Creating the Tower

We'll start by creating our desert terrain by adding a terrain displacement shader in the Terrain section:

Add Terrain > Power Fractal.

Reduce the displacement Amplitude to about 50. I also reduced the Feature Scale to 500 and increased the Lead-in Scale to about 100,000. The important thing is to keep your desert flattish. Now rename this shader Desert Displacement.

To view it from a more desirable perspective lower your horizon to about a quarter or a third of your scene height: Alt + LMB with your cursor over the 3d Preview window. Similarly adjust the height of your camera using Alt + RMB.

Now add a Crater Shader:

Add Terrain >Displacement Shader > Crater Shader.

To convert the crater to a tower make the Depth negative, i.e. change the default Depth of 100 to -100. Oh, what the hell, let's make it -3000. Whoa, we're probably going to have to back off a way to get it in our scene: Alt + scroll wheel to back our camera up. Of course you can use the camera navigation controls to get your scene as you want it. Rename this crater shader “Tower”. Here's what I've got so far:

Tower Displacements

Ok, now we'll give our tower some displacement:

Add Terrain > Displacement Shader > Power Fractal Shader v3.

We have a tower that has a diameter of 1,000 mtrs, and is 3,000 mtrs tall. So I'm going to try a feature scale of say 400 and a displacement of 150. We'll make the Lead-in scale really big like a million, or even a million and a half. That'll give us a decent number of octaves which will give us good variation. Don't make the Smallest scale too small or you'll get lots of needle-like spikes. It's probably best to make the Smallest scale similar to the Displacement value. I'm going to try 150. On the Tweak Noise tab change the Noise Flavour to Perlin Billows (You'll get more prominent displacement than you will with plain Perlin), and increase the Buoyancy from Variation to 0.5 or greater. Back on the Displacement tab you'll notice that the displacement is Along Normal and that you've got huge vertical displacements on the desert terrain and nothing on the sides of the tower. Select Lateral Normalised from the displacement drop-down menu. I also applied warping to the displacement to make it even wilder. I know, all those huge bumps have now disappeared. Right, before we progress, rename this power fractal shader “Tower Displacement”. You may have noticed that the displacement option Lateral Normalised said that it requires compute normal. So, what we're going to do now is to insert a Compute Terrain which will do some magical calculations on our terrain and place our displacement where we want it.

Ok, go down to the node network window (bottom right on default layout). Click on the Terrain button on the left of the node network window to bring the Terrain Group into focus. Click in the Terrain Group and select:

Create Shader > Other Shader > Compute Terrain.

Double click the Compute Terrain node to open it. Increase the Gradient Patch Size to 200, that's big enough to cater for the Lateral Normalised displacement of 150 that will be acting on this Compute Terrain. Now (still in the node netwok window) connect the output node of our Tower (crater) shader to the input node of this new Compute Terrain, and connect the Compute Terrain output node to the Tower Displacement shader input node. That's better. Now we have our displacement back and it's on the tower where we want it. I've inserted another Power Fractal shader for smaller Lateral Normalised displacement, named it Smaller Tower Displacement, and inserted it between the Tower Displacement shader and the new Compute Terrain node. Check my tgd to see the settings I've used for this smaller displacement. Here's what I've got now.

Weird, huh? You can see some unwanted effects of the Lateral Normalised displacement on the desert floor, but we'll sort that later. OK, I now want to add a Strata and Outcrops shader to chop those big bumps up a bit. So right click in the Terrain Group (we're still working in the node window) and select:

Create Shader > Displacement Shader > Strata & Outcrops shader.

OK, before we connect it to the other displacement nodes let's open it up (double click it) and enter values in some of the parameters. Set the Hard Layer Altitude to about 2000, and the Hard Layer Depth to about a quarter of that. I set my Hard Layer Spacing to 600. I set the Hard Layer Steepness to 0.5, and the Plateau Build up to 0. Now connect the S&O shader between the Smaller Tower Displacement shader and the default Compute Terrain node at the bottom of the Terrain Group. You should now be able to see how that's cut in to your previous displacement and made it more blocky. Play about with all the parameters of the S&O shader and see what works best for you. Check my tgd to see all the settings I've used.

Here's a useful link to a description of the S&O shader and all its parameters:

http://www.planetside.co.uk/wiki/index.php/Strata_and_Outcrops_Shader

Constraining the Displacements

OK, let's now constrain these Lateral displacements and the effects of the S&O shader to the tower. Staying in the node network window, right click in the Terrain Group and select:

Create shader > Colour shader > Distribution shader v4.

Double click the Distribution shader to open it. Click the Altitude Constraints tab and check the

Limit minimum altitude and enter a value of 0 with a fuzzy zone of 200. That should safely clear the desert floor of any Lateral displacement. I've also checked the Limit minimum altitude and entered a value of 3000, again with a fuzzy zone of 200. I did this to smooth the top of the tower. Check the Use Y for altitude, and Final position for the Altitude Key. Now hook the Distribution shader's output node to the Blending shader nodes of both the Tower Displacement shaders, and to the Blending shader node of the S&O shader. Go to each of these shaders and check its Blend by shader checkbox, otherwise they won't see the Distribution shader.
Here's what my tower looks like now.

Applying Surface Texture

In the Shader Group click on the Base Colours shader and choose your high and low rock colours via the colour slector box. You may wish to increase the colour contrast from the default 0.125. I've got mine at 0.75, and I've got a colour offset of 0.25 which biases towards the lower/darker colour.
Now add a Surface Layer:

click Add Layer > Surface Layer.

Name it Desert sand. On the Colour tab click the green cross to the right of the Colour function input and select:

Create new shader > Colour shader > Power fractal shader.

Click on the green cross again and select Go to “Power fractal shader”. On the Power fractal shader's Colour tab select your sand colours.
Click the Desert sand shader's Displacement tab and insert a Displacement function:

Create new shader > Displacement shader > Power fractal shader.

Go to that displacement Power fractal shader. The only settings I've changed from the default are the scale with a Lead in of 10. Back on the Displacement tab of the Desert sand shader I've changed the Displacement multiplier to 0.5. This is just to give the sand a wee bit of bump.
Click on the Altitude constraints tab and check Limit maximum altitude and enter a Max altitude value of 500 with a fuzzy zone of 400. Check the Use Y for altitude checkbox. Click on the Slope constraints tab and check Limit maximum slope and enter a Max slope value of 45 with a fuzzy zone value of 30. Check the Use Y for slope checkbox and select Final normal for Slope Key.
Now add another Surface Layer. Give it the name “Reflection holder”. This Surface layer will only be used to carry a Reflective shader. So on its Colour tab **uncheck** Apply Colour. Check its Limit minimum altitude box and enter a value of 200 with a fuzzy zone of 200, and check Use Y for altitude. Now go over to the Node Network window, and in the Shaders Group right click and select:

Create shader > Other Surface shader > Reflective shader.

Double click the Reflective shader and enter a value for the Reflectivity (I've used 0.35), and if you wish you can tint the reflection via the colour selector. I also unchecked Ray traced reflections (if you don't you're in for a much longer render time). OK, now hook the Reflective shader's output node to the Child layer node of the Reflection holder shader.
And here's the result of what we've done so far:

If you now want more than the one tower in your scene, all you have to do is to add more inverted Crater shaders and enter their X and Z coordinates. All the lateral displacement applied to our original tower will be applied to them as well. And each tower will be unique as the displacement applied is procedural on the planet and will be unique to whatever coordinates you enter. I fished about with the coordinates until I found a position that gave me an interesting looking second tower. Name your second tower “Tower2” and ensure it is inserted into your node network before the first Compute Terrain that you created earlier so that it picks up the lateral displacements.

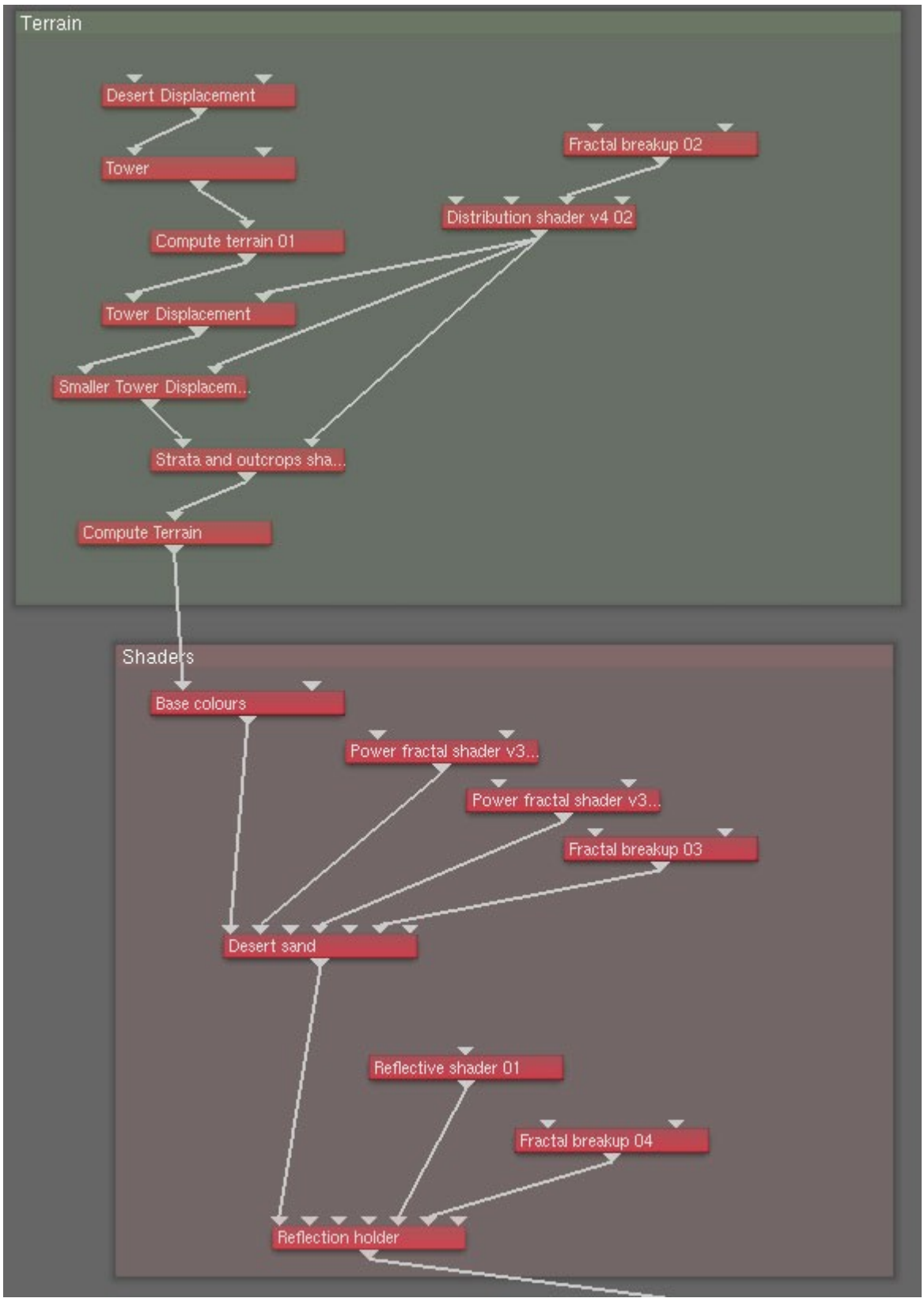
Inserting a Clip File

This tutorial is principally about applying displacements to inverted craters (towers). Some of you, though, might never have inserted a clip file into a scene, and or, might not be too sure as to how go about doing this. So we'll complete this scene by adding a cloud layer by way of inserting a clip file. I've included a clip file called “broken altocumulus” with this tutorial which you should copy into your Terragen project directory. We'll connect this clip file in the node network window. But first go up to the File menu and select Insert Clip File. An Open window will appear where you can navigate to, locate, and open your file. Now go back to the node network window which you may find has zoomed out so that all groups are visible. The nodes that have just been inserted will be highlighted. Locate them using Alt-LMB for panning, and Alt-Scroll wheel for zooming in the node network window. I found mine in the Water Group; go figure! Dry them off and drag them into the Atmosphere Group. Connect the Atmoshphere output node to the input node of the Altocumulus layer you've just imported, and connect its output node to the Atmosphere Shader input on the Planet shader (Planet 01). The previous link between Atmosphere and Planet will now disappear. That's it. Job done. You might have noticed that I've got a Power fractal shader connected to the Blending node of the cloud Density fractal. That's there as a mask to break up the cloud coverage; check out its settings.

I've included the tgd of this tutorial so that you can check the node network layout, and the settings of all my shaders, but I would encourage you to build the scene yourself, using your own settings, as you work your way through the tutorial and only refer to the tgd when you're uncertain about something in your build up.

I hope this tutorial has helped you to better understand and appreciate the functionality of Terragen.

Below is my final scene:


Terrain
Desert Displacement
Tower
Compute terrain 01
Tower Displacement
Smaller Tower Displacem...
Strata and outcrops sha...
Compute Terrain
Fractal breakup 02
Distribution shader v4 02
Shaders
Base colours
Power fractal shader v3...
Power fractal shader v3...
Fractal breakup 03
Desert sand
Reflective shader 01
Fractal breakup 04
Reflection holder