Title: Automated Device to Measure Forces and Frequency of Vibrations in Mosquito Bites

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Client: Professor Amit Lal, Dept. of Electrical Engineering

Date: Reporting progress from November 29 - December 5

Problem Statement: To design a self-contained, automated device to sense and record forces and vibrations present in mosquito bites.

Restatement of Team Goals: This week we wanted to focus our work on the sensor and its placement in the device with relationship to the CO2 source. We hoped to pick up a 20 lb. CO2 tank from a local supplier in the next few days so we can try a few different dispensing arrangements with mosquitoes to see which is most effective. We wanted to try to develop a frame that we can use to suspend parafilm about 1mm above the sensor and supply heat around the outer border of the film.

Summary of Accomplishments: We rebuilt the sensor and amplifier in a way that exposes the top of the piezofilm. This increases the available area for the mosquitoes to bite, but also increases susceptibility to interference. We found during testing that electromagnetic interference presented no problems, but the sensor acts as a very good microphone, so testing must be done in silence. We stretched the parafilm (waxy, stretchable material that Dr. Randall mentioned mosquitoes will bite through) over the exposed piezofilm and found that it was still sensitive enough to detect the touch of a human hair through the parafilm. The CO2 dispensing device given to us by Dr. Randall was modified to meet our requirements of size and power. The power source on this device was found to be adequate for powering the sensor and other electronics, as well. We have ordered CO2, and hope to get a tank within a week. Also, we obtained clear acrylic (for the top of a see-through box), and copper for a path of heat conduction on the sensor.

Statement of Team Goals: We hope to set up the entire apparatus within a week and begin tests. If we have time, we will work on automation using the motion sensor and "buzzing" detector.

Difficulties: Many tradeoffs are becoming apparent (such as sensitivity vs noise reduction, etc.). We may not have time to make the sensor completely automated, which would require some programming.

Activities:

Lab work, described above: 8 hours (Jake and Kevin)
Parts searching/ordering 2 hours (Jake and Kevin)