

MAKING LODS IN GMAX

What are LODs?

LODs are simply iterations of the model with progressively less detail in each. The most common arrangement is to have 7 such LODs, each LOD displaying at varying distances, so that far away, only a basic model is displayed. This is usually just a “paper” aeroplane. The distance at which each LOD is displayed is determined by the number applied to each LOD in the model – the lower the number the further out it will display. However, while the numbers always give the same progression in terms of detail, the actual display distance for each LOD display will depend on the users’ screen resolution.

The convention is to name each LOD as “XXXXXXXX_LOD_NNN”, where XXXXXXXX can be any name you like and NNN is a number, usually starting at 400 and reducing in each subsequent LOD. So for example the first LOD might be called “Phantom_LOD_400”. In practice, I use a generic name for all models, simply called *MODEL_LOD_XXX” or to condense that a bit, just “MOD_LOD_XXX”.

The numbering sequence can be determined by experiment, but I regularly use this sequence:

MOD_LOD_400 (greatest detail)

MOD_LOD_200

MOD_LOD_100

MOD_LOD_70

MOD_LOD_40

MOD_LOD_20

MOD_LOD_10 (paper aeroplane)

Process

Step 1 – select all the parts in the primary model and from the Gmax top menu, select “Group”. This will place all the parts together and Gmax will prompt for a Group Name. Call this part MOD_LOD_400, if using my sequence.

Step 2 – clone MOD_LOD_400 to create the next LOD down.

Step 3 – hide the previous LOD(s) by selecting it, right clicking a Gmax viewport and selecting “hide selection”.

Step 4 - select the newly cloned LOD and from the top menu, click “Group” then “Ungroup”. This will reveal all the individual parts again.

Step 5 – reduce the detail a degree, so for example in a 7,000-polygon model delete small parts to reduce the polygon count by 500 to 1000. There are some tips on how to do this in the last part of this tutorial.

Step 6 – rename each part in the LOD so that it is unique. For my second LODs I use the number _200, eg “l_gear_200”, “L_gear_201* etc.

Step 7 – group this LOD, clone it again and repeat steps 3-5, this time with part numbers “_300”. Continue to clone and edit subsequent LODs until a satisfactory progression of reducing polygons is achieved. I use part numbers “-400”, “_500” and “600” for each LOD, while the single part in LOD_10 is just called “paper”.

Step 8 – Compile the model and test for a smooth transition.

A Note about FSX/P3Dv4.

The same process is used for FSX/P3D models. However, although visibility tags will clone with each LOD, animation tags will not. They have to be re-applied in every LOD apart from the first and last one.

Hints and Tips

I have found the following techniques useful in creating smooth LOD transitions with minimal notice to the user as the viewpoint is zoomed away.

Don't remove large parts early on – their removal will be noticed.

Don't remove aerals in LOD_200. – they don't save many polygons and their sudden disappearance will be noticed.

Start with the pilot(s) – they are often quite detailed and provide a great deal of scope to reduce the polygon count progressively in each LOD. Interior cockpit detail might be reduced the same way.

In LOD_100, replace 3 width segment wheels (ie with tapered sides) to just 1, but keep them animated.

In LOD_70, delete the “blurred” tires and attach the “still ones” to the gear legs. They won't rotate anymore but they won't be seen at that LOD distance.

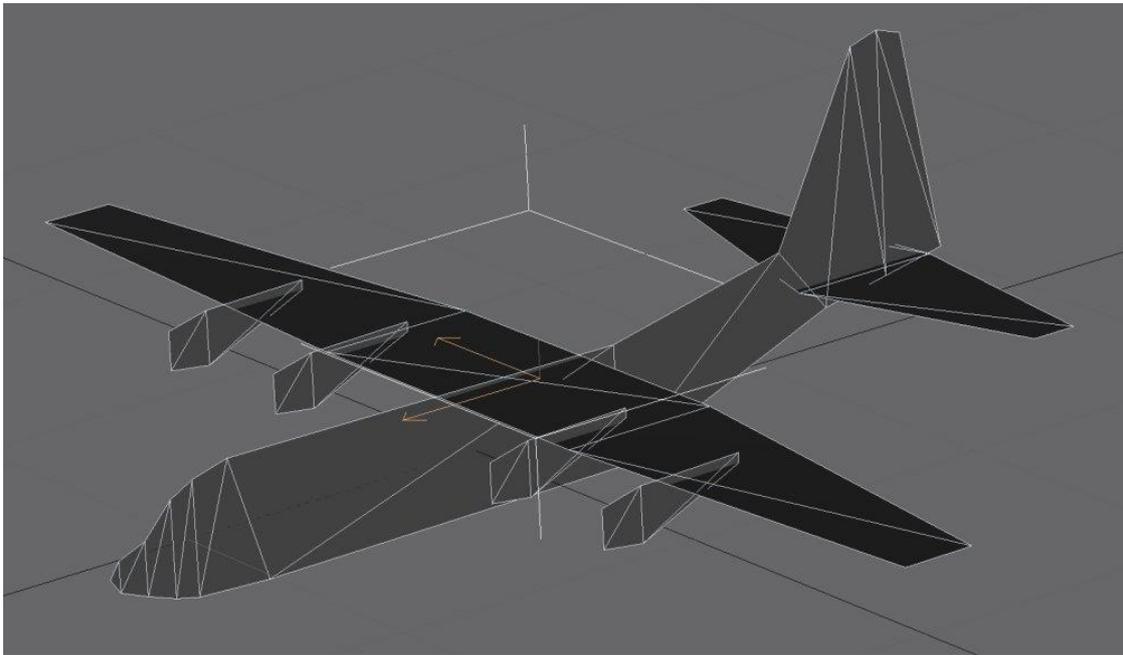
Don't remove prop disks in any LOD. (LOD_10 won't have one anyway) They don't use many polygons and their removal will be noticed.

For depressions, like gear wells and jet engine intakes and nozzles, select the internal vertices and drag them to the outer edges of the skin. Collapse the vertices with the surface ones to seal the holes. Re-map those polygons to the airframe colour.

LOD_20 is often the most difficult because by then most of the parts will have been removed, except for the airframe, the gear and props. The airframe polygons will probably need to be reduced. This can be done by deleting sections of the nose to make it sharper or to reduce the tail sections. Adjacent airframe vertices can be collapsed together. This will disturb the mapping but unless it is particularly severe, it won't be seen at this LOD distance. Feel free though to remap the airframe if there is a serious distortion.

To make a “paper” aeroplane for LOD_10, draw a Gmax plane roughly to the outline of the fuselage in LOD_20. Do the same for the wings and tail plane. Attach these parts together as a single sided object. Clone this object, select all the faces and from the Gmax Command Panel, select “Normal” and then “flip normal”. This will create the other side, which can now be attached to the first one.

There is no need to texture the “paper” aeroplane, but pick a block colour that is close the airframe colour. This is an example of one of my paper aeroplanes:



The part is double sided and consists of 88 polygons (mesh triangles),

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