

Status Report
November 2016
High Altitude Student Platform

Institution: College of the Canyons	Team Manager: Daniel Tikhomirov
Date: November 25, 2016	Advisor: Teresa Ciardi

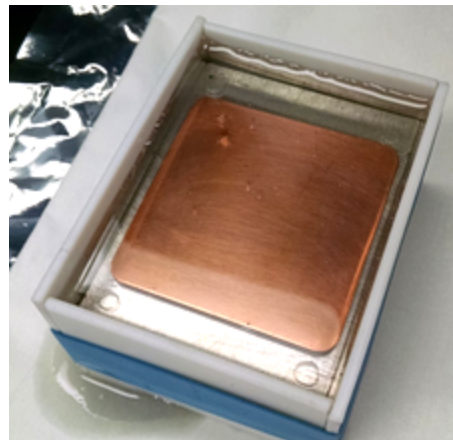
Science

Sample Update:

The sample has finally been collected from CSUN. Our team is now in the final stages of the experiment with many hours of microscope analysis time planned for next week. The sample seemed to be in perfect condition with the only physical imperfection found to be bubbles that formed in the epoxy resin when it cured. Hopefully, this should not hamper our efforts to find particles using the optical microscopes when finding objects of interest.

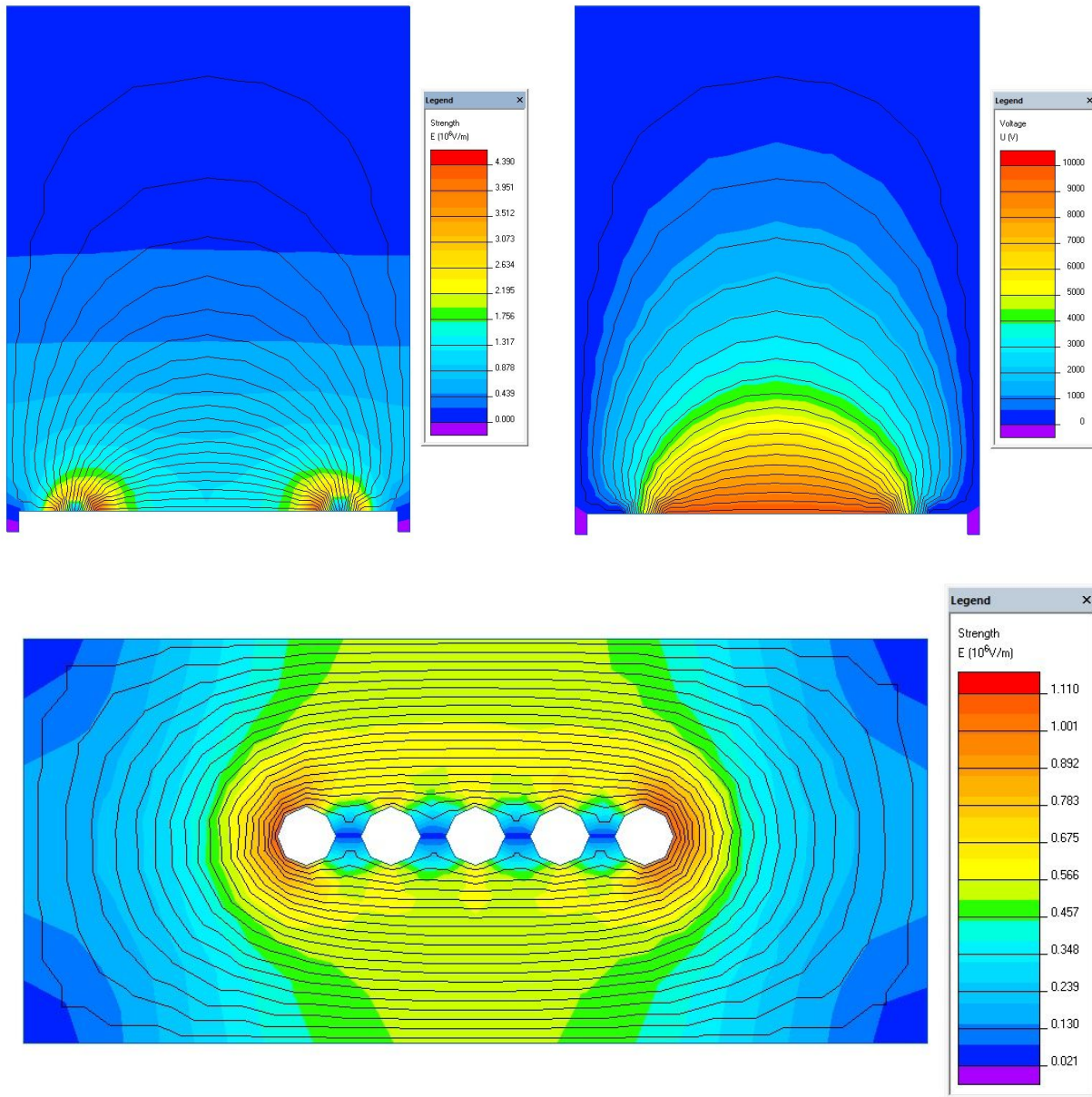
A new method of particle extraction was thought up by the team this month, closely based on the University of Washington's analysis of cosmic dust particles from the Stardust mission. The acrylic sample would be retrieved and cut down to a ¼" thick sliver that contains all the particles collected. A laser cutter would then cut out small pieces containing the objects of interest after the microscopic analysis. These small pieces are then placed on a SEM (scanning electron microscope) grid, and placed in a small custom-made heating chamber containing aqueous chloroform. The sample is dissolved by the slowly heated vapors which evaporates the acrylic resin but leaves the particles intact and ready for SEM analysis.

Most likely, this method is too time-consuming to be able to make it into the science report for HASP 2016. However, the findings and experience will be a vital component for the HASP 2017 proposal and potential science report.



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

We have also prepared some simulations from some new software we acquired which is able to give us predictions on the efficiency and capability of the electrostatic particle collector. What the simulations show is that the collector at the operating voltages and physical dimensions should have been fully capable of performing electrostatic precipitation of airborne particles. More details and figures will be included in the final science report.



Top Left: Electric field strength gradient from the copper plate **Top Right:** Electric field potential from the copper plate **Bottom:** Electric field strength from the wire mesh

Next week, 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 month 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

We are all excited for the final science report and would like to thank the entire HASP and CSBF team for the amazing hospitality and the chance to gather more career/life experience than we could have possibly hoped for. We also look forward to the HASP 2017 proposal and hope to fix the flaws we had and the gaps in understanding we found in HASP 2016. Despite the drawbacks, these next few weeks will determine the ultimate outcome of the success of the experiment.

Sincerely,

- The ECDC College of The Canyons Team

Current Team Members:

<u>Flight Systems</u> <ul style="list-style-type: none">● Jason Monsalve (lead)● Jayme Gimenez	<u>EPC Systems</u> <ul style="list-style-type: none">● Nicholas Kasdjono (lead)● Savannah Roussele● David Al-Nemri
<u>Thermal Control</u> <ul style="list-style-type: none">● Ryan J. Arroyo (lead)● Wyatt Kurumiya● Julian Drake	<u>Power Management</u> <ul style="list-style-type: none">● Mindy Saylor (lead)● Ifan Zaman
<u>Mechanical/Structural</u> <ul style="list-style-type: none">● Patrick Gagnon (lead)● Justin Hill● Scott Sebesta	<u>Faculty Advisers</u> <ul style="list-style-type: none">● 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 Saylor
- David Al-Nemri