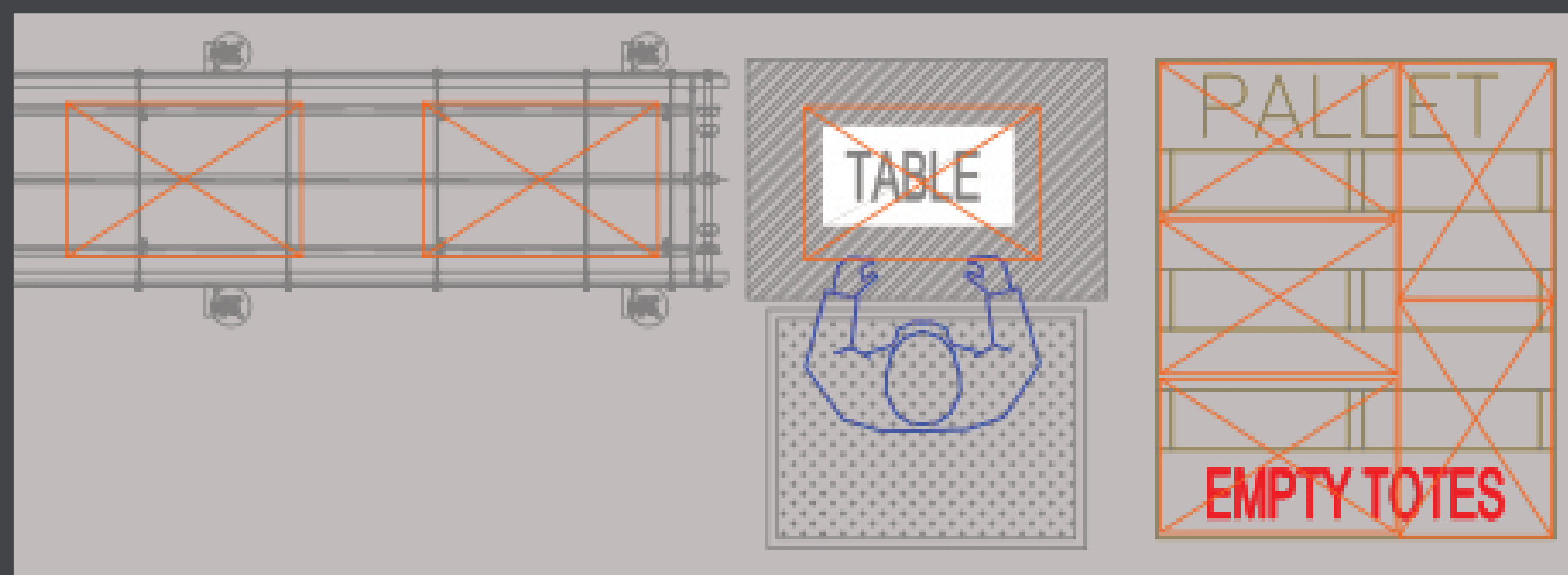


Abstract

Plastic shipping totes arrive at manufacturing facilities flattened and palletized. Our stand-alone machine will autonomously unfold these totes and dispense them onto an active assembly line, while maintaining a minimal footprint. This will provide greater consistency and efficiency, while improving the bottom line of the facility.

Problem/Need

HEB has a dedicated employee for each production line erecting totes. However, they seek to fully automate the process to reduce the need for an employee to spend time on this repetitive action. This would ensure maximum productivity during the working day.



Economics

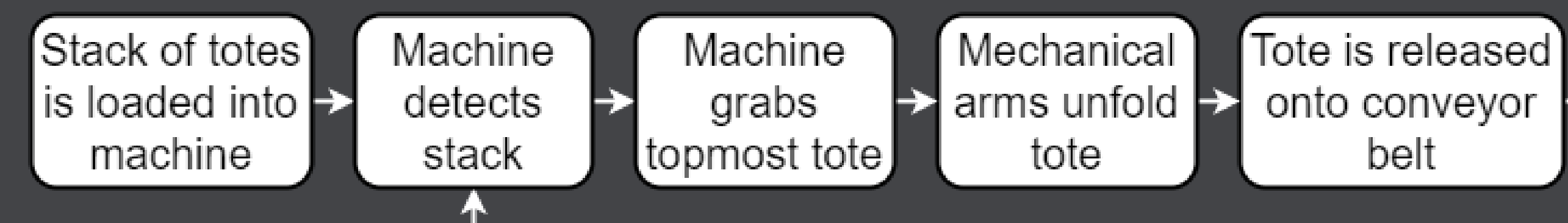
Annual Employee Partner Compensation			
\$18.50/hr	40 hr/week	52 weeks/yr	\$53,872.00
	≈40% for benefits +		\$21,548.80
			\$75,420.80
two shifts of employees x		2	
			\$150,841.60
Estimated Machine Cost			\$12,000.00

Benefits

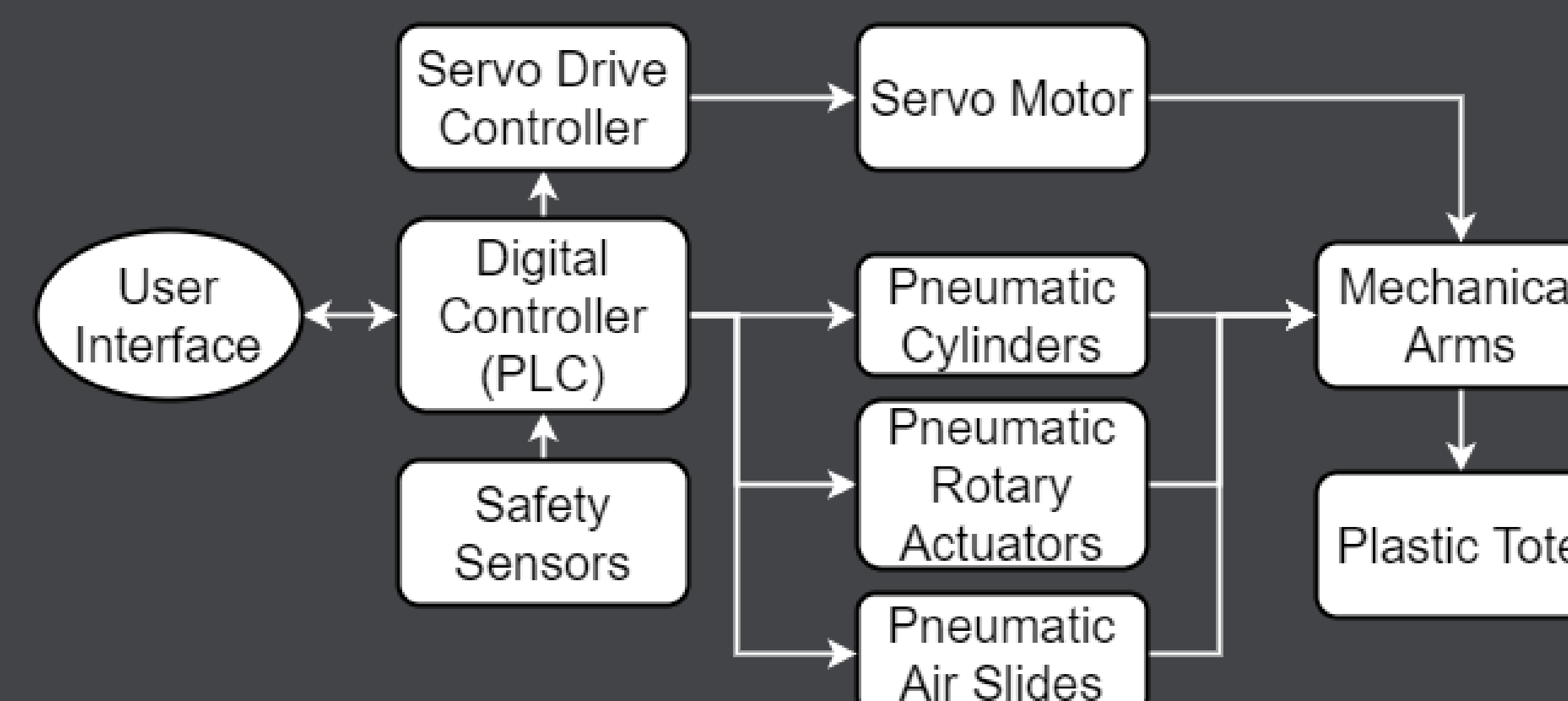
- Added productivity from retasking of employees
- Versus other machines of it's class:
 - Significantly reduced footprint - ≈ 6 sq. Ft.
 - Mechanical simplicity provides for easy maintenance and less downtime

Methodology

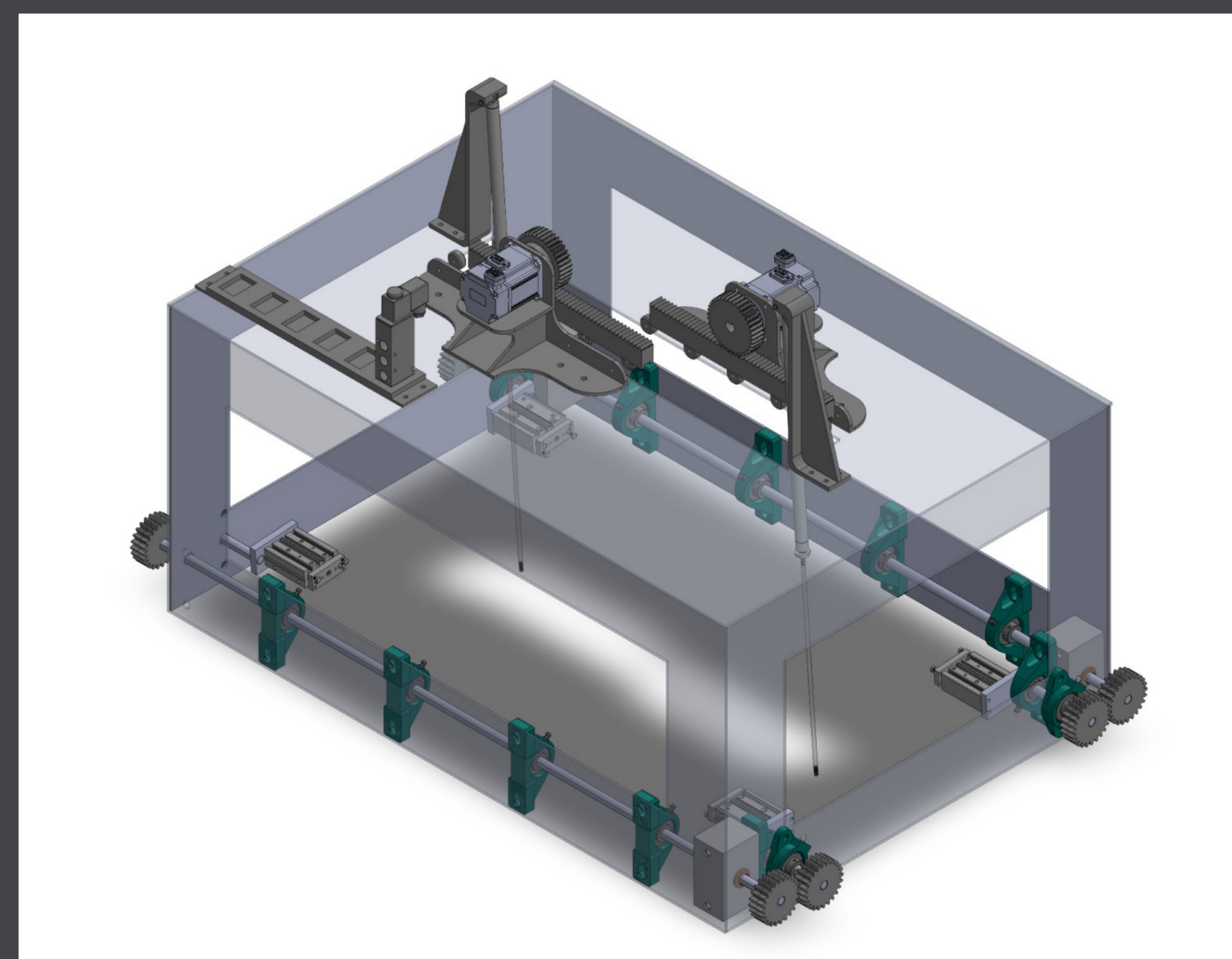
Functional Block Diagram



Hardware Configuration Diagram

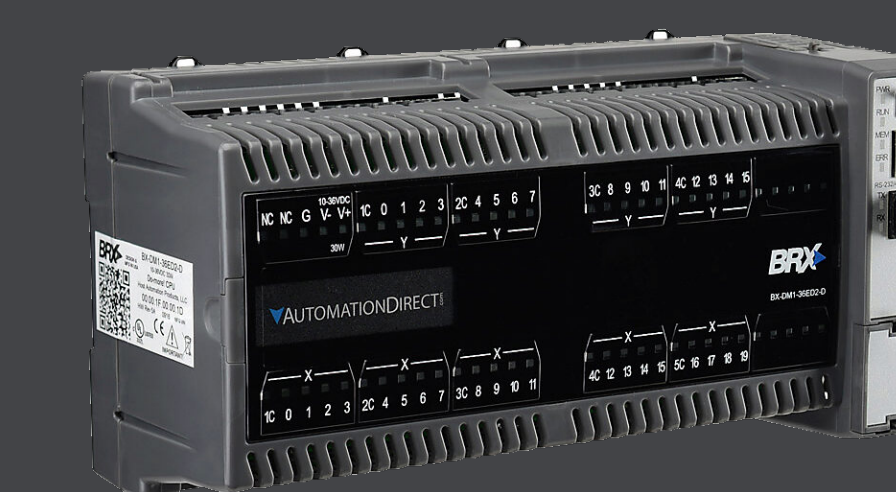


Solution/Design



- Two sets of air slides extend and raise the long sides of the tote and hold them in place
- Two arms lower down and raise the short sides of the tote and snap them in place

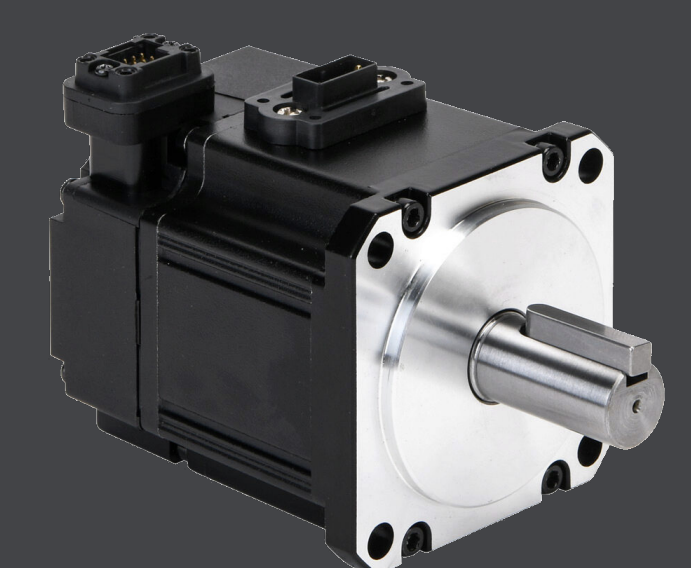
Components



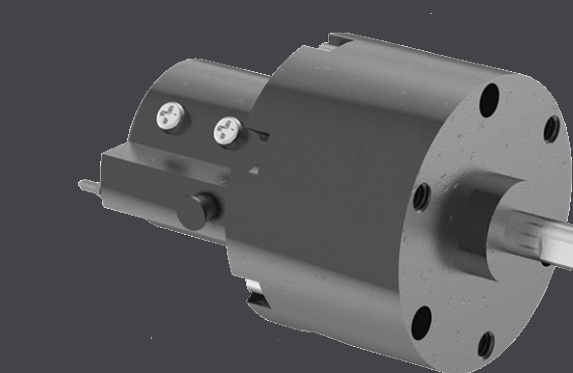
PLC



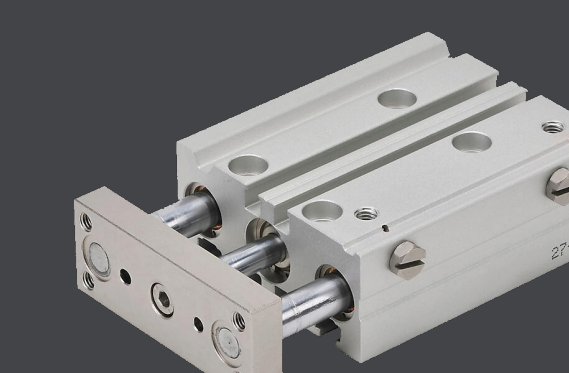
Servo Drive Controller



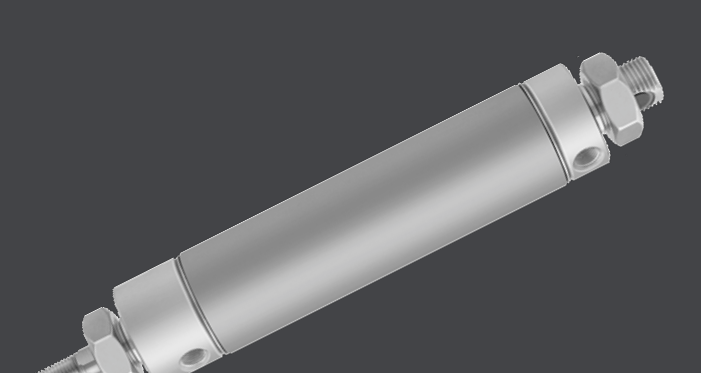
Servo Motor



Pneumatic Rotary Actuator



Pneumatic Air Slide



Pneumatic Cylinder

Summary

Due to time and budgeting limitations, it was necessary to cut several functions. In the future, these functions should be further developed and added to the system. These functions include the tote loading and ejection mechanisms. Many parts could also be further refined to allow for streamlined production of future machines.

Glossary

- **PLC - Programmable Logic Controller**
- **Servo Motor - Electromechanical rotary actuator that allows for precise control of angular position**
- **Pneumatic Cylinder - A component capable of moving a load in a linear path with compressed air**

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