Subject: Automated Microbial Analysis Start-Up Packet

Hello Scott,

We have made some good progress towards the overall design of the project. We have partitioned the workload into Mechanical, Electrical and Computer Science sub groups to help with organization.

**Mechanical**

Mechanically, Jorian has been working on creating a complete modeled design in Autodesk Inventor of the project in order to test out dynamic properties and check for possible physical problems. As of the writing of this email the robot armatures, motor mounts, frame, and homing system have been modeled and assembled with proper constraints. This current design should have full functionality of the delta robot arm and will be able to provide a proof of concept for the dynamics. Based off of these results, we have started ordering preliminary parts such as limit switches, PLA material and 80/20 aluminum struts. With these we hope to provide real life prototypes that we will then optimize. Future developments will be to create a full enclosure for the proposed electronic components and to assemble a loading/unloading system for the PetrFilm.

**Electrical**

Since the last email, Mack has been working hard to establish rudimentary delta motion. The robot can be controlled by streaming G-Code from the Raspberry Pi, which means the Raspberry Pi can effectively control the position of the motors. However, the system remains in an unpolished state; limit switches and encoder position have not been implemented as of yet, which means the wrong coordinates being sent could potentially cause permanent damage to the system by having the motors rotate too far. Furthermore, the custom PCBs meant to replace the CNC Shield (a component that translates coordinates into motor signals) have been designed and ordered, and should be implemented by next week. Lastly, the vacuum pump system, which will be used to pick up the perti films, has all of the main electrical components ordered, and should have a working proof-of-concept within the week.

**Computer Science**

The past weeks have been spent finalizing our designs for communication between the RaspberryPi, the brain of our system, the delta robot and the camera. We have also begun the process of researching the best solution for a user interface that will provide you with the appropriate data while still being easy to use. The user interface will start and, if necessary, stop the system and will display an image of the analyzed sample with the microbial count.

In the coming weeks we will continue our initial designs for the system and all of the updates we have provided in this email, as well as any future updates can also be viewed on our GoogleSite. Please do not hesitate to contact us if you have any questions.

Thank you,

Zach Bendt

Jorian Bruslind

Macklin Hall