

M01.04 – 31 Degrees

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Sponsor Information



- 31 Degrees supports events such as the Louisiana State Fair, the Fort Worth Livestock Show & Rodeo, AT&T Stadium (Dallas Cowboys), Schlitterbahn, Typhoon Texas, FC Dallas, and various music and margarita festivals.
- They have 300+ dispensing machines in their fleet.

Problems with Current Process



Several problems must be addressed:

1. Operators do not know how much product is in the supply tank at each dispensing machine, leading to machines running dry before they are reloaded.
2. Operators do not know which tanks need to be refilled, or the priority of re-filling each tank.
3. Companies have little visibility as to whether cash register receipts correspond to the amount of product dispensed.

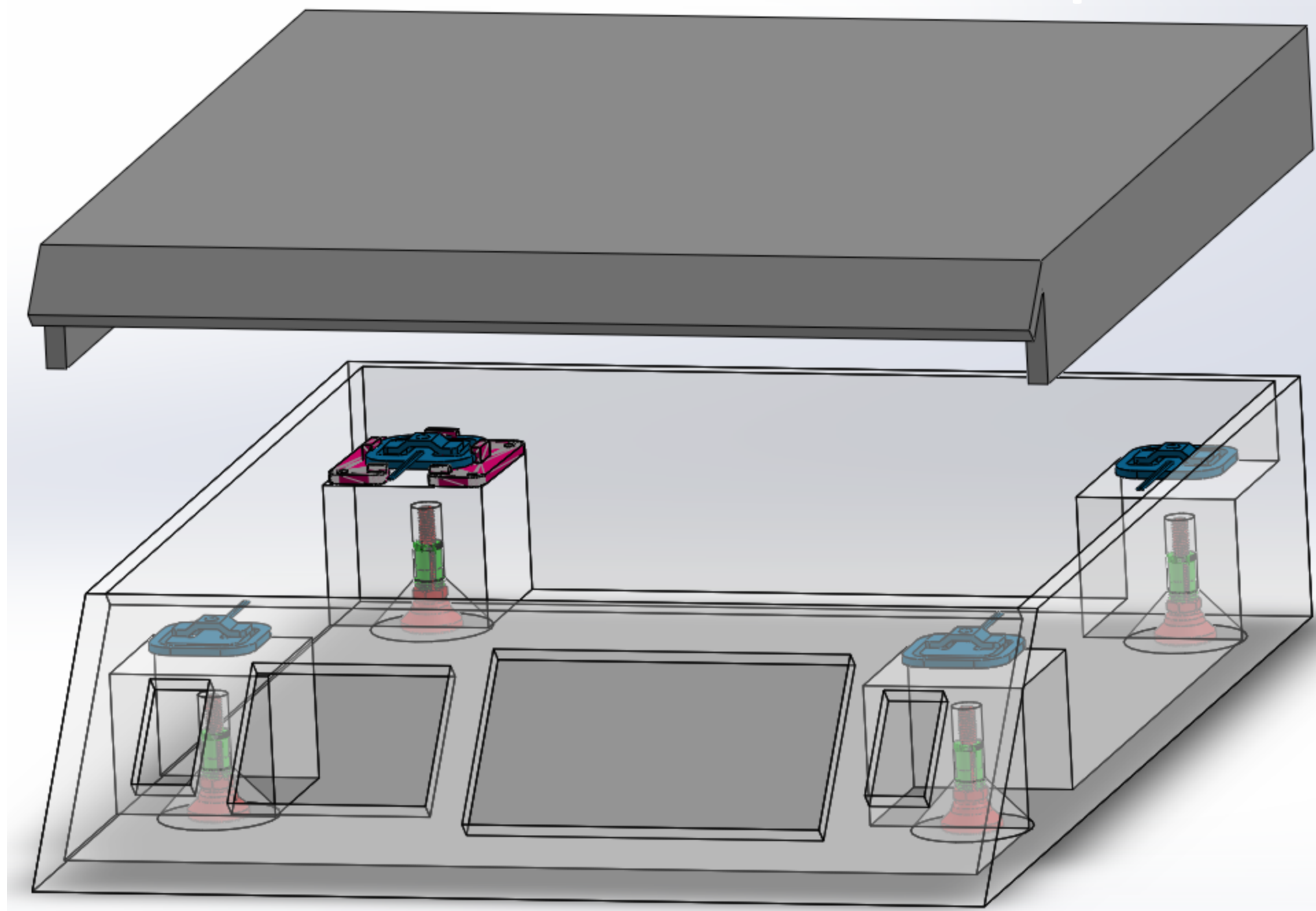
Project Objective

Design, prototype, and fabricate an enclosure to house the weight scale circuitry designed by EE sub-team, accounting for:

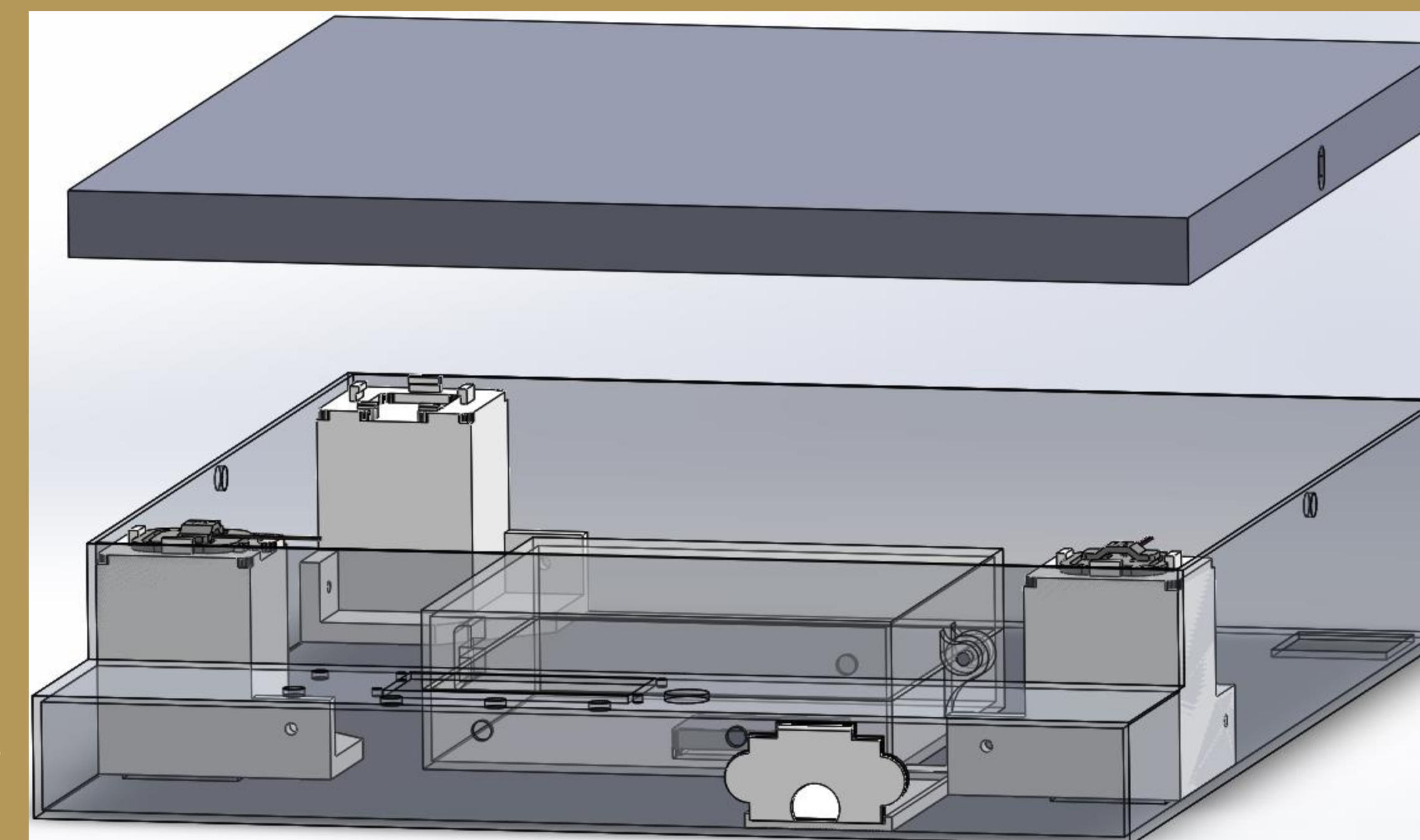
- A. The interface to several types and sizes of storage tanks.
 - B. Visual access to a digital display(s).
 - C. Access to replace batteries.
 - D. Provide for stability on uneven surfaces.
 - E. Provide access to connect a quick-disconnect temperature probe. (Stretch Goal)
- Design, prototype, and fabricate brackets to support fastening various electronic components, including load cells, within the enclosure/housing

Design

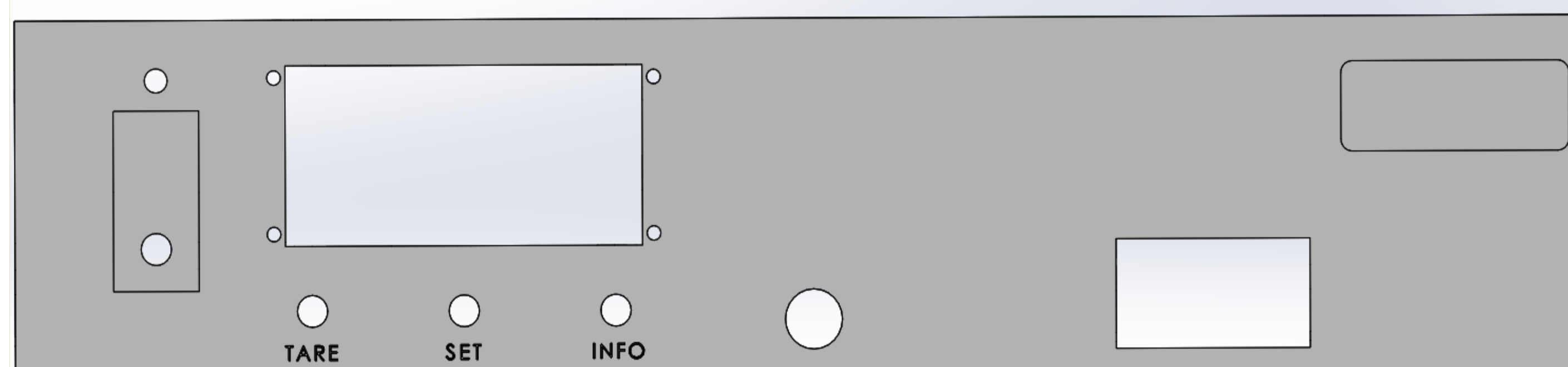
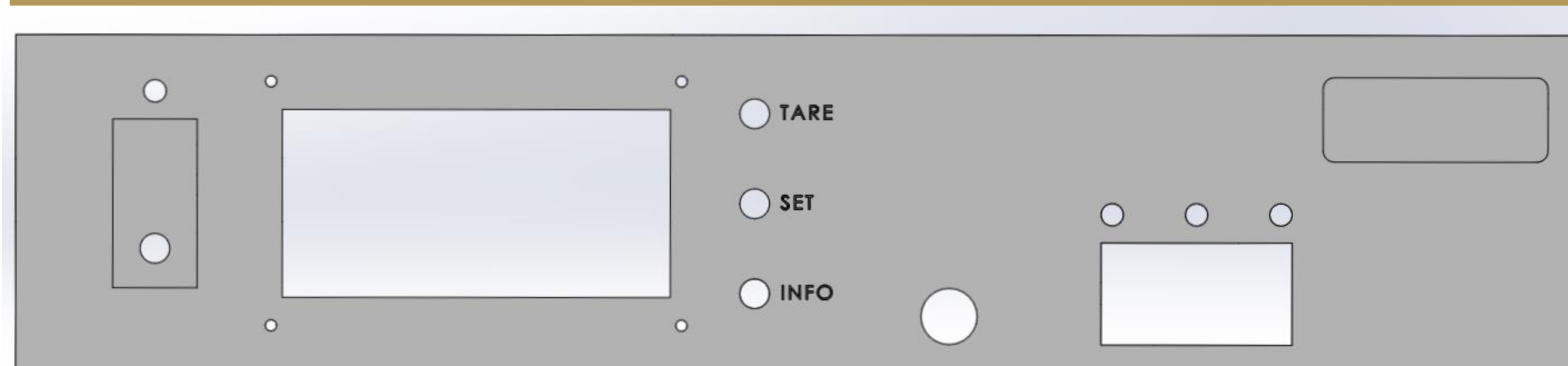
The Manufacturing Sub-Team will design and fabricate two enclosures. For the three vertical tanks, our enclosure will have dimensions of 14x17x3 inches. For the two horizontal tanks, an extra 10 inches in depth is needed, resulting in 14x27x3 inches.



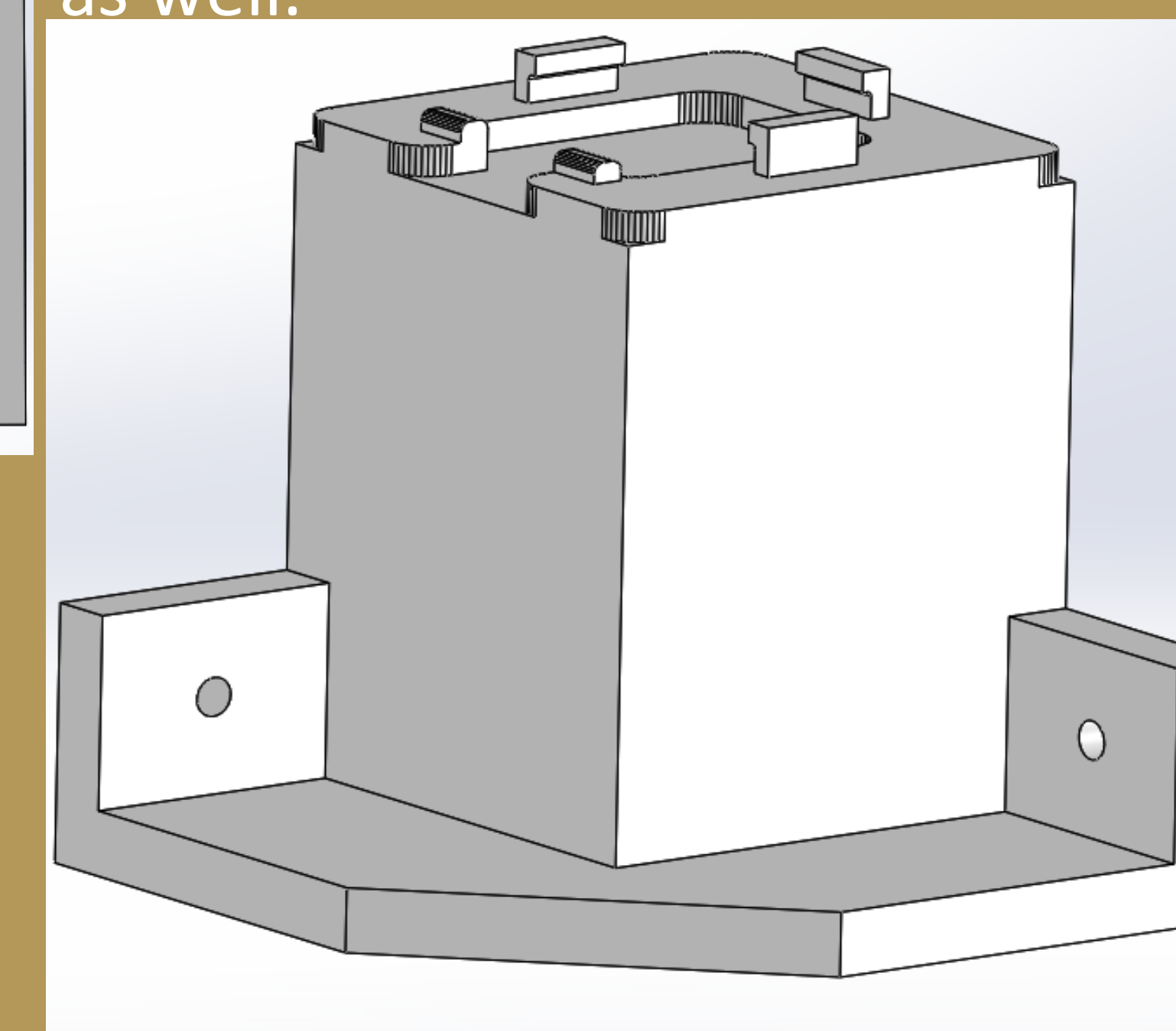
The Austin Design (pictured left) was our third design, with the initial idea to 3D print the enclosure out of plastic. This design has a front panel that is at a 45-degree angle, ergonomically designed for easier visibility. The lid would be attached by a hinge, for easy accessibility.



The D4 Design (pictured right) is our fourth and most recent design. Our goal is to make it out of 0.090" Aluminum. The front panel is facing up, so the user can see the display from a higher perspective. The lid for this design is a "floating" lid concept, and our goal is the inside of the enclosure needs to be rarely accessible.

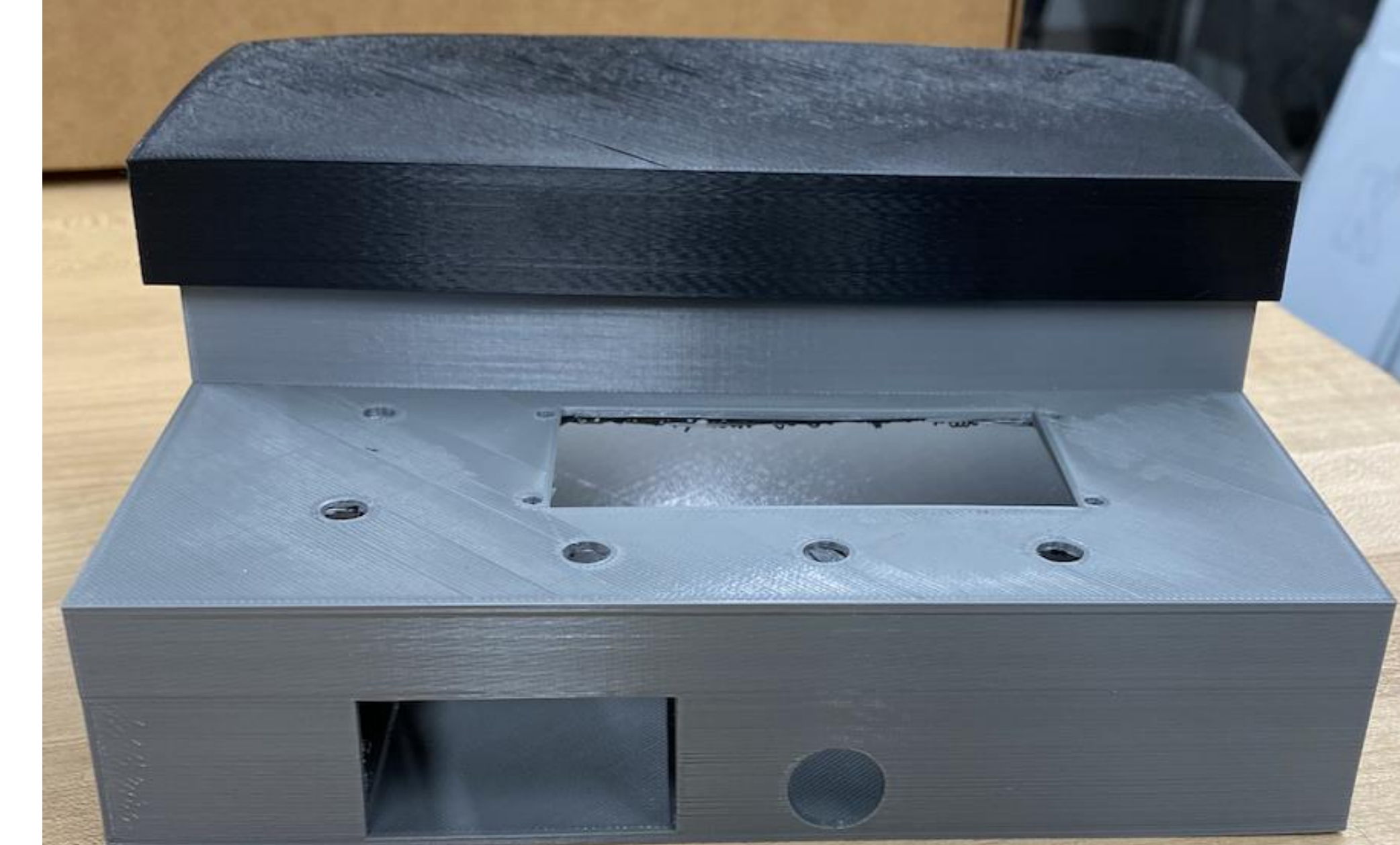


Pictured to the right is a stand that the load cells will be fastened onto. Each stand will be in each corner of the enclosure. The stands have brackets integrated into the top of them for the load cells to sit in. All of the weight from the top lid and product tank will sit on these load cell stands, so material selection for this part is extremely important.

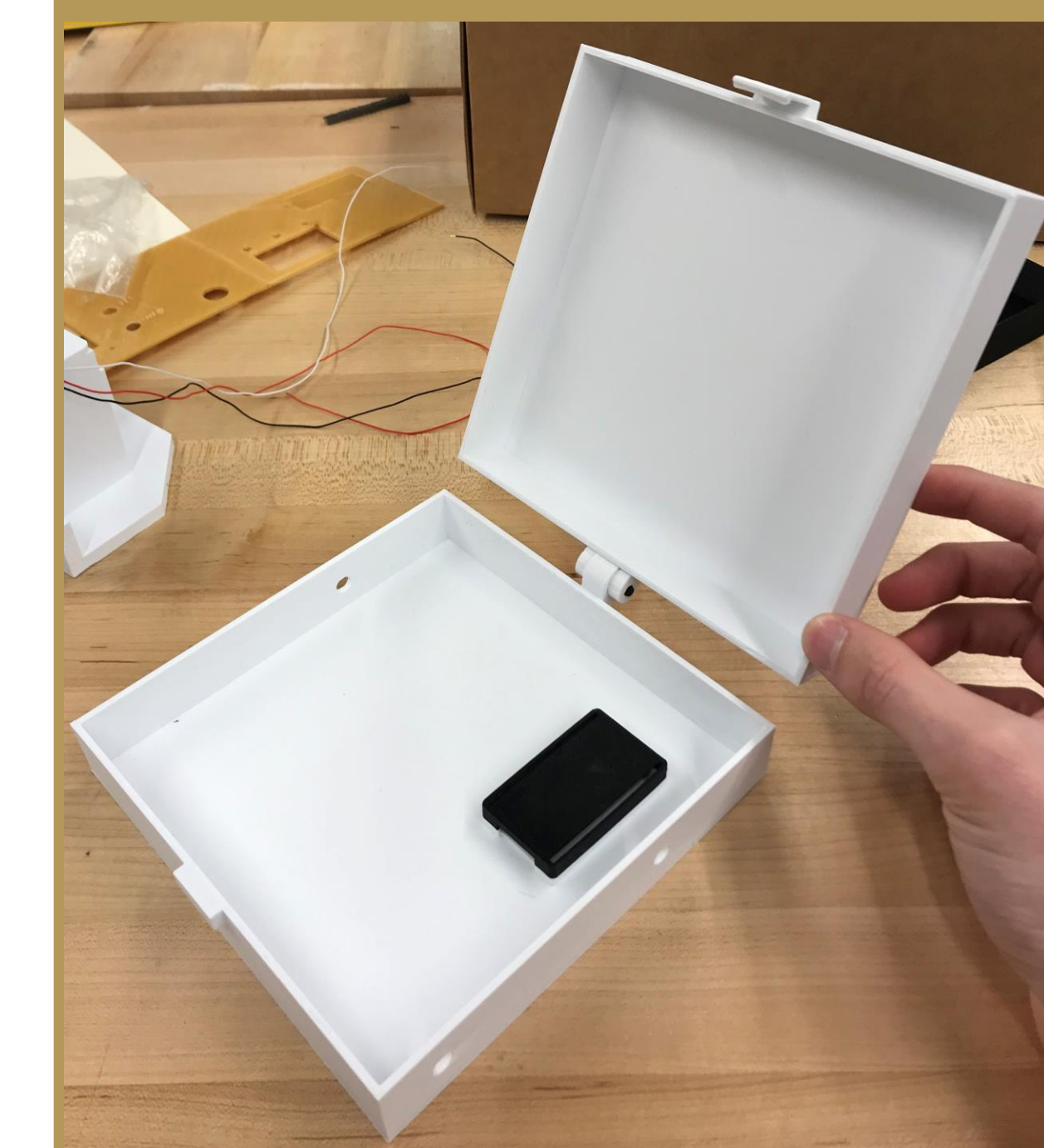


Pictured to the left are two front panels, one for each screen that the EE's might use. Both have ports for a toggle switch, a display screen, operational pushbuttons, an antenna, battery housing, and a low power light indicator. IE's barcode will appear on this facing as well.

Current Prototypes



We were able to print off a scaled prototype of our D4 design, so that the EE team could see our design physically and see how their parts would fit in the enclosure.



Pictured left is an internal housing for many electrical components. This will house four to six parts. Our team has locations for all parts and three fasteners are completed.

Prototypes that have been 3D printed, but not pictured include the load cell stands, Battery compartment and lid, and the front panel for the first display screen.

Future Work

Our team will open next semester with a full-scale sheet metal Aluminum prototype next semester. The Electrical Engineering Sub-Team will confirm all components before September so our team can then start fall design review, and ultimately begin the fabrication process.