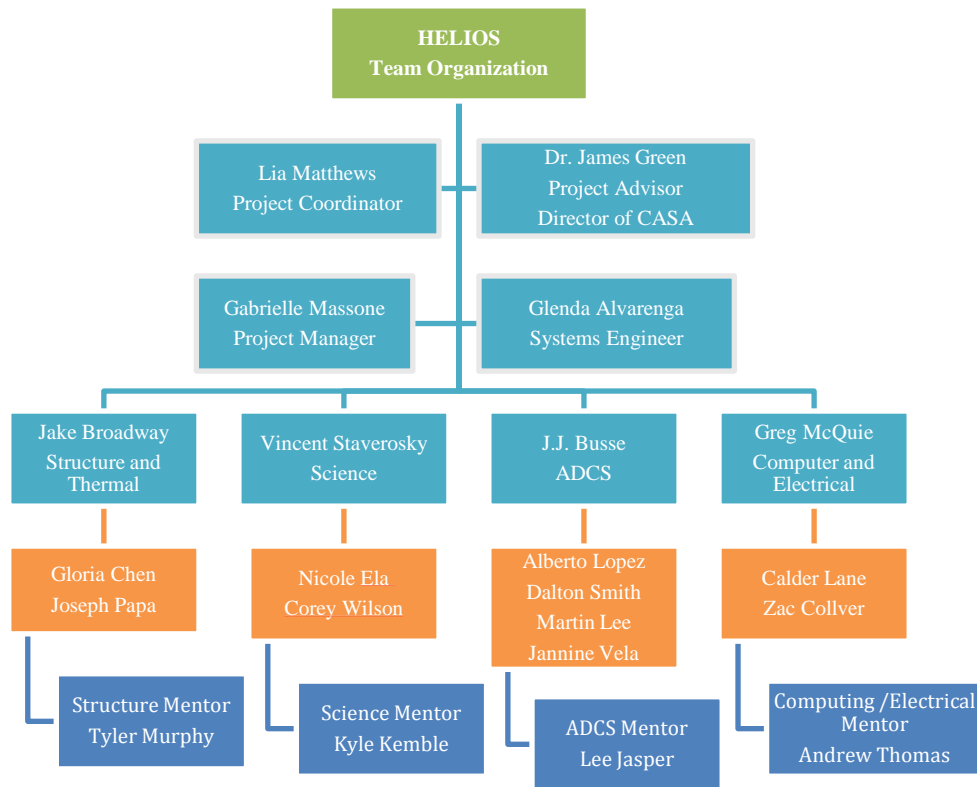


# University of Colorado at Boulder Monthly Status Report: March

## Overview Since 2/24/2012:

Throughout the month of March, the primary focus of the team has been refinement of the design following CoDR feedback, commencement of prototyping and protoflying designs, and compilation of a Preliminary Design Review. The PDR was especially useful in that it required a number of stress analyses, risk analyses, trade studies, and interface plans. Our mentors have been a very valuable resource to the team, advising each section on design and manufacturing plans and helping to avoid unwarranted errors.

## Current Team Members, Leaders, and Mentors:



Should a deficiency in one section arise, team members will adjust responsibilities to compensate immediately. Additionally, both the Systems Engineer and Project Manager are fully capable and willing to assist any section. The four mentors are upperclassmen or graduate students with extensive experience to aid in the design process.

### **1. Activities of Team Members**

Each section has accomplished trade studies and risk analyses of major components and design elements. This has helped to cement aspects of the design while alerting us to the need for potential offramps should the need arise. On Thursday, March 15<sup>th</sup> we ordered the first shipment of parts for testing and development. Major parts included aluminum plates, two microcontrollers, a motherboard, stepper motors, photodiodes, and camera filters and lenses. These parts are expected to arrive by the end of this week or beginning of next. Each section has also been conducting regular meetings with their mentors. Of particular help is the Attitude Determination and Control mentor, Lee Jasper, who is currently pursuing his

PhD. Each Friday he has held sessions to review ADCS theory and fundamental concepts, as well as advised elements of the design such as stepper motor placement and photodiode configuration. Additionally, Dr. James Green has already allowed us to use CASA's facilities on a few occasions to gather scrap materials and Russ Melon, who helped SPARTAN-V last year, has advised both the Science and ADCS on manufacturing and interface plans. All mentors have proven extremely useful and have made the team noticeably more focused and productive.

## **2. Issues Encountered**

Several problems have been encountered throughout the design, many of which are ongoing. Major issues include:

- a. Routing Wires from the mobile SHAIRC to the stationary electronics housing.
- b. Determining the optimal configuration and density of photodiodes given a half angle intensity of +/- 65 degrees. Concurrently, whether or not we would like to use passive relative voltage measurements or employ an active tracking algorithm to find the sun.
- c. Arranging the yaw stepper motor to avoid loss of contact with the turntable due to torque – a problem SPARTAN-V encountered in their flight.
- d. Designing the gear system to accommodate the motors, adjacent wires, and torque of the system.
- e. The feasibility of using an image-processing algorithm.
- f. Trimming the Linux distribution and interfacing with components and drivers.

## **3. Milestones Reached**

This month we have completed the materials for the Preliminary Design Review and are planning to hold the presentation next week (April 2 – 6, 2012) following Spring Break. We also began the prototyping process, including testing of photodiodes, ordering of components, and machining of several structural components. More testing is planned for the upcoming weeks, culminating in a semi-functional payload by the end of April, beginning of May.

## **4. Next Objectives**

For the month of April our primary objectives are the PDR presentation to Space Grant, and hopefully other audiences. We're creating testing plans for recently ordered materials and will conduct much of the testing in the next couple of weeks. We will also order a majority of our other materials and complete primary manufacturing of all subsystem components. Optimally, our goal is to have a semi-functional payload with which we can start thermal and vacuum testing at CASA.