Main Robot Features

Vortex is designed to cycle notes into the Speaker and Amp, shoot from anywhere on the field with its arm, instantly collect notes from the floor and center them, and quickly climb onto the stage with multiple robots on the same chain at the end of the match.

Robot Name: Following the tradition of naming our robot after natural disasters, the team followed the theme with Vortex which captures the image of our red and black robot pulling in notes from all across the field

Technical Specifications

Mechanical

General
8 Accurate speaker shot with Adjustable arm
8 Unblockable shooter and camera
8 Very low center of mass
8 Only 90 lbs.

Drive
8 Custom 90A TPU tires for maximum pushing power
8 Geared for 13.78 ft/s
8 WCP Swerve X Flipped Gearboxes with 2 Falcon motors each
8 Custom lightweight ACM bellypan

Climber
8 Under 4 second lineup and climb anywhere on the chain
8 Latching system for guaranteed no-slip climbing

Shooter/intake
8 50A 4" Stealth wheel shooter flywheels
8 Automatic note centering for improved shot consistency
8 2 Falcon 500 motors for fast spin up
8 Adjustable arm angles for launching from anywhere on the field entirely within our frame perimeter
8 Efficient lightening and folded poly construction for a maximum rigidity to weight ratio
8 Durable polycarbonate construction withstands high speed impacts from any angle
8 Custom 3D printed mecanum wheels for centering

Arm/A-frame
8 2 Neos with a 183:1 reduction using #35 chain for maximum mechanism stiffness
8 "Coast Mode Button" for ease of moving arm when the robot is powered on
8 Signaling LED's for collecting the note, and looking cool while we do it
8 Efficient Lightweighting for maximum stiffness

Programming
8 Java code with command-based framework
8 Automatic rotational alignment and arm positioning tracks subwoofer using vision and position awareness, enabling on-the-go shooting
8 Persistent positional awareness with dashboard field top-down display
8 Intuitive heading-based drive control
8 Thorough logging system assists debugging process
8 Command activation via button box allows for fast inputs
8 2-note auto that uses vision to align to the subwoofer

Electrical

Shooter/Intake
8 Limelight Camera for autonomous vision targeting of Speaker and Amp
8 Beam break sensor to detect successful note intake

Arm
8 Coast mode Button to allow arm position to be set and then allowing the arm to go back into brake mode and hold position
8 Hall effect soft stops at bottom and top of range

Electrical Board
8 9-axis inertial magnetic sensor and motion processor for Adaptive Pure Pursuit autonomous driving and target tracking with parallax adjustment
8 Wired following our "3R" guidelines

LED's
8 Custom programmed patterns via onboard Raspberry Pi:
    8 _Fire - Dragon_
    8 _Shockwave DNA - Arm_
    8 _Equalizer pattern - A-Frame_