

Experiments with Space

Summary

The purpose of these first experiments is to investigate the use of two separate VR capture locations, physically distant, but virtually integrated in the same simulated space. We developed three scenarios: the first consists of a room with a mirror; the second of two rooms and the third combining the two rooms with a glass / mirror wall.

Magic Mirror

The first experiment consists of a room in which one of the walls is a mirror. In this setting, the player, Narcissus, can explore the replication and synchronicity of his actions. See Fig 1.

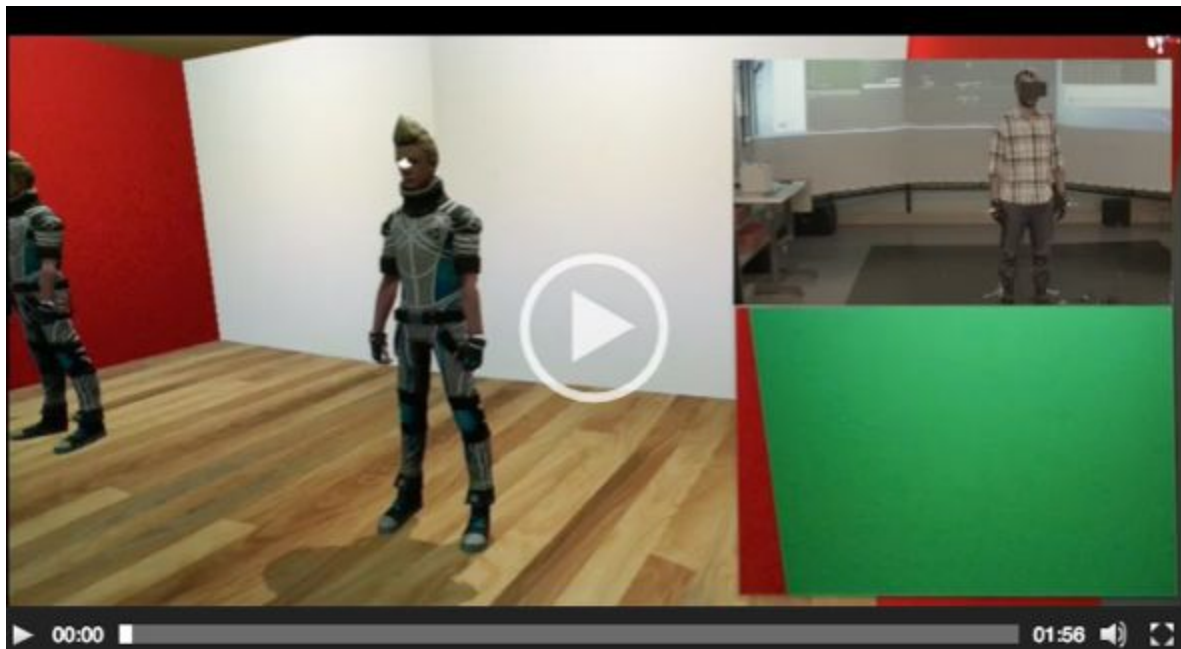


Fig 1. Episode 1: Narcissus

The hierarchy of this scene is shown below:



The object called *Ethan* contains the character model and the objects used for inverse kinematics, according to [this tutorial](#).

The *Mirror* object is a plane containing a reflection shader material.

Two Rooms

The second experiment consists of two rooms joined together at one of the walls. The VR capture locations are located in two physically separate areas distant to each other. But, in the virtual simulation these two spaces are fully integrated. There is also a virtual ball and the players can interact with each other through kicking the ball around from one room to the other, seamlessly. See Fig 2.



Fig 2. Episode 1: Let's Play Ball

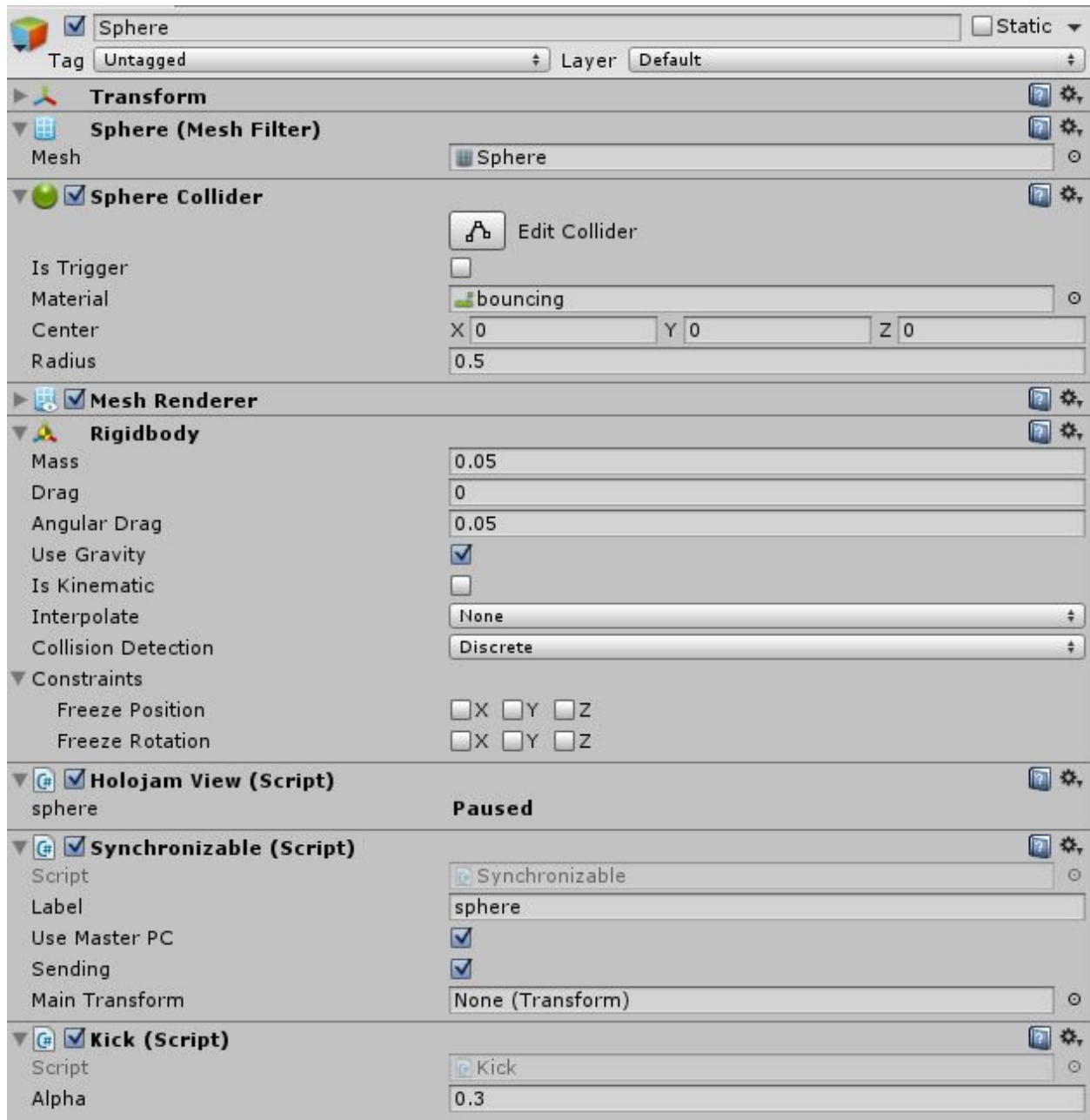
This scene contains the following hierarchy:



Room1 and *Room2* contain the planes that define the walls, floor and ceiling of each room. *GreenLantern* and *Sinestro* are the characters used.

Notice that *Sinestro* has only objects for his Head and hands, his legs do not move. We made it this way because this character was used with HTC Vive, which only tracks the head and two controllers (each one of them is mapped to a hand).

The Sphere object contains the following components:



There is a Synchronizable component to send the ball position and rotation to Holojam Server. The "Sending" flag is marked true only in one of the instances of the program. The Kick script component is used to add a force whenever some player touches the ball.

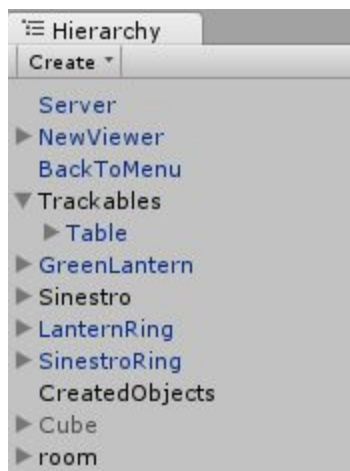
Mirrors + Rooms

The third experiment combines experiments 1 and 2. In this scenario now, the two rooms are joined at one of the walls, but this wall is made of a magic glass / mirror. The two players interact with each other dueling with lightsabers and wands that can create and destroy objects. See Fig 3.

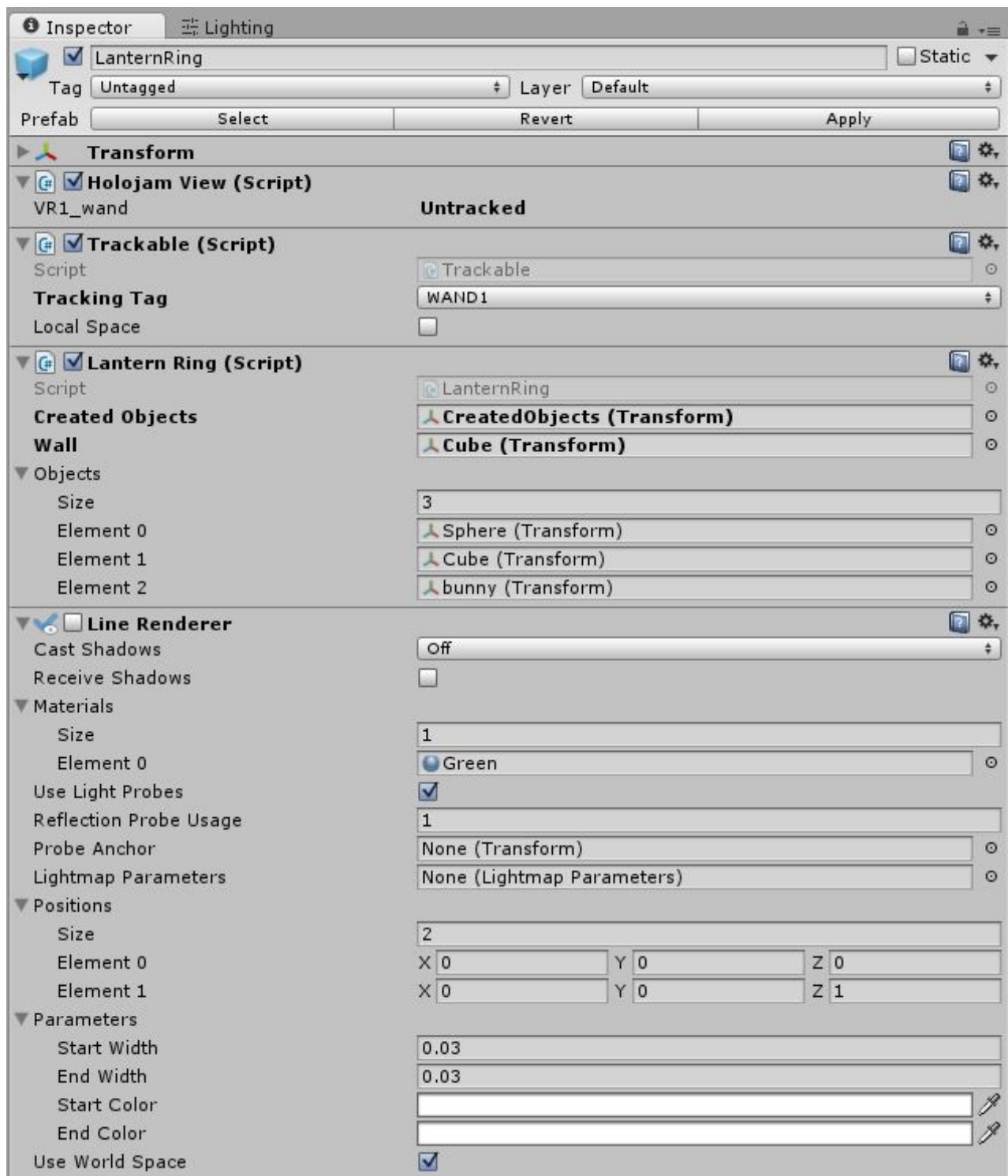


Fig 3. Mirror Wall - The Duel

This is the hierarchy of this scene:



LanternRing has the following components:



The *Lantern Ring* script component is used to create or destroy objects.

When the wand's button A is pressed, a ray appears with an object at its end. This ray is rendered using "Line Renderer" object. Before releasing the button, the user can move the wand to adjust the position of the object. After releasing the button, the object stays at the chosen position. The created objects are stored as children of "Created Objects".

When wand's button B is pressed, a ray appears and it destroys every object that was previously created with this same scheme, even if it was created by other user.

Wand's button 1 activates or deactivates the object defined by Wall attribute. It was used to control the wall with a mirror in this experiment.

SinestroRing object contains the same components, just using a different Tracking Tag, and also it does not have control over the Wall with mirror. This way, only *Green Lantern* can activate this wall.