

University of Colorado at Boulder August Status Report

In the month of August, HELIOS III integrated with the HASP platform in Palestine and flew on the platform out of Fort Sumner. The team encountered multiple issues during integration and was forced to fix the phi axis at a single elevation. The team also had to disconnect the ADCS camera so that the science camera could work properly. However, with the help of the Louisiana Space Grant Consortium and the CSBF crew, the team flew a successful mission, tracking the sun throughout flight without losing communication and capturing multiple partial images of the sun. After the flight, the team has been working on analyzing data and redesigning the parts of the payload that need fixing. The team is currently in the process of putting together a preliminary data presentation for Colorado Space Grant and our mentors.

Team Demographics:

Cooper Benson: Caucasian male, sophomore, Aerospace Engineering

Paige Arthur: Caucasian female, sophomore, Aerospace Engineering

Kristen Hanslik: Caucasian female, sophomore, Aerospace Engineering

Chris Bradford: Caucasian male, sophomore, Aerospace Engineering

Dylan Richards: Caucasian male, sophomore, Aerospace Engineering

Tyler Lugger: Caucasian male, sophomore, Aerospace Engineering

Ryan Cutter: Caucasian male, sophomore, Aerospace Engineering

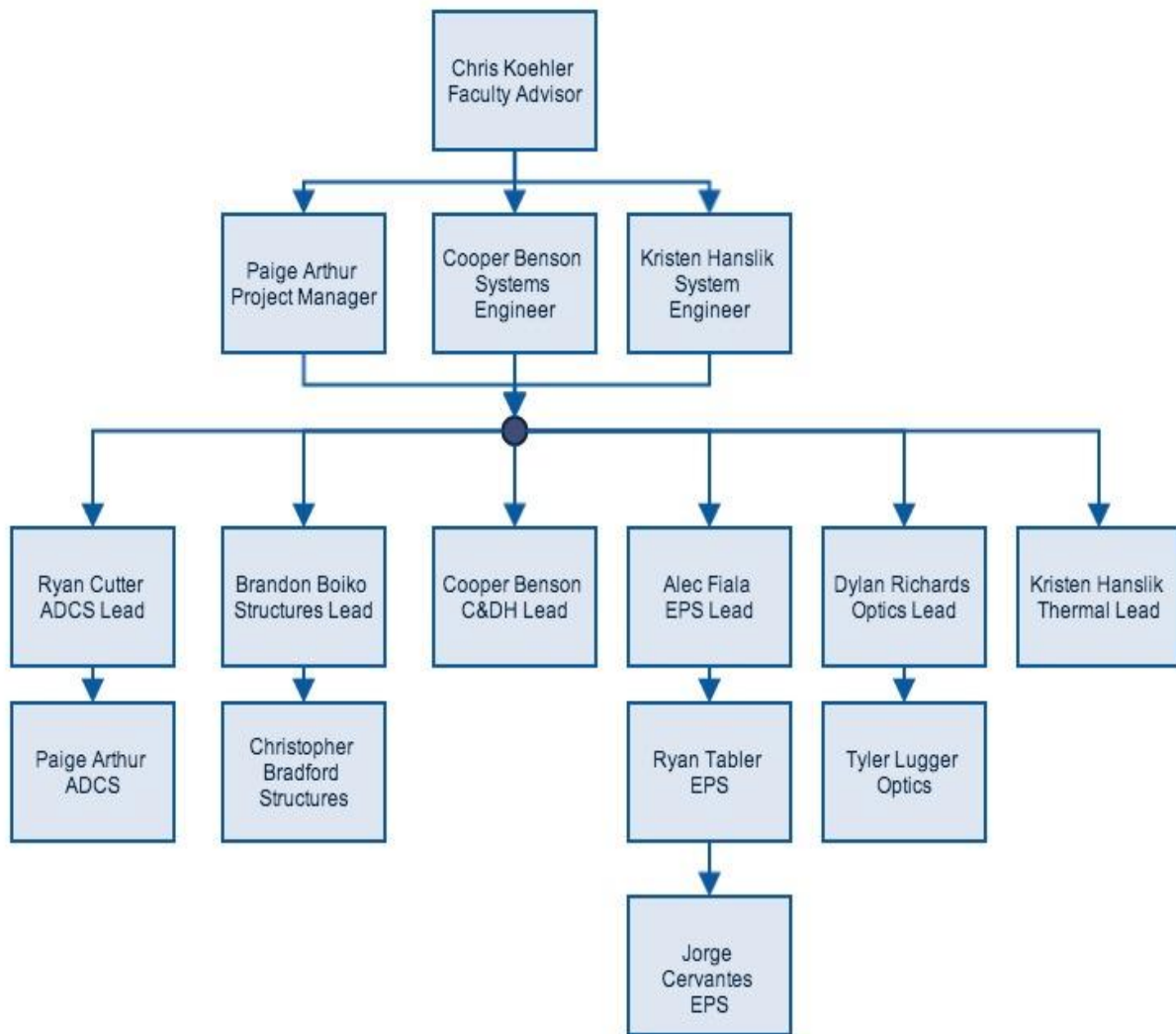
Alec Fiala: Caucasian male, sophomore, Aerospace Engineering

Ryan Tabler: Asian / Caucasian male, sophomore, Electrical and Computer Engineering

Jorge Cervantes: Hispanic male, junior, Aerospace Engineering

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

Team Organizational Chart:



Accomplishments of August:

ADCS: The Attitude Determination and Control System attempted to boost power to the motors through the use of an external circuit to bypass the motor drivers. This proved too difficult for the allotted time, so instead they worked with Structures to fix the camera housing at a maximum elevation. At the advice of Dr. Guzik, they also worked with CDH to write commands that would nudge the payload at 10 and 90 degree intervals in the event that the sun was out of the field of view of the photodiode arrays. After flight, they organized and analyzed the data from the motor position and the photodiode readings. They are currently finishing their slides for the preliminary data presentation.

C&DH: Command and Data Handling wrote a clean shutdown command that would systematically shut down the entire payload. They assisted ADCS in writing code for a nudge command that turned the payload at 10 and 90 degree intervals. During the thermal-vacuum test and flight, they downloaded and organized the downlink data into charts and graphs. After flight, they organized the data to a greater extent and downloaded all of the science camera images.

EPS: The Electrical and Power System had to make several last minute changes to the main power board. They solved the issue of the board randomly burning out microcontrollers and had to connect the two grounds in order for the board to be compatible with the platform. They also worked on connecting all of the electrical components from the camera housing to the board. They are now working on finalizing their slides for the data presentation and on deciding what to change on the board design. The team is currently in the process of taking on two new members, since our current board designer leaves the team after the final report is complete.

Optics: Optics cleaned the camera lenses immediately before flight. After flight, they looked through all of the images taken during flight and analyzed which images contained the sun and why some images contained what appeared to be reflections or glare. They are currently in the process of finalizing their slides for the data presentation.

Structures: Structures worked to drill holes in the camera housing to decrease its weight. They also drilled holes in the base plate to allow for cables and screws to pass through. Because this was done incorrectly the first time, they worked with the Louisiana Space Grant Consortium and CSBF to drill correct holes in Palestine. They worked with ADCS to fix the payload's elevation at its maximum possible angle. After flight, they carefully opened the payload, taking care to document all the damage done during flight, landing, and shipping as they did so. They are currently organizing their documentation of the damage and are thinking of alternative solutions to solve some of the structural problems encountered during the process. They are in the process of finalizing their data slides.

Thermal: Thermal painted the exterior of the payload white and the interior of the photodiode housings black to minimize the internal temperature of the payload. They cut out kapton and attached it to both the camera and the base housing and attached silicon pads to the bottom of the buck converters to allow them to better heat sink with the base plate. During flight, they monitored all of the temperature sensors to ensure that the temperature did not exceed the operating temperature of the components. After flight, they analyzed the temperature data and theorized about the causes of temperature increases and decreases. They are also finalizing their slides.

Management: Management has worked with each of the sub-teams to ensure that they have the resources they need to complete their goals. They have set meetings with older students in Space Grant to help the teams with obstacles, such as ADCS's problem with the power to the motors. They purchased last minute hardware in Palestine and help Colorado Space Grant's director organize the trips to Texas and New Mexico. They are currently organizing all of the data and assigning the sub-teams tasks. They are organizing and giving tips on the data presentation slides. They are also slightly re-organizing the team as, two of the EPS members are leaving and two more are coming to take their place.

Plan for end of September

HELIOS III will finish and present our preliminary data presentation to Space Grant and our mentors. We will then begin working on the actual final science report using the data that we organized for our presentation. We are also going to plan what parts of our payload need to be changed if we were to fly again and begin implementing those changes, in particular redesigning the EPS board. We do not plan on building an entirely new payload, just on fixing our current payload so that it moves smoothly along elevation as well as azimuth.