After our first successful test of the antenna tracker in flight, we noticed that a major shortcoming of our plan was our choice of ground station location. We set up at the same location that we launched from, and as a result, the balloon was very distant and at a very shallow angle with respect to the horizon for the majority of the flight. As a result of this, I decided to make a piece of software that would allow us to easily predict the performance of the ground tracking unit based on a predicted flight path and a ground station location. Additionally, the same software can be used to recreate the conditions of a previous flight so that it can be reviewed.

To use the software, run it in anaconda prompt. Select whether this is a flight prediction or a flight review using the checkboxes. Select the file using the browser by clicking the select file button, and enter a ground station location. Then click on make plots to get plots of the altitude, line of sight distance, elevation angle, and bearing angle as functions of time. If you have a hard time seeing the plots, first resize the window to a larger size, and then continue clicking make plots until the plots look better.

The format the the program expects for predictions is a .kml file. I’ve only tested this with KML files generated by <http://predict.habhub.org/>, which we use for our predictions. The format expected for reviews is the same as the Montana Space Grant website creates after tracking a flight using the Iridium modems. To get the data for review, go to the Montana Space Grant site (<http://153.90.202.26/> ) , select Archive, and then select the appropriate Link to Data link for your flight (based on the IMEI of your Iridium modem). Select all of the data in the table including the header line, and generate a .csv file from the data. (This can be done by copying it and pasting it into Excel, then saving it as a CSV file). The program can handle data in a .txt or .csv file if it is in this format.