

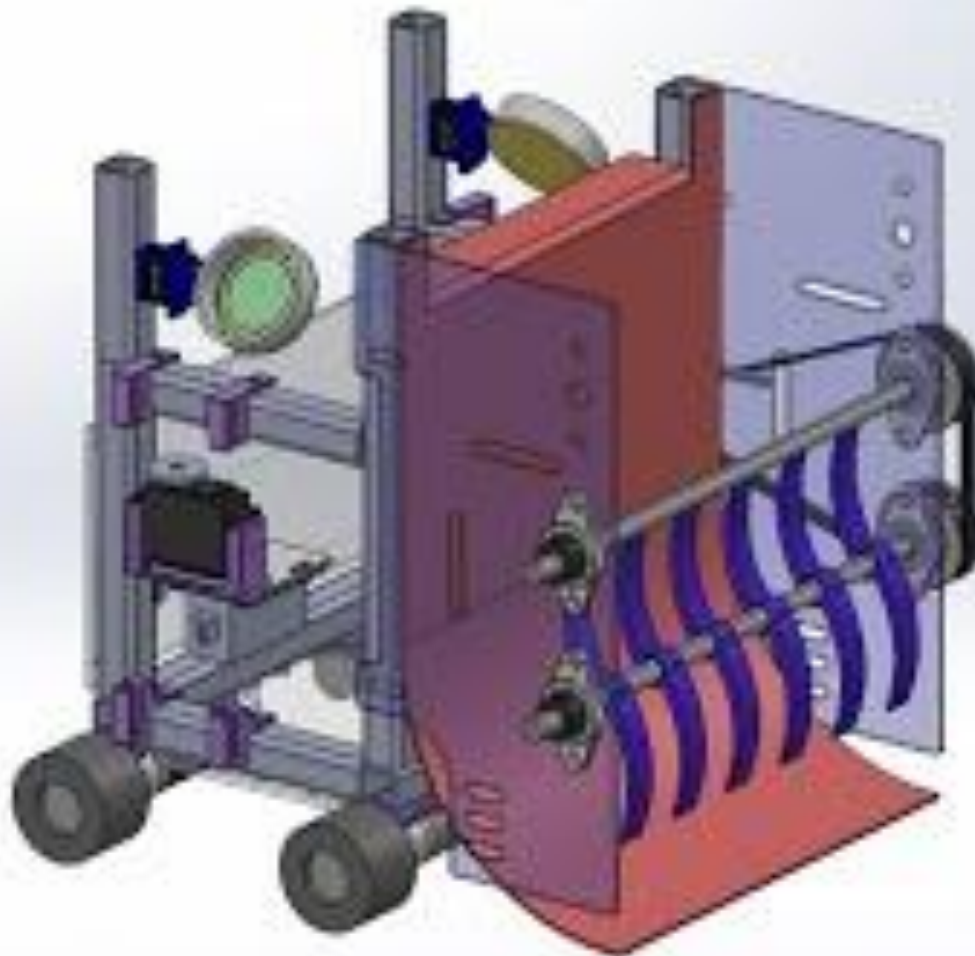
# IEEE SoutheastCon Hardware Competition

Nathan Gardner, Madison Kelly, Luke McGill, Mark Beech



# Demo

[IEEE SECON 2023 Robotics Competition](#)



# Plans vs Reality

- Plans and multiple backup plans developed

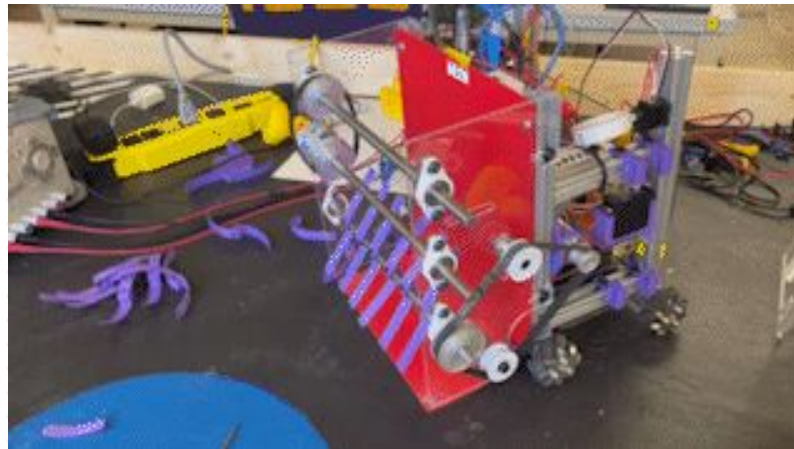
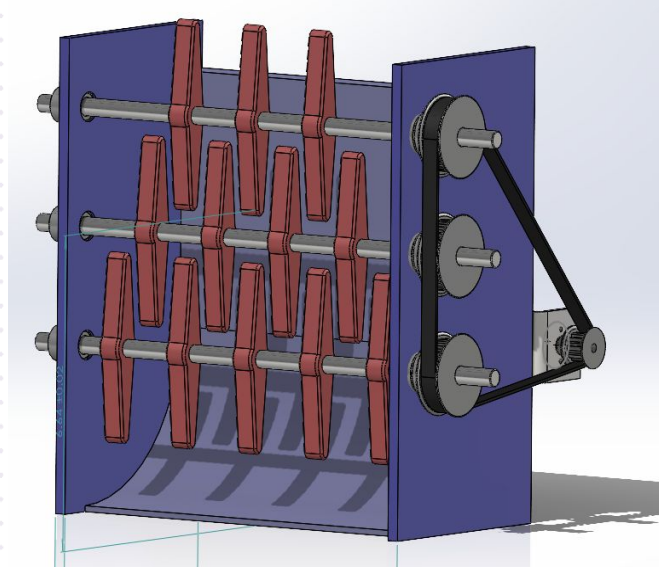


	Chip Feeding	Consumption	Duck Storage	Pedestal Storage	Sorting	Vision
Plan A	✓	✓	✓	✓	✓	✓
Plan B	✓	✓	✓	✗	✗	✗
Plan C	✓	!	✗	✗	✗	✗

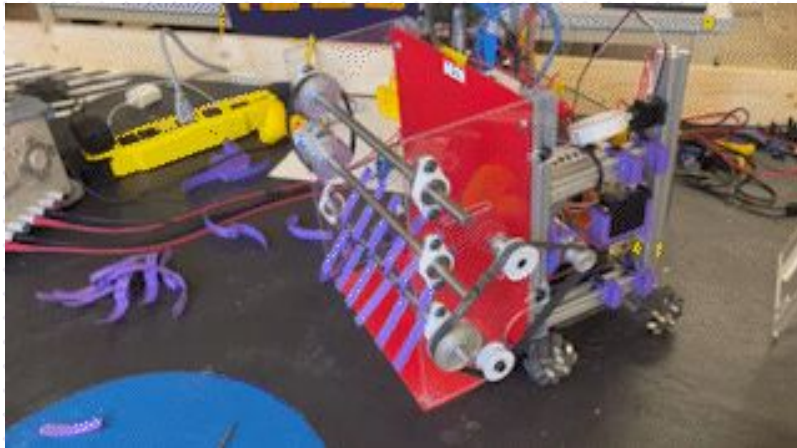
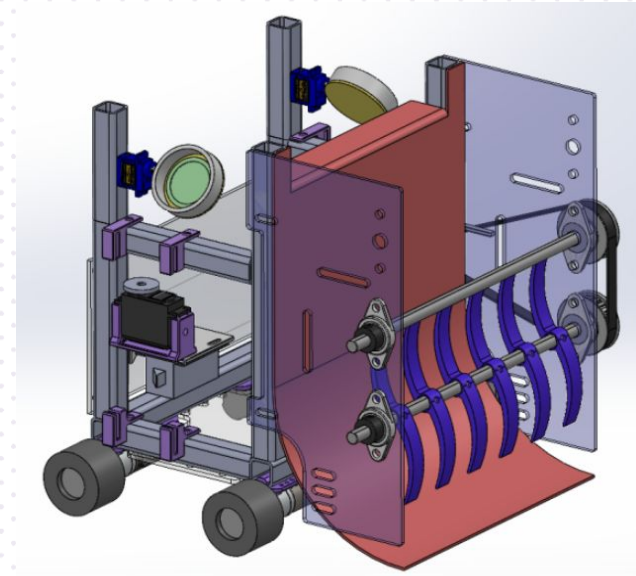
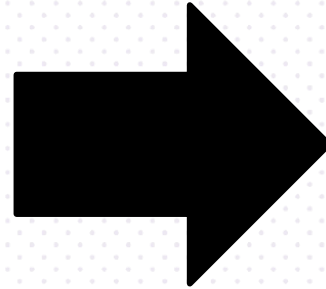
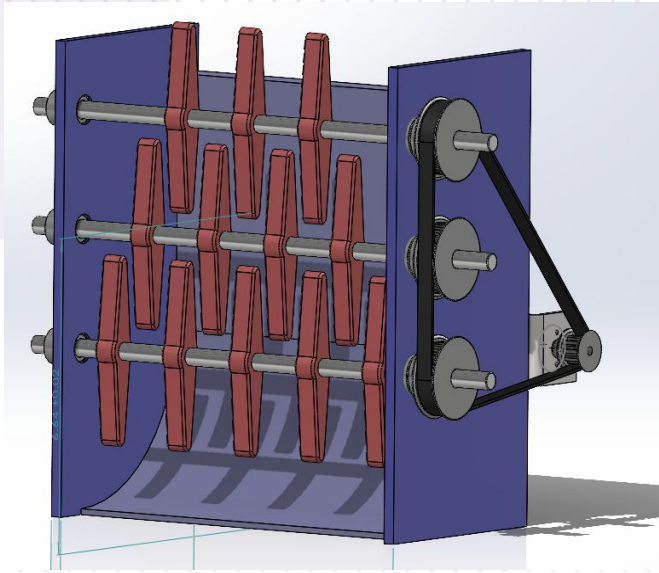
Legend	
✓	Planned to Implement
!	Repurposed
✗	Cut



# Consumption / Delivery

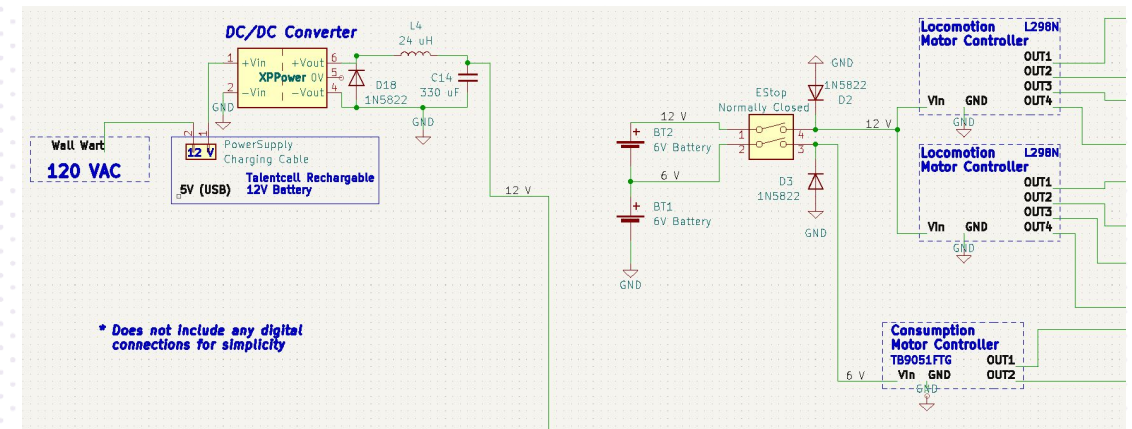
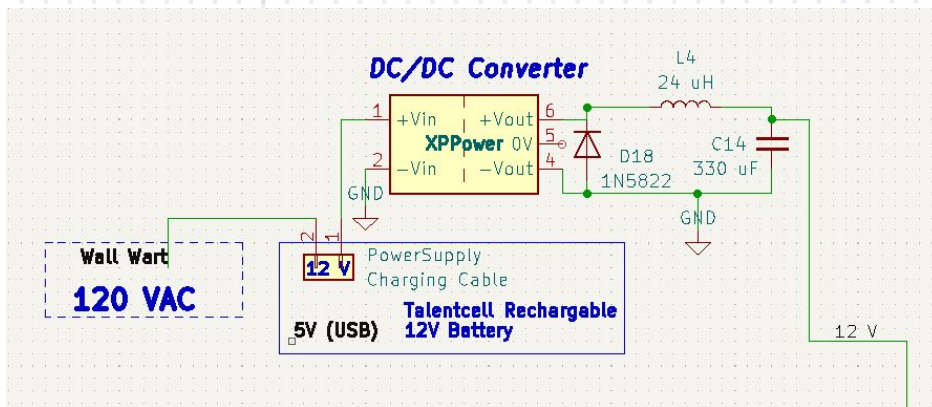


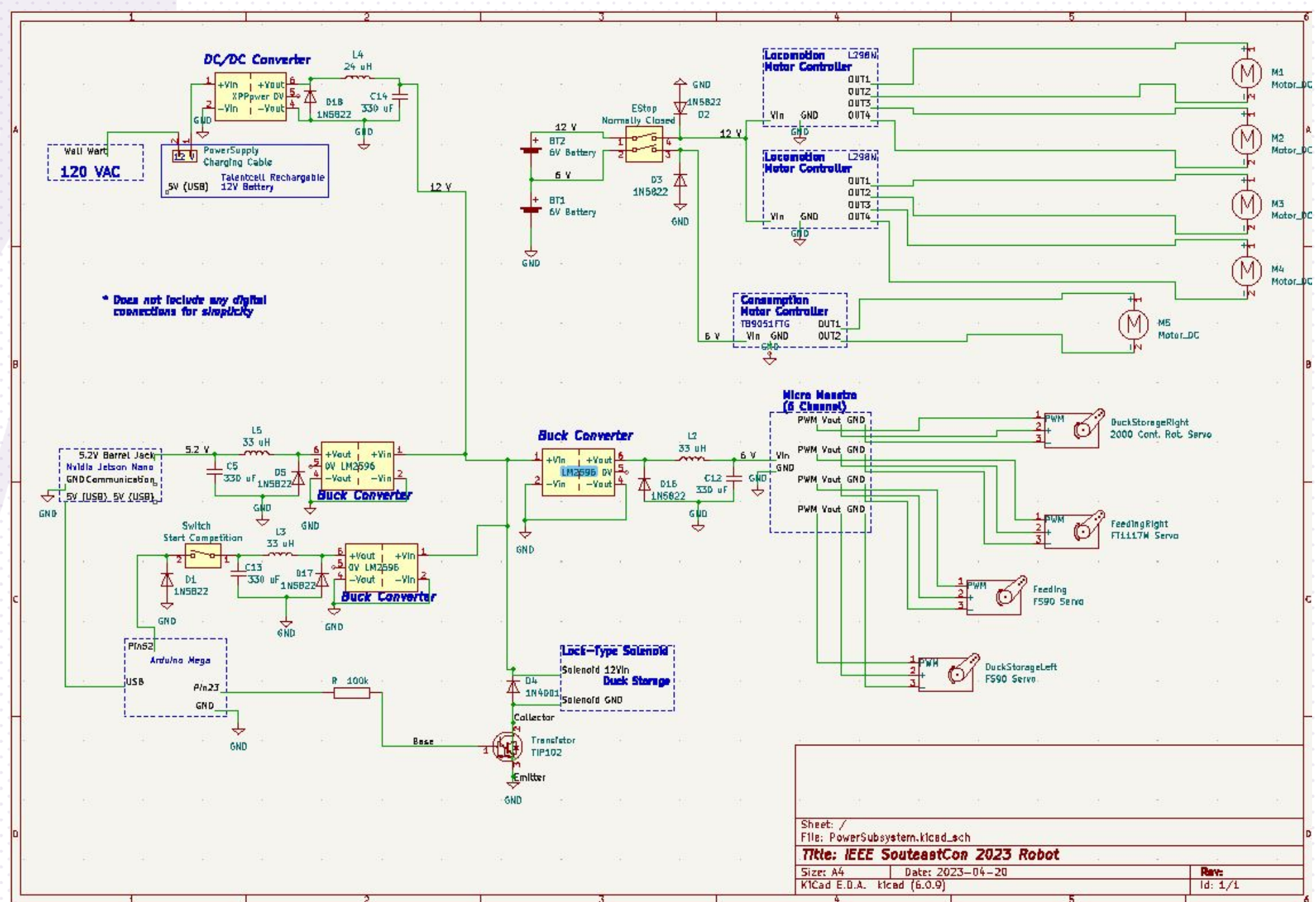
# Consumption / Delivery



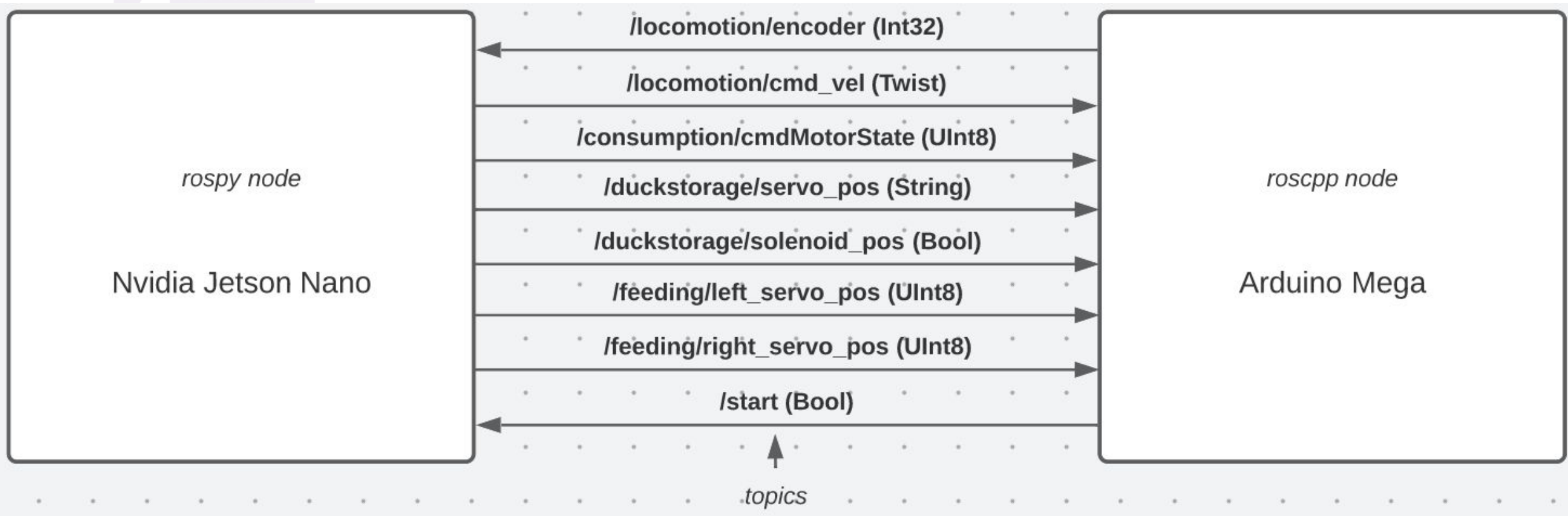


# Power Subsystem





# Software





# Path



## *Typical Competition Speed*

$$\frac{100 \text{ rotations}}{1 \text{ min}} * \frac{1 \text{ min}}{60 \text{ sec}} * \frac{48\pi \text{ mm}}{1 \text{ rotation}} * \frac{0.00328084 \text{ feet}}{\text{mm}} = 0.825 \frac{\text{feet}}{\text{sec}}$$

# Experimentation and Validation

Tasks Completed vs Round

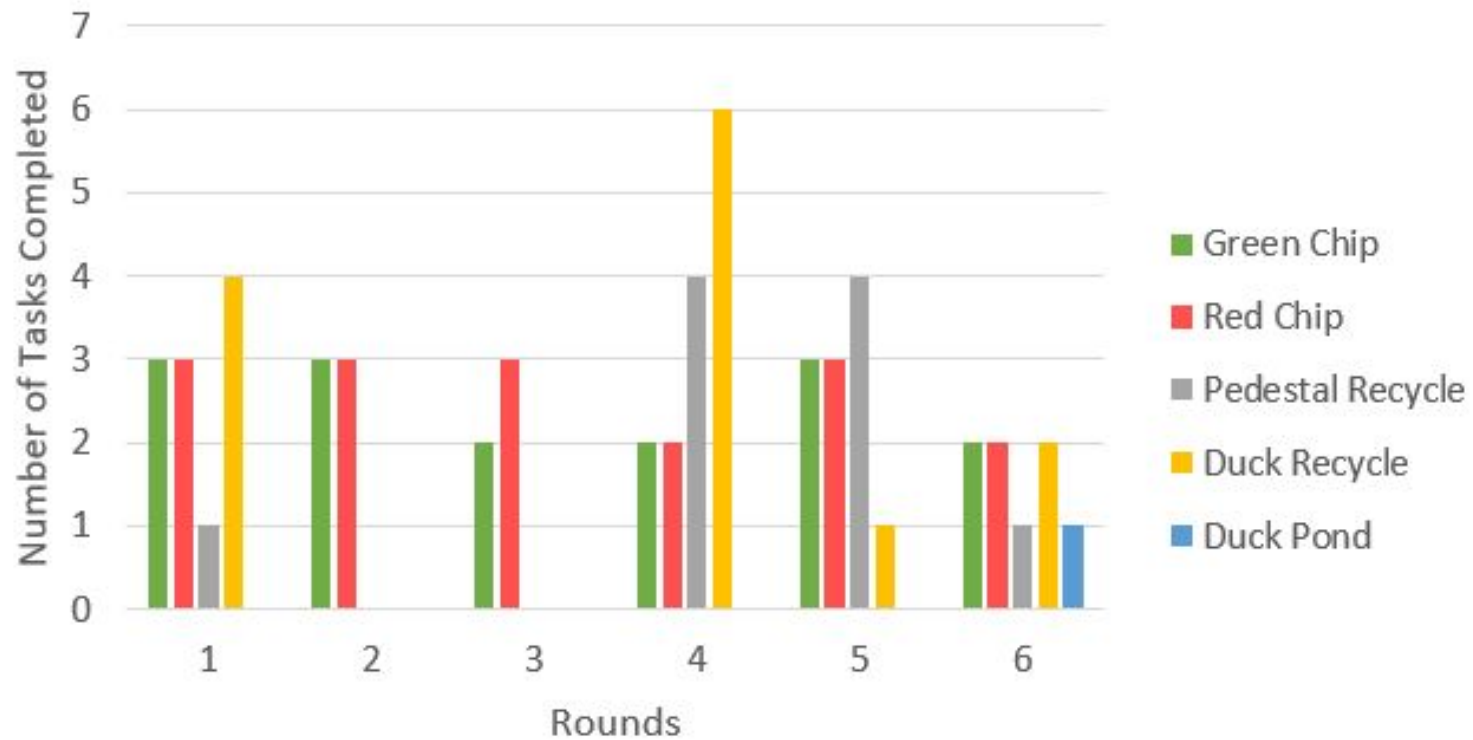


Figure 1

Points vs Round

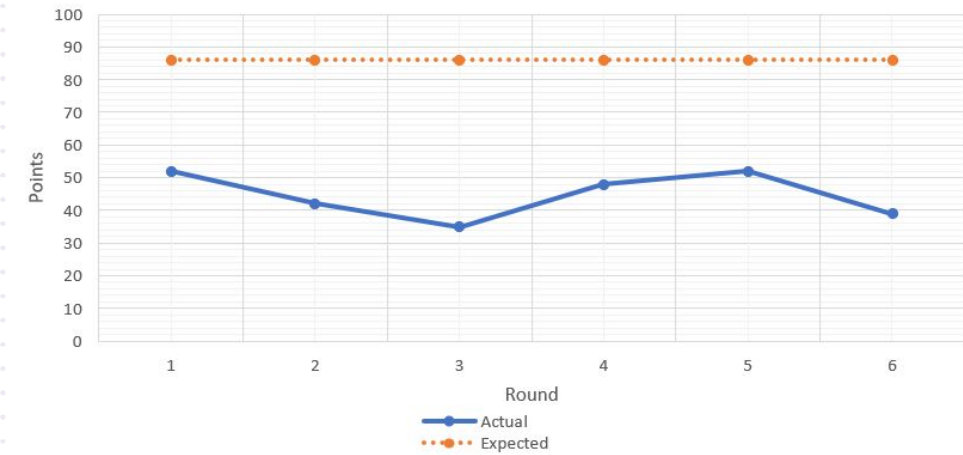


Figure 2

Round	Point Total
1	52
2	42
3	35
4	48
5	52
6	39

Figure 3



# Budget

- Budget includes R&D, build, and operations expenses

Purchase	Cost
Power	\$236.81
Duck Storage	\$234.88
Feeding	\$10.50
Pedestal Storage and Delivery	\$35.85
Sorting	\$100.04
Low-Level Controller	\$106.79
Locomotion	\$262.29

Purchase	Cost
Top-Level Controller	\$231.95
Vision	\$141.49
Consumption	\$306.43
Chassis	\$753.78
Arena Build	\$269.28
Miscellaneous	\$126.96
<b>Total Cost</b>	<b>\$2,690.09</b>

# References

- [1] "NFPA 79," NFPA 79: Electrical Standard for Industrial Machinery. [Online]. Available: <https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=79>. [Accessed: 13-Oct-2022].
- [2] "OSHA," *1910.212 - General requirements for all machines. | Occupational Safety and Health Administration*. [Online]. Available: <https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.212>. [Accessed: 26-Apr-2023].
- [3] "The Federal Register," Federal Register :: Request Access. [Online]. Available: <https://www.federalregister.gov/documents/2014/02/10/2014-02560/energy-conservation-program-energy-conservation-standards-for-external-power-supplies>. [Accessed: 13-Oct-2022].



# Questions?

