

DESIGN GOALS: USERS AND THEIR NEEDS

- An important part of the design process is understanding the users and how they may end up using the product.
- To start, the team analyzed the information that was available to display, then determined what was most important to the team when the rocket was actually flying and when it had landed.
- The CS capstone team considered the need to present lots of information in a short period of time. The GUI would need to order the information presented by how important it was to see updates for the data.
- In the end, the GUI presents the rocket's altitude, speed, and GPS location as the most important information. Secondary presentation is aircraft rotation and orientation.
- The last consideration in design was the code libraries to use. The team decided to use libraries that would work on any modern computer!



2020 HART Team Logo



HIGH ALTITUDE ROCKETRY

Goal: To design and build a user interface for the Oregon State University (OSU) American Institute of Aeronautics and Astronautics (AIAA) High Altitude Rocket Team (HART).



A First Look at the HART GUI

BACKEND: THE DATA

The program written to display the rocket's launch consists of two separate portions. The first portion, or the backend, focuses on reading the information coming in from the rocket. This is all of the data that the rocket is collecting on the way up, and includes raw sensor data and interpolated figures like altitude, speed, and orientation.

Interpolating these values means they are a "best guess" for the rocket's current state. In the future, CS capstone projects could write a portion of the backend that calculates these values more accurately.

Currently, the backend focuses on causing the least impact on the CPU while ensuring that the data is read in real time from an antenna that is connected to the rocket.

FRONTEND: THE DISPLAY

The second portion of the display is the frontend, the part that the team can see. Certain information was requested by the team for the interface to be displayed, including information on speed, acceleration, altitude, and GPS coordinates, that all get displayed as realtime as possible in the form of gauges and numeric readouts for both the booster and sustainer stages of the rocket.

C++ classes were made in order to quickly and easily create new gauges, numeric readouts, textures, or objects, in case our team or a future CS capstone team needs to modify the interface.

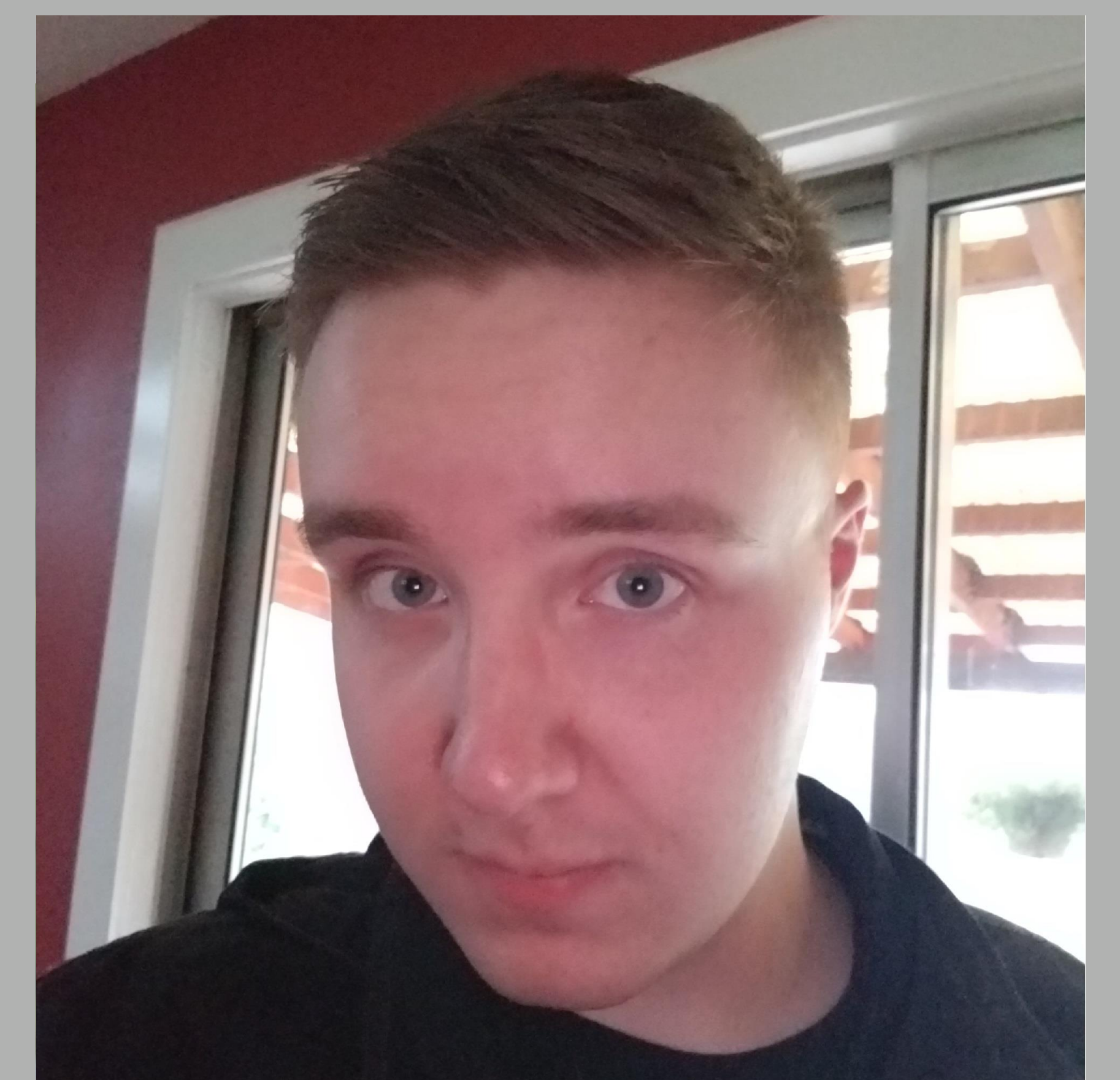
The frontend was written using the OpenGL graphics API so it can be written cross-platform compatible with Windows, MacOS, and Linux operating systems.

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- For any questions about the project please email lunng@oregonstate.edu or culpc@oregonstate.edu
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Grayland Lunn



Cameron Culp