

# Team 5: Freshman Lab Hardware Sorting and Vending Machine

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## Background and Objective

- Students take too many parts from open containers and often neglect to return unused parts in the lab.
- The project goal is to reduce waste and clean up the lab by preventing students from taking excessive amounts of hardware and incentivize students to return unused hardware by awarding credits to obtain more hardware.
- A senior project group attempted the project last year, their design and build may be reused as much or as little as is seen fit.

## Key Specifications

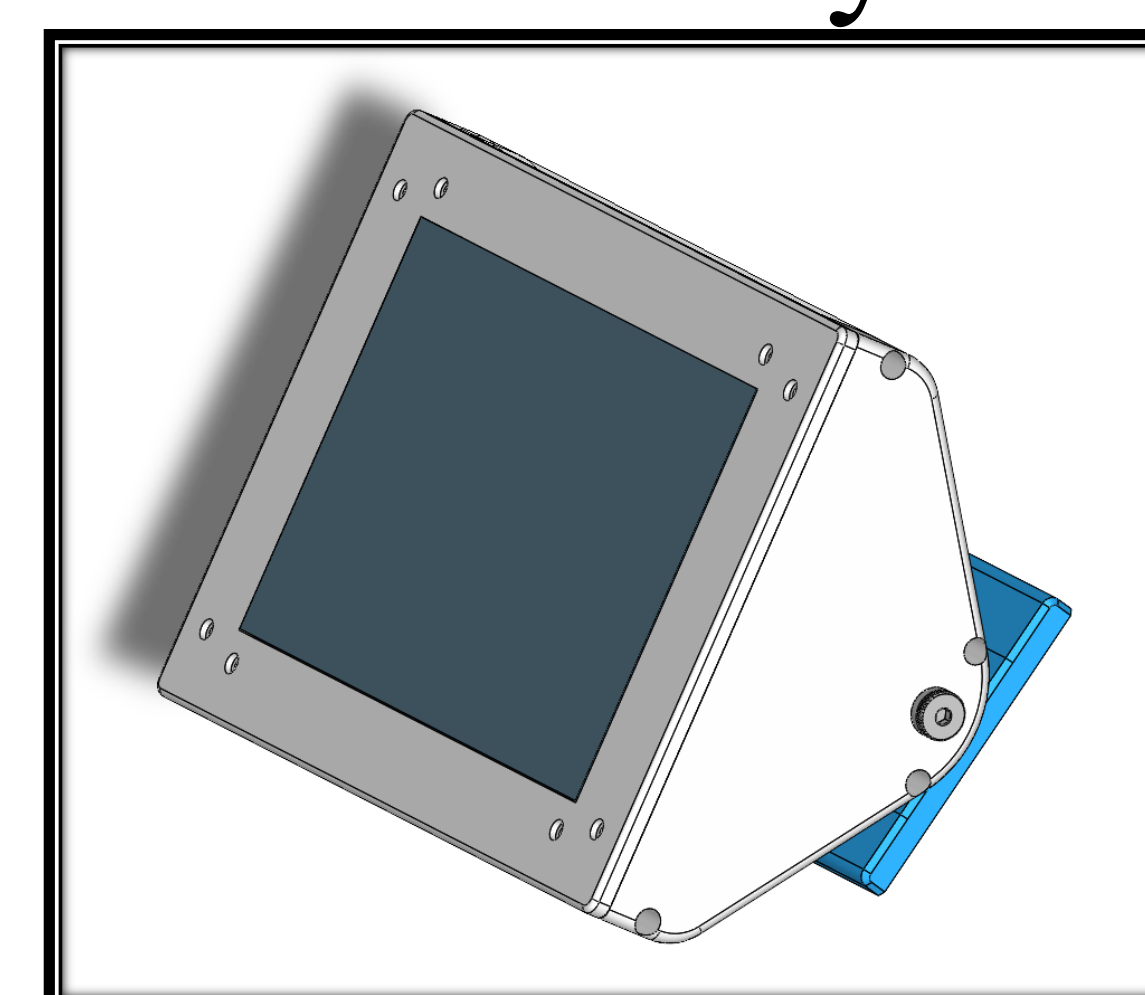
- Budget of 4,000 USD.
- Must not jam more than 1 in 1000 parts dispensed.
- The machine must store a minimum of 200 parts of each supported type.
- The machine must be ADA compliant.
- The machine must track the stocked part quantities.

## Design Approach

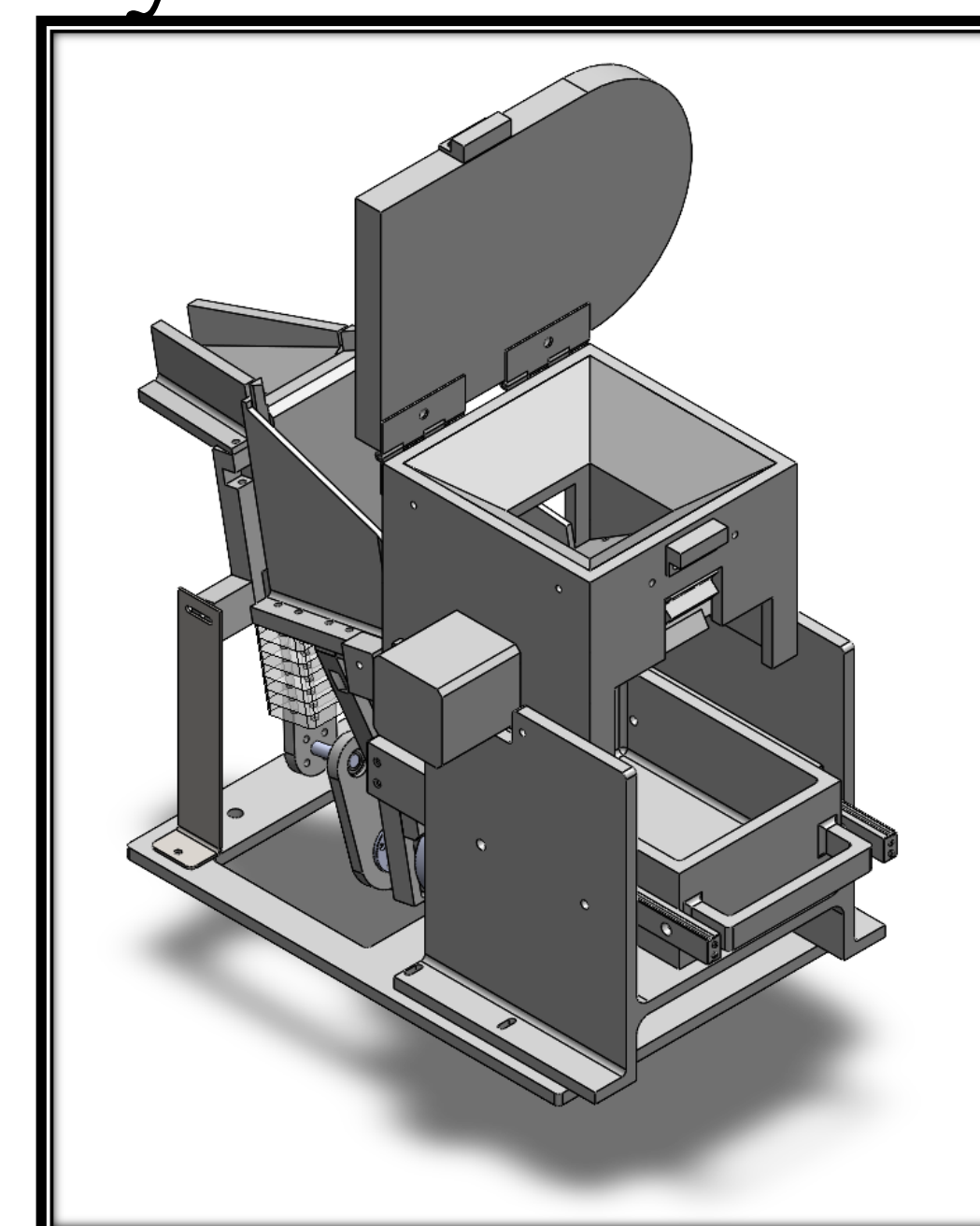
As the second iteration of the project, reusing and refining existing designs was prioritized over developing new designs, where possible.

The motivation is to produce a machine that works better than the existing machine, so improving fundamentally solid existing designs avoids having to re-invent the wheel.

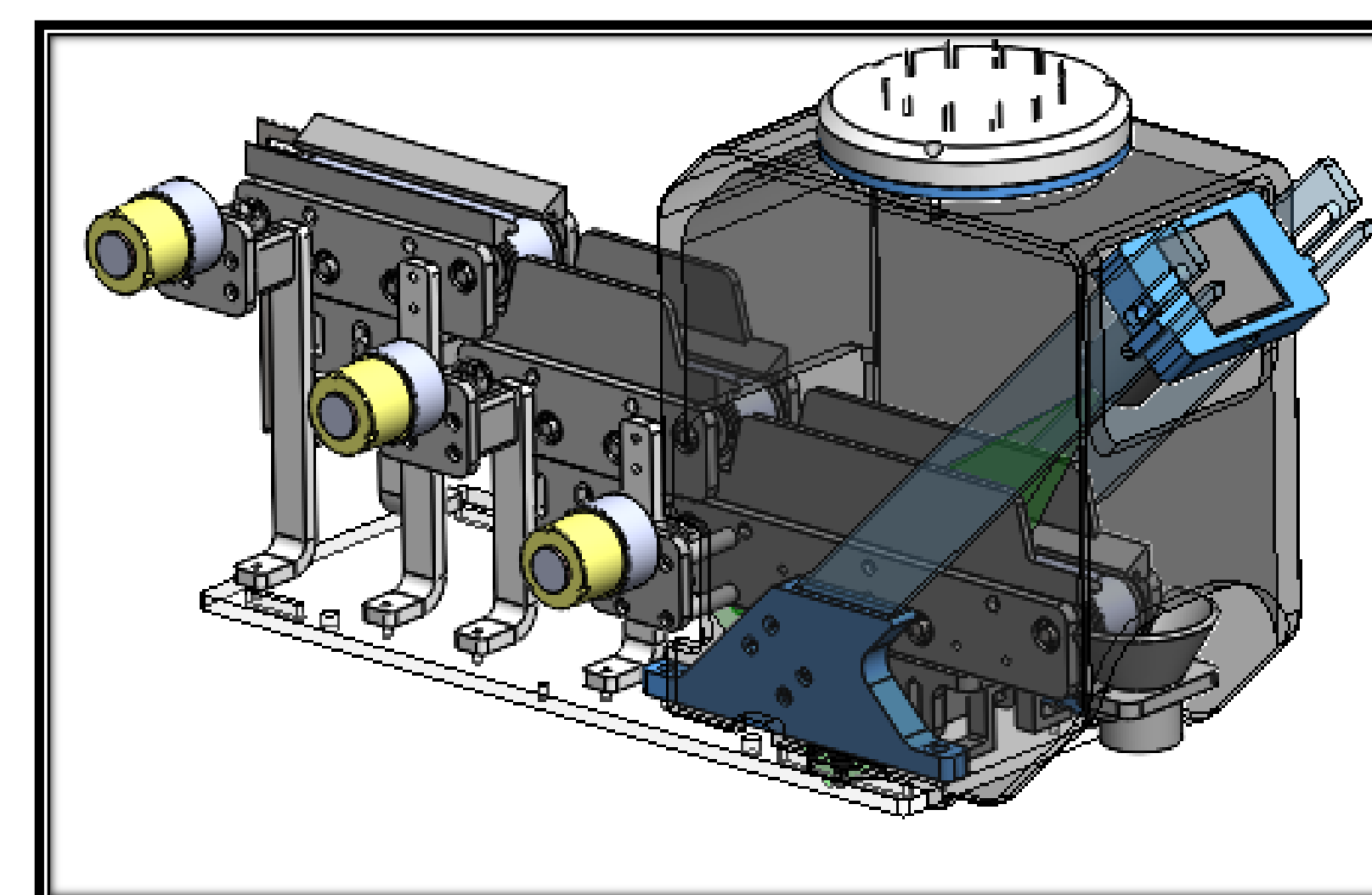
## Key Machine Subsystems



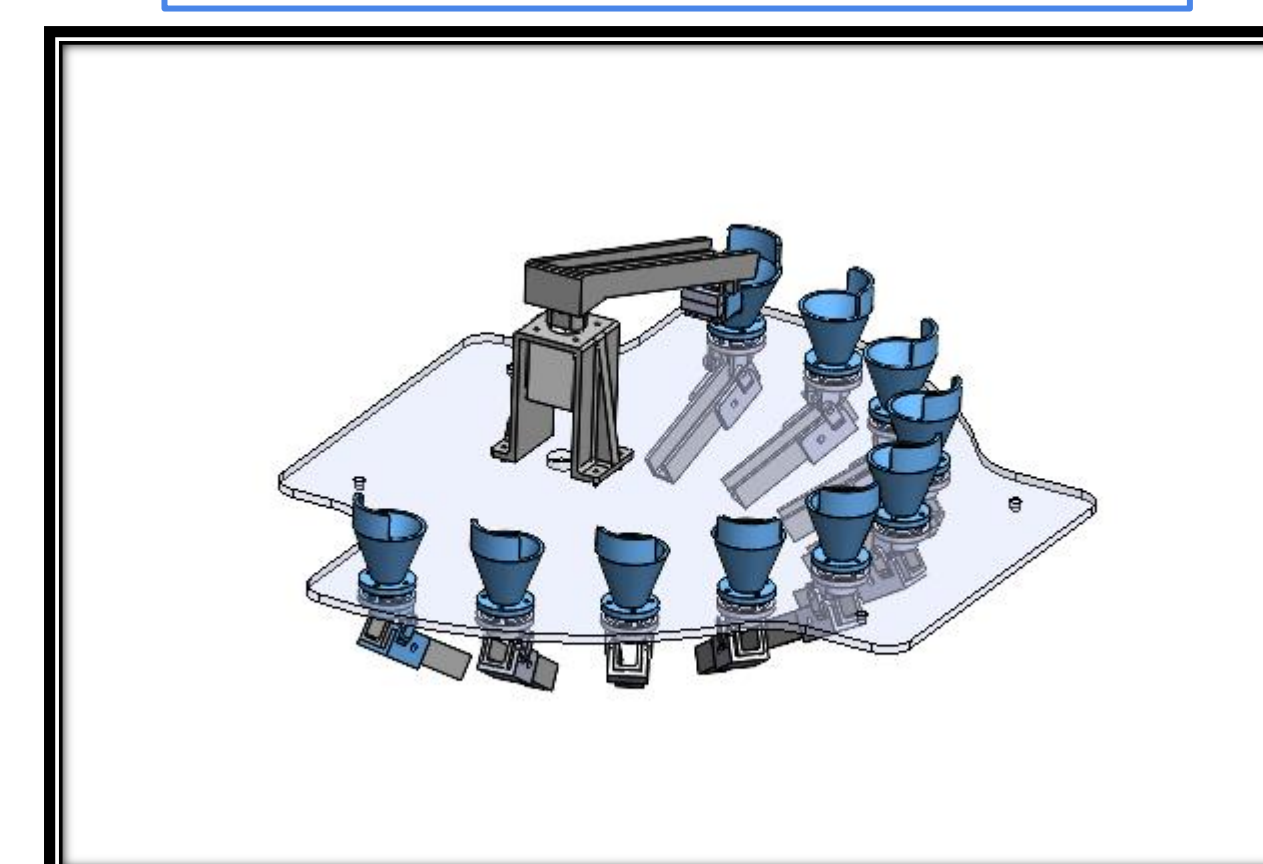
HMI Touchscreen



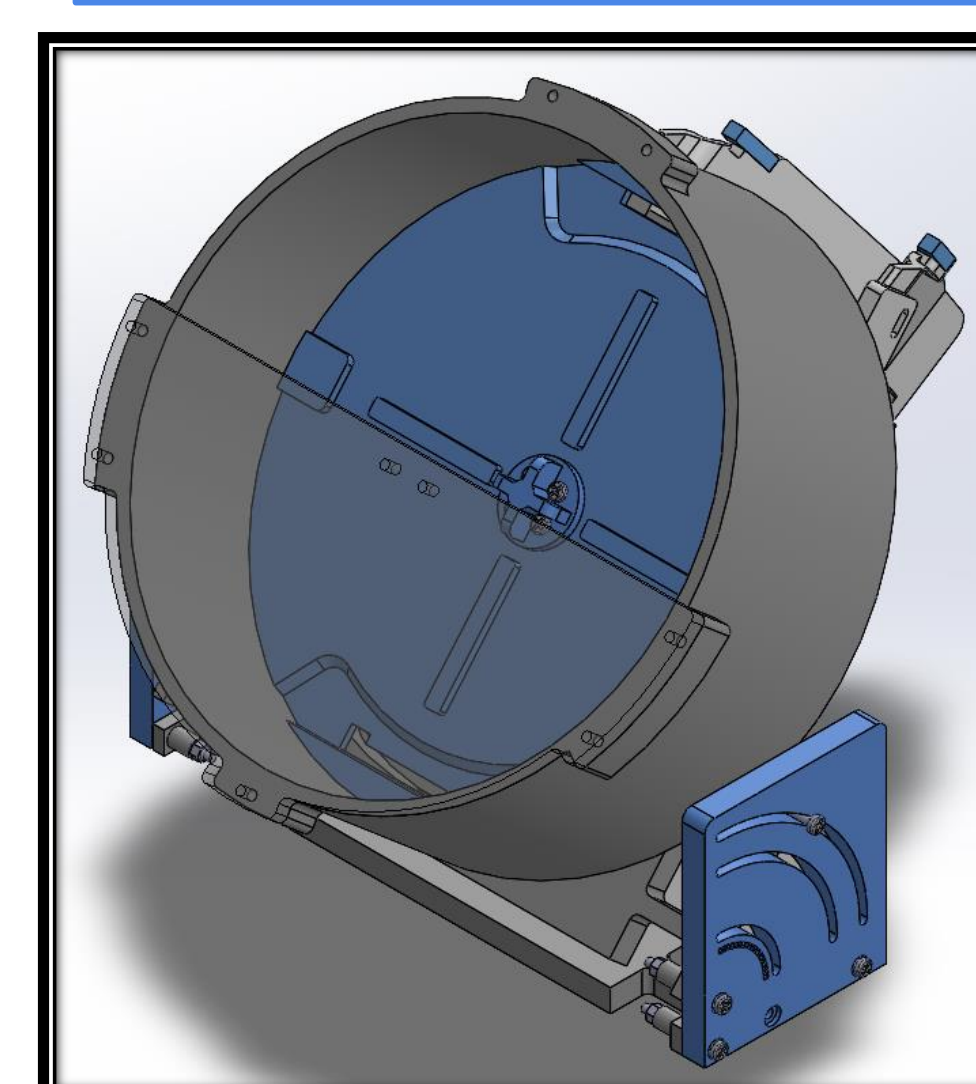
Machine Intake



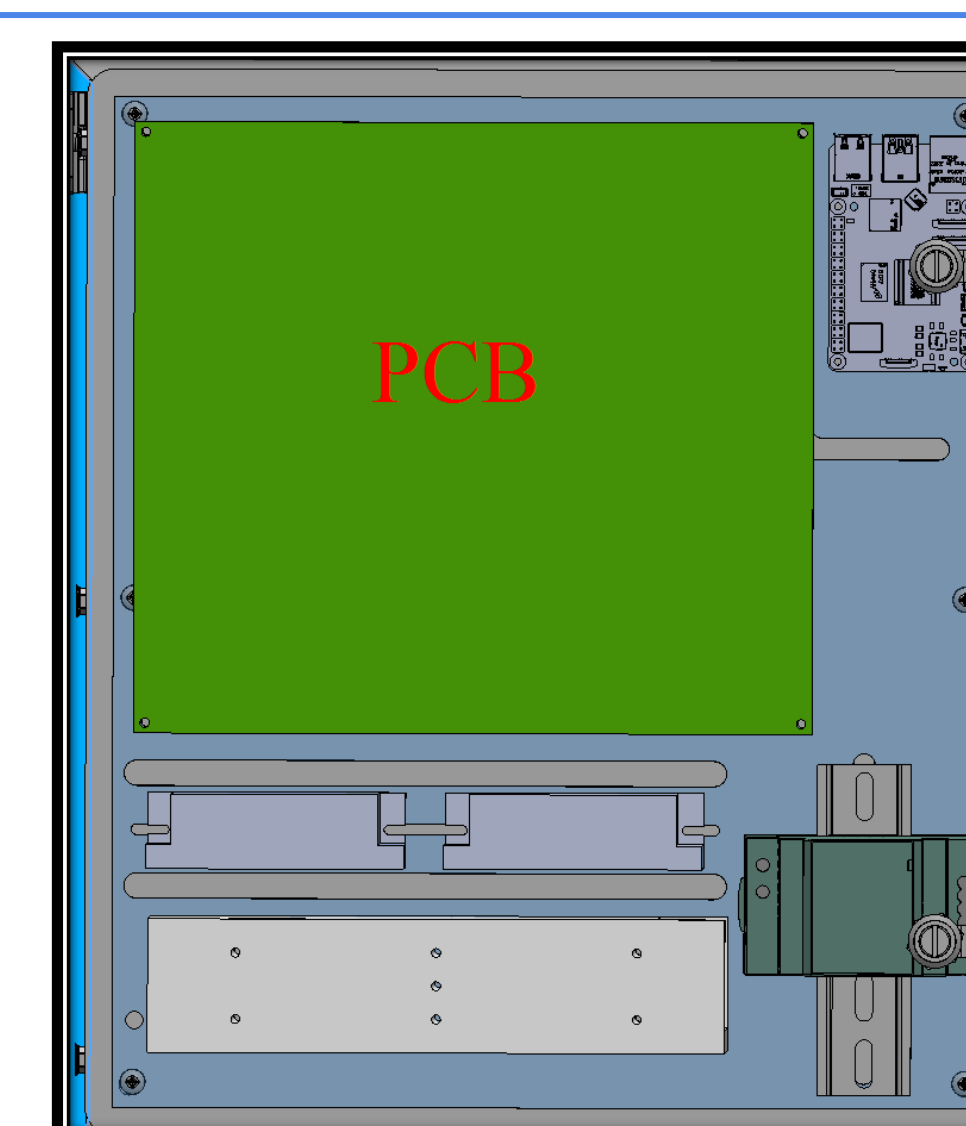
Camera to Identify Parts



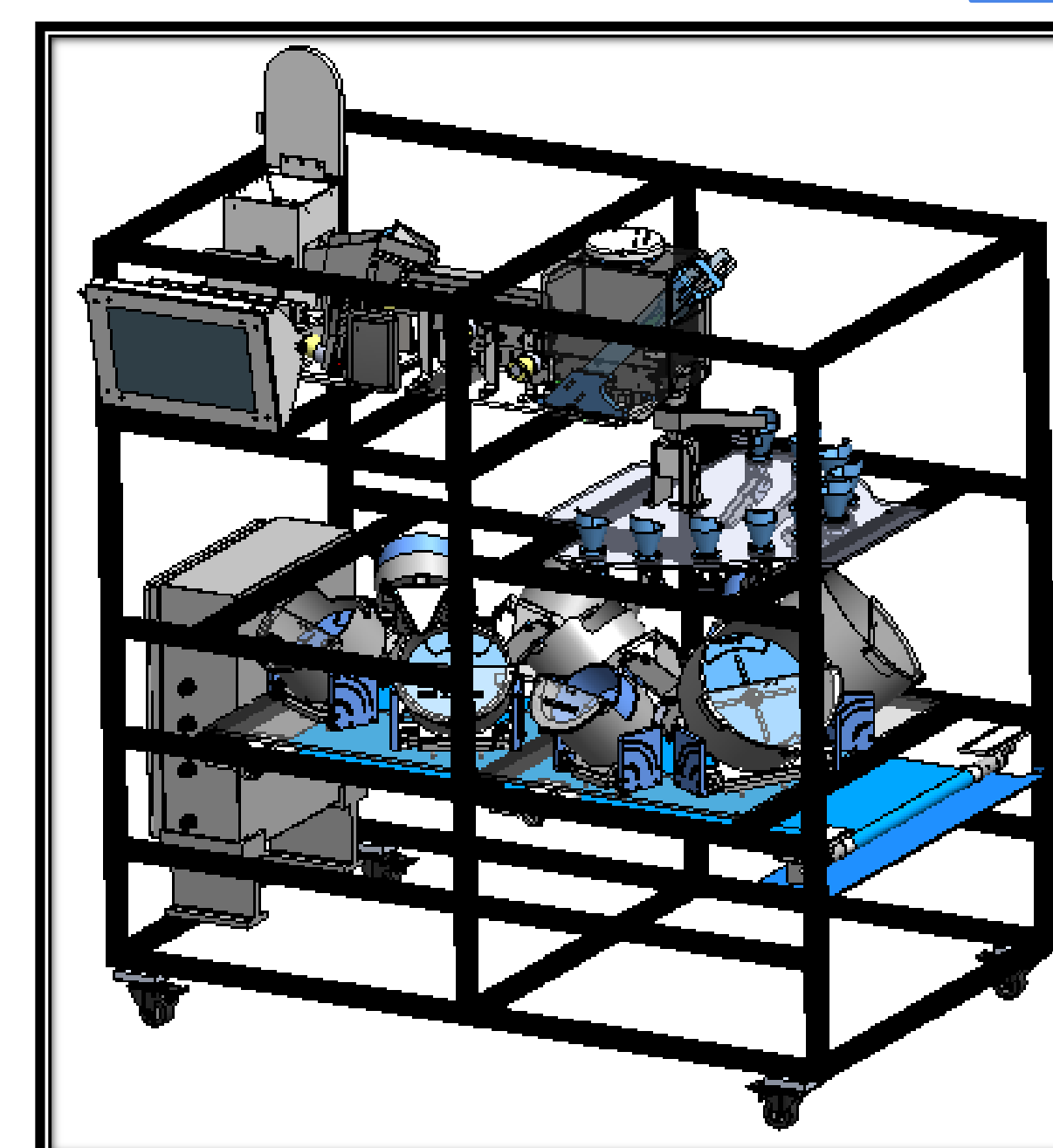
Sorting Clock



Dispensing Bin

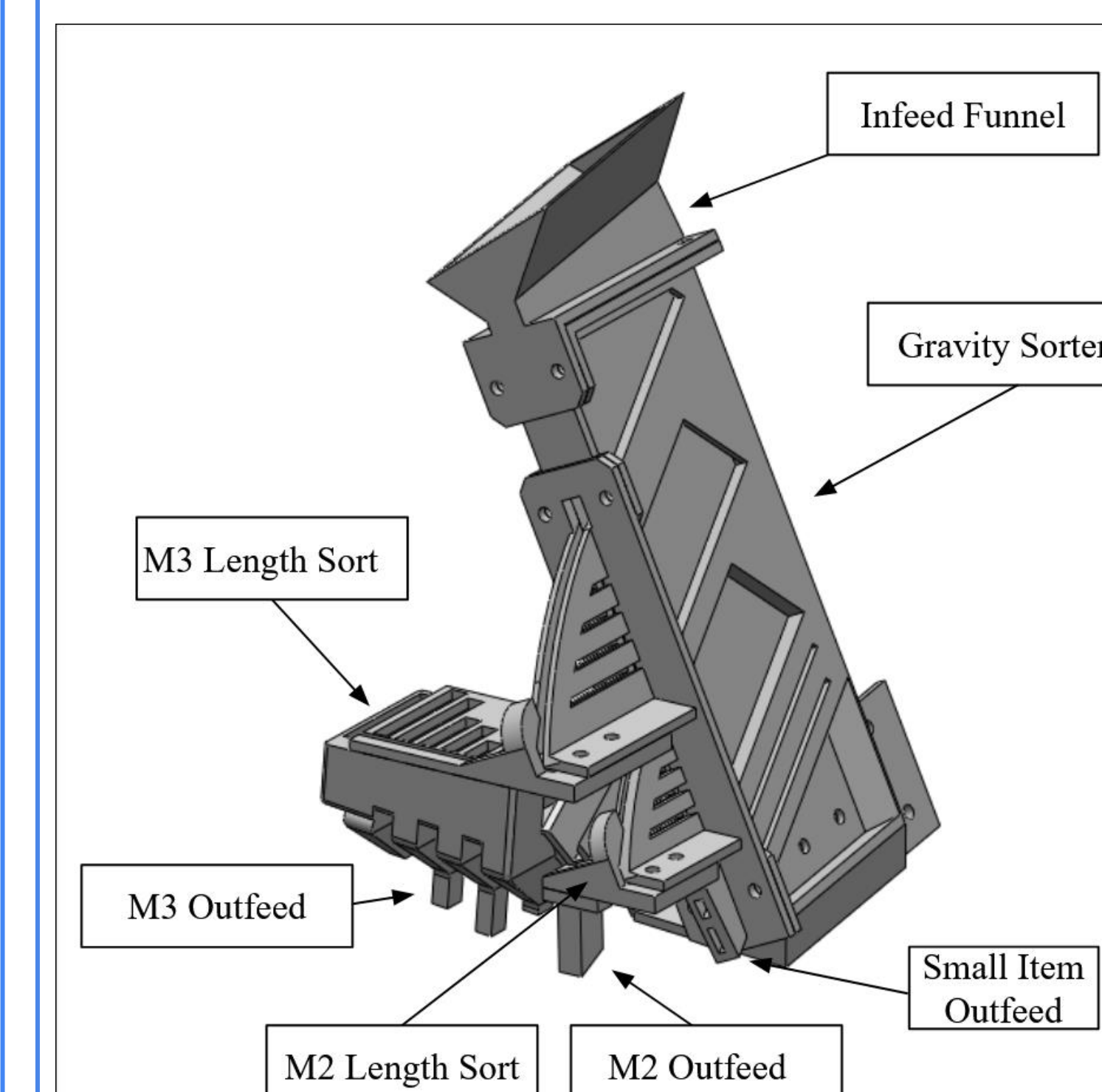


Electrical Panel

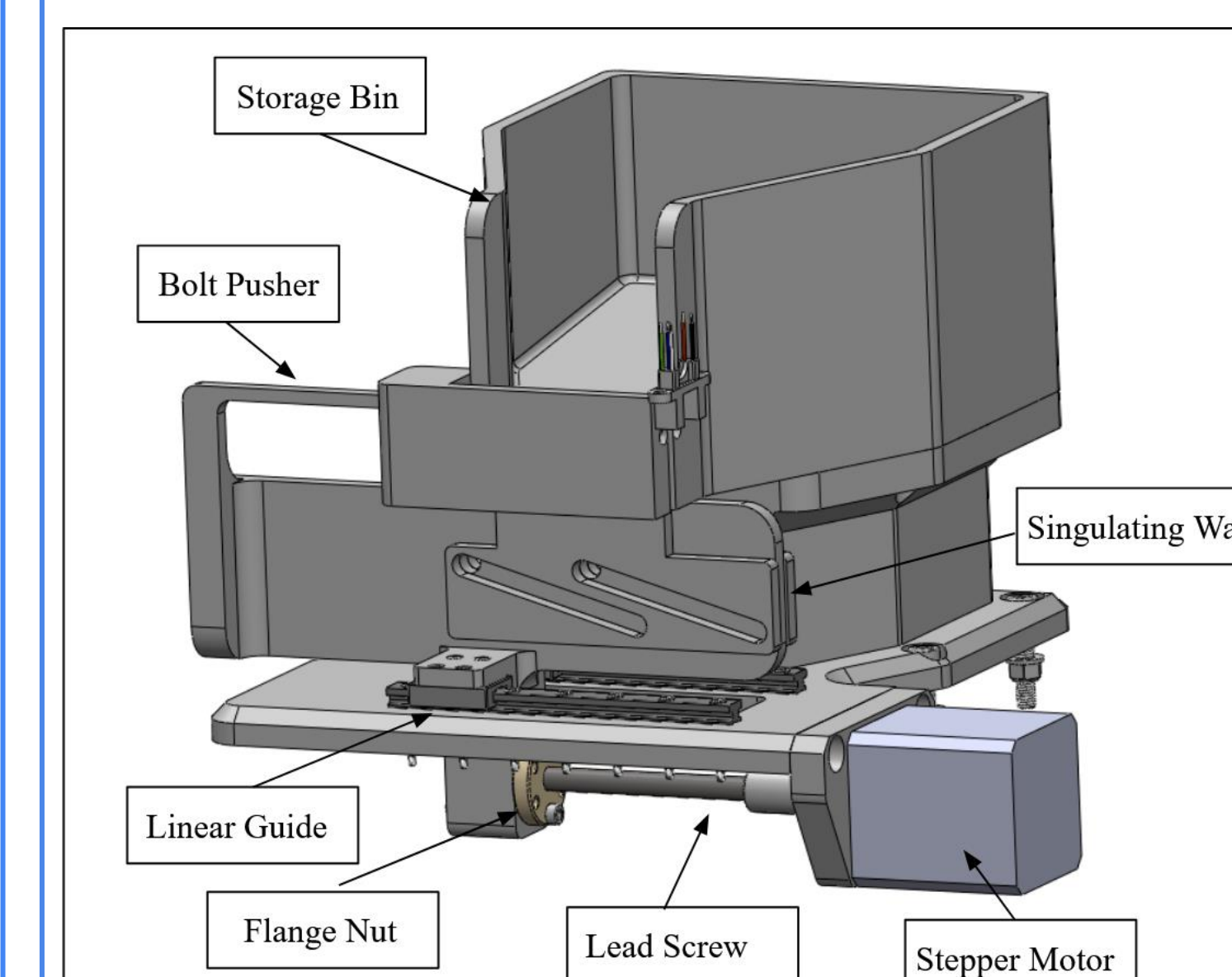


Full Machine

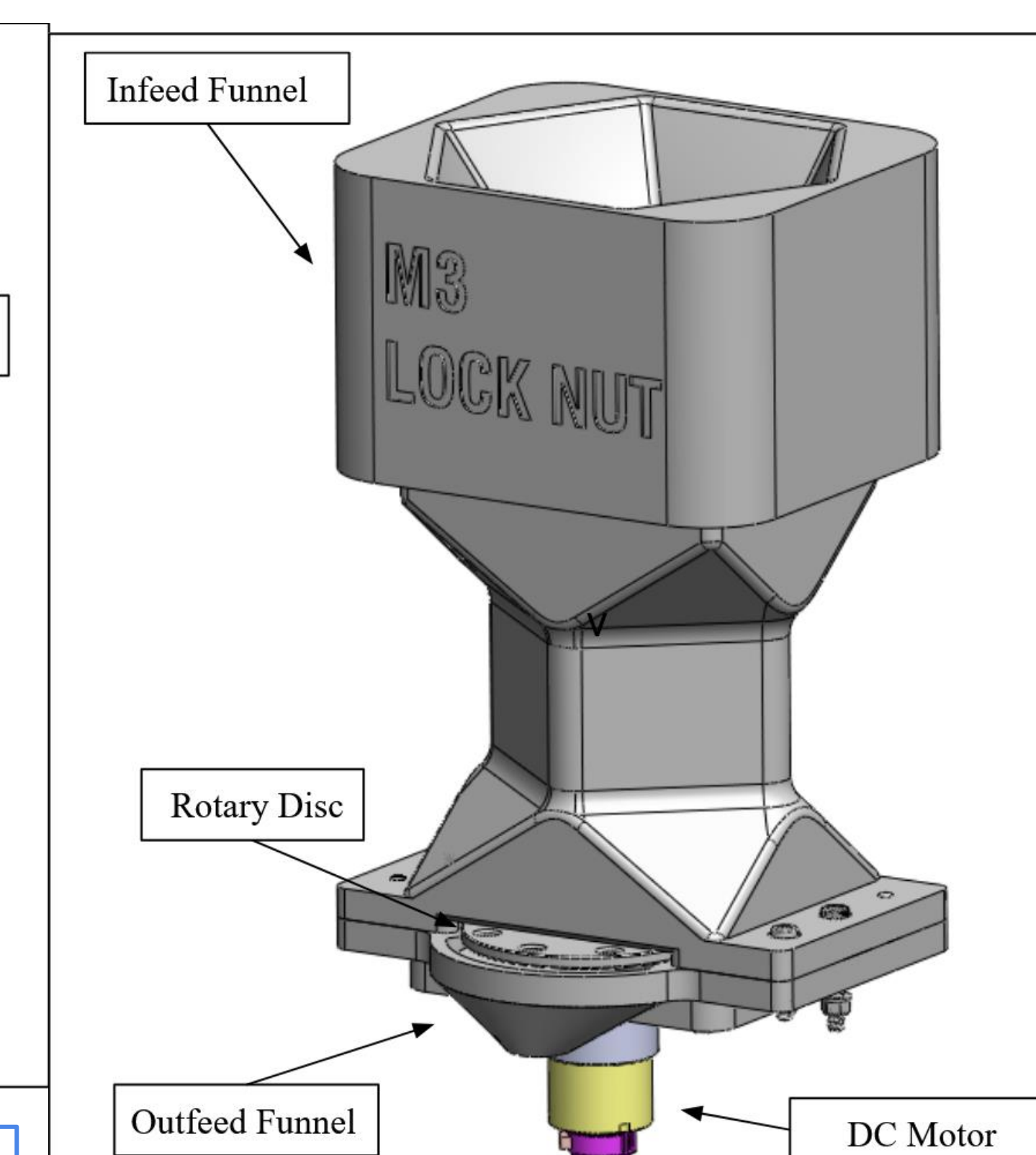
## Design Prototypes



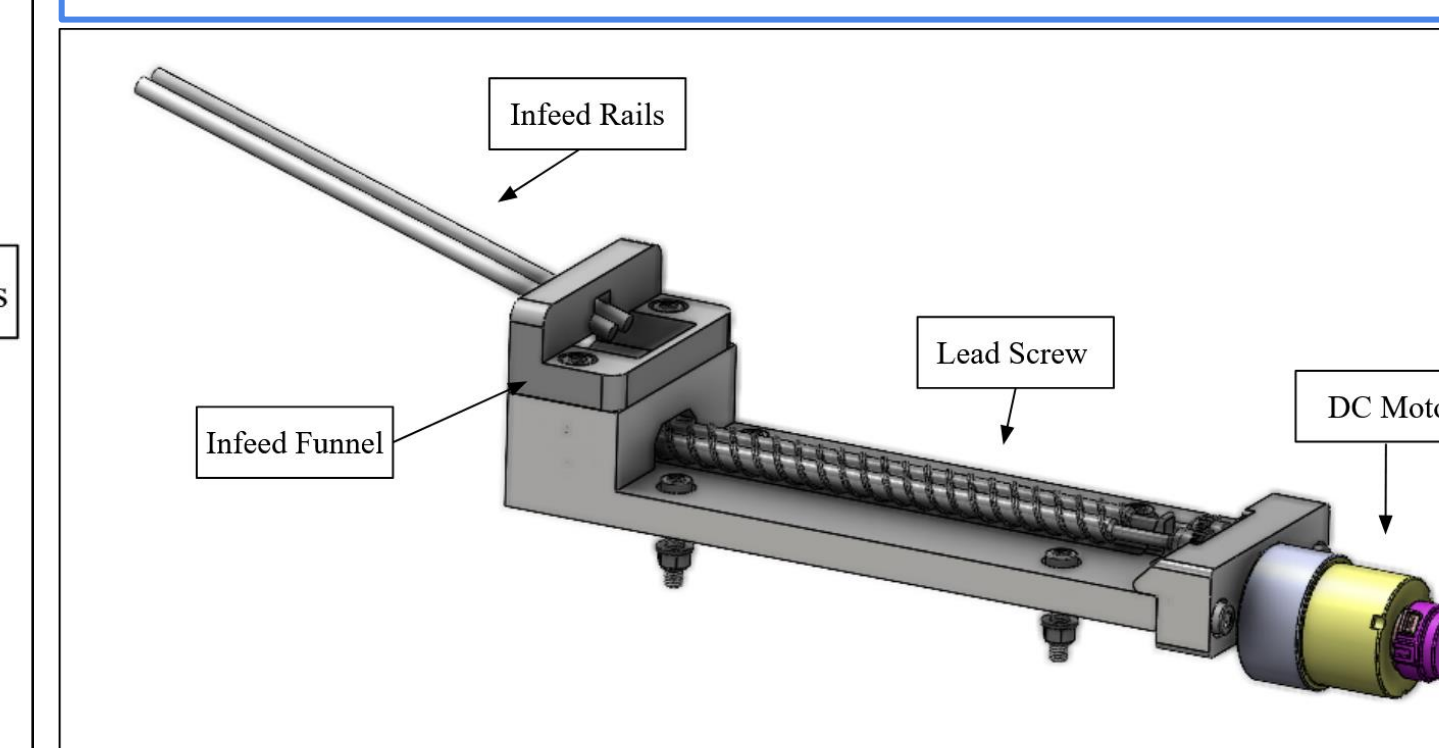
**Mechanical Sorter** – used multiple stages to separate and sort parts.



**Bolt Bin** – bolts are stored and dispensed from the bin, with a singulating stage on the output.



**Small Parts Dispensing Tower** – parts are staged in the funnel and inside tower and dispensed by a rotary disk at the bottom.



**Worm Drive Bolt Dispense** – final stage of bolt dispensing, fed from Bolt Bin – used to ensure only one bolt is dispensed at a time.

Special Thanks to:

Dr. Brakora – Faculty Advisor  
Dr. Hittepole – Sponsor