

CprE 492 3D Metal Printer

Progress report 3

2/9/18 to 2/23/18

Client: Dr. Bigelow

Faculty Advisor: Dr. Bigelow

Team Members:

Ben Pieper - Control Software

Caleb Toney - Sensor System

Jett Ptacek - Control Software

Kevin Oran - Mechanical Design

Rachel Shannon - Sensor System

Accomplishments during reporting period

- Vacuum Chamber
 - Vacuum Chamber was Ordered.
- Velmex
 - System was redesigned to include Bislides. Quote has been requested. Updated quote is pending. Slides should have been ordered.
- Manufacturing
 - Prepared waterjet parts with additional 100 thou in the drawings so we can get them jetted.
 - Didn't have as much time these two weeks. I prepared stock and DXF for sukup so we could order stock, but I haven't pulled the order trigger because I'd like to include material for the Panel Mount connectors and the Oxygen sensor.
- Stepper controls
 - Tested and were able to get coordinated motion to work on Dr. Bigelow's existing Velmex system
 - Experimented with process of sending multiple commands back to back
 - Were able to successfully send programs to Velmex controller and tested with our C# application through the serial port.

Pending Issues

- Drawings
 - Water jet process will create a beveled edge. I need to at 100 thou to the edges and get boyd to clean the edges and tap/thread for me. -done
 - Need updated quote request and will copy Bigelow. This way he can handle ordering.
 - Next step is to begin part drawings for chemistry machine shop.

Individual Contributions

Team Member	Contribution	Weekly Hours	Total Hours
Ben Pieper	Developed software to test controller motion, tested coordinated motion on Dr. Bigelow's controllers, specced out connectors for front panel	12	27
Caleb Toney	Began working with oxygen sensor for integration, began testing pressure sensor	6	18
Jett Ptacek	Researched hobbyist 2 axis laser printer for alternative motor control methods, met with Dr. Bigelow to make final motor control decision	9	22
Kevin Oran	Vacuum Chamber revisions, Design revision for Bislides, water jet and boyd meetings	9	34
Rachel Shannon	Worked on testing barometer pressure with vacuum chamber, began working with oxygen sensor for integration	5	16
	Total Hours	41	117

Plans for next work period

- Sensor System
 - Continue integration into a more cohesive sensor/safety unit rather than individual sensors
 - Spend more time working with the internal oxygen sensor system.
 - Order Arduino from ETG
- Mechanical
 - Order stock and finalize orders and part descriptions for Sukup and Sgt Metal.
 - Make drawings for sukup to get initial parts created.
 - Get Roller and bracket cad refined.
- Software/motor control

- Write software to generate g-code for cubes of various dimensions and parameters
- Need to create algorithm to calculate velmex code for angles for the 2-axis simultaneous motion
- Need to confirm Velmex digital output matches laser pulse input

Summary of Advisor Meeting

Advisor meeting was focused on determining the physical size and weight of the printer in order to determine which lab the printer can go in, and what type of table/cart will be need to hold the printer. Also discussed status of manufacturing the components, and plans to continue testing the motor control software on Dr. Bigelow's existing system as well as purchase of arduino.