

High Altitude Ballooning Payload hits the Stratosphere

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----Introduction----

The purpose of the balloon launch was to gain experience in payload design, conduct atmospheric profiling at various altitudes, collect weather data, and capture video and pictures. The payload was equipped with an acceleration, humidity, MiCS, pressure, and temperature sensor(s), along with a camera. All the sensors' data was processed using a Sunfounder Mega 2560 and data was stored onto a SD card. Our payload launched 12 miles south of the Gila Bend on November 20th, 2021, reaching 103,670 ft.

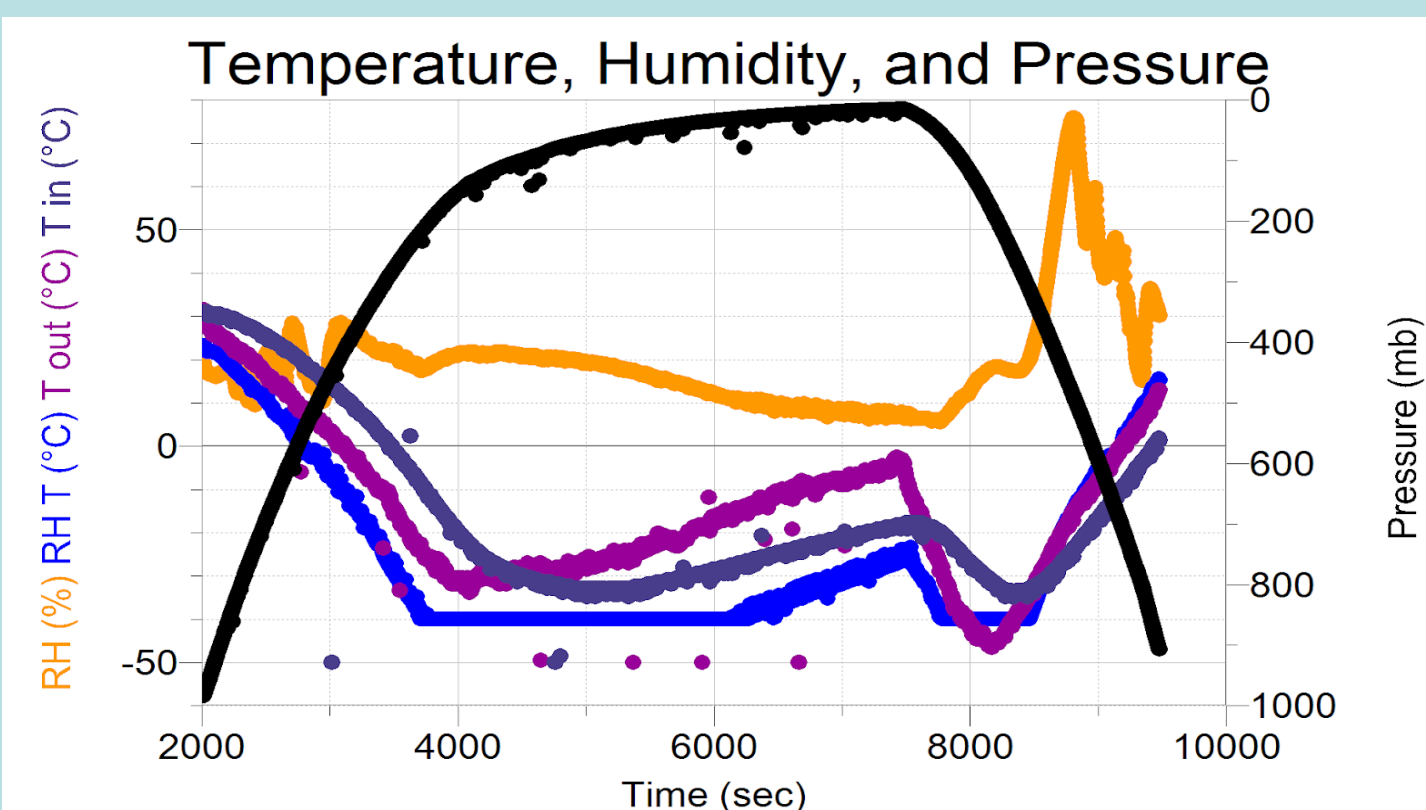


Figure 1- Temp, Humidity & Pressure

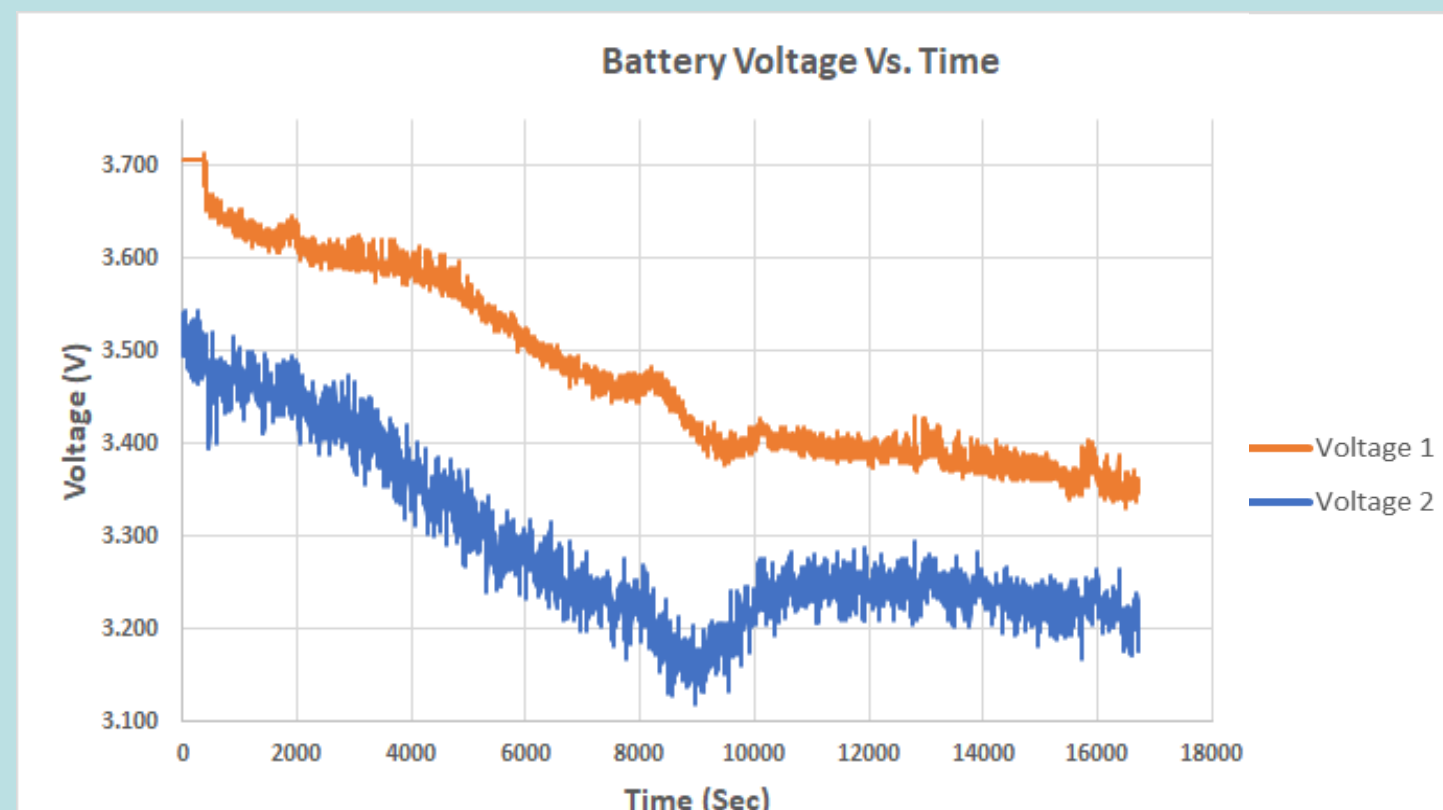


Figure 2 – Battery Volts vs Time



Figure 3 – Picture from RunCam

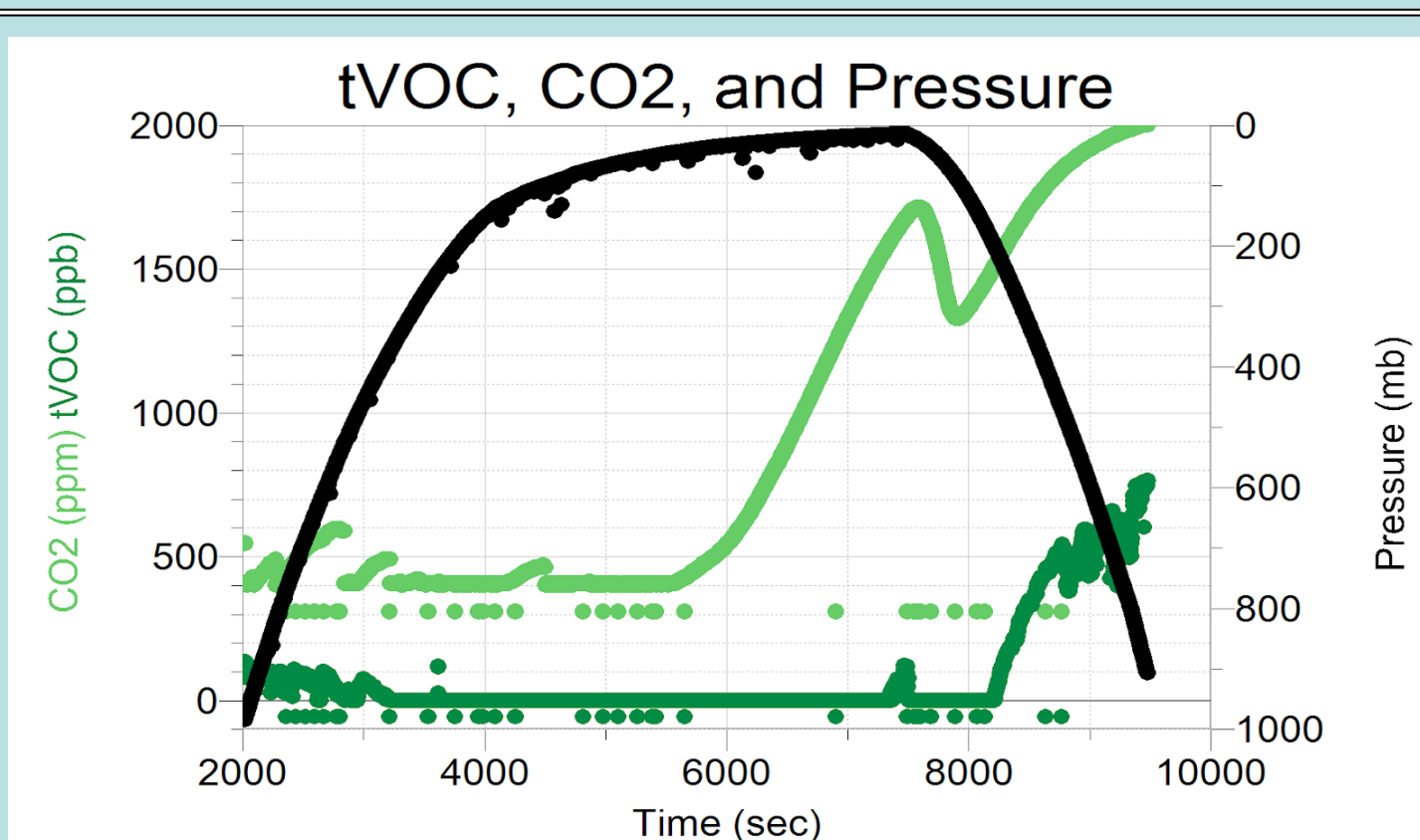


Figure 4 – VOC Data

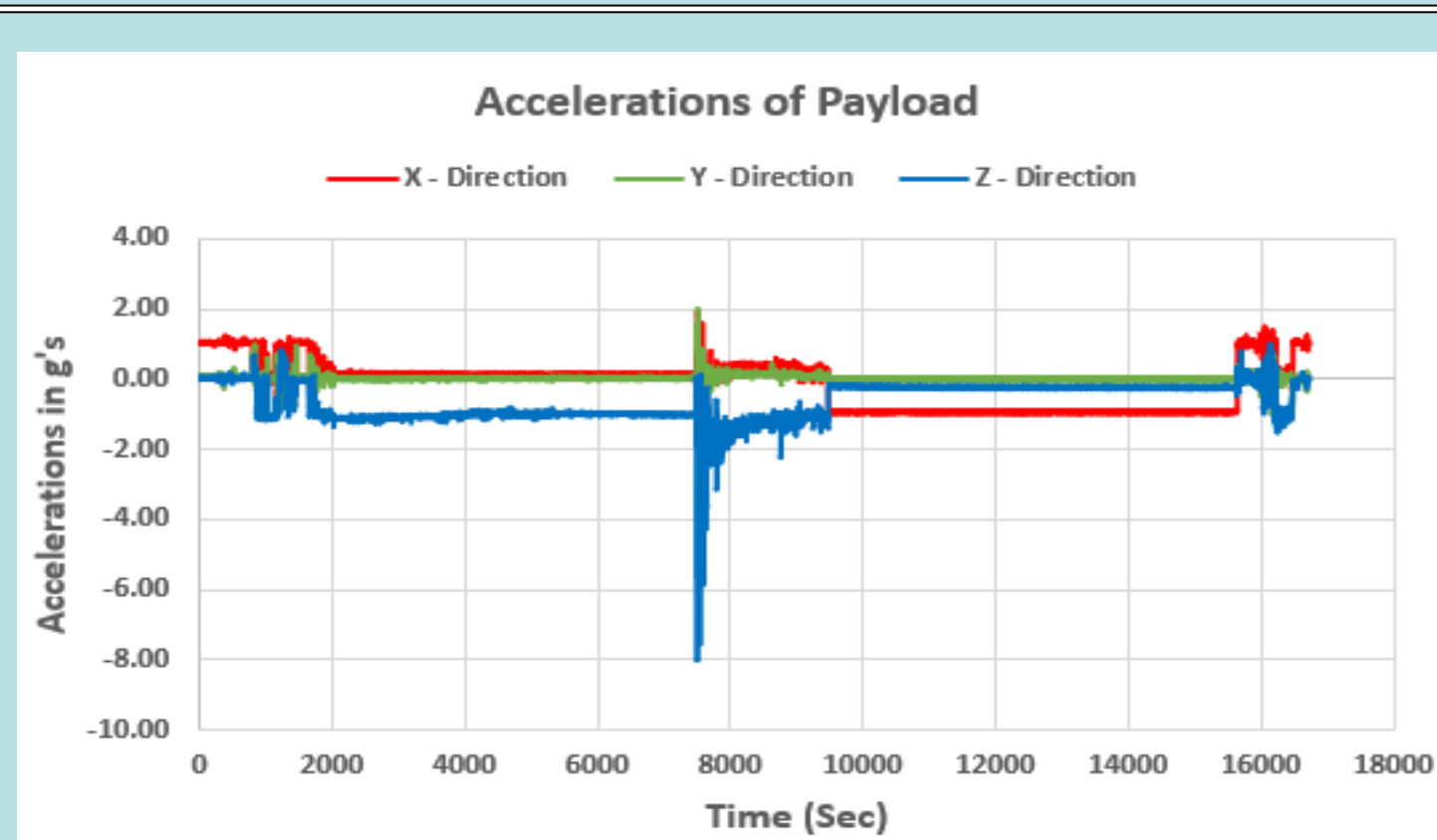


Figure 5 - Acceleration



Figure 6 – Payload Design

----Results----

----Discussion----

- The Payload experienced temperatures near -50°C
- The Payload was well insulated staying $+20^{\circ}\text{C}$ above coldest temperatures (Fig 1)
- The MiCS sensor measures CO_2 & VOC data. Faulty data is recorded due to low operating temps (Fig 4)
- A total of 0.083 volts were drained throughout the flight(Fig 2)
- The Payload experiences the most amount of force at balloon burst (Fig 5)
- The lowest pressure the payload experienced was 14.44 mb (or ~ 0.2 psi) (Fig 1)

Plans for upcoming launch include:

- Wider range for temperature readings
- Better insulation for internal components
- Image stabilization
- Geiger counter
- Improve MiCS housing

Conclusions: This payload was equipped with an acceleration, humidity, MiCS, pressure, and temperature sensor(s), along with a camera. Except for the MiCS and humidity sensor, all other components measured and stored accurate data. The upcoming launch will improve on payload design as well as the variety of sensors.

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