



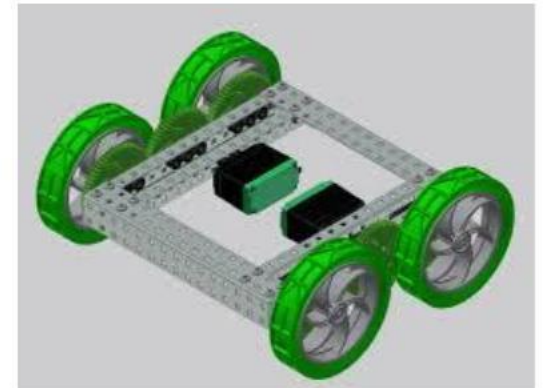
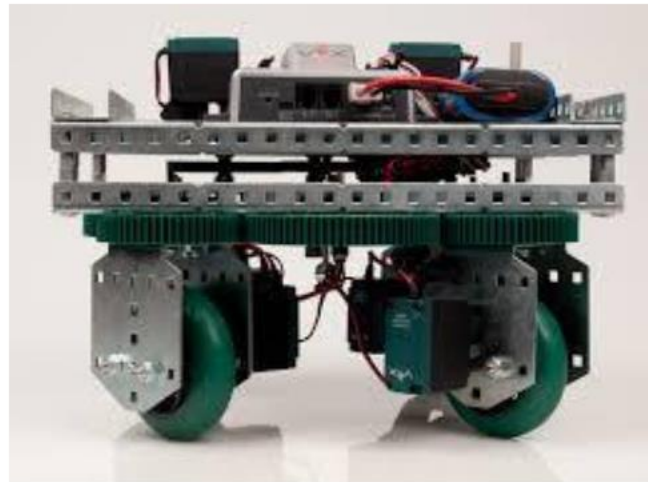
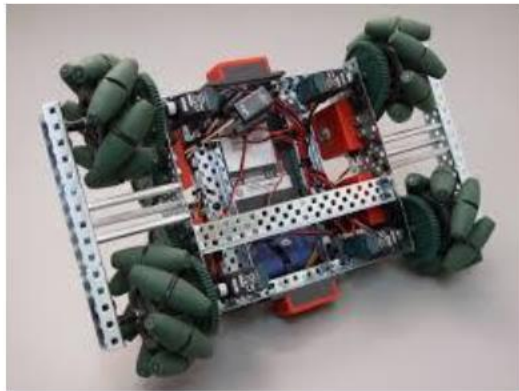
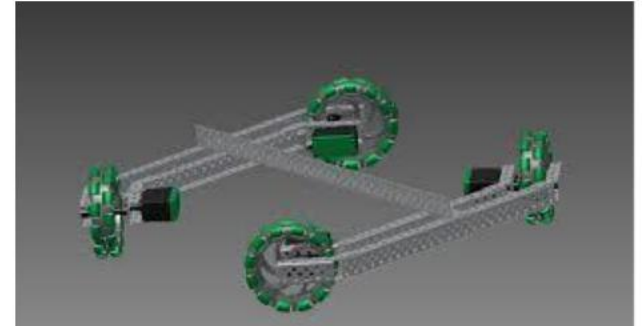
SuperQuest Salem

VEX – Drive Train Comparisons



Drive Trains

- Design Hints
- Compare different designs
- Look at examples from Worlds



Tips for Drive Systems

- Always support drive shafts on two points (gears, sprockets, track drive sprockets, wheels).
- Always use Delrin bearings flats when placing a drive shaft through a metal structure.
- Always have a shaft collar orientated so as to hold the drive shaft into the motor.
- Check that **no gears**, sprockets, drive chains, or wheels are **rubbing** against a surface that will cause additional friction to drive system. This can be tested by spinning the drive system without the motor attached.



More Tips/Thoughts

- It is a good practice **to test the motors** before attaching them to the drive system.
 - Try to orientate **motor screws for easy access** because they have a tendency to loosen up after use.
 - **Make sure that screws go into motor.** The V5 motor threading is a point of failure if the screw just barely gets into the motor.
 - When using 6 or 8 wheel drive systems it is advantageous to have **the center wheels lower or a slightly larger size** than the end wheels



More Drive Train Tips/Thoughts

- Large wheels are **faster** (all else equal) and provide **less torque**
- Smaller wheels accelerate quicker but have a slower top speed.
- Smaller wheels can be placed closer to the corners

Example: Skid Turn: Two Wheel Drive

2 wheel drive - This type of drive has only two wheels driven each wheel , driven by at least one motor A K A 2 wheel tank .(. . .)

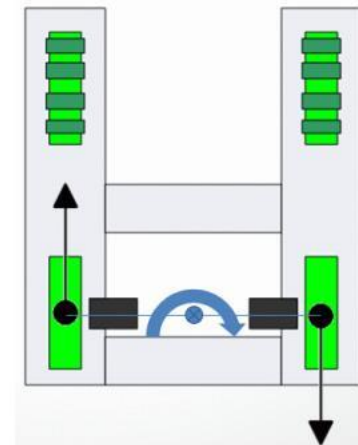
Pros-

- simple to build
- very flexible
- Not easy to push from side if traditional wheels are used

Cons –

- more difficult to control than other options
- the non driven wheels take weight off of the drive wheels -
- limited power in the drivetrain

Summary: Good for starters



Skid Turn: 4-6 Wheel Drive

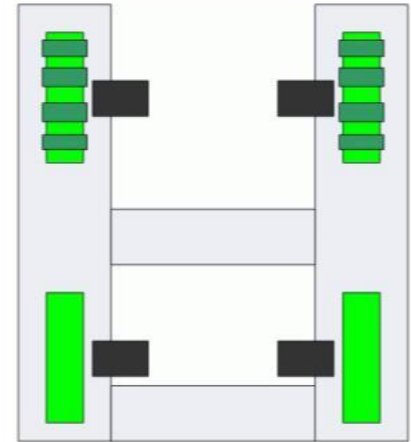
Pros : Relatively Simple: Common at Worlds

- relatively simple to build
- can utilize multiple motors
- used by many strong teams
- Not easy to push from side if traditional wheels are used

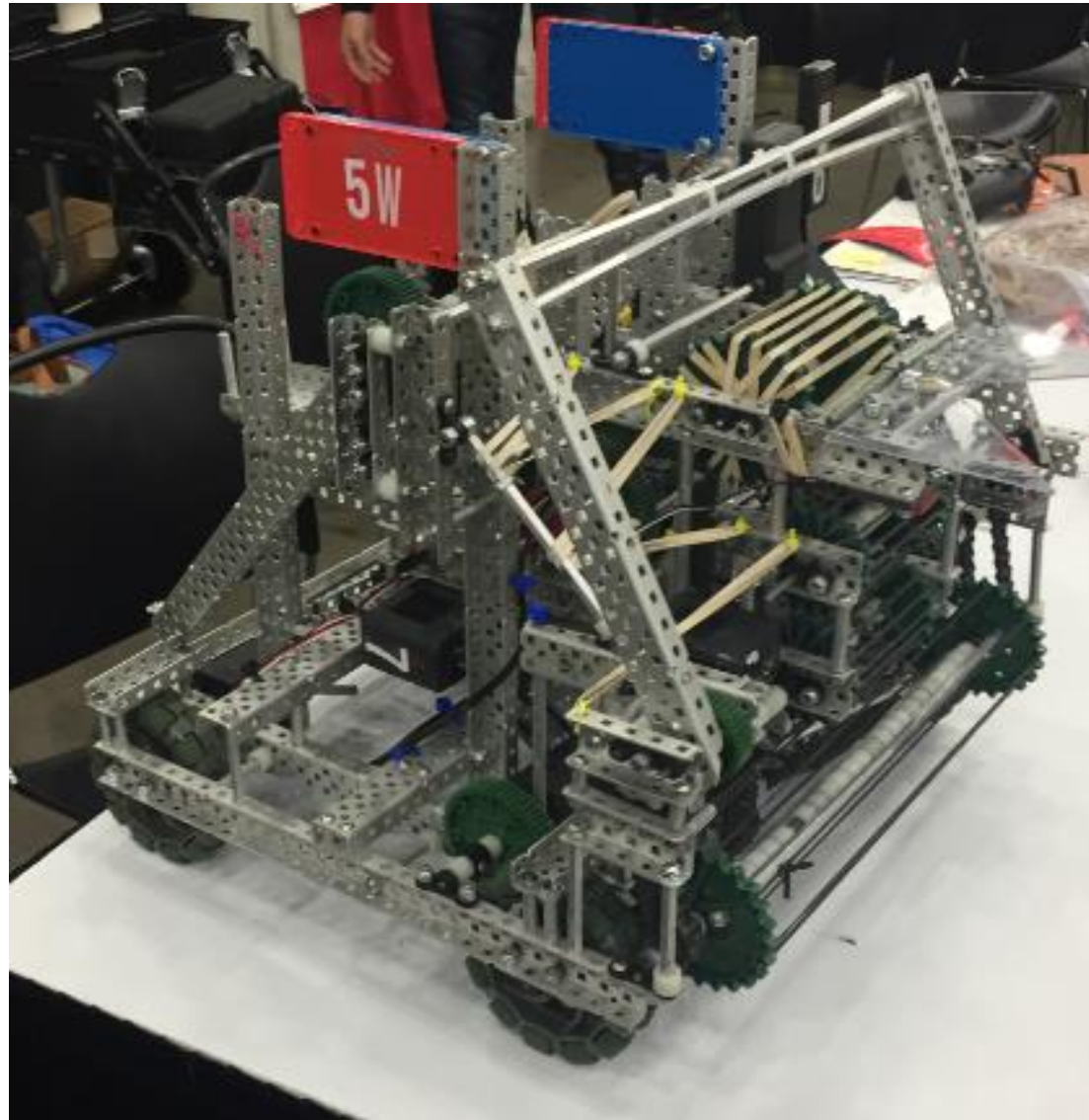
Cons:

- if gears are used the distance between drive shafts are determined by the gears used
- multiple motors draw more current and use up motor ports on controller
- Can be more difficult to repair and more components to fail
- all the drive wheels need to be close to the same size or they will fight with one another

Summary: Strong, relatively simple

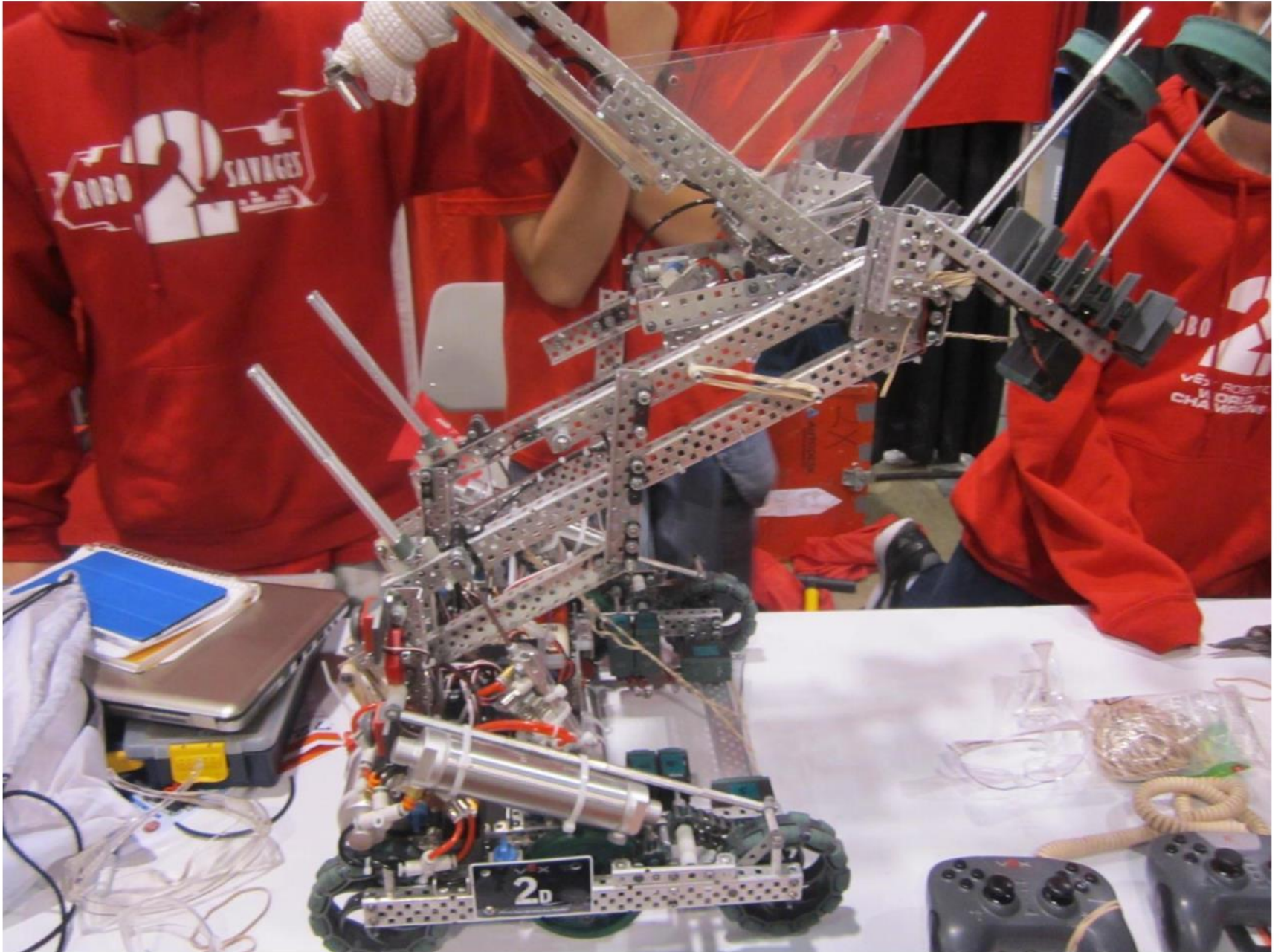


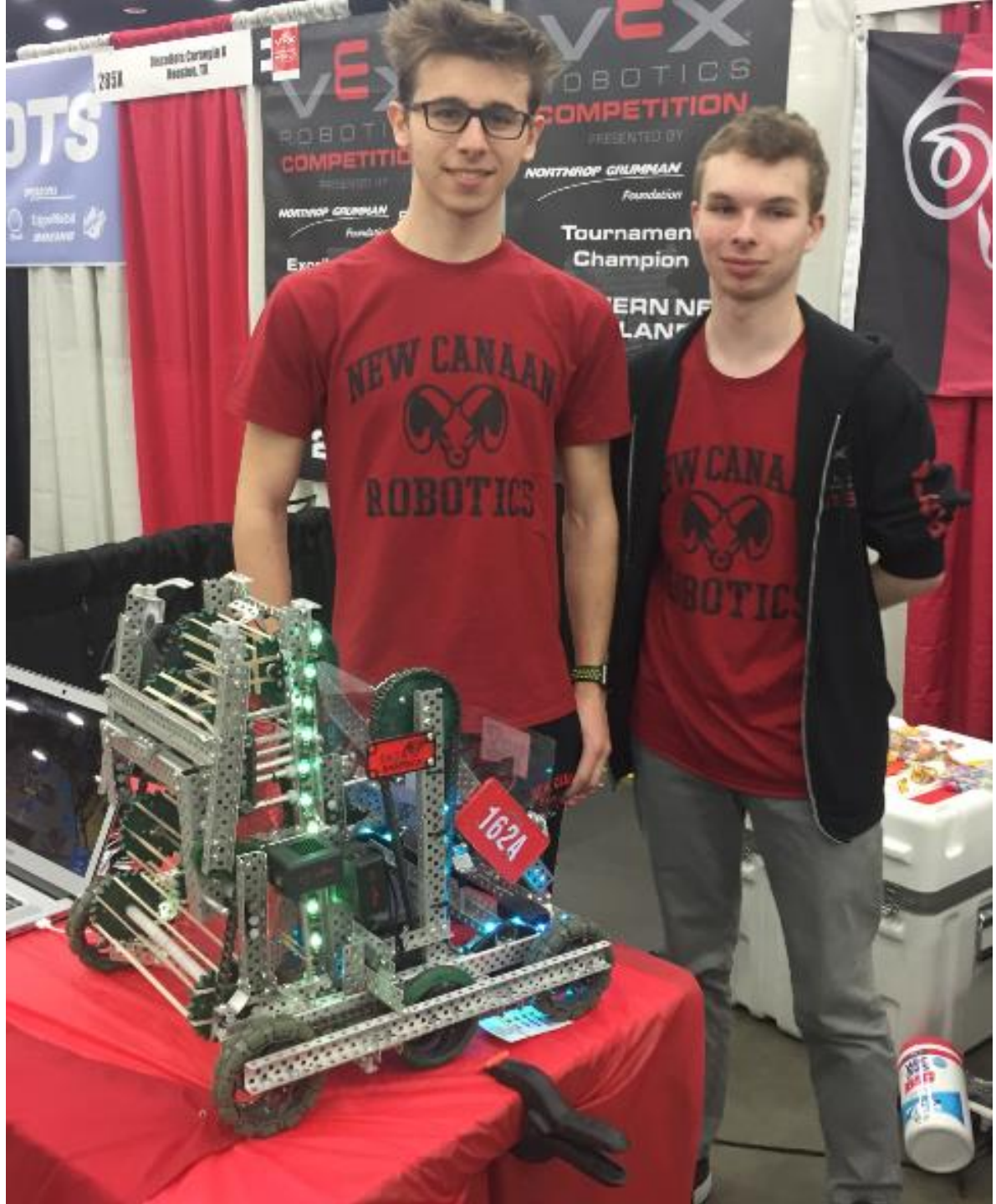
Skid Turn Sample



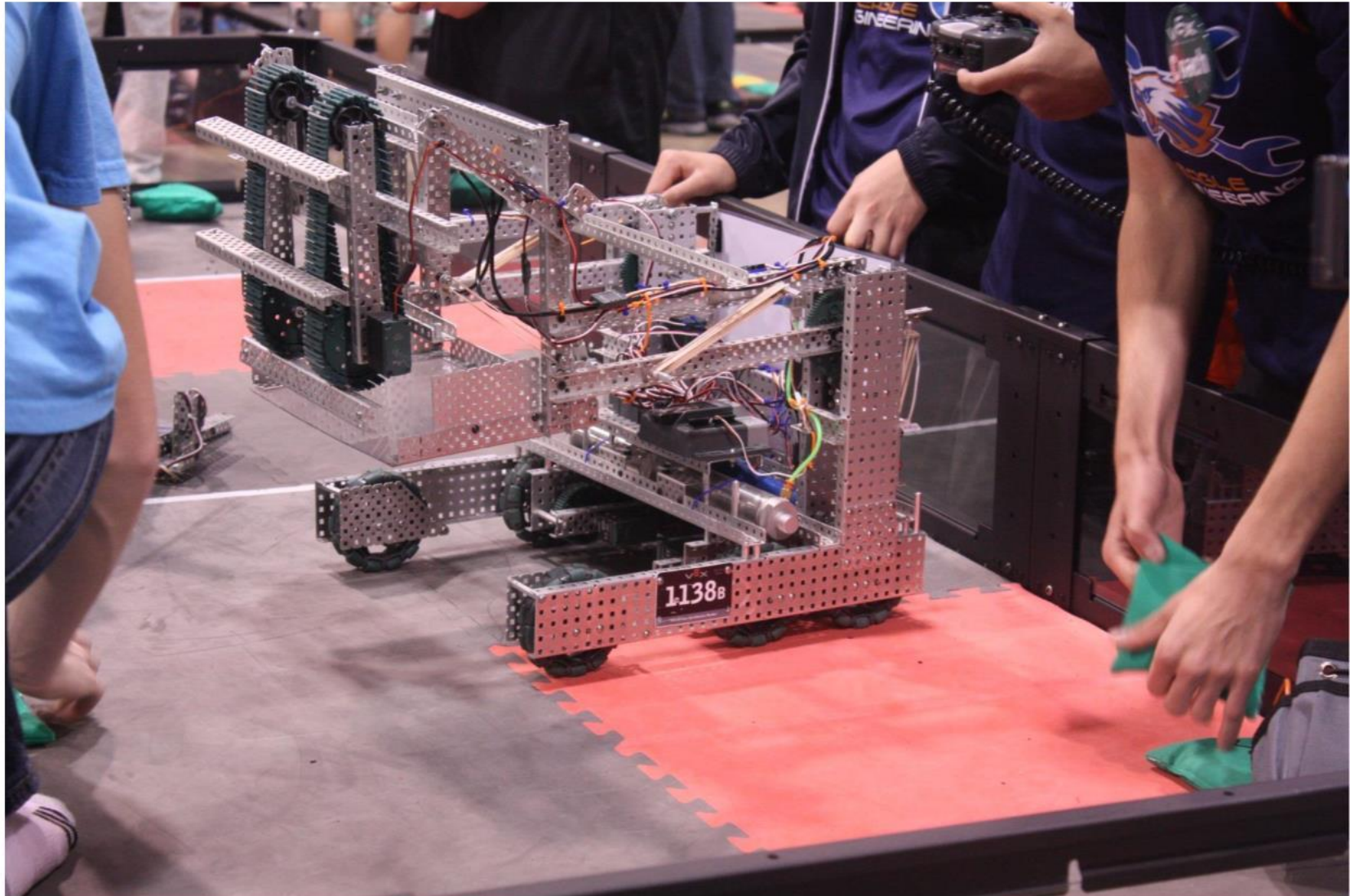
4 Omnis







Back Wheels Powered, Omnis



Track System

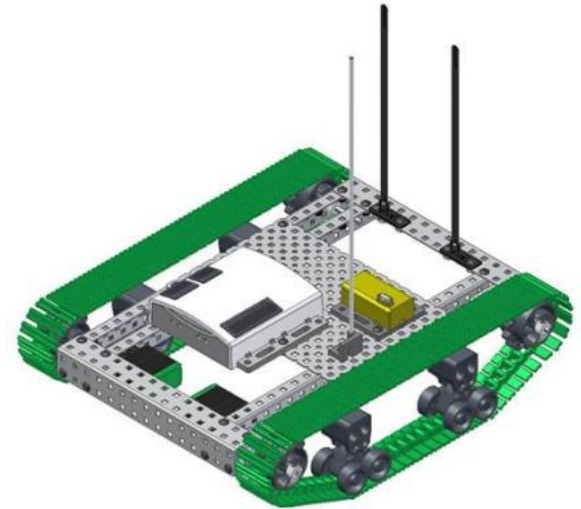
Pros

- pivot point is at the center of the drive system
- can use only 2 drive motors or multiple motors
- extra traction treads are available (**P/N: 276-2214**)
- able to climb over field obstacles

Cons

- Slick: the standard track lacks traction on some surfaces
- Slow: the distance traveled per rotation is limited by the size of the drive sprocket (note some teams have used the larger high strength chain sprockets, **P/N: 276-2252** as drive sprockets to over come this limitation.)
- can slip when pushed from the side.

Summary: Looks cool and can climb, but vulnerable



Tracks to helping climbing



LEGO Tank Gun



Mascot



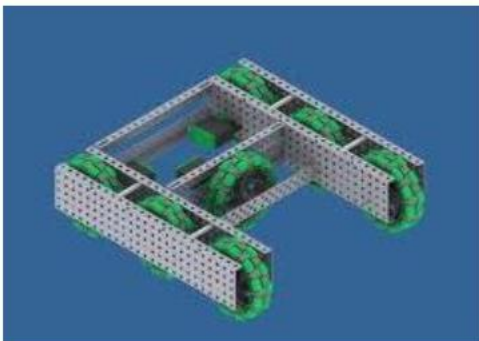
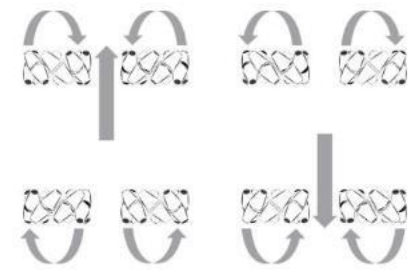
Holonomic: Robots that can go sideways

Pros

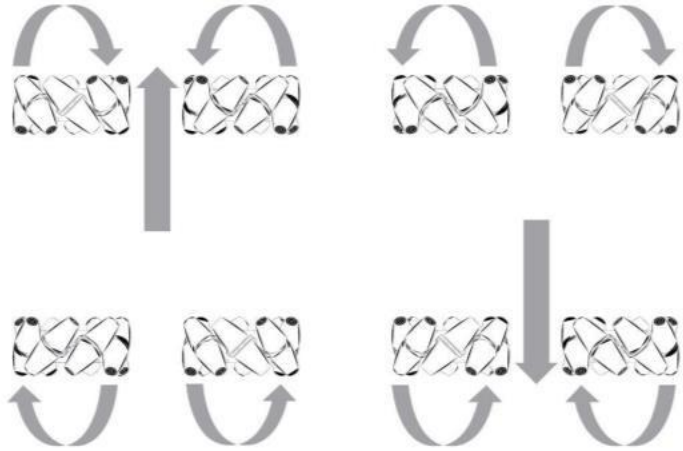
- can move in 2 different planes (front to back and sided to side), plus pivot
- very hard to trap in a corner
- very effective for lining up with game pieces

Cons

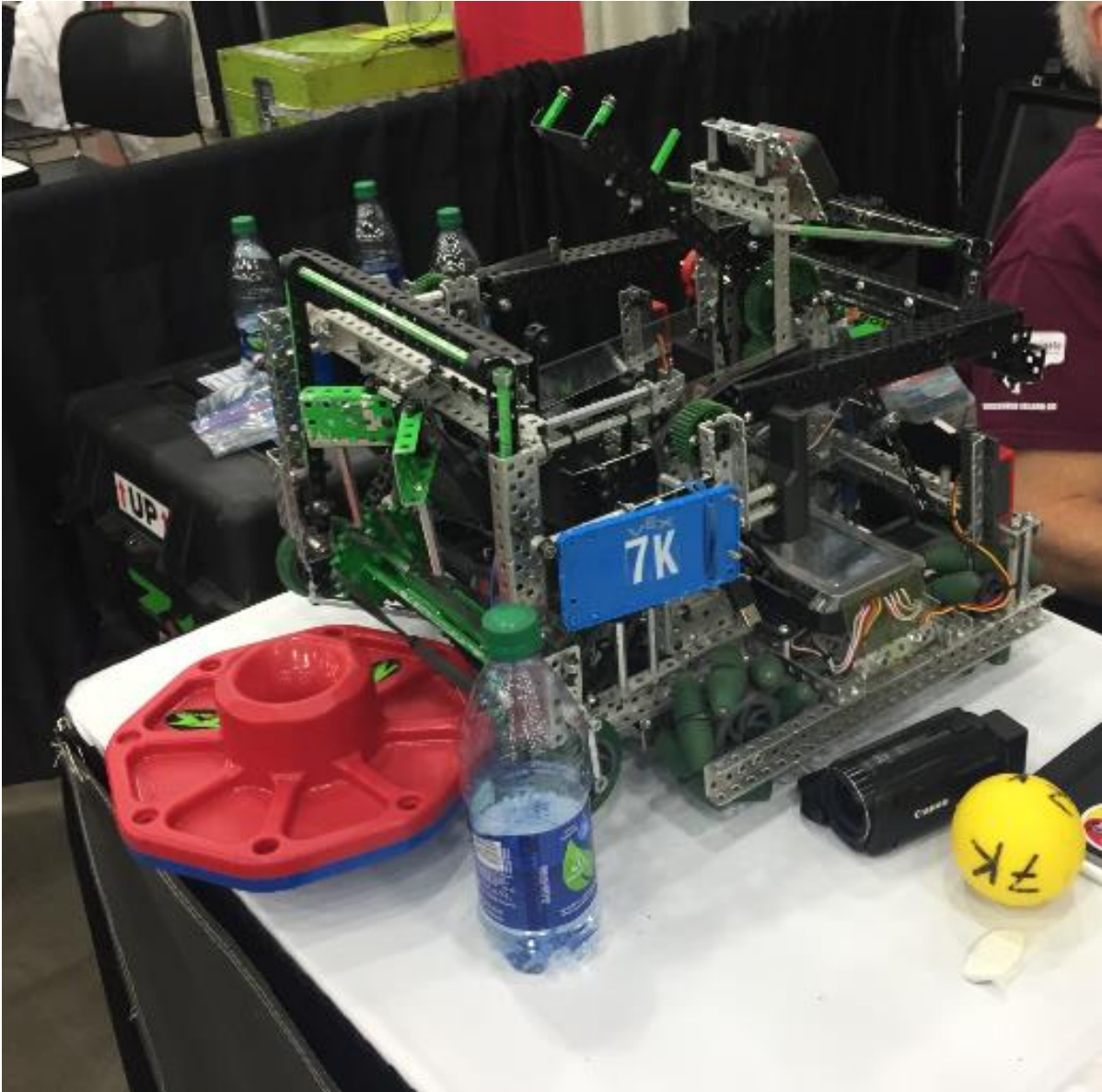
- requires a motor for each drive wheel
- need driver training
- multiple motors draw more current and use up motor ports on controller
- does not climb field obstacles well



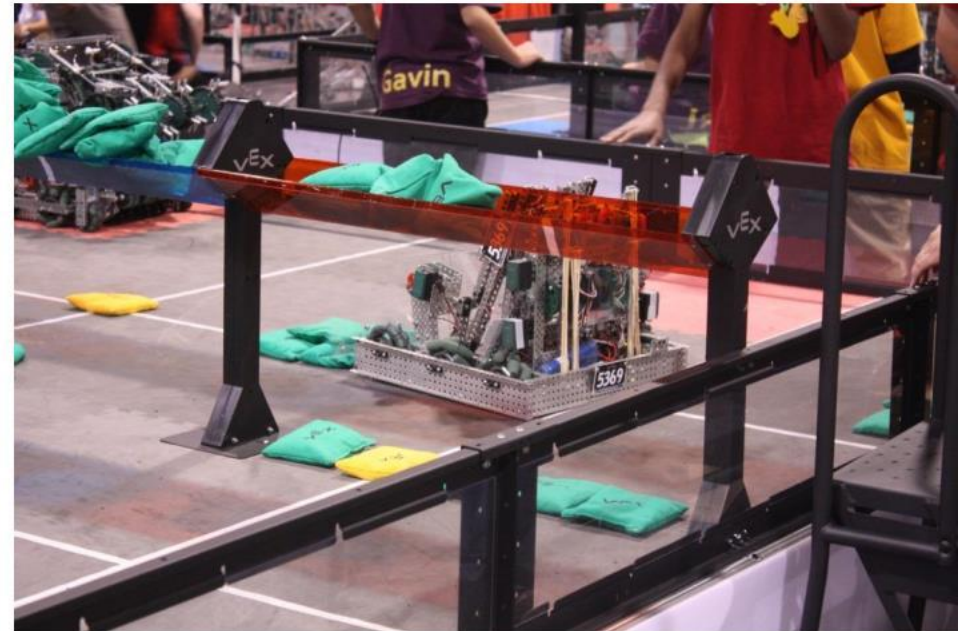
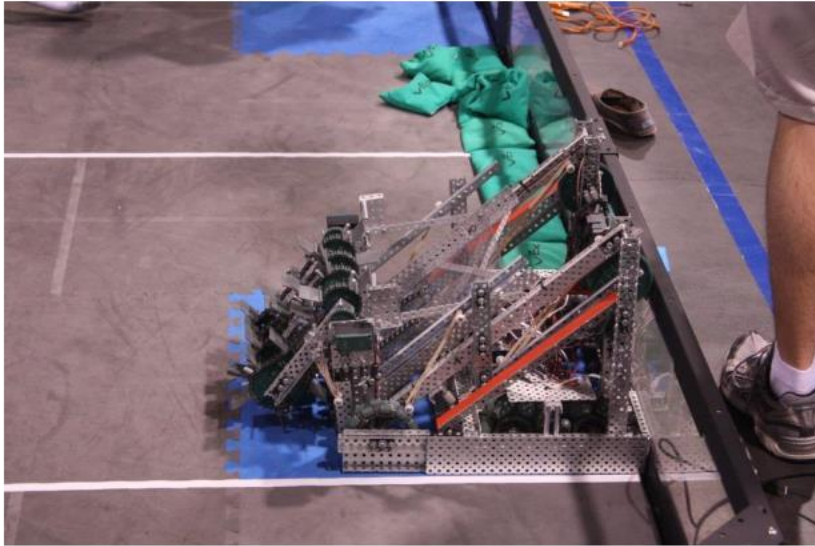
Mecanum



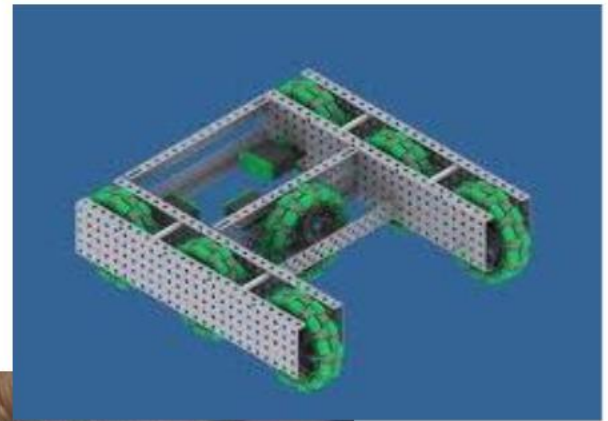
Mecanum: US Create Open Champ 2019



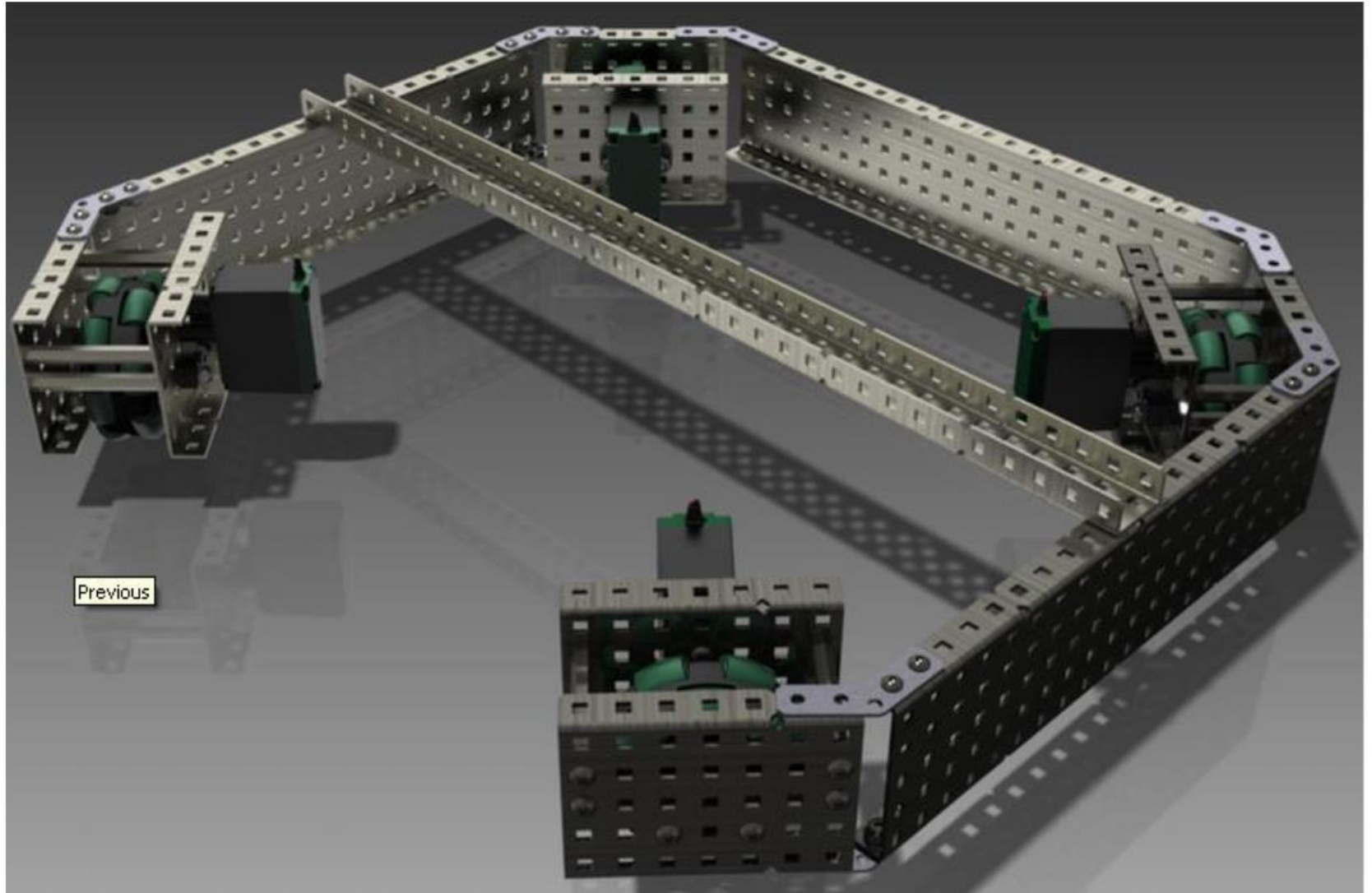
Mecanums in back, Omni in Front



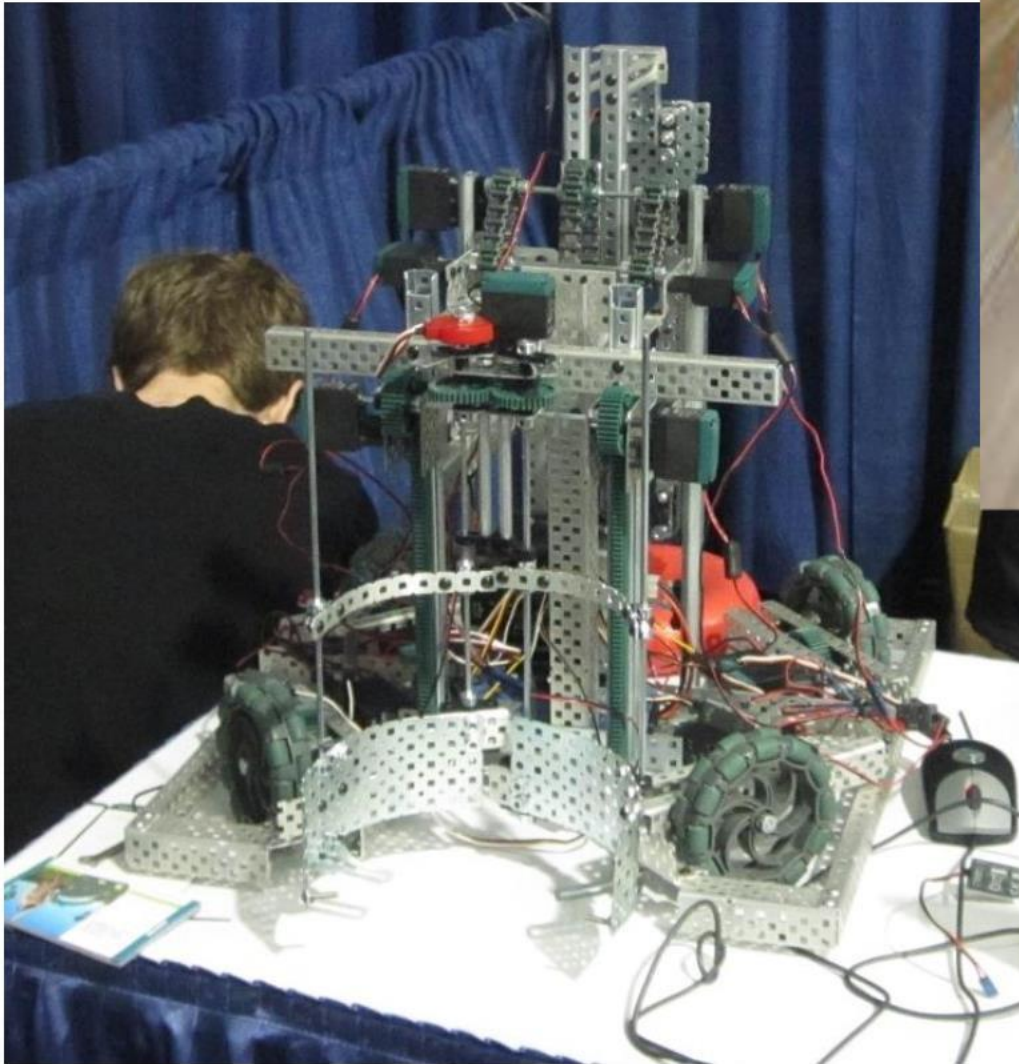
H-Drive



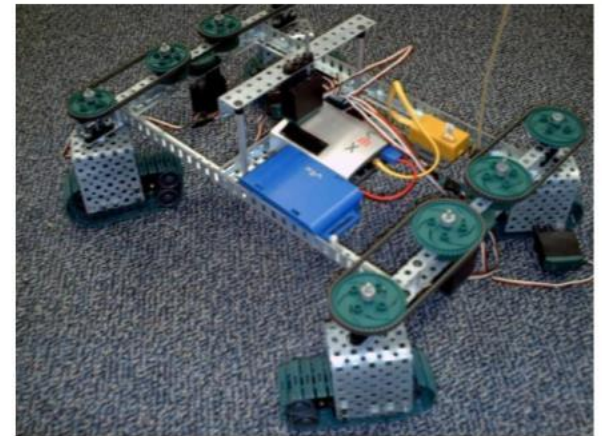
4-Omni, X-Drive



4-Omni



Swerve Wheels



Pros

- agile!
- can climb field obstacles

Cons:

- requires a motor for each wheel and motors to activate the swerve action
- complex
- multiple motors draw more current and use up motor ports on controller
- most designs have a higher center of gravity

Summary: Very agile, very complex and requires extra parts.

Make sure to give yourself time and resources if you are to implement this option.

