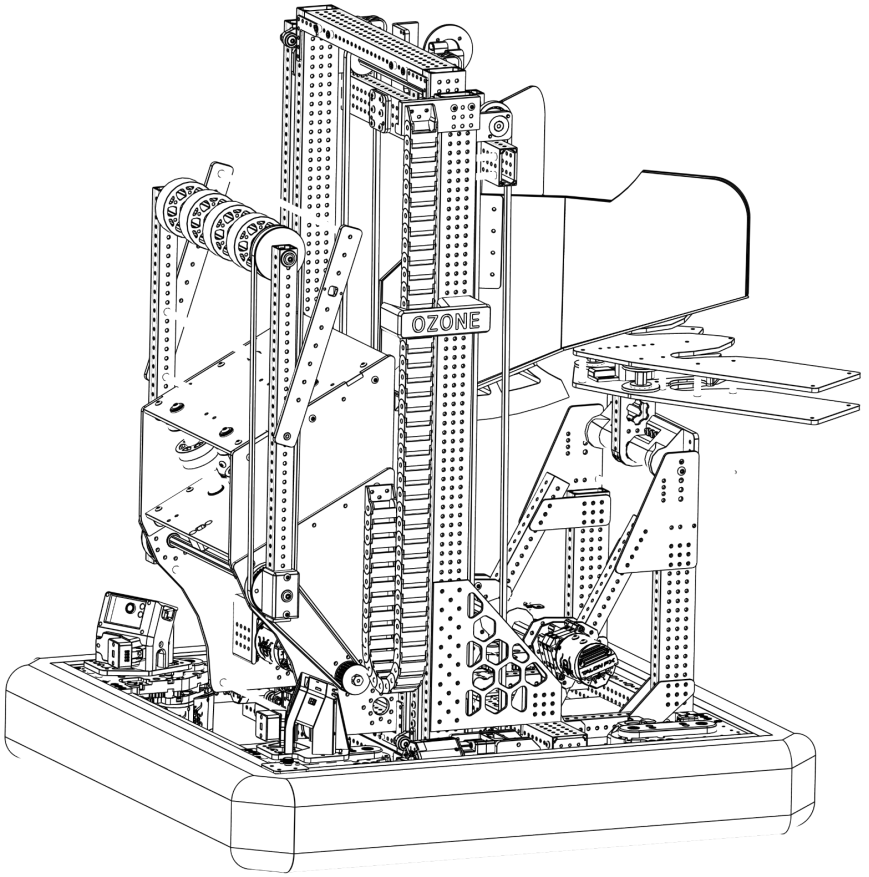
Capabilities:

- **Automated Scoring:** Supports automated scoring at all reef levels, including processor and net zones, ensuring consistent performance.
- **3.5 Piece Auto:** Scores 3 pieces autonomously and returns for a fourth, alternative options are also available providing flexibility for various strategies.
- **Precise PID Alignment:** Uses sensor and position data for accurate alignment in scoring and movement.
- **Input Flexibility:** Takes input from both the controller and the custom dashboard for real-time adjustments.
- **Python-Based Code:** Fully developed with the RobotPy framework, marking our first year of programming in Python.

OZONE 4611 ROBOTICS



TRIDENT

Controls & Automation

- **High-Level Automation in Teleop**: By reducing the number of manual inputs required for scoring cycles, drivers can focus on strategy and awareness, improving overall match performance.
- **Aux Driver Scoring Selection**: Using a custom designed and coded dashboard, the aux driver can send a target scoring location to the bot, taking unnecessary inputs away from the main driver
- **Automated Intake for Coral**: The driver can hold a button to enable automatic lineup and intake from the coral station, improving speed and accuracy compared to manual alignment.
- **One-Button Scoring Routines**: With a single button press, the robot aligns, raises its elevator, scores, retracts, and returns control to the driver, streamlining the scoring process.
- **L1 Stacking and Scoring**: Automatically places coral side-by-side and dynamically aligns for vertical stacking of up to three pieces, optimizing space and ensuring secure scoring in the trough zone.
- **Predictive Driver Assistance**: If the robot's primary scoring path is blocked, it uses odometry and feedback to predict and execute the intended maneuver automatically, lightening driver load and maintaining efficiency.
- **Automated Algae Handling**: Based on field location and sensor input, the robot determines whether to grab, score, or shoot algae—automating decisions, taking burden off the driver.
- **Anti-Beaching**: the robot, via roll and pitch values from the gyro, can predict if the robot is about to beach onto an algae and drive to counteract it.

Autonomous

- **Trajectory Generation:** Choreo generates short trajectories, combined into over 20,000 autonomous routines.
- **3.5 Auto:** The robot scores 3 L4 corals autonomously, returns to the station, and picks up a fourth. A simple auto and double net mode offers additional flexibility.
- **Dynamic Autonomous Pathing:** A custom dashboard defines scoring locations pre-match and wirelessly communicates with the robot to generate optimized paths, adapting to alliance strategies.
- **Autonomous Robot Assistance:** The robot pushes a stationary alliance partner over the starting line, securing the Autonomous Ranking Point while scoring 3 L4 corals.
- **Dashboard Integration:** Pre-programmed presets along with the custom auto maker allow quick selection of autonomous routines, and the dashboard provides trajectory feedback and data to drivers for precise execution.