Status Report

August-September 2016

High Altitude Student Platform

Institution: College of the Canyons	**Team Manager**: Daniel Tikhomirov
Date: September 30, 2016	**Advisor**: Teresa Ciardi

Flight Analysis

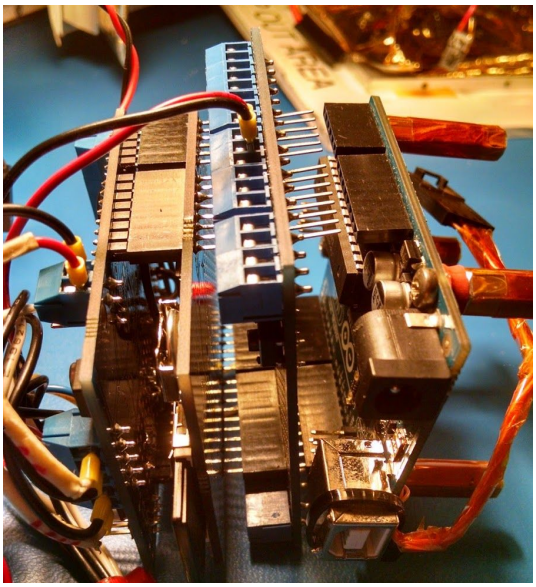
During flight, our team took shifts throughout the day to monitor the payload and to fix any problems that arose. Overall, the flight went smoothly with the exception of the HASP personnel accidentally turning the power off for our payload instead of payload #1 for about one hour. This meant that our collector was turned off for about 1.5 hours since the high voltage did not turn on until we realized to send another discrete signal. While this still gave us the rest of the entire float time to collect particles, it was inconvenient to not utilize the entire float time.

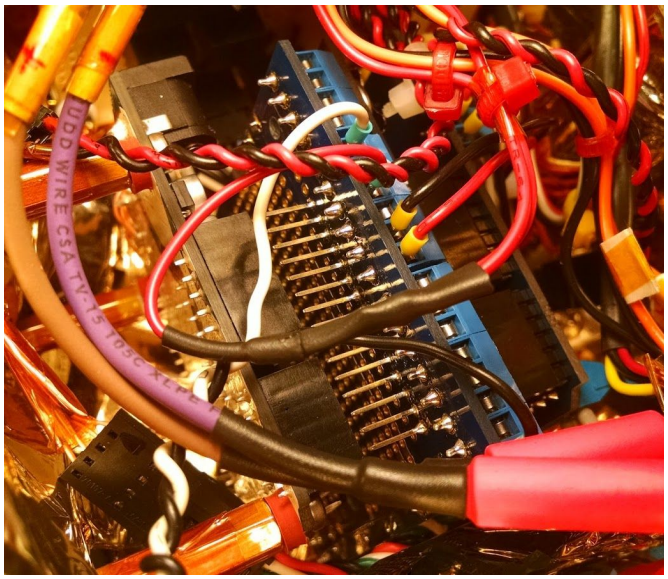
Above: During the first hour of launch, one of our team members managed to take a screenshot of when our payload was in camera view before the camera feed was lost.

Post-Flight Inspection

Upon inspection of the payload, it was revealed that we witnessed two major failures of our payload:

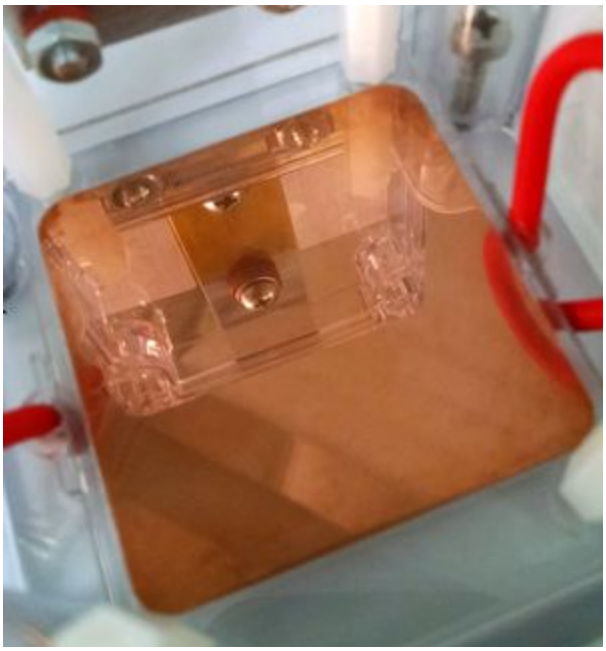
1. **Data Logger did not record any flight data**
    a. As of this moment, the failure is still under investigation. It is possible that the SD card was not formatted correctly after the thermal vacuum test; or that the SD card did not have proper contact when inserted (unlikely). The flight program was designed to keep running despite a data logging failure and we did not have any such failures in the many times we ran the program during integration. This issue is not critical to the main objective of the experiment, but it would have been a huge benefit to have a record of the internal processes of our payload. The only record of our payload function we have now is the current readings from HASP records and a possible detection by the UNC infrasound detector experiment. This problem will be a major point to address in next year's HASP proposal (we will use the serial uplink/downlink the second time around).
2. **Flight Computer Pin Disconnection**
    a. Once we had received the payload, the first thing we decided to check was the status led and if the program was still able to run. Once we plugged in the USB interface cable however, we noticed the led light did not turn on and the serial monitor displayed only partial data. Upon observation, it was revealed that a shock from either HASP landing or shipment back to California had caused the contact to not only pull out but bend out to about 30 degrees. We are still trying to pinpoint exactly when this might have happened and what could have prevented it.

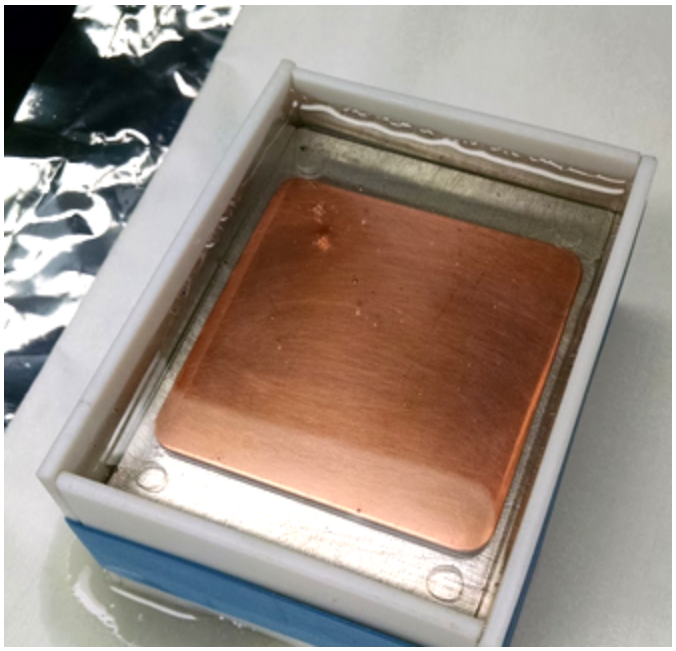




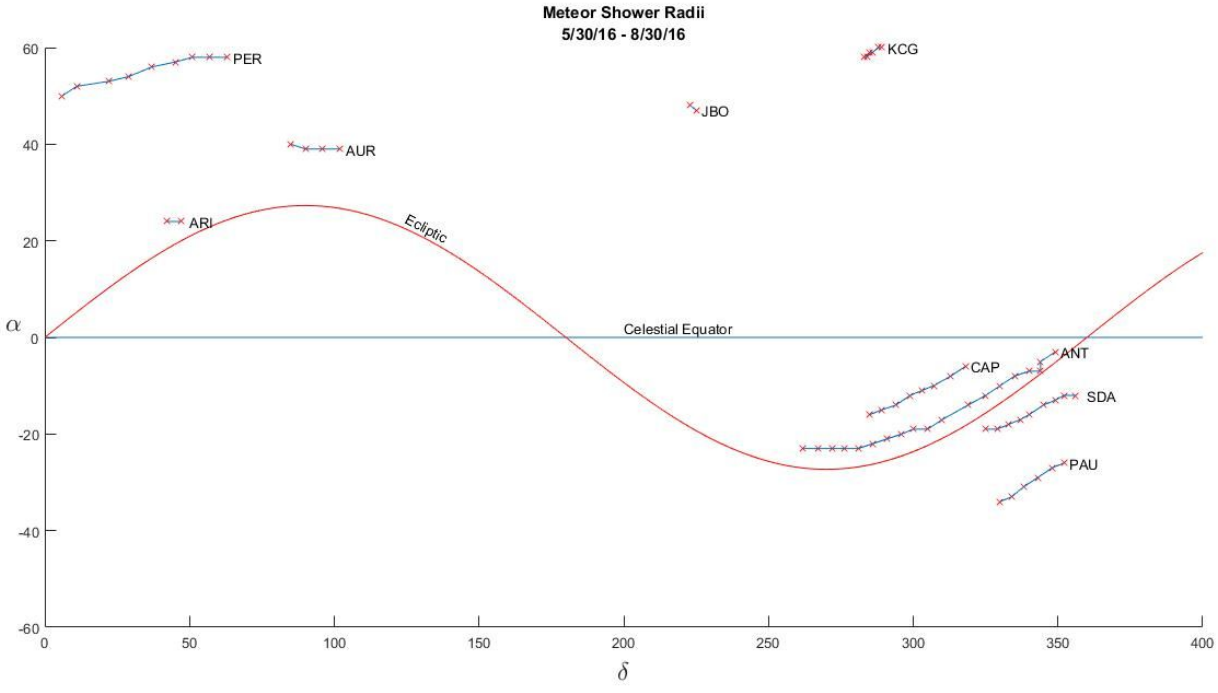
Left & Right: Condition in which the flight computer returned with permanent pin damage and full loss of pin contact on the right side.

Science





Left: Copper plate inside the EPC assembly after flight **Right**: Copper plate placed inside a casting mold for acrylic epoxy embedding.



Above: Meteor shower radii distribution (right ascension by declination) from May 2016 until August 2016

Scientific analysis of the particles has progressed slowly since payload return due to minimal hours at the CSUN clean rooms that our team has access to. What we have accomplished so far has been to retrieve the copper plate from the enclosure and begin the acrylic casting procedure to fully imbed the particles in a rigid and transparent medium. However, access to the clean rooms has been fully restricted until further notice due to a biohazard warning in an adjacent lab. A similar problem has plagued the College of The Canyons clean room when we had a water main leak earlier this year right before work began on the payload. We expect access back into the clean room during early October once they finish the clean-up that has already quickly progressed.

Once we have our sample, we will perform a various number of procedures on it to verify if the dust particles are of terrestrial or cosmic origin. Here is an ordered list of procedures expected during the next few months leading up to the science report:

1. **High-powered microscopic analysis**
    a. Catalog all particles in a grid system and identify objects of interest
2. Perform **UV/Vis and X-ray Photoelectron spectroscopy** on entire sample to detect possible rare-earth metals and space-borne volatiles
3. Analyze objects of interest with a **scanning electron microscope**.
    a. Take detailed spectroscopic analysis of each object
4. If possible IDPs found, collaborate with our contact at Johnson Space Center to receive our sample and perform further analysis.

In the meantime, our team has been working on identifying the likelihood that our payload captured cosmic dust during the flight. It was revealed after our flight, that we had actually just flown at the night of the peak of an active meteor called the Aurigids (AUR). In addition, its radii (point of origin) was close to the latitude and longitude at which HASP was flying. To fully determine where the highest flux of particles might be, we formed a meteor shower radii-drift distribution curve of the 3 months leading up to the flight. This data will later be calculated to include the flux of particles and their distribution in the stratospheric winds to create a radiant-based particle distribution map of meteor shower origin dust particles.

Current Team Members:

Flight Systems • Jason Monsalve (lead) • Jayme Gimenez	EPC Systems • Nicholas Kasdjono (lead) • ~~Savannah Rousselo~~ • David Al-Nemri
Thermal Control • ~~Ryan J. Arroyo~~ (lead) • Wyatt Kurumiya • ~~Julian Drake~~	Power Management • Mindy Saylors (lead) • ~~Irfan Zaman~~
Mechanical/Structural • Patrick Gagnon (lead) • ~~Justin Hill~~ • ~~Scott Sebesta~~	Faculty Advisers • Teresa Ciardi • Greg Poteat • ~~Christine Hirst~~

Current Science/Post-flight Analysis Team:

- Daniel Tikhomirov (lead)
- Teresa Ciardi (advisor)
- Nicholas Kasdjono
- Patrick Gagnon
- Wyatt Kurumiya
- Jayme Gimenez
- Jason Monsalve
- Mindy Saylors
- David Al-Nemri