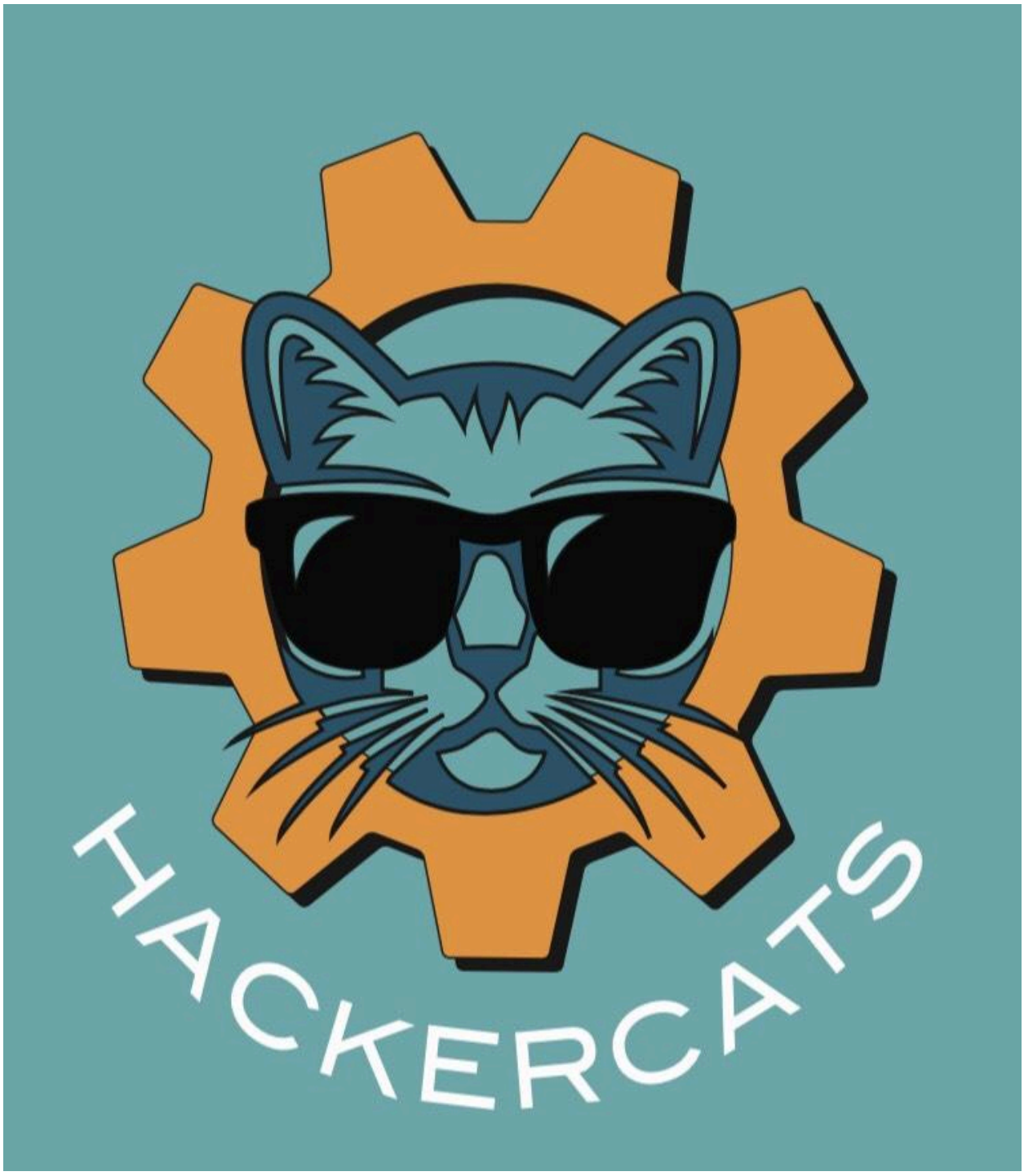


TEAM# 13603

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Team Summary

We are a team from Lakeville, MN, and all of our members go to McGuire Middle School. Our workplace is Lakeville South High School, where we have access to 3D printers, laser engravers, and many other tools we use to build our robot. The team consists of seven members. The school's older team, the Qbitz, practices at the school and helps us when we need it. In our first tournament, we did ok for the first time. We did really well in the engineering notebook but the last judges said it was too neat and we need to have more messy work. However, we have improved everything greatly and plan to do better in the second tournament. One of our strongest aspects as a team is how we all work so well together and can get a lot of stuff done when motivated.



Team Record/Robot Design

9/24/18

Today, we toured the stem facility at Lakeville South. It was really neat to see the 3D printers and other devices they had there. We also watched YouTube videos to decide what type of collection method we should use. We looked at some FTC tips and tricks videos, and to close the meeting we looked up name ideas.

10/1/18

Today, we started to finalize a team name. Our first idea was to take the letters of our first names to make a word, but that didn't work at all. Then, we decided on the Hacker Cats or the Coding Cougars (we picked Hacker Cats). We also set up our team's Gmail and Twitter accounts. We also strategized by ranking what tasks were harder on the field and which ones we wanted to do. Finally, we thought a little about how our robot would work.

Electronics:

10/8/18

Our team split into 2 separate groups for this meeting. One group started building the robot while the other started setting up the electronics. The following is a summary for the latter. We started by plugging the core power distribution module (CPDM) into a battery. We proceeded to plug the core motor controllers (CMCs) and the core servo controller (CSC) into the CPDM. We then plugged motors into the CMCs, two of which were equipped with encoders (also plugged into the CMC). Also plugged into the CPDM was the CSC, to which we attached our 4 servos. Both CMCs and the CSC were then plugged with different cords into the USB ports on the CPDM.

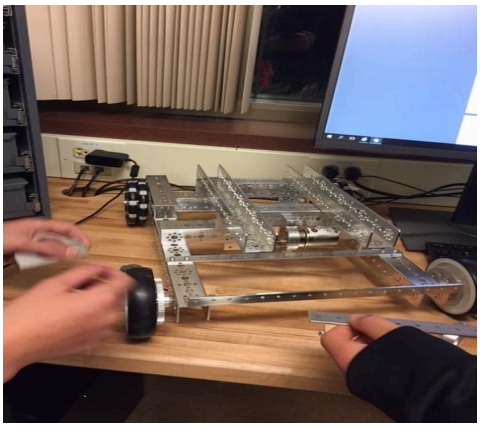
Another endeavour that the electronics group embarked on was one of setting up the cheap phones that our school had provided us with. We tried to download the required FTC applications, but failed miserably

because the phones were having problems connecting to the infamously slow school WiFi. However, we were able to, with much experimenting and the technological expertise of one of our coaches, get the phones to download the Robot Controller and Driver Station.

By the end of our meeting, we had completed our goals of setting up the phones and testing the electronics.

Robot: We began to build our first robot, a pushbot. It had been going pretty smoothly, until we realized we had placed a part in the wrong spot! We fixed it by taking it off and putting it back in the correct spot. We then proceeded to put the wheels on, and we had something incorrect with that, too. We fixed that and by then, practice was over. At the end of our meeting, we all huddled around a computer to look at a possible prototype for our team logo. We had made a good start on our robot and had tested our electronics. We all left the meeting with smiles on our faces and newfound knowledge in our brains.

ROBOT PROGRESS



This is our logo. We drew it out and then had a graphic artist redesign it better and as an electronic version.



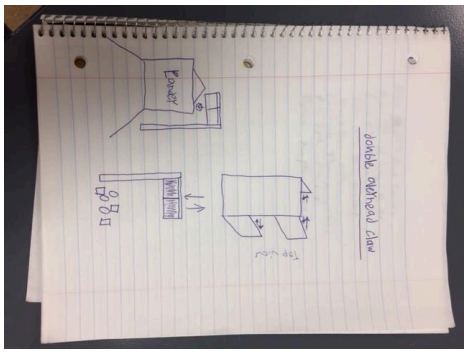


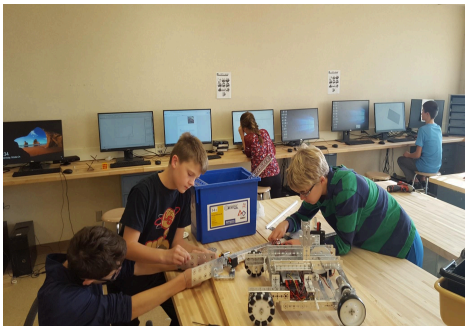
10/10/18-

Strategies

We found out that it would be easier to try to aim for the balls instead of the cubes. On the balls, there are no

straight edges, whilst on cubes there are straight sides that are easier to grip. Then we thought of an idea while looking at another FTC team's old robot. It looked something like this for the base.





The idea was that four sides that had a texture for gripping the sides would slide together and squish the ball. That would be attached to a arm that would lift it up and down.

<u>10/15/18</u>

Today, we continued to construct the robot. We noticed that we had used a wrong piece, so we replaced it without much difficulty. We are finishing construction as this is being written. Another activity we participated in was the testing of the servos and motors using some basic code for testing purposes. Almost everything seems to be working fine. We have the controller controlling the wheels on the robot pretty well. We have a plan for success and are ready to implement it. Today we worked on building are robot and testing the arm.



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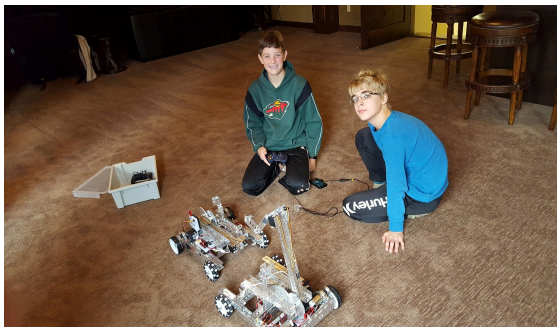
<u>10/16/18</u>

Today, we dived into the fantastic world of programming. Some of our group members learned how to program, while others finished building the robot. We read the official FTC block programming manual, and we learned

some basic ways to move the robot and such. We finished up the last few things on the robot, such as installing the last few servos and putting on all of the electronics.

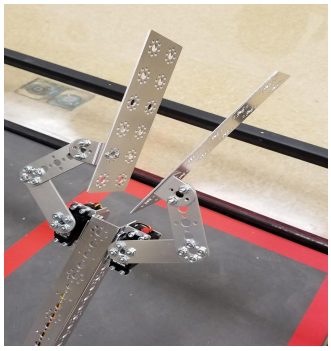
10/19/18

Today Ely and Sam worked on the robot at Sam's house. They created a Tank Drive code and an arm code. We are still working on the servo code. We drove the robot around in Sam's basement. From doing the programming, we now have a much better understanding of how the coding works.

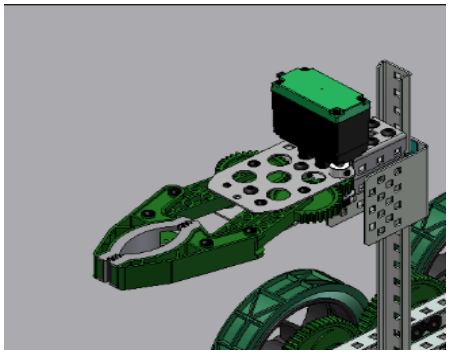


10/22/18

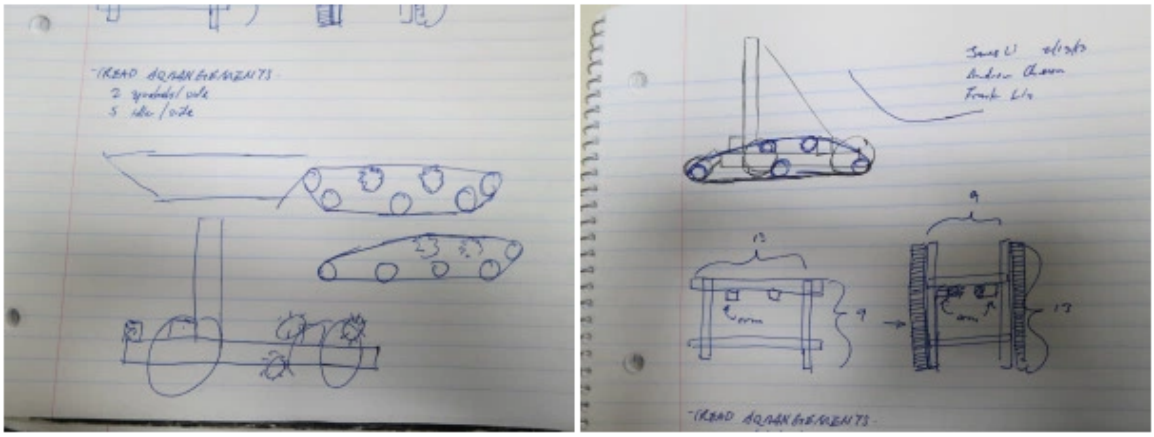
Today, we got a lot done. We split into 3 main groups, one working on learning CAD, one working on some kind of ball grabbing roller mechanism for the claw, and one working on improving the claw itself. We all made significant progress. The first group gained some necessary skills, the second developed a working prototype, and the third got a lot of ideas and have begun modifying the existing claw (see image below).







The first one is what are arm looks like and the others are what we based it on.



This is some wheel ideas.

10/24/18

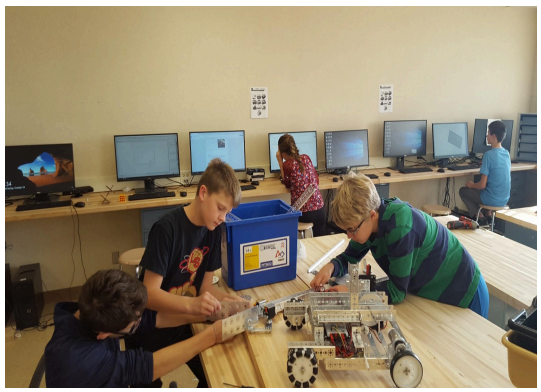
Pre-Meeting

Today, we rode on the bus to get to our meeting. We plan to continue working on the claw and alternate material collecting method. We also have seen the T-Shirt designs and all like them. One last objective for this rendezvous is to make our arm shorter and possibly have it be extendable.

Post-Meeting

Today, we accomplished a lot of what we had in mind and more. We modified the T-Shirt design, got some foam on the claw and adjusted the angle so it would better pick up the minerals, The team that was working on the alternate mineral collecting method tried a few designs and found the right size for their mineral storage cardboard box, started working on an extendable arm, began a design for the team marker, and we learned some CADing, how to use the laser to cut cardboard, and where the screwdrivers and Exacto knives are kept in the STEM room.





Trip to Stratasys

We went to the 3D printing company, Stratasys, for an educational tour. We learned that the founder of the company invented the method of 3d printing where hot material is layered onto a platform through a glue-gun like mechanism. We saw some very advanced printers and some examples of what they can do. We also learned that printers can use different material like a hard plastic to a very soft, squishy material, to a material that can be used as a support and later pulled away or melted in a chemical bath.

10-29-18

Stratagy-how you're going to score PTS?

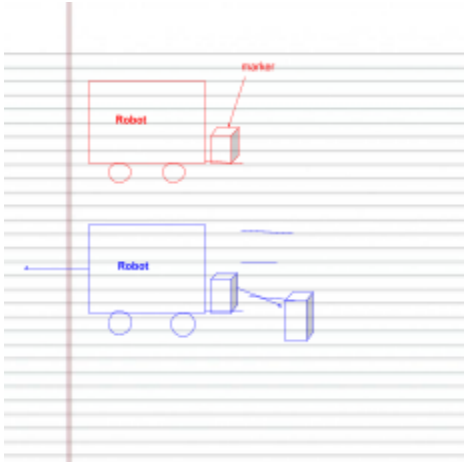
1. Game Marker - claim depot
2. start- where are you starting?
   1-Lander-Depot (code)
   2-drop/place marker (code)
   3-design something to place marker (CAD,build)

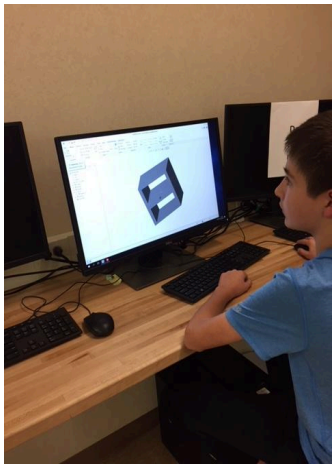
Problem: how big can we have the marker be or what size should we make the marker.

Solution:

The maximum size of the Team Marker is 4 inches (10.16 cm) by 4 inches (10.16 cm) by 8 inches (20.32 cm). The minimum size of the Team Marker is 3 inches (7.62 cm) by 3 inches (7.62 cm) by 4 inches (10.16cm). Team Number - Team Markers must be labeled with their Team number (numerals only, for example "12345") The letters must be legible when viewed from a distance of 12 inches away. The Team number needs to appear

only once on the Team Marker. This is how we want to move the marker:





10/29/18

We started this meeting by coming up with a game plan (shown above). We all dispersed and tried to get as much done as possible. First, we needed a team marker, so we CADed one up that would meet all requirements. While that was being done, two teammates continued their work on a ball/cube grabbing device. The CADing was finished on the marker (shown above) and we learned how to 3d print it. Also, one of members began working on autonomous programming.This was the day that we finished the first part of the sliding arm, now we just need to attach some motors to make it move. We also continued work on the ball collection system, printing the phone case (somebody broke it), and working on some other odds and ends.

11/1 /18

Today we are working on reprinting the phone case, and it took a while to adjust the 3d printers at our school. We are still working on adjusting them as I write this. Some of our other members are working on things such as the arm and ball collection system.

UPDATE: We lost the file for the phone case so one of our members is CADing up a new one. Also, another member is CADing up a final design for our ball and cube collecting device.

UPDATE: We found the file for the phone case but we can't get are 3d printers working so now it has taken a hour and a half.

11/2/18

Atomic Sheet Metal field trip

We took a trip to the company Atomic Sheet Metal. We saw a lot of examples of robotics and engineering in many forms. They created a system to help them configure buildings and designs. They had machines to help them make the sheets.

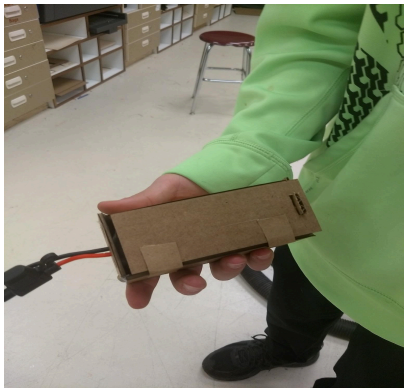
11/6

Today we continued work on some projects that weren't finished. Some of these projects were the mineral collection system, and the arm that extends. We also found our phone case on the 3d printer, but it was severely deformed and was not usable in the slightest. It did not resemble a phone case whatsoever. In other news, one of our team members recently completed the construction of a functional mineral-grabbing device, complete with a chain that spins the grabbing device. We also have made a great deal of progress on the extendable arm, which is folding with a winch system.

11/7/2018

Today we put our cube and ball collector on the arm. We used the laser engraver to create are logo and name. Then, we also put are logo and name on the collector. e tried to print the phone case a third time this time we built it standing up instead of it laying flat. Also we laser engraved a cardboard battery holder with a flap that goes up in the back and another flap on top that secures the flap on the bottom.

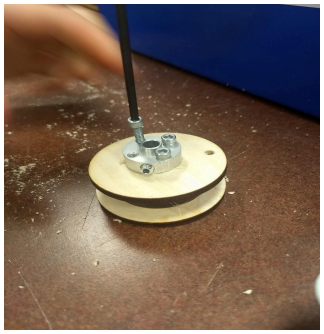




11/8/2018

First, we made a wheel to hold the string that moves the arm back and forth. Then, we realized that the 3d printers don't work well with the

program that we were using. That's why the phone case didn't print correctly. Now we are reCADing the phone case, putting the wheel on the



robot, and testing our height. This is what our wheel looks like:

11/10/2018

Today it was hard to do much because the tech room was closed, so we couldn't 3d print or laser engrave anything. But we did plan what we were going to code for placing the marker. Then we looked up what we needed for the engineering notebook.

11/12/2018

We planned the controls and worked on our problem with the arm. The problem is that it is too short so we need to extend the arm more.



11/14/2018

We made teleop program but our configuration was off so we had to reconfigure it. The FRC team had the same problem because they put spaces when naming them and they had more servo and motors then they actually had. So, we fixed the configuration.

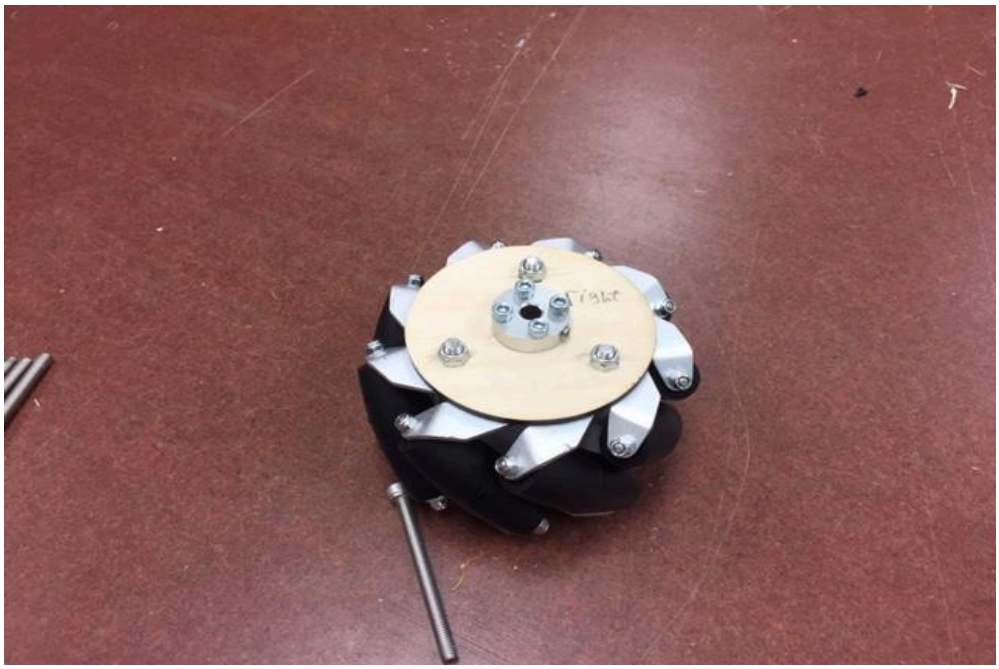
11/15/2018

We edited the engineering notebook and we tried to release some friction on the arm. Then, we printed our t-shirts and they look as spicy as a chili pepper.

11/24/2018

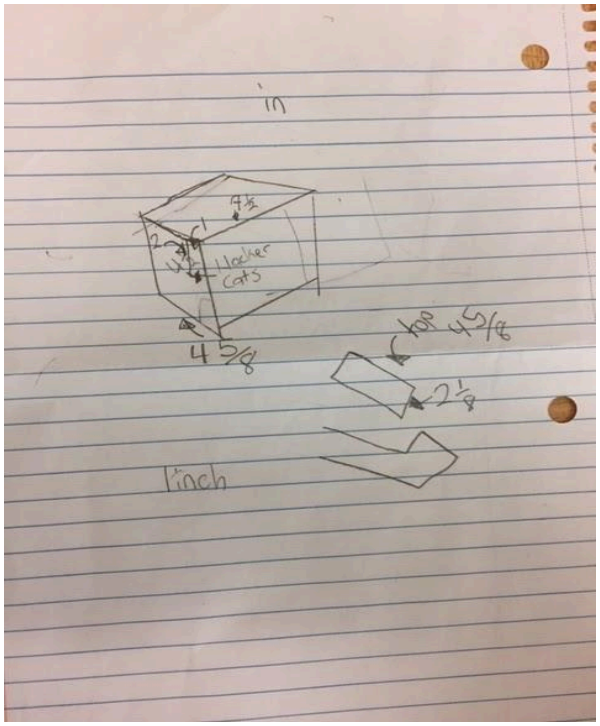
We met up at one of our team member's houses and made a chassis so we can program the mecanum wheels before we put them on our robot. Then we used a gear rack for a hanging arm. Our robot hung successfully, but we still need a hook to attach to the lander.

these are the mecanum wheels with a mount so they attach to the robot.



11-26-18

We 3D printed a hook for our arm. We also attached our battery box so it wouldn't fall off. We also worked a lot on our new mecanum wheels.

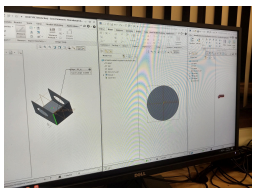


11/27/2018

Tonight, we worked a lot on the mecanum wheels and started to work on a code for the mecanum wheels. We attached the battery box so it would stay on as well. We 3D-printed a hook for our extender so we can attach ourselves to the lander.

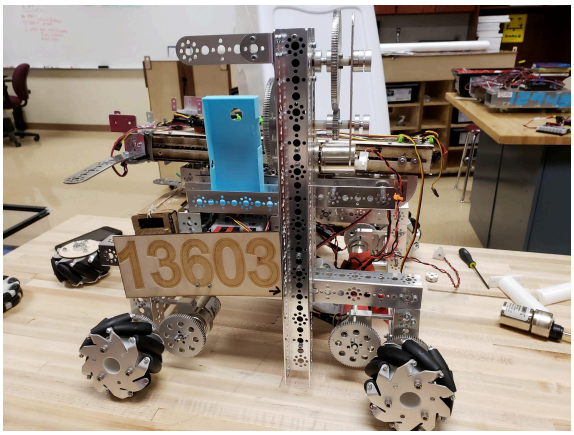
11/28/2018

Today some of our team members laser engraved the semi transparent ball and cube system. Then others tried CADing the ball and cube system. Then, our wheels were either on wrong or were not running. The extra chassis we made for the mecanum wheels's second motor controller wasn't working properly, so we couldn't test very well, but we got a program written up nevertheless and some genius put it on the computer.

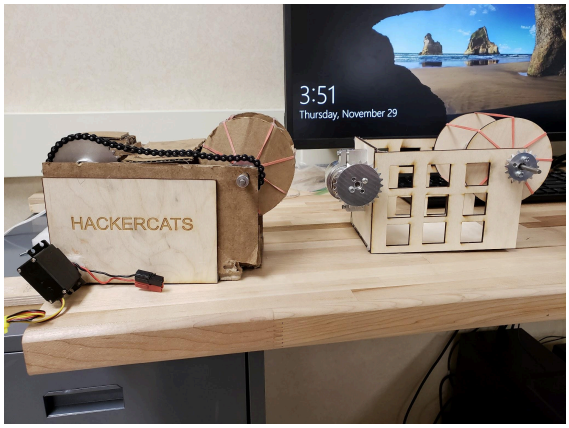


11/29/2018

Today we worked a lot on the mecanum wheels and the program to go with it. We attempted to attach the hook but it didn't seem to work well.



Collection mechanism: before and after



11/30/2018

Today Steve's sister's girl scout troop came and we showed them what FTC was and how. First we showed them are robot and explained every part of it. Then we went to show them how laser engraving and 3D-printing work.




outreach girl scouts

12/3/2018
3:00-5:00 Meeting:
Today we worked on programing the mecanum wheels and also worked on attaching the ball and cube mechanism to the robot.

6:00-8:00 Meeting:
Again, we programed the mecanum wheels.

12/4/2018
Our robot is over 18" limit so a member is working on making the robot skinnier. We successfully made the robot skinnier and finished programing.

12/5/2018
We worked on the poster board for our competition and we got our teleop program working. And we also worked on the programs.

12/6/2018
Our current wasn't flowing to our bucket so we learned how to use a multimeter to test the voltage. We found the faulty wire and now it works great! We also put supports on the arm because it was kinda coming apart.

What's on our Robot?

Motors

We have 8 motors

-Front Left Wheel
-Front Right Wheel
-Back Left Wheel
-Back Right Wheel
-Winch
-Arm
-Mineral Collector
-Hanging Mechanism

Servos

We have 2 servos

-Right Side of Mineral Collector
-Left Side of Mineral Collector

3D Printed Parts

-Phone Case
-Team Marker

Laser Engraved Parts

Cardboard Parts

-Battery Holder

Wood Parts

-Logos
-Mineral Collector
-Winch
-Mecanum wheel attachment part

TEAM SECTION



LUKE

My name is Luke Garso, I am 12 years old and go to McGuire Middle School. My hobbies are watching the weather and playing soccer. I was on a FLL team called Special Ops Lego Team for 2 years. On the team I 3D-print, and design the robot.



CALLAN

My name is Callan Theis, I am 13 years old and go to McGuire Middle School. I like golf, basketball, and reading. I was on the FLL team Marion Mindstorm Minions for three years. I work on the notebook and robot design.



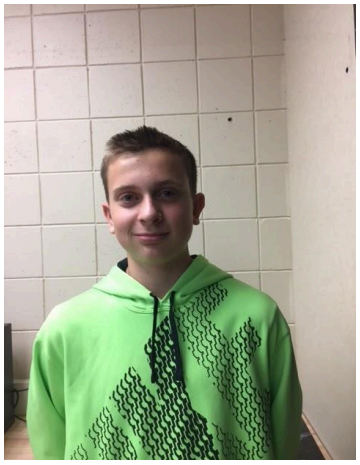
MARYA

My name is Mayra Mejia, I am 12 years old and I go to McGuire Middle School. My hobbies are playing soccer, doing musicals, and writing. I was on a FLL team called Special Ops Lego Team for 2 years. On the team I had the idea for the arm spinner and I write in the engineering notebook.



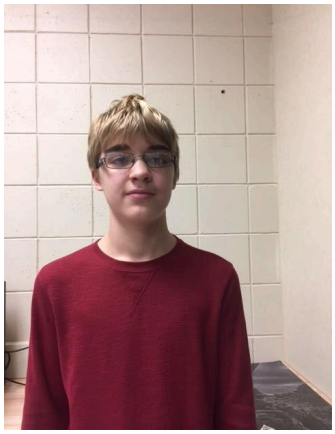
STEVE

My name is Steve, and I am 14 years old and go to McGuire Middle School. My hobbies include playing video games, and downhill skiing. On the team I am a programmer and work on the engineering notebook. I was on the FLL team Trashbusters for 1 year, and then we gained and lost a lot of members and became BEESTMODE for 2 years.



MATT

My name is Matthew, I am 14 years old and in 8th grade. I go to Mcguire Middle School. My hobbies include lacrosse and doing FTC. My roles on the team is programmer, builder, and laserer.



ELY

My name is Ely Wickander. I'm 12 years old and go to McGuire Middle School. My hobbies are robotics, cubing, polocrosse and tennis. My role is robot design and t-shirt design. I was on the FLL team with Callan and Sam for three years.



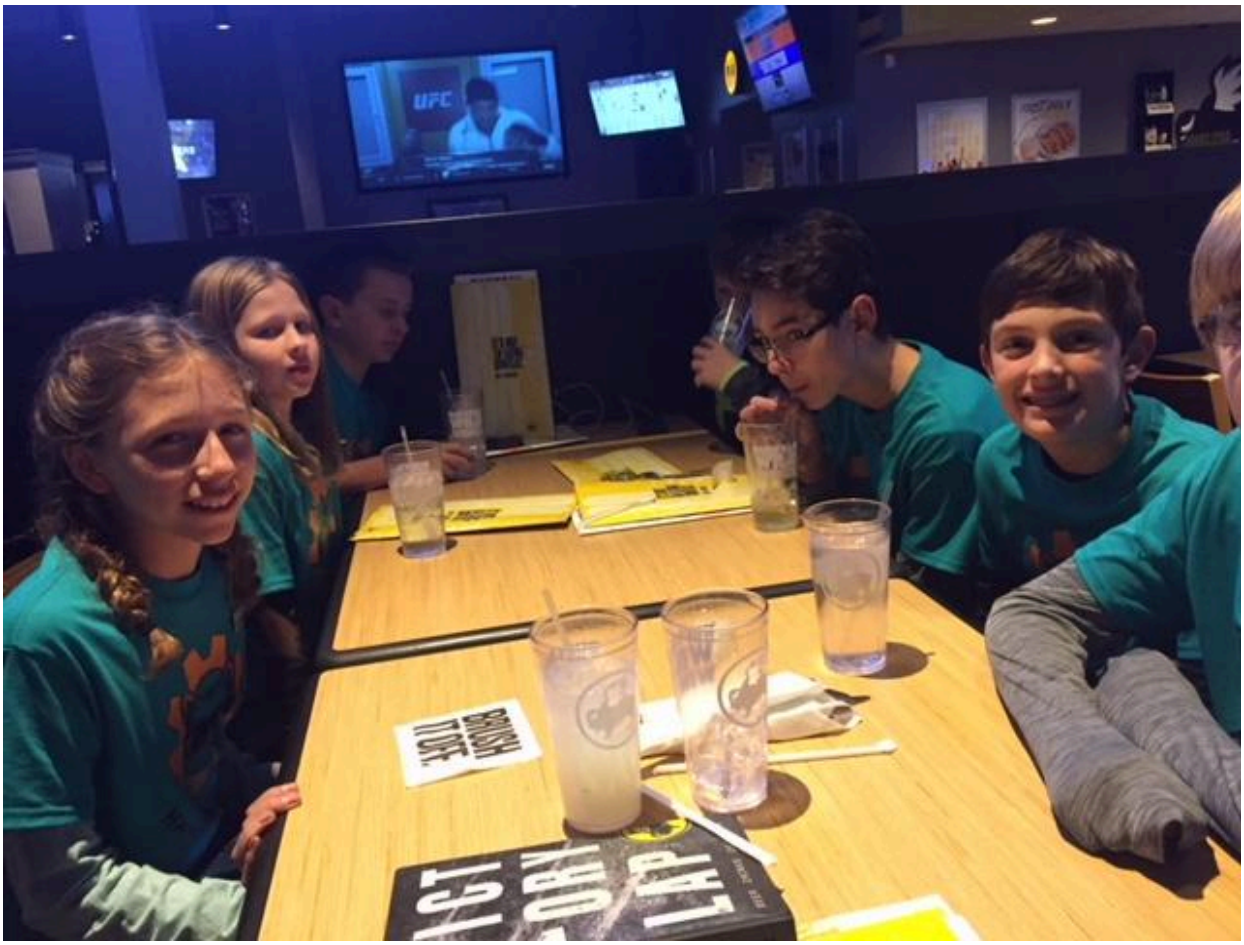
SAM

My name is Sam Hoghaug, I am 12 years old and go to McGuire Middle School. My hobbies are doing robotics, and hockey also takes up a large part of my life. Another one of my hobbies is doing magic. My role on the team is CADing, programming, engineering notebook and robot design.

Let's Get Down Business Plan

Our Future Goals

- Our idea is to print the names and logos of our sponsors on the back of our team shirts with the machine at school
- Our team is doing a Buffalo Wild Wings fundraiser



Outreach

- Volunteering at the LSHS tournament
- We will present FTC to Lakeville Boy Scout troop 262 on December 10th
- We presented to a Lakeview girl scout troop on November 30th
- We went to Stratasys and Atomic Architectural Sheet Metal





helping set up for tournament




stratasys
MINNESOTA WILD


Siemens motion control



Atomic Architectural Sheet Metal Inc.


ARMOUR