



Group M1.01 - Lighthouse Project

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Project Description

(Current)

Design and present a working automated system as a improved system to the current manual press system. The system will include employee as quality assurance operator (QA). We aim to improve cycle times and improve operator safety.

(Future)

Improve and optimize automation system. Standardized manufacturing process of system. Create employee training program to train QA role.

(Manufacturing Process)

This manufacturing process utilizes a pneumatic press to punch a hole into an EZ Cap intended to be used on a bendable pen. These pens are recommended to be used in areas where personal safety is a concern.

Background

The West Texas Lighthouse for the Blind has been impacting the community of San Angelo since 1963. Of which employs people who are blind or have severe vision impairment.

Design

Our project consists of distinct automation modules that all serve a different purpose. Start to End.

Counter/Dropper - Bulk unprocessed parts are dropped from the bucket rotating system in and are released into the vibratory feeder in batches of exact amounts.

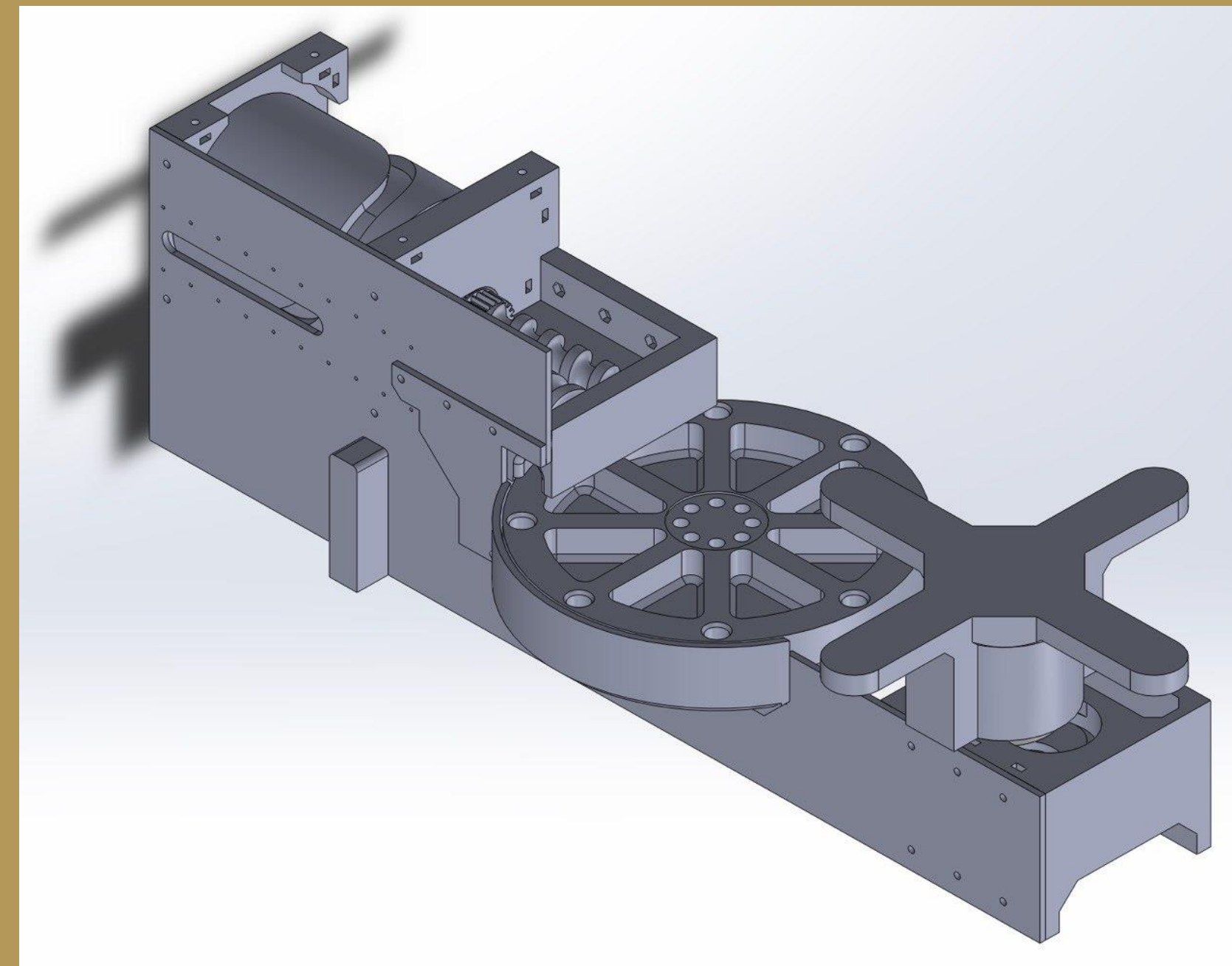
Vibratory Feeder – Uses electromagnetism to conduct vibratory movement to parts, moving them upstream in a linear-unoriented single file line.

Orientation System – The tower, grabs the parts and rotates them to correct orientation, then the indexer sets the parts into single positions, which sets them up for the press.

Pen Cap Press – Pneumatic press is utilized to punch a hole onto EZ Cap part.

(Future) Rail/Cartridge system – Parts are released out of the system in cartridges that operators will then QA parts from.

Digital Models of Prototype(s)

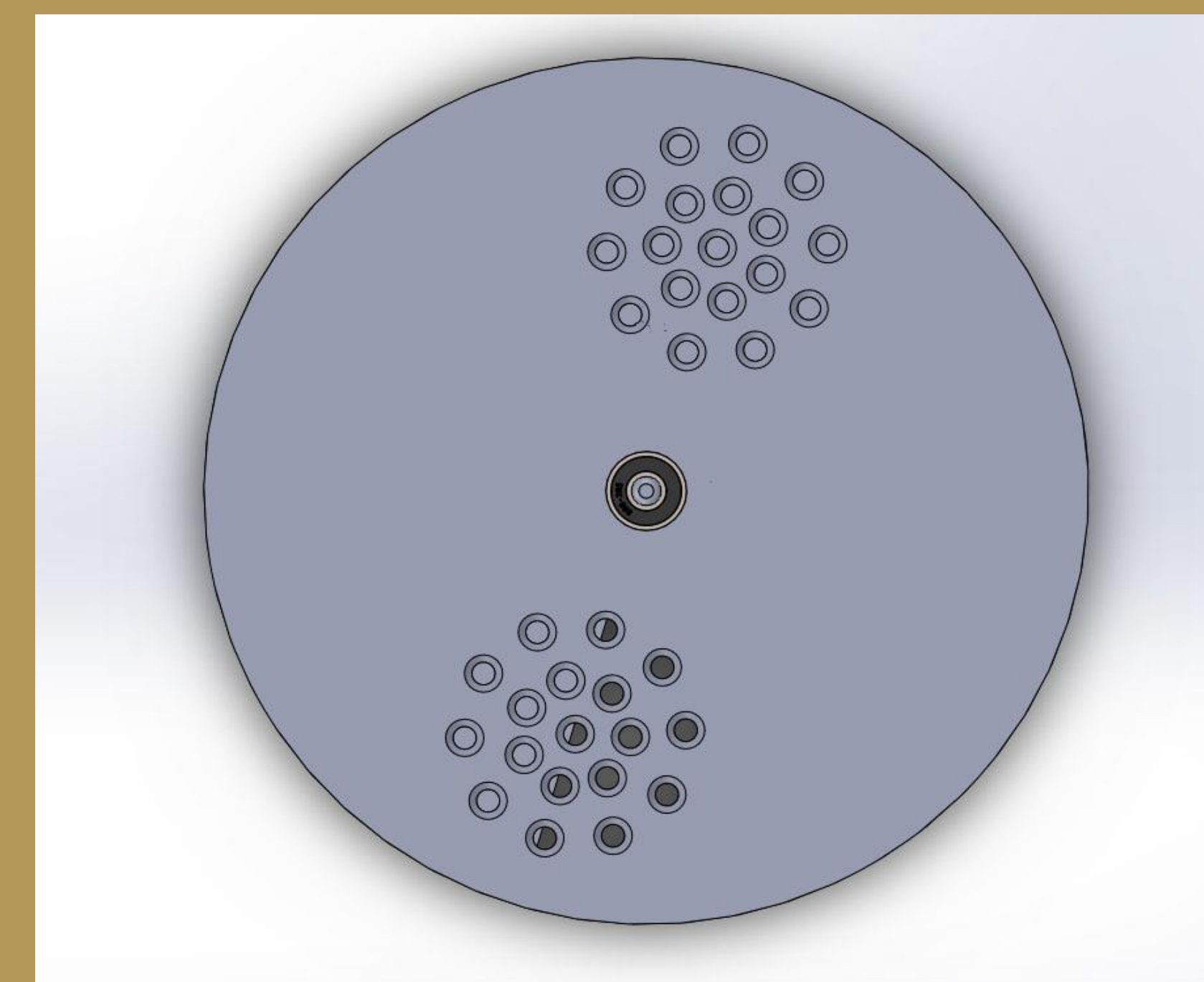


Orientation System Full Assembly

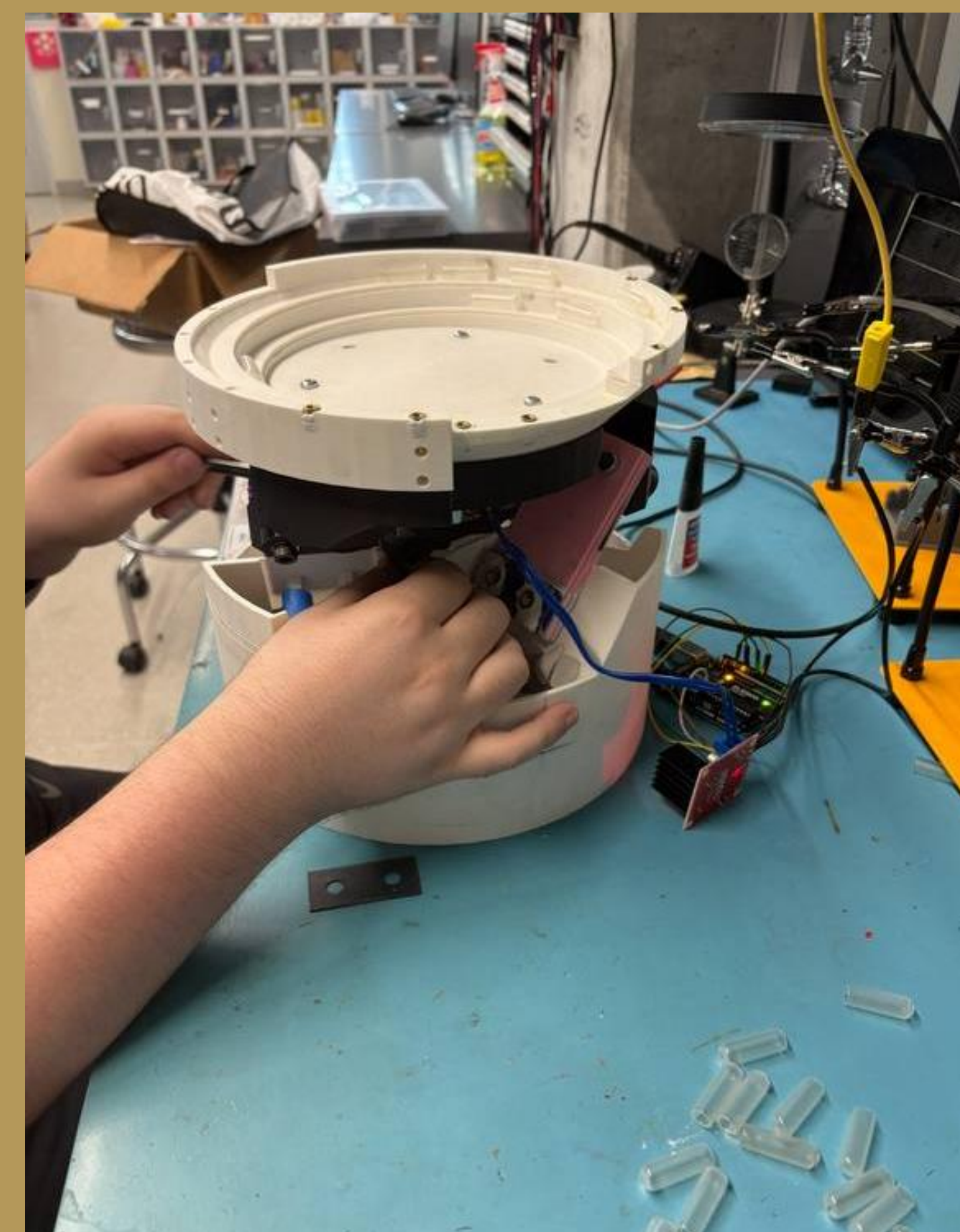


Bucket Hopper Section Cut View

Auxiliary Views & Physical Prototypes



Left: Auxiliary Views of Bucket Hopper
Right: Physical Model of Vibratory Bowl Feeder, also shows EZ pen cap part.



Our hopper can dispense exact amounts of parts onto the bowl feeder which avoids overfilling it and reducing its efficiency.

The plus of using a system like our bucket is being able to store mass bulk but still be able to control what amount goes into the system without overwhelming downstream modules.

Future Steps

Finalize and construct each module to standardize assembly plans and parts.

Create streamline manufacturing process by assessing bottlenecks, cost breakdown of multiple units.

Create Risk Assessment (FEMA) for the new automation system.

Optimize process times and reduce part waste. Done with tolerance and programming improvements.

Develop a preventative maintenance plan.

Create cloud-server based metrics to collect and maintain system data.

Create employee (re)training program(s) to support adoption in the Lighthouse organization.

Implement ergonomics in QA station, with accommodations for visually impaired operators

Processes

Our improved process will consist of what we like to consider three distinct parts.

Input/Feeding - Consists of the pen counter/dropper and vibratory feeder.

Processing/Pressing - Consists of the orientation system and pen cap press.

(Future) Output/Quality Control – Consists of the cartridge system and operator QA process.

Meet The Team

