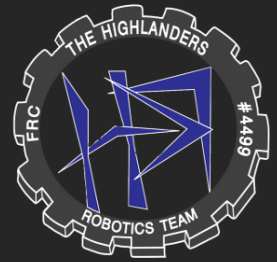


The Highlanders STEAMWORKS 2017

The Cyber Cycle



The highlanders are ready for the 2017 season—STEMWORKS. The games consists of shooting large whiffle balls(fuel) into a stem boiler, and placing gears on large spring pegs for the human player to pull up and score moving gears to make the propellers rotate. The more balls/fuel score and more propellers spinning equals more points.



FIRST® Robotics Competition 2017 Game

FIRST STEAMWORKSSM the 2017 FIRST Robotics Competition game, invites two adventure clubs from an era in which technology relied on steam power to prepare their airships for the ultimate long distance race.

Each three-team alliance prepares to take flight in three ways:

- Build Steam Pressure.** Robots collect fuel represented by green balls. They score it in high and low goals in their boiler. As fuel is scored steam pressure in the tank on the alliance's airship builds – the high goal builds pressure faster than the low goal.
- Start Rotors.** Robots retrieve and deliver gears to pilots on their airship who then install them on the appropriate rotor. Once a gear train is complete the rotor can be started.
- Prepare for Flight.** Adventure clubs want their robots to climb aboard their airships so they can assist the pilots during the race.

Autonomous Period:

Robots operate independently from preprogrammed instructions for the first 15 seconds.

Adventure clubs score points by:

- Reaching their baseline
- Delivering gears to the airship
- Scoring fuel into the boilers

Teleoperated Period:

Operators take control for the final two minutes and fifteen seconds.

Adventure Clubs continue to score points by:

- Collecting and delivering gears to their airship
- Scoring fuel in the boilers
- Climbing the ropes on their airship to prepare for flight
- Populating gear trains to start rotors
- Defending against other Adventure Clubs

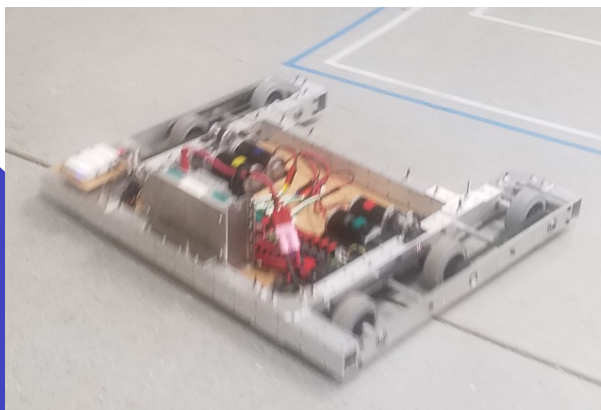
The adventure club with the highest score at the end of the match is best prepared for the race and wins.



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Protoying!

Once the game was announced we were underway to start pro-typing. We started with a shooter, and decided to use a turret. Then, we worked on how to feed the shooter, we tried several ideas, wheel actuator, poly cord...We also decided on a final chassis size and shape.



We went with a , wide low robot size this year. We went with 6 4" colson wheels and custom team made gear box with team made gears!



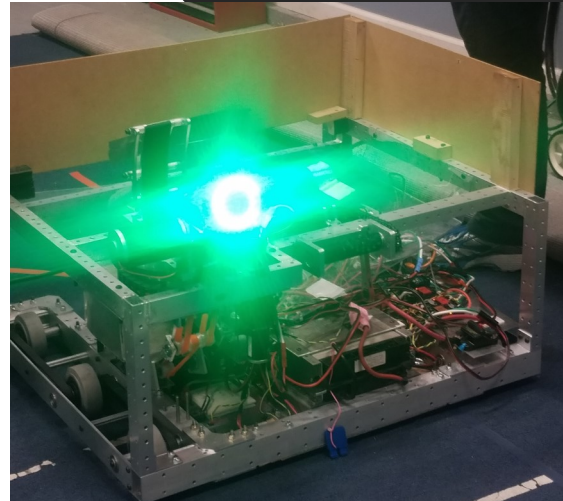
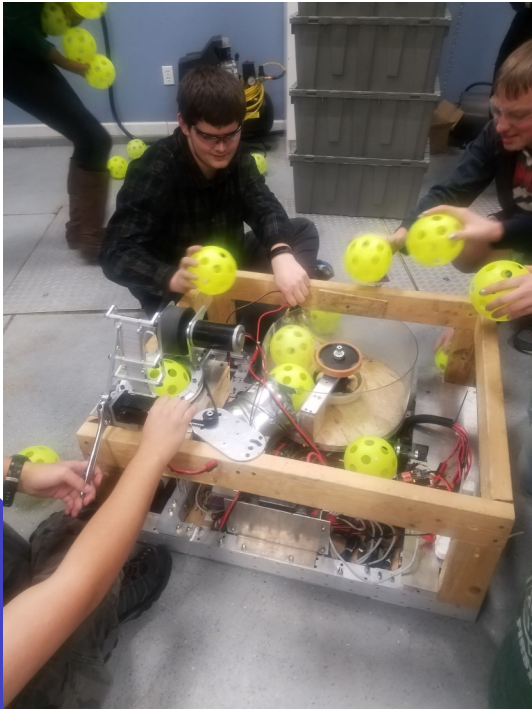
We also 3D printed the shooter hood plate for our turret.



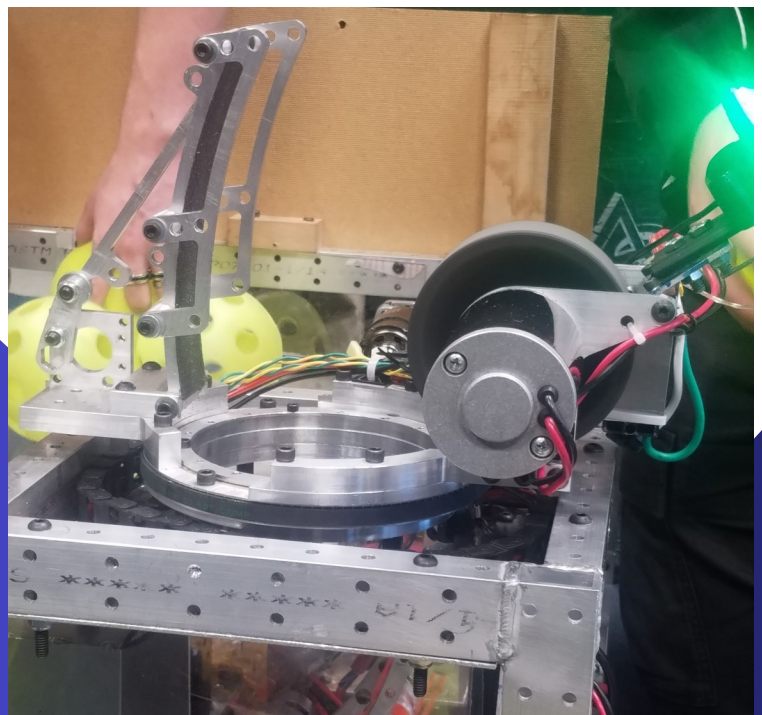
For our ball agitator we started prototyping a wheel based solution with 2 wheels stacked.



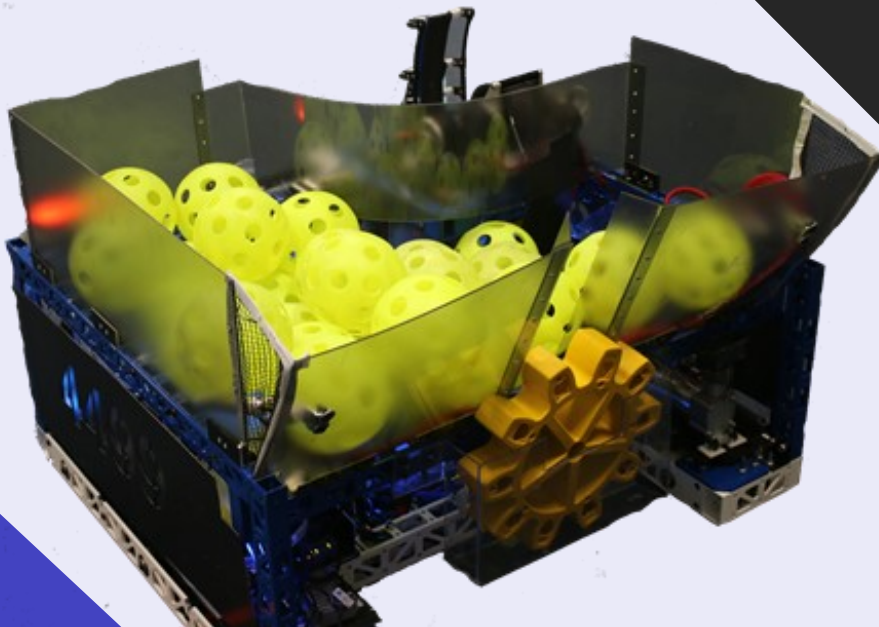
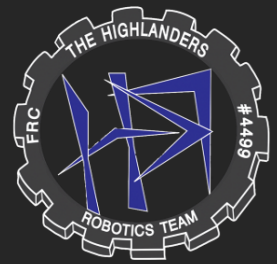
Protoying!



We created a superstructure so we could mount additional items to it, and finalized our shooter.



The Highlanders introduce Blitzar!



Here is our final design. We integrated a gear holder so we can place our 1st one. We added a climbing mechanism. We also enclosed the top of the robot with smoked lexan to hold in the balls

