FIRST Robotics Team 1756 Argos

Celebrating 18 Years of Engineering Our Future

Changing Lives

Transforming Our Community

Celebrating Engineering

Student Impact:

Majority pursuing engineering, manufacturing or technical careers

15% Female Students

In house robot manufacturing builds confidence and develops technical skills for entry level jobs (welding, CNC machining, plasma operation)

Growing *FIRST*

Helped start 5 *FIRST* Lego League teams in the Chicago suburbs in 2021

Reached 50 students in a school that previously did not have a *FIRST* program

Assisted new FLL team of homeschool students in 2022

Machine Attribute Awards:

2022 Excellence in Engineering

2022 Industrial Design Award

2021 Excellence in Engineering

2020 Autonomous Award

2019 Industrial Design Award

2018 Industrial Design Award

2018 Quality Award

2016 Industrial Design Award

2015 Championship Quality Award

2015 Excellence in Engineering

2015 Creativity Award

2014 Industrial Design Award

2013 Excellence in Engineering

2012 Quality Award

Community Outreach:

LCHS polycarb shields for Covid mitigation

LCHS technology support – plasma cutter repair and upgrade

Caterpillar Demo Bot - to support corporate sponsor

Easter Seals – annual fundraiser

Go Baby Go – adapt remote control cars for children with spina bifida and osteogenesis imperfecta

Penguin Project – organized silent auction

Robot Rumble – promote *FIRST* programs

Acknowledgement:

In 2018, Argos received the Championship Imagery Award

"The team is the full representation of the inspiration: engineering, impacting community, and corporate sponsorship" – Don Bossi (former president of *FIRST*)

Sponsor Support:

A 18-year partnership with Caterpillar:

Branding identifies us as the Caterpillar team

Majority of mentors are Caterpillar employees

2022 Robot demo at Caterpillar Family Day with >1k visitors

Two student trainees from our team in 2022

2018 Robot on display at the Caterpillar Visitors Center

Featured in two Caterpillar recruitment videos

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Arm:

-Linear actuator (ball screw) with custom gearbox to raise/lower arm

-Custom tube-in-tube extension driven by modified rack and pinion (CNC router drilled with spacing to align with sprocket teeth)

Bash guards:

-Operator selected option for additional arm/intake protection

-Hex shaft driven paired tubes driven via sprocket drive

-Tilted down to keep in bumper zone when extended (penalty avoidance)

Intake/Placer:

-Fully integrated mechanical solution to both intake and place cones and cubes

-Dual axle compliant wheeled intake to grab base of cone (flange)

-Aluminum tube to add rigidity and allow for cube control with bottom row of compliant wheels

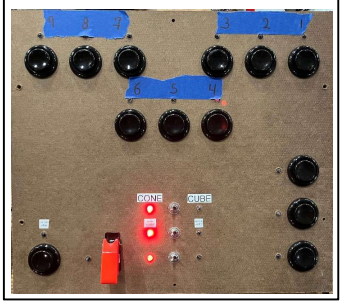
-Wrist allows intake to rotate 180+ degrees to orient cone for placement

Drivetrain:

-Swerve drive used for increased mobility

Controls – Operator:

-Custom operator control panel to select pre-set configurations



Controls – Features:

-Automated movement between pre-set locations using kinematic modeling
-Sensor conversion to physical units configurable using robot measurements

<u>Homing Setups:</u>
-Shoulder & wrist to initialize from stored absolute position
-Shoulder & extension retract to virtual limit switch

<u>Safety Features:</u>
-Limit movement to avoid joint overextension or over-rotation
-Failsafe functionality to prevent path execution if homing is incomplete

Controls – LED Signaling:

-LEDs used to communicate desired game piece to human player

-Sensor driven feedback loop to driver/operator for startup, intake status, and vision alignment