Virtual Space Exploration

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***Abstract*—Virtual Space Exploration is a VR environment of the Moon and Mars where the user can live the experience like as if a person was is in space.**

The project consists of a virtual reality environment (VR) in scenarios of The Moon and Mars, which will allow the user to experience the experience from the point of view of a character in the first person, making the person experience the space in an environment totally simulated. This also has an Android version allows you to live the experience through a Smartphone along with a Google Cardboard. You also have the option of a menu to select the scenario, either the lands of Moon or the arid soils of Mars.

***Index Terms*—NASA, resources, rover, Moon, VR, Mars, gravity, space, exploration, cloud, mission**

I. Introduction

An environment in Virtual Reality offers the opportunity to explore unbelievable places that are either too difficult to reach or just plain impossible to go to them. It's an useful tool can be applied in many fields, also it's a method that allows people to study environments in a very detailed way.//Virtual reality is an environment with scenarios and objects that resemble reality. To create it, it is crucial to use some kind of software to develop a virtual environment and to experience it we can use many kinds of VR glasses/helmets.//In this project, Unity 3D was used to build the Moon and Mars scenarios, a repository was also needed to keep track of the evolution of the environment, no matter where the developer works it. Also the software is a little complex, but some elements are easy to put through drag and drop.

II. Develop of the Environment of The Moon and Mars

A. Unity 3D

We used Unity to create the Moon and Mars, its a useful software tool because it isn't too complex, in comparison to other software of the same type. Also, it can bring many templates options that we can choose between free items or pay items.

First, we download the software and install it in the computer. It's file-size is quite big, so it can take a time while it's installing. Then it's necessary to create an account to use the platform and follow the next steps indicated in the platform itself to finish this process. (1)

B. Creation of Moon and Mars

We use predesigned templates and many elements that come in the library package of it. Also, its easiest because the most important aspect to keep in mind when working is building the scenarios with the characteristics that we want to create.

For Mars we also used a predesigned package. We changed the default capsule model from the first person viewer for the rover. it was necessary to know the characteristics of Mars as it has a rocky surface, with large canyons, volcanoes, areas of dry lakes and craters around it. The reddish dust covers most of that surface. Mars has clouds and wind very similar to the earth. Sometimes the wind blows the reddish dust causing a dust storm. The small dust storms may become hurricanes and the largest can be seen from Earth. The great storms of Mars sometimes envelop the entire planet.

Mars has about one third of the earth's gravity. Therefore a rock fallen on this planet would slowly fall a rock that falls on the planet Earth.When designing the Moon, we also utilized a template and we needed to recreate the conditions of Moon, such as the movements of the player on the moon, gravity, etc.

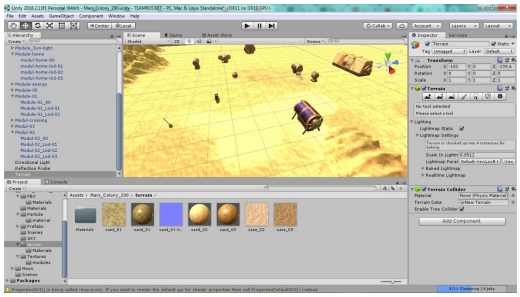

Fig. 1. The Environment of Mars

III. Rover Model For The Moon And Mars

We use a rover model from the NASA resources. This model has the purpose of exploring the environment of Mars. It belongs to the group of Mars Exploration Rovers (MER) and the objective of this is find answers about the water history of Mars. We set this rover in Moon and Mars as part of the stages.

To use this Model, we downloaded the file and then made a conversion from file Blender to .fbx. After, we can set it on the stages.

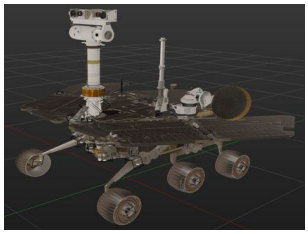

Fig. 2. Rover Model (MER)

IV. Adaptation To The User Interface

The user interface is a mode that is set in Unity so that the player can interact with the environment created in the software along with the elements added to it. The idea of the user interface is that the inexperienced have the opportunity to live the experience in these types of environments to improve their knowledge, paradigms and experiences. This is intended to facilitate the management of this with the help of elements such as menus and buttons.

This is achieved when the user uses a menu of options to choose some type of item or decide. In Unity this is achieved thanks to the GUI TEXTURE components, since with this you can edit the terrain more easily where the size and position of the user in the environment is adapted, this is also reflected in the graphics of the game.

GameObjectCanvas is one of the tools used to create this type of interface, since it contains elements to insert texts, images, menus, buttons, among others that help us in the development of the 3D environment. (2)

Currently for the user interface, many companies have chosen not only to limit themselves with smartphones, but have also included video game consoles that help make the experience more extensive and equitable among consumers, as this can be a great benefit because day by day this field continues to expand. (3)

V. Conclusion

3D environments are a very practical tool today because with this help we can help more people be integrated into the science of space, which they likely have never seen or may never see in such a way as they'll see the Moon and Mars. In addition, this can be applied in areas such as education and entertainment.

Unity 3D was a very important link for this project because thanks to this, we could resort to predesigned templates for the creation of the environments of the Moon and Mars. It provided us with several useful tools such as the positioning of objects, the different types of textures and terrains that we can provide to the space we want to design.

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