



FSregen

fs scenery regeneration..

v0.20 - 27 Apr 2002

document revision 004

Description

This program will take the output from makedml in the form of BGL code and will replace vertices with specific materials with other BGL items.

This version supports:

For scenery : Lights, Effects, Windsocks and Library objects.

For Aircraft design : Lights, Flexing wings and Shadow optimization.

Tools : Library / bgl browser, Library Compiler

Installation :

You need middleman v1.1 installed (takeoff.to/landing). This way you get to keep the asm code files generated.

Run the installation and select destination folder. Suppose you put it in c:\tmp\fsregen.

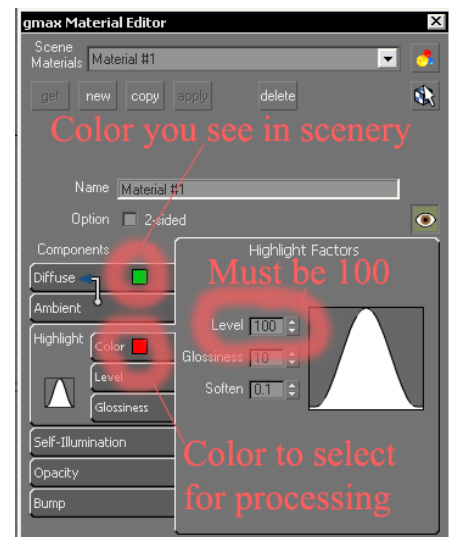
Get the BGLC.EXE file from the FS2000 scenery SDK and place it in the same folder.

You also need the VB6 runtime. Probably you already have it, just see if the program runs.

That's it.

Scenery Usage:

- Create all the scenery you want in gmax. Then place a single triangle wherever you want a light or effect. Make sure it's very small. Only one of its three vertices will be turned into a different object. Make as many as you like.
- Bring up the material editor. Create a new material, and name it anything you want except any of gmax's special material names (zbias, line etc). If this is going to be a light, choose the color that it will have. Click on the "Highlight" tab. Set the "level" to 100. You should see a white "mountain" in the box next to it. Now, click on the little "color" tab in the bigger "Highlight" tab. The color that you put here, must be one of the following : Red, Green, Blue, Yellow, Magenta, Cyan, White. They must be



fully saturated. So if you choose red, it must have RGB values of 255, 0 ,0 respectively. Magenta should be RGB 255,255,0 and so on. If you make all the possible combinations, excluding black, you get seven. Each material you create with one of them colors for high-light will be transformed into a different object. For now let's make it red. So click on the color square and in the Color selector that pops up, move the red slider all the way to the right and the green and blue all the way to the left. Close the color picker and apply the material to your triangle.

Repeat the procedure and create another material as above, give it another material color and another highlight color. You have used red, so pick Green. Apply it to your new triangle.

- Export to your fsregen installation directory, selecting to “keep files” in middleman. Lets call the export file test.bgl

- Start up the fsregen. Type in the top text box the file that you created using the full path. DO NOT include any extension. In our case this would be c:\tmp\fsregen\test

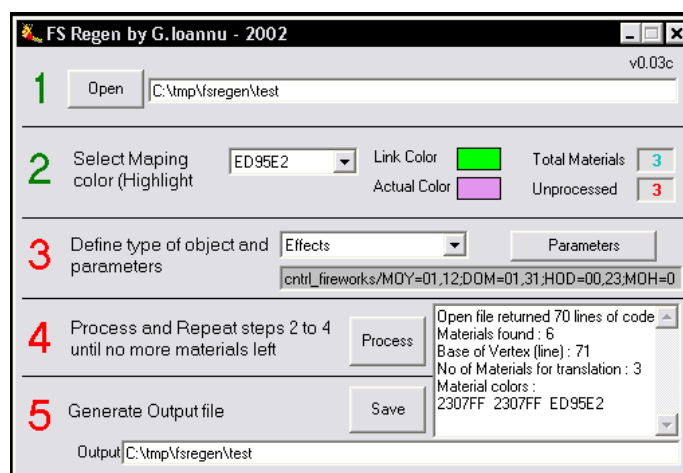
The same filename is put in the bottom textbox (output). Only change the “output” if you want to debug something, leaving your input file intact.

- Click on the Open button. Your file is loaded and some info displayed in the message box. You must see something like this :

```
Open file returned 6213 lines of code
Materials found : 12
Base of Vertex (line) : 6214
No of Materials for translation : 2
Material colors : 3434CA 97FD82
```

Note the “No of Materials for translation : 2”. These are the two special materials you created.

WAIT until the big red “1” turns green.



- In step 2, the drop down list must have two values. These are the materials that will be replaced. Select the first one. The “link color” shows you the “Highlight” color and the “Actual color” the diffuse color. It will only be used if you create a light or a windsock; effects completely ignore it.

- In step 3 select the type of the object you want and click on the parameters button

The supported objects are :

Lights

Light type. “Light strobe” is a good starting point. The “Att Linear” and “Att Square” are parameters affecting the attenuation of the light with distance. Leave them to the defaults for now. Check “Day off” if your lights are going to be off during day time. The Flashing mask defines (you’ll never guess!) the flashing of the lights. Try values like CCCC, 8888, DDDD. If set to 0 the lights stay on continuously.

Library

Library New

Both selections place library objects. You need the GUID of the object. Use the “Library Tool” button to open the library browser. Copy and paste the GUID exactly as displayed in the browser window. The “Search Results” will display the last browse results.

The difference between “library” and “Library new” is the placement method. The first uses the SCALE command to position the object in space while the second uses a faster method. Use the second; the “Library” will be disabled in future versions.

Effects

Effects. This is one of the effects that exist in your fs2002 “effects” folder. The list is populated by a text file called “fx_list.txt” in your fsregen folder. If you want to add or remove effects edit this file. Not all effects work in scenery. Experiment and see. Check out the fx_sparks, fs_spray, fs_steam1 and all the fireworks and smokes. The fx_aurora is quite impressive too... now you can have it over the equator...:-) Please note that in order to see any effects you must have them activated in the display settings of fs. They are also affected by the “effects detail” setting.

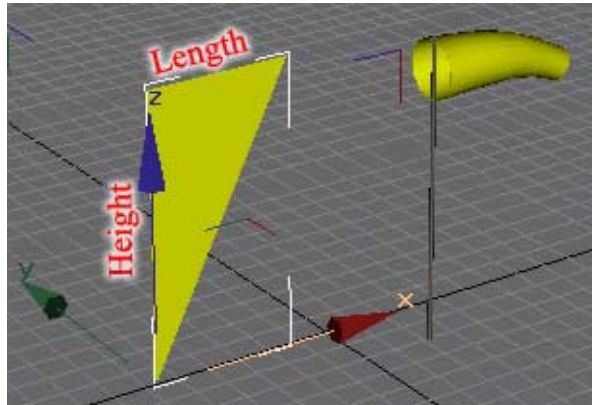
There is a problem with the placement of effects related to their altitude. This is the reason why you have the “On the ground” and “Terrain elevation” controls. If you create your effect-triangle on the ground (in gmax), check the “On the ground” checkbox in fsregen. This will use a different command in BGL that will take in consideration the terrain elevation and place the effect right on it. You can try and raise the effect triangle in gmax and still check the “On the ground” checkbox. The height offset will be passed to BGL, and in some cases it works fine.

The alternative is to place your effect at the height you want, uncheck the “On the ground” and set the elevation of the terrain in “Terrain elevation”. This must be in feet, and you can find it by going into slew mode (in FS take the default Cessna on the ground and use the indicated altitude on the top left of your screen).

Note: the effects are also placed with the old “SCALE” method. It will be replaced in the future with the faster “TRANSFORM_MAT” method.

Windsocks

A windsock is created in gmax as a triangle. The size of the triangle represents the size of the windsock, and the diffusion color its color. The color of the mast can be set in the parameters window of fsregen. As shown in the picture below, the triangle must have its plane perpendicular to the ground plane. The lower point is the where the mast will be on the ground. The size of the vertical side will be the height of the mast and the size of the horizontal side the length of the socket. You can have the windsock lighted at night, by checking the “Night light” checkbox in the properties window of fsregen.



Example of windsock in gmax. To the right you see a representation of what you get in fs

- Click on step 4 “Process” button.
- Go to step 2 and select the next material. Repeat the step 3 and 4, creating another effect or light.
- Once finished click on “Save” in step 5. Once Green, you are done. All you have to do is compile.
- Open a command prompt window, go to the c:\tmp\fsregen folder.

Type : **bglc /bgl test.asm**

You should get no errors and get the prompt back.

- Copy the test.bgl file to your addon scenery\scenery folder and enjoy the view....

Aircraft Design

Lights

This is just like the scenery lights, only operated by the aircraft light switches. Follow the method described in the scenery section, and in the parameters window select the light type. Also you can select the time variable that controls the flashing of the lights. This is useful for putting lights on flexing wings. The standard way of lights would leave them behind as the wing goes up and down.

Flexing wings.

Well, they do. So here's how to create them.

First design your complete model. It's a good practice to keep everything in easy selectable groups, you will need them later. The general idea is to have the fuselage drawn all the time, and depending if you are flying or not, have the "high" wings or the "low" wings.

So copy the wings to a new gmax file and make them look "loaded", bent that is.

Export the following :

- Full model e.g.. test_all.mdl
- Fuselage e.g. test_f.mdl
- Wings only with all moving parts and lights in the normal/low position e.g. test_wl.mdl
- Wings in the high position as above. I have not tested having both high and low wings in the same gmax file, I do not know if it creates problems with the lights and animations.

Go in fsregen and click on "Wings - shadow". In the "model modifier" window that appears, check the "flexing wings" checkbox and select each file in the appropriate text box. Leave "shadow optimization" unchecked for now, and click on "Process Aircraft". If all went well, you should have the MASM source code ready for compilation under the filename that is in the "Complete model" textbox.

Go in a dos prompt, switch to the working directory and compile with :
"bglc /mdl test_all.azm"

That's it. You should get no errors.

Shadow optimization

This is an idea of mine that proved to be very good :-) The principle is this :

When fs puts an aircraft on the screen it does it in two main steps (this is for the outside view). It first passes the COMPLETE model to the shadow mechanism which processes the code and creates the shadow on the ground. Then the same model is passed to the graphics engine again for a visual creation on screen. As you understand, specially with complicated aircraft, the engine wastes a lot of time, just to create an outline for shadow projection. Check to see the massive difference when both scenery and aircraft are complex. You get a big boost on frame rate if you switch shadow off.

Now, if we could pass an oversimplified version of the aircraft that creates the same or almost the same shadow, we get the benefit of saving the processing of the whole model. This is done with the shadow optimiser. Get a copy of your one-million triangles aircraft, put it in a new gmax file and show no mercy... All internals can go. The fuselage can have just 6 sections. You will NOT see the difference. Then use the "optimiser" modifier in

gmax (You should always do anyway...). The decision on how low to go is yours. You will be surprised with how much stuff you can get rid off. The more the better.

Now export the shadow model to another file, let's call it test_sh.mdl.

In the “model modifier” window of fsregen, just check the “shadow optimization” and select the exported file. If you have flexing wings, select them as well and process... Please, do some frame rate comparisons. You will be surprised....

Tools

Library tool

The main purpose of this tool is to help you explore the fs library.

“Search selected Directory” will search the selected directory and all subdirectories for any bgl files with library objects in them. It will then list the contained objects and all the required details to call them from your code, or place them with fsregen.

Clicking on any displayed bgl file will display all the header information and give you a concise description of what it's contents are. If any library objects are found, all the related details will also be listed.

Many library files found in the fs library, are limited to some geographic area. You can see if a library is limited by observing the Lat and Lon boundaries. If you want to make such libraries and their contained objects available for placement worldwide, select the file and click on the “Make universal” button. This will create a backup of the original and modify it accordingly for universal usage. By clicking on “Revert to original” the modified library file is deleted and the original is brought back to active duty.

Library Compiler

Gmax, once mastered, is the ideal tools for 3D object creation and the produced code executes very fast. Now you can convert objects created with gmax into libraries and use them from any design program you wish. This is what this tool does. Here's how to create a library :

Create a number of objects in gmax.

Export each object in a separate bgl file. Place them anywhere you want; the coordinates will not be used when the objects are compiled into a library.

Open each .asm file in the “New object details” text box. For every object you will find two .asm files. Assuming one exported file was named “test”, a test.asm and a test_0.asm will be created. Select the first. Once opened, various parameters are read and the textboxes filled as required. Modify the name if you want, and make sure you define a GUID that is unique throughout the fs library system. The program does not check this yet, so it's up to you to avoid any duplication.

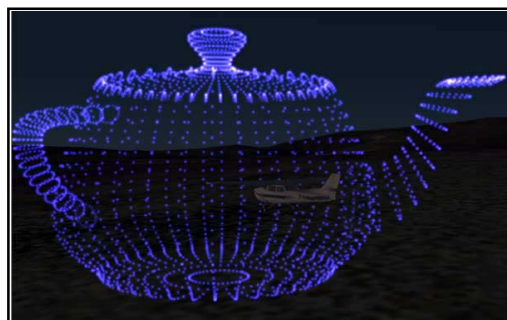
Click “Add to list” and repeat the procedure for all previously created objects. Do not forget to change the GUID for each one. Select any file from the list to modify the parameters and click on “Modify” to commit any changes made.

After your list is complete, select the output file and click on “Create Library”.

Compile with `bglc /bgl <outputFileName>.asm`

Tips

- A good idea would be to export lights and effects in a different bgl. Select them and use “export selected” from gmax. This way you can have as many different objects as you like, not just 7 that the fsregen will support in one source file. Also any problems should be easier to spot and isolate.
- If you create complicated objects with many vertices, then apply a special material, each vertex will have the chosen light, effect or library object. This way, you can create complicated arrangements of lights or effects very easily. See the teapot further down.
- To create your scenery with it's main axis parallel or perpendicular to North and then rotate it in makemdl, do the following :
In middleman assign a latitude with an error. For example if you want to place the scenery at “N10° 30.44’”, use “N10° 20;44’”. Note the “;” instead of “.” Makemdl will stop and give you a chance to correct it and at the same time specify a rotation.
- Rotation creates a whole new set of calculations for effects, so if you can, avoid it. The placement of effects with rotation may be less accurate in the x/y axis.
- The “Tools” section is part of a system for generating conditional display (such as animated sequences or flexing wings for aircraft etc. It is still under development.
- You can use the program for creating lights in plane models (.mdl). You can save the trouble of calculating and editing text files. The normal procedure applies, only compile with : “BGLC /MDL mymodelfile.azm” You can do it by modifying source code by hand.
- Check for latest version on www.nhreas.com/fsregen.html. As of March 2002 this utility is under heavy development.



ChangeLog:

27 Mar 2002 - v0.20a

- Support for the new makemdl from MS SDK
- Library browser supports compressed bgl files
- “Make libraries Universal” added.
- Support for placing library objects added
- Full support for aircraft lights controlled by the cockpit switches.
- Backing up files before modifications are applied added.
- Library compiler for gmax objects added

10 Apr 2002 - v0.08a

- major code rewrite.
- Library browser added.
- Support for flexing wings added
- Support for “GSO” - (Georgio Shadow Optimization :-) added.

1 Apr 2002 - v0.06

- Fixed bug - wrong BGL if no effect used.
- Added tools to rename labels (future use for this one)

25 Mar 2002 - v0.05

- Support for Windsocks
- Fixed bug - wrong color displayed in “Actual color”

24 Mar 2002 - v0.04

- Support for scenery rotation (in makemdl. see tips)
- Altitude placement of effects as Above Ground Level or Absolute.

22 Mar 2002 - v0.03c

- Effects support

20 Mar 2002 - v0.02a

- Bugfix : Material table changed in the wrong way - fixed
- Added Day/Night light support

15 Mar 2002 - v0.01b

First Public release - beta

12 Mar 2002 - v0.01a

Alpha Version released for testing

So long and thanks for all the fish...

O.K. that's it. Many bugs expected, error trapping to the minimum, so you do something wrong, you get the program crashing.

The accuracy of the effects placement leaves me satisfied not... but there you have it. Maybe in the next version.

Because the formulas required for effects placement in the globe were done by me (I couldn't wait until someone posted something), there is the possibility that in certain longitudes/ latitudes the program will misbehave. If you have patience and time, check it and report back any problems. Do not create scenery that is split in half by the 0 meridian.

Please e-mail me with all comments and bugs; having said that, I have to also tell you that I really enjoy making and sharing this... So I cannot understand why some people (thank God a very small fraction) cannot be polite when reporting problems. At the end of the day you don't like it, never ever use it. A big thanks to the rest of you for your kind words.

And please, if you use this program to create something, please mention it. That's all I ask you for it !

Cheers for now.

Many thanks to

Chris File for creating Middleman and making our lifes easier.

Paul Springthorpe for all the motivation and his suggestion to do aircraft processing like flexing wings, lights etc.

Bill Potvin for his unique sharing of amazing knowledge of fs workings.

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George Ioannu

george@nhreas.com
