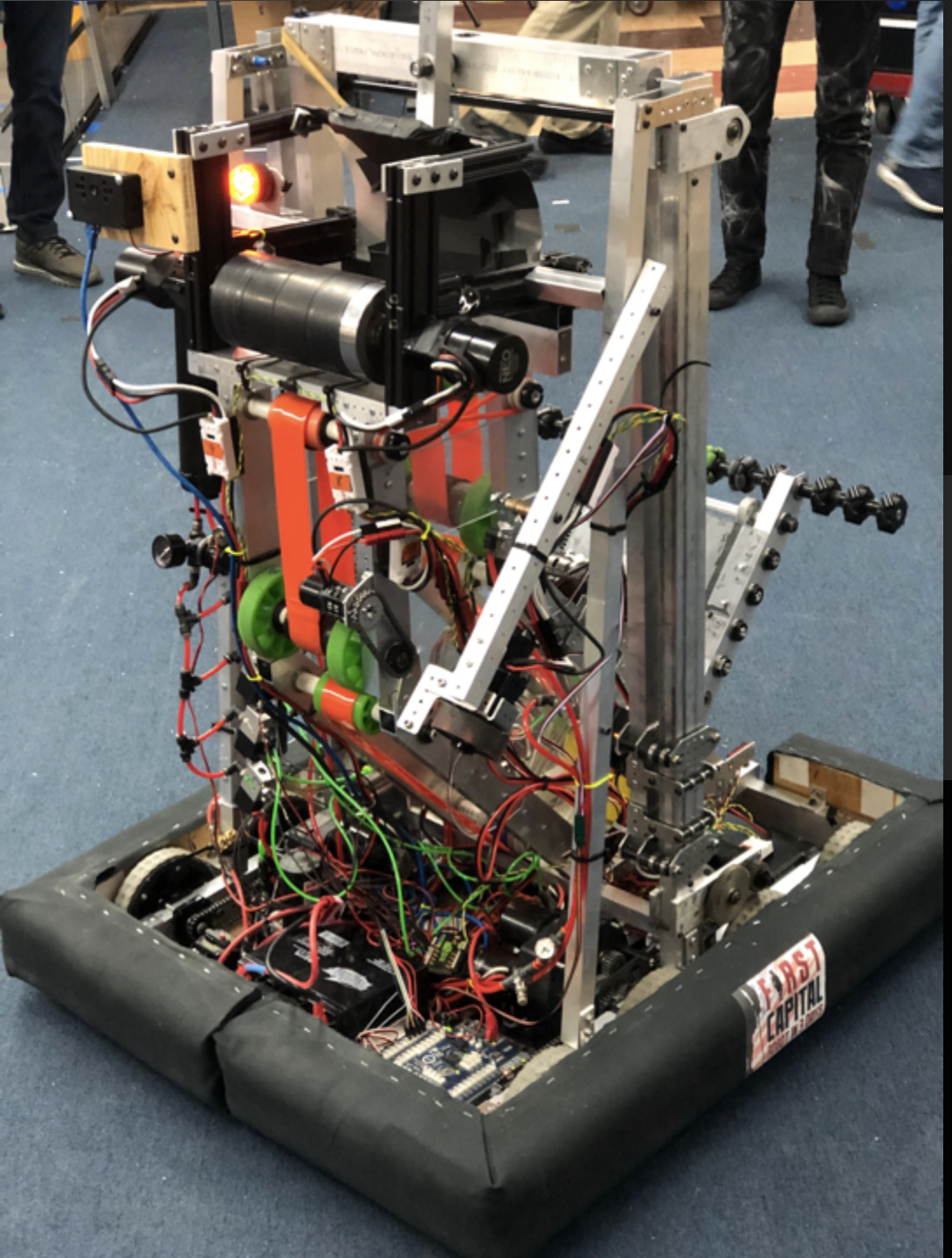


FIRST Capital Robot in 3 Days

2020 AndyMark Debrief

Products Provided By AndyMark

- Game Piece
- Swag Pack
- Pneumatic Cylinder Ends
- 12 AWG Silicon Wire
- 2x1x1/16” Aluminum Box Tube
- Peanut Extrusion
- ½” Churro
- 2” Omni Wheels
- 2.25” & 3” Compliant Wheels
- 2” Stealth Wheels
- Flyer Overdrive Gearbox

Use of each provided product during Ri3D 2020 is covered in this document

Check out our video series here:
https://www.youtube.com/playlist?list=PLkZ6_Ld1x9Y8Il0Qrzvx3vujqxQbAT9o2

Over 60 Videos!

Game Piece

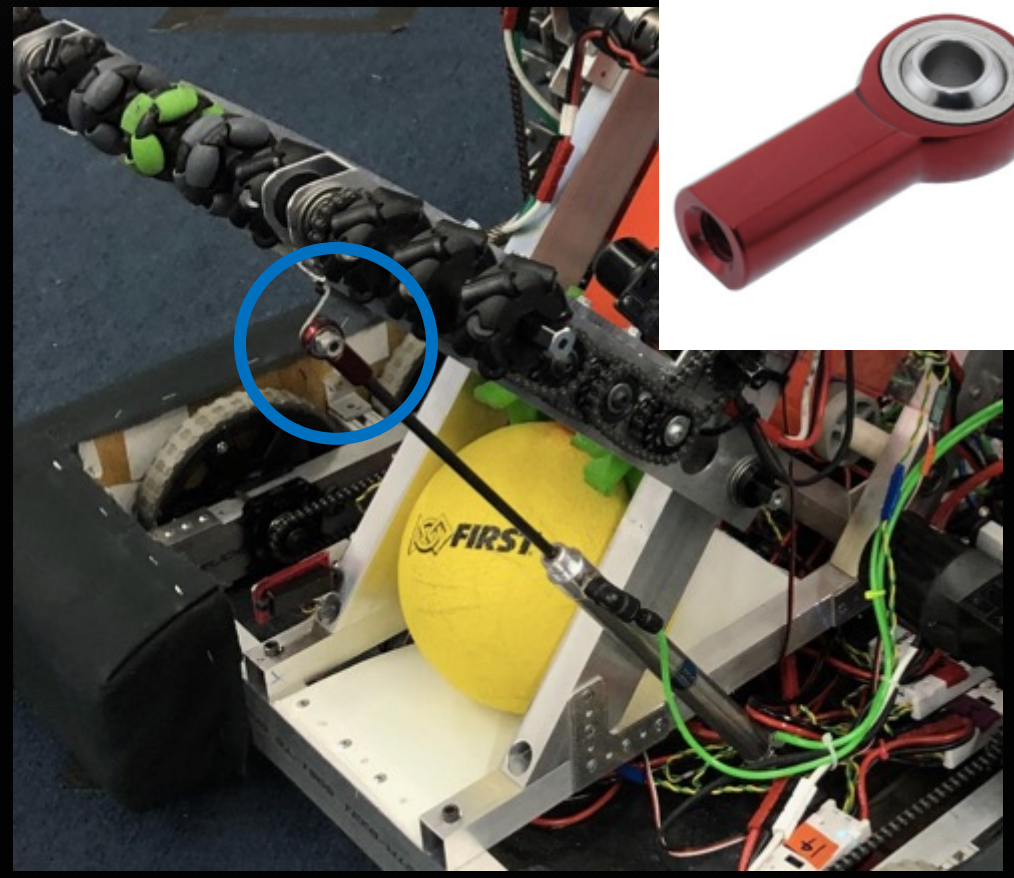
- Having a 2nd game piece (including 225's game piece and the AndyMark game piece) was incredibly valuable for showing teams interactions between balls
  - Especially international teams, who might wait weeks to get their game pieces
- Thank you AndyMark for providing us with a game piece this year!

Swag Pack

- Our viewers got win some AndyMark swag – we gave away the shirts provided on our live shows for the viewers and provided additional promotion for AndyMark!
- The AndyMark Goat accompanied us throughout the build, several times hanging out in the goal or on the robot

Pneumatic Cylinder Ends

- Awesome utility for teams
  - Aluminum, lighter than traditional pneumatic clevises provided with cylinders
  - Ball end makes them easier to attach to mechanisms
- We used a rod end do drop our intake with a 7” pneumatic cylinder



12 AWG Silicon Wire

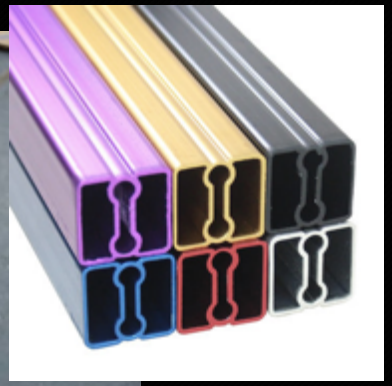
- Super useful and easy to use
  - Wire is able to curl around corners much easier than traditional zip cord frequently used in FRC
- Made it super easy to run wire deep in our robot – used to make several connections between PDP and various mechanisms

2x1x1/16” Aluminum Box Tube

- Very useful for robot structure
  - Thin and lightweight, can use for almost any robot structure
  - 6061 is good quality aluminum for robot-building vs. worse grades like 6063 you might find at the hardware store
  - Potentially can be used for drivetrains in some games
- We used this aluminum to build the majority of our indexer structure, our climber structure and our intake arms
  - ***(almost the whole robot)***

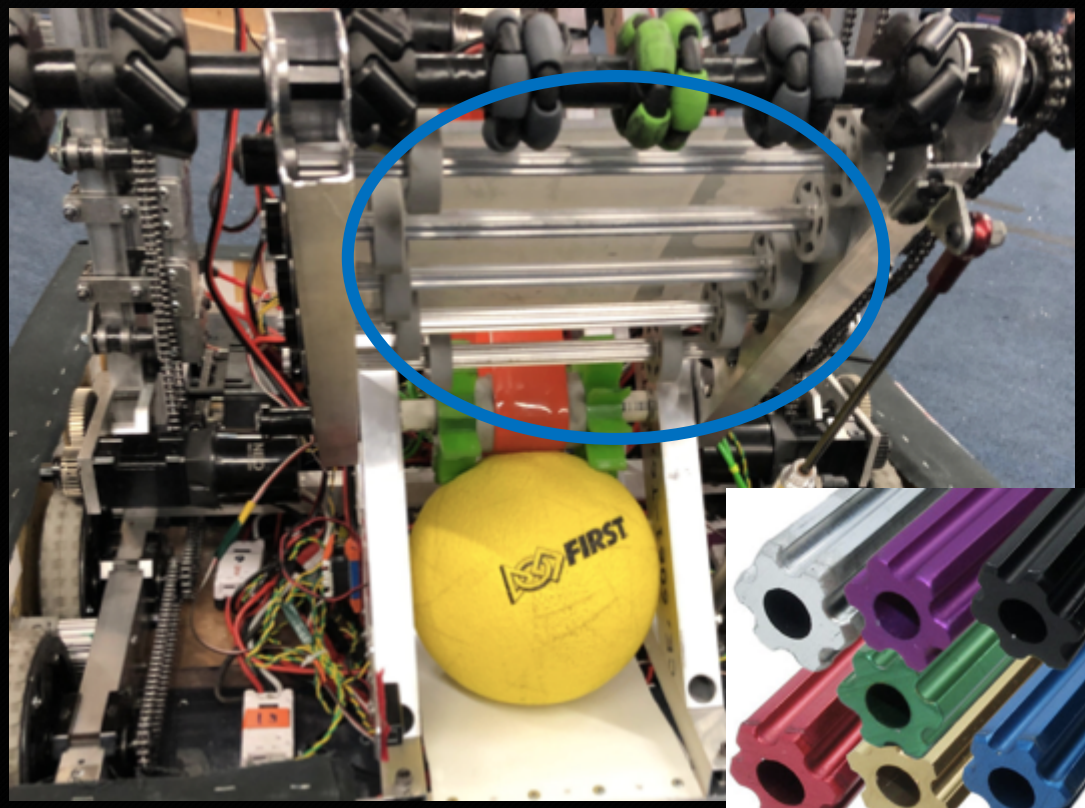
Peanut Extrusion

- Useful for making standoffs that don’t twist
  - Tap the 2 holes in the peanut to make a quick standoff
  - Lightweight compared to other solutions like 80/20 and less complicated than making plugs for tube
  - Often easier than gussets
- We used the peanut extrusion to connect our climber superstructure to our shooter superstructure



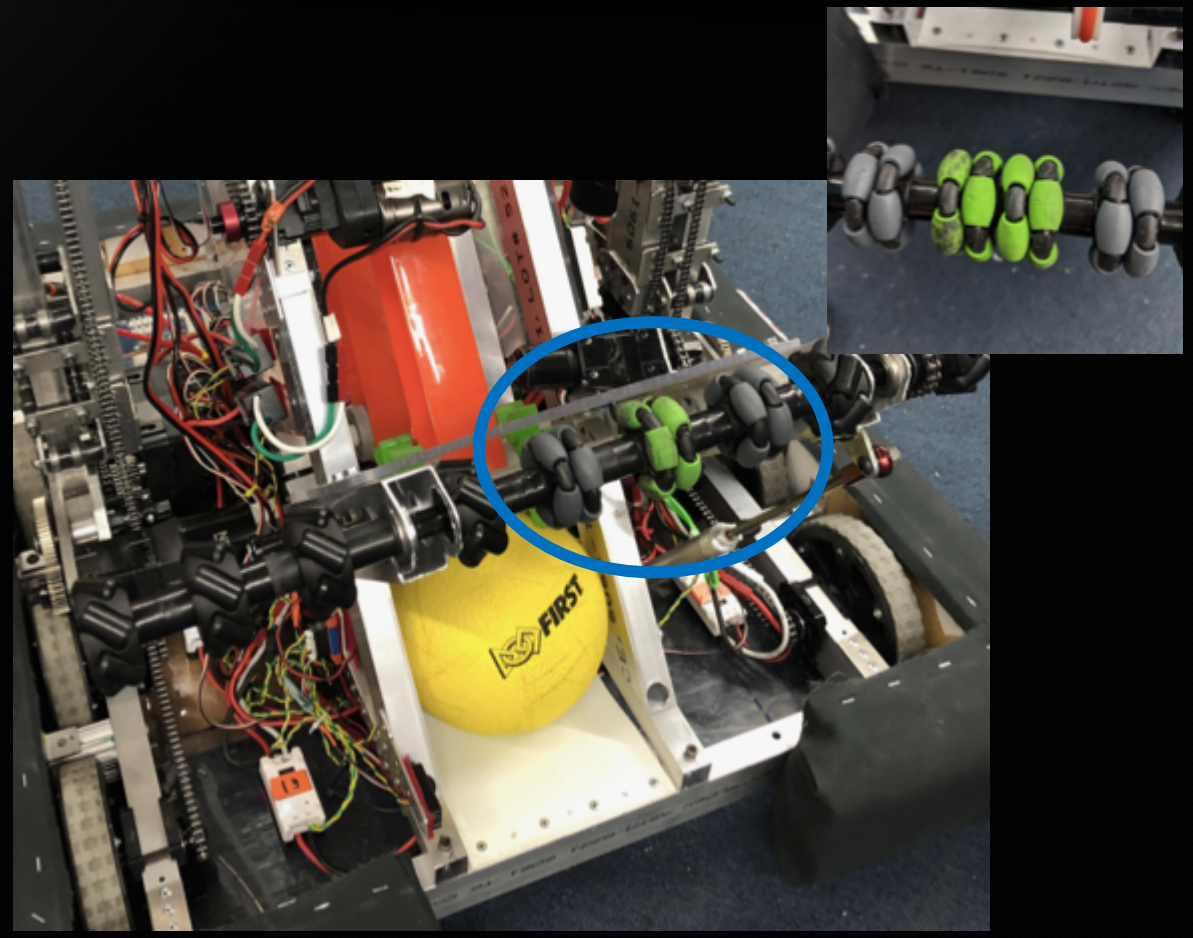
½” Churro

- Useful as hex shaft or as a standoff
  - End is easily tapped to ¼”-20
  - Useful as a roller in intakes
  - Comes in many colors!
- We used many churro rollers as rollers for moving the ball between our initial intake roller and the indexer
  - The ball rode directly against the metal churro, so it was a true ”roller”



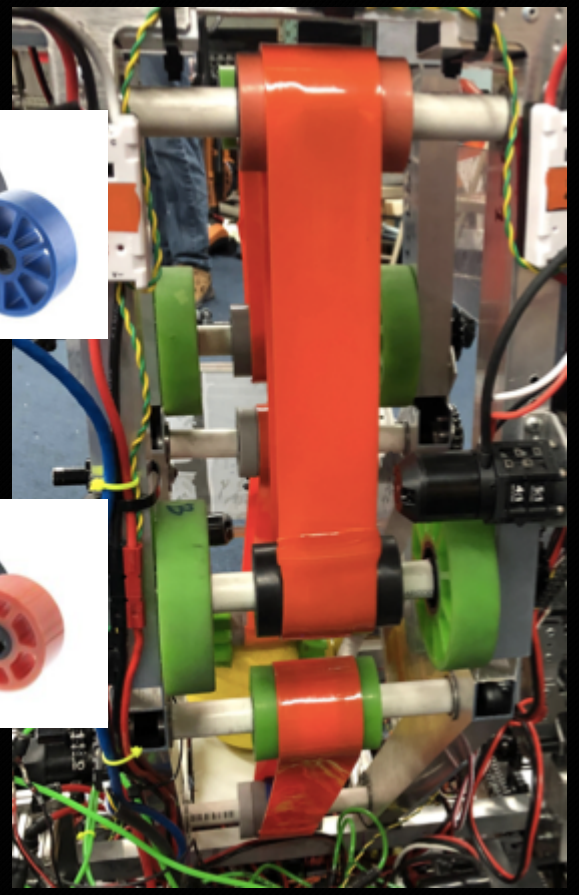
2” Omni Wheels

- Very useful in intakes
  - Allows teams to move a ball without sideways resistance
  - Small, useful 2” profile
  - 35A and 60A options – AM provided the 60A versions this year
- We used the Omni wheels in the center of our front intake roller



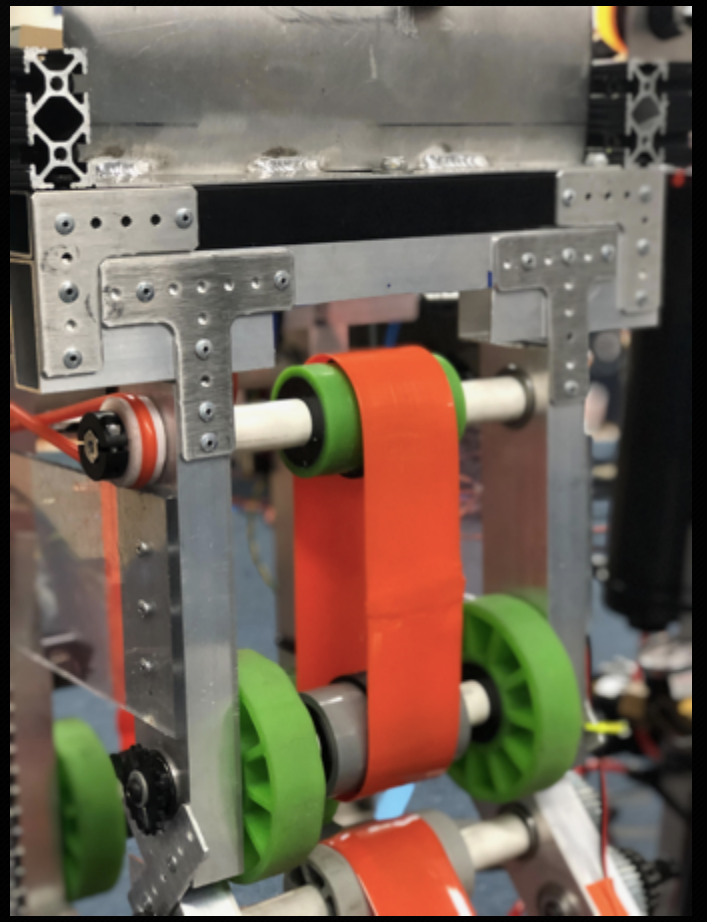
2.25” & 3” Compliant Wheels

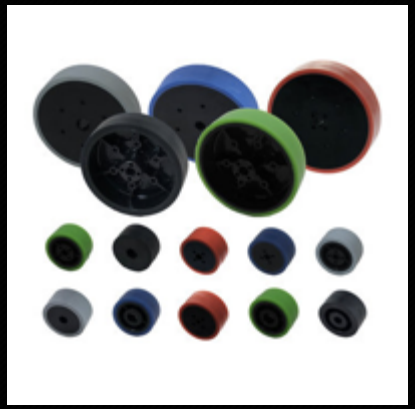
- Incredibly useful for ball movement in robots
  - Multiple different durometers for whatever the need
- Wheels can also be used for crowned rollers for flat belt
  - Our belt pulleys were 2.25” compliant wheels surrounded by 2 2” stealth wheels
- Did not use 3” compliant wheels on final robot, but did use for prototyping
  - Many 4” green compliant wheels were used on the indexer to manage ball transitions



2” Stealth Wheels

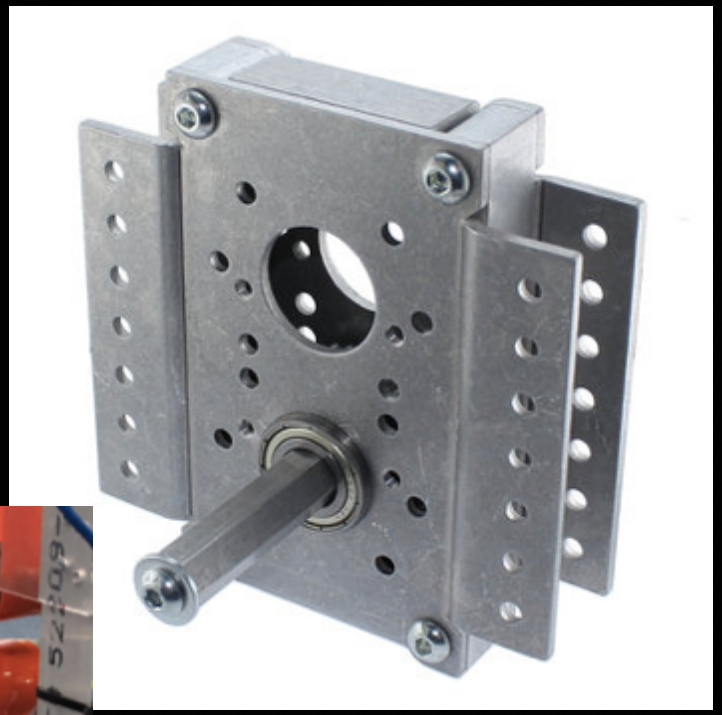
- Also incredibly useful for ball movement in robots
  - Multiple different durometers for whatever the need
- Useful for when compliance is not needed
- Wheels can also be used for crowned rollers for flat belt
  - Our belt pulleys were 2.25” compliant wheels surrounded by 2 2” stealth wheels

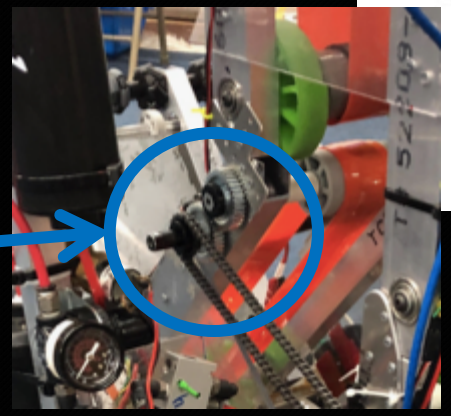




Flyer Overdrive Gearbox

- Very useful for teams looking to overdrive their shooter wheels
  - Teams looking to use 2 shooter motors geared faster can use 1 on each side
- FIRST Capital Ri3D felt showing rapid-fire shooting was important and felt we needed 2 brushless motors to do this in a way most useful to teams. With only 1 flyer gearbox, we were unable to show the gearbox as designed during the stream
  - However, we used the AM gears from the gearbox for reversing direction on our indexer belts





Thank You AndyMark !!!