



HASP Monthly Status Report

Report Month: May 2023
Submitted by: Benjamin Dyer
Submit Date: 05 / 26 / 2023
Institution: McMaster University
Payload Number: 2023-11
Payload Name: Electron Spectrometer Telescope

I) Activities During Previous Month:

Mechanical

Fabrication of Mechanical parts is underway. The collimator fabrication has been outsourced and the parts are shipping in a few days. The rest of the payload is being manufactured in house and should complete fabrication by mid-June. Thermal analysis of the magnet and collimator shutter module (CSM) is underway to ensure there won't be any overheating issues. If thermal issues occur with the CSM we will implement a heat sink to connect the CSM to the payload housing to dissipate the heat.

Electrical

The power distribution module (PDM) boards have arrived and are ready for functional acceptance testing and population. PDM firmware continues to progress well with CAN communication now working. The CSM driver (CSMD) design has been completed and the board have been sent out for fabrication.

Instrument - Hardware

The data acquisition module (DAM) has completed manufacturing and functional acceptance testing. Three of the four boards are functional, which should help accelerate firmware development. The Front-End Module (FEM) has arrived and is currently being put through functional acceptance testing before populating and testing. We have also ordered two more 1500um-thick MDS040 detectors so we can have both a flight and engineering model for HASP.

Instrument - Firmware

HDL from the NEUDOSE mission has been repurposed for HASP and is undergoing test bench testing. On the C side of thing, drivers for SPI, I2C, and CAN have been set up and are being tested. The SPI is top priority right now as we need this to enable the high-speed ADC that samples the detectors. Once the ADC can be enabled the HDL to ingest the LVDS signals will be tested. We expect once the LVDS signals can be ingested the rest of the firmware will come together quickly as it has largely been written and tested on previous missions.

II) Issues Encountered:

Things are going smoothly, we are a couple weeks behind on instrument firmware but have hired two new students to help.

III) Milestones Achieved:

- DAM passed functional acceptance test and have been handed off to firmware developers

- CSMD design completed and sent for fabrication
- Mechanical parts sent for fabrication and being fabricated in house

IV) Plans for Coming Month:

Mechanical

Fabrication of parts will continue until mid-June at which point the instrument and payload will be assembled. We are also coming up with a test plan for determining the change in magnetic field strength of the electro-holding magnet to ensure it will be able to hold the CSM open throughout different thermal conditions.

Electrical

The PDM will be put through functional acceptance testing and population over the first two weeks of June. The PDM will then be integrated with the DAM to test communication. The CSMD should arrive mid-June at which point it will also undergo functional acceptance testing and population.

Instrument – Hardware

The FEM will finish functional acceptance testing and population by mid-June. The high voltage lines will be tested separately to ensure they operate correctly and will not damage the detectors. Once the FEM has been tested, the DAM and FEM will be connected along with the Silicon detectors in our test housing and the full system will be tested and characterized. The system will be compared with a commercial CAEN system to ensure acceptable performance.

Instrument - Firmware

We can now test firmware on hardware which is helping speed up FW development. By the end of June we aim to have both trace and list mode working (though more work will likely be needed to get accurate energy measurements). Communication between the DAM and PDM will be tested including sending list data to the PDM for storage on an SD card.

V) Other Comments or Questions for HASP Management:

I will be away for most of June so Steven (Xingzhi) Cheng will be taking over as student lead while I'm gone. His email is chengx4@mcmaster.ca

VI) Team Composition and Organization:

Name ⁽ⁱ⁾	Start Date	End Date	Role	Student Status	Race⁽ⁱⁱ⁾	Ethnicity⁽ⁱⁱⁱ⁾	Gender ⁽ⁱ⁾	Disabled
Benjamin Dyer	01/10/22	Present	Student Leader	Graduate	Asian	Non-Hispanic	Male	No
Andrei Hanu	01/10/22	Present	Faculty Advisor	Faculty	White	Non-Hispanic	Male	No
Graham Power	01/10/22	Present	Firmware Lead	Graduate	White	Non-Hispanic	Male	No
Connor Chandran	01/10/22	Present	Electrical Lead	Undergrad	White	Non-Hispanic	Male	No
Patrick Chin	01/10/22	Present	Mechanical Co-Lead	Graduate	Asian	Non-Hispanic	Male	No
Angela Tolis	01/10/22	Present	Mechanical Co-Lead	Undergrad	White	Non-Hispanic	Female	No
Jonathan Wang	01/10/22	Present	Mechanical	Undergrad	Asian	Non-Hispanic	Male	No
Michael Altali	01/10/22	Present	Mechanical	Graduate	Asian	Non-Hispanic	Male	No
Kosta Gianicos	01/10/22	Present	Electrical	Undergrad	White	Non-Hispanic	Male	No
Elijah Menna	01/10/22	Present	Electrical	Undergrad	White	Non-Hispanic	Male	No
Felix Yuan	01/10/22	Present	Electrical	Undergrad	Asian	Non-Hispanic	Male	No
Austin Liu	01/10/22	Present	Firmware	Undergrad	Asian	Non-Hispanic	Male	No
Connor O'Reilly Juarez	01/10/22	03/23/23	Instrument Mechanical	Undergrad	White	Hispanic	Male	No
Xingzhi Cheng	01/10/22	Present	Instrument	Graduate	Asian	Non-Hispanic	Male	No
Larysa Duda	01/10/22	Present	Instrument	Undergrad	White	Non-Hispanic	Female	No
Kristen Di Loreto	01/04/23	Present	Instrument Mechanical	Undergrad	White	Hispanic	Female	No
Barnett Wan	05/04/23	Present	Instrument	Undergrad	Asian	Non-Hispanic	Male	No
Caleb Gannon	05/24/23	Present	Instrument	Undergrad	White/ African-American	Non-Hispanic	Male	No

- i. Current NASA guidance requires information from up to date legal documentation (for instance, Driver's License, Passport)
- ii. Accepted options include African-American/Black, Asian, American Indian/Alaskan Native, Native Hawaiian, Pacific Islander, White
- iii. Accepted options are Hispanic on Non-Hispanic.