



**Inter-American University of Puerto Rico**  
**HASP 2014**  
**March Monthly Status Report**

During the month of February the Thermal Energy Control & Particle Air Filter System (TECPAFS) team addressed the quotations for the components to be incorporated on the design. Starting the procedures for testing and then integration of the components. Also, the testing equipment is currently being optimized to be used for the testing and integration part of the project.

**Team Activities**

1. The Power team (PT) is currently waiting for the components to arrive so they can make the assembly and power tests and generate test data. Working in collaboration with TT and ST to analyze the heat films selected by the TT. Also, working on the power system schematic and the power integration with the HASP platform.
2. The Software team (CT) worked to establish the best analog to digital converter (ADC) for the project, since depending on the ADC, the code changes. This makes the code simpler and more efficient. At the same time, the program to run the SD-card is currently being worked with to gather the information faster and get the validation of a given stopping point at a certain given time, since tests were made with a large number of sensors at the same time and analyzing its effects on the voltage.
3. The Structure team (ST) in the past month has remodeled the design to the new specifications. Analyzing how to expose the sponge in regards to position, direction and usage of a proper mechanism for a simple yet effective exposure. The idea of using screw drives was brought to attention and is being considered for the sponge to be exposed yet calculation have not yet been made to consider what type of motor will be best for this kind of mechanism. Once established the space for each component will be given in order to maximize volume for the air pump and any other mechanism needed to improve its function while keeping in mind the mass limit.
4. The Thermal team (TT) is starting to work on a simulation of the thermal structure being exposed to the changing temperatures of the experiment, using in-house numerical simulation using the Matlab interface and ANSYS. Incorporating at the same time the Phase Change Materials (PCM), encapsulated and non-encapsulated.

**Issues Encountered during Payload Design / Development**

1. Administrative problems with the purchase of the Phase Change Materials and other components.
2. Research for a unique ADC to be used was needed, because the use of more than one different type of ADC was not efficient since it was needed two different codes to run the software.



3. Analyze and optimize the design given the change from small to large payload, but it has helped the particle air filter system greatly.

### **Milestone**

The TECPAFS team is currently working on the Test & Integration Planning part of the milestones. No further advancements have been made this month, on a milestone point of view.

### **Current Team Members**

For this month's report, there has been no team changes on the TECPAFS project. Here is a structure of the project, advisors, and student leader and student goals and demographics: (gender & ethnicity)

Faculty Advisor:

- Prof. Amilcar Rincón (M, Hispanic)

Advisors:

- Dr. Rafael Salgado (Thermal Engineering) (M, Hispanic)
- Dr. Nedim Vardar (Environmental Engineering) (M, American)

Student Leader:

- Emmanuel Torres (M, Hispanic)

Structure Team:

- Julio Martínez (M, American)
- Frank Garriga (M, Dutch)
- Steven Quiñones (M, Hispanic)

Power Team:

- Christian Morales (M, Hispanic)
- Nicolle Torres (F, Hispanic)
- Jihad Chamseddine (M, American)

Software Team:

- Daniel Muñíz (M, Hispanic)
- Ivan Muñíz (M, Hispanic)
- Dayna Rivera (F, Hispanic)

Thermal Team:

- Luis Santiago (M, Hispanic)
- Alexander Rivera (M, Hispanic)