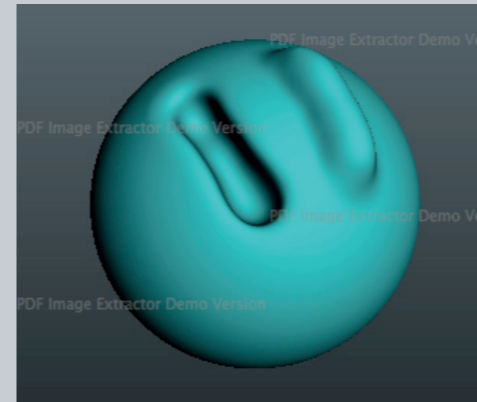


Voxels are the 3D version of pixels, in a nutshell. A pixel is represented by a square, having the same height and width - and having a specific size. Given any 2 dimensional area, this area can only contain a set number of pixels.

Voxel is a new word that really stands for “volumetric pixel”, since it has depth, as well as height and width.

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.

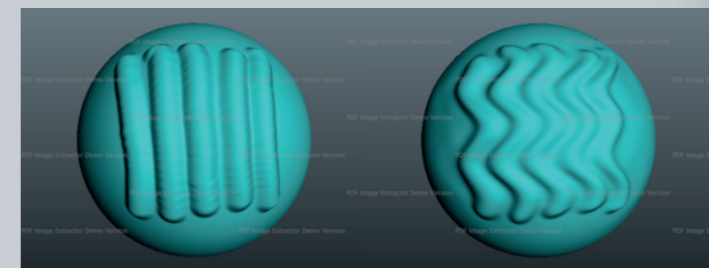
Like pixels, voxels have the same width and height - but also have dimension along the typically “z” axis - which is the same as the distance for its height and width - in essence, a voxel is a cube - floating in an invisible mass of voxels which occupy an infinite volume of space.



For any given 3 dimensional volume, there can only be a set number of voxels occupying this space.

In a black and white painting program, “paint” is applied to a given area by giving any number of invisible pixels, occupying that area, a value of black or white - (a pixel is either “on” or “off”) - thus making it appear that some of the area is “empty” while other parts are painted - like black paint on white paper.

In a voxel program, painted “volume” is applied to empty space by giving any number of invisible voxel cubes an “on” or “off” value - which produces the impression of a 3 dimensional shape floating in empty space - some cubes are turned “on” while others are turned “off” (some represent occupied space and some represent empty space).



An additional benefit of voxels in 3D-Coat is their ability to be assigned a color and a “material” or “shader” (giving the additional illusion of some real world or “other worldly” substance).



For the user, this experience simulates working with a solid or semi-solid material (like clay or molten wax) by means of functions that mimic the use of real world sculpting tools.

Nearly every other 3D-sculpting program is **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 cubic array or “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!

As fantastic as voxels are, you should also understand some of the limitations of this technology. For instance, objects can't be extremely thin in a voxel form. If you want

to make a very thin surface, like cloth, you need to increase the resolution of the voxel object to avoid the appearance of 3D “jaggies”.

A more convenient way to work with very thin layers is to use the new “Surface Mode” for voxels. This can be done by clicking on the Cube icon next to the particular

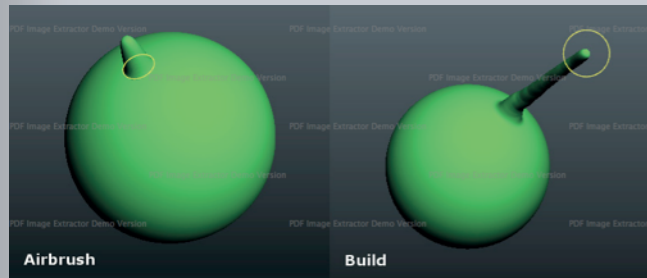
Voxel Layer you would like to work on -- and cube icon will then change to a wavy line. The wavy line icon tells you that you have entered the Surface mode

## 1.2 Sculpting Tools

When you're in the Voxel Room, there are 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 obtain access to the Voxel Tool Panel by pressing “Spacebar” anywhere on the screen. As with any other panel, you can dock it for your convenience.

**Grow:** Increases or decreases the surface beneath the cursor. None of the Brush Alphas





having any effect on “Grow” - just the brush size and the intensity. Press “LMB” and move the mouse to produce an

expanded section.

CTRL+RMB to produce a contracted section. On the top panel, the “Growth power” slider controls the intensity of the expansion and the “Thaw power” slider controls the intensity of the contraction.

**Smooth:** A dedicated tool for evening out any irregular areas of a sculpture.

**Fill:** Fills any cavities or voids that you apply the brush to. Its action is similar to the “Smooth” tool, but more precise. It’s useful when you want to make cavities shallower, but not fully level with the rest of the surface. It sometimes requires very high intensity settings to fill areas.

**Clay:** Lets you blend expansive strokes quickly on the surface of your model. It will also simultaneously smooths the surface after you’ve applied it.

**Carve:** Lets you place high peaks and deep gouges quickly on your model, but with no smoothing.

**Blob:** Very much like the “2D Paint” tool, but with fewer options.

**CutOff:** Cuts polygonal or spline-shaped section away from a sculpture all the way through the volume.

**Airbrush:** This tool provides a very controllable way to add volume to your model. Unlike the Clay tool, it constantly grows underneath your brush as you press the LMB, regardless of mouse or stylus motion.

**Build:** This tool is similar to the “Grow” and the “Airbrush” tools. 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 “Grow” brush.

However, with the Build tool you can determine the Brush interaction by means of the Brush Alphas (no smoothing is applied).

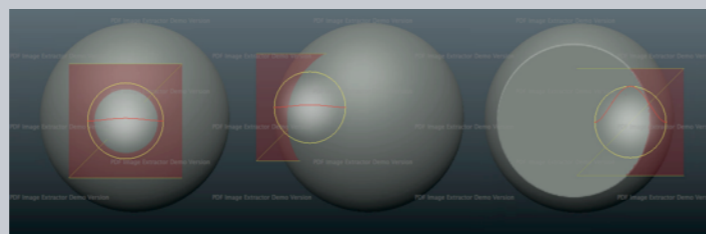
**Extrude:** This tool is very similar to the Carve tool, but it includes intense smoothing.

**Sphere:** This tool is a very quick way to create bubbles, bodies, eyeballs, etc. The size of the sphere is dependent

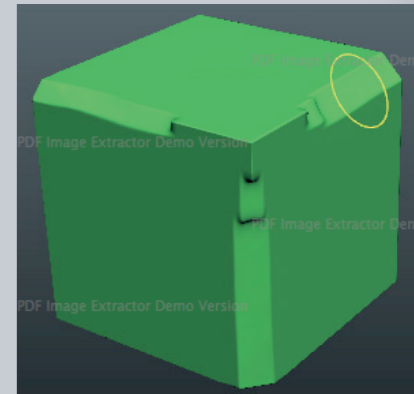


on the size of the brush. You can also make it dependent on stylus pressure: click on the icon near the Sphere extrusion slider. The maximum size will be the maximum size of the brush. You can create separate spheres and long, “pill-shaped” cylinders rounded at the ends, by **Left - click** dragging in open space. Because of this, regular, “button based” viewport navigation needs to be accompanied by holding down the “**Alt**” key.

**2D-Paint:** This tool paints voxel thickness on two axes which you specify by right-clicking anywhere in space or on the surface of an object. Notice first that, as you rotate the view and move the brush, it’s moving along the two axes. When you change your view, new strokes will always face the camera. Pick any **Brush Alpha** you like and just paint! It also has an important option on the top tool bar: “**Double sided**”. With this checked you can paint double-sided strokes.



**Plane:** This tool, new in version 3.2, acts just like a carpenter’s wood plane does. It will scrape the volume away, from the set position as well as the normal of the brush cursor. You set the brush cursor’s position and 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:



- 1. Pick point & forward direction:** This will place the cursor at the last location you used the **RMB**, facing toward the camera.
- 2. 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.
- 3. 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.
- 4. 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.

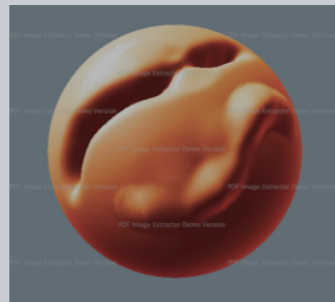


**5. Navigate:** Lets you navigate the viewport. This can also be done while holding the ALT key.

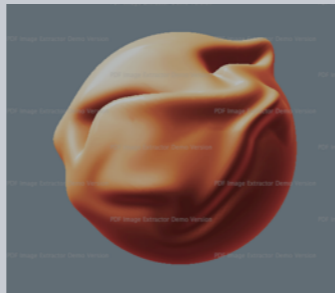
Now we'll continue with the other tools:

**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.

**Pinch:** This is great for making very nice tight edges, cavities and peaks.



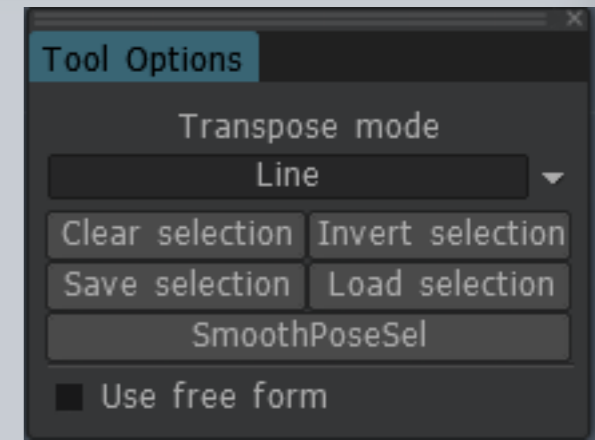
**Smudge:** This tool drags the surface topology along with the brush. It's great for producing wrinkles on a character or a piece of clothing.



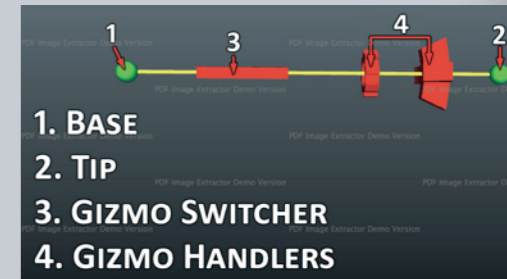
### 1.3 Adjustment Tools

**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.

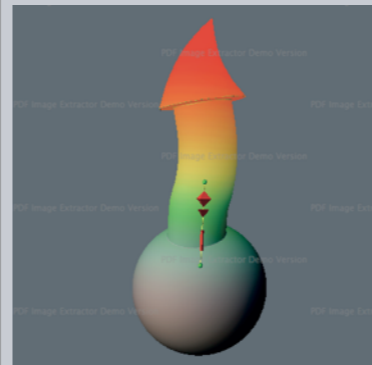
**Pick:** Sometimes when you have more than one object in the **VoxTree**, it can become a tad cumbersome to know which layer has what object. With the Pick tool you can visually select the object (and therefore the **VoxTree** layer) simply by clicking on the one you wish to work on.



**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 Brush 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.



The Pose tool 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. Now, the Pose tool works on all visible objects (through all volumes).

Through all volumes

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,

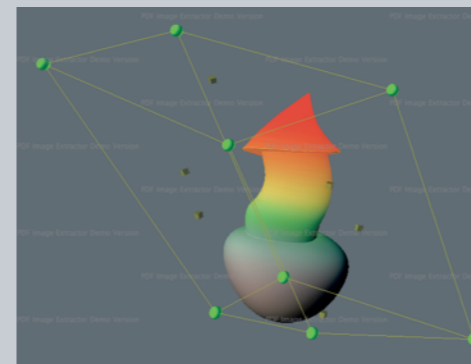
**Airbrush mode:** By using airbrush mode you can also smoothly selected areas instead of having a hard edged

selection. It makes for tidy deformations around the edges of your selection.

**Note:** "Select with pen" mode is very useful. With the Pose tool, you can use almost any of the selection methods in the "E" Panel, 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.

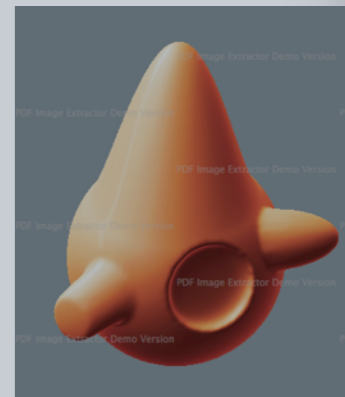


**Use free form:** A new feature has been added to the Pose Tool which allows for using a **lattice** to

deform the selected Pose area. Select from several lattice shapes to transform the Pose selection.

"**Fit**" and "**Directional fit**" give you the most control over the Pose area.

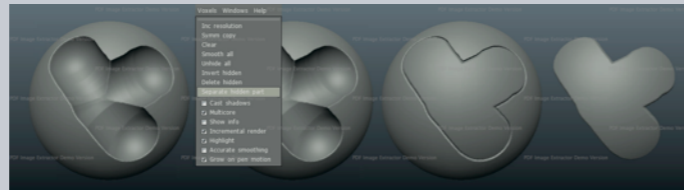
**Move:** This tool is one of the most powerful and versatile tools in the voxel arsenal. Not only can it "adjust" any shape, large or small,



but it also can act as an “Extrusion/Intrusion” tool.

Drag with the “LMB” to move the surface within the area of the cursor, relative to the screen view. Hold down the “Ctrl” key to move the surface along the normal. The “Move” tool also interacts with **Brush Alphas** - providing a wide array of effects.

**Hide:** This tool has been improved greatly.



You can now hide on a per voxel basis. This lets you to paint 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 many hard edged surfaces for objects. The tool also has a few other functions, which you will find in the Voxel menu. They are listed as follows:

**Unhide all:** Unhides any hidden voxels. any voxels you have hidden.

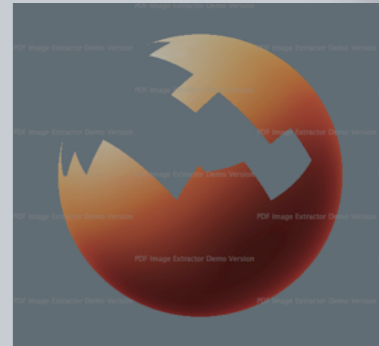
**Separate hidden part:** Creates a new Layer in the **Voxtree** and places the previously hidden voxels into the newly created Layer.

Continuing with the other tools, they are:

**Invert hidden:** Inverts hidden voxels.

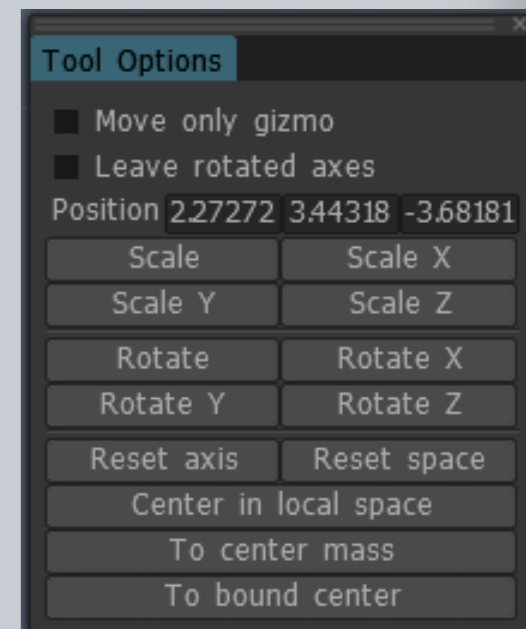
**Delete hidden part:** Deletes those parts which are not visible.

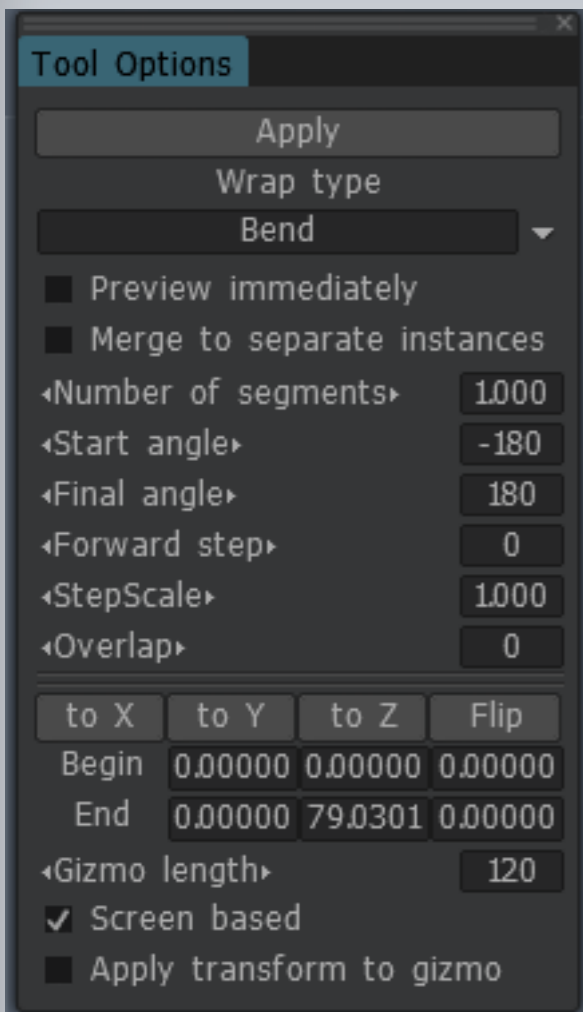
**Cell Hide:** This hides “cells” of voxels based on your brush size. Unlike the other Hide tool, it does not allow sculpting or separating hidden parts to create seams and other objects.



**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 translate 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. The 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.

**Instancer:** A memory saving method of making duplicates of your voxel objects. Instances consume far less memory than duplicates. You can “**Clone**” an instance (**Right Click menu**) and “**Merge**” new objects as instances. Negative volumes can also be instances.

**Warp:** You'll find this tool is quite versatile! It lets you twist and bend the currently selected object Layer in the **Voxtree**.



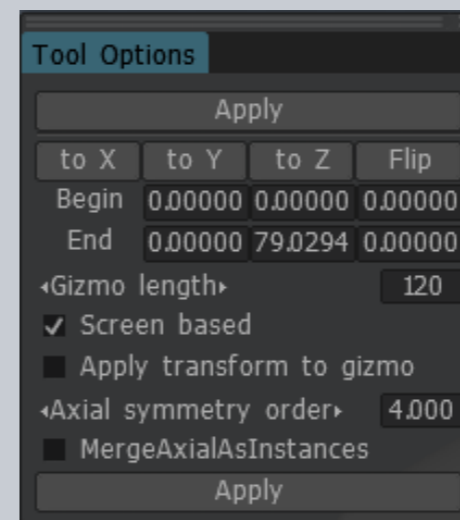
**Note:** Each function of the Warp Types will alter any of the

other type's end functions. Experimentation is strongly encouraged.

The following descriptions are based on the use of a default sphere, so let's take a look:

**WarpType:** 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.

**Forward Step:** Create a “spiral staircase” look: it will literally spiral the object upward.

**Step Scale:** The distance between steps.

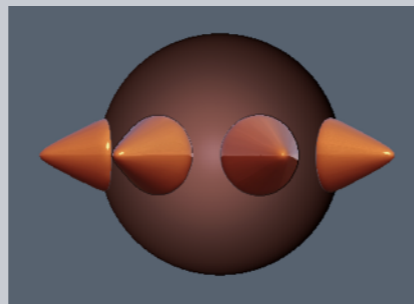
**Overlap:** This tapers each segment where they meet. The effect will vary depending on the object.

The following functions are for the Twist type: **Segments count:** Increases the amount of segments.

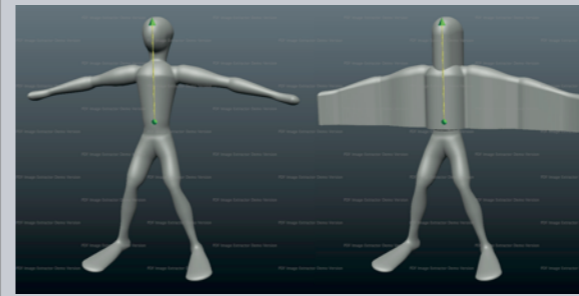
**Twist angle:** Twists the current object around the gizmo.

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

**Axial symmetry:** Some applications call this “Radial Symmetry”. Any Voxel Layer can be duplicated and rotated in number and angle from a central axis. Use “Axial symmetry order” to determine the total number of copies. You can merge these copies as separate instances if you desire.



**Bas relief:** 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.

**Undercuts:** Use this tool to prepare a voxel object for casting purposes (where undercuts are undesirable).

## 1.4 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.**



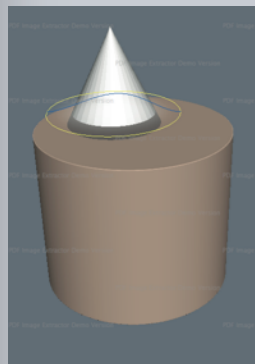
**Clone:** Clones the selection without cutting.

**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**.

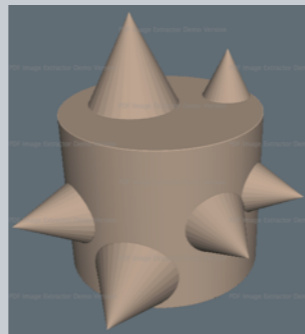
**Merge:** This tool lets you import polygonal meshes to convert into voxels. Let us first go over some of the basic functions of this tool:



**Select mesh:** Selects a mesh stored on your hard drive.  
**Pick from retopo:** If you have something retopologized in the **Retopo Room**, then you can use the mesh to merge to voxels.



**On pen:** Turns any merged mesh into a “**Merge on the Fly**” tool, which allows you to merge any object at the cursor position (respecting the base object’s normals and intrusion into or extrusion above the base object). Adjust the merged object’s size by **Right-click dragging left or right**, and adjust its intrusion or extrusion by **Right-click dragging up or down**.

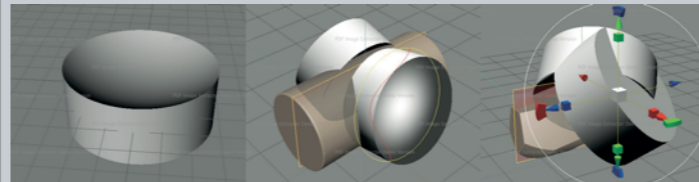


**Subdivide:** Subdivides your un-merged mesh, giving it more initial resolution before merging.

**Transform:** Allows you to position any merged object with the aid of a “**Transform widget**”.

**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.



**Merge separate volumes:** Merges each “sub-object” to its own, unique volume.

**Respect negative volumes:** If an un-merged object has “**\_negative**” listed in its name - (indicating a “**subtractive**”



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 a “**negative**” or **subtractive** boolean object. This function 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).

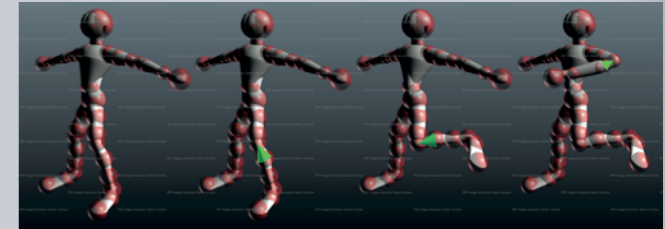
“Greebles” or “Nurnies” can be created in any 3D modeling application, usually with a series of arbitrary extrusions. To make your models look more interesting, you would probably want to create your own unique models for this purpose.

Details with angled surfaces look better than surfaces which are 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 Panel to permit contour exclusion. Because the “negative volume” width is larger than the width of the detail, we get an interesting effect. There is automatically generated a joint between the body and the object.

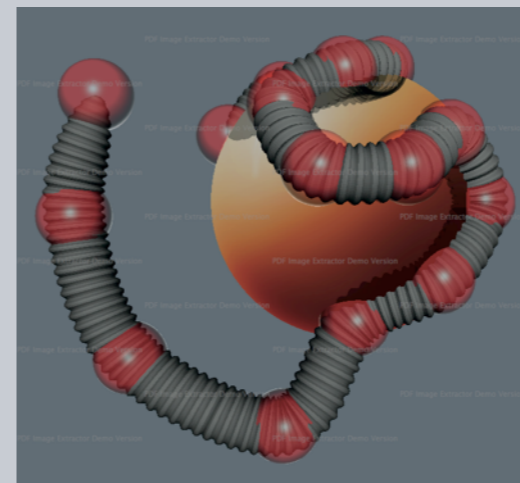
Load the Greebles using the “Merge” tool. Use the “On pen” mode and the “9” and “0” keys to rotate the brush.

**Sketch:** This new tool is a very important addition the 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.

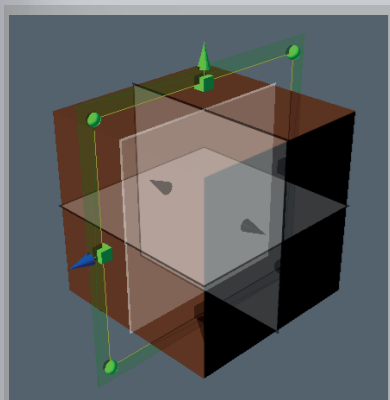
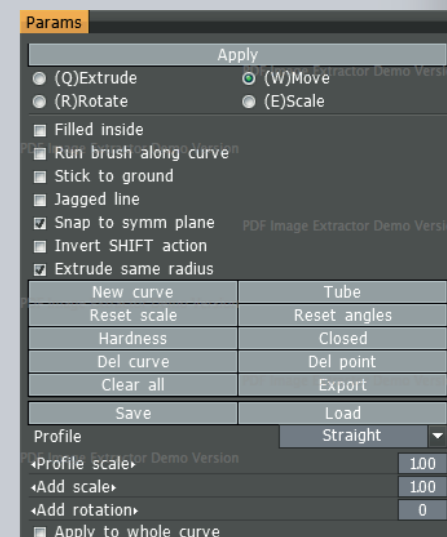


**Curves:** The “Curves” tool is easily one of the most powerful tools in the voxel arsenal, as it lets you place spline points directly into your scene with the **LMB**. To edit an existing point, simply click with the **LMB**. To **Escape**



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.

**Conform:** Forces the points of your curve to be constrained to the surface of a volume object you drag across.

**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.

**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.

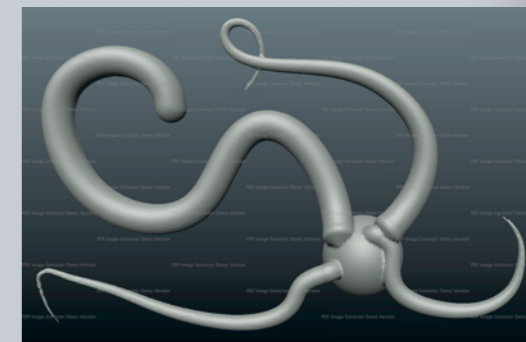
**Apply to whole curve:** With this any rotations, scaling or translation will apply to the whole curve centered from your current selected point on the spline. The gizmo for the point will change, adding a new large, white circle around the rest of the gizmo.

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)

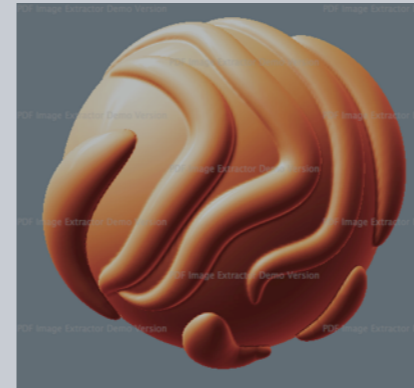
**Spikes:** Functions exactly like the snake tool, except that it tapers on the end point, causing a spike-like appearance.

**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



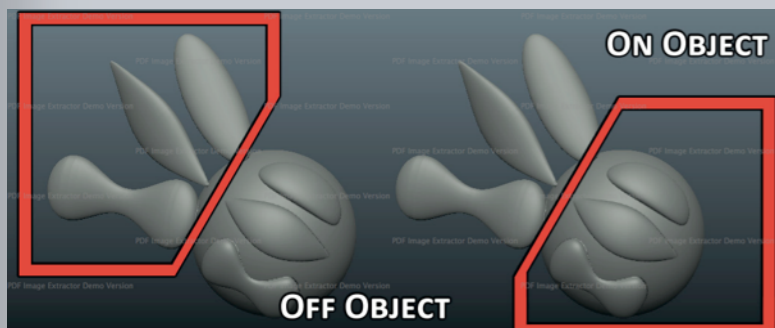
smoothed.

**Conform:** Forces your stroke to adhere to the surface of the object, instead of passing in front of the base object, or 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 Brush 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.

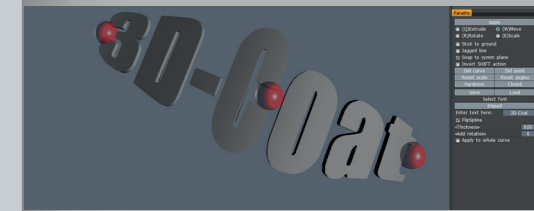


**Misc. ResetPrim:** Lets you reset any changes you've made to the object.

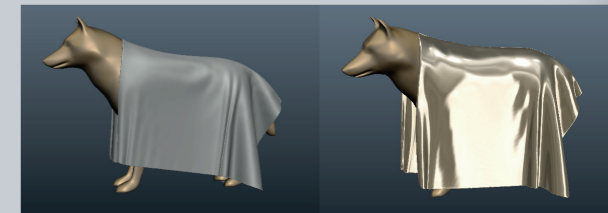
**EditPoints:** Allows numerical values for each visible point of the lattice cage. Inner/Outer Radius & Thickness are only applied to some of the ffPrimitives, such as ffDisc and ffTube, they allow for the radius of the inner section or outer

section of the tube and the thickness of some of the primitives with keyable values. The drop down list also has a few more options, usually different .OBJ files with different cages for similar shapes, such as ffDisc. When holding "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 as follows:



**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.

## 1.5 Surface Tools

This palette of tools is an abbreviated version of the sculpting tools found, in their entirety, in the Surface Mode section of the Voxel Room. See the Surface Mode descriptions in that section.

## 1.6 Commands

**Res+:** Use this to add voxel resolution only when you have exhausted the ability of the current resolution to add sufficient detail to your sculpture.

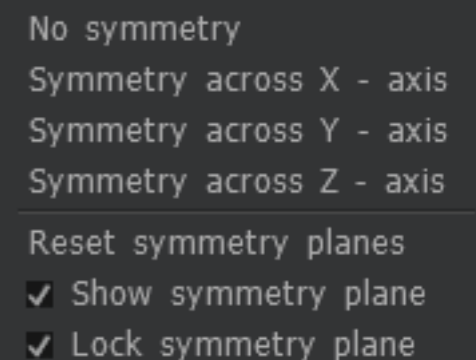
**Resample:** This presents you with a dialog that allows you to adjust the resolution of your model “up or down”, as you require.

**Clear:** Clears all voxel information from the current layer.

**Smooth all:** Performs a 1 step smoothing of everything on the current voxel layer.

## 1.7 Symmetry

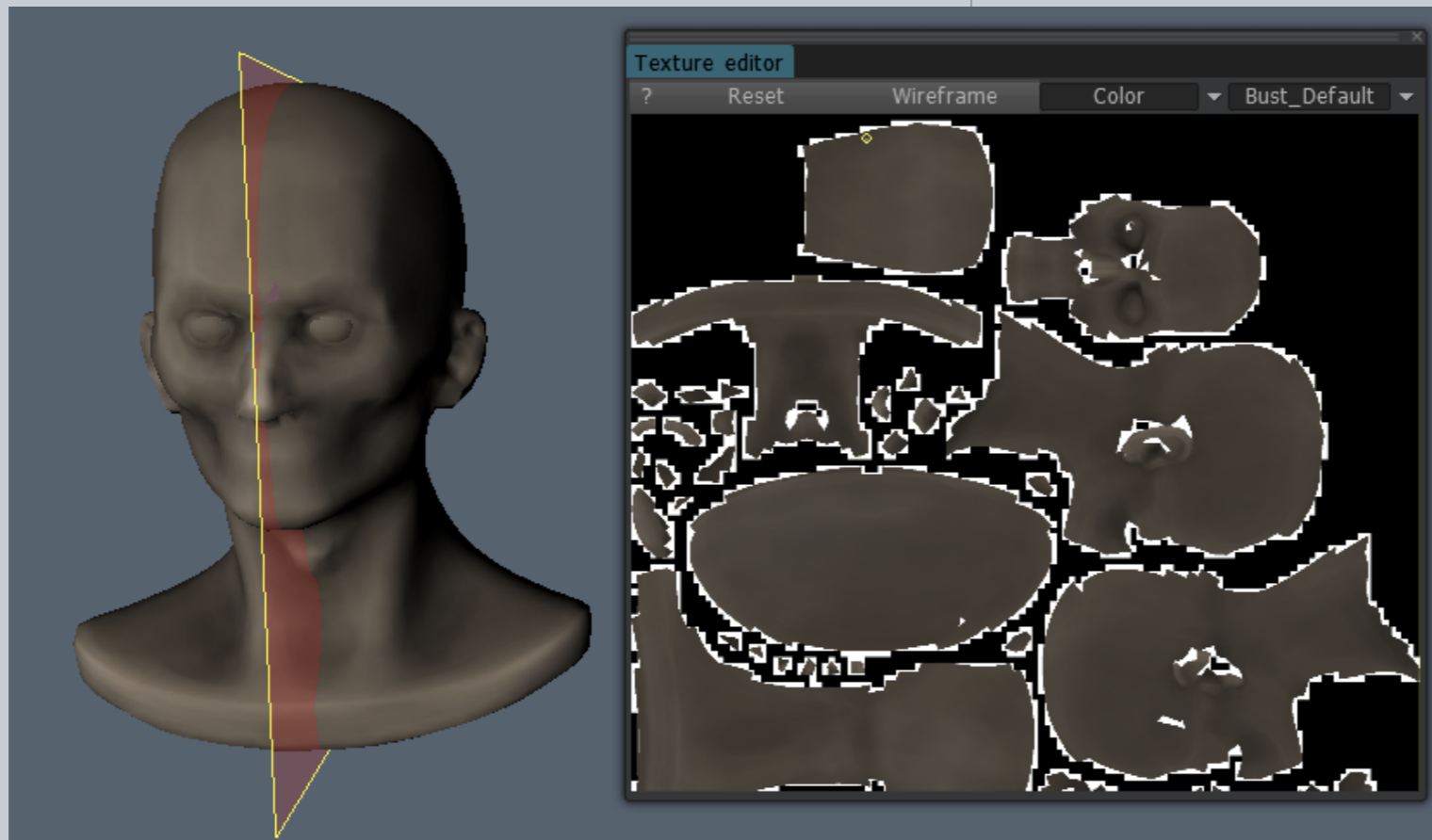
Many organic and man-made objects are constructed to be symmetrical across **one or more** axes. 3DC lets you create and arrange items with this kind of symmetry.



No symmetry  
Symmetry across X - axis  
Symmetry across Y - axis  
Symmetry across Z - axis  
Reset symmetry planes  
 Show symmetry plane  
 Lock symmetry plane

This dialog can be invoked in the Voxel Room and in any other Room, where symmetrical functions operate, by pressing the “S” key.

Toggle Symmetry on and off, set the symmetry plane to be active for any of the 3 axes, reset the location of the Symmetry planes, hide the visual display and lock the position of the active plane position to avoid accidentally moving it with these options.





# Voxel “Right-Click” Menu

1. Object Commands
2. Supplemental Commands
3. AUTOPO (Automatic Topology)
4. Layer & Boolean Commands

Much of the power of voxels is found in the functions contained in the Vox Layer, “**Right-Click**” menu set.

Perform **Layer Merging**, create **Boolean** associations, clean up scanned mesh data, make “shell” structures, create radial symmetry arrays, adjust and resample voxel resolution - all these things, and more, can be done with this set of functions.

## 1.1 Object Commands

**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.

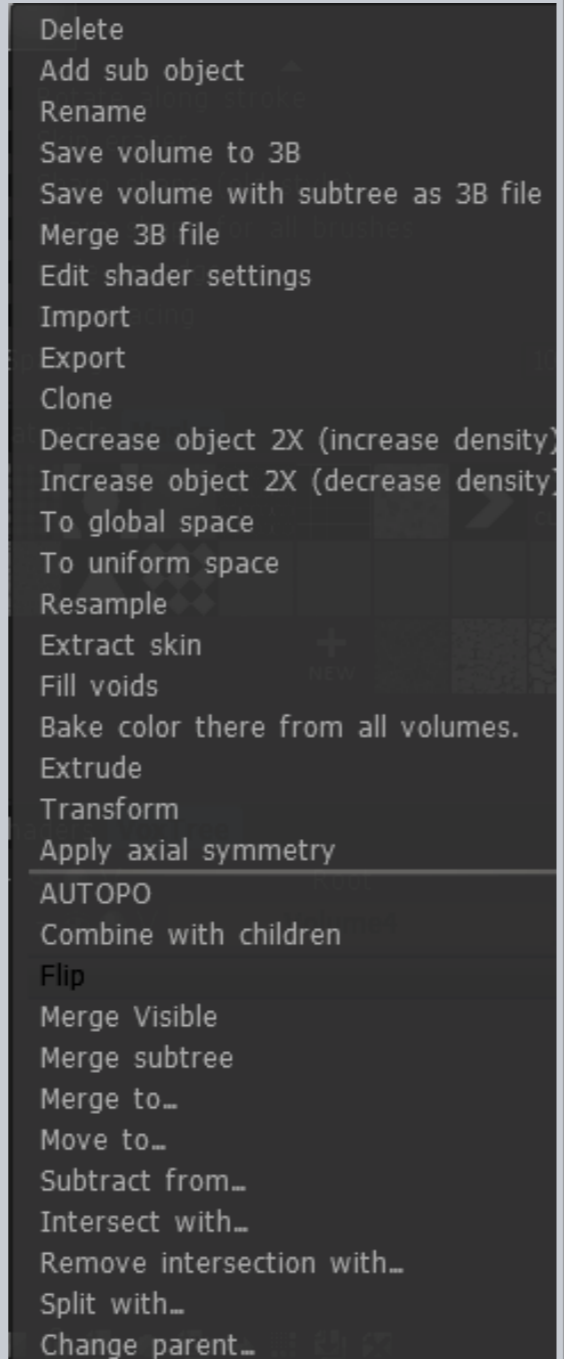
**Rename:** Type your own name for the Layer, instead of the default “Volume XXX”.

**Save volume to 3B:** Saves the voxel volume without its subtree to the 3D-Coat native file format.

**Save volume with subtree to 3B:** Saves the voxel volume with its subtree to the 3D-Coat native file format.

**Merge 3B file:** Merges an external .3B file into the scene.

**Edit shader settings:** Edit custom shader’s parameters, if it has them.



Delete  
Add sub object  
Rename  
Save volume to 3B  
Save volume with subtree as 3B file  
Merge 3B file  
Edit shader settings  
Import  
Export  
Clone  
Decrease object 2X (increase density)  
Increase object 2X (decrease density)  
To global space  
To uniform space  
Resample  
Extract skin  
Fill voids  
Bake color there from all volumes.  
Extrude  
Transform  
Apply axial symmetry  
AUTOPO  
Combine with children  
Flip  
Merge Visible  
Merge subtree  
Merge to...  
Move to...  
Subtract from...  
Intersect with...  
Remove intersection with...  
Split with...  
Change parent...

**Edit shader settings:** Opens the shader editing dialog for the current layer.

**Import:**

**Merge Point Cloud:** Merges a set of points as a sequence of a small spheres.

**Merge object:** Merges a standard 3D object into the scene.

**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. A Preview of the current Voxel Layer object will appear in the “Models” Panel.

**Export curve profile:** Exports the current object as a profile for a curve.

## **Clone:**

**Clone instance:** Clones and transforms an instance of an object.

**Clone:** Clones and transforms a voxel object.

**Clone with symmetry:** Clones with symmetry and transforms.

**Clone and degrade:** Clones the layer and decreases the level of detail by 2 times.

**Clone space density:** Creates a clone layer with the same density as that being cloned - essential for using the “Copy” tool.

## **1.2 Supplemental Commands**

**Decrease object 2X:** Increases the selected object Layer’s density twice. Object will decrease twice.

**Increase object 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.

**To uniform space:** Applies orthogonal symmetry across the designated symmetry axis.

**Resample:** Duplicates the same command present in the Surface Tools.

**Extract skin:** Makes a hollow skin based on a solid voxel sculpture. There are 2 versions of this function - “**Make hull using voxels**” and “**Make hull using surface**”. The former is more accurate, but takes longer to perform while the latter is faster and less accurate.

**Fill voids:** Makes any voxel object a contiguous solid, which is necessary for creating proper topology - either automatically or manually.

**Bake color from all volumes:** Bakes all vertex colors applied in Paint Room (Direct Painting) from all visible volumes to the current layer. This leaves the layer in Surface Mode.

**Extrude:** Extrudes all objects in the current layer outwardly by a specified amount. Enter this amount in the Extrusion parameter Dialog.

**Transform:** Transforms a whole object using a special gizmo.

**Apply axial symmetry:** Applies all settings you have made while using the “Axial” tool.

### 1.3 AUTOPO (Automatic Topology)

#### **AUTOPO:**

**Create edge loops with AUTOPO:** This routine creates surface topology based on your specifications given in the following dialogs, and places the resulting polygonal mesh in the Retopo Room.

**AUTOPO with Ptex:** Runs the routine mentioned above and places the resulting mesh in the Paint Room for painting using Ptex. UV seams and Maps are created automatically.

**AUTOPO with MV Paint:** Runs AUTOPO and places the result in the Paint Room for painting with the “Micro-vertex” method. UV seams and Maps are created automatically.

**AUTOPO for Per Pixel:** Runs AUTOPO and places the result in the Paint Room for painting with the “per-pixel” method. UV seams and Maps are created automatically.

There are a few things to note about the **AUTOPO** tools. It is a good idea to enable symmetry planes to force symmetry during the process of creating automatic topology - (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 automatic result, you can always go to the Retopo Room 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.

### 1.4 Layer & Boolean Commands

**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 to the current layer - leaving all visible layers intact.

**Merge subtree:** Merges all sub-layers to the parent layer, deleting the sub-layers in the process.

**Merge to:** Merges a copy of the current layer to a specified layer. **Move to:** Moves the current layer to another layer.

**Move to:** Moves a selected layer to a specified 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.

**Remove intersection with:**

**Split with:**

**Change parent:** Changes the current Layer to another Layer or to the Root.

# Voxel Menu

1. Six Foundational Commands
2. Nine Surface Commands
3. Seven Basic Commands
4. Five Advanced Commands
5. Eight Supplemental Commands

The Voxel Room contains one of the largest set of functions of any of the 3D-Coat “Rooms”. Many of these may, at first, seem obscure and hard to understand. This section will make these clear.

The **Voxel Menu** contains most of these functions - which include surface clean-up, creating proxy versions, resampling voxel resolution, voxel decimation, memory management, and many more.

## 1.1 Six Foundational Commands

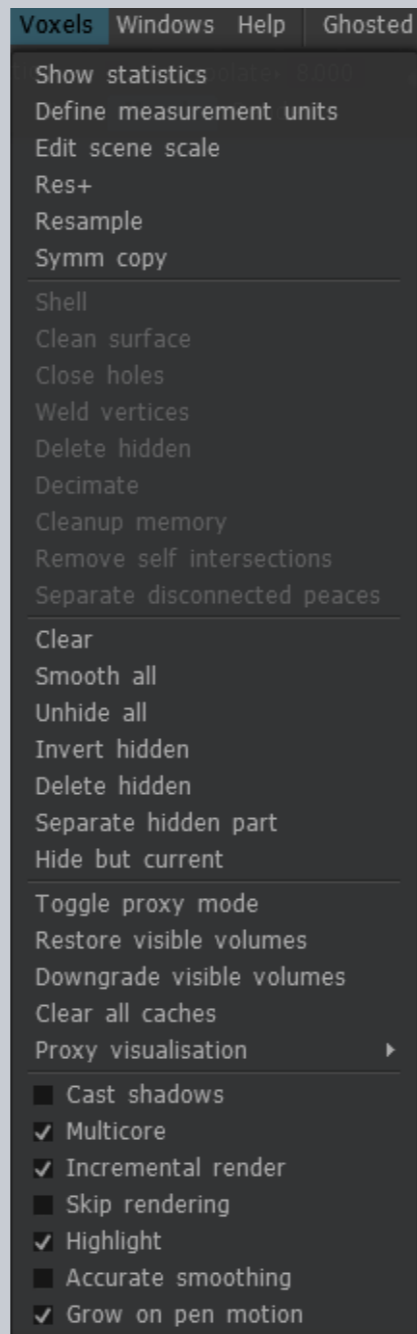
Like most of the other major Tabs (or Rooms as they are also called), there is also an accompanying menu. We have already covered most of these options in previous sections. Any repeated functions are here only for your convenience. Let's take a look at them:

**Show statistics:** Displays a dialog showing many lesser known statistics of the current layer.

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

**Edit scene scale:** Allows you to recompose your scene by shifting its overall location and scale on the global axis.

**Res+:** Increases the resolution of the current voxel layer.



**Resample:** Opens a comprehensive dialog allowing you to upgrade or downgrade the current layer's resolution.

**Symm copy:** Creates a symmetrical copy of the current layer across the designated symmetry plane.

## 1.2 Nine Surface Commands

Only available for voxel layers currently in Surface Mode.

**Shell:** Creates a hollow shell or skin of a designated thickness from the current voxel layer.

**Clean Surface:** Re-optimizes surface mesh structure.

**Close holes:** Heals any holes found in a surface. Very valuable for fixing imported scanned meshes.

**Weld vertices:** Welds any vertices occupying the same point in space.

**Delete hidden:** Deletes any portions of the mesh that are currently hidden.

**Decimate:** Performs an optimized reduction of polygons for the current layer.

**Cleanup memory:** Optimizes mesh memory allocation.

**Remove self-intersections:** When 2 layers intersect each other, this command will extract the intersecting surface from the current and designated layers - placing this intersecting part on its own layer, while leaving the 2 original layers intact.

**Separate disconnected pieces:** Any disconnected objects found on the same layer will be removed from this layer and placed on their own layers.

### 1.3 Seven Basic Commands

**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 all:** 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:** Deletes any hidden voxels.

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

**Delete Hidden:** Deletes the hidden part of the surface.  
**Separate hidden part:** Creates a new volume from the hidden surface.

**Hide all but current:** Hides every voxel layer that is not the selected layer.

### 1.4 Five Advanced Commands

**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 unit scale.



**Clear all caches:** Clears all cache information from memory - thus releasing it for other tasks. Cannot be undone.

**Proxy visualization:** Selects the resolution of the proxy mesh and how downgraded the mesh is - (You can downgrade from 2x, 4x and 8x).

## 1.5 Eight Supplemental Commands

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

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

**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.

**SkipRendering:**

**Use CUDA:** Employ CUDA acceleration.

**CUDA smooth boost:** Makes use of special CUDA smoothing.

**Highlight:** Toggles highlighting, if it is turned on for your selected **VoxTree** object will be highlighted a different color. When off, there will be no visible change. This effect is dependent on the shader.

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

**Grow on pen motion:** With this enabled, relevant operations are not performed unless the Brush is in motion.

# Voxel Shaders

## CREATING, USING & EDITING

1. Basic Shaders
2. Complex Shaders
3. Matcap Shaders
4. Adjusting The Light
5. Creating & Editing Shaders

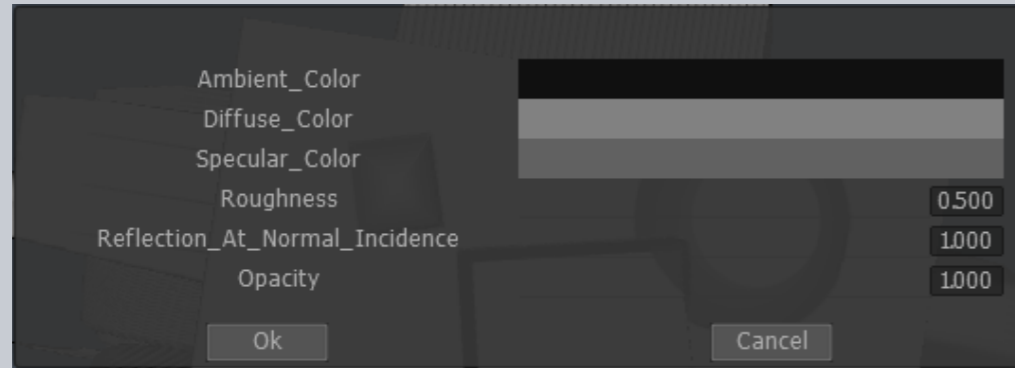
The use of Shaders on a voxel sculpture allow you to quickly see a realistic or impressionistic real time preview of your sculpture with various materials applied.

Shaders can be baked into the diffuse color layer of a “Merged” Retopo mesh, thus streamlining the texturing process in certain situations.

Primary shader properties can be edited, and altogether new Shaders can be created from scratch - giving you a powerful set of visualization options.



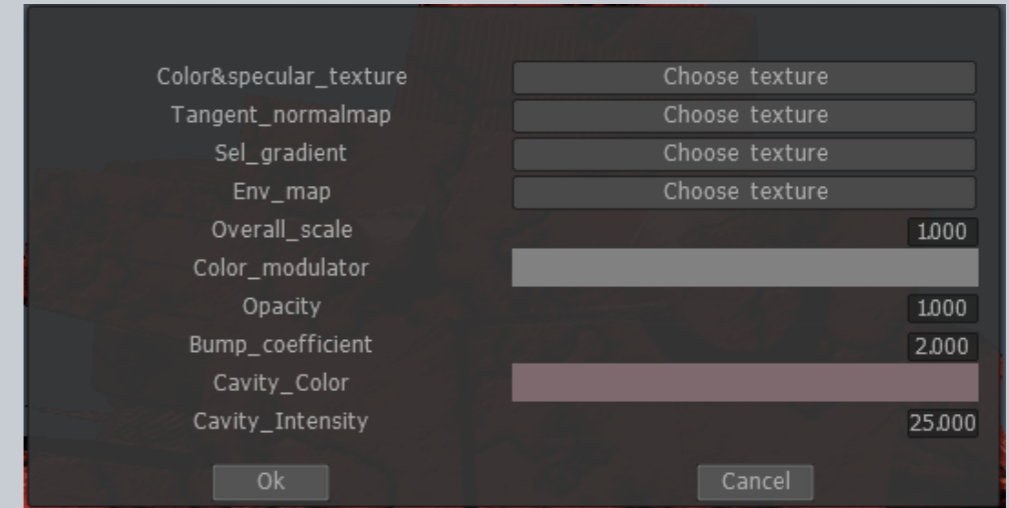
## 1.1 Basic Shaders



The most basic kind of shader has absolutely no custom settings (like the Default Shader). They are what they are and can't be modified.

The second kind of Basic Shader does have adjustable parameters as shown in the above dialog - which is obtainable through selecting a Shader, **Right-Clicking** over the Shader Icon and choosing one of the “**Edit**” commands from the **pop-up menu**.

## 1.2 Complex Shaders

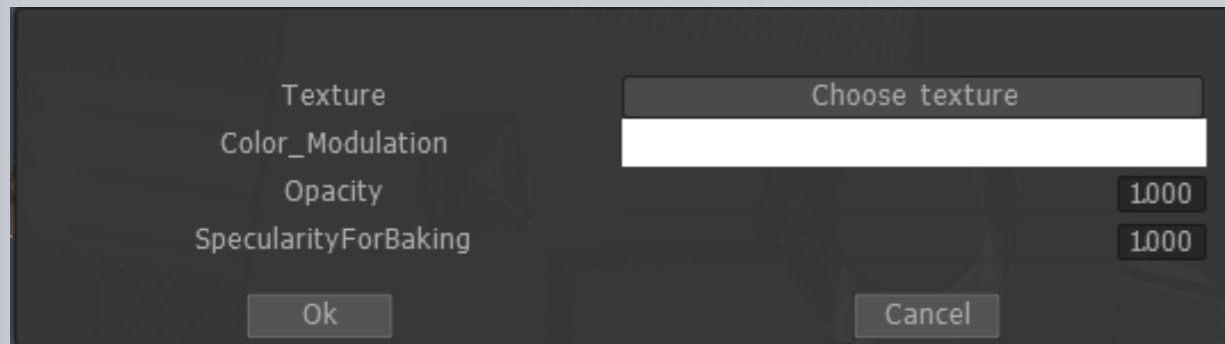


These types of Shaders have a number of additional properties that involve the use of textures (not mandatory). Shown above is the main “**Edit Dialog**” which include the use of textures for controlling things like **Normal** and **Bump** simulation, **Reflection** simulation and **Cavity** simulation.

Experimentation is the key to success, here.

Lots of new shaders have been created by users over the years, and can be found in the “**3D-Coat Exchange Library**” part of our Forum.

## 1.3 MatCap Shaders



These are special Shaders which get their characteristics from a certain type of Texture file which contain artificial lighting, color, specular, transparency and shading properties.

To create these Texture files, special software is needed and links to both the software and techniques for creating convincing textures can be found on the **Forum**, in the “**3D-Coat Exchange Library**” section.

# Surface Sculpting

Voxels require extensive hardware resources to produce highly detailed models, since they always include the entire volume of that object.

Surface Mode allows you to get an incredible speed boost by letting you ignore volume and concentrate on the surface of your model, only.



# General Surface Tools

## SURFACE FUNCTIONS

1. Sculpting Tools
2. Brush Options
3. Adjustment Tools
4. Object Tools
5. Commands
6. Direct Voxel Surface Painting

Many times asset economy and working speeds are a deciding factor in how to start and finish a complex project. Volumes are not always needed when considering the structure of any given model.

Working with Surfaces is fast and efficient whether you are the owner of powerful hardware arrays - or whether you are restrained by very basic system architecture.

Surfaces also offer the advantage and ability of being infinitely refined. Add, Subtract, Intersect, Decimate, Simplify, Smooth, Harden and Blend your surfaces until you are ultimately satisfied with the outcome.

## 1.1 Sculpting Tools

These are the “clay-like” tools that often parallel the same tools found in pure Voxel space.

You can choose to begin in Pure Voxels and eventually move your sculpture into Surface Mode (for increased performance, memory preservation and very fine detail work) - or start from the beginning working with “Surfaces”.

Many of the **Surface Mode Sculpting** tools lend themselves to freeform “**Brush-Based**” sculpting operations - giving the artist the freedom of building with the equivalents of clay, wax, wood, stone and paint. 3D-Coat also makes full use of your **graphics tablet’s** abilities.

Other tools provide for precision required in constructing mechanical model forms. Notable among these are those tools found in the “**E**” Panel - a selection of spline and polygon based drawing tools which can be positioned and altered as you work.

Both varieties of tools give the user the fastest, most fluid and accurate ways of constructing any type of model you might conceive, while economizing on system resources.



Since the Surface environment makes extensive use of “**Brushes**” - it is important to grasp their nature and composition - for it relates to many other areas and **Rooms** found within the 3D-Coat application.

**Brushes** consist primarily of the form of the Brush as defined by **Brush Alphas** found in the main “**Brush**” Panel, as well as their corresponding “**Options**” found in the **Options Panel**.

Surface Mode Brushes can be adjusted “on the fly” by means of the “**Right Mouse Button**” and horizontal or vertical **gestures** within the 3D Viewport.

Corresponding slider settings can be found within the “**Brush Parameters**” Panel, which show and augment the **Mouse-Based** parameters, and are found at the top of the 3D-Coat interface.

**Brush strokes** can also be modified by using functions from the “**Materials, Masks, Strips, Models and Splines Panels**”, when the context is appropriate.

The wonderful thing about Surface Mode Brushes is that you can work with incredible speed and accuracy - and if some polygons begin to become stretched, you may “**Re-Skin**” the whole model (affecting only your latest revisions),

by simply pressing the “Enter” key - replacing these stretched areas with a very consistent and organized, triangulated mesh structure.

At any time during your Surface Sculpting session, you may either return to pure Voxel Space - or move directly to the **Retopo Room**, by means of **AUTOPO** functions or to perform all of your manual Retopo operations.

Use the Voxel “**Layers**” Panel to store different versions of your sculpture, as well as parts of the model that need different and separate features and detail. These can all be transferred into different “**Retopo Groups**” for adding unique topology to each - and ultimately to the “**Paint Room**” for final displacement, bump, specular and color texture creation.

By **Right-Clicking** on any “**Surface Layer**” - you obtain access to the most frequently used functions that deal with Surfaces. More functions can be found in the main “**Voxel Menu**” at the top of the interface.

To view the current statistics of your Voxel Sculpture, or to obtain “**Tool Tips**” in expanded form, just look at the



“**Statistics**” Panel located at the bottom left of the interface.

Use the “**File**” menu to access all “**Import**” functions for bringing in external creations into the Voxel environment - and use “**Export**” functions for producing various direct Polygonal and Raw Voxel versions of your sculpture - to be used and modified in external CAD and 3D printing applications.

**Draw:** The Draw tool is great for quickly adding spontaneous detail. It is similar to the the Airbrush tool, but it only operates on the surface of a volumetric object.

**Smooth:** Produces much more dramatic smoothing than can be achieved with the standard Voxel equivalent.

**Pinch:** Surface Pinch is identical to the Voxel Pinch tool, but it is faster and 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:** Similar to the Flatten tool, but it's effect is less extreme and provides some irregularity along the stroke.

**Clay:** Surface Clay lets you quickly and fluidly apply mass to your voxel sculpture. The difference between this tool and the Carve brush is that it will also simultaneously smooth the surface after you've brushed it, giving it an authentic clay look.

**Buildup:** Similar in action to the "Build" tool found in the Voxel Room.

**Fill:** Surface Fill is a great way to fill in small voids and gaps in your objects. It is especially effective at very high settings.

**Expand:** Expands all vertices outward, uniformly, to a given radius. At the top left of the interface are the Extrude Direction Settings. This allows for user definable extrusions. The extrusion methods are as follows:



Average normal, View direction, Along axis (X, Y or Z), Vertex normal & Initial vertex normal.

These settings are unique to the following three tools:

**Expand:**

**Extrude:** 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 Brush Size, Depth and Extrude direction settings, while also maintaining the underlying surface details and topology.

**Freeze:** A very useful masking tool, which allows you to define areas to be avoided by sculpting tools, or inverted to be the focus area for sculpting. The common shortcuts are "Ctrl+Shift+ I" (inverts your selection) and "Ctrl + D" (which deselects it).

**Surfhide:** Works as a mask to hide a portion of the model's surface mesh. Use the "Invert hide" option to hide everything but the masked area.

**Rapid & Rapid2:** 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 Brush alphas but only brush **Size** and **Intensity**. Another great thing about this tool is that if you have two voxel objects in the viewport that are separated from each other in space, it will try its best to form a bridge between them (welding them together as one object).



**Scratches & Scratches2:** Provides a similar effect which clay sculptors use to "rough out" surface features quickly.

**Mud & Mud 2:** An interesting surface texture effect, providing rough edges.

## 1.2 Brush Options

These **Options** are the same as those you will find in the Voxel Room and offer you comprehensive control over your Brush behavior.

At the top of the panel is a preview of the **Brush Alpha** shape followed by a series of behavior controls.

**Brush rotation:** This sets the initial orientation of the alpha at the beginning of the stroke.

**Zero pressure radius:** When using a tablet stylus, this number indicates the default radius at the beginning of the brush stroke.

**Depth modulator:** The default depth for each brush being used.

**Rotation amplitude:** Sets the amplitude for additional brush rotation.

**Radius variation:** Sets the percentage of random brush radius variation.

**Depth variation:** Sets the percentage of random brush depth.

**Opacity jitter:** Defines the randomness of the brush opacity setting. **Jitter:** The overall randomness of brush behavior.

**Hue jitter:** Defines the randomness of the brush hue when used for painting color.

**Brightness jitter:** Varies the brightness, randomly, over the course of a stroke.

**Saturation jitter:** Varies the saturation of the primary color, randomly, over the course of the stroke.

**Vary color each stroke:** Use this option to produce painting effects, like fur or hair, when you need to either vary the Hue/Saturation/Brightness as you paint a single stroke, (variegated strand color), or when you want each stroke made to have a slightly different Hue/Saturation/Brightness - as determined by the corresponding “Jitter” setting.

**Random flip (x, y):** This randomly flips the selected brush either across its x or y axis while painting.

**Paint with dabs:** Creates paint or sculpting “dabs” which occur at some set spacing - as determined by the “Spacing” control.

**Rotate along stroke:** When using brush alpha shapes that you want to align like the bristles of a brush - so that they

change direction as the brush changes direction, all along the stroke - use this option.

**Skip eraser:** Disables the “eraser layer” of the brush.

**Strict alpha:** Use this setting to cause both sculpting and painting brushes to strictly adhere to the shape defined by the brush alpha.

**Flattened stroke:** Use this brush setting to mimic Photoshop brushes for improved stroke overlapping with a truncated alpha shape.

**Fade on edge:** All strokes painted with this option checked will have a smoother edge transition

**Use spacing:** When used with the “Paint with dabs” option, adjusting the “Spacing” percentage slider determines how close or far apart the paint dabs are applied.

### 1.3 Surface Adjustment Tools

A small subset of those same tools that appear in “Standard Voxel mode, offering faster response due to the nature of polygonal surface meshes, which are at the heart of the Surface mode.

## 1.4 Surface Object Tools

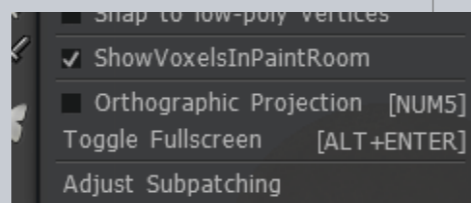
A growing subset of those same tools that appear in “Standard Voxel mode, offering faster response due to the nature of polygonal surface meshes, which are at the heart of the Surface mode.

## 1.5 Surface Command Tools

A subset of those same tools that appear in “Standard Voxel mode, offering faster response due to the nature of polygonal surface meshes, which are at the heart of the Surface mode.

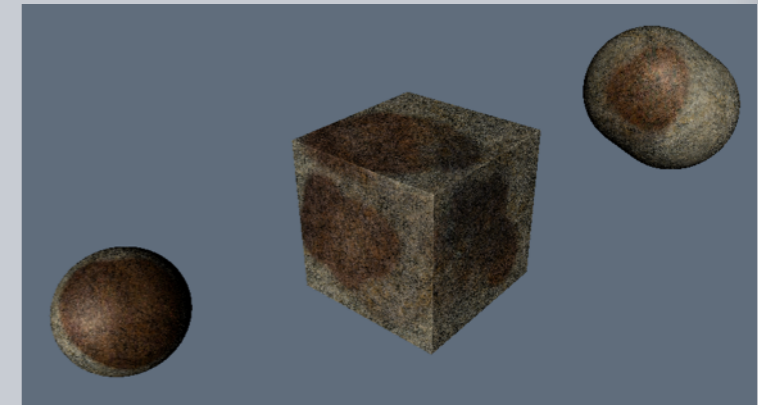
## 1.6 Direct Voxel Surface Painting

Once in Surface Mode, we really are dealing with a polygonal representation of a voxel object’s “skin”. Although this skin represents a temporary condition of a model before it is ready for export, vertex colors can be applied to



this temporary, relatively high resolution mesh in the Paint Room.

To use the Paint Room tools for painting the diffuse color directly onto your Surface Mode mesh - simply click on



the Paint Room tab and start painting with the standard tools and **Alphas** with a single color - or use a “**Material**” from the “**Materials Panel**”.

If you have applied a Voxel Shader to your sculpture, the diffuse details from this shader will be combined with whatever you paint in the **Paint Room**.

Make sure you have enabled “**ShowVoxelsInPaintRoom**” from the “**View**” menu to enable diffuse color painting.

All painting done in this manner is strictly temporary - in the sense that it is bound to the realm of 3D-Coat, itself. Once you use any method to “**Merge**” your model and its topology into the Paint Room - all these painted details will be baked into this permanent mesh as a diffuse texture map, which can then be exported along with your mesh.

# LiveClay

BY CHRISTIAN MICHELIN

LiveClay is 3D-Coat's implementation of "Dynamic Subdivision" theory. It is rapidly becoming a preferred way of working and developing very large scenes.

With all of the "feel" of volumetric sculpting, LiveClay also supplies users with friendly and familiar tools for "painting" volume and detail into their models.

Crisp detail and sharp edges can be created, refined and preserved all through the sculpting process - without exhausting system resources.

Work interchangeably with Curve and Polygon based spline tools - as well as an infinite variety of supplied and user defined Brush Alphas that contain boundary, interior and depth.

# LiveClay in 3dCoat V4

## What is LiveClay?

LiveClay is a new array of sculpting tools introduced in new 3D Coat V4 that perform local subdivision to provide sharper details where needed. Those tools can be accessed under Surface mode and are fully compatible with all surface tools, including Freeze tool.

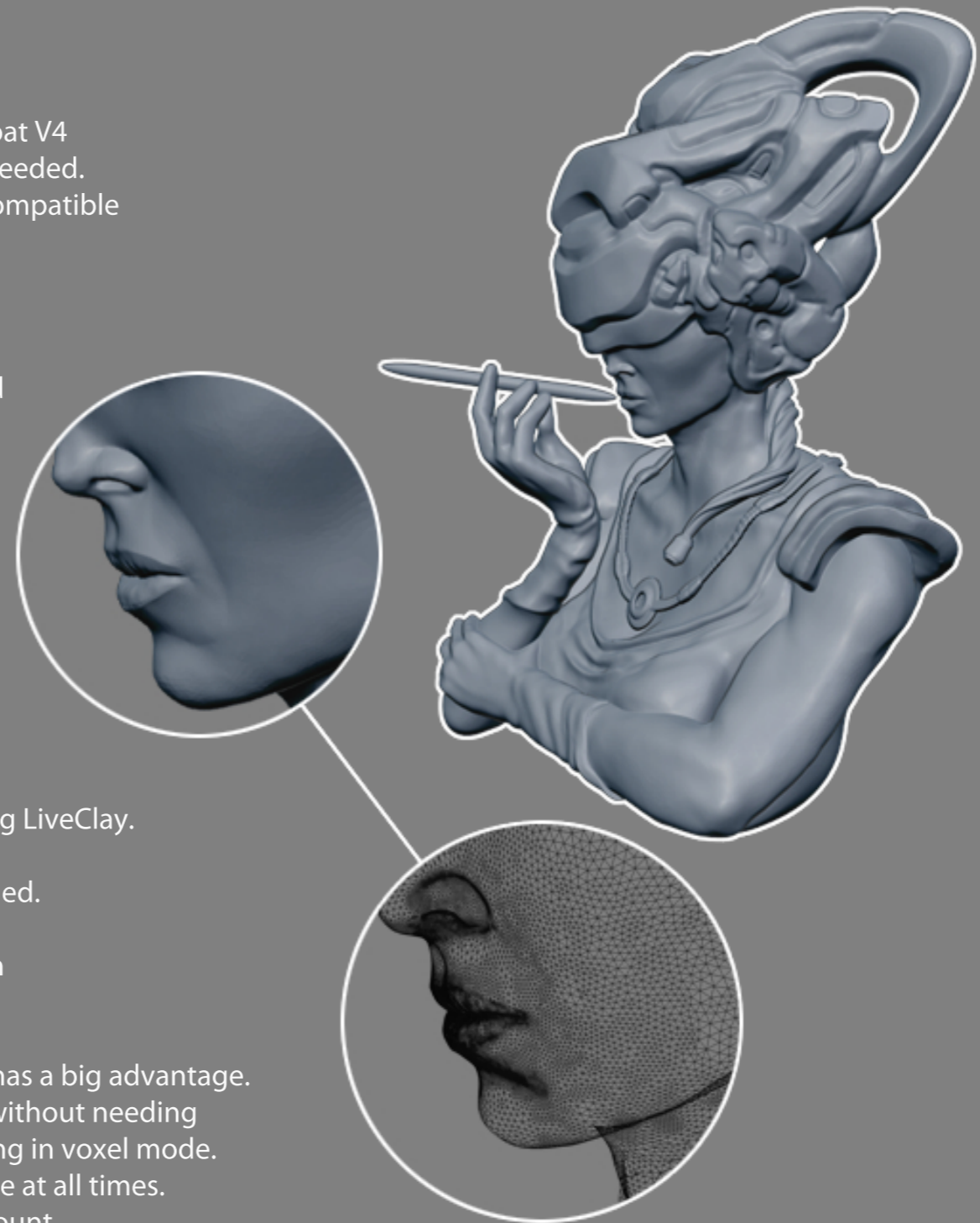
With LiveClay you set details where you want them to be, at the resolution you want them to be. Surface can be heavily distorted without polygons stretching and you can locally reduce, increase or even reconstruct any parts of your sculpt at any given time.

LiveClay also include a broad range of tools that allow cutting, bridging, cutting/closing holes.

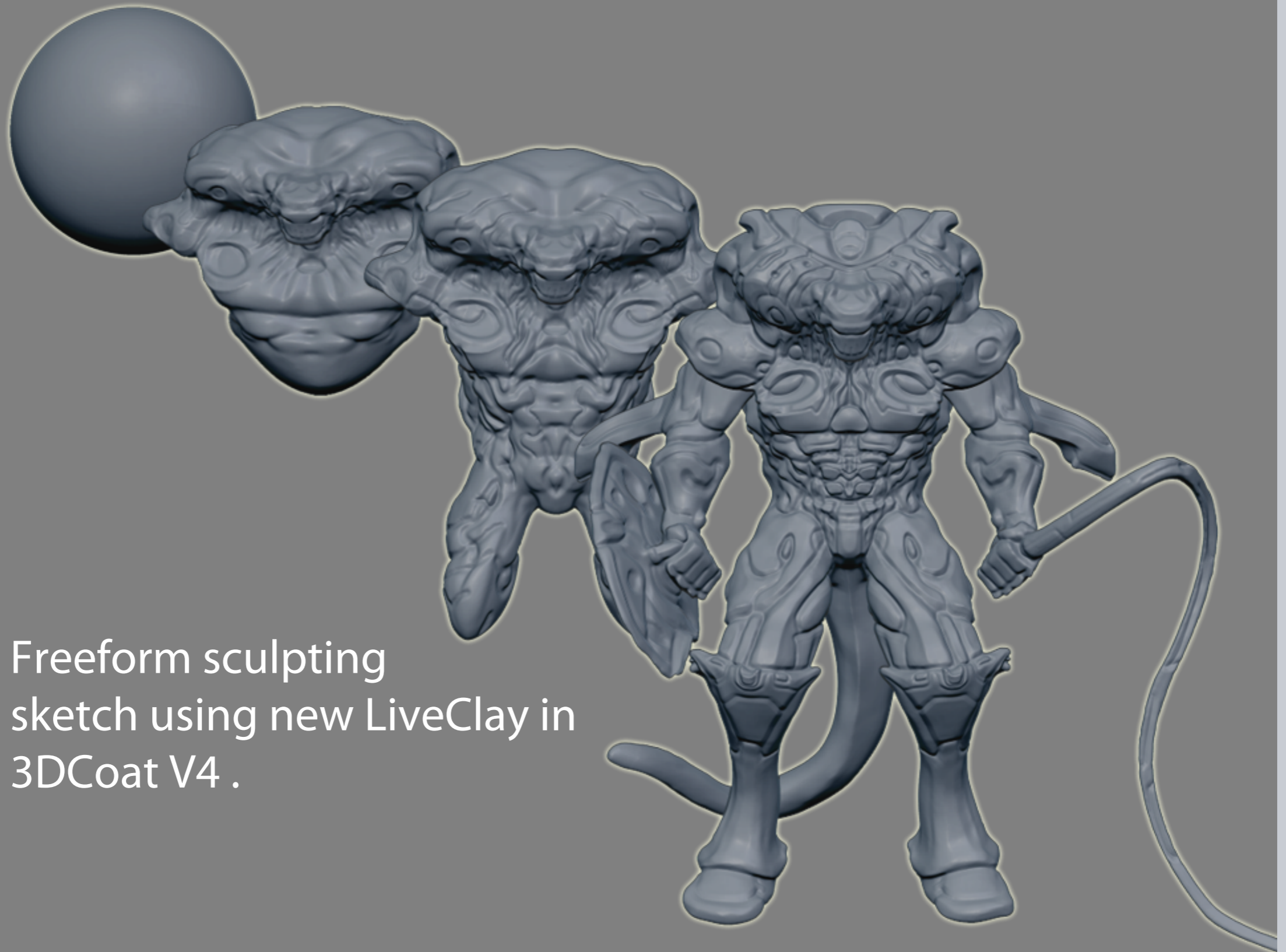
## LiveClay VS Voxels.

In voxel mode booleans operations perform much faster. (subtraction, merging, intersection ect..)  
Voxel mode is perfect to build up bases to be further refined using LiveClay. Also, although LiveClay gives user a great sense of freedom, when dealing with polygons a certain level of care is always needed. In Voxel mode, since user never truly deal with polygons, there user can be more aggressive and use more true freeform approach closer to 2D sketching.

But when dealing with meshes from external packages LiveClay has a big advantage. With LiveClay you can directly add details on imported meshes without needing to subdivide the whole object, which is not the case when detailing in voxel mode. In voxel mode mesh resolution is distributed evenly across surface at all times. So to merge crisp and sharp detailed meshes require huge polycount. Even when shapes are not so complex, because even low polycount objects can be very sharp sometimes.



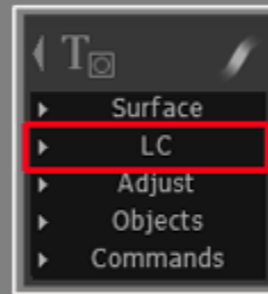
Sharper details around lips area locally subdivided using LiveClay brushes.



Freeform sculpting  
sketch using new LiveClay in  
3DCoat V4 .

# Starting using LiveClay.

In Surface mode LiveClay tools are located right between Surface and Adjust tools:

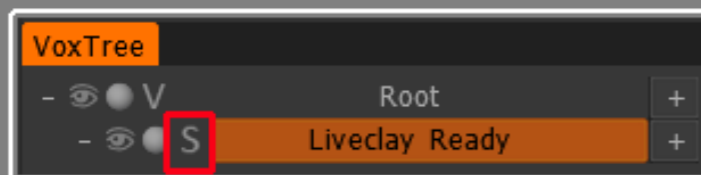
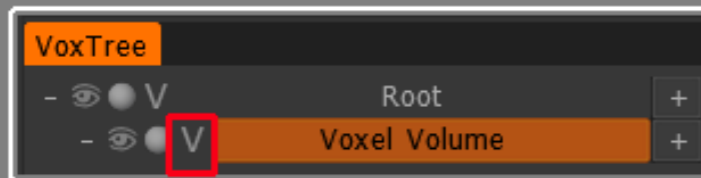


There is 3 ways user can directly start using LiveClay tools.

1. Selecting Surface mode from 3DCoat's start up menu.

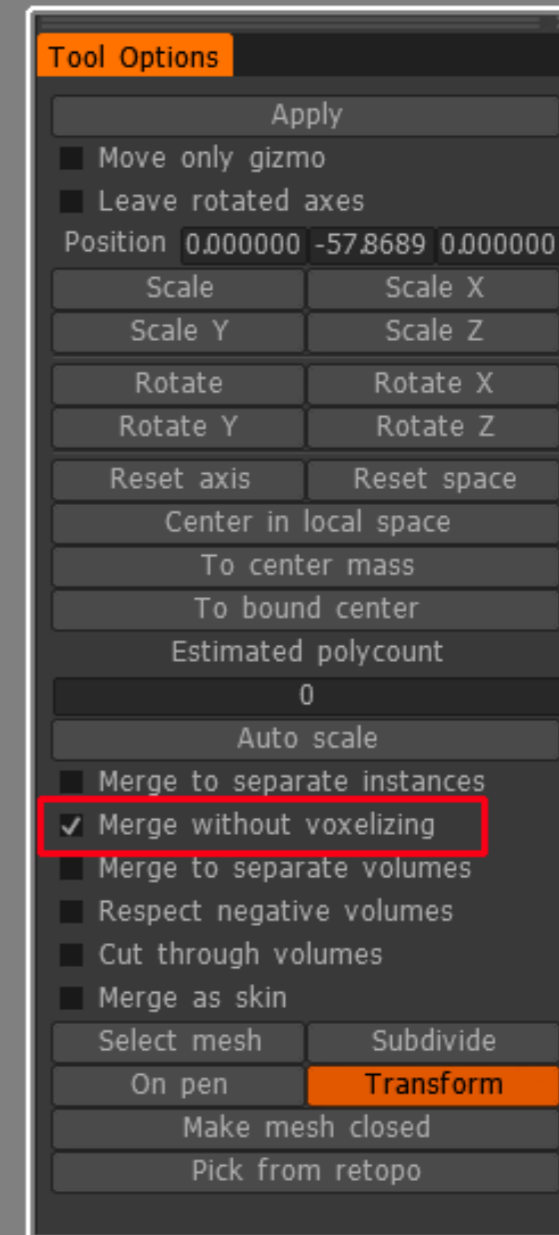
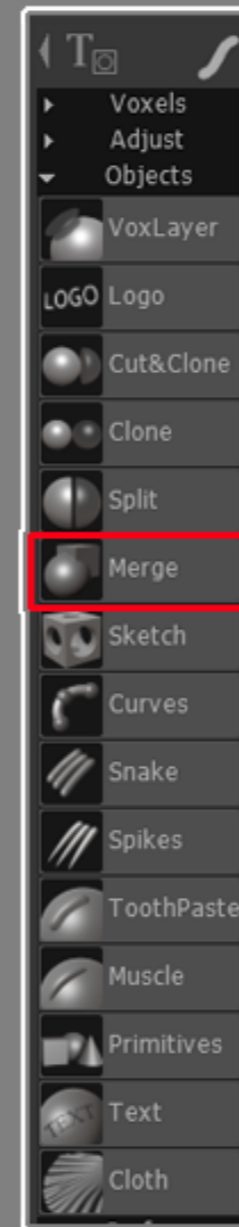


2. Turning a vovtree layer that is in Voxel mode to Surface Mode by clicking on the "V" icon beside your volume layer in the vovtree.



3. Checking "Merge without Voxelizing" checkbox in Tool options of "Merge" tool.

This is the best method if you want to import an external mesh "as is" without using start up menu.





# Basic Settings: Detail and Smoothing

Even though each LiveClay tool is different, they all share the essential action that is dynamic subdivision. The 2 fundamental settings controlling this in 3DCoat are : DETAIL and SMOOTHING.

## Detail:

The detail slider control the degree of subdivision the brush will perform along the stroke.

It goes from 0 to 3.

High values will produce sharp strokes or very clear stamps( if stamp mode is used)

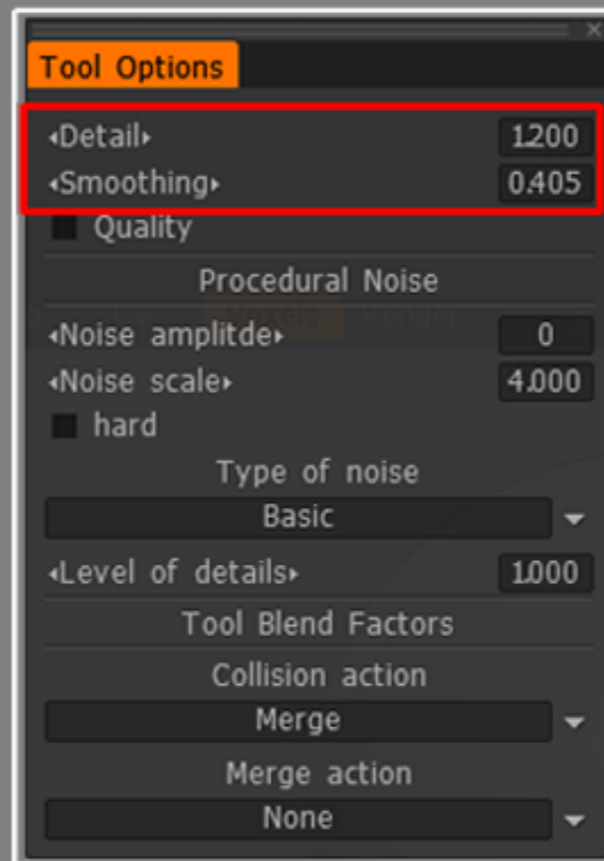
The triggering of subdivision is highly related to brush radius, smaller brush radius will automatically trigger subdivision.

## Smoothing:

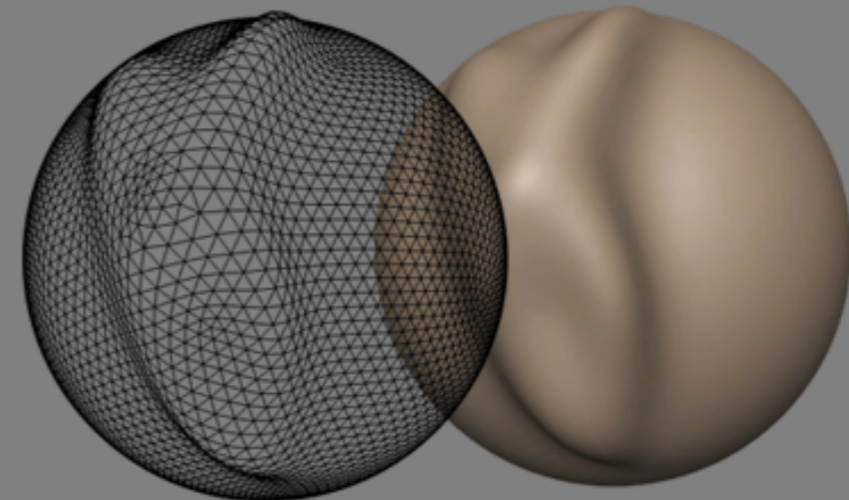
The smoothing slider control the amount of smoothing that is performed along the stroke.

It goes from 0 to 1.

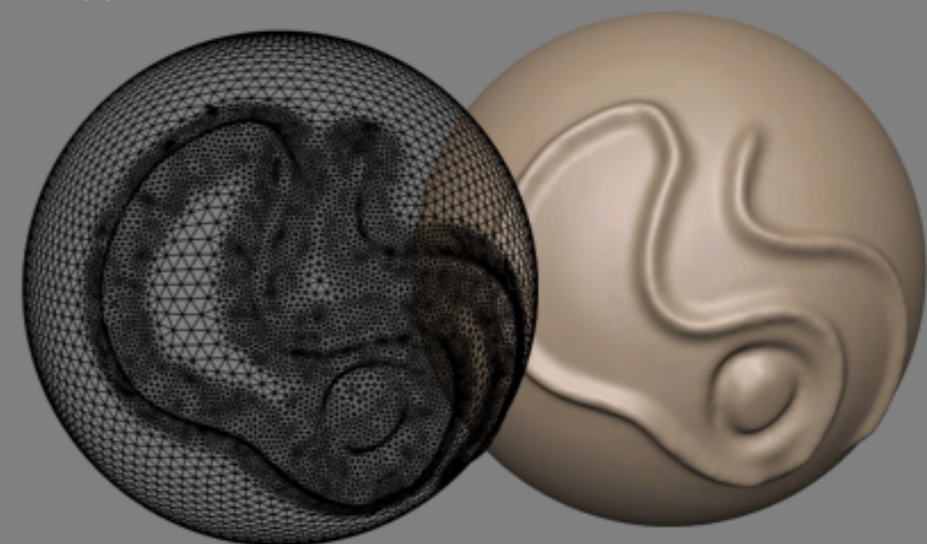
High values will give a very smudgy claylike feel that will even smooth surrounding areas, while lower values are very useful to produce nicer strokes ,especially when spacing is activated in pen options.



Here is an example of BuildClay tool using a medium sized brush along a Detail value of 1.5. Notice that no local subdivision was performed.



Now with same value of 1.5 but a smaller brush radius is used and local subdivision is automatically triggered.

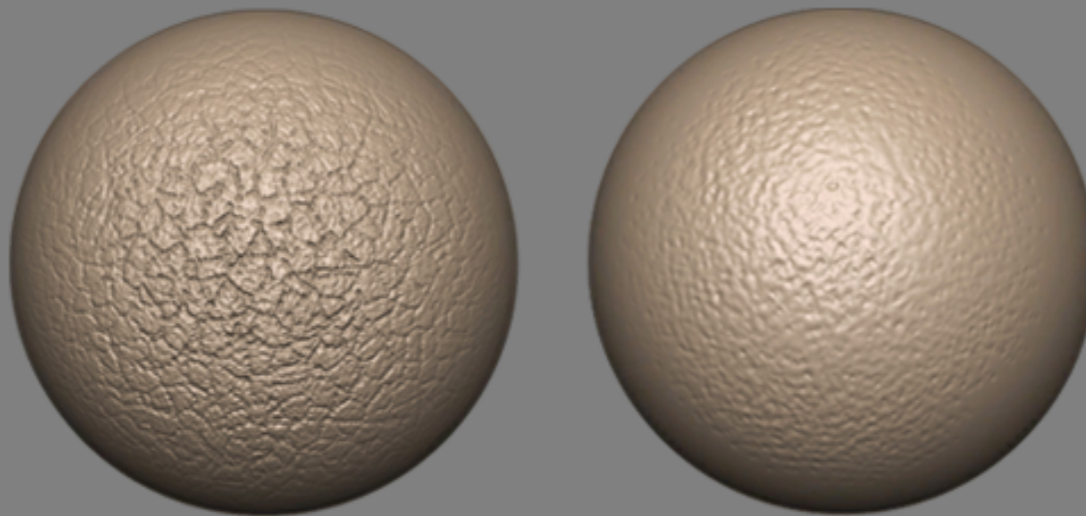
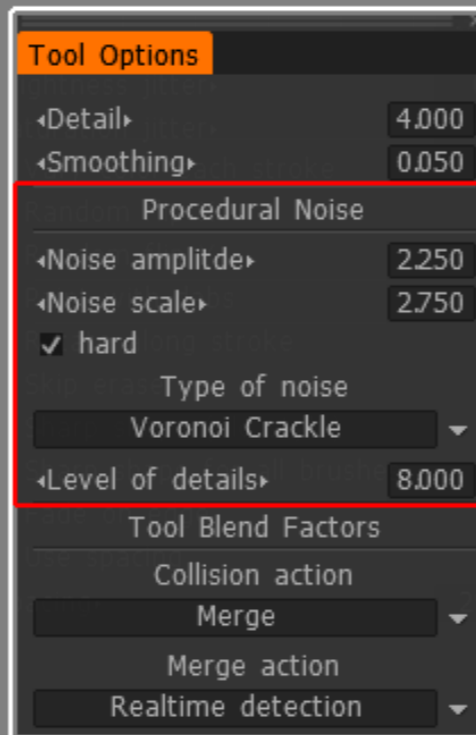


# Secondary settings: Part 1: Procedural Noise

A lot of Liveclay tools are empowered with 2 different set of controls: Procedural Noise and Tool Blend Factor.

Procedural Noise let user add different types of noise effect to their brush strokes. When mixed with the normal behavior of the tools some very interesting results can be achieved, ranging from distressed paper to granite or bumpy skin.

Here are two examples demonstrating some kind of crackles and skin bumps user can achieve when activating Procedural Noise.



## The settings:

**Noise Amplitude:** This setting determine the strenght of the applied noise effect.

**Noise Scale:** This setting control the overall scale of the applied noise. Smaller values will produce more grainy textures while larger values can generate more rocky effects for example.

**Hard checkbox:** checking this will provide sharper noise.

**Type of noise:** Various types of noise can be selected there. -Basic, Perlin and six different Voronoi noise.

**Level of Details:** This setting control the level of local subdivision performed by 3DCoat when applying the noise effect. It is entirely independent from the chosen Liveclay tool own level of detail.

Slider range from 0 to 8 but higher values can be entered. Sometimes to achieve desired effect much higher values are needed.

:Note that since 3DCoat is performing local subdivision for both the chosen tool and the procedural noise at the same time, so high values will impact performance.

# Secondary settings: Part 2: Tool Blend Factor

Tool Blend Factor is a very important addition that is present in many LiveClay tools. Those controls are there to let user decide what is going to happen when strokes intersect with geometry .

Using those controls 2 effects can be achieved:

-3DCoat can either trigger a near voxel-like behavior, meaning the stroke will organically merge with the geometry it collides with or alternatively 3DCoat can automatically repel the colliding geometry .

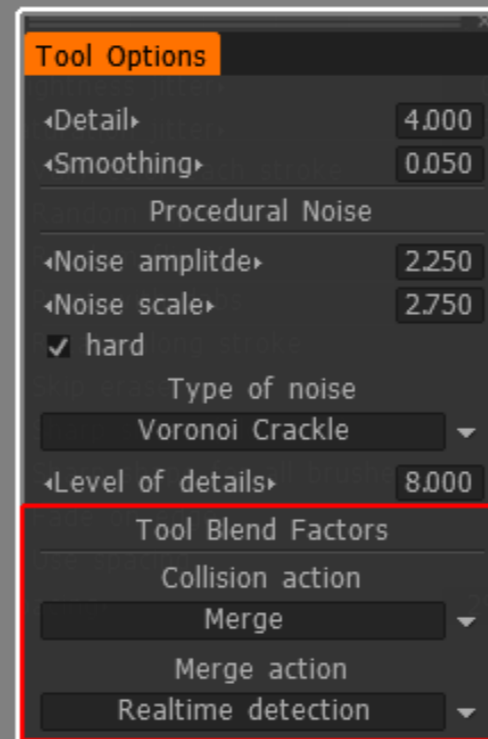
## The settings:

Merge action: there you can either select NONE or REALTIME DETECTION.

To activate either repel/merge  
Realtime Detection MUST be selected.

Selecting NONE is equivalent to turning tool blend factor off.

:Note that Realtime detection is an heavy process and it can impact performance significantly depending on the other settings values like Level of Detail.



Collision action: There you can choose either MERGE or REPEL.

Here is an example using BuildClay tool with REPEL activated:



Here is an example using same tool but with MERGE activated.:



# LiveClay tools

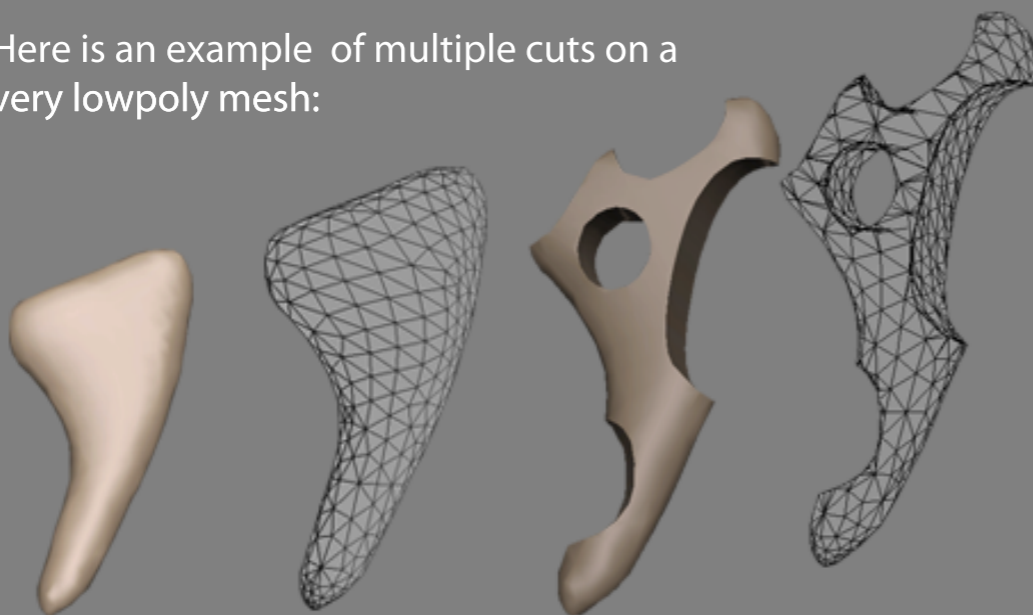


## Cut Off

Cut Off tool is a very powerful tool in LiveClay arsenal. It allow user to make fully volumetric cuts on lowpoly objetscs. 3DCoat will automatically add local subdivision along your cut in order to provide the sharpest cutting possible and this ,even on very low density meshes.

Cut Off tool is intended to be used on lowpoly meshes, it is NOT intended to do large cutting operations on multimillion meshes . For this, Voxel Mode is better suited. Cut Off tool is optimised to make large cuts on meshes in the 10k-500k polys range and smaller holes/cuts on meshes in the 500k-2millions range.

Here is an example of multiple cuts on a very lowpoly mesh:



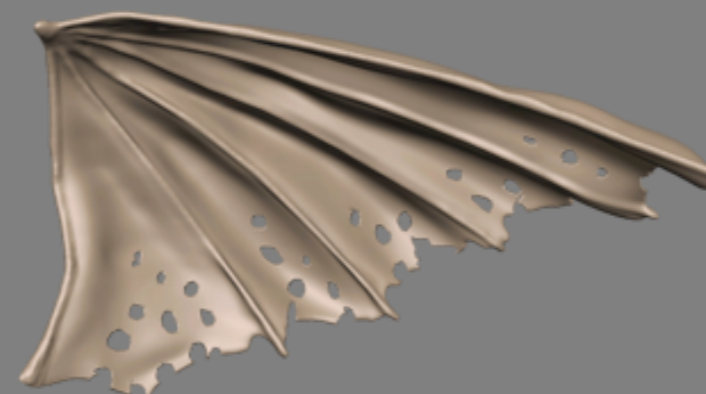
## To Use:

Simply choose one of the available selection modes from 3DCoat's E-panel...and Cut!



It is perfect tool to make hard surface designs out of lowpoly objects or create holes through thin surfaces like clothes ect...

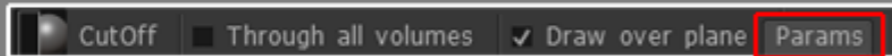
here is example of smaller cuts on a 1 million polys mesh:



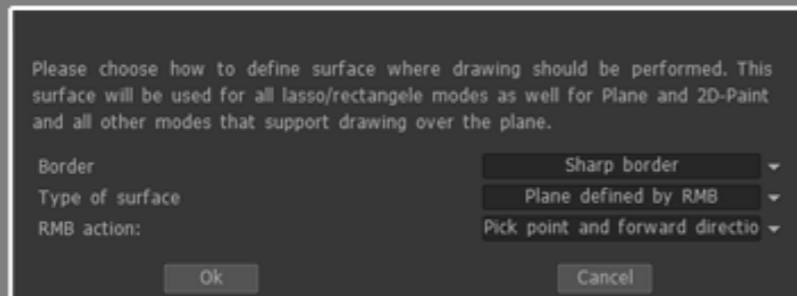
: Note that Cut Off tool does not work well when attempting to cut through self-intersecting surfaces, in such cases cutting operation may fail. But in those situations 3DCoat will warn user about the existence of such intersecting parts,and operation can be safely aborted.

## Using Cut Off with Draw over Plane Option.

When activating "Draw over plane" checkbox that is located on the top Ui bar,



a new set of options become available that allow you to use CutOff tool using a custom plane. It is very useful to achieve nice hard surface designs or when you just don't want to cut all the way through your sculpt.



Border:

This parameter is not relevant when using CutOff tool

### Type Of Surface (RMB):

Plane Defined by RMB: Plane location will be set by rightclicking on the surface. Drag while holding RMB to define larger/smaller plane.

### RMB Action:

-Pick Point and forward Direction:

Rightclicking will pick base point for the plane and will use camera view as normal direction.

-Pick Point Only:

Rmb will pick point only and leave direction unchanged.

### RMB action(suite)

-Pick Point and Direction:

Rmb will pick base point of the plane and sampled averaged normal under point will be used.

-Pick Point and Direction (local):

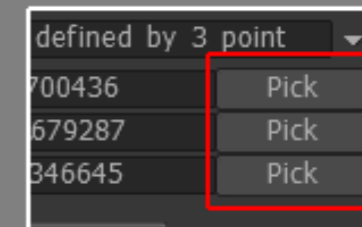
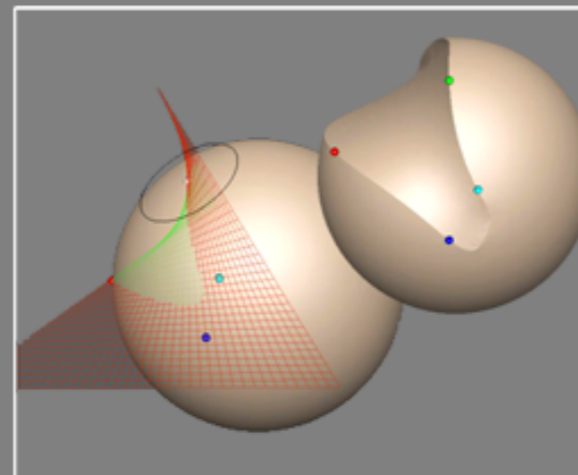
Rmb will pick base point of the plane and local normal under point will be used.

-Navigate:RMB won't pick anything.

### Type Of Surface (points):

#### Plane Defined using 3 points:

Plane location is controlled by 3 user defined points. To draw a point on surface, select using PICK button then click on surface. To move points around just click and hold RMB.



NOTE; When using 3 or 4 points method it is better to perform Cutting using Lasso as Rectangle mode can create unexpected results.

#### Plane Defined using 4 Points:

plane location is controlled by 4 user defined points. The fourth point is very useful to achieve curved areas.

# LiveClay tools



## LiveClay and BuildClay



LiveClay and BuildClay tools are very good brushes to sculpt organic details. They can also provide sharper strokes when coupled with sharp alphas, custom brush curves or Falloff.

The only difference between LiveClay and BuildClay is that BuildClay tool will keep adding depth to the surface as long as pen/mouse is in motion, while the basic LiveClay tool will stop adding depth pass the chosen depth value until mouse/pen is released and stroking renewed.

Below is example of tools used with continuous motion for same amount of time using a Depth value of 65%.

LiveClay



BuildClay



Notice that LiveClay tool stopped adding depth while BuildClay kept adding depth way over the initial value as long as pen motion was performed.

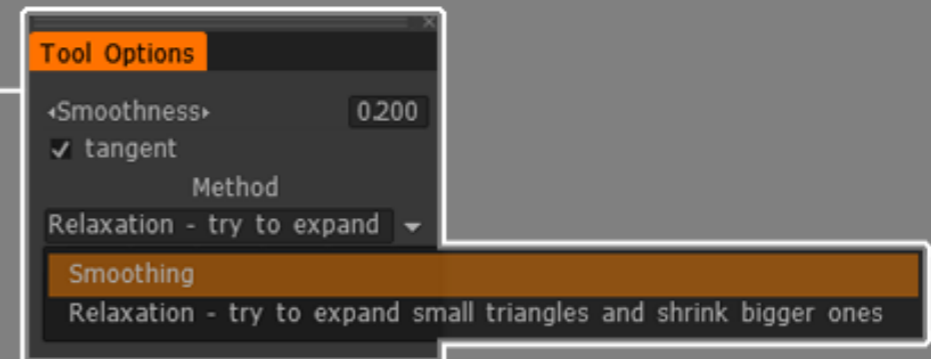


## TSmooth

TSmooth or Tangent Smooth provide a wide range of smoothing/relaxation options. It improves topology but does not shrink the mesh, as it maintains the original shape as much as possible and all relaxation happen over the surface. Very useful for clean topology.

Smoothness: Set the degree of smoothness applied when brushing.

Tangent: When checked smoothing will better preserve hard edges, especially when Relaxation mode is used.



User can choose between two modes: Smoothing or Relaxation mode. Relaxation mode will try to expand smaller triangles while shrinking bigger ones.

# LiveClay tools



## ExtrudeClay

ExtrudeClay is among all LiveClay tools the one that is best suited to be used along grayscale images. It provides maximum sharpness and various modes of extrusion.

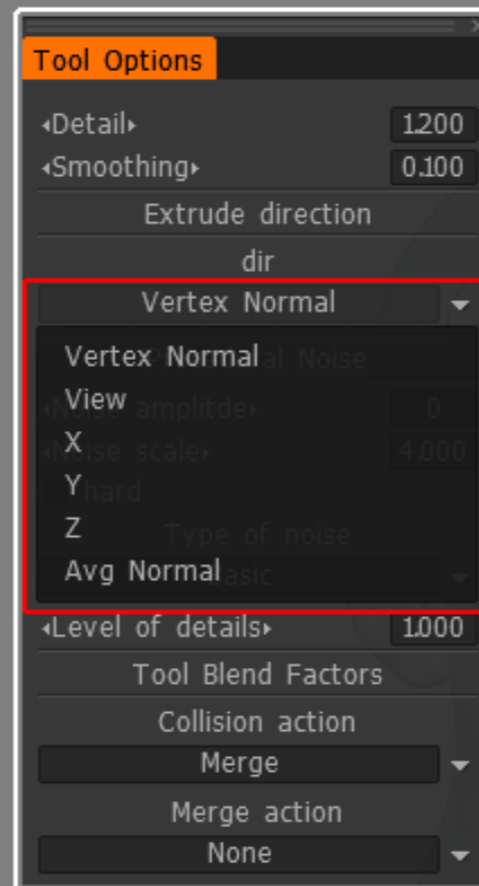
Use the dir roll out to select one of the various mode to determine the direction toward which the extrusion will be performed,

Vertex Normal: extrusion will be performed along true normal of the vertices

View: extrusion will be performed facing the current selected view

X,Y,Z: Extrusion will be drawn toward selected axis.

Avg Normal: Extrusion will be based on the averaged normal of the vertices.

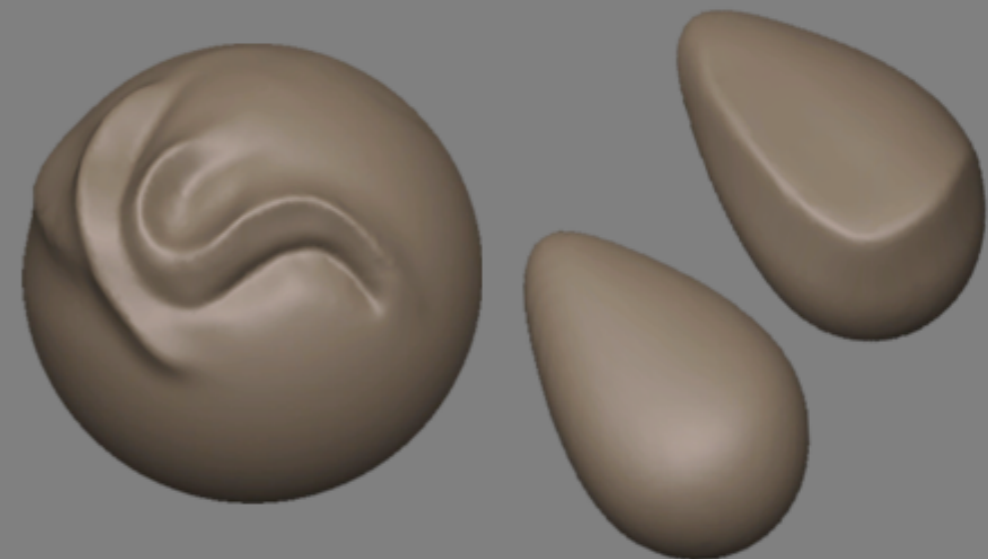


## CreaseClay

CreaseClay is a tool that perform a dual action, it combines depth addition/substraction of the basic Liveclay tool but it perform some pinching along the stroke as well.

It is great tool to locally add wrinkles and folds to organic sculpts or sharp curves to hard surface designs.

Larger brush sizes are best used at lower resolution for better efficiency.

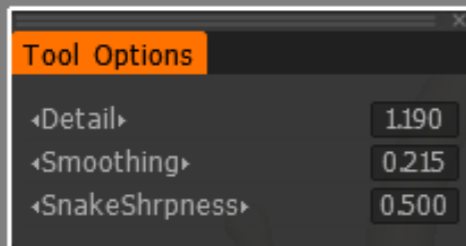


# LiveClay tools



## SnakeClay

SnakeClay let you pull strands out of the surface of your sculpt. New strands can even be pulled out of each others. Perfect for an animal's tail or ornamental jewelry.



### Detail:

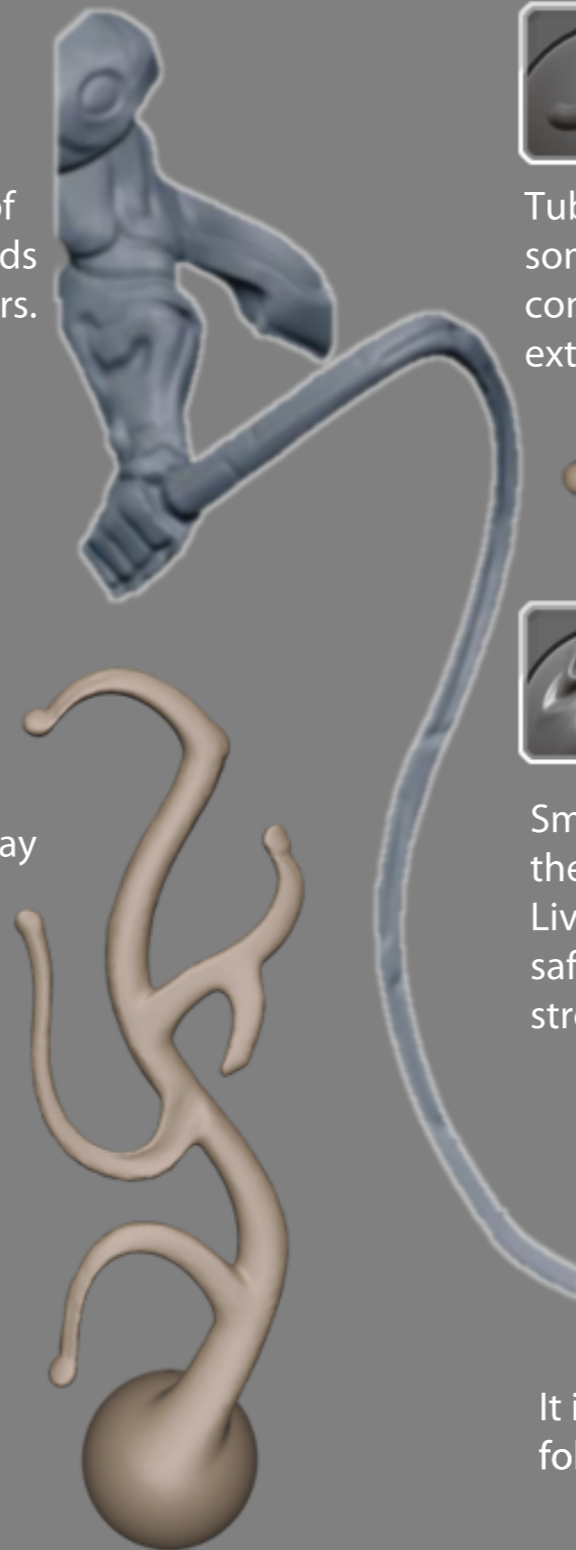
The detail value determine how far the strand can be pulled away from the surface.

### Smoothing:

Control how much the strand is smoothed as it is pulled.

### SnakeShrpness:

This value determine the sharpness of the pulled strands. Higher values will tend to create more spiky strands. Very useful to make horns or grass.



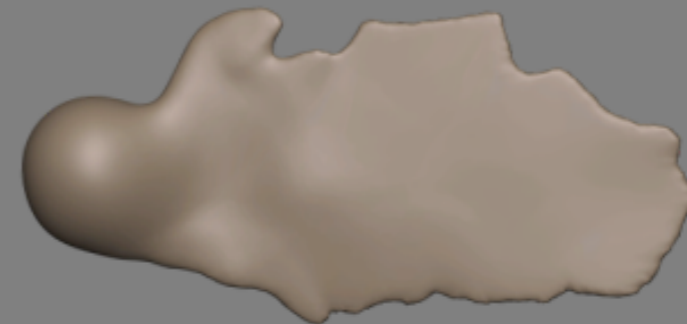
## TubeClay

TubeClay is a very straightfoward tool that is somehow similar to the BuildClay tool as it let you continuously stack up depth, but in a much more extreme manner.



## SmudgeClay

SmudgeClay let you smear the surface across the screen as if it was a 2D painting. LiveClay takes care of adding resolution so you can safely smear across big distances without worries of stretching the mesh too much.



It is a very useful tool when working on clothing folds or sketching hair styles for example.

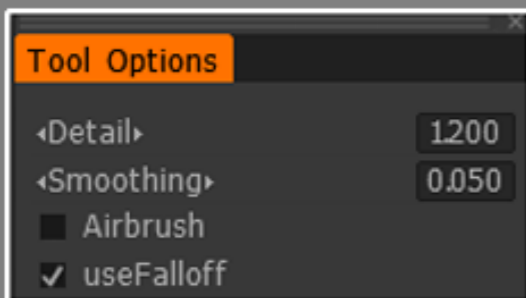


# LiveClay tools



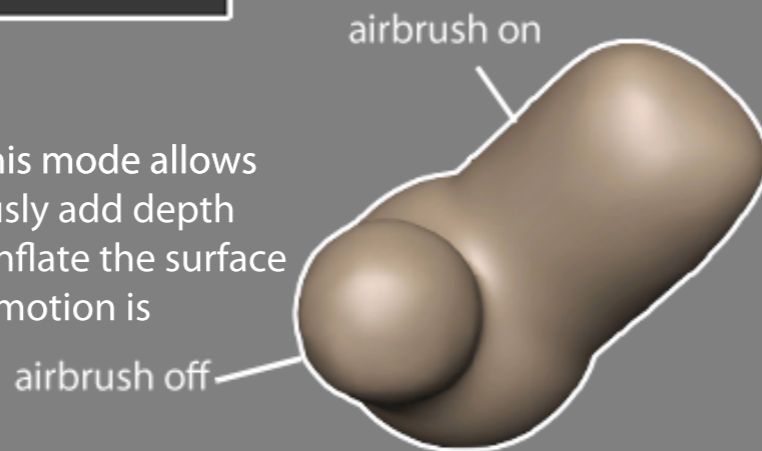
## InflateClay

InflateClay let you add depth as if hot hair was blown from underneath the surface. With InflateClay one can quickly build eyes inside their sockets or even grow fruits at the end of tree branches for example.



This type of deformation tend to stretch polygons a lot but, thanx to LiveClay it is now pure fun to use.

**Airbrush:**  
When checked this mode allows you to continuously add depth while the brush inflate the surface as long as brush motion is performed.

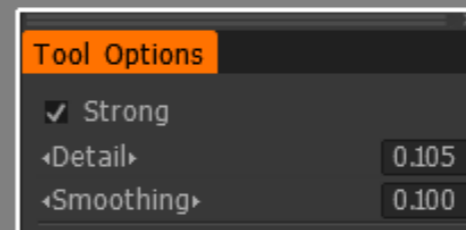


**useFalloff:**  
checking this box will make the tool take full advantage of the current falloff value. it is very useful to achieve less spherical results.

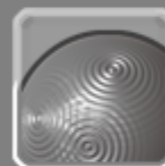


## SwirlClay

SwirlClay allow you to twist portion of mesh around brush center. LiveClay will generate the necessary resolution needed to prevent overstretching of polygons. Using a negative depth value will twist the mesh counter-clockwise.

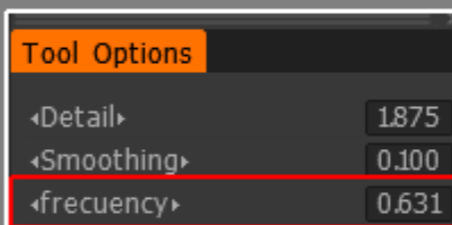
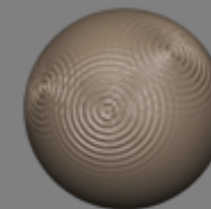


**Strong:**  
checking this box will provide a slightly stronger effect.



## RippleClay

RippleClay tool let you add or substract depth using a custom ripple, it is a very simple and straightfoward tool.



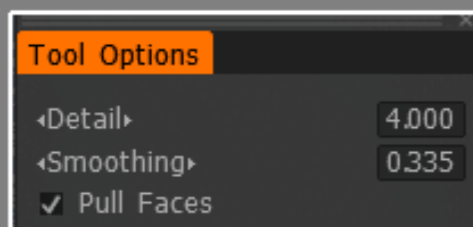
**Frequency:**  
this value control the amount of ripples that will be in your stroke. Lower values generate more ripples.

# LiveClay tools



## FlattenClay

FlattenClay tool allow you clip the surface of your sculpt using brush strokes. LiveClay will establish resolution of flattened areas based on the chosen Detail value. It is compatible with both falloff and pen pressure.



Pull Faces: checking this will add depth at the same time flattening is performed.

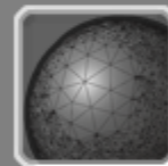


## WrinkleClay

WrinkleClay tool is somehow a blend between SmudgeClay and surface Pinch .It works by dragging and pinching the surface altogether along the stroke.

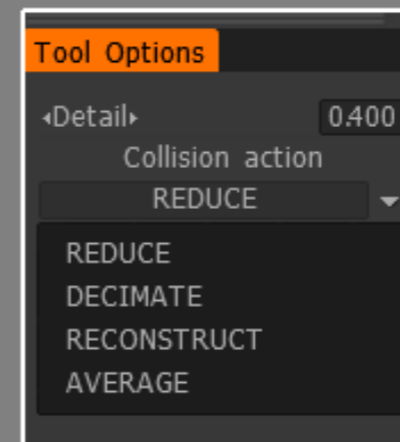


Various effects, useful for both organic and hard surface sculpting can be achieved using that tool.



## CleanClay

Of all the tools in the LiveClay arsenal CleanClay is one of the most vital as it allow user crush down mesh density. Actually,CleanClay it is not a single tool but rather a collection of tools that provide user with different ways to restructure the topology.

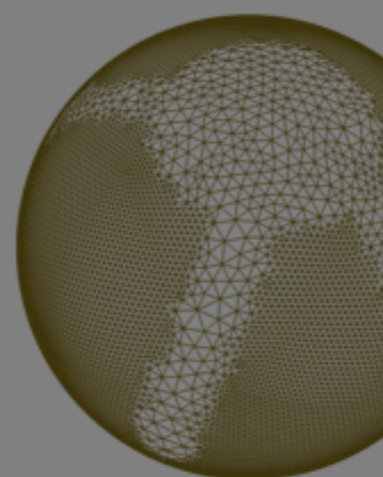


Reduce: Perform reduction based on detail value.

Decimate: Perform Decimation instead of reduction, preserving sharp details.

Reconstruct: remesh the area under brush area,generating new topology based on Detail value.

Average: Will average the mesh density to the level sampled at the very start of the stroke.

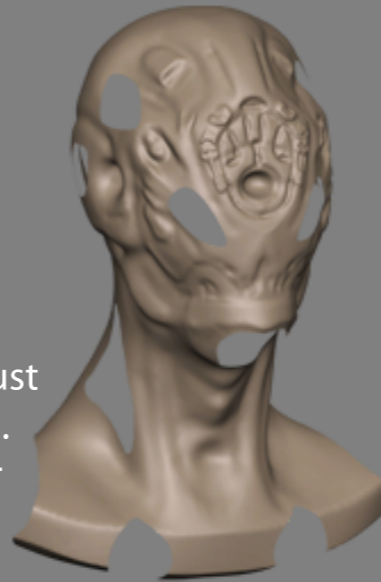


# LiveClay tools

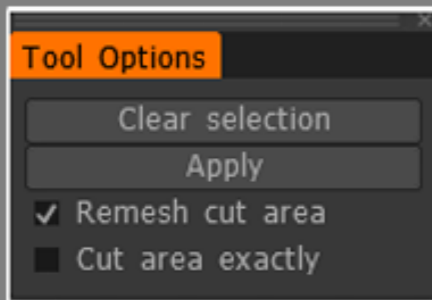


## PaintHole

PaintHole tool is a little similar to CutOff tool, but instead of making fully volumetric cuts it just make holes unto the outer surface of the mesh. Adaptive subdivision is still performed in order to provide the sharpest holes possible.



To use PaintHole ,just select any of the available selection modes from E-panel or directly paint selection using brushes if you like. Once satisfied with the selection just press the Apply button.



Remesh cut area: checking this will remesh the holes. When using remesh it is better to leave "Cut area exactly" unchecked.

Cut area exactly: use this to get sharper cuts.



## CloseHole and PinHoles



Both CloseHole and PinHoles share the same purpose which is to close holes. but here is how they differ :

-CloseHole tool lets you close holes by enclosing them inside selections made using E-panel .

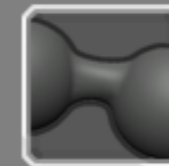
-PinHoles will automatically detect/close holes when stroke cross from the exterior to the interior of the hole. It also use a custom Detail value .



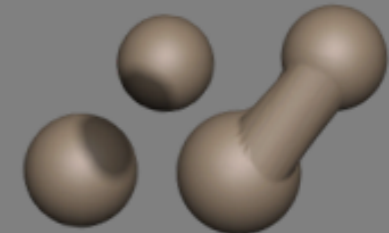
## Reconstruct

Reconstruct tool perform the exact same operation as its equivalent in CleanClay tool, but instead of using brushes strokes it let you draw a selection to define area to be reconstructed. Here action is not performed in Realtime but only when user press "Apply" button.

As in CleanClay tool, Detail value controls the coarseness of the remeshed section.



## Bridge

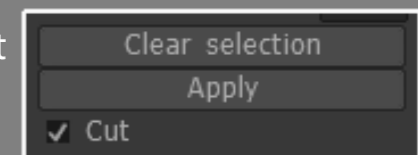


Bridge tool automatically generate new topology to link 2 opposing surfaces on the same volume. It can bridge between 2 objects but both objects need to be on the same volume,

It works by painting 2 selections on the 2 opposing surfaces and pressing "Apply".

NOTE THAT IF A THIRD SELECTION IS MADE THE OPERATION WONT BE PERFORMED.

cut: this will remesh /cut the selections prior to bridging.



# AUTOPO

Automatic Topology Creation. This revised and improved function now produces very accurate, contour following topology automatically - that works equally well for both organic and mechanical shapes.



# AUTOPO (Automatic Topology)

## DENSITY AND GUIDES

1. Opening Dialog
2. Density Shading
3. Flow Guides
4. Automatic UV's
5. Tips for Hard Surfaces

We were first in bringing you the most accurate and efficient automatic routines for adding usable Topology to Sculptural models - both organic and hard surfaced.

We continue to refine these routines to greatly reduce the number of man hours needed to create 3D assets from start to finish - all within 3D-Coat.

Once mastered, these automatic tools will often produce completely usable models - ready for texturing and even animation - all with the minimum of manual input and toil.

## 1.1 Opening Dialog

The AUTOPO routine tries to create a mesh with nice edgeflow. It uses a curvature field over the surface. But it is not always possible to create a clean curvature cross field because of noisy details on the model's surface. So it is helpful to draw directional guidelines using the Retopo->Strokes tool. You may do this during the next step of this wizard. Add strokes or slices to provide better cues for the AUTOPO algorithm. There are 3 parameters below: Intermediate resolution means that initial mesh will be reduced to this resolution before starting the procedure. The larger the intermediate mesh, the longer the procedure will take. Approximate polycount refers to the number of polygons you want for your exported model. Additional smoothing steps are used to smooth the mesh and hide noisy details. You can set it to 0 if you want to get sharper details.

Intermediate resolution (x1000 faces)	180
Approximate polycount	3000
Additional Smoothing	2.000
Ok	Cancel

Automatic Topology or AUTOPO lets you begin the process of creating new topology with a minimum of tools. You can determine much of the

final result by properly using the settings found in the opening dialog box.

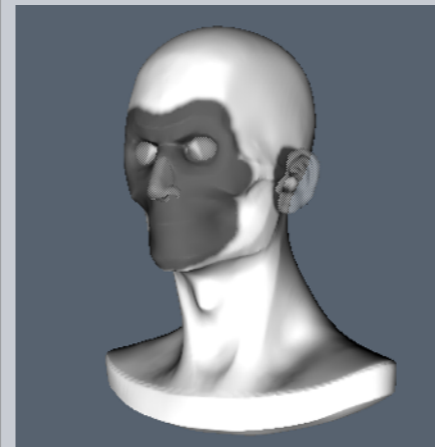
**Intermediate Resolution:** A temporary subdivision level that 3D-Coat uses for establishing an approximate level of detail that is needed to snap the final topological “cage” accurately. You will find that the default setting works well for most situations (but, trial and error will help you to learn which value is best for any given model type).

**Approximate Polycount:** This value determines the final number of polygons that will be present in your automatically topologized mesh. For example, 2500 is a typical value used in making game assets.

**Additional Smoothing:** The default value is usually fine for organic models, and a value of 1 is usually better for hard surface model shapes. Feel free to experiment with these.

## 1.2 Density Shading

AUTOPO wizard	
Paint with this tool to mark areas of higher polygon density. Press "Next" when done. The parameter below is the density modulator for shaded areas.	
DensityModulator	2.000
Next	Cancel

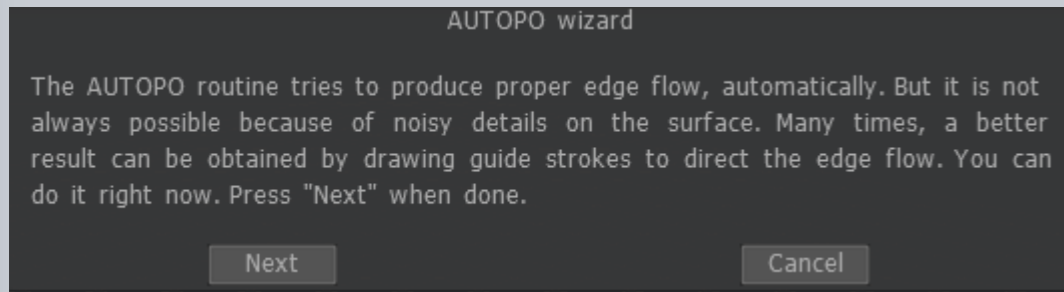


In models where you desire more polygonal density (for displacement purposes), 3D-Coat allows you to designate these areas with a “mask”. You can paint these regions with freehand Brush Tools, or you can make more precise designations by using the “E” Panel tools.

In practice, it is often helpful to allow **AUTOPO** to determine its topology without assistance - just to see which areas need more guidance - (this applies for Flow Guides, as well). Sometimes “no guidance” produces the best results.

After a first pass with **AUTOPO**, you will be able to see more clearly which areas need your manual help. It's easy to get carried away, masking too many areas to be scrutinized by the algorithm.

### 1.3 Flow Guides

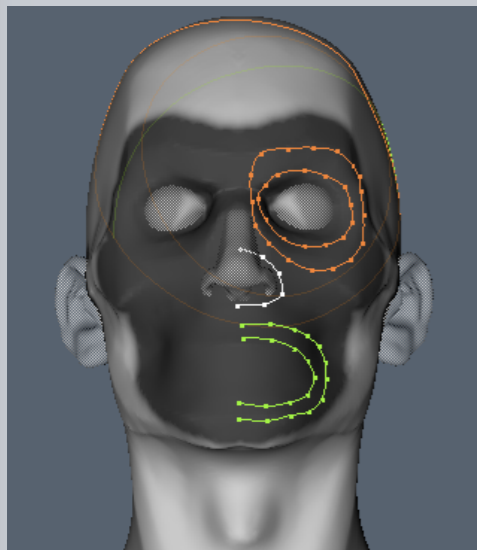


When no guides are placed by the user, **AUTOPO** usually produces good polygon flow throughout the resulting

mesh, with no unwanted twisting. (Facial topology being the exception).

However, adding guides which do not reach far enough can result in this unpleasant twisting of edge loops and polygon rings.

The best practice, when dealing with organic shapes that have appendages (arms, legs, fingers),

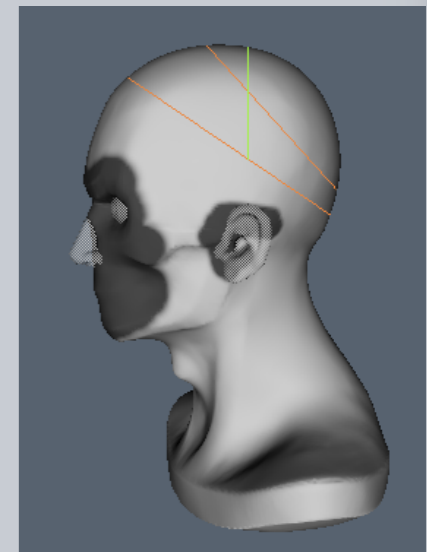


is to start and stop the guide lines before and after “connecting” joints, where a thinner piece of geometry meets a thicker piece (i.e. where an arm meets a shoulder or an arm joins a hand).

In these cases, the guide should be drawn as a continuous line starting before the shoulder and extending beyond the wrist and well into the hand area. Fingers should be given guides that start at the tip and continue beyond the wrist, when possible (the longer the better). This helps eliminate any twisting.

In areas of your model where loop consistency is desired and there are no branching areas, use “through” guides - longitudinally and laterally - starting and stopping the guide line outside of the mesh area.

These guides will, by default, be straight lines and will serve to “slice” the model all the way through - saving you the time of drawing separate guides for the front and back surfaces. This type of guide works well in areas like the torso and within the “girth” of an arm or leg, for example.



When a “through” guide is used laterally across an area like an arm, they will form complete “loops” around the arm.

## 1.4 Automatic UV's

If you choose one of the more extremely automated options for **AUTOPO**, (“**AUTOPO** for Per-pixel”, for example), be aware that 3D-Coat will mark and “Unwrap” your mesh in its own automatic way. This can often work out well, producing a **UV Map** with consistently sized quadrangles throughout - but the seams of this UV Map may be awkwardly placed for certain view angles and uses.

When you anticipate potential problems, it may be best to choose the simple “**AUTOPO**” function and mark all seams and Unwrap your mesh manually, inside the “**Retopo Room**” before “**Merging**” your mesh into the **Paint Room**.

## 1.5 Tips for Hard Surfaces

Generally speaking, a hard surfaced model will not be animated in an “organic” fashion, but, if at all, will be animated along discreet “part” lines of construction, (like a robot arm or leg, for example).

Even more often is the case that a hard surfaced model will not be animated within itself, at all - but may only remain a static fixture or a model moving through space as a whole unit.

Sometimes a hard surfaced model needs to have concrete divisions of texture space - designating unique texture areas that start and end along designated edges.

Each of these situations may require individual treatment, and are, thus, better achieved by creating topology manually.

However, in those non-animated cases or in cases where a texture will be consistent throughout, (like a rusty boiler or a painted object consisting of one color) - **AUTOPO** could be the ultimate, time-saving alternative to manual texturing, UV marking and unwrapping.

In these cases, try running **AUTOPO** by offering, as your only input, the final, desired polycount. Add no **Density Shading** or **Flow Guides**. Do a trial pass, letting **AUTOPO** do all the work - and you may be surprised at the excellent results.



**AUTOPO** does a surprisingly good job at finding hard surface edges and divisions - relieving you of that responsibility - saving you time and sweat.

If you find yourself needing to add input in the form of **Guides** or **Density Shading**, it can be necessary to use Orthographic Projections (front, side, back) - without Perspective, to accurately mark a “**Through Guide**” or a straight density demarkation.

# Manual Topology

3D-Coat provides a plethora of tools for constructing custom topology, automating repetitive tasks when possible - giving you the speed you need to get your project done on time.



# Retopo Tools & Functions

## THE TOOLSET

1. Overall Purpose & Function
2. General Retopo Workflows
3. Basic Tools
4. Tweak Tools
5. UV Tools
6. Commands
7. Retopology Groups
8. The Retopo Menu
9. The Texture Baking Tool

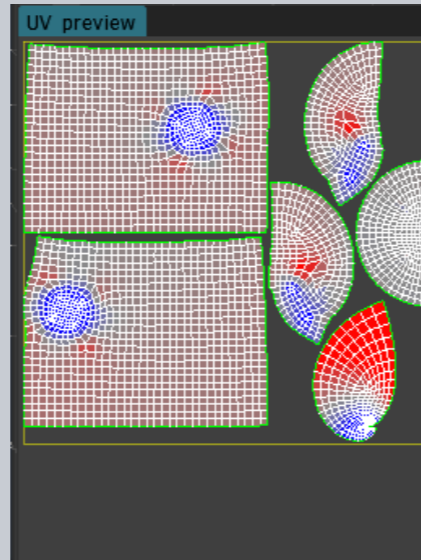
In the 3D Age of Polygons, topology is still a necessary consideration for nearly every phase of modeling and texturing.

The 3D-Coat set of tools make this necessary task as quick and painless as possible, allowing you to approach topology creation from many different angles accommodating many different methods.

Tied directly to the creation of UV Maps, you can see a preview of your UV's throughout the topology making process for modification and updating, before you commit to a final arrangement.

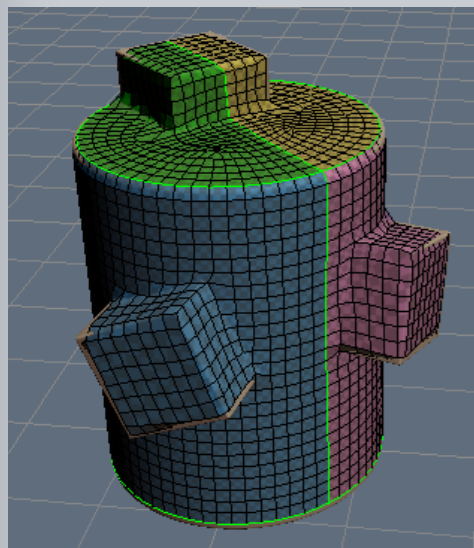
## 1.1 Overall Purpose & Function

The Retopo Room and the UV Room and its functions are tied together, so that whatever topology is created or edited in the Retopo Room is also reflected in the UV Preview - (which will ultimately become the “permanent” UV Map for your model).



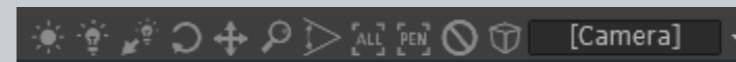
Some parts of the Retopo Room interface change and update to reflect new choices that become available for a given function - dependent on the context of that function.

We will point out these changes when the selection of a tool or function causes them to occur.



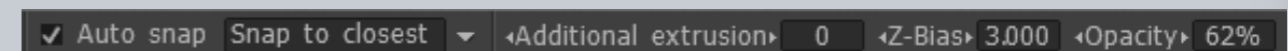
Also, many important functions are contained in the “Retopo Menu”. It is important to know when and why to use these options throughout the entire Retopo/UV Map creation process.

Since there are many possible workflow situations which will involve the creation or modification of a model’s topology and its associated UV’s - we will cover the most common ones.

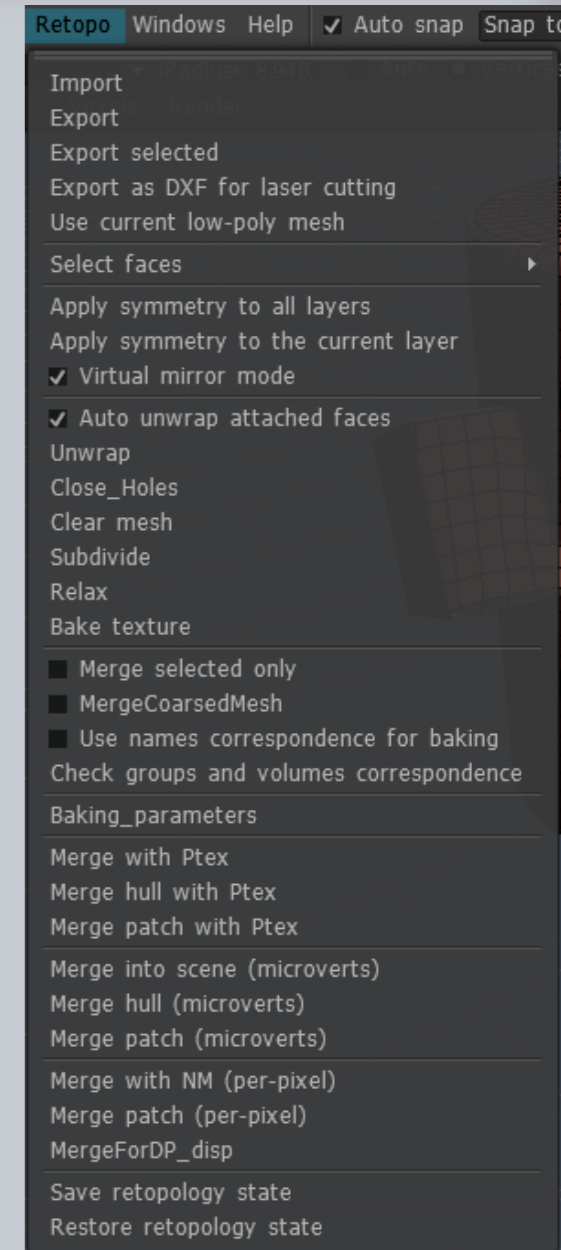


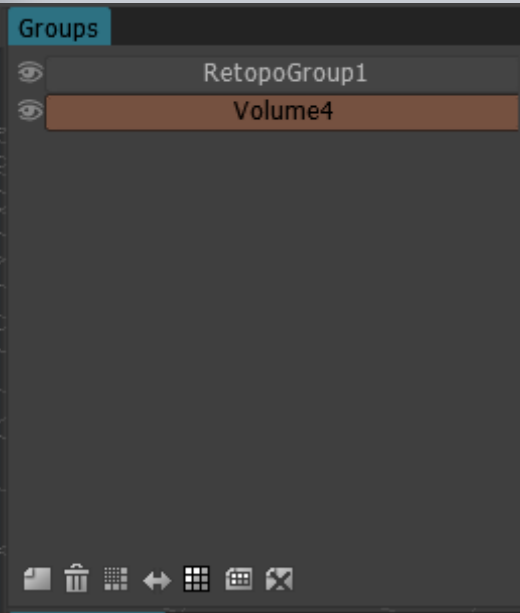
The Viewport in the Retopo Room functions as it does in all other Rooms - and you can use all of the gestural shortcuts and Navigation and Camera controls available in the other Rooms.

When a Retopo function makes use of 3D-Coat Brushes - these familiar controls are adjusted as they are in other Rooms. For numerical control of the Brushes, look to the sliders at the top of the interface.



The Retopo Room and its tools can also be used to modify any topology created automatically through the use of AUTOPO, as well - nothing is set in stone.





One model can be composed of many separate “Retopo Groups”. These Groups may be created simply to designate different components of a model - or to isolate different areas to receive different texture treatments. They may also be used to contain different topological treatments to be used for different purposes (LOD

versions and animated or static versions of a model, for example).

fps:19; Faces: 2979 [0 Triangles, 2975 Quads, 4 N-Gons] Verts: 2983 UV-verts: 3221 [3223] Triangles: 5962

The “Statistics Panel”, located at the bottom of the interface contains a continual readout of your most important model information, as it is updated by your actions in the Retopo Room. These can help you in locating troublesome n-gons, triangles and give you a complete overview of the total number of polygons composing your model.

## 1.2 General Retopo Workflows

When one needs to create or modify topology, it is usually due to one of the following cases:

1. A model exists which already has a topological arrangement that needs to be modified.

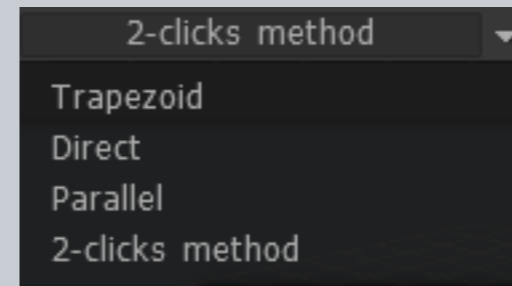
2. A model exists which has topology, but it needs to be changed in shape or form or detail level - by means of sculpting in the Voxel Room - (and these new model features will serve as a “base” to which existing topology must be “snapped”).



3. A sculpture (made in 3D-Coat or Merged into Voxel Space) needs to be given practical topology and textures within 3D-Coat - for export and use in a 3rd party application.

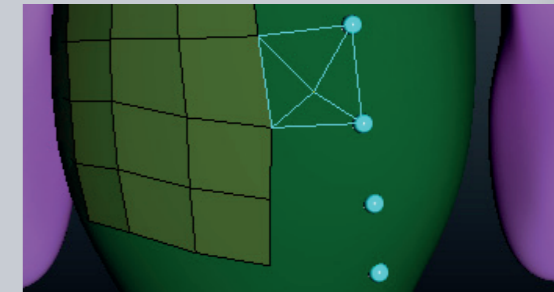
In the case where a sculpture has originated in 3D-Coat or has been imported into the Voxel Room - and this model will be used for CAD, CNC or Rapid Prototyping applications - it is not usually necessary to produce Manual Topology. There are direct Export functions available from

the “File/Export” menu which allow for the export of a skin approximation of your voxel sculpture or options for exporting various dense quad meshes or triangulated meshes for those systems which prefer these topological arrangements, and need “actual” detail and displacement, rather than those “simulated” forms which are produced by means of texture maps. These types of Exports can take place from within the Voxel Room, itself.



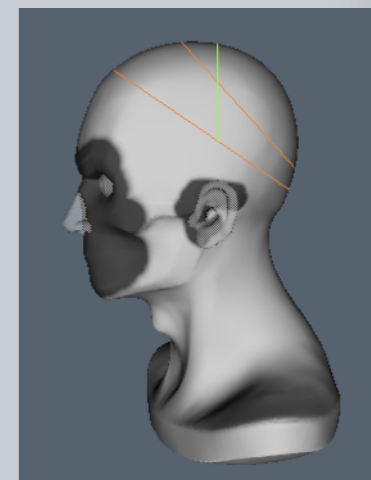
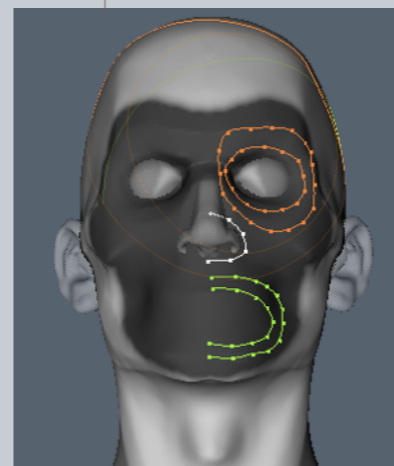
**Quads:** You can use 4 different methods for defining new topology, one quadrangle at a time.

**Points/Faces:** Use this tool to create either quadrangles or triangles, point by point - hovering the mouse cursor over the area defined by the points and “**Right-Clicking**” to establish the new polygon. You can move vertices by “**Right-Clicking**” and dragging it.



**Cap:** Hovering the mouse cursor over a hole surrounded by connected topology and “**Right-Clicking**” creates a “pole” and the connecting triangles which serve to close the hole.

**Strokes:** Create topological “cuts” which form loops through an area of a model, or draw freeform splines with an even spacing of vertices which you define in advance. One use for this tool is to define a surrounding cylinder



### 1.3 Basic Tools

**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.

**Select Path:** Define a seam for Unwrapping by designating a path composed of vertices you select in linear order. Press “**Enter**” when you have established your path to create the seam.



of polygonal rings by first drawing a sequence of loops (start drawing in empty space and finish in empty space) - then draw a freeform spline along the length of a model “appendage” (arm or leg), and pressing “Enter” to finalize and create a cylindrical set of faces which define the appendage.

**Brush:** This tool can be used to “Tweak” a set of vertices based on a “soft selection” determined by the size of the Brush. Holding down “Shift” while using this tool causes the brushed polygons to be “relaxed” or smoothed.

## 1.4 Tweak Tools

**Delete Polygons:** Hover the mouse cursor over a polygon until it highlights and “Left-Click” to delete it.

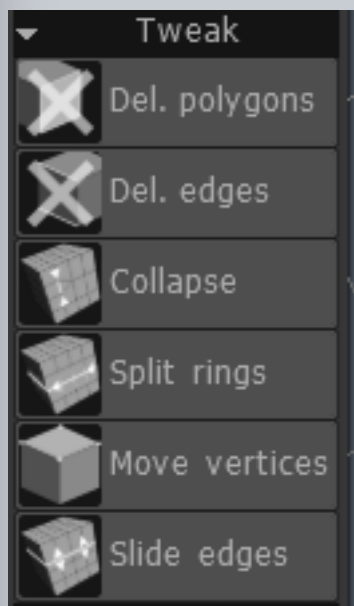
**Delete Edges:** Hover the mouse cursor over an edge until it highlights and “Left-Click” to delete it.

**Collapse:** Hover the mouse cursor over an edge until it highlights and “Left-Click” to cause the 2 vertices joined by the edge to become 1 vertex.

**Split Rings:** Create new edge loops and adjoining edges by highlighting a row of edges and “Left-Clicking”.

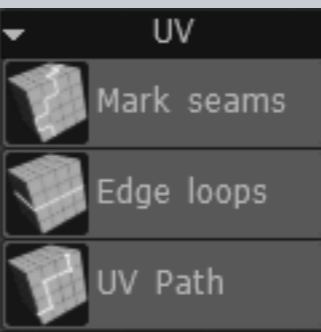
**Move Vertices:** This is a general “Tweak” tool for moving either vertices, edges, edge loops or faces - depending on which you have enabled in the “Brush Command Panel”. Selecting “Auto” in the panel allows you to choose to move any topological element, on the fly.

**Slide Edges:** Adjust the spacing between any row of edges by highlighting the desired edge and dragging it with the “Left-Mouse” button held down.



## 1.5 UV Tools

These tools essentially provide those functions which allow you to mark seams for the “Unwrapping” process:



**Mark seams:** Let’s you mark a discontinuous set of connected edges.

**Edge loops:** Selects and marks contiguous edge loops on your topology.

**UV Path:** Allows the selection of vertices which are interpreted by 3D-Coat to provide the path for a connected series of edges.



## 1.6 Commands

**Import:** Imports a mesh which you can use as a basis for a new topological arrangement, or to be modified with Retopo tools.

**Export:** This lets you export your retopologized mesh in .OBJ, .LWO, .STL and .PLY formats.

**Snap:** This snaps the retopologized mesh to the underlying voxel or reference model. Many times, after creating

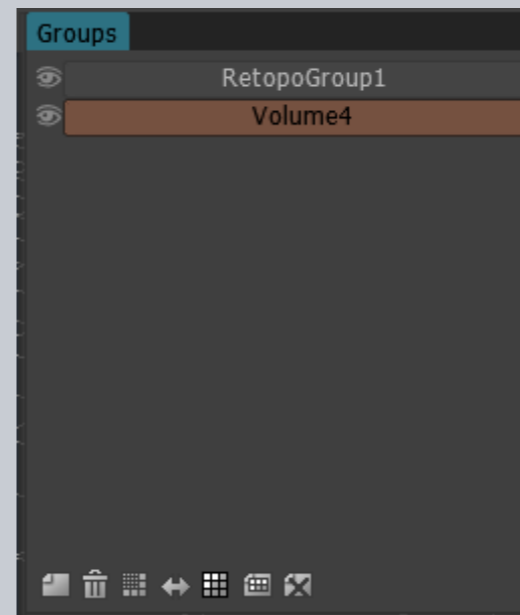
topology, you may desire to modify the underlying voxel model. The changes will produce a non-correspondence between the “base” mesh and the Retopo mesh. The “Snap” function will align the 2, once again.

**Subdivide:** This tool is self-explanatory. It subdivides the mesh. For example, each polygon is divided by 4.

**Clear:** This will clear all topology in the scene.

**Relax:** This relaxes the current retopologized mesh which can aid in “snapping” your topology to the “base” model which has been used as a guide.

**Symmetry:** Using the settings found in the “Symmetry Panel” (S key), a symmetrical copy of your Retopo mesh will be created. Use this in conjunction with the Retopo menu’s “Apply symmetry” commands.



## 1.7 Retopology Groups

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.

## 1.8 The Retopo Menu

Of course any good tool has more to it than meets the eye. The retopo 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 creating topology started in another 3D modeling program.

**Export:** Exports a retopo mesh to continue work in an external 3D application.

**Export selected:** Exports only the selected faces of your retopo mesh.

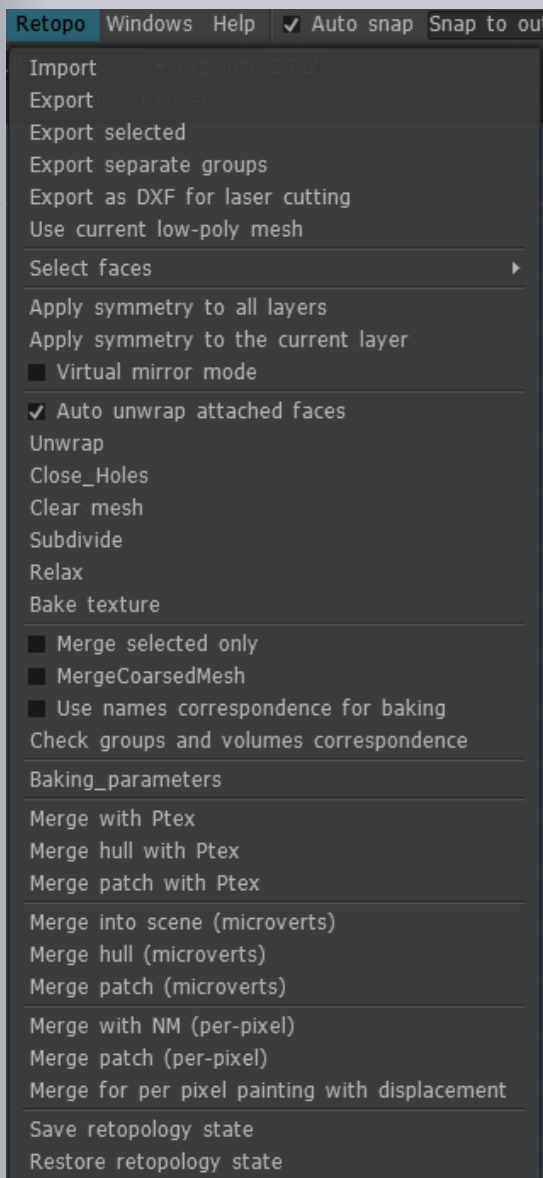
**Export separated groups:** Exports each Retopo Group as a separate file.

**Export as DXF for laser cutting:** Exports the connected boundary of a UV island to facilitate laser or CNC cutting.

**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.

**Select faces:** Selects faces based on the following options: **Triangles, Quadrangles or N-Gons.**

**Apply symmetry to all layers:** Makes all symmetrical operations permanent for all Retopo Groups - allowing



them to be “Merged” into the Paint Room and “Unwrapped” in the UV Room.

**Apply symmetry to current layer:** Makes only the currently selected Retopo Group permanently symmetrical for Merging and Unwrapping.

**Virtual mirror mode:** Allows the temporary creation of symmetrical topology as dictated by the Symmetry dialog. Use one of the 2 above commands to make the symmetrical topology permanent. You need only work on one side of the mesh.

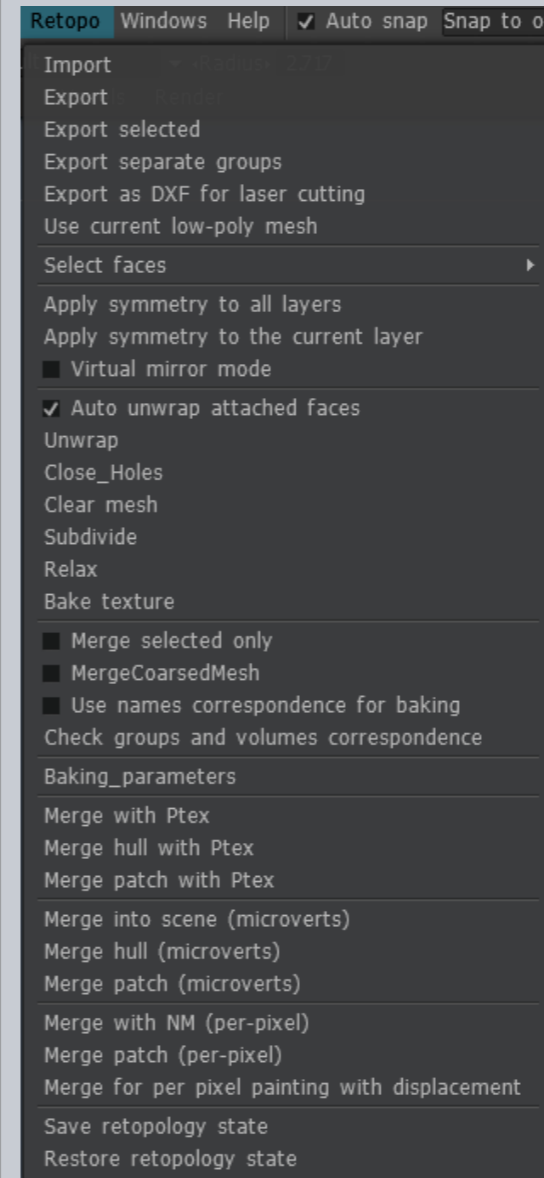
**Auto unwrap attached faces:** Check this option to create UV’s automatically.

**Unwrap:** The same command found in the “UV Tools” section of the Tool Panel.

**Close holes:** A very valuable option which attempts to repair holes in imported Retopo meshes - especially dense scanned meshes.

**Clear mesh:** Clears the whole mesh from the selected Retopo Group.

**Subdivide:** Subdivides the whole mesh, using one iteration, from the current Retopo Group.



**Relax:** Relaxes the Retopo mesh to aid in snapping to the reference surface - for the currently selected Retopo Group.

**Bake texture:** Invokes the “Texture Baking Tool”, which allows you to bake the Diffuse, Specular, Normal and Displacement textures which have been already applied to your “Merged” Retopo mesh - onto a similar, external polygonal mesh file.

Go to the next sub-topic for a complete description.

**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 selected only:** Merges into the Paint Room - only those faces which are currently selected.

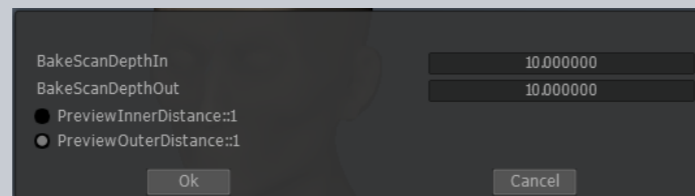
**Merge coarsed mesh:** Merges a mesh into the Paint Room that has the number of polygons specified.

**Use names correspondence for baking:** Assures that only Retopo Groups bearing the same name as their Voxel Layer counterparts are Baked and Merged into the Paint Room.

**Check groups and volumes correspondence:** Checks for correspondence in Retopo Groups with their Voxel Layer derivatives.

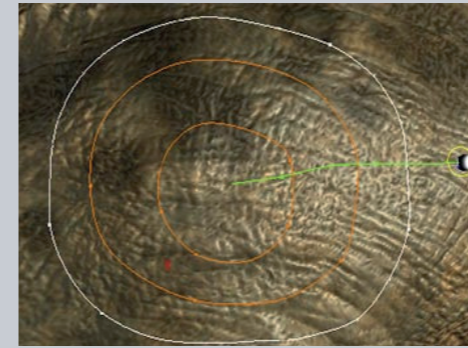
#### **Baking\_Parameters:**

**Merge with Ptex:** Takes the mesh as defined in the Retopo Group for an object and Merges it into the Paint Room and “Objects” Panel, making it ready for texturing operations, using the Ptex method.



**Merge hull with Ptex:** Merges only the outer “hull” of the Retopoed object into the Paint Room and Objects Panel for texturing using the Ptex method.

**Merge Patch:** Merges only the Retopo geometry, without projecting details, into the Paint Room and Objects Panel.



**Merge into scene (microverts):** Merges the currently selected Retopo mesh into the Paint Room and Objects Panel - making it ready for texturing using the “Micro-Vertex” method. Use this

on objects where you wish to paint “actual” displacement in real time.

**Merge hull (microverts):** Works like “Merge into scene”, but is optimized for multi-objects - and prefers projection using the outer points of the reference mesh. Readies mesh for texturing using the “Micro-Vertex” method.

**Merge patch (microverts):** Readies the Retopo mesh for texturing using the “Micro-Vertex” method, but uses only the “raw” form of the mesh and performs no “baking” operations. Merges the result into the Paint Room and “Objects” Panel.

**Merge with NM (per-pixel):** Merges the Retopo mesh from the currently selected Retopo Group into the Paint Room and the “Objects” Panel, readying it for texturing using the “Per-Pixel” method. Details are baked as a Normal Map. A dialog is presented which allows for including a Paint

Room layer for simulated “Ambient Occlusion” (global illumination).

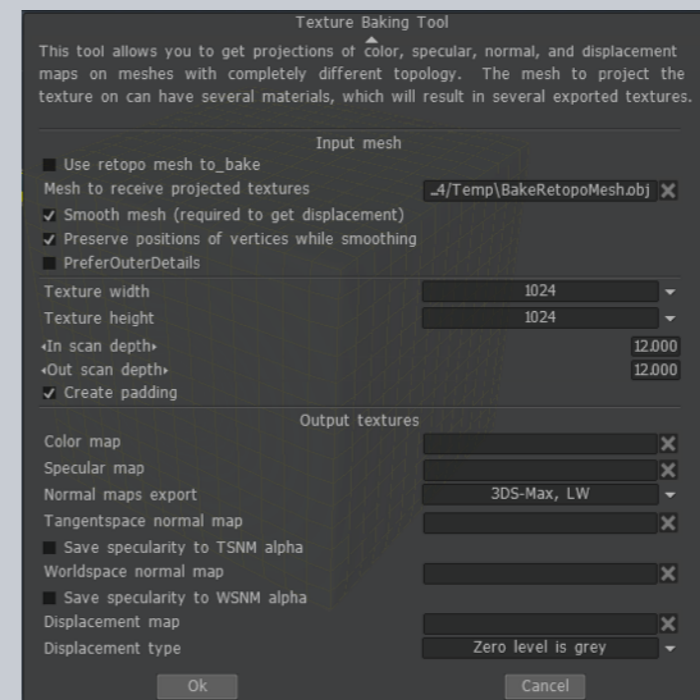
**Merge patch (per-pixel):** Merges the raw mesh from the currently selected Retopo Group into the Paint Room and the “Objects” Panel - for texturing using the “Per-Pixel” method.

**Merge for per-pixel painting with displacement:** Merges a baked version of the current Retopo Group into the Paint Room and “Objects” Panel for texturing using the “Per-Pixel” method. An attempt is made to also include a real displacement map (but is usually not suitable for objects with deep displacement).

**Save retopology state:** Saves a file which captures the current state of your Retopo mesh.

**Restore retopology state:** Loads a saved file that had captured the state of a Retopo Mesh.

## 1.9 The Texture Baking Tool



When you have the need to bake the Textures you have created for the current Retopo Mesh onto a similar Saved Mesh (having different topology), you can do this with the Texture Baking Tool and Dialog.

Just specify which mesh will serve as the one that Baking is sampled from and which saved mesh you wish to Bake to - along with which Texture Channels you wish to Export and Bake with (and their various sizes) - and this process will happen automatically.

Check out our YouTube Channel for precise demonstrations on how to use this powerful tool:

<http://www.youtube.com/user/PILGWAY3DCoat>

# UV Mapping

Very fast and flexible - our tool set gives you the most accurate and comprehensive mapping techniques. Those who wish to produce templates for real world models can also use “un-stretched” versions of maps to produce accurate construction patterns.



# UV Tools & Processes

## THE TOOLS

1. Retopo Room & UV Room
2. Tools & Functions - Modes
3. Tools & Functions - Commands
4. Tools & Functions - Selections
5. Tool Parameters Panel
6. UV Preview Window
7. Textures Menu
8. Sample UV Workflow

The UV Room is a duplication and an extension of tools available in the Retopo Room - made to work with UV Maps once your model has been “Merged” into the Paint Room. What you produce in the UV Room will represent the permanent maps you will use for export to 3rd party applications.

## 1.1 Retopo Room & UV Room

Many 3D specialists use only those parts of 3D-Coat which help them do very specific jobs - like creating UV Maps or new topology. 3D-Coat's UV Room provides a very powerful set of specific tools for performing every type of UV alteration for existing models and maps.

In 3D-Coat, the Retopo Room and the UV Room are closely tied together and most often are used together to produce final UV Maps.

When altering an existing UV Map, small changes to model topology are sometimes desirable - these adjustments being made in the Retopo Room, first, followed by Unwrapping the modified mesh and bringing the new Map into the UV Room for final island placement and packing.

At any time in the UV Mapping process, new seams can be placed and new maps created - which vary from those layouts made in the Retopo Room.

Before unwrapping, 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 the unwrapped clusters

immediately - so that you can see the degree of distortion for every part. Having this convenient function helps to keep you from forgetting the location of any seam or cluster.

3D-Coat also supports the creation and editing of multiple UV maps on a single mesh.

## 1.2 Tools & Functions - 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.

**UV Path:** Allows the selection of vertices which are interpreted by 3D-Coat to provide the path for a connected series of edges, which are marked as unwrapping seams.

### 1.3 Tools & Functions - 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, according to a guide “rectangle”



which you define. 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 “Update Islands” command to carry that information to the **UV Preview Panel** so that you will then have those two UV islands selectable, in the **UV Preview Panel**.

**Apply UV-set:** Applies the current Unwrapping scheme to the current Retopo 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.





## 1.4 Selected

**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.

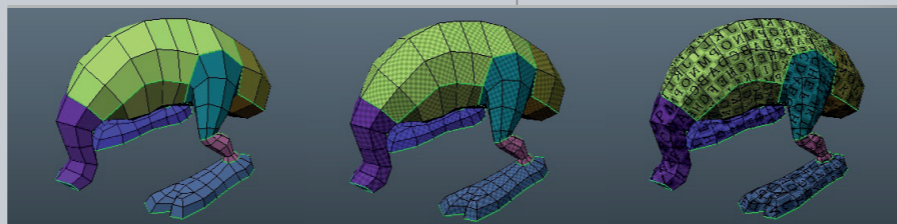
**Flip U:** This will flip the **U** of the **UV** map.

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

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

**To ABF:** The newer, more advanced form of **Unwrapping** which is best suited for organic meshes.

**To LSCM:** The older, more traditional form of **Unwrapping** which may be more compatible with external 3D applications.



**To Planar:** Uses Planar projection for Unwrapping selected UV Islands.

**Hide:**

**Inv. Hidden**

**Unhide:**

**Unhide all:**



**Copy UV:**

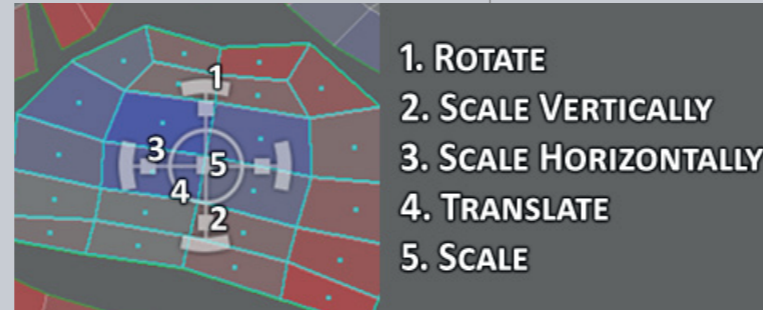
**Paste UV:**

## 1.5 Tool Parameters Panel

Located near the top of the interface, this panel includes the functions needed to select every type of component from your UV Map (**vertices, edges, faces & islands**) for manipulation with the **UV gizmo**.

This panel also displays which **UV Tool** you are currently using, which type of **default texture** you wish to show mapped onto your **Unwrapped Retopo** mesh (simple checker, etc.) as well as a **drop-down** menu that shows a

list of all **UV Maps** that you have produced for that mesh.



## 1.6 UV Preview Window

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.

In addition, 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**.

### 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 (Optimized unwrapping) into a UV map. You must have the “Manipulator” tick box turned on to use this.

Use this gizmo to manipulate **vertices, edges, faces and whole islands** inside the **UV Preview** window.

In the block selected you will find a set of commands that are related to the selections made in the **UV Preview** window. After

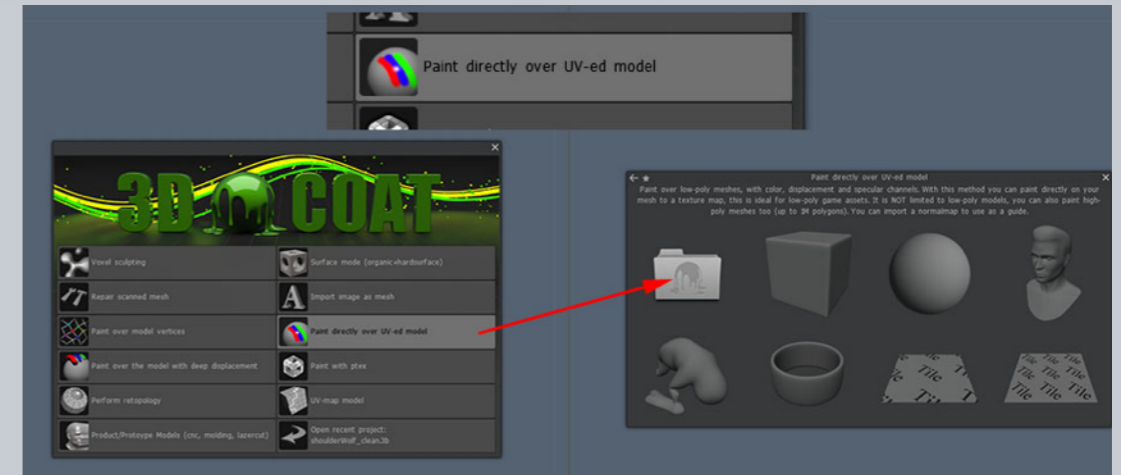
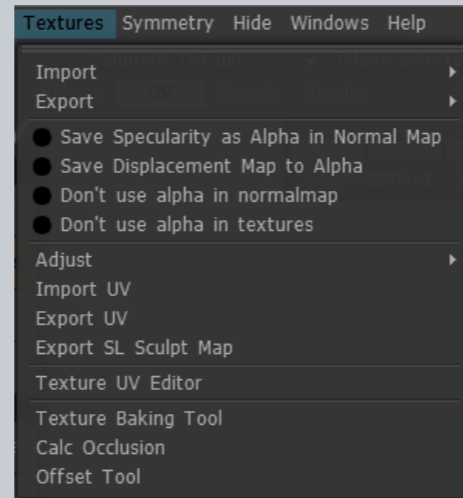
applying the **Unwrap** command found in the **Retopo Room**, you may want to edit **UV islands** in the **UV Preview** window, before **Merging** your mesh into the **Paint Room**.

To recap the basic workflow for taking a mesh from the **Voxel Room** to the **Paint Room** - and ultimately to the point of “Exporting” both mesh and texture data:

1. **Sculpt** your model in the **Voxel Room** and **Surface Mode**.
2. **Add Custom topology** by means of **AUTOPO** or manually within the **Retopo Room**.
3. **Mark seams** and **Unwrap** your **Retopo** mesh.
4. **Manipulate UV Map** elements and **optimize** your **UV Map** (in **Retopo Room**)
5. **Unwrap** your **Retopo** mesh and **optimize** your **UV Map** by “**Packing**” it.

6. Merge your Retopo mesh into the Paint Room (and “Objects” Panel) and apply your textures.

7. Choose “File/Export Model” - saving out all mesh and texture data according to your chosen parameters.



**Adjust:** From the array of Layers present in your Paint Room file - choose from the Options shown, at left - which include some common image adjustment parameters - as well as some very specialized options that are tailored for professional users.

**Import UV:** Actually imports a mesh that has UV coordinates and maps - replacing those maps with new ones present in the UV Room selected map.

**Export UV:** Exports the model currently being worked on without its accompanying textures. This allows for editing of the UV map, itself, within a 2D image editing program.

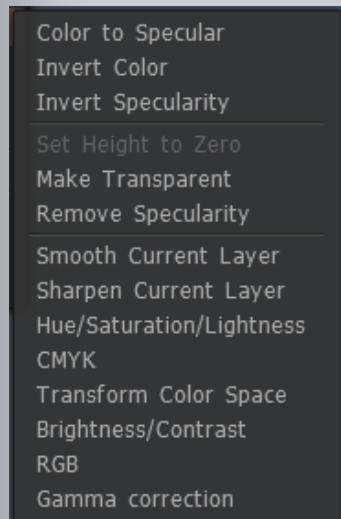
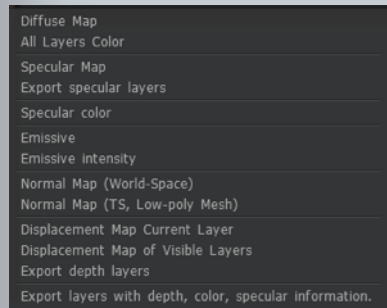
**Export SL Sculpt Map:** Takes the current UV information and exports this for use in an editor for the purpose of creating assets for the program “Second Life”.

## 1.7 Textures Menu

**Import:** Choose from the list, at left, which sort of texture you wish to import.

**Export:** Choose from the list, at left, which sort of texture you wish to export for use in 3rd party applications.

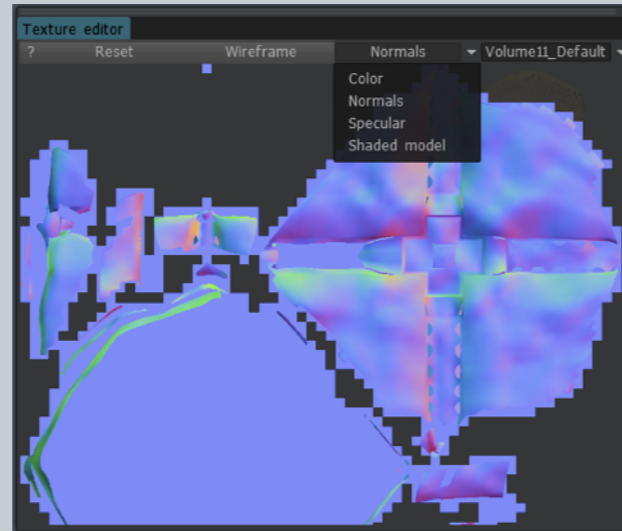
Also, add further refinement to your exported texture data by checking any of the 4 boxes listed below the Export command.



**Texture UV Editor:** Opens a comprehensive editor for viewing and editing textures maps in their “Unwrapped” form.

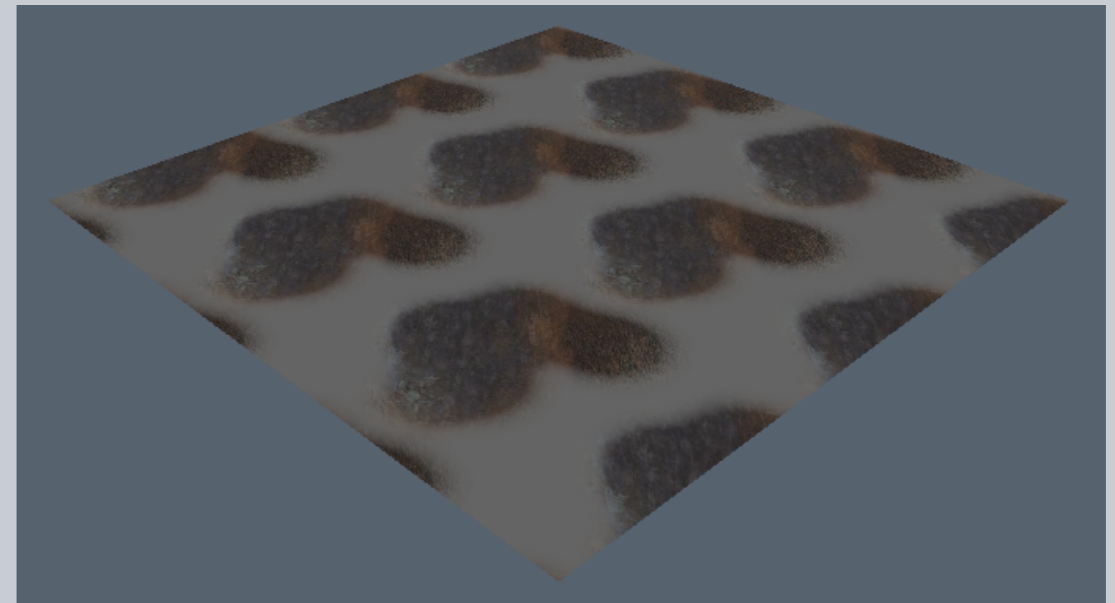
Choose to edit any existing UV Map texture, including diffuse color, normal, specular or the entire shaded model.

Since 3D-Coat allows you to make as many UV Maps of an object as you need, choose to view and work on any one of these from the drop-down menu.



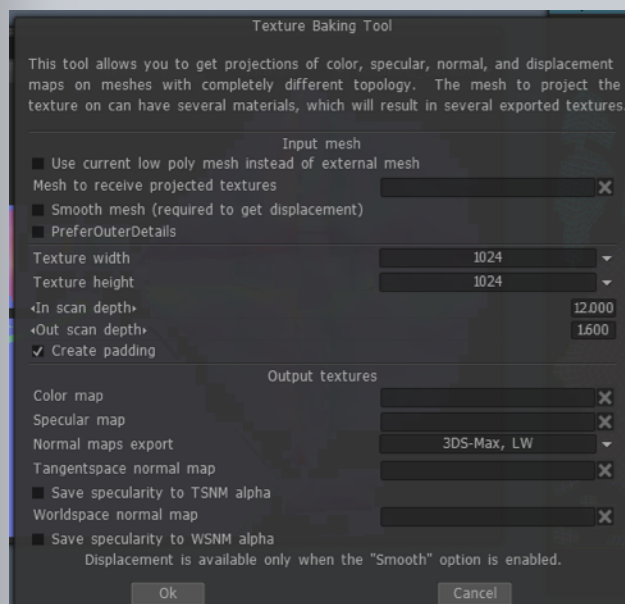
based on tracing a number of light rays surrounding an object. Use this to simulate “real world” ambient lighting situations. May take a long time to complete.

**Offset Tool:** When you import an image plane for creating a flat texture (as found in the opening 3D-Coat dialog) - you have the option to make a tiling texture (that repeats and wraps to the other side of the image). Use this tool to help you align the texture so that it wraps in the way you desire.



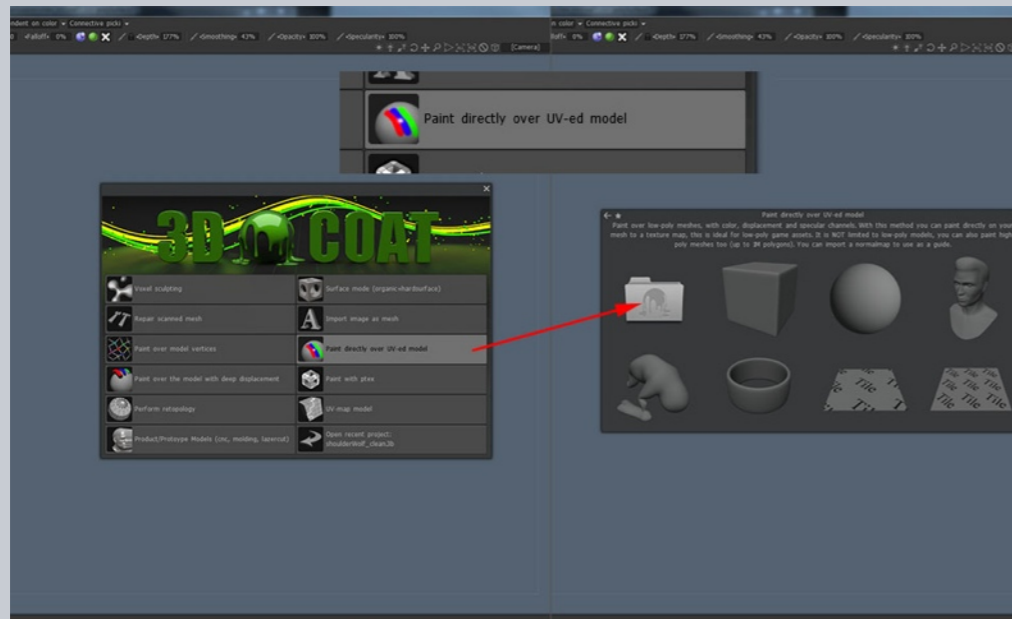
**Texture Baking Tool:** Opens the Texture Baking dialog which contains all of the parameters you will require for Baking texture information to your model.

**Calc Occlusion:** Runs a routine which calculates “Ambient Occlusion” (global illumination)



## 1.8 Sample UV Workflow (David Schoneveld)

### 1. Import your object

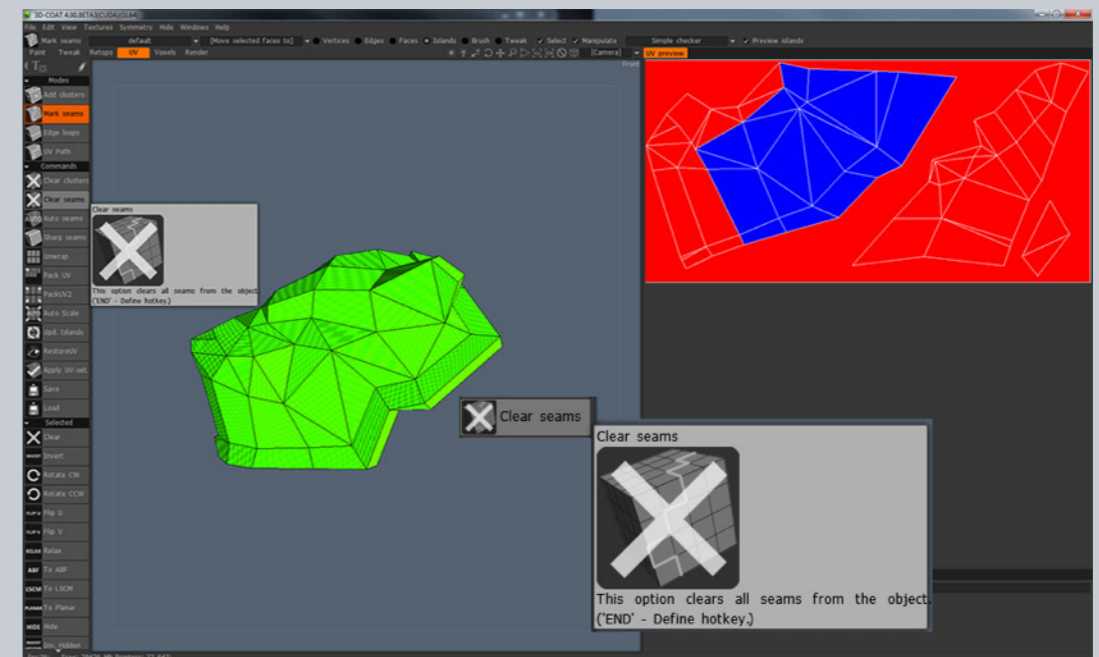


2.

(optional) clear seams and start from scratch if its something that's not been UV'ed before or if its something that's been edited too much to keep the seams.

(alt optional) Auto seams is another good place to start. 3D Coat will try to best guess where the seams should be.

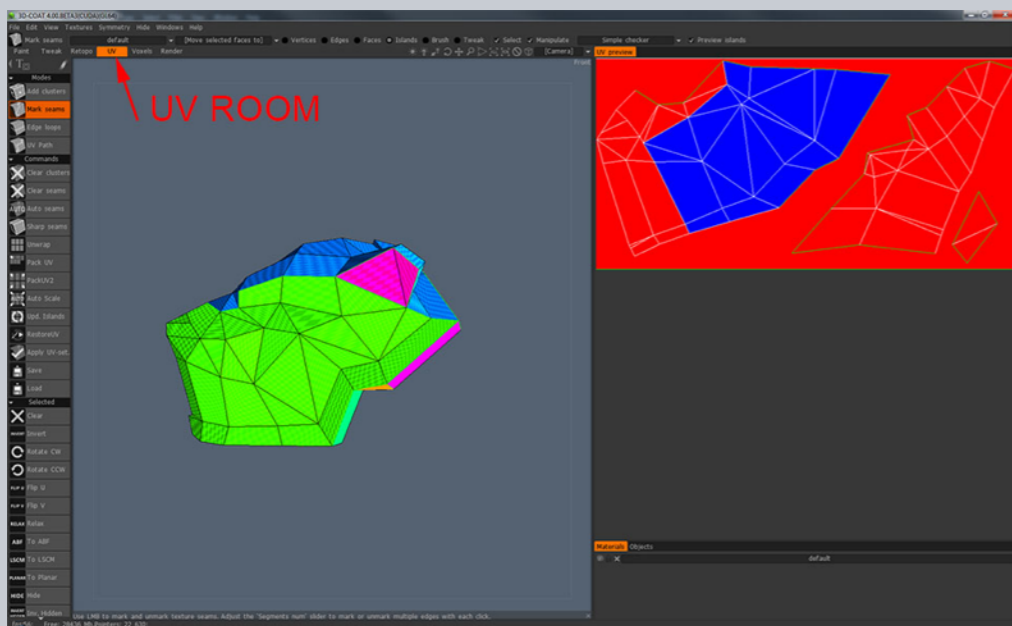
(alt 2 optional) Sharp Seams is another auto seams best used for mechanical objects as a starting point.



3. You can try both and just undo or clear seams at any point.

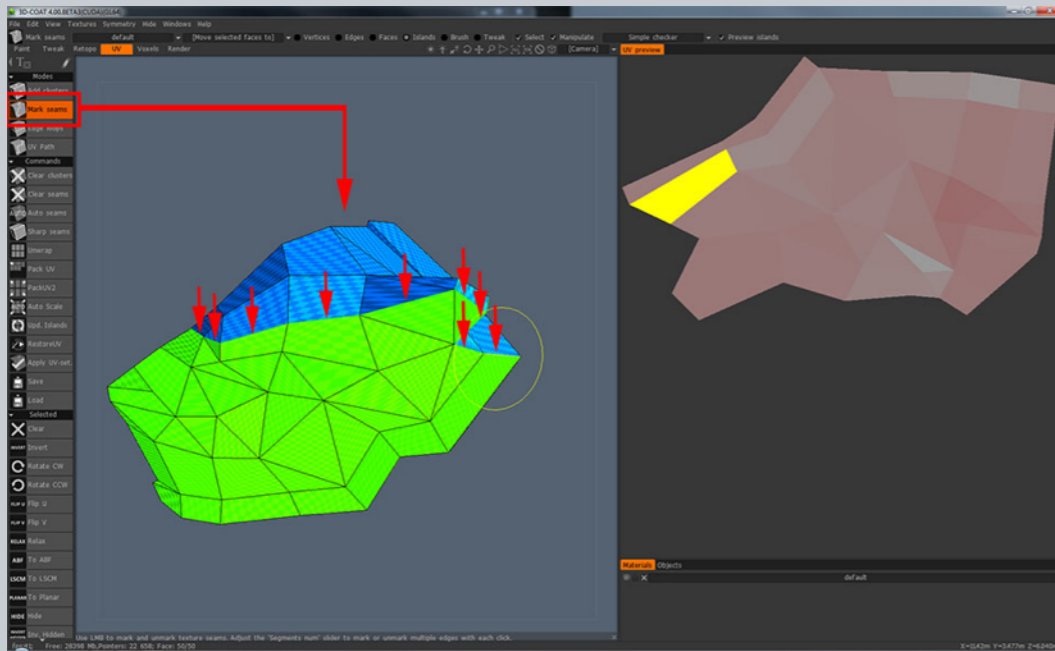
4. Clicking on an edge creates a seam.

Holding Ctrl while clicking removes a seam

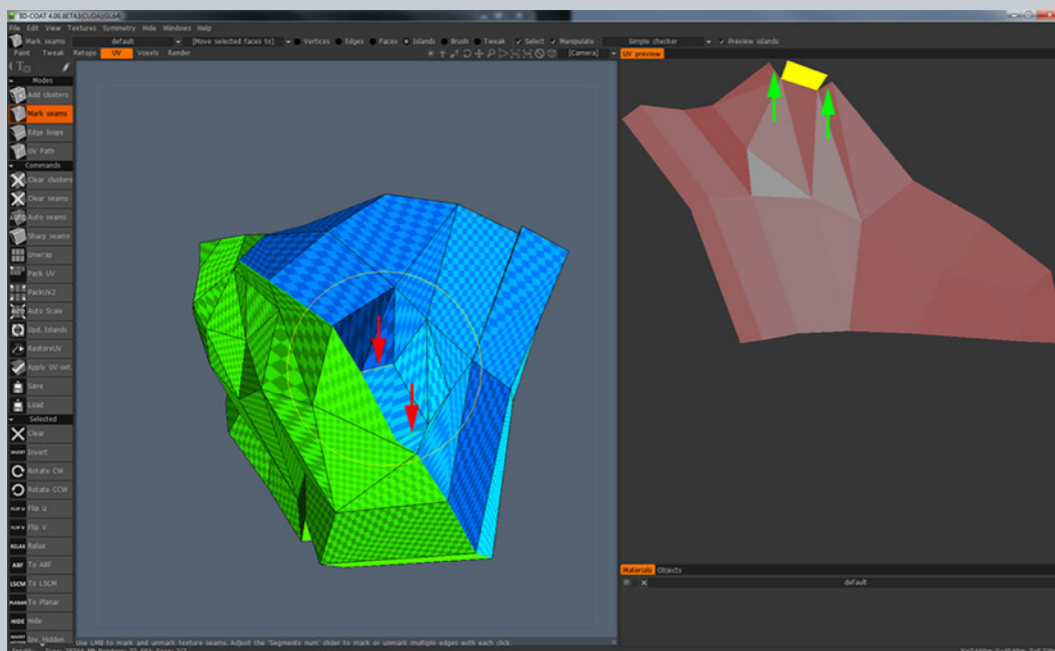


Switch to the UV room

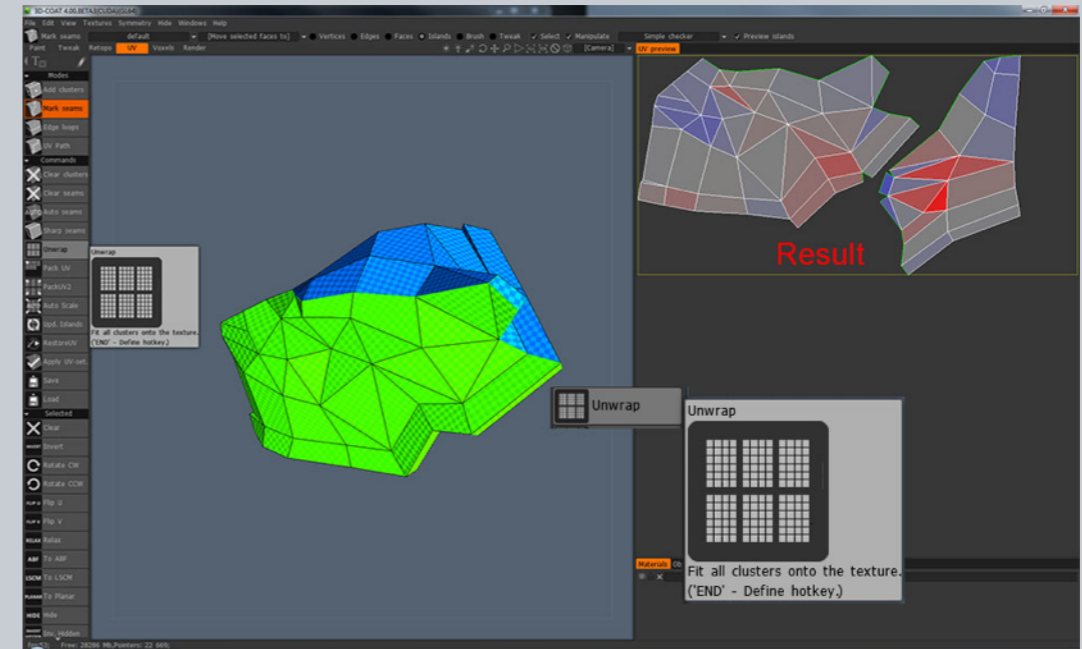
5. Make sure to cut/add seams to corner edges to help the shape unfold. If you see an area too red or too blue it



means there will be a lot of unfolded distortion in that area and you might want to try to cut more seams around it to help the island better unfold.



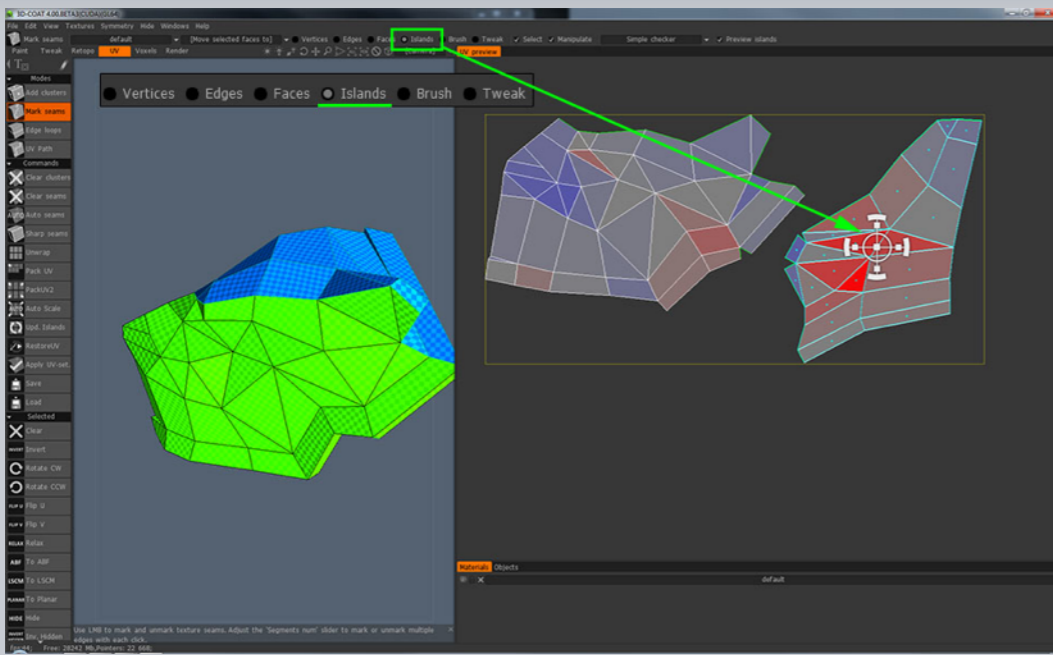
6. Completely cutting an area off automatically creates a new UV island, and the interface will update with new color patch for that section.



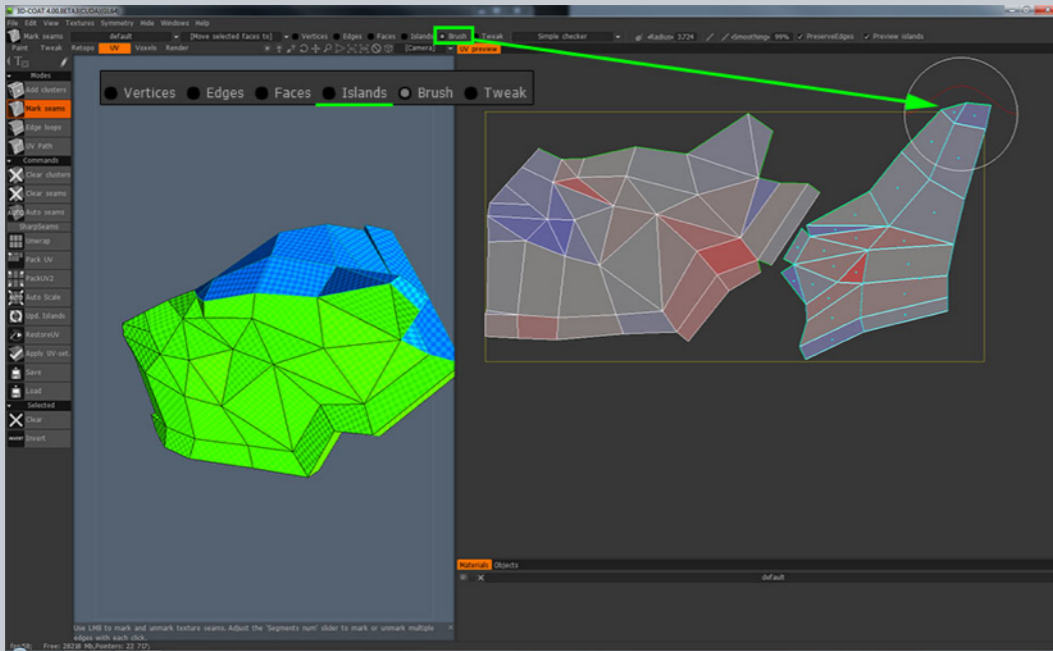
At this point the UV previewer is showing what will unwrap when you actually unwrap it, but currently its not yet unwrapped.

7. Now that we click unwrap we can see how well the unfolding process worked.

8. (optional) You can rotate and scale the islands a bit to either exaggerate the more important parts (scale them up) and/or to reduce the space between islands.



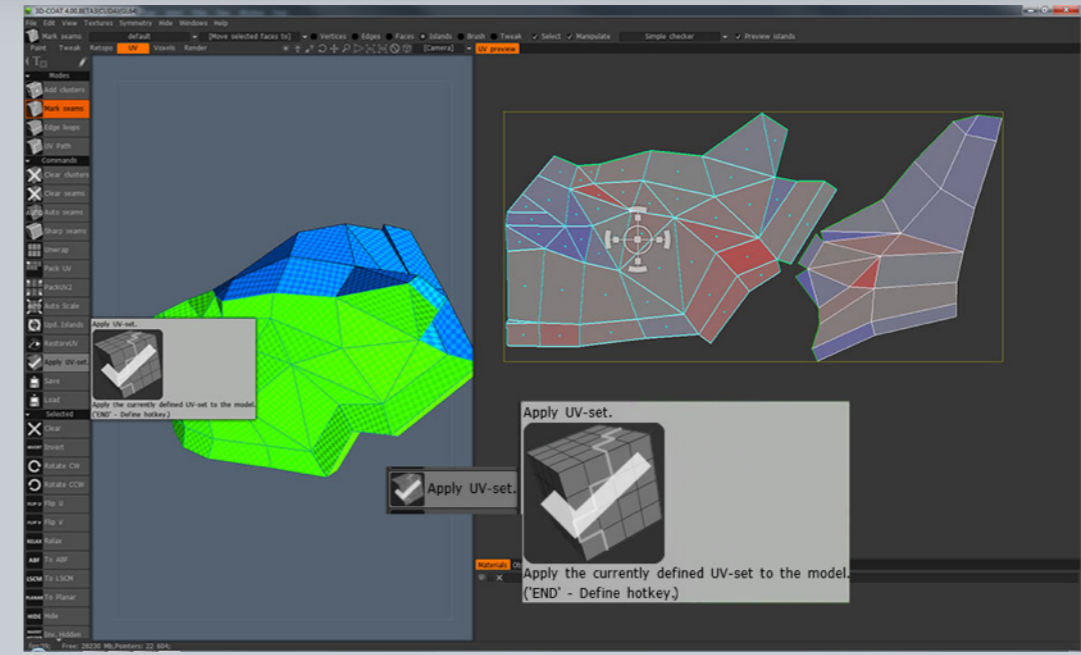
(optional) Use the brush to smudge areas of the island to finish the unfold.



9.

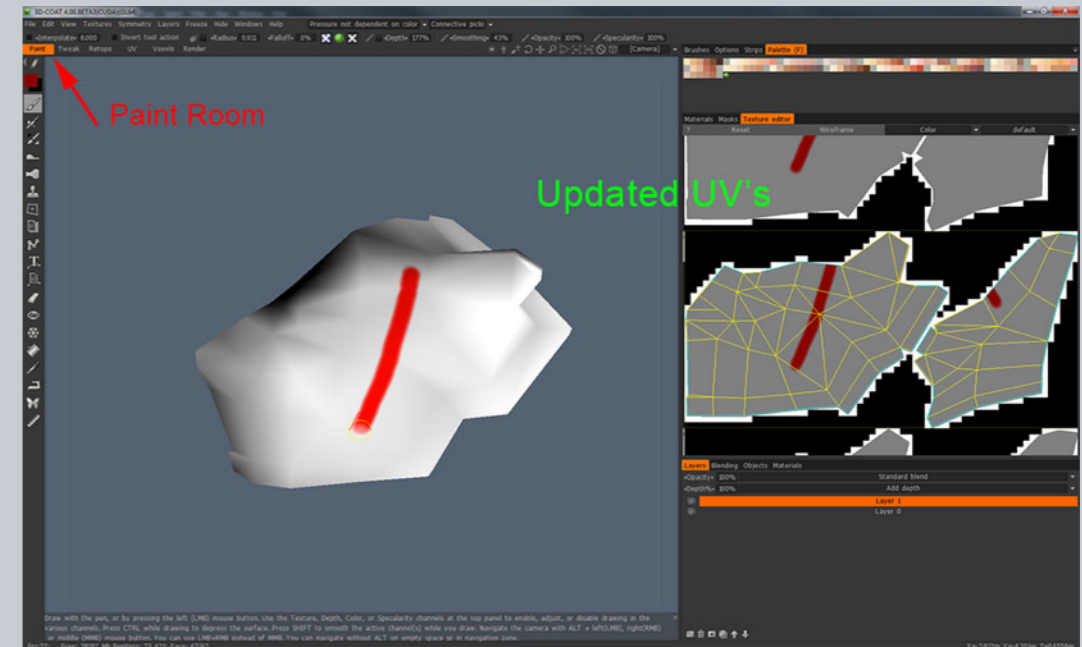
We

now apply the UV's the the mesh. Its important to note that we have been editing the UV layout but we've not yet applied them to the mesh. If we export w/o applying or



move back to the paint room now the old UV's will still exist. This is good for trying out different things with your UV set w/o actually changing anything until you are ready.

10. Move back to the paint room and check your UV's have been updated.



# Tweaking

Sometimes it is necessary to modify models in some more extreme ways, without changing the underlying topology - Poses, extreme body changes and morphs, to name a few. This is where the Tweak Room comes into play.





# Modifying & Morphs

## THE TOOLSET

1. Move
2. Select/Move
3. Drag Points
4. Draw
5. Collapse
6. Expand
7. Shift
8. Smudge
9. Flatten
10. Smooth

Use these tools to make larger mesh adjustments, after all of your other modeling and texturing steps have been completed.

Pose limbs using “Drag Points” - change a thin character into a fat one - create facial morphs for export.

These are just some of the uses for this direct polygonal manipulation set of tools.

The Tweak Room tools represent a basic, but powerful means to perform both major and minor alterations to an existing “Merged” Retopo mesh. All modifications take place without adding any new topology.

Use the Brushes and Alphas along with all the Options in the “Brush Options” Panel to perform the Tweak functions.

## 1.1 Move

Works just like the Voxel Move tool.

Movements are based on the size of the Brush - which can be made “on the fly”. Use this tool to perform major adjustments to your mesh.

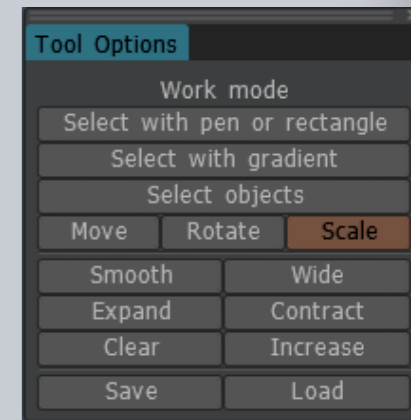
Try to avoid stretching an area of polygons excessively, especially creating long, thin polygons (press “W” to see the wireframe) - since this will cause unwanted texture distortions in your “Merged” model, and will require major alterations in your UV Map.



## 1.2 Select/Move

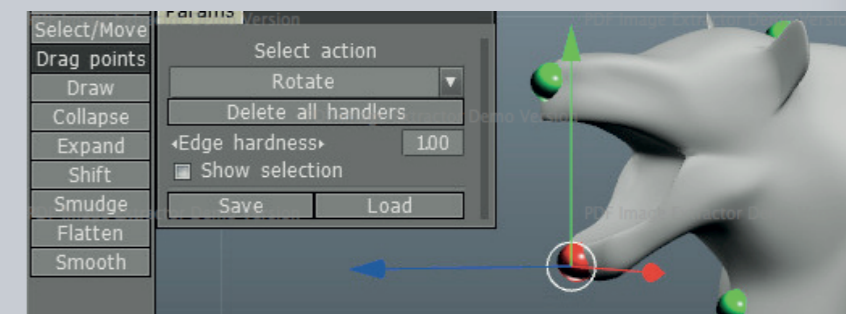
Actually, this tool allows you to define and refine a selected area of your mesh before you apply either the Move, Scale or Rotate function to that area. You can use standard Brush Alphas to define the selected region - or use rectangular selection.

A number of commands exist in the “Tool Options” panel to modify the selected area - making this tool a very precise means of altering your mesh, as well as the means to “Save” and “Load” selection areas.



## 1.3 Drag Points

A versatile tool which allows you to use Brush size to place “Dots” (areas of influence - or soft selection) that work in opposition to “freeze” dots - giving you the ability to adjust only specific portions of the mesh while the freeze dots (all dots except the finally



selected dot) keep those portions of the mesh from moving.

The size of each dot determines the region of influence or non-influence.

The soft selection area is defined by the “Edge Hardness” slider.

You can “Move, Scale or Rotate” the unfrozen areas (defined by the selected dot) by first selecting the function and then Left-Click dragging on this dot.

This tool is especially well suited to performing the posing (bending) of organic limbs or appendages of any kind.

## 1.4 Draw

Works like the Surface “Draw” tool, except that polygons are stretched to make the alteration. The size, depth and nature of the Brush and its Alpha shape determine the action of the tool.

Use the “Cntrl” and “Shift” modifiers to apply an inversion or smoothing action to this tool.

## 1.5 Collapse

This tool draws areas of the mesh closer together in a very precise fashion, without raising or lowering the affected area. The size, depth and nature of the Brush Alpha effect the distance of the mesh translation.

Use the “Ctrl” modifier to invert the action of the tool - and the “Shift” modifier to perform a relaxation of the mesh.

## 1.6 Expand

Works precisely as an inverted version of the “Collapse” tool.

## 1.7 Shift

This tool slides and pushes a portion of the mesh in one direction along the plane of the existing mesh surface. It acts like a 2 dimensional “wave” of sorts.

Use the “Ctrl” modifier to “repel” the mesh away from the Brush cursor, in every direction - and use the “Shift” modifier to relax areas of the mesh.

The tool is affected by Brush size and depth but not Alpha shape or other Brush Options.

## 1.8 Smudge

Works similarly to the Shift tool, but tends to indent the mesh near the edges of the Brush.

Use the “Ctrl” modifier to invert the action and the “Shift” modifier to relax areas of the mesh.

This tool is only affected by the size and depth of the Brush.

## 1.9 Flatten

Works quite similarly to the “Flatten” tool in Surface mode. Repeated movements of the brush over an area tend to produce a general flattening - similar to the effect produced by a blacksmith’s hammer.

## 1.10 Smooth

Overall, this tool performs a mesh relaxation - lessening the distance between adjoined vertices as the tool passes over them.

# Texture Painting

Paint textures at breakneck speeds. Using 3DC Materials or colors and values - paint up to 3 texture channels simultaneously (Diffuse, Displacement, Specular). Take advantage of Alpha functions, repetitive Strips and complex masking to realize your final texturing details.



# Overview & Modes

## CONSIDERATIONS & ADVANTAGES

1. Different Forms of “Resolution”
2. Micro-Vertex Painting (Deep Displacement)
3. Per-Pixel Painting
4. Ptex Painting
5. Texture Baking Panel

## 1.1 Different Forms of “Resolution”

Within 3D-Coat, resolution can be summarized by the terms, “Perceived Resolution”, “Actual Resolution”, “Viewport Resolution” and “Export Resolution”.

### Perceived Resolution

Among those who produce 3D content for “Entertainment-Based” uses, applying techniques which produce a believable effect while using the fewest number of actual hardware and software resources is the most desirable way to structure any given project, with regard to resolution.

Broadly speaking, these project assets can be divided into “Game Assets” and “Film (or Video) Assets”. Game assets use the fewest resources and the highest level of “Perceived Resolution” - while Film assets can use resolution resources more liberally.

In the Entertainment Industry, artists produce assets that require textures to achieve the element of believability and realism. In essence, the textures produced create the “illusion” of resolution or detail.

The polygonal structure of a model is actually secondary to the economical use of textures - which include Diffuse, Specular, Normal, Bump and Displacement Maps as the

most common. All of these Maps work together to produce the illusion of resolution and detail - a model's "Perceived Resolution". These are the most common "tricks" CG artists use to produce their realistic "illusions".

### **Actual Resolution**

Actual mesh resolution is what you are using when working in Voxel space or Surface Mode, and is that resolution which is exported when your model will later be used in CAD and CAM applications that make no use of the techniques common in the entertainment industry. Within 3D-Coat, all modifications to models for these purposes take place in the Voxel Room and Surface Mode.

Voxels and "Surface Skins" provide the closest representation of a finished model prototype's "Actual Resolution". A unique set of Export commands can be found in the "File" menu, which allow for saving your model to be used in various forms of 3D cutting and printing.

### **Viewport Resolution**

3D-Coat handles resolution, in the Paint Room, in a unique way, by means of the Viewport - in order to give you real-time representation of models and their associated textures as they are created.

You can designate how much "Viewport Resolution" will be used, which is a temporary representation of a model and its associated textures. In essence, you can assign the amount of real-time subdivision that is visible while you paint your textures.

This "Viewport Resolution" can be different than the final exported resolution of your model and its associated textures, which are assigned as a final step for use in 3rd party applications.

### **Export Resolution**

This is the resolution of both the retopologized and exported mesh, itself, along with the texture maps that are associated with an exported model file.

## **1.2 Micro-Vertex Painting**

When you need to provide your model with high levels of "actual" displacement - by means of sculpting or "painting" this displacement - the best mode to use is the "Micro-vertex" mode. This mode allows you to export either standard or vector-based displacement maps that accurately reflect the more extreme levels of displacement you have added by means of textures or sculpting.

Micro-Vertex painting actually modifies a temporary “viewport mesh” - which is a user-defined subdivided version of your base mesh - applying real and actual displacement to this temporary mesh.

Upon export of your model and its associated textures, you are given the option of setting the finished mesh density. To assure that your model can accurately represent the displacement achieved, real-time in the viewport, make sure you give it adequate polygon density (10’s or 100’s of thousands of polygons).

### 1.3 Per-Pixel Painting

Use Per-Pixel mode for both high resolution models and low resolution models, where you need maximum compatibility with other environments and where extreme clarity of texture is required. Note that Depth painting within this mode only supports the real time generation of a normal map, rather than actual painted displacement - but, based on this information, a displacement map can be exported as well as a normal map.

### 1.4 Ptex Painting

When your model does not require extreme displacement (by means of texture maps) - and you want to work without the considerations of UV Map seams (very fast) - try the Ptex mode.

With the “Texture Editor” Panel open, as well as the Ptex “Tool Options Panel”, you can adjust Ptex resolution, locally, and at any time during the texture painting process - instantly seeing the UV Map changes in real time.

After clicking the “Ptex Icon” at the bottom of the “Painting Tools Panel”, you can designate areas of increased resolution by painting the desired polygons in the Viewport and pressing “Increase Resolution” in the “Tool Options Panel”.

Whatever features you add in the Paint Room can be automatically converted to standard texture maps which can be read by many 3rd party applications. Ptex provides optimized distribution of texture space, and allows you to work very quickly.

Be aware that texture maps converted from the Ptex Mode are not suitable for modification in external paint apps, like



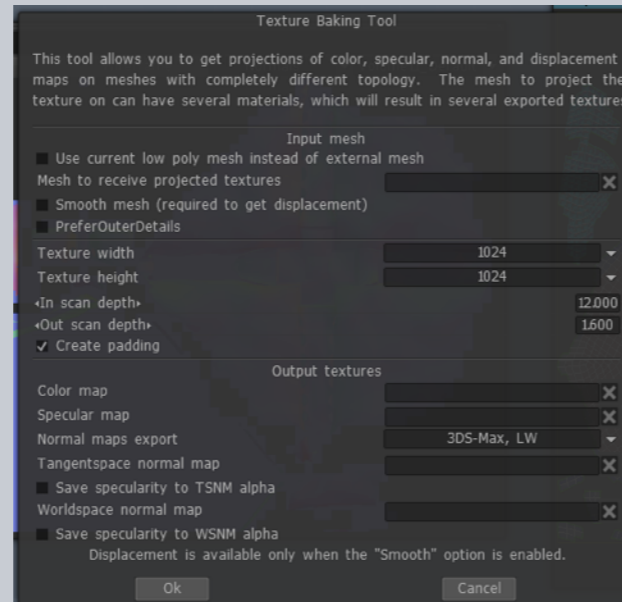
Photoshop. At this time, Ptex is still considered an experimental process for texturing.

## 1.5 Texture Baking Panel

With the **Micro-vertex** approach every face, (quad only allowed), was represented as a patch  $N \times M$  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.

Per-Pixel painting has only one disadvantage when compared to Micro-Vertex painting: per-pixel painting does not support vector displacement, only normal displacement. Sometimes this functionality difference is important, so we left both approaches as options.

For example, using the Micro-Vertex approach to paint on baked voxel sculptures gives you better results. Additional advantages of per pixel painting are as follows:

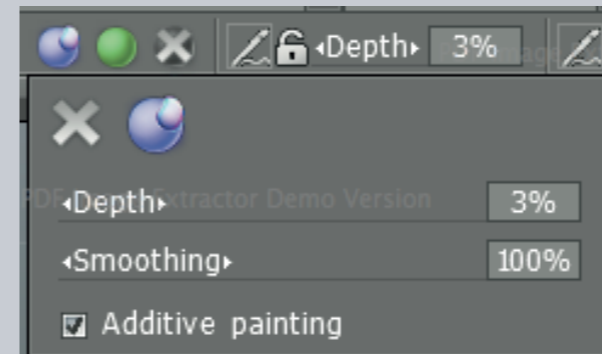
- The ability to affect pixels on the back of the model, (filling, blurring and applying overall effects.)
- The painting quality does not depend on the distance from the object to the camera.
- More precise painting: what you see is what you get.

The key advantage over Micro-Vertex painting is the ability to blur pixels underneath the brush. This is possible because every pixel has a neighbor toward which it can be blurred.

#### Notes:

## Painting With Depth

Painting, in 3D-Coat, can take place in up to 3 “channels” at the same time - Depth, Color and Specular. Enable or



disable whichever channels you wish to use, simply by clicking on the corresponding icon in the top tool bar.

Hovering the mouse pointer over each of these icons brings up an additional menu of options.

The Additive painting option is best illustrated in the diagram to the right. When not enabled, crossing brush strokes plateau at the same level of depth - when enabled, the same strokes will cause paint to “pile up” wherever the strokes intersect. Also, if the option is disabled, the overlapping behavior is applied only on strokes drawn in the current Layer.

The depth of your painted stroke can be controlled, “on the fly”, simply by holding the Right mouse button down and dragging up or down. The depth intensity is visually indicated by the center colored and contoured line within the painting cursor, (red by default). The shape of this

center contour reflects the shape of the Alpha you have selected in the primary Brush Panel.

Depth intensity can also be controlled with the keyboard by pressing either the “+” or the “-” key, or by rolling the mouse scroll wheel forward or backward. When using a stylus, use less pressure to avoid stroke “overdrive”.

When painting in the Micro-Vertex mode, and your mesh is low resolution, painting with high depth intensities may cause abrupt mesh distortion.

Smoothing of your painted depth stroke can be adjusted by using the “Smoothing” slider in the top Brush tool bar or by holding down the “Shift” key and the Right mouse button and dragging up or down. The keyboard shortcut for this function is either “Shift +” or “Shift -”. The center brush profile line becomes green, by default, when you are in Smoothing mode.

# Painting Params & Tools

## OVERVIEW & SPECIFICS

1. Primary Painting Parameters
2. Painting with Materials
3. Painting Shortcuts
4. The Color Picker
5. The Color Image Window
6. Custom Color Palettes
7. Paint Room Tools
8. Paint Room Layers
9. More on Ptex Painting



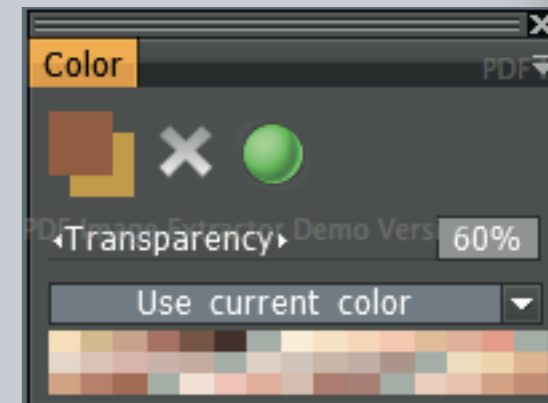
## 1.1 Primary Painting Parameters

### Painting with Color

When no material is selected, you can paint with basic color or

randomly with the 2 colors chosen from the main Color Swatches.

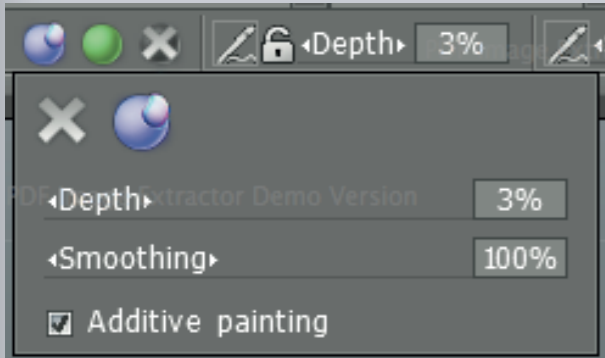
You can also paint with a random blend of colors, chosen between those 2 swatches. Invoke the Color Pop-up with the “C” key, where all of these modes are available.



### Painting with Specular

The degree of shininess that you wish to paint with, for Alpha Controlled application, or for Specular mapping contained in a Material, is adjusted with this Pop-up

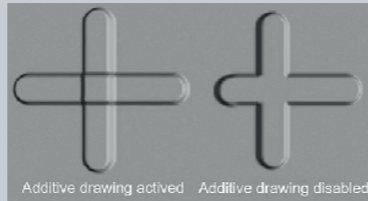
panel. Use these functions to turn off Specular painting, to adjust the intensity of the effect, or to add a Blending amount to your Specular map or “flat” Specular application, when no map is found. Press “R” on your keyboard to bring this panel to the front.



## Painting with Depth

Depending on which texturing method you have chosen, painting in the Depth channel produces

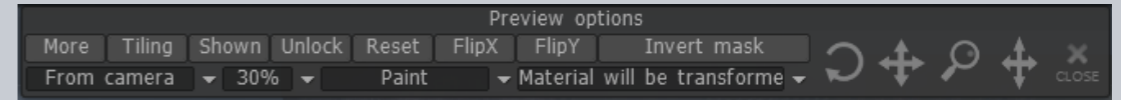
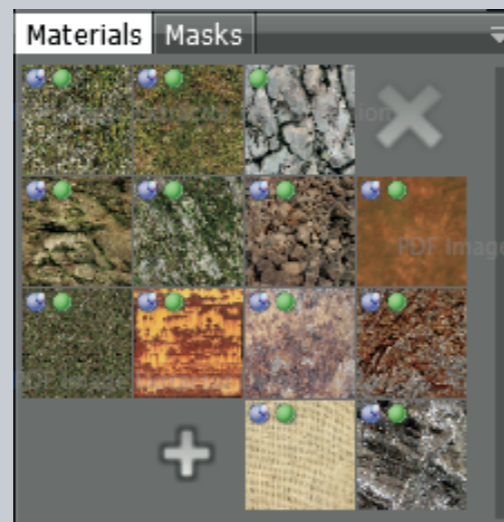
different information when producing its corresponding texture maps. When painting on a "Viewport Mesh" - as is the case with the Micro-Vertex method, real displacement is being applied to that mesh - which will ultimately translate into "real" displacement maps during the export process.



When painting on a Per-Pixel mesh, the primary Depth information is for the purpose of creating Normal or Bump maps - (although there is an option for creating a Displacement map).

## 1.2 Painting With Materials

All 3 Paint Channels, when enabled, will react with any Material that is currently selected from the Materials Panel. Every



Material can contain a separate texture for each of its channels - Color, Depth and Specular. If no Material is selected, (disable the use of Materials by clicking the large "X" in the Materials Panel), then each Paint Channel will respond based upon which Brush Alpha has been selected .

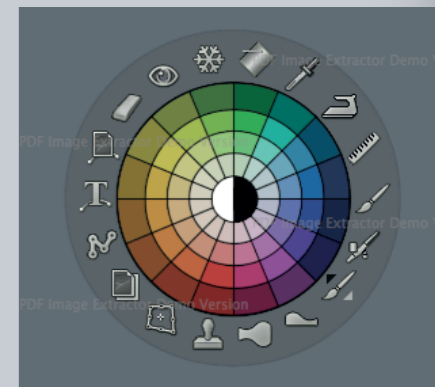
New Materials can be added to an existing Material Folder simply by clicking on the large "+" icon in the Material Panel. The thumbnail image of each new material is created based upon which texture image you select for that Material's "Color" channel.



New Material Folders can be created or loaded by pressing the small "Down Arrow" at the top right of the Material Panel and selecting either the "Add new folder" or "Add existing folder" options.

## 1.3 Painting Shortcuts

Some artists like to paint and texture with as much "blank" screen space as they can get. They dislike the clutter of many

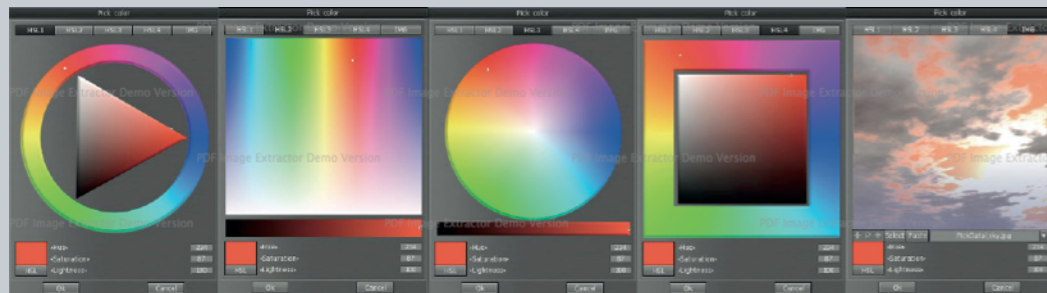


interface elements - and 3D-Coat allows you to work in just this way. Just hide those elements of the interface that you find distracting and use keyboard shortcuts that give you access to the tools you need, only when you actually need them.

One of the most convenient “Pop-Up” tool panels is the “Tool/Color” panel. It contains all of the Painting Tools from the left tool panel, in addition to a handy color wheel.

Paint and texture, freely, and press the “Spacebar” when you need to change to a different Paint tool or color.

To access the Main Paint Functions panel, just press “~” on your keyboard to bring it to the front of your work space - right at your cursor location.



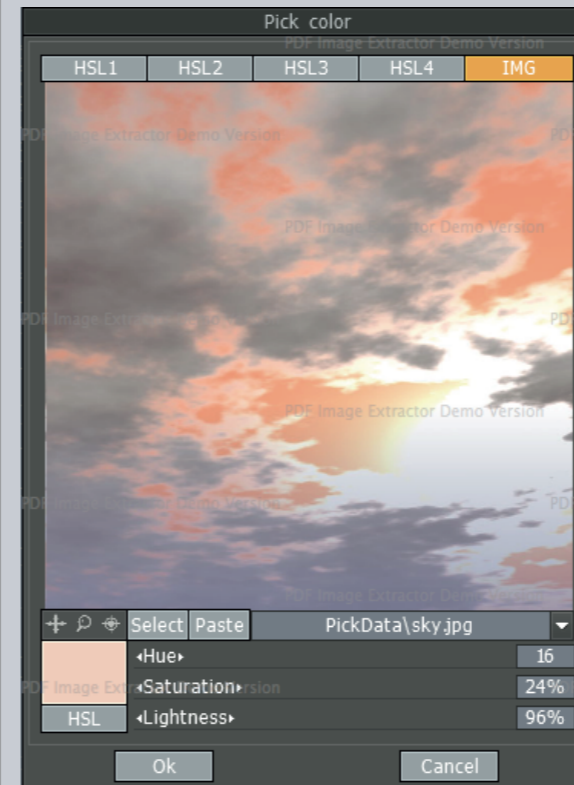
## 1.4 The Color Picker

There are 5 flavors to choose from, as shown at left. These are made available by left clicking on the color swatches in the top left of the main Paint Tool Panel. The pickers work

just like their equivalents in other mainstream painting applications.

## 1.5 The Color Image Window

The exception is the “Image Color Picker”, which allows you to assign an image of your choice - from which you can choose any hue present in the image for painting. This

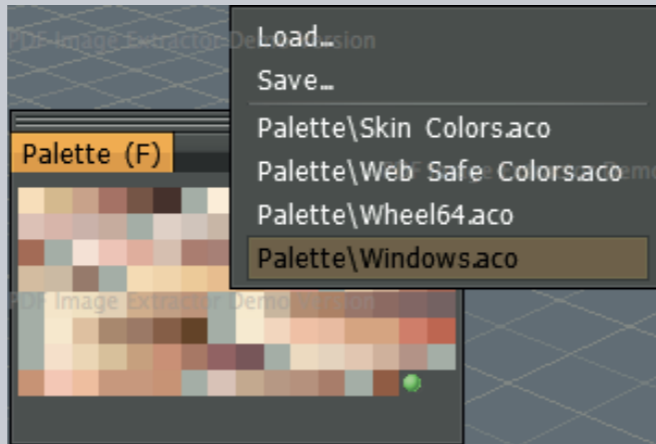


is also quite handy for keeping a reference image open at all times during sculpting or painting operations. You can manipulate which portion of this image is visible, and its position in the window, with the 3 controls just underneath it and to the left of the image window. Select the image of choice with the “Select”

button or “Paste” the image from your Clipboard. Once used, an image becomes available via the “drop down arrow” to the right of the image name.

## 1.6 Custom Color Palettes

Create your own custom color palettes via the “Windows/Popups/Color Palette” menu. (you can assign a keyboard shortcut for this). Right click on any color to



Delete, Insert or Edit any color using the Color Picker.

New Color Palettes can be created and saved for later access - these are stored in the main 3D-Coat folder, subfolder.

“Palettes”. Once stored, these palettes will always be available in the list - accessible through the “drop down arrow” menu.

**NOTE:** To disable the use of Color, as defined by the Color Swatches, Right click on the Color Swatch - and an “X” will appear over the Color Swatch, informing you that you are no longer influencing painting with these colors.

## 1.7 Paint Room Tools

In the “Paint Room” you have access to a comprehensive set of painting, texturing, adjustment and texture transformation tools. These tools are located in the left side panel. You can also press the “Spacebar” for quick access.





**Paint and Material Brush:** This tool works in combination with the 3 Paint Channels, (**Depth, Color, Specular**), and its effect is influenced by which **Alpha** shape is chosen from the Brush Alpha panel. If no material is selected, the basic color or colors that are applied are indicated by the 2 color swatches at the top of this tool bar.


If a **Material** is selected, a combination of interactions occurs, based on the Brush Alpha shape and those Material channels which have textures assigned - as well as which basic Painting Channels you have “turned on”. Tablet response can also be set via the “**E**” panel - along with various curve and closed spline methods of paint application. (See “The “**E**” Panel”).

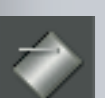



**Airbrush:** A softer brush which has an “accumulation” coefficient. This brush produces the most profound “dabbed” painting effect when used with the “**Paint with dabs**” Brush Option selected.

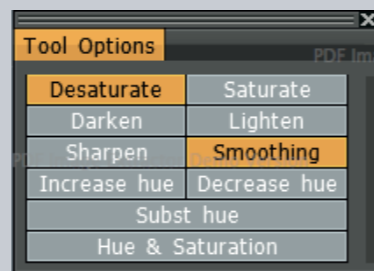
 **Clone Brush:** Like traditional painting applications, this brush “clones” texture from one randomly selected area to another, (“Ctrl-LMB” to set source. See complete description on the next page.

 **Eraser:** Just like it sounds, but erases all information from whichever basic Paint Channels are enabled, (checked).

 **Eyedropper:** More powerful than an ordinary eyedropper tool - this one samples the information from all 3 “basic” Paint Channels, (**Depth, Color and Specular**).

 **Fill Tool:** Fills contiguous areas of color with either a single Paint value for all 3 basic Paint Channels, (**Depth, Color, Specular**), or with a selected **Material**, (which uses up to 3 textures for each of these same channels).

 **Color Operations:** This tool has 10 different color adjustment functions which are “Brushed on”, reacting with **Alpha** and/or choice of “**E**” panel tool:



**De-saturate:** (decrement the chromatic level) When you press “Ctrl” the opposite action is performed, and it increases the saturation of the color.

**Saturate:** (increment the chromatic level) When you press “Ctrl” the opposite action is performed, and it de-saturates the color.

**Darken:** When you press “Ctrl” the opposite action is performed, and it lightens.

**Lighten:** When you press “Ctrl” the opposite action is performed and it darkens.

**Sharpen:** This accentuates the color definition. Use “Ctrl” to smooth.

**Smoothing:** This reduces the color definition. Use “Ctrl” to accentuate the color definition.

**Increase hue:** Incremental adjustment of the hue. (use “Ctrl” to decrement the value). The “**Transparency**” setting influences the degree of hue change.


**Decrease hue:** See above.

**Subst hue:** Substitute the hue in the current layer with the current color swatch.


**Hue&Saturation:** Substitute the hue and saturation from the current layer with the current color swatch. For example, paint on an object using color, then choose the **Darken** command. Paint 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 painting, it is only the current Layer height that is changed. Press “Ctrl” to perform an inverted operation. When using this tool, both “E” panel functions and the selected Material are taken into account. Use the “Degree of change” slider to limit the amount of 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 center the area to be modified in the best view position. This tool is intended to move only small details in the Layer.

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



**Clone Brush:** This tool can also be considered a “Texture Adjustment” tool, and it has quite a few options for use, so please read and test it out carefully to learn more about it. Press “Ctrl-LMB” to mark a source point for copying, then paint using the **LMB**. You can clone your texture, not only

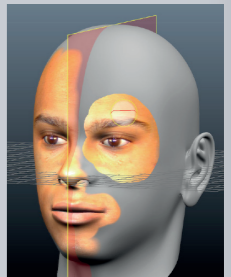
with a standard **Brush Alpha**, but also with the frame and contour Brush functions - (press “E” for Brush functions). There exist a number of methods for cloning:

**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.



**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+LMB**” in corresponding place.

**Number of sectors:** Number of sectors when cloning a pattern in a sector.

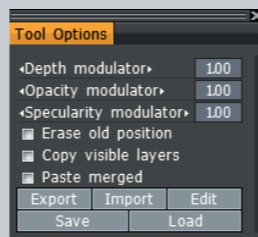
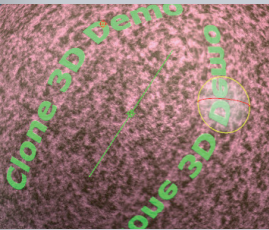
**Counter clockwise:** When enabled, the sector will be copied counter- clockwise.

**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 Brush:** 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 the **Rectangle**, **Circle** and **Curve** painting methods (press “**E**” to open the draw types menu). The border width determines the edge softness when transforming. By disabling channels (**Depth**, **Diffuse**, **Specular**) you can limit the channels that are affected. In the transform mode the surface area is erased from its old location and copied onto the new one.

In order to simply copy without deleting, do not check 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 the **Rectangle** tool, but also by using the freehand selection tool, and others. The options for this tool are as follows:

**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.

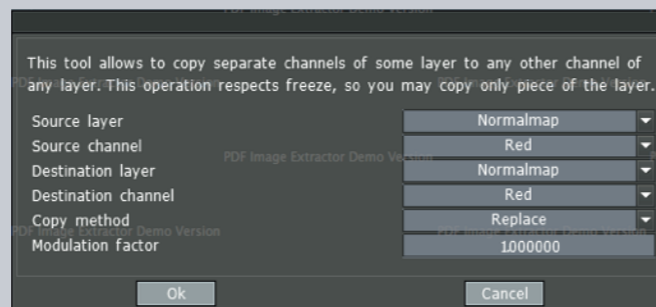
**Edit:** Edit image with an external editor that supports .PSD files. By default it is Adobe Photoshop.

**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.



**Paint with Splines:** Upon activating the tool, the Parameters Panel will be activated. There are many parameters for the curve tool:

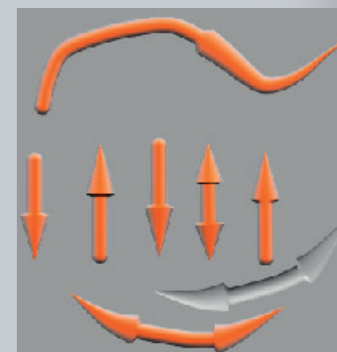
**Curve profile:** First let's take a look at the Curve profiles.

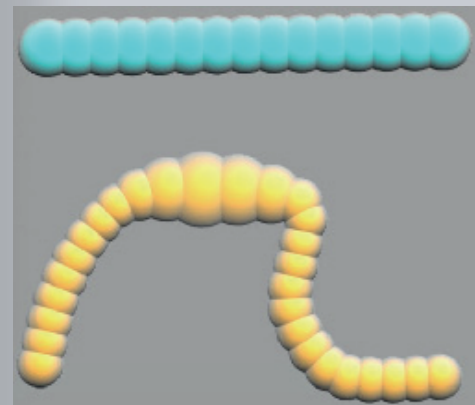
**Uniform:** The curve with no linear modulation.

**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:**

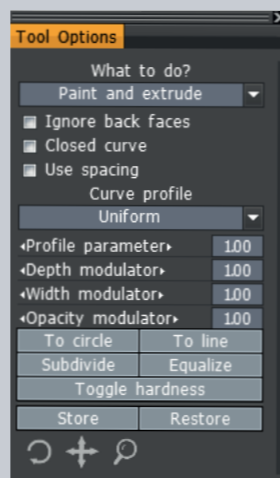
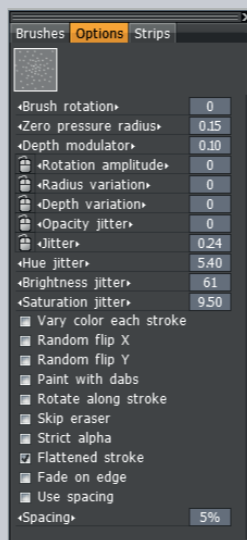
**Sinuous.**

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

**Closed curve:** Closes 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 the hardness of the spline vertices by clicking on the vertex. Pressing



“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:** Transforms the current combination of points to a 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.

**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 Parameters Panel menu - You can rotate/move/ scale the entire curve. **NOTE:** You can use “Ctrl” while

dragging a point to rotate the whole curve and you can also use “Shift” while dragging a point to move the entire curve.

#### **Paint a spline by Left-Clicking to position a few points:**

Hovering the cursor over one of the blue dots causes it to highlight. **Left-Clicking** captures the point and allows you to drag it into a new position. Click again to release the control point.

Splines are handy used together with **Strips** to carefully paint a chain or a series of rivets. Clicking “Enter” applies the spline to the object. **Left-Click** to add new points to the spline. Pressing “Enter” to complete a curve produces a raised element - while completing the spline with “Ctrl-Enter” indents the curved elements. Use “Backspace” to delete the last point and “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. Spacing combined with the various “Jitter” options can create a wide variety of effects. Curves will be drawn correctly, even if their knot points are far from each other and the surface between them is quite curved.

With the “Paint with Splines” tool, you are not only able to paint and extrude/intrude, but you also can do the following:

**Erase:** Erase the current Layer along the curve.

**Freeze:** Freeze along the curve. “Ctrl-Enter” to unfreeze.

**Make Planar:** Flatten the surface along the curve. Set absolute height. Apply the plane tool along the curve and then apply the usual extrusion.

This sets the absolute (not relative) depth along the curve.



**Painted Text Tool:** 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. Use the following options with this tool:



**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:** Modulates the opacity of the entire curve.

**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\User-Data\StoreData\Texts\ by default.

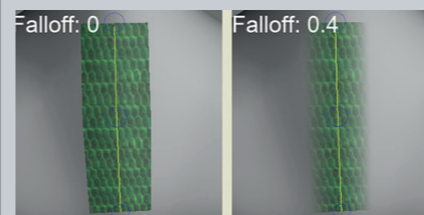
**Load:** Load text from a .txt file, located in InstallDir\UserData\StoreData\Texts\ by default.

Add new points into the spline by “**Left-Clicking**”. Use “**Enter**” to apply, with depth - upon applying, the text will be extruded outward over the curve. Pressing “**Ctrl-Enter**”

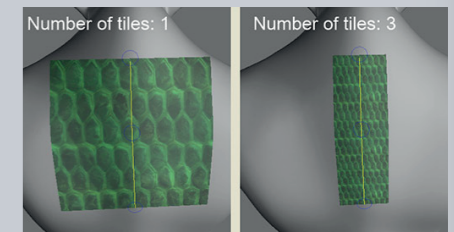
indents the text into the object. Use “**Backspace**” to delete the last point, “**Esc**” to delete all points. Click on a blue sphere to move it. Painting with text along a curve allows you to paint and extrude, as well as letting you **Erase/ Freeze/Make Planar/** Set the absolute height. You can place text along any polygonal surface and along any contour.



**Place Image Along Spline:** You can apply an image along a spline curve with this tool. You can select the images used for Depth texture/Color texture/Specular texture to tile along a spline. There are several settings and functions:



**Number of tiles:** Specify the number of tiles. A lower number produces fewer tiles.



**Falloff:** Opacity falloff.

**Extrusion:** Extrusion of the whole texture.

The other parameters are the same as used with “**Paint with Splines**”. With the “**Place Image Along Spline**” tool, you also can **Erase/Freeze/ Make Planar/Set absolute**

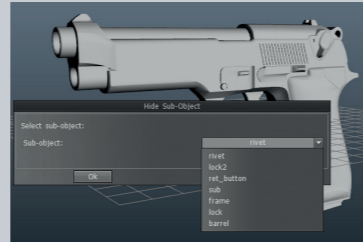
height. Here is an example of using an image along a spline to freeze an area.



**Erase:** Erasing the **Color, Depth** or **Specularity** in the current Layer. Eraser intensity depends on the slider for Eraser transparency. Erasing only effects your currently active Layer.



**Hide:** Hides selected polygons. “**Left-Clicking**” with a Brush hides parts of the surface by painting on the model. Pressing “**Ctrl**” shows previously hidden surface areas. Use “**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.

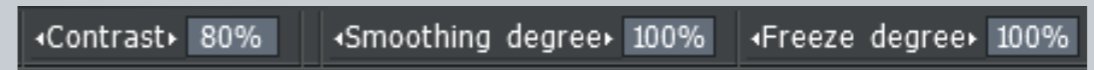
**Hide Menu:** Additionally, you can access the more advanced functions of the Hide tool in the main menu in the “**Top tool bar**”. For convenience, you can also undock this menu (like any other menu) and place it in an easy to access area. With this menu, you are not only able to hide surfaces by painting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

the whole object by selecting the object you want to hide.

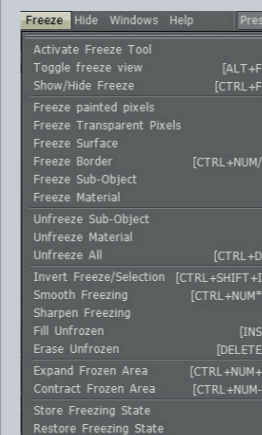
For example, if there are several sub-objects in the scene, you can use “**Hide Sub-Object**” to hide a specific object, as in the picture below. If there is only one object in the scene, “**Hide Sub-Object**” will hide only that object. You can also hide faces by their specific material, use “**Hide 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

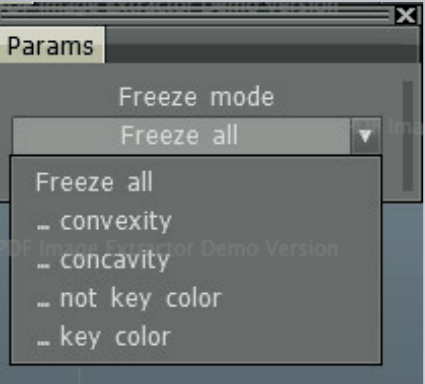


can be conditional, for example for relief, flat or colored parts depending on mode selected. Blocking masks the



action of feathering. Freeze mode is an operation opposite to selection. Press “**Shift**” to smooth out the edges of blocking.

This drop-down list provides the various **Freeze** modes. When the Brush goes along the surface, it gets masked in accordance with the condition you choose in this menu.



There are five masking modes in total:

**Freeze all:** Mask with a touch of the Brush or mouse-click (default mode).

surface.

**Concavity:** Mask the concave parts of the surface.

**Not key color:** Mask all, except the color currently selected.

**Key color:** Mask the color currently selected.

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

**Contrast:** This parameter increases the freezing contrast.

**Smoothing degree:** Sets the smoothing level of the freeze area.

**Freeze degree:** Controls the level of the opacity of freezing. Masking can be saved to a file and loaded. In this way you can create a set of handy masking 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 Tool:** 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.

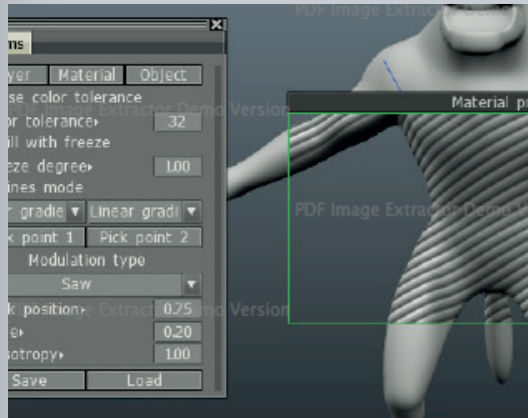
**Object:** Fill the sub-object.

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



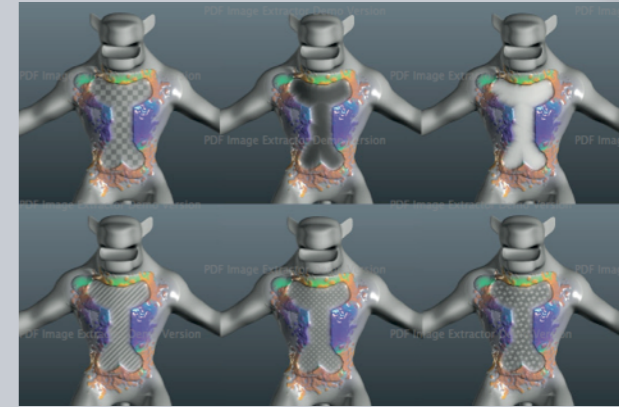
fill.

**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 with other tools” option is selected, the modulation acts not only in the “Fill mode”, but with the standard modes.



**Brushes tool:** There are a number of basic and user-adjustable types of modulation available:

**No modulation:** Filling will be done without additional modulation.

**Noise:** Random noise.

**Gaussian noise:**

**Gaussian noise applied:**

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

**Random modulation with**

**Stripes:** Stripes that are perpendicular to the main axis.

**Saw:** Saw-tooth 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:**

**Fractal N2:**

**Fractal N3:**

**Fractal N4 (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 axe, 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:**

**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.

**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. The parameters are as follows:

**Depth modulator:** Modulation value.

**Extrusion:** The addition extrusion. “-1” means that the surface will only be indented, “1” – only extruded.

**Modulate color:** Select the corresponding color operation and paint with it. Vary the opacity to make the effect stronger or weaker. These parameters are listed as follows:

**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.

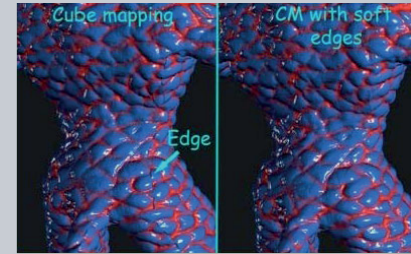
**Modulate specular:** Select this option if you want to modulate specular channel. These parameters are as follows:

**Convexity specular:** Convexity specular modulator.

**Concavity specular:** Concavity specular modulator.

To apply the new fill pattern you should specify a texture for the Bump channel and a texture for the Color channel (optional). They will be mapped on an object using cube mapping with soft edges. The screenshot to the right shows the difference between usual cube mapping and mapping with soft edges. In this way, you can texture objects seamlessly, with ease. It is easy to create materials like skin or pores with this method.

**Save/Load fill parameters:** Using the menu “Store/Restore” you can store parameters of the Fill 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 the Fill tool separately, but also in combination with other methods. For example, we can use the Fill tool in combination with a Material. In the picture at right, we have filled in a certain area with a Material, using the 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 a 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 hasn't frozen - just calculating.



**Eye dropper:** Pick the **Color** and **Specularity** from the surface of an object. Use the hot key “**LMB-V**” to pick the primary color and “**RMB-V**” to pick the secondary color outside this tool. Use “**H**” to pick the top Layer. Use “**G**” to pick the depth of the Brush.



**Make planar:** This tool flattens the geometry on the object. Use the **LMB** to make the surface inside the Brush cursor flat. The Brush shape is stored. By choosing 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:** Cuts off parts above the plane.

**Fill mode:** Fills holes below the plane.

**Topological symmetry tool:** Topological symmetry lets you copy surface pieces if they have a symmetrical face structure - even if they are not symmetrical geometrically. Select the red face with a “Left click” and then select the blue face. It is better if they are adjacent. Either way, the contents 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 Brush.

**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.

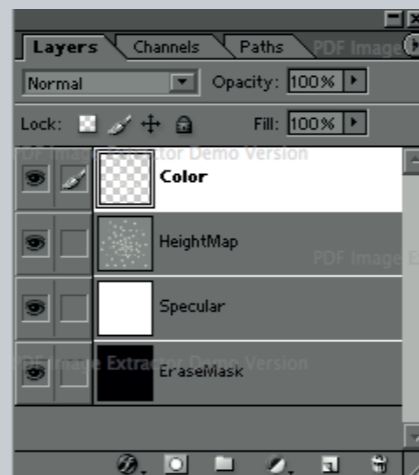
**Units to display:** You should choose the units to display. There are parameters in these combo boxes: **Meters (m)**, **Millimeters (mm)**, **Centimeters (cm)**, **Kilometers (km)**, **Feet (ft)**, **Inches (in)**, **Yards (yr)** and **Miles (mi)**.

**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.

## 1.8 The Layers Panel

The Layers Panel changes depending on which Room you are working in. In the Paint Room, Layers are used much like you would in Photoshop or other painting applications, where



aspects of each Layer can be controlled independently, such as blending modes and opacity - but with additional control over how Depth painting affects the Layer in question.

Right-clicking on a Layer name opens a menu of addition commands. Icons at the bottom of the panel are, in order, for the following functions: New Layer, Delete Layer, Merge Layer downward, Move Layer

up, Move Layer down, (in the list).

**Layer visibility:** Simply toggle the “Eye” icon to hide or show the Layer in question.

Hold down the “Alt” key to hide every layer except the layer clicked on.

**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

## 1.9 The Strips Panel

The Strips panel offers an alternate selection of Brush

tips, which repeat over the

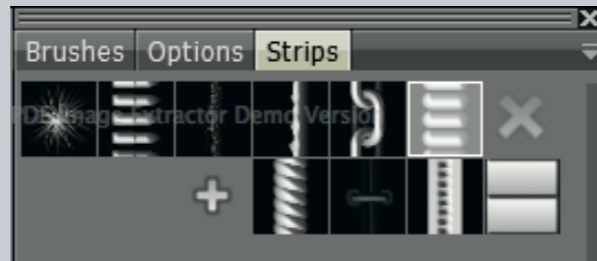
length of a stroke. Choosing a Strip shape overrides the alpha shapes in the Brushes panel. Strips work best in the Paint Room for creating detail with

normal map depth, in concert with per-pixel painting modes, or, for actual displacement painting while using the micro-vertex method.

In this illustration, the bandolier was created with a standard Strip shape, totally within the Paint Room - using the micro-vertex method of painting.

For similar functionality in the Voxel Room, use the “Curves” tool with a repeating Spline shape selected from the “Splines” panel. The Strips panel uses the same methods of adding folders and individual strips as the Brushes panel.

blue and red parts in the topological symmetry tool.



Copy Channels:

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.

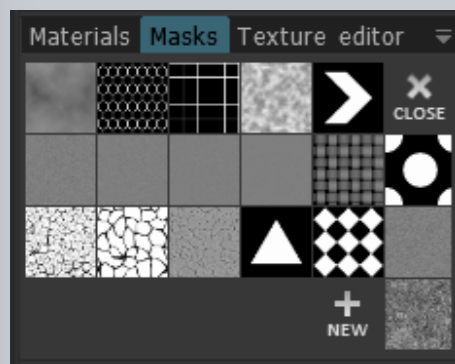
**Clamp depth of the layer:**

**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.

## 1.10 The Masks Panel



Masks are used as a way to specify an area for sculpting or texture painting with Brush depth and transparency. Masks are essentially stencils.

The mask, in conjunction with materials can be moved and rotated independently using the new navigation controls. Masks and materials, both, can also be rotated precisely 45 degrees by using SHIFT key.

If you choose to display mask/material in at least one of the channels (Depth and/or, Color and/or Specular), a new panel shows up on top.

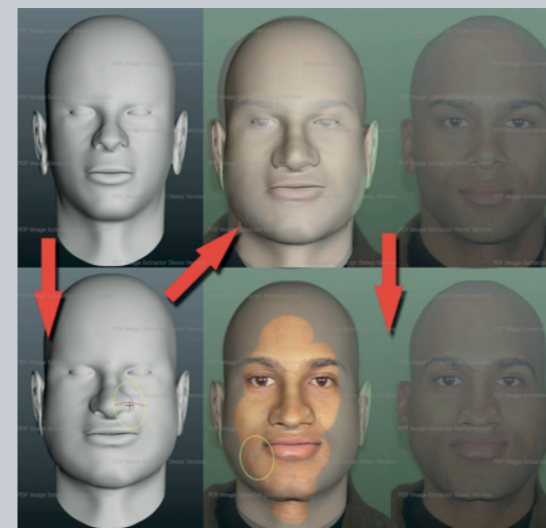


**Mask/Material Preview Panel:**

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

**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 mask image, mirror-like, across the horizontal axis. **Flip Y:** Reflect mask image, mirror-like, across the vertical axis.

**Paint:** This mode lets you paint, using your mask or material.

**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.

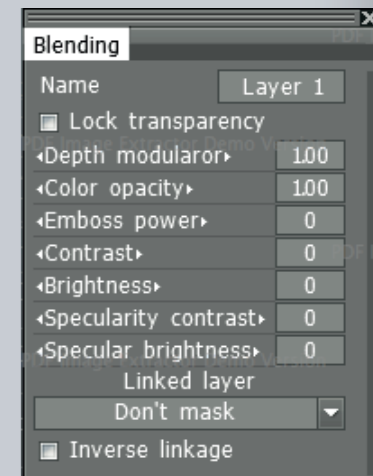
Adding a new mask or material is done exactly as you do with Brushes and Strips.

## 1.11 The Blending Panel

This panel contains a more advanced set of parameters. Let's take a look:

**Lock transparency:** This lets you draw on a Layer without changing its transparency.

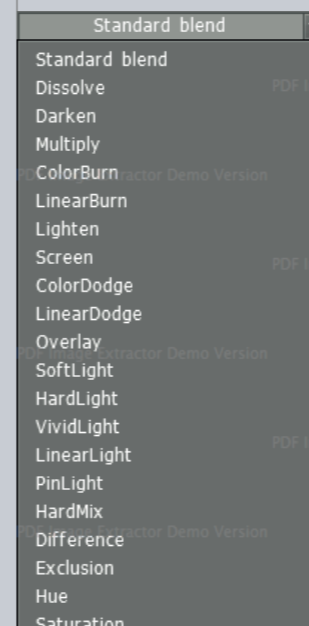
**Essentially,** it lets you edit the current colors on a Layer without adding more.



**Depth modulator:** Color opacity: Emboss power: Contrast: Brightness: Specular contrast: Specular brightness:

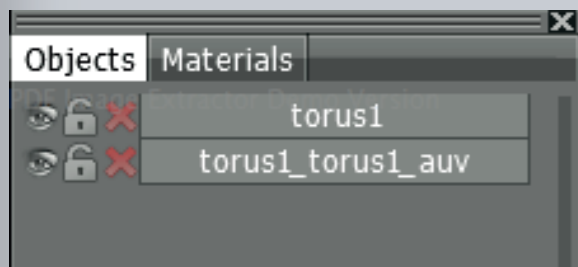
**Linked Layer:** This drop-down list enables you to mask the current Layer with another Layer. The transparency and depth of the current Layer will be modulated by the selected Layer transparency.

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





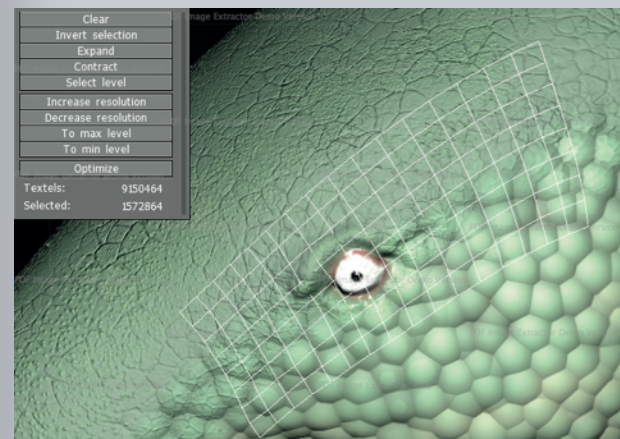
## 1.12 The Sub-objects/Materials Panel



This tab displays all imported meshes into a Layer system. Essentially, each Layer is an object, and can be toggled on/off

for a number of things, like its visibility or locked/unlocked

## 1.13 More on Ptex Painting



Ptex is one of the more amazing technologies, allowing you to paint extremely high resolution textures on a per polygon basis, as well as completely bypassing all UV work - as it does not require

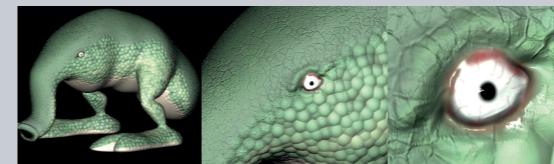
any manual input for the creation of the UV maps. Ptex, in its current implementation, only supports quad polygons, no triangles or N-gons.

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, or group of polygons, 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 which calls for an extreme close up shot or just requires more detail in one particular area - yet, you don't want to create a lot of very high resolution texture maps. Ptex works quite well for this purpose.

What is even more remarkable is that the .ptex format can

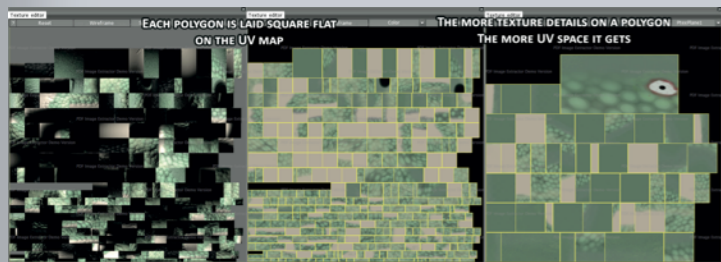


store hundreds of thousands of textures directly with in one .ptex file. At this time, only external application that

supports the .ptex format will be able to import/export the .ptex file for use. To fill in this gap in .ptex support, we have provided for the export of an ordinary texture map, based on Ptex technology, in the .TGA, .BMP, and .PNG formats.

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 subdivided 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, maintaining any sharp edges that are present. Each of the following Ptex functions requires a selection. To make a selection, simply activate the **Ptex Local Resolution** tool and “paint over” the polygons in the viewport.

**Local Resolution parameters:**

**Clear:** Clear any selection.

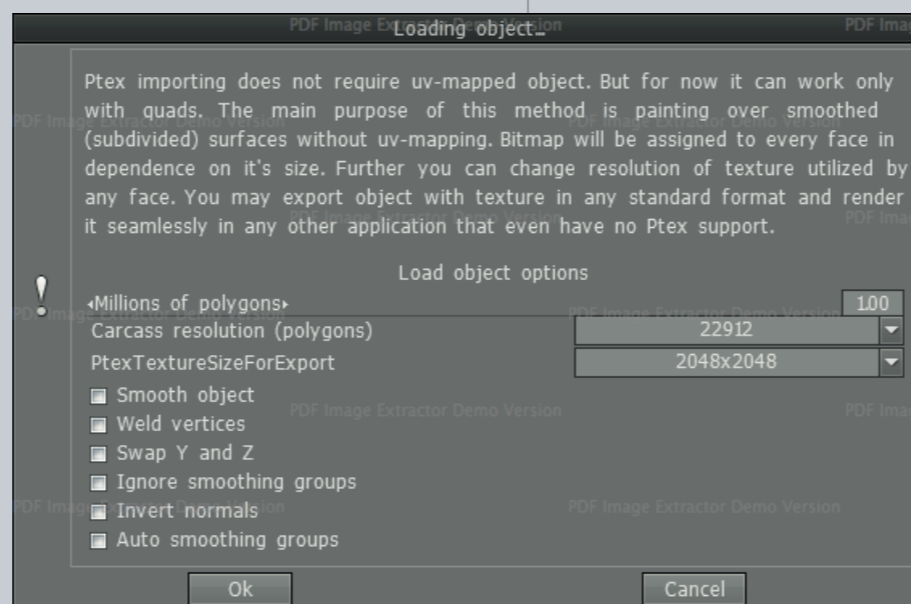
**Invert selection:** Inverts your selection.

**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 polygon 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. However, 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/>

# Rendering

Render internally using Ambient Occlusion, Depth of Field, ray traced shadows and multiple light sources - in real time - with up to 32 bits of information. Render turntables and fly-throughs at real time speeds.



# Rendering Parameters

## THE RENDER PANEL

### 1. Parameters Panel Explained

When creating a portfolio of your work, it is often advantageous to include both “Turntable” and “Flyby” animations of your 3D sculptures and scenes.

Also, all through the creation process, it is helpful to get a reasonable approximation of your rendered models and scenes - without the added difficulty of exporting to 3rd party rendering applications.

3D-Coat’s internal Render Room provides all of these convenient and fast methods for viewing, evaluating and exporting realistic views of your models and scenes.

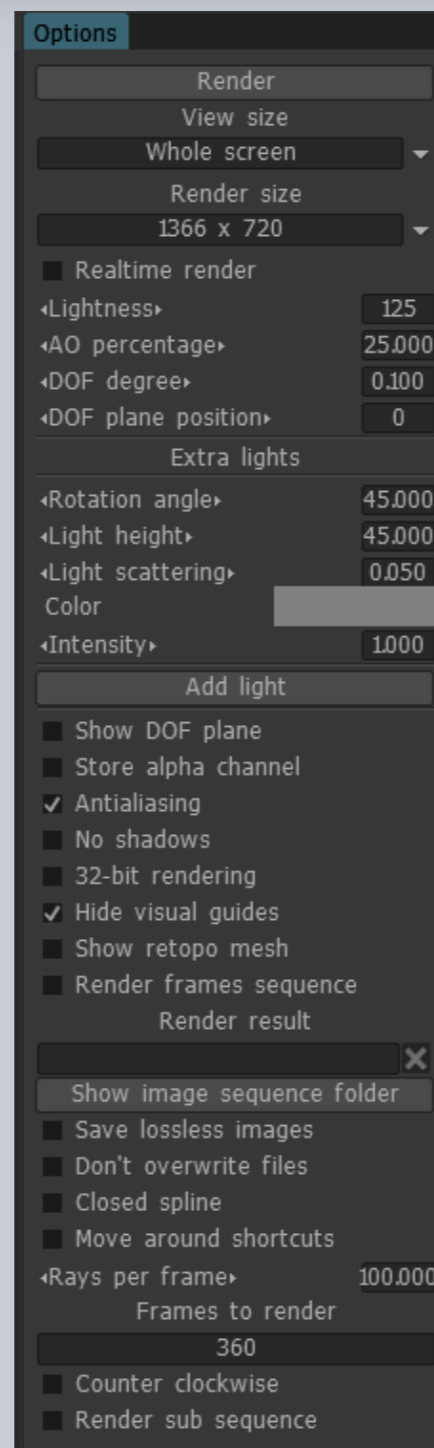
## 1.1 Parameters Panel Explained

You have 2 choices for rendering your scene within 3D-Coat - Render using the entire screen - or use a custom size of your own.

Realtime, full Rendering is possible and very practical within 3D-Coat, due to its very fast internal renderer. This makes it practical to update the rendered view as you move your Camera in relation to your model or scene - letting you see, interactively, the effect of multiple, colored light sources, ambient occlusion, soft shadows and depth of field. You can also combine all of these with an overlay of your Retopo Mesh, for effect or reference purposes.

**Lightness:** Adjust the ambient light intensity for your rendered scene .

**AO percentage:** Control the intensity of the overall effect of Ambient Occlusion within your 3DC scene with this slider.



**DOF degree:** Control the intensity of the Depth of Field effect with this slider.

**DOF plane position:** Adjust the position of the imaginary plane where Depth of Field goes into effect with relation to the current Camera view. See the result of this adjustment as you move your Camera in the scene, using the common Mouse gestures.

Add your additional light sources with the “Add light” button and control these lights with the following settings:

**Rotation angle:** Control your render camera’s rotation within the 3D Viewport with this slider.

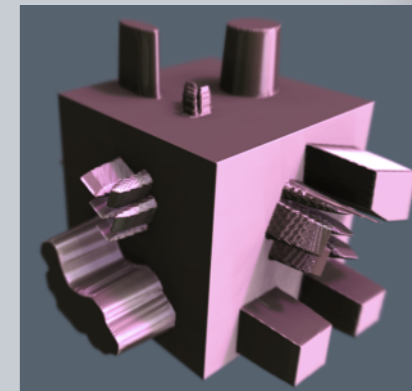
**Light height:** Control the vertical position of your Viewport Camera with this slider.

**Light scattering:** Control the degree of shadow softness with this slider.

**Color:** Set the color of your light source.

**Intensity:** Set the brightness of your light source.

**Add light:** Add additional light sources to your scene - all controllable as outlined above.



**Show DOF plane:** Toggle the visibility of the “depth of field” plane within the Viewport - gives you a visual representation of where the “depth of field” effect begins.

**Store alpha channel:** Makes sure your rendered images contain an alpha channel.

**Antialiasing:** Softens the edges and removes the “jaggies” from rendered images.

**No shadows:** Renders your object without shadowing.

**32-bit rendering:** Saves out 32-bits of image depth in your renderings.

**Hide visual guides:** Hides the Symmetry Plane, Grid and View Axis in the 3D-Viewport.

**Show retopo mesh:** Overlays a polygonal representation of your mesh topology.

**Render frames sequence:** Check this option for rendering out “Turntable” and “Fly-by” animations. Fly-by positions are determined based on your selections under the “Camera” drop-down menu: “Add camera shortcut . . . “ for each Camera position in the Fly-by.

**Render result:** Choose the location of the saved rendering.

**Show image sequence folder:** Display the folder for saved animations in the box above.

**Save lossless images:** Save images without any form of compression.

**Don’t overwrite files:** Forbid the overwriting of already saved renders.

**Closed spline:** Makes sure your animations start and end at the same point in the sequence.

**Move around shortcuts:** Adds spline-based interpolation between the saved “Camera shortcuts” - giving an overall smooth trajectory.

**Rays per frame:** Adjust the number of ray traced “rays” that are rendered per frame of animation. Higher numbers take longer, per frame, to render.

**Frames to render:** Sets the total number of frames that will be rendered to complete a circuit of Camera rendering positions.

**Counter-clockwise:** Reverse the direction of the default Camera rendering positions.

**Render sub-sequence:** Check this option to render only a portion of an animated Camera sequence or circuit.

# Import/Export

Use 3D-Coat's comprehensive set of tools to seamlessly sync your models with all of your external 3D applications. Import "raw" mesh data or models with UV's intact. External models can be imported as reference meshes or for creating all new topology - ready for texturing.





# All Import Functions

## IMPORTING INTO DIFFERENT ROOMS

1. Importing Into the Voxel Room
2. Importing Into the Retopo Room
3. Importing Into the UV Room
4. Importing Into the Paint Room

Importing in 3D-Coat is a broad topic - and encompasses specific assets which can be imported - and which can only be understood in the context of which Room you are importing them into. Some asset imports only make sense when you take into consideration the Room in which they primarily function.

We'll show you which menu you should use for which type of asset import - and which Room you should be in when you import these specific assets.

## 1.1 Importing Into the Voxel Room

Model for per pixel painting  
Model for microvertex painting [CTRL+SHIFT+O]  
Model for Ptex  
Import for AUTOPO  
Import retopo mesh  
Reference Mesh  
Big Mesh  
Image Plane [CTRL+SHIFT+M]  
SL Object  
Import mesh for voxelizing  
Import for vertex painting  
Import images as mesh  
Import raw voxels data  
Import vertices positions  
Replace geometry

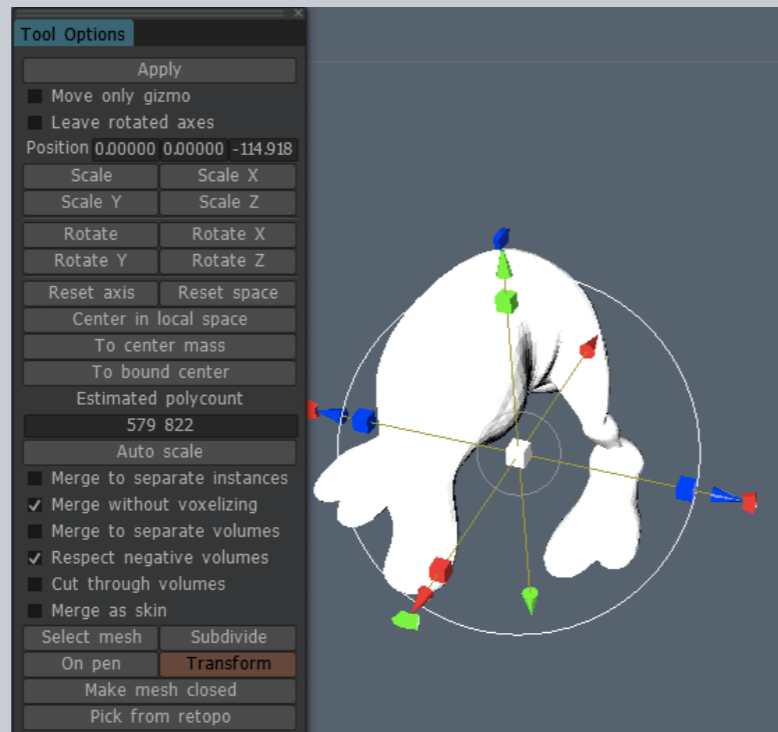
The bottom line is that when you import an external model into the Voxel Room - you are essentially changing its nature - into a 3D-Coat volume-based “Sculpture” - unique to the 3DC environment.

Most imported 3D objects are

polygon-based, and because of this need to be translated into a Voxel volume of a given “Resolution”. This kind of resolution is directly dependent on the scale that you specify for this object upon import.

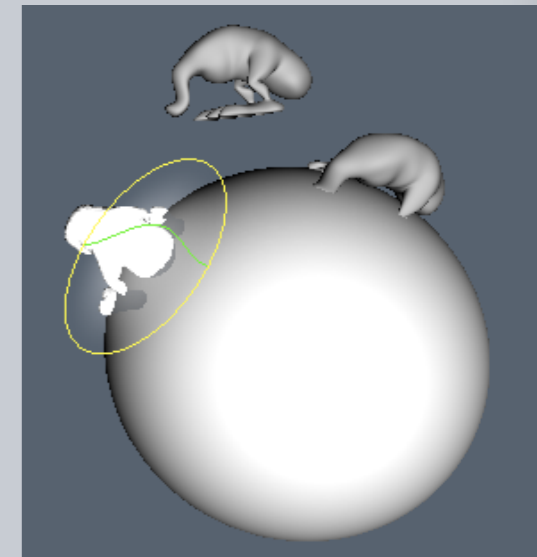
External objects enter the Voxel Room either by way of the “Opening Dialogs”, the “File/Import” menu or by “Merging” operations.

In all 3 cases, your object is introduced



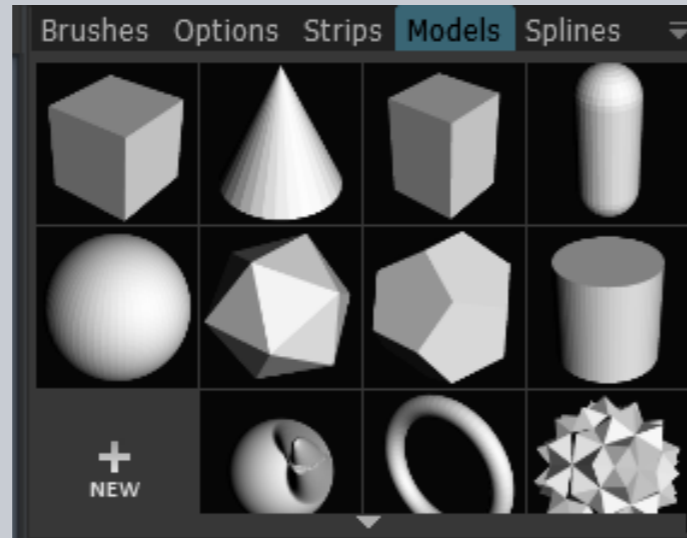
into the Voxel Room surrounded by the “Transform Widget/Gizmo”. You can provide your imported model with the resolution it needs by visually scaling it up in the Viewport - or by numerical entry. Once the proper Scale/Resolution is obtained - press “Enter” to make it valid and permanent.

When you “Import for voxelizing” or when you “Merge” an external object - there is the interesting and useful function called “On pen” - which allows you to interactively place instances of your imported mesh with any scale, orientation and penetration depth (if another object already exists in a Voxel Layer) - all “on-the-fly” - and by means of the Mouse.



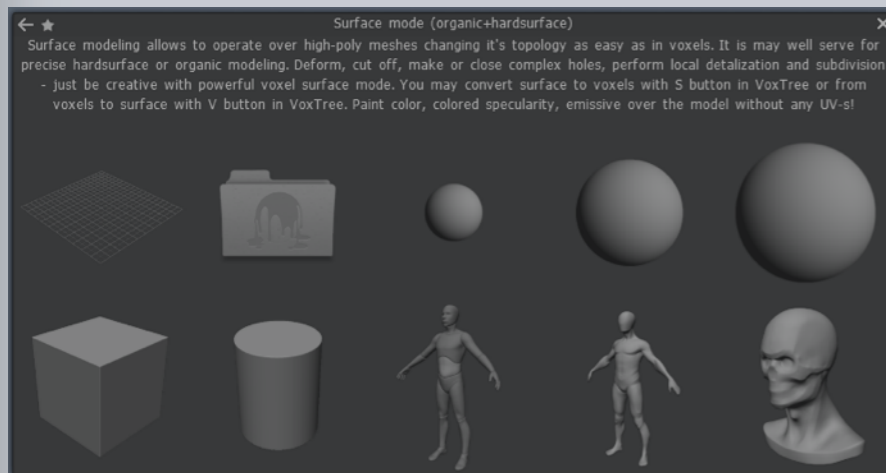
Dragging with the Right button down - from right to left - resizes the Merged object, while dragging with Right mouse button down - up or down - changes the “penetration” depth of the Merged object into whatever object may already be present on a Voxel Layer.

If you have an object which exists in the “Models” Panel and you wish to add this to a Voxel Layer - you can do this by simply clicking on its icon in the Panel - and you will be presented



with standard “Import/Merge” dialog - which will allow you to deal with it as you would any external model.

### Importing for Surface Mode:



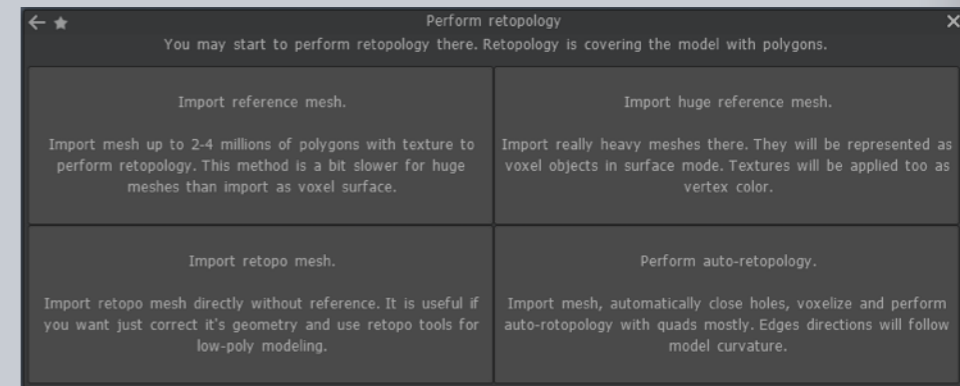
You can also import directly into Surface Mode through the Opening Dialog. Surface Mode is a subset of the

Voxel Room - but works entirely on surfaces (without volume). Surface Mode provides an adjustable triangular mesh skin representation of your imported model, which behaves similarly to voxels.

Once your imported model is in the Surface Mode workspace, you can also use LiveClay - our implementation of “Dynamic Subdivision” - (localized subdivision). Using this method for sculpting adds resolution only where needed (locally) - conserving software and hardware resources.

### 1.2 Importing into the Retopo Room

If you have a saved voxel or surface sculpture that you wish to make practical



by giving it an economical polygonal representation and surface texture - or, if you simply want to modify an existing external model’s topology (or start from scratch with new topology) - you will want to import your model into the Retopo Room.

**Importing as a Reference Mesh:** Good for most applications where you wish to modify topology on an existing mesh - and then move to the Paint Room for texturing operations, and eventually export your finished

product. This method is also good for imported meshes that you wish to reference existing UV's and textures, since they are imported, as well. Practical for Imported Meshes with 2 - up to 4 millions polygons.

### Importing for Retopology Only:

If you simply want to import a mesh for the purpose of modifying its existing low poly topology (or starting from scratch) - use this method of importing. No reference will be made to its UV's or textures in this case. This method was specifically designed to work with **low poly** assets.

### Importing a Huge Mesh:

When you need to import a very high poly mesh - upon which you also wish to add or modify hi-res sculptural detail by means of the Voxel Room - use this importing method.

Its UV's and textures will be imported also for reference and possible **Baking**. The newly formed voxel representation of your imported mesh will be aligned to the Retopo mesh that now exists in the **Retopo Room** where topology can be added automatically (**AUTOPO**) or manually using the **Retopo** tool set.

### Importing for Automatic Topology (**AUTOPO**):

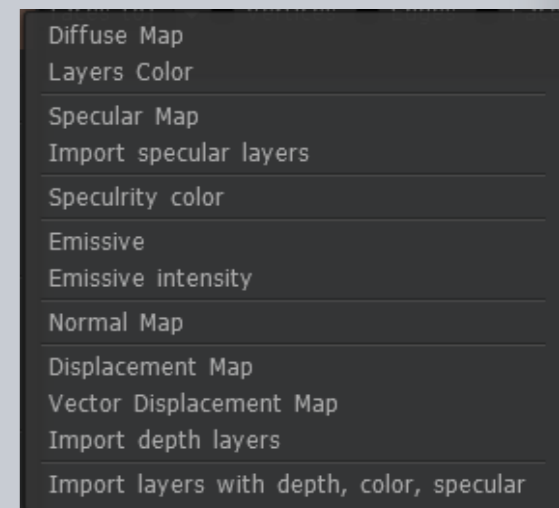
When you wish to import an external mesh for the purposes of allowing 3D-Coat to interpret its overall shape and edge structure, by means of **AUTOPO** - with the added benefit of closing any unwanted holes - use this importing method.

All meshes imported using this method will be re-made as voxel objects, as a preliminary step.

## 1.3 Importing Into the UV Room

At the time you will be wanting to use the tool set that exists in the **UV Room**, your model will already have been given some form of **topology** and a tentative **UV Map** arrangement - based on the "**Unwrapping**" you performed in the **Retopo Room**.

In this context, the "**Texture Menu**" appears in the **Main Menu Panel** with a list of "**Import**" functions.



As you can see, all of these Import functions deal with importing individual textures or Texture Layers.

After creating a **UV Map**, the next logical step is to create layers of Texture which can then be exported along with your newly topologized model. And, if textures have already been created for this model - the **Texture Menu** becomes available to import them.

In the **Opening Dialog**, there also exists an option entitled:

**UV Map Model**, which, if selected opens the “Import for Per-Pixel Painting” dialog - allowing you to import a model with existing UV’s that can be modified in the **UV Room**.

## 1.4 Importing Into the Paint Room

The primary way to import assets into the **Paint Room** is through the **Opening Dialog** and its sub-options.



In order to Paint some textures, 1 of 2 conditions must be met:

1. A model with topology and UV’s created in 3DC has been successfully **Merged** into the **Paint Room** (which can’t happen without the existence of a **UV Map**).
2. A model created externally, which has been **UV Mapped**, is imported into 3D-Coat for texturing using one of the **Painting Methods** (which automatically places any existing UV Maps and Textures into the **UV Room** and the **Paint Room**).

In this context, the **Texture Menu** becomes available, also, in the **Main Menu Panel**. As described in the “Importing Into the **UV Room**” section - the options available in this menu allow you to import existing texture assets into the **Paint Room** for further modification.

# All Export Functions

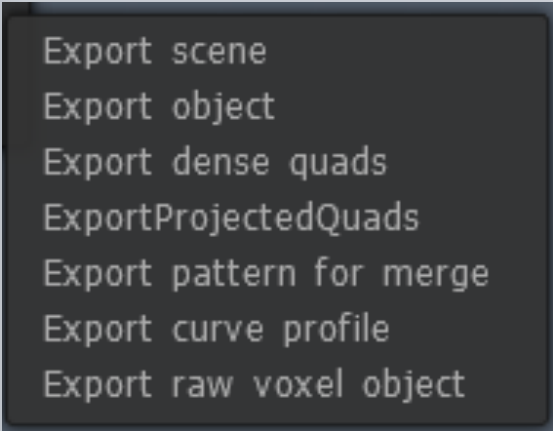
## EXPORTING FROM DIFFERENT ROOMS

1. Exporting from the Voxel Room
2. Exporting from the Retopo Room
3. Exporting from the UV Room
4. Exporting from the Paint Room
5. Exporting from the Tweak Room

Exporting in 3D-Coat is a broad topic - and encompasses all assets in the context of which Room you are exporting from. Some asset exports make sense when you take into consideration the Room in which they primarily function.

We'll show you which menu you should use for which type of export - and which Room you should be in when you make these exports.

## 1.1 Exporting from the Voxel Room



Export scene  
Export object  
Export dense quads  
ExportProjectedQuads  
Export pattern for merge  
Export curve profile  
Export raw voxel object

From the “**File/Export**” menu there are the following options for exporting your Voxel sculpture:

**Export scene:** Exports all Voxel Layers as a triangular mesh in the following available formats - **.obj,**

**.lwo, .fbx, .stl, and .ply.**

**Export object:** Exports the current Voxel Layer as a triangular mesh in the following available formats - **.obj, .lwo, .fbx, .stl, and .ply.**

**Export dense quads:** Exports a dense, quadragulated mesh that may not always be manifold in nature.

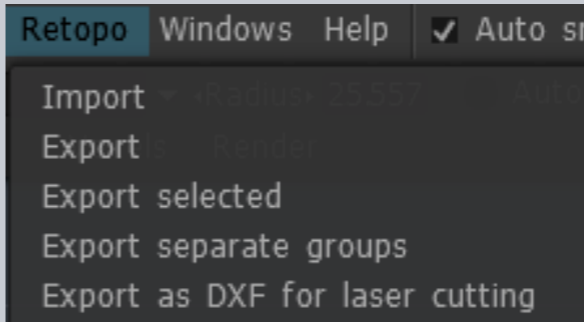
**ExportProjectedQuads:** Exports an optimized quadrangular mesh by means of projection.

**Export pattern for merge:** If you wish to keep your Voxel model in the “**Models**” Panel - for future and repeated use - this option saves it there with an iconic representation of the object.

**Export curve profile:** Exports the current Voxel Layer as a curve profile.

**Export raw voxel object:** Exports raw voxel data in the form of a table - which describes the object in 3 dimensions - indicating its volume.

## 1.2 Exporting from the Retopo Room



Retopo Windows Help  Auto st  
Import  
Export  
Export selected  
Export separate groups  
Export as DXF for laser cutting

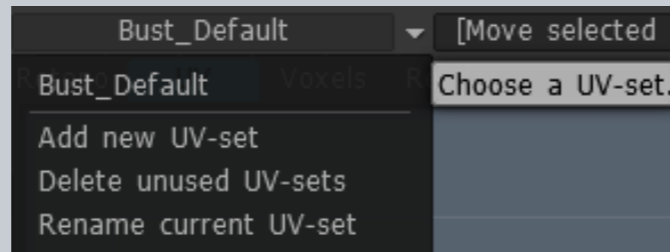
**Export:** Exports the Retopo mesh as an editable patch of polygons in one of the following formats - **.obj, .lwo, .fbx, .stl, and .ply.**

**Export selected:** Exports only the selected faces as an editable patch in one of the following formats- **.obj, .lwo, .fbx, .stl, and .ply.**

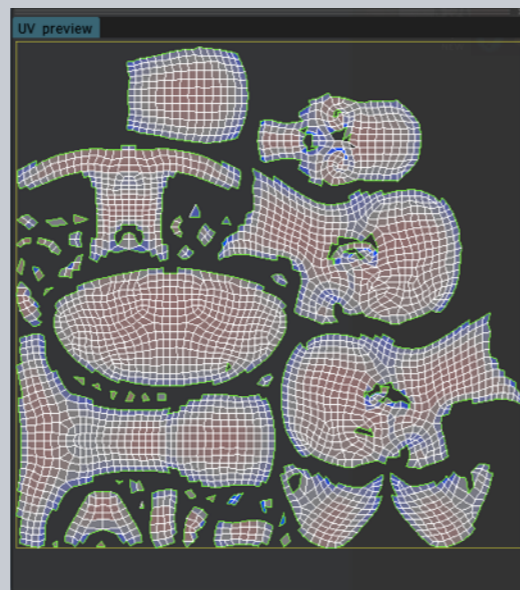
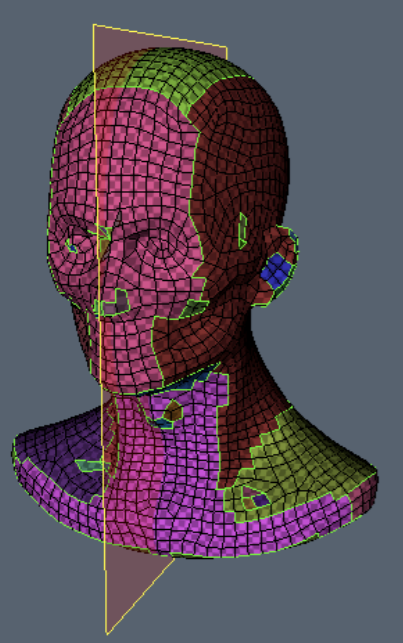
**Export separate groups:** Exports each Retopo Group as a separate object in one of the following formats - **.obj, .lwo, .fbx, .stl, and .ply.** Each object retains the name of its corresponding Retopo Group.

### 1.3 Exporting from the UV Room

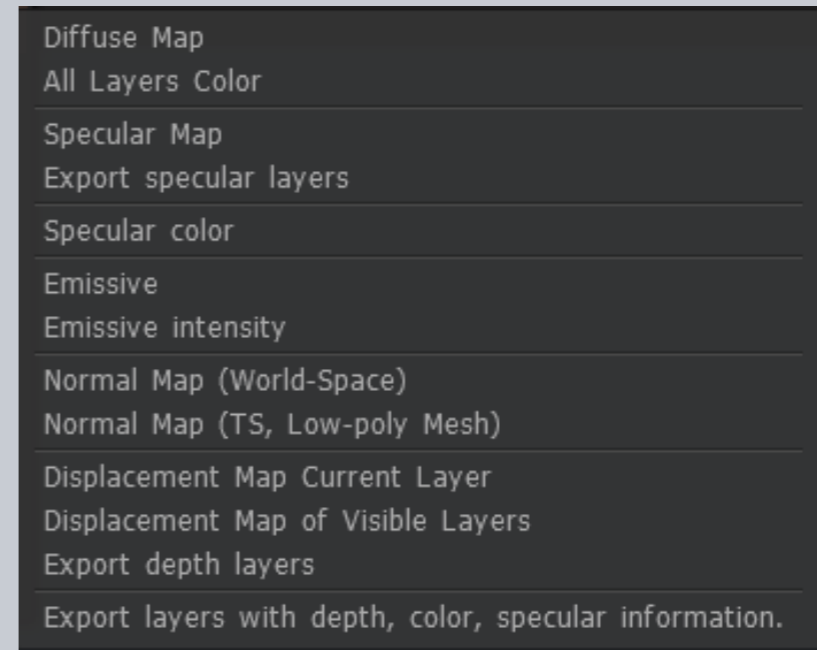
Since the UV Room may contain a number of different sets of UV Maps, first select the desired UV Map before proceeding with your export.



Just like exporting textures from the **Paint Room** - exporting from the **UV Room** involves exporting individual textures, in the form of **UV Maps**, which correspond to **Diffuse**, **Specular**, **Normal**, **Displacement** and **Emmision** texture data.



Use the Export options found in the “Textures” menu as displayed below:



The only remaining “**Export**” function is found in the “**File**” menu, which is the same option available in the **Paint Room** - “**Export**”, which exports a polygonal version of your model in one of the following formats - **.obj**, **.lwo**, **.fbx**, **.stl**, and **.ply**.

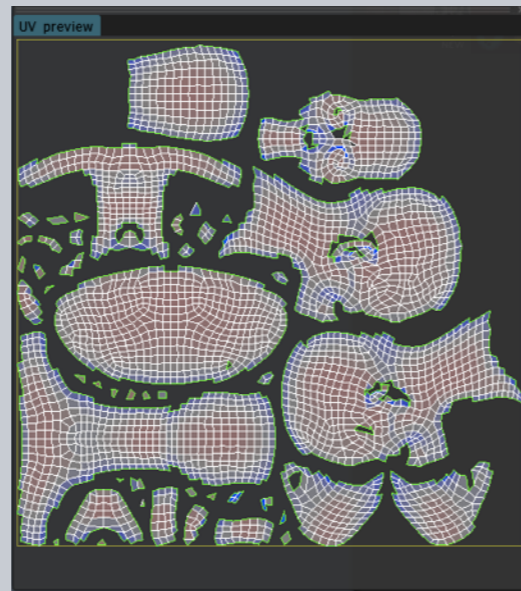
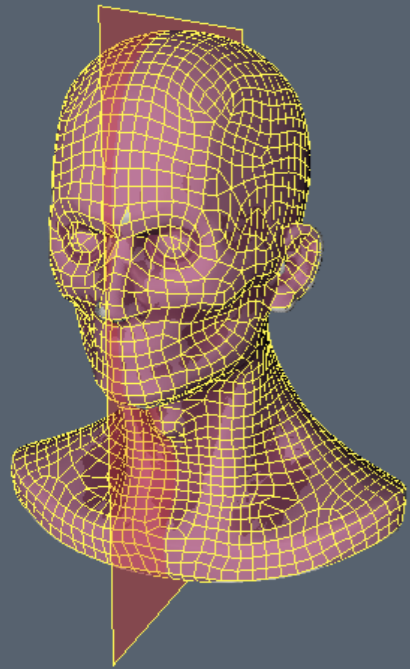
No UV Map would exist in the **UV Room** without first having topology created in the **Retopo Room** - having seams marked and having been “**Unwrapped**” and then “**Merged**” into the **Paint Room**.



## 1.4 Exporting from the Paint Room

There are only 2 categories of export which can be performed while working in the Paint Room:

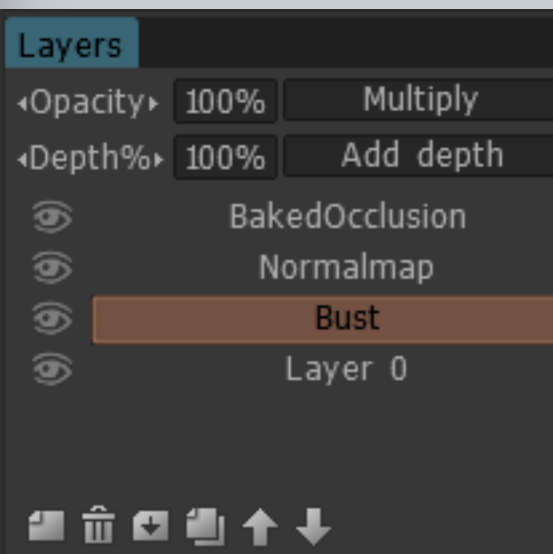
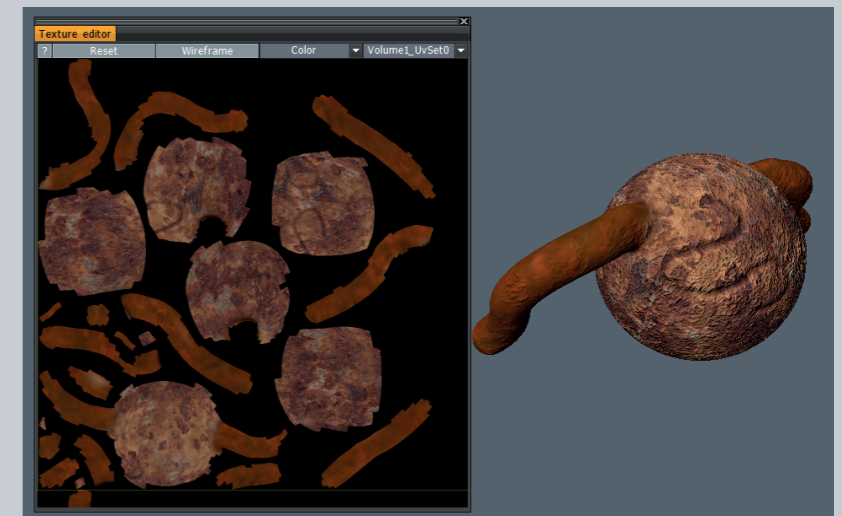
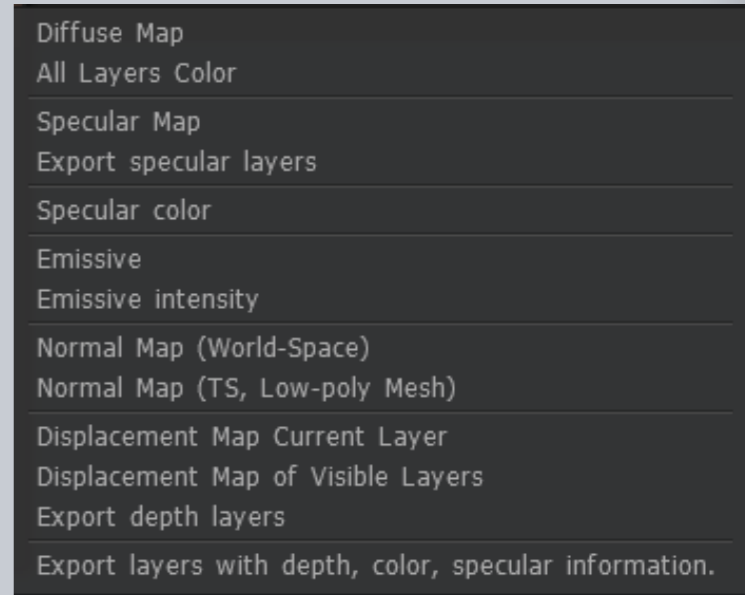
1. Export of the polygonal model as defined in the Retopo Room.
2. Export of all of the Painted Textures which have been created in the Paint Room.



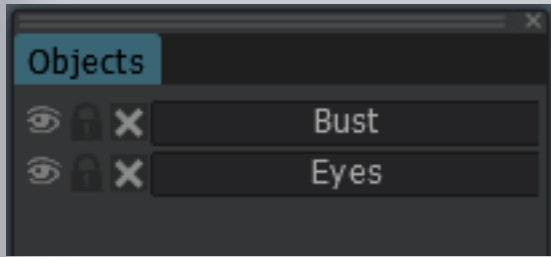
All Texture Painting Data is contained within the various Layers which have been created in the Paint Room.

This data exists in the form of the **5 basic UV Maps** that are created at the same time you **Paint** that information onto your sculpture.

As is the case when exporting data from the UV Room - it must be put into a format that other applications understand. This format is that of a **UV Map**. Separate maps are saved for each of the 5 categories of texture that you have created by painting onto your model: **Diffuse Color**, **Specular Color**, **Emissive Intensity**, **Normal (bump) information** and **Displacement information**.



## 1.5 Exporting from the Tweak Room

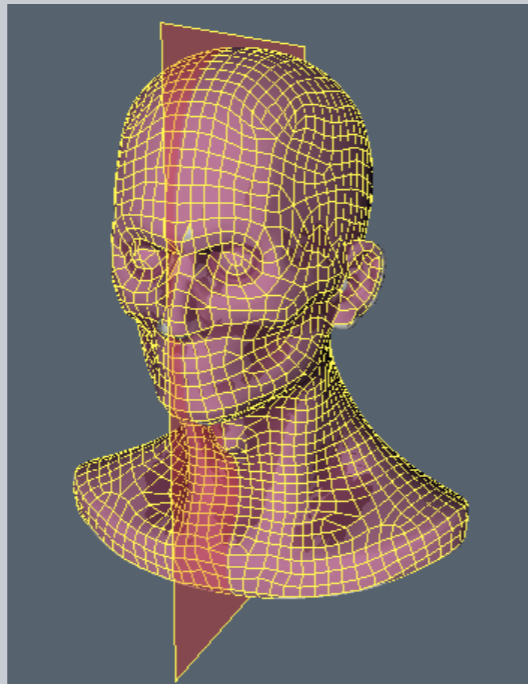


Since the Tweak Room is only responsible for containing and manipulating polygonal mesh data, in that context it is only

appropriate to export that data as mesh data in one of the following formats

- .obj, .lwo, .fbx, .stl, and .ply.

When any Retopo Group is “Merged” into the Paint Room, it also makes its appearance into the “Objects” Panel - which is the main Panel associated with the Tweak Room.



When you use the “File/Export model” option, all of the Objects which are present in the “Objects” Panel are exported, whether they are currently visible, or not.

# Keyboard Shortcuts

Nearly everything can be assigned to a single keystroke or combination. Speed up your workflow and customize these for your specific needs.



# Keystroke Assignment

## WORKFLOW

1. Procedure
2. Keyboard Diagram

Nearly any tool or function can be assigned a single or multiple keyboard shortcut by selecting the tool or function and pressing the “END” key.

3D-Coat comes pre-packaged, however, with a series of default shortcuts which are outlined on the following pages.



**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: (]) 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 (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**



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 RMB = "right mouse button"  
 MMB = "middle mouse button"  
 WHEEL = "mouse wheel scrolling"

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Open (.3b extension): Command + O  
 Import for Microvertex painting : Command + Shift + O  
 Import image plane: Command + Shift + M  
 Save: Command + S  
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 Undo: Command + Z  
 Redo: Command + Y  
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 Paste: Command + V  
 Apply operation: Return  
 Escape from operation: ESC  
 Swap background and foreground color: X

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 Zoom: (Option + RMB) or (RMB on empty space)  
 Pan: (Option + MMB) or (Option + LMB + RMB)  
 Fit items to viewport: Shift + A  
 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  
 Back view: NUM8  
 Left view: NUM4  
 Right view: NUM6  
 Top view: NUM7  
 Bottom view: NUM1  
 Add camera shortcut: Command + Up  
 Delete camera shortcut: Command + Down  
 Switch to previous camera shortcut: Command + Left  
 Switch to next camera shortcut: Command + right

**Navigate Screen Materials/ Mask:**

Move Materials/ Mask: RMB on empty space  
 Rotate Materials/ Mask:  
 Command + RMB on empty space  
 Scale Materials/ Mask:  
 Shift + RMB on empty space  
 Change aspect ratio of Materials/ Mask:  
 Command + 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  
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**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  
 Copy a part: Command + C  
 Creation of a new pen from a site:  
 Command + Shift + C

**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**

# Applinks

Free 3rd Party plug-ins give you streamlined access to your favorite external Applications. Tailor made for speed and ease of use, add these to your already powerful arsenal of tools.



# External Connections

## AVAILABLE APPLINKS

1. Maya
2. 3DS Max
3. SoftImage
4. Cinema 4D
5. Modo
6. Lightwave
7. Blender

3D-Coat was developed, and is continuing to be developed as an integral part of the overall 3D asset creation pipeline. Without external applications and 3D-Coat's connection to them - the pipeline would be incomplete.

As part of our communities' efforts to make 3D-Coat more and more useful, they have worked very hard to provide more intuitive connections to external 3D applications in the form of Applinks.



## Applinks

The development of “live” links between 3D-Coat and other commercial 3D applications is an ongoing project. So, consider some of these “Links” as beta versions. As of this printing, the list of available Applinks is as follows:

**Maya, 3DSMax, Lightwave, Modo, Houdini, SoftImage, C4D, Messiah Studio, Cheetah3D, Unity3D, Blender, Zbrush, Modo.**

After installing you should run your App, then run 3D-Coat. There should appear the new menu in 3D-Coat - File-> Open in -> Your app name.

You may use this item to bring 3D-Coat's models from any room (Paint, Retopo, Voxels) to your app with color, normal, displacement and specular. But you should choose what you need - displacement or normalmap, not both at once.

Also you may bring your models from your app to 3D-Coat using plugin. In this case you will get new item in menu - File -> Open in original app. In this way you may bring model back to your app.

Find your Applink at : <http://3d-coat.com/applinks>

# What's New

Version 4 is a landmark release of 3D-Coat - opening up depths of function not yet seen. Now users of all platforms and hardware configurations can find the right tools for their particular needs and experience technology that is yet to appear in competitive products.



# Version 4

## WHAT'S NEW IN VERSION 4?

3D-Coat Version 4 represents a substantial upgrade to the application and in many cases a total re-write of existing functions, as well as the introduction of a number of innovative new features. The interface has changed and new customization features allow for a very subjective user experience.

## 1.1 What's New in Version 4?

### 3D-Coat V4 Features List

<http://3d-coat.com/3d-coat-4/>

- **Live Clay released!**
- **Interface revised! New Iconic Look. New Start Dialog**
- **Speed increased everywhere 3 to 10 x. This is mostly related to Win version, Mac and Linux versions got speedup too, but Win version speedup is especially impressive!**
- **Painting emissive and colored specular introduced.**
- **Painting over voxels/vertex painting introduced.**
- **New tools and options!**
- **New Spline drawing mode.** Multiple strokes per pass, closed strokes allowed. Different radius per control point if needed (optional). Better spline preview. Progress shown. Good description in hints. Spline shapes tuned to be very nice and predictable. It allows modeling of very clean and accurate strokes with spline and pressure graph in ANY tool where it makes sense -
- **Major update of texture baking functions**
- **High-speed boolean operations in surface mode, hardsurface modeling with sharp edges.**
- **Special tools for Product/Prototype modeling**
- **Scripting via "C++ like" - Angelscript**
- **Possibility to retopo big meshes 10-50M and more**

#### Paint Room changes:

- **Colored specular** and **emissive channels** introduced in ppp/mv/ptex/voxels. Use new layer blending modes to assign colored specular/emissive to some layers.
- Specular contrast to Specular modulator in Layer options for convenience.
- **Magic Wand** tool.

- Possibility to edit projection in external editor with higher resolution than viewport - with multiplier. The picture size will correspond to viewport size, not to the whole window size as it was before.
- Applying masks and materials via cube mapping is now available in both - Paint and Voxels rooms.
- Two ways of calculating normals - as before or as in Maya for better compatibility.
- 3D-Coat has the most common TBN space used in most 3D-applications (Maya, Blender) - Morten Mikkelsen's TBN space
- N-gons with complex shape will be correctly supported in Paint and Retopo rooms.
- Material's tiling can be toggled On/Off

#### Voxel Room Changes:

- New **spacebar menu** with quick access slots (скрин)
- **Vox Layer, Vox Extrude** tools.
- New **Fit tool** to combine separate pieces that look similar but has different topology. Important to handle scan data.
- **Remove undercuts** tool.
- Volume preserving mode in masks painting added.
- **Smooth all** may work over frozen area and will work much faster. It gives a good and predictable way to smooth selected areas.
- **Extrude/Flatten** area in voxel surface mode done.
- Surface smooth polished a lot, now it has a lot of useful options and has become a very powerful tool .
- New items in VoxTree menu: **Show all, Show subtree** (to make nodes visible)
- All applicable brush jitters will act on merge tool in "On pen" mode.
- **Proxy** (multi-resolution) may now work via decimate! It helps a lot with thin surfaces.
- New command in VoxTree - **Split with...** to split one volume with another one into two parts. It works for both modes - surface and voxels.
- In **Move/Pose/Transform** tools you will be able to modify voxels and retopo simultaneously (optionally) .



- Pressing SHIFT while dragging transform tool allows to move only gizmo as if "Move only gizmo" was chosen.
- Current selected point in **Curves** tool will be highlighted when you edit points.

### Retopo & UV Room Changes:

- Models palette is now available in Retopo room to be merged directly in the re-topo room. Retopo layers may be dragged to that palette.
- **Retopo->Export groups** for exporting group as separate file.
- **Faces extrude** tool in face selection mode .
- Automatic vertex/edge/face selection in **Select** tool. Double-click will select connective area.
- Selection is additive now. Use CTRL+D or ESC or click outside the retopo mesh to deselect.
- **Add/Split Quads** may work in free space too if you attaching polygons to existing geometry.
- General Retopo settings moved to Menu line to save space.
- **Points&Faces** tool got set of improvements:
  - 1) possibility to assign another tool with CTRL, SHIFT, CTRL+SHIFT.
  - 2) possibility to create quads only
  - 3) possibility to work in free space
- UV improvement - you may select multiple UV islands, copy via CTRL+C, select one island of similar topology and use CTRL+V to put them on each other.
- Retopo opacity may now be varied, other UV-sets are visible too (more transparent).

### Other changes:

- Render quality (shadows, transparency, wireframe) improved!
- Essentially updated **Preset**s system!
- Important change! "Ignore backfaces" works based on Z-Buffer, not on normals direction. It makes possible to work correctly over multilayered structures correctly (i.e. thin pants).
- Direct uploading to sketchfab.com

- Masks preview for cubemapping (while navigating)
- E-mode circle/lasso/rectangle/spline etc will work closer to PS style - SPACE+LMB will move the whole shape.
- E-mode improvements: new modes for square and circle instead of SHIFT+Drag because SHIFT conflicts with other modes.
- Recyangle & Circle modes will show dimensions in orthographic mode with real world values, SPACE allows to enter numbers .
- Camera position will be stored in 3b file
- C++ like script language (angelscript) is introduced. It allows you to perform batch actions, create macro commands and interactive tutorials. It has very basic functionality now and will be extended upon request. C++ like scripting chosen because of speed, possibility to include good scripts directly into 3D-Coat's engine.
- New UI global feature - if you are changing something, instead of dragging mouse manually you may press SPACE and enter an exact numerical value. Space now has a double action - usually choose tool, but in tools where you pressed a mouse button and drag something, it allows entering precise values. It is applied to gizmos, primitives and split ring tool in Retopo room.
- Collada (dae) import-export support.
- Arrows now can be used for navigation.
- To global space modified, To uniform space introduced.
- More graphic tablets/manufacturers supported now.
- Toggle fullscreen in View menu
- Transform improved, now pivot points will be transformed together with child objects, in so way posing of chunked objects becomes very easy. Obj files export/import will store/restore pivot point.
- Invert tool action now has the option to assign a hotkey, this checkbox added to Paint room also.
- All tools are more consistent when used with the E-panel, unusable E-modes are hidden now for each tool.
- Important export option for real production - DXF export of UV islands contours for further laser cutting in real scales. In this way you may retopo an object, map it, export and cut it from leather, acrylic or plastic.
- Depth/opacity/radius may now be defined as a function (curve) of pen pressure.
- Brush Curve Editor