

LR Results from Lenoir-Rhyne Balloon Team Payload Launched During August 21, 2017 Eclipse



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Abstract

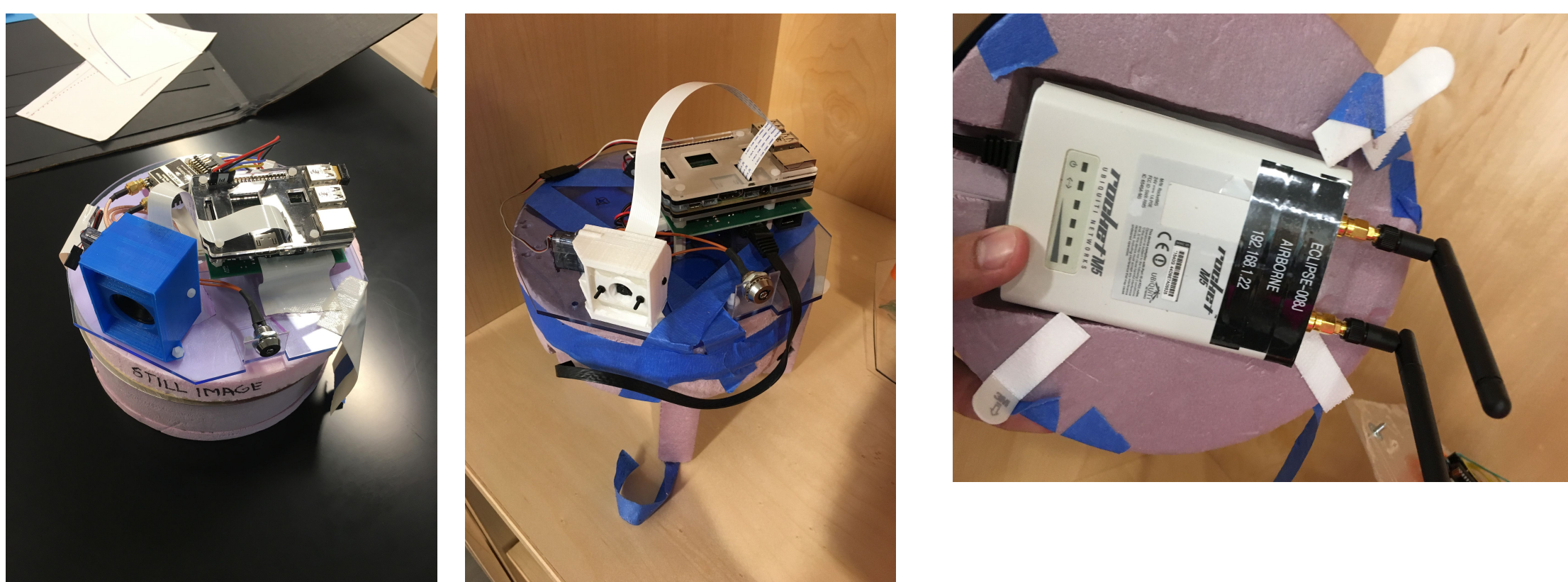
The Lenoir-Rhyne Eclipse Balloon Team participated in The National Eclipse Ballooning Project and launched a balloon with payload from Pisgah Astronomical Radio Institute. Payload apogee was 99,470 feet, with balloon burst during local totality. The team was able to track the balloon during flight, stream video during the ascent, take multiple pictures close to apogee and successfully fly and retrieve a student designed payload. Tracking information and data from nominal and student designed payloads is presented.

Ground Station

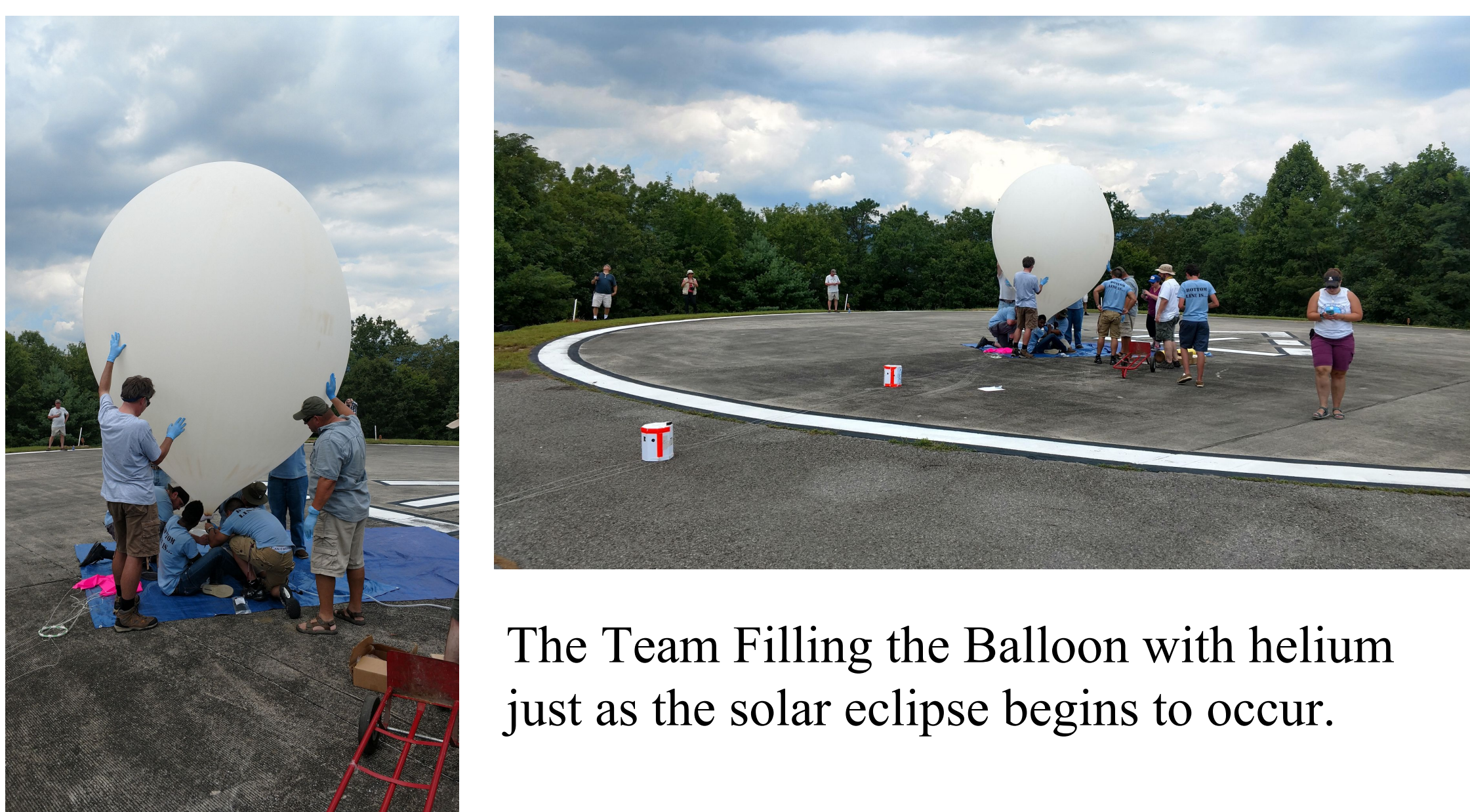


The Ground Station used to communicate information between the payload and our team throughout the balloons flight profile.

Nominal Payload and Launch



Balloon Payload specified by Eclipse Ballooning Project

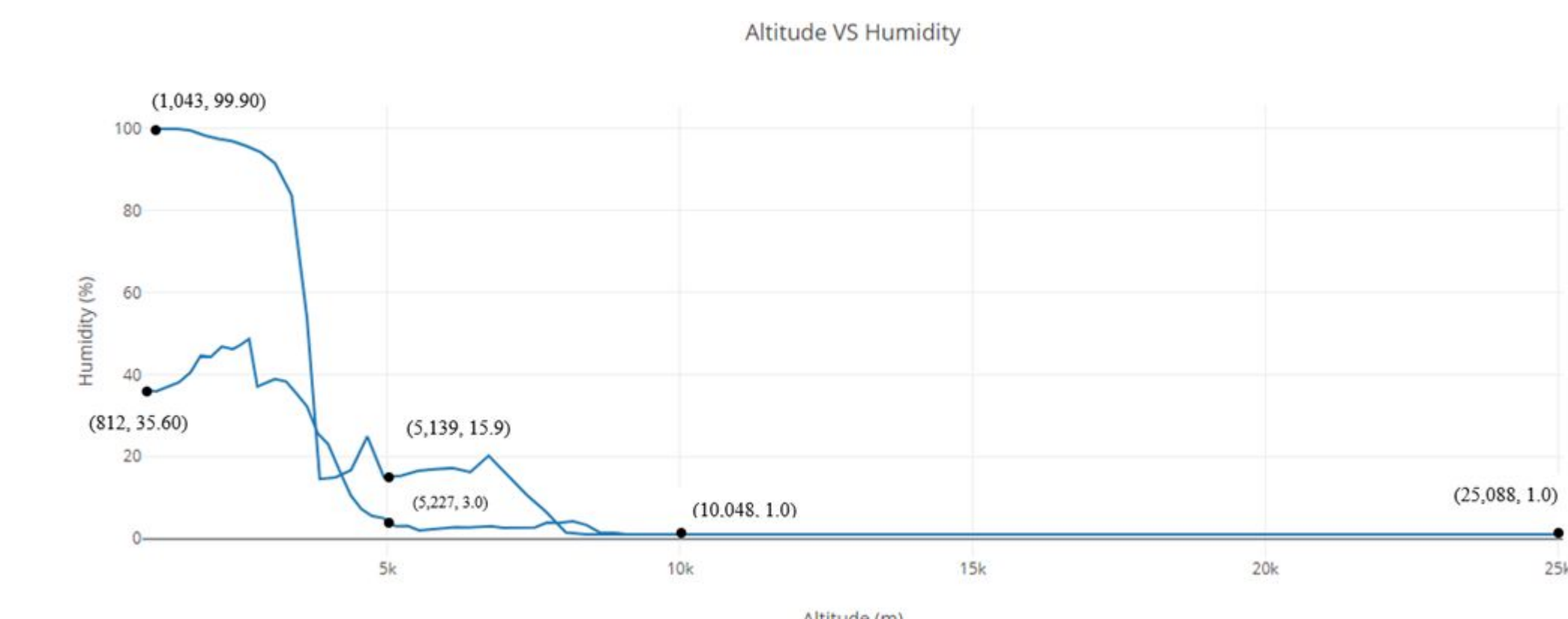


The Team Filling the Balloon with helium just as the solar eclipse begins to occur.

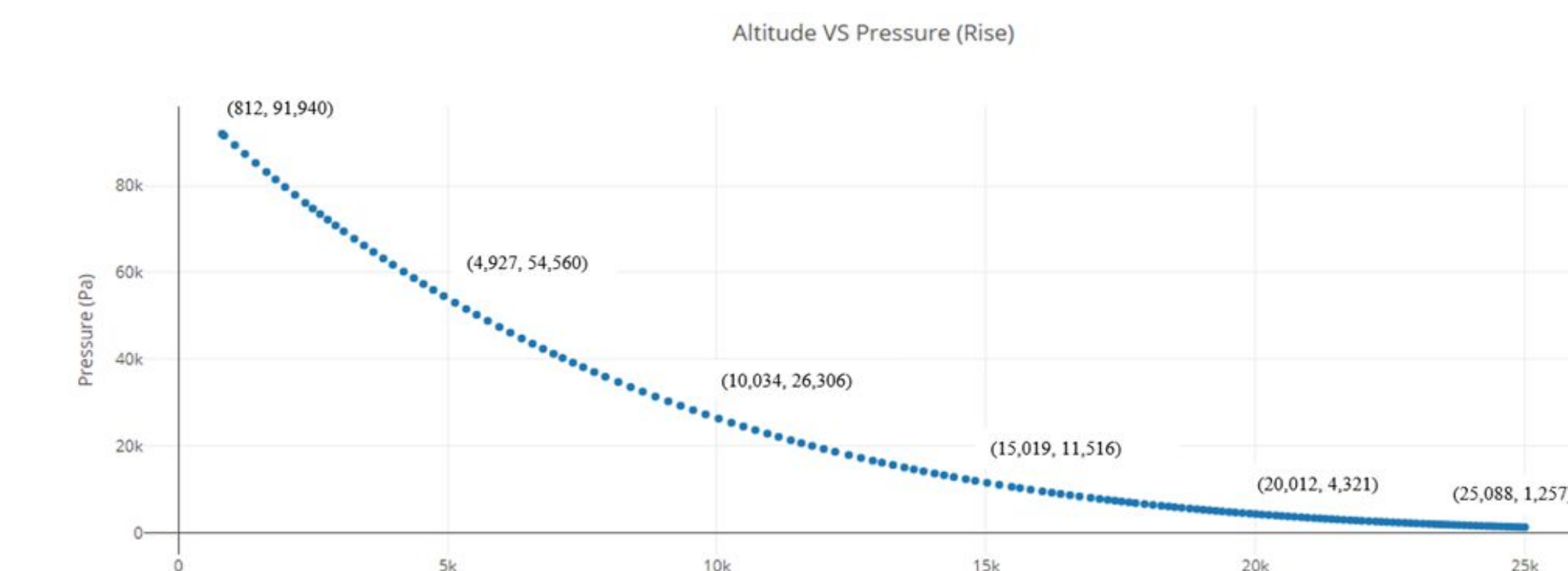
Authors: Hernandez, Juan; Carranza, Erik; Joseph Johnson; Robinson, Jake; Furchess, Spencer; Bryant, Sean; Jump, Larry; Grady, Anthony; Daily, Tyler; Knight, Douglas

Graphs from Payload Sensors

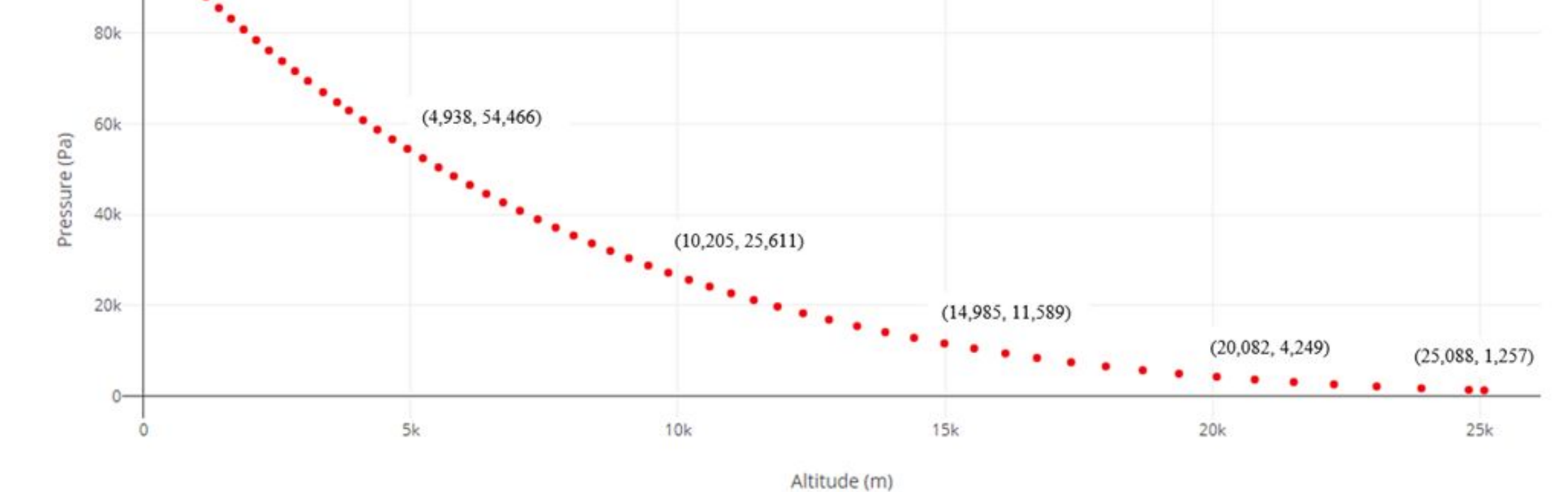
Red Lines/Dots: Descent of Balloon
Blue Lines/Dots: Ascension of Balloon



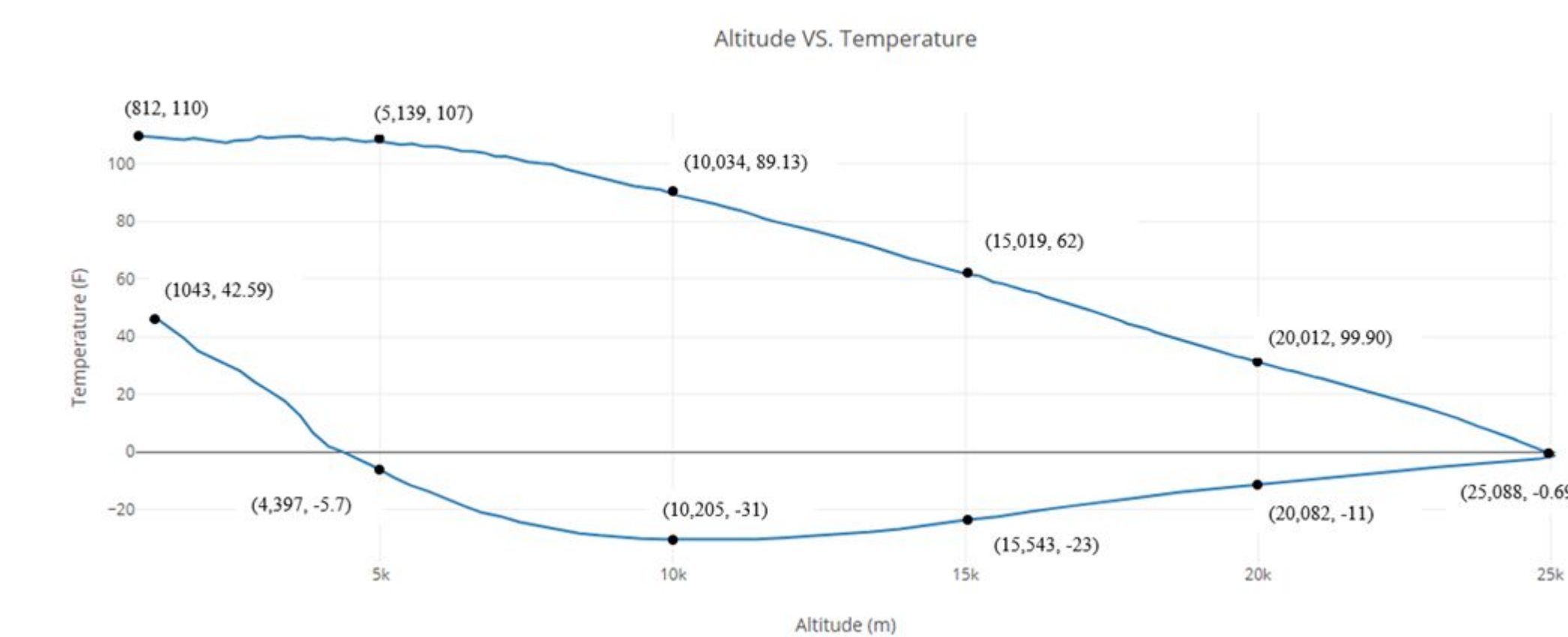
As the balloon gained altitude the humidity decreased. The humidity percentages increased as it descended. Storms were present near the area as it landed.



The Pressure (Pa) decreased as the balloon gained altitude

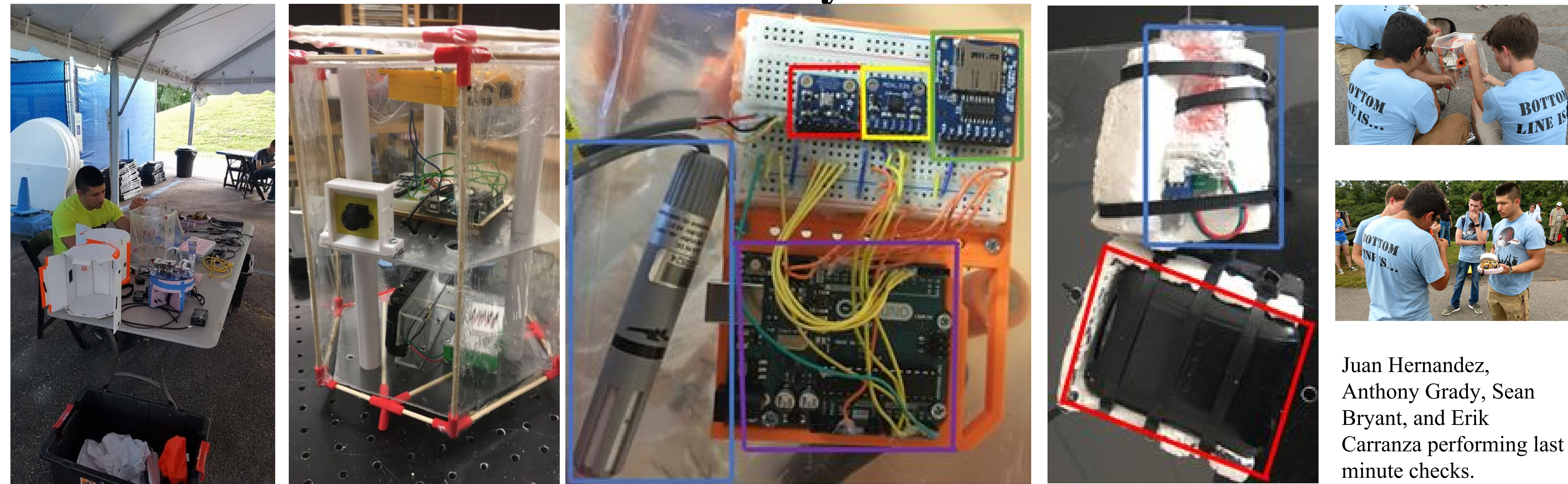


As the balloon descended from the atmosphere pressure rose



Temperature from inside the enclosure during its ascend and descend

Student Payload



Erik Carranza performing checks on mechanical design.

Student made payload which captured 180 degree images at totality.

Red: Pressure Sensor Yellow: Accelerator
Blue: Humidity/Temperature Sensor Green: SD Card
Purple: Arduino Uno

Red: GPS Scout Tracker
Blue: 900 MHz pinger

Juan Hernandez, Anthony Grady, Sean Bryant, and Erik Carranza performing last minute checks.

Recovery



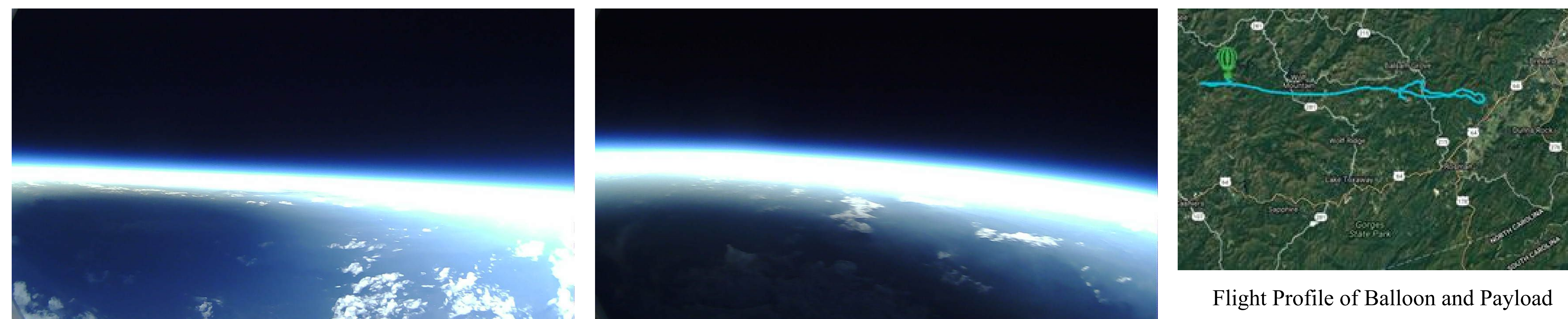
Group Selfie as the Recovery Team (Jake, Sean, Spencer, and Larry) tracked the payload during the eclipse.

Larry Jump recovering Student made payload. The other two payloads were stuck in vines and unreachable.

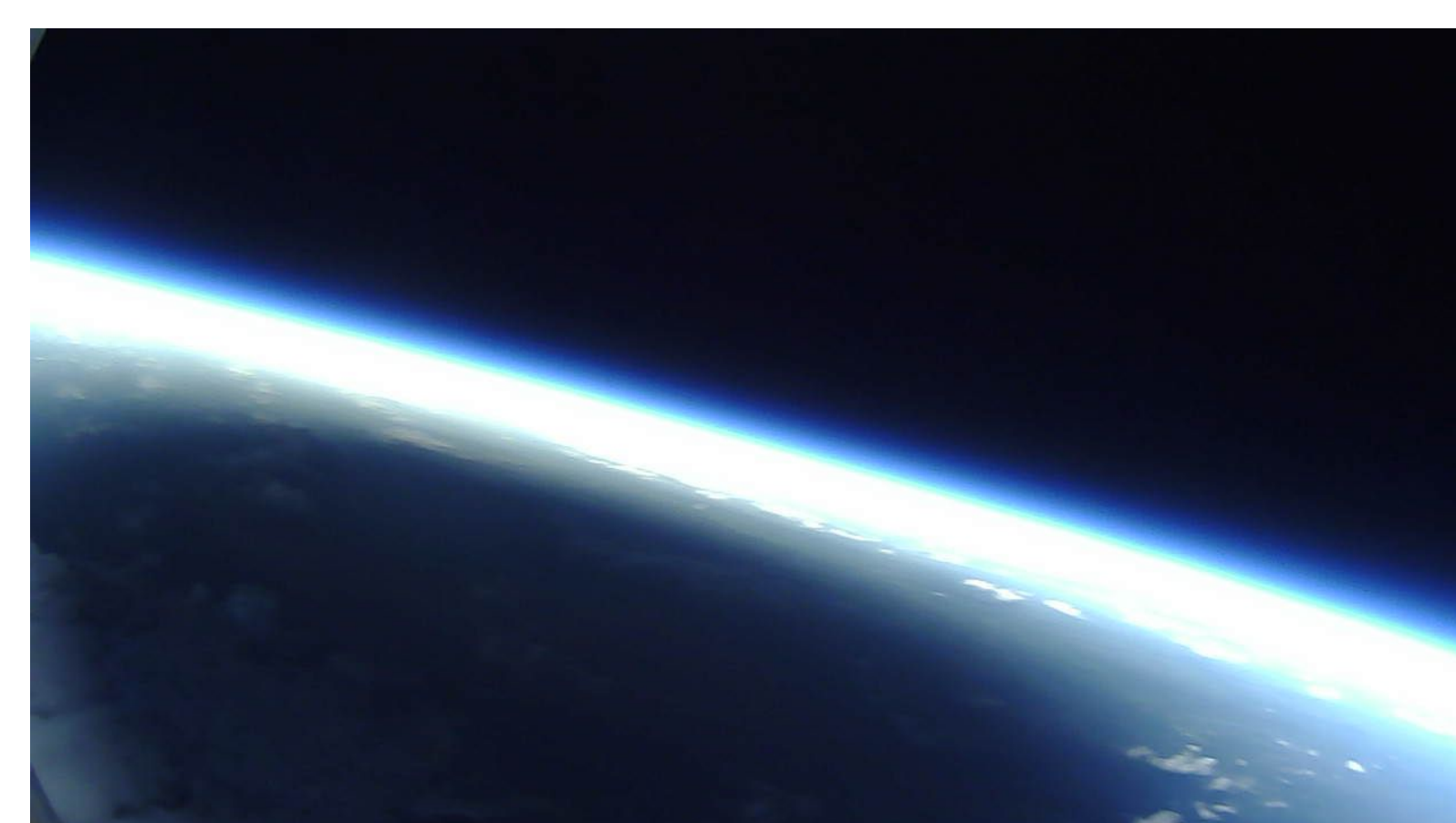
Dr. Knight holding what's left of the balloon.

Sean, Erik, and Dr. Knight return to the landing site to recover remaining payloads.

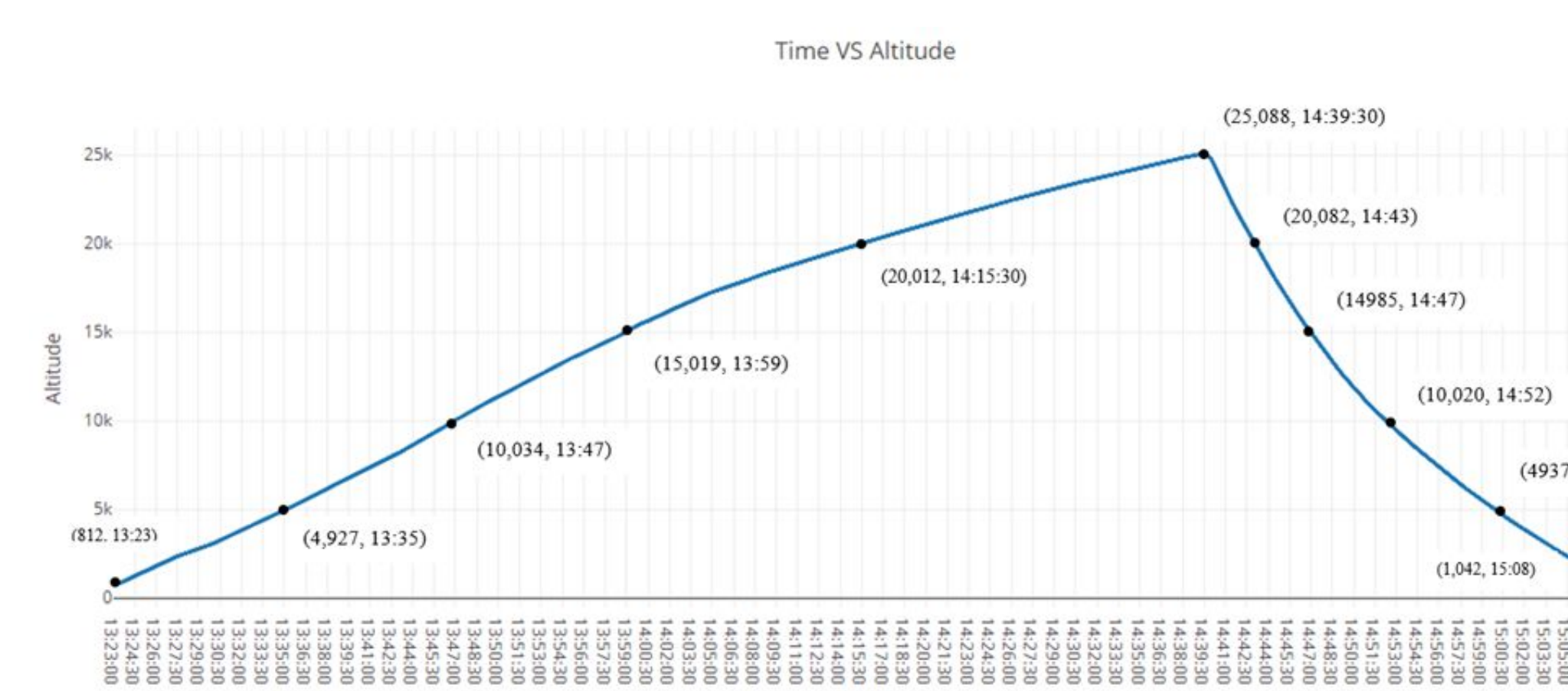
Results



Flight Profile of Balloon and Payload



Images Captured



Balloon and payload were launched at Approx. 13:23. The Balloon burst at 14:39:30, two minutes after totality which was at 14:37:22. The Payload landed at Approx. 15:08. Flight Duration: 105 minutes; Ascension: 77 minutes; descention: 28 minutes

Conclusion

The Lenoir-Rhyne Eclipse Ballooning team successfully launched, tracked and retrieved a balloon payload for the 2017 Eclipse Ballooning Project. The team track streamed video to the NASA website during ascent, took pictures of the shadow of the Moon as it traveled across the Earth. From a student designed and built payload, the team recorded temperature, pressure and humidity during flight. The team wishes to thank North Carolina Space Grant for funding of this project.