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Report “Beyond 3D Computer Visualization” AR0771

I am delivering, together with this file, a pdf version of an A1 150dpi poster render, the Maya 2020 project directory and the .sbs file I have created in Substance Designer.

Geometries

The scene is supposed to be the interior of an alien spaceship which holds a weird liquid tank in the middle and weird devices. I have tried to emphasize the liquid tank in the middle increasing the lighting in this zone compared to the lighting in the back. However, even if the lighting in the back still looks too bright, I choose to leave it like this, because that’s how I imagine a spaceship.

All the 3D models in the project are modeled by me. The scene is composed of mainly polygon objects, apart from the mirror on the left (there are other 3 of them hiding behind the liquid tank in the middle, which can be seen if the camera is moved slightly upwards), which is a Nurbs surface.

For the aforementioned Nurbs surface, tessellation settings have needed to be tweaked in order to get the curvy mirror effect. If we zoom really close to the mirror, the tessellation can be seen, but I was quite satisfied with the achieved result, so I didn’t increase the tessellation even more because the rendering time was already quite high.

All the geometries in the background are quite simple, while the “computers” and the central tanks are the most complex ones. The tank structure has been created using the “duplicate special” function.

Lighting

Is it quite visible from the render, that there is a lot of lighting in the scene. The scene is in fact mostly illuminated by indirect light. The background has some small area lights and some emissive parts. The central tank is illuminated by a central spotlight and some small area lights (one for each side), which have been set as kind of spotlights changing the “spread” values. The central tank also has lots of parts with emissive blue light.

Finally, the “computers” show lots of blue, green, red and yellow emissive parts. The screen are themselves emissive. Finally, a special note needs to be done about the 5 lights on the top of the computers. Each computer in fact has 4 green lights and 1 yellow in the middle. The 4 lights are made as an emissive semi-sphere inside an “opaque glass” semi-sphere. On the contrary, the central yellow light is a point light inside an opaque glass material. I find that the 2 ways of designing this kind of “scattering” light, gave very different feelings, so I choose to leave both.

Materials

The 2 materials called in the project file “Walls” and “MetallicBlues” have been taken from the website 3D Textures (https://3dtextures.me/). The first one covers the left wall, while the second one cover the floor, the ceiling and the left wall in the background. All the screen textures and the “stars” texture in the background have also been taken from online sources.

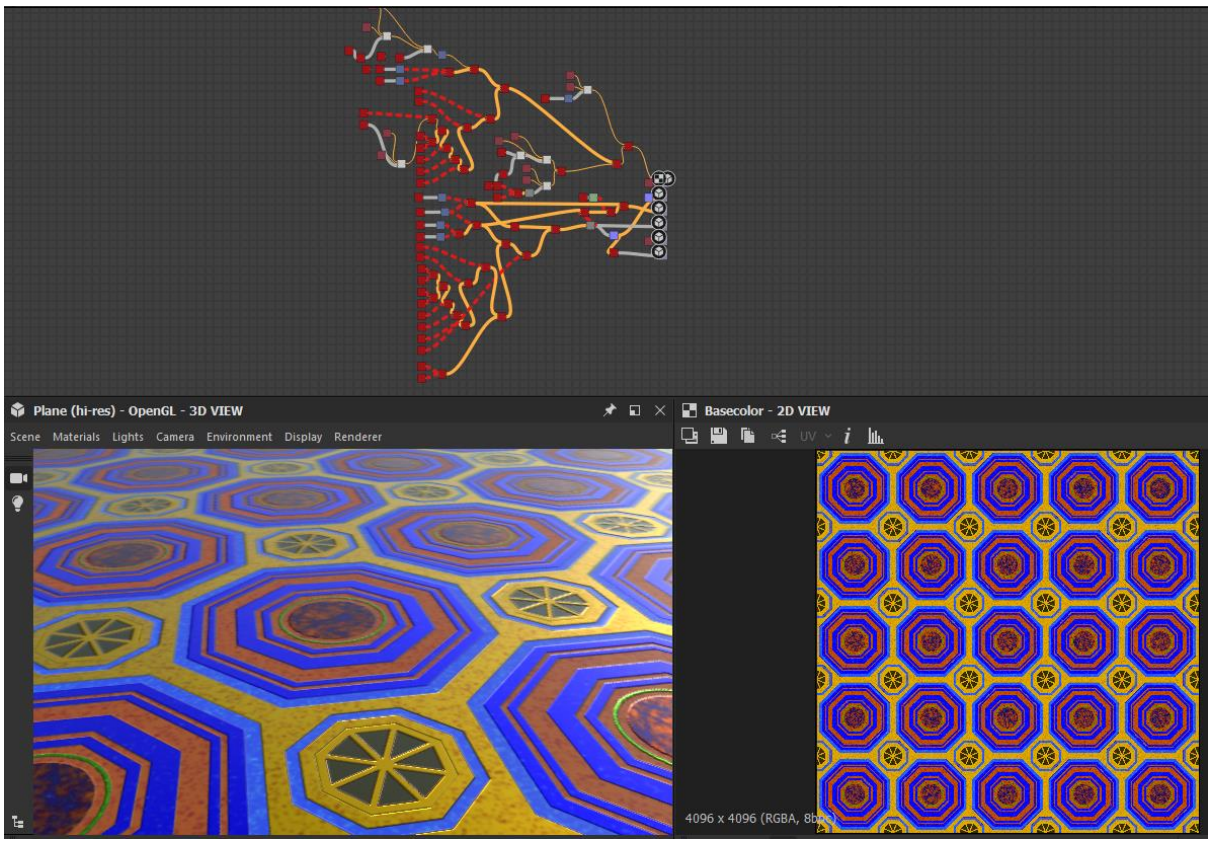
All the other materials in the scene were design by myself using the aiStandardSurface material provided by Arnold.

There are 3 types of transparent glasses in the scene. The one holding the liquid which has very low specular value, the glass window in the background which has high value of specularity and reflects the lights in the scene, and the opaque glass holding the lights on top of the computers.

The liquid in the tank has a green scattering value, which gives the opaque feeling and which makes the bubble in front very sharp and the objects in the back very blurred. It also has some “Dispersion Abbe”, which gives the rainbow colors to the objects in the back.

The bubbles are made tweaking the “Thin layer” parameter in the aiStandardSurface material.

Finally, the octagonal floor material has been made by me in Substance Designer, trying to recreate some kind of weird marble colored floor. The picture below shows a screenshot from the Substance Designer interface. Normal mapping has been used for this material aswell as for the Walls and MetallicBlues to simulate 3D material. An attempt of using displacement mapping was done for the octagonal floor, but the visual appearance was not improving too much compared to the normal mapping, while the rendering time was increasing dramatically.



Rendering and Possible Improvements

I have tried to keep the rendering parameters as low as possible. Due to the complex nature of the scene (lots of transmission, diffuse lighting and scattering), the rendering time was incredibly high.

Some artifacts are in fact present in some parts of the scene.

The ceiling for example shows some quite disturbing artifacts which I think are caused by the diffuse sample or diffuse rays parameters. The diffuse sample was already quite high, so I could not increase it even more because the rendering time was also already high. I also noticed that I did increased the diffuse and specular rays too much, which is not needed in this scene but I had no time to redo the rendering with lower settings.

I can say the same for what concerns the floor, the wall and the gold chrome parts in the background. All these parts show some artifacts, which I personally suppose could be due to the very high number of indirect lighting and so to the diffuse parameters.

Other improvements could have been done increasing the subdivisions in the top surface of the liquid (polygon faces are visible).