

## **University of Colorado at Boulder HELIOS IV January Status Report**

In the month of January, HELIOS IV received its acceptance decision and, more recently, the proposal comments. They have starting reviewing the comments and making the necessary changes to the design. They met with their mentor about improving the system's movement and tested all of the systems with the power board.

### **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

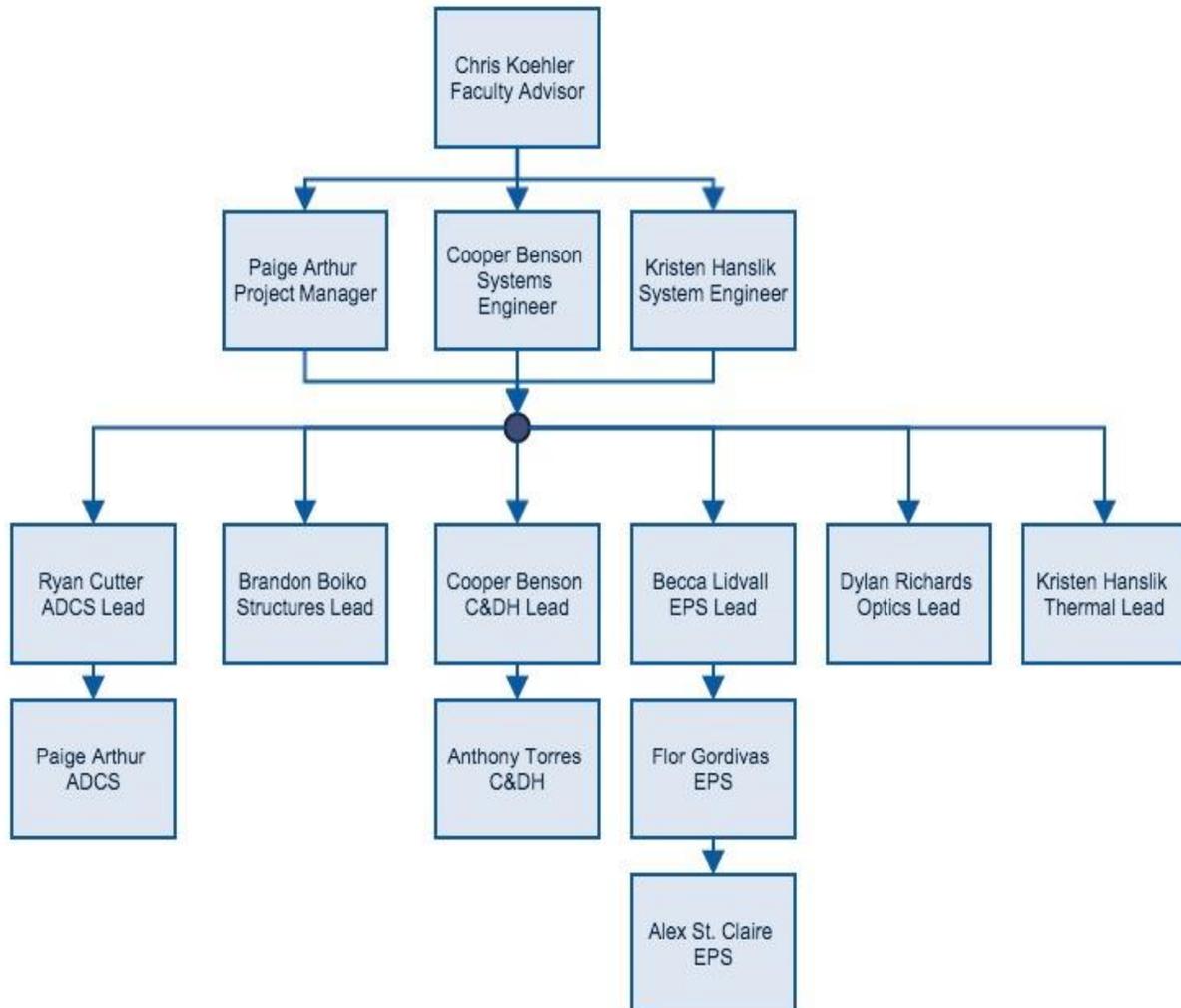
Flor Gordivas: Hispanic female junior, Electrical Engineering

Rebecca Lidvall: Caucasian female, junior, Aerospace Engineering

Anthony Torres: Caucasian male sophomore, Aerospace Engineering

Alex St. Claire: Caucasi male freshman, Aerospace Engineering

## Team Organizational Chart:



### Accomplishments of January:

**ADCS:** The Attitude Determination and Control System worked with the EPS team to test the new board with all of the ADCS components. They were able to successfully achieve light tracking on azimuth through the board, proving that the board, the photodiodes, the motors, and the structure are able to all work together successfully. They also met with the HELIOS mentor, Lee Sutherland, to discuss possible ways to make the payload easier to turn on azimuth from an ADCS perspective. He suggested that a driver with a higher duty cycle or a stronger motor would be helpful. The ADCS team decided to try this if and when the payload could still not turn with a new structure.

**C&DH:** Command and Data Handling has finished the code for the image analysis software but has been unable to test it without the ADCS camera working. After struggling for several months

with the ADCS camera, CDH decided that a new camera was probably the best option. They have researched and selected a new camera and will decide on purchasing it based on decisions that will be made based on proposal comments. They also: updated the boot script for the RTC changes; updated the Gerduino pins; tested the Gerduino with all sensors except for the temperature sensors; updated Quick2Wire for the Raspberry Pi B+; installed several more libraries; installed OpenCV3 in an attempt to get the cameras functioning properly; tested with the camera; and investigated capture script but were unable to properly diagnose the problem, hence the desire for a new camera.

**EPS:** The Electrical and Power System took on a new member and has been training him in circuit design. They have been testing the new power board with the different subsystems and fixing several minor problems as they arise. The board functioned well with all systems except for the cameras, and a new board will have to be designed and ordered to fix those issues. However, EPS is waiting on designing the new board until decisions are made regarding the proposal comments. They also re-designed the photodiode chips and will decide on ordering them based on decisions made about the proposal comments.

**Optics:** Optics was able to test the science camera outside and take successful images of the sun using the Raspberry Pi and the main power board. They also narrowed down the range of optical density filters to use on the science camera.

**Structures:** Structures met with ADCS and the HELIOS IV mentor to discuss solutions that would make the camera housing easier to turn on elevation from a structural perspective. Lee suggested that the team work carefully to ensure that the gears were properly aligned and make sure that they have good bearings. He suggested that the new structure incorporate dowel pins to help with this. Structures also worked on a packet of comprehensive diagrams to present to the faculty member in charge of a new machine shop on campus where the team wants to do the machining for the new structure. They presented this packet and will start machining as soon as the design is finalized, since it is pending changes based on the proposal comments. They are also looking to take on another member or two to assist with the machining.

**Thermal:** Thermal decided upon a method and implementation of heat sinking the motor drivers through the board. They will flip the drivers to the underside of the board and then fill the gap between the driver and the board with an aluminum block. A thermal gap filler will be placed between the driver and the aluminum block and between the aluminum block and the baseplate.

**Management:** Management has helped mentor the new small payload team, SIMBA. They have assisted in interviewing team members and organizing them into sub-teams, as well as teaching the new managers about the responsibilities of a team leader of a HASP project. The positions will be made official early next week.

Management has started answering the proposal comments and has considered options regarding the scenarios presented by CSBF. They have coordinated with the director of COSGC.

## **Plan for February**

In the next week, HELIOS IV will finalize several design aspects based on the proposal comments. They will interview new potential members for the structures team and choose the best applicants. In the next month, they will machine and assemble the new structure and order and integrate any new parts necessary to comply with any design changes made on account of the proposal comments. If necessary, they will order and integrate the new ADCS camera. EPS will made the necessary changes to the board and order and populate it, and then will begin testing it with all of the subsystems.