

HASP 2016 Student Payload Monthly Report

Team Member Activities:

Kyle Thurmond worked on designing a method of monitoring payload health during flight. Current method of monitoring system health is to send a steady 10Hz signal that is generated via the NI cRIO DAQ. The signal is continually streamed as long as the VI locally reads all subsystems running and operational. In the event of an error in the system the VI will cease the 10Hz signal to notify a ground user of a request to cycle power.

Michael Villar was assisted by Kyle in fixing the previous solution to the TEC polarity problem. The solid state relays that were being used were not switching properly and were stuck in a single current direction. Inducing a timing delay in switching speed corrects the relay current sticking problem.

Justin Urso conducted standard temperature and pressure measurements on the modified system as the LEDs have been given more power than previously altering their detectability limit. He is currently working on processing the measurements to determine new minimum detection limits at ST&P.

Akshita Parupalli was given the task of redesigning the test cell that is containing the N₂/CO₂/CO mixture. The updated design is to incorporate a diaphragm to be able to alter the pressure of the test cell to correlate with atmospheric pressure as altitude increases. This will give a wider range of collected data than the previous single pressure measurements.

Issues Encountered:

- New Electronics modifications for LED temperature control
 - Small issue with the TECs on the LEDs only being wired to cool the system. The solution was to introduce Solid State Relays to allow for current switching, a secondary issue arose when the relays were not switching properly when a switching command was sent.
- Continual modifications to the Payload chassis
 - With the completion of the environmental chamber tests. The current temporary support structure for the optical system is to be taken apart and the final chassis is to be assembled on the system.

Milestones Achieved:

- Secondary Environmental Chamber testing was completed.
 - Secondary Environmental Chamber tests were completed with new minimum power being supplied to each LED improving the detection limit of CO₂ and CO
- cRIO DAQ VI improvements
 - 10Hz System health signal has been implemented and is currently being tested for reliability and methods of improvement.
- New structural components have been added to the optics to improve rigidity and allow for thermal pooling to assist in temperature control.