



# SuperQuest Salem

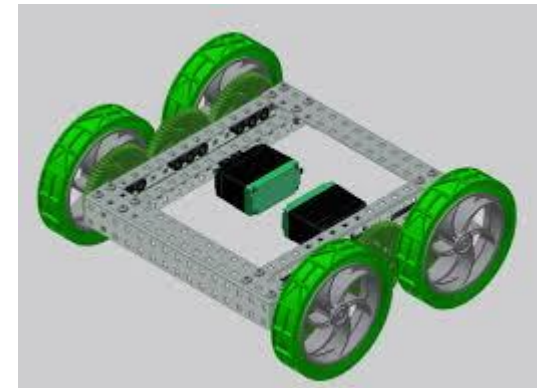
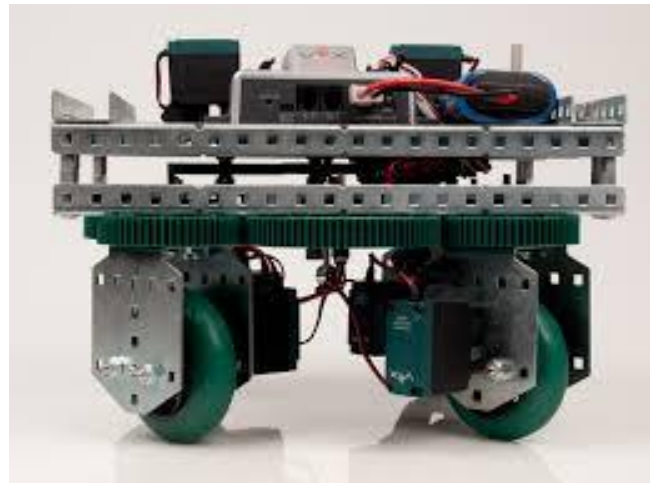
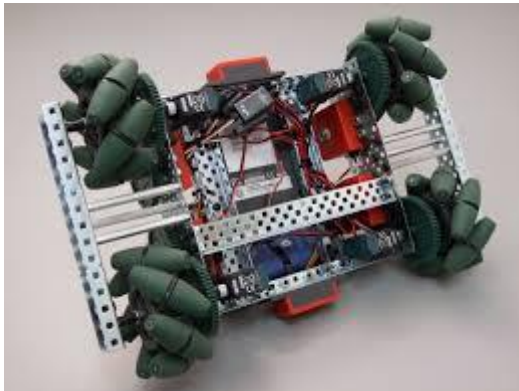
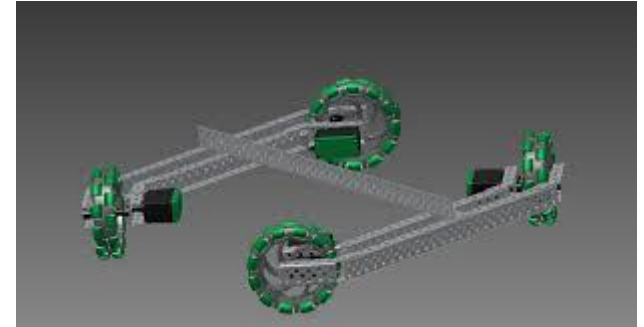
## Drive Train Best Practices

vEX EDR



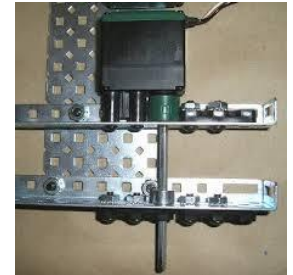
# Drive Trains

- 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.
- Use the high strength **stainless steel (6-32) motor screws** ( P/N : 275-1169 ) they are less likely to strip.
- 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
- With skid turn designs, short-wide designs are easier to turn than long-narrow

# 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 .( . . . )

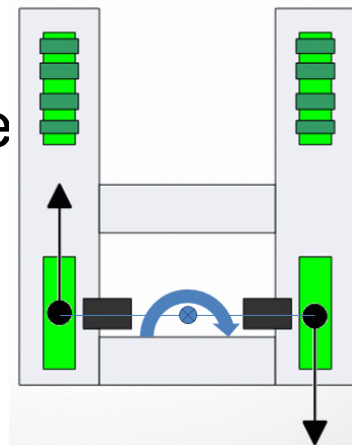
## Pros-

- 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

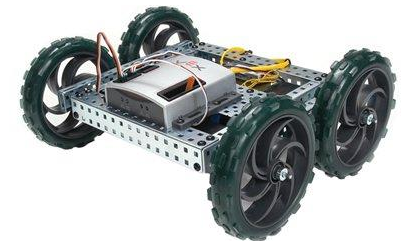
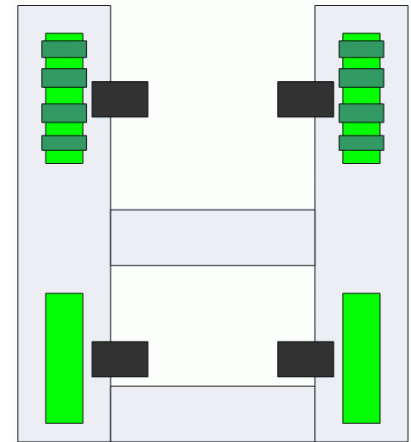
## Pros : Relatively Simple: Common at Worlds

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

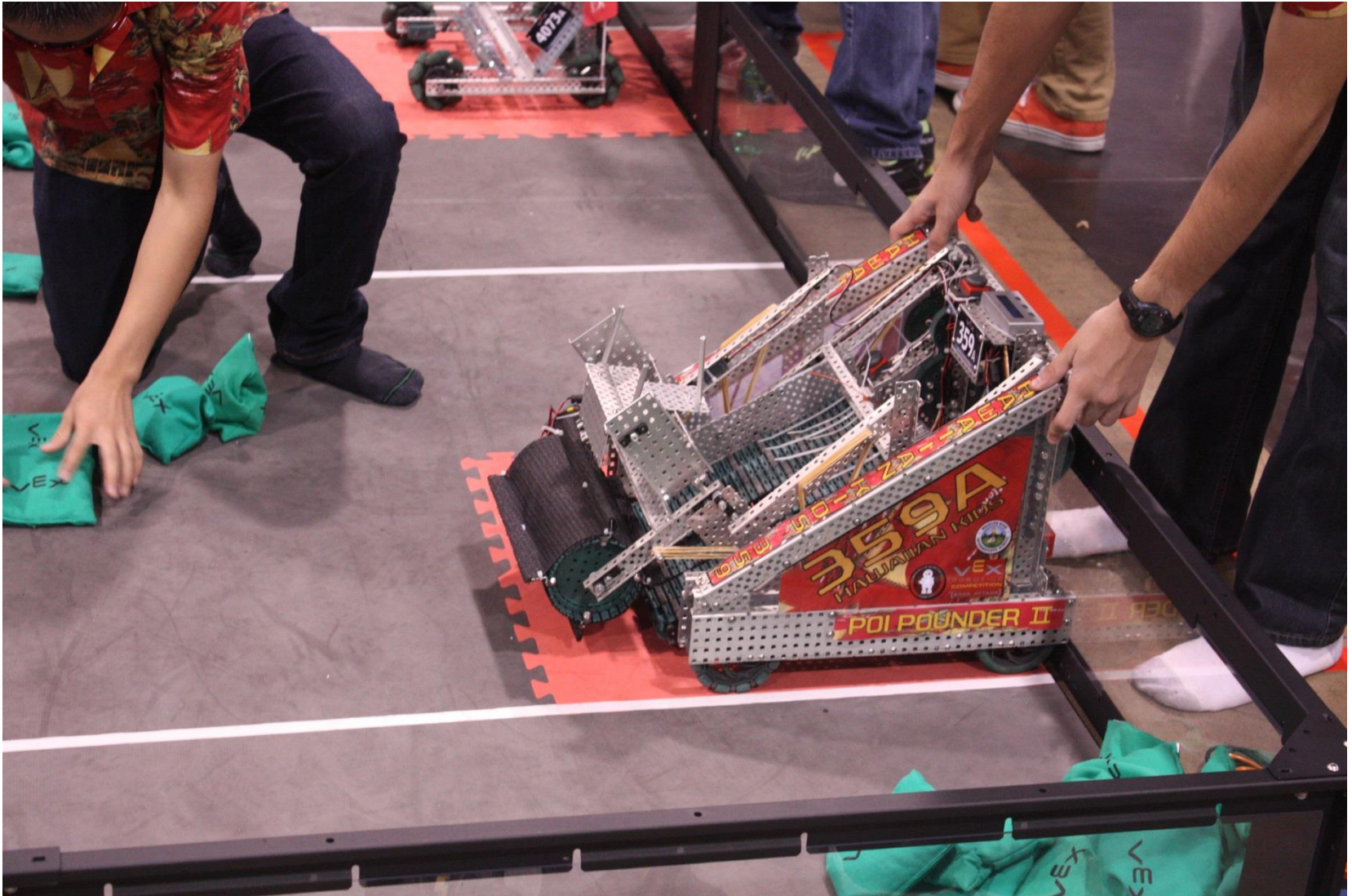
## Cons:

- 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

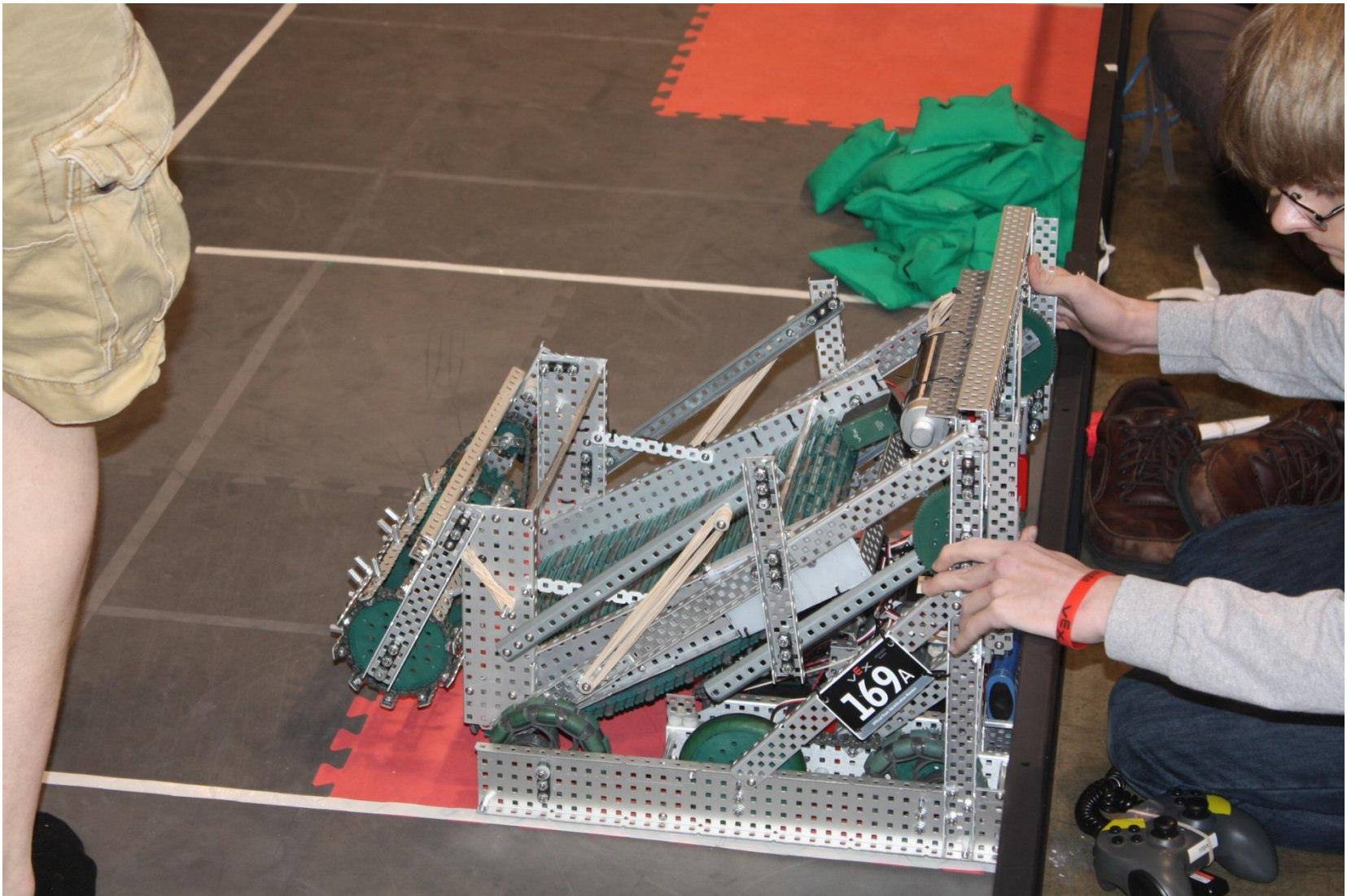


# Skid Turn Sample

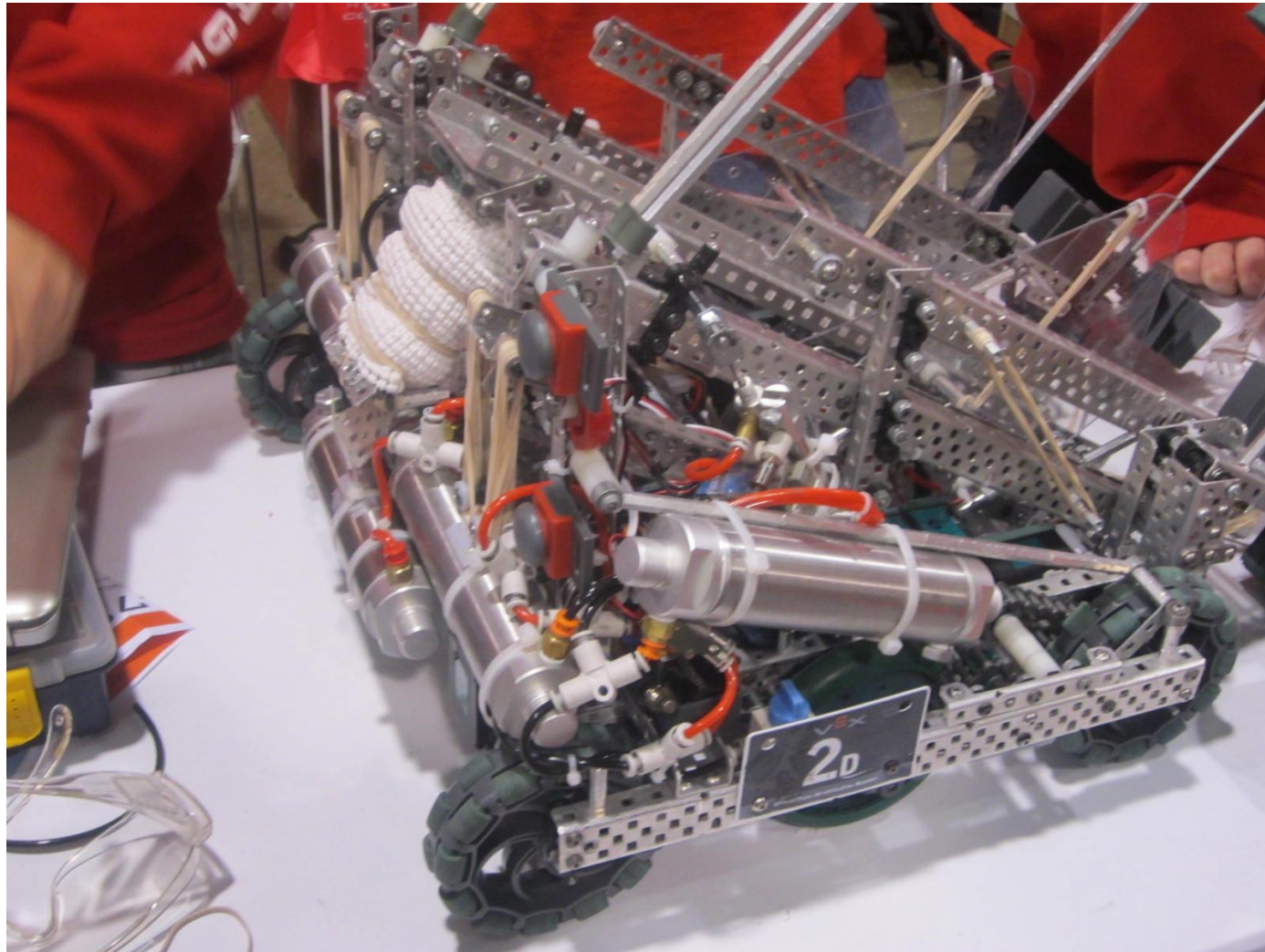


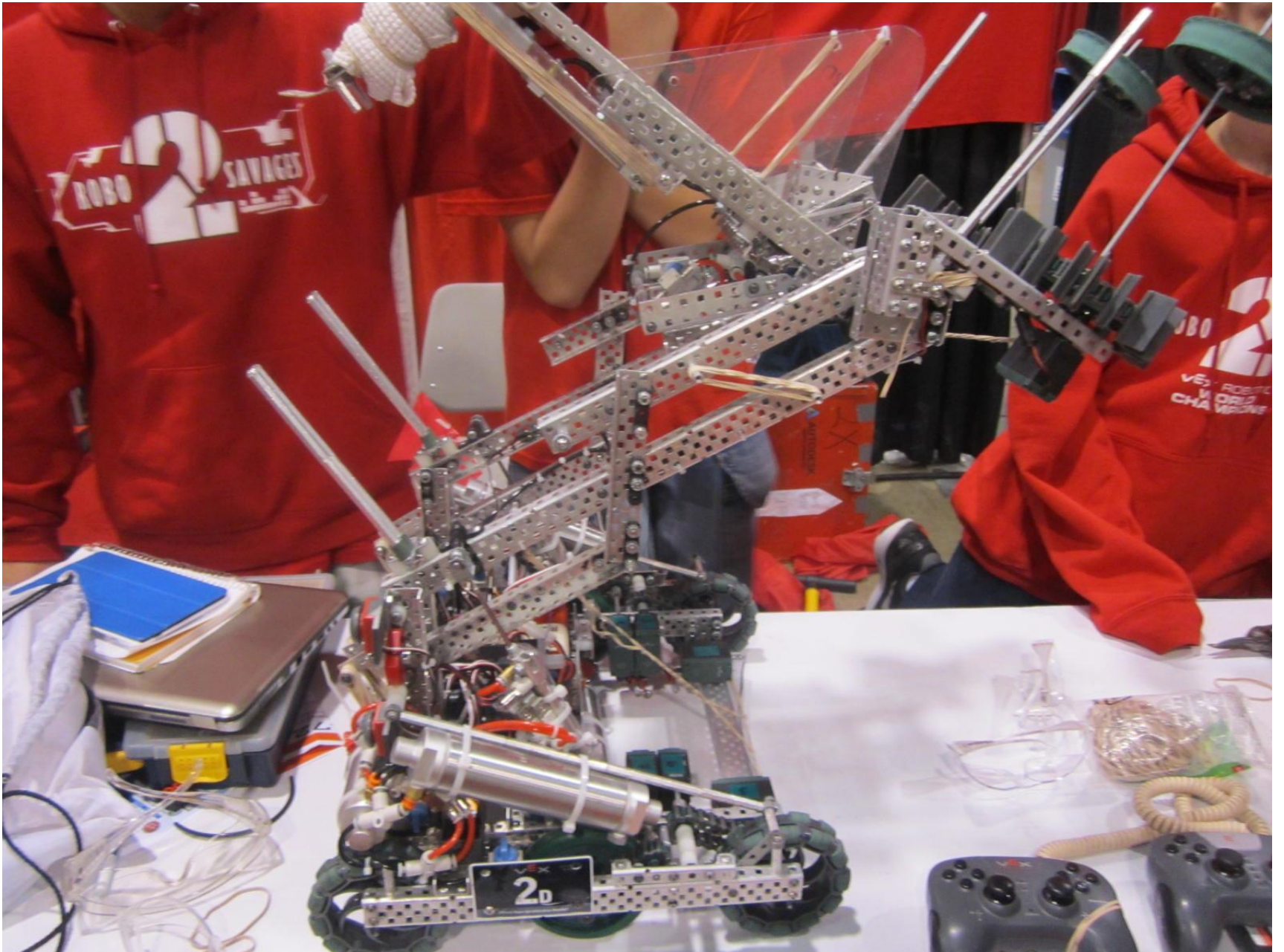


# Omnis Outside, Traction Middle. Only Driving Back Four Wheels

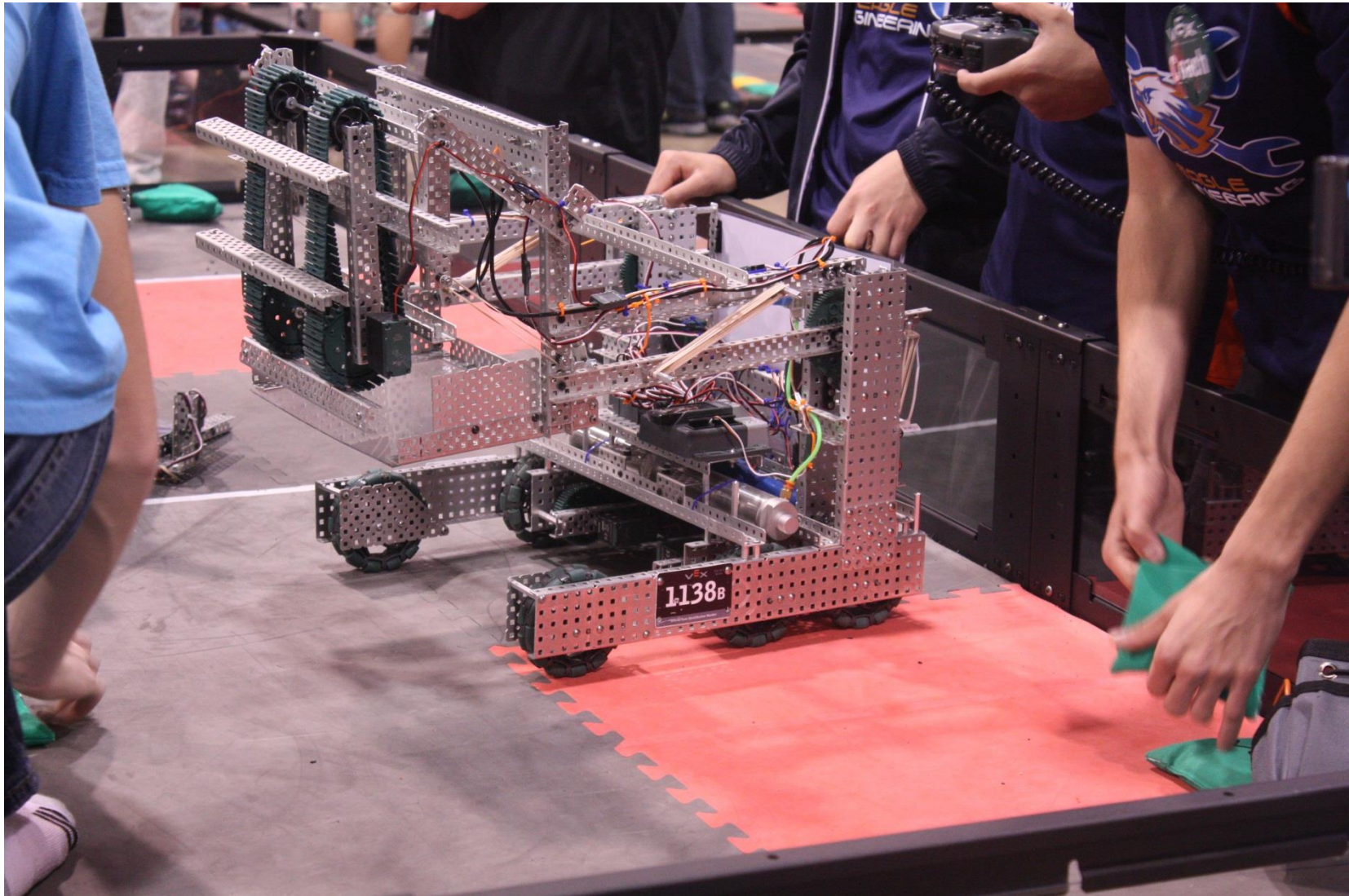


# Division Semifinalist: Note Middle Wheel





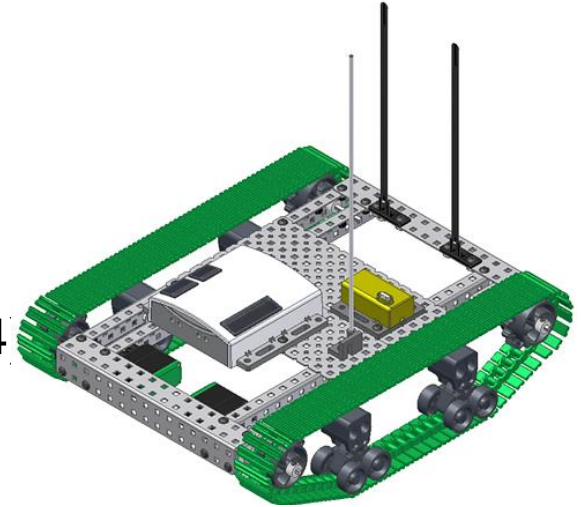
# Back Wheels Powered, Omnis



# 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

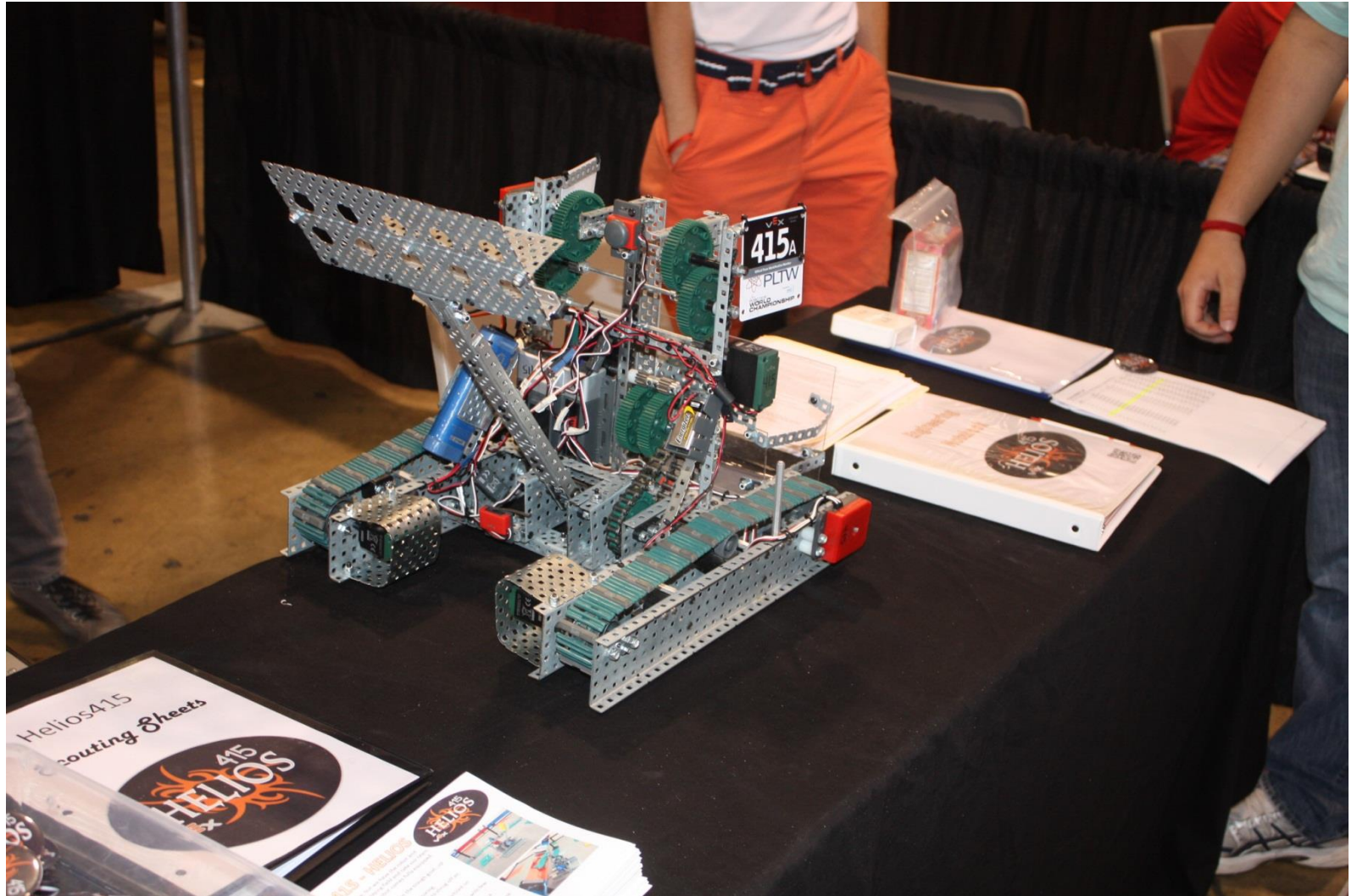


## Cons

- 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**

# Sack Attack Track Bot



# LEGO Tank Gun



# Mascot





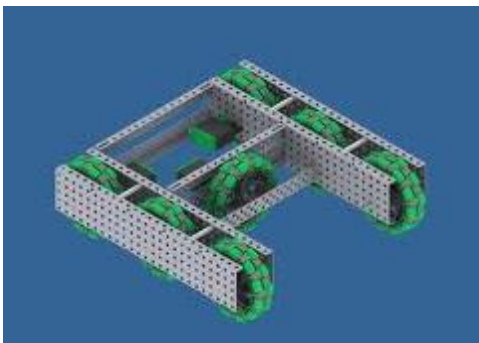
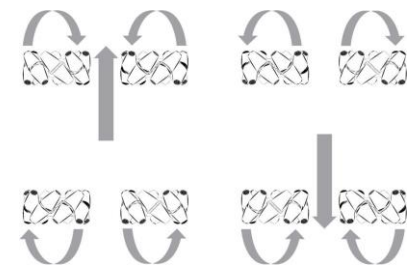
# Holonomic: Robots that can go sideways

## Pros

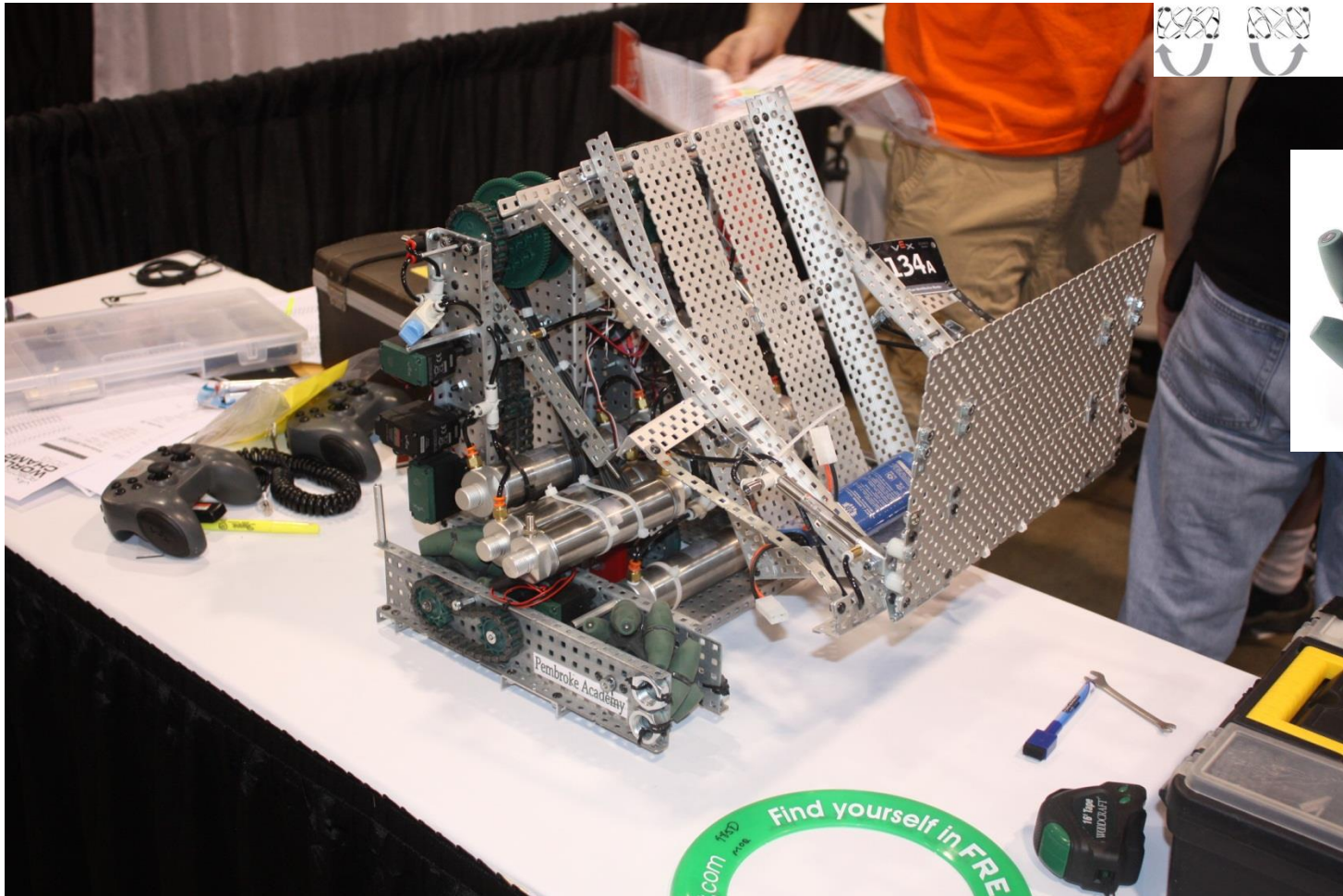
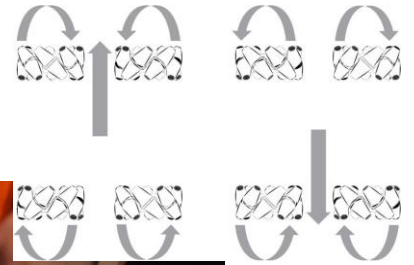
- can move in 2 different planes (front to back and sided to side), plus pivot
- very hard to trap in a corner
- very effective for lining up with game pieces

## Cons

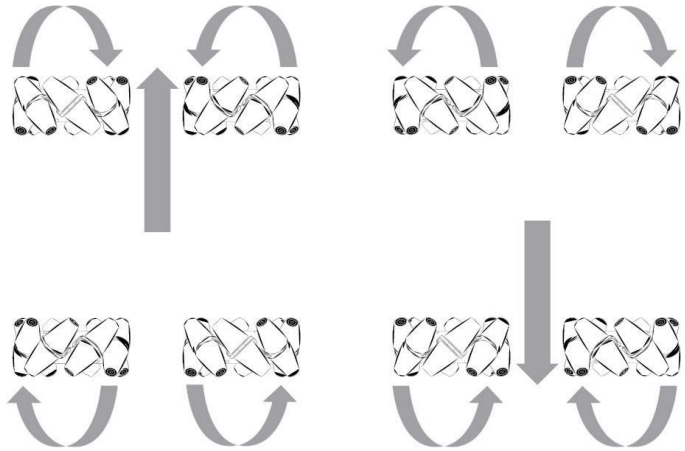
- requires a motor for each drive wheel
- need driver training
- multiple motors draw more current and use up motor ports on controller
- does not climb field obstacles well



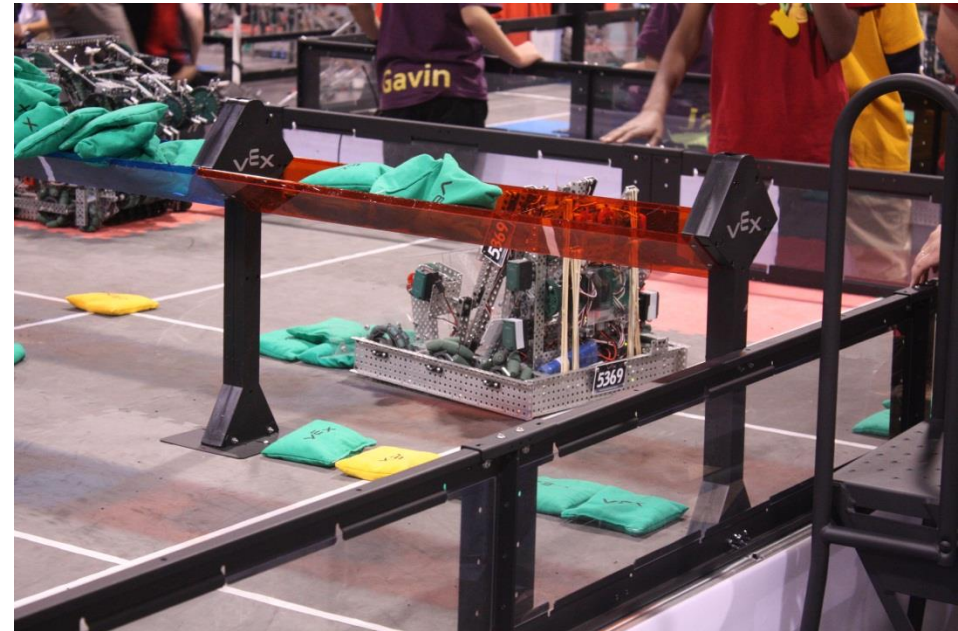
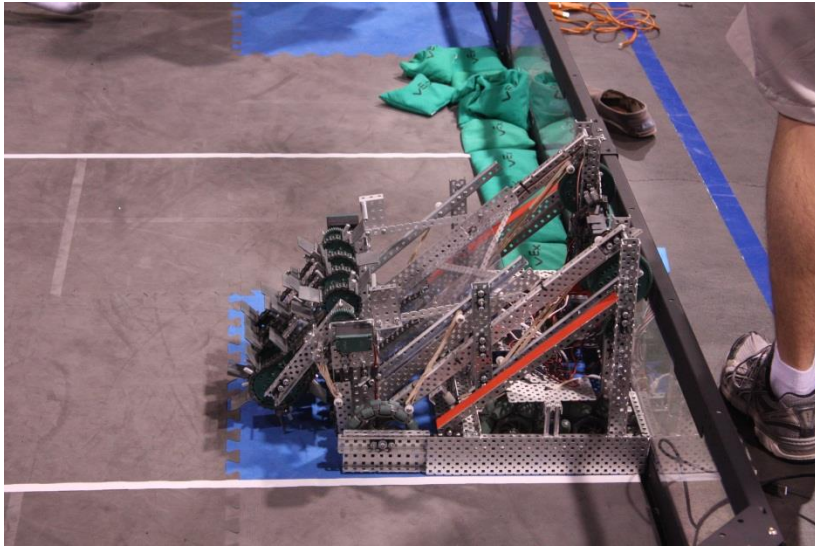
# Mecanum



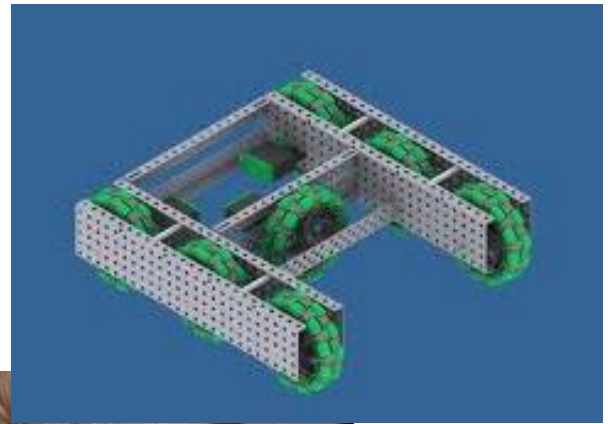
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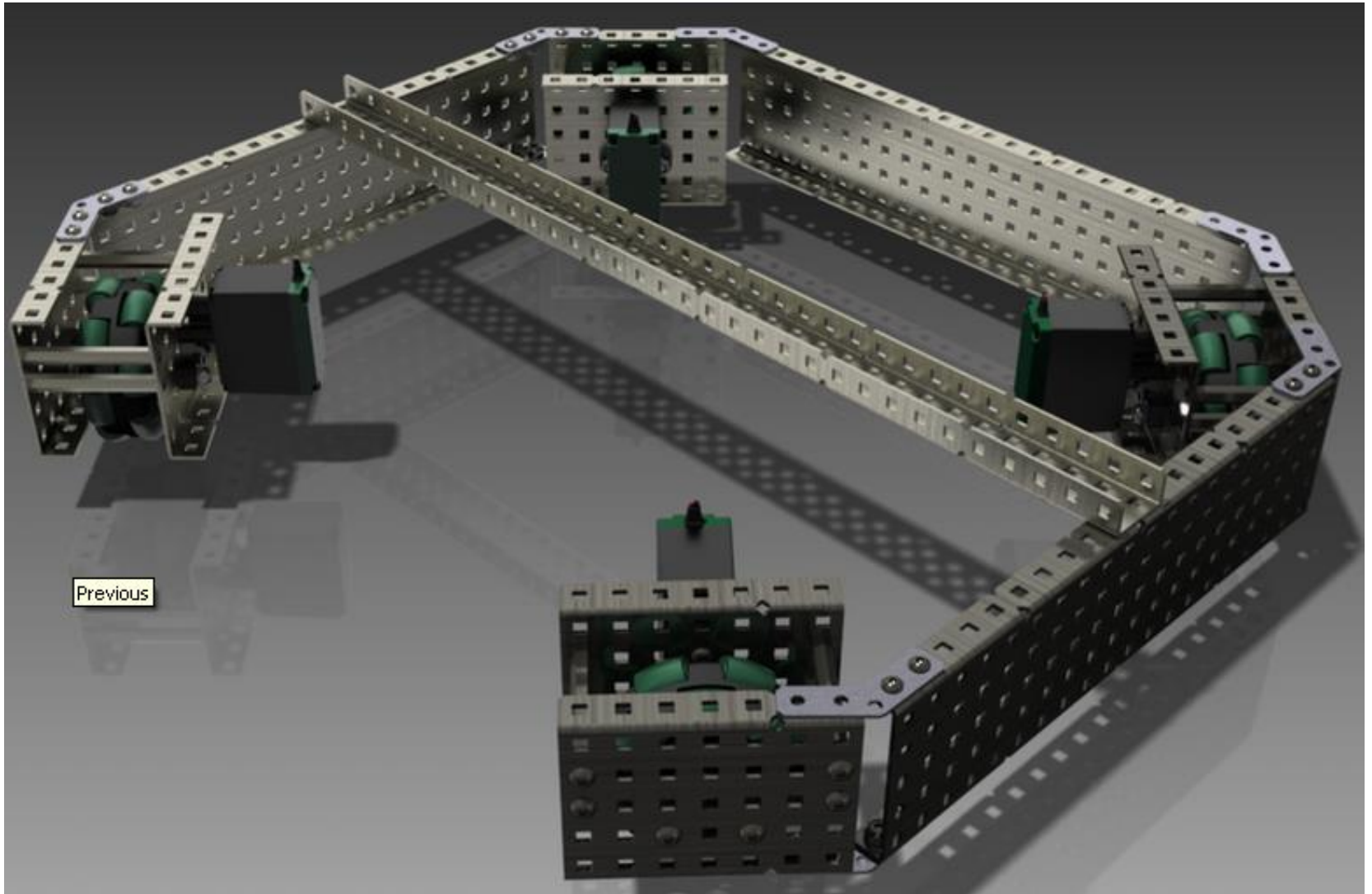
# Mecanums in back, Omni in Front



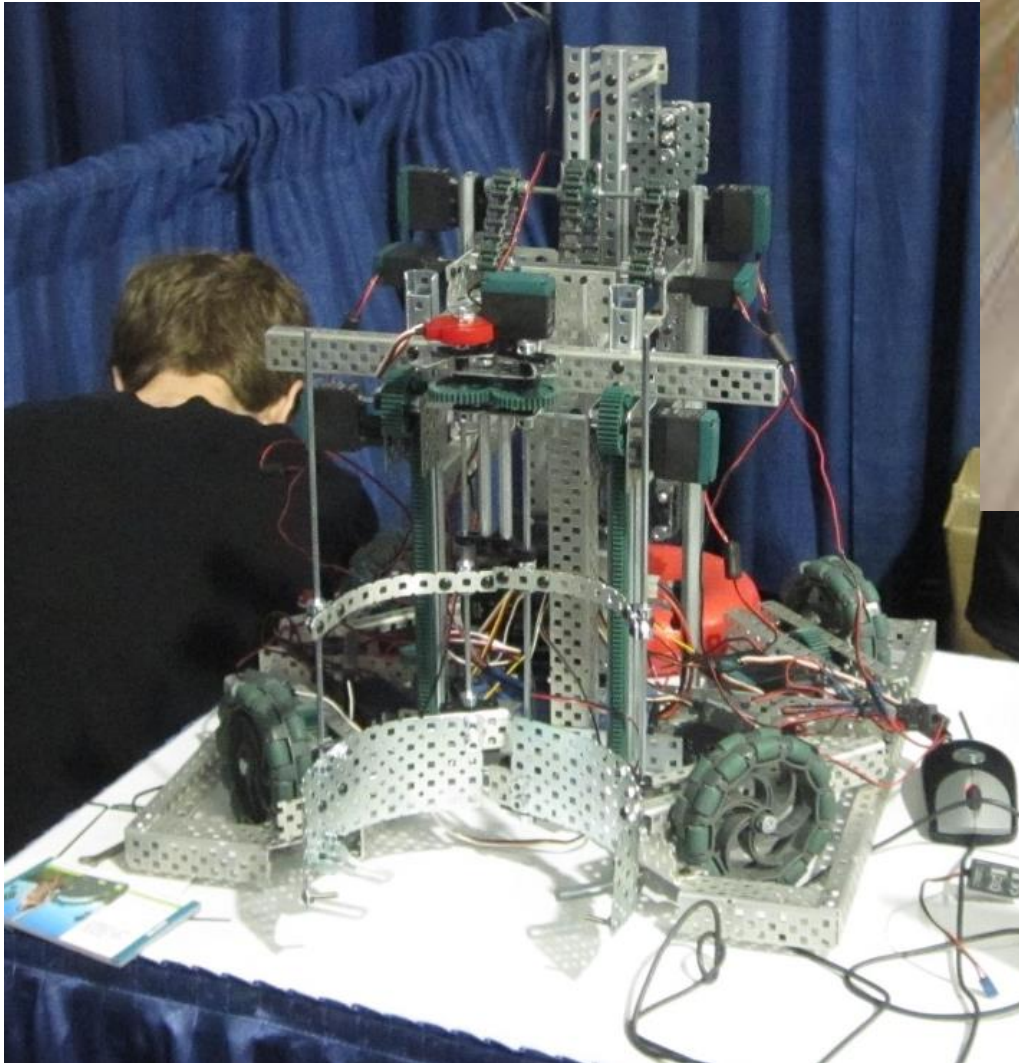
# H-Drive



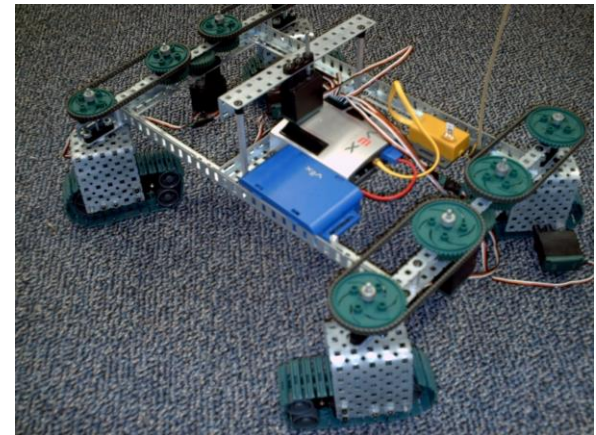
# 4-Omni, X-Drive



# 4-Omni



# Swerve Wheels



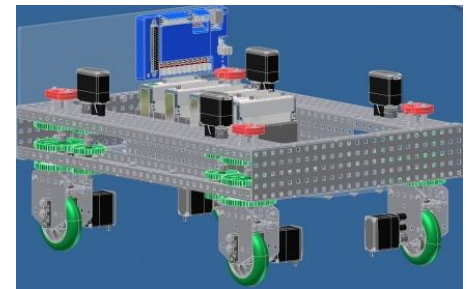
## Pros

- 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.**





# Swervebot

