HASP Monthly Status Report - May 2015

North Carolina Infrasound

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1 Synopsis

- Acquired a second Data Cube data logger to provide a total of 6 microphone channels
- Started construction of acoustic array
- Tested microphone operation at extreme temperatures
- Started construction of data logging circuit

2 Activity Summary

Since there is a possibility that the Ref Tek 130 data logger may encounter problems writing data to disk at high altitudes, we decided to use Omnirecs Data Cube data loggers for HASP 2015. This is the same model that flew successfully in 2014. Two Data Cubes will be flown, for a total of 6 acoustic channels. Construction of the acoustic array wiring is ongoing, and the microphone channels for the flight ladder have been built. The infrasound microphones were tested at extreme temperatures to try and determine the cause of anomalous amplitude response during HASP 2014 (Figure 1). Amplitude response was found to drop by 30x when the microphones were exposed to temperatures in excess of 70 C for more than a few hours.

Construction of the sensor array (accelerometer, wind speed, temperature sensor, GPS) is also ongoing. Since the Ref Tek 130 data logger is no longer being used, we are using a Arduino GPS shield for time synchronization. Development has also begun on a sensor PCB that will bring all of these sensor and power together limiting miscellaneous wires.

3 Issues Encountered

The mechanical filters of our infrasound microphones respond poorly to high temperatures, resulting in amplitude response deviations. This apparently happened during float in HASP 2014. We expect to address this by providing sun shades for the microphone enclosures on the flight ladder.

4 Milestones Achieved

Determined cause of amplitude discrepancies during HASP 2014.

5 Team

The student team consists of Daniel C. Bowman (University of North Carolina at Chapel Hill), C. Scott Johnson (North Carolina State University) and Jacob F. Anderson (Boise State University). Jonathan M. Lees (UNC Chapel Hill) and Rachana A. Gupta (North Carolina State University) serve as Faculty Advisors.

Figure 1: Microphone at approximately 70 C in a solar oven (background) and microphone at approximately 10 C in a cooler (foreground) with a microphone at ambient temperature and the data logging system.