Exploring Atmospheric Dynamics

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Overview: The West Club has developed an advanced payload featuring upgraded components, including new sensors and a 3D-printed PLA structure, to improve air quality investigation and structural resilience testing. This project highlights the club's innovative contributions to the ASCEND program.

Introduction & Project Description:

This project contributes to the ASCEND program by enhancing environmental data collection and structural resilience testing. Integrating advanced sensors and high-resolution imaging investigates correlations between temperature, pressure, altitude, and physical impacts, showcasing the engineering innovations of the West Club.

Results:

- The balloon completed its mission, collecting accurate environmental data during a record-breaking 2 hours and 50 minutes of flight, reaching 58,000 feet, with minor setbacks like a disconnected crash sensor.
- The durable 3D-printed PLA structure and 360° 4K camera supported successful data collection, achieving project goals and showcasing the West Club's innovations for the ASCEND program.

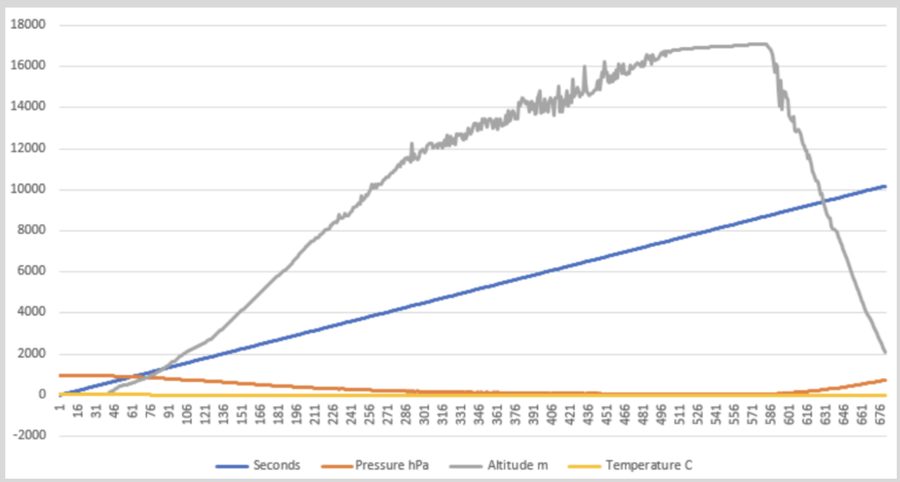


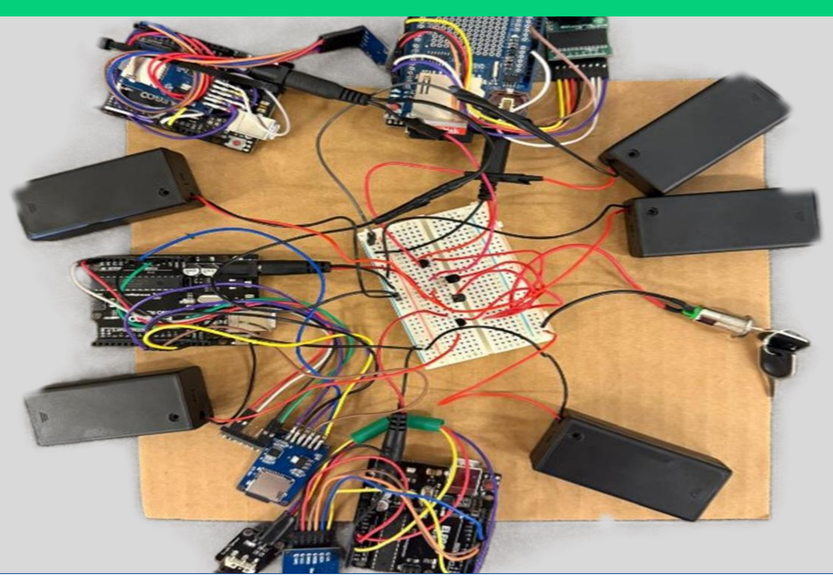
Figure 1.1: Visual Representation of Results.

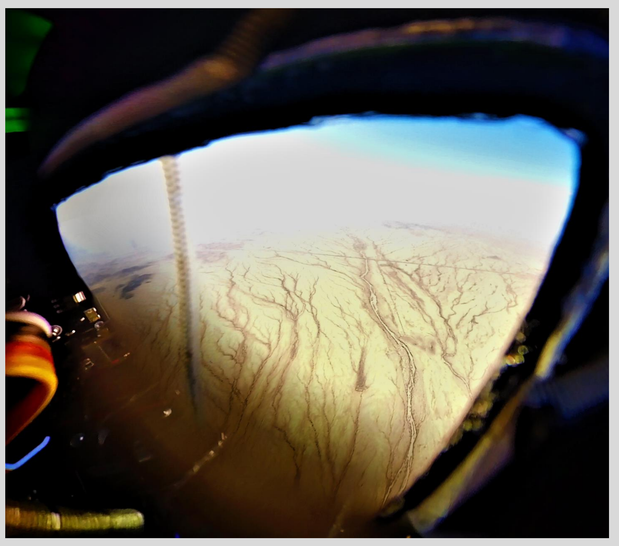
Methods:

Data was collected using Arduino hardware integrated with sensors, including a MPL3115A2, crash sensor, external temperature sensor, and accelerometer. The data was stored on a micro SD cards and analyzed in Excel. These methods were chosen for their reliability, cost effective-ness, and seamless integration with the project's components, ensuring accurate results.

Conclusion:

The project successfully enhanced environmental data collection and structural resilience testing. Advanced sensors, including the accelerometer, provided key insights, while the durable 3D-printed PLA structure and 360° 4K camera supported detailed analysis. This work enhances payload design for air quality research and advances in engineering.





Future Projects: **We want to test SRI passive cooling paint focusing on:**

- Thin air convection efficiency of paint
- Heat radiation, infrared emissivity at variable elevation
- Coating degradation at variable elevation
- Moisture reduction, balancing thermal system

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