

## **University of Colorado at Boulder June Monthly Status Report**

### **Overview:**

Since May, the team's primary focus has been on testing and assembly of the payload. We delivered a CDR presentation to Space Grant on June 20, 2012. Unfortunately, our Project Coordinator, Lia Matthews, has left Space Grant to pursue another job opportunity. As a result, Brian Sanders will be taking on the role of Project Coordinator and will advise the HASP team within Space Grant. We have also gained a new team member, Benjamin Zatz, an incoming in Jr. Aerospace Engineering who is interested in helping with the ADCS flight software.

### **Current Team Organization:**

#### **Project Coordinator**

Brian Sanders

#### **Project Advisor**

Dr. James Green  
Director of CASA

#### **Project Manager**

Gabrielle Massone (Fr.)

#### **Systems Engineer**

Glenda Alvarenga (So.)

#### **Structure and Thermal**

Lead: Jake Broadway (Fr.)  
Joe Papa (So.)  
*Mentor: Tyler Murphy*

#### **Science**

Lead: Vincent Staverosky (Fr.)  
Nicole Ela (Fr.)  
Gloria Chen (Fr.)  
*Mentor: Kyle Kemble*

#### **ADCS**

Lead: J.J. Busse (Jr.)  
Jannine Vela (Fr.)  
Corey Wilson (Fr.)  
Alberto Lopez (Grad.)  
*Mentor: Lee Jasper*

#### **Computing and Electrical**

Lead: Greg McQuie (Fr.)  
Zac Collver (Jr.)  
Benjamin Zatz (So.)  
*Mentor: Andrew Thomas*

### **Activities of Team Members:**

The month of June focused primarily on compiling the CDR presentation, testing, ordering all necessary components and assembling in-house components. The structures team has finished machining all four trussed sides and is in the process of completing the upper and lower plates of the electronics housing. Similarly, the science team has readied all Master Cams of the design for use in the CNC machine, and will be completely machining the telescopes this coming week (contingent upon machine shop availability). Additionally, we are in the process of scheduling time with Dr. Green to perform all calibration and testing of the telescopes at the CASA facility, where there is equipment (collimating light sources, celestrons, etc...) to deal with precise optics. We received our CCD cameras earlier this month and are in the process of programming the cameras to be compatible with our on-board Linux

computer via third-party software. Additionally, we are programming both on-board microcontrollers to sense all photodiodes, magnetometers, and temperature sensors and to relay this data to the computer. Serial communications are completely programmed, and the data structures of each downlinked packet have been outlined. Additionally, the designs for the power and motor board were completed and the boards are printed. Pending functionality tests of board components, we can begin assembling, soldering, and testing the boards in a comprehensive “flat-sat” test with the other payload components. This will allow us to ensure all power and data lines are functioning properly before mounting the components within the structure. Finally, the ADCS team has thoroughly tested the torque outputs of the stepper motors and determined thresholds where the motors will fail under certain mass and torque conditions. Fortunately it appears our payload is well within the operational margins. All parts of the chain drive have arrived in house and can be assembled. The larger sprocket, made of solid steel, will need to be machined to reduce mass before it can be mounted. The sun-sensing photodiodes have undergone extensive testing to determine the level of filtering necessary. Unfortunately, due to the recent wildfires and smoke surrounding Boulder, direct sunlight has not always been available for testing; however, we have been able to conduct enough tests that this is not anticipated to be a large issue.

### **Issues Encountered:**

As expected, programming the flight software has been an in-depth process. While there are currently no specific issues, the volume of work required to interface all components is extensive. We hope that our new member, Benjamin Zatz, (who expressed an interest in the feedback control loops and microcontroller programming) will help to expedite this process in the coming weeks.

The other issue is in a slight miscalculation of the power and motor boards. Despite what is specified on the data sheets, the pins of some components are too large for the current board headers, so we are considering revising the design and ordering new printed boards. Fortunately the lead times for these boards is short and this is not expected to hamper the overall payload assembly.

### **Milestones Reached:**

CDR was completed June 20, 2012 and was presented to Space Grant and our new advisor, Brian Sanders. All four structural side trusses have been completed, and all mechanical designs are solidified.

### **Next Objectives:**

Our next objectives involve full subsystem and system tests. To achieve this with sufficient time for testing, all assembly must be complete by July 11<sup>th</sup>, and software must be complete by July 17<sup>th</sup>.