

# Individual Lab Report 3

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Team B: (still nameless)

Teammates: Trevor Decker, Ian Hartwig, Ian Rosado

ILR03

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## Individual Progress

### Full Robot Design

I helped design and CAD the linear slide. I also performed stress calculations to determine that the sliding beams in the extending unit could support a 70 ft-lb moment in a cantilever configuration. Since the pins on the bearing would be the first to fail, especially when the slide is fully extended, I also did similar calculations to determine an appropriate pin size. In addition to the other calculations, I also determined how much torque the motor would need to apply to turn the lead screw for the gripper. I took part in determining the list of parts for our first order.

### Gripper Design and Demonstration

For our system demo this week, I made the CAD model for the purpose of laser cutting pieces for the gripper prototype. I was able to translate the extruded blocks from the original CAD model into 2D pieces that would fit together. After the pieces were laser cut, I assembled the prototype using acrylic glue and screws. Here is an image of the prototype:

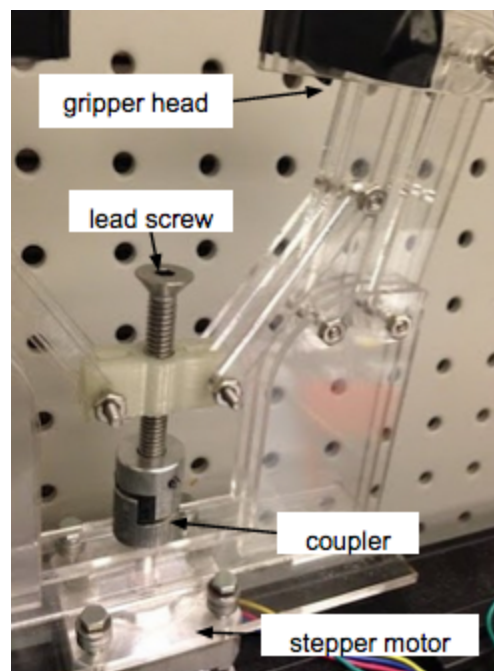


Figure 1. Gripper made out of laser cut  $\frac{1}{8}$  inch acrylic

### Website

I wrote the skeleton for the content for the website. I also provided many of the pictures and videos. Since our functional diagram, needed to be revisited, I drew a new functional diagram.

## Challenges

In building the gripper, I ran into many difficulties, the first being finding a motor that had good mounting points as well as an appropriate shaft length for the width of our gripper. Although I settled on using a stepper motor for the demonstration, I know that the stepper motor will not provide enough torque for gripping. Therefore, I need to redesign the gripper to accommodate a larger motor. Also, I had trouble securing the motor shaft and the bolt to the coupler. The coupler also had a rubber piece in the middle that caused it to separate while the motor was spinning. Also, our screws kept loosening and would sometimes fall off during operation. Overall, we needed components that better fit our application.

## Cross-Referencing with Other Team Members

By doing some simple hand calculation, I facilitated ordering of parts, which was mainly overseen by Ian H. I made the CAD model of the gripper of that allowed Trevor to laser cut the pieces. Ian R. was able to work off the CAD model I started and assemble the gripper. By writing the content for the website, Trevor and Ian H. were able to format the website and focus more on the presentation.

## Future Work

For the upcoming week, I plan to complete the whole CAD model, which will help us solidify the motions of the final design. I also plan to figure out the geometry of the cleaning unit based on our new linear slide design.