



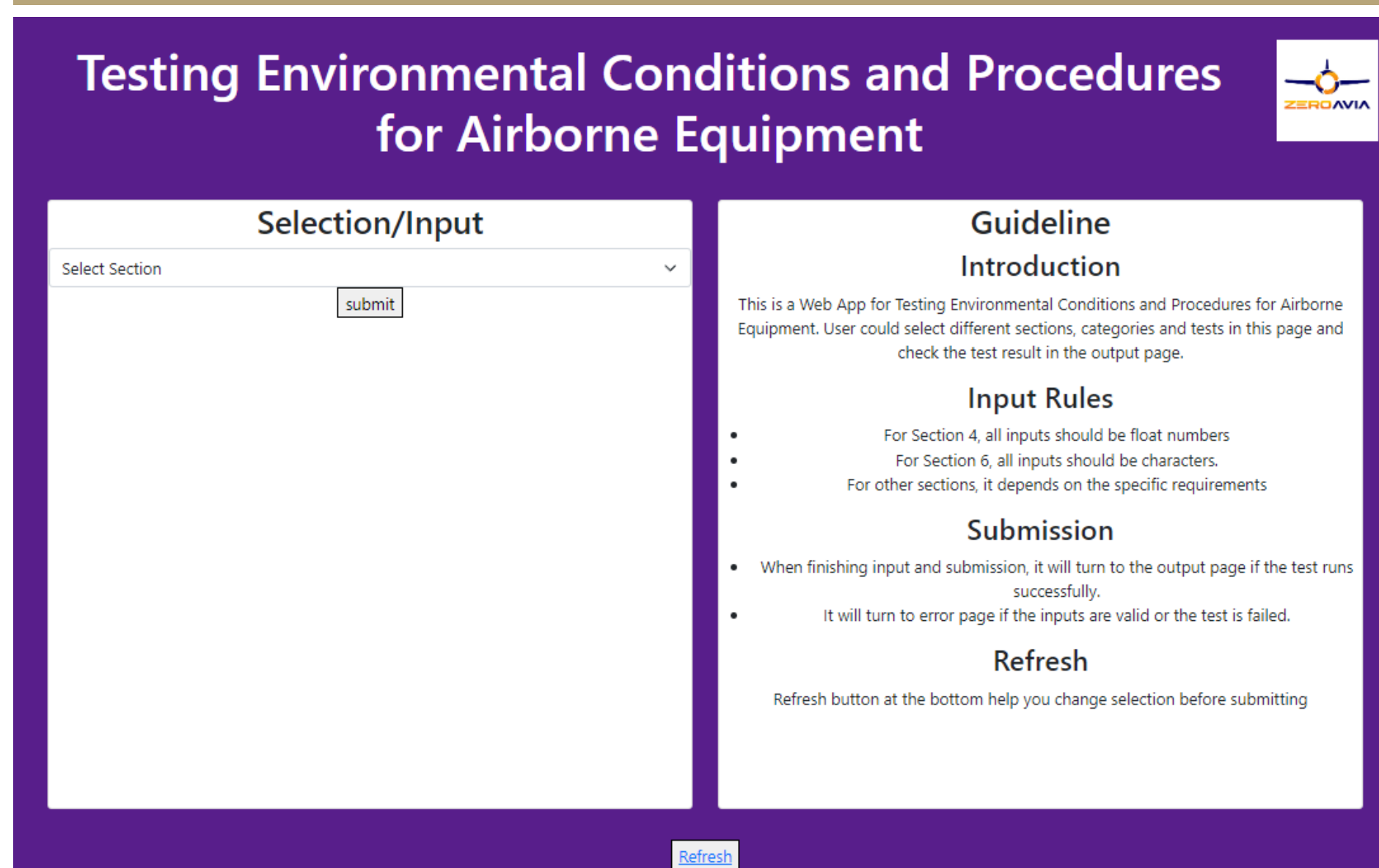
Problem Statement

- ZeroAvia is an aerospace company dedicated to designing the first fully electric commercial aircraft using hydrogen fuel cells.
- The hydrogen-electric aircrafts need to meet all existing safety standards currently used by the aviation industry.
- Our project seeks to partially automate the testing and validation of various aircraft components to ensure they are safe to fly via the DO160G Standards.
- The DO160G Standard contains environmental conditions and the corresponding test procedures for airborne equipment.

Requirements

- A web application that facilitates the engineer when performing RTCA DO-160G testing. The RTCA DO-160G document consists of standards for environmental conditions and the corresponding test procedures for airborne equipment of all types of aircrafts.
- While the DO160G contains 16 different sections, the web application will focus on temperature and humidity testing. Leaving future work towards the other categories.

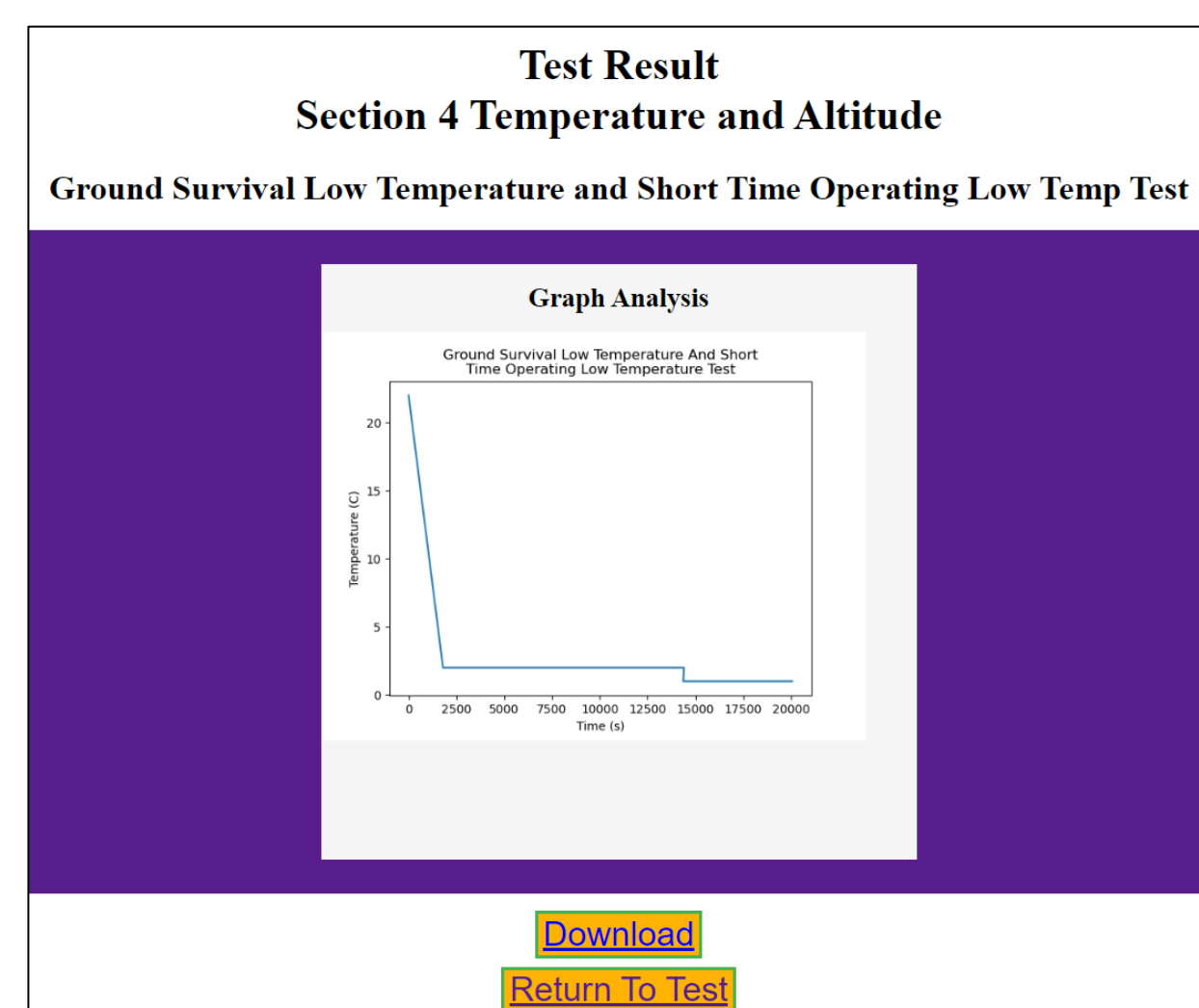
Web App: Front End Navigation



LEFT: Starting point for program. Selection/input will produce more dropdown options as required while navigating the “tree of inputs” based on previous selections.

RIGHT:

- Output graph based on selections. In order to meet this test the temperature curve must follow the shown data line.
- Graph currently showing “Section 4 Temperature And Altitude” with test “Ground Survival Low Temperature and Short Time Operating Low Temp Test.”



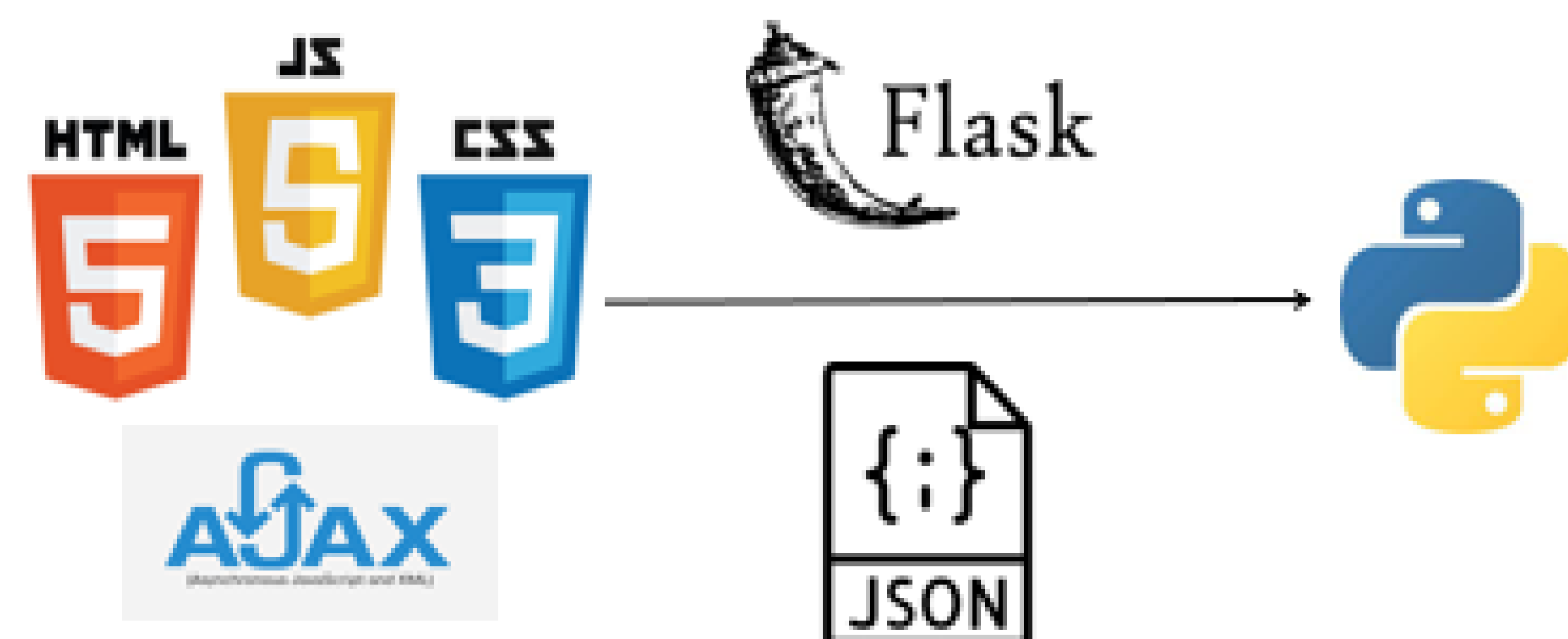
Web App: Backend Organization

Input page:

- Sends user input and selection to backend by flask request
- Page dynamically changes based on section

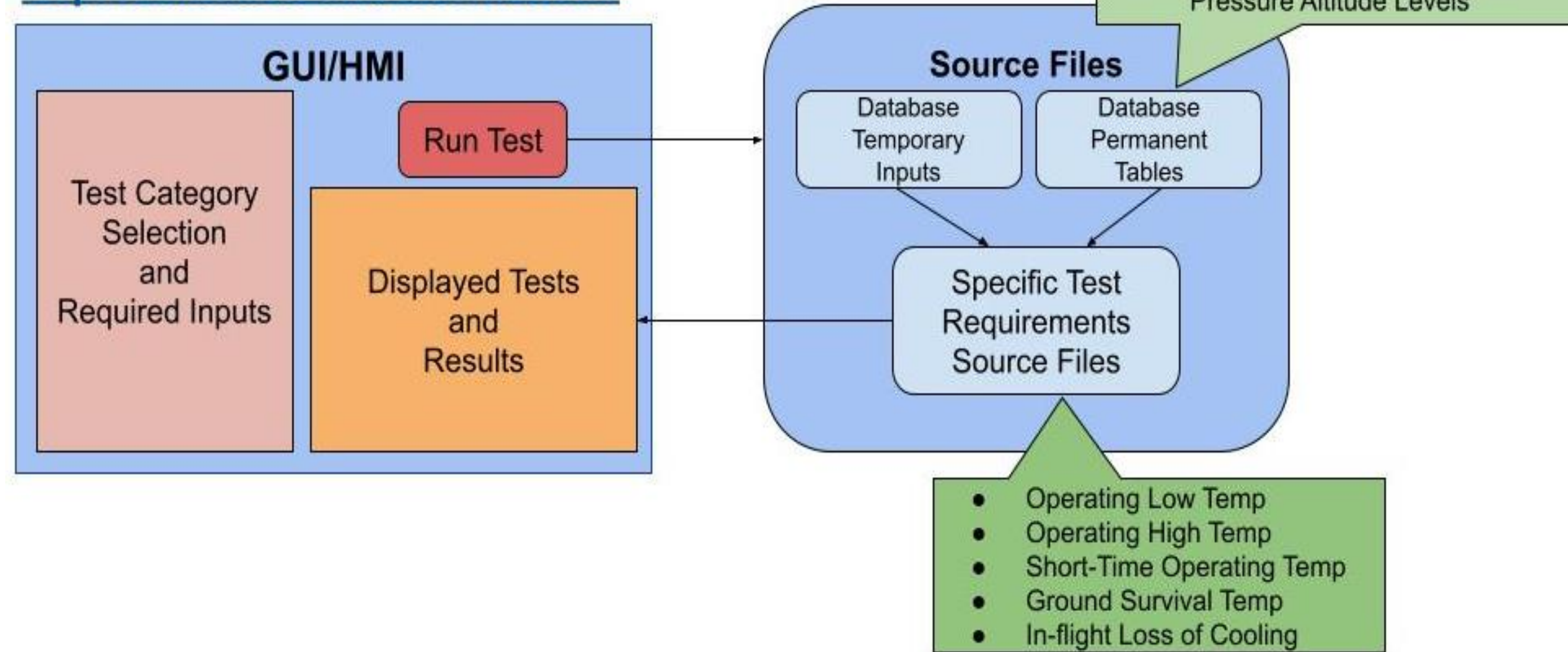
Output Page:

- Check the user selection from form submission in the input page and set the path name as a URL for the output image.
- Upload image on a HTML page with Python Flask by passing the image URL to the template.
- Download file button and back button for returning to home page.



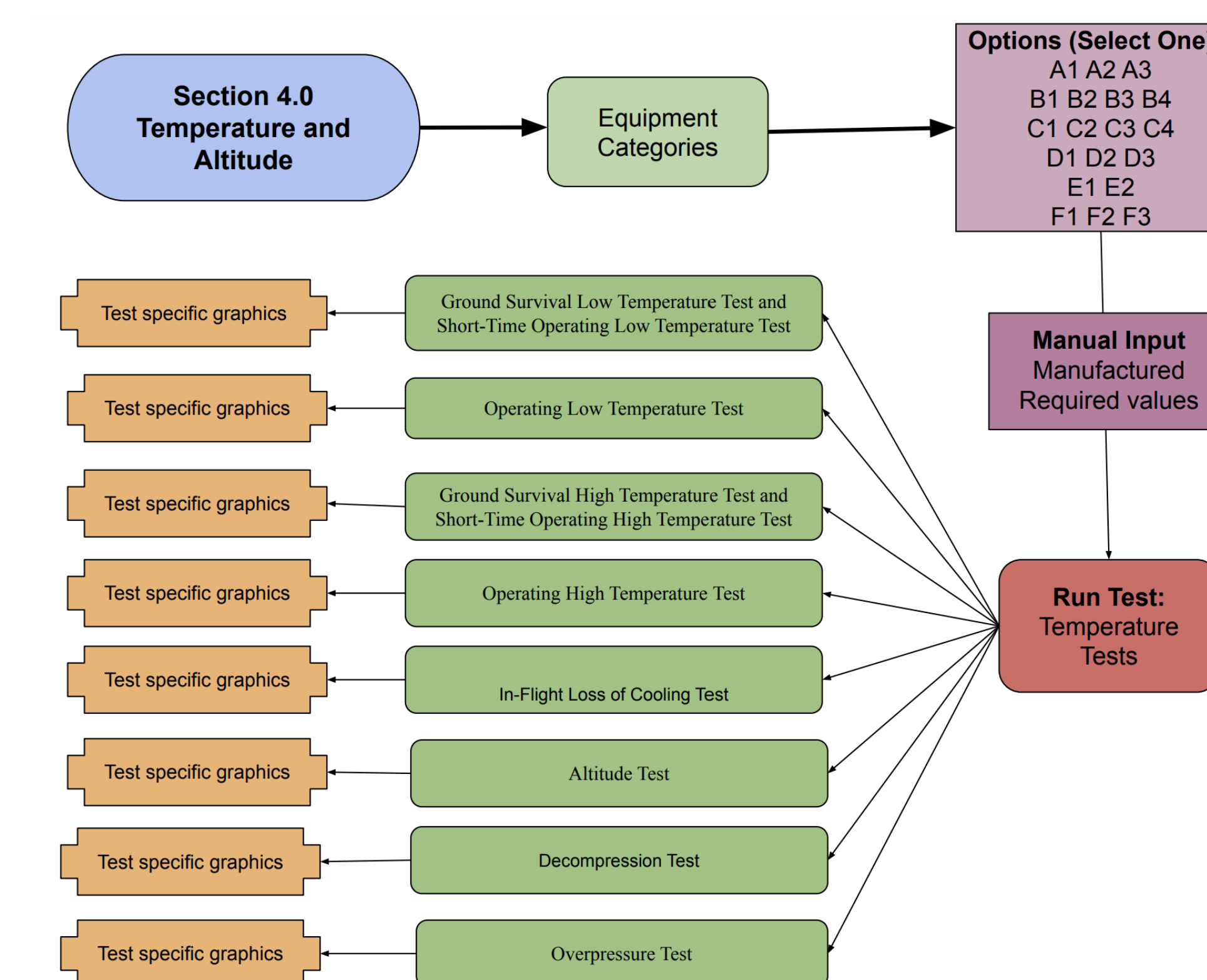
Web Application Flow Chart

RTCA DO-160G Section 4.0: Temperature and Altitude Representation and Interactions



- Test category, subcategory test, equipment category and manufacturing specific values are all inputted via the GUI/HMI.
- These entered and selected values are then inputs into the appropriate source files for calculations and plot generations.
- This feeds back into the GUI/HMI for display and/or download.

Temperature and Altitude (Section 4.0) Operational Flow Chart



- Temperature and Altitude is one of the sixteen categories that the DO160G covers. For this section there are 19 possible equipment categories (A1 through F3).
- Equipment category is selected based on equipment operating conditions such as: max altitude, inside/outside of temperature control, inside/outside of pressurized control or in specific locations on the aircraft.
- Each ‘branch’ will require different manufactured values for specific tests. That will affect the outputted graph.

Future Work

- Future work of incorporating more sections of DO160g into the web app.
- Implementing a validation path to compare test data output to web app generated data within tolerance.
- Migrating web app to a local server for a network to utilize.

Acknowledgements/References

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RTCA, Incorporated, “RTCA DO160G,” December 8, 2010 Environmental Conditions and Test Procedures for Airborne Equipment” Prepared by Special Committee 135 and approved by RTCA Program Management Committee.