

LightWave 3D

7.5 Update

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Manual version: 1.0

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LightWave 3D 7.5 Update



NOTE

You may need to assign some new commands to your menu or keyboard shortcuts before you can use them.

VIEWPORT CHANGES

The PathTool

The PathTool will allow you to directly edit the current item's motion path, right in a Layout viewport! To use, simply activate the PathTool and drag any of the current item's keys. The perfect tool for tweaking an item's motion path. Note that the key will only move along the vertical and horizontal axes *of the view*, even in perspective. The PathTool command is in the Tools group.

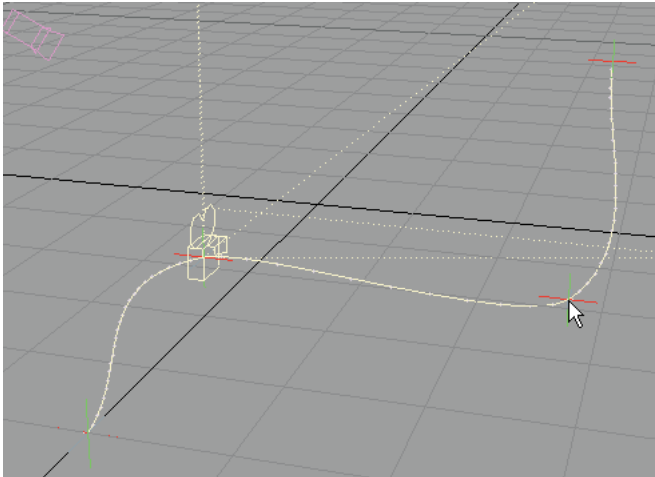


Figure 1: Adjust keys interactively with your mouse using the Path Tool

Bone X-Ray

There is an option to make bones visible inside opaque objects. To use, activate the **Bone X-Ray** option on the titlebar (see Figure 2). Note that bones may still be invisible if the object surface is similarly colored/shaded. Change the bone colors using the Scene Editor, if this becomes a problem.

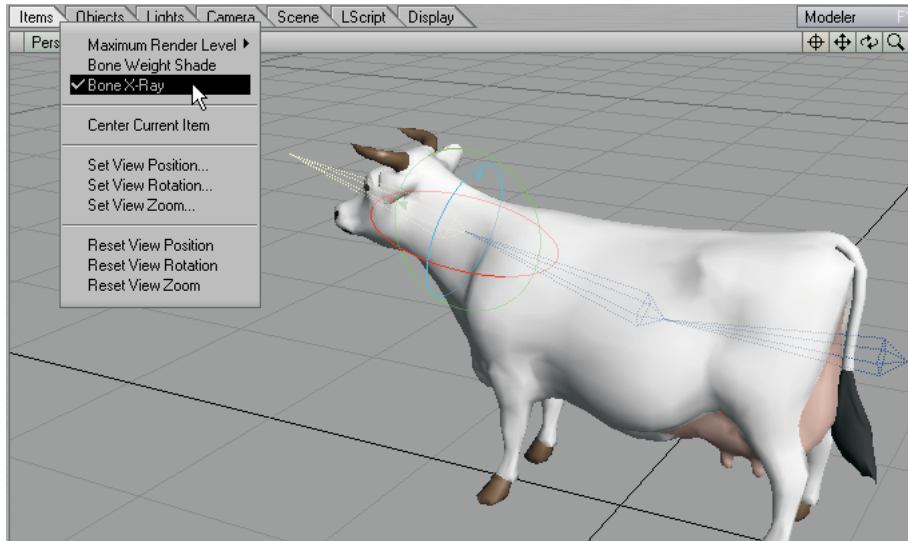


Figure 2: The Bone X-Ray display mode allows bones to be seen inside opaque objects

Motion Path Frame Markers

Motion paths in Layout viewports have dots along the curve to indicate frames (see Figure 3).

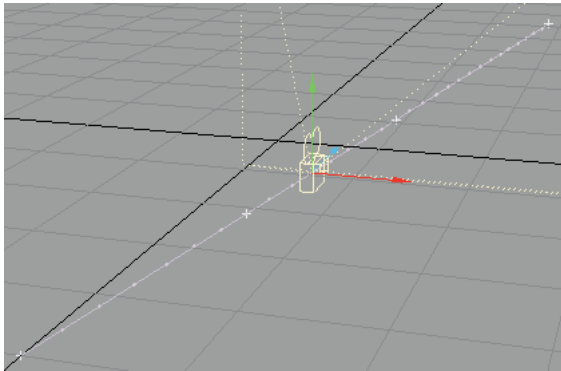


Figure 3: Motion paths in Layout viewports have dots along the curve to indicate frames

OpenGL Specular Highlights

OpenGL specular highlights are now added after texturing, providing much more realistic shading on shiny surfaces with dark textures. This feature requires either OpenGL 1.2 or the proper extension under 1.1 (See "About OpenGL dialog" on page 3.).

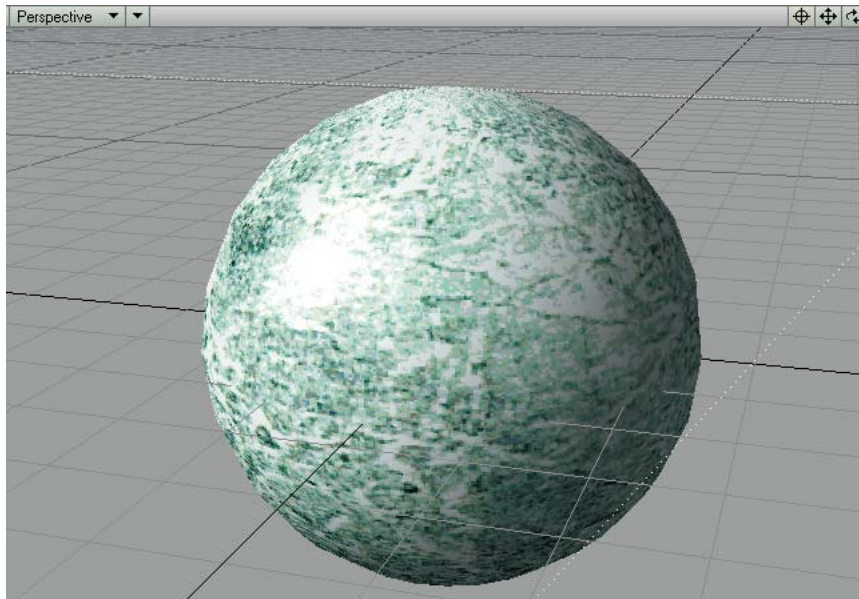


Figure 4: Specular highlights over color texture

About OpenGL dialog

The About OpenGL dialog includes information about the limits of the OpenGL driver and hardware-which may be different than LightWave's own limits (see Figure 5). (Note that if the Renderer entry on a Windows system with hardware 3D acceleration reads "GDI Generic", the system has reverted to software OpenGL and should probably be rebooted.) To see this dialog, you may need to assign the About OpenGL command (Display group) to a menu or keyboard shortcut.

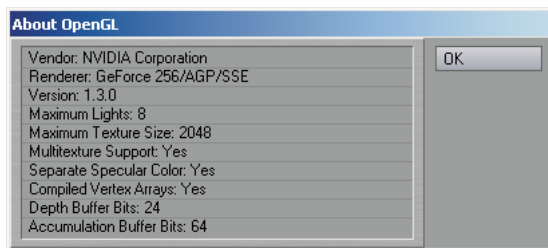


Figure 5: The About OpenGL dialog

Item Selection

You can select items in a viewport by clicking on any polygon edge rather than just on a pivot point.

A selection bounding box – like in the Graph Editor – can now be created by dragging your middle mouse button in any viewport (see Figure 6).

Items whose points appear within the box will be selected, and if the Shift key is held down, the items will be added to the existing selected items, if they are the same type. If items of more than one type are within the box, preference is given to those items matching the current edit mode.

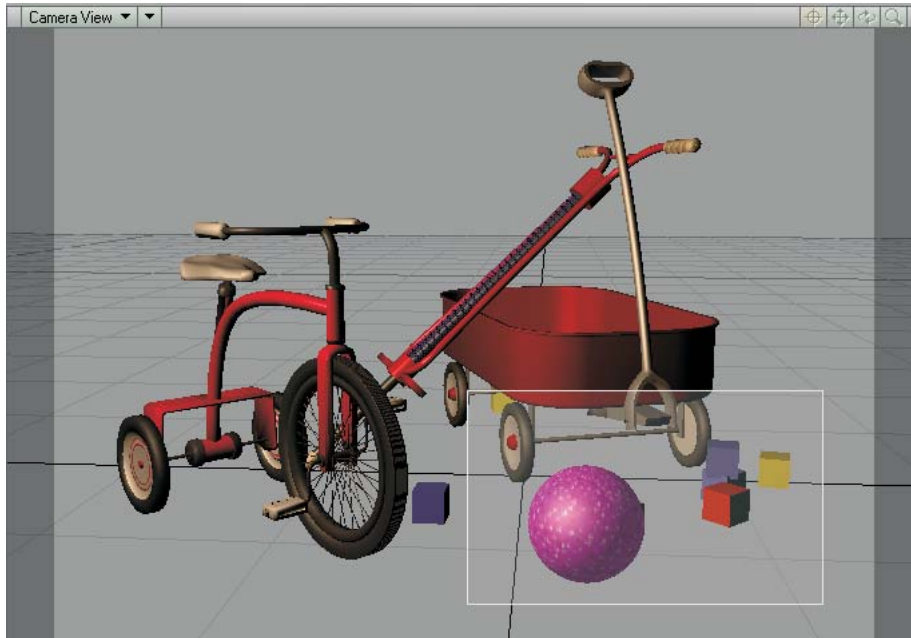


Figure 6: Drag your middle mouse button to select Layout items using a bounding box



HINT

If you have a scroll wheel, it may also function as a middle mouse button if you press down on it. This obviously depends on the make and model of your mouse.

Motion Blur/DOF Preview

Pressing **SHIFT+F9** will render an OpenGL motion blur and/or depth of field preview using the current camera, for the viewport under the mouse (see Figure 7). While the effect is being computed your mouse pointer will turn into a busy pointer. The viewport will return to normal when any subsequent change causes it to be redrawn. Motion blur can be used in any viewport type, but *depth-of-field effects only appear in a camera viewport*.

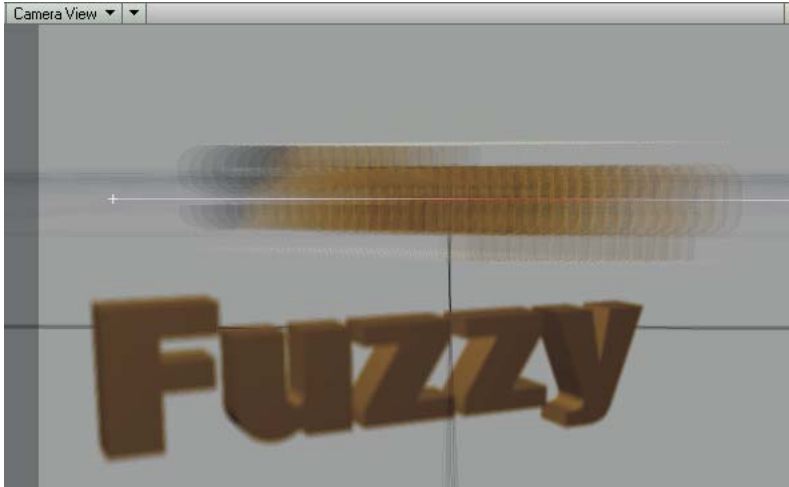


Figure 7: OpenGL preview of motion blur and depth of field

Rotation Handles

When Parent Coordinate rotation handles are visible and rotation limits are enabled (Motion Options panel), areas outside the rotation limits are now shaded on the viewport rotation discs.

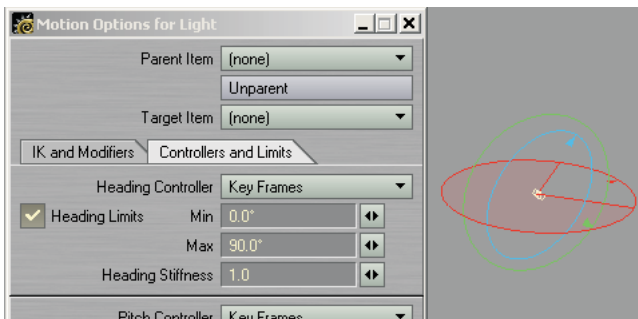


Figure 8: Areas outside rotation limits are now shaded

OBJECT PROPERTIES

SubPatches

When the **SubPatch Level** (Geometry tab) is set to 0, the cage is now converted directly into polygons. This usually results in half the number of points compared to the previous Level 0, improving interactivity if used for **Display SubPatch Level**. (Note: The previous Level 0 was just Level 1 with **Subdivision Order** set to **First**.)

The Object Properties panel now shows the number of SubPatches and metaballs in the current object.

Panel Organization Changes

The Deformations tab is now called "Deform" and the Rendering tab is "Render".

The **Polygon Size** and **Particle/Line Thickness** settings have been moved from the Rendering tab to the Edges tab.

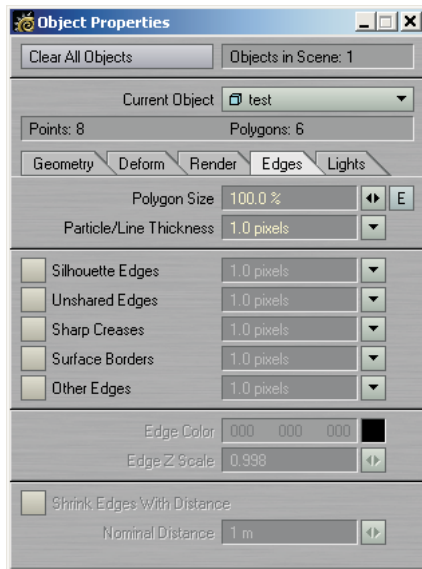


Figure 9: The Polygon Size and Particle/Line Thickness settings have been moved from the Rendering tab to the Edges tab

The Light Exclusion list is larger and on its own tab called "Lights".

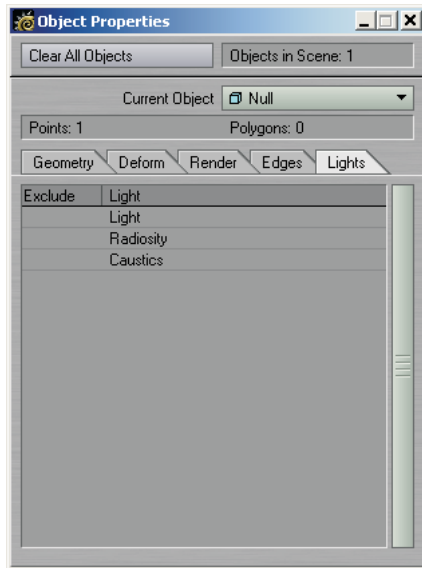


Figure 10: The new Lights tab on the Object Properties panel. The Light Exclusion list is larger.

Matte Object Option

A **Matte Object** option has been added to the Render tab. It causes an object to be rendered in a single user-specified color (usually black or white) with no shading, overriding all of the object's surfaces.

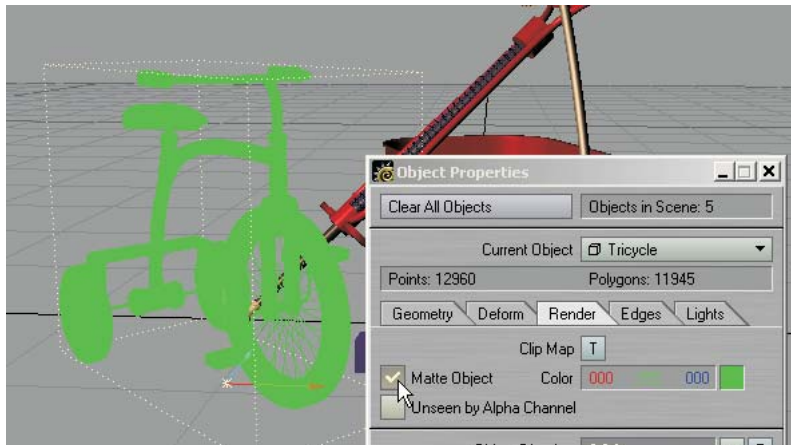


Figure 11: The tricycle is turned bright green using the Matte Object option

Unseen by Alpha Channel Option

An **Unseen by Alpha Channel** option check box has been added to the Render tab and causes the object not to affect the alpha channel.

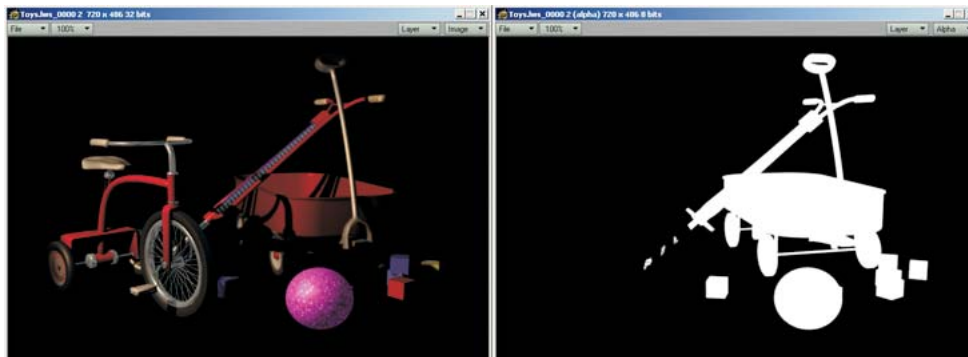


Figure 12: (left) Tricycle has Unseen by Alpha Channel option enabled. (right) The tricycle is missing in the resulting alpha image, but also note the effect on the pogo stick where it overlapped the tricycle.

Object Comments

If you add a comment to a scene item using the Comments plug-in (**Scene > Utilities: Generics > Comments**), you can add the Item Comment Display custom object plug-in and see the comment in your viewports. The **Item** setting determines with scene item gets its comment displayed. *It does not have to be the item you add the custom object plug-in to.* You also have control over the text **Color**, density (**Alpha**), and **Justification**.



Figure 13: Comment is displayed on null object parented to the ball

The text is placed at the object's pivot, so it can be obscured by the object's surface. You may want to display the comment on a null that can be placed anywhere or even parented.

Sliders

Sliders are slider gadgets that are displayed over viewports. An individual slider is tied to a specific animation channel. A slider will indicate the current value of a channel and also let you interactively adjust that channel value.

To use sliders in a scene:

Add the Sliders custom object (Object Properties panel) to any object. To display and interact with the sliders, choose **Items > Sliders**.

The sliders for the last current object (with the Sliders custom object) will be editable when the Sliders tool is active. Keep this in mind if you have more than one object with the Sliders custom object.

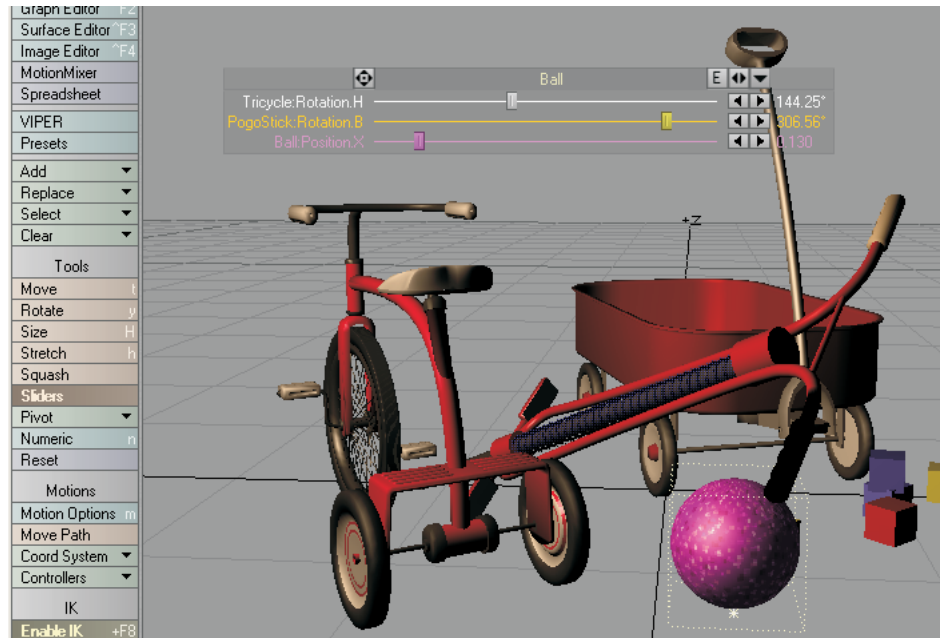


Figure 14: Sliders added to ball object



NOTE

Remember, as with all Layout tools, you'll need to select another tool (Move, Rotate, etc.) to deactivate the Slider Tool.

To configure your sliders:

Open the Sliders custom object settings dialog from the Object Properties panel. The left window will list all of the channels in the scene. To attach a slider to a channel, simply select the channel in the left window and click **Add Channel**. Selected channels in the right window can be removed with the Remove Channel button.

The **Range Min** and **Range Max** settings define the interactive range of the slider. The underlying channel can go beyond these values, but the slider's range of control and feedback will be limited to this range. If the underlying channel goes outside the range, the slider value will turn red. Clicking on the slider handle will immediately change the channel to the slider's corresponding value.

The description **Label** will default to the channel name, but you may edit that if you desire. You can also set the color used for the slider with the **Color** preset pop-up menu or specific RGB values.

Display Controls

There are three controls along the top. Drag the far-left one to move the slider group. The envelope (E) button will display the Graph Editor with the associated channels in the curve bin. The right/left arrowhead (O) button can be dragged to scale the size of the slider group. The arrowhead button on the right will minimize/maximize the slider display.

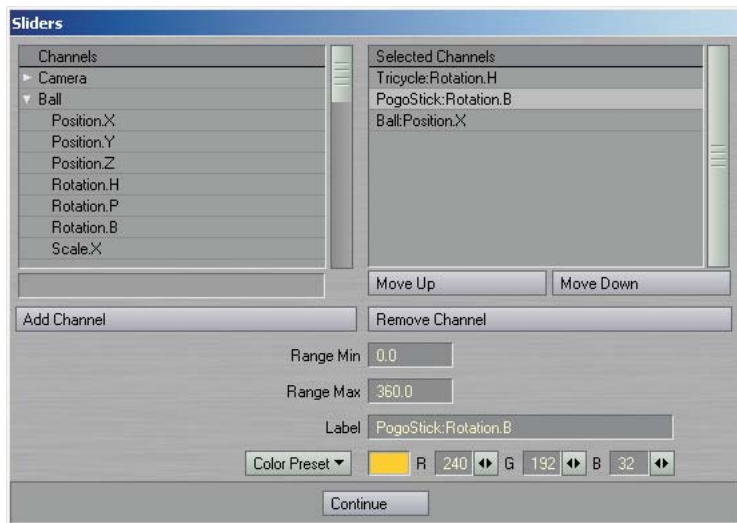


Figure 15: The Sliders (custom object) settings panel

Add Slider Bank Command

To simplify using sliders, use the Add Slider Bank generic plug-in command. It will add a null object, apply the sliders custom object to it, and open the sliders interface, all in one step.

Depth of Field Display

This custom object plug-in adds a graphical representation of your camera's depth of field settings, visible in your viewports. To use, add the Depth of Field Display plug-in to a null object and then parent the null to the camera. If you desire, you can manually set the **Circle of Confusion** value on its options panel. Enable the **Auto Circle of Confusion** if you want this computed for you. The "Circle of Confusion" is a photographic term meaning the largest size perceived as a "point" on a final print.

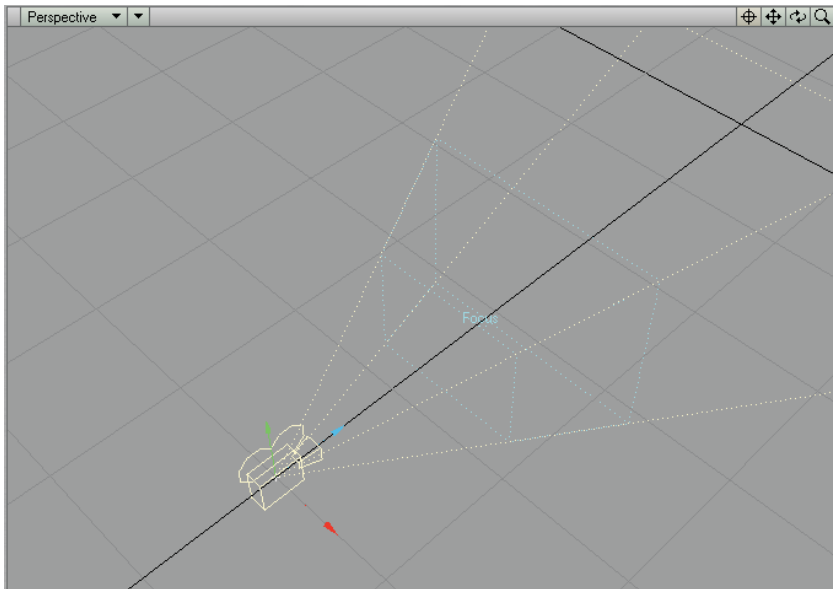


Figure 16: The Depth of Field Display custom object plug-in adds a graphical representation of your camera's depth of field settings, visible in your viewports.

BONE CHANGES

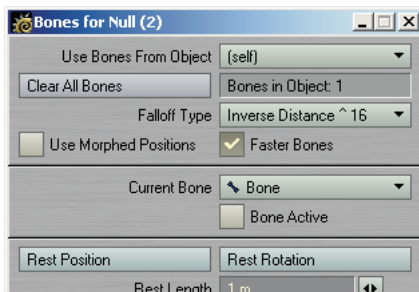


Figure 17: Faster Bones and Use Morphed Positions options have been added to the Bones Properties panel

Faster Bones Option

A **Faster Bones** option has been added to the Bone Properties panel. This controls a new optimization where each point is only affected by the four bones with the most influence on that point. The option can significantly accelerate bone deformation in objects containing more than four bones. The option is turned off when loading old scenes in order to preserve their original behavior.

Use Morphed Positions

A **Use Morphed Positions** option has been added to the Bone Properties panel. When enabled, bone deformations will be based on point positions after morphing, allowing the "morph through bones" effect that was possible in prior releases. Normally, this option should be turned off (even for morphed objects), since it reduces performance.

LIGHT CHANGES

Shadow Color

A **Shadow Color** setting has been added to the Light Properties panel. If a shadow-casting light uses the default black color (RGB 0, 0, 0), it will have no direct effect on areas that are blocked by opaque objects, which matches the behavior of previous versions of LightWave (and the real world). Using colors lets you tint shadows without having to adjust ambient lighting. This option works with both ray tracing and shadow mapping.

The original light color dissolves into the shadow color as the amount of shadow increases from zero to 100%. To change the density of shadows without tinting them, set the **Shadow Color** to be the same as the **Light Color** (Light Properties) and then adjust the **Shadow Color** value (using the HSV colorspace controls). Note: Right-click on the color settings to change to HSV from RGB).

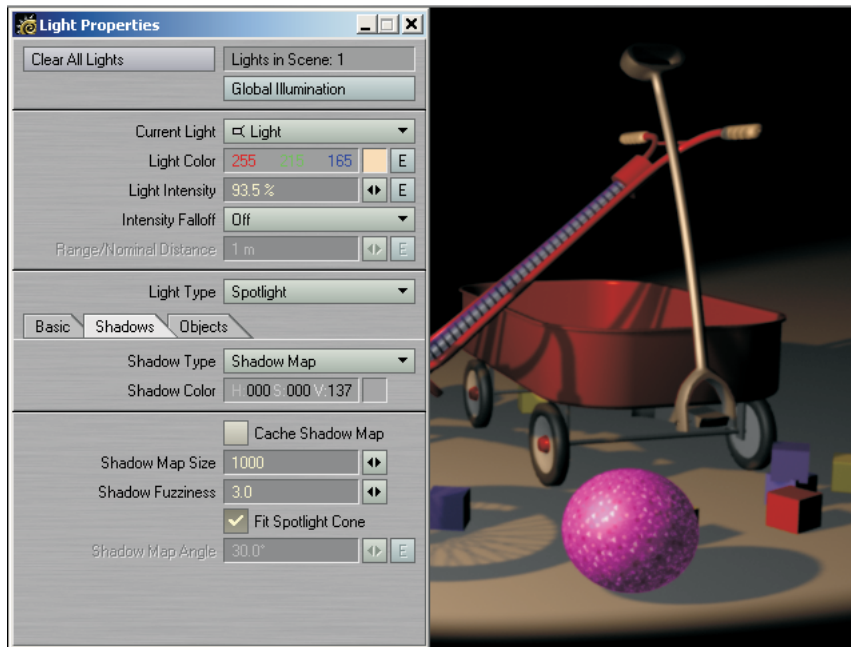


Figure 18: Increasing the HSV Value for Shadow Color brightens shadow (when the Light Color and Shadow Color are initially the same).

Spotlight View

When viewing from a Spotlight, the area outside of the cone is now shaded and the Soft Edge Angle is indicated with a dashed circle.

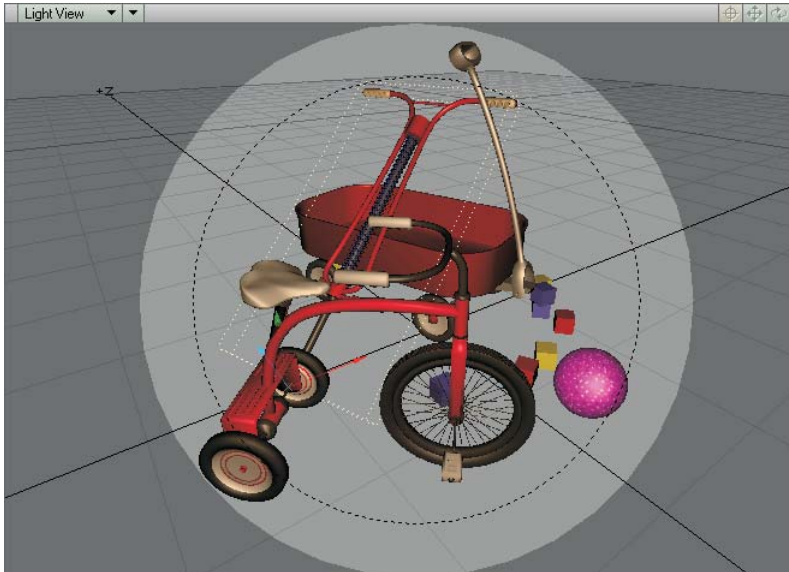


Figure 19: When viewing from a Spotlight, the area outside of the cone is now shaded and the Soft Edge Angle is indicated with a dashed circle.

Light Properties Objects Tab

The Light Properties panel now has an Objects tab containing a list of all objects and a column for excluding them from being affected by the current light. This is an alternate view of the same settings that appear on the Lights tab of the Object Properties panel.

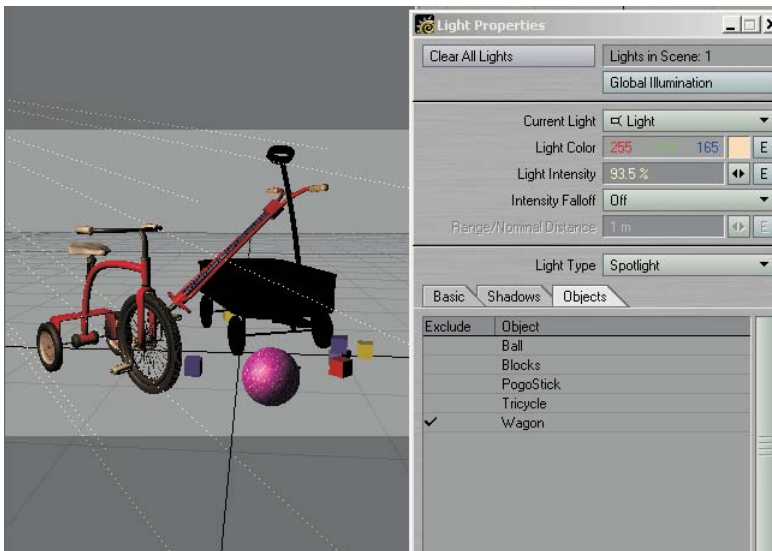


Figure 20: The wagon object is excluded from being affected by the current light.

Caustics

Caustics are now filtered to improve focus and reduce graininess.

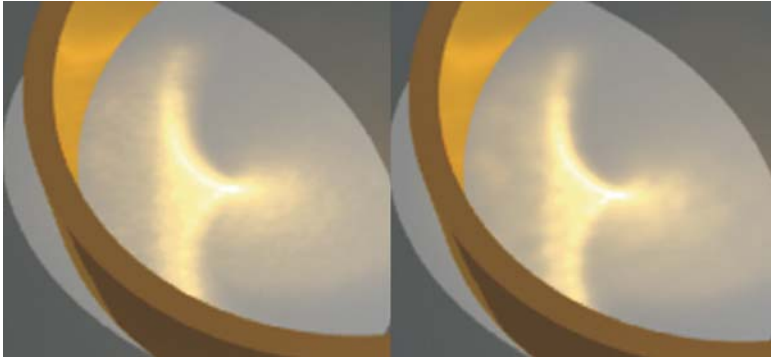


Figure 21: (left) LightWave 7.0 caustics. (right) Improved result. The difference in graininess is more apparent in lighter areas of the effect

Radiosity

The **Indirect Bounces** setting on the Global Illumination panel sets the maximum number of indirect diffuse bounces, up to 8, used for radiosity evaluation. Previously there was only one bounce. This option should be used with restraint, however, since the effects of each additional bounce become decreasingly less noticeable although rendering time will become increasingly more noticeable.

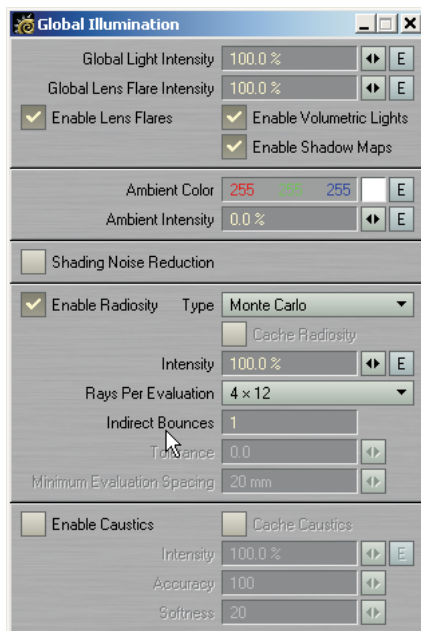


Figure 22: The Indirect Bounces value sets the maximum number of indirect diffuse bounces when using radiosity

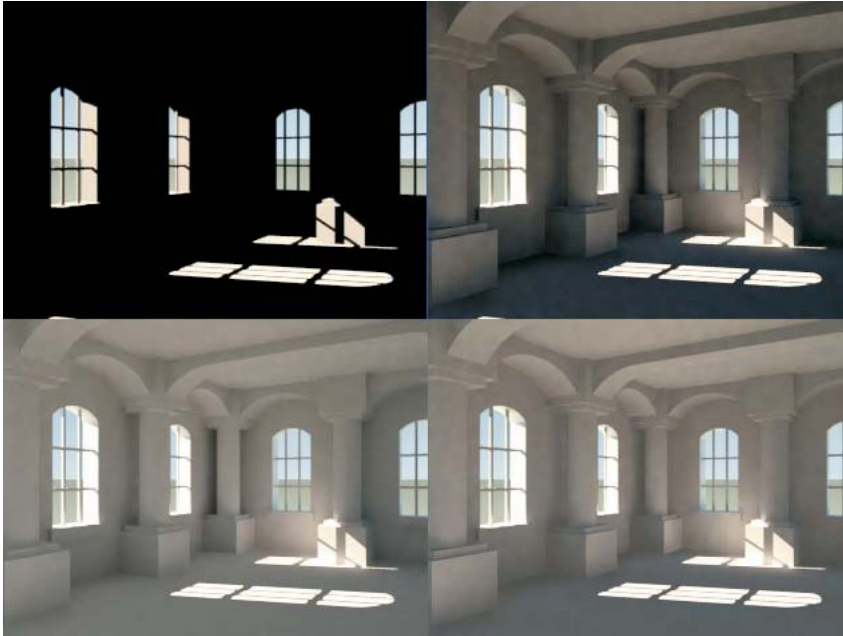


Figure 23: (top-left) Direct lighting, 6 secs. (top-right) 1 indirect bounce, 205 seconds. (bot-left) 3 indirect bounces, 9127 secs. (bot-right) 1 indirect bounce with ambient light and increased radiosity intensity, 206 secs.

MOTION MODIFIERS

Simple Constraints

Use Simple Constraints (SimpleOrientConstraints, SimplePointConstraints, and SimpleScaleConstraints) to achieve "dynamic parenting" effects. You can independently inherit (world) position, rotation, and scale from other items in the scene and even use different items for different channels. These modifiers are "keyframe-aware" so you can have different settings at different times in your animation. You can also use Simple Constraints to set up your motion and then "bake" the motion into keys.

To use SimpleConstraints, simply open the Motion Properties panel for the item you want to control and add one of the Simple Constraints motion modifiers. SimplePointConstraints is used for positional effects; SimpleOrientConstraints is used for rotational effects; and, SimpleScaleConstraints is used for scaling.

Adding Constraints

The large window lists each constraint entry in the order it becomes effective. The number on the left indicates the frame.

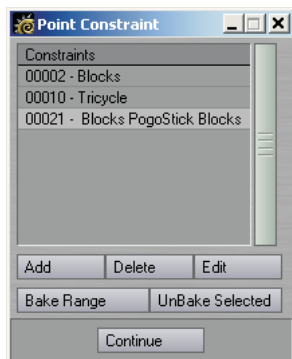


Figure 24: The main SimplePointConstraints panel with three defined constraints

To set up a "constraint," first make sure the Layout current frame is where you want the constraint to start. Then click the **Add** button to add a constraint entry to the list. A panel will appear where you adjust the settings for the entry.

There are three main rows of settings. Each row controls the XYZ position, XYZ scale, or HPB rotation, depending on which modifier you are using. Each channel has its own targeted scene item. (HINT: The scene item selected on the pop-up menus will default to item currently selected in Layout just prior to clicking **Add**.)

The **Weight** value determines how much the channel is "followed." The default, 100%, will match the targeted channels exactly. You can use less than 100% or even more than 100%. Note that you can use the envelope (**E**) button to animate the weighting.

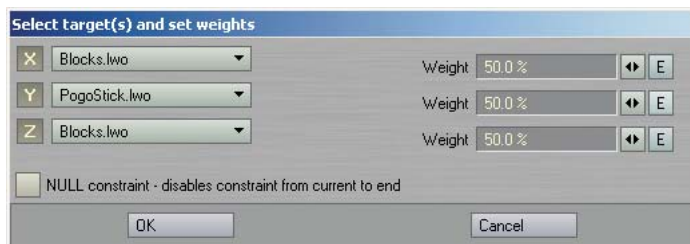


Figure 25: The "Add" dialog for SimplePointConstraints

SimpleConstraints uses the pivot points for the source and target for its computation, so keep this in mind if the effect isn't turning out like you expect. Also, world space position, rotation, and/or scale are used, overriding the source's parenting and keyframed data.

Select **Null constraint** if you want to disable and "bake" (see next section) the constraint at the current frame.

You may disable any channel by "clicking off" the XYZ or HPB button, making it unhighlighted. You can also set the selected item to **none**.

You can edit an existing entry by selecting it with your mouse and then clicking the **Edit** button.

Baking

To disable all constraints within a range of frames, but retain the constrained states, you can "bake" the constraint effect into actual keys. However, note that keys are only created where the *targeted object* has a key, not at every frame. Also, the keys' **Incoming Curve** will be set to **Stepped**. This locks the state at each create key.

To bake the constraints, click the **Bake Range** button. In the panel that appears, set the sliders to define the range of frames you want to be baked. If you only want to bake the current frame, click **Bake Current Frame** to set the sliders to only the current frame. Click **OK** to execute the process.

After baking, the constraints falling within the baked range will become disabled. Obviously, subsequent adjustments to targeted items will not affect baked motions.

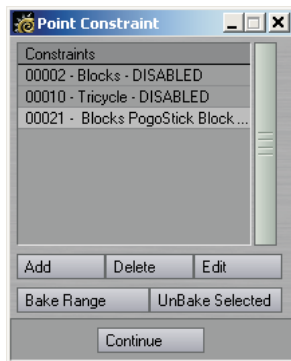


Figure 26: Example result after baking

If you click **UnBake Selected**, the selected constraint will be re-activated. Any keys created from baking will remain; however, remember that constraints will override them.

Deleting Constraints

To delete a constraint from the list, simply select it with your mouse and click the **Delete** button.

Simple Constraints vs. Parenter

Simple Constraints are slightly faster than Parenter and allows you to control motion channels separately. In general, you should use Parenter, unless your item hierarchy is deep enough to cause performance issues.

Simple Affectors

The Simple Affector modifiers (SimpleOrientAffector, SimplePointAffector, and SimpleScaleAffector) are set up exactly like Simple Constraints, described above. The difference is that the object retains its keyframe motion and is merely influenced by the target.

Parenter

Parenter is also a dynamic-parenting modifier, but is easier to setup compared to SimpleConstraints. It also differs in that you can keep the (source) item's initial state and take only into account changes in the parent.

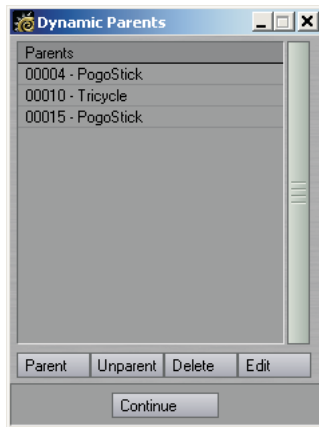


Figure 27: The Parenter panel with some example keys

To use Parenter, simply open the Motion Properties panel for the item you want to parent to something else and add the Parenter motion modifier.

To add a parenting entry, change Layout's current frame to the desired time and click the **Parent** on Parenter's settings panel. A dialog will appear. Select the parent item on the pop-up menu. You may independently select to keep initial position, rotation, scale, and/or parent after taking into consideration effects of IK. Click **OK** to close the dialog and add the entry to the list. Note that when you are using the **After IK** option, you will need to manually create a key (in Layout) for the parented item at that frame.

Clicking **Unparent** freezes or "bakes" the parented state *at the current frame*, but only until the next parenting entry, if any.

To delete an entry from the list, select it and click the **Delete** button.

You may edit a selected entry by clicking the **Edit** button.

IMAGE FILTERS AND SHADERS

Photoshop PSD Export

The Photoshop PSD Export image filter is an image saver masquerading around as an image *filter*. Being a filter allows it to have access to all the different internal render buffers. When you render a frame, a sequentially numbered PSD file is saved with each of the selected buffers placed into their own *channel*. (In Photoshop 6, select the Channels tab, between the Layers and Paths tabs.)

The **Max** field determines the maximum value allowed in a buffer. So the acceptable buffer values are always zero to the **Max**. All values in the buffer are divided by **Max** to normalize them to the range zero to one.

The **Sliding min/max range** option will dynamically compute the minimum and maximum values of each buffer. The values are computed for every frame so the output buffers will have the widest possible range of values. This is great for still images, but animations should not use this setting, due to the lack of "temporal coherence" (i.e., the images may "pop" from frame to frame).

The **16 bit component output** option will save out 16 bits per channel/ buffer. Normally, only eight bits are used.

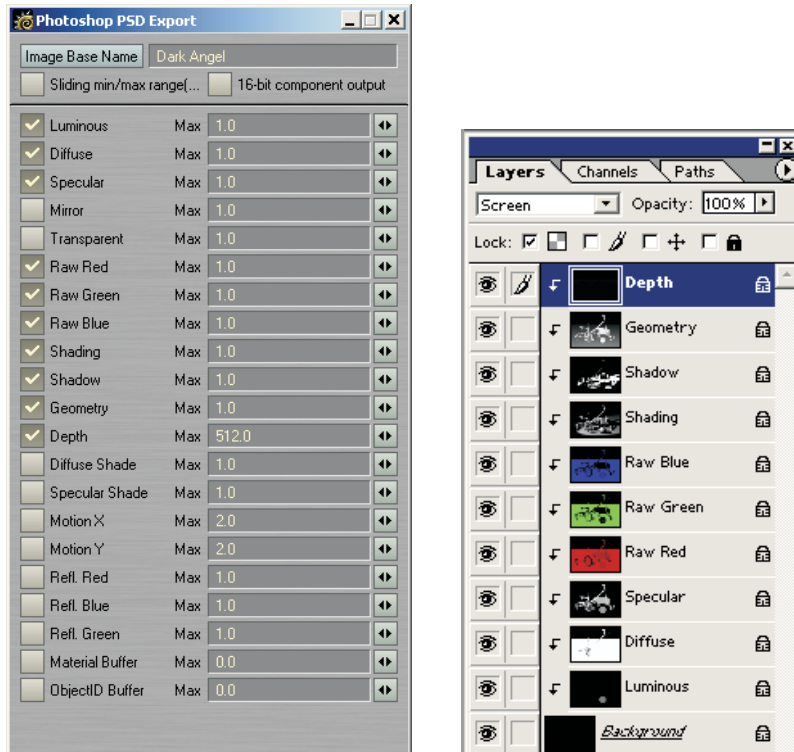


Figure 28: (left) The Photoshop PSD Export panel. (right) Layers window in Photoshop when the resulting image was loaded

Flare2Alpha

The Flare2Alpha image filter will add an alpha mask lens flares to the alpha channel. Lens flares are a post-process effect and normally do not affect the alpha channel.



Figure 29: Result on the alpha channel from a simple lens flare with reflections using the Flare2Alpha filter

SpriteEdger

The SpriteEdger image filter "unmixes" antialiased object edges from the background. It can remove background color fringing if the object is not rendered over black. It can also clip the alpha channel to form a 1-bit (0 or 1) mask. It can even use this mask to clip the RGB imaged edges, setting the pixels to the background color if they are outside the mask.

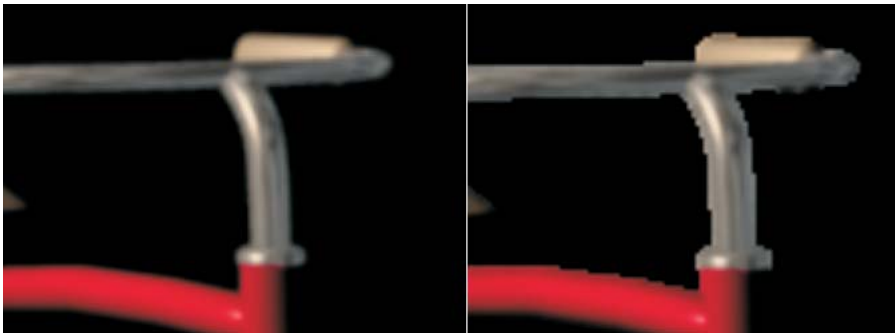


Figure 30: (left) Normal antialiased image. (right) Using SpriteEdger

Virtual Darkroom

The interface for the Virtual Darkroom image filter has been streamlined.

The settings are pretty much unchanged, but many more presets have been added to a new **Film Preset** pop-up menu. Settings tabs, other than Basic Settings, can be accessed by clicking the **Advanced Settings** button.

BRDF Surface Shader

The 7.0 BRDF surface shader interface is a little different than what is documented in the manual. The functionality and use is basically unchanged, however. Each group of specular reflection settings are now on separate tabs. The **Alpha** and **Beta** fields have been renamed to **Anisotropy** and **Direction**. If you use **AnisotropicII**, besides using a UV map, you may also use standard cylindrical or cubic mapping. Also, to change the relative impact of lights, select one in the list and adjust the **Light Strength** value. Note that the AnisotropicII algorithm was improved.

OTHER LAYOUT CHANGES

Statistics Window

The Statistics window now shows the number of IK chains in the scene.

Render Display

You can double the size of the Render Display panel window. To change the size of the window, simply select the desired size on the **Show Rendering in Progress** pop-up menu (Render Options panel). Also, the display area above the window includes more information.

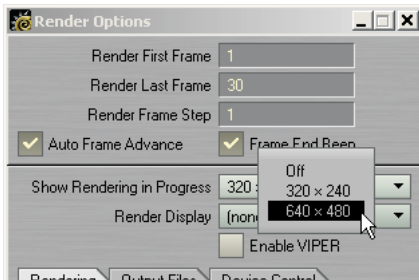


Figure 31: The Show Rendering in Progress option now lets you choose a larger image size



Figure 32: The Larger Render Status panel provides more information

Image Viewer

If a render is started with the F9 or F11 keyboard shortcut (commands) and both the **Show Rendering in Progress** and **Render Display** options are off, a requester will appear allowing you to turn on the Image Viewer, render without viewing options, or to cancel the render.

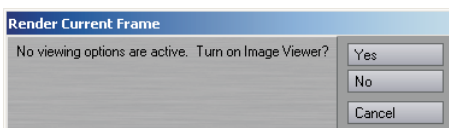


Figure 33: Dialog to turn on Image Viewer

Extreme Antialiasing

The image quality when **Extreme Antialiasing** (Camera Properties) is used has been improved. Thus, it is useful for more than just motion blur and depth of field.

Depth Buffer Antialiasing

The Depth Buffer Antialiasing command (Effects command group) has been added to specify how the Z buffer values from multiple antialiasing passes should be combined when creating a final depth buffer for output. Executing the command will display a small dialog. The **Minimum Value** setting (the standard behavior) causes each pixel to store the closest of the depths found at that pixel in all passes. The **Average Value** setting causes each pixel to store the average of the pixel's depths in all passes.

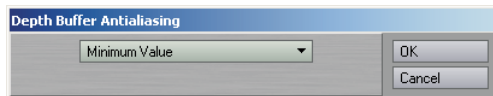


Figure 34: The Depth Buffer Antialiasing dialog

AutoDirectoryUpdate

An AutoDirectoryUpdate config file entry has been added. If its value is 0, then whenever the Content Directory is changed, the updating of the Scenes, Objects, etc. directories is disabled.

Print Assistant Plug-in

The Print Assistant generic plug-in sets the camera resolution according to print options (i.e., inches, picas, dpi).



Figure 35: The Print Assistant dialog

Lightgen2lw Plug-in

The Lightgen2lw generic plug-in will read a "Lightgen" file and create a light array based on the color and intensity values of the image used to create the file. Lightgen files are created by HDR Shop, developed by the ICT Graphics Lab, designed to view and edit high dynamic range images (see <http://www.debevec.org/HDRShop> for more information).

CameraSelector Plug-in

The CameraSelector master plug-in lets you switch between multiple cameras. *Note that this cannot be used to switch the camera during a render – the current camera is still used for that.* However, you can use it to switch between cameras while playing a scene in Layout or when creating a preview anim.

To access, first bring up the Master Plug-ins panel (**Scene > Master Plugins**). Then, add the CameraSelector plug-in. Double-click the entry to bring up its setting panel.

The Render Camera Keys window lists a sequence of frames and the camera to switch to on those frames. Clicking the **Add** button adds the current camera at the current frame to the list. To delete an entry, just select it with your mouse and click **Delete**.

The **Enable Dynamic Preview** option turns the plug-in on and off.

For CameraSelector to do its magic, it needs information not normally available to master plug-ins. As such, it automatically creates a null object called "SpecialTriggerNull" whose only purpose in life is to serve CameraSelector. If you wish to use a different object simply select it on the Trigger pop-up menu; however, normally, there is no reason to do so.

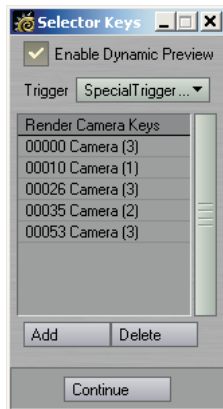


Figure 36: The CameraSelector panel

64-bit SGI Image Saver/Loader

Lightwave now supports loading and saving 64-bit SGI format images.

EXPRESSION BUILDER

The Expression Builder is a "wizard-type" feature designed to help you write expressions. To access, click the **Builder** button on the Graph Editor's Expressions tab. This will guide you through setting up a single function as an expression.

To use, first select an expression function from the pop-up menu at the top.

The Description tab gives you a description of what the expression is. The Example tab gives you an example of how to use the expression. The Applications tab explains why the expression might be used.

Once an expression "template" is chosen you will be presented with a composite of the expression below the info windows where you are presented with pop-up menus to set what values and/or channels are driving each of the components.

Once you've set the inputs, click **Accept**. You will be able to rename and modify the expression on the lines below. Click **Create Expression** to add the expression to the Graph Editor's list.

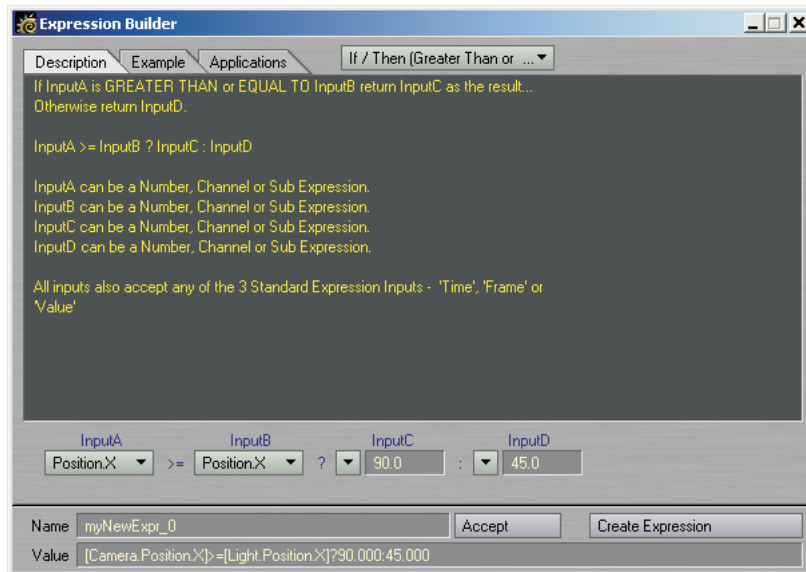


Figure 37: The Expression Builder panel

POWERGONS

Before we discuss Powergons, it is important to understand Layout commands. If you have ever customized keyboard shortcuts or menus, you have touched on Layout's underlying command structure. Nearly all of your actions in Layout are executed by sending discrete commands.

The commands listed in the keyboard shortcut and menu configuration panels only show the command name, but not any parameters the command might support. For example, the Render Options command causes the Render Option panel to display. It obviously needs no additional information to execute. The Add Spotlight command, on the other hand, can take an optional argument that names the added light. Thus, executing "Add Spotlight CoolLight" would add a light named CoolLight.

You can get a much better idea of what we are talking about here by choosing **Layout > Commands > Command History**. This opens the Command History window (see Figure 38). Leave it open and do some things in Layout. You will see commands whiz by as you click buttons and drag scene items. Here, you can see not only the command names, but also any parameters. You'll also see some commands that are not listed in the keyboard shortcut and menu configuration panels, like "Position" and "Rotation."

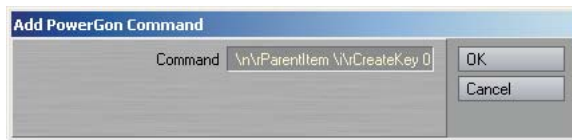


Figure 38: The Command History window

What are Powergons

Powergons allow you to execute a short Layout command script, which is attached to selected polygons in Modeler. You can use this feature to quickly add, say, lights using polygons for positioning. Moreover, all of the lights properties can be defined as well.



NOTE

Once the script is executed in Layout, you can clear the object if it is unneeded otherwise. However, the default command parents the lights to the object, so be careful since you don't want to delete the children.

To Attach Commands

To attach a Powergon command script to polygons, first select the target polygons in Modeler. Then choose **Construct > Additional > AddPowergon**. This brings up a dialog where you can enter the command script. There are certain special "escape" characters you can use.

- | | |
|-----|---|
| \\a | Returns the area of the polygon. |
| \\c | Returns the position of the polygon's center in the form "x y z". |
| \\d | Returns the polygon's normal vector as "nx ny nz". |
| \\i | Returns the item ID of the object containing the polygon. |

- \n Returns the polygon's normal converted into heading, pitch and bank angles (bank is always 0) in the form "h p b".
- \r Creates a line return to signify the end of the current command and the start of the next. Note that it is not needed at the very end of the last command.

The default command is "AddSpotlight LGON\rPosition \c\rRotation \n\rParentItem \i\rCreateKey 0". This adds a spotlight named LGON, positions it at the center of the polygon, rotates it to match the polygon's normal, parents the light to the object, and creates a keyframe at frame 0.



Figure 39: The Add PowerGon dialog

Once you click **OK**, the command script is attached to the selected polygons. (Technically, this action adds a PWRG type polygon tag to the polygons.)

To Clear Commands

To clear Powergon commands from polygons, simply select the polygons and choose **Construct > Additional > ClearPowergons**. Activate the **General Powergon** option and click **OK**.

Executing the Commands

Once the Powergon commands are attached, load the object into Layout. Then choose **Scene > Generics > DoPowergons**. This executes any command scripts attached to the selected object.

LUXIGONS

Luxigons are very similar to Powergons, but are specialized just to add lights and set certain light properties. To use, in Modeler select the desired polygons and choose **Construct > Additional > AddLuxigon**. When the dialog appears, select the type of light you wish to add and set its properties.

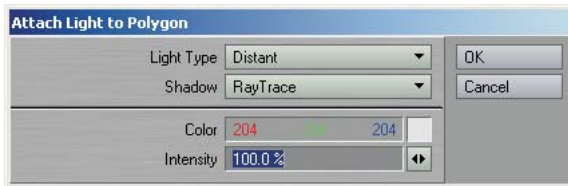


Figure 40: The Add Luxigon dialog

Next, load the object into Layout and choose **Scene > Generics > ConvertLuxigons**. If you wish to use an existing light's properties, select it in the **Clone Item** pop-up menu. Enter the desired name of the new lights in the **Light Name** field. After you click **OK**, the defined lights will be created, positioned at the center of the appropriate polygons, aligned with the polygon's normal, and parented to the object.

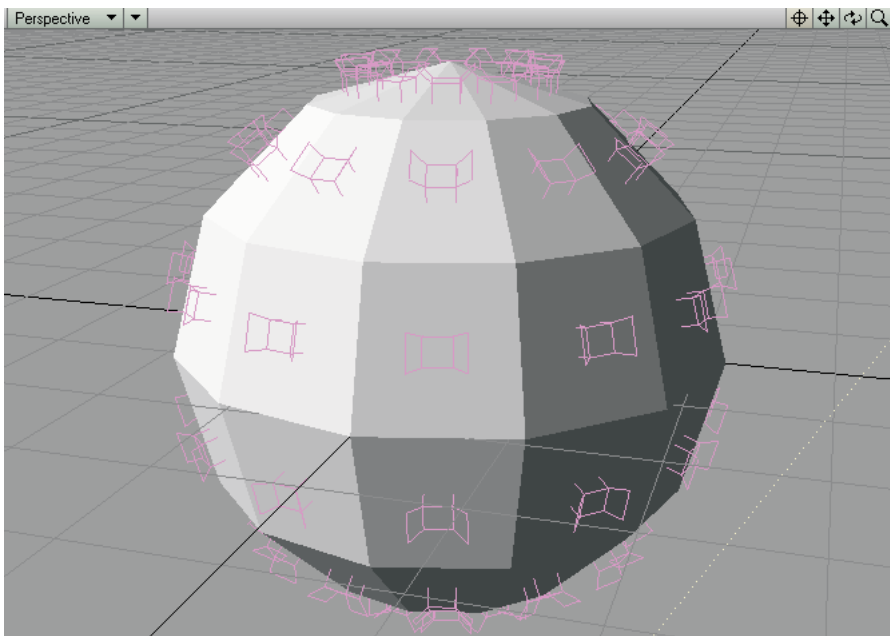


Figure 41: Converted Luxigons attached to a simple ball

You can clear Luxigons from selected polygons using the **Construct > Additional > ClearPowergons** command.

KEYFRAMER

Keyframer is essentially a collection of keyframing utilities. Its functions can be applied to currently selected items or defined by an external text file. You can even save and load frame and motion data.

To use Keyframer, choose **Scene > Utilities: Generics > Keyframer**. The functions are divided into three different tabs on the panel: Standard, Transfer, and Other.

What is Affected

When you choose certain functions, the Select Range and Objects panel will appear. Here, you set which range of frames, scene items, and channels to affect. All operations only modify items listed in the Affected Channels and Affected Objects lists.

The **Start** and **End** values define the range of frames that will be affected.

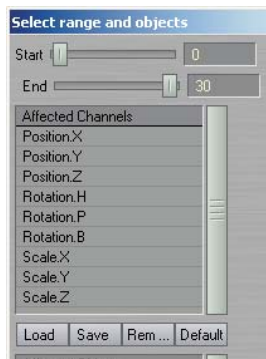


Figure 42: Top portion of Keyframer's Select Range and Objects panel

Affected Channels

The Affected Channels list (see Figure 42) shows all of the channels that will be affected by operations. You may remove a channel by selecting it with your mouse and then clicking the **Remove** button.

If you click the **Save** button, you can save the list of Affected Channels into a text file. You should use the file extension ".lw_channels". The file contain just a straight list of the channels, like:

```
Position.X
Position.Y
Position.Z
Rotation.H
Rotation.P
Rotation.B
Scale.X
Scale.Y
Scale.Z
```

You may replace the list of Affected Channels with the channels listed in a text file using the **Load** button.

Clicking the **Default** button returns the list of Affected Channels to the default ones.

Affected Objects

The Affected Objects list (see Figure 43) will default to the currently selected item(s) in Layout. You can list all scene items by clicking the **All** button.

If you click the **Save** button, you can save the list of Affected Objects into a text file. You should use the file extension ".lw_items". It will be just a straight list of the scene items, like:

```
Null (1)
Null (2)
Light
Camera
```

You may replace the list of Affected Objects with the scene items listed in a text file using the **Load** button.

The **Use selected objects only** option, will cause the list to only show the item(s) current selected in Layout.

The **Include all subchildren** option will cause all children of the listed items to be shown.

If **Use custom loaded** is enabled, all of the items in the Affected Objects list will be affected. Otherwise the list is always dynamically determined by what is selected in Layout, what the children are, and so on.

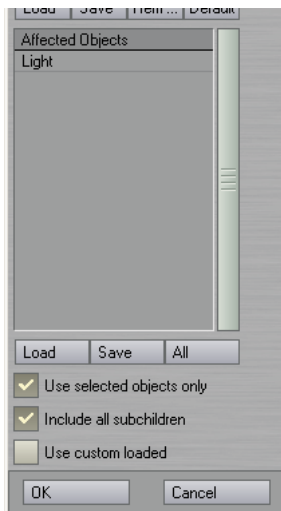


Figure 43: Lower portion of Keyframer's Select Range and Objects panel

Standard Tab

Choose Cycle (Bake) Keys: Keys within the range are copied and pasted *after* the **End** frame *plus* the **Cycle Gap**. The copy is repeated by the number times set with the **Repeats** slider.

Destroy Keys: Keys within the range are deleted.

Defractionalize: Fractional keys within the range are rounded to the nearest integer value.

Create Random Keys: Creates new randomly spaced keyframes between the **Start** to **End** range. The animation curve "should" maintain its shape, if possible.

Random/Jitter Keys: This adds "noise" (i.e., jitter) to existing keyframes between the **Start** to **End** range.

MoveRotateScale: Modifies the position, rotation, and/or scale of items. If the **Add** method is used, the entered value is added to existing key values. If **Multiply** is used, the existing key values are multiplied by the entered value-be careful using 0! The **Overwrite** method replaces existing key values with the entered values.

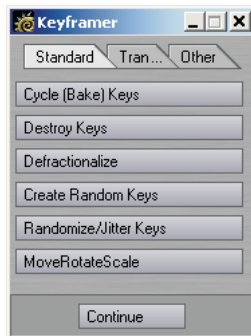


Figure 44: Keyframer Standard tab

Transfer Tab

Node-to-Node Frame Copy: Copies the **Position**, **Rotation**, and/or **Scale** of the **Source** to the **Target** at the current frame. If the **Use World co-ordinate Copy** option is enabled, the target will take on the "world space" values of the source (i.e., not the local values). *Note that you will still need to create a key with the copied values.*

Node-to-Node Motion Copy: Copies the entire motion of the **Source** to the **Target**. (This is the same as saving and loading a motion file.) If **All descendants** is enabled, all descendants of both the **Source** and **Target** will be used and modified. If you are using **All descendants**, the **Source** and **Target** hierarchies should be identical or results will be unpredictable.

Load Single Frame data: Use this function to load the motion data saved with the **Save Single Frame data** function. Note that the position and rotation channels are loaded regardless of what appears in the **Affected Channels** list. Also, it will only affect the same item (when the data was saved)-that item must be in the **Affected Objects** list.

Save Single Frame data: This function will save all of the motion data for the **Affected Objects** at the current frame. Note that the position and rotation channels are saved regardless of what appears in the **Affected Channels** list. The file should be saved with the ".lw_frame" filename extension.

Load Clip data: Use this function to load the motion data saved with the **Save Clip data** function. Use the **Start** and **End** sliders to trim data. Regardless of the **Start** and **End**, the range is always copied in starting at frame 0. *Note that the item must have the same name as the item used to save the data.*

Save Clip data: This function will save all of the motion data for the Affected Objects for a defined range of frames. Note that all channels are saved regardless of what appears in the Affected Channels list. The files are saved to a directory you specify. *Only the data at actual keys within the range is saved.* If the start of your range is not a key, the data for the next key (in time) is used. Keys retain their position in time even if you don't save starting from frame 0.

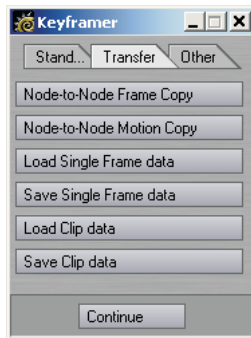


Figure 45: Keyframer Transfer tab

Other Tab

Dissolve: This function adds keys to the **Object Dissolve** channel (Object Properties, Render tab). The object will be 100% dissolved at the **Start** frame up until the **End** frame, where it becomes 0% dissolved.

UnDissolve: This function is the opposite of **Dissolve**, described above.

Key All Morphs: Sets keys in every MorphMixer channel at the current frame for items with MorphMixer.

UnKey All Morphs: Deletes keys in every MorphMixer channel at the current frame for items with MorphMixer.

Reset All Morphs: Sets key values to zero in every MorphMixer channel at the current frame for items with MorphMixer.



Figure 46: Keyframer Other tab

BIOVISION MOTION CAPTURE SUPPORT

LightWave provides a couple plug-ins to support the BioVision (BVH) motion capture file format (see www.biovision.com for more information). The MoCap_BVH_Setup generic Layout plug-in reads a BioVision BVH file, creates bones, and applies the motion capture data to them.



Figure 47: The MoCap_BVH_Setup dialog.

Set **Start frame offset** to the frame you want the motion to begin. The **Bone name postfix** is simply a number appended to the end of all of the bone names (e.g., LeftKnee_1).

After you run the plug-in, replace the top null (in the created bone hierarchy) with the object to be animated. You could also use the **Use Bones From Object** feature on the Bones Properties panel.

If you need to change the initial resting position of bones, make sure you reset their rest positions (use the R key). You'll probably need to adjust some of the individual bone properties after you run the plug-in.

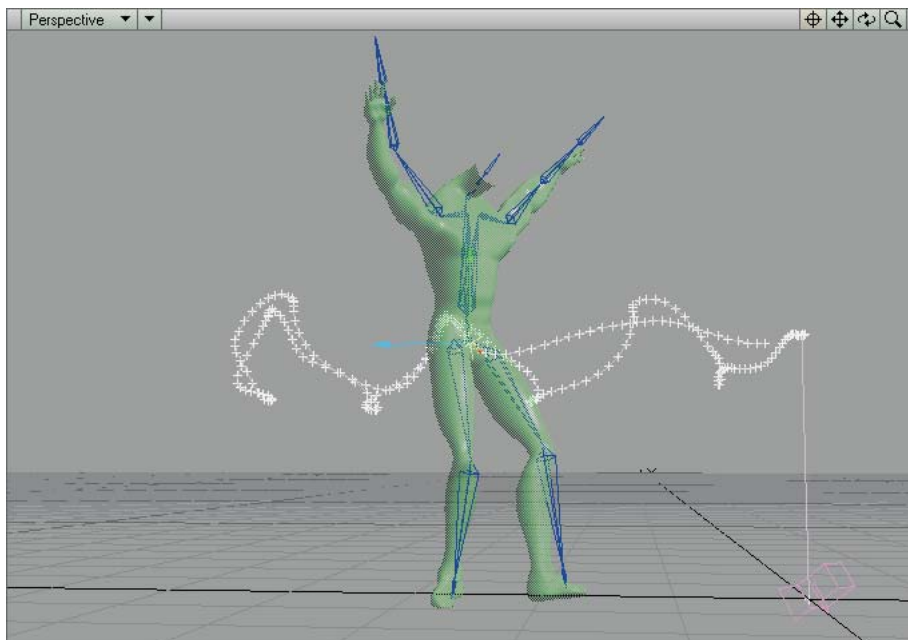


Figure 48: Example object using a bone hierarchy with motion created from a BioVision motion capture file.

MoCapSkelegons is a Modeler plug-in that creates skelegons in Modeler that match the initial rest position of the Biovision BVH data. Use it to determine the correct scale, position, etc. for your object mesh. This object can then be used with the bones created using the MoCap_BVH_Setup generic plug-in in Layout.

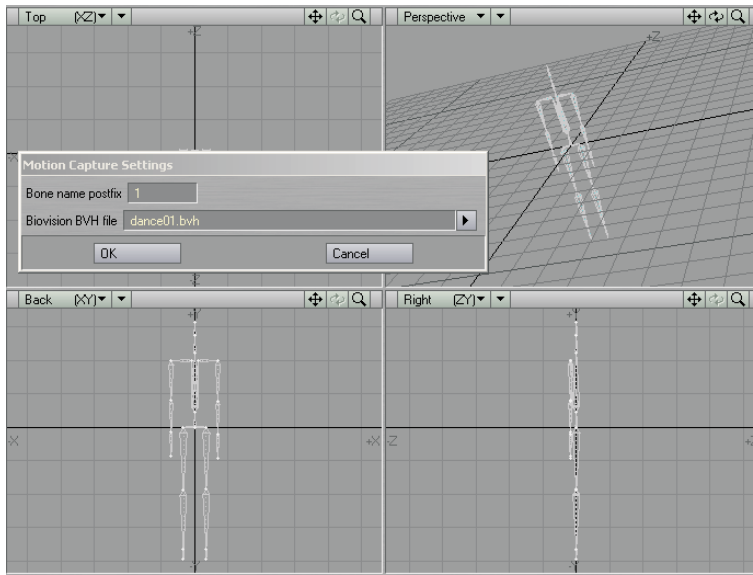


Figure 49: MoCapSkelegons creates skeletons in Modeler that match the initial rest position of the Biovision BVH data

Motion Preview

There is also a custom object plug-in that can be used to preview BioVision motion data. The preview is fast and accurate. Use it to determine if there were any errors in the motion conversion.

Simply add the MotionCapturePreview custom object to a null object on the Object Properties panel. (If you run the MoCap_BVH_Setup generic Layout plug-in, a null called "MotionCapturePreviewNull" will automatically be added to the scene with the custom object plug-in already applied.)

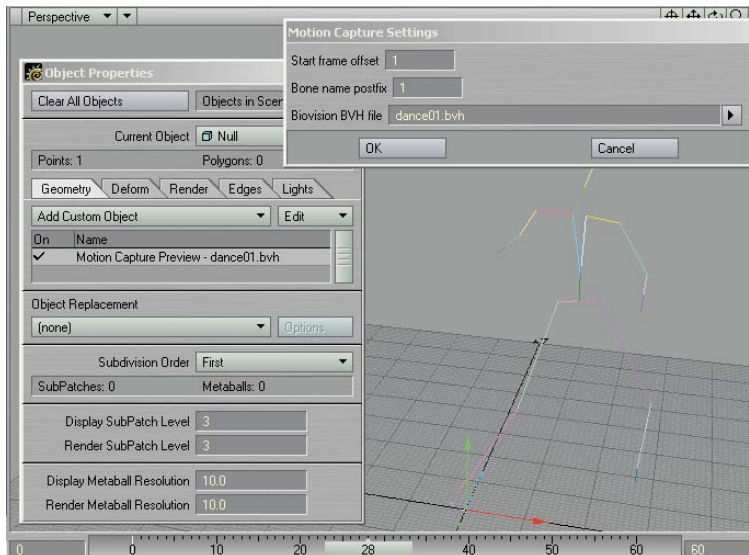


Figure 50: Use the MotionCapturePreview custom object plug-in to preview BioVision motion files.

SPREADSHEET

If you enable **Edit Columns** from the **Options** pop-up menu, you can add, remove, and change each column in the active "bank" of channels. When this option is enabled, you will see small arrowheads, plus signs, and minus signs at the top of each column. Clicking the arrowhead displays a menu where you can change the channel for that column. Clicking the plus sign lets you insert a new column and clicking the minus sign deletes that column.

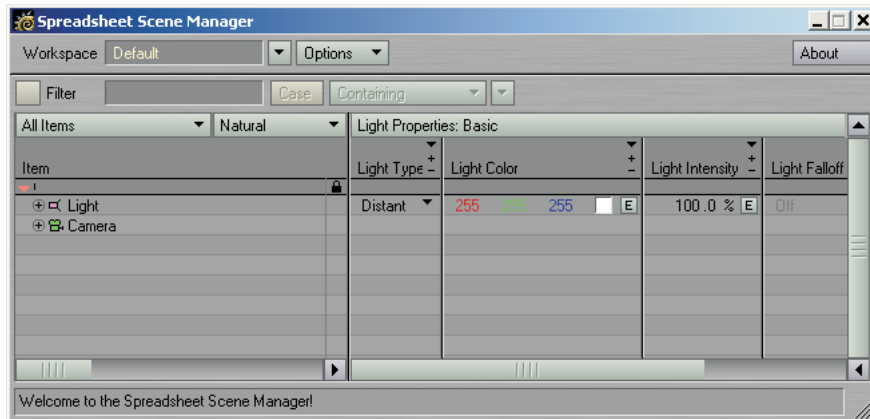


Figure 51: With Edit Columns active, special buttons appear at the top of each column allowing you to customize the banks

Once you create a custom bank, you can save it as part of the scene (a "Scene Custom Bank") or as a "Global Custom Bank," which can be accessed when any scene is loaded. The save function (**Create Custom Bank**) is on the menu accessed when you click on the Bank titlebar above the channel columns. There are also functions to rename, replace, and delete custom banks. The active bank is selected on this menu as well.

Also look for new banks and added channels in Spreadsheet.

MOTION MIXER

Shift+LMB Click: Add/remove Motions to/from the selection.

Shift+LMB Drag: Moves selected Motions on the Timeline. Drag anywhere other than on a Motion.

Ctrl+Drag: Moves the entire contents of active tracks. Disable a track if you don't want to move its contents.

Ctrl+RMB Drag: Moves the contents of active tracks that have their start frames after the frame at which the drag operation is started.

Ctrl+MMB Drag: Same as Ctrl+RMB Drag, but affects only those Motions that have their end frames before the initial click frame.

Interface colors will now match custom color schemes, as far as possible.

Added "Custom Offset" to the Offset Editor. When you add this to a Motion, you can choose, on a per item basis, whether to use Absolute or Relative offsets. This is very useful for animations containing translation. Just set the translation item(s) to Relative and the rest to Absolute. Changing the offset type is done by clicking on the column next to the item name in the Offset Editor list box, this will toggle between ABS and REL.

Added complete channel support. This means that anything in Layout with an envelope (E) button can be used by MotionMixer. When you create an Actor, you will see a new item has been added to the Actor, called "ExternalXChannels." This is a "virtual" item to which any channels that are not part of an items channel group are added. There is a new entry on the Actor Menu, "Add XChannels," which will bring up a panel that will allow you to choose channels to add to the Actor. Double-click on a channel in the left-hand tree view to add it to the selection list.



NOTE

Only add channels from the "Clips," "Surfaces," "Global," and "MC" channel groups. Adding channels from other groups will most likely result in unexpected behavior!

Once these channels have been added to the Actor you can build Motions in the normal manner. There is a new choice on the Create Motion panel called "External XChannels," for this purpose.

Key pass-through has been removed until an issue with Panels is resolved. This fixes the Delete key problem people were experiencing.

Displacement/HyperVoxel Texture Layer Position, Rotation and Scale envelopes etc. can now be used. General XChannel support has been improved.

Context Menus have been added to Motions, Transitions, Behaviors and the Timeline Tracks.

Motions can now be dragged between Tracks.

Motion & Behavior bars are now drawn as gradients. The colors for which (including the Toolbar) are specified in the MotionMixer config file.

MotionMixer now remembers the position & size of its interface between sessions.

The minimum height of the interface has been reduced to take up less screen space.

MotionMixer now creates a config file (in the same directory as the LightWave configs) to store settings between sessions. Colors for Motion & Behavior bars and the Toolbar are specified here. Other colors will be affected by any changes made to the LightWave color scheme.

Timeline can be zoomed by Alt+Ctrl+LMB dragging.

The Timeline will now also pan vertically during a normal Alt+LMB drag if the mouse is moved up or down more than the height of a track.

Load from Scene support has been improved. Scenes containing the same Actor can now be imported using Load from Scene, this creates a duplicate Actor.

Motions on the Timeline that have been made inactive through the Channel Editor can no longer be selected or moved.

Removed the Delete key shortcut for removing Motions and Transitions from the Timeline. (This was causing problems with key pass through.) Motions and Transitions can be removed from the Timeline using the RMB menus.

Weight Curve

Motions can now be assigned a Weight Curve which allow you to specify the influence a Motion has over time. These curves have the added benefit of allowing you to weight to any keyframed animation underlying the Motion in Layout. The weighting system works on a value of 1.0 indicating full influence and a weight value of 0.0 indicating no influence on the final animation. The difference with MotionMixer's weights is that as the weight approaches 0.0, and if there's underlying animation in Layout, then more of that underlying animation will be mixed into the final value:

Weight Value	Motion Influence	Layout Influence
1.0	100%	0%
0.75	75%	25%
0.5	50%	50%
0.25	25%	75%
0.0	0%	100%

If a Motion has no Weight Curve attached then it's treated as if it has a weight of 1.0. Weights can also be increased above 1.0, this is very useful for overlaying other Motions, the higher the weight value you apply the more influence that Motion will have over any others at that time (i.e., if you give a Motion a weight of 10.0, it will have ten times more influence over another Motion with a value of 1.0). When a Weight Curve has been applied, a small green bar is drawn under the Motion on the Timeline. Weight Curves can be added, disabled temporarily and opened in the Graph Editor either through the Motion Properties Panel or directly from the Timeline's context menus (see below).

Curve Translation

Curves for Transitions, TimeWarps & Weights are now moved and scaled to match their positions on the Timeline. This makes working with the curves far more intuitive; the frame indicator in the Graph Editor now shows the position on the curve at the current time.

Motion Instancing

Motion Instancing is now implemented. Any number of instances of a Motion can be placed on a Track and each can have their own independent attributes (i.e., Item/Channel states, in/out points etc.)

To create an instance of a Motion, select the source Motion from the Motion Menu (this can also be a previously created instance) and click **Add Motion**.

Freeing the "source" Motion also removes all instances.

TimeWarp Curves

These can be attached to any Motion (or instance) and allow you to vary the timing of the animation, you can speed up or slow down sections, go backwards or freeze time and continue. A small red bar is drawn under the Motion to signify that a TimeWarp curve is attached. These can also be temporarily disabled.

Controls to add/remove/disable TimeWarp curves are in the Motion Properties panel and on the context menus.

Relative XZ Custom Offset Type

This is a hybrid of the normal Relative Offset and the Absolute Offset types. All channels are evaluated as relative offsets apart from the Y axis. This allows motions to be blended relatively but retain their Y heights (i.e., you don't end up with a follow on Motion under the floor or floating above the ground).

Character Custom Offset Type

As the name implies this offset type is specially designed for characters and makes it very simple to align Motions automatically. Say you have a Motion where a character turns a corner and ends up facing 90 degrees, you append a Motion of a walk in a straight line, MotionMixer can now rotate that Motion so that it continues in the direction that the last Motion ended on.

The Adjust Alignment control can be used to modify the calculated rotation value allowing you to fine tune the direction your character travels.

The Compensate for Start Angle checkbox allows you to compensate for a Motion that doesn't travel along the +ve Z axis. This is very handy for motion capture where motions are often not axis aligned (i.e., in situations where the performer runs diagonally to make the best use of the capture area, or probably more commonly, where people don't create their forward motion along the +ve Z axis).

To use the Character offset type set any items that control the characters movement (e.g., pelvis bone, IK Goals etc.) to CHAR in the Offset Editor (Custom Offset type).

MOTION DESIGNER

If *Parts* exist in an object and the **Use Partname** option is **ON** (Objects tab for target), Motion Designer will only see those polygons and ignore any surfaces in the object as far as the surface list goes in the MD interface.

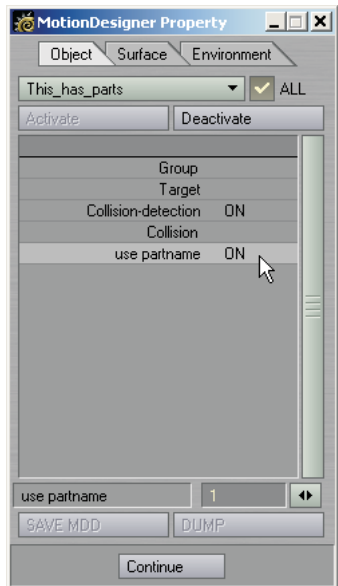


Figure 52: The Use Partname option has been added to Motion Designer

Using Motion Designer with SubPatch Objects

In order to use Motion Designer with SubPatch objects, you need to set **Subdivision Order** to **Last** on the Object Properties panel. However, understand that Motion Designer does not directly interact with the underlying smooth SubPatch surface. Basically, it is a displacement plug-in and can only deform the cage.

By postponing the subdivision until after all displacement deformations take place, Motion Designer can appear to work with the smooth SubPatch surface. Make sure the cage conforms closely to the underlying surface as much as possible—this will likely mean you will need to use a more complex cage than you would normally. This is particularly important when collision detection is involved.

MODELER

Bandglue

The Bandglue command (**Construct > Additional**) merges a contiguous row of four-point polygons into one polygon. To use, first select a contiguous row of (two or more) polygons. Then execute the command.

Like Bandsaw, the operation continues all the way around the geometry until it hits itself or a non-four-point polygon.

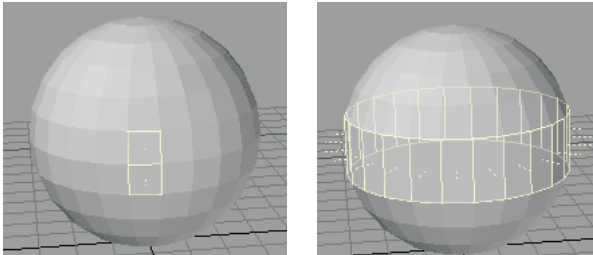


Figure 53: (left) Two selected quads. (right) After executing Bandglue command

BandSaw Pro

The BandSaw Pro tool is similar to the standard Bandsaw function, but works interactively. The **Direction** pop-up menu controls which direction is used to select polygons. The **Auto** menu item chooses based on the selected polygons. You need to select at least one four-point polygon.

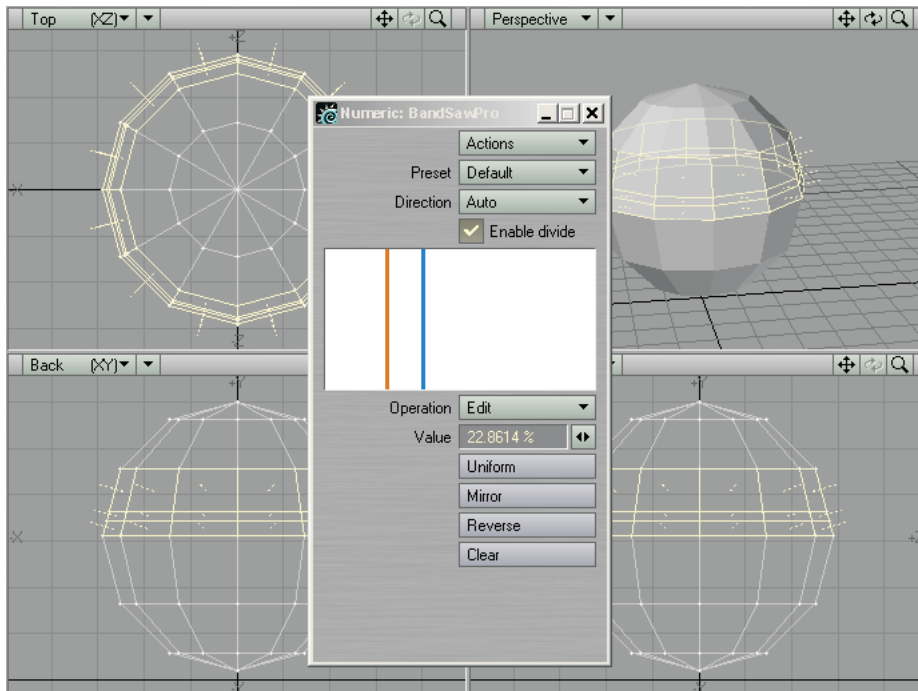


Figure 54: Use BandSaw Pro to slice through a contiguous row of polygons

The BandSaw Pro tool can be used for just selection purposes, normally you'll also want to slice polygons. In this case, you need to activate the **Enable divide** option.

In the white slice window, there will be at least one vertical cut line. When there are multiple cut lines, only one is selected at any one time and it is orange colored. The non-selected cut lines will be blue.

When the **Operation** pop-up menu is set to **Add**, you can click in the slice window to add more cut lines. Choose **Delete**, to remove existing cut lines when you click on them. When **Edit** is selected, clicking in the window does nothing.

Changing the **Value** setting modifies the selected cut line. You cannot move a line past another existing line. Note that it does not matter what the **Operation** pop-up is set to.

Click **Uniform** to evenly space the cut lines in the window. Click **Mirror** to mirror the selected cut line to the opposite side. **Reverse** will invert the order of all existing cut lines. **Clear** removes all cut lines and leaves a single centered one.

The **Preset** pop-up menu lets you go back to the last cut line set up used when that Preset was selected.

UV Spider

In a manner like BandSaw selects polygons, UV Spider "crawls" along a mesh and deposit UVs.



Figure 55: The UV Spider panel

Like with BandSaw, you must first select at least one polygon. When you run UV Spider, the UVs are applied between the **Start** and **End** values on the polygons in the band. If the **Direction** is **U**, the band stretches in the U direction with a top and bottom in the UV plane determined by the **V Start** and **V End** values. If the **Direction** is **V**, then the band goes in the V direction.

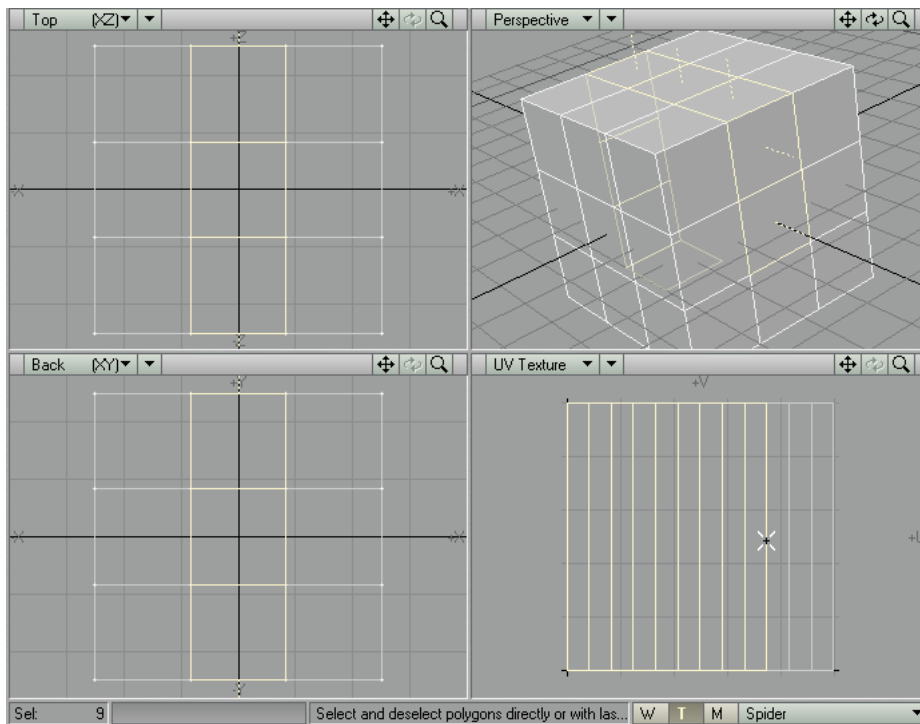


Figure 56: UV Spider used with default settings with a single polygon selected. UV polygons are selected in the UV Texture viewport to show corresponding mesh polygons.

By applying UV Spider multiple times in the **U Direction**, adjusting the **V Start** and **V End** positions each time, you can gradually "unwrap" an object. To do this, start with **V Start** at 0 and **V End** at 0.1. For the next band, use **V Start** at 0.1 and **V End** at 0.2, and so on.

Magic Bevel

The Magic Bevel tool (**Construct > Additional > Magic Bevel**) lets you interactively drag out a bevel along an editable path with tremendous control over how the bevels are created. This tool works on polygons, SubPatches, one-point polygons, two-point polygons, and Metaballs.

You create the bevels by dragging any of the blue circle handles (see Figure 57). *All polygons will get a handle regardless of what is selected.* The path will be drawn along the vertical and horizontal axes of the viewport, so use a Perspective viewport to bevel off axis.

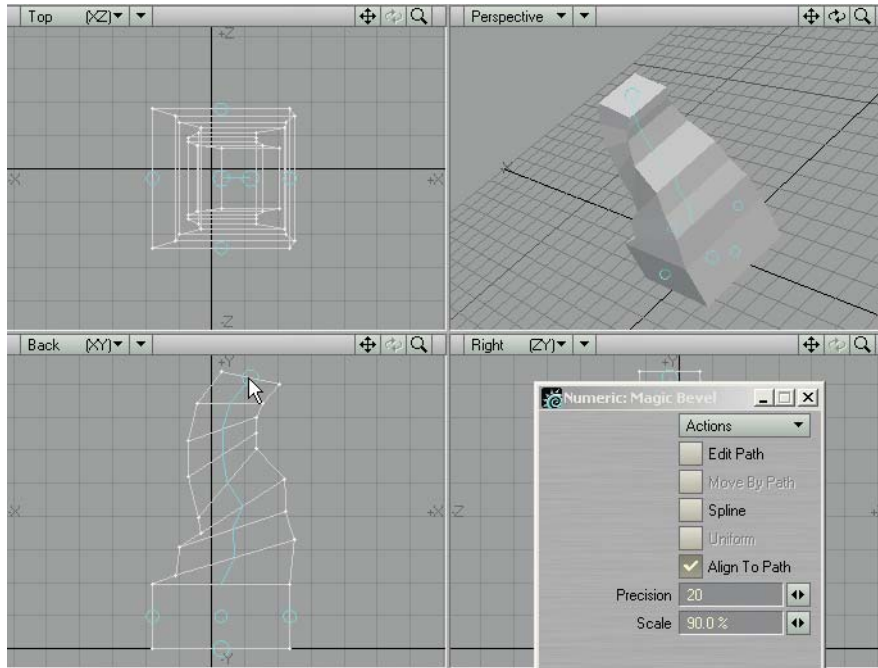


Figure 57: Create the bevels by dragging any of the small circle handles

The **Precision** value sets mouse sensitivity and determines how closely the bevels follow the path. When your mouse pointer moves this many pixels, a bevel is created. Higher values are less precise and result in longer segments. The **Scale** value sets how much to size down (or up) each successive bevel.

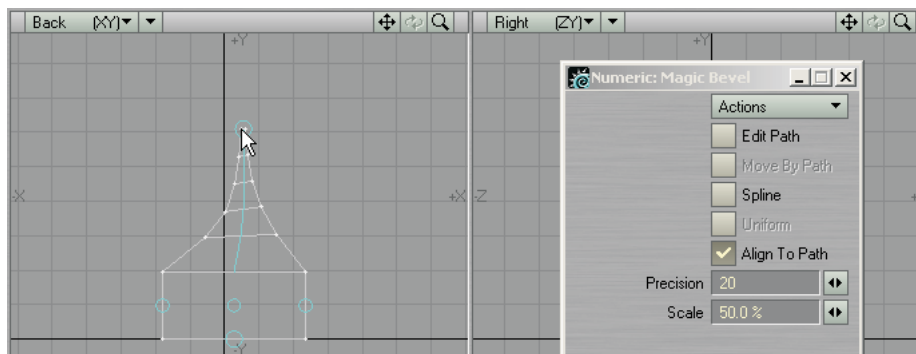


Figure 58: A smaller Scale value accelerates scale down of the bevels

The **Align to Path** option aligns the bevel polygons with the tangent of the path. When this is off, the angle of the bevels match the starting polygon angle.

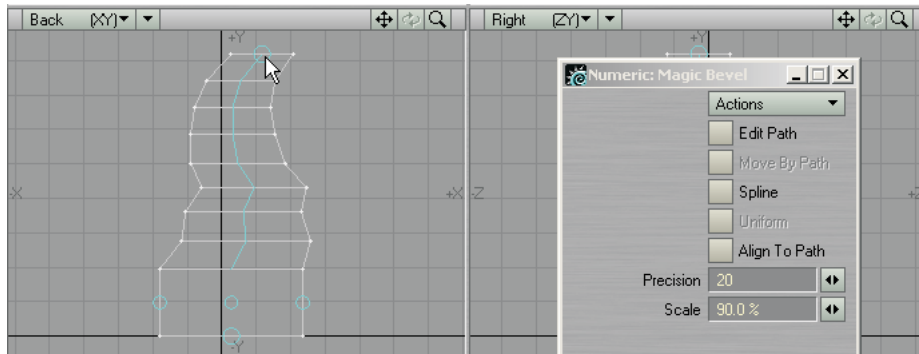


Figure 59: When Align to Path is off, bevels match the starting polygon angle

If you activate **Edit Path**, drag handles will appear at each bevel. You may drag them to change the positioning of each bevel.

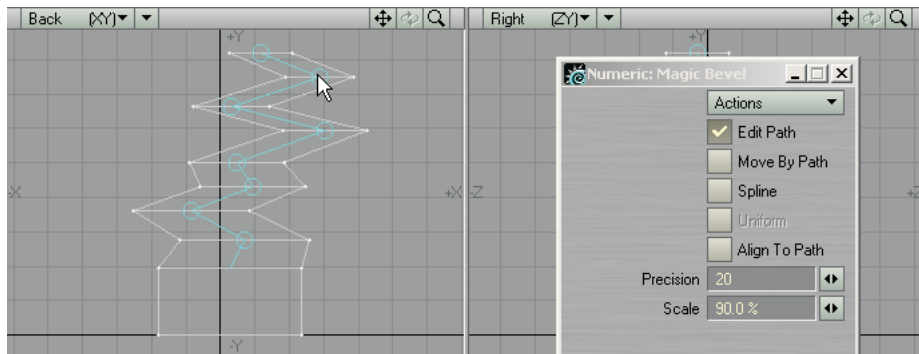


Figure 60: Activate Edit Path to edit a Magic Bevel operation

When **Edit Path** is active, you may also activate **Move By Path**. This option moves all of the bevel positions including and past the one that you edit. When this is off, only the selected point moves.

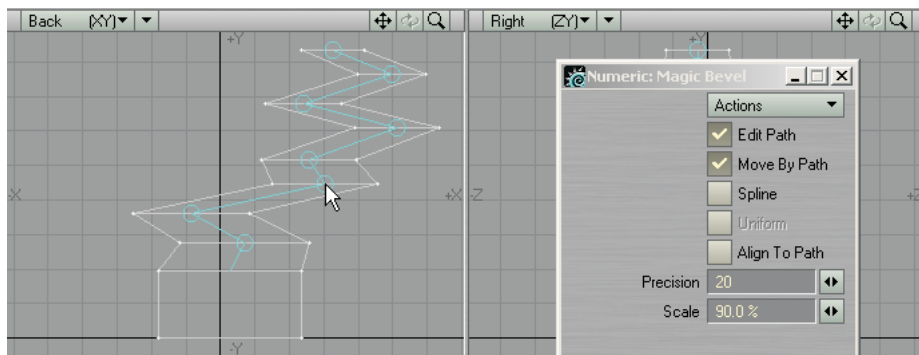


Figure 61: Move By Path moves all of the bevel positions that follow any one that you edit

The **Spline** option turns the path into a smooth spline path. This will change the bevel positions slightly.

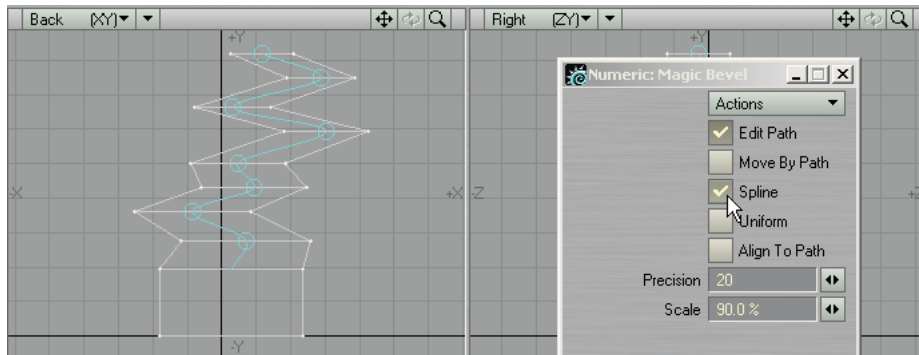


Figure 62: The Spline option turns the path into a smooth spline path

The **Uniform** option causes the bevels to occur evenly along the path. You will notice that the bevels will no longer occur at each edit handle. This only works when using the **Spline** option.

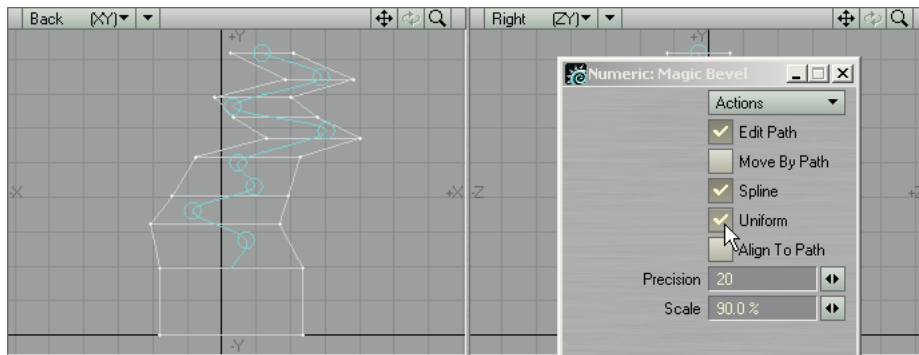


Figure 63: The Uniform option causes the bevels to occur evenly along the path

If you click your RMB after you create a bevel path, blue handles will appear on the new bevel geometry.

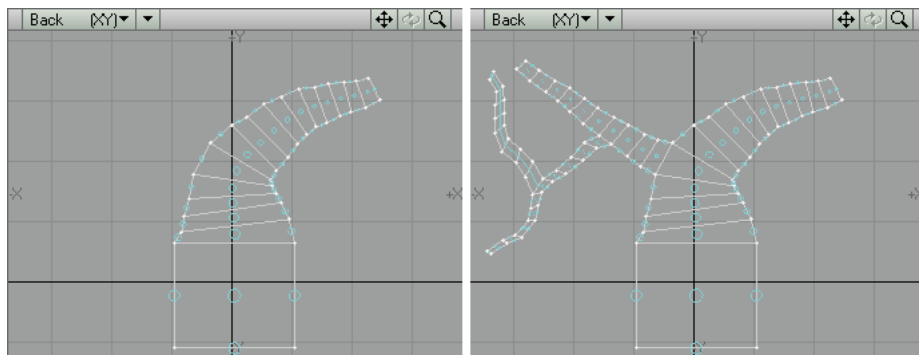


Figure 64: (left) Clicking your RMB displays blue handles on new bevel geometry. (right) Bevels from the new geometry dragged out a few times