Terrain

Lightwave 9.0 Tutorial by Tom Ruiz

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In this tutorial we will use endomorphs and displacement maps to create terrain that we can manipulate and change to fit our needs...all within Lightwave modeler and layout.

**Advantages**
- No need for additional applications.
- Easily customizable to fit individual needs.

**Disadvantages**
- Requires a more intermediate knowledge of lightwave.
- May require considerable tweaking to accomplish specific results.
Endomorphs

- Deformations that use specific targets to create shapes.
- Mostly used in animations.
Displacement maps

- Images that create geometry on an object.
- Often called normal maps.

Sphere with procedural texture Turbulence on default settings

Bump Mapping

Displacement Mapping
Now to Create Terrain...

- Open lightwave modeler

- Use the box tool to create a plane with 0 height value and 8 segments on the x and z axis.

(More segments means more geometry and more complex landscapes, but also more polygons and may cause trouble for us later when we alter subpatch levels in layout. Keep the segments as low as possible to create the proper scene you need.)
Next we need to create our endomorphs.

- Click the “M” at the bottom right corner of the screen

- Next click the base bar and select “new” from the dropdown menu

- The Create Endomorph menu will open in the center of the screen. In “Name” change “morph” to “morph_up”. Be sure Relative is active and click “create”.
Now to set up the morph target.

- At the bottom right corner of the screen be sure the dropdown menu is set to “morph_up”

- Now press tab to enable subpatchs.

Lightwave 9 has a different type of SubD algorithm called Catmull-Clark that supports polygons with more points. Since our polygons are 4 pt we can leave this at Subpatch. Using Catmull-Clark will effect the subpatch levels further in the tutorial so leave it off by making sure it that “subpatch” is checked in the SubD-Type dropdown menu at the bottom of the screen.

- In the “back” or “right” viewpanels use the move tool to drag the object up. Be sure that the dragging object is directly above the original object.

The height of the points will be the maximum height of the points we can morph. Since we are subpatching these points will not equal the maximum height of the hills we can create.
-Next we go back to the bottom right corner of the screen and change “morph_up” to “base” from the dropdown menu. The object should snap down to its original position.

Now we use a new tool: the airbrush to build our mountains.

-Select the airbrush tool (Map>General>Airbrush)
- Press N for Numeric

- Change the Vertex Map to “Morph_up”. If the information dialogue pops up, click ok.

- Using the perspective viewpanel, paint on the hills on the plane. I use small circular motions to create hills.

You can change the brush size by holding the right mouse button and dragging.

Keeping the strength low will allow you to build up the hills with more control. Undo works here.
- Maximizing the perspective view panel will help you paint.

This is the terrain I made. (I enabled smoothing in the surface editor)

When you are finished save the object and send it to Layout.
Part 2: Displacement Mapping

-In Layout arrange your camera and lights the way you like so you have a good view of the terrain.
-Select Objects at the bottom left side of the screen and press P to open the properties window.

Explanation time:

This panel shows us lots of information about our objects and lets us transform it in various ways. We must take note of the polygon count and the subpatch levels. The display subpatch level is what we see in layout on the screen in OpenGL and Render subpatch level is what we see when we render. These numbers should be equal otherwise our render will look considerably different from what we see in layout. Also, bumping up the values on these will exponentially affect the amount of polygons on the object. This may seriously bog down your pc so increase slowly and with caution.
-Under the Deform Tab click the T-box next to Displacement Map.
- The Texture Editor window will open. This works just like the surface editors texture editor.

- Select the procedural texture Crumple and adjust the settings to match the ones on the right. The displacement axis should be set to Y since we are working with a ground level plane we want to displace vertically. The texture value is the amount of black in the texture. Frequency is the amount of crumples that will appear. Small power controls the difference between the values of the various frequencies.
-Add a new procedural texture layer. Make this one Turbulence and match the settings to the one on the right.

Setting the blending mode to subtractive subtracts the turbulence layer from the crumple layer. This works for other blending modes to create different patterns that will not look so mathematical. The turbulence frequency is the amount of noise in the texture. The contrast controls the amount of difference between the dark and light areas.
-When all the textures are set up close the window. It's now time to bump up the subpatch level to make a nice looking terrain. I set the levels to 66 each. This made the polygon count in the realm of 550,000.

Again, beware of increasing the subpatch level too high. Doing so can cause your scene to quickly have too many polygons and your computer may not have enough memory to handle it.

Now texture as you see fit. I used the Dry Ground preset under Nature.
Final Render: Enhanced Low AA, Time: 1m 1s
Further Topics:
HyperVoxels
Adaptive Pixel Subdivision
Normal Displacement Mapping

References:
Using SDTS maps and Texturing:
http://www.newtek.com/products/lightwave/tutorials/surface/texturing/texturing_landscape.html
Using the Morphmaps to make terrain.
Using Procedural Textures to create Terrain.