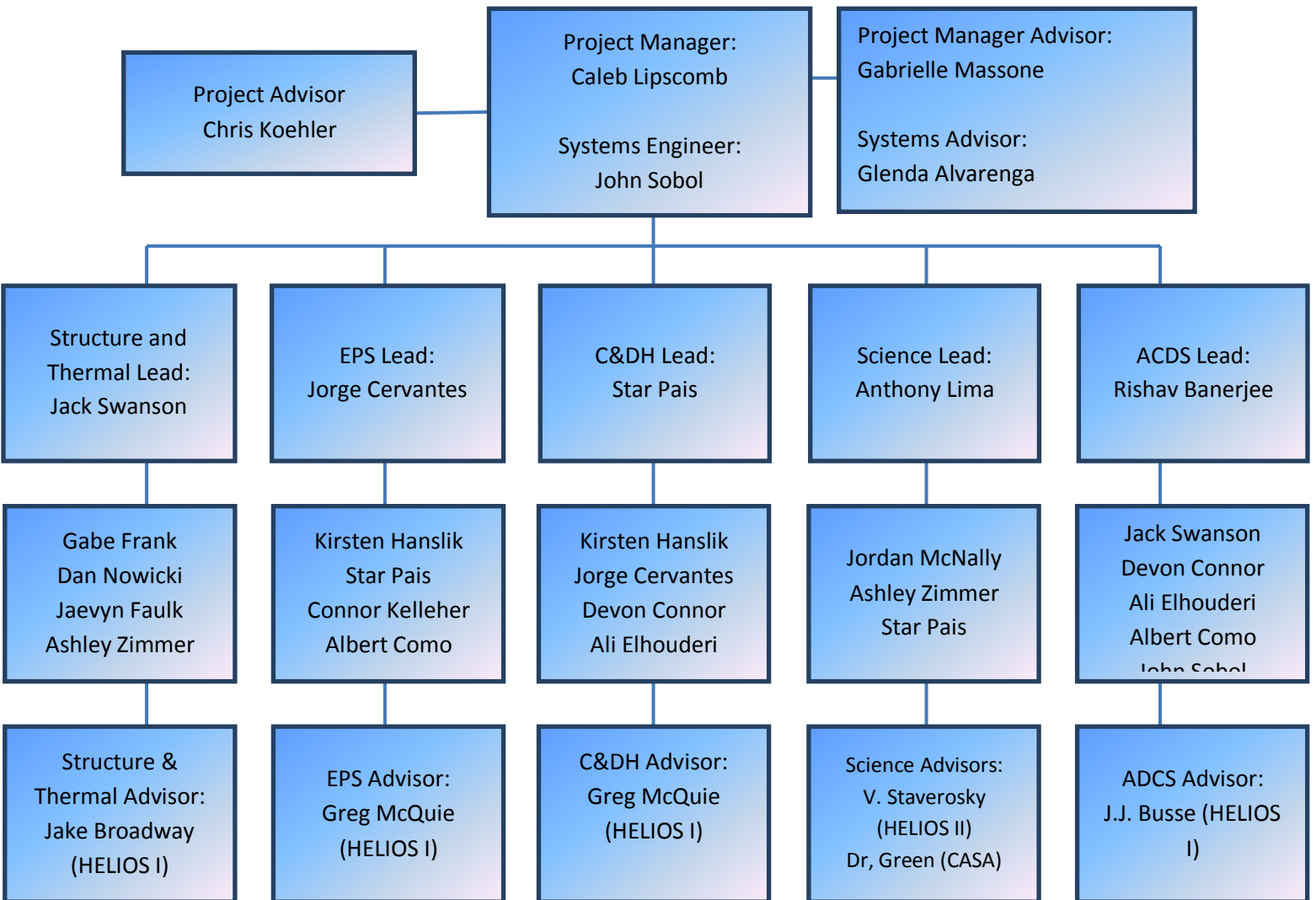


University of Colorado Boulder Monthly Status Report: February 22, 2013

Overview since 1/25/2013

In the last month, HELIOS II has addressed the HASP reviewer's comments on the HELIOS 2013 proposal. HELIOS II has had a Concept of Design Review (CoDR), which was presented at Space Grant on February 18. Advisors from last year's team, including Glenda Alverenga, Gabrielle Massone, and Vincent Staverosky, Dr. Green, Lee Jasper, Kyle Kemble, and Chris Koehler attended the review and gave constructive feedback on the HELIOS II project. The team has further developed the design of the HELIOS II payload based on advisor feedback from the review. Photodiodes and op amps have been ordered in order to test and calibrate the photodiodes and begin prototyping of the Attitude Determination and Control System (ADCS). Finally, HELIOS II is beginning to apply for outside sources of funding from Undergraduate Research Opportunities (UROP) and the Engineering Excellence Fund (EEF)

Current Team Members and Leaders



1. Activities of Team members

The primary goal of the past month has been to address the reviewer's comments on the HELIOS II proposal, to prepare for the CoDR, and to improve on feedback from the CoDR. The Solar Wavelength Imaging System (SWIS) has specified a field of view, magnification specifications, and method of light filtration, necessary to identify sun spots in the images captured in the high resolution camera. The second, low resolution camera will have a designated field of view equal to the maximum expected error of the ADCS to allow the accuracy of the ADCS to be measured. ADCS has developed an algorithm to track the sun, having a lock on the sun every 5 seconds. The ADCS shall be accurate enough to capture the sun in 10% of the total images of the high resolution camera. Additionally, ADCS has ordered parts to begin testing and calibrating the photodiodes. This is to ensure the ADCS can successfully meet mission requirements on schedule. ADCS has also determined the materials necessary for assembling the photodiode conduits and began to draft a budget. The Structures and Thermal team has determined an effective thermal management plan involving heat sinks applied to motors and components. This heat is then conducted to the payload structure and radiated into space. Further, the team has begun orientation and training at the CU Boulder machine shops in order to effectively fabricate the structure of HELIOS II. They have also determined the dimensions of all components and have budgeted and designated space for all systems. The C&DH team has determined that all images captured can be stored uncompressed. Additionally, they have determined the process of communicating with all other subsystems and have drafted a pre-liminary code as well as a list of discrete commands to be used during flight. The Electrical Power System team has developed a power-circuit diagram which displays how current and voltage will be distributed to all other subsystems on HELIOS II. Additionally, they have found solutions to over-voltage and/or over-current draw that may occur during flight and have drafted solutions to these potential issues.

2. Issues Encountered:

- a. quantifying reaction times and rotation rates for the ADCS in comparison to the rotation of the HASP platform
- b. Determining field of view and accuracy of photodiode array
- c. Developing the magnification system needed to meet mission requirements
- d. Developing a method to effectively filter out the light

3. Milestones reached:

First, the addressing of all comments made on the proposal by HASP reviewers. Second, completion of the CoDR review. Finally, the ADCS design has been finalized and testing/calibration/prototyping of the ADCS has begun. Additionally, all HASP deliverables have been successfully completed on time.

4. Next Objectives

In the upcoming month, we will finalize the ADCS method of locating the sun. This will be accomplished upon completion of the calibration and testing of the photodiodes. Additionally,

we must develop an effective light-filtration solution for the cameras, whether using active or passive filters. Next, we will prepare for the Critical Design Review (CDR) on March 18th. Finally, we must complete and submit the applications for outside funding sources.