ECE Senior Design Weekly Report

Engineer’s Name: Andres Martinez Paz Date: 03/23/2017

Team Name: Globetrotters Lab Section: 4

Week’s Task: This week I continued planning the rotation system for the physical globe. Also, I improved the rotation script I have been working on for the projected version of the globe. Finally, I did some research and some of the components needed for the physical globe’s rotation, like a set of wireless inductive power transfer coils, and micro metal gear DC motors.

Results: After coming up with an initial plan for the physical rotation of the globe, I began exploring the different complications that we might face once we implement the system. The main issue I see rising, is the lack of friction at the base of the levitating magnet. Since the DC motor that provides torque to the globe is mounted on top of the levitating magnet, as soon as we apply a rotation, the levitating platform will likely rotate the opposite way to counteract the torque applied by the DC motor as a result of the lack of friction helping the platform stay in place. After several hours of brainstorming, I came up with the idea to position a second DC motor, mirroring the position of our main motor, but under the platform (with the shaft pointing down) driven by the same PWM that drives our main motor. Hopefully, this second motor will counter the torque of the first motor and keep the levitating platform from rotating. At this point, these issues are theoretical, but I want to design the rotation system with complications in mind. Another task I had this week was modifying the rotation script for the projected version of the globe. In the improved version of the script, I apply a mirroring on the image at runtime, effectively simulating twice the amount of frames that are being stored in program memory. The new version of the script is to be tested on the Raspberry Pi to measure any improvement on the performance. Due to the changes made to the script, some of the logic for the voice/gesture interfacing has to been changed as well. Finally, we have ordered two coils for wireless power transfer. We will measure the performance and reliability of these coils as a power source for our rotation system by measuring the operational distance, resulting power, and most importantly, their performance under a magnetic field.