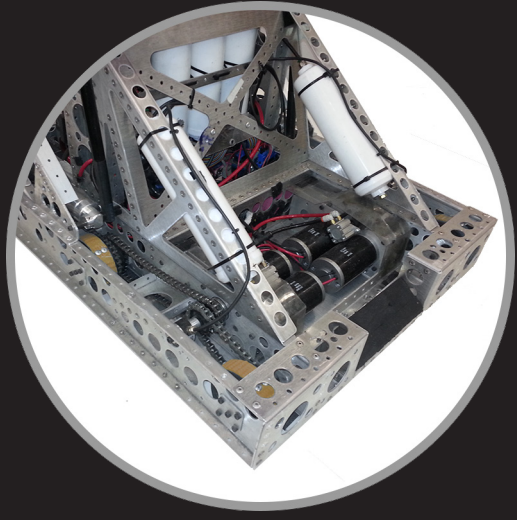


TEAM 1114 PRESENTS: SIMBOT EVOLUTION



Drive



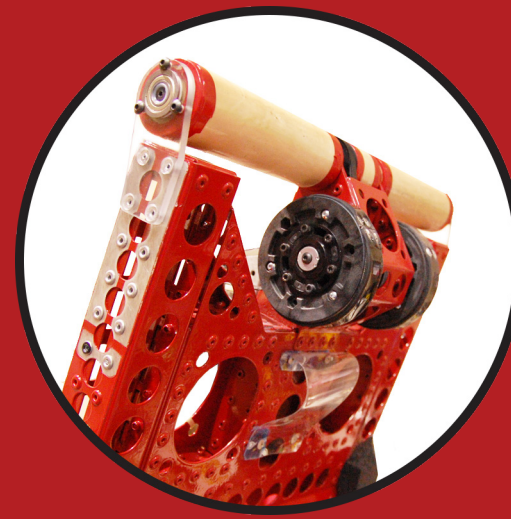
- Riveted aluminum sheet metal chassis
- Six wheel drive utilizing 4" x 1" VEXpro traction wheels
- Powered by four CIM motors; power transmission via custom two speed transmission, utilizing VEXpro ball shifter components and roller chain drive
- Approximate top speeds of 5.7 ft/s (in low gear) and 13 ft/s (in high gear)
- Drop down VEXpro 4" omni wheels to assist with getting out of t-bone pins
- Wheelie blocks to move tipping point fulcrum out and closer to the ground, making the robot more difficult to tip

Claw



- Driven by VEXpro BAG motor through a 50:1 VersaPlanetary gearbox
- 12 DP sheet metal gear attached to claw for additional 7:1 speed reduction
- 24 DP 3D printed gear attached to claw frame for potentiometer feedback
- A pocket is designed into the claw sheet metal to maximize the height in the robot's starting configuration, maximizing the release height of the ball
- Two sheet metal tusks are used to help center the ball, along with adhesive backed foam and teflon
- Two plastic tubes prevent accidental contact between the ball and shooter wheels

Intake



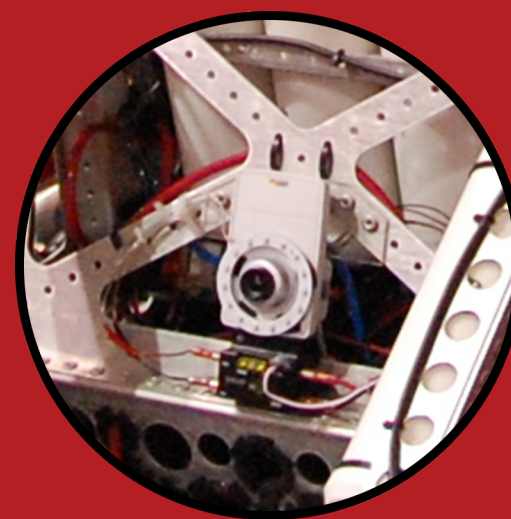
- 2" diameter PVC tube covered in paint-on urethane with wooden plugs, driven by nylon hex shaft
- Powered by shooter gearbox with a 30:18 VEXpro belt/pulley reduction
- Theoretical free speed linear velocity of 25 ft/s

Shooter



- 2 pairs of 4" x 1" VEXpro traction wheels with 3/16" fabric backed urethane riveted to the circumference
- Each pair driven by two RS-550 motors through a custom gearbox with a 4:1 gear reduction and VEXpro belt/pulley power transfer
- Theoretical free speed linear velocity of 88 ft/s
- Two 3/4" bore, 8" stroke cylinders accelerate the ball into the shooter wheels
- Each cylinder has a designated high flow solenoid and working pressure accumulator to maximize actuation speed
- Surgical tubing retracts cylinders to reduce air flow restriction

Control

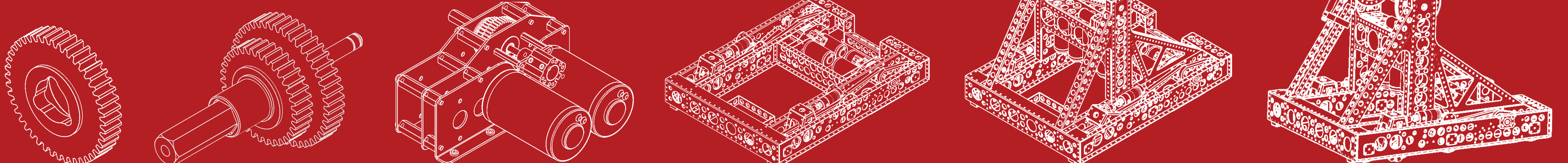
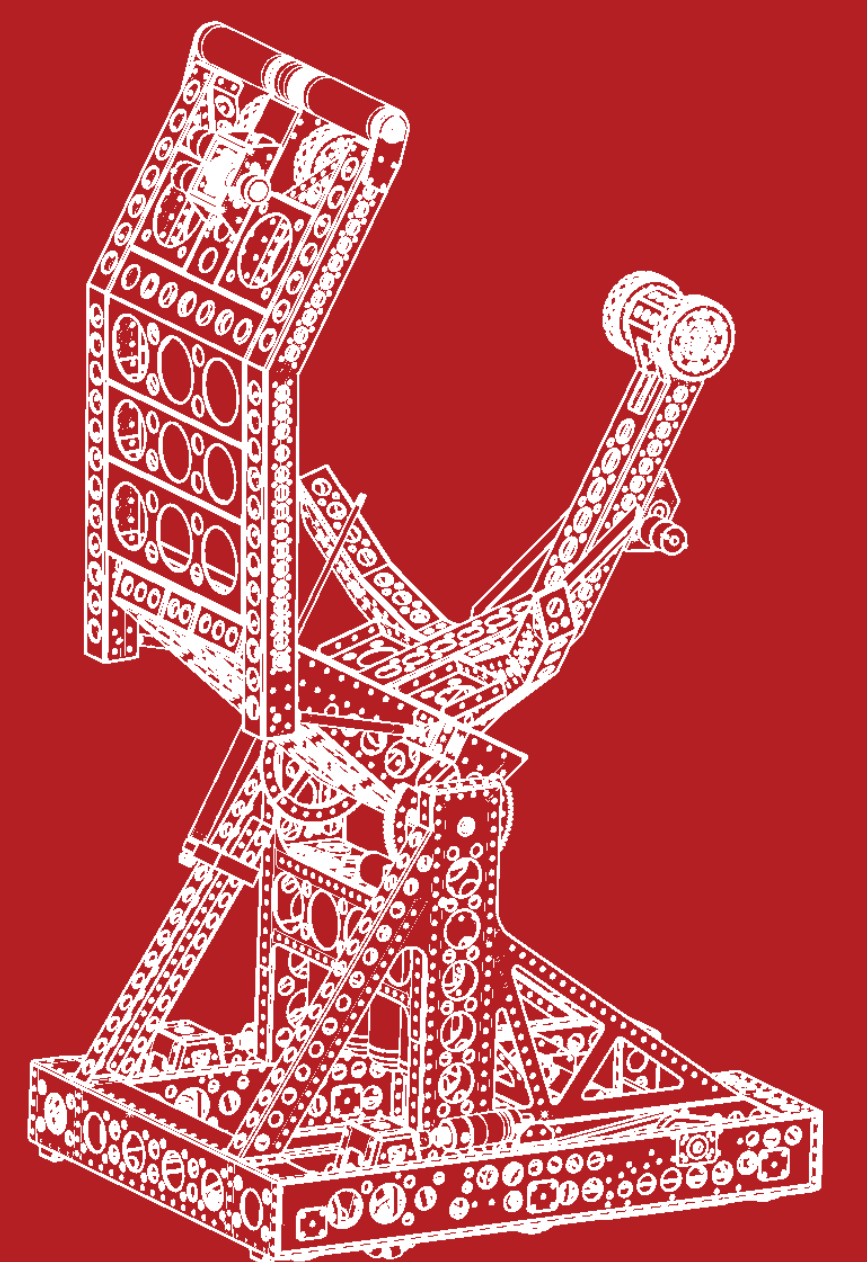


- Multiple pre-set claw angles and shooter wheel speeds for various shooting positions around the field
- Claw angle controlled by PID controller with position dependent power limiting to optimize pickup and position holding
- Bang-bang controlled shooter wheel RPM for rapid spin-up and accurate shooter velocity
- Hot goal detection during auto, utilizing on-board camera
- Encoder and gyro based feedback for reliable autonomous driving and positioning

"Mutation: it is the key to our Evolution. It has enabled us to evolve from a single-celled organism into the dominant species on the planet. This process is slow, and normally taking thousands and thousands of years.

But every few hundred millennia, Evolution leaps forward..."

- Professor Charles Xavier



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