Metal Mercenaries
3093
2022-2023
FTC POWER PLAY

THE METAL MERCINARIES

Table of Contents

Our Team

We are extremely honored to be able to participate in FTC this year, however we would have not accomplished anything if it were not for each member in our team

Brennan: Our Social Media Expert and CO captain this year, he managed our social media presents and helped us establish connections and strategies with other teams. This will be his first but not last year of FTC.

Nik: Our Lead Funds Expert and second CO captain this year, he organized fundraisers for us to earn money for parts and uniforms we needed. This is his second year of FTC and the second year being on The Metal Mercenaries.

Travis: Our 3D Printing Engineer, He worked with our Lead Engineer Dustyn and printed parts using thurstons 3D printer for parts we need. This will be his first but not last year of FTC.

Gavin: Our Lead Programmer, He made our tele-op controls and programmed and managed our Autonomous Program, giving us the ability to scan the cones with our camera. This will be his first but not last year of FTC.

Dustyn: Our Head Engineer, He constructed our robot from nothing but a frame and worked to make our robot earn the maximum amount of points we were capable of. This will be his first but not last year of FTC.

Strategy

Strategy Behind the Robot

Our Strategy for this competition mainly focuses on scanning the given signal sleeve and trying our hardest to prevent opponents from making circuits, while trying to make them ourselves. Our strategy is mostly defensive, but is often successful.

Autonomous Period

Our Autonomous code starts off with scanning the signal sleeve and parking where it was told too, the code does not require a specific spot to run and can operate with most teams autonomous.

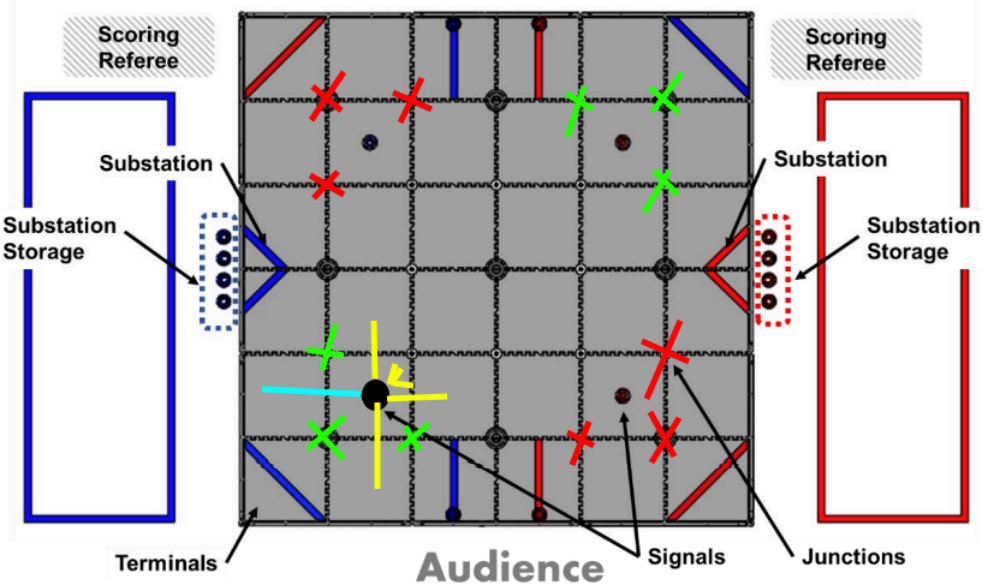
Tele Op Period

During Tele-Op, our driver starts off by putting cones on as many of the ground junctions as possible to make it difficult for our opponents to get a circuit.

Endgame

We do something similar to what we did in Tele Op in endgame, just we absolutely make sure no opponents have a circuit and if they do try to break it to prevent them getting the extra points, making them rely on cones they score.

Autonomous Path
spot: Start Position
Blue Line: Robot interacts with field element
Yellow Line: Robot Moves to position
Red X: Important field points which we will target as soon as we can
Green X: Places we need to keep to our alliance, as losing them could be devastating



Post Season

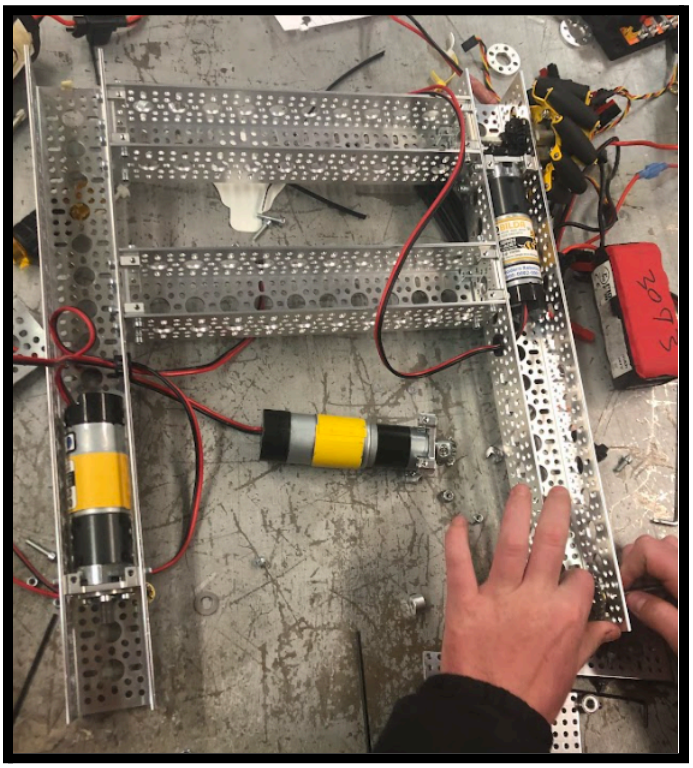
Post season 3093 was still fairly active, we Volunteered at Positive community kitchen to help with preparing confetti cornbread for those who need it

(Nik At PCK)

We also ran a Springfield Public Schools Robotics/3D printing camp for those in middle school, we had a total of 30 kids and the camp ran for a total of 4 days (Photo of cam running on left)

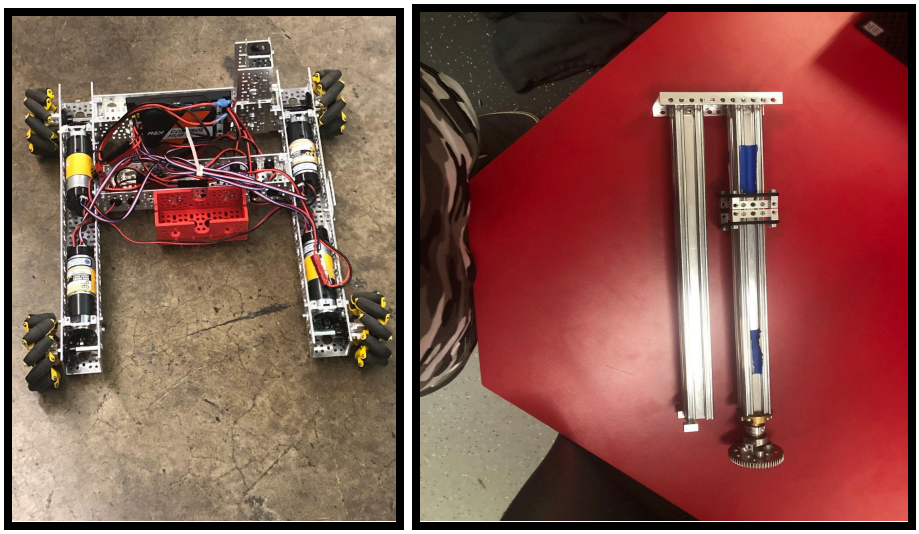
Journey to League Meet 0

Our journey begins with the disassembling of the previous robot, which took a few days to disassemble. Once the robot was disassembled completely, we started on the drive-train for our first version of our robot.



(Our first drive-train, this was scrapped for being too big to maneuver through the field).

While our lead programmer practiced coding our robot, the rest of us were hard at work on our original drive-train. It took us quite a long time to get the motors on correctly, which later we figured out they were never actually correct to begin with. Meanwhile, a small part of our team did our first fundraiser of the year, a concession stand at the University of Oregon football game. We started working on our first crane but never finished it in time for league meet 0.



(League meet 0 model of our robot (left) first crane model (right).).

League Meet 0 was on October 21st. Our robot was able to push cones into the terminal, and ground junctions if we got lucky, but our robot was so big it kept getting caught on junctions. As a team we did rather well, our main issue was adjusting to the stress that a league meet creates, and functioning through the stress. We were a little disappointed about our rank of 9-10, but for most of us, this was our first ever meet, so it wasn't too big of a deal. As a whole our biggest problem so far has been team communication. We had trouble sharing strategies and ideas, and just didn't tell anyone what we were doing.

(Us at league meet 0)

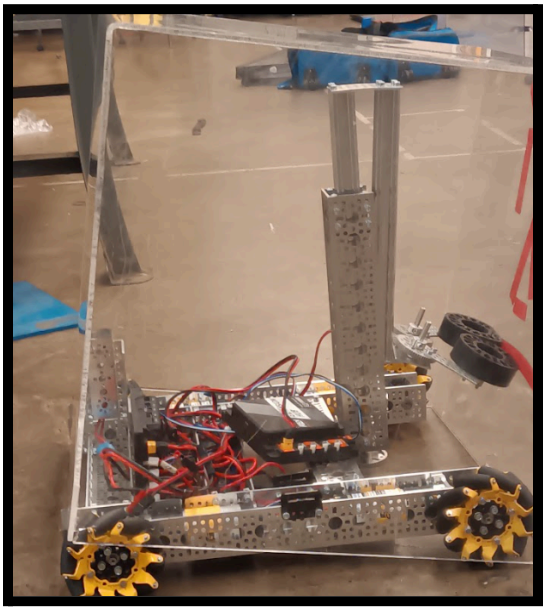
Journey to League Meet 1

Shortly after league meet 0, we had our next outreach opportunity. We got to show off some robots to kids at our school's Halloween Fair. We let all visitors test out some spare robots dressed up in halloween costumes.We also ran a few carnival games too. Although we didn't make too much fundraising money, we had lots of fun and hopefully made many young kids interested in robotics.

(Us and some peers working the "Plinko" carnival game).

(Working Football Concessions).

Some of us also got to run concessions for a school football game. Our lead programmer now had the autonomous code almost completely done, while a few of us worked on our team uniforms. Our two engineers worked on building and attaching an arm and crane on our robot. But this is where we found some major problems, as we were approaching closer to meet 1. Not only was our crane only tall enough to reach the low junctions, it also sat too tall to be allowed.



(Measuring our robot to unexpectedly finding that it was too big).

And to make things more complicated, our team got into a fight, which very well could have led to us giving up, but we realized that to do this, we had to do it together, so we looked past our fight and kept marching forward.

Eventually, meet 1 arrived on Nov. 19. We entered with our robot looking no different from last meet, with no claw or crane. We didn't even have time to build proper side plates, and had to use cardboard. Although, as a team we improved a lot. Everything seemed to go wrong in the beginning, from robot errors to bad communication and so much more, but we ended up with an overall rank of 6 out of 12, which is pretty good, although most of our good scores came from our alliances. We definitely felt much more satisfied with this meet than the one prior, but we still had a lot to do, in very little time.

Our robot had to have cardboard plates).

Journey to League Meet 2-3

Shortly after meet one, we discovered one of the hardest endeavors so far. The FIRST Lego League Qualifying Tournament, also known as the FLL Tournament. We and our partners this year hosted a FLL competition for 12 of its midwestern league teams, and for our first time hosting for this league it did rather well and went rather smoothly other than a few bumps.

During this time, we also decided it was time to make a brand new robot that was quite a bit more compact then the last one was. It took hours to do, but it was definitely worth it. We also ordered parts to make a 4 stage viper slide, a brand new crane for our robot. Although we almost ended up scrapping the crane in the end due to it causing many future problems and never getting done. Although at this point we were pushing through the struggle.

(Us working basketball concessions).

Throughout the winter, we got to do plenty of fundraisers, most of which being concessions for basketball. Fundraisers like these help us pay for these amazing experiences for robotics, including the robot itself. Plus they are usually really fun too.

Right on time, a day before league meets 2 and 3, our brand new uniforms arrived in the mail. After a long process of waiting, we were able to pick them up and wear them the next day.

(Part of our team in our new uniforms)

After what seemed like forever and only a few days at the same time, we finally arrived for league meets 2 and 3. It would be just like the last one, but twice in one day. It was rough. One of our newly made side plates was sized incorrectly, so we ended up with one cardboard plate, as well as our new plexi glass one.

(our robot during league meets 2 and 3)

In the beginning we felt not the greatest, trying to move forward with headaches and new problems occurring left and right. For a while our code was inverted, and our batteries kept dying, but by the time it went to league meet 3, everything was starting to get better. In the end, we were able to snag three more wins, giving us a total of five wins, which isn't great but was better than we expected.

Journey to Championship

Even after League meet 2 and 3, we realized we had much left to accomplish in a minimal amount of time. We had to rush to fix all the errors and flaws in our robot's design, code, and functionality. As well as finalizing our portfolio. We also did another round of basketball concessions.

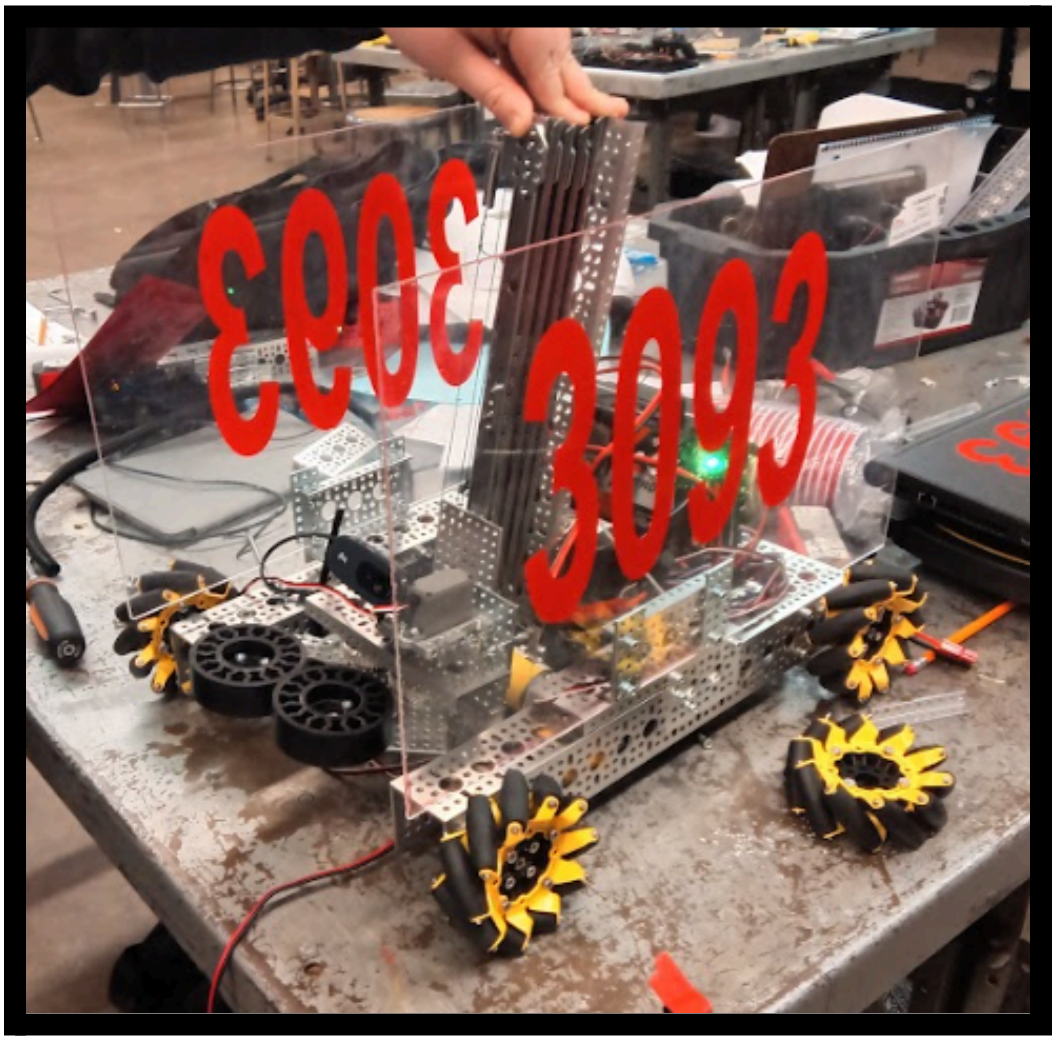
The robot had no working arm, or claw. It couldn't pick up cones to score points, making our robot not super helpful. Another struggle was getting this portfolio done in time. Even after being warned multiple times, we still wish we would have started a little sooner.

In the middle of all this, we hosted a scrimmage with 8 other teams in our league. This includes time to talk to other teams about strategies and tips for getting through championships. We also got to do plenty of practice matches against alliance teams. And time to work on our robots.

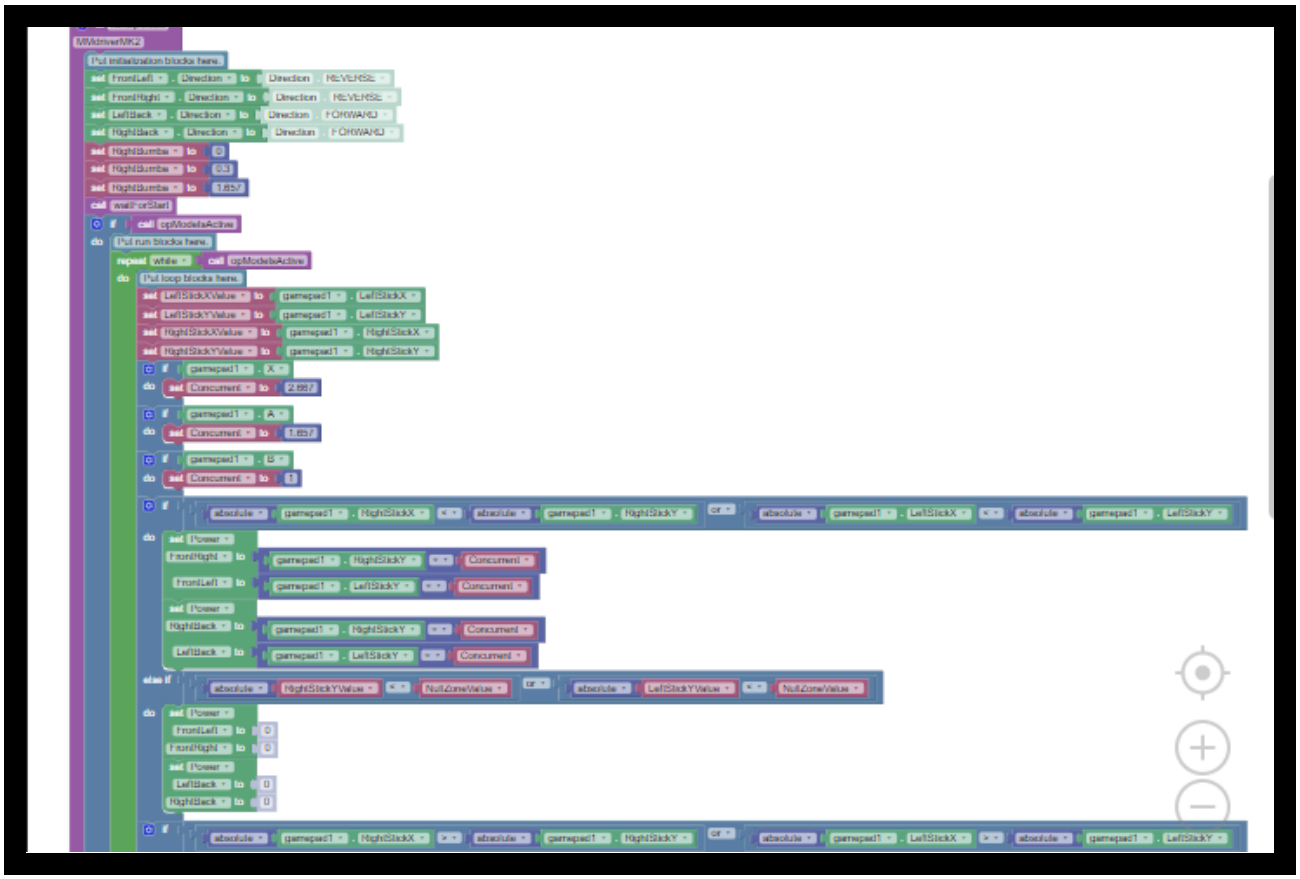
We struggled a bit during these matches due to our robot half done due to renovation. We also accidentally inverted the controls again, making it hard to steer. In the end we got to see what some of the best teams look like, as well as work on our robot.

With the deadline fast approaching, we finish up this portfolio, as well as the rest of the robot. During the League Championship, we were able to get our crane completely finished, as well as the claw. And we were able to get 11th place in our rank which is pretty good. And most importantly, we had a blast.

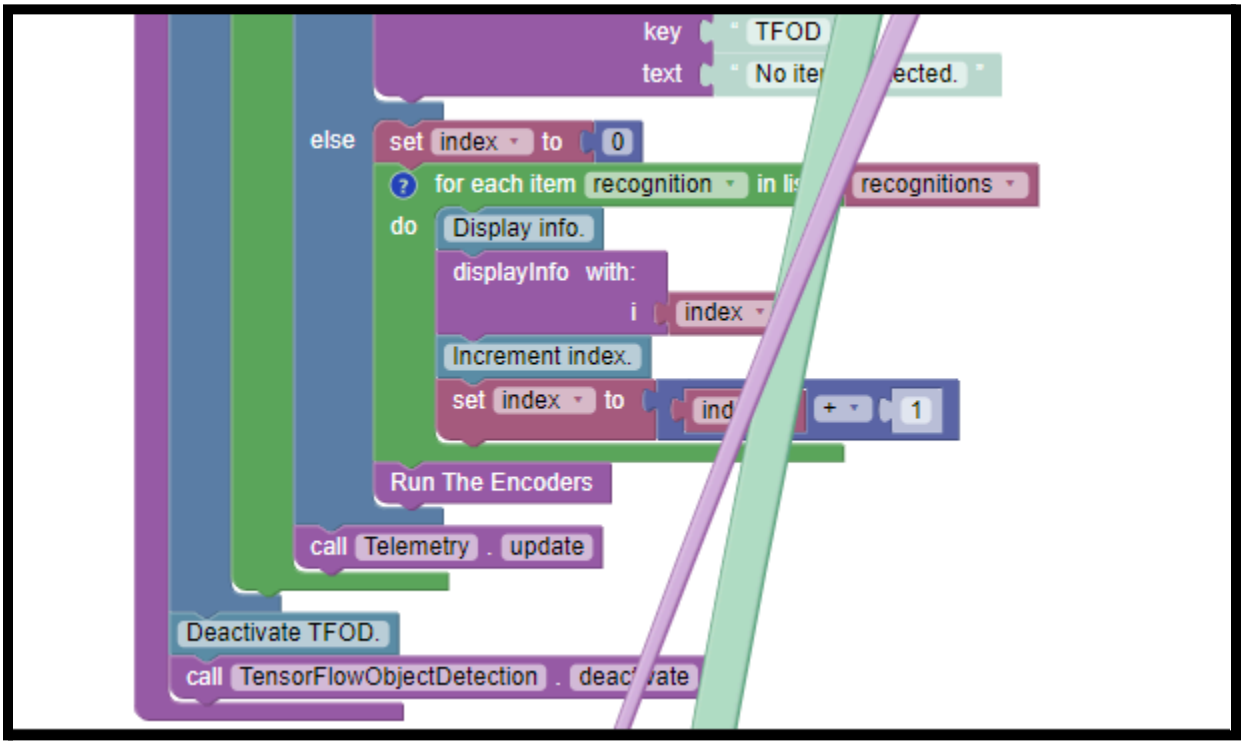
In the end we realized that we worked significantly better together than any of us thought we would in the beginning. We hope to get the opportunity to participate in the final championship matches of today and to have a great time today.



(Final Robot)



(Code for Tele-Op)
(Code for autonomous camera below)



This code allows our robot to drive around using a controller. Without this code, our robot is completely stationary and will not do anything.

This code allows our robot to move on its own using a camera installed at the front. This is used to park into the randomized spot during the autonomous period.

Outreach

For outreach, 3093 worked along other Thurston teams 10428 (Ace of Spades) 12721 (Apollo) and 3963 (Iron Legion) to get all of our teams funding for the season. We collaborated on a total of 8 separate concession stand fundraisers securing us the funding we all were looking for. To reach out to other teams we were also planning a sticker to hand out at League Meets but unfortunately we ran out of time to finish and print it.

This year we partnered with team 14126 Fibonacci to host league meets for this year, so we got to get to know each other rather well and were able to help each other with design ideas and strategies for the year. We originated our offensive strategy based on them.

Logo Revamp

METAL MERCENARIES

(2021-2022 “Old” Logo)

We decided as a team to update some aspects about us as a team, so we revamped our logos from the previous year. So with the help of our artist Eli, we were able to create a brand new logo. We wanted to keep with our current knight theme as seen above, so we landed on this. Which to us is a huge improvement and we are extremely proud of it and we hope you like it too.

THE METAL MERCINARIES