Scarlet Hawk II-HASP 2014
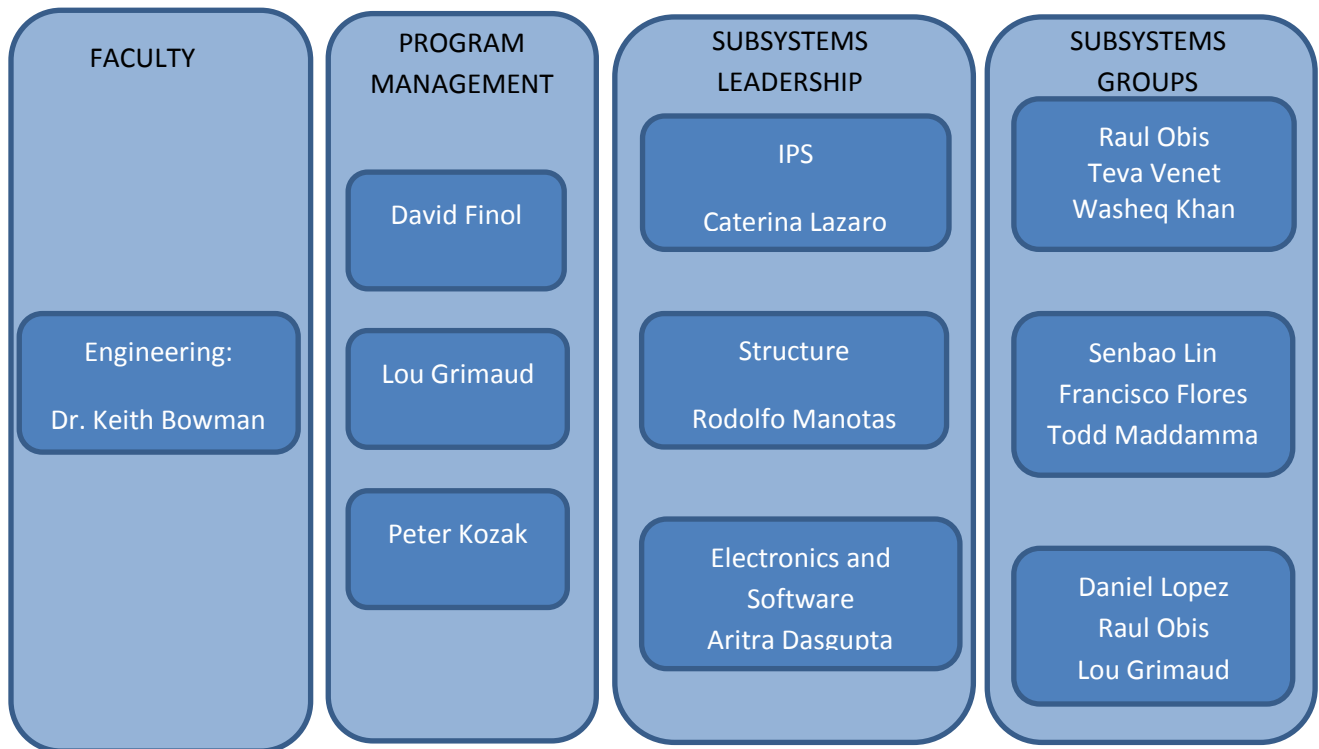
February Status Update

2/28/2014

Summary of Progress

The team has been working non-stop this month following the set deadlines. The team made some basic changes to the original design, the major one being the cancellation of the biology experiment. Each subgroup focused mainly on the prototypes for each subsystem. The subgroups also attended several training sessions that has been very helpful for the building process of payload. The team has been working on identifying possible issues that may come up during the flight and will then be finalizing the prototyping phase this upcoming month. We will be also working on the manufacturing process during March and April.

Updated Team Structure

FACULTY	PROGRAM MANAGEMENT	SUBSYSTEMS LEADERSHIP	SUBSYSTEMS GROUPS
	David Finol	IPS Caterina Lazaro	Raul Obis Teva Venet Washeq Khan
Engineering: Dr. Keith Bowman	Lou Grimaud	Structure Rodolfo Manotas	Senbao Lin Francisco Flores Todd Maddamma
	Peter Kozak	Electronics and Software Aritra Dasgupta	Daniel Lopez Raul Obis Lou Grimaud

Electronics and Software (ES)

The electronics part of the project progressed as we moved deeper into the completion of the hardware circuit of the system. The team was able to get all the components needed for the manufacture of the Maximum Power Point Tracker and started the prototype of the ISV006V2. The setup for the PCB manufacturing was finished this month and the test traces where made.

Apart from the PCB and MPPT manufacturing, small modifications were made to the power management system. We introduced voltage and current sensors in order to monitor the voltage and current values throughout the circuit. We will be obtaining the values from the

Arduino board and, since it is a DC supply, the power can also be calculated as Power = Voltage x Current. We will be introducing 3 current sensors: one just after the battery, and two before the entry of each camera. A voltage sensor will be placed outside the battery as well. With this arrangement for the sensors, we will be able to keep track of the power that is supplied from the battery and the power supplied to the cameras. The latter will help us to control the functionality of the cameras with respect to power input and enable us to save energy.
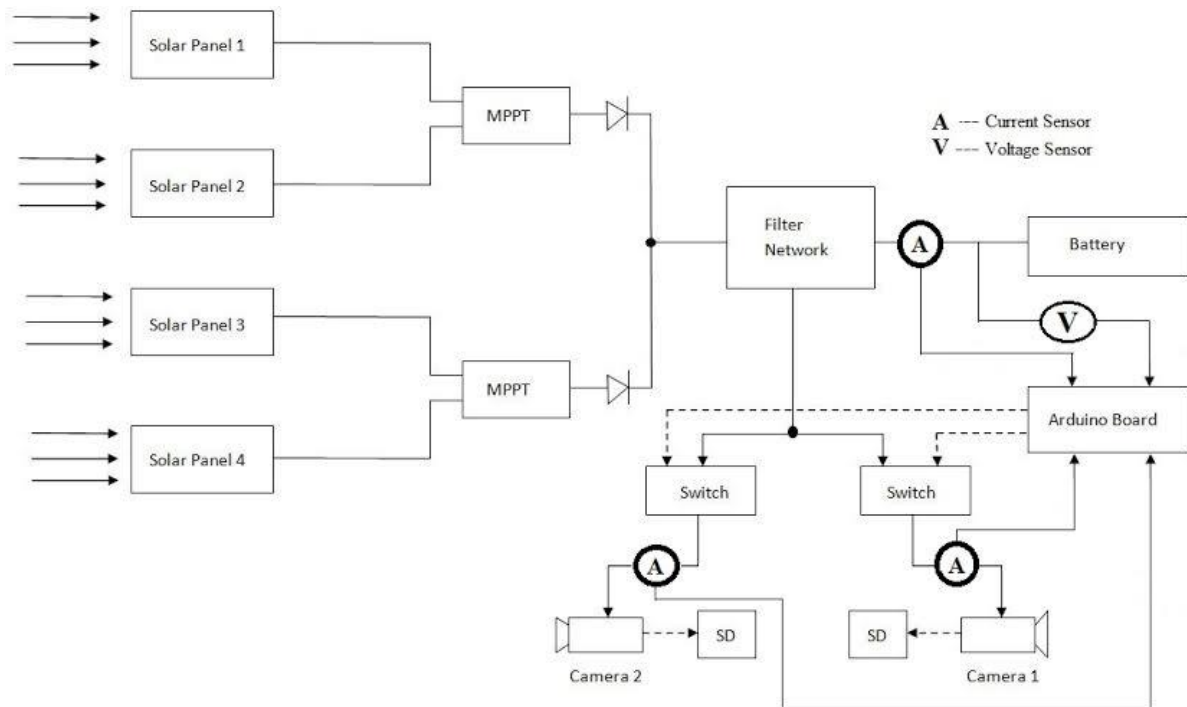

Figure 1: Updated schematics

Independent Power System (IPS)

During this month, the IPS team tested a brand of sollar cells and try different methods for their adjusment to the FRP pannels. It was determined that the cells of the brand used are too brittle and they are considerably difficult to cut. After the difficulties with the size adjusment of the solar cells, the team decided to used a new brand of solar cells. These new cells are smaller but more efficient and they are easier to handle. The team also designed a protective cover for the cells to be used during the flight and transportation of the payload. In addition, the team completed the overall logic of the code to be implemented in the payload. We have studied the possibility of controlling the GoPro cameras from our Arduino microcontroller . Since the on/off switch is relatively simple, we are going to be controlling that with the Arduino. The plan is to be able to shut down the cameras in case the battery voltage drops too low (indicating a low battery charge). This would give a chance for the battery to recharge.

Structure

During the month of February, the structure team has focused on optimizing the payload structure and better defining the manufacturing details. The team put on hold the manufacturing of the main aluminum frame as some modifications came with cancellation of the biology experiment. Meanwhile the team worked on the building of the FRP Shields and the integration of the shields with the solar cells. In the last two weeks, several welding sessions have been arranged to practice and refine the welding techniques to be used on the Aluminum 6061. The main limitations associated with the use of welding have been identified, and changes will be made to the structure to make it easier to build (more tolerance to imperfections along edges of frame, slightly smaller inner dimensions to accommodate the additional volume of the welds).