HIGHLANDER ROBOTICS 8033

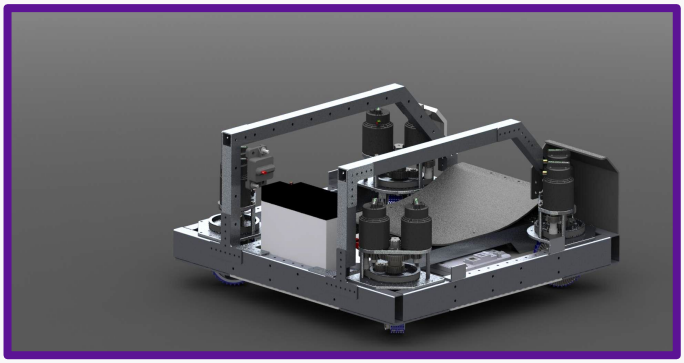
INTRODUCING SELKIE . . .

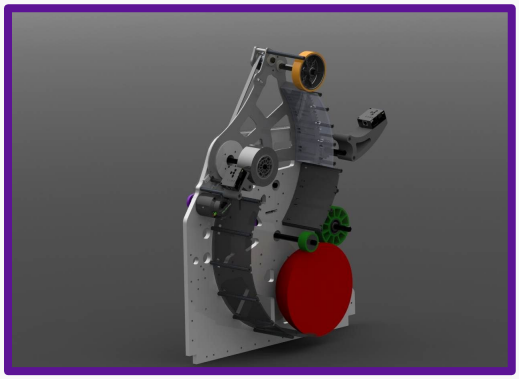
Overview:

We are a pandemic rookie. Although Selkie is the third robot our team has built, this is our first full "regular" season of FIRST Robotics Competition. We are excited to be in our new home in Engineering Lab at the new STEAM Building at Piedmont High School and bring the best we have to competition.

Drivetrain:

Our drivebase is a simplistic 24" square swerve drive made from 2" by 1" aluminum beams. This differs slightly from our design last year as we choose a smaller base for more maneuverability and less supporting beams to cut down on weight. The corners are held together by 1/8th inch aluminum gussets that are riveted into the base but also screw into the mk3 swerve modules with .3 inch bolts. Finally, we have a light bottom plate in which all our electronics are secured into.



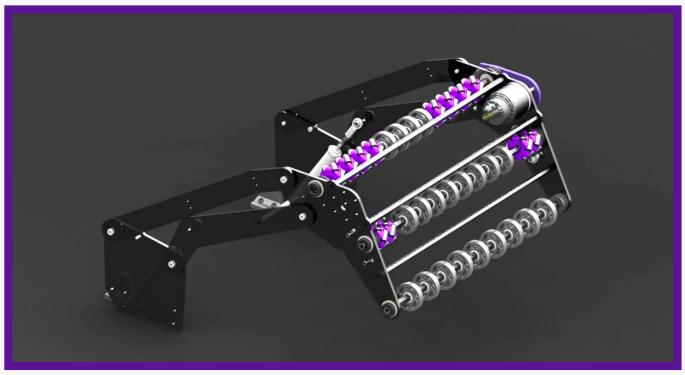


Shooter:

As the central mechanism of the robot, our shooter integrates both shooting and routing into one subassembly. Two independently controlled routing wheels take the balls from the intake and store them in our linear routing system. Using beam breaks and color sensors, we are able to control two balls and have automatic ball rejection. Once software auto-aim is locked on, we use a two wheel active shooter with an adjustable hood that allows the ball to have a consistent shot from anywhere while reducing spin.

Intake:

Our pneumatically deployed over-bumper intake features 2-inch compliant wheels and vector-mecanum indexing in order to pick up cargo as fast as possible. Polycarbonate material, used on arms and main plates, is resistant to impacts and flexes instead of cracking. The intake deploys on a non-parallel 4 bar via just 2 inches of piston stroke, making the deployment extremely jam-resistant and fast. Our intake is also balanced with surgical tubing to increase deploy speed and smoothness.



Climber:

The two climber modules on the robot use tape measures, that dispense from spools, and carbon fiber hooks attached by 3d printed parts epoxied to their ends. The spools are chained to an axle that goes through the robot, powered by a falcon with a 30:1 reduction. To rotate the tape, we're using a guide made from PVC rotated by a rack and pinion. The pinion is belted to an axle that goes through the robot powered by a falcon with a 25:1 reduction. The mechanism is surrounded by ⅛ inch aluminum plates which are bolted to the shooter's HDPE and the robot frame.