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Team B: No Name

Teammates: Ian Rosado, Stephanie Chen, Trevor Decker

ILR 03

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Individual Progress

This week I focused on specifying our motion components. We specified and ordered a motor to test closing our test gripper. I also worked on the gear ratios necessary to generate enough torque to flip our robot over on one gripper.

In the gripper, we are looking for small motors that can provide high torque to a screw. I pushed to use an acme thread type (which we have ordered for testing) in order to reduce the frictional losses under high load. This is paired with a very small but high gear ratio DC motor[1] . We can measure the closing force through the motor current output from the Pololu motor drivers[2] we ordered last week.

Challenges

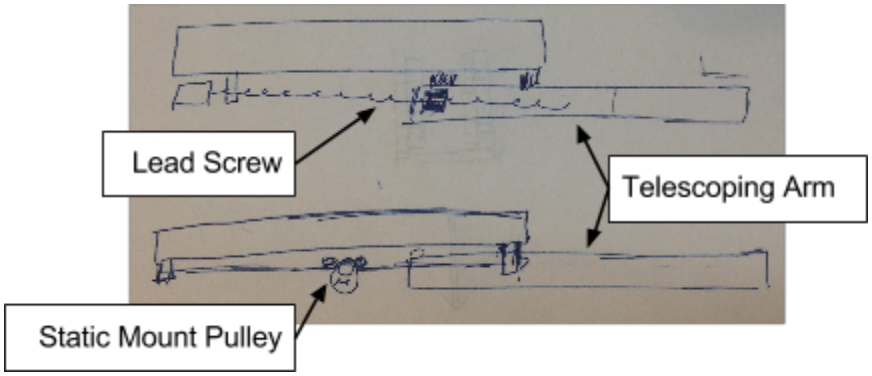

Figure 1: Options for telescoping arm motion.

I also investigated options for extending the telescoping arm. We originally planned on using the same acme thread as is in the gripper, but I was very concerned with the weight of the solid steel threaded rod. I investigated some other, lighter, options as seen in figure 1. One was mounting a rubber timing belt between 2 static points and using it like a rack. This places the long can of our motor across our arm's structure and might cause us to use a heavy or custom gearbox. Instead, we will likely use an aluminium threaded rod with a standard thread profile. We were unable to find an acme rod in aluminum from common outlets, and we don't have the tools on campus to make this easily. We will likely address this issue again in a couple weeks as we chose to work on the other prototypes first.

Teamwork

Ian Rosado and Stephanie Chen worked heavily on the prototype gripper. They made a laser cut model with a standard threaded rod profile. As a group, we identified weaknesses and strengths in the current design so that these can be incorporated into the next revision. We also now have the acme thread hardware to include in the next prototype.

[1] https://www.pololu.com/product/2218/specs
[2] https://www.pololu.com/product/1451

Plans

We will be focusing on constructing new prototypes for the gripper and telescoping arm next week using the materials on order. This will give us a better idea of if our platform is possible. I need to work with Ian to put together a worm gearbox and other motion components to test the rotation motor.