HASP 2016 Student Payload Monthly Report

Payload Flight Number: 20016-09	**Institution:** University of Central Florida
Payload Title: Hazardous Gases for Harsh Environments LED Sensor	
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Report Month: March	**Report Date:** 3/25/2016

Gantt Chart:

	March			April			
Tasks	3/13/2015	3/20/2015	3/27/2015	4/3/2015	4/10/2015	4/17/2015	**4/24/2015**
Program DAQ (K,M)					X	X	
Chassis Readiness (M)			X	X			
Electronics Readiness (M)							
Hydrocarbon Measurements							
Enironment Chamber Testing (J,M)	X	X	X	X			
Corective Actions (J,M,K)				X	X	X	
Low Pressure Hydrocarbon Measurements (J,M)							
Extending Sensor [N2O, NH3, HCN] (J,M)							
Variable Pathlength Measurments							

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Team Member Activities:

       Kyle Thurmond revamped the DAQ VI to increase performance and reduce CPU load of the system to lower overall power consumption. He also spent time revising the LED TEC controllers as it was revealed that the TEC's could only operate in cooling, as such a solid state relay had to be added to switch the direction of the applied current to enable heating of the LEDs.

       Michael Villar assisted Kyle in the TEC polarity electronics and integrated the circuit to the existing electronics board. Michael also constructed a temporary chassis for use in the Environmental Chamber for ease of access to all subsystems for modification. Included pictures of new minimalistic support structure is shown below. Michael also assisted in initial test runs of the modified system in the Environmental Chamber under vacuum, initial test results show the systems electronics functioning properly at near space conditions.

       Justin Urso assisted Kyle and Michael in initial Environmental Chamber test runs and TEC electronics modifications. Justin also spent time analyzing initial improved resolution limits from the new optical filters that have been implemented as well as integrating the manufactured adapters for the feed through for the electrical and gas lines for the system in the EC.

       Akshita Parupalli also assisted Kyle and Michael in initial Environmental Chamber test runs. Akshita spent the majority of her time altering and improving the post process MATLab code that compiles and analyzes all of the saved data from each test. Results from the initial Environmental Chamber runs are being complied and will be included in the next monthly report.

Issues Encountered:
- Electronics modifications necessary for LED temperature control
  - Small issue with the TECs on the LEDs only being wired to cool the system. This was remedied by introducing solid state relays to reverse the direction of the current to allow for heating.
- Continual modifications to the Payload chassis
  - The chassis that will be used for the HASP flight has been removed from the EC to allow for ease of access of the core electronics and components of the system while in lab testing is being conducted. The inflight chassis will be reintroduced at a later time when system modifications are complete.

Milestones Achieved:
- Initial Environmental Chamber testing was completed.
  - Initial test run data is currently being compiled and processed by Akshita and results will be included in the next monthly report.
- cRIO DAQ VI improvements
  - LED TEC's circuitry has been modified and the VI updated to allow for control of the solid state relays to control heating and cooling of the LED's
- New structural components have been added to the optics to improve rigidity and allow for thermal pooling to assist in temperature control.
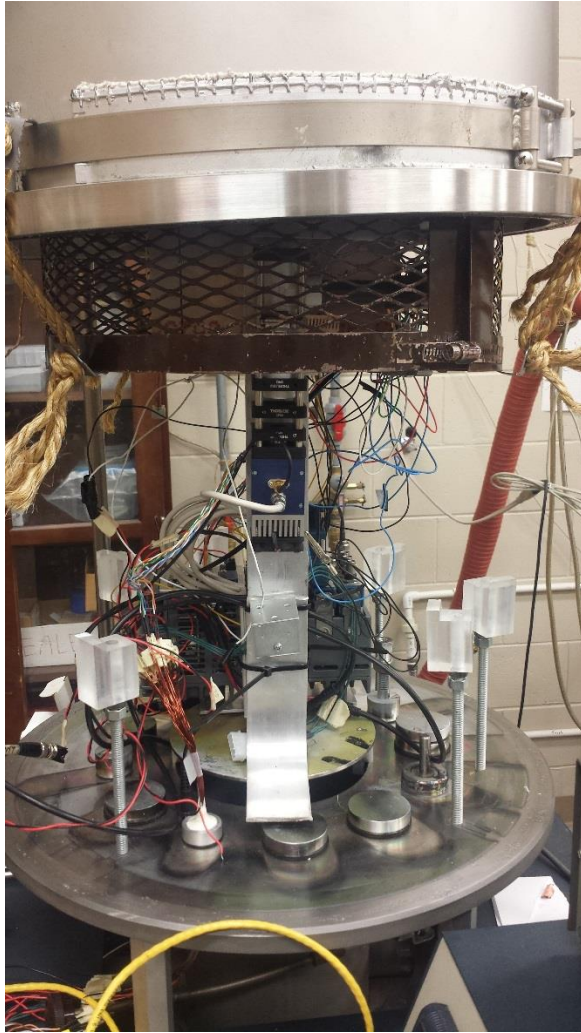
Figure 1: Back Face (Optics Side) Temporary Chassis for EC testing.

Figure 2: Back Face (Optics Side) of Payload in EC w/ flight chassis

Figure 3: Temporary minimal chassis for ease of
system electronics modification inside of opened
Environmental Chamber