sdmay19-03: 3D Metal Printer - Phase II

Week 4 Report
October 7 - October 22
Client/Advisor: Dr. Bigelow

Team Members

Thomas Waters — *Team Lead, Computer Engineer*
Ariel Rizshky-Yakobson — *Computer Engineer*
Alvin Rymash — *Electrical Engineer*
Jacob Gosse — *Electrical Engineer*
Armand Hernandez — *Software Engineer*
Carter Cahill — *Software Engineer*

Summary of Progress this Report

During this report, we completed our project plan along with our design document. This was a large portion of our work, as creating the final design and researching parts and solutions took a large chunk of time. In order to complete the reports, we collaborated with the mechanical engineers to talk about the design for the rollers and the full printer. We documented the motors so that we can have the code for the roller ready to go when it is complete. We were also able to get the printer running for the first time, and the necessary software is now downloaded onto the PC in the lab in which we are working. We were also able to speak with Dr. Bigelow about the type of camera that we wanted and decided to buy a cheap camera with a large casing, and then find a spot to drill a hole in order to equalize the pressure. Lastly, we were told in our meeting that we should implement a contact sensor to make sure that the lid of the vacuum box is closed

Pending Issues

There are a few issues that we see ourselves having in the next reporting period. First off, we can not be sure that the camera will work. The vacuum will be a low-pressure vacuum, which means that plastic will not erode over time. Another problem that could arise, however, is with the pressure difference inside and outside the camera. While drilling a hole in an empty spot of the camera may work, we will not know until we test. We also have to find a contact sensor that is cheap and will ensure that the vacuum sealed box is closed when testing.

Plans for Upcoming Reporting Period

The first order of business for this period will be to order a camera as soon as possible. As soon as we discuss with Dr. Bigelow the cameras that we have researched, we plan to order the camera and test it in a vacuum. During the meeting with the mechanical engineers, they stated that they have designed the roller and are waiting on the parts shop to create it. While the part is being created, we will work on implementing the motor so that the roller can be tested immediately after creation. We also hope to start to implement the code for 3D printing, since the printer only prints in 2D currently. Lastly, we will research contact sensors in order to find one for the lid of the vacuum box at a reasonable price point.

Computer Engineers

Thomas Waters: Begin creating the low-level code for the roller motor. This will use a velmex slide motor, and will simply have to go back and forth. Make sure to keep consistent contact with the Mechanical Engineers and work closely with them.

the print beds, which will be the next thing implemented after the roller. The print beds will be more difficult to code, since we will have to move both beds at the same time.

Electrical Engineers

Jacob Gosse: Give a narrowed-down (4 options) list of cameras to Dr. Bigelow and consult with him as to which camera we are going to buy, and order the camera. Begin making plans to ensure the camera works under vacuum.

Alvin Rymash: Speak with the Mechanical Engineers about the vacuum sealed box and discuss what the best way to implement the sensors we have as well as which contact sensor to buy.

Software Engineers

Armand Hernandez: Begin to implement the 3D part of the code by creating code for the pistons moving the lasers.

Carter Cahill: Examine the code which currently prints a square and see what can be done to expand it to print a cube.

Individual Contributions

Team Member	Contribution	Weekly Hours	Total Hours
Thomas Waters	Met with Mechanical Engineers to collaborate on roller design, documentation on necessary commands for motors.	15	38
Ariel Rizshky-Yakobson	Met with Mechanical Engineers to collaborate on roller design, documentation on commands for print beds.	18	
Alvin Rymash	Met with Dr. Bigelow and spoke about possibilites to use camera under pressure.	14	28
Jacob Gosse	Researched to find cameras that we could drill a hole in to use under pressure.	18	43
Armand Hernandez	Found and downloaded necessary software for lab PC.	14	30
Carter Cahill	Examined printer code and tested 2D printing capabilities.	17	39