



HASP Monthly Status Report

Report Month: May 2023
Submitted by: Elsa Carreras
Submit Date: 5/26/ 2023
Institution: Cu Boulder Space Grant
Payload Number: 2023-03
Payload Name: LunaSat Testbed

I) Activities During Previous Month:

We finished our CAD design for the payload. This includes the base plate assembly and the structure itself. We also had preliminary testing of the RF with Aluminum and Nylon plastic. We found that the Aluminum decreased the distance but not to a point where we must worry about the Aluminum interfering with the RF communications. We also started attaching and planning out wire management. This past month we continued working on power testing and setting up an entire electrical circuit. We also are working on learning how to use EAGLE PCB to design and print a PCB for our circuit in the next month. Software has been relentlessly working on transferring and storing data from the LunaSats to the Raspberry Pi. They have been very successful with this, storing any data from the LunaSats as a string on the Pi. Two team members joined summer internships and left the project. Since school is out, team members return home, so some must work remotely only. We are losing one more team member in June.

II) Issues Encountered:

The problem we encountered was that we needed to rethink space because we needed to use more Raspberry Pis. And need a place to weld or an alternative method to fix the structure together. We encountered a few problems this month, one being rather large. The major problem had to do with the LunaSats. Software was testing data transfer from the LunaSats to the Pi and discovered that if two LunaSats were running the same sensor transferring data on the same I2C line, one of the LunaSats would override the data from the other. This is because each specific sensor on the LunaSats has the same I2C address (ex, all temp sensors on every LunaSat have the same address), which is hardwired into the microprocessor. If we wanted to change one of the sensors' addresses, we would have to rewire the LunaSats, which we do not have the time or resources to do. So with one Raspberry Pi, we cannot have any LunaSats with the same sensors running simultaneously, or the data will be corrupted. However, this does not allow us to complete all of our testing goals, so we plan to run 5 Raspberry Pi Zeros, each with a maximum of 2 LunaSats connected. This will enable us to fulfill all of our testing goals. In the coming weeks, we need to redesign our electrical system, create new schematics, and test to ensure we will still be under the current limit

of 0.5A with all of the Pis.

III) Milestones Achieved:

After many tests, we decided to change the electronics design.

IV) Plans for Coming Month:

Plans for the coming months are to cut the Aluminum and put together the payload. In the coming month, we plan to redesign our electrical system because of some issues we encountered, which will be mentioned below. We plan to thoroughly test this new electrical design to meet our requirements. We also plan to design and print a PCB to handle power and data distribution (this also reduces the amount of wire management we need). CU Boulder has resources to print PCBs on campus when we complete this.

In that case, we plan to run tests integrating the electrical and software systems that will collect data for extended periods to ensure everything works correctly before fully integrating all our systems. We are in the process of hiring three new team members For Avionics.

V) Other Comments or Questions for HASP Management:

VI) Team Composition and Organization:

Name ⁽ⁱ⁾	Start Date	End Date	Role	Student Status	Race ⁽ⁱⁱ⁾	Ethnicity ⁽ⁱⁱⁱ⁾	Gender ⁽ⁱ⁾	Disabled
Veronica Corral Flores	9/9/22	Present	Faculty Advisor	Faculty	Mixed race	Hispanic	Female	No
Mary Hanson	9/9/22	4/7/23	Faculty Advisor	Faculty	White	Non Hispanic	Female	No
Elsa Carreras	9/9/22	Present	Project Manager	Undergrad	White	Caucasian	Female	Yes
Benjamin Hellem	9/9/22	Present	Systems	Undergrad	White	Caucasian	Male	No
Chloe Zentner	9/9/22	Present	Structures lead	Undergrad	White	Caucasian	Female	No
Chris Brown	9/9/22	Present	Avionics lead	Undergrad	White	Non Hispanic	Male	No
Hallie Hill	9/9/22	Present	Structures Member	Undergrad	White	Caucasian	Female	Yes
Nicholas Mueller	9/9/22	Present	Structures Member	Undergrad	White	Caucasian	Male	No
Brice Parrott	9/9/22	4/28/23	Avionics Member	Undergrad	White	Non Hispanic	Male	No
Zack Goldberg	9/9/22	4/28/23	Avionics Member	Undergrad	White	Caucasian	Male	No
Jack McDonald	2/8/23	Present	Avionics Member	Undergrad	White	Non Hispanic	Male	No
Emanuele Rimini	2/8/23	Present	Avionics Member	Undergrad	White	Italian	Male	No
Sebastian Vargas	9/9/22	12/12/22	Avionics Member	Undergrad			Male	