**Space Navigation Simulation**

Dr. Curtis O’Malley
Noah Schweitzer, Floyd Bell, Dane Robergs, William Janney, Jose Villa, Samuel Arellano

**Background**
New Mexico Tech reaches out to students in High School in order to inspire students to pursue STEM degrees. The Space Navigation Simulator is going to help students decide if they are interested in learning all about the simulation. The simulator will show different aspects of STEM fields. For instance Physics, Engineering, Electrical Engineering and Computer Science.

**Objective**
To accurately demonstrate a space shuttle navigating through space from Earth to Mars with the effects of gravity. This will be used by NMT for recruitment efforts in college Fairs and at local High Schools.

**Design Specifications**
- Battery powered
- Portable
- Easy to assemble and disassemble
- Simulate the effects of the gravitational pull of earth and mars
- Simulate a weightless environment

**Scale Model**
The 4 foot high, 5 foot long, 1 foot wide frame is constructed of 80-10 Aluminum. The linear actuator will be mounted to the middle most part in between the two lengthwise parallel bars, placing the simulation at about eye level.

**Simulation**
Written in Python, the simulation calculates the gravitational pull from both planets and the moon, and also the velocity of the craft when it is in motion. The python code uses a Raspberry Pi to run the code and make the calculations of where the craft is in position x, y, and z axis.

The graphs below represent how the effects of gravity and how a space shuttle travels from earth to mars.

**Progress Completed**
- Decision of Frame material (80-20 Aluminum)
- Placement of linear actuator and motors
- Modular, simple ship design
- Fine tuning of code
- Model of Craft Articulation

**Future Work**
- Synchronize the code with motors for desired outcomes
- Finalize frame design and assembly methods
- Mount linear actuator
- Test exhibit as a whole
- Fine-tune audience experience
- Connect a controller using an arduino to see how the controller affects the craft in motion

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