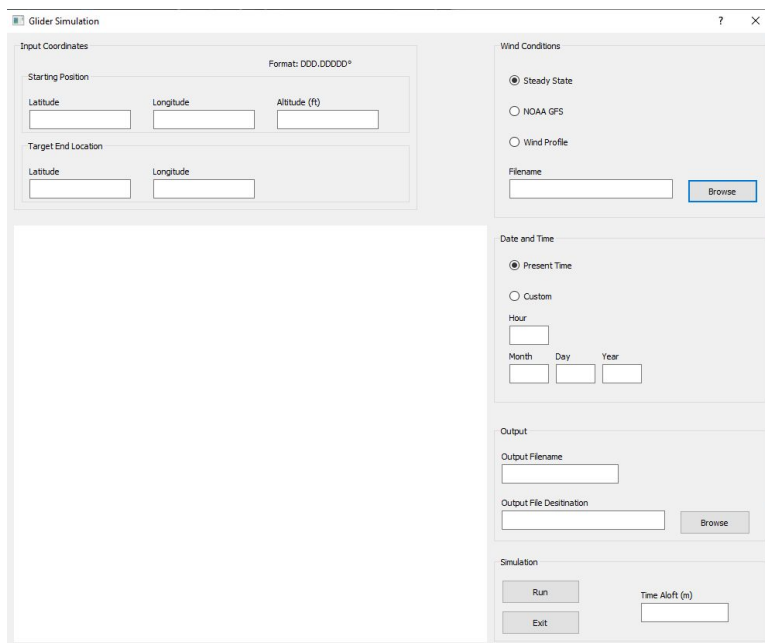
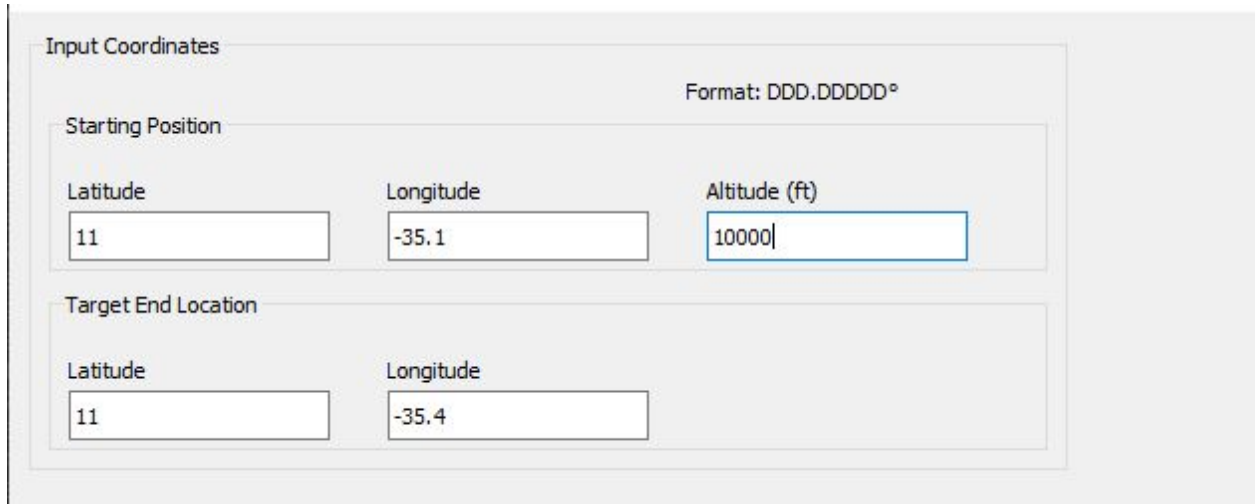


Simulation Instruction:

- Download the zip file that includes 5 separate files
 - DragPolarSeniorDesign_updated
 - Glider_Class
 - QT_main
 - QT_Simulator
 - QT_Simulator.ui
 - stopcrashingexcel
- Ensure all required packages are installed: (**NOTICE**: If having difficulties installing packages for proper execution feel free to contact Garrett Clay at garrett.clay@okstate.edu or garrett.clay1@gmail.com. Please attach an image of error)
 - PyQt5
 - math
 - metpy
 - `conda install -c conda-forge metpy`
 - xlrd
 - `conda install -c anaconda xlrd`
 - matplotlib
 - numpy
 - datetime
 - netCDF4
 - `conda install -c anaconda netcdf4`
 - siphon
 - Pandas
 - scipy
- Open QT_main and run. The GUI shown below should appear



- For any run a starting latitude, longitude, and altitude in decimal degrees (xx.xxx) and a desired ending latitude and longitude in decimal degrees must be input.



Input Coordinates

Format: DDD.DDDDD°

Starting Position

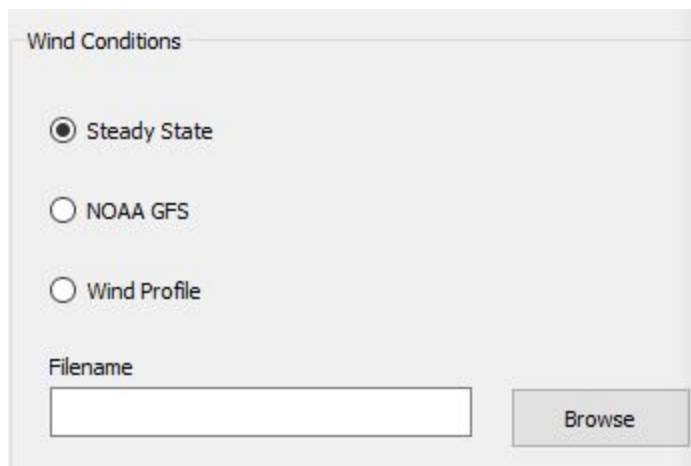
Latitude	Longitude	Altitude (ft)
11	-35.1	10000

Target End Location

Latitude	Longitude
11	-35.4

Running Steady State Glide

- Input starting and desired ending coordinates and starting altitude
- Select the “Steady State” option shown in the image below

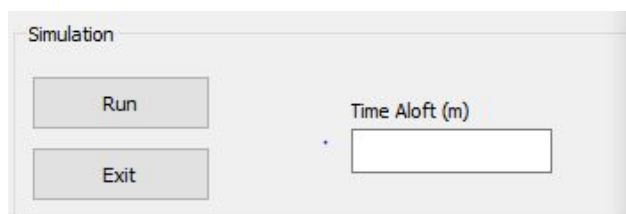


Wind Conditions

☒ Steady State
☐ NOAA GFS
☐ Wind Profile

Filename

- Hit the run button
- Simulation is completed when Time Aloft in minutes is displayed and graph is shown



Simulation

Time Aloft (m)

Running Simulation Using Data File

- Input starting and desired ending coordinates and starting altitude
- Select the “Wind Profile” option and Browse for wind data text file

Wind Conditions

☐ Steady State
☐ NOAA GFS
☒ Wind Profile

Filename

- Text File must be set up as shown in the image below.
 - Data in this format can be found using the “Text: List” option on <http://weather.uwyo.edu/upperair/sounding.html>

LEV	PRES	HGHT	TEMP	DEWP	RH	DD	WETB	DIR	SPD	THETA	THE-V	THE-W	THE-E	W
	mb	m	C	C	%	C	C	deg	knt	K	K	K	K	g/kg
0	1000	83												
1	925	774												
SFC	854	1453	14.4	-1.6	33	16.0	6.5	275	3	300.8	301.6	286.4	312.9	3.98
3	850	1511	15.8	-1.2	31	17.0	7.2	305	8	302.7	303.5	287.2	315.3	4.12
4	848	1531	16.4	-1.6	29	18.0	7.3	306	9	303.5	304.3	287.3	315.8	4.01
5	840	1612	17.8	-2.2	26	20.0	7.6	308	12	305.8	306.5	288.0	317.8	3.87
6	823	1786	17.2	-1.8	27	19.0	7.4	314	19	307.0	307.7	288.6	319.6	4.07
7	708	3044	6.2	-5.8	42	12.0	0.7	310	24	308.3	309.0	288.5	319.3	3.50
8	700	3137	5.4	-6.6	42	12.0	-0.0	305	24	308.5	309.1	288.4	318.9	3.33
9	642	3835	-1.5	-8.5	59	7.0	-4.4	307	28	308.4	308.9	288.2	318.2	3.13
10	631	3973	-1.9	-11.9	46	10.0	-5.7	305	28	309.4	309.9	287.8	317.2	2.43
11	611	4228	-4.1	-12.1	54	8.0	-7.1	301	27	309.8	310.2	288.0	317.7	2.47
12	590	4503	-6.9	-10.7	74	3.8	-8.4	293	26	309.6	310.2	288.3	318.7	2.87
13	577	4676	-8.3	-13.1	68	4.8	-10.0	287	28	310.0	310.4	288.0	317.7	2.41
14	567	4812	-8.1	-18.1	44	10.0	-11.2	283	31	311.7	312.1	287.8	317.1	1.62
15	539	5204	-11.3	-21.3	43	10.0	-14.1	285	36	312.5	312.7	287.7	316.8	1.29
16	535	5261	-10.5	-26.5	26	16.0	-14.4	286	36	314.1	314.3	287.7	316.9	0.82
17	526	5391	-11.3	-28.3	23	17.0	-15.2	288	37	314.7	314.8	287.8	317.1	0.71
18	518	5509	-11.9	-24.9	33	13.0	-15.2	290	39	315.3	315.5	288.3	318.7	0.98
19	511	5613	-11.5	-23.5	36	12.0	-14.7	292	39	317.0	317.3	289.0	320.9	1.12
20	500	5780	-12.5	-24.5	36	12.0	-15.6	295	41	317.8	318.0	289.2	321.4	1.05
21	476	6152	-15.5	-26.5	38	11.0	-18.1	295	41	318.6	318.8	289.3	321.8	0.92
22	446	6639	-18.1	-33.1	26	15.0	-20.9	299	45	321.3	321.4	289.8	323.2	0.53
23	434	6841	-19.9	-29.9	41	10.0	-21.9	300	47	321.5	321.7	290.0	324.1	0.74
24	421	7066	-21.3	-34.3	30	13.0	-23.5	302	49	322.6	322.6	290.1	324.4	0.50
25	410	7260	-22.5	-31.5	44	9.0	-24.2	304	50	323.5	323.6	290.5	325.9	0.67
26	400	7440	-23.9	-35.9	32	12.0	-25.8	305	52	323.9	324.0	290.5	325.6	0.45
27	395	7532	-24.3	-41.3	19	17.0	-26.5	307	53	324.6	324.6	290.5	325.6	0.26
28	375	7909	-27.5	-48.5	12	21.0	-29.5	313	56	325.2	325.2	290.5	325.7	0.12
29	344	8524	-33.3	-49.3	19	16.0	-34.6	319	61	325.4	325.5	290.6	325.9	0.12

- Once file is selected hit the “Run” button
- Simulation is completed when Time Aloft in minutes is displayed and graph is shown

Running Simulation Using NOAA GFS (Present Day)

- Input starting and desired ending coordinates and starting altitude
- Select the “NOAA GFS” option and select “Present Time” under “Date and Time”

The screenshot shows a software interface for configuring a simulation. It is divided into two main sections: "Wind Conditions" and "Date and Time".

Wind Conditions:

- Three radio buttons are present: "Steady State", "NOAA GFS" (which is selected and has a dashed border), and "Wind Profile".
- Below the radio buttons is a text input field labeled "Filename".
- To the right of the "Filename" field is a blue button labeled "Browse".

Date and Time:

- Two radio buttons are present: "Present Time" (which is selected) and "Custom".
- Below the radio buttons are input fields for "Hour", "Month", "Day", and "Year".
- The "Hour" field is a single text box.
- The "Month", "Day", and "Year" fields are each a single text box.

- Once this is completed hit the “Run” button
- Simulation is completed when Time Aloft in minutes is displayed and graph is shown
 - **NOTICE:** NOAA GFS runs can take up to 30 minutes to simulate

Running Simulation Using NOAA GFS (Future/Past Forecasting)

- Input starting and desired ending coordinates and starting altitude
- Select the “NOAA GFS” option and select “Custom” under “Date and Time”
 - **NOTICE:** Date Input can only be up to 3 days prior to present day or up to 16 days after present day.
 - For the “Hour” input put closest integer hour in UTC time (0-23)

The screenshot shows a software interface for configuring a simulation. It is divided into two main sections: "Wind Conditions" and "Date and Time".

Wind Conditions:

- Three radio buttons are present: "Steady State", "NOAA GFS" (which is selected), and "Wind Profile".
- Below the radio buttons is a text input field labeled "Filename" and a "Browse" button.

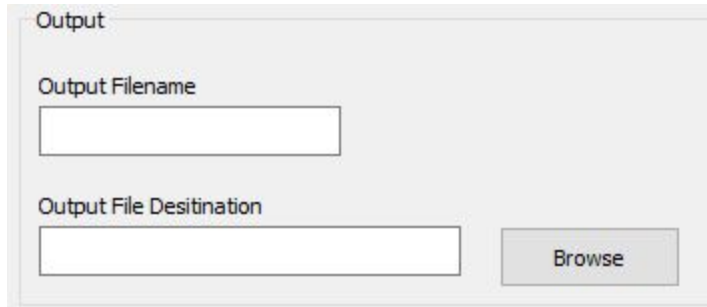
Date and Time:

- Two radio buttons are present: "Present Time" and "Custom" (which is selected).
- Below the radio buttons are input fields for "Hour", "Month", "Day", and "Year".
- The "Hour" field contains the value "6".
- The "Month" field contains the value "04".
- The "Day" field contains the value "30".
- The "Year" field contains the value "2020".

- Once this is completed hit the “Run” button
- Simulation is completed when Time Aloft in minutes is displayed and graph is shown
 - **NOTICE:** NOAA GFS runs can take up to 30 minutes to simulate

Saving Waypoint and Winds-Aloft Output File

- For any simulation conditions output files can be saved using the “Output” section on the GUI
- Select the “Browse” button next to the “Output File Destination” box.



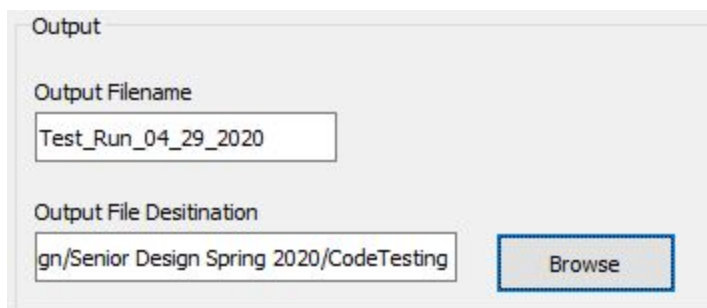
Output

Output Filename

Output File Destination

Browse

- Selected desired output file destination
- If desired, input a filename in the “Output Filename” box. This will add a file name to make it easier to find and ensure no overwriting of files.



Output

Output Filename

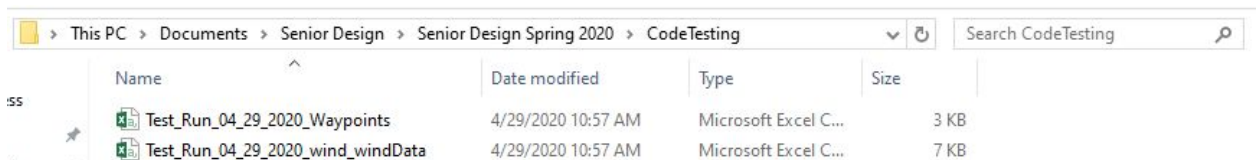
Test_Run_04_29_2020

Output File Destination

gn/Senior Design Spring 2020/CodeTesting

Browse

- Run desired simulation type. Once complete, the files can be found in the folder that was selected for the “Output File Destination”



This PC > Documents > Senior Design > Senior Design Spring 2020 > CodeTesting					Search CodeTesting
	Name	Date modified	Type	Size	
	Test_Run_04_29_2020_Waypoints	4/29/2020 10:57 AM	Microsoft Excel C...	3 KB	
	Test_Run_04_29_2020_wind_windData	4/29/2020 10:57 AM	Microsoft Excel C...	7 KB	