Team PLEASE

August Status Report

HASP

Activities of the Team:

Ching-Cheng Hsu and Joel Taylor attended integration. At integration, our payload survived both the power and thermal vac test. However, we learned that we needed to update our serial downlink to include more data. Also, at integration, our discretes failed.

We discovered that the problem with the discretes was that we had the relay coils grounded and we were manually sending a positive voltage to the coil to fire the relay. However, our setup is opposite of how the HASP discretes work. We adjusted for this and are now using the discretes to ground each coil.

We also analyzed the data form the two thermal vacuum tests. The data from the thermal vac test showed that we are well within the temperature limitations of our components without using our heater system. In addition, all of our components did not show a change in performance in correlation to temperature changes. However, we did discover that during long term operation we saw a timing drift between the Arduino's GPS reading and the camera shutter. This timing drift was approximately 100ms. Also, there were very large spikes in increased time between the GPS reading and the camera shutter which we have isolated and removed from our code.

Once back from integration, we have finalized calibrations for the tiltmeter, CCD alignment, and timing issues along with fixing the discretes. The CCD alignment was done by created an LED grid on the ceiling. By taking pictures of the grid, one can determine the angle of the CCD by comparing the ratios between the LED lights and the pixel distance between the bright pixels. Using this, the CCD angle was adjusted to be perpendicular to the HASP plate. In addition, the tiltmeter was calibrated so that the the X and Y tilt outputs were exactly 2.5V parallel to the HASP plate.

We have done a lot of test in addition to the integration data in order to better understand the timing differences between the GPS reading and the camera shutter. We have concluded that the timing drift is linear and we can normalize the difference post flight without loss of resolution.

The PSIP and FLOP have been updated to match the payload function.

Joel will no longer be team leader after August 20, 2013. He will be leaving the group to pursue graduate school. Ryan Gueho will not lead team PLEASE. His primary role will be analyzing flight data and developing the scientific report.

Problems Encountered

The current documentation (PSIP and FLOP) were not updated for integration.

The discretes needed to be rewired.

There were very large timing different spikes as a result of poor coding.

We attempted to use the GPS pulse per second to control the camera shutter. However, the delays needed trigger the camera caused issues when trying to use the PPS as an interrupt. It was decided that the PPS was not a feasible means for controlling the camera.

Milestones Achieved:

PSIP and FLOP updated

Calibrations Finished

Payload survived integration

Timing differences between the GPS readout and camera shutter have been improved

Payload ready for flight

Current Team Members and Demographics:

Team Leader: Ryan Gueho

Team Members: Joel Taylor, Nicholas Chason

Faculty Advisor: Michael Cherry

With Guidance From: Michael Stewart, Gregory Guzik, Winston Capps, Ching-Cheng Hsu, Brad Ellison, Michael Cherry