Ov3R1y K0Mp13X 8708

Who are we?

We are FRC team Ov3R1y K0Mp13X. We are one of two FIRST teams under The Dunbarton and Bow Robotics 4-H club. Our 4-H club is the only STEM 4-H club in our county; however, we have paved the way for more to start in the state. 4-H is commonly seen as an agriculture program but offers so much for any project or club, including STEM, business, and leadership. We have the mission of building a place for students to learn about STEMB alongside real-world professionals. We believe that by providing access to tools and mentors from different career fields, we can empower the next generation of leaders in STEMB.

Team Structure

Our team has different sub-teams: robot, marketing, and strategy. Each section has a vice president who manages that sub-team, setting deadlines and checking progress. The robot sub-team has smaller sections: CAD, electrical, mechanical, and programming. The strategy team has smaller groups including the initial strategy with the rest of the team and scouting. The marketing team has smaller teams including social media, branding, and marketing. The president coordinates with the vice presidents, which helps ensure we are making constant progress. Our sub-teams allow students to get hands-on experiences with anything they want to try. It allows new students to come in and try out everything before being part of the team. The sub-teams are also set up in such a way that students can be a part of multiple based on what they want to learn.

Fundraising

For fundraising, we do a few things. First, we ask students to learn how to do an elevator pitch and talk with local companies each year. They discuss ways the company can help with either goods, services, or sponsorship dollars. We have been able to secure parts, a banner, supplies, and funds using this technique. Second, we apply for any grants we qualify for. We reach out to the companies and thank them for their support which has resulted in repeat assistance. Lastly, we have amazing support from our community through our charity account on PayPal. Last season, after qualifying for FIRST Championships, we had less than 3 days to get to Houston with all our stuff. We also didn't have the funds to pay the registration fee. We advertised our success and need to the people in our town and in ~24 hours we raised over $7,000 on our PayPal account! This year, we have increased our budget and sponsors in case we are able to qualify again.

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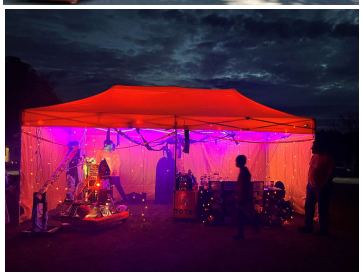
Outreach

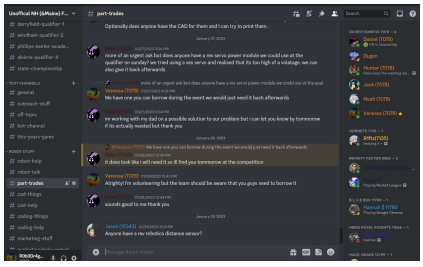
Hopkinton: We put up posters and set up two FTC bots in 2021. In 2022, we were able to use a larger building; we were able to set up multiple stations across, an area for FRC, an area for FTC, and an area for teaching students how to code using Minecraft. The building was renamed “4-H Robot Building”, we were added to the map, they used our robot as advertising in the paper and on Facebook, and they announced us multiple times a day on the intercom.

Events in town center: We attended Halloween and Old Home Day within our town center. For these we show our bots and talk about what we do. During Old Home Day, we were part of the parade.

Interaction with our school: We are not affiliated with our school, but we still have participated in school events. We were part of our schools STEAM Day, part of a Podcast and we also work alongside the VEX team.

4-H maker expo: We were able to set up a table and set up our robots for this event. Which allowed us to be alongside other 4-Hers.





FTC: We acted as mentors for the FTC team under our club, of the seven FTC students, 5 of them are rookies in the program. They joined from our efforts in outreach. We guided them within aspects including how to develop a strategy, how the engineering design process works, how to make an engineering portfolio, and much more. We also run the FTC NH & Maine Discord, making sure everything works within it. This server allows for the teams to communicate and get help when needed. It also has been used for teams that need to get a certain part or borrow parts. Lastly, members of our teams volunteered at 3 FTC events. Our students were in positions including Emcee, Game Announcer, Lead queuer, queuer, and field inspector.

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Rankings in Auto			
Task	Mech	Prog.	Auto time
Short Mobility	1	1	2
CS Mobitlity	1	1	4
Long Mobitlity	1	1	3
Pre-load Cu low	1	1	1
Pre-load Cu mid	5	2	2
Pre-load Cu ligh	6	2	3
Pre-load Co low	1	1	1
Pre-load Co mid	6	2	3
Pre-load Co High	7	4	4
Field pickup Cube	3	4	8
Field pickup Cone	3	4	8
Docked	1	1	1
Engaged	1	5	3

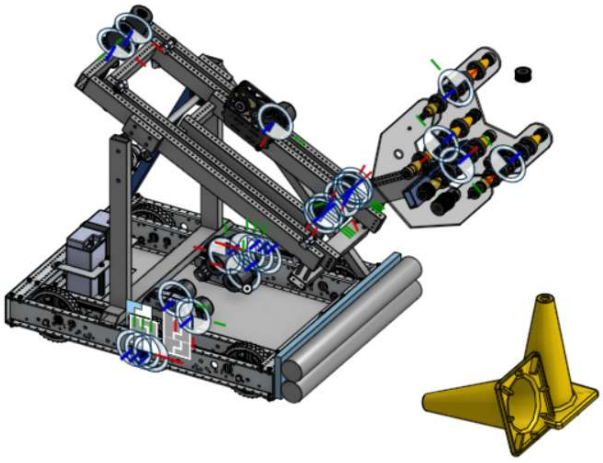
Auto priority
Engaged
Docked
Mobitily
Game Piece low
Game Piece Mid
Game Piece High
Teleop
Links (RP)
High
Mid
Low
Endgame
Engaged (RP)
Links (sustainability)

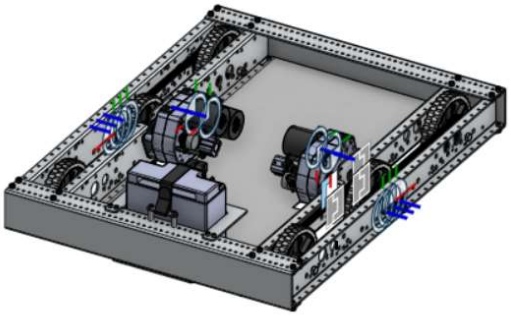
Strategy

We start off the season by reading the manual and analyzing each task the robot needs to complete. We then ranked each mission by difficulty (programming and mechanical), time we think it would take, and point value. This allowed us to see what would be the points for the least amount of effort. We then each came up with strategies and played the game as people. Each person was a robot with a set strategy. We timed the match and saw that some of the strategies worked better than others. With this in mind, we then determined the importance of doing certain tasks so that we could develop a design for our robot.

Modularity and Branding

We designed our robot with modularity in mind. We made it simple to take apart, yet sturdy and won't fall apart. The modularity allows us to make quick fixes when needed and prevents us from having a difficult time fixing our robot. We put our robot into CAD to help us develop our design. We then made and assembled our robot to it. We use the sides of our robot not only to protect our robot from a stray game piece but to make our robot recognizable to anyone. We keep our logo visible and following our color scheme to ensure a nice-looking robot.





Drivetrain

With our strategy in mind, we decided on the Kit of Parts Chassis, only modified to fit our needs. Firstly, we changed the width, taking off 2 inches which helps make room for other bots on the charge station. We are using Pneumatic shifting gearboxes, which allows us to have a chance to use speed but also lets us slow down for more pushing power. We are using friction for the simplicity of design, and because we didn't need any added maneuverability.

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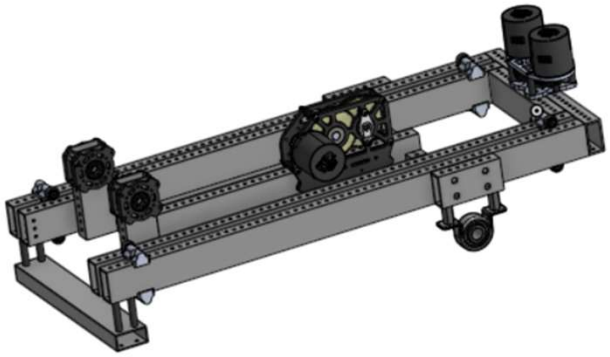

Lift

We designed our lift to work on 3 moving parts to be able to place or pick up cones or cubes wherever they would be. The first part is a Pneumatic operated pivot point, that allows the whole system to pivot between a high and low position, to pick up or place. The second stage is an elevator, which is the West Coast Products GreyT elevator which was kindly donated to us. This allows us to extend and reach the further goals in the community. The third stage is a wrist motion that gives us even further reach and allows us to adjust our pickup location more accurately.

Pickup

We designed our pickup with the mindset of wanting to be able to pick up both cones and cubes, while still being both touch and own and able to score quickly. Our final design uses a shape that fits the cone and works for the cube and uses a series of belts and wheels to quickly pull them in while aligning the cones to be easily fitted to the community, and the cubes to be easily and lightly launched toward their proper shelves. This design can pick up and score any game piece anywhere, making us very fast.