FIRST Robotics Team 1756 Argos

Celebrating 17 Years of Engineering Our Future

Changing Lives

Transforming Our Community

Celebrating Engineering

Student Impact:

Majority pursuing engineering, manufacturing or technical careers

25% 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

Machine Attribute Awards:

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 – fundraiser

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

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 17-year partnership with Caterpillar:

Branding identifies us as the Caterpillar team

Majority of mentors are Caterpillar employees

2018 Robot on display at the Caterpillar Visitors Center

Featured in two Caterpillar recruitment videos

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Climber:

-Linear actuated climbing arms for deployment and swing mitigation

-Double hook system to latch and extend to next RUNG

Launcher:

-Fully integrated system using vison processing to control each component automatically

-360-degree turret enables lateral targeting with active controlled wire management system

-Modified rack and pinion hood for active shot shaping with powered wheels that reduce backspin

-Belt feed accelerates CARGO into launching wheels

Intake/Elevator:

-Pneumatically actuated single axel with mix of mecanum, compliant, and omni wheels to funnel game pieces through bumper opening

-Automated feed using combination of belts and compliant wheels to move CARGO from the intake to the launcher

Drivetrain:

-Swerve drive used for increased mobility

Controls – Intake/Elevator:

-Fully integrated intake and elevator system that indexes game pieces into single stream

-Time of Flight (ToF) sensor at the beginning of the elevator detects when we have a ball. Second sensor stops elevator with second ball intake

-Reversal of intake/elevator is slower than intake to eject only one ball for incorrect color

Controls – Launcher:

-Vision processing provides inputs for tracking the vision target and automatically adjusts turret, hood, and wheel speed

-Single button control for target lock that includes a vibrating controller feedback loop to the driver and operator

-ToF sensor detects balls as they exit to time the second shot so the shooter has time to re-stabilize

-Operator has pre-sets for close-up shots against any face of the HUB for any of the 4 cardinal directions of the robot

Controls – Climber:

-Three button control to raise climbing arms, grab first rung, and pull the robot to the next rung. Operator also has a button to terminate the climb

-Motion profiling to move between set points throughout the climb sequence

-Linear actuators have limit switches and hooks have soft stops to prevent damage via position detection