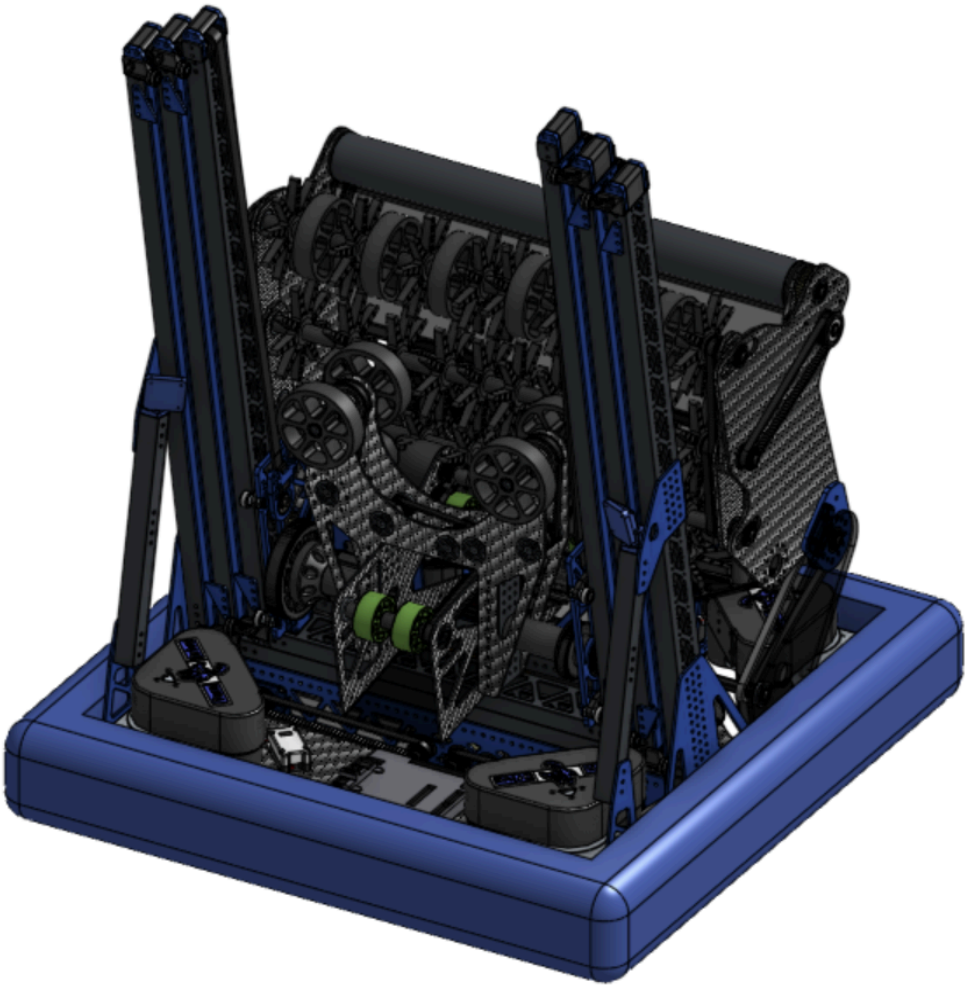
Leviathans
8744

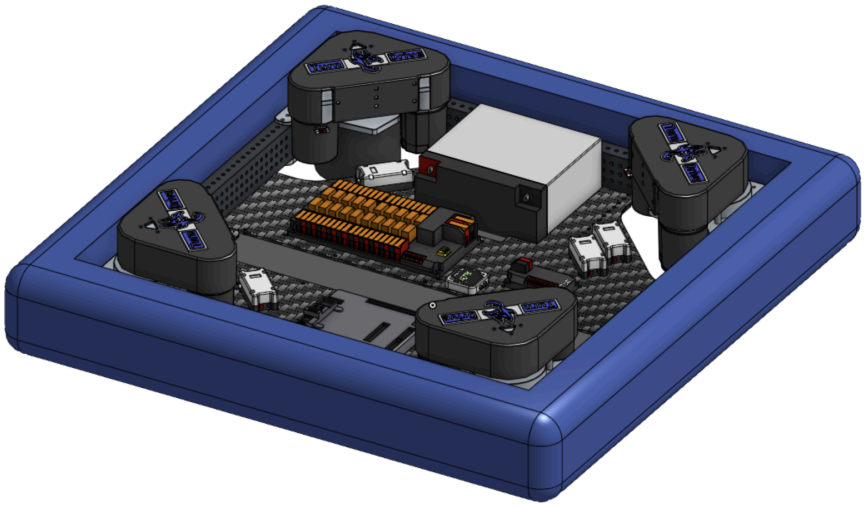
SHARKBYTE

2025 Technical Binder

Table of Contents



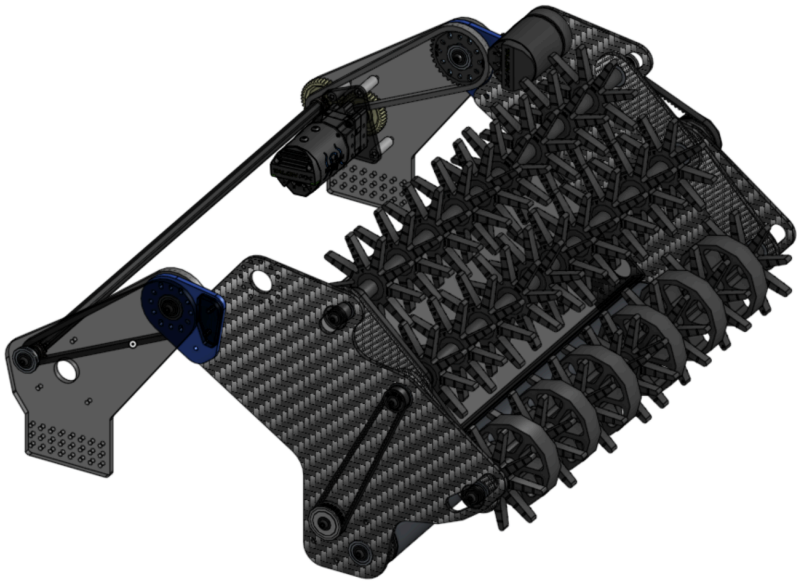
Drivebase



The Drivebase is the main building point of our robot, and laying a solid foundation is critical to achieving peak robot performance. We designed ours to be fast, light, and strong.

- 26” x 26” aluminum frame
  - 1/8th inch 2x1 aluminum tubing
  - Full SSRP bellypan
- Undermounted Battery
  - Battery is inserted through the bottom
  - Held in by a plate with four ¼-20 bolts
- MK4i Swerve
  - Neo turn motors
  - Kraken drive motors
  - 3D printed TPU wheels with Aluminum Hubs
  - 3D printed Onyx Swerve Covers

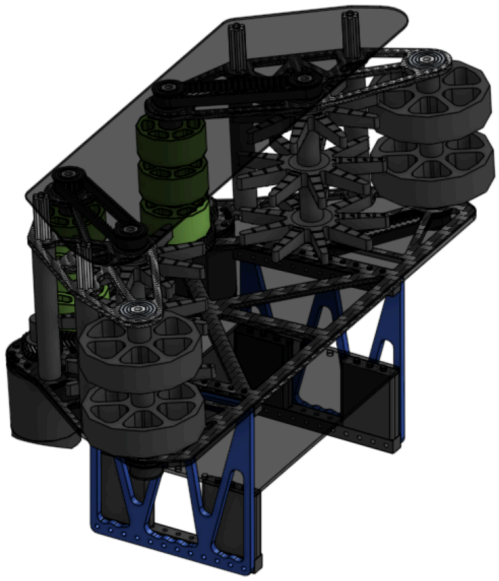
Ground Intake



The intake allows us to pick up Coral from the ground at any orientation. This allows us to be more competitive and run fast cycles that don't necessarily depend on human coral input.

- Intake pivot
  - Powered by Kraken
  - Allows us to stow the intake in a safe position
- Three Star Rollers
  - The front and rear rollers are compliant
  - Touch it own it leading rollers
  - Powered by Kraken
- 2.5in Compliant bottom roller
  - Made of ABS pipe
  - Laired with foam and rubber tape
  - Speed synced with the rest of the intake

Indexer



The indexer complements the intake by reorienting the coral in the proper direction for the rest of our Coral path. And allows us to intake Coral faster.

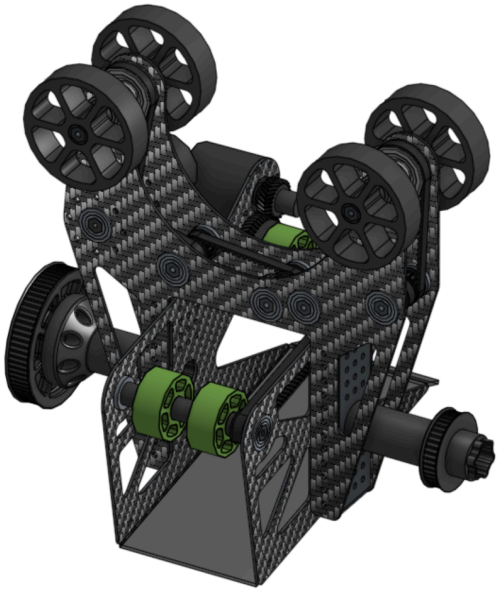
- Powered by two Krakens
  - Allows us to independently control both sides
  - Has enough power to prevent jams
- Three different wheel sets
  - A combination of star and compliant wheels
  - Integrated on spacing to gain faster intaking
- Top Plate
  - Holds coral in the indexer
  - Shape creates a chute for Coral during auto

LeviaLift

The LeviaLift allows us to reach all levels of the reef both fast and precisely. This allows us to reduce cycle times and score more Coral in the match.

- Continuous belt drive
  - 18.5’ belt on each side
  - Continuous rigging makes rigging simple
  - Driven by two Krakens with 5:1 gearing
- LeviaLift Guide Rails
  - Poly-Carb plates stop the stages from separating
  - Removes the need for cross-bracing
  - Very easy to add or remove stages
- Camera Mounts
  - Cross-eyed Cameras have better FOV
  - Mid-level cameras allow for a better view of the field

Scoring Mech



The Scoring mech allows us to hold and score Coral as well as take algae off the reef. This one mechanism controls both game pieces and works with our other intake mechanisms

- Interacts with both game pieces
  - Holds Coral to score on all four levels of the reef
  - Uses compliant wheels to remove algae from the reef
- Powered by two Neo motors
  - One to hold coral
  - One for algae
  - Allows for better control
- Pivot Powered by Kraken
  - Directly driven by a Kraken with belt reduction
  - Little to no backlash for better control

Software

- Java programming using PhotonVision and PathPlanner
- Dual cross-eyed black and white global shutter cameras
- Uses April tags and odometry to create a pose estimation with a Kalman filter.
- Auto-align
    - Known location for left or right poles
    - Known location for each level of the reef
    - Uses a rotation matrix to auto-align to the closest face
- LEDs
    - Top section shows the current vision status
    - Middle section increases in size as the level of the reef increases
    - Bottom shows intake mode and status
- Intake
    - One button sequence
    - Deploys and runs intake while the button is held
    - Once a game piece is detected, Intake runs backward to prevent multi-game piece penalty
    - Automatically stows when sequence is complete
- Scoring
    - One button scoring sequence
    - Auto aligns to the reef and pole, and the level selected by the co-driver