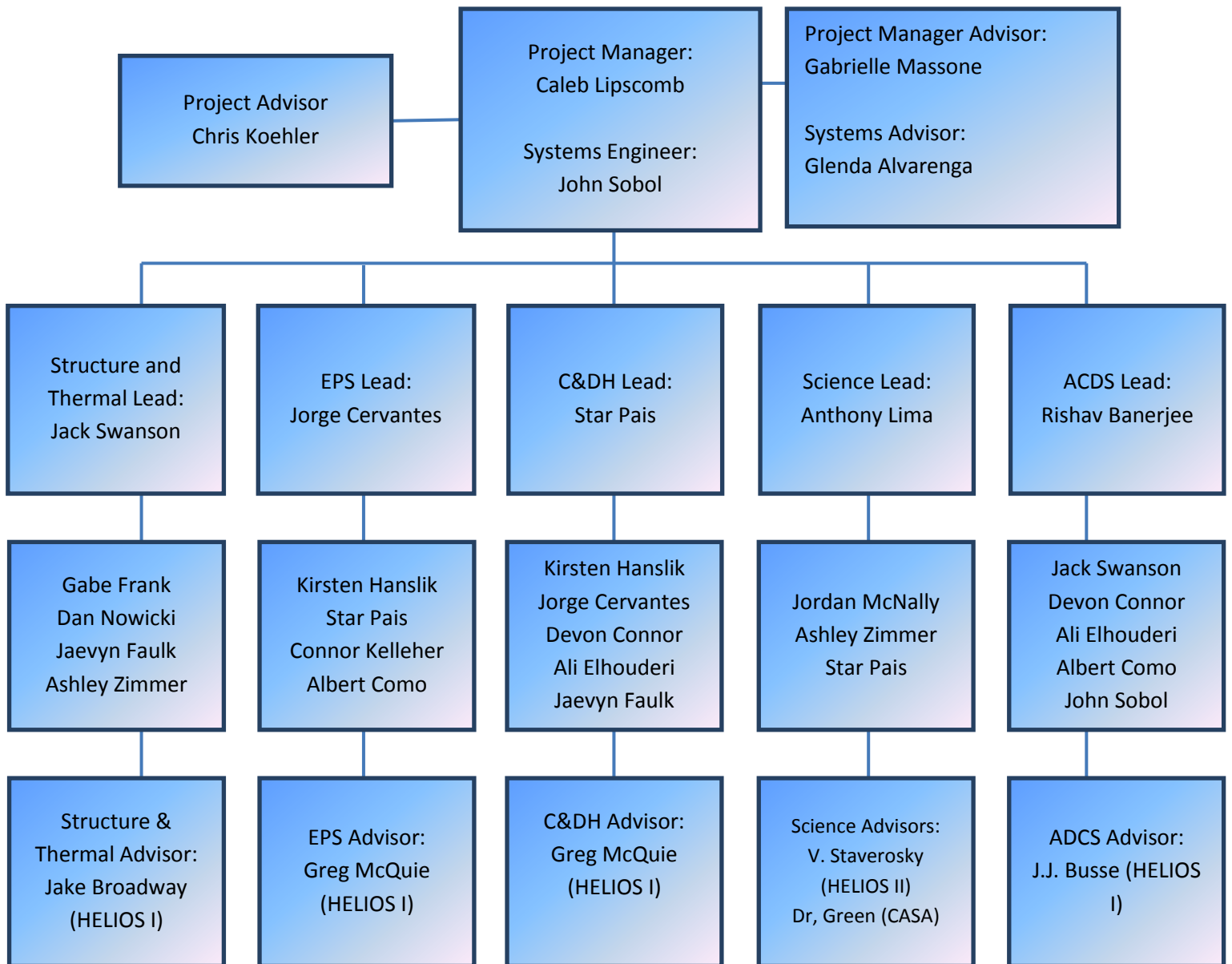


Overview since 2/22/2013

In the last month, HELIOS II has worked on finalizing a design and moving forward into prototyping and component level testing. Following the Concept of Design Review (CoDR) in February, HELIOS II has made several design changes in order to address the advisor's comments. Additionally, Photodiodes and op amps have been tested and determined that they will be a viable method to find and track the sun in the sky. HELIOS II held a Critical Design Review (CDR) which was presented to Space Grant on March 18th. The project's advisors: Dr. Green, Kyle Kemble, Glenda Alverenga, and Chris Koehler attended the review and gave constructive feedback based on the HELIOS II project. After this review, parts have been ordered for each subsystem to begin initial component testing and prototyping. Finally, HELIOS II has completed applications to both the Undergraduate Research Opportunity fund (UROP) and Engineering Excellence Fund (EEF) in search of additional funding for the project.

Current Team Members and Leaders



1. Activities of Team Members

Each subsystem has finalized their designs and is prepared to begin component level testing. Anthony Lima has finalized a design for the Solar Wavelength Imaging System (SWIS), and has presented the system design to Dr. Green both at the CDR and in an additional review session post-CDR to ensure the design is well developed. Initial SWIS testing will be done with old cameras from the HELIOS I mission and new narrow band pass filters have been ordered from Edmund optics. For ADCS, initial testing with the photodiodes has determined that they can be used to track the sun and that the current ADCS design is a valid design; however more testing will be needed to determine how the photodiodes will work when they are aligned in an array. Five new photodiodes and new op amps have been ordered in order to test how the Theta plane (Horizontal plane) will perform when subjected to various intensities of light and when the source of light is in different locations. Additionally, a stepper motor and driver have been ordered in order to test the motor's performance. The motor tests will be performed in parallel with the photodiode array tests. For the structure subsystem, all of the aluminum parts needed to construct the payload structure have been ordered. This includes 4 side plates, and a plate to place on top of the aluminum structure. These plates are made of T6 6061 aluminum. Initial testing with the Command and Data Handling (C&DH) subsystem will be done using the pandaboard, Linux CPU, and solid state drive flown in the HELIOS I mission. Also a new Arduino DUE, an Analog to Digital converter, and temperature sensors have been ordered for testing. Testing will include transferring data from the CPU to the solid state drive and communicating between an Arduino DUE. For the Electronic power system, 3 Buck converters and a linear regulator have been ordered in order to begin component level testing and characterize the performance of these parts.

2. Issues Encountered

Several issues have been encountered in the design. The major issues include:

- a. Tracking the sun when it is above an angle in the sky than is visible by the photodiodes in the Theta plane (Horizontal plane. Currently the plane is stationary and will not be able to view the sun when it is 10 degrees above the center of the plane.
- b. Determining the correct amount of filtration necessary to prevent an oversaturation of pixels in the SWIS cameras.
- c. Characterizing the performance of the photodiode arrays in the ADCS system.

3. Milestones reached

This month, several milestones have been reached. First, the CDR was successfully completed and our project advisor, Chris Koehler, has given the go-head to purchase parts for component testing. Additionally, our SWIS design has been approved by Dr. Green and testing to determine the proper amount of light filtration necessary can begin. By the end of April, each subsystem should be able to function on its own.

4. Next Objectives:

The next major objective for HELIOS II is to perform and complete component level testing in the month of April. This means that each individual part will be tested to ensure it is working, and parts will be tested together. By the end of April, it is expected that each subsystem is ready to be constructed and start subsystem testing. As each step of component level testing is complete, more parts will be order to further test.