Inter-American University of Puerto Rico
HASP 2012
February Monthly Status Report

During this month our team has made the addressing of the HASP 2012 application comments the highest priority to accomplish. During the month a comprehensive effort was placed in define clearly our objectives and explain in detail critical aspects of the application. Also for the ADS the selection of components was completed; therefore the IMU selected should be the ADIS16488 (meeting with requirements). The schematic is in progress (over 70%) it shall be completed by Friday 24. The pin configuration for the PC104 bus is greatly developed. Currently we are working with the preparation of the Preliminary Design Review (PDR) document. Up to date we develop a Pre-PDR document for the HASP 2012 payload.

1. Activities of team members

The Electrical team (ELEN) is currently working with the ACS schematic design verifying that all of the components works properly and meets the PC/104 standards. In addition the ELEN is researching about possible DC to DC converters to run the motors.

The mechanical team (MECN) put together the payload prototype to test the behavior of the motors under actual load operation. **Figure 1** shows the prototype with the motors attached. One motor it's in the inside of the payload and the other outside.

The ADCS and Software team are still working the implementation of the Kalman filter on dspic33. Currently we are facing some problems with some memory limitations of the microcontroller. We run out of memory when we try to run the whole filter on the microcontroller. Therefore we are trying to reduce the complexity of the Kalman filter so it will work correctly. Finally, are trying to determine the sensors accuracy using a Linear Covariance method which establishes some value of uncertainty to approximate possible errors in the measurement of data.

In addition the team tested the dc motor to obtain the required voltage to move the CubeSat in an acceptable manner. Basically we mount a gyroscope in top of the structure and we measure the angular velocity which it rotated with respect to the bottom box.

Figure 1: Payload Prototype

2. Milestone achieved

a. Determination of the necessary voltages for the motors.
b. The ADCS team develops a quadrature encoder in arduino which is currently working but with some resolution limitations due to the capability of the arduino. We are planning to translate the code to dspic33 to achieve the required performance.
c. Selection of ADS sensors
d. PC104 Pin Diagram Development

3. Current team members

During February one student was added to the mechanical & thermal team, In addition to Prof. Diego Aponte as electrical advisor. Below is the latest version of the team structure.
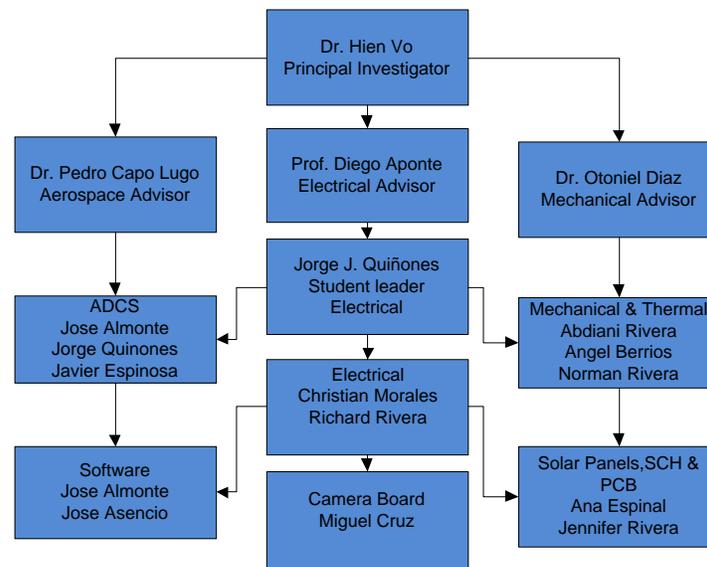

Figure 2: ARIES-DYNAMICS