

How-To

Converting DEM Files to Trainz Maps

By Bill Slack



When you want to create a *Trainz* model based on actual terrain, you may need to use DEM (Digital Elevation Modeling). My approach is certainly not the only way to do it, but I like the method I learned, and I can do it fast.

In the beginning, you have to have an idea of just what terrain you want to duplicate. There are a couple of sources of DEM for the area in which we are modeling the Darjeeling Himalayan Railway - NASA, GIS Data Depot, and MapMart. All three sites allow free downloads, some with restrictions. Of all of them, I find that Mapmart is the easiest to specify what you want.

The GIS Data Depot breaks things down into counties of a state, but if you don't know the county, then you're reduced to moving around the map until you find the right spot.

Mapmart, on the other hand, allows picking Topo maps from the USGS in 7.5 minute hunks, with a name for each map. The NASA site provides worldwide DEM data, but you have to know the latitude and longitude of the area in question. If you don't have those coordinates, then a quick trip to an atlas will get you in the general area. For MapMart, the web site address is:

<http://www.mapmart.com>

Once I have the particular area I want downloaded, I can then open *MicroDEM*, which is a program provided free by the US Naval Academy at:

<http://www.usna.edu/Users/oceano/pguth/website/microdem.htm>

It is an extensive piece of software that allows you to manipulate DEM data in various ways.

Once opened, the DEM file will give you a multi-color view of the area. The various colors depict higher and lower terrain. As you move the mouse pointer across the map, along the bottom of the window you will see latitude and longitude called out, along with altitude. There are several options available to set the type of Lat/Lon (Decimal degrees/Degrees, Minutes, Seconds, etc.). You can additionally see altitudes listed in (Meters/feet).

You can also get a subset of the main map by using the top menu item "In/Out" and selecting "Subset". This allows you to drag a box over the area you want. Then, when selected, you can save the file as a new DEM, re-open the new subset selected DEM and continue from there.

Figure 1 shows the entire screen for *MicroDEM* with an elevation map loaded.

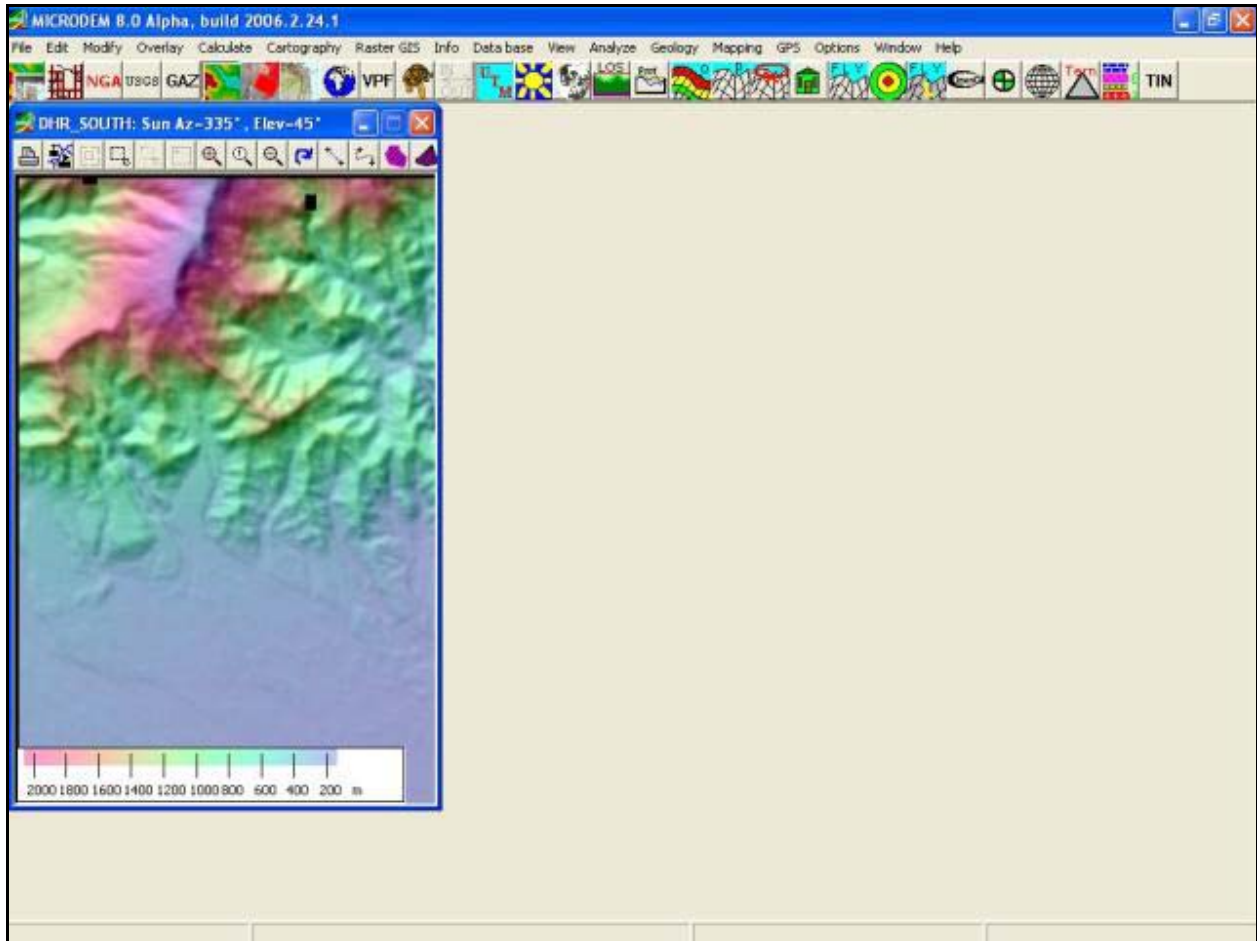


Figure 1.

On the upper Modify menu of *MicroDEM*, click **Modify -> Display Parameter -> Elevation**. This opens a dialog box (figure 2).

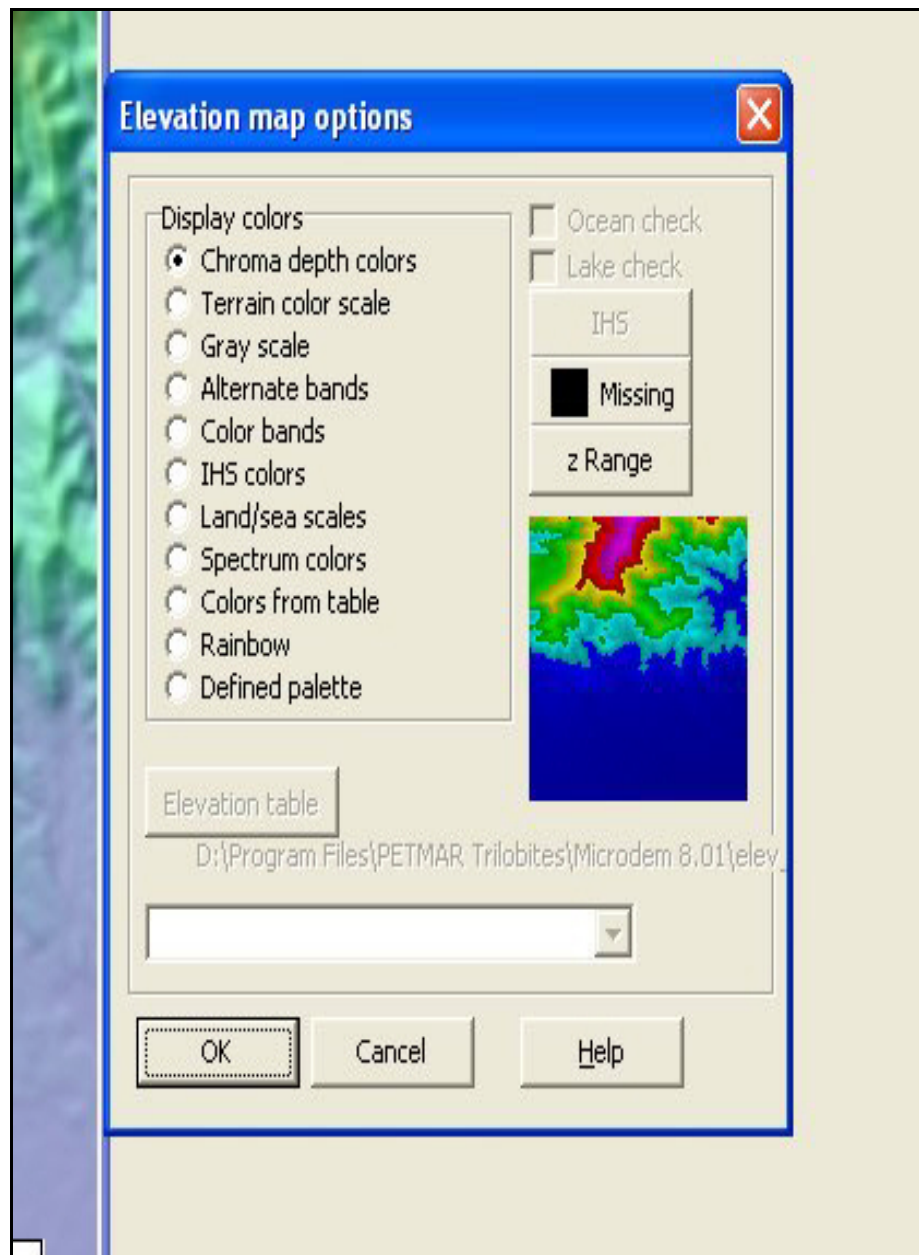


Figure 2.

Select **Display colors: Chroma depth**. This will change the display to that shown in figure 3.

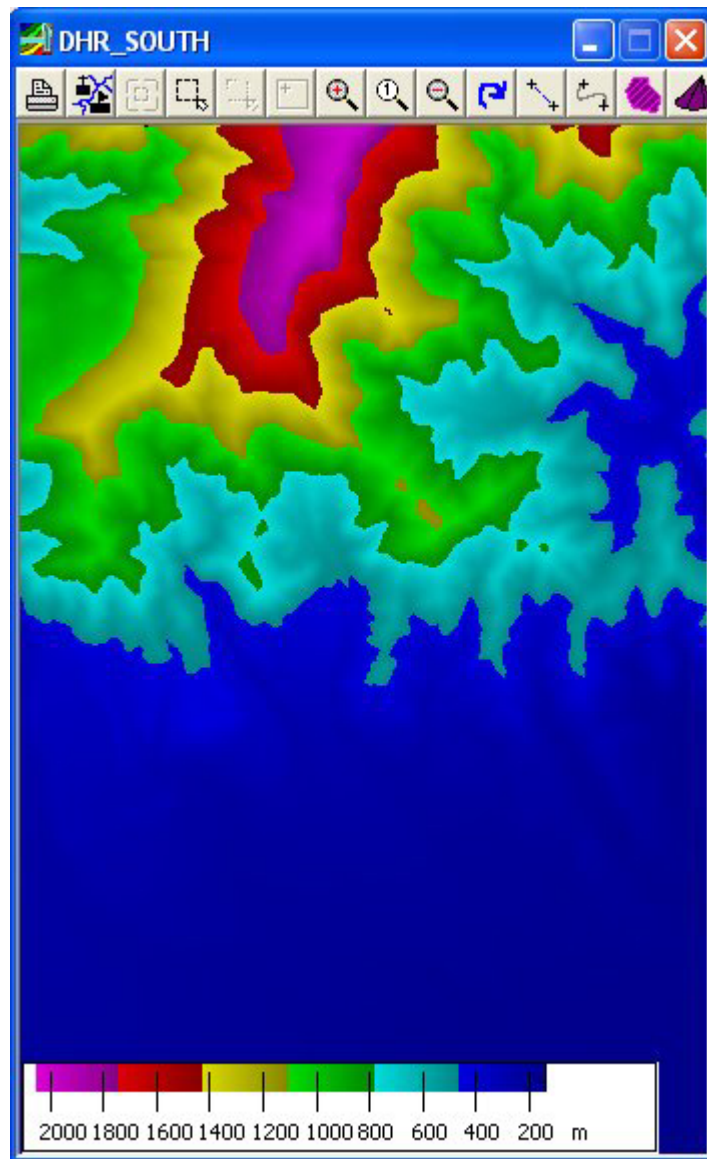


Figure 3.

Then select **Modify -> Grid**, and in the dialog box (figure 4) that displays, set **Grid = Neither**.

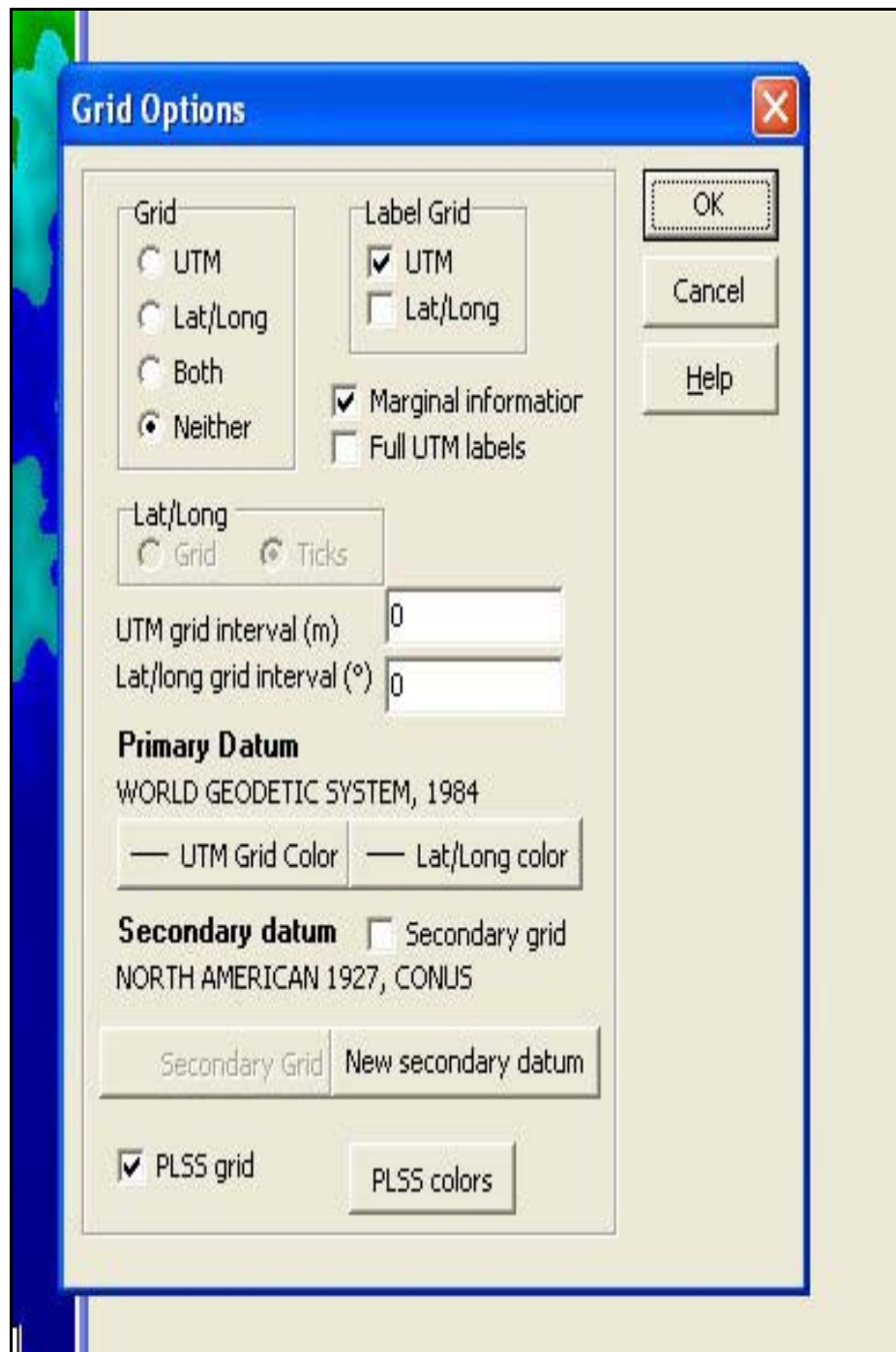


Figure 4.

Now, back on the main menu (figure 1), select **Info**. A dialog box will open figure 5).

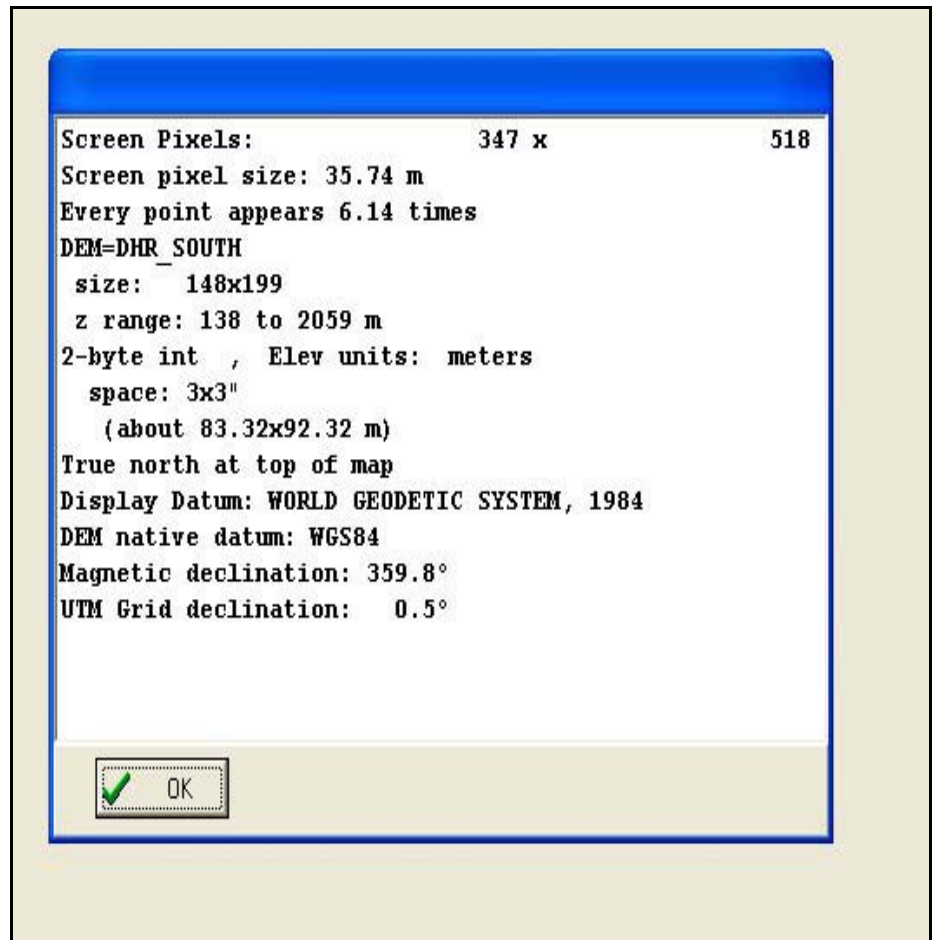


Figure 5.

Make a note of the **Screen pixel size:** (35.74M). What you want to do is to make this value 10m - the same size as each yellow square on a *Trainz* baseboard (aka trainboard). Also make a note of the **z range:** (138 to 2059 m). Close the dialog box and select the small magnifying glass with the red "+" in it - a small box will open up (figure 6).



Figure 6.

Enter the value obtained of Screen pixel size divided by 10. Thus 35.74 becomes entered as 3.574. You may get a warning that this produces a files size of <whatever> but it is usually safe to ignore this unless you are tight on memory/disk space. If this happens, and you don't want to create such a large map, then subset a smaller part of the original DEM. Once all the above is done, right-click on the image and then select **Copy to Clipboard**.

Start up your graphics program (I use the free version of *Adobe Photoshop* because it allows layers should you want them). Create a New image and then select **Edit -> Paste** to get the colored image into the newly created image (figure 7).

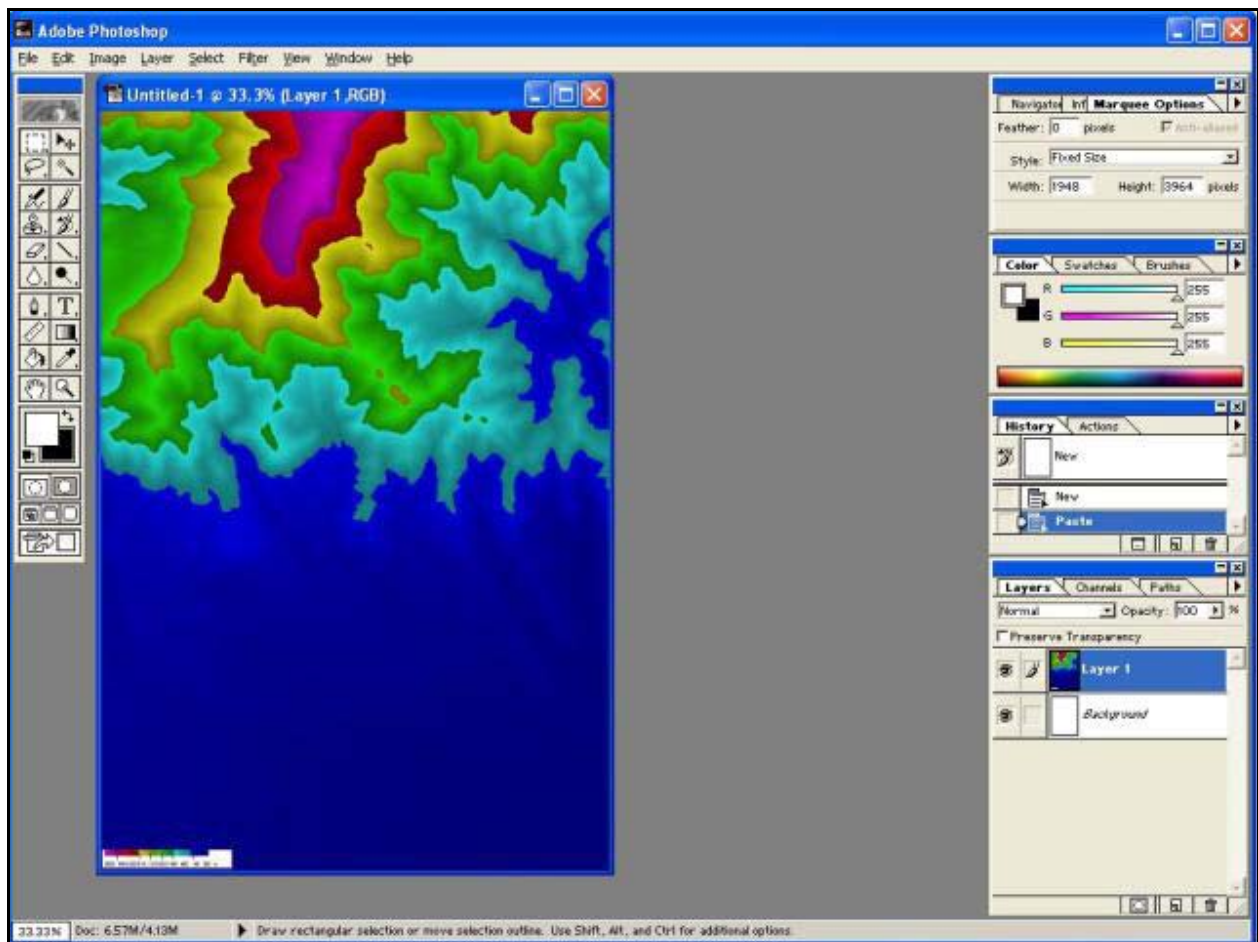


Figure 7.

Now comes the tricky part. You need to crop the image down to exactly what you will need for the new trainboard(s). To do this, you need to know that each trainboard is 72x72 pixels per board plus a two pixel border around the whole layout. So the math for a 12 x 14 board layout would be: $(12 * 72) + 4 * (14 * 72) + 4$.

This means you need a box that is 868x1012. On the right side of *Photoshop* you enter these two values as shown in figure 8.

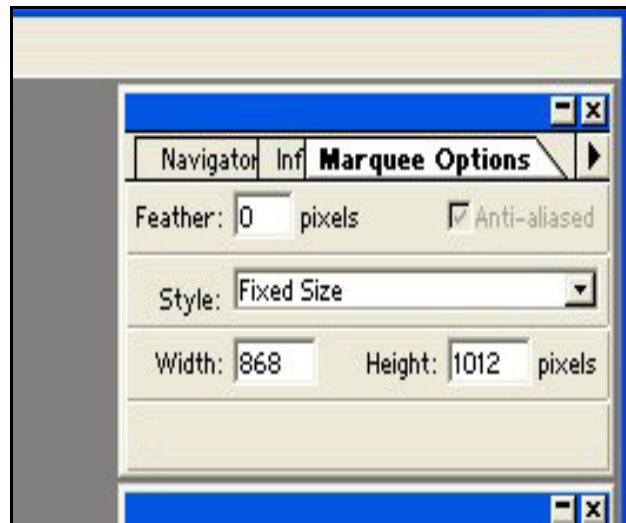


Figure 8.

Click the left vertical menu button with the dotted square and a box with those dimensions will appear on the image (figure 9). You are then able to move it around and position it just as you want.

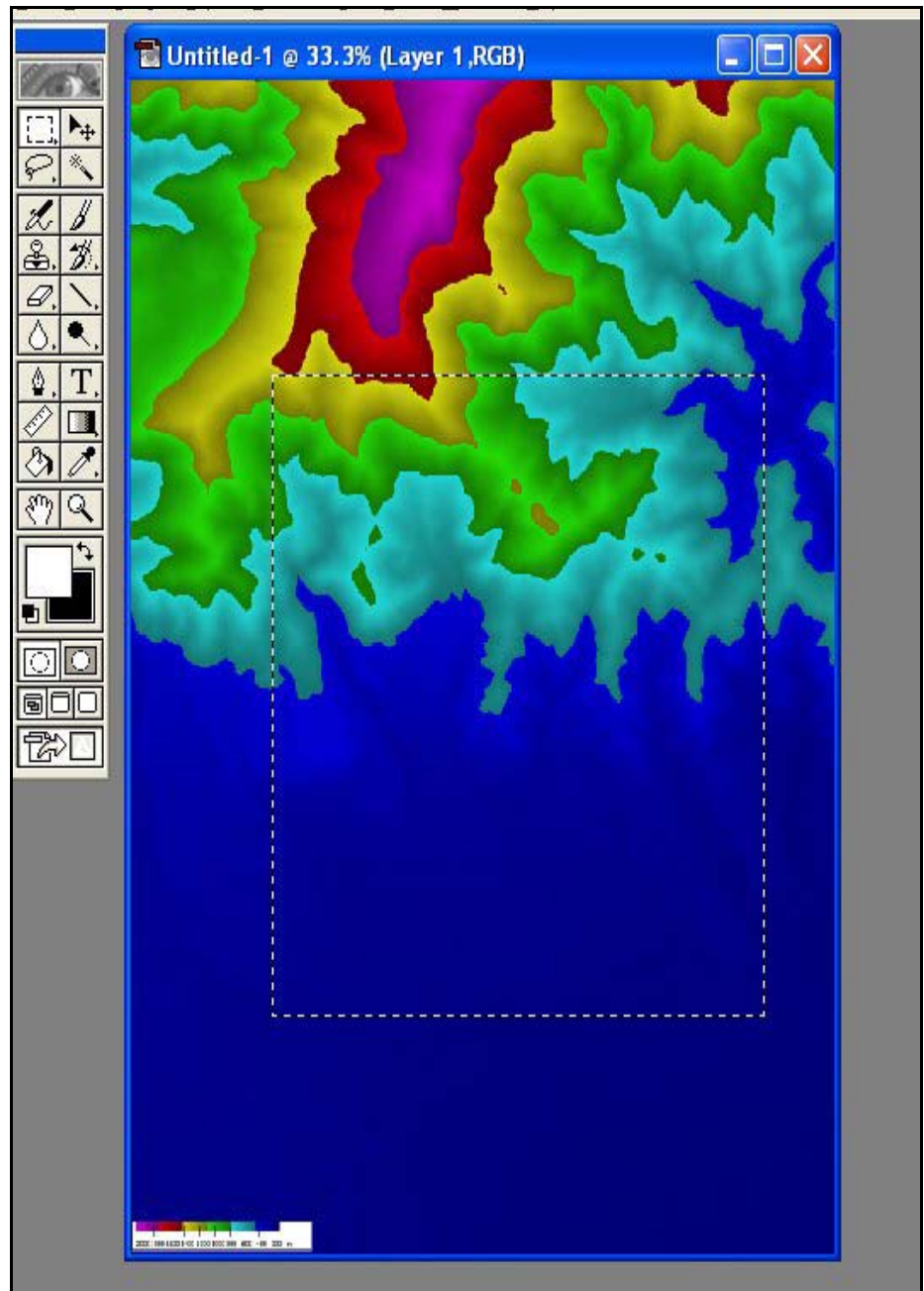


Figure 9.

When satisfied, use the **Edit -> Cut** and **File -> New** to create a new image, and **Edit -> Paste** the box you just cut into this new image. What you have then is the final output that HOG will use, but there are just a couple more steps to execute first.

Notice that over on the right you have a Layers box (figure 10), showing two layers.

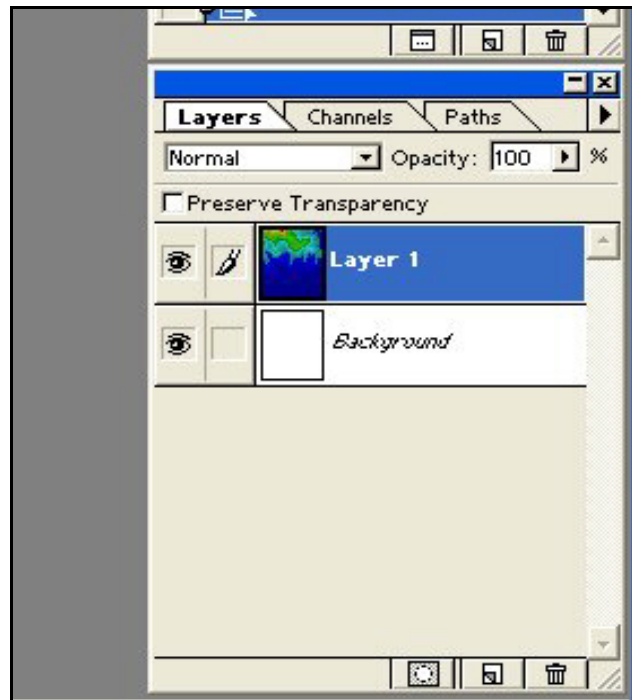


Figure 10.

You must reduce this to a single layer by selecting (from the top menu) **Layer -> Flatten Image**. Once done, select **File -> Save As...** and select **Targa (TGA)** and name the file and location you want. I usually save this file directly into the directory where I originally installed *HOG* - it's easier that way. A small pop-up window will appear asking for the TGA bit-size; select **24 bits/pixel** and click **OK** (figure 11).

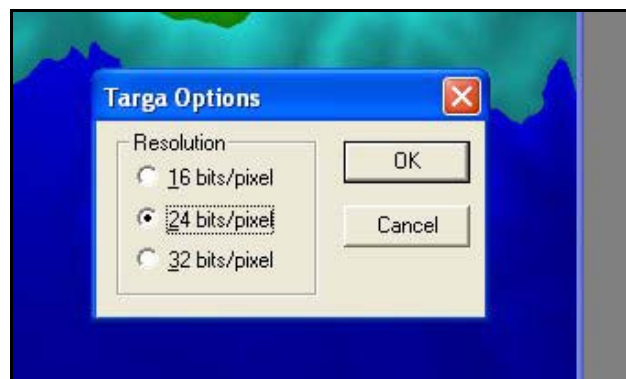


Figure 11.

Now, close everything and go to the directory where you installed *HOG*. Get *HOG* running and see the screen like figure 12.

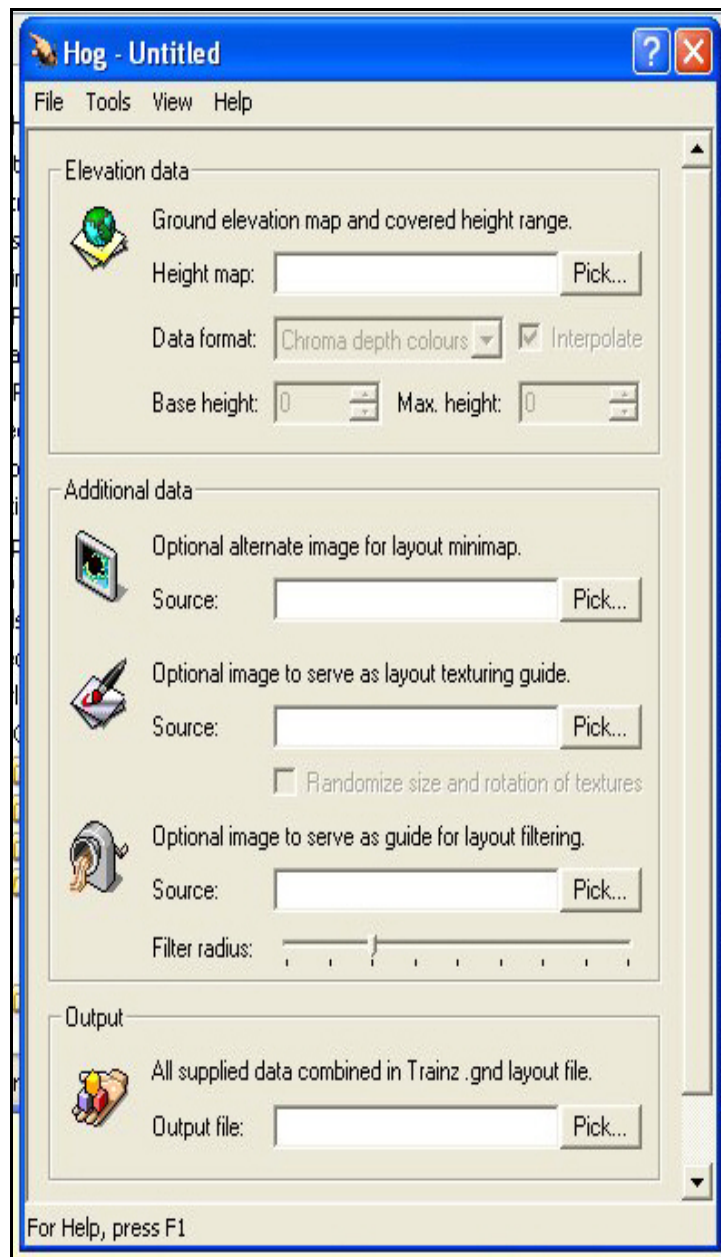


Figure 12.

Enter, or use the Pick... button, the name of the TGA file you just created. Also, enter the Lowest and Highest values you obtained from the Info menu in *MicroDEM* into the two boxes as shown in figure 13.

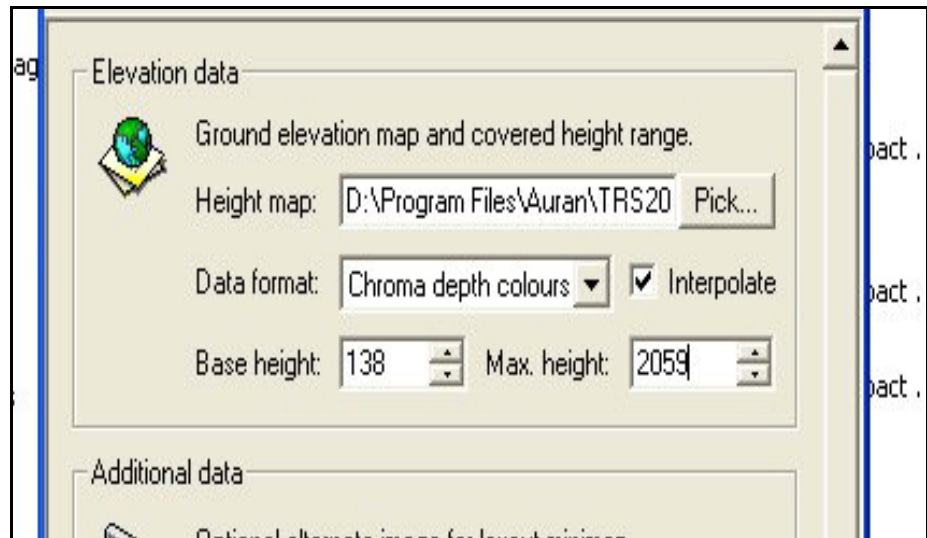
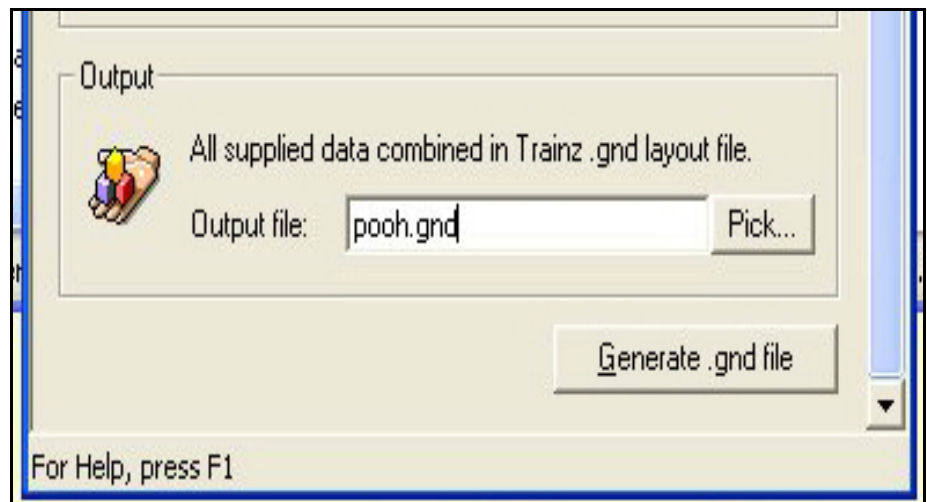


Figure 13.

Move down to the Output box (Fig 14) and put in a name for your new GND file -- remember to add the .GND because HOG will not add this automatically.



Installing into Trainz 2004

The rest is easy. Go into *Trainz* and create a new layout (any name you wish) and close *Trainz*. Copy and paste your newly created GND file into the folder where the Surveyor-created layout resides. Make sure that your new GND file has the same name as the one you are replacing. When you next start up *Trainz*, you will be able to go into Surveyor and see your new DEM layout as shown in figure 15.

Installing into Trainz 2006

Start *Trainz* and create a new layout and save it; exit *Trainz*. Start up Content Manager Plus (CMP) and find the new layout. Open it with **Edit -> In Explorer**. Once that window opens, go back to the directory with your newly created GND file and Copy/Paste it into the Explorer folder opened by CMP. Make sure the new GND name matches and overwrites the old GND file. Close the CMP-opened Explorer window and **Edit -> Commit** the new layout. When you open the new layout in Surveyor it will have DEM contours similar to those shown in figure 15.

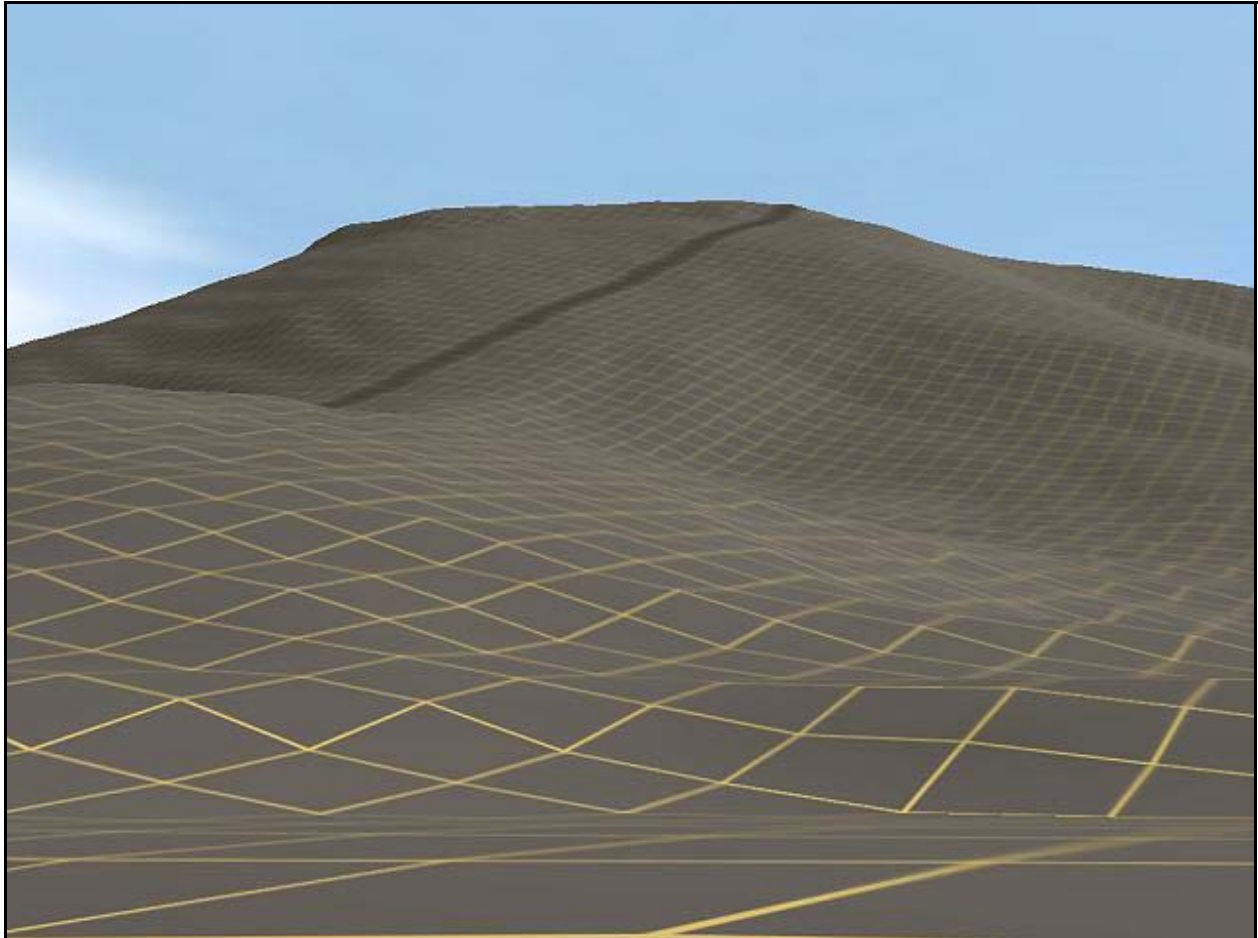


Figure 15.

I hope that this article will help you to enjoy creating true to life models for *Trainz*.

Bill

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