

# My project

As a kid and even now I have enjoyed watching Battlebots on TV and always wanted one of the robots on the show. Unfortunately, not many people sell them and when they do they are worth at least 5 figures. Coming into my senior year I knew I needed a project and I thought it would be fun to try and make one. This is easily one of the best learning experiences I have ever had and the fact that everything was done by me and seeing the evolution of it has kept me motivated and excited. This is the evolution of my project.



# Research and Bought Parts

(September-October)

After a month of learning how the electronics worked, what I needed, and keeping price in mind I decided on this group of parts that consists of:

- Transmitter: 1x
- Receiver: 1x
- Wheels: 2x
- 21T motor: 2x
- 35T motor: 1x
- Batteries: 2x
- Electronic Speed Controller (ESC): 3x
- 6mm x 178.816mm MXL belt: 1x
- 6mm x 438.912mm MXL belt: 2x



# Breaking in the Motors

## (October)

Breaking in motors improves reliability and gets rid of anything that may be stuck inside.

To do this I fully submerged a motor in distilled water, ran it under low voltage for 30 minutes, and cleaned it with electrical degreaser after.



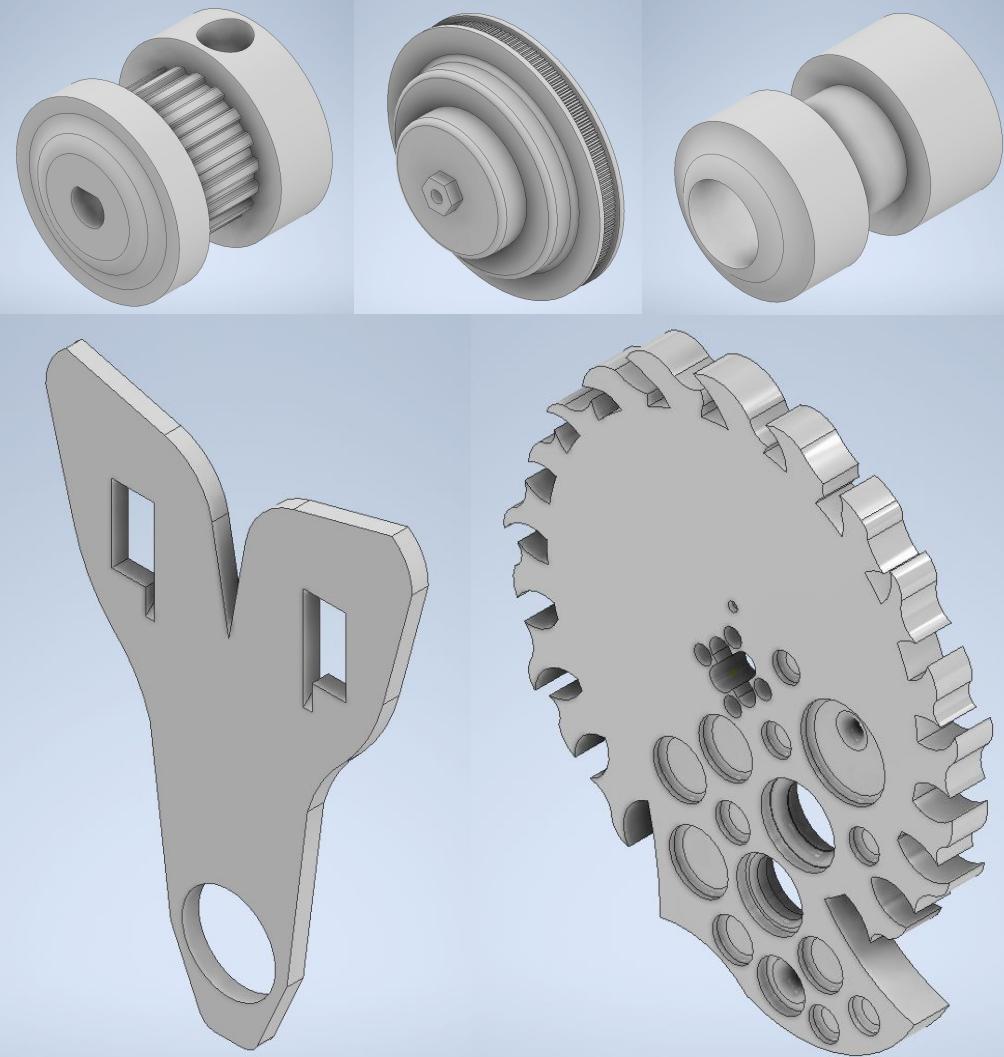
Video ↑



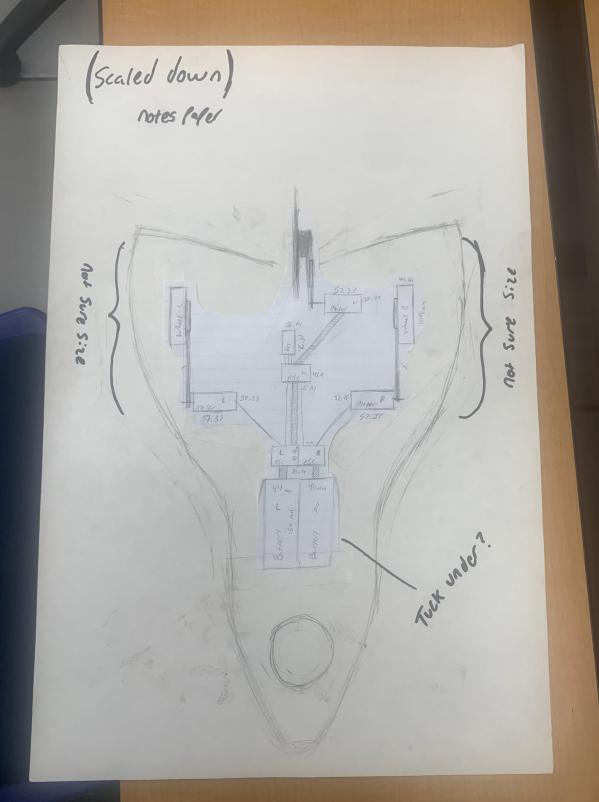
# Custom Parts

(November)

When I was looking for parts online I saw a lot of pulleys with different gear ratios but there was always an issue. Some pulleys were too big, didn't fit my motor, didn't have a big enough ratio, etc. This made me make my own pulleys with my own ratio (1:8). These pulleys were also made to fit my wheels and motors perfectly. I also made my own, asymmetrical weapon design a pulley to spin the weapon, and a base to be cut on CNC.

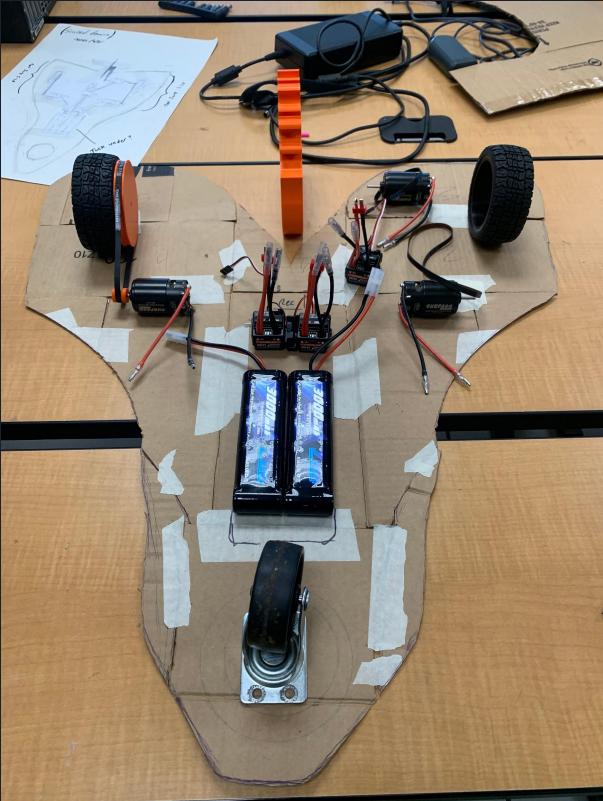


# Beginnings



When my parts came in and the others were done 3D printing I spent some time drawing what i wanted everything to look like on paper

After this I cut out the shape on a piece of cardboard and layed out the physical parts to make sure everything would fit and connect properly



# (November)

# Making a Base

(November)

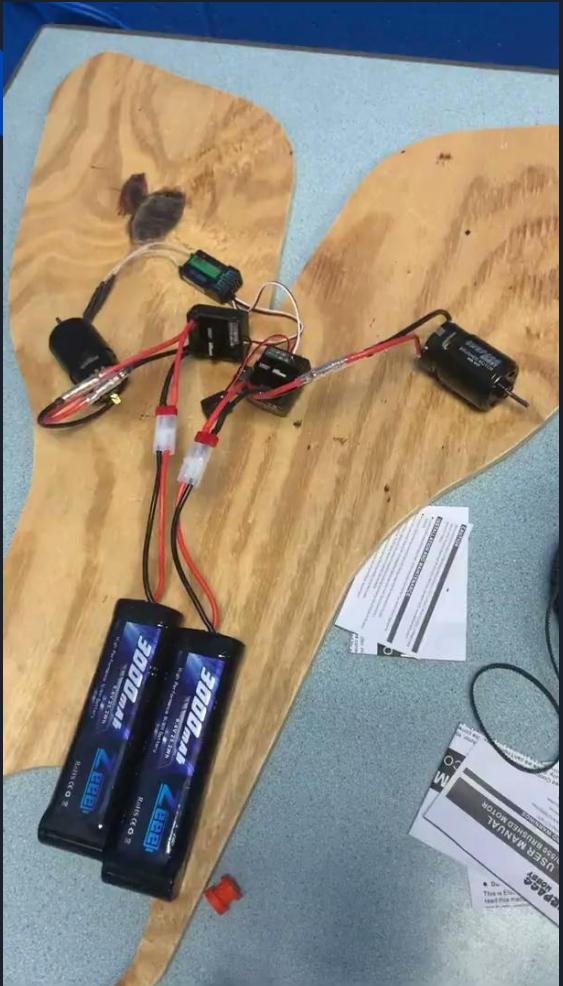
After I had the shape planned out I modeled it in Autodesk Inventor and cut it out on a CNC machine



# Testing Electronics

## (November)

Video of the drive system wired and working under zero load



Video of the weapon system wired and working under zero load



# Mounting a Wheel

(November)

The first time I mounted a wheel on my robot all I wanted was to see the wheel spin (video on the right) and while it did there were a couple issues. The motor at this stage was held by zip ties and the belt wasn't tight enough to pull the weight of the robot.



# Mounting the Drive (December)

To mount the drive I made a few upgrades:

- Put the second wheel on.
- Went to HVAC and they made me a mount that will hold the motor and give me a way to tighten the belt.
- Attached all stationary parts with zip ties.
- Screwed on a temporary wheel on the back so it wouldn't drag.

Recent picture with more upgrades to the drive



# First Drive Tests

(December)



This is the first time that I drove my robot for a long period of time and where I saw issues that needed to be fixed.

To fix these issues I:

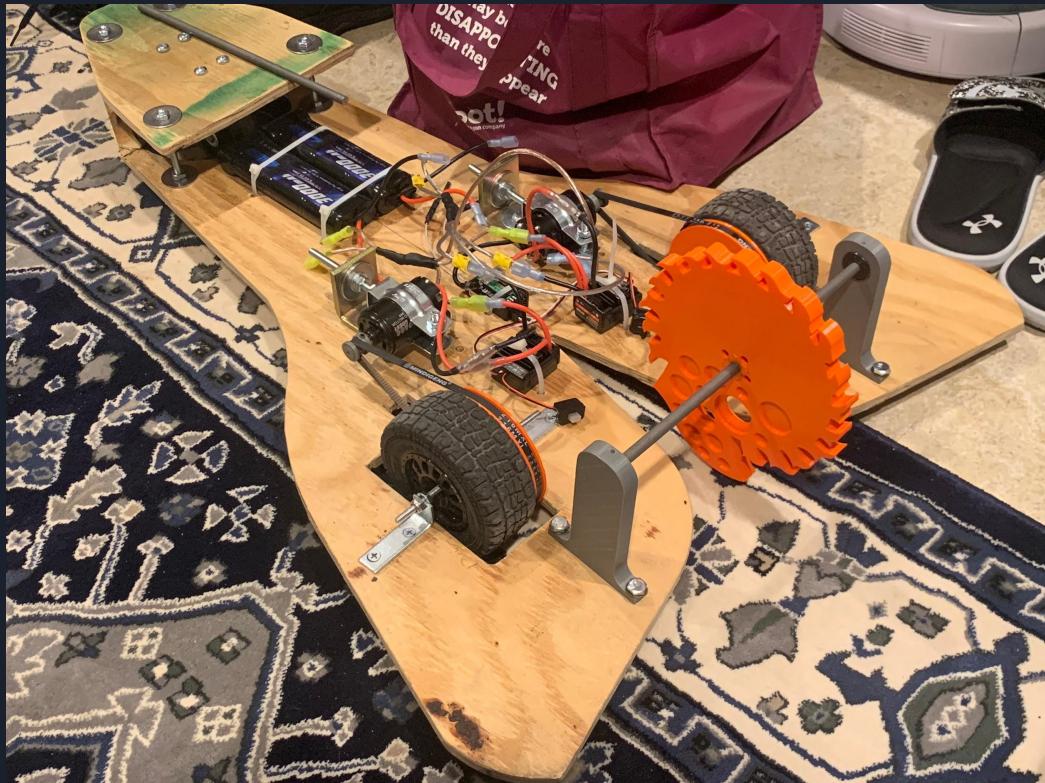
- Crimped my own connectors to the components.
- Made a harness to split two batteries into three ESCs
- Replaced the temporary wheel with a bigger permanent wheel and a platform to hold it.
- Put set screws in the pulleys so they don't fall off while driving



# Mounting the Weapon

(January)

To mount the weapon I made two mounts with a hole big enough to hold a bearing and a hole to put a set screw in to lock it in place. I cut a steel bar to fit in both supports and be the axle. I also made a pulley to fit on the axle so the belt on the motor had something to grip.





(January)

## First Weapon Tests



After the weapon was fully mounted I drove it around and hit random things that were going to get thrown out. My robot tore through everything in its way and showed no signs of slowing down.



To fully stress test my robot I hit an old softball and the weapon underwent a catastrophic failure. This pushed me to make a better weapon that was stronger and more balanced.





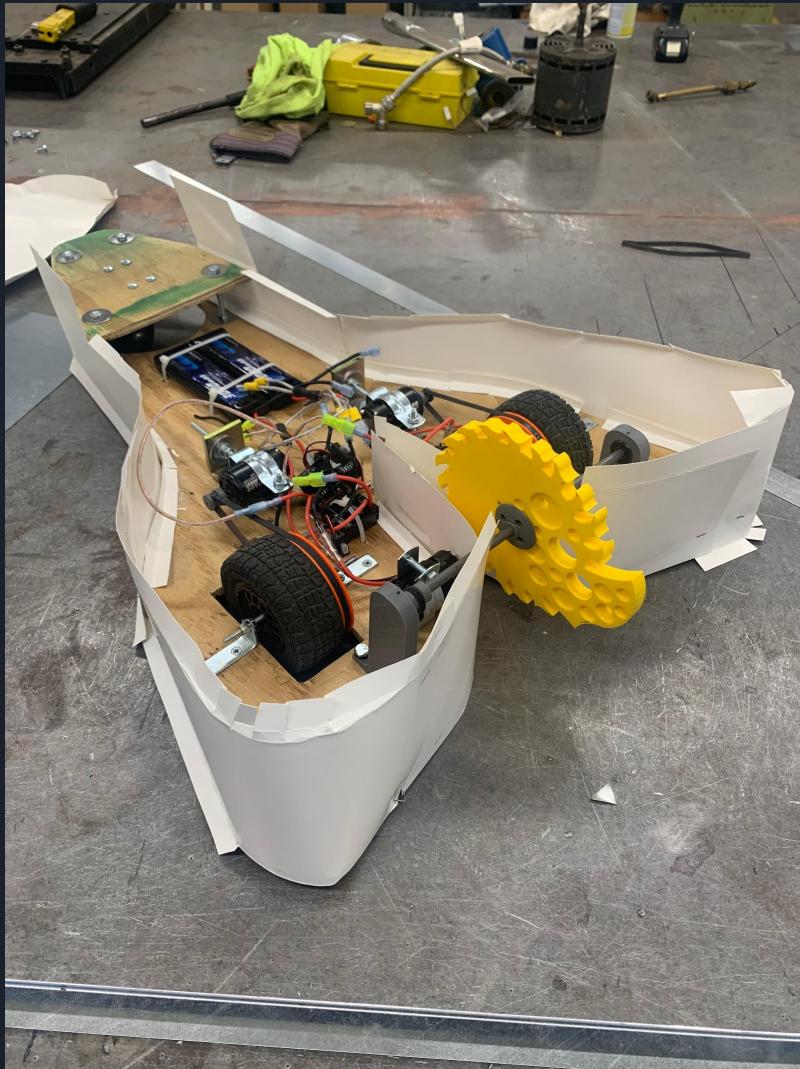
# Weapon Tests With a Better Blade

(January)

A few days after the first weapon tests I remade the weapon to be more balanced and dense for strength and more power (videos on the left).

# Planning (February-March)

Before I made the body out of metal I wanted to get an idea of the shape. To do this I made a body out of cardboard to visualize an end product and also make changes with a material that's easier to work with.



# Making the Body

(March)

With ideas in mind I spent five hours in a metal shop a family friend owns. While there I bent brackets to hold everything to the wood, bones out of heavy gauge metal, and screwed lighter aluminum plates to them.



# Complications and Fixes

(Start to finish)

The hex nut that fits into the wheel broke after time and was hindering the drive. To fix it I reprinted the pulleys 100% solid.



The original holes for the weapon axle to fit through were too low so I shaved material off with a dremel.



Occasionally the weapon would fall off of the supports I made. To fix this I cut a longer axle and drilled holes all the way through the supports and put caps on the ends so it wouldn't move or fall off.



# Finishing Touches

(April-May)

The last thing I had to do is wrap the back of the robot in sheet metal. To start, I made bones like the ones around the body with leftover metal from the machine shop. After, I cut a piece of aluminum that was long enough to wrap around everything, put cuts in places that needed to be bent, shaped the metal how I wanted, and put screws in to lock everything in place. After that was done I put the top I made earlier back on and, after 9 months of hard work, my robot was done.



