

How to make a scene for products with the help of Album3DEngine

Designer guide

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Introduction

Album3DEngine resources consist of the following components:

- Models of galleries (for instance, a room, a museum, etc.), where photo frames are placed;
- Models of photo frames, i.e. models without photos in a special format that determine where and how a photo will be placed.

The engine accepts files of its own format *.alb3d for scenes and of *.3ds format (*3D Studio* format) for frames. Dynamic lighting is not supported. That means that it is necessary to render the global illumination (GI) of the scene and save it in light maps, which are then loaded as textures. Such a scheme is a standard one, let us say, for game applications.

This guide presupposes that modeling is performed with the help of *3ds Max*, while rendering of global illumination and data export in *.alb3d format are performed with *gile[s]*. Global illumination for frames can be rendered in *3ds Max* itself.

Required software

Creating models of scenes and frames requires the following software:

- *3ds Max*;
- *gile[s]* (<http://www.frecle.net/giles/>);
- plugin for *gile[s]*, which serves to export data in *.alb3d format¹;
- *Album3DNavigator*, which serves to view created models of scenes and frames¹.

Creating a gallery

The process of creating a gallery (see Fig. 1) comprises 3 steps:

- Geometric modeling with the help of *3ds Max*;
- Rendering of global illumination with the help of *gile[s]*;
- Viewing the results in the album.

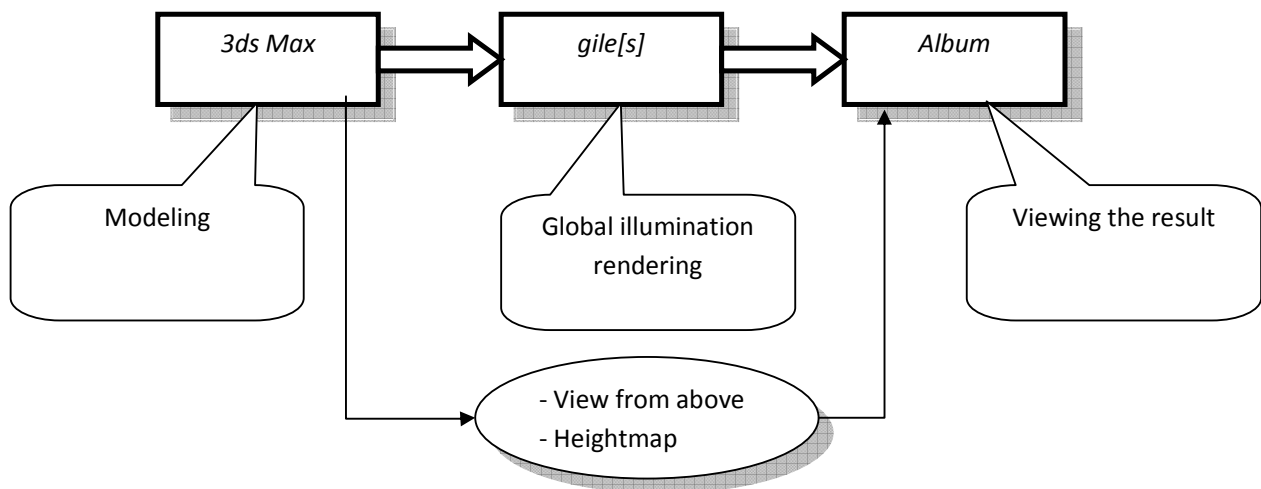


Figure 1. The process of creating the model of a gallery

Step 1: Modeling with 3ds Max

With the help of *3ds Max*, create any scene with the following attributes:

Geometrical structure:

- All sizes should be given in centimeters.
- The floor is at Level 0 (z=0).

¹ It is an internal product and it must be delivered with the current guide.

- The initial position of the camera in the engine is (0, 0, [the height of the avatar]). This point must be placed in the open space inside the scene, so that it is possible to move out of there during navigation.
- The ceiling should be 2.2–3 meters high (i. e. 220–300 cm). It's safer to make it high rather than low.
- There should not be any steep ascents with the up gradient over 45 degrees.
- The stairs of the staircases should not be higher than 30 cm.
- Passages should not be narrower than a meter. For the same reason, there should not be any narrow doorways.
- A multi-storey arrangement of photos is unacceptable, whereas it is possible to place photos at different levels. The reason for this is that the automatic navigator orients itself by the view of the scene from above and it will not be able to correctly approach the photos situated under the floor of the upper storey (Fig. 2).

Characteristics of geometry and textures:

- Geometrical complexity should be 8,000–20,000 polygons.
- Texture size should not be larger than 512×512.
- Only diffusive textures can be used.
- Only diffusive color and glossiness can be used for materials.
- JPEG format is advisable for textures. For semi-transparent textures, TGA format should be used.
- Mirror-like surfaces are not supported.
- *3ds Max* makes it possible to arrange lighting sources. They will be exported correctly for further rendering of lighting textures.

Note: lighting textures and textures of materials used in *3ds Max* are different (the engine employs multitexturing).

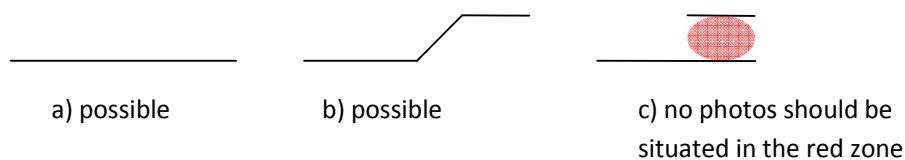


Figure 2. Examples of correct and incorrect geometry (side view).

Step 2: Creating the view from above and the heightmap.

The view from above and heightmaps are used to generate automatic navigation around the gallery. This step is *not obligatory* for creating a gallery and viewing it with *Album3DNavigator*.

However, this step is compulsory for using galleries in programs employing an automatic navigator.

The following 3 files need to be created:

- The view of the scene from above (in orthographic projection);
- A heightmap for the view from above (the images should correspond to each other);
- Xml file with the determined correspondence between the images and real coordinates of the scene.

Creating the view from above

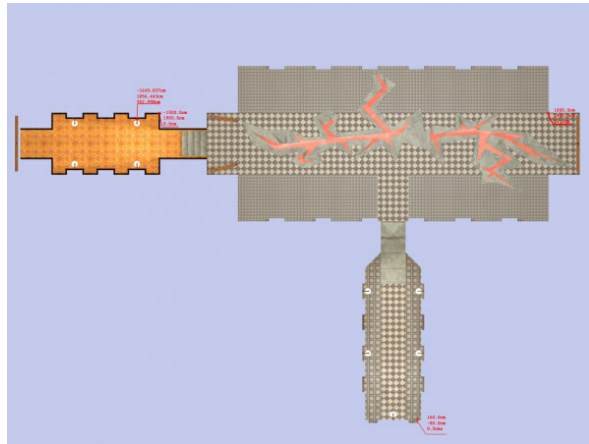


Figure 3. An example of the view from above

Creating a heightmap

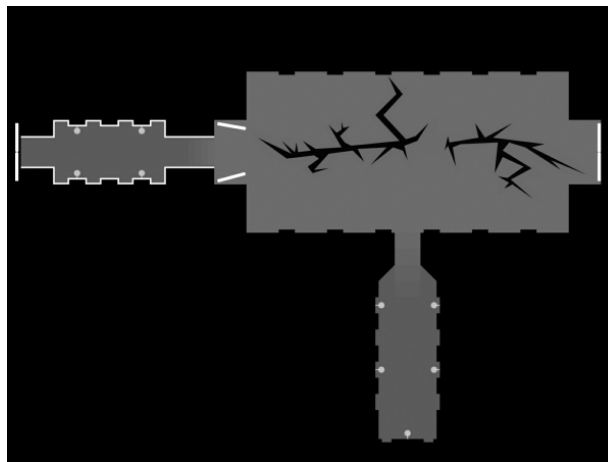


Figure 4. An example of a heightmap

Creating an xml file with correspondence

```
<Translate version="1.0">
  
  <map ImagePt1 ='1377, 280' ImagePt2='1046, 1061' ScenePt1='1000, 1900, 50' ScenePt2='160, -60,
0' />
  <zlevel z = '0' />
  <frames src="castle.gal"/>
  <depth src="castle_z.jpg"/>
</Translate>
```

Figure 5. An example of a correspondence file

Step 3: Exporting the scene (3ds Max → ASE → gile[s])

- Export the scene from *3ds Max* into ASE format (it is necessary to export meshes, normals and materials).
- Check that all textures are in their proper places (usually near ASE file).

Step 4: Planning global illumination (gile[s])

Note: If you are not familiar with *gile[s]* or other programs for creating light maps, it is advisable to get some practice creating light maps for simple scenes.

- Load the ASE file exported from *3ds Max*.
- After the scene has been loaded in *gile[s]*, make sure that all the textures were loaded and all the materials were exported/ imported correctly. All the details can be adjusted in *gile[s]*.
- To render the lighting correctly, you will probably need to adjust the position, brightness and color of the lighting sources, because lighting models in *3ds Max* and those in *gile[s]* differ.
- Then you will need to assign light maps (textures) to different materials of the scene. This operation requires practice, because if the same light map is assigned to all the materials, its resolution may not be enough. A separate light map can be assigned to each material.
- It is important to set the parameters of assigning lightmaps to parts of the scene correctly, so that the lighting quality is improved (see help file for *gile[s]*).
- **Note:** The size of light maps cannot be larger than 512×512!

Step 5: Exporting the scene to the album (*gile[s]* → *ALB3D* → *Album3DNavigator*)

- To export the scene to the album, install *gile[s]* plugin for performing export to ALB3D format. To do so, copy the file `album3d_giles_exporter.dll` to `C:\Program Files\gile[s]\Plugins\Exporters\` and restart *gile[s]*.
- The export of the scene is performed through the menu: File > Export > Export Scene. This is done after the light maps have been rendered. Choose “Album 3D Exporter (*.alb3d)” in the list of formats. The *.alb3d file and the set of images (light maps) will be saved.
- Place the generated files into *Album3DNavigator* resources, so that it is possible to view the created geometry:
 - All the resources are situated in the ‘`$ALBUMDIR\resources`’ folder. ‘`$ALBUMDIR`’ is the folder, into which *Album3DNavigator* was installed.
 - Let ‘`$SCENE`’ be the name of the created scene.
 - The ‘`$SCENE.ALB3D`’ file and all the light maps should be placed in the following folder: `$ALBUMDIR\resources\scenes\shared_textures`.
- After that, you can launch *Album3DNavigator* (`$ALBUMDIR\bin\Album3DNavigator.exe`)
- To open the scene, choose the left icon (New Gallery), pick the name of the scene (`$SCENE`) in the list and hit OK button.
- The scene should open then. You can perform navigation using the keyboard (either arrows or WASD keys).
- If you face any problems, see if ‘`$ALBUMDIR\bin*.log`’ files contain any messages about textures that have not been found, etc.

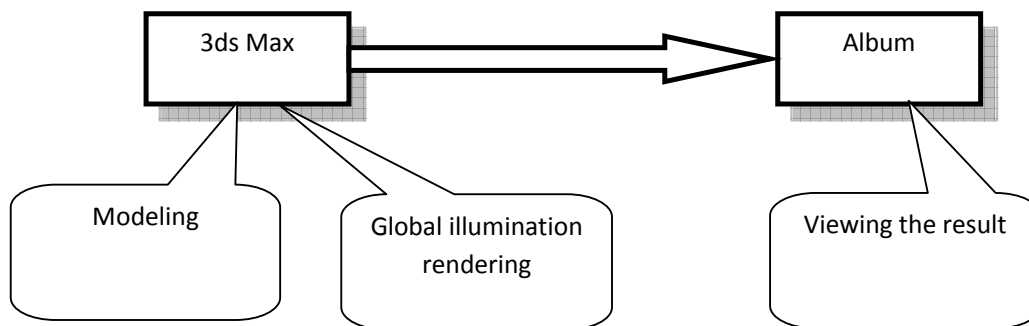


Figure 6. The process of creating the model of a gallery

Creating a frame

Photo frames can be of 2 types: flexible and static. The size of flexible frames is customizable, whereas the size of static frames cannot be changed. However, the shape of flexible frames is restricted to make them flexible, while static frames can be of almost any shape.

A frame is created as a separate *.3ds file with textures.

The engine accepts *.3ds files without lighting, i.e. only textures with the lighting rendered beforehand – the ‘Render to Texture’ function in *3ds Max*). Since frames can be situated in different places of the scene, the lighting for them should be rendered in a ‘unified’ way (usually from above), like when creating scenes (Render to Texture).

Note: Unlike in ALB3D format, only one texture is supported in *.3ds files, i.e. lighting must be rendered together with the texture of the material.

Step 1: Modeling and rendering global illumination (3ds Max)

Geometrical sizes and parameters

- All the sizes should be given in centimeters (usually, frame sizes range from 20×20 to 200×200 cm).
- The number of polygons should range from 100 to 300. (Only in special cases, due to a prior arrangement the number of polygons can reach 500).
- Texture size should not be larger than 512×512 (the smaller the better).
- The middle of the upper side of the frame, oriented along X axis (the view from above), should lie exactly at the point of origin.
- The frame should be moved along Z axis at a distance of 5 to 15 mm (so that X axis is situated behind the frame). It is necessary for the frame to stand out against the wall.

Static frame

The file name of a static frame should contain ‘static_frame’, like ‘static_frame....3ds’.

There are two objects:

- The frame itself (with the name ‘frame’) and
- Photo plane (with the name ‘ph_plane’).

IMPORTANT! The number of materials should amount to two (the number of objects is equal to the number of materials).

Flexible frame

The file name of a flexible frame should contain ‘flex_frame’, like ‘flex_frame....3ds’.

There are nine objects:

- The top left corner (with the name ‘t_l_corner’)
- The top right corner (with the name ‘t_r_corner’)
- The bottom right corner (with the name ‘b_r_corner’)

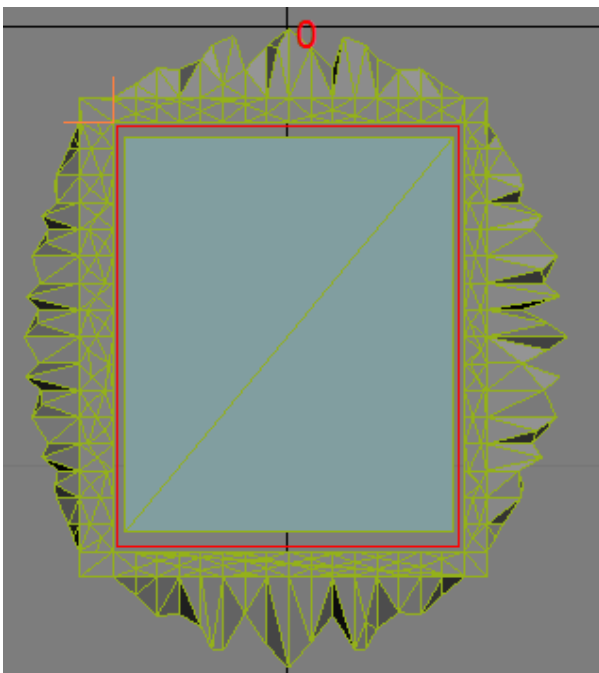
- The bottom left corner (with the name 'b_l_corner')
- The top side (with the name 't_side')
- The right side (with the name 'r_side')
- The bottom side (with the name 'b_side')
- The left side (with the name 'l_side')
- The photo plane (with the name 'ph_plane')

IMPORTANT! The number of materials should amount to nine. (The number of objects is equal to the number of materials).

The red color in the picture denotes that the middle of the upper side of the frame lies exactly at the point of origin.

The inner sides of the frame form a rectangle.

The pink color in the picture shows how corners and sides of the frame should be put together.



Step 2: Exporting frames to the album (gile[s] → ALB3D → Album3DNavigator)

Exporting to 3ds

Export to 3ds is performed in a usual way. Textures should be placed together with the *.3ds file.

Loading frames in Album3DNavigator

- Place the *.3ds file together with textures into the catalogue \$ALBUMDIR\resources\frames.

- Run *Album3DNavigator* and load the scene.
- Right-click any object of the scene.
- In the drop-down menu, choose 'Add frame'.
- The dialog box should display the preview of the created frame. When you click it, the frame finds its place on the wall.
- If you face any problems, see if '\$ALBUMDIR\bin*.log' files contain any messages about textures that have not been found, etc.

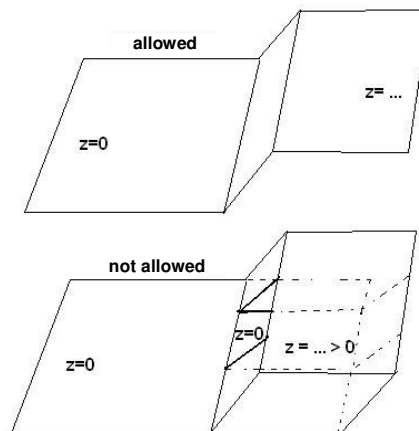
Frequently asked questions

What is the total number of textures per scene?

The total number of textures per scene is about 15–25 (we do not take into account lightmaps). A material cannot contain more than one texture, because later on, after lightmaps have been calculated, one more texture (a light map, actually) will be attached to it. The 512×512 size of textures is allowed, but still it is advisable to make textures 256×256 in size (the reason is that productivity decreases considerably on computers with insufficiently modernized hardware).

I did not quite get your explanation of the fact that many storeys are unacceptable. If we take a room, for instance, there is the ceiling, the floor and the walls. So, in fact we have two storeys: the floor and the ceiling, which actually corresponds to Figure 2. Could you explain it in a more detailed way?

Naturally, we do not take the ceiling into consideration. That means that there should not be another storey under the floor.



How will glossiness affect the look of the object in the engine?

The look of the object will not be affected. Only diffusive parameters are used.

Which parameters of light sources should be taken into account when rendering lightmaps?

Rendering of lightmaps is performed not in *3ds Max*, but in a separate program! You can find this program here: <http://www.frecle.net/giles/>

The parameters you should take into account are position, direction, radius, color and intensity.

Is Radiosity used when calculating them?

Photon mapping is used.

How is an object determined as a photo frame?

Frames are dynamic objects. They are placed in the gallery that has already been finished, but not at the stage when the scene is still being modeled. In other words, there should be no frames in the scene, but there MUST be places, to which frames will be 'attached' later (they are surfaces with the size of 1.5×1.5 meters).

Are semi-transparent objects supported?

Yes, they are. There are Alpha values in vertices and Alpha Channel in textures.