Michael O’Connor

Team G: Bobs the Builders

Teammates: Christian Heaney-Secord, Eric Newhall, Guillermo Cirde

ILR 4 – System Demonstration

February 26, 2015

Individual Progress

System Demonstration:

For this week's system demonstration I worked to design and fabricate the part placer assembly that will be capable of moving along one axis, raising and lowering an arm, picking a part up via electromagnet and rotating a part 180^{o} to re-orient the part. Working with Christian, I laser-cut acrylic parts for the part placer and machined aluminum angle to use as mounting plates for our stepper motor and idler pulley. I also made aluminum brackets to attach different components of the subassembly. I added these components and attached the timing belt with the assistance of my teammates(Figure 1). After mounting the system to the rails, the rack with the servo and electromagnet was then added to the subassembly(Figure 2).

Website:

I have made sure to update sections of the website as I have worked on different parts of the project.

Challenges and Issues

One problem we ran into was that the weight of the servo and electromagnet attached to the end of the rack back-drives the gearmotor used to actuate the rack and pinion. We plan on rectifying this by either using a lighter electromagnet or by using a stepper motor instead of a gearmotor so that it may hold its position better. We also had an issue with adding a power supply to our system. We are at a point where we need a power supply in order to actuate our subassemblies while powering the electromagnet. However, we had difficulties deciphering the datasheets for one of the power supplies and need to spend a little time reading and testing before we can have it be a part of our system.

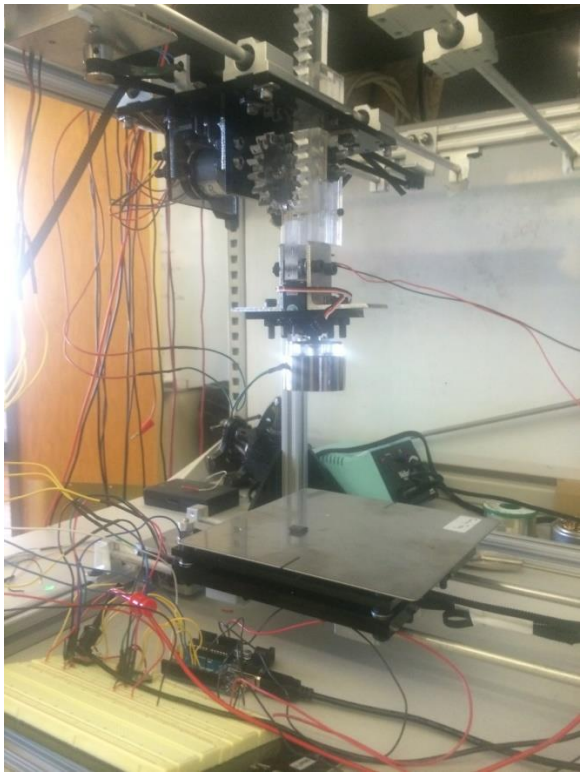
Cross-Referencing with Teammates

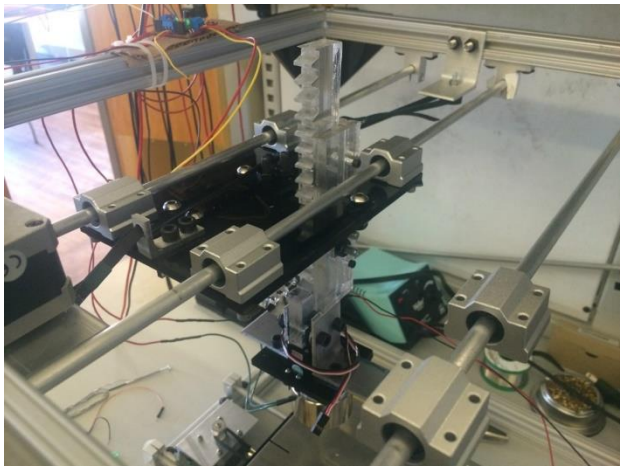
Christian and I worked together to create the components for the part placer subsystem. This involved laser-cutting components as well as machining aluminum angles. As a whole team we installed these pieces into our system and attached the motors and timing belt.

Eric and Guillermo wired the stepper motor, stepper motor driver, gearmotor, and electromagnet after they were mounted to our system. Guillermo integrated the actuators and electromagnet into our GUI and established a slide-bar within our GUI

that allows for positioning, raising/lowering, and activating the electromagnet, showing the subassembly's functionality.

Figures





(Above) Figure 1: Top view of part placer subassembly showing actuation via timing belt wrapped around stepper motor

(Left) Figure 2: Bottom half of part placer subassembly showing electromagnet actuated via rack and pinion

Plans for Following Week

My plan for next week is to add our flux extruder to our system. This will consist of a gearmotor with a threaded rod attached to the shaft and a piston threaded onto the rod which will push on the rear of a plastic syringe. I also plan to help implement a wire feeder and cutting system into our project. The wire will be feed using either a stepper motor or gearmotor and will be cut using an altered pair of bolt cutters. If possible, I would like to see the placement system for the cut pieces of wire be developed, but that will be dependent on how quickly the other tasks can be accomplished.