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GLOW2.0

Northern Periphery and Arctic

Deliverable D2.1.1 Concepts of the Virtual Planetarium

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From work package 2 in period 1 (12.2022 – 05.2023) the activity 2.1 – Developing the requirement specification for the immersive technology/virtual planetarium, generated two deliverables:

- D.2.1.1 – Concepts of the virtual planetarium
- D.2.1.2 – Technical specification

1 Introduction

Before starting the development of the virtual environment, desired features and functions needs to be addressed first and followed by a concept phase. Also, the level of immersiveness and interactions should be specified early in the project as a part of the scope.

The virtual environment could then be built in 4 stages:

- First stage is to create stars and planets.
- Second stage is to establish the locations where the “virtual tourist” is spectating from.
- Third stage could be implementing storytelling with a narrator.
- Fourth stage could be a preview of a real video or photograph captured from that location.

The application made and displayed for showcasing is suggested to be primarily developed to exclusive locations that are equipped with high end VR computers and a high-resolution VR headset for the ultimate experience, and then secondary released to VR enthusiast that wish to have the experience from home.

2 Concept of the Virtual Planetarium

Due to other existing software and experiences that already are developed and presented on the market that are based on real pictures, there are not created any concept regarding these. The focus has been primarily put on the fully virtual planetarium, and this was decided in plenum with the other partners during the first meeting in Finland.

The first stage was development of the concept of a full-scale virtual environment with stars, earth, earth’s moon, with the possibility to control the day/night-time, clouds, and aurora.

The second and next stage will be to recreate the selected location into the virtual environment, the location selected to start with is Ballycroy, County Mayo in Ireland.

The content used for creating the concept is gathered from [NASA](#) (Table 1).

Table 1 - Content from NASA

Name	Link
Star map – Milky Way	https://svs.gsfc.nasa.gov/4851
Earth	solarsystem.nasa.gov/earth
Mercury	solarsystem.nasa.gov/mercury
Jupiter	solarsystem.nasa.gov/jupiter
Venus	solarsystem.nasa.gov/venus
Saturn	solarsystem.nasa.gov/saturn
Uranus	solarsystem.nasa.gov/uranus
Mars	solarsystem.nasa.gov/mars
Neptune	solarsystem.nasa.gov/neptune
Earth's moon	solarsystem.nasa.gov/moons/earths-moon

2.1 Examples

Figure 1 illustrates how the stars around us look like outside Earth's atmosphere and this can not be seen with the naked eye from Earth, but it is possible to capture with a camera. The moon is scaled up 12 times to illustrate how accurate the textures and visuals are in a virtual environment. The moon is created with the real dimensions for the radius, distance, orbital radius, and orbital period.

In Figure 2 the Earth can be seen along with the sun and the ocean of stars surrounding it, the highly detailed star map also allows us to see other galaxies such as Andromeda and Triangulum. The Earth in the concept is created with real dimensions and accurate position in the solar system.



Figure 1 – Screenshot showing the Milky Way and Earth's moon.

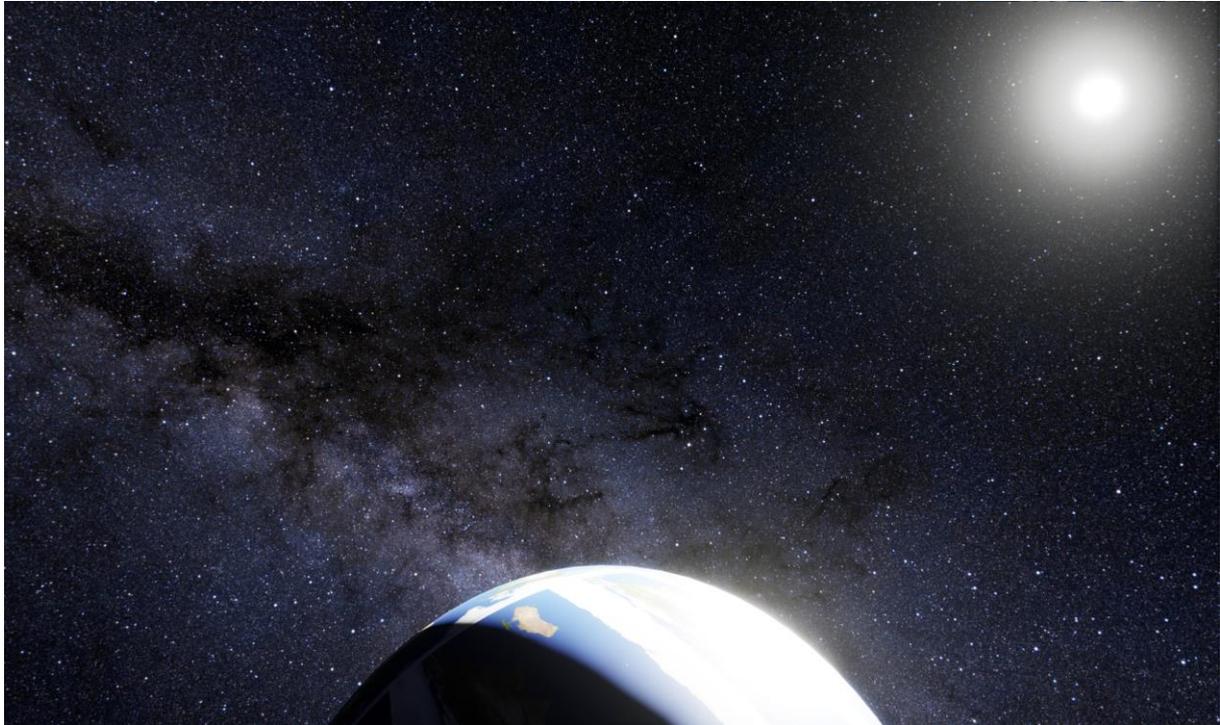


Figure 2 – Screenshot showing the Milky Way, earth, and the sun.

Figure 3 illustrates how users could experience star gazing that is similar to what they could observe in the real life. The atmosphere is toned down, so the stars are still visible and there is a layer of volumetric clouds and layer of 3D animated northern lights. When running the

software, the clouds and aurora is randomly generated and will never look the same, as in the real world.

As for Figure 4, the clouds have been removed to illustrate clear skies and northern lights.

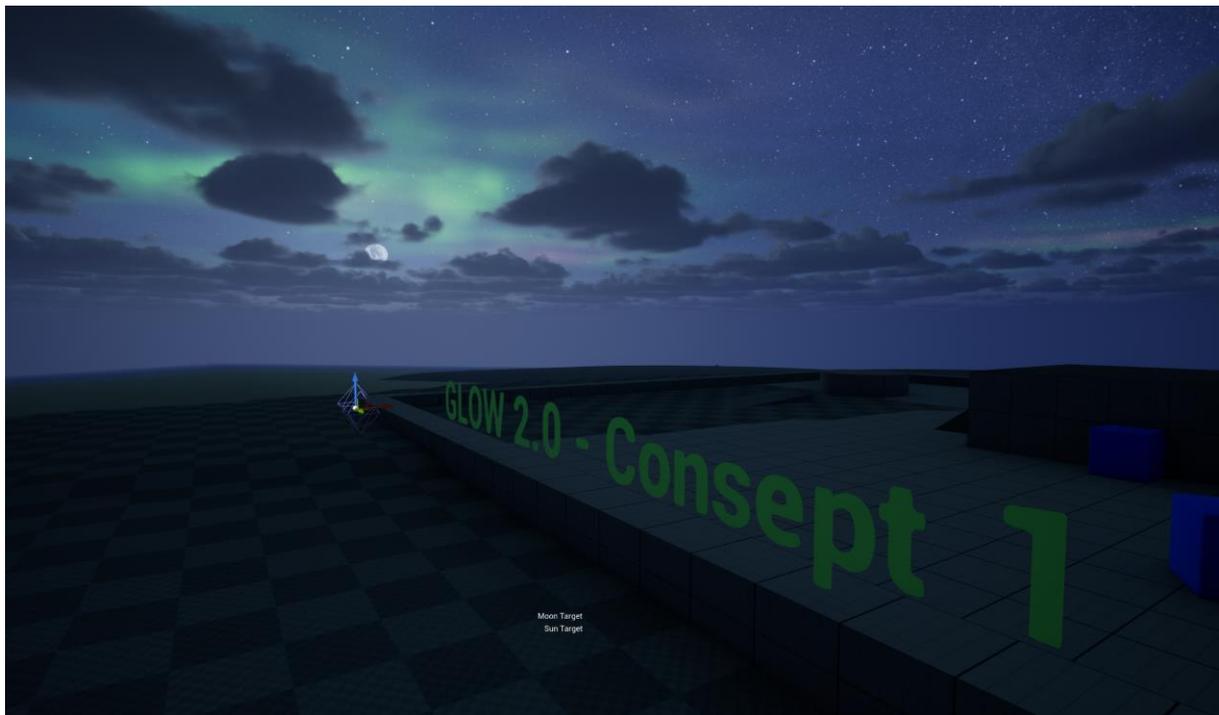


Figure 3 – Screenshot showing the stars, moon, clouds, and aurora.

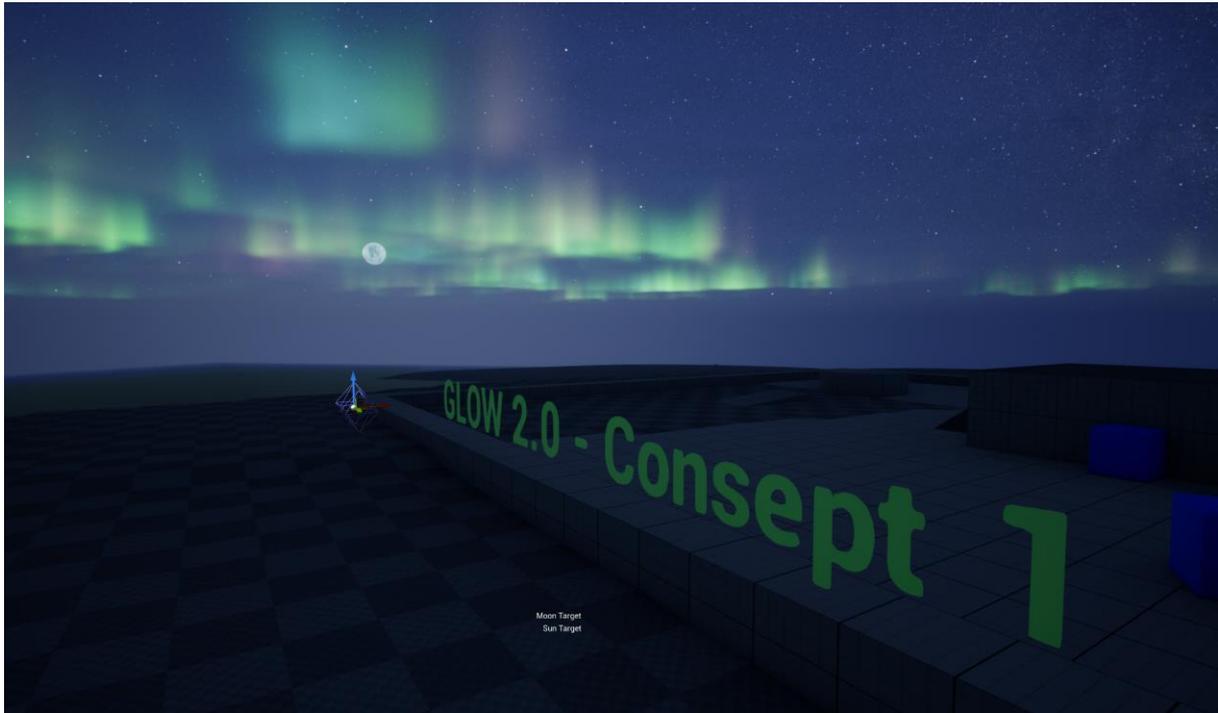


Figure 4 – Screenshot showing the stars, moon, and aurora.

2.2 Main menu

Within the concept there is also a basic main menu established.

Figure 5 illustrates the start screen for the virtual planetarium for the users. As for the main menu, the idea is that it shall be easy to navigate and do not have too many features as it could provide complexity for unexperienced user. At the same time, the menu will be accessible whenever the users need to either switch language or destination. Figure 6 illustrates how the menu is thought to function.

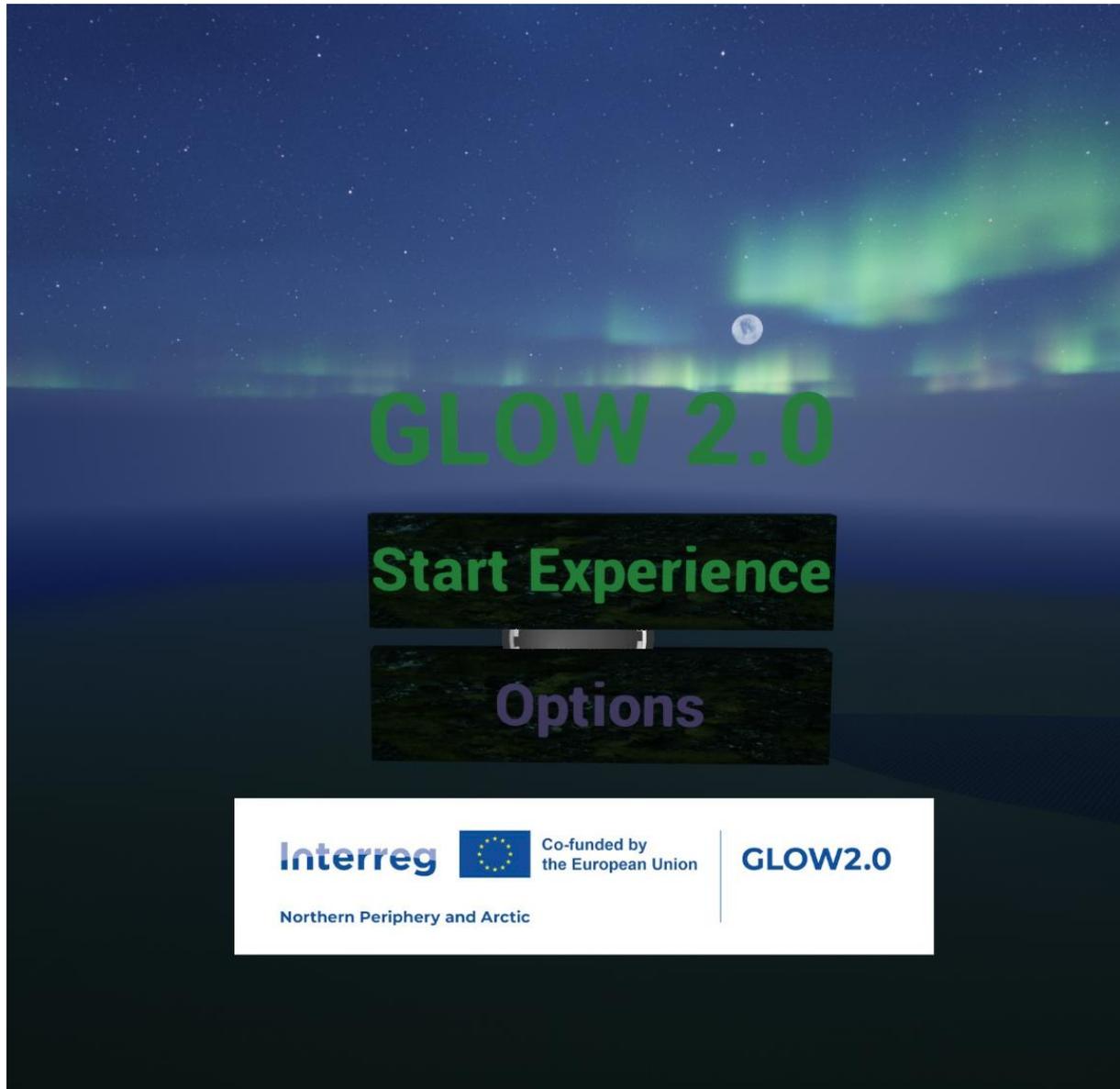


Figure 5 - Screenshot of main menu

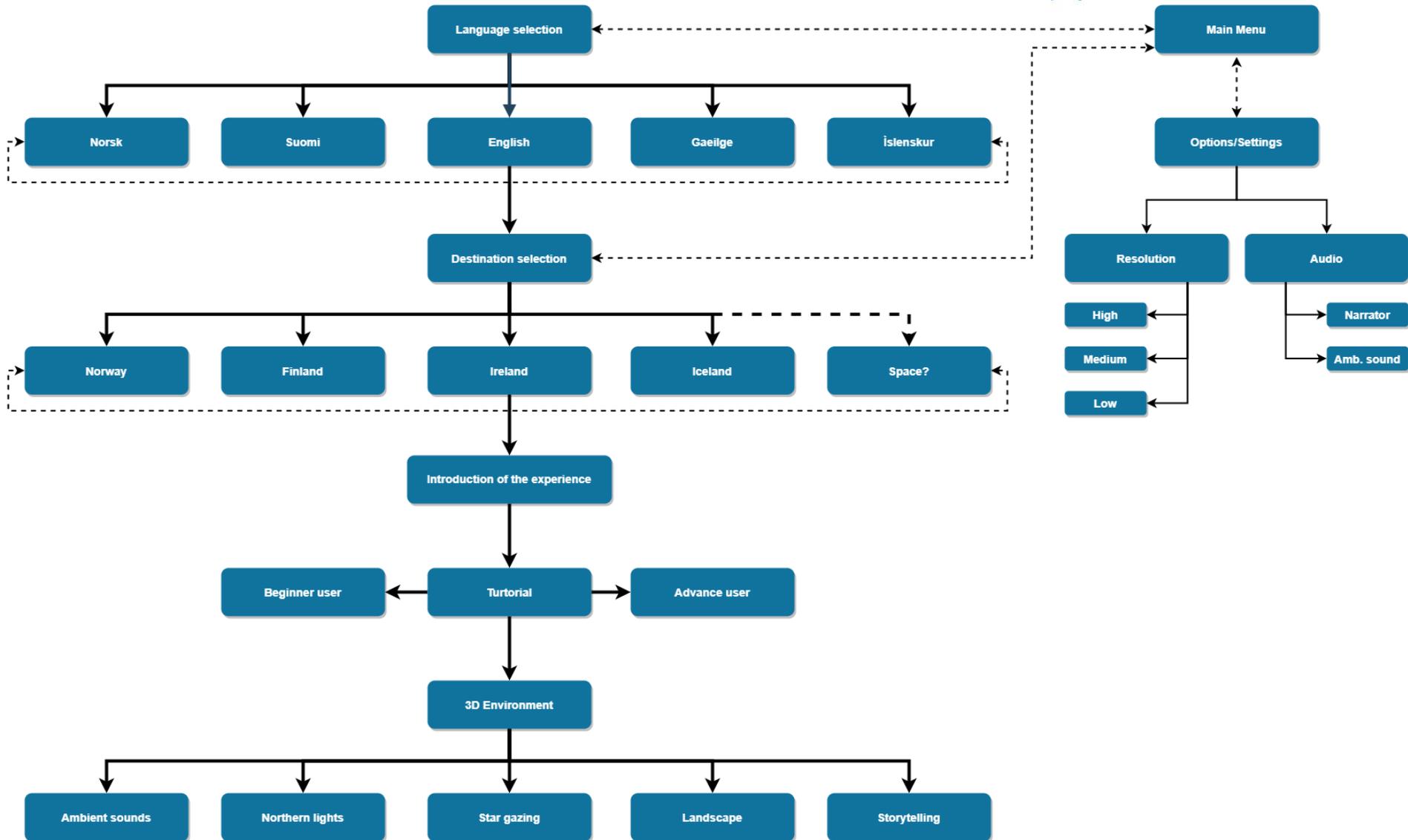


Figure 6 – Flow chart of main menu

FURTHER INFORMATION

GLOW2.0 - Green Energy Technologies for Tourism Project has been funded by Interreg Northern Periphery and Arctic Programme.

Link to project website: [NPA GLOW](#)

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