Project Deliverable G: **Prototype II and Customer Feedback**

GNG 1103 – Engineering Design

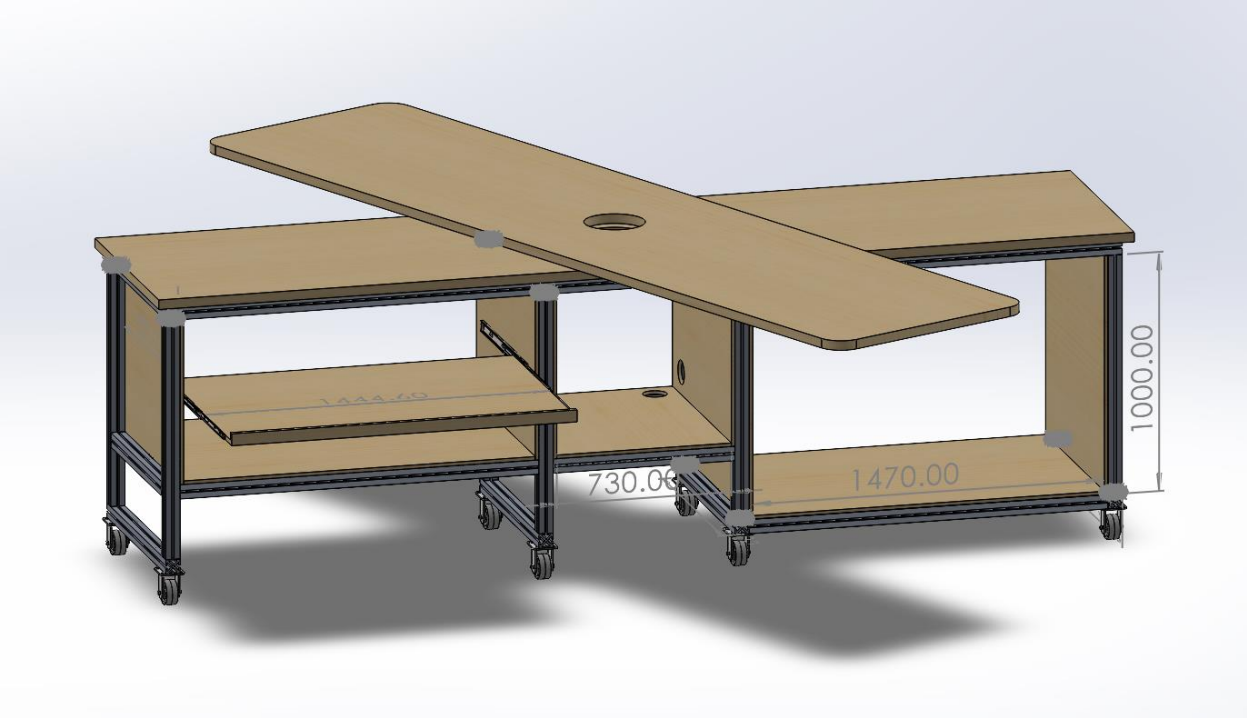
Client Feedback

We have not yet received any updated feedback from the client. For now, we will move forward with designing our final prototype; once feedback is received it will be incorporated into both the design and the test plan.

Prototype 2

Ideas and prototypes from potential clients/users that we have sought out and identified on our own were how the table rotates, the materials used for the frame, and space for electrical wiring. The plant station has a table able to rotate 90 degrees. To achieve this feature, we use a spinning bearing in the middle of the station shown in our second protype below. Another consideration we made in our design is using aluminum for the frame. Since this station was made to be mobile, the station needs to be light enough for the user to move and aluminum is a light and strong metal. Also, shown in the second prototype below, is the fastening mechanism for the frame structure. Lastly the hole in the middle of the station provides space for the electrical cables so that they won't tangle up while the table is rotating.

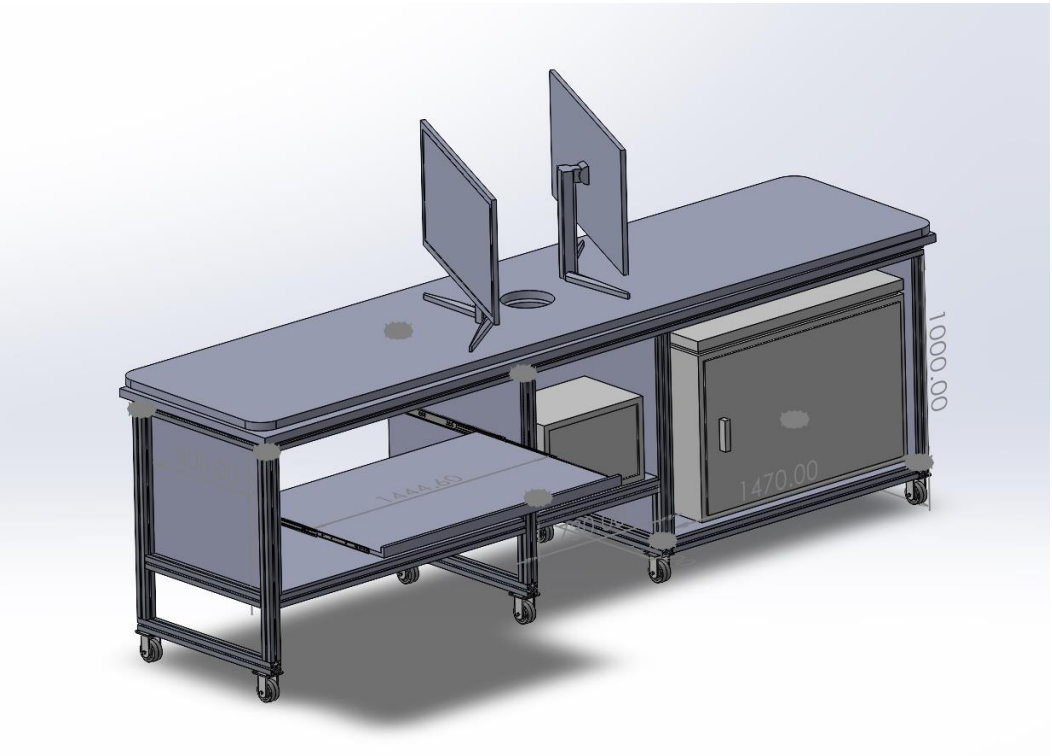
For our second prototype, we decided to focus on the aluminum frame/body of the plant processing station. The fastening mechanisms and bearing are both important components of the frame subsystem. We've decided to put most of our focus on the testing of this frame as it is essentially the backbone of the entire design. This prototype gives us a better understanding of how the different components will fit together, as well as a better cost estimate for our materials. Testing will also enable us to gauge the maximum load our design can support, which allows us to focus on other subsystems (I.e., freezer, dehydrator, storage, etc.) later in the design process.



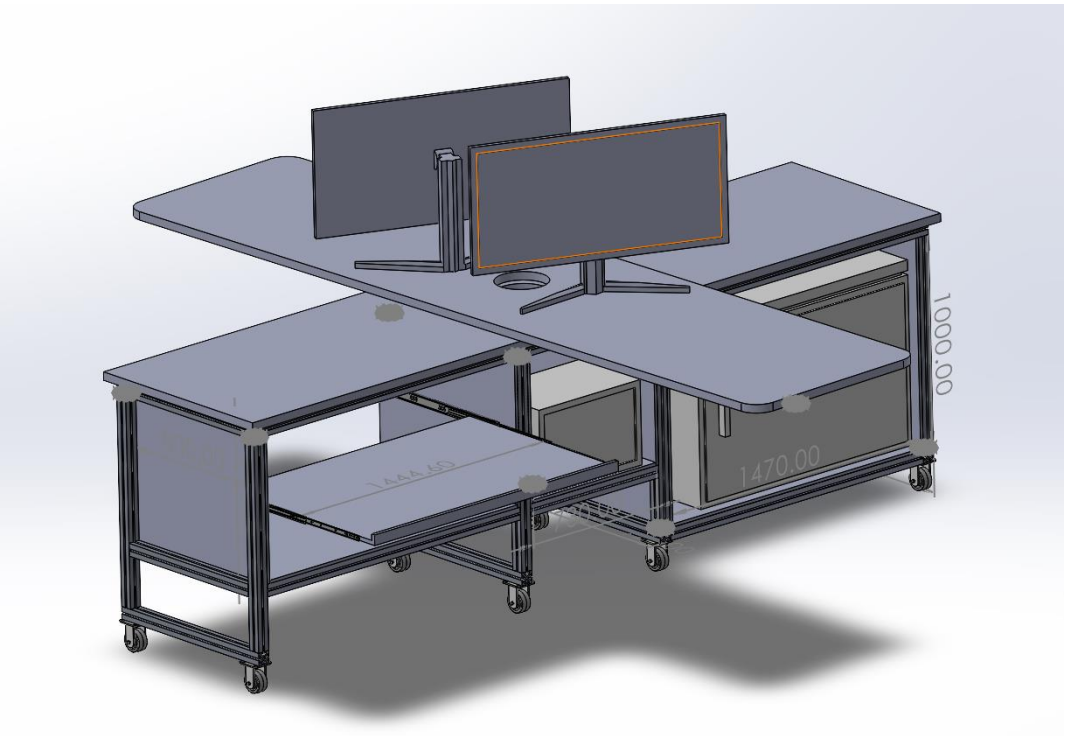
Total Weight 350kg

Note: High-capacity caster/wheel has a capacity of about 400kg each x 6

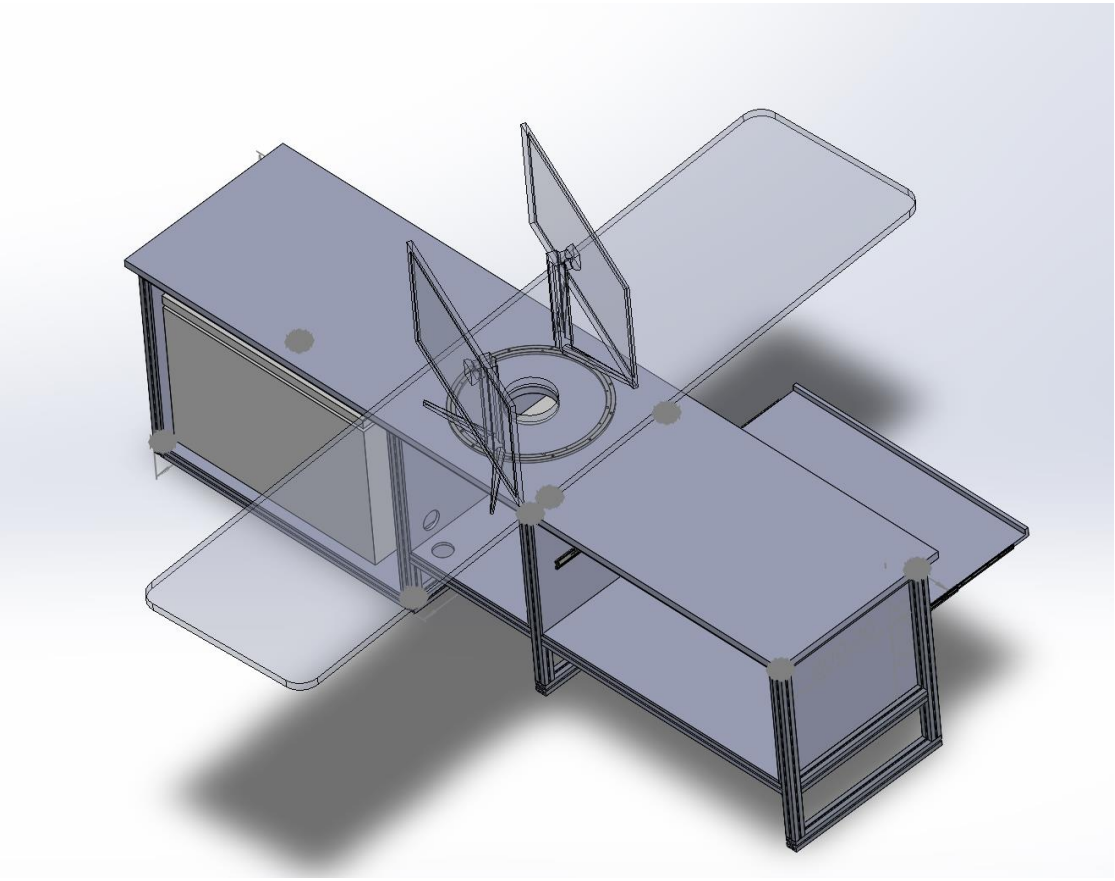
Workstation in collapsed form



Workstation in expanded form



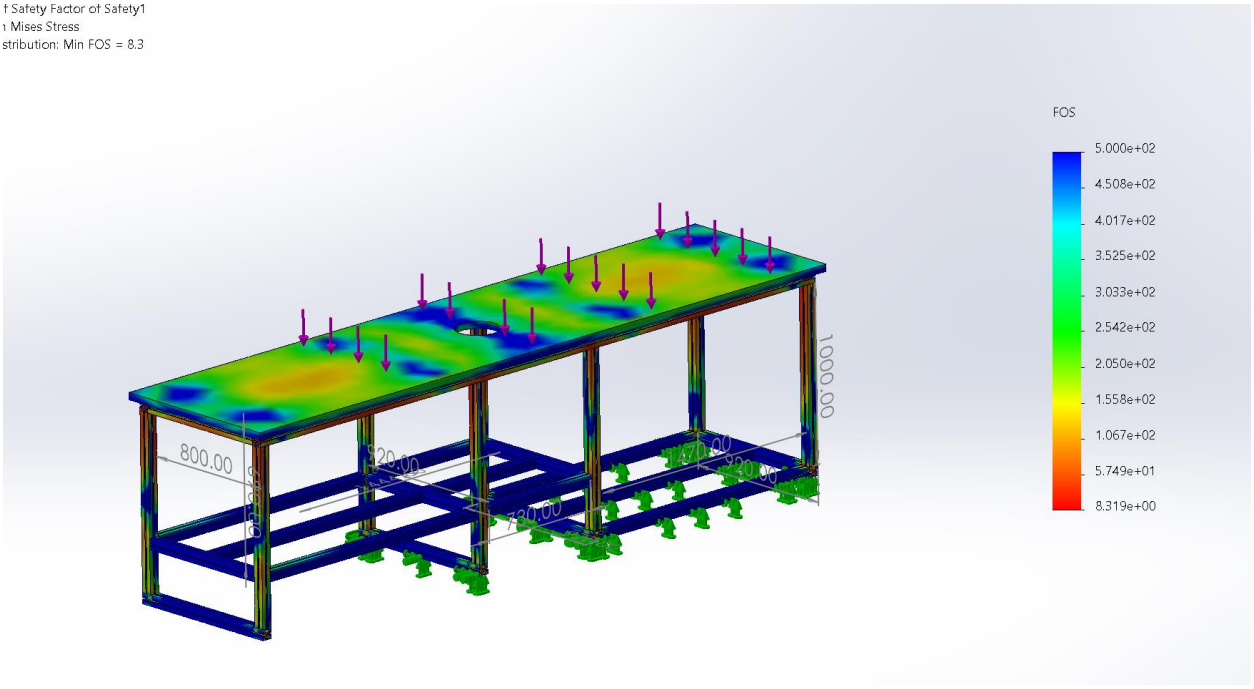
Spinning tabletop bearing display



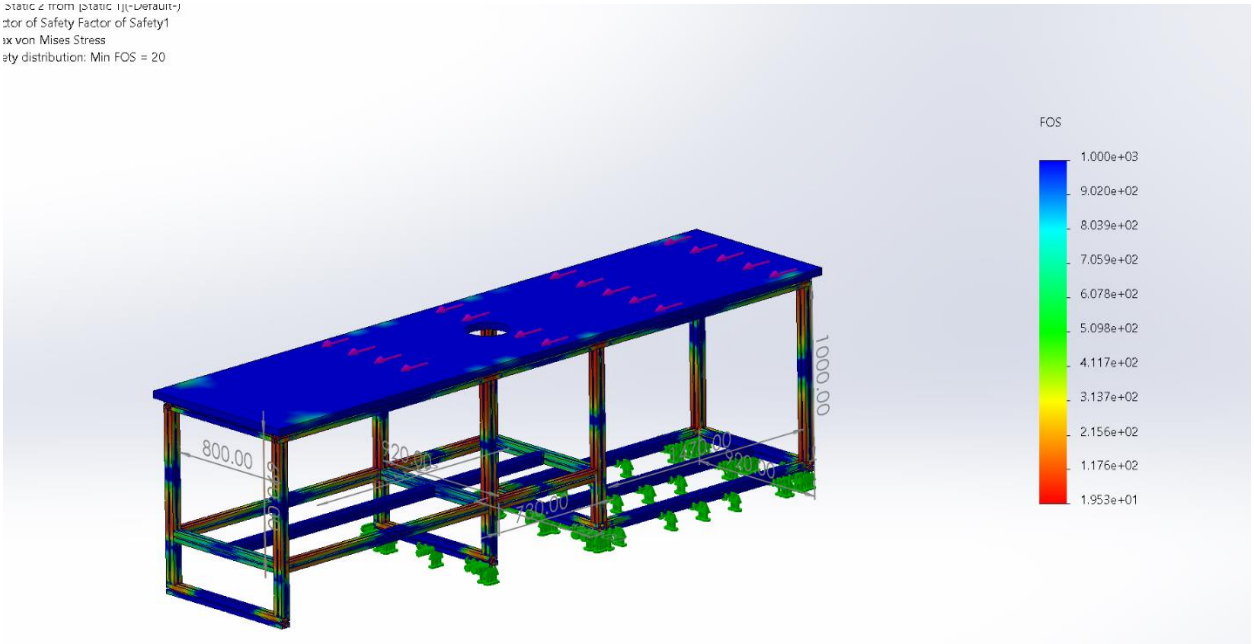
Note: See hole cutouts for cable management and power to every appliance

Simulation 1:

Downward force on tabletop

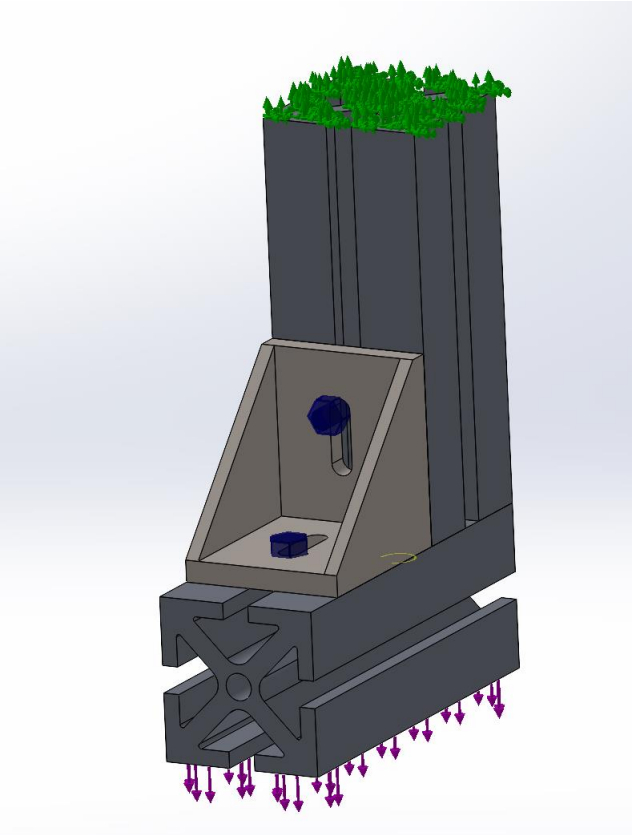


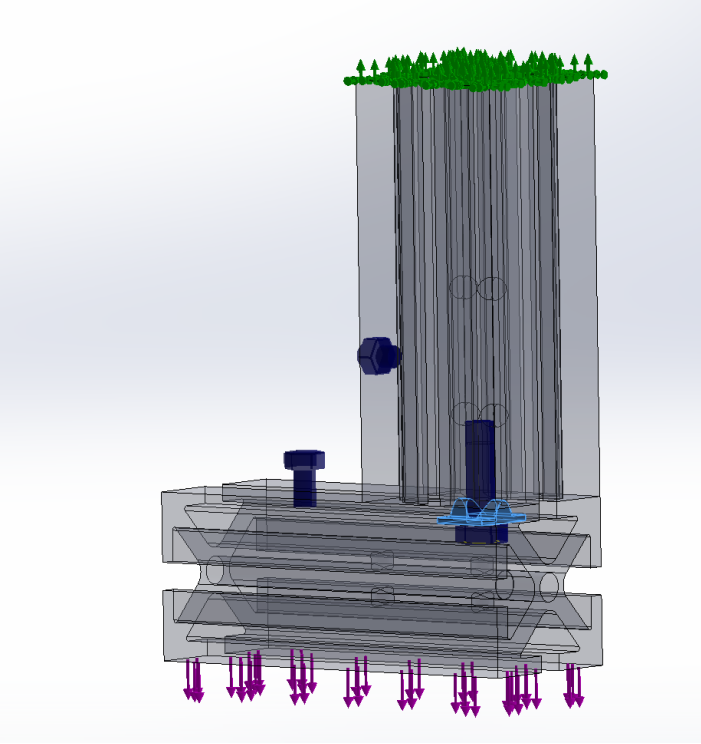
Simulation 2:
Shear force on frame



Note: See factor of safety plot on right

Fastening Mechanism





Prototyping Test Plan, Analysis and Results (including detailed images of the prototype)

Test ID	**Description of Prototype used and of Basic Test Method (What)**	**Test Objective (Why)**	**Description of Results to be Recorded and how these results will be used (How)**	**Estimated Test duration and planned start date (When)**
1	Client meeting 2 Prototype: Hand drawing, simple CAD model	Determine any required or desires changes based on client preferences	Record notes from client meeting	Nov 10: 2nd client meeting
2	SolidWorks static table-top load simulation. Prototype II	Determine max load on the spinning tabletop before failure. A method to determine an appropriate material or structure to support the required weight.	Stress, deformation, factor of safety plot	Digital simulation can only be completed after a detailed CAD prototype is made (prototype II: development starts Nov 9) Since digital, relatively low testing duration/time requirement
3	SolidWorks static Shear force on frame Prototype II	Fastener load simulation to determine the if frame can handle a certain shear force	Stress, Factor of safety plot	^ |
4	SolidWorks overall weight on wheels Prototype II	Determine how many wheels/contact points are necessary to support the overall weight of the workstation	Based on decided wheels, calculate load capacity of one. Divide total force of gravity by the max load of one wheel. Consider weight of equipment and factor of safety	^ |

Stopping Criteria

1. When client is satisfied with overall design and features
2. 3. 4. When acceptable results for max load on fasteners, tabletops and shelving are met.

General and Client Feedback on Prototype 2:

We still have not yet received any updated feedback from the client. For now, we will move forward with designing our second prototype and including more detailed subsystems; once feedback is received it will be incorporated into both the design and the test plan.

Updated Test Plan for Prototype 3:

November 12: Submit Prototype 2 and receive additional feedback from the client for both prototypes

November 12-26: Continue to run tests on Prototypes 2 and 3, adjust as needed, implement client feedback

November 12-26: Once additional testing for prototype 3 is completed, 3D print a scaled-down version of the prototype, as well as a larger model of the fastening mechanism

November 26: Submit Prototype 3 and prepare to present to client on Design Day