3DS MAX 5

by David Lightbown

INTRODUCTION

My relationship with 3ds max started about 4 years ago, when I was required to UV Map a model for an Unreal mod I was working on with a friend. At that point, I had never heard of UV Mapping and had been using Lightwave 5.x for years, which had no built-in UV Mapping until version 6. My experience at that time was limited, requiring me only to map and export a model.

Years later, around the same time 3ds max 4 came out, I started working at a video game developer, which required me to learn the package in a few weeks. It is a testament to the simplicity of the 3ds max system that I was able to learn it so fast. I have since used it for the production of entire projects, more or less from start to finish, and I found it to have many features I never thought I needed, which I now find irreplaceable. That kind of experience can be very refreshing and educational.

As one of the people at my company responsible for testing new technology and helping to decide the direction of the tools and techniques for the artists, I developed a relationship with discreet through some personal friends and a series of meetings with the discreet team to find out how to optimize our pipeline with 3ds max. Based on those meetings, which had involvement with discreet's 3ds max development team, I was given the opportunity to beta test 3ds max 5. From there, I was offered the chance to write this review for CG Channel, because of the unique position I was in months before the product was released.
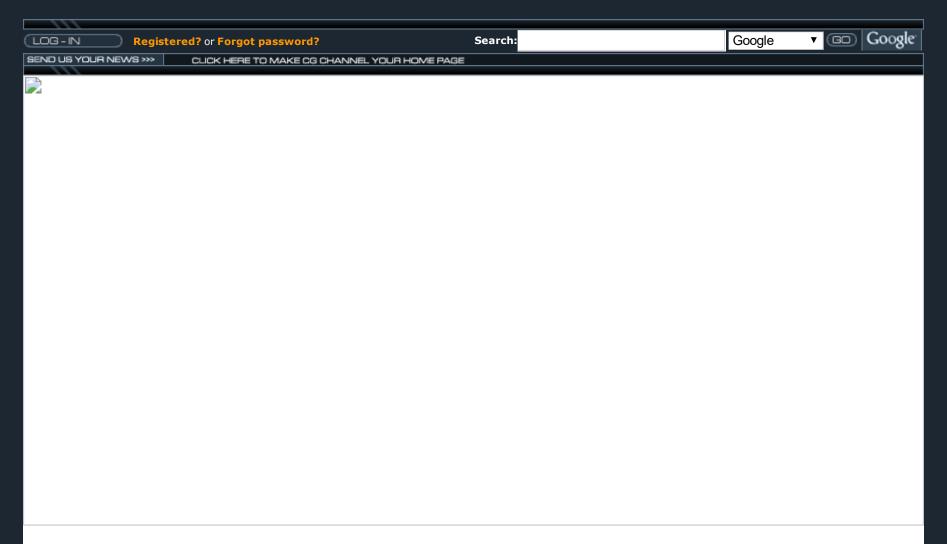
HOTKEYS & INTERFACE

Some of the default hotkeys for a newly installed copy of 3ds max 5 have been changed to accommodate a faster workflow. For example, the q w e and r keys now activate the Select, Move, Rotate and Scale tools. Pressing q cycles the types of selection marquees from box, circle, polygonal lasso and free lasso, while pressing r cycles Uniform, Non-Uniform and Squash modes.

However, there is almost no need to cycle between Uniform and Non-Uniform scale because of the new transformation gizmos afford all the control needed over axis-specific scaling. The new Scale gizmo allows a selection to be scaled Uniformly, on two axes at once, or one axis in a Non-Uniform fashion. The new Move tool gizmo is more compact than the version in 3ds max 4 and easier to interpret. The new Rotate tool gizmo has multiple enhancements, one of which being that as the selection is rotated, colors are filled in like a pie-chart: when the rotation surpasses 360 degrees, the color inside of the rotation disc darkens along the angle of the rotation, progressively with every pass. Also, if the gizmo is clicked inside its boundaries but not on the axis circles, the effect is that of a trackball rotation, a very welcome addition. Finally, all the gizmos light up on the axes that the mouse rolls over, making it very easy to see what is being manipulated.

This video demonstrates some of the new Editable Poly modeling tools
3MB DiVX movie

Other changes to the hotkeys include Control A, Control D and Control I now performing a Select All, Deselect All and Invert Selection respectively. Because Control A is being used, Redo has been moved to Control Y. Also, Control C and Control V now act like a Copy/Paste for multiple selections, a more familiar alternative to Shift clicking. Because w now activates the Move tool, Alt-w now expands viewports to full screen. The z key now zooms on a selected object instead of e due to the fact that it is being used for Rotate. Those are just a few of the improvements made, and of course, the 3ds max 3 and 3ds max 4 keyboard shortcuts can be loaded in place of the default 3ds max 5 hotkeys.

Some of the buttons on the interface have been moved around: the snap tools have been moved to the top of the interface, and some of the other buttons have been moved around to make for a more organized workspace. Some will notice that the X, Y, Z and dual axis conform are no longer on the workspace by default. Also, a flexible and powerful layers system has been implemented to make scene organization easier, especially for large and complicated files with many levels of complexity. In addition, a Trackbar shortcut button has been placed to the left of the timeline so that an integrated Trackbar opens at the bottom of the screen, making it easy to edit the curves of selected objects without blocking the viewports. More on that later on in the article.

Another improvement over 3ds max 4 is that when changes are made to the video card settings in the Viewports options in the Customize -> Preferences menu, the changes are seen right away, instead of having to restart 3ds max 5. Therefore, if changes to the way the video card displays textures have to be made, there is no need to lose time by closing and reopening your work.

Finally, the 3ds max splash screen has a Macromedia Flash layer on top of it, so that while 3ds max is loading, a selection of the currently assigned hotkeys are displayed as a reminder and a distraction while waiting for the software to load.

MODELING & MODIFIERS

3ds max 5 improves upon the Editable Poly mode, adding a host of features not available in previous versions. Sub-object selection modes in Editable Poly can now be hotkeyed, which are set to 1 through 5 by default just as in Editable Mesh.

The Quickslice tool acts much like Lightwave's Knife tool and Maya's Cut Faces tool, included in the Poly Tools bonus pack.. When the Quickslice tool is selected, the cursor draws a line between two points selected by clicking the mouse, cutting through the geometry related to the plane of view the cut was made from. Also, sub object selections can be made to constrain exactly what the Quickslice cut will affect. This is a fantastic tool and a huge improvement upon the Slice Plane tool.

The new Cut is also greatly improved. It now allows quick and easy cutting to edges and points via visual cues from the cursor, and even cutting to the middle of polygons, much like Maya's Split Polygon tool. This makes polygon modeling much easier and faster. Without a doubt, all 3ds max users will be very pleased to see this new addition.

Hinge from Edge is a new tool, which allows a wedge shaped polygon to be extruded from a face. This is much like Maya's Wedge Faces tool also included in the Poly Tools bonus pack. However, the version in 3ds max 5 allows quick and easy rotation along a predetermined axis by simply clicking on an adjacent edge. Also, Bevel, Extrude, Weld, and many other tools all have pop up menus accessible from the toolbar and the Quad menus, which makes customizing their operation much easier and interactive.

New sub object selection tools have also been added. One of these is selection conversion: by selecting a vertex and choosing Convert to Face from the Quad menu, all of the polygons connected to the selected vertex and selected. This can be done with any kind of sub object combination. Also, growing and shrinking of selections, as well as Ring and Loop selection modes have been added and made easily accessible.
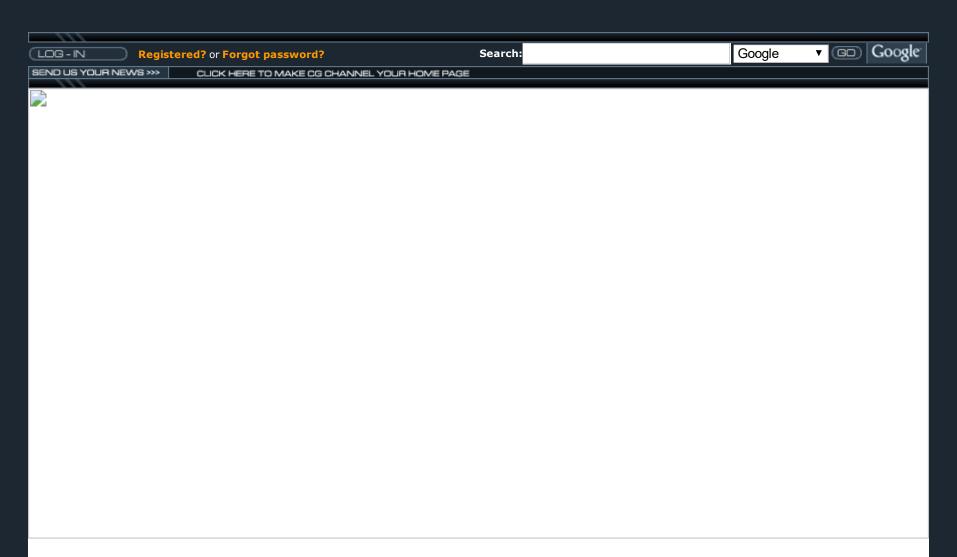
Speaking of Ring and Loop, those familiar with Laszlo Sebo's Meshtools will be happy to know that they have been integrated into 3ds max 5 in the form of a command called Connect. By selecting a series of edges, Connect will draw edges to easily add detail to faces. Connect can also be used on vertices: by selecting two or more vertices and selecting Connect, an edge is drawn to connect them.

There are many other small improvements in the Editable Polygon tool to discover, such as the reorganized Quad menus, Repeat Last, Extrude Along Spline, Edit Triangulation and others. All 3ds max users will be very happy with the new power given to them with by the Editable Poly mode, which feels like a more complete toolset compared to it's predecessor in 3ds max 4.

Click for movie of Cut, Quickslice, Hinge, Context Menus & Connect.
11MB DiVX Movie

3ds max 5 also boasts a series of new modifiers. A few examples: Symmetry, which allows for symmetrical modeling akin to doing an Instance Clone and Mirror combination. Options include automatic seam welding, slicing along the mirror, and more. The Vertex Weld modifier is similar to using Weld in Editable Mesh, but since it's a modifier, it can sit on top of an object's stack and constantly weld the object to ensure points within a certain threshold are always welded. The Morpher modifier now includes an option for Progressive Morphing, so that if tweening between two shapes produces unwanted interpolation results, an intermediary morph state can be introduced to better control how the morph progresses.

TEXTURING & UV MAPPING

One of the most significant additions to 3ds max 5 is the new and improved UVW Unwrap modifier. All of the features added into it are welcome ameliorations; some completely new innovations and others are improved versions of unwrapping tools previously found in other applications. In the opinion of this reviewer, 3ds max 4's UV mapping abilities were not up to par with the likes of Alias|Wavefront Maya 4, Softimage XSI 2 and Newtek's Lightwave 7.5. However, not only does the UV mapper in 3ds max 5 meet the level of sophistication in the aforementioned applications, it combines some of their best points, raises the bar and surpasses them.

Making their return to the UVW modifier sidebar rollout are Planar mapping by X, Y, Z and averaged normals, Map Channels, Saving/Loading UVs, and others. New additions such growing and shrinking selections, selecting by planar angle and a few others are present. However, it's the Edit UVWs window that has really seen substantial improvement.

Synchronizing selections between the Edit UVWs window and the viewports has been vastly improved, compared to the previous method of selecting polygons and choosing to hide everything but those selected. This is an excellent feature, which facilitates finding specific polygons and modifying their UVs quicker. Selections can also be made not only by vertex, but also edge, polygon and element in the UV window now. Those selections can be converted to other sub-object types: for example, a tricky vertex selection could be simplified to a face selection, then by selecting "Convert Face to Vertex" the vertexes which are connected to the selected faces are selected. Soft selections are now also possible in the Edit UVWs window, making UV cleanup easier.

In addition to the regular tools for editing selections, there is a new all encompassing manipulation tool called Freeform Mode. It allows quick and easy modification of vertexes, edges and faces by combining move, rotate and scale into one easy to use tool. Clicking inside the area of the selection moves, the edges rotate and the corners scale, with the Control and Shift keys constraining uniformly and horizontal/vertical respectively. Also, the centerpoint can easily be moved to customize rotation and scale operations.

Perhaps the most significant improvement is the addition of automatic mapping, packing and sewing tools which were, until 3ds max 5, only previously seen in a few other 3d software packages. The implementation discreet has integrated takes the best points of these and adds new features to make mapping as quick and simple as possible.

For starters, there are three types of automatic mapping:

Click for movie of using the normal mapping & stitch combo
7.8 MB DiVX Movie

Copying and pasting UVs has also been added, making it easy to swap and overlap the UVs of polygons with equal vertex counts. For example, the old way of saving time on UV mapping for a humanoid character would be to cut off one arm, map the other arm, then mirror the mapped arm over and weld it, alternately flipping the UV map of the cloned arm if the texture has to be different on it. However, with Copy/Paste UVs, one arm can be UV mapped and the UVs Copied and Pasted onto the opposite arm. To top it all off, every time the UVs are pasted, the vertex numbers are incremented by one, so that the orientation of the pasted UVs will cycle to rotate the placement.

Something that may cause confusion in some people, and elation when they realize what's going on is that textures are now automatically updated in Max as soon as the file is saved in whichever 2D image editor is being used. 3ds max 5 checks for image files being updated and automatically reloads them. This saves from constantly clicking on Reload when a texture is modified, saving time and speeding up the creative process. This option can be disabled in the preferences.

Sketch Vertices is an interesting feature, which allows quick and easy organization of sets of vertices. By activating the tool, the user is required to hold down the mouse and select a set of vertices in whichever order is appropriate for the situation. When the mouse is lifted from selecting, the cursor turns into a pen, which can be used to draw a line, which the selected vertices follow. It's a neat feature, and certainly has its uses.

Lastly, one of the other great options included in the new Unwrap UVWs modifier is the ability to save the configuration of the Edit UVWs window. For example, if the settings were saved after Constant Update is checked, it would be active whenever a new Unwrap UVWs modifier is added and the Edit UVWs window is opened. Also, everything in the Edit UVWs window is hotkeyable, and the Quad menus have, of course, been modified to implement all of the new features.

In conclusion, the new UV tools are now vastly improved and any current 3ds max user will find mapping models much faster and easier, perhaps even wondering how they ever mapped objects in 3ds max without these tools before.

RIGGING & ANIMATION

On the side of animation, there have been some changes to the interface elements. One of which is the integrated Track

Flatten Mapping, Normal Mapping and Unfold Mapping, which can all be executed directly from the Edit UVWs window. Flatten Mapping breaks the model up into pieces in the UV window based on angles of adjoining edges. Therefore, if a new 6-sided box were mapped with a 90-degree threshold, it would create two UV pieces, whereas with an 89-degree threshold, it would create 6 pieces. Normal Mapping allows the choice of different types of projections (Back/Front, Top/Bottom, Box, Box with no top, Diamond, etc…) which are like a series of different types of planar projects or box, but done automatically and cleanly. Also, the previous two mapping modes offer the option to rotate and normalize the created clusters as well as align them by width. Finally, Unfold Mapping attempts to unwrap the object by breaking edges and flattening each polygon, to ensure that everything is planar.

Stitching and Packing are probably the most important additions to the Unwrap UVWs modifier. When a selection is made in the Edit UVWs window, attached vertexes and edges are highlighted, identifying which parts are connected in 3D. Choosing to Stitch a selection will automatically weld the connected portion in the UV window. For example, to quickly and easily map a head with the minimal amount of distortion, a cylindrical map could be used. However, the top and bottom of the head would have some distortion because the cylindrical map does not deal with them. However, using a combination of Normal Mapping set to Box and stitching the sides of the face, chin and hairline creates a quick and almost distortionless UV map created in under a minute. This technique can be used for almost any type of object, perhaps by only having to modify the type of Automatic Mapping. Finally, when all the UVs are done, Pack UVs can be used to organize, resize and rotate all the clusters of UVs created so that they use up the least dead space and therefore maximize the amount of pixels allocated to them in the final texture.
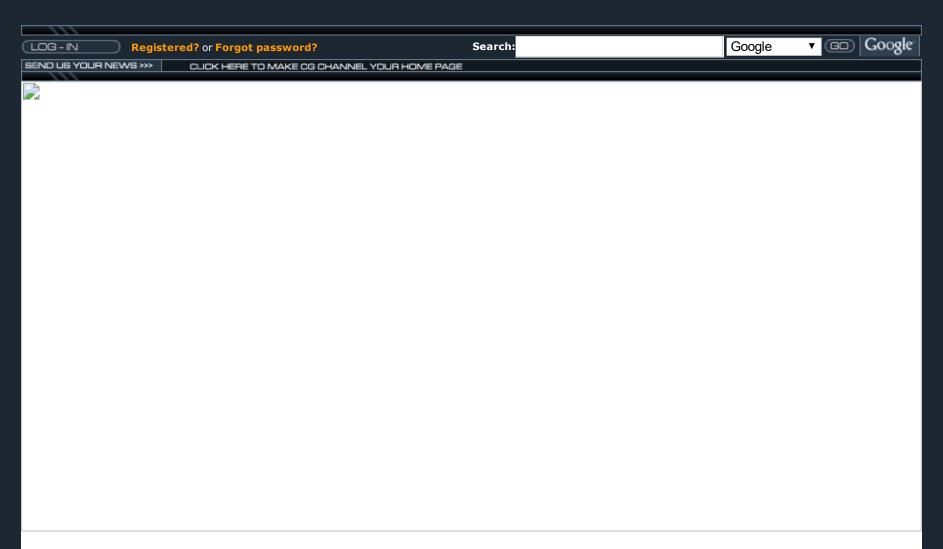
View, which I mentioned earlier. Also, the method in which keys are created has been modified a little: There are now two buttons to set keys at the bottom right of the interface: Set Key and Auto Key. The latter works as the Animate button did in 3ds max 4, whereby the former sets keys only when the user clicks the key button, making settings keys much more controlled. Both allow keys to be set using key filters such as Position, Rotation and Scale but also IK Parameters, Object Parameters, Materials, Modifiers, and more.

Spline IK might not be something new to some 3ds max users, as it was an optional 3rd party plugin before, but it has now been integrated into the package, much like many other tools seen in 3ds max 5. Essentially, Spline IK is a spline, which controls a hierarchy such as bones or other objects. By deforming the spline, the hierarchy follows the spline, making it easy to pose characters or other objects precisely and quickly.

The Track view has been improved and has many new features, a few of which being a reorganized menu bar, the ability to edit function curves and their tangency handles, control over which tracks will be keyable, soft selection of keys, and more. Also, one of the new major additions, which is integrated to the Track view, is the Dope Sheet. In the Dope Sheet, animation is much easier to understand and manipulate in key or range mode, making tweaking or modifying large chunks of time simpler. There is also an integrated hierarchy system: if changes are made to parent objects, child objects inherit the changes too.

The Character Node is very much akin to Character Studio 3.x, because it has many of the commonly used functions. For example, adding a Character Node to a hierarchy of bones controlling a mesh will treat the set as a group, which can be modified with the Character Assembly menu. The Character Assembly menu has a variety of functions, one of which being Set Skin Pose, which returns the object to the pose in which it's mesh received influences from the bones, much like Figure Mode in Character Studio.. Also, there are controls for various mesh resolutions for quicker playback when setting poses before rendering at full quality, and the ability to save and load animations. Specific ranges of time can be saved out as separate files and loaded back in, to the same character, or different characters by setting associations between two different hierarchies with the Merge Animations menu.

The Skin modifier has been vastly improved. The painting tools have been expanded and streamlined, so now painting influences is much easier and faster. The Painter Options window offers options such as Pressure Sensitivity, Mirroring for symmetrically adding influence, Brush Properties for customizing how influence is painted on, and more. Also, a comprehensive Weight Table makes tweaking influences faster and easier to visualize, with many options for filtering and organizing vertex IDs.

Last but not least, the Bone Tools is a toolbox for bone creation, which groups all of the commonly used tools together. Bone Edit Mode is made for adjusting the pivot or root of a bone without affecting the children. This makes tweaking the placement of bones in a rig much faster. Remove Bone will remove a bone and attach it's parent to the deleted bone's child, with an option to realign the parent to it's previous orientation, while Refine splits a bone in two. Connect Bones will create an intermediary bone between two selected bones, while Delete Bone removes a bone and adds an end bone to the parent of the removed bone, with the option not to. Re-Root Chain reverses the hierarchy of a bone, inverting it's parent / child progression and moving the end bone to the opposite end. More cosmetic than technical, there is also the option to add a gradient to a bone chain, so that as the bone hierarchy progresses, the bone blends between two selected colors, from the root to the end bone. Finally, the Bone Tools window also offers controls over Fin Adjustment and properties of the bones, such as toggling influence, alignment, stretching, and more.
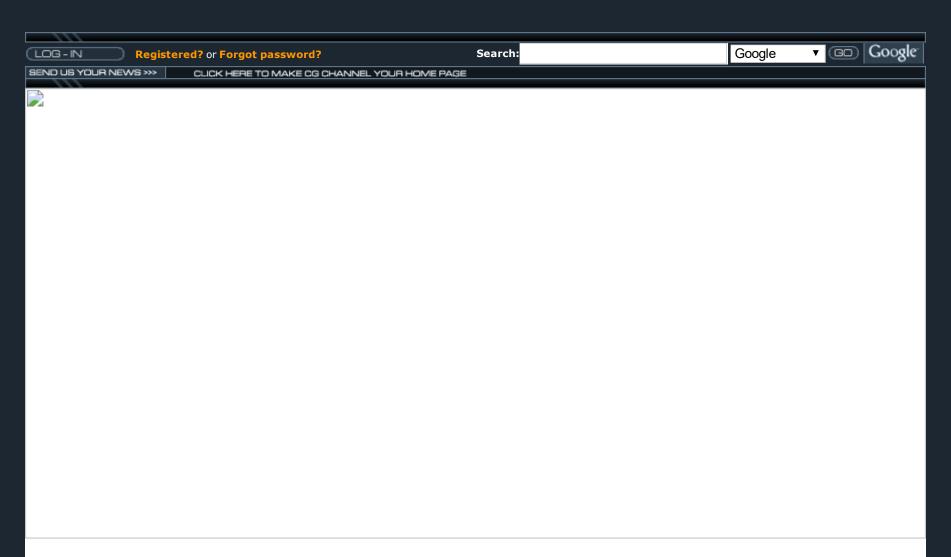
LIGHTS & RENDERING

New Light types have been added, such as a vast selection of photometric lights, Skylight, Sun, Sky, and many others. Photometric lights are more accurate and realistic, because they are measured in light energy, or photometric values. The lights in the Daylight Lights system, such as Sun and Sky, can be used in combination with other lights to simulate realistic daylight. The effect of these lights on the surface of objects can be controlled with the Advanced Lighting Override material.

There are two Global Illumination systems: Radiosity and Light Tracer. The former is a more precise and complicated GI system, while the latter is more generic and does not require the user to understand the complex mechanics and concepts inherent with Global Illumination. The reason for having two systems is so that rendering time can be optimized based upon what kind of scene is being lit, and also to make using GI easier for new users.
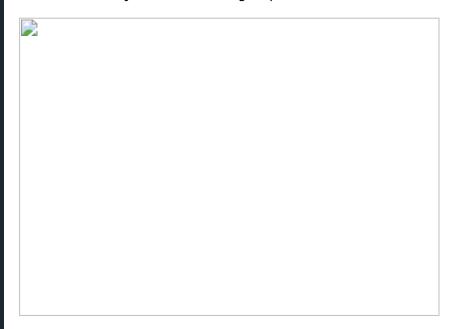
New shading options include: Ink N Paint, which is an integrated a cell shader with many options, a Translucency shader to simulate effects such as projecting shadows through a piece of cloth or the glow at the base of a lit candle illuminated by it's flame, as well as integrated Direct3D shader plugins to take some of the guesswork out of interactive and video game development.

On the topic of real-time shaders, there are more added features in 3ds max 5 geared towards game developers: as with a few other 3D applications, Normal Mapping has been added to allow an artist to create bump maps out of high polygon geometry for use with low polygon models. For example, a high polygon model can have Normal Mapping applied to it to create a series of grayscale maps representing the relief of the surface. Those maps can be applied to a lower resolution version of that same model, which gives a low polygon model the semblance of being much higher polygon. Best of all, most of this is automated for the artist. Also, a shadow or light map creation system has been added, which interacts with the GI system to create extremely realistic looking real-time environments.

ODDS & ENDS

Developers and artist will be pleased to know that the SDK architecture for 3ds max 5 is the same as in 3ds max 4, so all plugins that work in version 4 should work just as well in version 5. This saves a lot of time, and makes it easier to consider upgrading to the latest version of 3ds max. Also, the Reactor dynamics simulation system has been integrated so that simulating cloth, water, and a variety of other dynamic surfaces and objects is at the fingertips of the user.

Of course, because of time constraints and limitations, not everything has been fixed and some things are still missing in this new version. Old bugs or problems rearing their heads (in some cases, again since 3ds max 4 came out) are: Boolean still produces undesired results, background images of different sizes with Lock Zoom/Pan on will be the same size after a few pans, no way to export a snapshot of the UV window as a bitmap for painting in a 2D image editor, inability to select edges or vertices in the 3D window while in Edit UVWs mode, and a few others. However, all things considered, this version of 3ds max is a huge leap forward in every other way.

CONCLUSION

In closing, this new version of 3ds max adds features and fixes that greatly increase the workflow and power of this application. Continuing on with their commitment to empowering content creation artists, discreet has shown that they are able to take this product, and make it a solid and impressive toolset. However, even with the excellent offering that I have summarized here, one can only wonder about 3ds max's continuing evolution, it's integration into discreet's current line of products, and how long it will be until we have in our hands a version of 3ds max re-written from the ground up. Only time will tell...

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