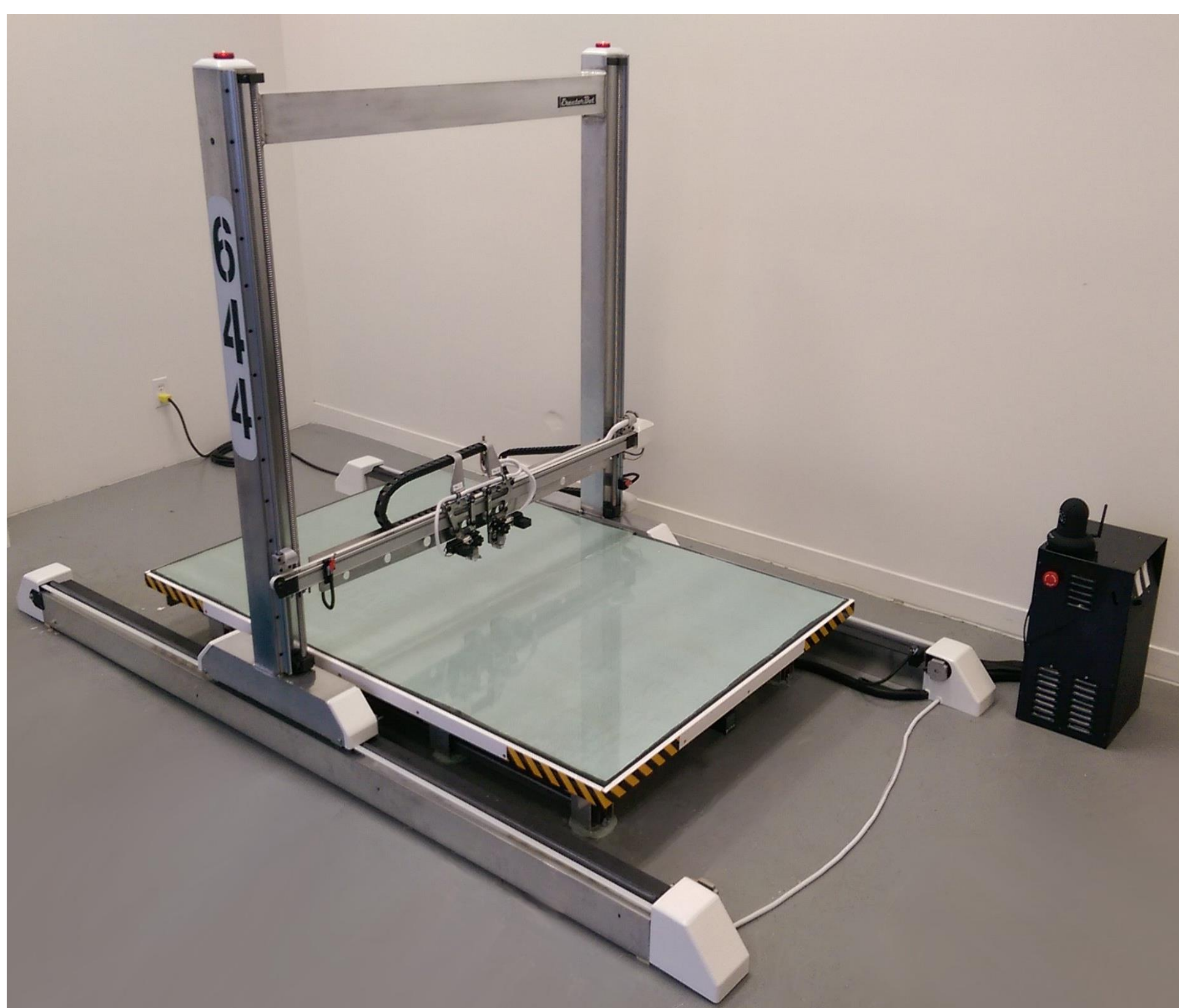


Purpose

The Ingram Hall Makerspace owns a retired, large format 3D printer. Its components and control system are outdated, but the rigid motion system can be utilized and expanded upon. This team is tasked with refurbishing this machine and completing the groundwork for an easy-to-use **universal CNC platform** to advance Texas State's engineering graduate research programs.



Core Goals

Successfully restoring this printer will have the following impacts:

- Recovery of a \$20,000 piece of equipment
- Platform for graduate students to perform advanced research
- Understanding the foundations of a CNC platform
- Optimization of the machine will allow students to create future projects on linear 3-axis systems

Design Features & Processes

Electrical Box
Organized and simplified wire connections. Created compact, weatherproof casing.

Electrical Components
The main-board and stepper drivers were upgraded to match machine requirements

Firmware
Updated firmware, MARLIN to better accommodate components.



Previous state of the control box (left).

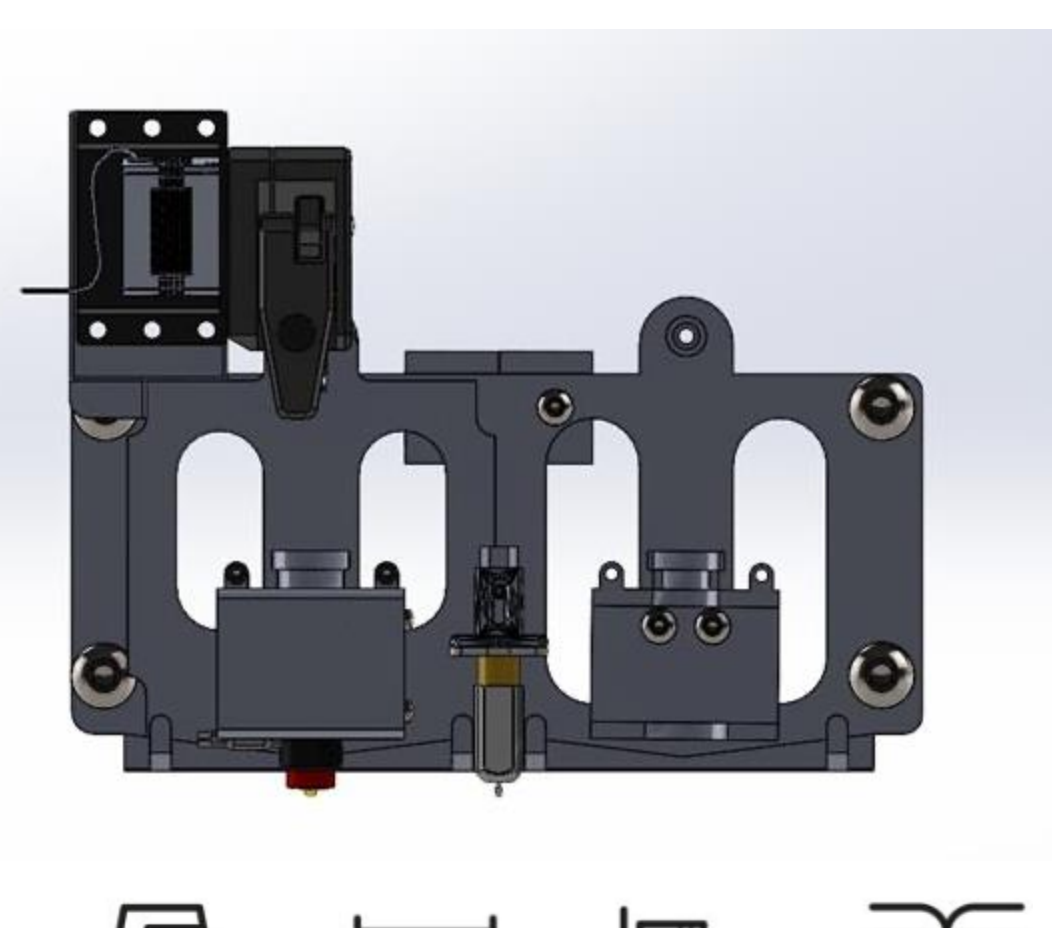
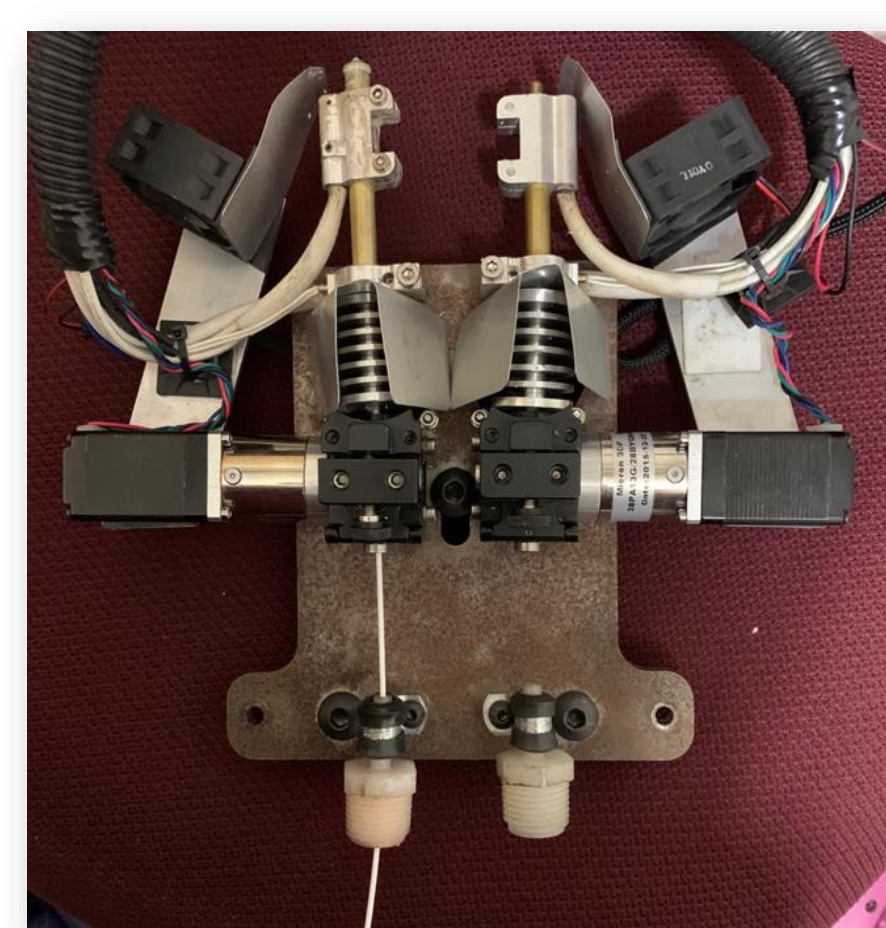


Current state of electrical box (right).

Tool Fixturing

Designed mounting system to be more flexible, updated extruder motor and heating elements, and rewired connections.

This is an example of how the system can facilitate versatile toolheads

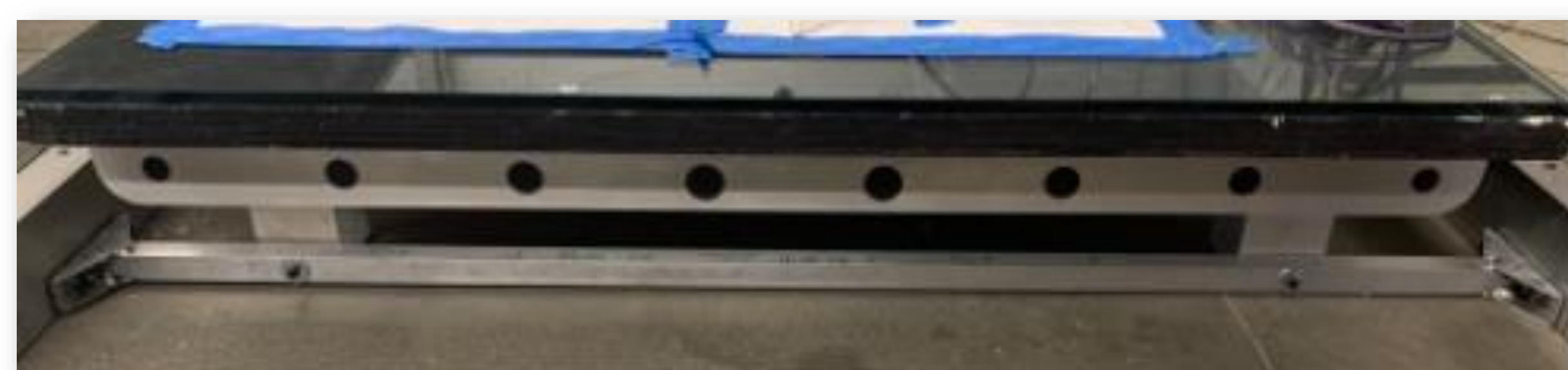


Former extruder set up (left) and the redesigned extruder mounting system (right)

Bed Alignment & Rail Attachment

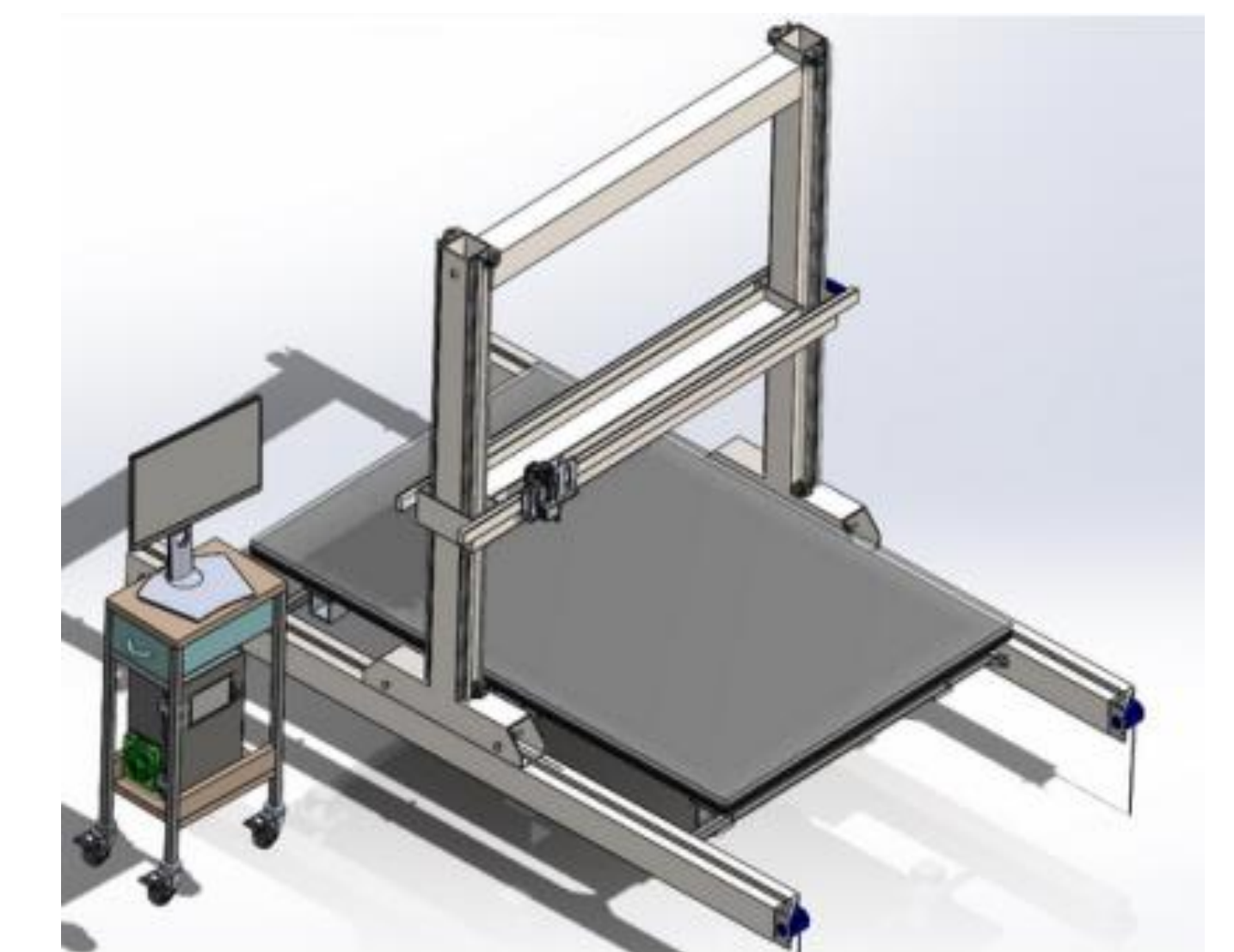
Adding a bracket not only attaches the bed to the rails, but also squares/aligns the bed. By providing rigidity, this platform can withstand industrial applications.

Bed and Rail Bracket



Conclusion

The creation of the standard operating procedure will help create a safe guideline for using the printer and allow future users to understand the equipment.



Future Projects

- F-SAE Team
 - Nose Cone Printing
 - Foam Cutting
- Materials Research
 - Magnetic Deposition
 - High Temp. Extrusion

Team Members



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