University of Colorado at Boulder September Status Report

In the month of September, HELIOS III presented its Preliminary Data Presentation to the Colorado Space Grant Consortium and their mentor, Lee Sutherland. They have continued to analyze the data collected during flight and have begun writing their final science report. They have made several adjustments to the structure and have ordered new drivers for the stepper motors. They have gained several members and lost several members.

Team Demographics:

Cooper Benson: Caucasian male, sophomore, Aerospace Engineering

Paige Arthur: Caucasian female, sophomore, Aerospace Engineering

Kristen Hanslik: Caucasian female, sophomore, Aerospace Engineering

Dylan Richards: Caucasian male, sophomore, Aerospace Engineering

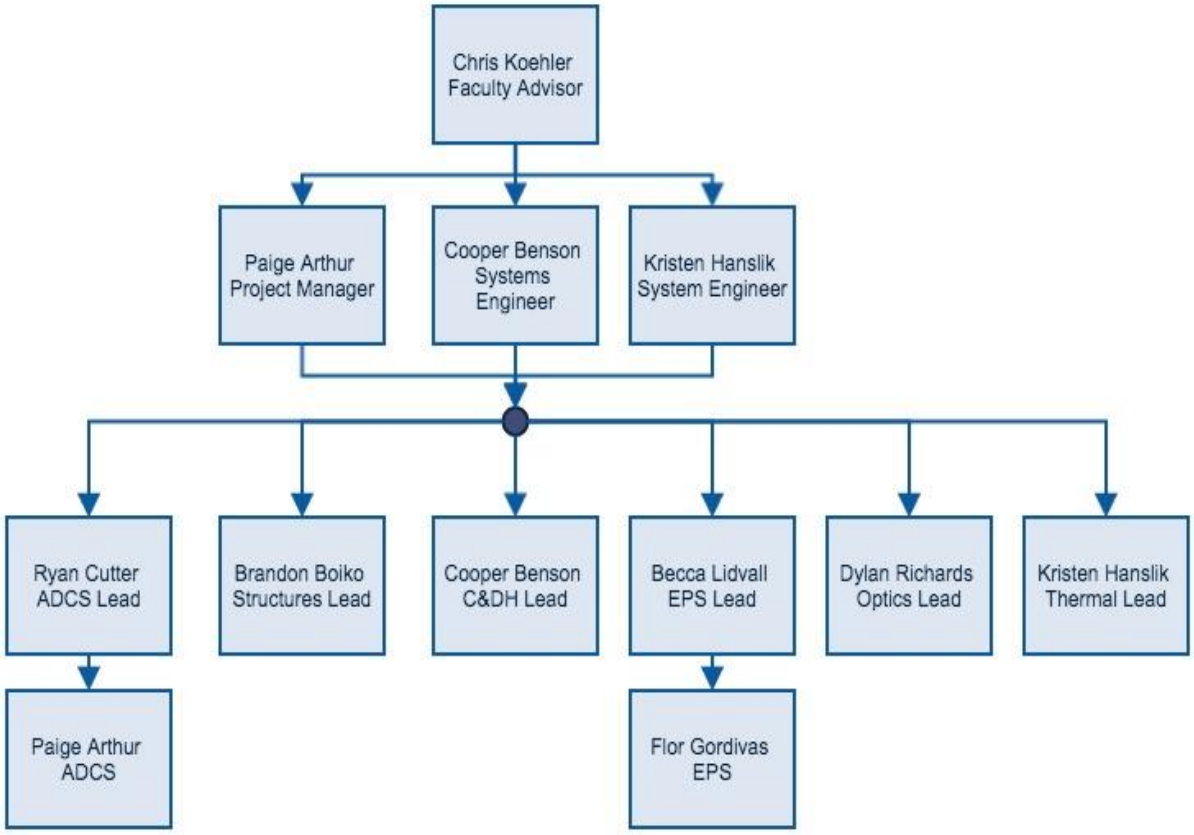
Ryan Cutter: Caucasian male, sophomore, Aerospace Engineering

Brandon Boiko: Asian / Caucasian male, junior, Mechanical Engineering

Flor Gordivas: Hispanic female junior, Electrical Engineering

Rebecca Lidvall: Caucasian female, junior, Aerospace Engineering

Team Organizational Chart:



Accomplishments of September:

ADCS: The Attitude Determination and Control System presented data on the photodiode readings and motor movement captured during flight. They concluded that movement along the azimuth worked well during flight but could be faster if faster ADCs were used between the diodes and microcontroller. They also concluded that the moving average implemented on the photodiode readings worked well because they decreased the noise on the diode readings while still allowing for accurate pointing at the sun. They want to recalibrate the didoes readings because the sun was slightly to the left to all of the images. They recently ordered the motor drivers and will begin coding with an Arduino within the next week. They have begun to write the final science reports/

C&DH: Command and Data Handling analyzed the flight data from the HASP platform. They confirmed that we retained communication with the payload throughout flight except for several minutes near the end of flight.

EPS: The Electrical and Power System lost all of the members that participated during the summer and gained two new members. The old members spent some time getting the new

members familiar with the power board design. They analyzed the EPS problems encountered immediately before flight. In particular: the low-side switching mechanism caused the microcontroller to overheat; the multiple grounds caused the driver to behave erratically when connected to the platform; and the temperature sensors were disorganized. EPS has begun designing a new board that will account for all of these issues.

Optics: Optics analyzed the images captured during flight. They concluded that over 6000 images were taken in total, 75 of which definitely contained the sun. This means that approximately 1.19% of the images contained the sun. Taking into account the fact that the payload had a very limited tracking window, approximately half of all images taken during its window contain the sun. Optics also analyzed the reasons that they images appeared blurry and saturated.

Structures: Structures analyzed the payload's structural failures during impact with the ground. In particular, the press fit popped off, separating the camera housing and the base housing. Structures determined that to make sure this doesn't happen again, the axle should be longer or the end of the axle should be threaded. They also determined that the structure would be more reliable if the gear were better aligned. Last week they worked on tapping the holes in the base housing so that the brackets, which had caused major inconveniences in assembling the structure, would no longer be necessary. They provided the EPS team with dimensions for the new EPS board.

Thermal: Thermal analyzed the temperature data collected during flight. They determined that several of the temperature sensors were disconnected when the payload was returned to us and so are unsure if the sensors were connected directly to the components during flight. However, the sensors still provided expected data. The highest temperature reached was approximately 75 degrees Celsius. The component that reached this temperature was the motor driver, which was expected because it was observed during testing the driver reached very high temperatures. However, this temperature was only about half of the component's operating temperature, and so is not a huge concern. Because none of the components overheated, thermal determined that the system as a whole functioned very well and plans on keeping the thicker baseplate, kapton, and white paint.

Management: Management has organized the Preliminary Data Report and invited our mentors to attend. They have organized weekly team meetings and have assigned the sub-teams with slides, sections of the first draft of the final science report, and tasks with hardware. They have ordered the new motor drivers and expect them to arrive within the next few days. They have reorganized the team as we have lost an optics member, a structures member, and three EPS members and gained two new EPS members. The have coordinated with the director of the Colorado Space Grant Consortium.

Plan for October

HELIOS III will now start working more heavily with hardware. They will become familiar with the new drivers and code them act on photodiode readings. They will fix the structure to a point at which the attitude determination and control system can test the new motor-motor driver system and ensure that the two are compatible enough to provide enough torque to turn the

housing smoothly along elevation. They will continue to analyze the data collected during flight and complete the first and second drafts of the final science report. They will design the new EPS board and order it by the end of the month.