

## sdmay18-05: 3D Metal Printer

Week 6 Report

October 8 - October 14

### Team Members

Ben Pieper — *Researcher / Communicator*

Jett Ptacek — *Meeting Organizer / Researcher*

Kevin Oran — *Mechanical Design*

Caleb Toney — *Researcher*

Rachel Shannon — *Researcher/Meeting Notes*

### Summary of Progress this Report

This week the team ordered parts for the Arduino-based sensor system. The parts ordered are an external oxygen sensor and a barometer. In addition, research was continued on splicing CAD files, and continued adjustments to the dimensions on our present design is being done to accommodate the optical laser head.

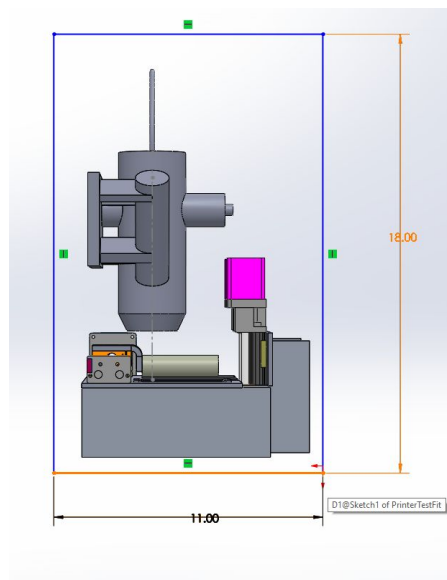


Figure 1. Optical head dimensions conflict with current design.

The dimensions of the optical head creates a concern for the maintainability of the printer. The stepper motors for the print beds are now in conflict. Possible solutions:

1. laser head has the ability to have a storage position where it can be moved out of the way when need be
2. extend actuators farther back
3. rework design to be taller and abandon extra wall on the print bed

The team called Velmex to ask about motors/slides in vacuum and dust protection for the slides. Velmex suggested that the slides will be operational without the use of dust covers. An alternative is to design a custom dust cover.

### Pending Issues

The internal oxygen sensor needs to be more sensitive as we want to operate at 1000 ppm of oxygen before we introduce nitrogen into the chamber. More research is needed to determine if more sensitive oxygen sensors exist on the market. Also, the Arduino still needs to be ordered.

### Plans for Upcoming Reporting Period

- order internal oxygen sensor and Arduino
- Solution for splicing CAD files
- final design based on optical laser head
- order stepper motors

### Individual Contributions

| Team Member    | Contribution  | Weekly Hours | Total Hours |
|----------------|---|--------------|-------------|
| Ben Pieper     | Researched parts for the safety and environmental sensors, set up a parts list for order, design document | 6            | 34          |
| Jett Ptacek    | Researched software algorithms for splicing CAD files, design document                                    | 5            | 33          |
| Kevin Oran     | Adjusted design dimensions to accommodate optical head, design document                                   | 6            | 40          |
| Caleb Toney    | Assisted with research on sensor system, design document  | 5            | 29          |
| Rachel Shannon | Assisted with research on sensor system, design document  | 5            | 26          |
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