SMITH team monthly status report

Biological

The limit of detection is being determined for various biological tests. I have calculated the lower limit for DNA amplification and ATP extractions. I will determine the smallest amount of DNA that can be successfully extracted from culture. Efforts are continuing to determine the phylogeny of the organisms isolated from the first lower altitude flights. Microscopic analysis of these organisms has revealed the basic morphological characteristics. These organisms will be reisolated in order to determine their level of resistance to UV, desiccation, and temperature. Tolerance to these parameters will add credence to the fact that these organisms were isolated from the atmosphere.

Mechanical

Any lubrication placed on the engine wears off in an hour of run time. The engine will require constant lubrication. WD40 works in a vacuum as a lubricant. The throttle allows for successful application of the WD40 at a desired drip rate, preventing excess lubricant in the system. The lubrication also reduces the amount of heat produced in the engine. The force of compression is negligible in a vacuum and reduces the power consumption of the motor from 70 watts to 48 watts.

The solenoids operate at 12 volts across a pressure differential. 12 volts was proven to be sufficient to operate the solenoid valves across a pressure differential.

A finalized layout of the mechanical system is being developed.

Electronic

Communication board design is complete, and the parts have been ordered for the board. The PCB schematic is now complete for the communication board. The prototype board for the communication board is also complete and is currently being tested with the software. The LED circuit, motor control, valve control is designed and will soon be prototyped. PCB layout of these components is in progress. All the electronic components have been ordered and fabrication will begin soon. Prototyping of the temperature and pressure sensors board has begun.

Software

Team has started writing the software for the whole system. Currently working the software for communication board, specifically uploading commands to the FIFO buffer from computer.