971's 2017 Robot Overview

Ginger Schmidt & Adam Snaider

971
SPARTAN ROBOTICS

Intro

- Hello!
  - Adam: Code Lead, UCSB
  - Ginger: Mechanical & Captain, Harvey Mudd!
  - 971 Class of 2017!

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Assemblies

- Drivetrain
- Intake/Hanger
- Gear Mechanism
- Shooter
- Serializer

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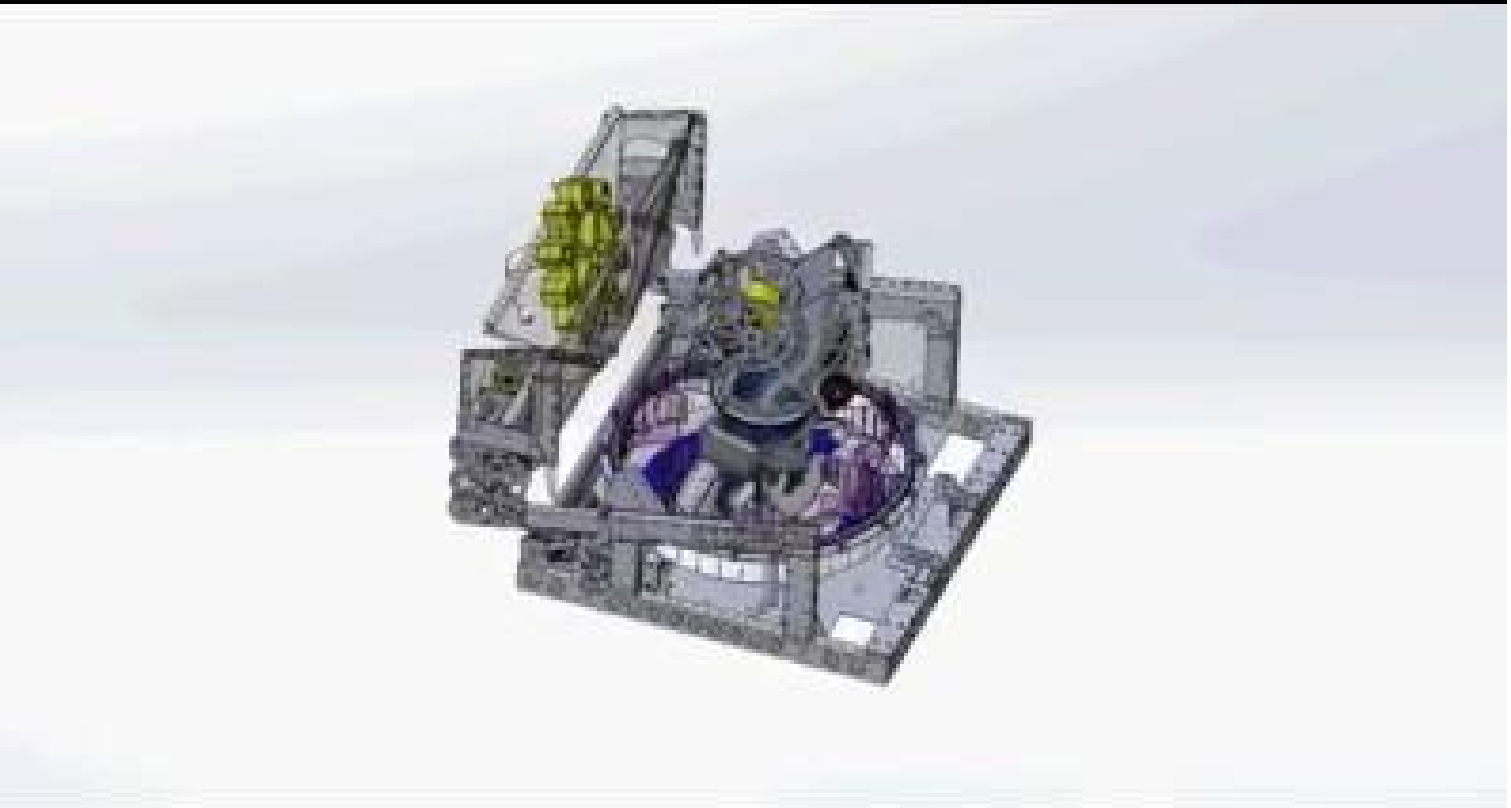

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Drivetrain Overview

- “2+2”
- 1 omni wheel in front
- 3 stacked Colsons in the back
- Single speed transmission

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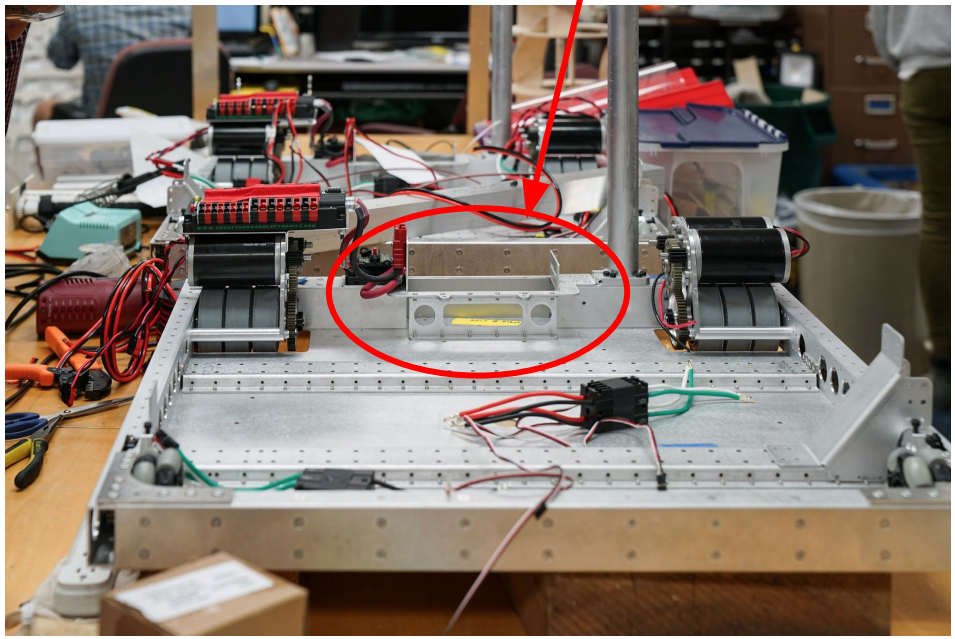
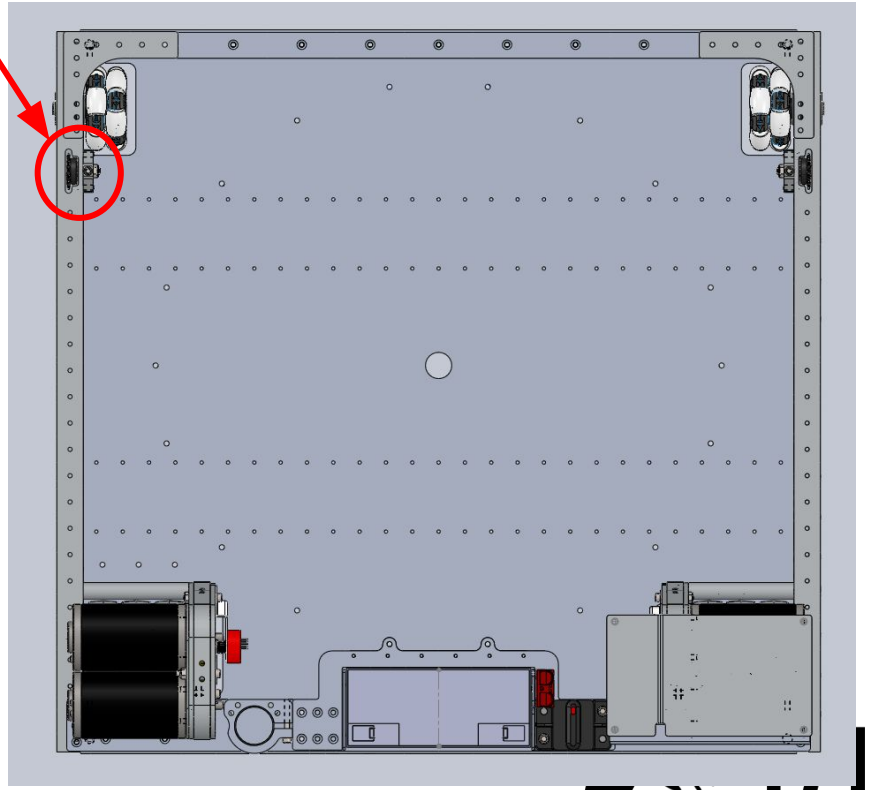
Drivetrain

battery box



chain tensioner



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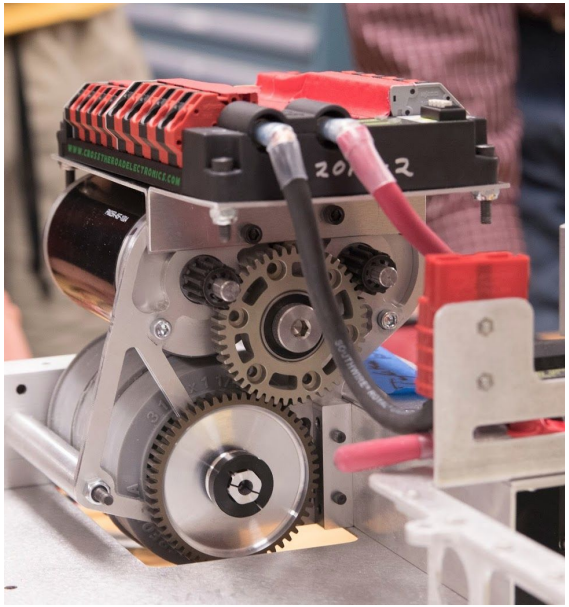
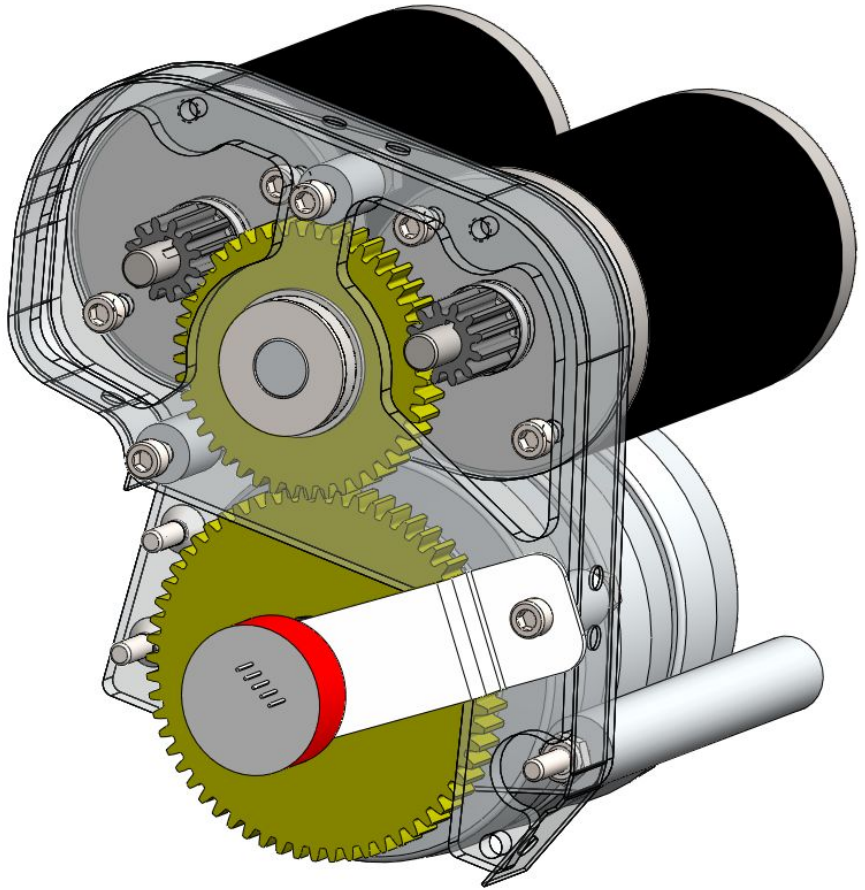
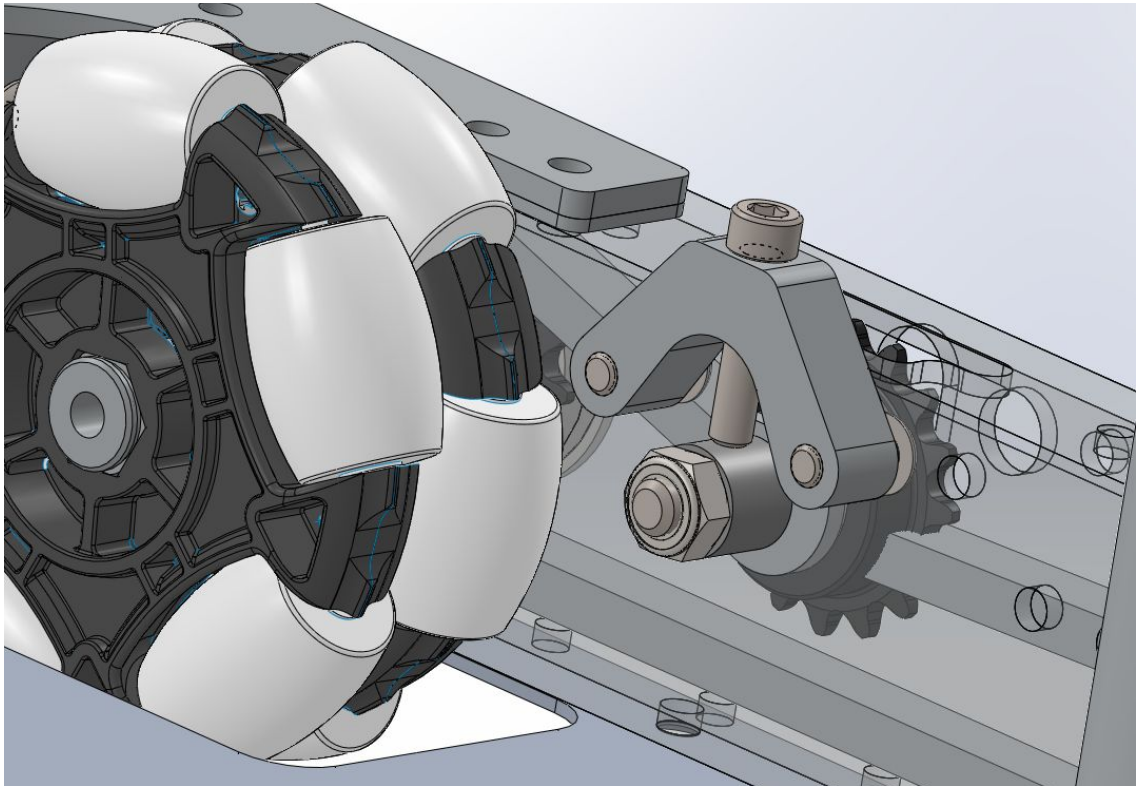
Transmission

- Single Speed





Tensioner



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Drivetrain Controls

- Sensors:
  - Encoder - Located in the output shaft to decrease noise
  - Gyro - Located in the Spartan Board
- We use a state space controller for the drivetrain.
  - Basically, we use sensor fusion (Encoder + Gyro) and we combine that information with our expectations from Physics to get a better estimate of where the drivetrain is.

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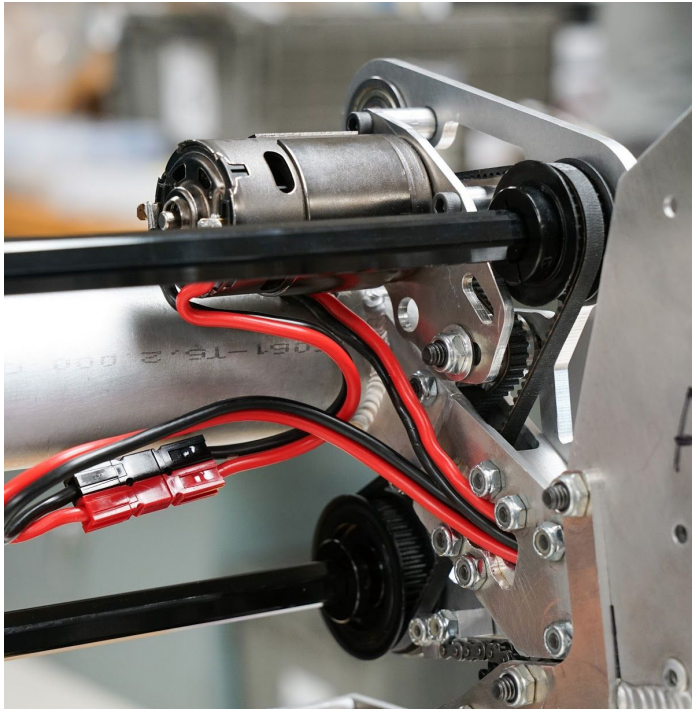
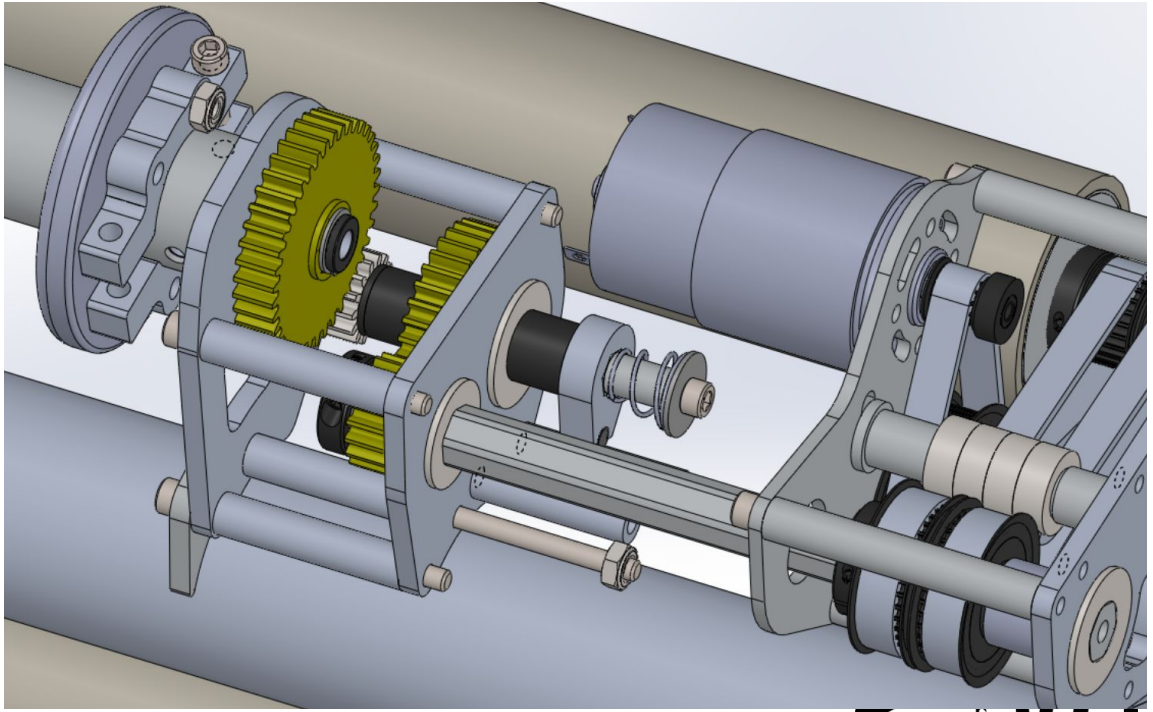
Hanger





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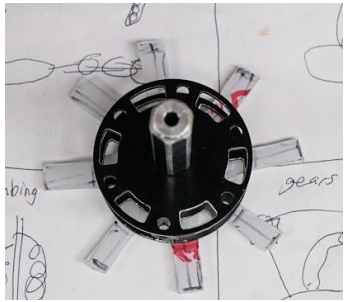
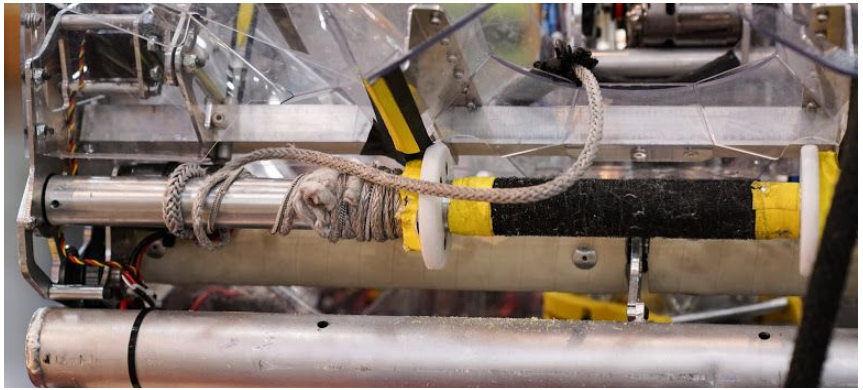
Hanger



lol



velcro!

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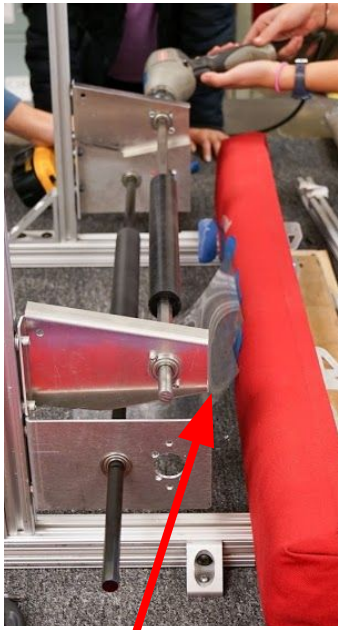
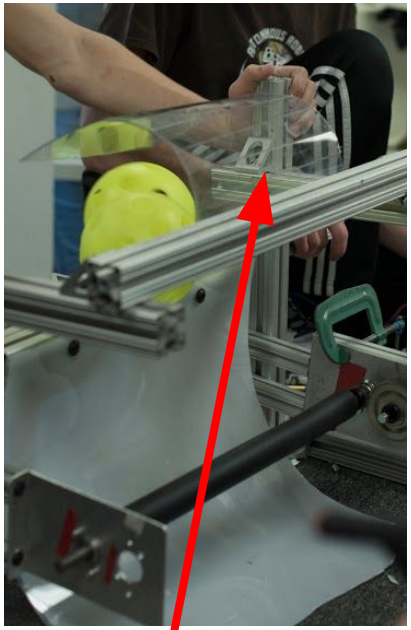
Intake Prototyping

through the bumper



deadspace!



flinging method!

over the bumper

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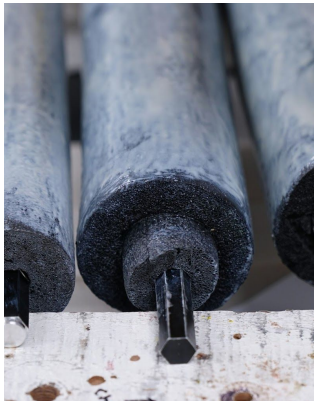
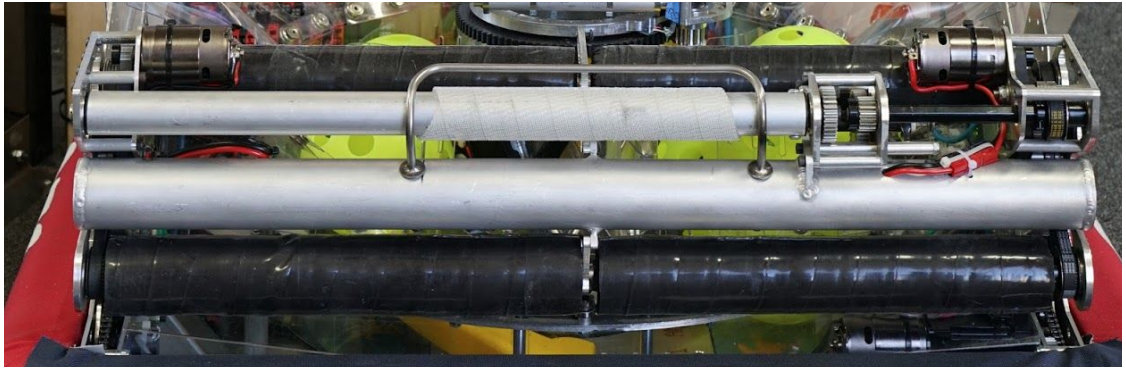
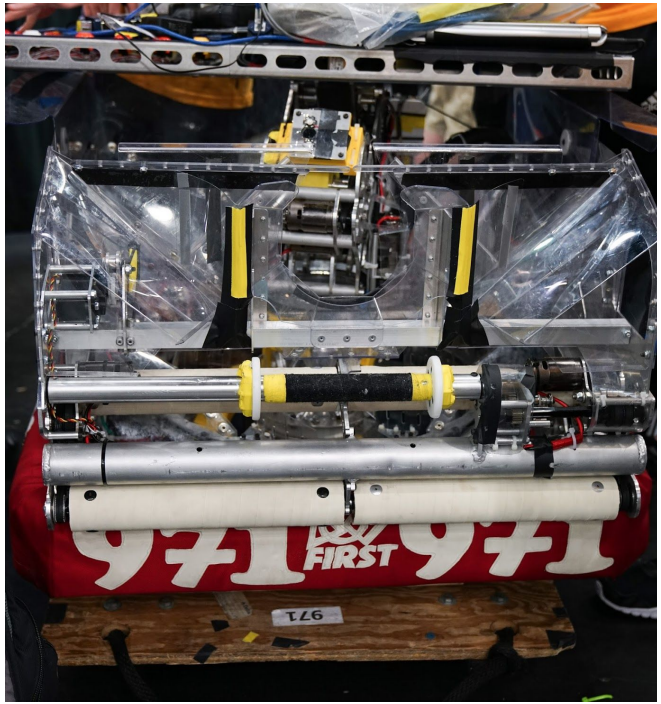
Rollers







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Bumpers

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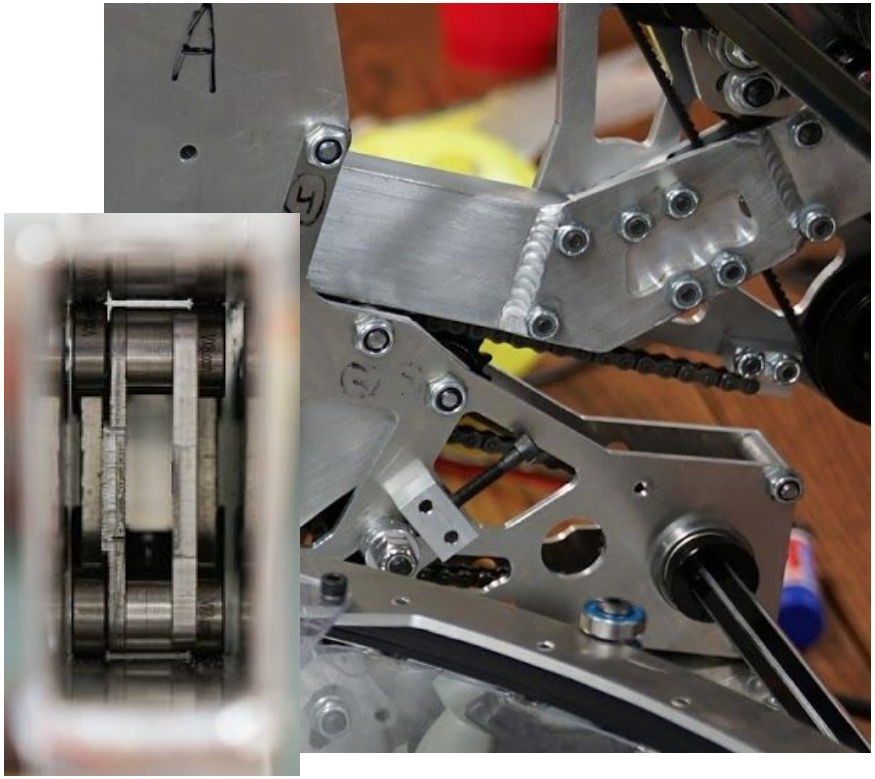
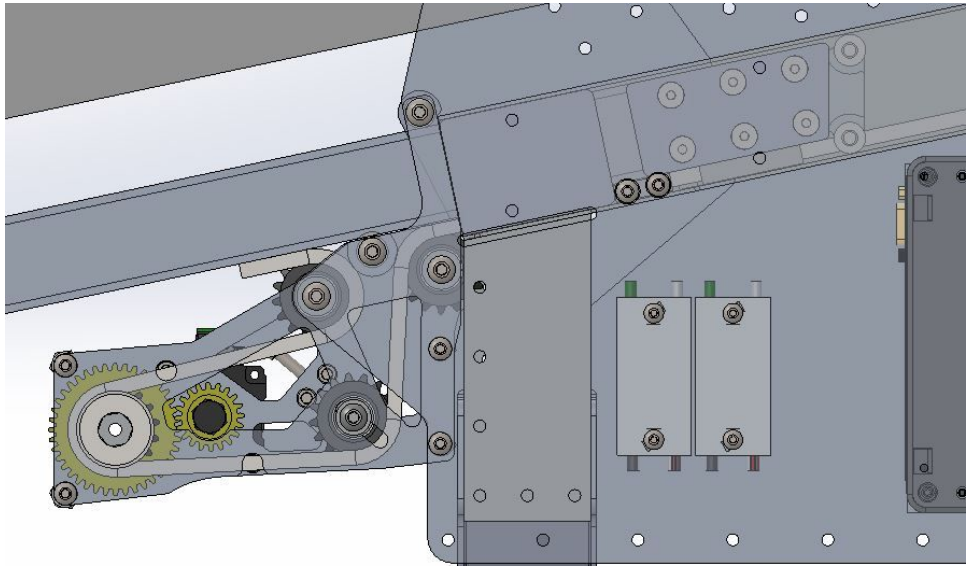
Intake Extension





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Intake/Hanger Controls

- Sensors
  - Encoder
  - Potentiometer
- State space controller (almost like the drivetrain)

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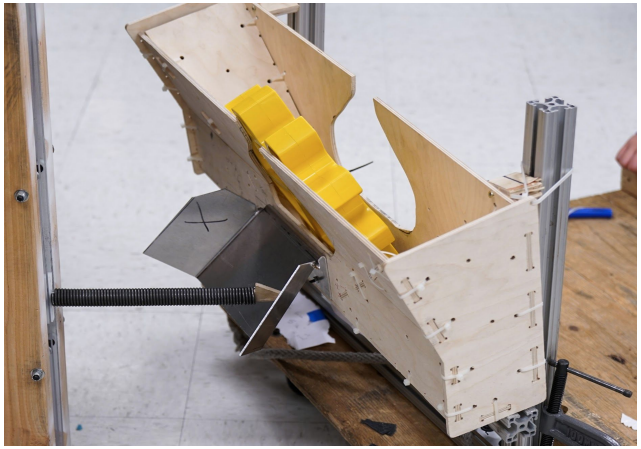
Gear Mechanism Prototyping



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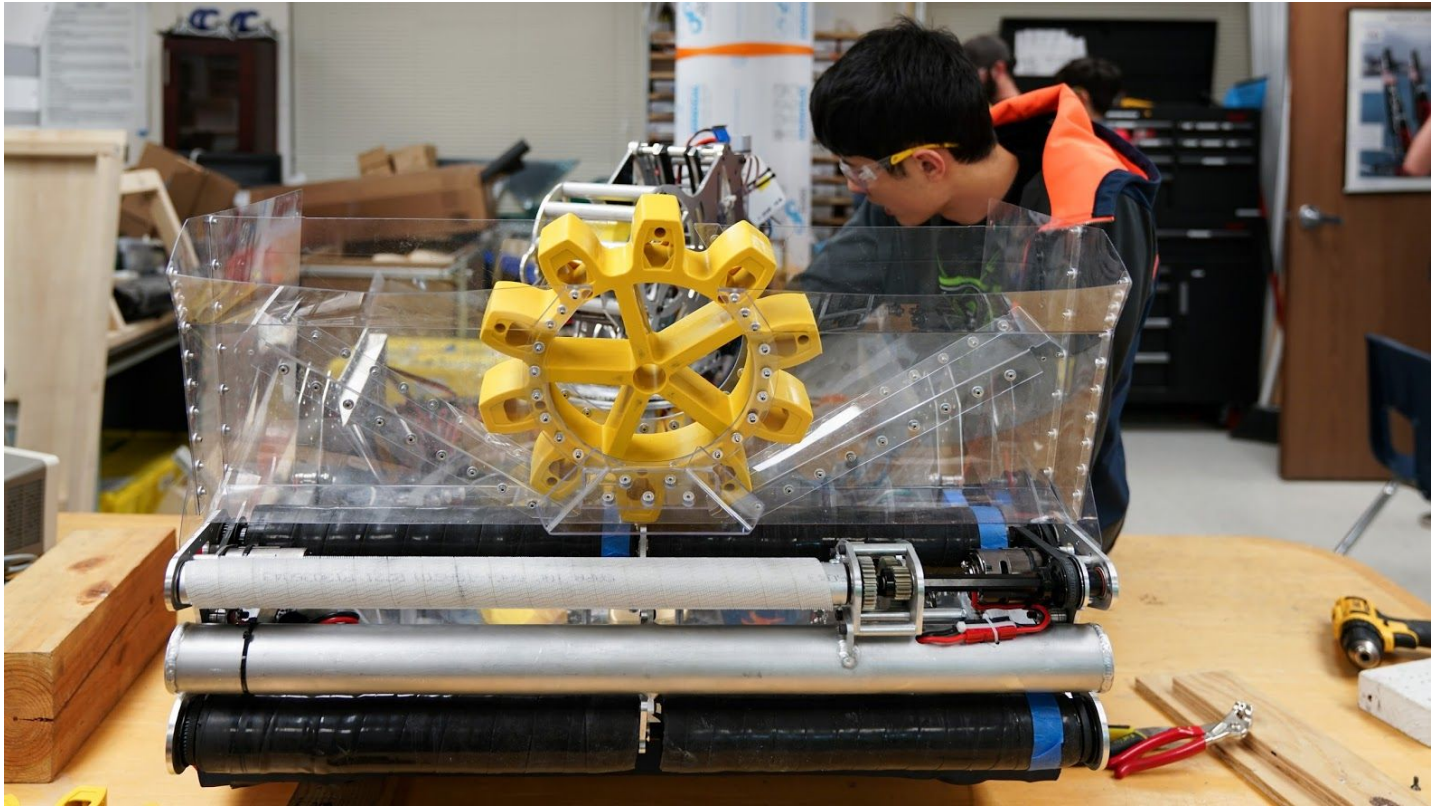
Gear Mechanism Iteration (SFR)



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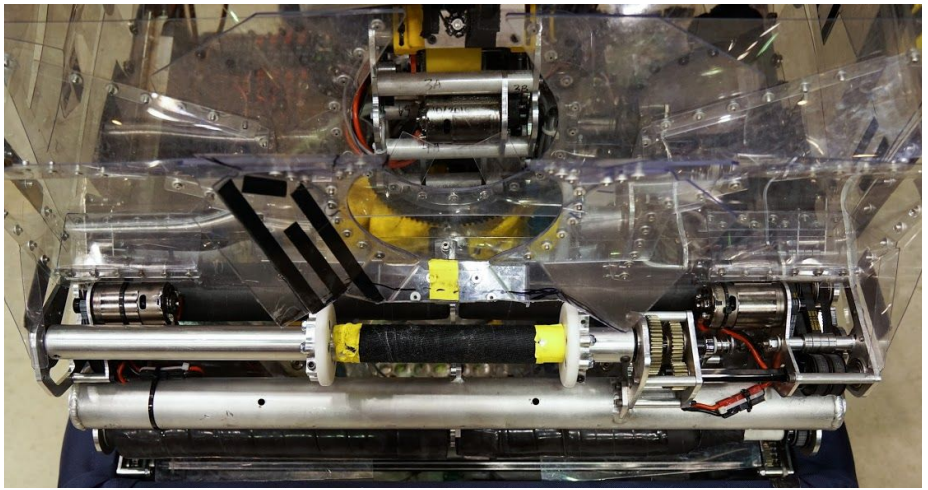
Gear Mechanism Iteration (SVR)



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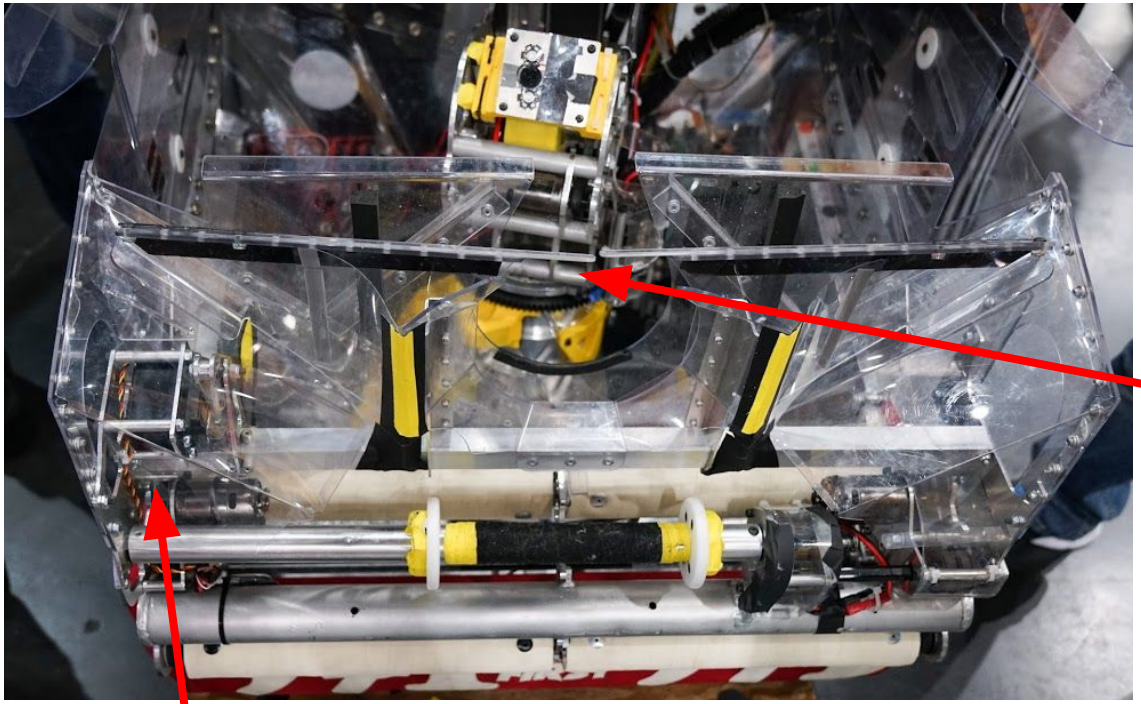
Gear Mechanism Iteration (Champs)



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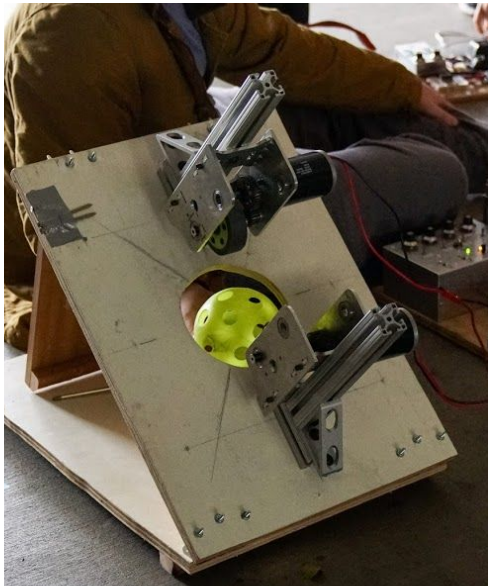
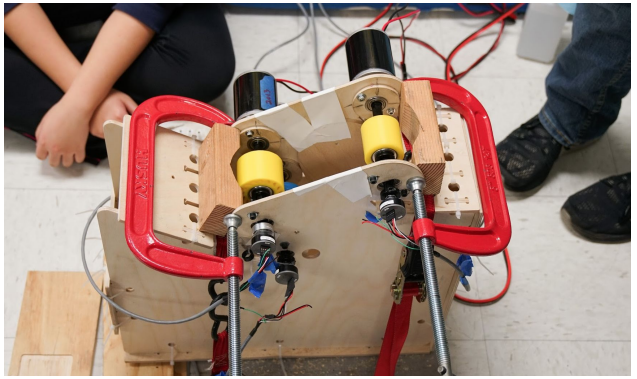
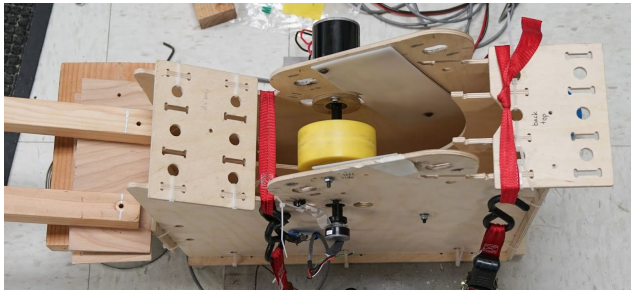
Shooter Prototyping







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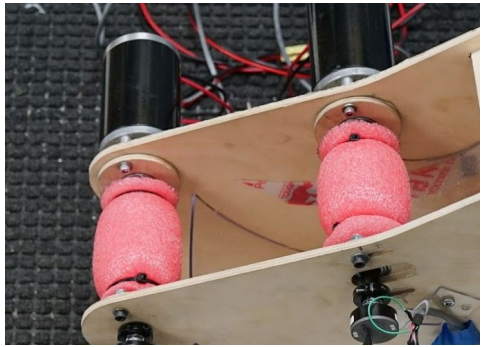
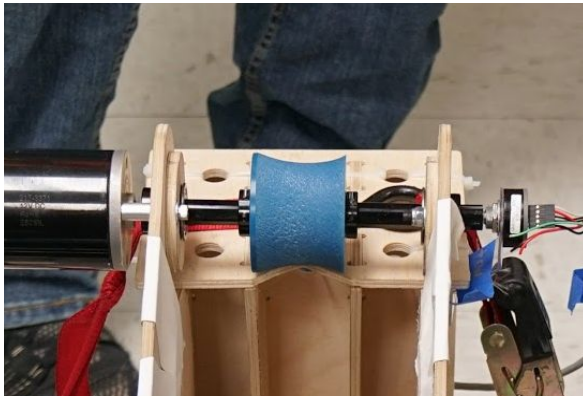
Wheel Prototyping





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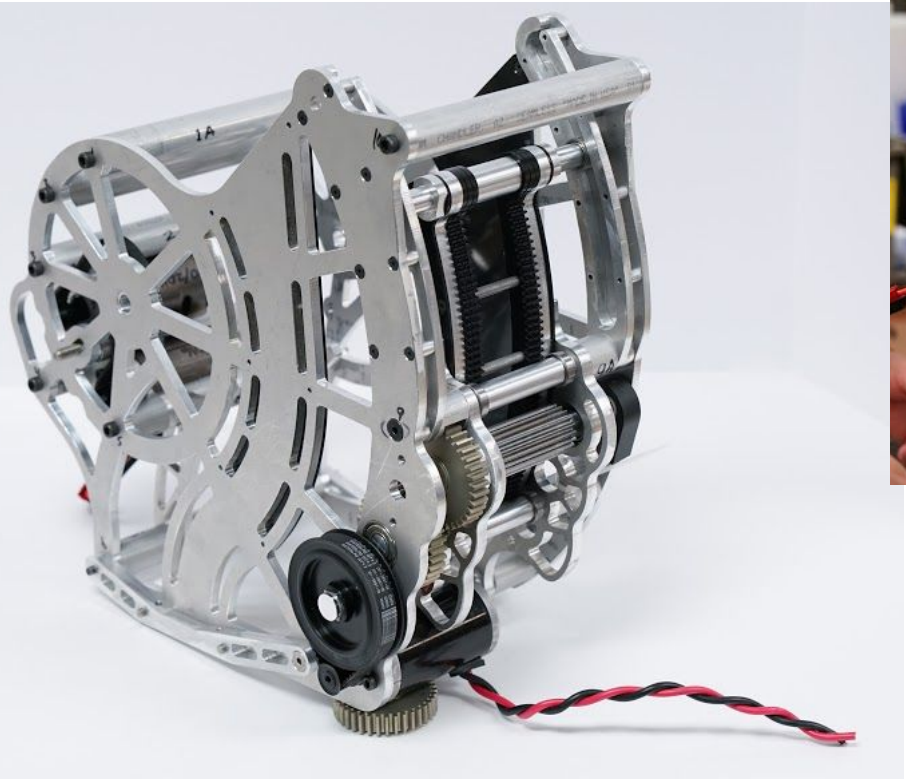
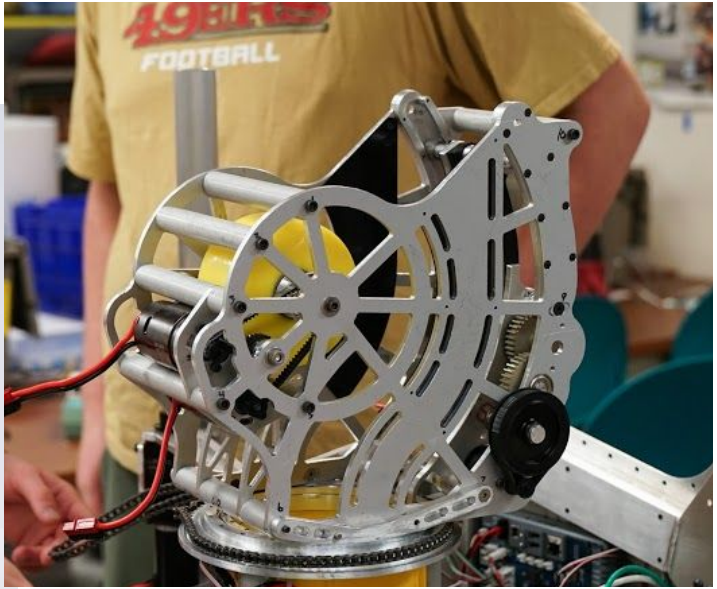
Shooter





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Shooter Controls

- Sensors:
  - Encoder
- We use a state space control with the Hybrid Kalman Filter

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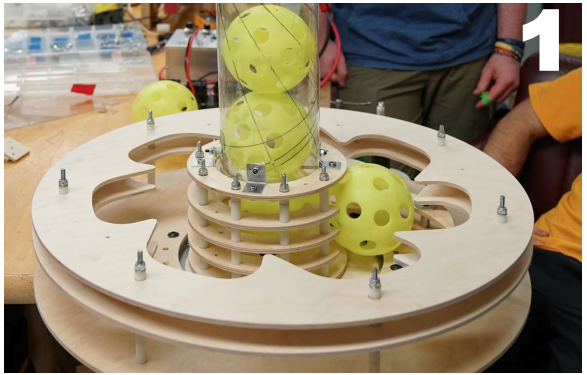
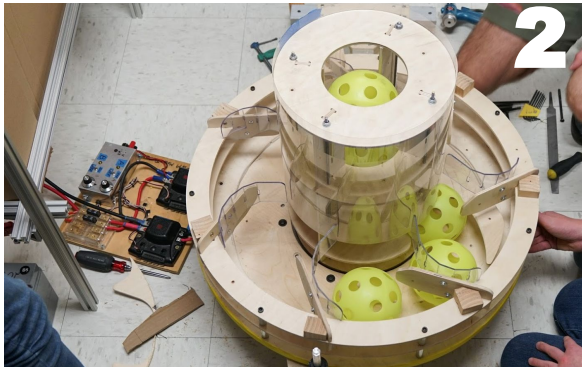
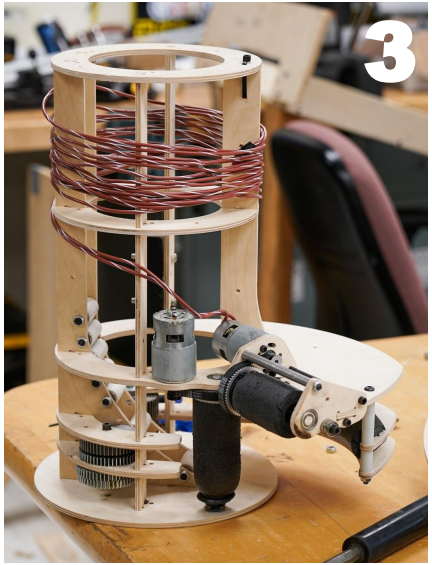
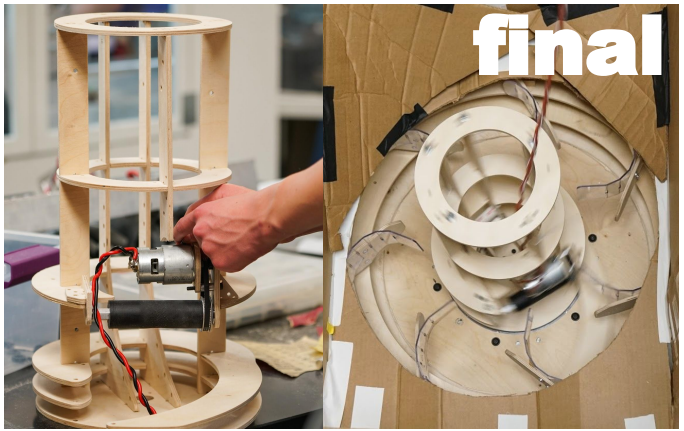
Serializer Prototyping









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Serializer Center Column

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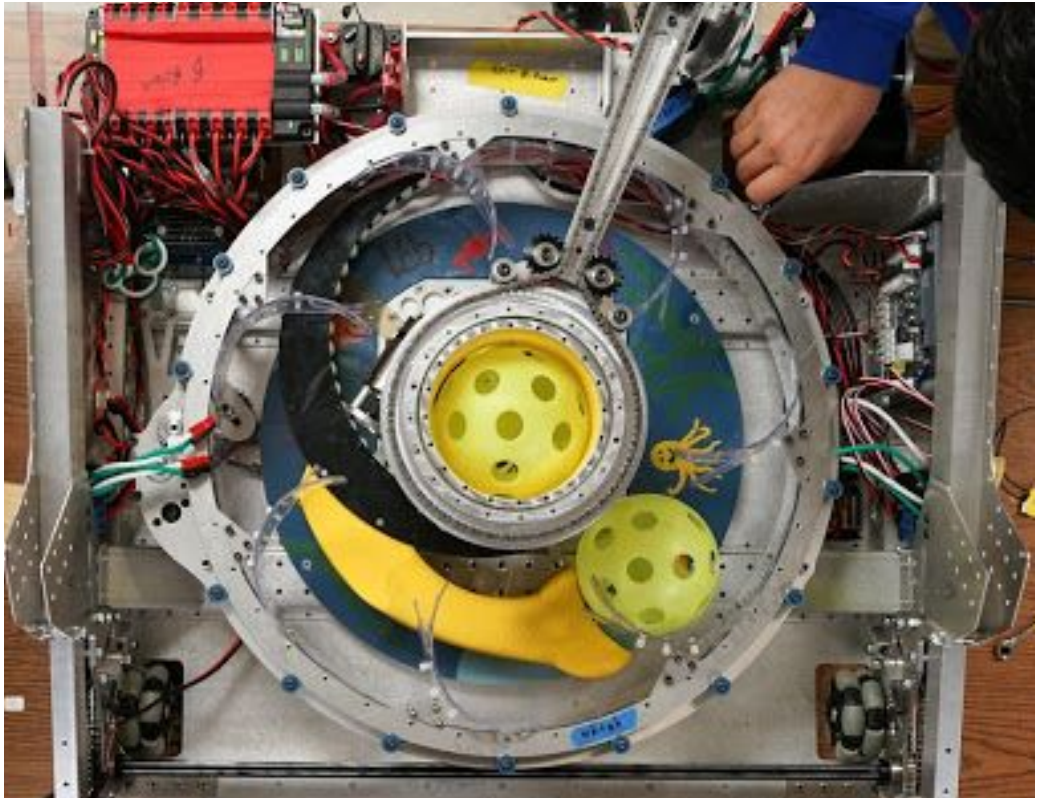
Serializer



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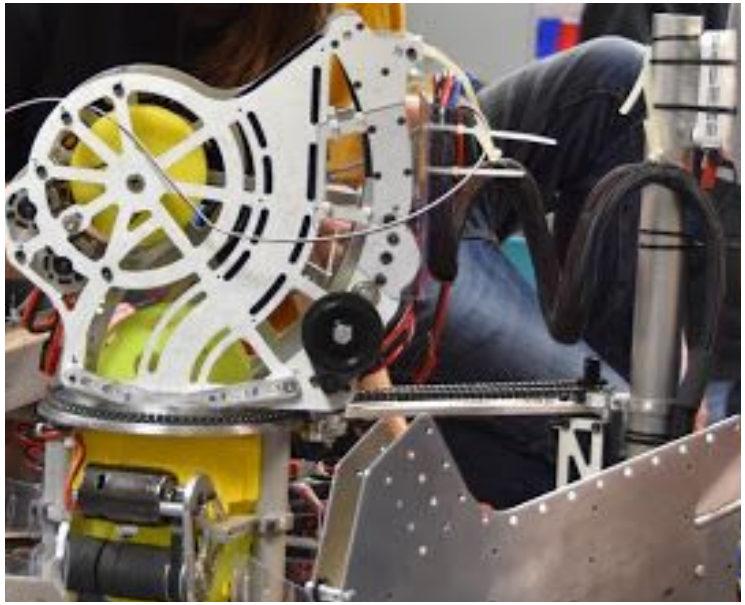
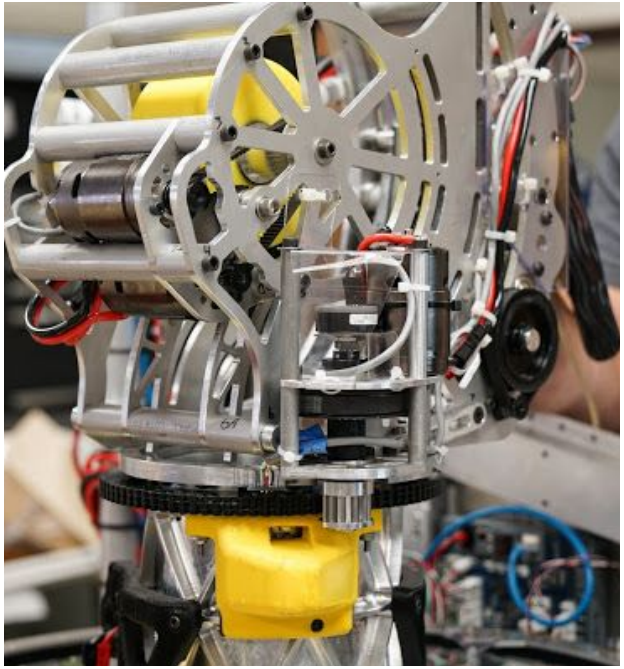
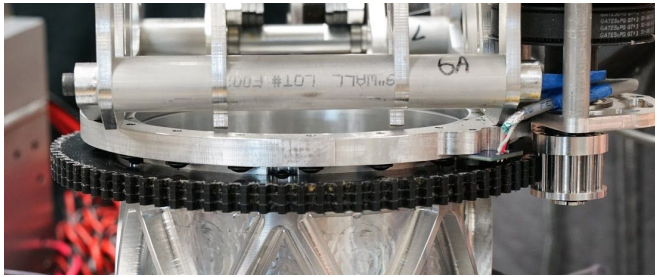
Turret







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Serializer/Turret Controls

- Sensors
  - Hall Effects
  - Encoder
- Really interesting problem since we spin the turret by spinning a motor connected to the serializer.
- We use a state space controller (with really awesome math)

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