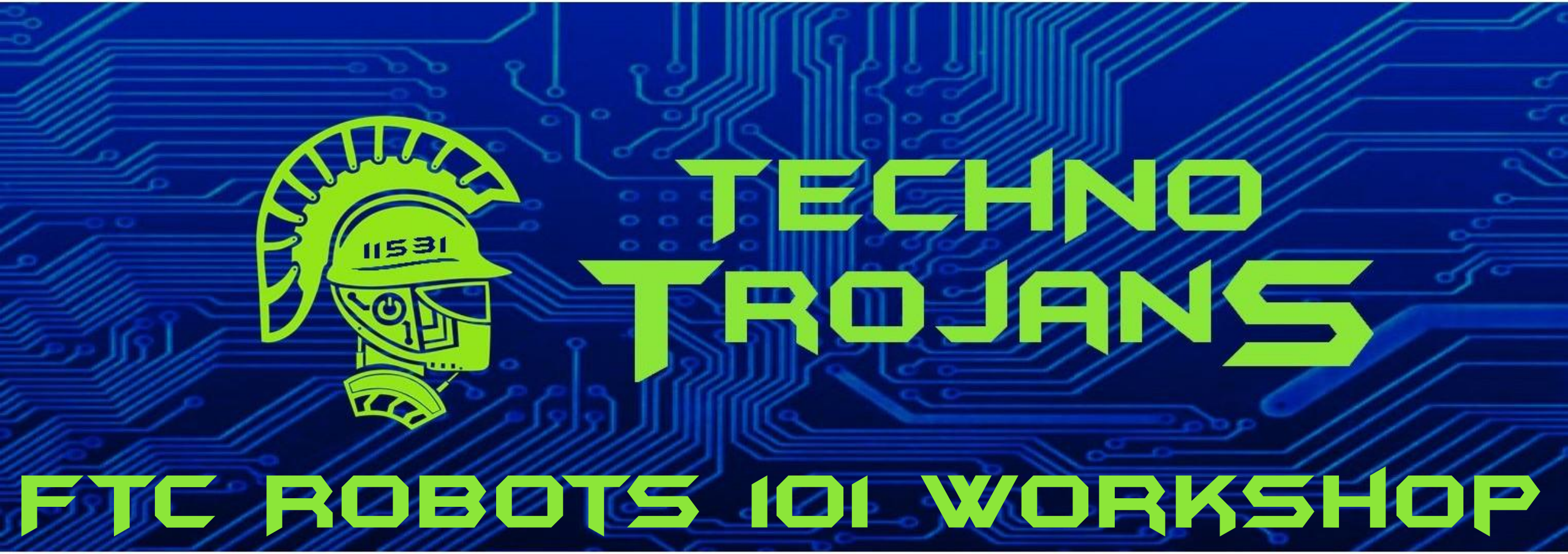
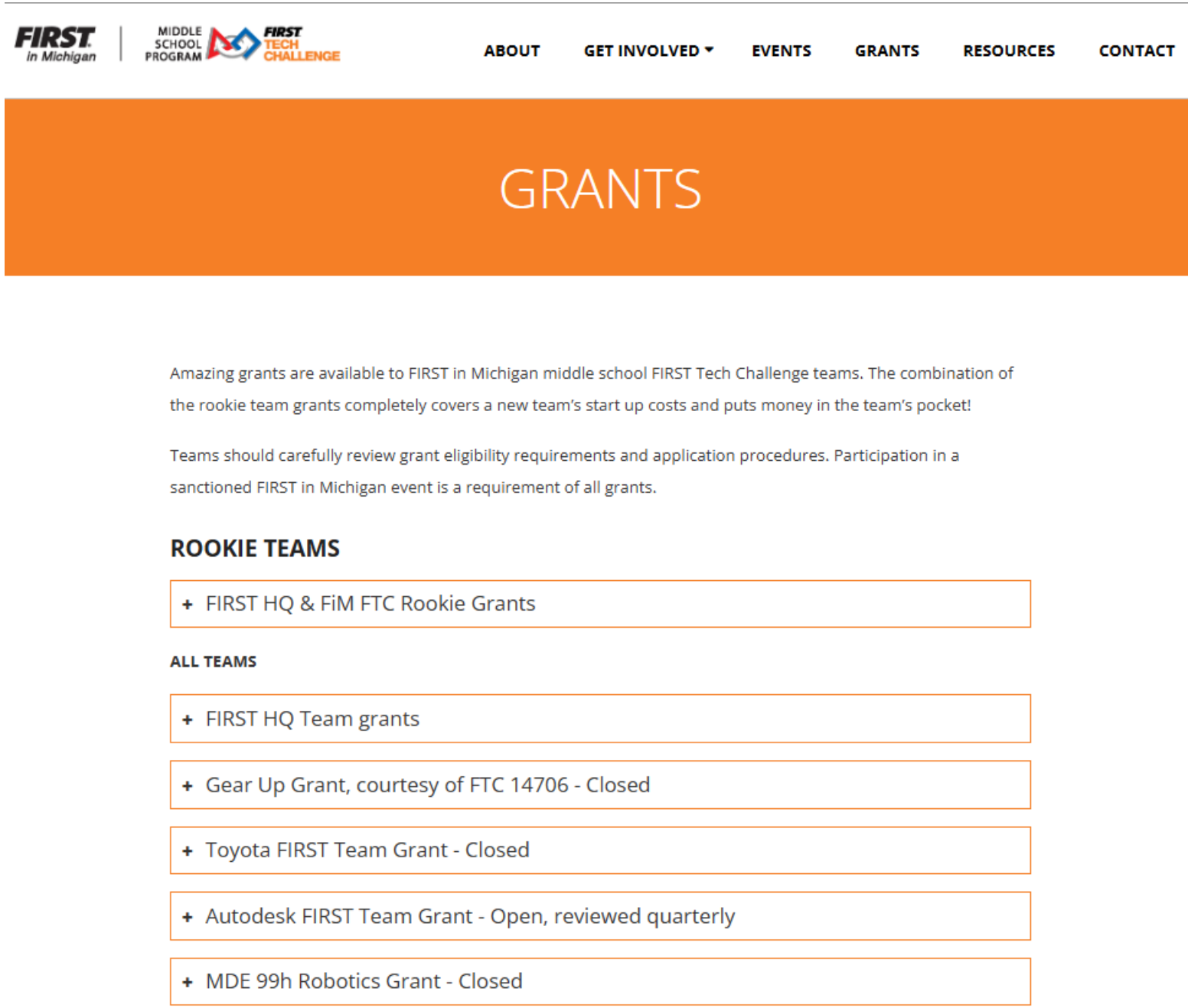


Presented by Kris Cole

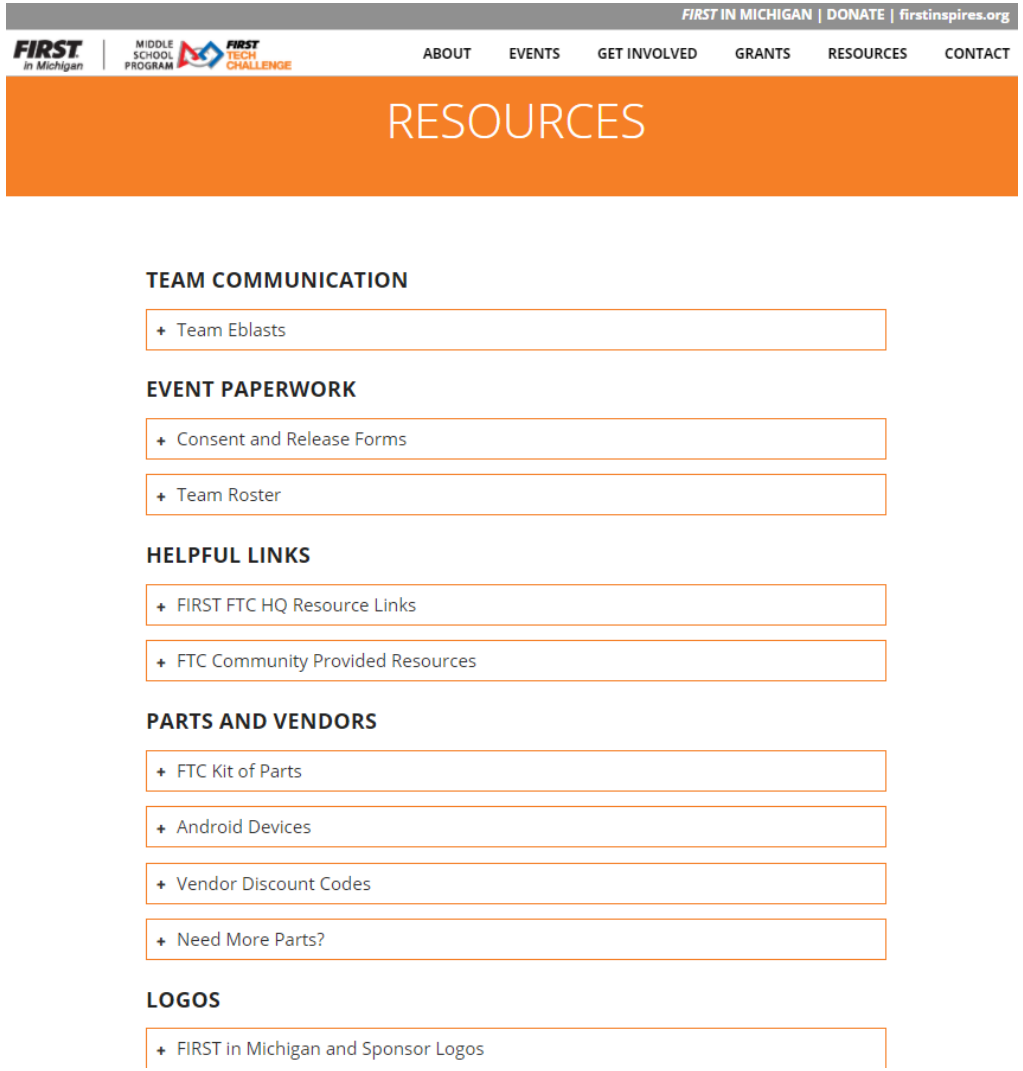
Grants

- Make sure to check out the First in Michigan Grant site weekly
  - https://firstinmichigan.us/FTC/grants/



Resources

- Many sites exist to help your team.
  - First in Michigan is a good one for all things from the game materials to logos and blogs
    - http://firstinmichigan.us/FTC/resources/
  - Other teams have sites with teaching videos for just about anything
- Make sure to read the manuals!
  - There is tons of information in the manuals
    - https://www.firstinspires.org/resource-library/ftc/game-and-season-info
- Many places will do a Robot in 3 days
  - One example is goBILDA which will be on for twitch TV for Sunday - Tuesday
    - https://www.gobilda.com/gobildatv
  - These are great because they talk through the game and design ideas.
- Techno Trojans Site
  - https://www.fruitportrobotics.org/2024-2025-ftc-resources

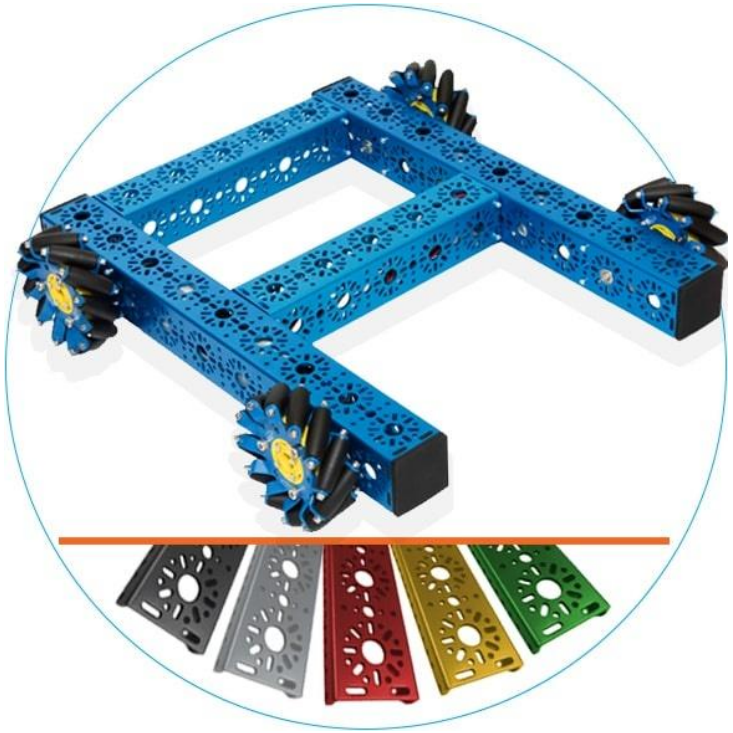


Robot Parts

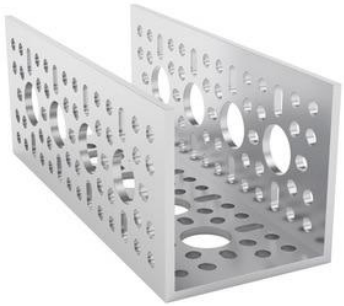
- Here are the main sites we shop from are:
  - Studica 25% discount for FTC
  - Rev Robotics 15% discount on select products
  - goBILDA 25% discount for FTC
  - AndyMark
  - Pitsco
- Things to pay attention to when ordering your parts
  - #1 Make sure they are legal – Most will tell you if it is FTC Legal.
  - Most everything is Metric now.
  - Many of the sites offer guides to how their hardware works together.

Structure

- All the sites have their own type of structural systems with there pluses an minuses and most are now metric



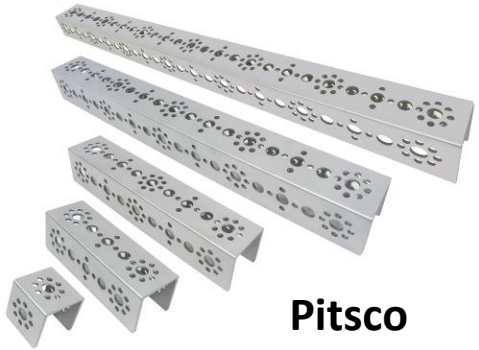
Studica



goBILDA

Rev Robotics

AndyMark



Pitsco

Motors and Gearboxes

R501 *Allowable motors.

Motor Name
AndyMark NeveRest 12V DC
AndyMark NeveRest Hex 12V DC
goBILDA Yellow Jacket 520x Series 12V DC
goBILDA 5000 Series 12V DC
Modern Robotics / MATRIX 12V DC
REV Robotics HD Hex 12V DC
REV Robotics Core Hex 12V DC
Studica Robotics Maverick 12V DC
TETRIX MAX 12V DC
TETRIX MAX TorqueNADO 12V DC
[Additional motors may be added on or after Kickoff]

- Be careful. You may only use the motors shown in Game Manual 1
- Most come with a gearbox attached but you can buy them separate
- The only rule for Gearboxes is they must be single speed

Motors and Gearboxes

- Most drivelines use ~20:1 gear ratio
- 3 types – Planetary, Spur Gear and 90deg
  - The planetary is better for high torque
  - The Spur Gear is better for space
  - The 90deg is great for close spaces
- The Rev Ultraplanetary Gearbox kit allows unlimited gear ratios

Servos

- There is an endless supply of servos with a wide variety of capabilities
  - Continuous rotation
  - 180deg rotation
  - High torque
  - High speed
  - Programable
- We like the Rev Smart Robot servos, goBilda servos and Studica Servos because they will work in almost all our applications. It can be either continuous or set for any angle with the programmer.
- Limited to a max of 12 servos on robot

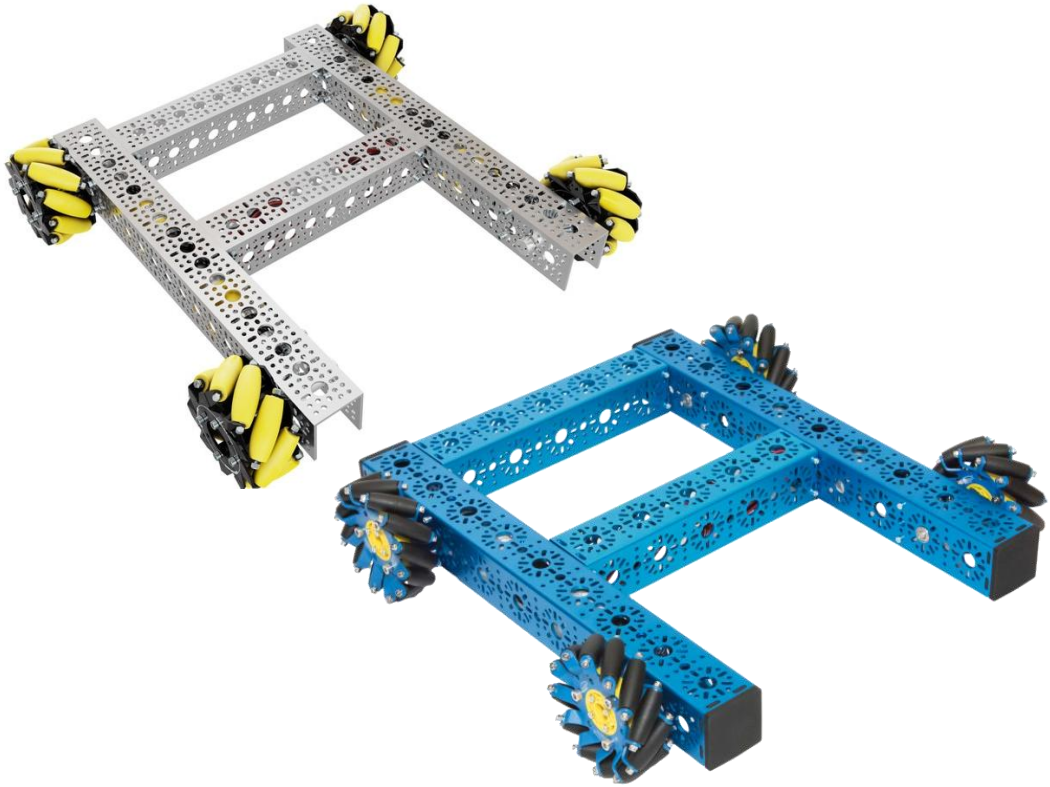
Driveline

- Most common driveline types are 4-6 wheels, tank tread and mecanum

- Simple and easy to build/program
- Harder to maneuver accurately

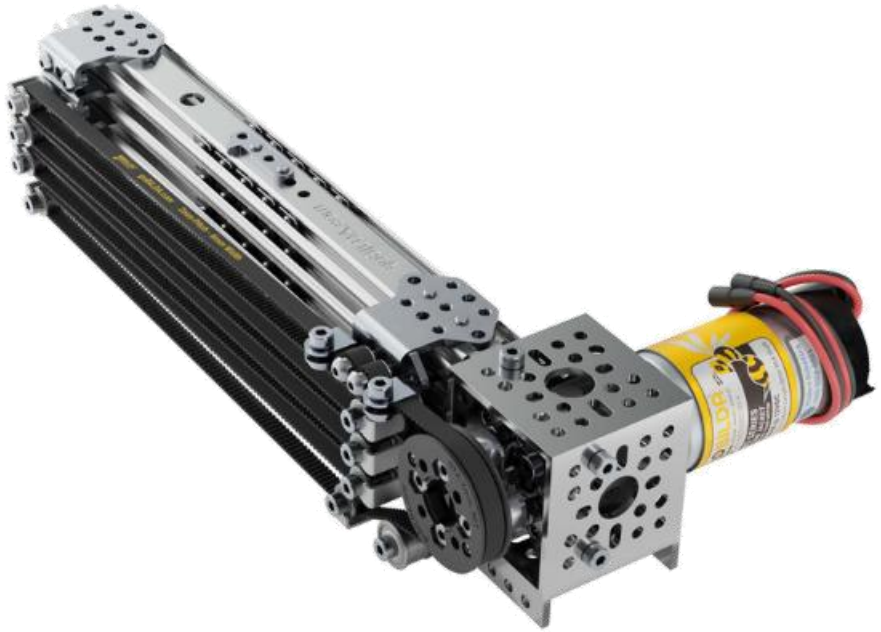
- Great for multiple terrains and climbing over objects
- Requires CG to be in the middle

- Most maneuverable
- Allows movement in all directions
- Requires CG to be in the middle



Linear Arms

- We recommend goBilda version.
  - They have multiple extension lengths available
  - They are the most reliable we have used.



Customize

- Design 3d printed parts
  - www.solidworks.com/product/students/first-robotics-students
  - https://www.onshape.com/en/
  - https://wiki.bambulab.com/en/general/filament-guide-material-table
  - www.thingiverse.com
- Modify existing things
- Have fun with lighting

Next Level Items to Consider

Basic Sensors

Color

Distance

Ultrasonic Distance Sensor

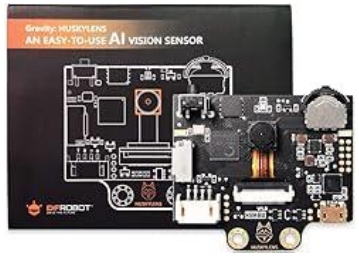
Touch

Magnetic Limit Switch

Odometry Module

Cameras

Webcam

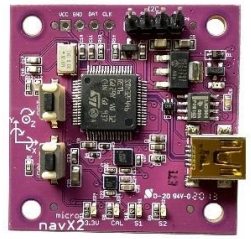


Husky Lens

Limelight 3A

LED Controller

NavX2 IMU Robotics Navigation Sensor



Questions?