



HASP Monthly Status Report

Report Month: February 2023
Submitted by: Benjamin Dyer
Submit Date: 02 / 24 / 2023
Institution: McMaster University
Payload Number: 2023-01
Payload Name: Electron Spectrometer Telescope

I) Activities During Previous Month:

Mechanical

Most of the focus the past month has been placed on the shutter design. A preliminary design has been made using a torsion spring and small motor (to avoid generating a constant magnetic field with a solenoid). The 3D print of the two-piece shutter is shown in the below figure for illustrative purposes.



Electrical

New members have been caught up with the design of the Power Distribution Module (PDM) from 2021 and have begun modifying the schematics for HASP 2023. A new STM processor has been chosen for the PDM and will be the main interface between the EST instrument and HASP. A firmware architecture has been established and work to repurpose firmware from HASP 2021 is underway.

Instrument

Schematics for the Front End Module (FEM) and Data Acquisition module (DAM) have been completed awaiting a final design review. Layout of the DAM has begun and part manufacturers have been contacted to obtain some part (primarily SiTime since their clocks are factory configured). The mechanical structure to hold the instrument collimator and Si detectors has been put together and is being modified to fit within the HASP2021 housing. Testing of the silicon detectors is underway (I-V curves) to ensure detectors meet the manufacturer's standards.

II) Issues Encountered:

During testing, one of the Si Detectors had an unusually high leakage current. We are designing a new test fixture to ensure the high leakage current isn't caused by the measurement. If we determine the issue does not originate from our test fixture, we will contact the manufacturer about acquiring a replacement.

III) Milestones Achieved:

- Preliminary shutter design
- Completed Front End Module and Data Acquisition Module Schematics
- Preliminary mechanical housing for the Si detectors designed.

IV) Plans for Coming Month:

Mechanical

Over the next month the shutter design will be iterated on and prepared for a design review mid March (planned date of March 15th). Once the payload plate arrives work will begin on determining where mounting holes will be placed and how the pigtail will interface with the payload.

Electrical

Next month the final schematics for the PDM should be finished and layout of the PCB will begin. We are targeting a design review for the PDM board by the end of March.

Instrument – Hardware

PCB layout of the Front End Module and Data Acquisition Module will continue and is projected to be completed within the next 3 weeks. Following the layouts, we will conduct design reviews for both boards and send them out for manufacturing (The DAM will be printed and populated by PCBWAY while the FEM printed by PCBWAY but populated at McMaster).

Instrument – Firmware

We will continue to conduct interviews to fill the firmware positions and aim to onboard new members within the next 4 weeks. Work will begin on collecting code from the NEUDOSE mission that can be repurposed for the EST.

V) Other Comments or Questions for HASP Management:

N/A

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	Present	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

- 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.