Student Payload First Flight (SPIFF) Payload Team Monthly Status Report

Boston University / New Mexico Institute of Mining and Technology / Georgia Institute of Technology

April 27, 2012

Current Team Roster

a. BU: Nate Darling, Chris Hoffman, Nima Badizadegan, Pantelis Thomadis
b. GaTech: Josh Mendez, John Trostel
c. New Mexico Tech: Jordan Klepper, Matt Landavazzo

Boston University

Further development of the HASP routing board is underway with particular focus currently on the temperature and current sensors implemented on that board. Earlier this month a suitable power regulator was identified as well as an appropriate microcontroller. Board layout is now underway and the fabricated PCB will be ordered within 1.5 weeks. Future steps include populating, debugging and testing the board.

BUSAT Command and Data Handling team members have divided their efforts this month between demonstration of the SPA-1 software interface and implementation of the ASIM software on the payload instrument side. The software interface hosting software has been moved from a proxy laptop platform to the nanoCDH board and communication between this and a simulated payload instrument has been achieved. Additional work on the host portion of the software system connected to an astronomical camera (to be implemented on the BUSAT mission, not directly related to HASP) has proven that the software interface is functional and capable of handling relatively large image files. The team is also currently working on the secondary processing component of the nanoCDH board – an Atmel AT90USB microcontroller that will monitor system health via current and temperature sensors (as well as provide protocol translation for the UART interface to BUSAT's radio, the Astrodev He-100).

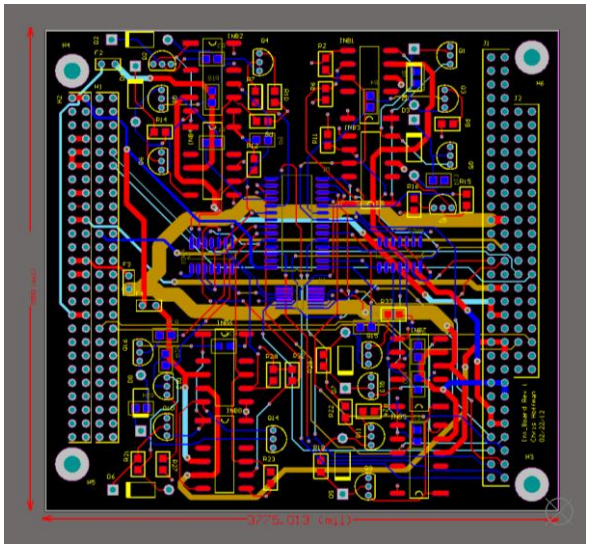

Figure 1: The SPIFF / HASP Interface Board

Ongoing efforts to test deployable solar panel hinges and antennas are contributing to the team's knowledge of the thermal and vacuum testing

equipment in BUSAT's laboratory. This knowledge will be directly applicable to HASP / SPIFF board testing in the coming weeks.

Georgia Tech

Over the last month, the Georgia Tech group has focused its attention on a prototype version of the central data handling system for the electrical field mill. This portion of the device includes the processor running the SPA-1 networking protocol, a data-logger, temperature and humidity sensors, and a stepper motor driver. It was decided that temperature and humidity data should be collected as well (to monitor the atmospheric conditions during a volcanic eruption in the target measurement environment). A photograph of the prototype is show in Figure (2).

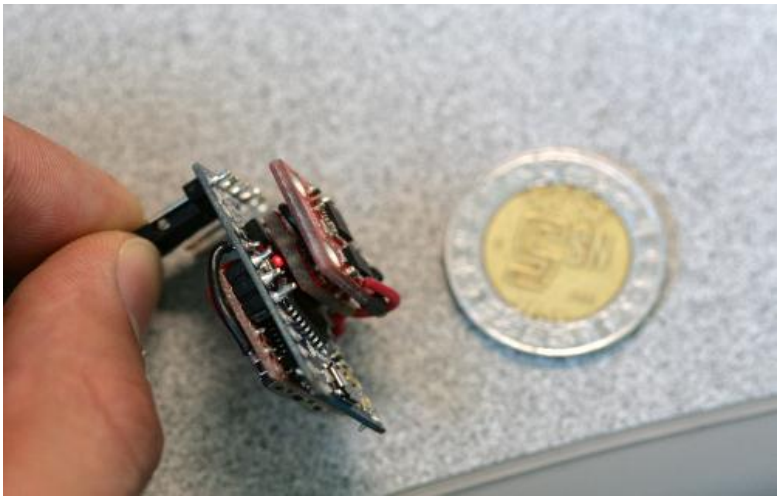

Figure 2: Photograph showing the prototype for the EFM control and data collection system. Coin is about the size of a quarter.

A plan had been devised to test the reliability of the prototype on a high altitude university-built rocket through the University of Washington. The launch was scheduled to take place in Black Rock Desert in California, however severe weather forced the group to postpone the launch.

Concurrently, the GT group is finishing a layout for the field mill portion of the device. The group hopes to have this complete by the end of this month and have a board ready to be populated by the middle of May.

New Mexico Tech

Electrical

Recent stability issues in our op-amps introduced by the dynamic of the impedance of the PZTs was investigated and corrected. Facilitated changes to the analog system are being documented and calibration is underway to characterize our measurements. Additionally software is being finalized for biasing system control and data acquisition. All changes are being documented and will be put toward a flight board design in the near future. Impedance characterization against a laboratory analyzer is in progress to refine measurement data.

Mechanical

Interface between the PC104 standard and the cube cap has been designed and simulations have been run to determine the structural stability of the design. Most of the work in the last month has been directed towards the development and finalization of the SHM-F system. The mechanical design has been completed and material and parts have been selected. Currently we are awaiting the arrival of parts and expect the unit to be done by the beginning of May.