One Small CubeSat, One Giant Leap: High-Altitude Data Collection With A Custom CubeSat Payload

Razak Adamu, Nicholas Blanchard, Sarina Blanchard, Colin Brown, Ethan Chumley, Sam Day, Maximo Esquivel, Maddox Green, Arturo Lopez Jr., Andrew Kwolek, Kane Mattison, Forrest Moorman, Natasha Oler, Cameron Sacra, Edward Vanica, Divya Venkadesh, Liora Wilkins, Zachary Yang

Mentor: Michelle Coe

University of Arizona SEDS ASCEND! Team

Overview: Developed a 1U cubesat with the same sensor array as previous, larger models while increasing the efficiency of data collection.

Introduction & Project Description:

We designed two lightweight payloads (one per semester) for near space research via high-altitude balloons. General Data Logging - pressure, altitude, temperature, humidity, radiation, ozone, UV, IMU, Two Cameras.

Results:

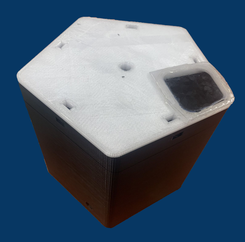
During the fall semester, all of our sensors were successful while the cameras experienced difficulties and didn't get viable footage. The spring semester launch was cancelled so no data or video was collected.

PCB

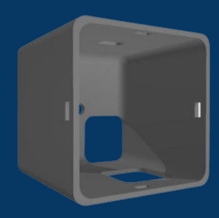
(Customized schematics using Autodesk EAGLE)

Housing

3D Printed PETG



Pentagonal Cylinder (fall)



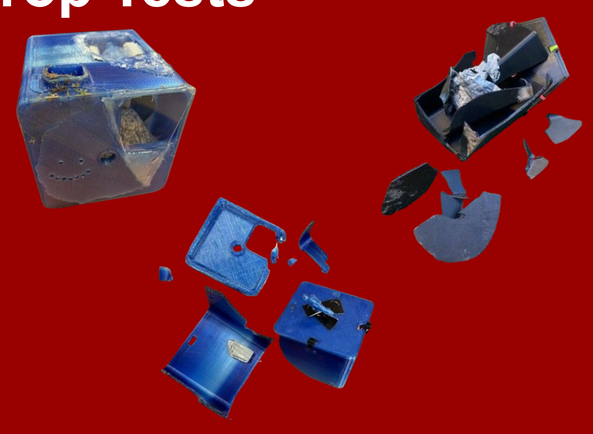
1U Cubesat (spring)

Both housings were developed using SolidWorks and printed with 50% infil. Lid was secured to body with zip-ties.

Sensors

- Pressure, altitude, temperature, humidity, Radiation, Ozone, UV, accelerometer, gyroscope, magnetometer

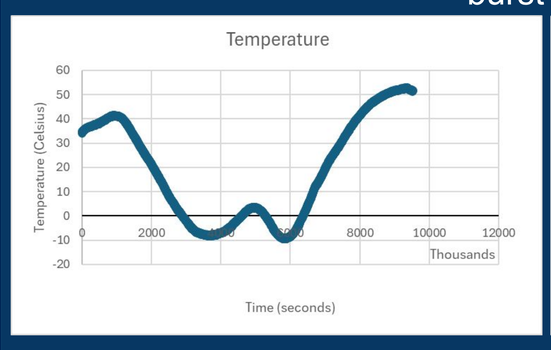
Drop Tests

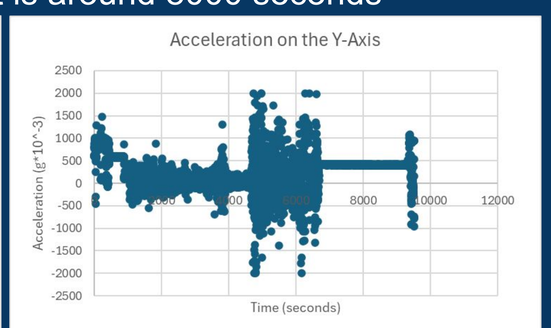


Drop tests were carried out to determine structural weaknesses in the designs. Changes implemented from the drop tests include: higher infill and rounding edges.

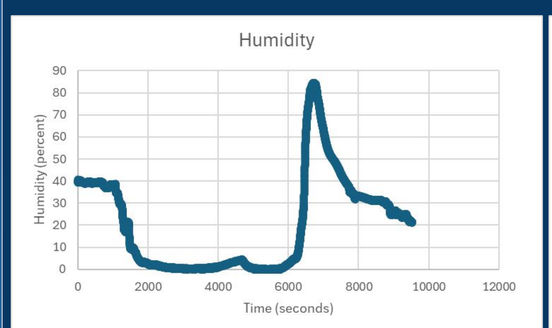
Plot of Data

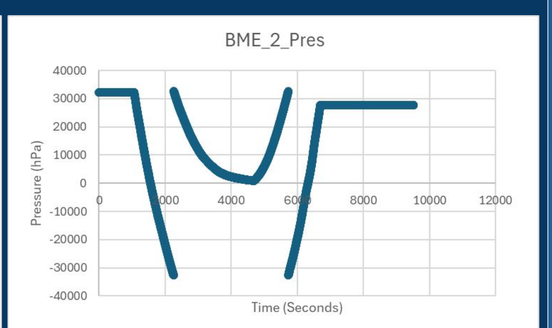
Note: Launch is around 1000 seconds, burst is around 8000 seconds





Plot of Data





Future Projects: Integration of solar power into battery charging circuitry, live data transmission (APRS, Iridum, etc), upgraded MCU

Scan QR code to see past flight footage!

2024 Arizona Space Grant Consortium
Statewide Student Research Symposium

Partner