

## Part 5: Packing them in tightly

Modellers soon discover the most challenging part of building an aircraft model is often the virtual cockpit. Mapping a VC model is also quite challenging, but we've already covered most of what we need to know. If you haven't read the previous four parts of this series, do so first!

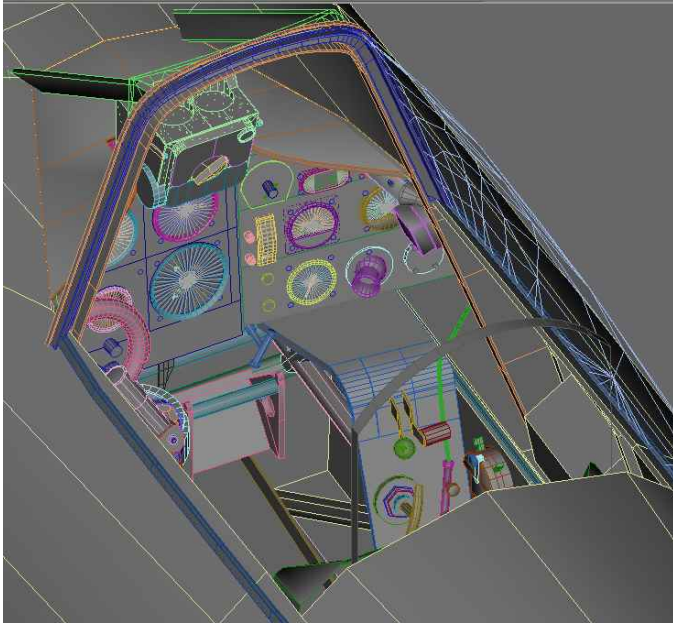
Using your textures efficiently is very important: using more textures than necessary will affect frame rates, so we want to fit as many mappings on each texture as possible. Here's a tightly-packed 2048<sup>2</sup> example:–



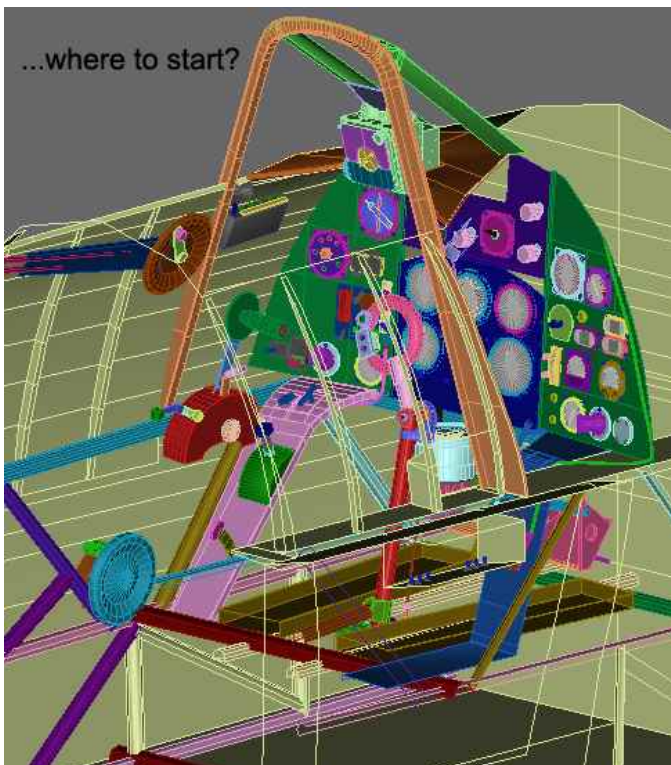
There are 96 objects on this mapping texture and a few more could possibly be fitted in.

### ***Mapping to different sizes***

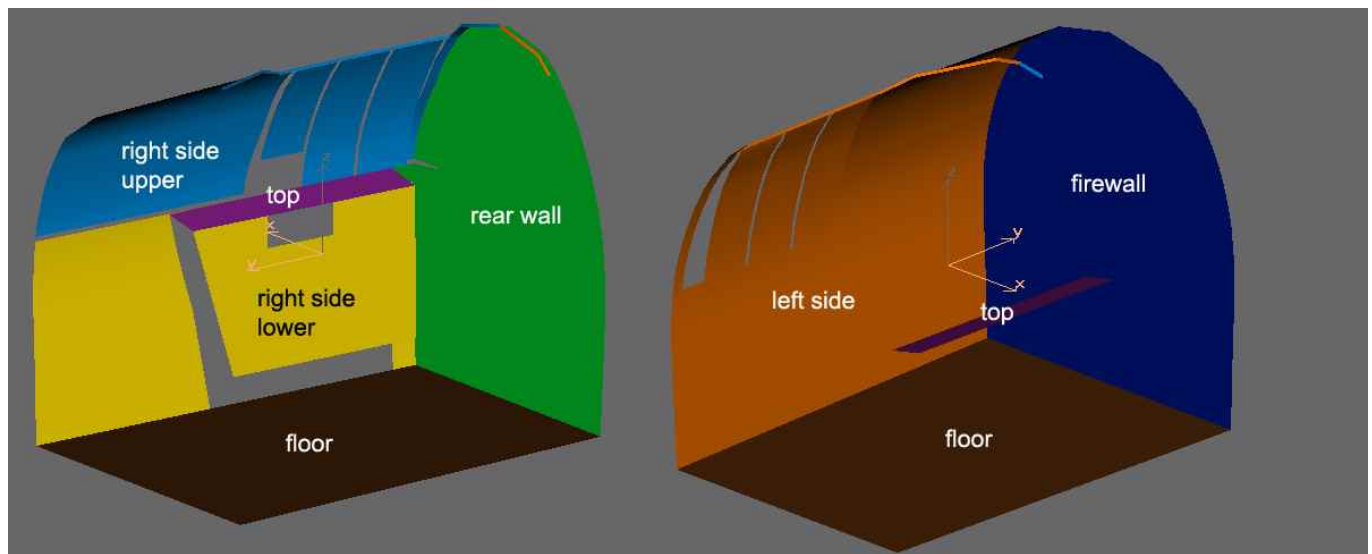
So far we have mapped all objects on a texture to the same size. To do this in the VC would mean many more texture sheets to cover the necessary detail: The sides, rear, floor and firewall of the cockpit can be mapped to a larger size (and hence smaller scale) than instruments or flight controls which have lots of small detail. In the example I'm using, there are mappings between 4m x 4m and 1m x 1m (small and large scales respectively), plus the instrument faces have been already created in 256<sup>2</sup> pixel resolution on two separate textures.



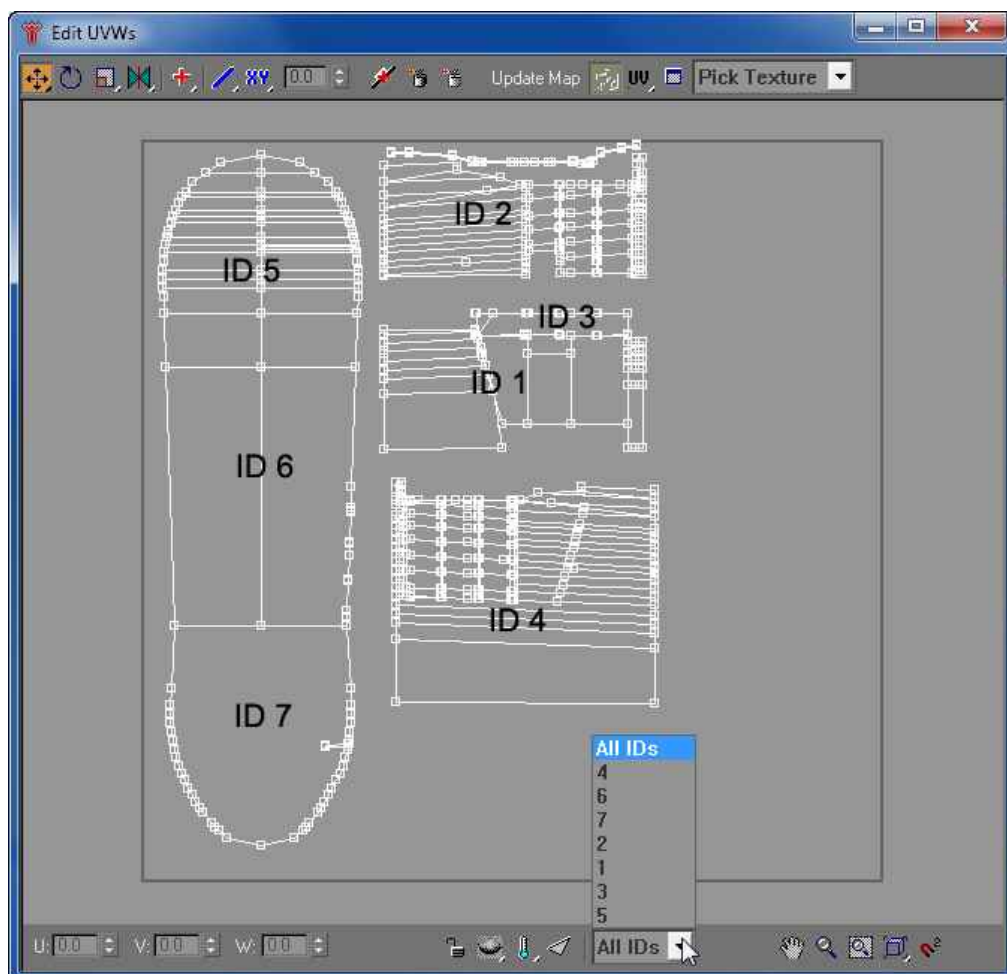
If you haven't mapped any of your VC until this stage there's a heap of work to do. Let's hide the cockpit coaming, canopy, seat and seat armour to see the inside better:—



Start with the biggest objects and the biggest is the cockpit well itself. The starboard side has a boxed section, so is mapped in three parts: the lower half (yellow) and upper half (blue) in Left view and the top of the boxing (purple) in Top view. The rest of the well is mapped with simple Planar maps. There are seven Poly Selects involved, so Harlequin material is being used here:–

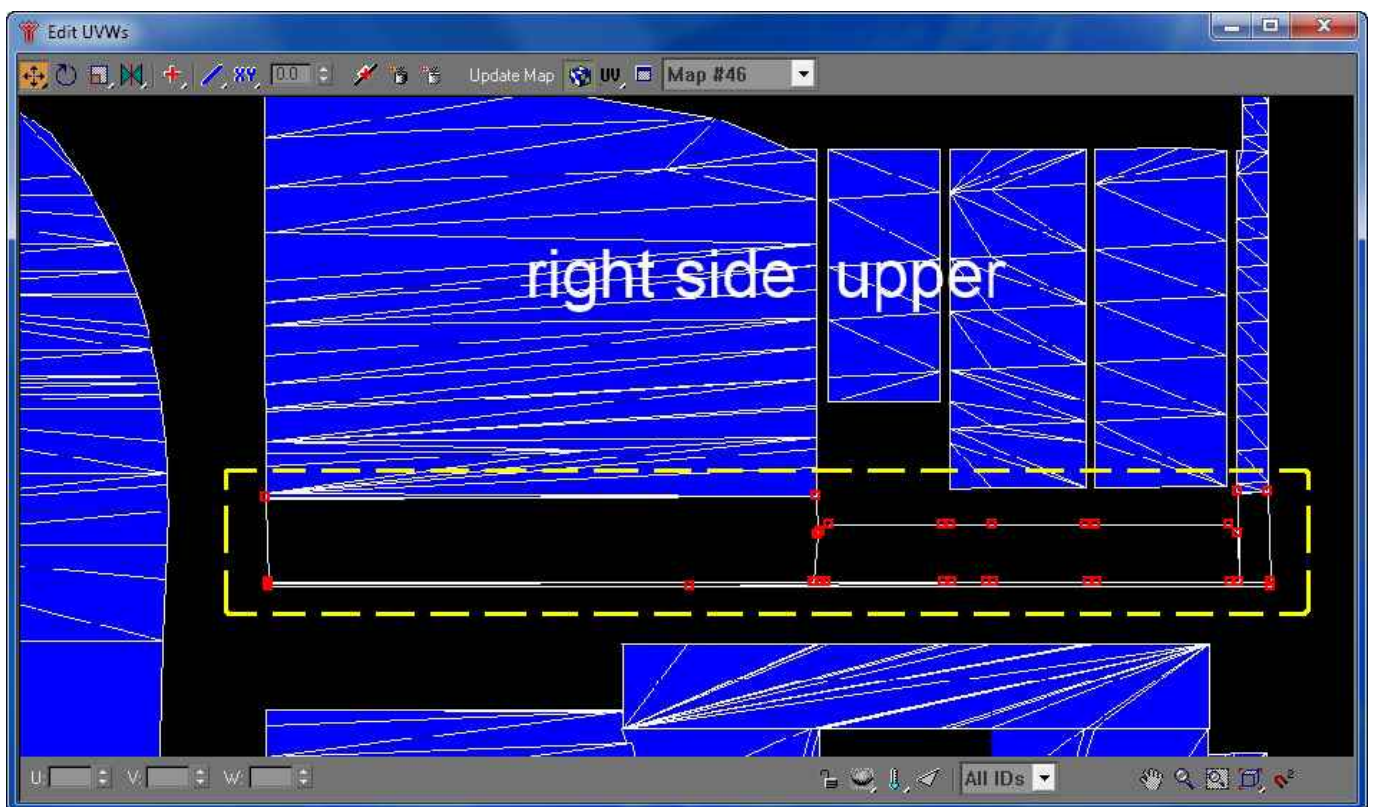
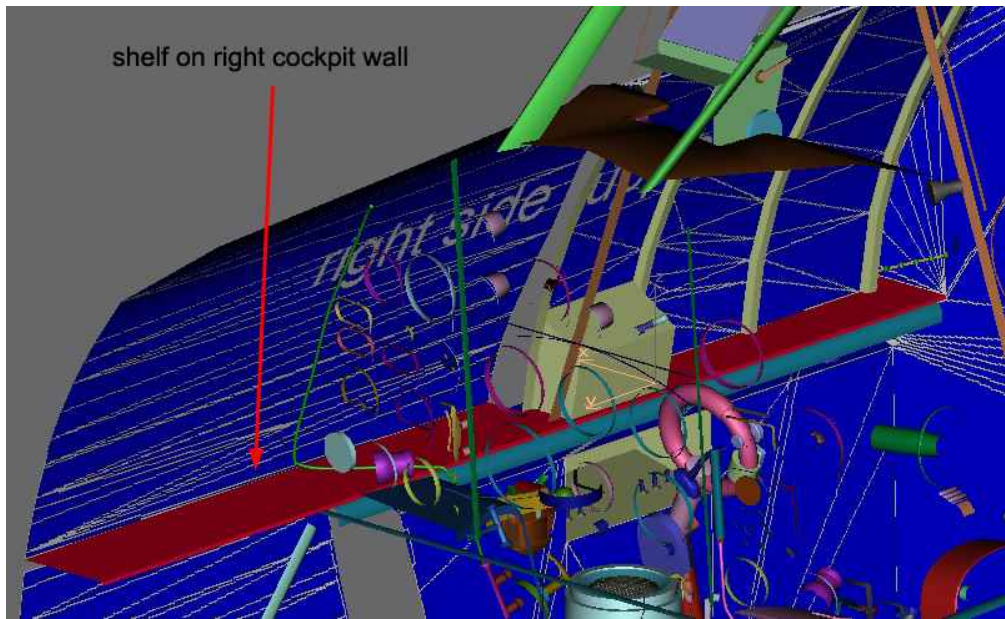


The well is mapped to the smallest scale, 4m x 4m, and laid out thus in the UVW editor:–





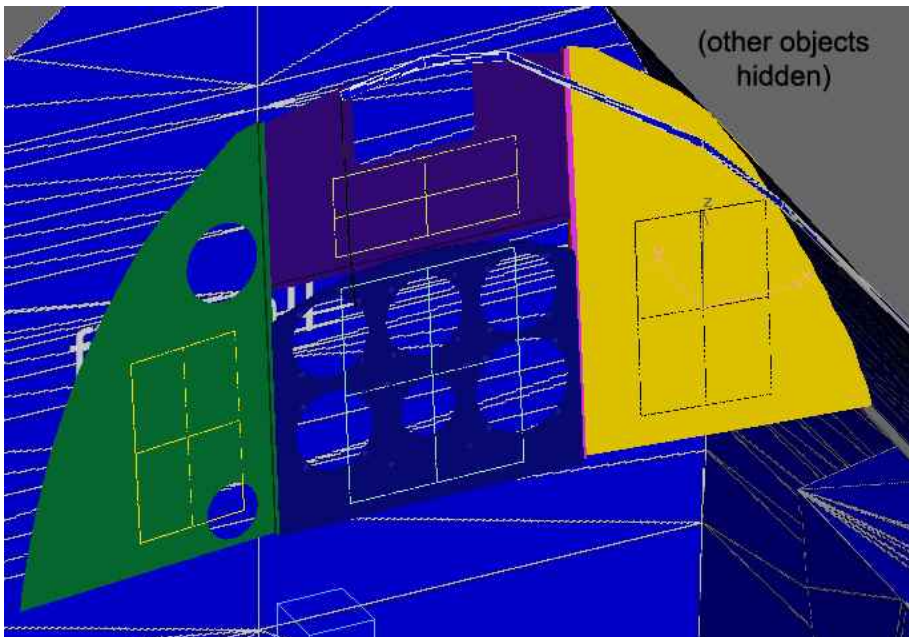
There is a shelf on the cockpit wall to the right which is mapped next and fitted tightly to the right side upper mapping:-



As can be seen, a new material for the cockpit has been made and applied to the cockpit interior.

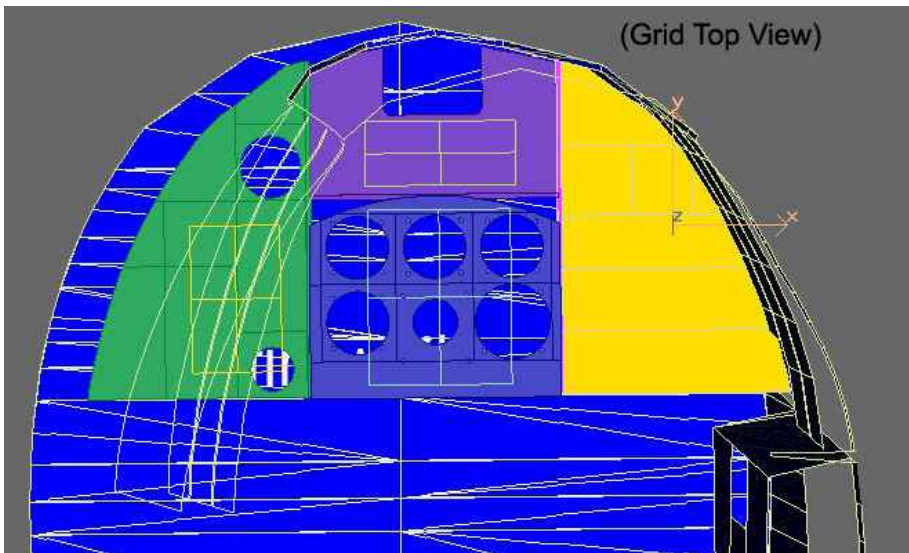
The next largest items are the instrument panels. The top and blind flying panels are not vertical but angled to make them easier for the pilot to read. The left and right hand panels are also angled as well as rotated slightly for the same reason. So straightforward Planar mappings using Front view (for looking from the back) aren't going to be accurate.

This is a classic case for using custom grids, one for each panel and aligned to it with AutoGrid:–



We'll start with the right hand panel: it's mostly yellow in the pic above because it's had Harlequin material applied prior to mapping. The panels are in constant view so we'll try to map at the largest scale, 1m x 1m.

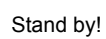
Select the grid over the right panel, activate it and select Grid Top view:–



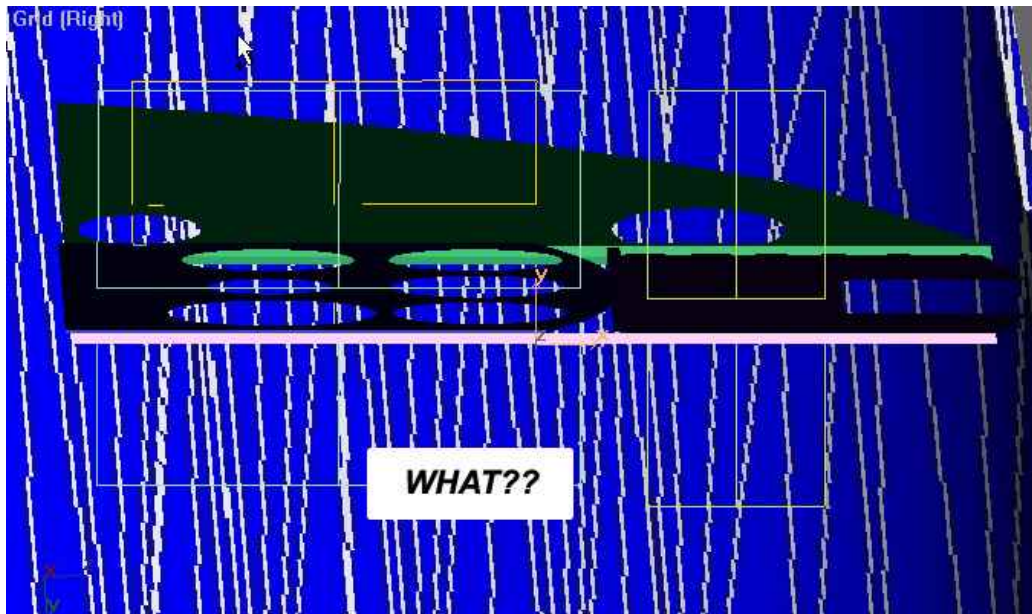
We can now apply a Poly Select modifier to select Material ID 1 for the main area of the panel and apply a UVW Mapping to these polys.

Be ready for a little disorientation next, we're going to use other Grid views while mapping the rest of this panel.

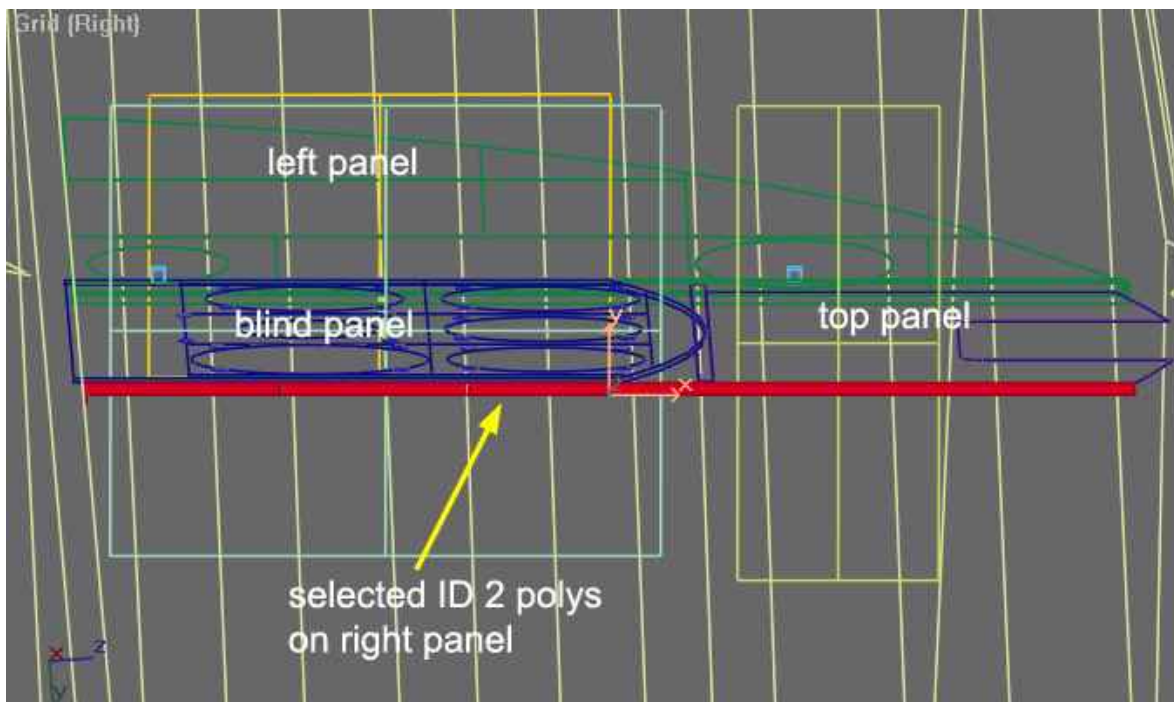
Select the ID 2 polys with another Poly Select modifier and set Grid Right for the viewport:–





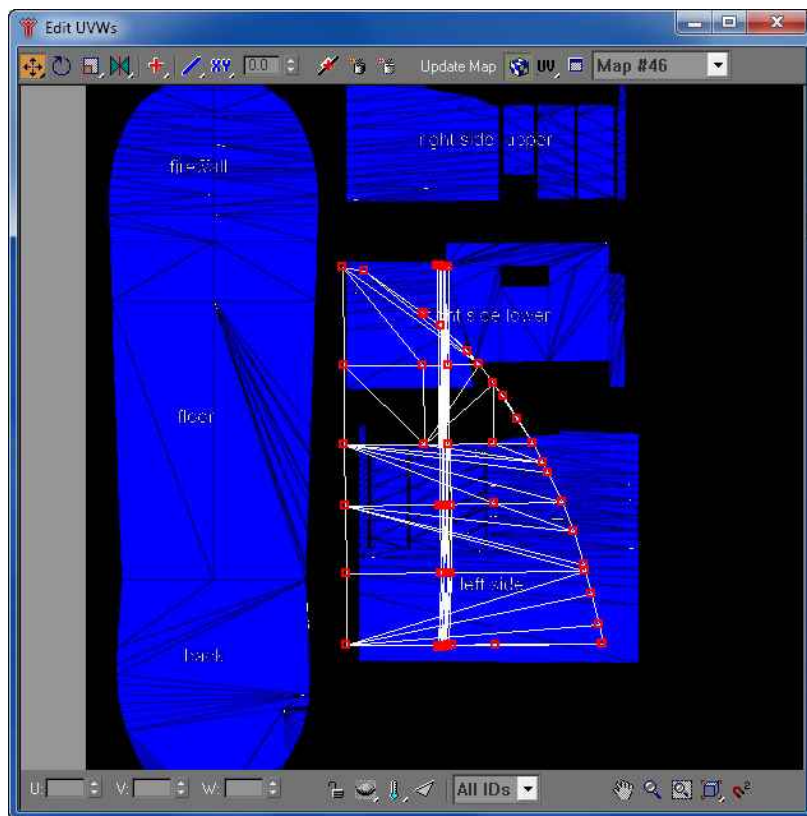


Don't panic, you're looking at the right panel from its right hand edge. Perhaps wireframe view might help:-

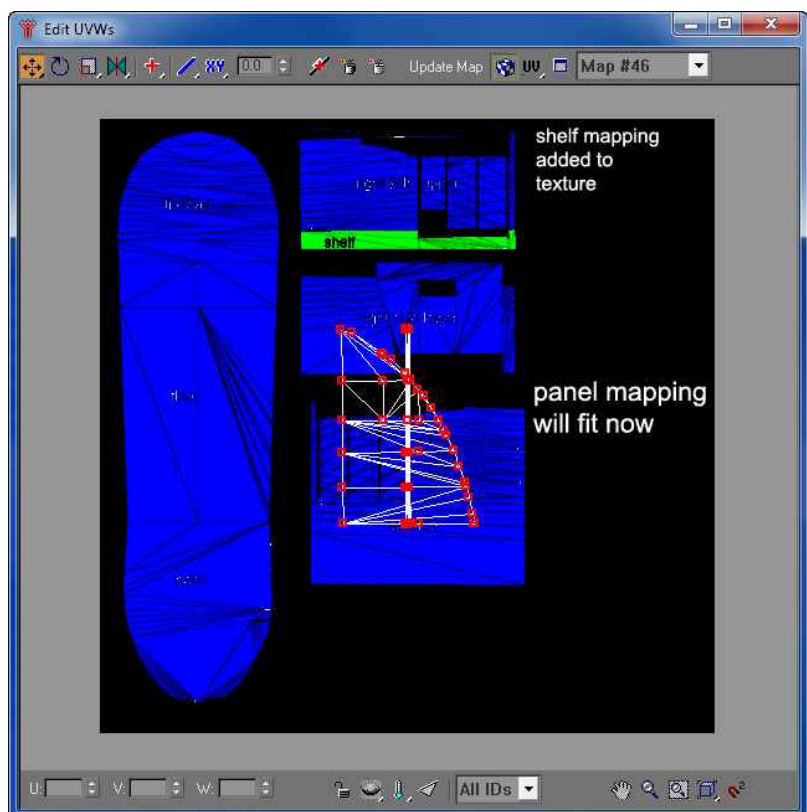


These polys can be mapped and the Gizmo rotated to orient them correctly.

ID 3 polys are next, in Grid Top view again and then ID 4 polys in Grid Left view. Apply the new cockpit material to the panel. Don't worry about position on the mapping texture, we're going to put the Material IDs to work in the UVW editor.



It's obvious we're not going to fit this on the mapping texture without overlapping, so go back and adjust the mapping size to **1.5m x 1.5m** for the poly selections. Having deleted the previous Edit Mesh and UVW Unwrap modifiers from the top of the stack, we reapply Edit Mesh and UVW Unwrap to see the corrected result in the UVW Editor:—





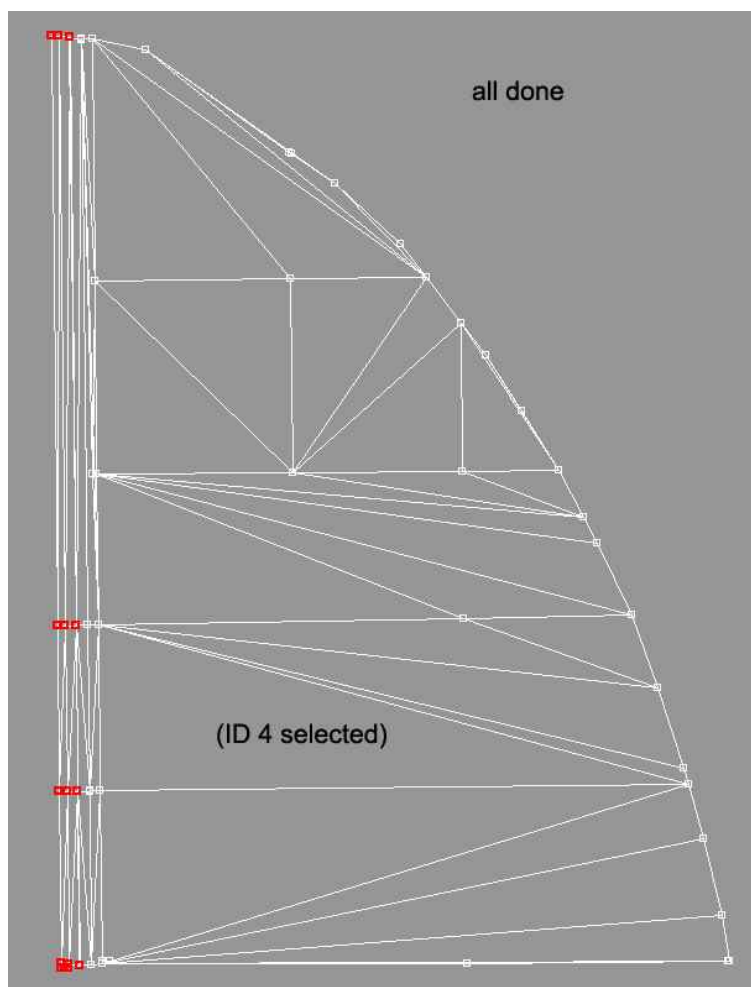
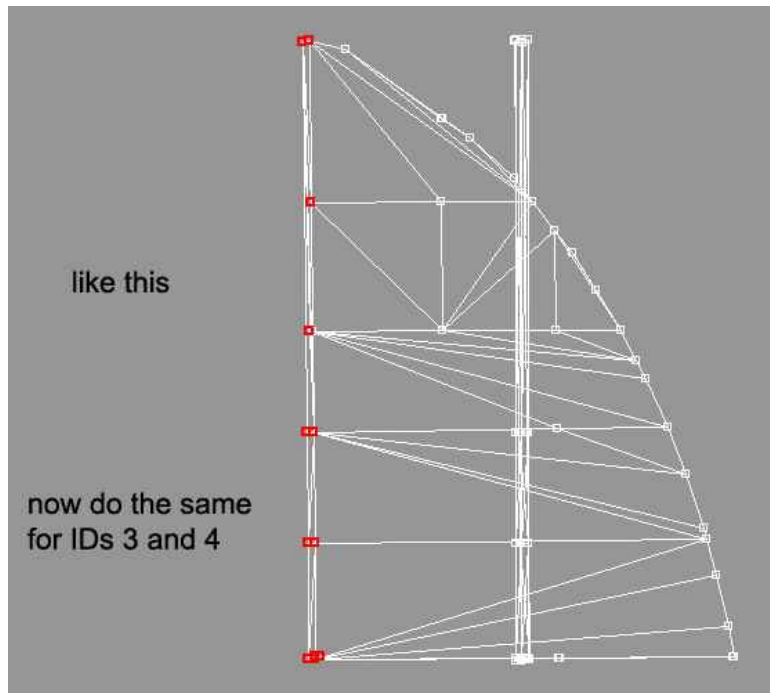
move locked ID 2 vertices to here

1. Show Map

2.

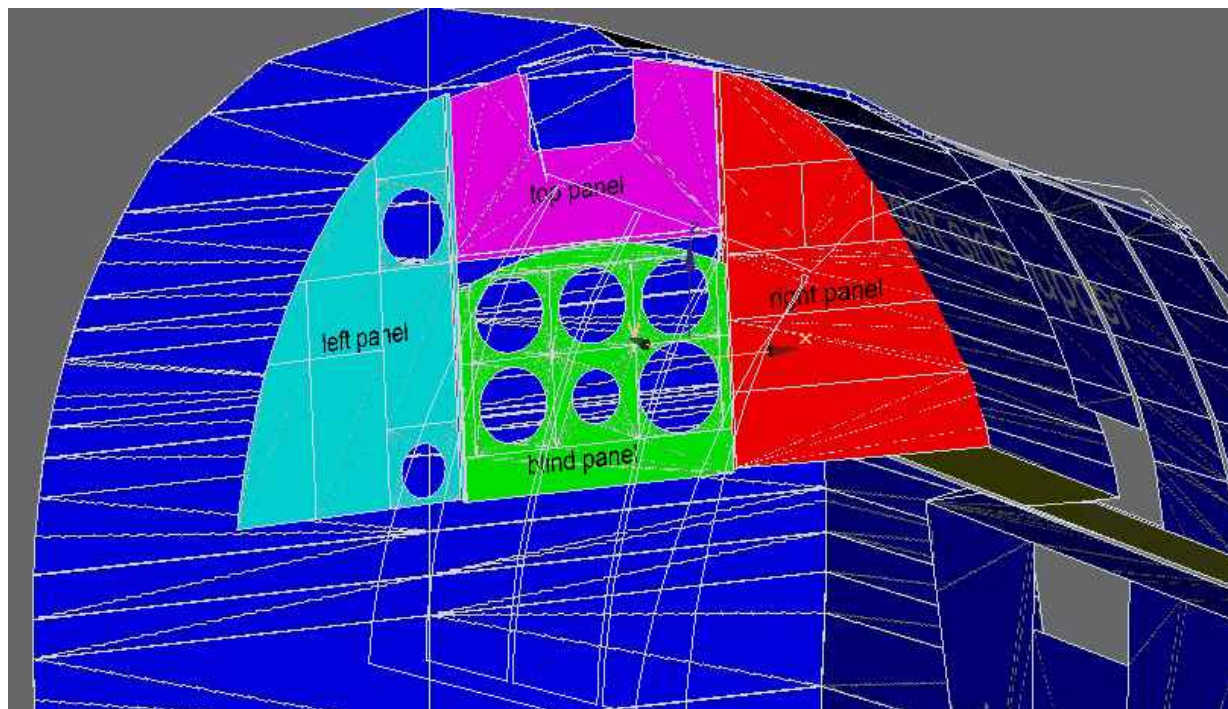
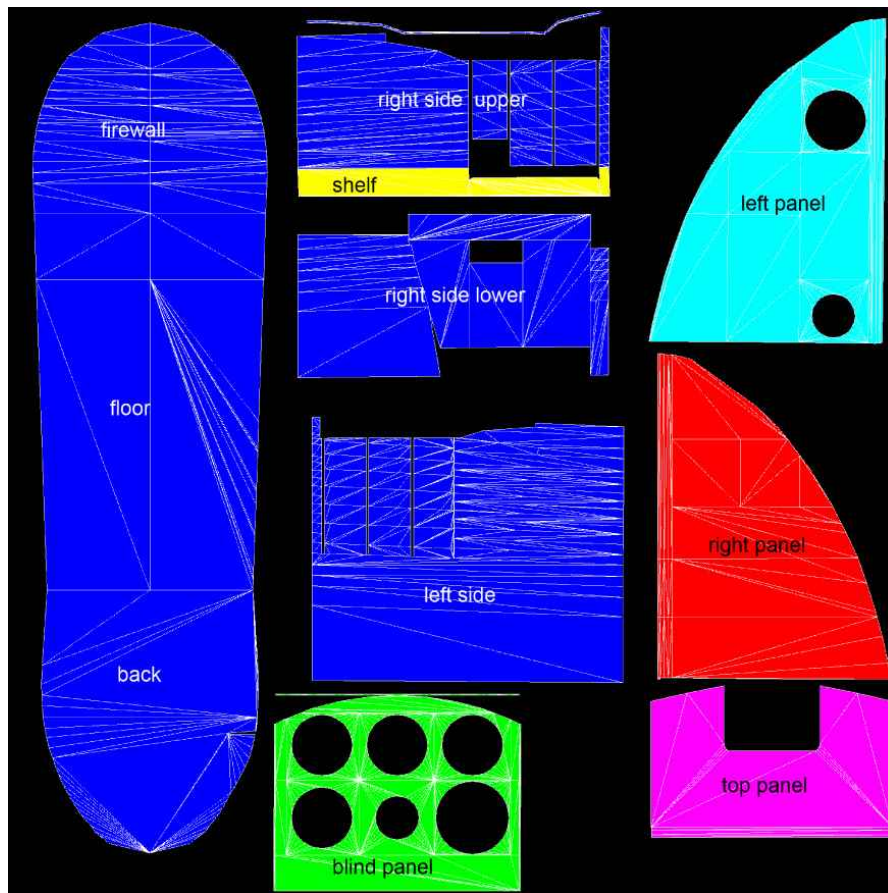
3.

All IDs



The result is like unfolding the panel's folded edge. Turn Show Map on in the editor and move the whole mapping to where you want it on the mapping texture. Update the mapping texture via LithUnwrap and Paint.NET.

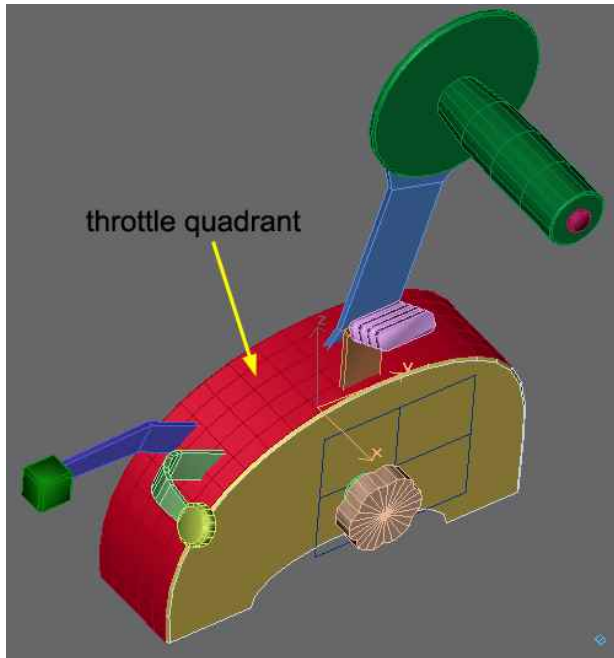
Now select and activate the grids for the other panels in turn and map each, updating the mapping texture as you go. Since the right panel was mapped to 1.5m scale, the other panels will be mapped to the same scale. When all panels are mapped, be sure to activate the Home grid.



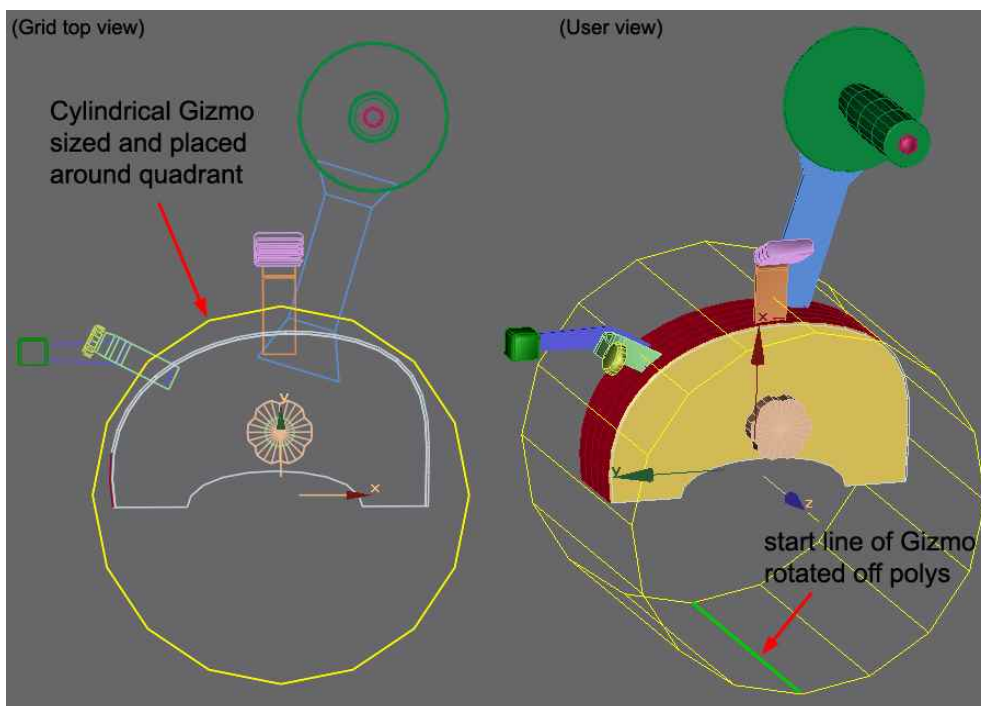


Now start mapping the other cockpit objects one by one and arranging them around the mapping texture.

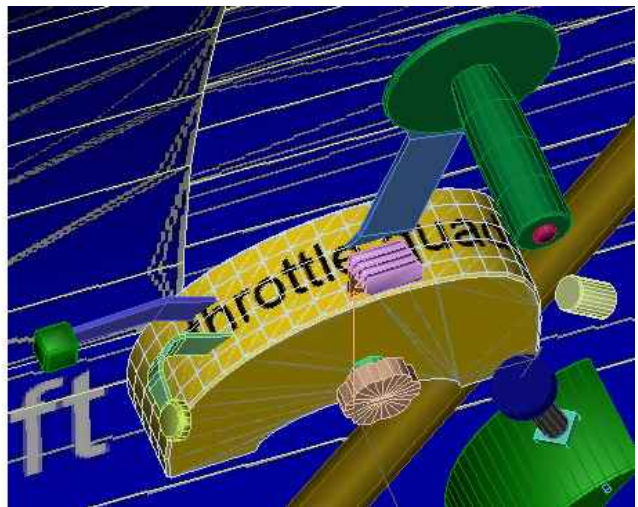
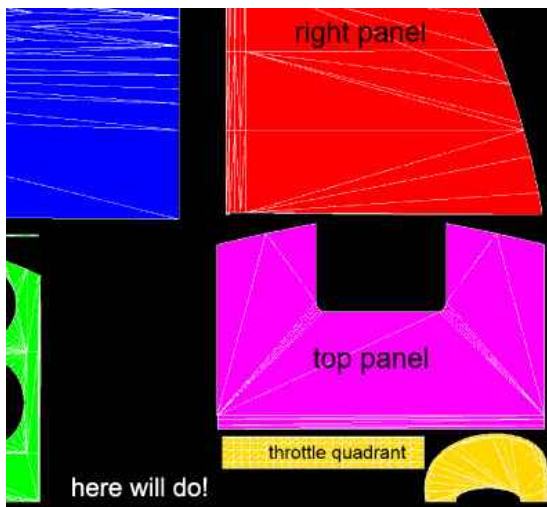
This is the throttle quadrant: the selected polys get a Cylindrical mapping while the rest get the Planar treatment and since the quadrant is both tilted off vertical so the throttle lever doesn't hit the cockpit framing and rotated to line up with the tapering cockpit side, a custom grid is needed to align the mapping accurately. Mapping scale is medium here, 2m x 2m:—



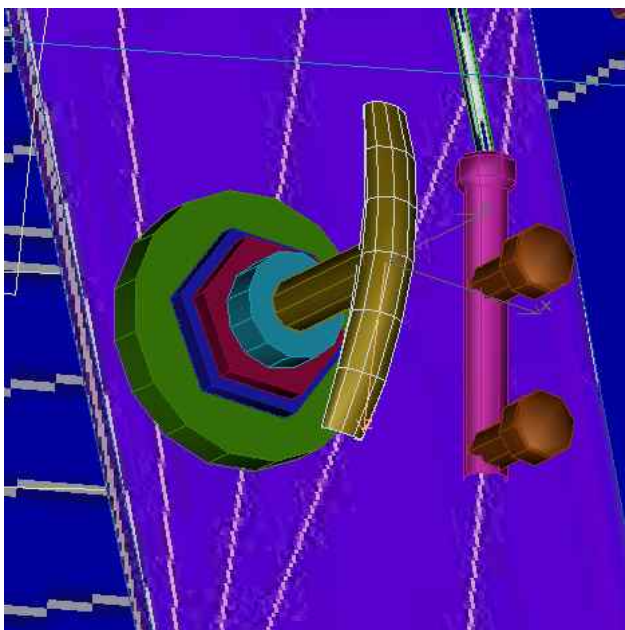
The Cylindrical mapping length and width have to be set manually and the Gizmo is rotated so the green start line is **not** over polys: here the quadrant has no bottom (it's not seen) so the start line is rotated down there. Remember to set the Cylindrical mapping height to 2m (still to do here):—



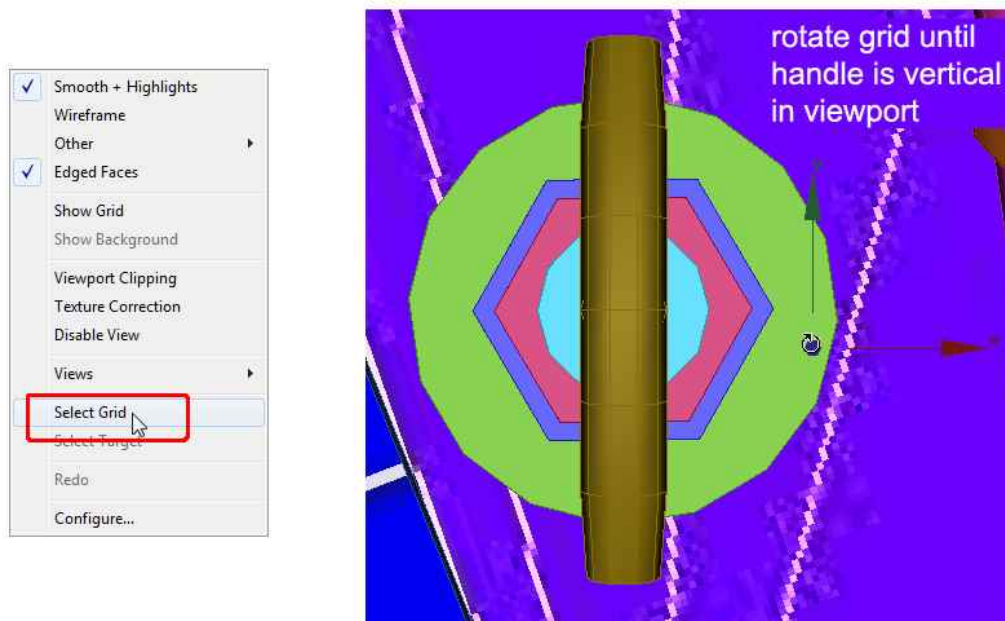
Once the Cylindrical mapping has been matched to the Planar mapped quadrant side, find a suitable spot for it on the mapping texture.



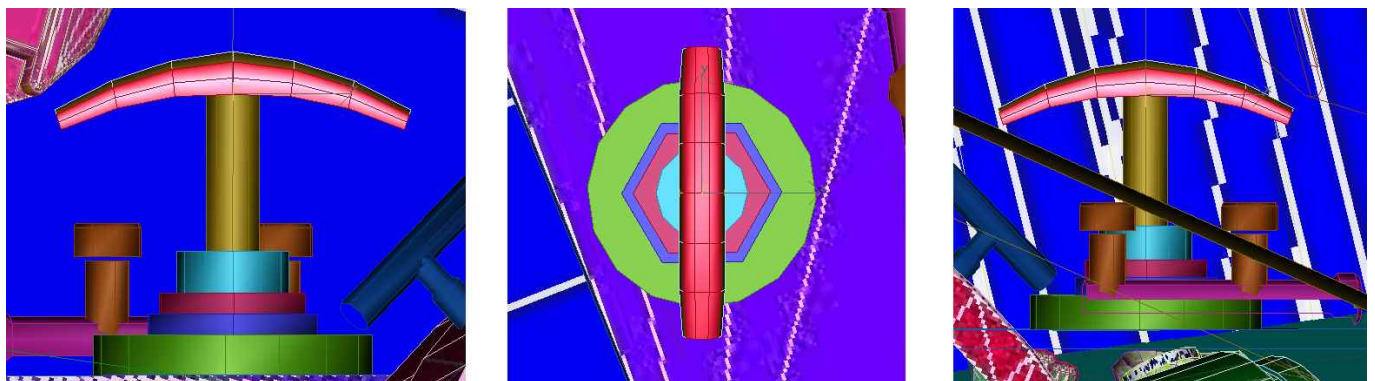
Here's another example of using grids. This is the top of the fuel priming pump handle and we'll use a grid aligned with the purple panel the pump is set into:-



Since the custom grid is active, it's not visible for selecting. Right-click at top left of the viewport:—



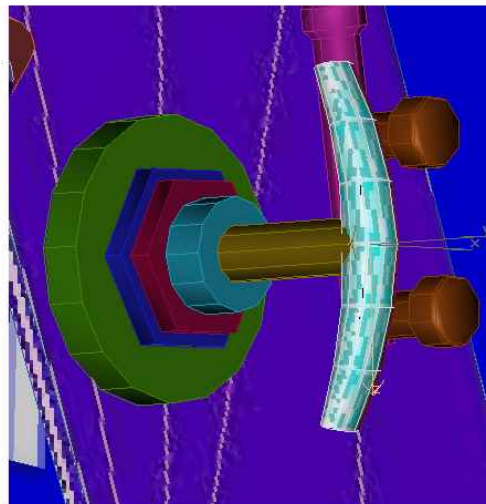
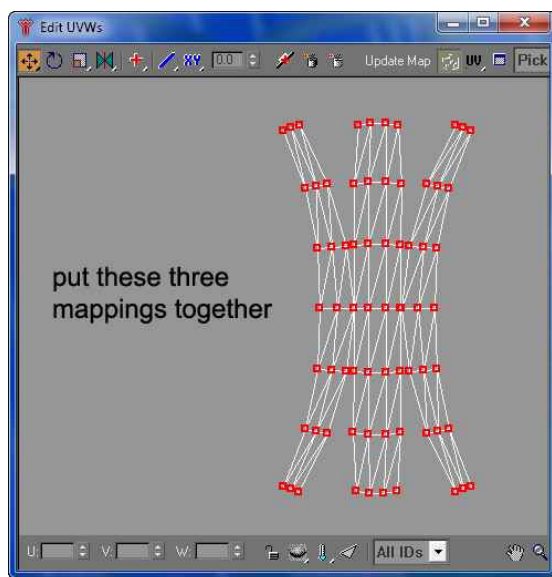
The view rotates with the Grid! Now the handle can have poly selections mapped in Grid Left, Grid Top and Grid Right views:—



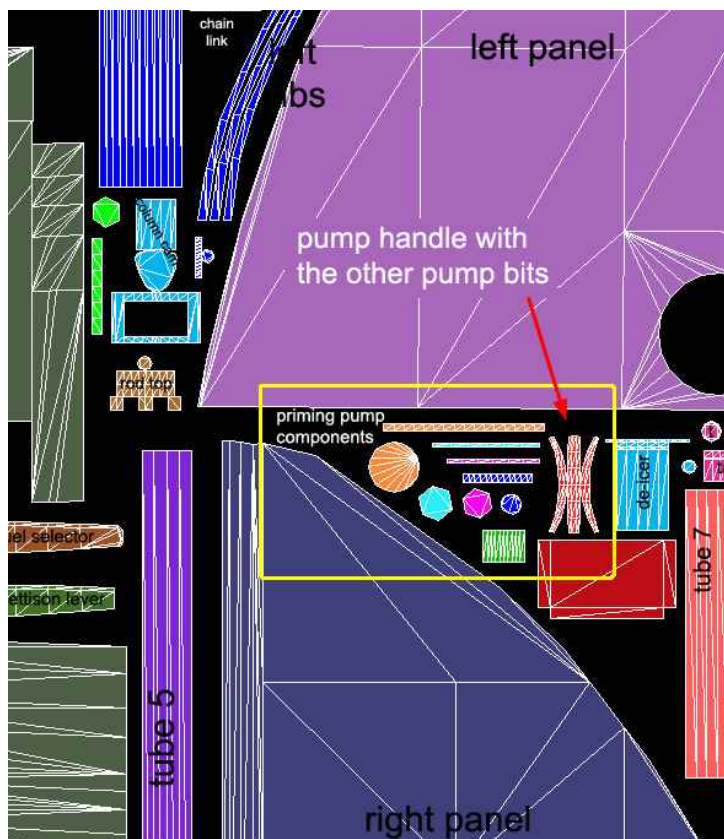
Grids are incredibly useful for getting the viewpoint correct when mapping objects at all sorts of angles around the VC (they're also incredibly useful for building things at all sorts of angles around the VC, but this is not a modelling tut!). Just remember to activate Home Grid again when you've finished with them.



The mapping is assembled in the UVW editor and a home for it found on the mapping texture:—



Collapse the stack for each object when you're happy with its mapping. Here's the handle on the texture sheet seen at the start of this section:—



(End of Part 5)