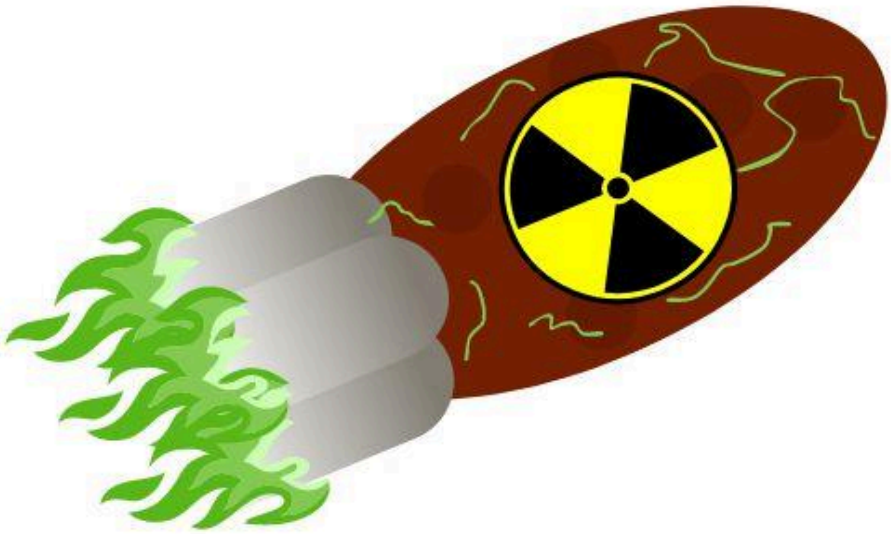

Nuclear Space Potatoes
Team #25655

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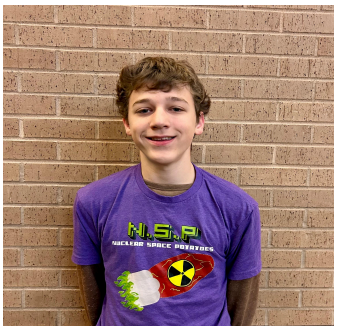
About Our Team

We are a rookie team, 25655 Nuclear Space Potatoes, based out of Bolivar, Missouri with eight members and three coaches. We are all homeschooled and we range from seventh to ninth graders.

Our Creative team name came from everyone on the team putting their favorite things together. The logo was easy. We put a nuclear sign and rocket boosters on a potato. For colors we decided green, and purple would fit our logo perfectly.

Team Members - Coaches - Mentor



Eli Neeld

- Freshman
- Team captain, build team, programming team, strategy, speaking representative
- 2 years experience

Noelle Nance

- Seventh grade
- Driver, Team Cooperation, Community Outreach, Photography
- First year

Drew Reasons

- Seventh Grade
- Speaking Representative, Marketing, Programming Team (to learn), Hardware and Tools Management, Strategy
- First year

Gabe Curtis

- Freshman
- Driver Coach and marketing
- First year

Sam Cook

- Eighth grade
- Build team, Driver, Pit Crew
- First year

Roman Coose

- Seventh Grade
- Brainstormer, Driver, Pit Crew
- First year

Ethan Neeld

- Seventh Grade
- Driver, Hardware/Tool Management, Pit Crew
- Second year

Bodhi Martin

- Eighth Grade
- Build Team, Programming Team
- First year

Nicole Neeld

- Lead Coach

Laura Rabell

- 2nd Coach

Teresa Coose

- 2nd Coach

Mentor

Cory Cline

- PCB Design Class

Meetings

We start the meeting with an overview of the past week, and end with a summary of the meeting. The team meets once a week for three hours. We have three forty-five minute groups. In the groups we drive, code, and build the robot.

Season Timeline

Pre-Season: ● Built last year's starter bot ● Fundraising around Bolivar ● Fundraiser at Walmart ● Fundraiser at Wendy's ● September 7th Game Release	Weeks 1-10: ● Moved buildings ● Planned the bot build ● Built the REV starter bot for this year ● Planned the improvements for the bot
Weeks 11-15: ● First meet, got 5th in meet, 6th in league ● Planed for improving the bot ● Started extension arm ● Started climbing arms ● Finished the arm ● Put arm on bot ● Coded bot ● Bolivar Christmas Parade ● 2nd meet, got 5th in meet, 6th in league	Weeks 16-20: ● 3rd Meet, 5th in meet, 10 in league ● Fixing arm ● 4th Meet, 7th in meet, 10 in league ● Preparing for Tournament

Our Goals:

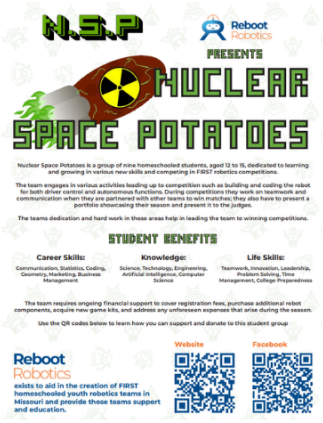
1. We strive for greatness!
2. To finish our robot (The Masher), and to make it as good as it can be.
3. To place in the competition, hopefully in the top 5.
4. To learn and improve on our robotics, speaking, and marketing skills.

Outreach

Bolivar Chamber of Commerce hosts a community Christmas Parade in December. We were able to participate. Potato costumes were bought, lights added to the truck, and flyers printed. We wanted to bring awareness to our team and thank our sponsors. Leading up to the parade we spent the week making the logo to display in the back of the truck. Several members walked the parade route and handed out flyers.

OZARKS FOOD HARVEST
THE FOOD BANK

We're excited to get involved in the First 2 Harvest Challenge! This is a fantastic opportunity for us to raise money for Ozark Food Harvest. We're looking forward to making a difference.



We also have plans to start a summer camp or class with Reboot Robotics to hopefully get more people interested in robotics.

Our Sponsors

Our team developed a letter to give to potential businesses or individuals. The letter provided information about the team and what we do, shared financial need information, and provided the sponsorship levels.

Members of our team visited local businesses and spoke to friends and family to fundraise. The team was able to obtain **10** individual sponsors and **35** business sponsors.

The team also did a fundraiser at the Bolivar Walmart and through the Bolivar Wendy's. We raised over **$500** with these two events and are grateful that our local community stepped up in support of us.

We received grants totaling **$1,525** from Missouri Stem Initiative, Walmart, and the FIRST Tech Challenge New Team Hardship Grant.

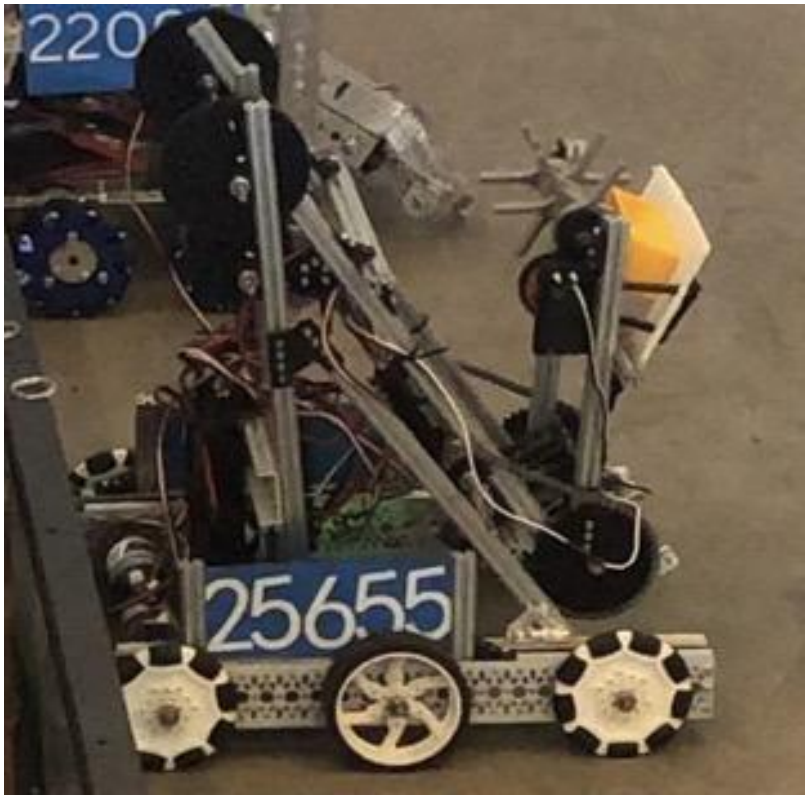
Our team is supported by Reboot Robotics, a 501c3, which allows for us to apply for grants and have donations be tax exempt.

Design Process

1. Brainstorming and Explore Ideas
2. Build and Test
3. Identify problems or issues
4. Improve or Change
5. Retest and Repeat

The Process of Our Design

We had to make some decisions during the design of the robot. Originally we tried to build a bot from scratch but after getting nowhere with sixteen hours of work we decided to build the REV starter bot. We used the unmodified version at our first Meet.

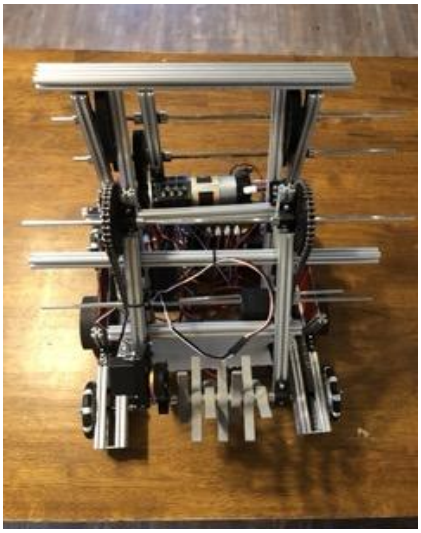


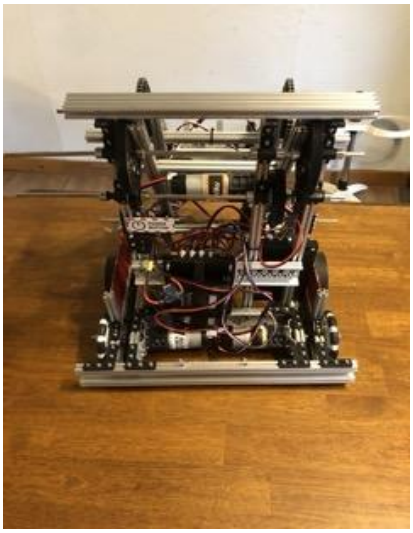
After the meet we began giving the robot upgrades. The first thing we did was improve the code. Then we modified the arm, and added a second wrist but we had a problem. The wrist would not stop moving down and the motor blew. Since we had little time till the meet we were not able to repair the wrist and had to use the original bot again.

We tried many new designs over several weeks and were unable to produce a design that would work. Instead we added the original claw back onto the robot and are using it to score high specimens. We hope to solve the issues and improve the robot in the near future.

Our Robot

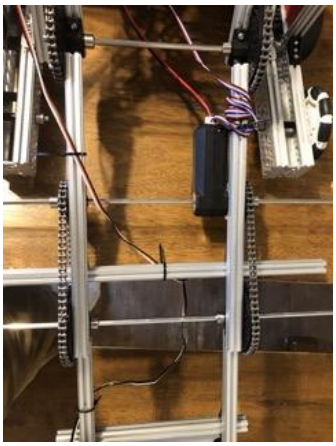
This is our current robot. It has many parts which we will explain one at a time.





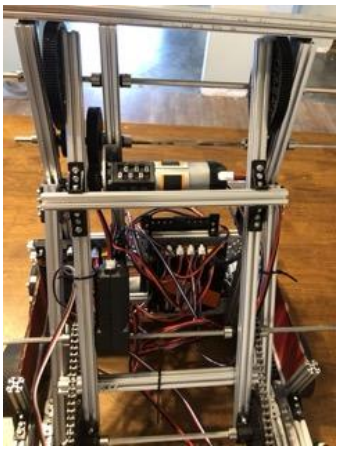
This is the full bot. The drivetrain works on two motors and a gear train.

This is the intake. It is powered by a servo and a gear train.



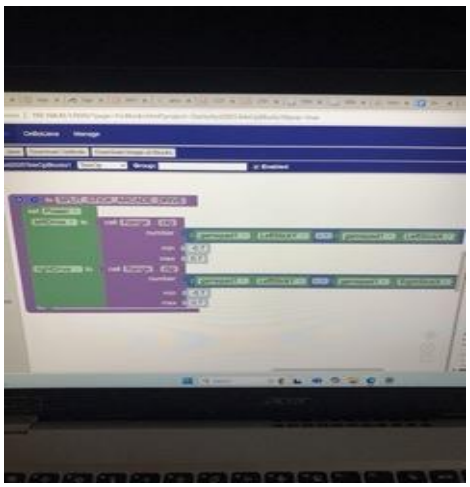
This is the wrist. It is powered by a core hex motor.

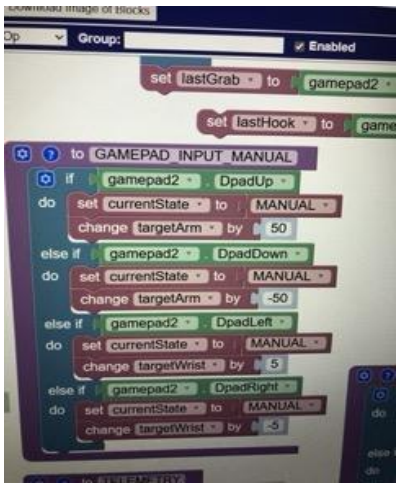
This is the arm. It is powered by an HD hex motor. You can also see the control hub and expansion hub where all of the motors and servos are connected.



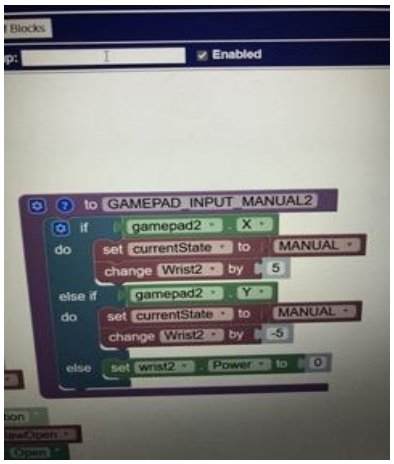
Programing

This is an explanation of our current code. Our teleop code was fairly simple since we made the REV Robotics starter bot, but we did have to make some modifications. We improved the smoothness of the drive train by lowering the motors power.

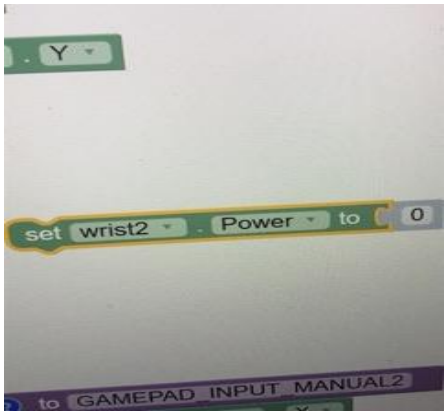




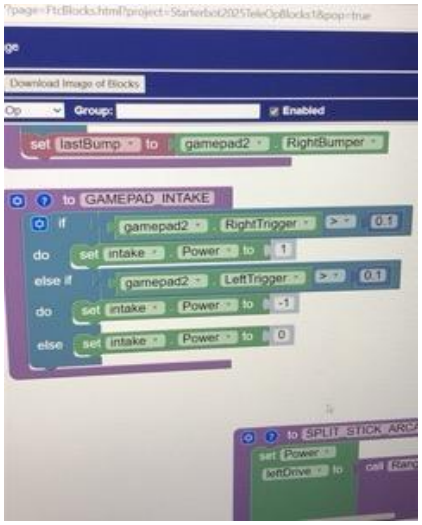
We also reversed the steering because our drivers thought it seemed backwards. We also made modifications to the arm, wrist, and intake. For the arm we just lowered the speed of the motors and upped the power.



For the wrist we had to make a whole new code section because we added a second wrist. The second wrist code was similar to the First wrist code.

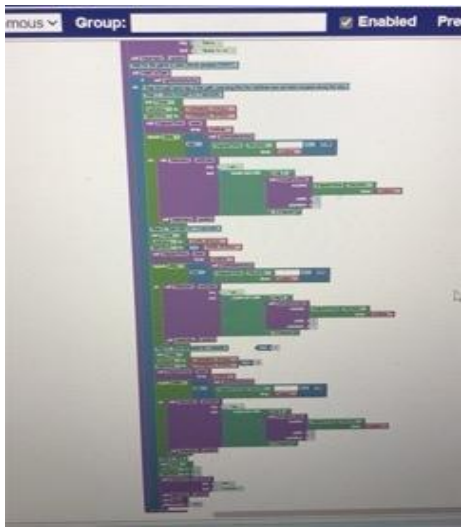


But we had a coding hitch, the motor would not stop moving down. We had to look up how to fix it because we could not figure it out on our own. We fixed the problem by adding a set_power_0 block.



For the intake we increased power to pick up samples faster.

Our autonomous movement is very simple, we drive into the observation zone. The code is longer than you would expect for something so simple, but basically the code is to drive forward for 0.5 seconds, turn left 90 degrees, and then drive forwards for 3 seconds.
We hope to improve the whole code in the future.



Lessons Learned

- Strengths
  - One of our strengths would be that we are really good at adapting to different situations. When we encounter an unexpected issue we change our strategy to overcome it.
  - Another thing we have been good at this year is creating a plan with other teams we've never worked with before.

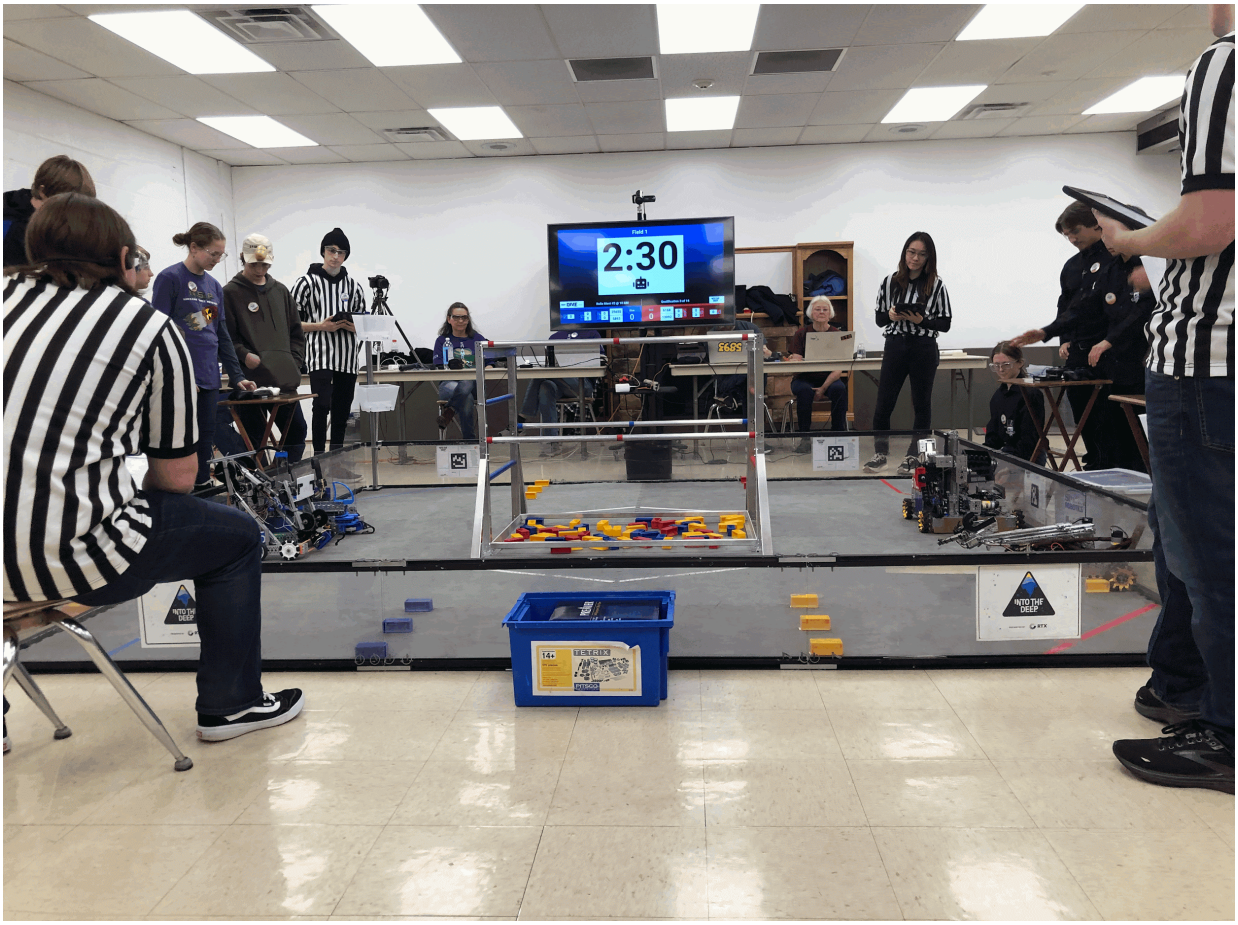
- Weaknesses
  - Communicating our plans with each other can be a struggle at times.
  - Understanding the mechanical limits of the robot. Just because the code can be written for a certain task doesn't mean the robot is able to perform it.

- Opportunities
  - We have had several donations of tools and equipment to expand our skills with.
    - We've been given a computer to learn how to design PCBs and use CAD software
    - A 3D printer was donated allowing us flexibility to design custom parts
  - We were able to attend a class that taught us how electrical components work and how to design PCBs

- Threats
  - Horse play is important to avoid when operating the robot or using tools.

Strategy

We discuss with the other team and see what their team's robot is capable of. We also share our robots strengths and weaknesses so they can have a general idea of what we can do as well. Usually using an intake at the tip of the arm, we pick up the specimen and put them in the low basket, but as of writing this we were adding extensions to the arm so thus it can put the specimen in the high basket. At the beginning of the game, after the autonomous period, we take our yellow specimen to discourage the other teams from stealing ours. If our ally team's robot arm doesn't work or they don't have one, they can push the specimen over to our robot so we can score higher points. As for the 30 second end period, we try to be unfazed and we keep collecting specimens until the 15 second mark. Then we stop what we were doing and go to the low bar and touch it because we can not hang on the bar yet.



Alliance Scouting

Before each match we are assigned to alliance with another team. We discuss our strengths and weaknesses with our allies.Once we are done with the meeting we will note what we discussed and also note our compatibility with our allies and put that information in a spreadsheet. The spreadsheet will show us our data so we will know who we want to partner up with for later rounds if needed.