**SMITH Progress Report July 29, 2011**

The SMITH team is currently developing the FLOP for Monday. The integration at CSBF will allow us to prove the functionality of the pump and motor during a flight profile. After this successful trip, we will integrate the control filter side of the payload. When the payload is in its final configuration, we will begin biological tests of the filter system.

Mechanical Progress Report

A box is connected to both cylinder heads of the engines, and will serve as the oil intake and air exhaust for the engine. The frame has also been fabricated; the outside is painted and the inside is buffed. The copper fittings between the solenoids and the filter have been implemented. The solenoid mounts have been designed and made. The solenoid holes in the base plates of the frame have been slotted to allow sliding them back and forth. The phototgate mount has been designed, tested, and implemented. The control D/C motor and the control engine have been mounted. Both the engine and motor have been coupled and tested. The cut off disks were also created and tested. Within the next 24 hours the electronics box will be completed and the temperature sensors will be mounted on the control engine and control D/C motor.

Software Progress Report

Since the last progress report, the team now has a complete list of commands for SMITH and SUBR. These commands are listed in table format in the two Interface Control Documents (ICDs) attached. One ICD is for communication between HASP and SMITH and the other is for communication between SUBR and SMITH. The HASP and SMITH ICD also has a section for responses (command and error) to uplinked commands as well as a testing interface explanation since the testing interface is different from the physical (flight) interface. Each ICD has explanations for the electrical and physical interfaces for communication. In addition to this, the ICDs also have a data section. In the HASP and SMITH ICD, the data section explains how the data will be formatted when it is sent to ground, and in the SUBR and SMITH ICD, the data section explains how the data will be formatted when it is sent to SMITH.

The team now has flowcharts for the code. We started off drawing the high level flowchart for the main loop. We followed this same procedure for each subroutine except in low level. High level is written to explain the general procedure and low level is written to explain the process step by step. There are a total of sixteen flowcharts to complete the code, each with multiple revisions. The code is written and was integrated with HASP on July 28th 2011 and could read the downlink data from HASP. We also have code to test the photogates and counter chip, the ADC channels, the Hall sensors, communication between SMITH and SUBR, and communication between SMITH and HASP.

Electrical Progress Report

We are no longer going to monitor the output value of the solenoids to tell if they are open, instead we are using Hall-effect Switch sensors. These magnetic sensors have a logic output and when the solenoid opens it sends out a high value. We are sending these four outputs to an I/O expander soldered on to the BalloonSat and connected to the BASIC Stamp. The circuit has been tested on a breadboard with and without the BASIC Stamp, then again once soldered to the BalloonSat. We also changed the circuit for receiving the RPMs. Instead we are using logic output photo-gate sensors connected to counter chips then connected to an I2C Bus Switch which sends the information to the BASIC Stamp. As with the Hall sensors, this circuit was first tested on breadboard with and without the BalloonSat, and then again after soldered to the Communication Board. The Temperature board is the only board that has not changed since the last report; it was populated quickly then calibrated from 0 to 130˚C.