



ASML Actuated Breadboard in EUV Research Chamber

Team MECHX: Andy Huynh, Sidney Palomino, Matthew Dacayo, Xikai Xie
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Project Overview

The purpose of this project is to develop an actuator capable of lifting, tilting, and rotating a platform. This lift will be used in a vacuum chamber with typical operation temperatures reaching 212°F. Actuation will be assisted by an automated motor while tilting and rotation will be done manually.

Primary needs/goals :

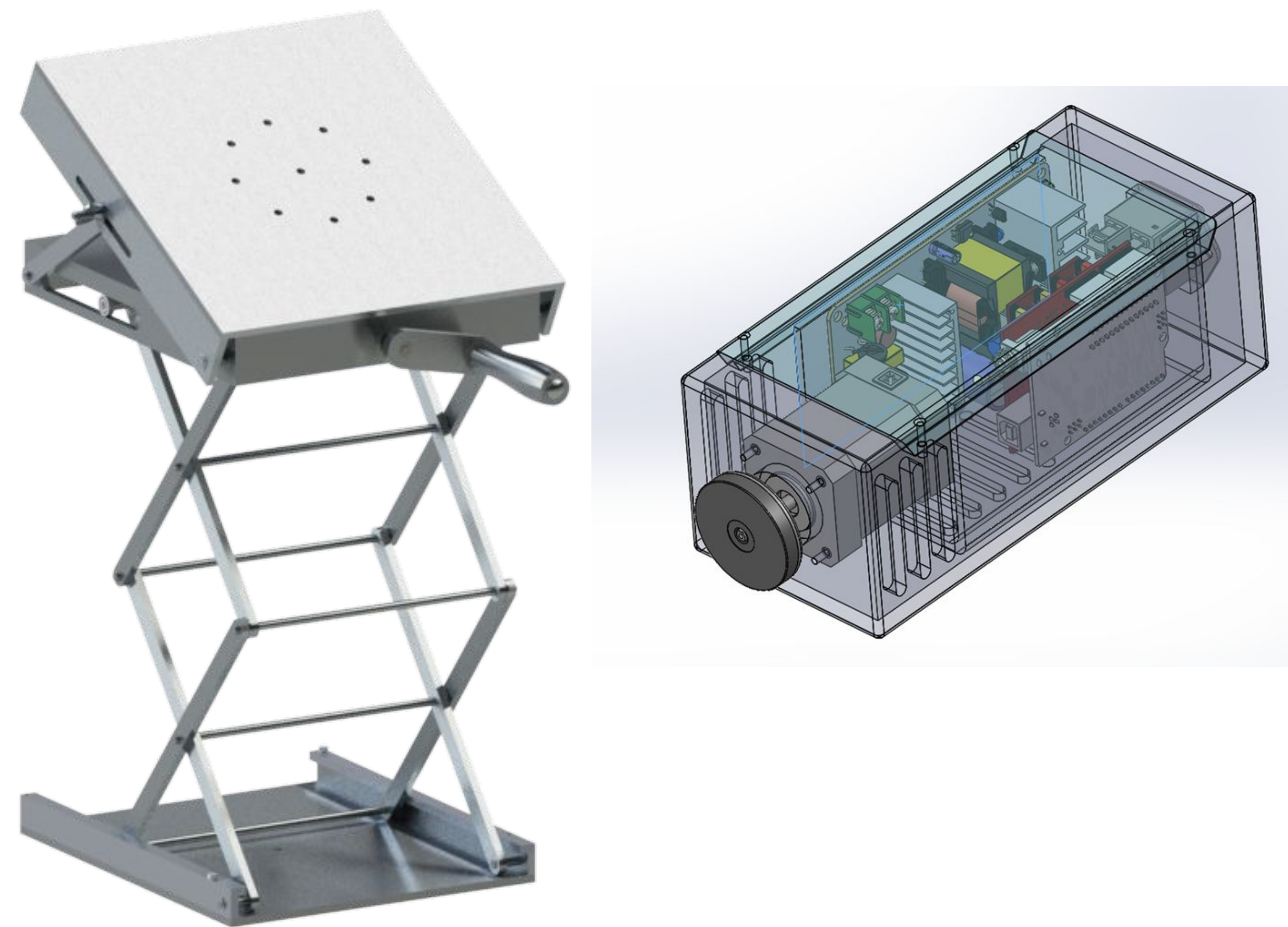
- Create better precision for positioning
- Meet cleanroom standards
- Fix the lack of maneuverability
- Incorporate a tilting function
- Capable of supporting a minimum weight of 20 lbs while maintaining a tilt angle of 0 - 15 degrees.
- Be manually operated with ease; (optionally) with an automated alternative

Team MECHX

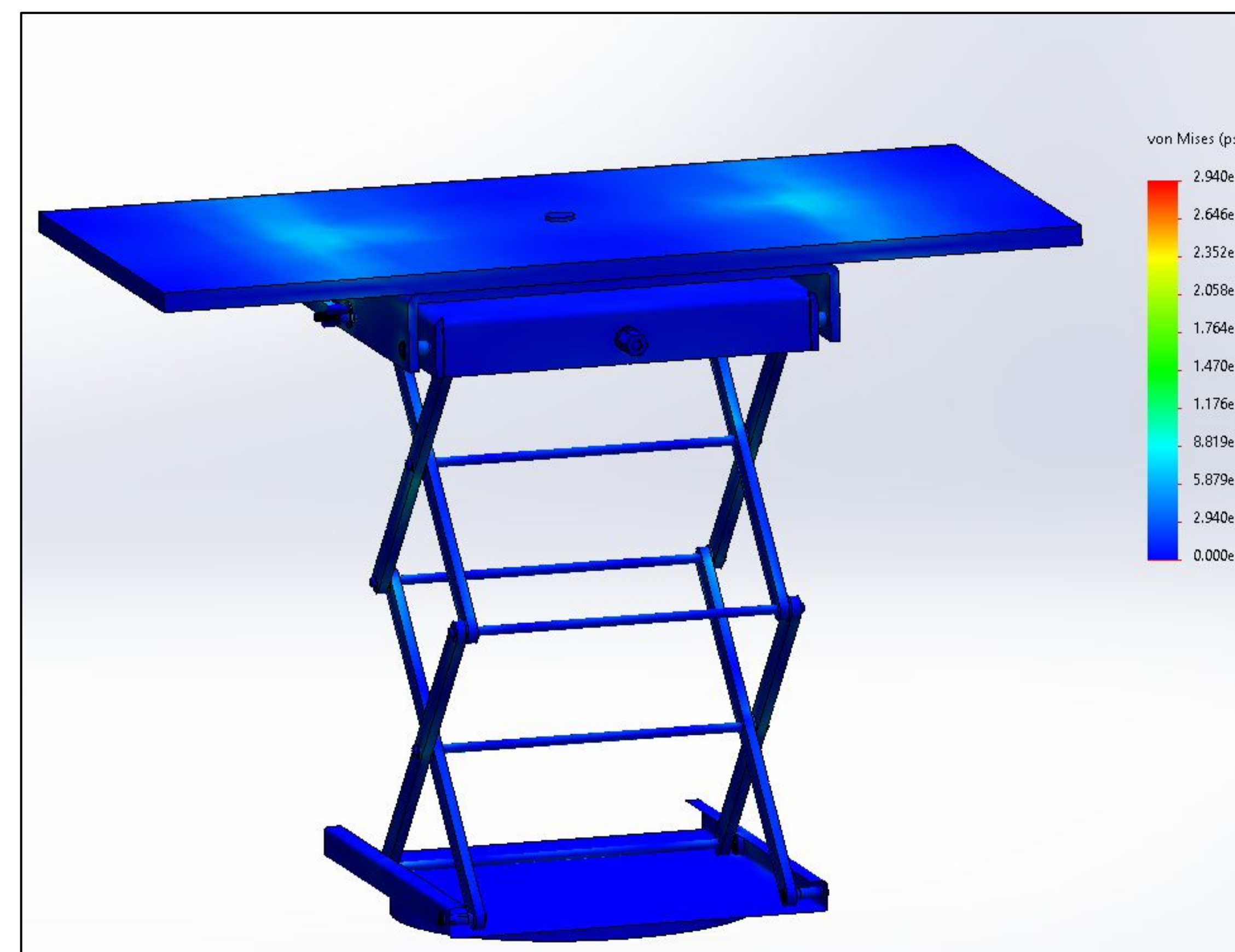
Featured left to right:
Sidney Palomino - Quality Lead
Matthew Dacayo - Motor Control Lead
Xikai Xie - Manufacturing Lead
Andy Huynh - Team Lead



Designs



Analysis



Top left: Fully modeled and assembled lift; Top right: electronic assembly modeled inside of the housing unit; Bottom: Model simulating load experienced by the lift showing it can handle the prescribed load

Manufacturing & Assembly

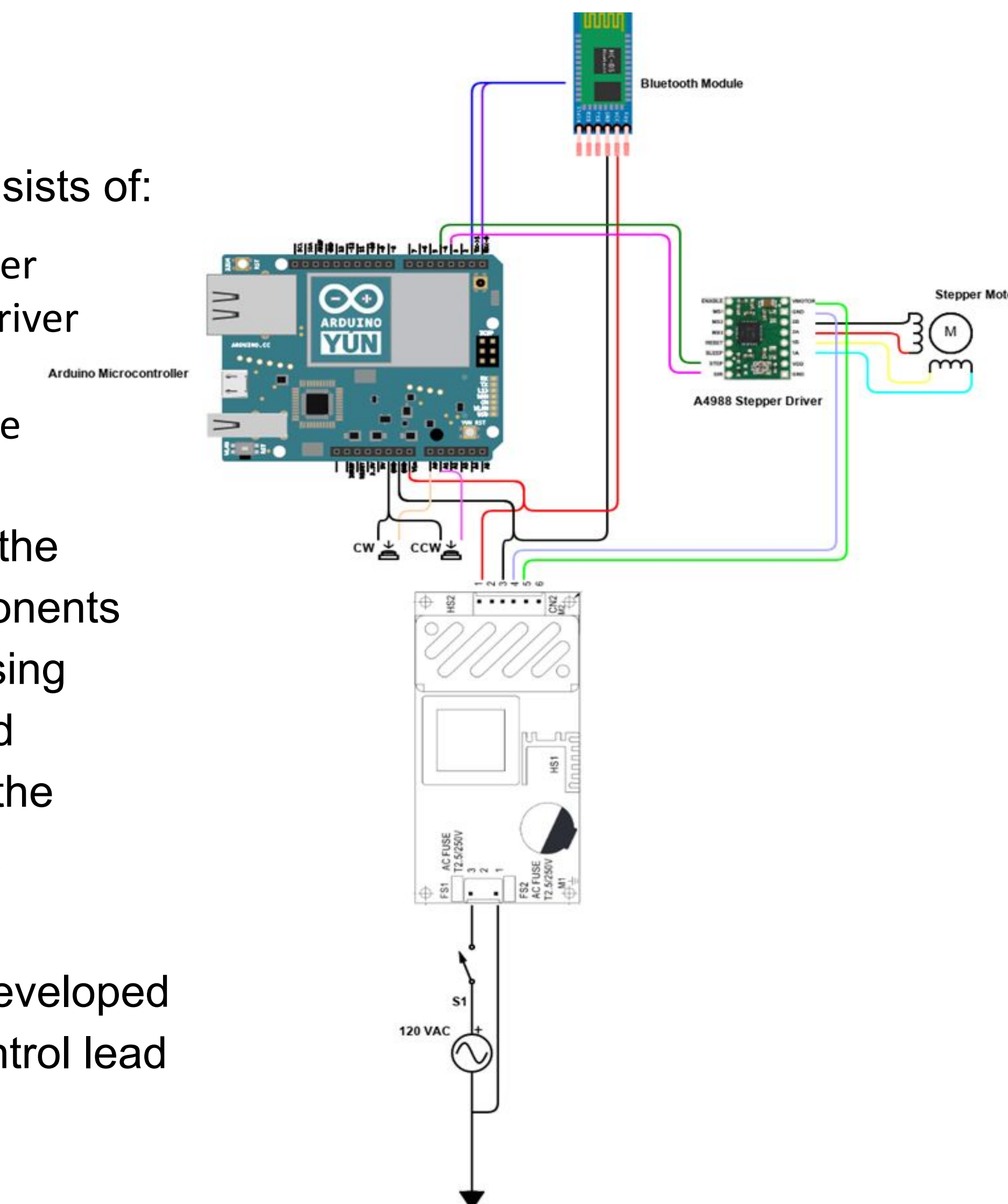
- Large aluminum sheets were cut with the water jet cutter to for each component
- Rods were cut to size with the saw and milled/sanded as well; all holes, bores, and threads were made using the bench drill in the shop.
- The base and top components of the lift were held together through bolted connections
- Each part was thoroughly cleaned with acetone, and put them in the oven to heat and remove any excess moisture.
- The lift was then assembled and all the pieces were set in place with retaining rings
- The scaffolding was brazed to increase the stability

Motor control components consists of:

- Arduino Controller
- A4988 Stepper Driver
- Stepper Motor
- Bluetooth Module
- Power Supply

The housing for the electronic components was designed using 3D-modeling and 3D-printed to fit the components in a compact space.

The code was developed by our motor control lead



Acknowledgements

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