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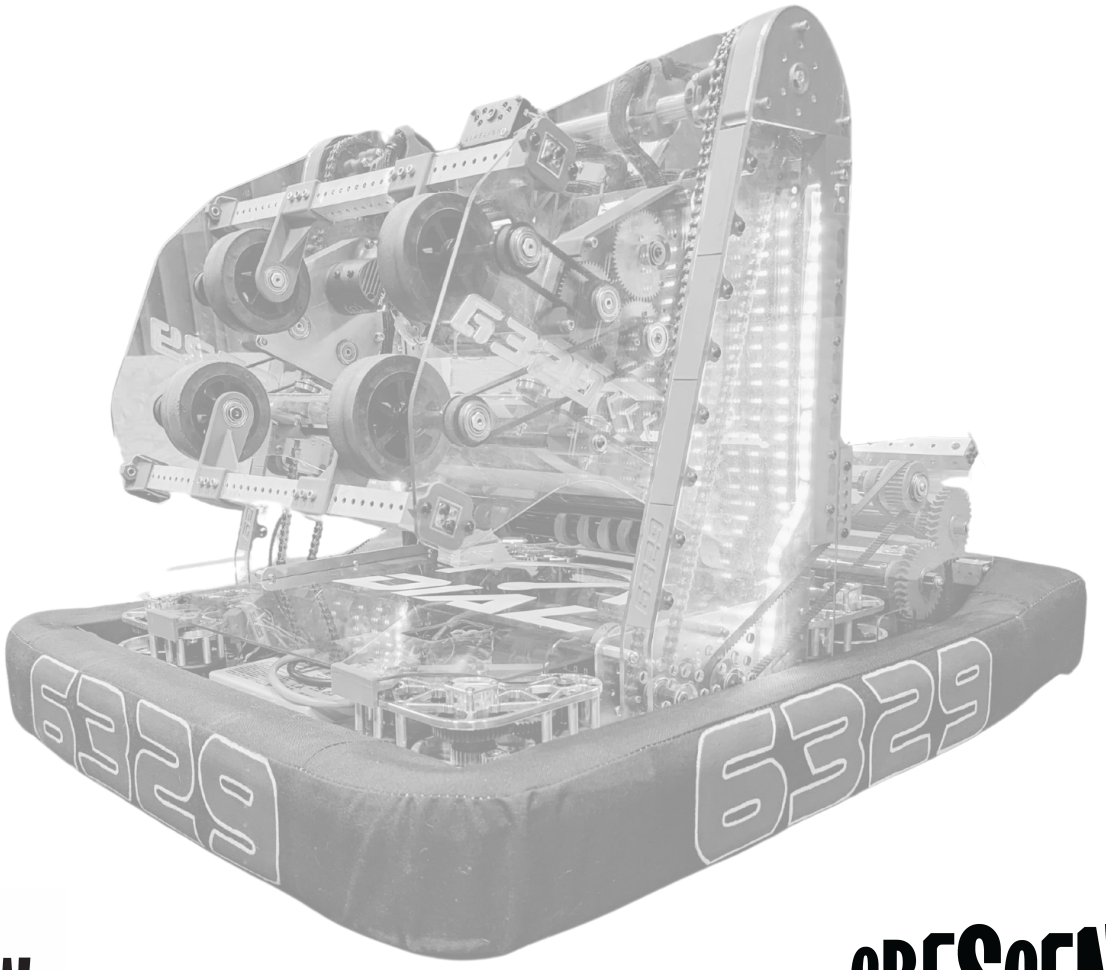
TECH BINDER



FIRST IN SHOW
PRESENTED BY Qualcomm

CRESCENDO℠
PRESENTED BY HAAS Gene Haas Foundation

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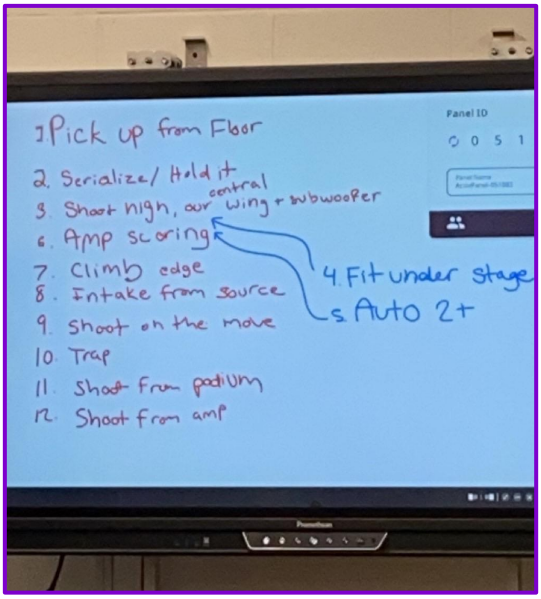
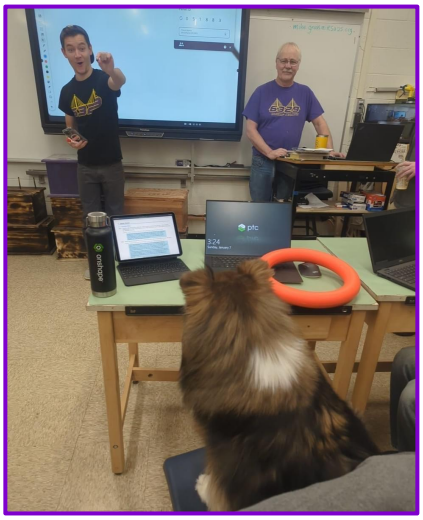
GAME BREAKDOWN

PRIORITY LIST

SEASON PRIORITIES ON KICKOFF

1. Intake note from ground
2. Serialize and hold note
3. Shoot into speaker from inside alliance wing
4. Be able to drive under stage
5. 2+ note auto into speaker
6. Be able to score into amp
7. Climb and climb on edge of chain
8. Intake from source
9. Shoot on the move
10. Shoot into trap
11. Shoot from podium-protected zone
12. Shoot from amp-protected-zone
13. Microphone shot



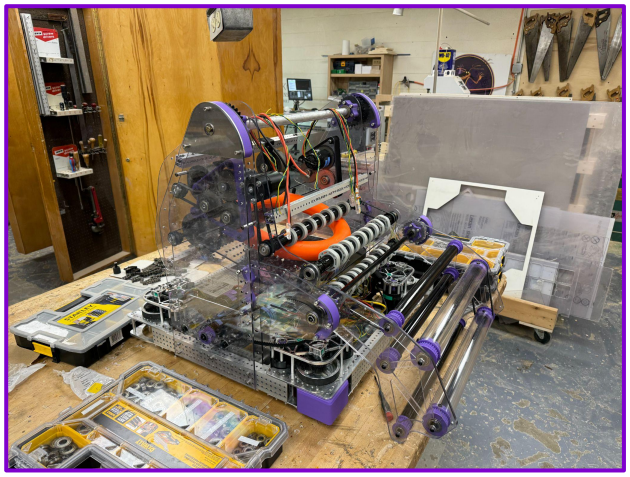


PROTOTYPING PROCESS

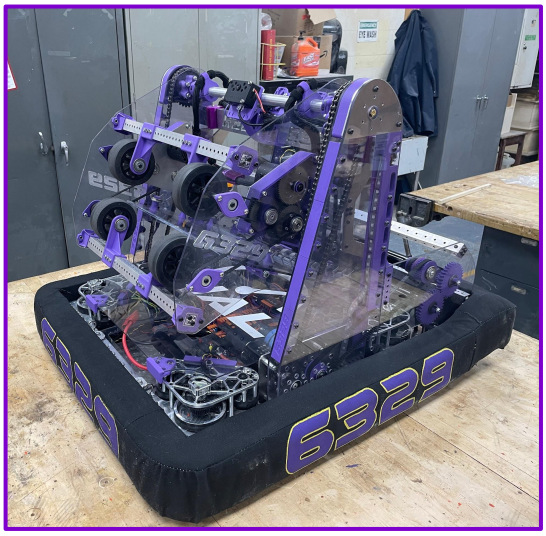
DESIGN PROCESS

1. Brainstorm possible solutions as large group
2. Divide into groups of three to make crude wooden prototypes to test the validity of the design.
3. Regroup and present prototypes to narrow down options.
4. Refine remaining prototypes out of wood.
5. CAD and machine prototypes out of wood.
6. Machine out of more robust materials and integrate motors.
7. Present solutions and choose a final design to integrate into robot.

PROTOTYPE



FINAL DESIGN



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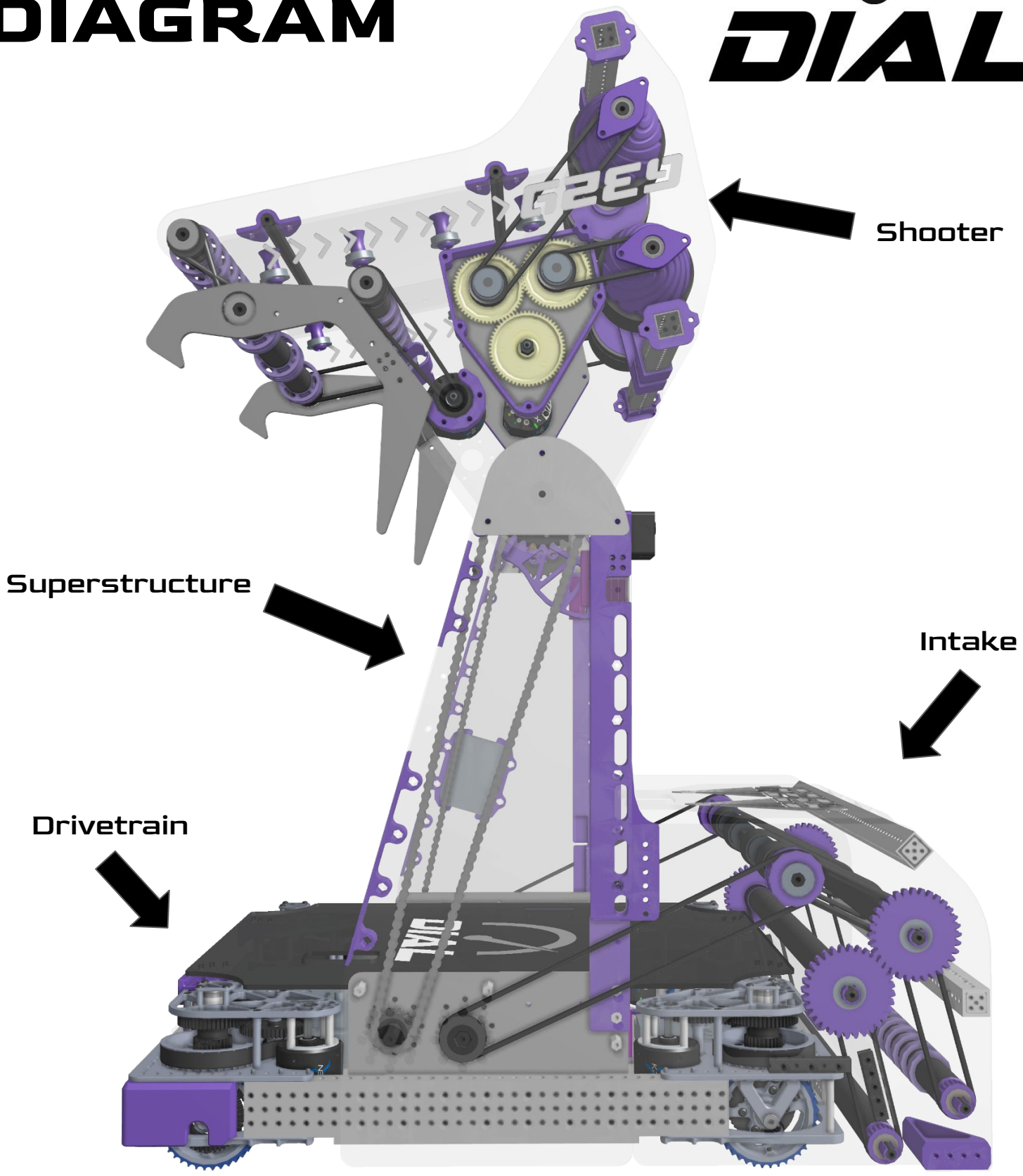
THE BUCKS' WRATH

PRESENTS

DIAL

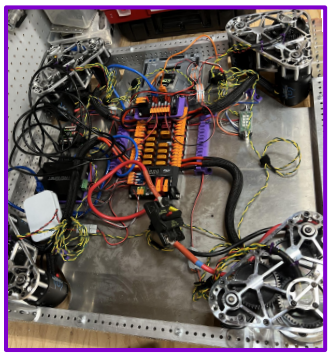
ROBOT DIAGRAM

DIAL

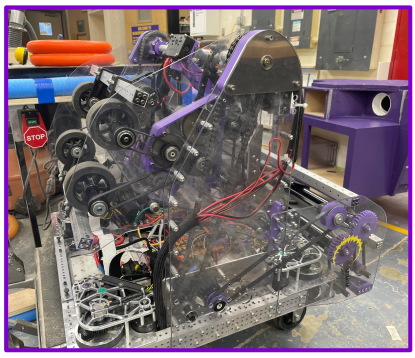


Designed In onshape®

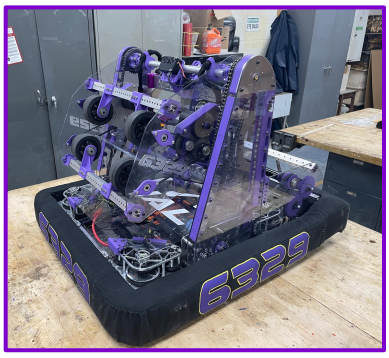
DRIVETRAIN



Base Chassis



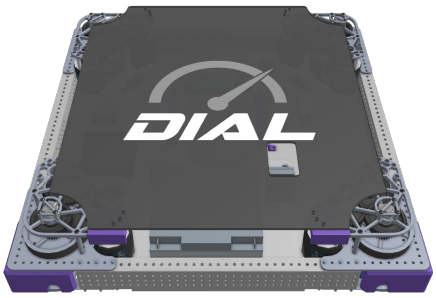
Eggo

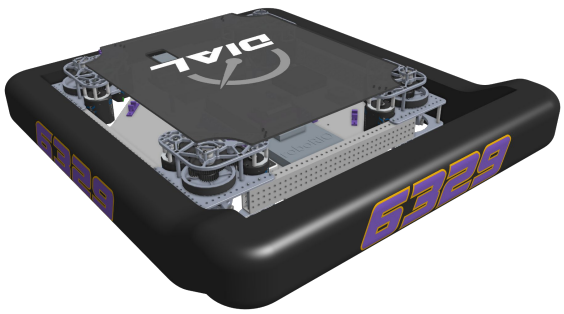


Dial

MECHANICS

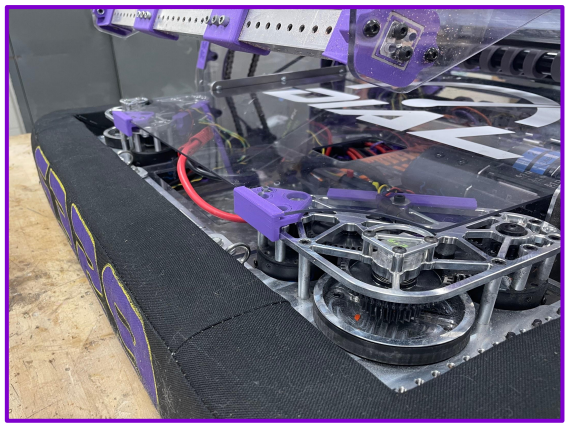
- 26”x 26” drivetrain perimeter
- 26.5” x 31.5” frame perimeter
- 118.5 lbs
- SDS MK4i L3 swerve modules
- Drive and steering powered by Kraken X60
- Free speed of 17.1 ft/s
- 1/4" aluminum belly pan

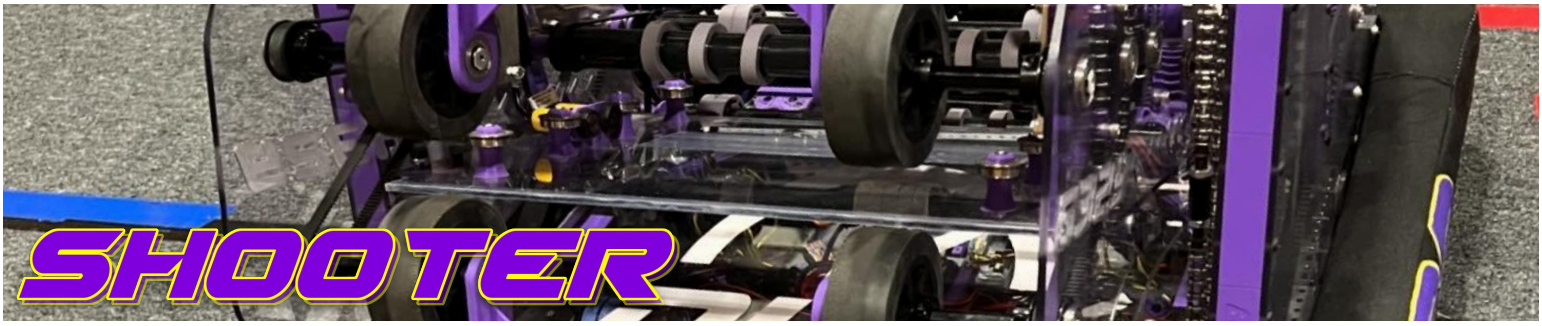




CONTROLS

- Field oriented driver control
- Cardinal directions for robot orientation using a Pigeon

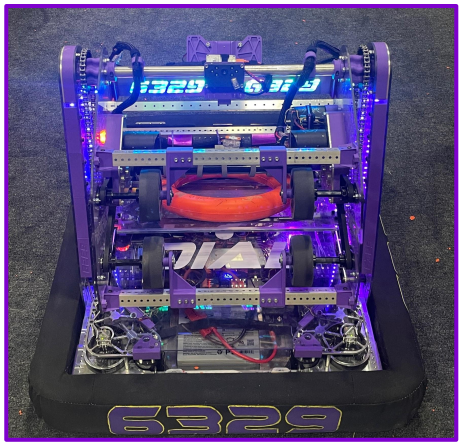




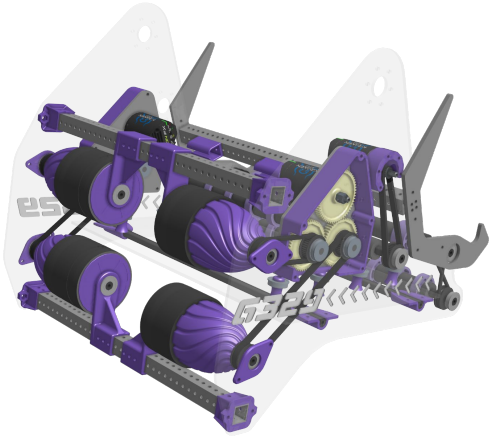
SHOOTER

MECHANICS

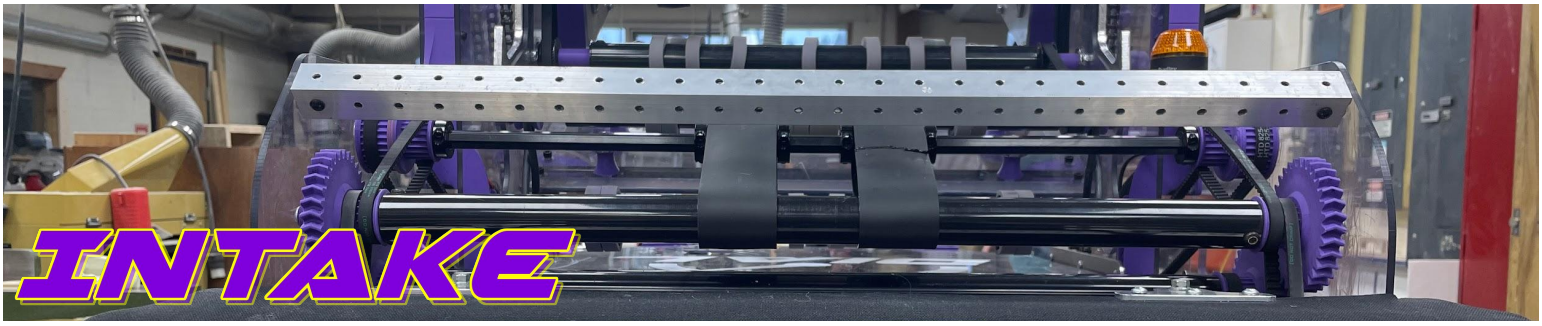
- VersaRoller serializer with flex wheels for grip
- Kraken X60 powered serializer with a 1:2.25 ratio
- Two Kraken X60 running a gearbox ratio of 29:27 powering two sets of 4” urethane wheels. The left side is spinning at 90 rps and the right is 60 rps
- Added 4” Stealth Wheels for more shot rotation
- 1/4” aluminum hooks for climbing
- Two Kraken X60 motors with 80:1 gearbox ratios with a 5:2 sprocket ratio mounted to superstructure to pivot the shooter
- Centering using bearings



CONTROLS

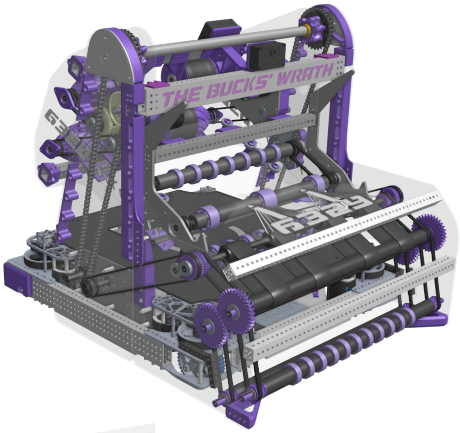


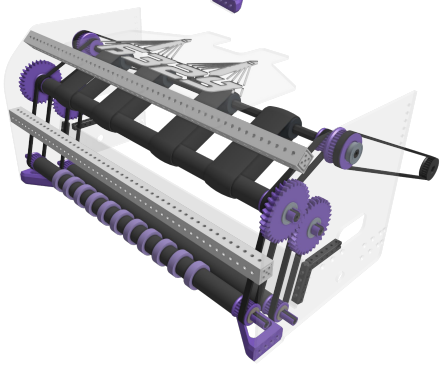
- Preset shooter positions for amp, subwoofer, and trap
- Limelight camera used to track april tags
- Shooter automatically adjusts angle and drivetrain orientation based on distance to target
- Shooter automatically adjusts the target location using the x and y velocity of the robot to be able to shoot on the move



INTAKE

MECHANICS

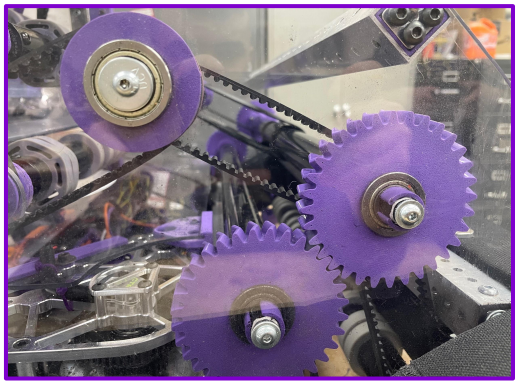


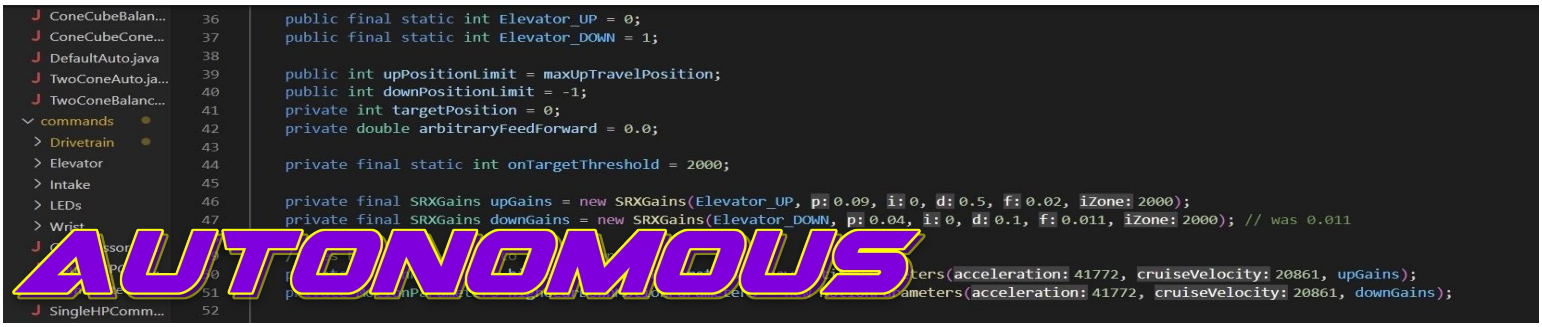


- Under the bumper intake to provide robustness and speed to the intake
- Two Falcon 500 motors on 3:1 MAXPlanetary gearboxes
- 26” inside width
- Four dead axle intake rollers with 1.25” VersaRoller and one live axle roller
- 3d printed pulleys and gears to spin the intake
- 3d printed deflectors to help center notes in the robot

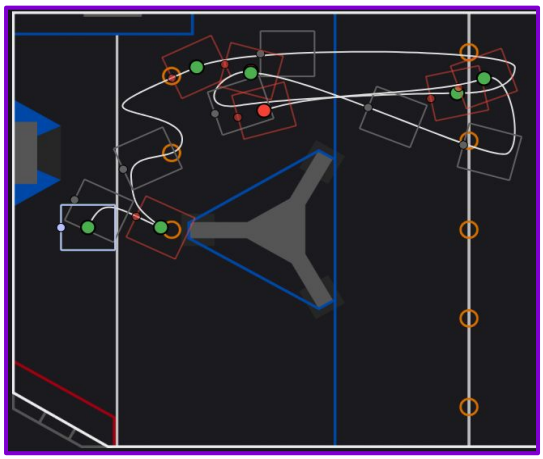
CONTROLS

- Autonomous intake using a Limelight with a machine learning program that creates a trajectory to center the note drive the right distance
- Manual intake for notes that are visible to the driver
- LED lights flash when intaking, when a note is collected the LEDs stop blinking to communicate that we have a note
- Dual infrared sensors to detect when a note is in the robot which allows us to automatically stop the intake



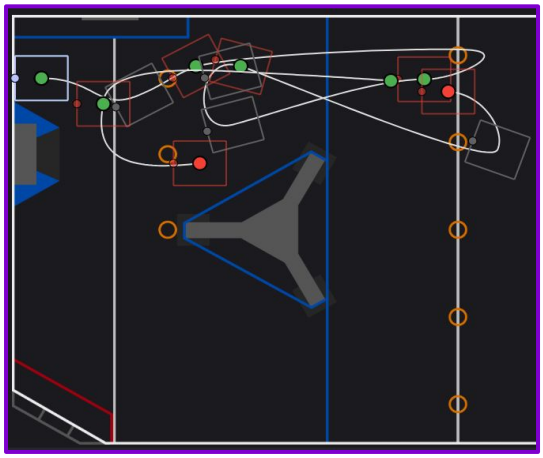


AUTO MODES

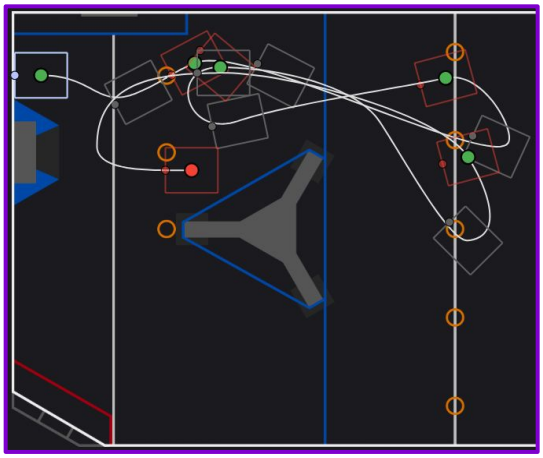


6 Note Auto

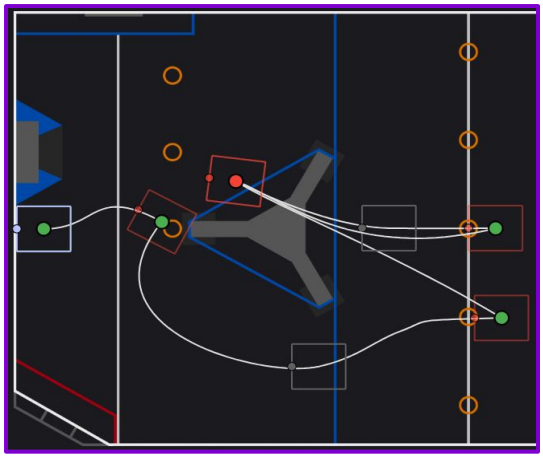
We use path planner for our autonomous routines. The robot uses the trajectories to drive across the field with extreme precision. The robot also uses autonomous aiming and intaking using the limelights to increase reliability for note scoring.



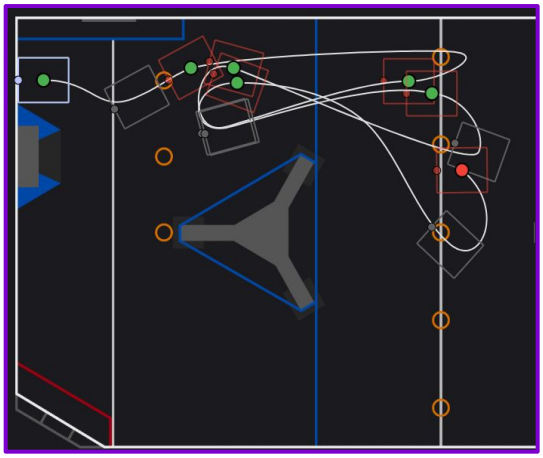
5 Note Auto V1



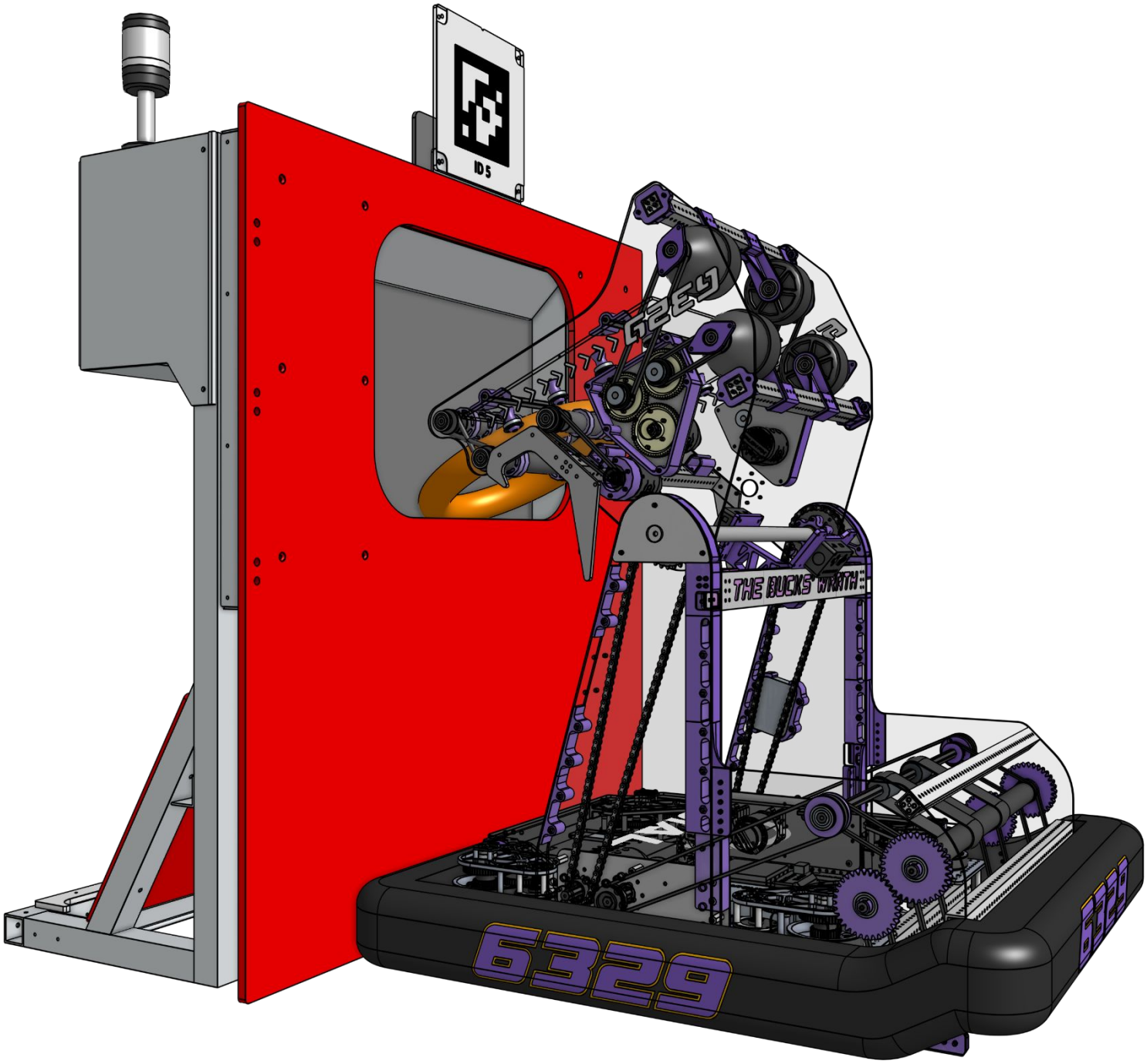
5 Note Auto V2



4.5 Note Auto V1



4.5 Note Auto V2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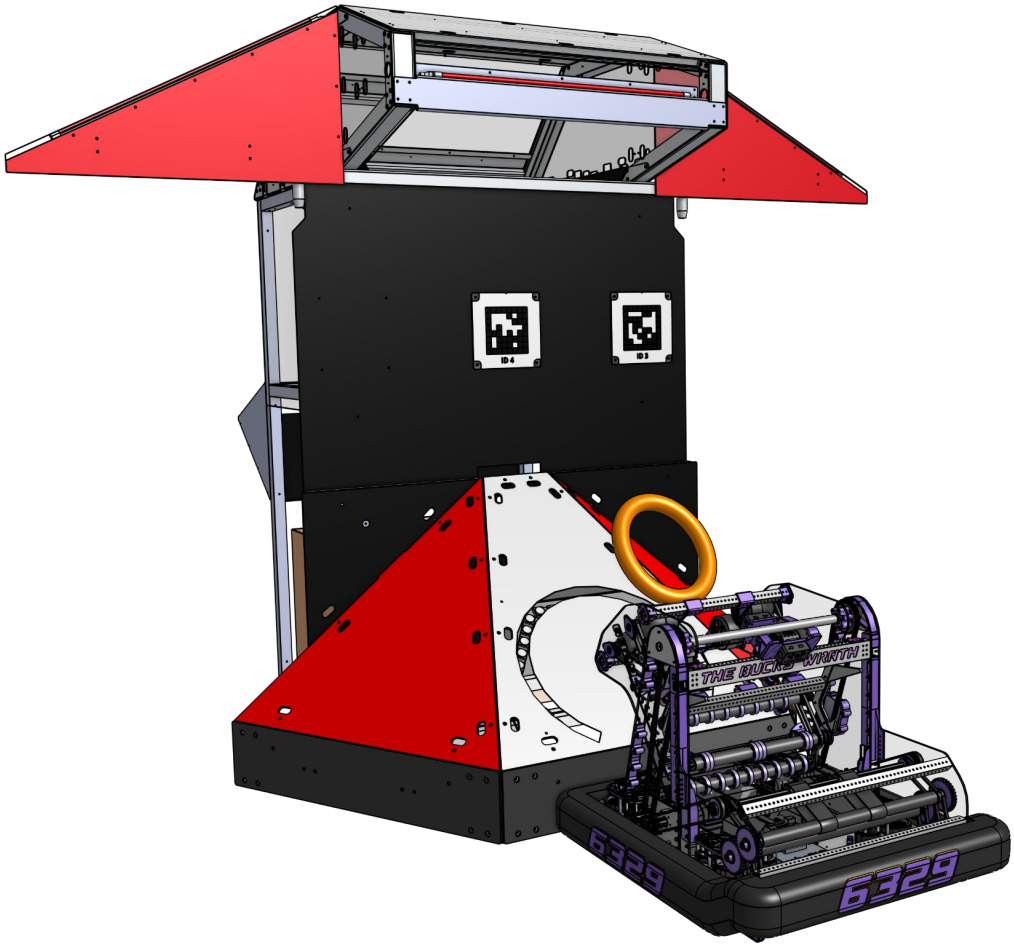
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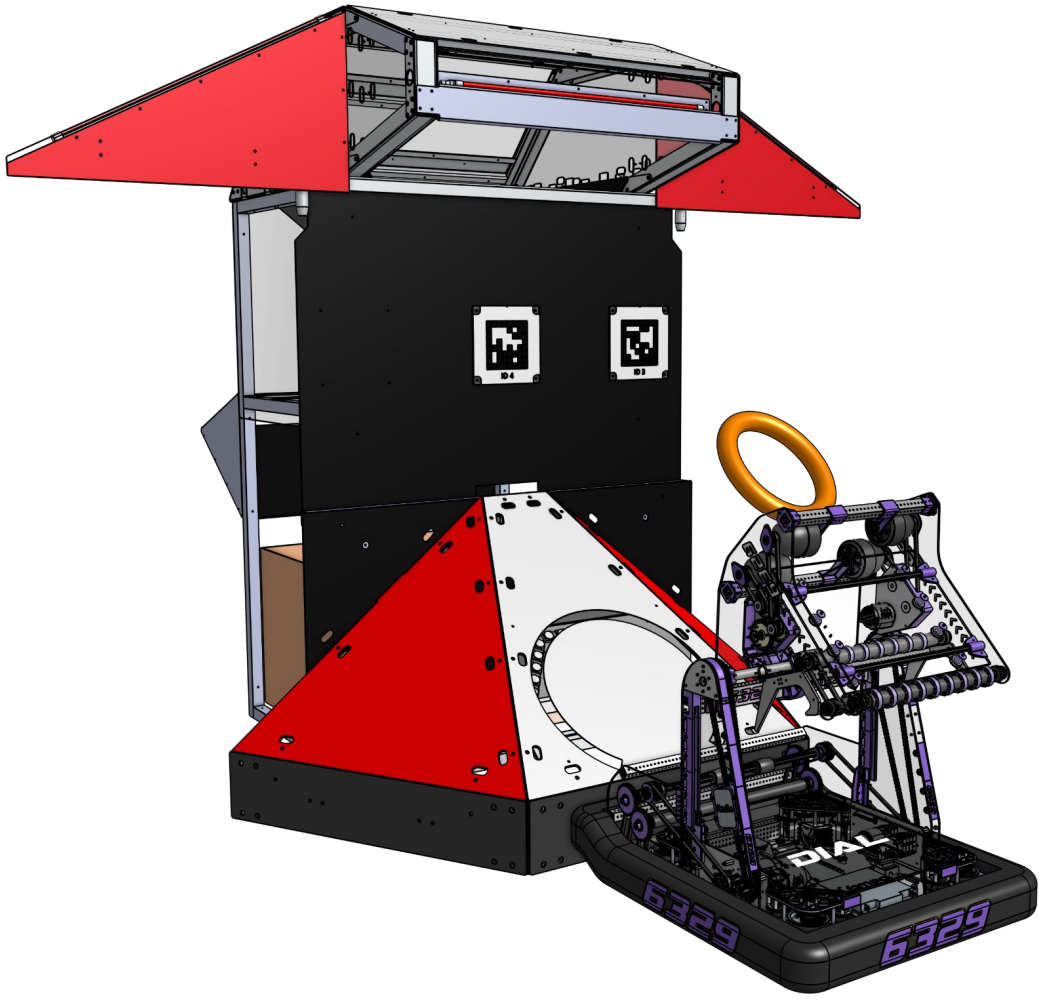
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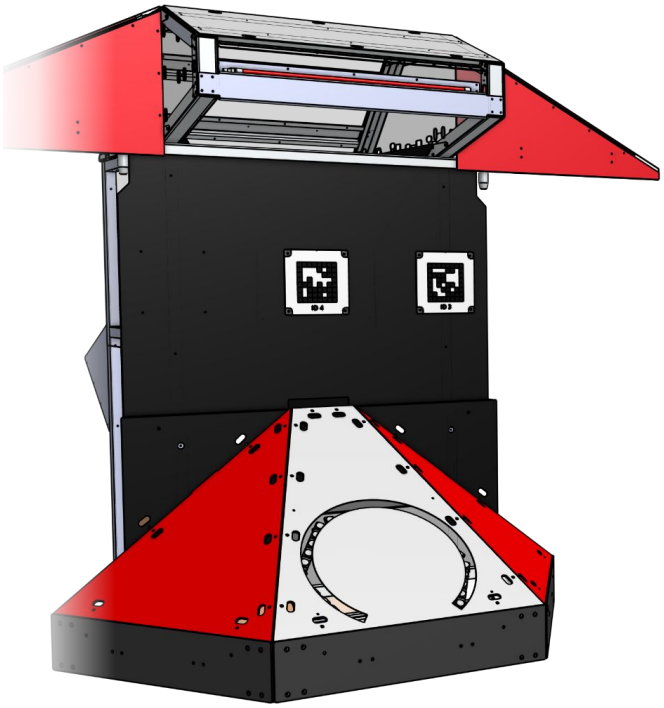

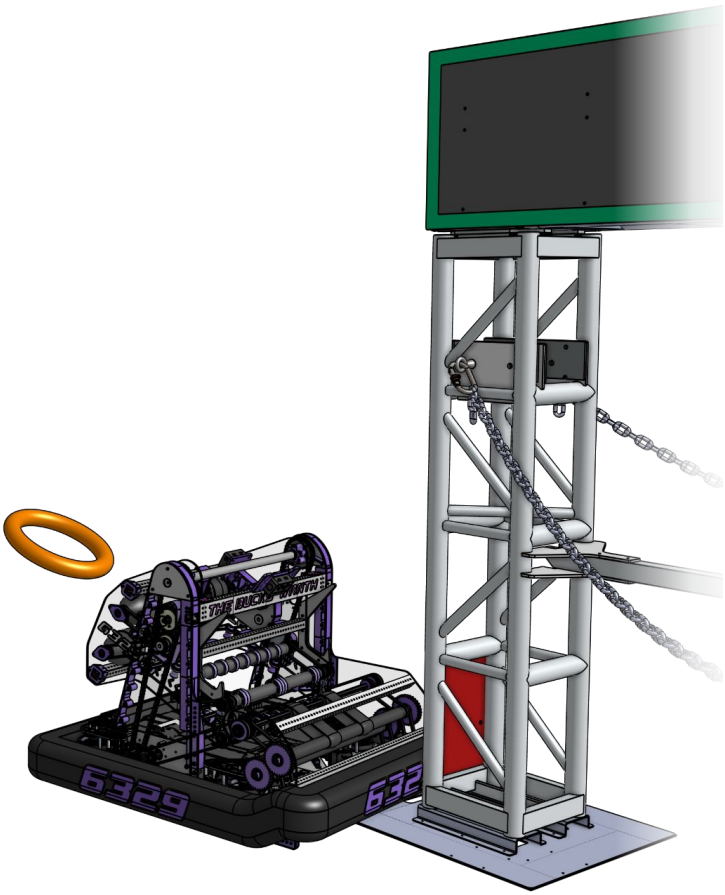
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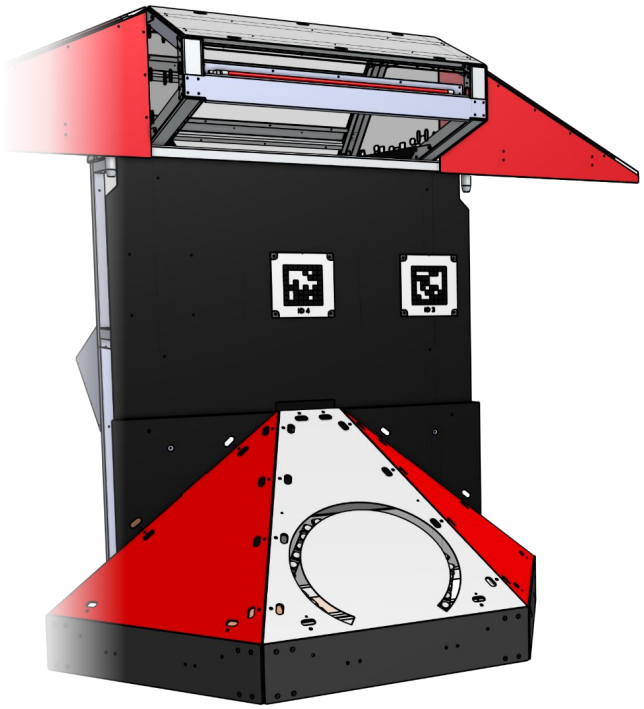

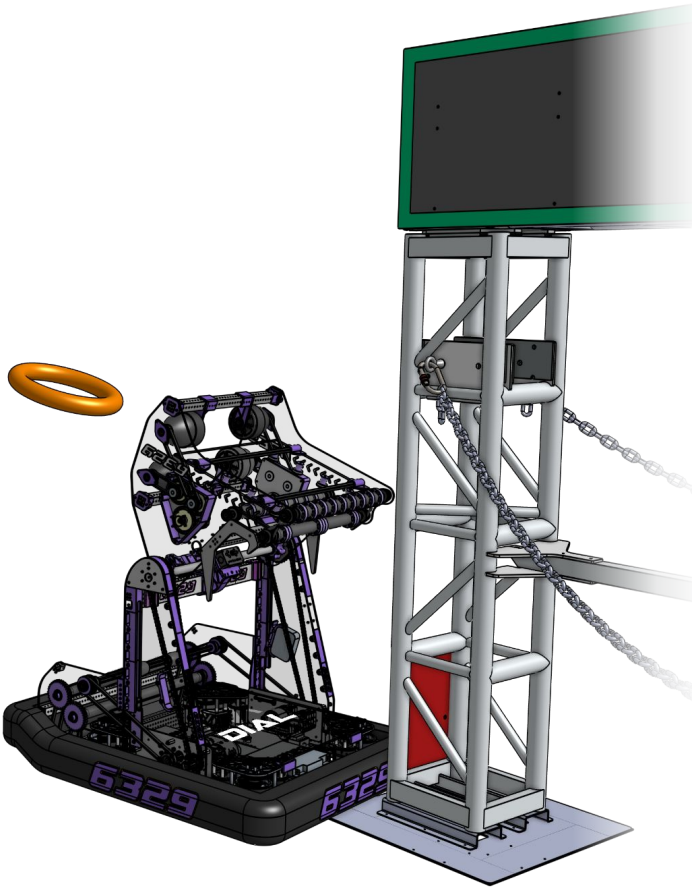
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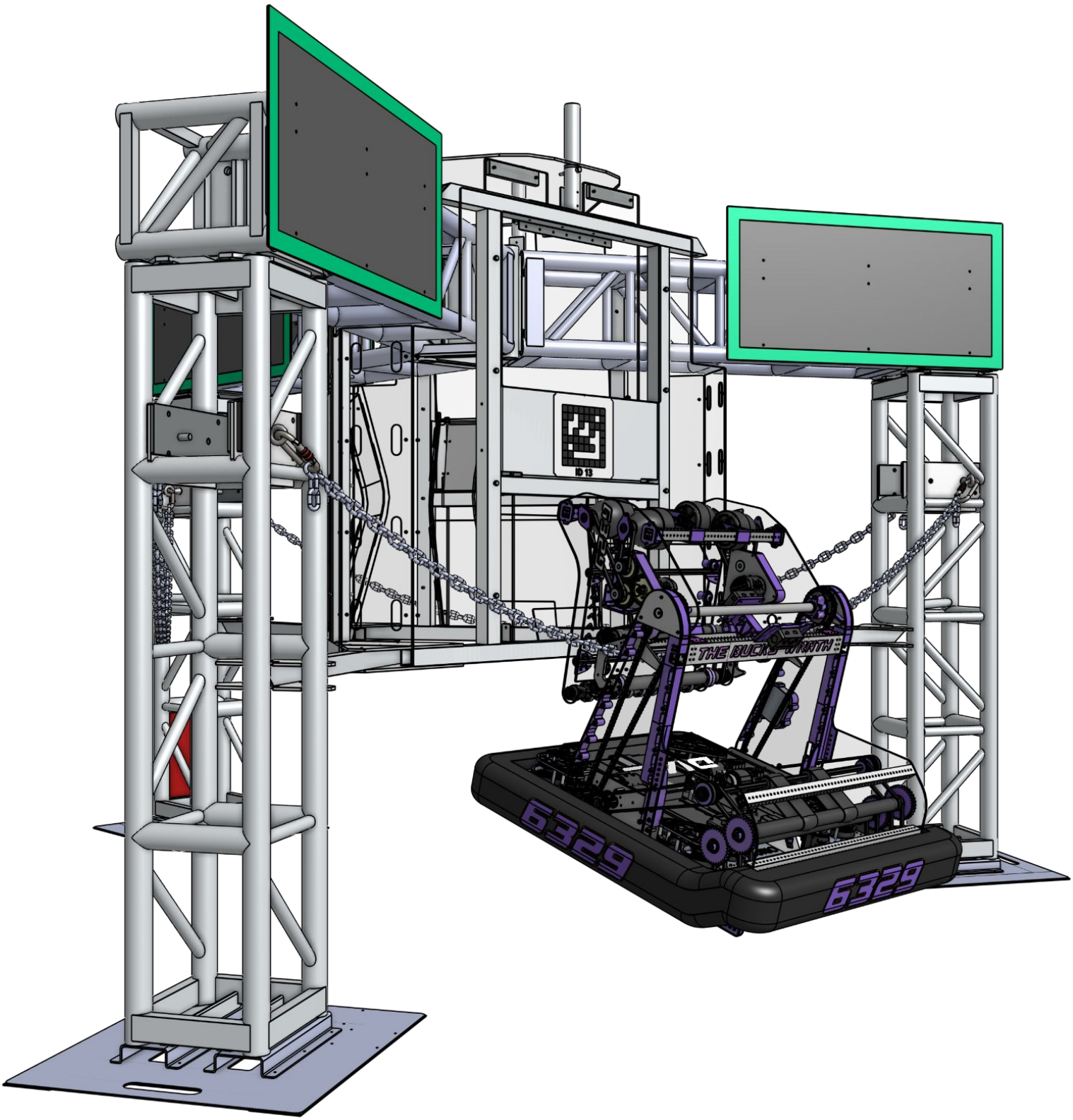
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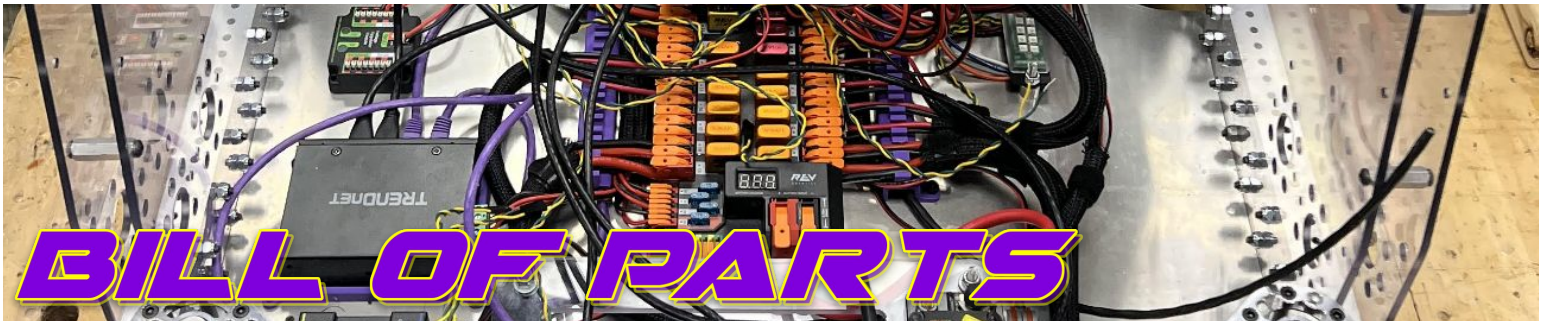

Part	Quantity	Vendor
Electronics		
RoboRio	1	Andymark
Open Mesh Radio	1	Andymark
Power Distribution Hub	1	REV
TPLink SG105	1	Amazon
Radio Power Module	1	REV
Pigeon 2	1	CTRE
Mini Power Module	1	REV
CANdle	1	CTRE
LED Lights	1	Amazon
120A Breaker	1	Andymark
Limelight 3	2	Andymark
Google Coral	1	Andymark
Voltage Regulator Module	1	CTRE

Shooter		
Kraken X60	3	WCP
120T 3mm Belt	1	WCP
180T 3mm Belt	2	WCP
100T 3mm Belt	2	WCP
0.1875” Polycarbonate	406in^2	
0.0625” Aluminum Tube	57”	Bangor Steel
0.1875” Aluminum Plate	49in^2	Bangor Steel
0.25” Aluminum Plate	31in^2	Bangor Steel
0.0625” Aluminum Tube	78in	Bangor Steel
0.5” Hex Shaft	126”	WCP
0.5” Thunderhex Bearing	20	WCP
Versaroller	49”	Vex
1x1in Tube Plug	6	WCP
36T 3mm Pulley	11	WCP
16T 3mm Pulley	1	WCP
54T 20DP Gear	4	WCP
58T 20DP Gear	2	WCP
0.375” Round Bearing	4	WCP
4” Solid Urethane Wheel	4	Thriftybot
2” Straight Flex Wheel	8	Vex
1.625” Straight Flex wheel	17	Vex

Part	Quantity	Vendor
Drivetrain		
mk4i L3 module	4	SDS
Kraken X60	8	CTRE
CANcoder	4	CTRE
0.125” Smoked Polycarbonate	484 in^2	WCP
0.125” Aluminum Tube	68 in	Bangor Steel
0.25” Aluminum Sheet	498 in^2	Bangor Steel
0.1875” Polycarbonate	474in^2	Amazon

Superstructure		
Kraken X60	2	WCP
80:1 MAX Planetary	2	REV
#35 Chain	260 links	WCP
0.1875 Aluminum	119in^2	Bangor Steel
0.875 Aluminum Rod	25.75in	McMaster-Carr
1x1” Aluminum Tube Plug	2	WCP
0.125” Aluminum Tube	23.625in	Bangor Steel
0.5” Thunderhex Bearings	2	WCP
0.1875” Polycarbonate	820in^2	
30T Plate Sprocket	2	WCP
12T 0.5” Hex Sprocket	2	WCP
0.875in Brass Bushing	2	McMaster-Carr

Intake		
Falcon 500 Motors	2	Vex
3:1 MAXPlanetary	2	REV
0.5” Hex Shaft	78.5”	WCP
0.375” Hex Shaft	52”	WCP
0.1875” Polycarbonate	372in^2	
1.25” Versaroller	88”	Vex
1.625: Flex Wheel	15	Vex
80t 5mm Belt	2	WCP
85t 5mm Belt	2	WCP
65t 5mm Belt	2	WCP
165t 5mm Belt	2	WCP
.0625” Aluminium Tube	26”	Bangor Steel
0.125” Aluminium Tube	26”	Bangor Steel

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OAK RIDGE CUSTOM CONSTRUCTION
OLE' TIME WOODSMAN
OPERA HOUSE VIDEO
UNIQUE ROCK SHOP
VIKING LUMBER

MISSION STATEMENT

FRC Team 6329, Bucks' Wrath Mission:

To cultivate a comprehensive understanding of engineering by actively engaging in the process of planning, constructing, and programming robots to be competitive in each year's game challenge. To foster an environment that encourages open-minded communication, collaborative spirit, and cohesive team efforts, all aimed at realizing our shared objective of excellence in our community..

TEAM HISTORY & GROWTH

First year (2017):
- Won "Rookie's Highest Seed" Award
- Won "Rookie Inspiration" Award
- Ended the season at World competition

Second Year (2018):
- Won "Excellence in Engineering" Award
- Mentioned on the FRC top 25 on two separate occasions
- Ended the season at World competition

Third Year (2019):
- Reveal video was voted best in the Northeastern Region
- In the second event we won the "Quality" award and the "Industrial Design" Award
- Ended the season at New England Regionals

Fourth Year (2020):
- Went to the SE Mass event
- Made top 10 on First updates
- Ended the season at New England Regionals due to Covid-19

Fifth Year (2021):
- Youtube videos became a prominent aspect to our marketing strategy
- Interviewed by personnel from FRC
- Won the "Autonomous" Award

Sixth Year (2022):
- Won the "Entrepreneurship," "Excellence in Engineering," and "Quality" Awards
- Finalists at both qualifying events as well as the District Championship
- Ranked 1, 4, and 6 in both qualification events and NE Championships respectively
- Qualified for Worlds, but ended the season at New England District Championship

Seventh Year (2023):
- Won the Autonomous, Imagery, and Quality during our regular season events
- Won the Excellence in Engineering Award on the Curie field at the World Championship
- Won the Rhode Island District and UNH District events, and were 3rd Place at the New England District Championship
- Won the Curie Division and were 3rd Place on Einstein as alliance captain.
- Ranked 1st, 1st, 17th, and 3rd in the regionals, district, and Curie division

ORGANIZATIONAL STRUCTURE

Bucksport High School incorporates classes in its curriculum to inspire interest in STEM. Some examples of STEM classes include Intro to CAD, Intro to Engineering and Advanced Engineering. Tasks are divided and shared between team members. Various groups focus on building, electrical system, programming the robot, creating CAD representations and working on team marketing and media.

We continue to expand our program and the success of our team through opportunities in the classroom as well as outreach programs in the community.

RISK ANALYSIS

FRC Team 6329 has a safety manual that explains safety guidelines the team must follow. Safety checks are performed in the pit by our safety captain. Mistakes are marked down and fixed, and all other requirements are checked off. When an incident occurs, the safety captain files a report. This report is signed by two witnesses, a mentor, the injured party, and the safety captain. The form gives a narrative of the incident, first aid performed, and a corrective plan of action.

MARKETING

FRC Team 6329 is more connected with parents, sponsors, and the community through various social media outlets. Our marketing team updates Instagram (*frcteam6329*), Facebook (*Team 6329: Bucksport High School Robotics*), YouTube (*FRC Team 6329 The Bucks' Wrath*), and Tiktok (*frc.team.6329*) using a consistent schedule. Through these platforms, we share photos and videos of our team and robot to build excitement for the sport and instill a sense of pride in our community. The media we produce is also meant to increase exposure for our sponsors and for our team. We make sure to maintain connections with our sponsors each year by providing them with updates and 6329 swag.

FINANCIALS

To financially support our team and the expenses required to attend competitions, our team members work to recruit sponsors from local companies, apply for grants through organizations such as NASA and West Coast Products, and accept the allocated budget our school district, RSU25 provides. Our sponsors receive benefits that are correlated with different levels of our donation ladder. Levels might include, but are not limited to, a mention of their business on our social media platforms, their business' name on our t-shirt and/or robot, or a listing as an official sponsor of Team 6329 which will be announced at events. This year has been a stellar year of fundraising. We raised over $80,000 to help us reach our goal of returning to the FIRST Championship.

Expenditures	
Item	**Cost for 16**
FRC Registration (Kit of Parts and Two Events)	$6,000
Additional Robot Parts	$10,000
Swag	$2,000
Total	**$18,000**
Pinetree Hotels	$3,000
Pinetree Meals	$1,000
Total	**$4,000**
NH Hotels	$3,000
NH Vehicles	$500
NH Meals	$1,000
Total	**$4,500**
New England Championship Registration	$4,000
Hotels	$4,500
Vehicles	$500
Meals	$1,500
Total	**$10,500**
Worlds Registration	$5,000
Flights	$20,000
Meals	$3,000
Ground Transportation	$3,000
Hotels	$12,000
Entertainment	$2,000
Robot / Pit Shipping	$3,000
Total	**$48,000**
Total Season Budget	**$85,000**

Revenues	
Corporate and Private Sponsors	$45,600
Grants	$2,000
School Aided	$35,000
Total Expenses	$85,000
Net Income	-$2,400

Expenses	
Fees	$15,000
Materials	$10,000
Travel	$60,000
Total Expenses	$85,000