LIGERBOTS
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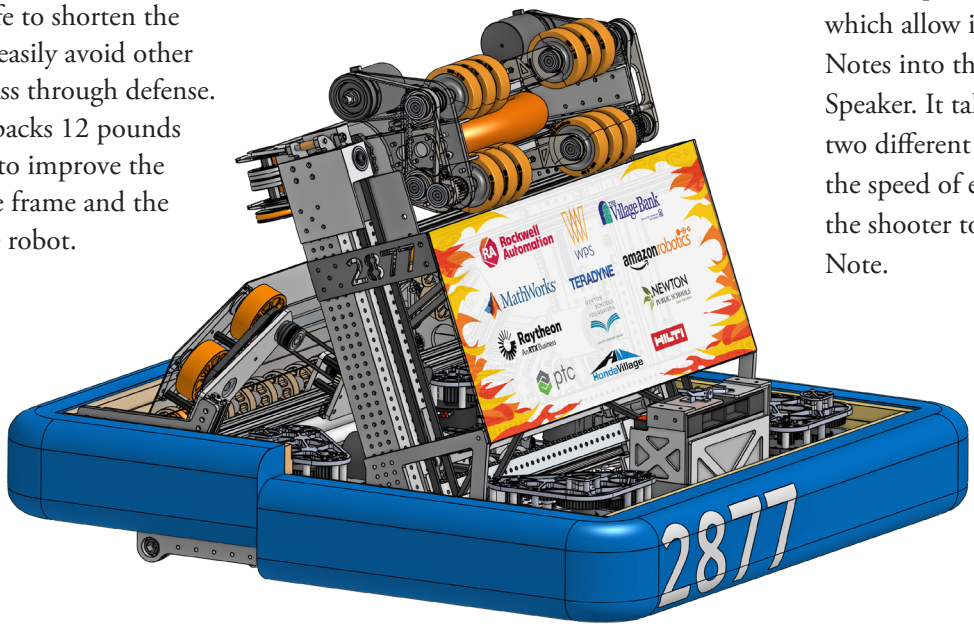
Calliope

Swerve Drivetrain

The maneuverability of Calliope's swerve drive allows the robot to pivot and strafe to shorten the scoring cycle, easily avoid other robots, and pass through defense. Calliope also packs 12 pounds of steel frame to improve the strength of the frame and the stability of the robot.

Intake

Calliope's intake features an under-the-bumper design which means it is protected, and does not need to be deployed.



The LigerBots 2024 robot, "Calliope," is named for the Greek goddess of music, song, and dance.

Shooter

Calliope's shooter has 12 wheels: six on top and six on the bottom, which allow it to shoot the Notes into the Amp, Trap, and Speaker. It takes advantage of two different motors to control the speed of each side, allowing the shooter to create spin on the Note.

Elevator

The elevator has two stages. It has a maximum height of 43", allowing it to easily reach into the Amp and the Trap while it is on the Stage. Calliope's elevator is angled at 30°, which allows it to better reach outside the robot.

Vision System

Two global shutter cameras, plus target recognition software, allow the robot to know where it is on the field. A third camera detects Notes on the floor and allows the driver to see them.

Climber

Calliope grabs the chain using custom-designed aluminum hooks. The hooks are then pulled down towards the base of the robot using two winches.

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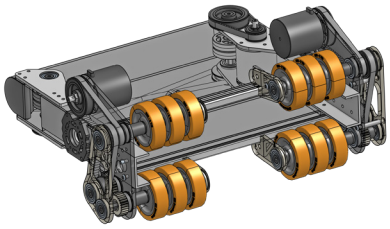
Features of Calliope

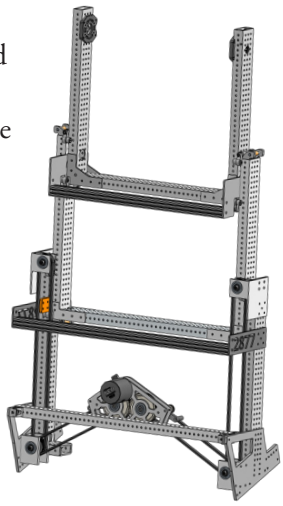
Shooter

- Calliope's shooter consists of two independently-controlled sets of wheels, one on the left and one on the right, allowing for the introduction of spin to the Note.
- Each set has top and bottom wheels that spin in opposite directions, using a gearbox.
- The shooter also has feeder wheels to hold the Note while the shooting wheels speed up, and feed the note into the shooter wheels on demand.



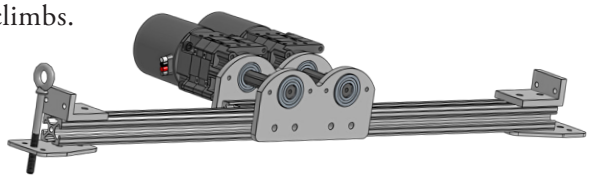
Elevator

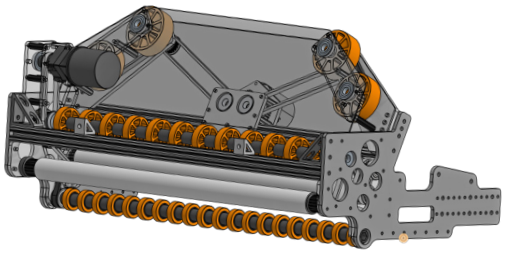
- A custom, two-stage elevator is used to raise the shooter to an optimal height while also allowing it to drive under the Stage when collapsed.
- The elevator includes a custom gearbox to raise and lower the elevator with a mix of belts and strapping rigged in cascade style.
- The elevator is set at at a 30° angle, allowing it to reach outside the robot when raised.



Climber

- The climber hooks onto the Stage's chain with two custom-designed aluminum hooks.
- The spring-loaded climber uses two winches and a ratcheting system to pull Calliope up and hold it in place even when disabled at the end of a match.
- The climber uses NavX IMU and independently-controlled winches to keep Calliope level as it climbs.



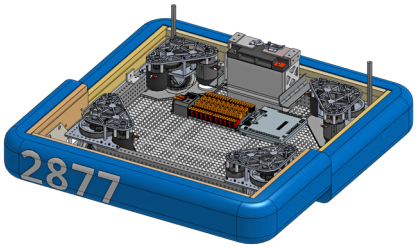


Intake

- Calliope's intake uses polycarbonate tubing covered in silicone to grip the Notes and pull them from the floor into the centering mechanism.
- Notes are picked up under Calliope's bumper, protecting the intake.
- The Note is then transfered into a centering mechanism that guides the Note into the shooter using compliant wheels and polyethylene-covered polycarbonate sheets.

Swerve Drivetrain

- Swerve Drive Specialties' MK4i L2 gear ratios provide the optimal balance between speed for scoring and the torque necessary for defense.
- Falcon motors power driving and Neo motors power turning, allowing Calliope to rapidly change direction.



- A steel frame improves the strength of Calliope's chassis and lowers the center of gravity to increase stability.

Vision System

- Two global shutter cameras use PhotonVision software to identify AprilTags as an aid to positioning the robot on a virtual field. The cameras image all of the pixels at once, for rapid visual feedback.
- PathPlanner software is used to precisely move the robot to the desired location, minimizing the need for driver adjustments.
- A third camera uses color and shape recognition to find Notes on the ground and display their location on the monitor.