An Approach to Content Creation for Trainz

© Paul Hobbs

Part 2

Mapping Models with ChilliSkinner

(Updates and sample files available from http://www.44090digitalmodels.co.uk)
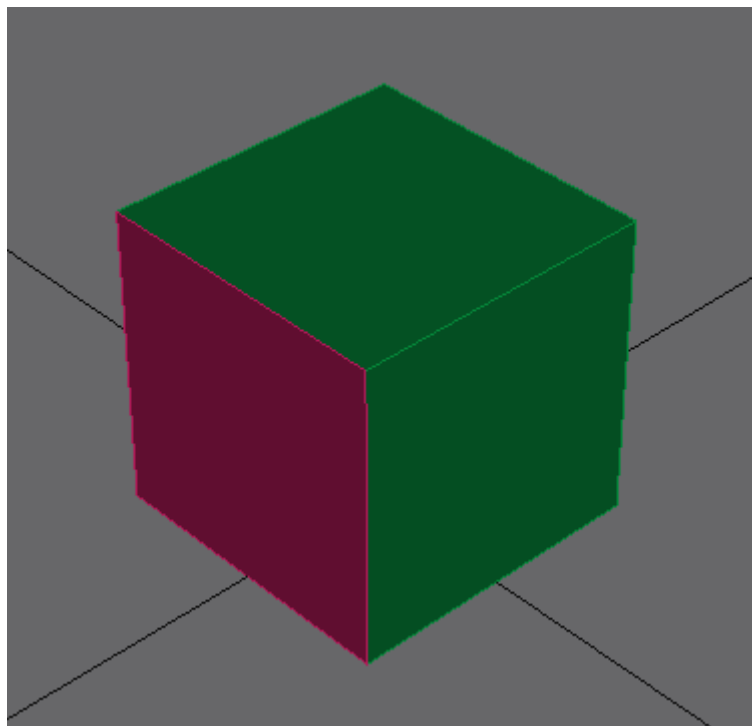
Mapping With Chilliskinner

One particular quirk of the way I skin models is the method of mapping the textures that I use. This relies on a combination of a script that was originally written for 3Dmax (the 'ChillerSkinner'), the GMax Tempest GamePack (which adds support for exporting *.md3 files) and an old piece of software called 'Lithunwrap' (available here) which is just used to save the mapping.

ChilliSkinner can be downloaded from this link, installation instructions are included.

The ChilliSkinner allows you to unfold parts of the model so that it lies on a 2D plane making the mapping much easier as you only need to apply a planar map. An important side effect though is that you can plan exactly how to make the best use of the available texture area by moving and/or scaling the parts around on the 2D plane. When you are satisfied with the arrangement you can save the mapping to create the skin and then refold the model back into 3D.

This sounds complicated but the ChilliSkinner helps to make it easy and a simple example should demonstrate this.

Create a cube and convert it to 'Editable mesh'. Then delete the bottom and rear polys. Detach the front polygon as shown below (the original cube polys are green, the
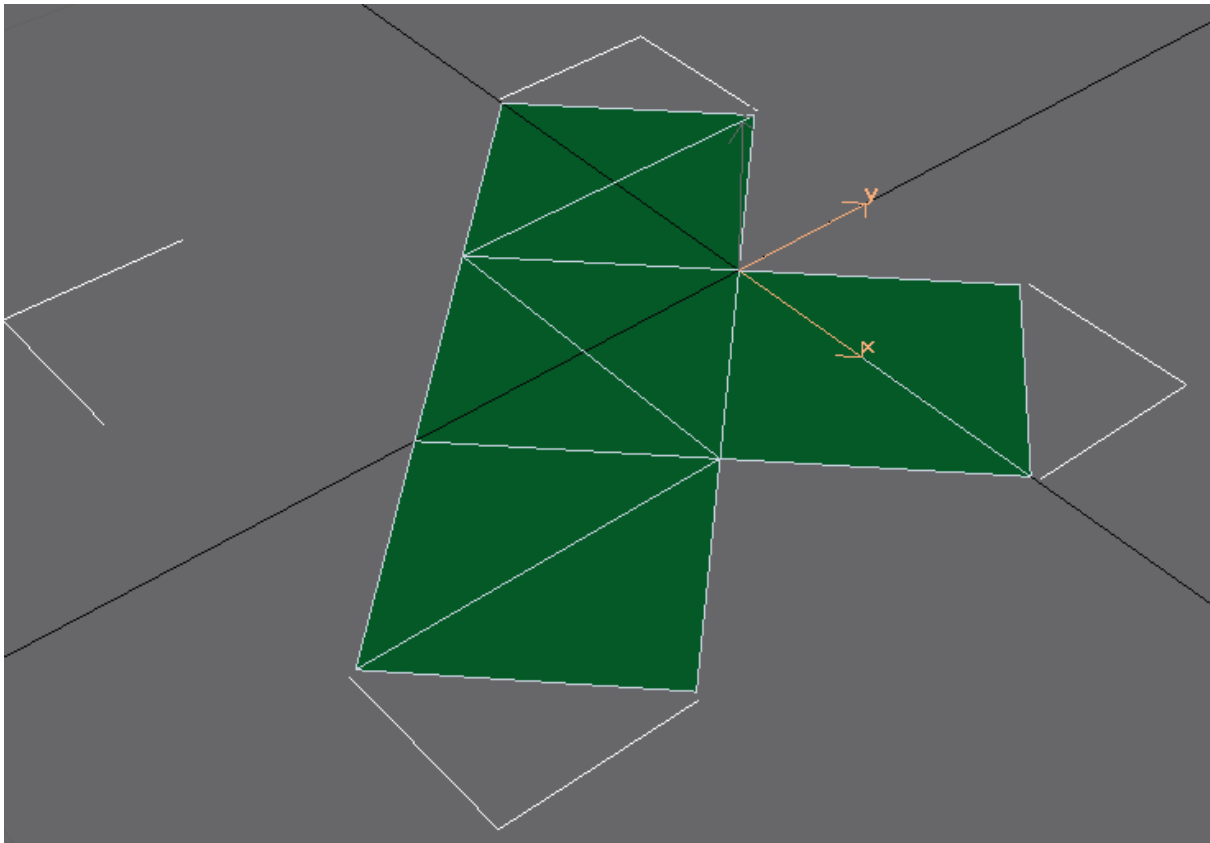
detached one red). Now attach the red poly to the green ones and weld the vertexes on the front top edge together.

The Chilliskinner treats edges that are welded together as fold lines, which is why it was necessary to detach a polygon, reattach it and then weld the top corners together. The bottom front corners are not now welded together which allows the script to unfold the shape as if it was made of cardboard with slits at the front vertical edges. Actually unfolding the shape should make this clearer.

The axis is centred on one of the top front vertex points in the following picture. As you can probably see, the trick is to split the model up in such a way that it can be correctly unfolded.
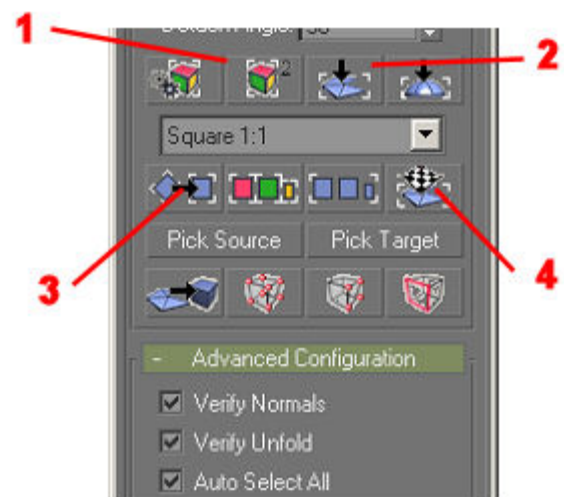

As always there is a little more to it than that, so let's go through this example step by step. Having prepared the model by ensuring that the correct vertices are welded together and that any that would prevent the folding from working are not welded, we need to select the model and make a copy of it for later. To do this click on the icon marked '1' in the ChilliSkinner window.
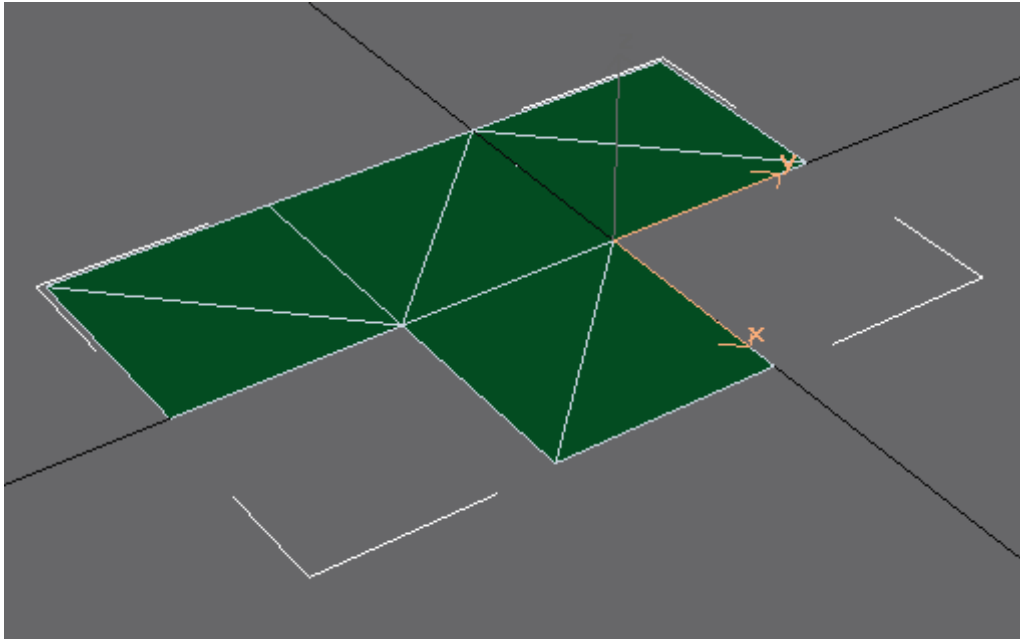
This copies the selected objects, adds 'Clone' to the front of the copied object name and hides the copied object (so actually nothing seems to happen when you click on the icon!)

Next click on the 'unfold polys' icon (marked '2') to create the unfolded pattern as shown above.

Then click on the 'optimise polys' icon (marked '3') to position the pattern ready for mapping.
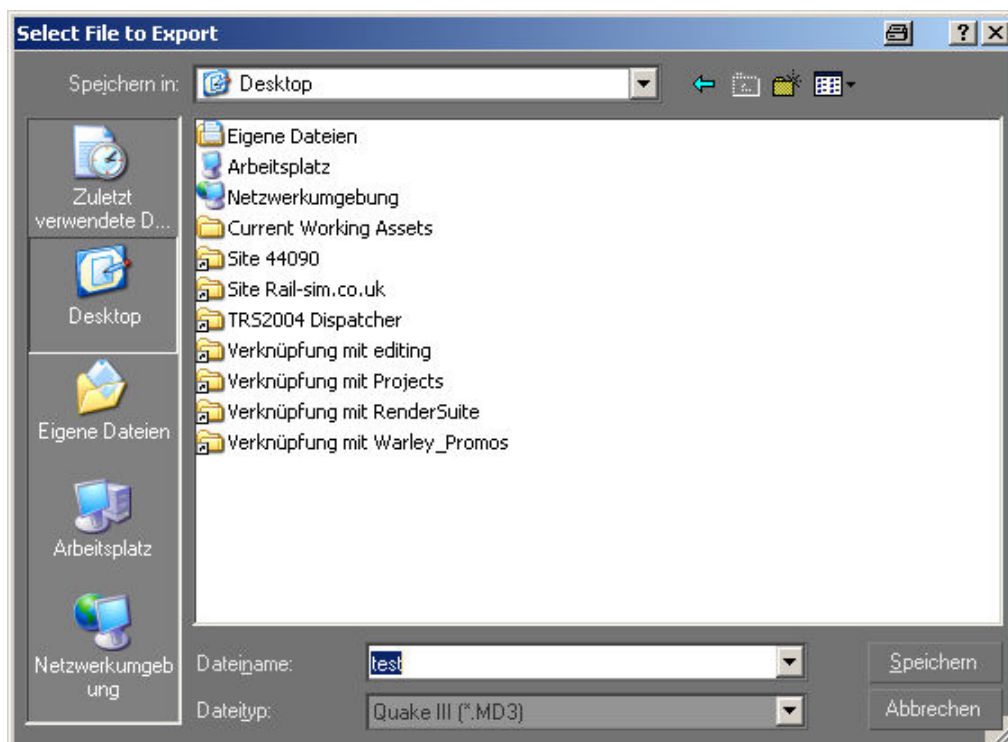
As we only have the one object folded flat there is no need in this case to arrange anything, an example of a complete loco body will be found later in this document.
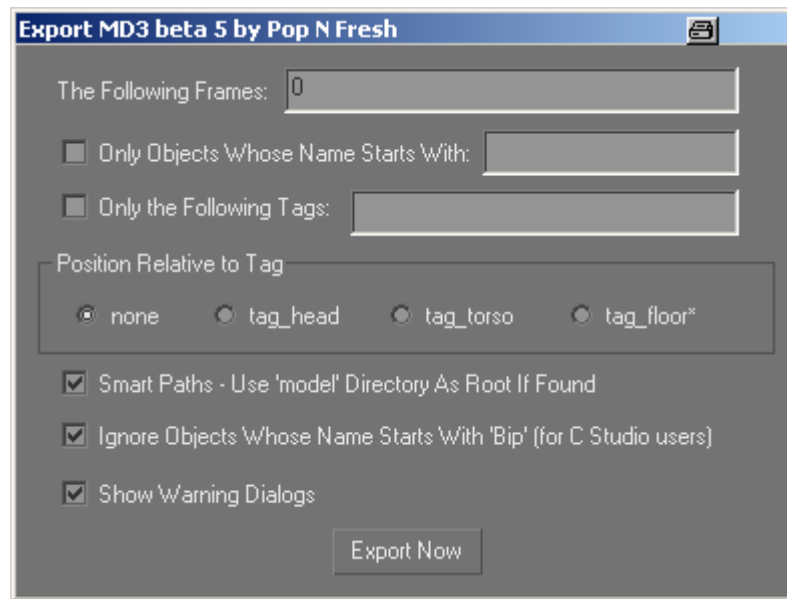

The mapping is actually applied with the 'apply planar mapping' icon (marked '4'). At this stage you should save the GMax file with a meaningful name in case you later want to add extra objects to the texture map – if you don't do this it will be necessary to go through the step of arranging everything on the 2D plane again and this is the most time consuming part of the operation.
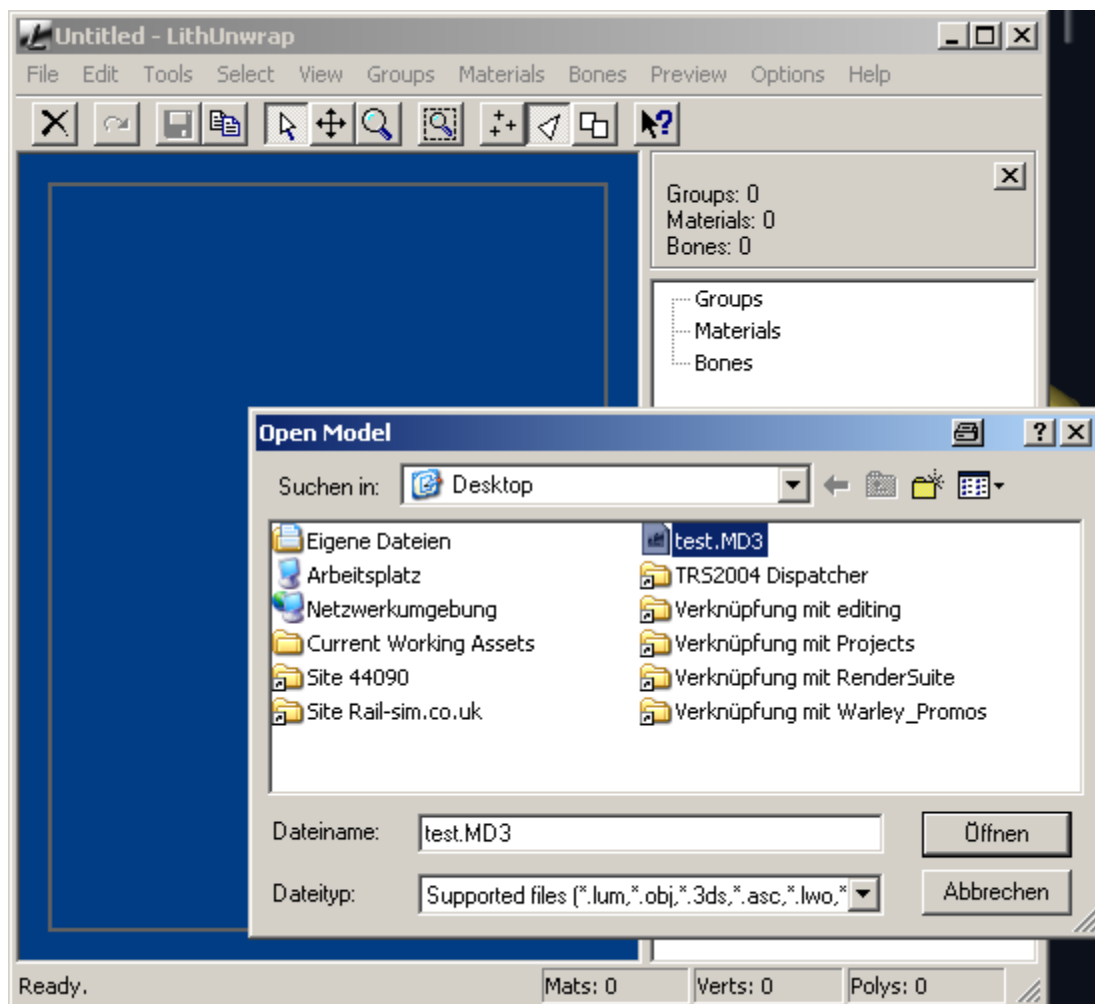
So, having applied the mapping we now need to save it as a *.md3 file so that Lithunwrap can load it to save the mapping. Assuming the Tempest GamePack has been installed (see Part 1), select the unfolded pattern and use File -> Export selected to save it as a *.md3 file – the name doesn't matter.
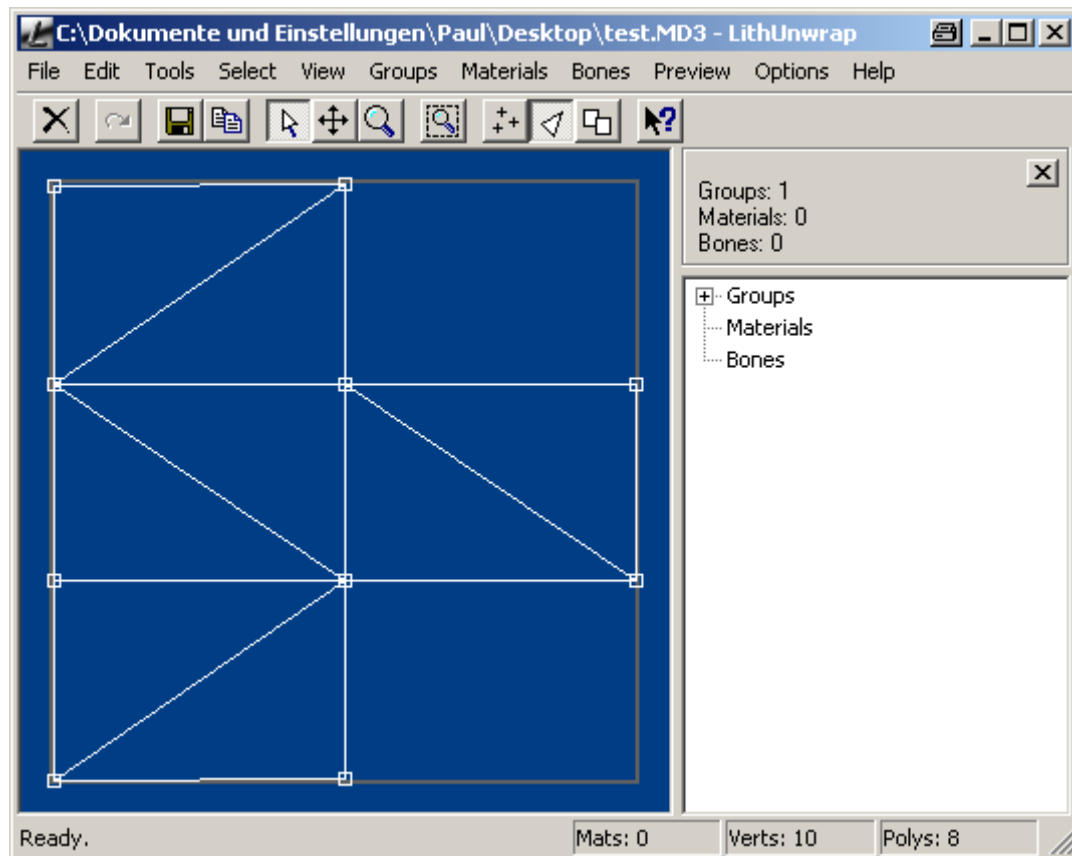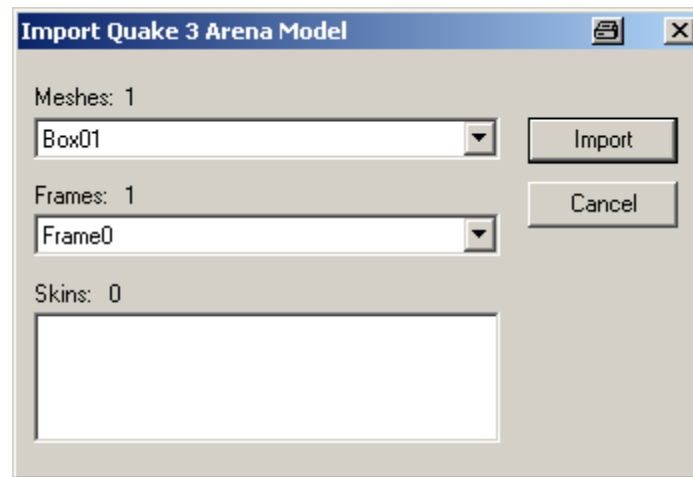
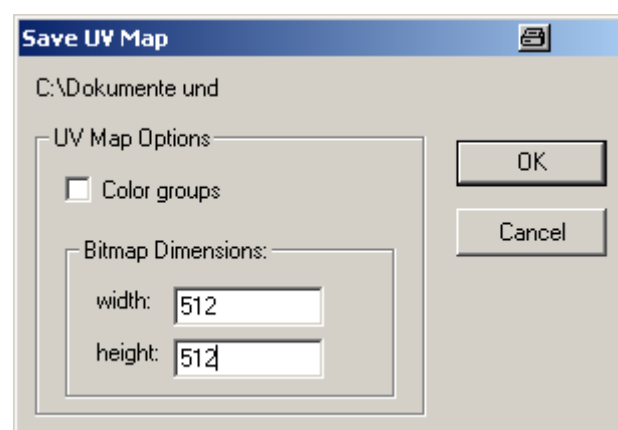The following dialog box then pops up, under 'The Following Frames' enter '0' as shown.

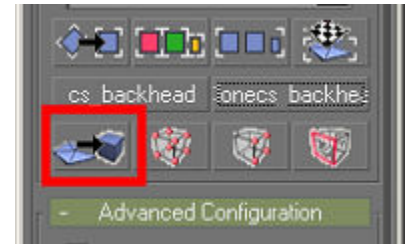Use Lithunwrap to open the *.md3 file with File -> Model -> Open

Choose File -> UV Map -> Save to create a *.tga of the mapping. Remember that Trainz will only work with texture files that are powers of 2 in pixel sizes, so choose a sensible size bearing in mind what you are trying to make.

Back to GMax now, unhide everything, select the unfolded pattern and then click on 'Pick Source' in the ChilliSkinner window, then select the 3D version of the model with the name starting with 'Clone' and click on 'Pick Target'. Finally the click on the morph icon (see right) to refold the model.
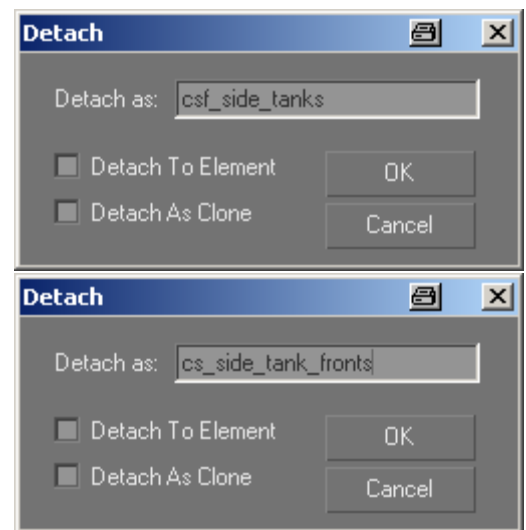
A material can now be created in GMax using the bitmap of the saved mapping and once it has been applied to the 3D model the result will be perfect alignment of the mapping coordinates.
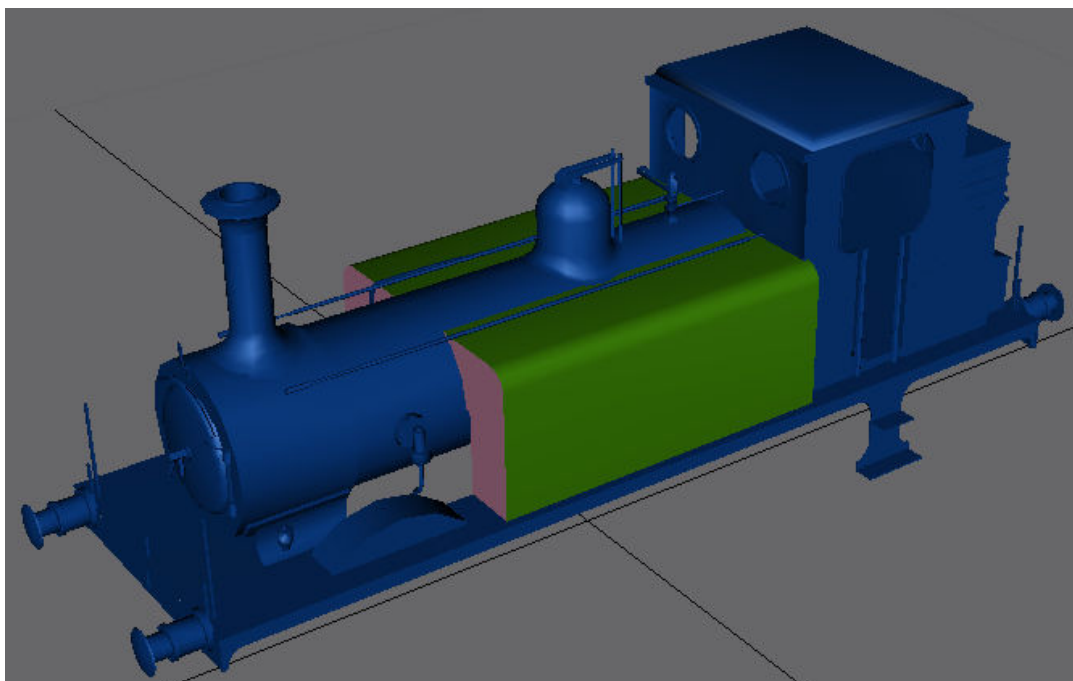
Before we end this whirlwind tour of the ChilliSkinner there is one more thing to mention and that is there is another option you can use on the objects, one that simply projects to whole shape onto the 2D plane. This is handy for things like smokebox doors which normally cannot be unfolded. We'll see this in action in the next bit where we map a whole loco body…

Now that we've been through the basics of ChilliSkinning let's go through a real example of loco body which can be downloaded here, in this case a short bunker Terrier that I've been finishing for the last few years. The body has been prepared by joining it together as one mesh called (unsurprisingly) 'body'.

The first stage is to detach the various parts of the mesh that we wish to map by selecting the polygons and with the right mouse button menu choosing 'Detach' Note the prefixes 'cs_' and csf_', this is so I'll know later which bits will be flattened ('cs_') and which will be folded (csf_'). I also colour the various parts differently to aid planning the ChilliSkinner operations, blue for bits I'm not going to fold or flatten, green for folded parts, yellow for parts that will be mirrored and pink for flattened ones.
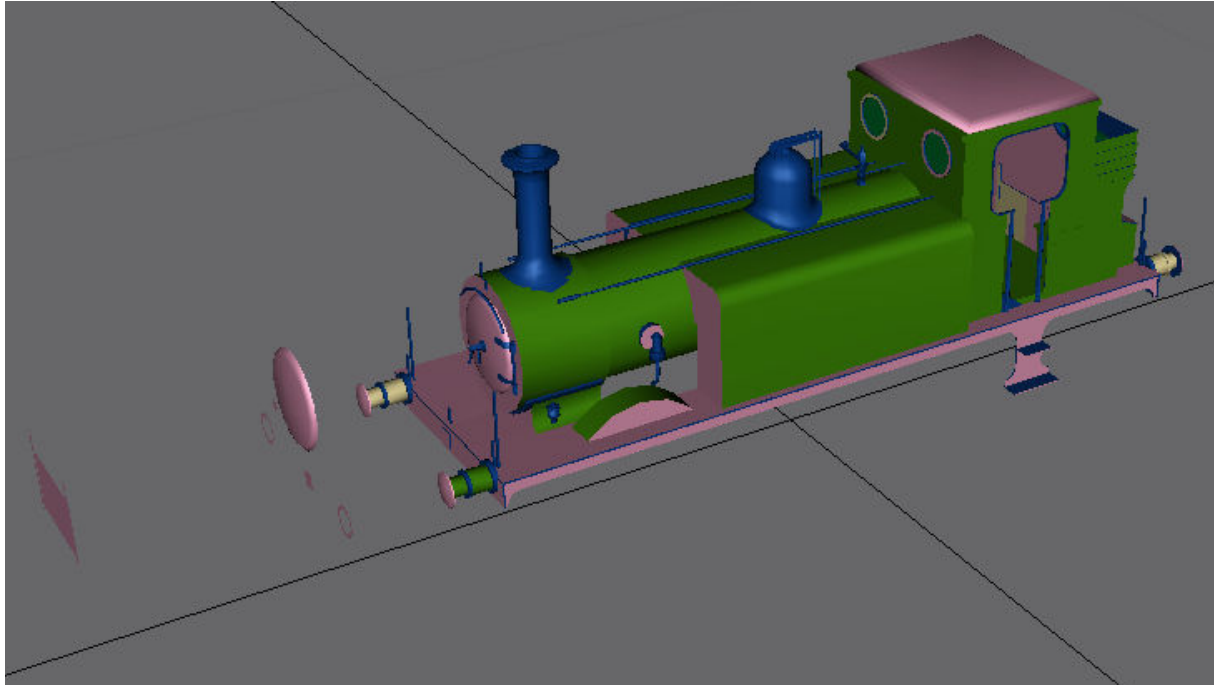
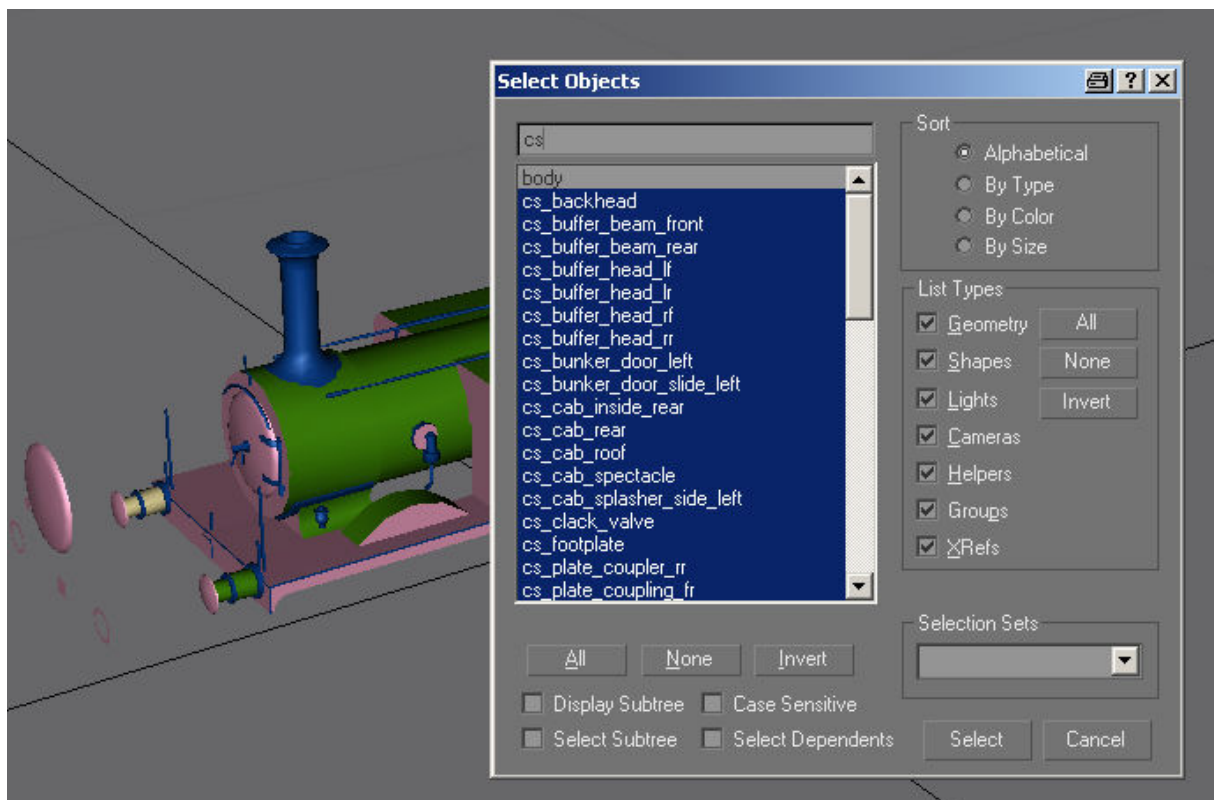At this stage the loco body looks like this:

As each part that will be folded is detached it's a good idea to test that the folding actually works as expected, this will save time later.

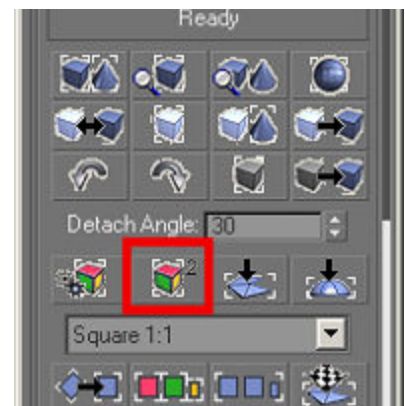Some time later the model appears as shown, nicely split up for ChilliSkinning:

Note the extra bits and pieces in front of the loco, these are copies of various elements that will be projected onto the 2D plane and having them makes creating the skin slightly easier. We'll see this in action later; these meshes will be deleted once the model has been refolded. The model in this state is available here.
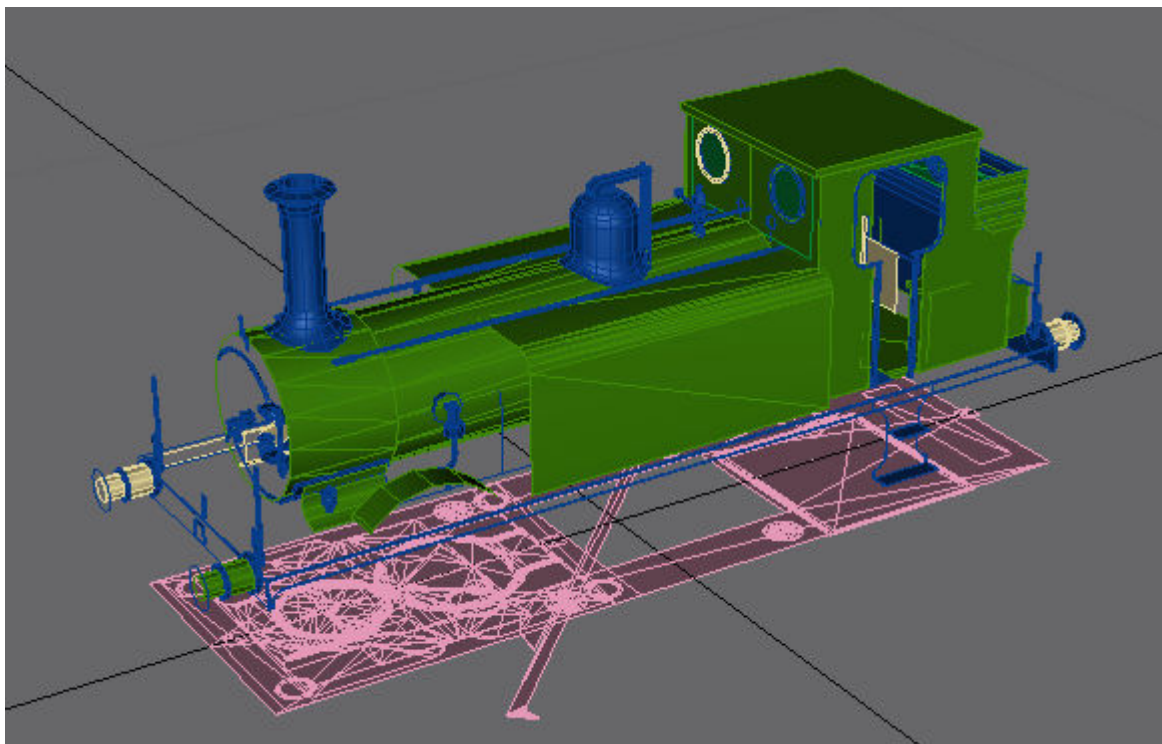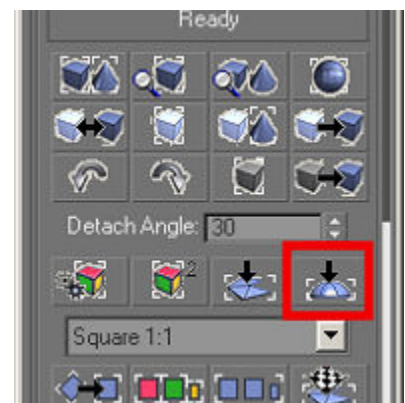
We are now ready to start the mapping of the model using the ChilliSkinner. **First select all of the parts that have names starting with 'cs' by pressing 'H' and putting 'cs' in the top selection field of the dialog box. Then open the ChilliSkinner window and choose the 'Clone' icon.**
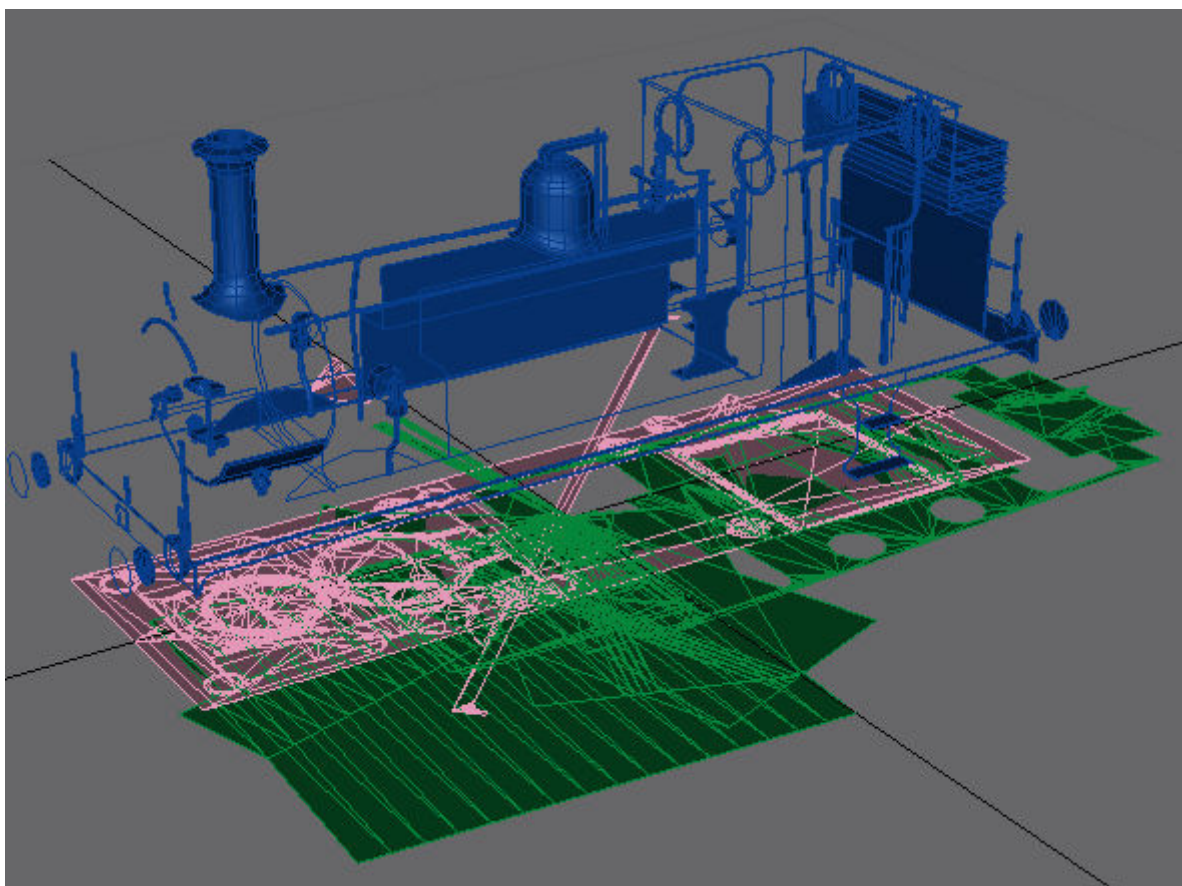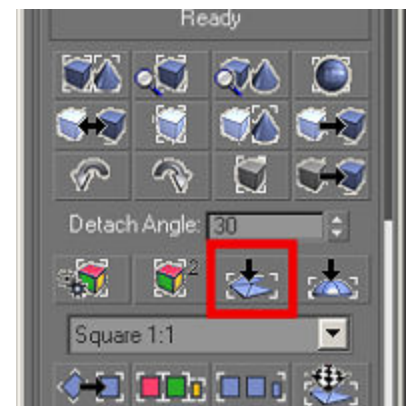
This will create hidden copies of everything that is selected, prefixed with the string 'Clone'.
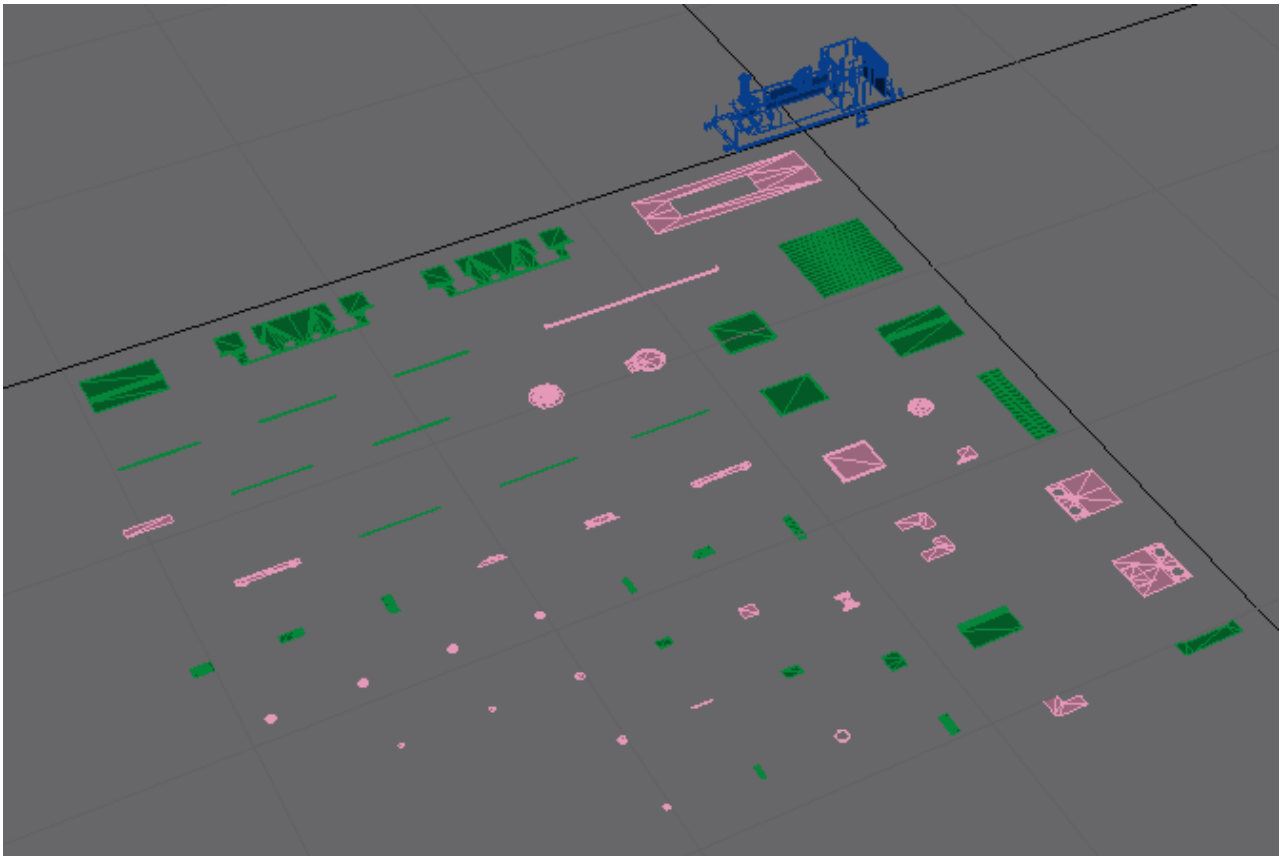
Now to create the flattened elements of the model. Select all the elements that have names beginning with 'cs_' and choose the 'Flatten poly(s)' icon. About half the loco will be squashed down onto a 2D plane – don't panic.
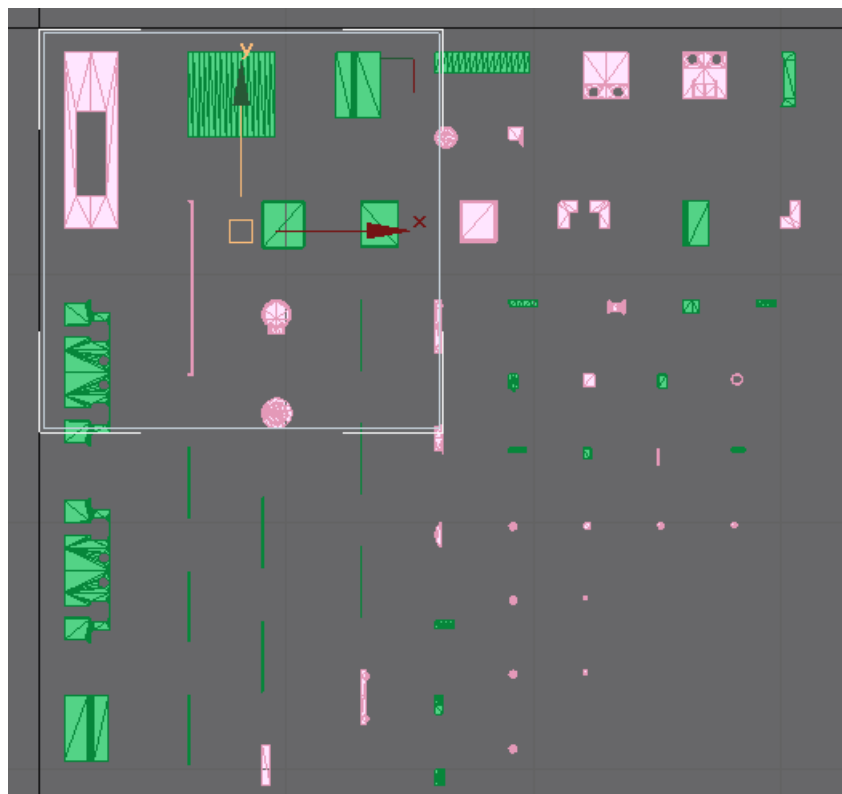
Now select all the elements with names beginning with 'csf_' and choose 'Unfold poly(s)'. Again don't panic! The unfolded polys are now green and the pink ones have been flattened onto the plane. **Now is a good time to save the GMax file with a meaningful name…**

Now for the clever bit, select all the elements with names beginning with 'cs' and choose the 'Optimise poly(s)' icon followed by the 'Arrange poly(s)' icon:
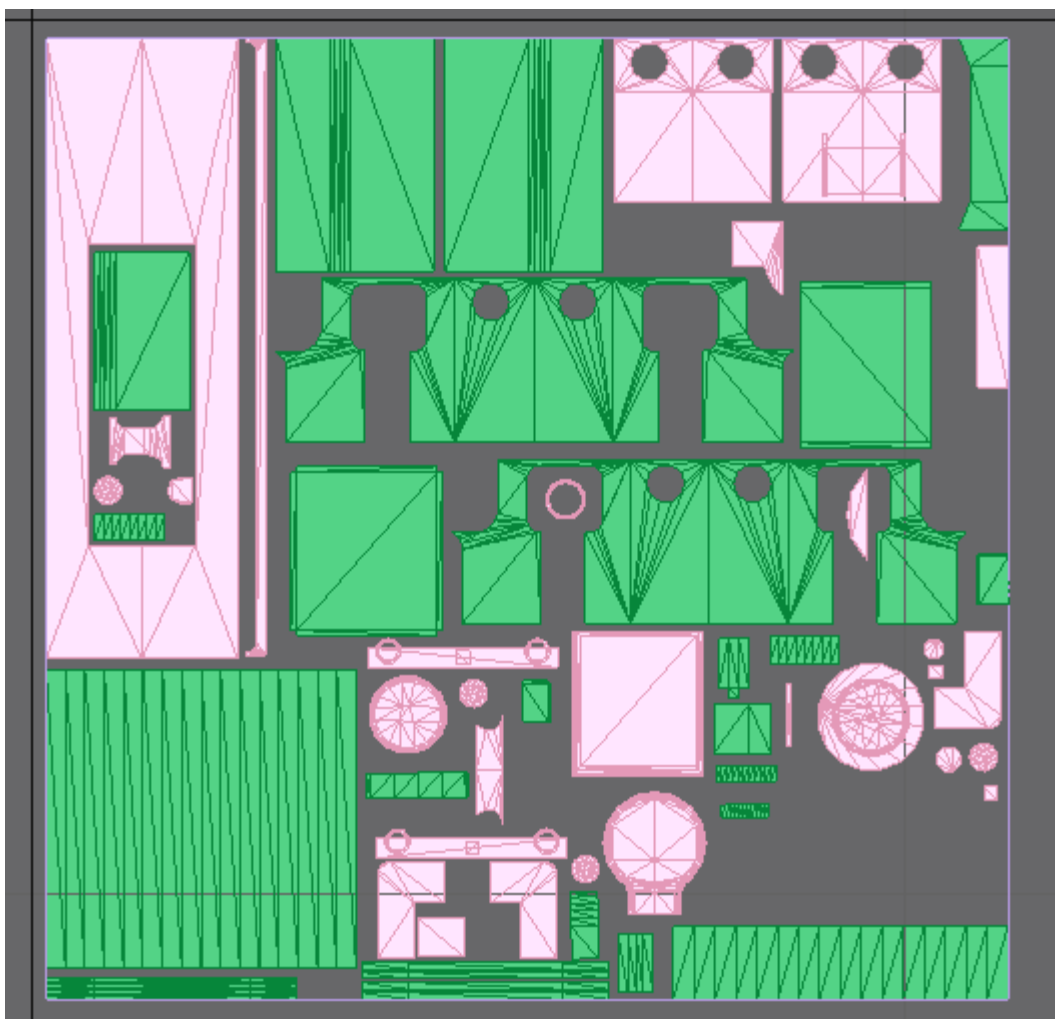
All of the elements have now been arranged (not very well admittedly) in a square formation. Hide the blue element ('body' in this case) and switch to the Top View by

pressing 'T'. Now sketch a wireframe square in this view. The trick is now to arrange the separate meshes to fit in the best way possible inside the square. If it seems that the square is too large or too small you can resize it, but make sure it stays square. Also it is important to place meshes in diagonally opposite corners touching the square to avoid distortion of the mapping. This is the most time consuming operation when ChilliSkinning, but doing it manually is even worse! The best part of using the ChilliSkinner is that you have total control over the mapping and can arrange things using the actual meshes as a guide.

Save the GMax file frequently while arranging the polys, you'll be doing a lot of work that you will only want to do once.
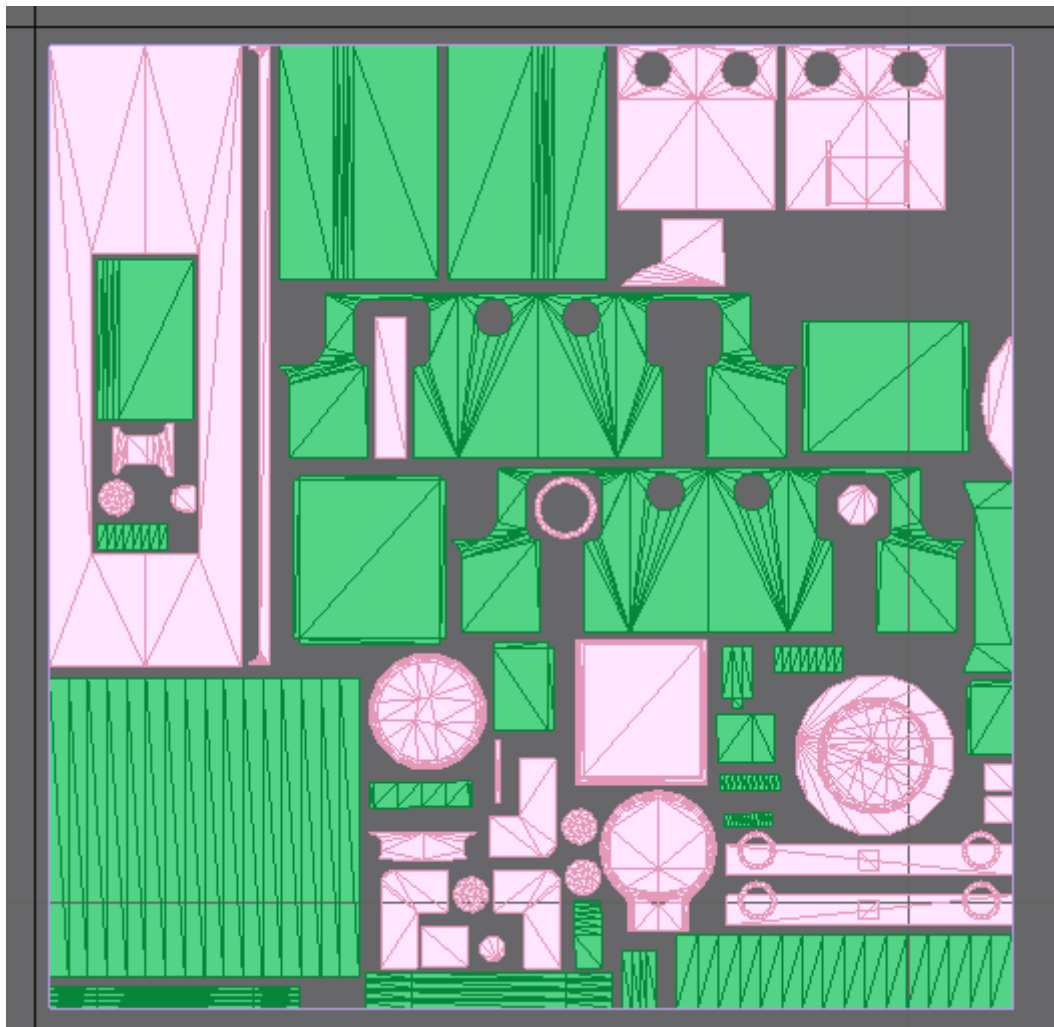
Here's the first try at arranging the polys, this took about half an hour:

Note that you have access to the usual GMax tools such as Move, Rotate, Scale and Align when arranging the polys. I haven't tried to use every single square millimetre of space (not that this would be possible anyway); the extra space can be used for extra bits and pieces for the skin. **Also note that I've left a little space between each element; this will make selecting in the skin easier later**.

The next step is to optimise the arrangement by rescaling certain elements to make better use of the space. The original names of the elements are unchanged so you can easily tell what each element is.

A couple of things I usually scale up 150% or 200% are the buffer beams and the smokebox front as they are very noticeable in the final skin.

Here I've scaled up the buffer beams, smokebox door and a few other parts to make better use of the space. **Where you know you are going to have lining or rivets it's better to keep the scale unchanged to ensure the lining will be the same width on all the parts and that the rivets will be about the same size**.

I've also left a few areas clear in case I've forgotten anything….

I think you'll agree this is an easy way of arranging the mapping of a loco body, or anything else for that matter.

Very important: Save the GMax file again at this stage with a meaningful name as extra polys can be added to this model later and incorporated into the mapping.

This might seem like a lot of work, but actually you can easily map a loco in an evening using this technique. You can make things a lot easier for yourself if the
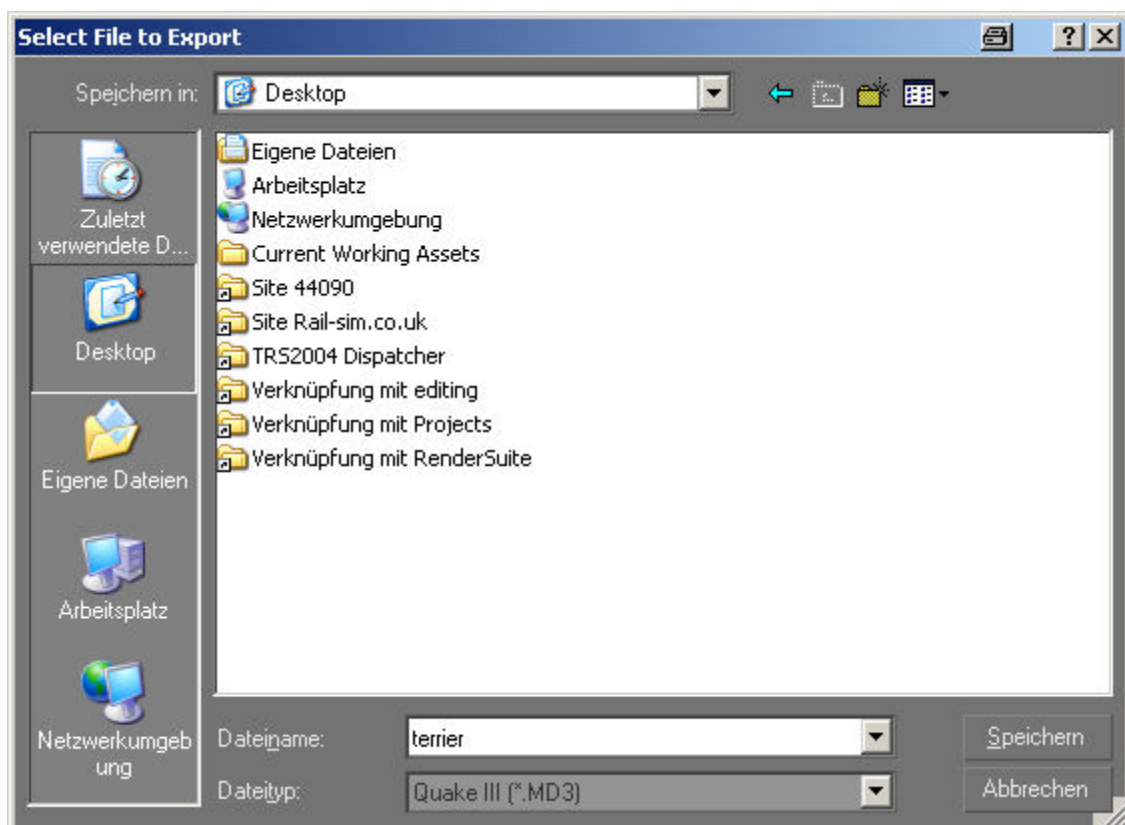
model is built with skinning in mind right from the start, but I don't usually manage to think that far ahead.

Ok, now to create the mapping and save it. Select all the elements with names starting with 'cs' and choose the 'Attach polys' icon. This attaches all the polys together into one mesh.
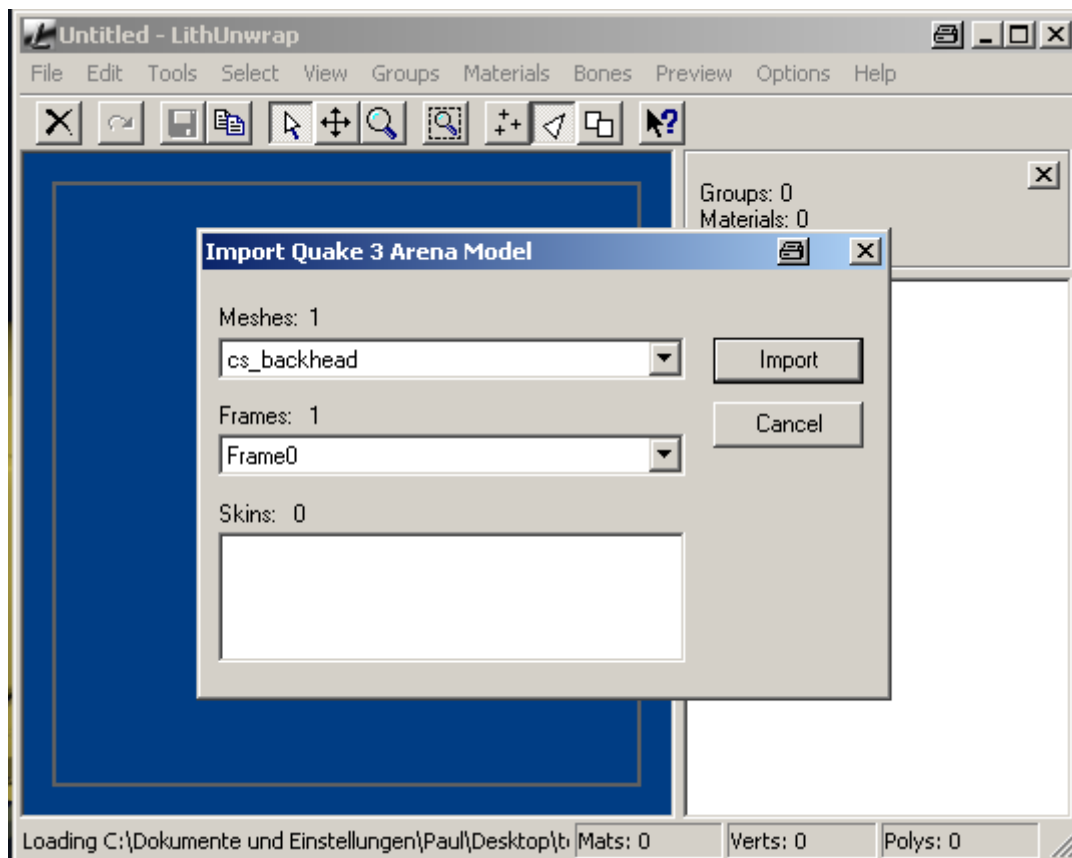

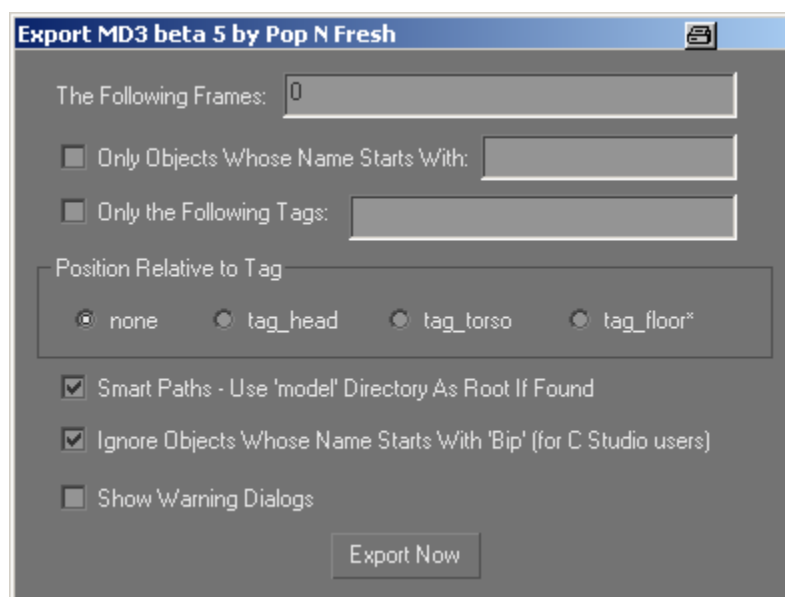Next choose 'Apply Planar Map' to create the mapping.

Now let's export the mapping into Lithunwrap so that we can save it. Select the flattened pattern and choose 'File-Export selected' from the GMax main menu bar

If you've installed the Tempest GamePack (see Part 1) you'll have the option to save as a Quake (MD3) file. I normally just save the file to the desktop, as I won't be keeping it after I've extracted the mapping.

Choosing 'Save' (or in my case 'Speichern' as my computer works in German…) results in the following dialog box opening:
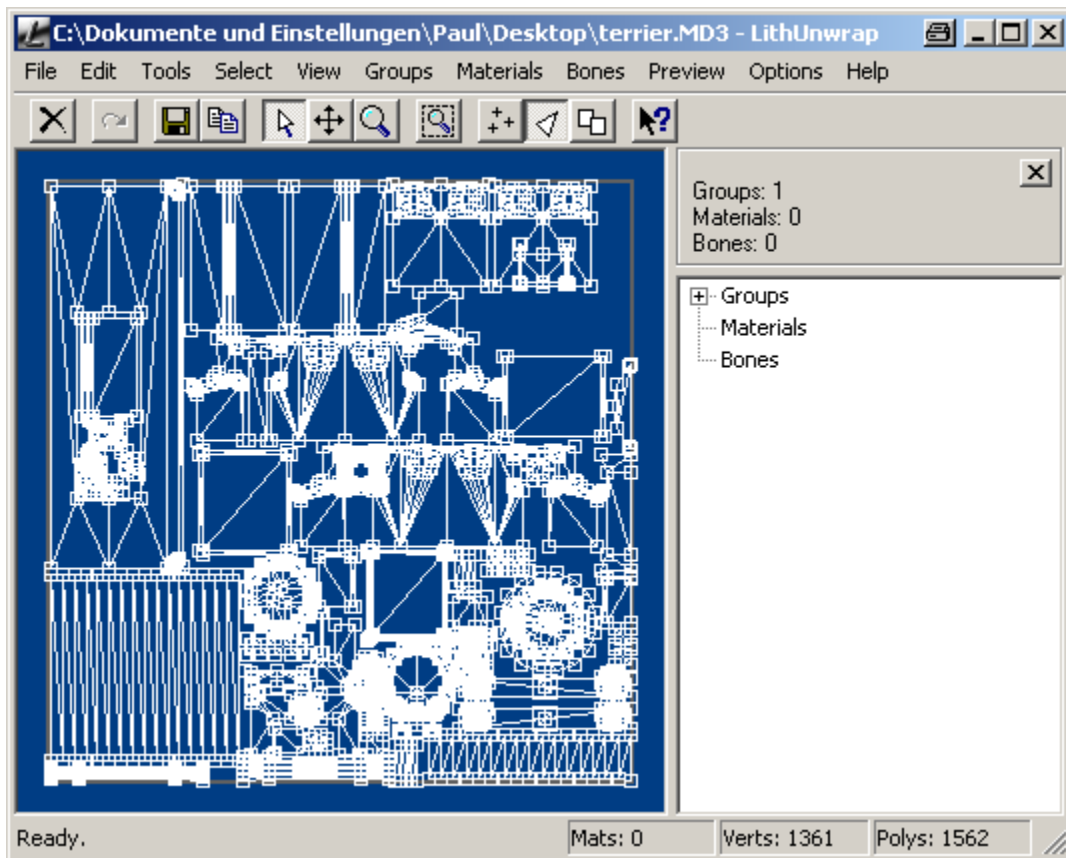

Enter 0 in the box 'The Following Frames' and uncheck the option 'Show Warning Dialogs'. Incidentally the little Printer icon in the title bar of my windows is put there by an excellent piece of Shareware called 'HardCopy' which takes screenshots and transfers them directly into Word or other applications, very useful.
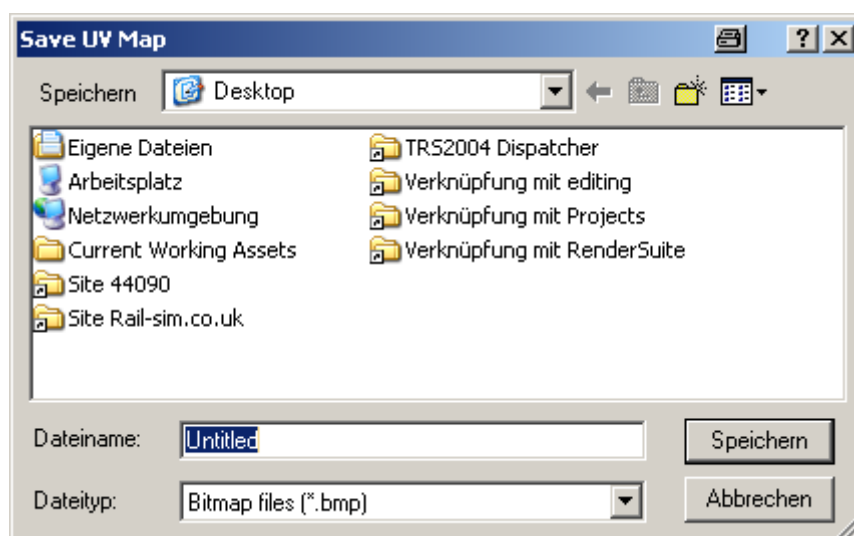
In this case the file will be saved as 'terrier.md3'. Start Lithunwrap now and using 'File -> Model -> Open' load this file. The *.md3 file is available for download here.

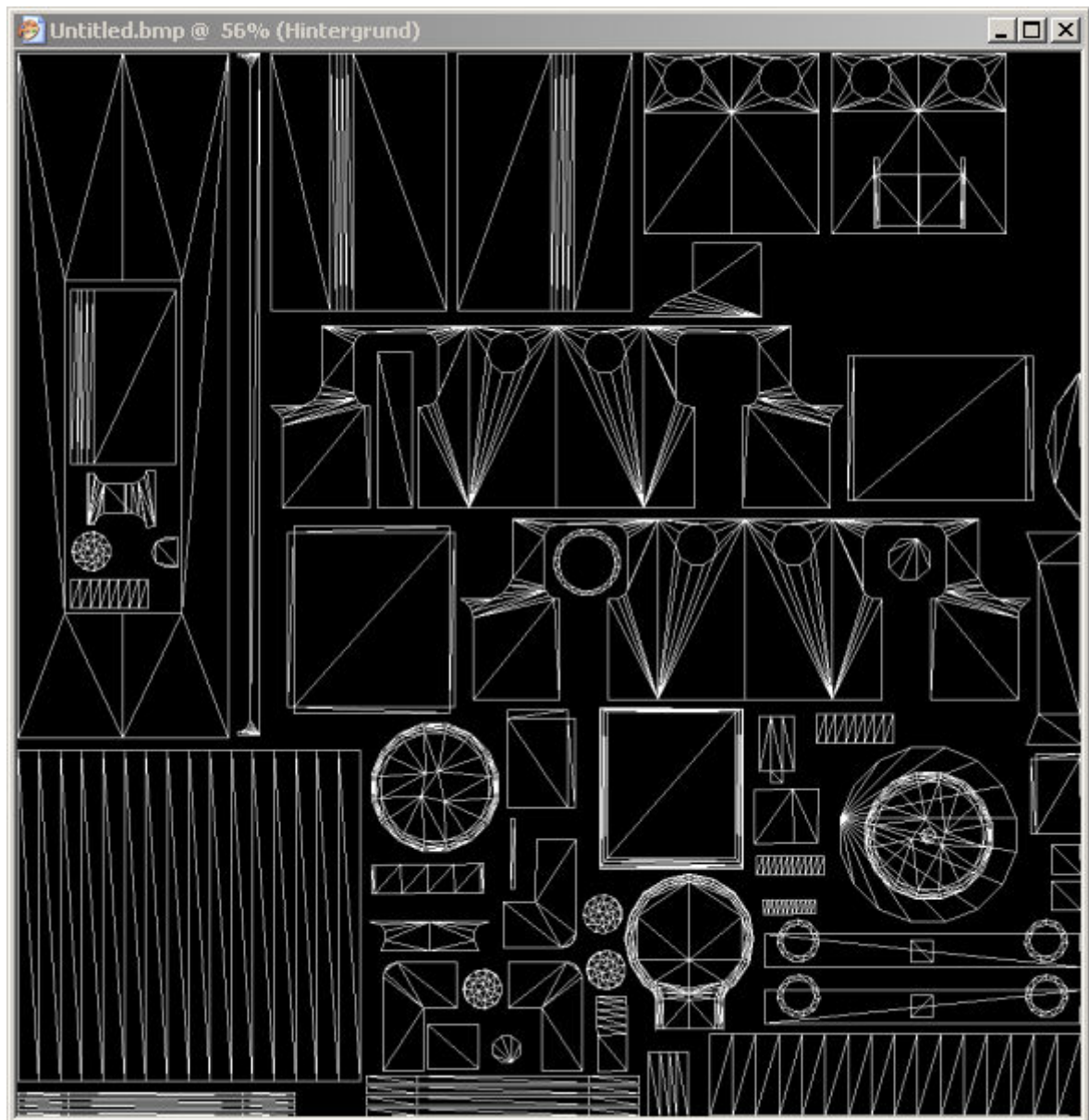Clicking on 'Import' will load and display the mapping as shown.

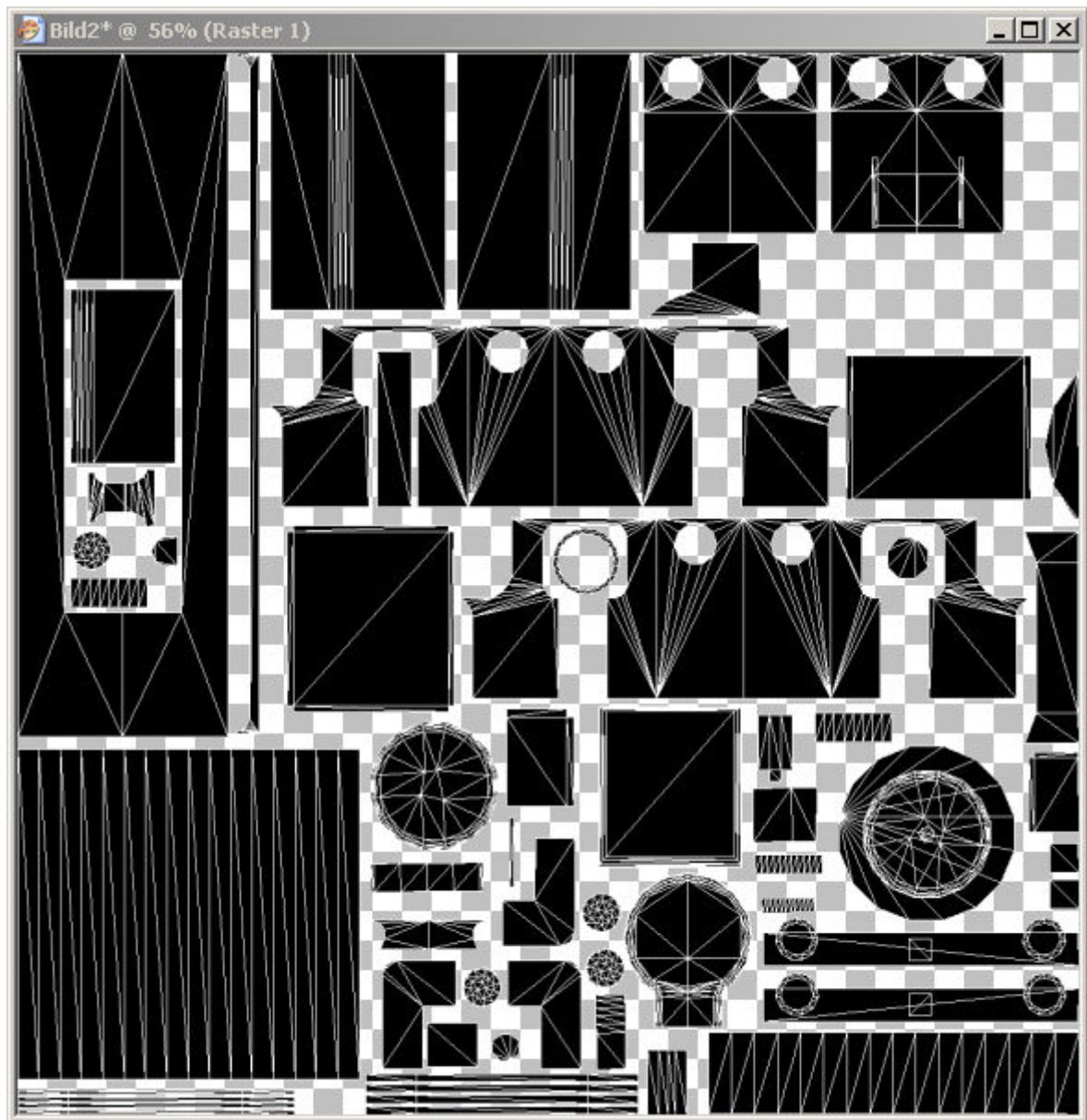Choose 'File -> UV Map -> Save' to save the mapping as a *.bmp or *.tga:

Now you have to decide what size you want the bitmap to be. I'd suggest twice the size of the final map, but it's easy to reduce the size in PaintShop Pro later. In this case I'll make the map 1024x1024 and reduce it to 512x512 later. **Remember that Trainz can only handle textures with sizes that are powers of 2!**

Load the texture that you have just saved into your bitmap editor and check carefully that there is at least one pixel gap between each element – this to make selection of the elements easier when you are creating the skin.
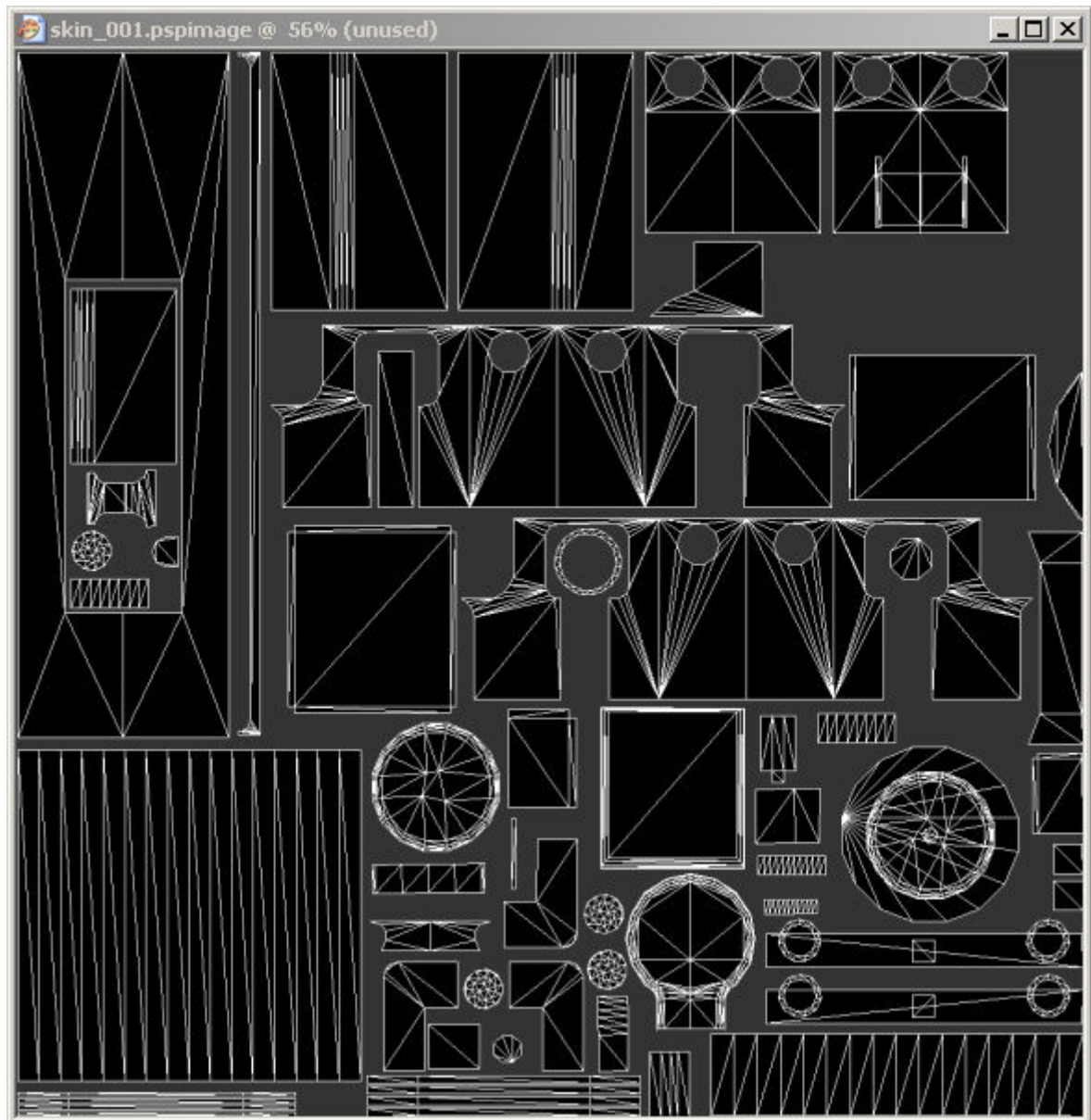

If you find that you have overlaps or elements that are touching it's probably best to go back to your GMax model and adjust the arrangement again, finally exporting the mapping again.

You can now select the background elements of the skin and invert the selection to just leave the elements themselves:
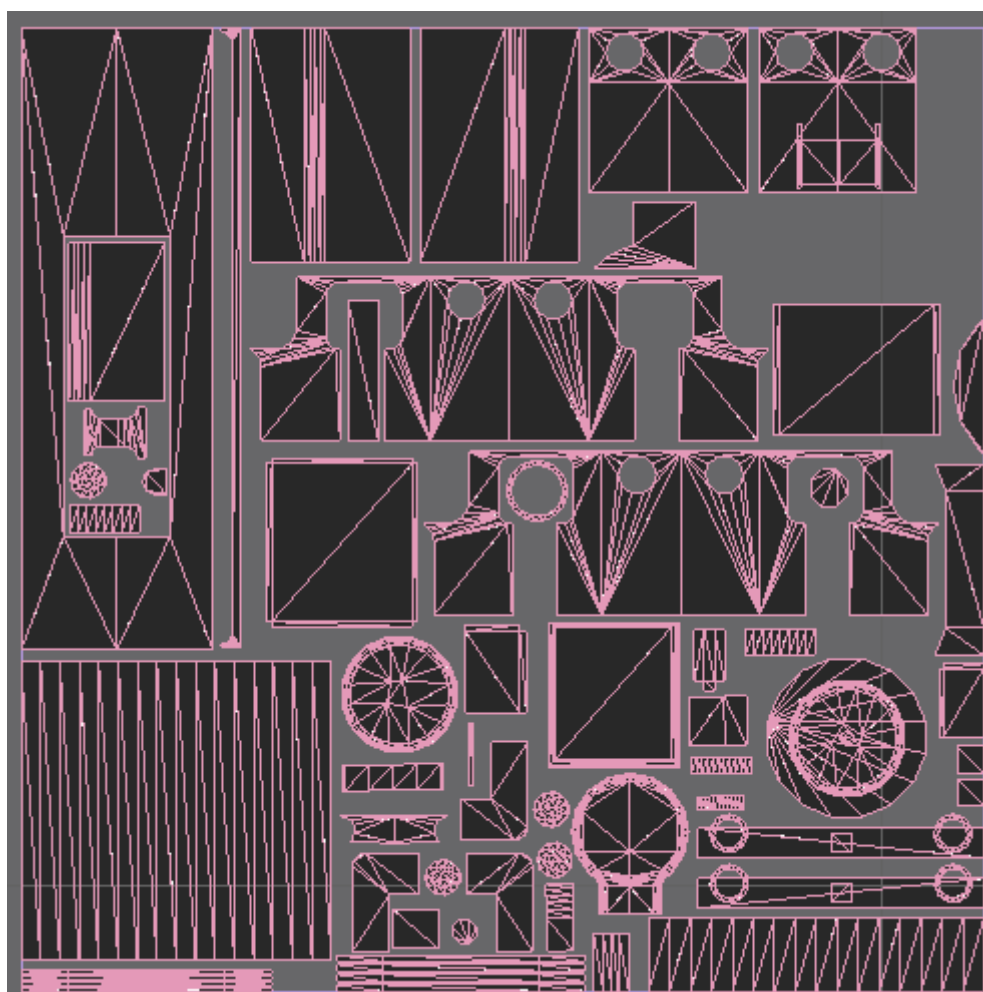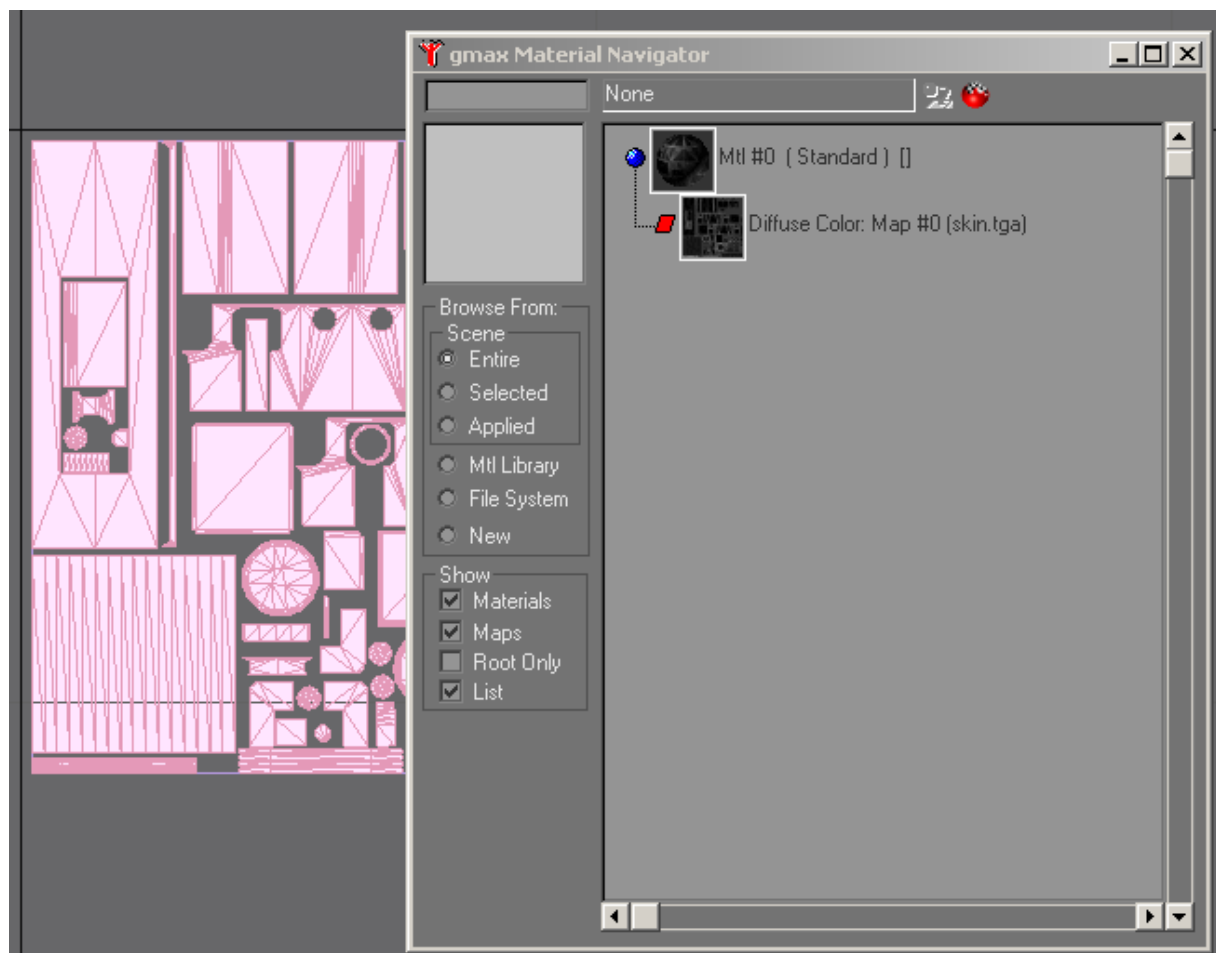
This will form the basis of the skin and can now be saved in your working directory to be used as a material in GMax. Here I've created a new layer underneath the original one called 'unused' and I've filled to with 51,51,51 grey (never use pure black or pure white in a skin).
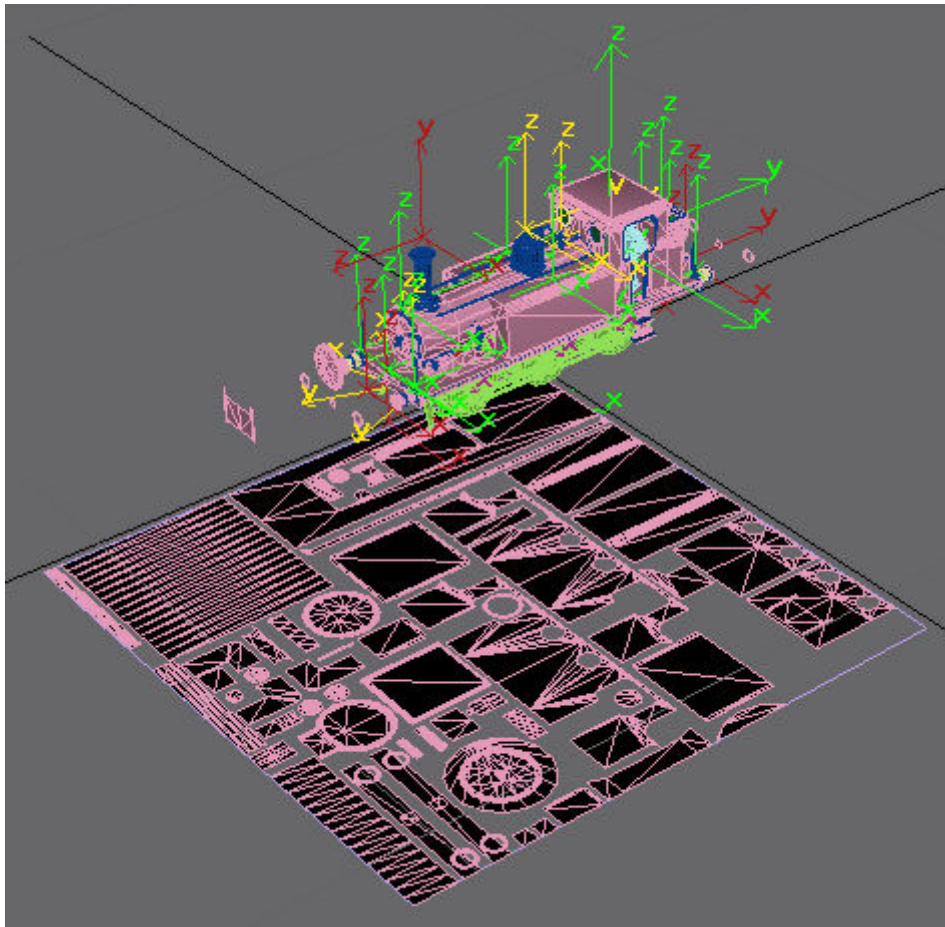
This file I've saved as a Paintshop Pro file to preserve the layers and as a *.tga for use as a GMax material. The GMax material is created in the usual way and can be applied to the flattened pattern.

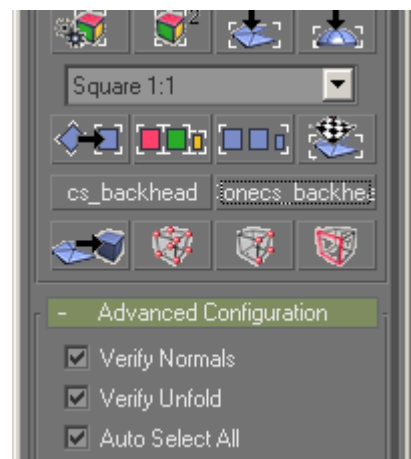Drag the material onto the flattened pattern to apply it.

And now the really good bit, refolding the model. First, unhide all the elements and select all the elements with names that begin with 'Clone'. Attach them together using the 'Attach polys' icon in the ChilliSkinner window as we did for the elements in the flat pattern.
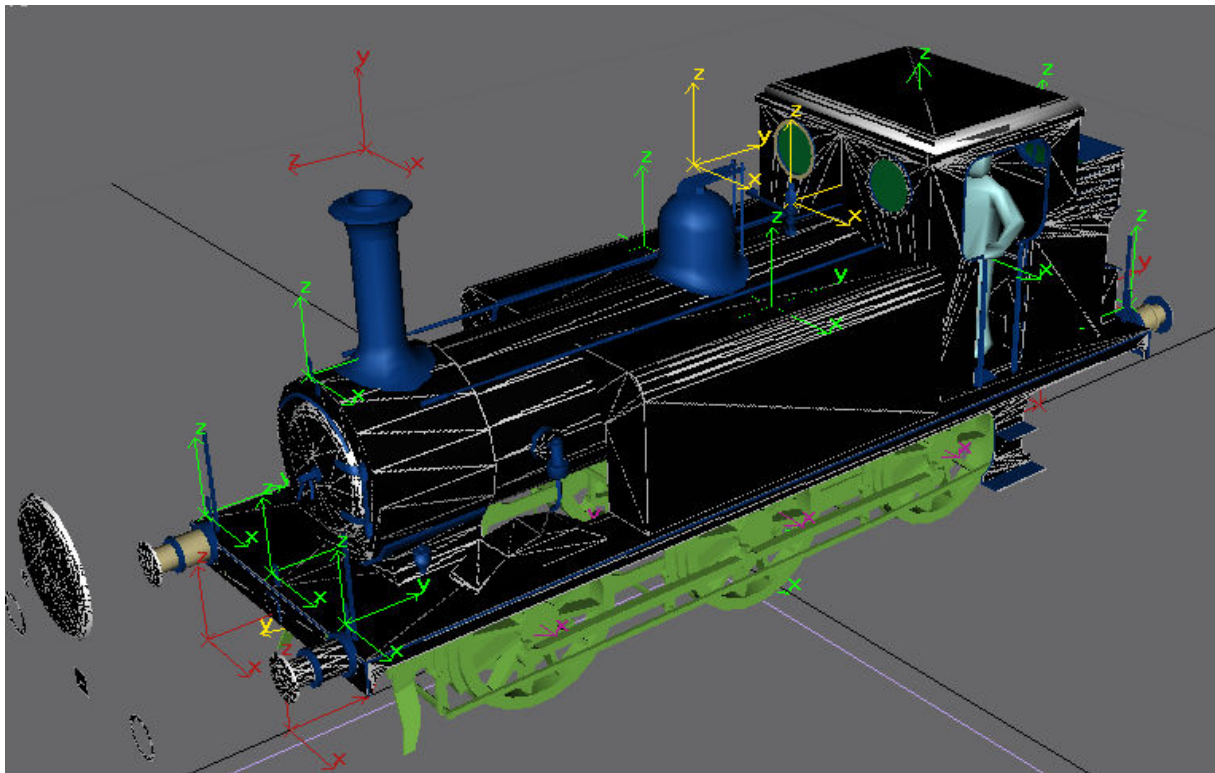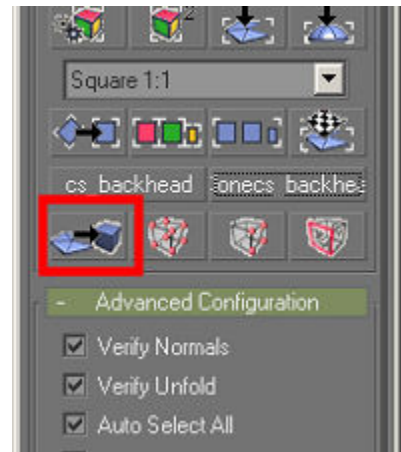

Now click on 'Pick Source' in the ChilliSkinner window, followed by the flat pattern. Then choose 'Pick Target' and then the element with the name beginning with 'Clone' (there will be only one as we've joined them all together).

In the picture to the right you can see that 'Pick Source' and Pick Target' have been replaced with the name of the elements that you selected.

Finally choose the 'Morph Source to Target' and prepare to be amazed.

The skin has now been perfectly wrapped around the model – there is no need whatsoever to manually adjust any of the mapping.

The final stages consist of mirroring over parts such as the buffers and valances and welding the model back together and applying the smoothing. And of course making the skin based on the mapping that we have created, but that will have to wait until the next part of this saga is ready.

Any questions, requests for more explanation or corrections needed – please mail me at paul.hobbs@web.de