Simulated Gravity—VR/AR
Semi-Finalist List
for
NASA HUNCH
Design and Prototyping 2021

Congratulations for being chosen as a Semi-Finalist for NASA HUNCH Design and Prototype 2021. Your design was chosen as a semi-finalist because you have a prototype that shows some or all of your idea, interesting/original ideas in your design, you did some valuable testing, and/or had some CAD designs that conveyed significant contributions. Despite the difficulties and not as many schools participating this year, I believe that HUNCH has received as good of quality of projects as ever. You should be very proud of your prototypes and ideas especially because of the difficulties surrounding this school year. Some schools have been out of class all year and others have been in class all year but students were being pulled out of class for weeks at a time. Some students were only able to work and build from home. One school was only able to work together on their project for 3 weeks before their CDR. Everyone should be commended on your resilience to finish your project and the great ideas and work you have put together in front of your own eyes. Prototyping and testing are the first steps in any engineering project and all of you have learned the value of it.

It is from the Semi-Finalist list that we will narrow down our choice for Finalists. We at HUNCH are very proud of how difficult you as students and teams have made it to choose which designs should go forward. **Congratulations!!!**

This list may be updated in the next day or two if we find we are missing a few team's brochures.

We expect to have the list for the Final Design Review in the next day or so as well.

Value Proposition:

“Artificial gravity is a needed solution that needs to be tested, however, it is too expensive. There is nothing like our virtual reality simulation on the market. It will showcase how artificial gravity could work, and what one could do in it realistically. Spinning from 3 m/s in the central module to around 8 m/s on the other, the simulation will be capable of producing forces equal to ⅓ g up to 1 g. Using the Unity Engine, the service is compatible with the Oculus Quest and Rift. This product has the potential to help NASA with creating the option for long-term space missions. Our goal is to aid Nasa with progression in space travel while spending less and getting more in return.”

Contact Us:

Tony - _____

Tanner - _____

Camden - _____

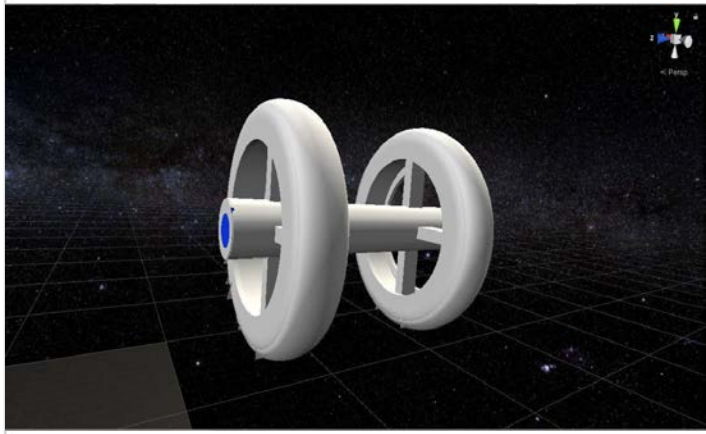
Trey _____

The Team

Pictured above: Tanner Lockhart, Tony Ngo, Trey Gower, and Camden Hobbs

Virtual Reality Simulation

By: Tanner Lockhart, Tony Ngo, Camden Hobbs, and Trey Gower (Group 7)



Website: https://bit.ly/2N9wbj2

The Math

Centripetal Force: The force that pulls an object towards the center of rotation in circular motion.

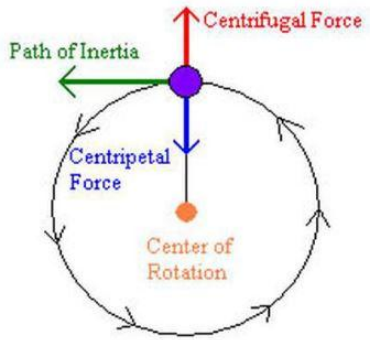
Centripetal Force = $m*v^2/$ radius

This will act as the artificial gravity in the module.

Current Numbers:
Radius: 15 meters

Speed of the Module:
2.8 m/s inner module, 8.6 m/s outer module

Force Achieved:
3.8 m/s^2 inner, 9.8 m/s^2 outer



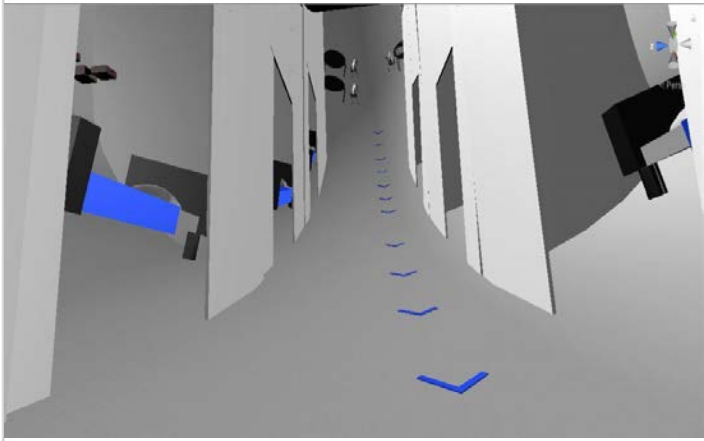
The How

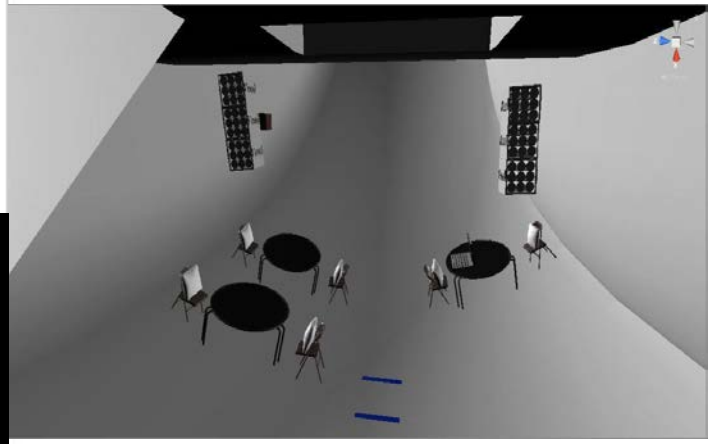
Built in Unity 2019.3.8f1

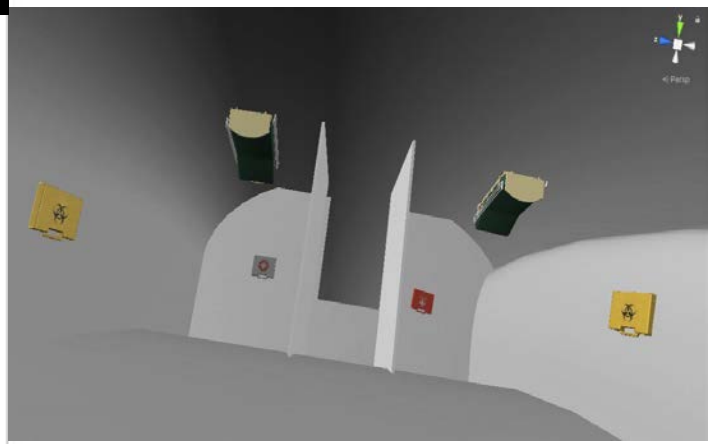
Models Created in Blender

Version Control - Plastic SCM

The Inside

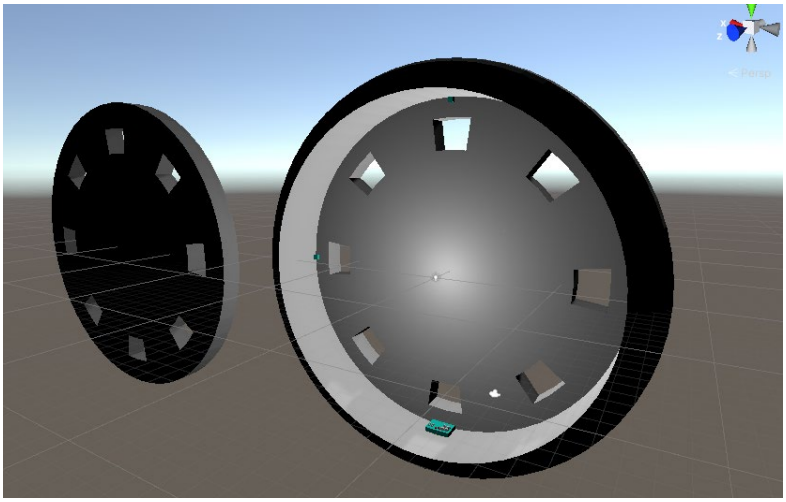






VR Artificial Gravity Simulation
Palm Bay Magnet High School
R. Allen
Jaedon Hight, Kaleb Anderson, Jacob Berry

Our simulation utilizes a VR headset and tracking controllers to give the user an accurate depiction of what it is like to be inside a simulated gravity environment, as well as the behaviour of objects that are inside the environment as well.

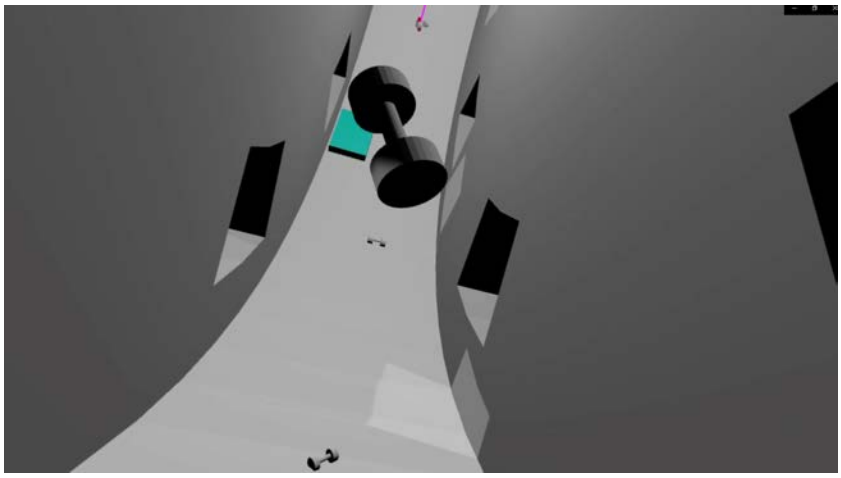


We used Unity and SteamVR to build our simulation, which is compatible with a wide variety of headsets although we used an Oculus Rift S to create and test the simulation in the classroom.

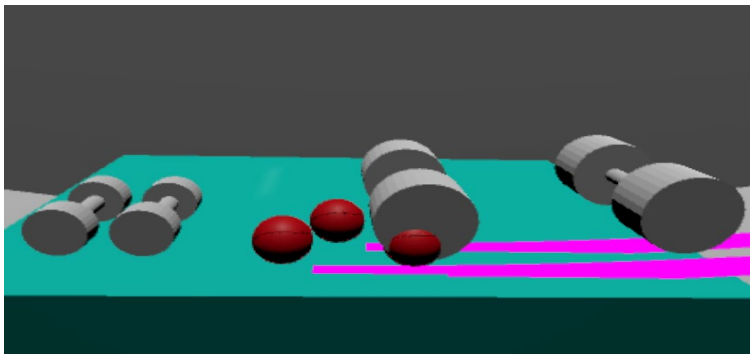
The simulation features:

- A rotating ring-shaped spacecraft to simulate gravity, 15m in diameter and 3m wide.
- Movement controls that allow the user to traverse the ring and its various areas.
- 3 Baseballs that the player can hold and toss, with trails that show the movement of the baseballs.
- Weights, which the player can also pick up and move around.
- Objects will fall to the floor when dropped, even while upside down

To traverse the craft, use the thumbsticks to walk around the ring. The directions don't orient with the headset, so make sure you point the stick the correct way.



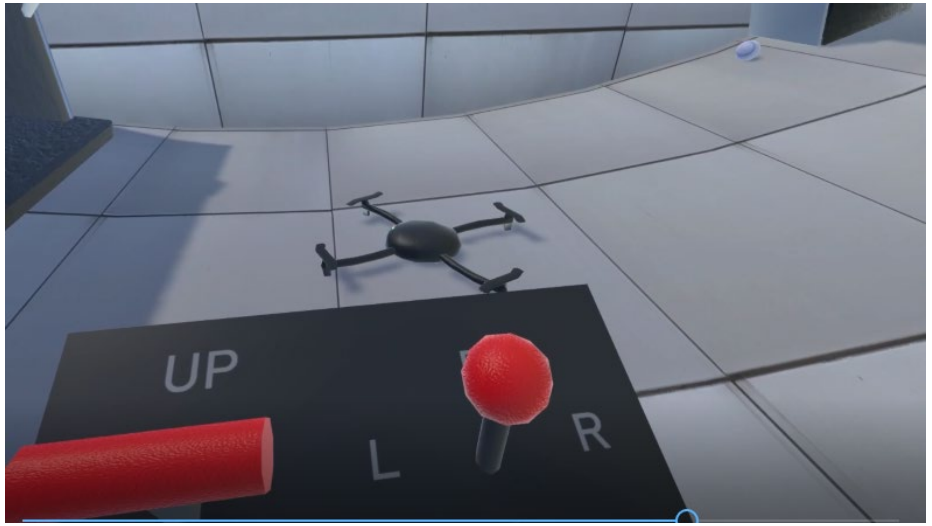
To use the Interactable Objects, like the weights and baseballs, look towards the turquoise platform near where you start. Place your controller over them, and hold down the Grip Button on the side of the controller to pick it up. Let go of this button to drop them, or let go while you perform a throwing motion with the controller to toss them. While in motion, a purple trail appears behind the baseballs to show the path it moves.



Simulated Gravity- VR/AR

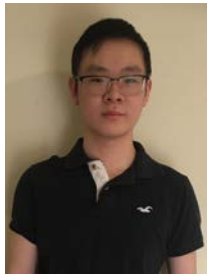
Meridian Technology Center
Mrs. Short
Brendan Bovenschen, Collin Bovenschen, Emma Li, Kurt Sewell

"Our Artificial Gravity Simulation strives to demonstrate both practical and simulation-based components that could be applied to a real-world artificial gravity centrifuge. The physics within our program were created to emulate centrifugal force as well as Coriolis force. This simulation contains elements that have yet to be applied within an actual spacecraft, and this is due to the presence of gravity”



VR Artificial Gravity Space Station

School: Miami Valley Career Technology Center
Teacher: Melissa Goodall
Students: John Li, Justin Butler, Ethan Howard



Description:
We created a VR project made in Unreal Engine 4 to simulate the physics of a space station with artificial gravity. Our project is a full physics simulation of a rotating station and potential problems of such an approach.