Overview

Hardware

* 2.3 meter dish with mounting assembly
  + Dish fastens to ring mount attached to motor with 180° gear
  + Gear has peg on either end to trigger limit switches
* Series of conversion gear converted power from two 24 V electric motors
  + Power is fed to motors by a Pololu Motor Driver Carrier
  + Motor turns are monitored by a Hall effect sensor (reed switch)
* The motors required replacement
  + Because of the motors being replaced a series of modifications were required on the new motors to meet the specifications of the larger system
  + The gear shafts the motors came with were metric and shorter than required
  + New shafts are being machined on sight to meet all the specifications of the old motors and more
  + Additionally, the motor cover is metal and as such, magnetic, interfering with the Hall effect sensor
  + New motor covers are being designed in SolidWorks awaiting laser forging
* FIGURES:

Electrical

* An Arduino microcontroller monitors the system
  + The Arduino outputs signal to Pololu Driver to open up power to the motors
  + The Arduino then reads data from the Hall effect sensor and limit switches to monitor distance traveled and limits of motion to calibrate and avoid damage
* An electrical hardware box is being modeled to house:
  + Power supplies for the motors and electronics
  + The Pololu Motor Driver Carriers
  + The Arduino Microcontrollers
  + A Raspberry Pi to oversee operations and host a Graphical User Interface

Software

* A preliminary Graphical User Interface has been developed using Dahs DAQ
  + The code is written in a Python-HTML hybrid
  + The interface is meant to be clean, simple, and user friendly
  + Hosted on the Raspberry Pi, it will respond to user commands and communicate directives to the slaved Arduinos through a Serial connection
  + The Pi continuously requests position information from the Arduinos so that after startup calibration an accurate location of the dish’s aim is returned
* Graphical User Interface includes:
  + A direct control panel to allow for initial calibration and forward and reverse control of both the Azimuth and the Altitude of the dish
  + A dropdown of common observables in the solar system including the sun, the moon, the planets and an object of the user’s choice
  + For the object of the user’s choice option an additional box is provided to input Right Ascension and Declination of the object which will be automatically converted to Azimuth and Altitude for the length of the user specified observation time
  + Future functions that will be made available after further hardware implementation and calibration will be a track function so the object can be tracked through the sky and a scan function, so the airy disk of an object might be scanned over the course of the object’s traversal.
  + Additionally a graph is provided that supplies the planets currently present in the sky and the object specified by the user, as well as the trajectory of the selected object

Summary Conclusions

* Take aways
* Next steps