Team Unbroken
Quick Look Presentation

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Mission Overview

**Mission:** Build a BalloonSat which will collect and compare data between solar energy and wind energy throughout its ascent into near space.

**Objectives:** Our mission objective is to determine where each source of renewable energy is most effective by comparing the amount of energy absorbed through the solar panel and wind turbine at the different levels of atmosphere. The purpose of this is to provide data as to the locations in terms of altitude in which would be best suited for harnessing such energy for future use.
Design: Concept of Operations

- Operated as expected, except that the wind turbine did not collect any data
- Burst: 95,000 ft.
- Launched: Deer Trail, CO
- Landed: Hugo, CO (55 miles away)
Results and Analysis - Sensors

- Random spike in external temperature - anomaly
- No wind data
- Solar panel did not reach full capacity (5V)
Failure Analysis

• The wind turbine failed to collect data
  • Wind turbine data read at 0 V for entire flight
  • Don’t really know why… Turbine disconnected? Turbine spun along with box so motor wasn’t rotated? Improper wiring?
  • In order to verify failure mode: retest turbine, “tree test” with spinning, “car test”

• The wind turbine broke off sometime during landing
  • Due to structural problems
  • Turbine was found in pieces close to landing site

• Solar panel did not reach full capacity
  • Wiring and capacitor issue
  • Cleanliness issue - solar panel produced less voltage as it became dirtier and was never cleaned

• SD card fell out of Arduino at some point
  • SD card was found to be disconnected upon recovery
What’s Your Plan?

• Fix the wind turbine
  • JB weld it back together
  • Retest for more extended periods of time
• Figure out a better way to get solar panel data
  • Rewiring and more secure attachment to Arduino
  • Clean panel
• 3 weeks to ensure everything is working properly and to be (potentially) ready for reflight