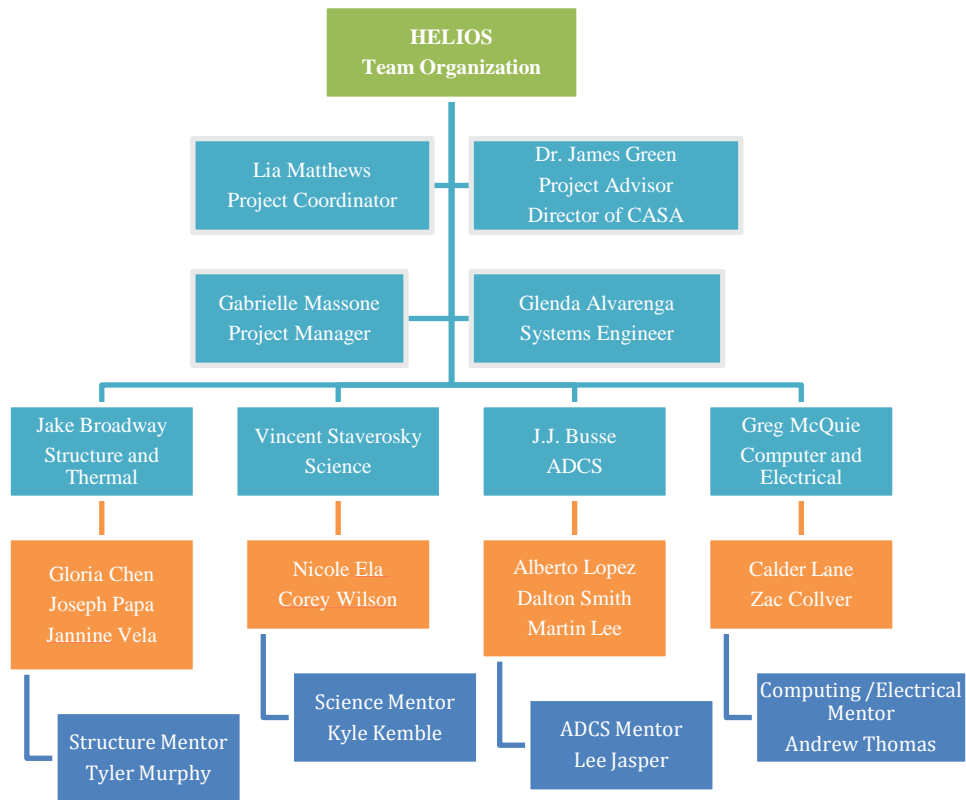


Monthly Status Report: February

Overview Since 1/27/2012:

In the past month, we have considerably refined the designs detailed in our original proposal, guided by feedback from both the Payload Summary and the Conceptual Design Review. The CoDR, presented on 2/9/12 and 2/21/12 to CASA and Space Grant respectively, was very successful. Following the presentations, we garnered the support of four new official mentors (dark blue below), as well as several other mentors willing to support the project on an “as-needed” basis. Each new mentor has considerable experience through Space Grant, including Kyle Kemble who worked on the DIEHARD CU Boulder HASP payload several years prior.

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 new mentors are upperclassmen or graduate students with extensive experience to aid in the design process.

1. Activities of Team Members

The primary focus of the past month was the completion of the CoDR and the re-evaluation of the payload design based on subsequent feedback. The Structural Team has addressed the concerns with the mounting plate interface and the “cut corners” that were not evident in our initial sketches. They are also in the midst of stress analysis and trade studies for each major component, to determine the optimal configuration. The Science team, working under the guidance of Dr. James Green and Russ Melon (who helped the SPARTAN-V team with their telescope design), is finalizing the cameras, filters, and lenses to be employed. Since

some issues involving camera sensitivity to IR wavelengths (see below) were discovered, the exact model and resolution of the IR camera has yet to be determined. The Attitude Determination and Control team is conducting trade studies assessing the optimal configuration of photodiodes to track the sun. Additionally, we are attempting to implement a center of mass algorithm that would keep the SHAIRC focused directly upon the sun once found. Optimal sensor configurations will be finalized through extensive trial and testing throughout March. The Computing and Electrical team has finalized a preliminary power schematic, and will soon begin working on the trimmed down Linux distribution and software for flight, a task that is expected to be a time-intensive process. Each section lead is holding a meeting with their assigned advisors to develop a detailed manufacturing plan, prior to ordering materials and components.

2. Issues Encountered

Several problems have been discovered through the course of the month, due largely in part to CoDR feedback. Major issues include:

- a. Traditional CCD chips will not read wavelengths past 900-1000 nm. In order to image IR between 1400-1600 nm, we will need a modified CCD camera or a full infrared camera. Due to cost-prohibitive materials, this may result in images with slightly lower resolution.
- b. Routing wires from the mobile SHAIRC to the stationary electronics housing. Also, determining whether the use of slip rings in this interface would introduce impedance and noise into high frequency cables from the cameras.
- c. Determining the optimal configuration and density of photodiodes for sun tracking, given a half angle intensity of +/- 65 degrees.
- d. Resolving potential thermal issues, due to overheating of electronics – which has compromised the operation of past CU Boulder payloads.
- e. Creating the software and computing interfaces necessary to operate the ADCS and SHAIRC. Choosing components whose software is compatible with the Linux computing system.

3. Milestones Reached

Primary accomplishments this month include the submission of the Revised Management Plan, the submission of the Revised Design Document, and the presentation of the CoDR. Additionally, we applied for and presented to the Engineering Excellence Fund for an additional grant to fund the project. Team structure has become more refined, including regular working hours for each section, team meetings and/or working hours, and leadership meeting times. Each section officially has a mentor, and the Director of CASA – Dr. Green – has offered the use of his thermal and vacuum testing equipment. This will help to ensure successful testing in Palestine, TX in May.

4. Next Objectives

In the upcoming month, we will be presenting a Preliminary Design Review on March 8th. Following the feedback of this presentation, we will finalize major design elements and begin full scale ordering, prototyping, and proto-fighting. Each section is required to have a comprehensive list of materials by March 4th, which will be assessed in detail that week to determine if it is appropriate. Before ordering, each section will have to document and prove a detailed manufacturing plan, to ensure no wasted time and funds are expended.