

Problem Statement

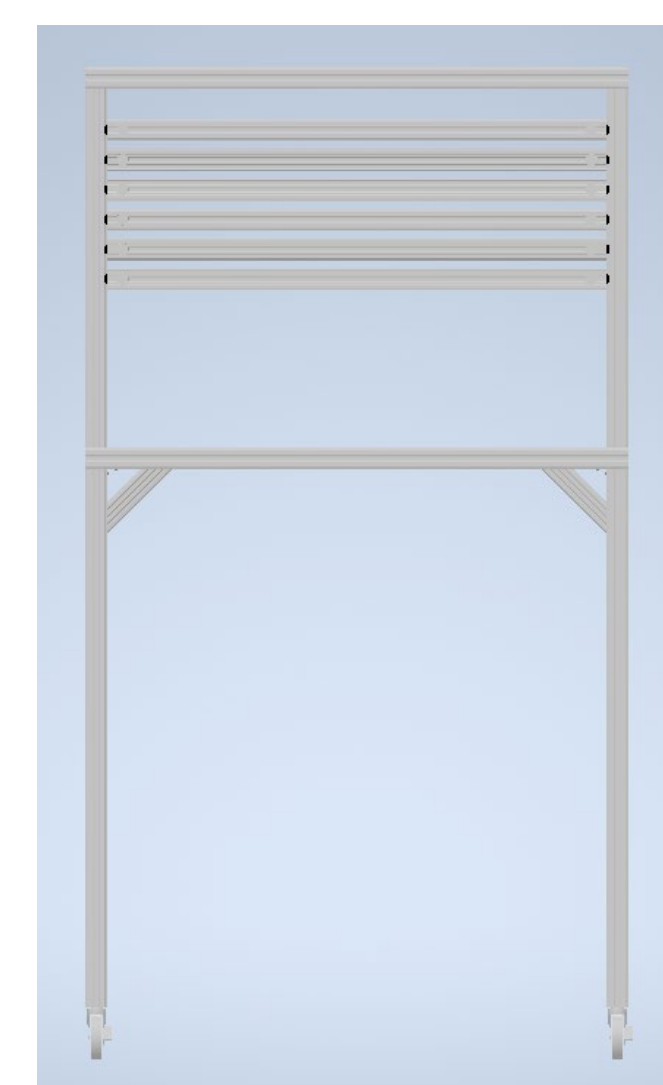
- The hydraulic trainers at Western Carolina are showing age. The current trainers are leaking, and the hoses are cracked and falling apart. The problem that has been presented to the team is to build a new modular hydraulic trainer setup while being able to reuse parts from the old trainer to keep cost down. The trainers are meant to be modular so that the school can add to the trainers whenever new items need to be added without having to tear the entire trainer down to rearrange it. This will be done by making the mounting board out of 80/20 aluminum bars that will allow for multiple mounting points so that the items in use can be mounted and then taken off when they are not in use.

Requirements

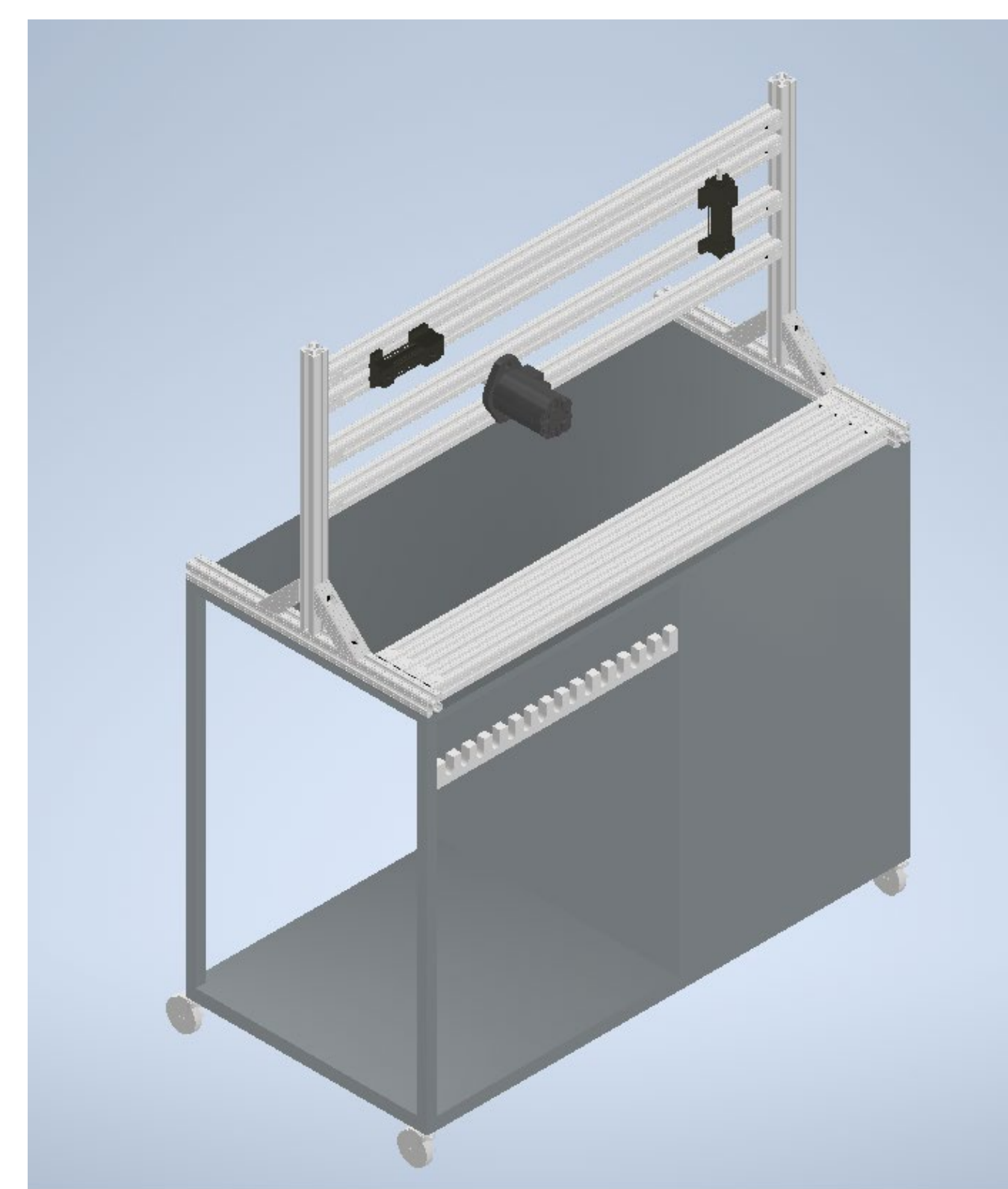
- Design a new modular trainer setup with 80/20 aluminum bars
- Make the attachments for the trainer easily attachable so they can be changed with ease
- Replace worn hoses and connections to prevent leaks and promote safety
- Design for future trainers to be updated in the same way

Concepts

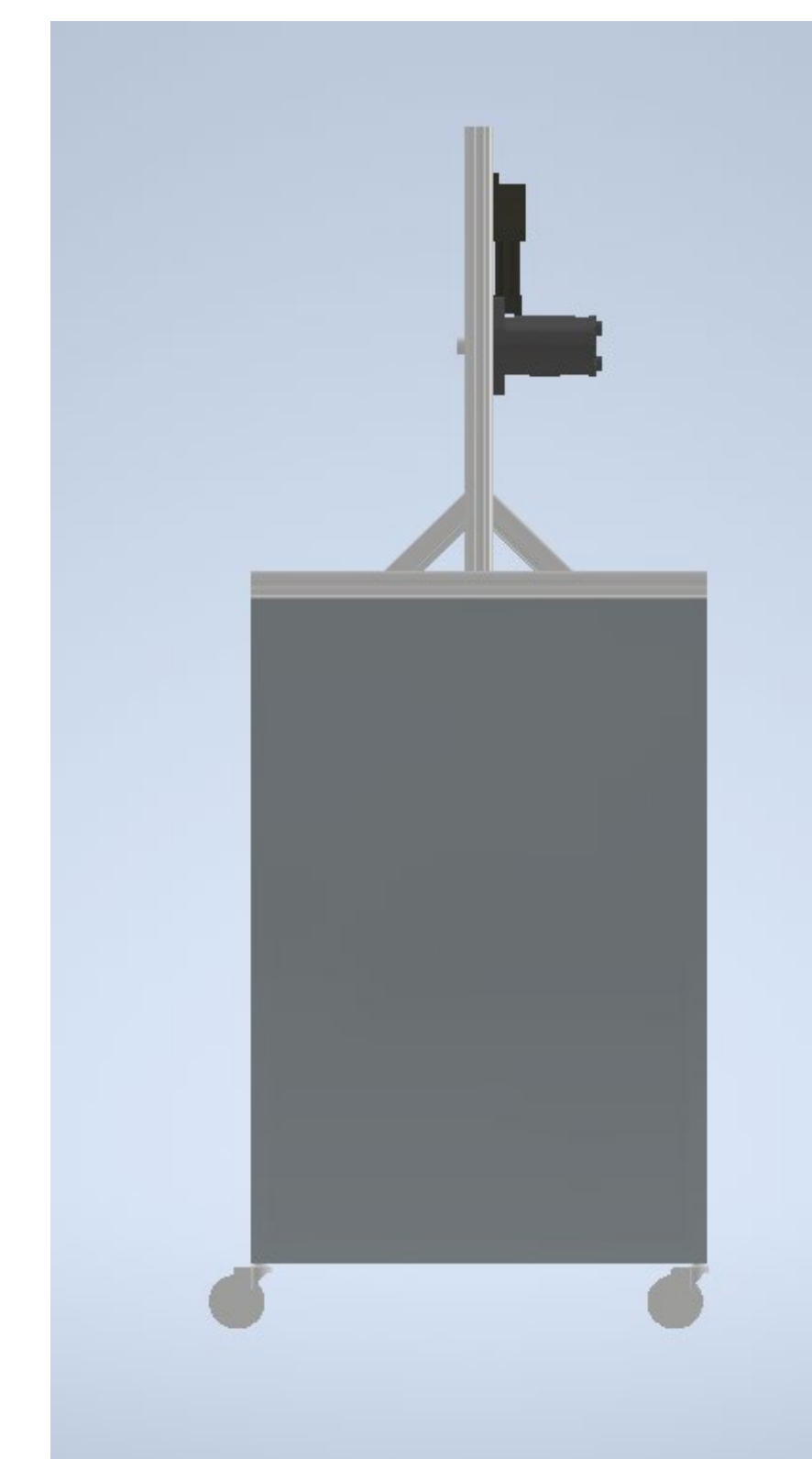
- Hydraulic Trainer Breakout Board
 - This design incorporated a separate board that would hold a 2-way directional valve as well as two extra hydraulic cylinders
 - This board would be an extension to the existing trainers, allowing for more lab variety to be accessible and available to be performed.



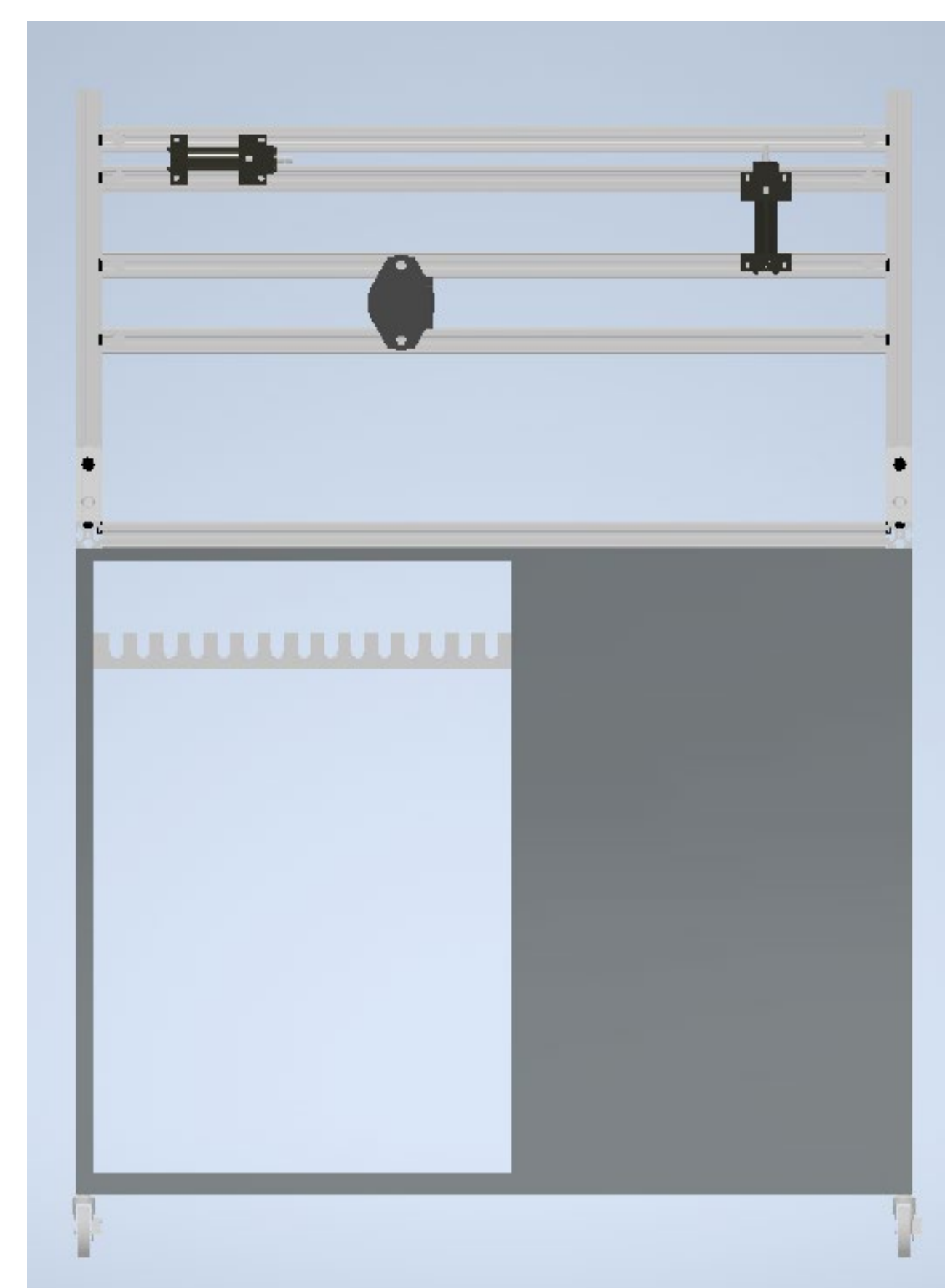
Final Design



- Lower section of 80/20 used to attach directional valves and manifold



- Updated board attaches to the top of existing trainer table



- Extra space left for additional 80/20 bars to accommodate extra modules

Results

- The project was rescoped late into the semester to build a separate breakout board. The design was made and a list of parts were made, but with the time remaining the team designed a full board addition.
- Research was done to find a more adequate quick – connect fitting for the hoses to hook up to the implements. This fitting is called a Flat Face Quick - Connect
- Project is left with the intent of a future group finishing and revising the team's ideas.

Summary

- There were many challenges throughout the capstone on whether which design the team wanted to go with. The team was able to view the trainers and throughout the capstone the team wanted to go with the 80/20 aluminum bars. The team wanted to implement a way for valves to be easily installed. The Final design of the new Hydraulic trainer is better organized and easily attachable for new valves .

Team & Acknowledgements

- Jeremy Chastain,(ME) Dolan Funderburk(ET), Drew Robbins(ET), Kevin Thenbouapha(ET), David Maddox(ET)

- Project sponsor: Dr. Nelson Granda
- Project assisted by Dr. Nelson Granda and Brett Banther