

# Contact Us

The Lee's Summit North  
Broncobots

**FIRST Team 1987**

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The Broncobots (Team 1987)

**Youtube:**

[www.youtube.com/broncobots1987](http://www.youtube.com/broncobots1987)

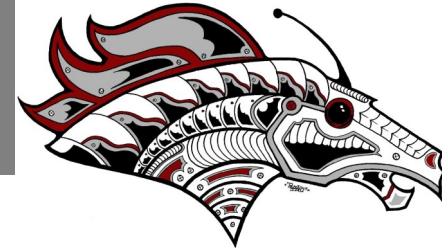
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# The Robot

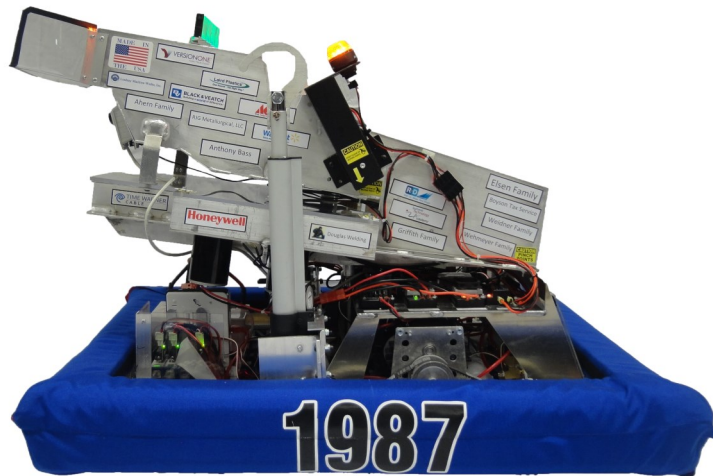


# FRC Team 1987 The Broncobots

Lee's Summit North High School

Lee's Summit, Missouri

# Dennis The Menace



## Dennis The Menace can...

- Shoot accurately from the back of the pyramid into the 3 Point Goal
- Store 4 Discs
- Collect Discs from the Middle Feed Slot
- Climb to the First Pyramid Level
- Shoot 3 Discs in Autonomous Mode into the 3 Point Goal

## Highlights:

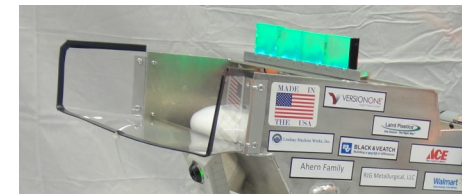
- Shooter
- Hopper
- Climbers
- Drive System
- Lights

# Lights



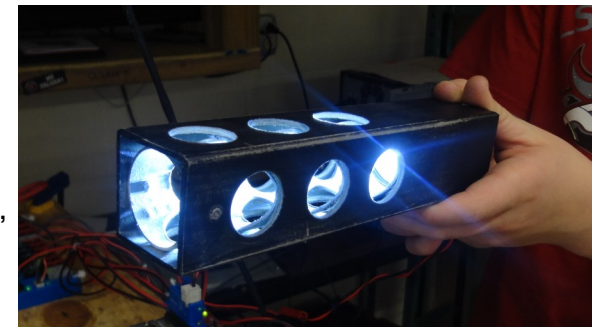
The decorative color lights are a pair of RGB LED's against an engraved polycarbonate plate. Each color is controlled by a different solenoid output from the cRIO. We change the color depending on our alliance, but can make them any color we want.

We use three major light systems not including the Amber Robot Status Light. We have decorative colored LED's, green LED's to show the number of Frisbees, and an aiming flashlight. Each of these can be removed quickly.



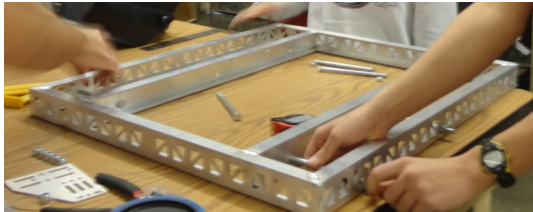
The green lights are strips of RGB LED's where only the green lights were used. There are four strips, each with a frosted piece of acrylic to diffuse the light. Each light is related to a sensor in the Frisbee hopper to tell our drivers how many Frisbees are inside the robot, as well as where they are at.

The aiming light (Photon Cannon) is a law enforcement-grade flashlight. At 15,000 Candles, we used a 4-inch steel pipe to "silence" the beam. The flashlight is powered through a spike, then through a 12V-5V converter to dim the light. The light only turns on when we are aiming at the goals to avoid shining it in drivers' eyes.

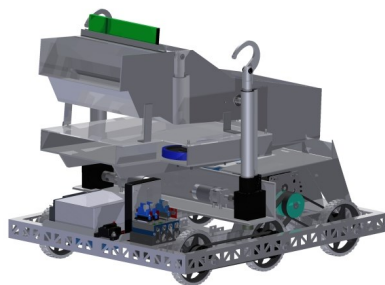


# Drive System

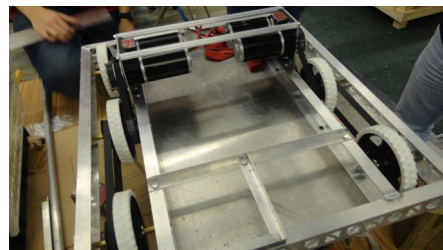
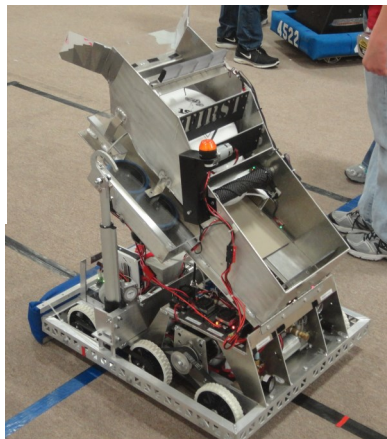
Dennis the Menace drives on a 6-Wheel Drop Center system with FIRST Standard 6-inch wheels. We used mini-toughboxes for the transmission and belts between the wheels.



The frame is 26"x 30" to allow an even balance of maneuverability and construction flexibility. We decided that this proportion would allow us a workable platform to build upon.

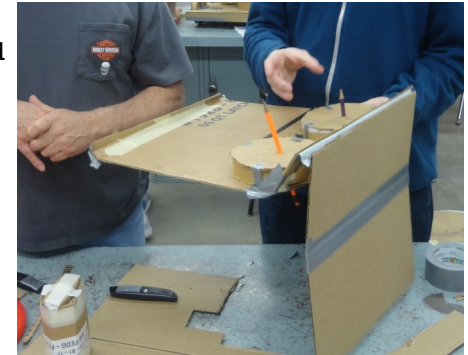


The frame is 2-inch aluminum c-channel waterjetted to our designs. It was then welded by Hi-Tech Welding in Lee's Summit. This is the first year our team has used a custom, welded frame.

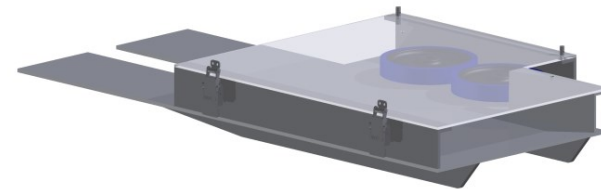


# Shooter

We use a linear shooter system. The Frisbees are pulled into the two-wheeled ejector using a pneumatic cylinder.



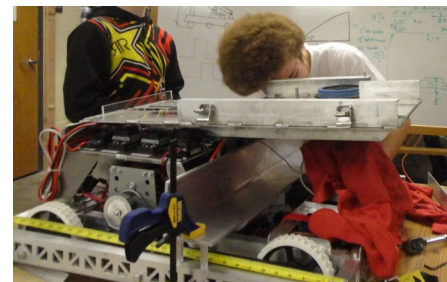
The Shooter uses two BaneBots rubber wheels on VEX Mini-Cims. The rigid side uses IFI Roughtop Tread.



The angle of the shooter is adjusted by two pneumatic cylinders. We drive with the shooter in the down position, and shoot and feed in the up position. In the down position, the robot does fit underneath the Pyramid



The shooter is designed to make 3-Point shots from behind the Pyramid. These shots can be taken from either the center or corners of the Pyramid.

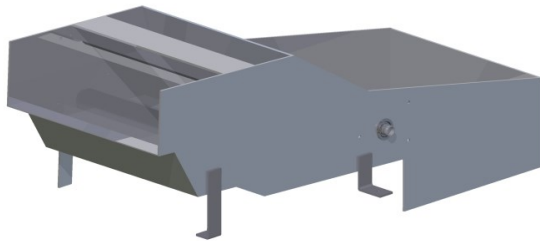


# Hopper

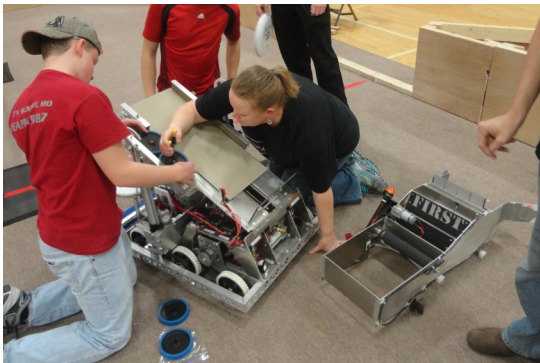
Our hopper is designed to accept frisbees from the Center Feed Slot. It can hold four Frisbees, and can function with fewer. The frisbees fall from the hopper directly into the shooter indexer.



The hopper is constructed out of welded sheet metal. The front extension, however is 1/16" polycarbonate. The extension is fastened with pop rivets and automotive tape.

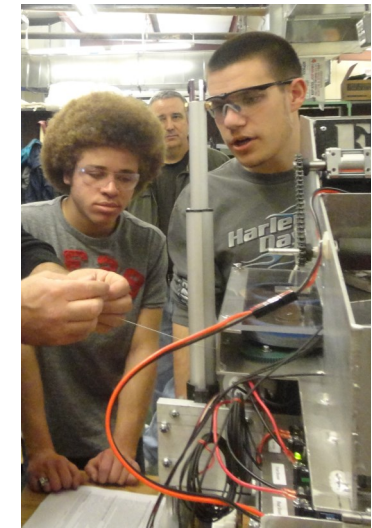


The entire hopper is designed to be quickly removed in order to change the shooter wheels. We have 1 hub of 4 Anderson Quick Disconnects, 2 Serial Cables, and 3 latches to detach before removing the hopper. The Shooter can also be removed after disconnecting 2 more cables and the pneumatic pistons



# Climbers

Two electronic actuators with hooks allow us to climb to the first level. These actuators were ordered and modified to fit beneath the first rung of the pyramid.



Each climber is powered by a BaneBots RS550 motor on a Talon speed controller. Each climber has both a string potentiometer to monitor its height and a limit switch as a backup to prevent the climbers from destroying themselves.

Removing the robot from the pyramid requires one side to be removed before the other, to avoid damaging the Amber RSL. If removal time is an issue, the hooks themselves can be removed from the robot.

