

# IEEE Southeast Con 2019 Team Presentation

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Department of Electrical and Computer Engineering  
Department of Mechanical Engineering



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# Team Members



Chase Sapp

Team Leader



Kyle Voycheske

Lead  
Mechanical  
Engineer



Chendong Yuan

Lead Control  
System Engineer/  
Financial Advisor



Daniel Delgado

Lead Software  
Engineer



Fabio Trinidad

Lead Electrical  
Engineer

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# VDR 5 Itinerary

Topic	Person
Southeast Con Recap	Daniel Delgado
Budget Update	Yuan Chendong
Robot Versions to Now	Kyle Voycheske
Software Update	Fabio Trinidad
Next Step – Version 3	Chase Sapp

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# Southeast Con 2019

- IEEE Region 3 for: Technical, Professional, and Student conference
- Focuses on sharing ECE latest Information
- Events
  - A technical program with seminars, tutorials and workshops
  - A student program with student competitions
  - Exhibits
  - IEEE regional meetings
- Conference Location: Von Braun Center in Huntsville, Alabama
- Thursday, April 11th, 2019 through Sunday, April 14th, 2019



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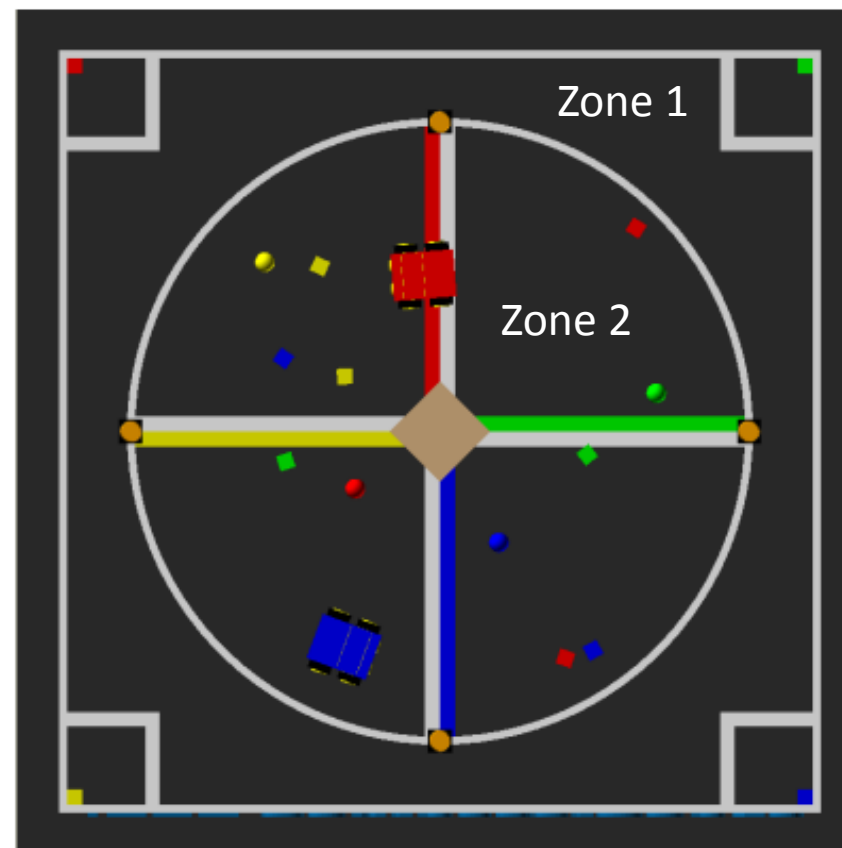


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# How to Earn points in the competition

## Southeast Con 2019 Hardware competition Point System [1]

Points	Task
5 pts	Leave home base and enter Zone 1
5 pts	Cross the orbital line into Zone 2 (first time only)
5 pts	For each complete, counter-clockwise orbit within Zone 2, starting from the quadrant closest to designated corner square
10 pts	Debris removed from Zone 2 (each)
10 pts	Debris placed in corner square (additional to removal)
10 pts	Color-matched debris placed in appropriate color corner square (bonus points)
10 pts	Finish in your home base
25 pts	At conclusion of debris removal, raise your onboard flag while in home base
-10 pts	Every collision with a Spacetel



[1] Southeast Con 2019 Playing Field

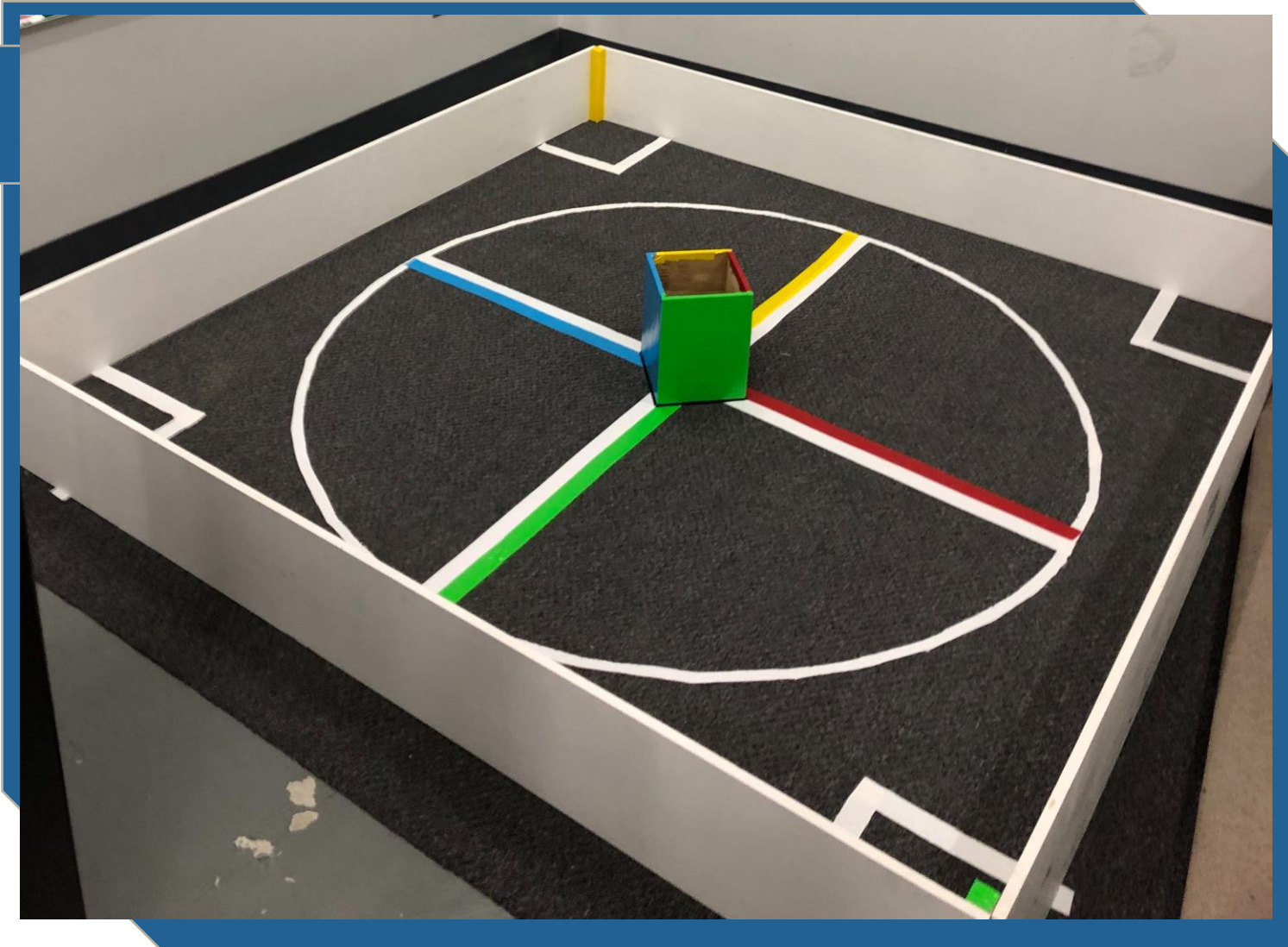
# Rules Update (Version 1.3)

- The playing field walls are not painted; wall material comes primed flat white.
- The playing field carpet base is now specified as: Home Depot, Elevations – color Sky Grey Ribbed Texture indoor/outdoor - 12 foot carpet
- Green Paint color is provided (Glidden: Base GLN9013N)
- There are no wires leading from the Spacetels, they are powered by a 9v battery on the base.
- The wooden blocks, corner posts and central column are painted, not taped.
- The only tape is on the carpet base.
- Each playoff team will be given assigned squares, these are the home base and the first counter clockwise corner square, as scoring squares. This is during the playoff rounds



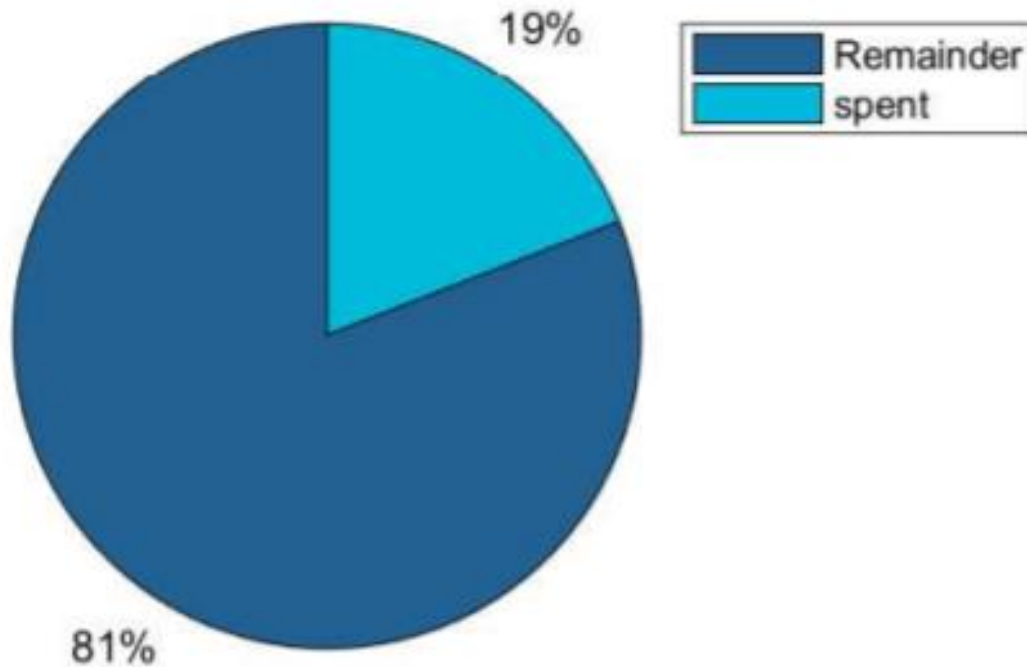
# Testing Field

- Design to Match the competition's layout
- Tape Was used for the center structured (base on rules V1.2)
- Spacetels have not been added to avoided collision during "Planned Route" Testing

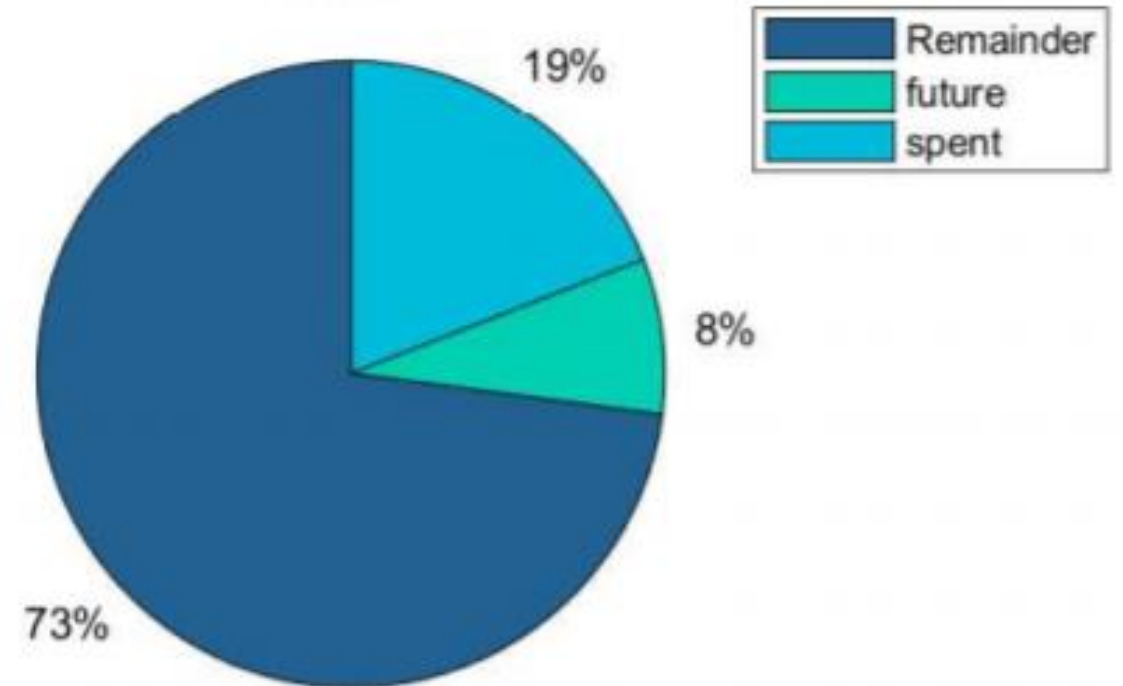


# budget update

Fall 2018 Spent

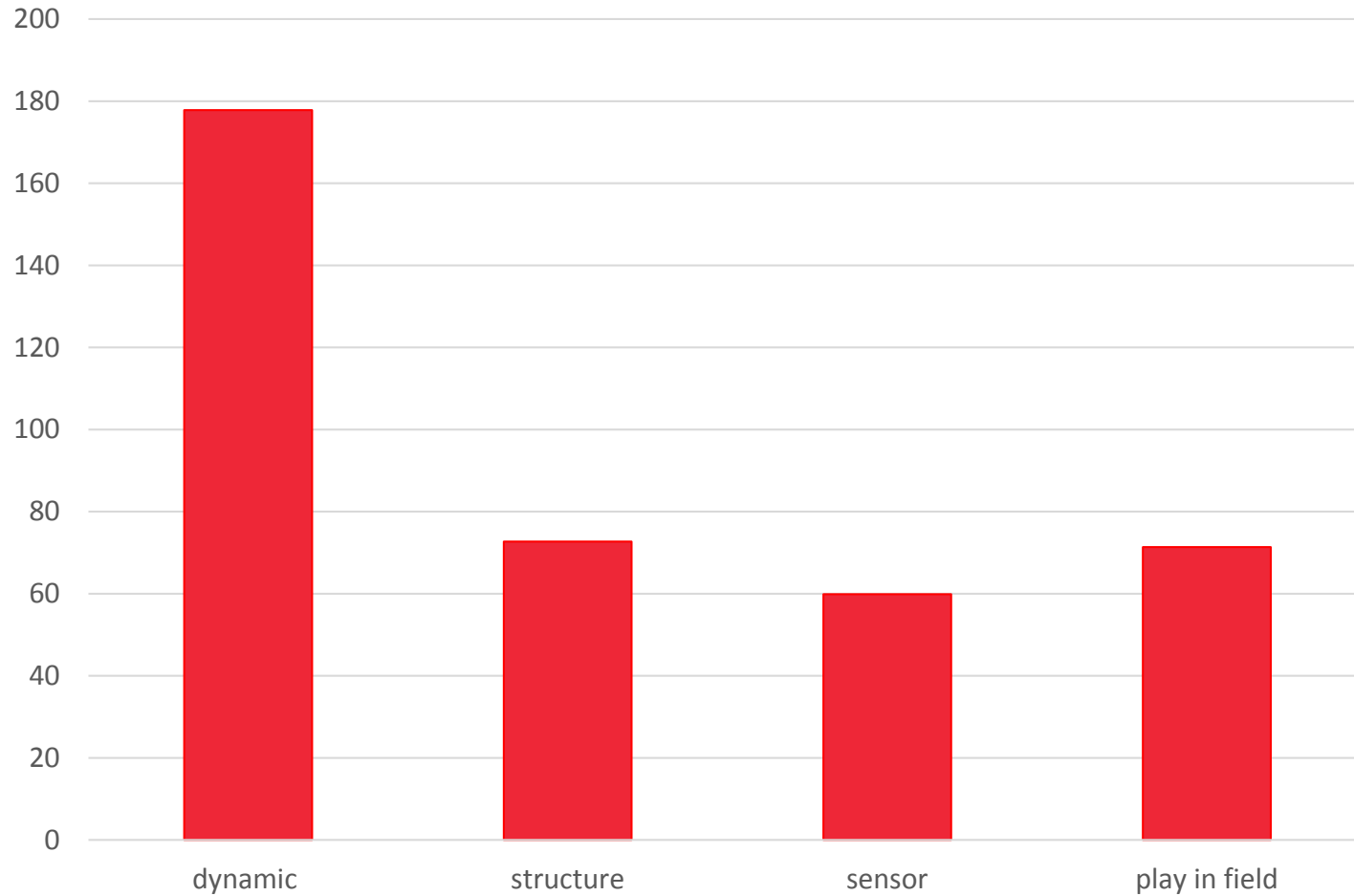


Spring 2019 Spent





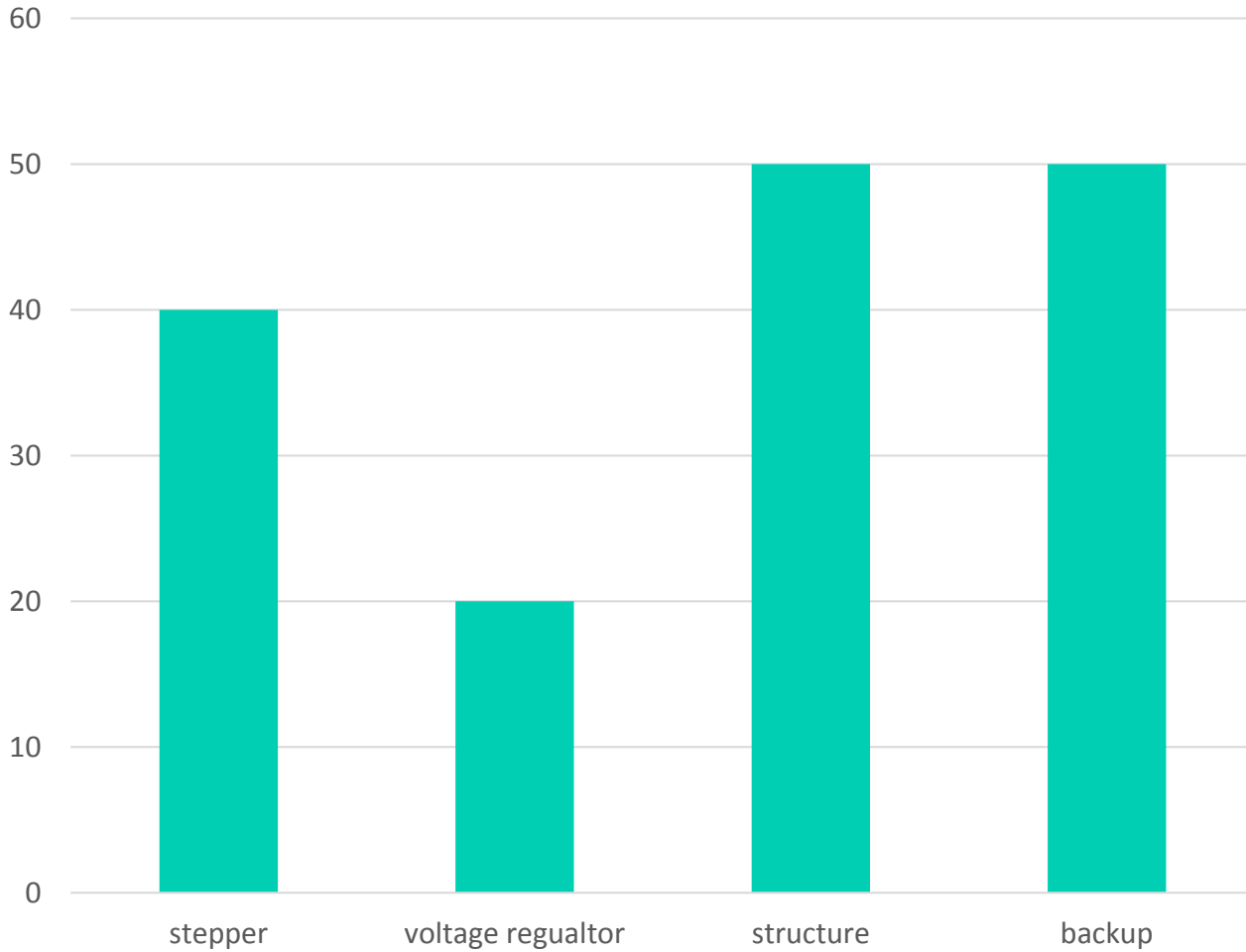
Southeast Con Spending Breakdown



item	amount
tired wheels	\$12.99
pixy2	\$59.9
wooden blocks	\$17.99
pit balls	\$13.85
2*DC gearmotor	\$35.98
4*h-bridge	\$67.96
aluminum sheet and rod	\$30.44
2*garmotors	\$73.9
2*plastic sheets	\$29.27
4*amber lights	\$39.54



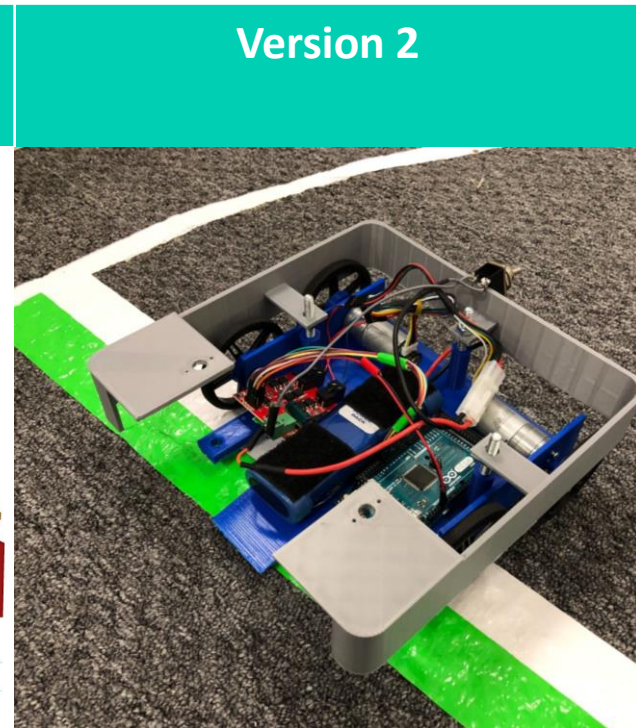
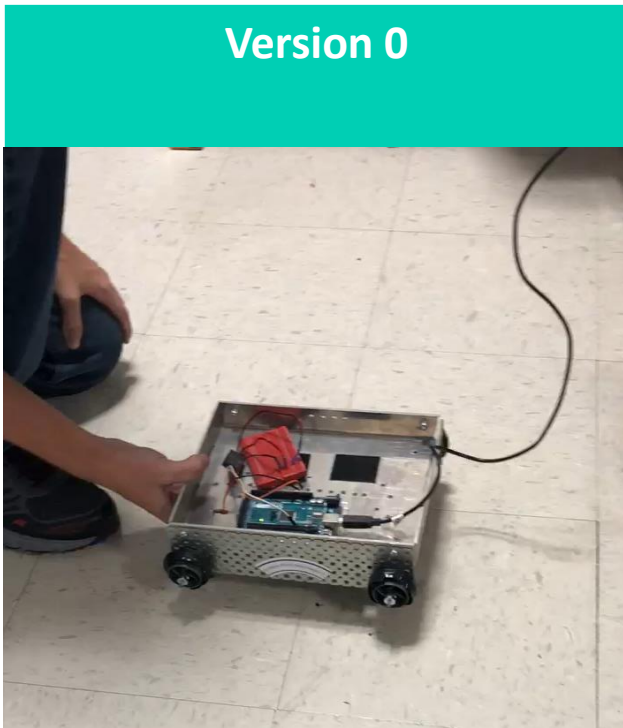
Southeast Con Future Spending Breakdown



Item	amount
2*Stepper motor	\$40.00
Metal rods	\$10.00
Voltage regulator	\$20.00
Aluminum 3000series	\$30.00
Backup parts	\$50.00
Bearings	\$10.00

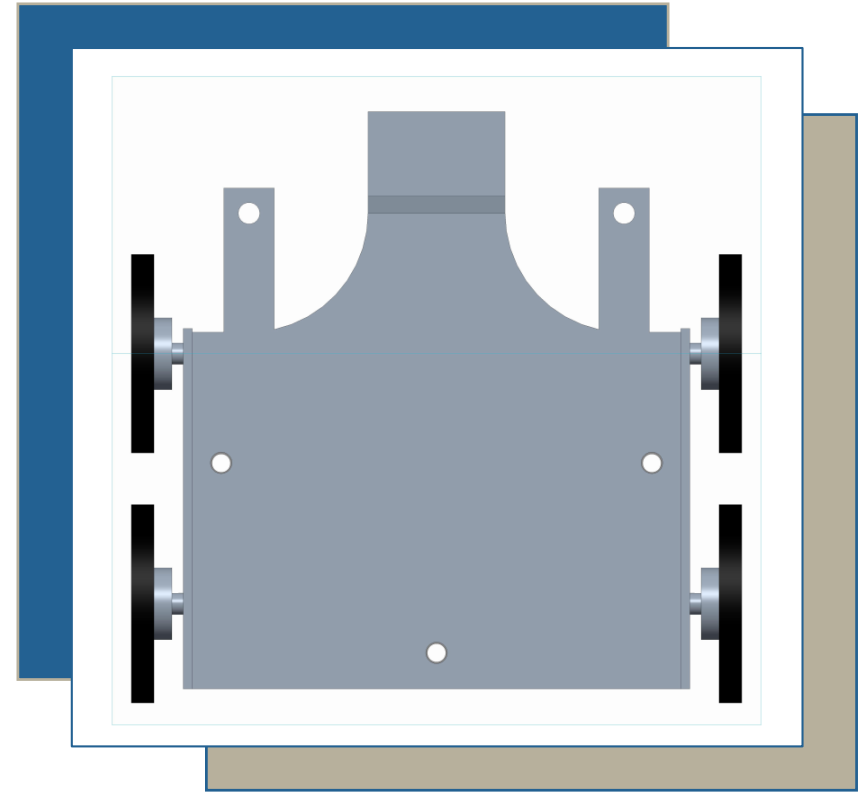


# Robot Versions to Now



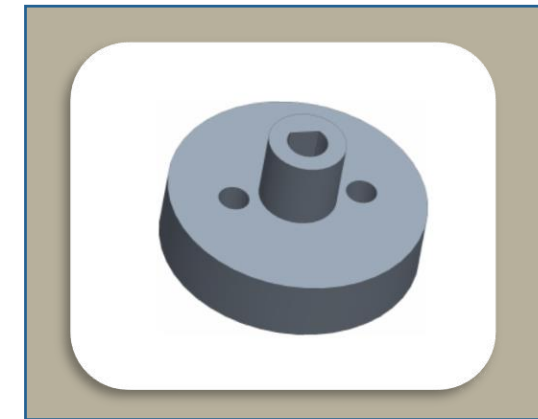
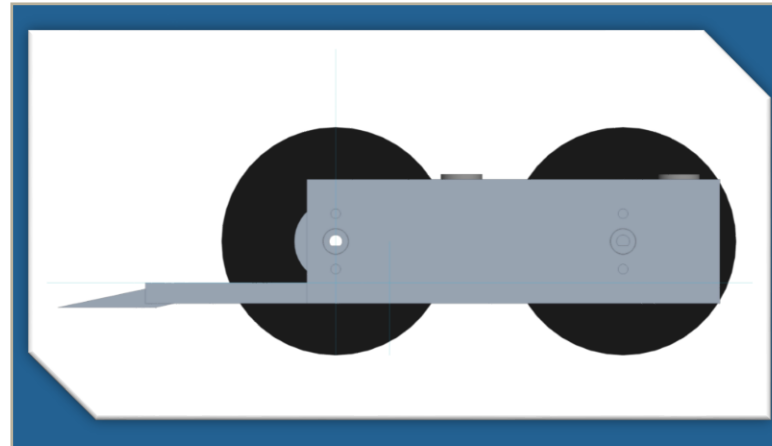
# Version 1 to Version 2

- Change wall spacing
  - Enough space for the support beams
  - Account for wheel hubs
- Drop from 4 support beams to 3
  - Old support holes share the same space as the motors
- Bumper width height increase from 1" to 1.5"

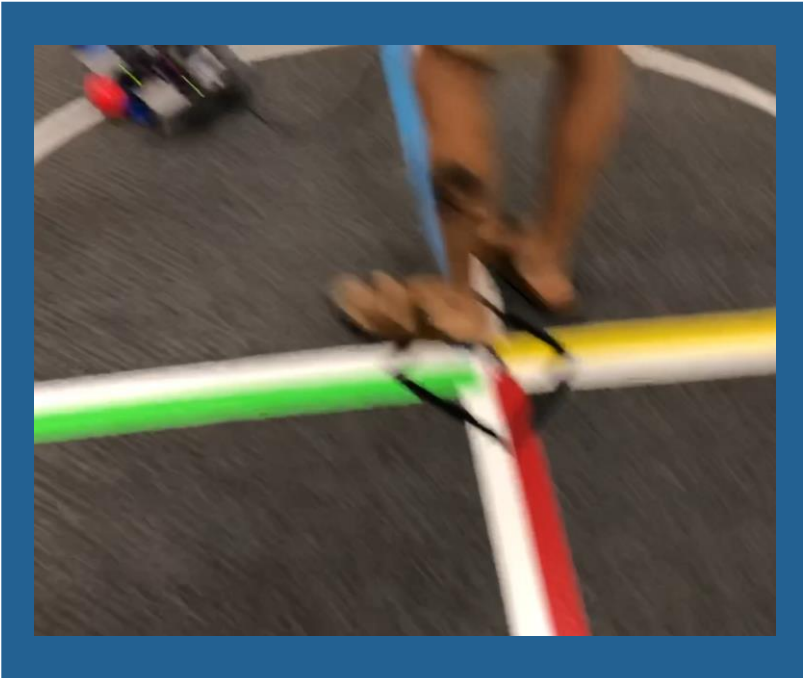


# Version 1 to Version 2 [Continued]

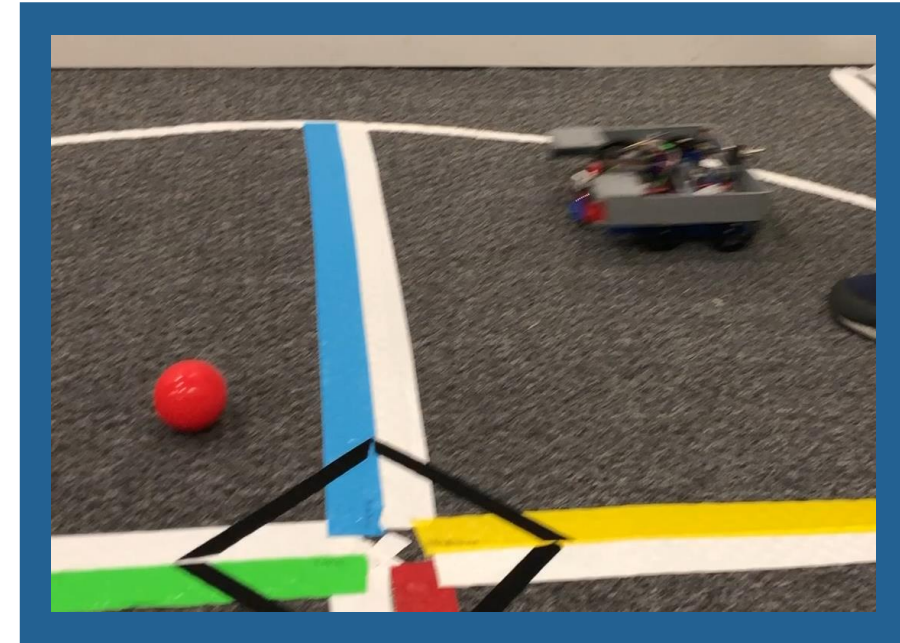
- Included hubs
- Included Holes for motor mounting
- Using ABS and PLA Material
- Introduced another battery pack for the Arduino (7.2 V)



# Software Update: Planned Route



- Follows planned route
- Travels at maximum speed when rotating
- Stays within Zone 2 During rotation



# Software Update: Recognize Objects

- Able to follow Debris
- Stops if the Debris is not in front of the robot



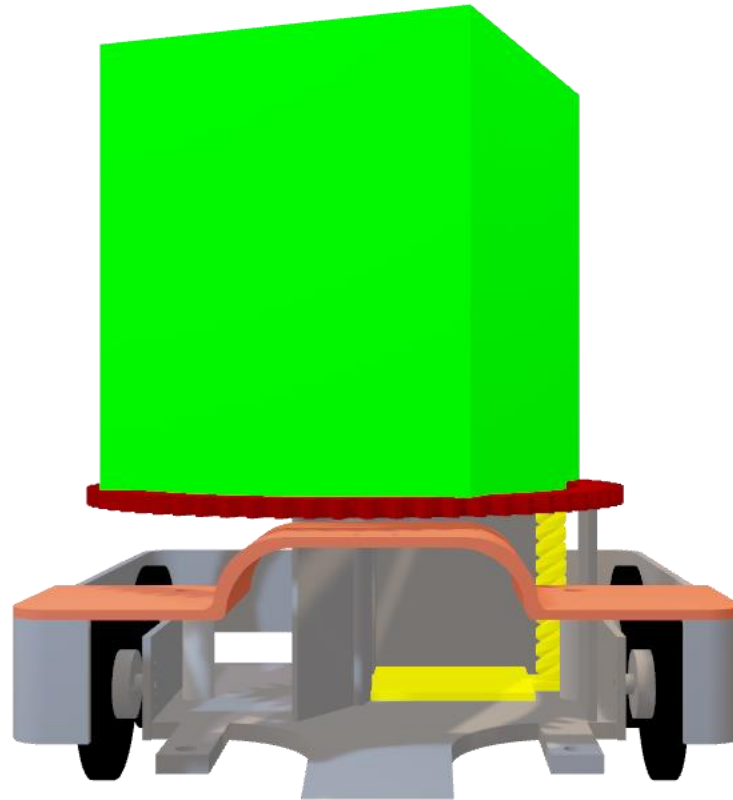
# Software Next Steps

Task	Southeast Con 2019 Hardware Comptition Schedule															
	Feb 17 - Feb 23		Feb 24 - Mar 2		Mar 3 - Mar 9		Mar 10 - Mar 16		Mar 17 - Mar 23		Mar 24 - Mar 30		Mar 31 - Apr 6		Apr 7	Apr 14
Elevator & Sorting																
Hall motion																
Planned Route																
Combine Follow & Planned Route																
Return Home																
Applied Routing																
Avoid Other Robots																
Place Debris in Proper home																
Raise Flag																
Competition																





# Version 3 – Next Iteration



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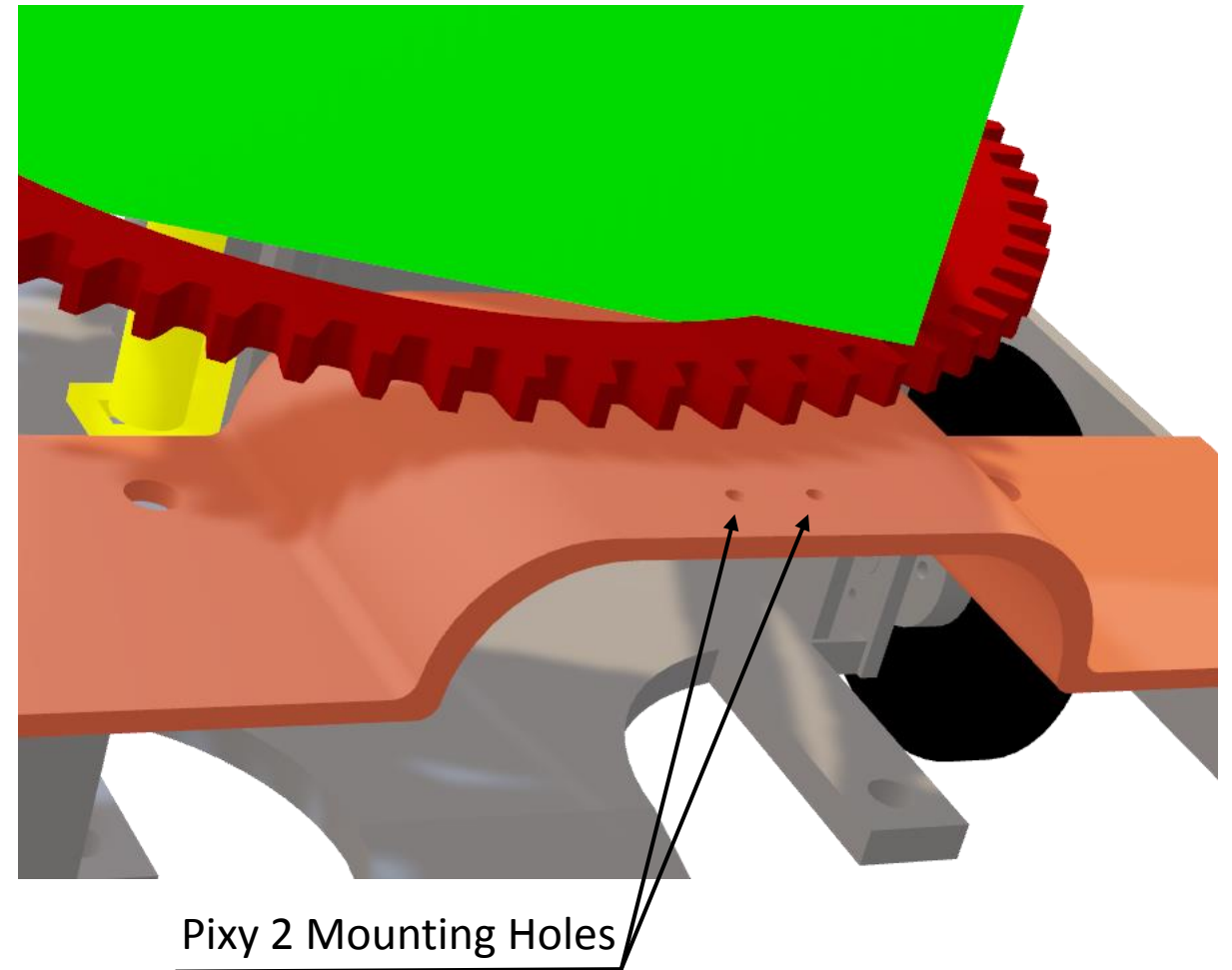
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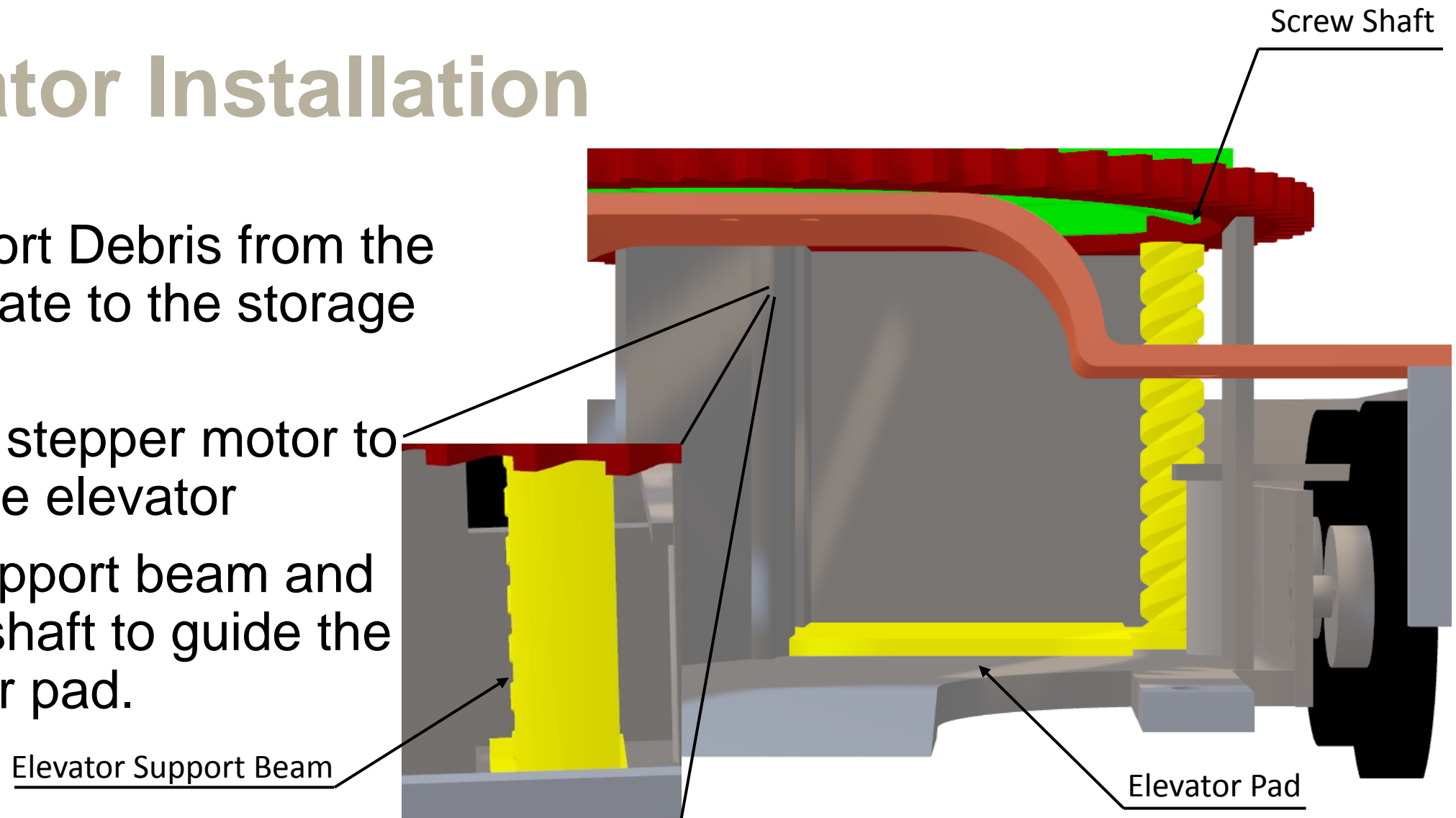
# Arch Pixy2 Base

- Allows the debris from the field to enter the robot without interference
- Places Pixy2 in front of the robot
- Increases the strength of the bumper



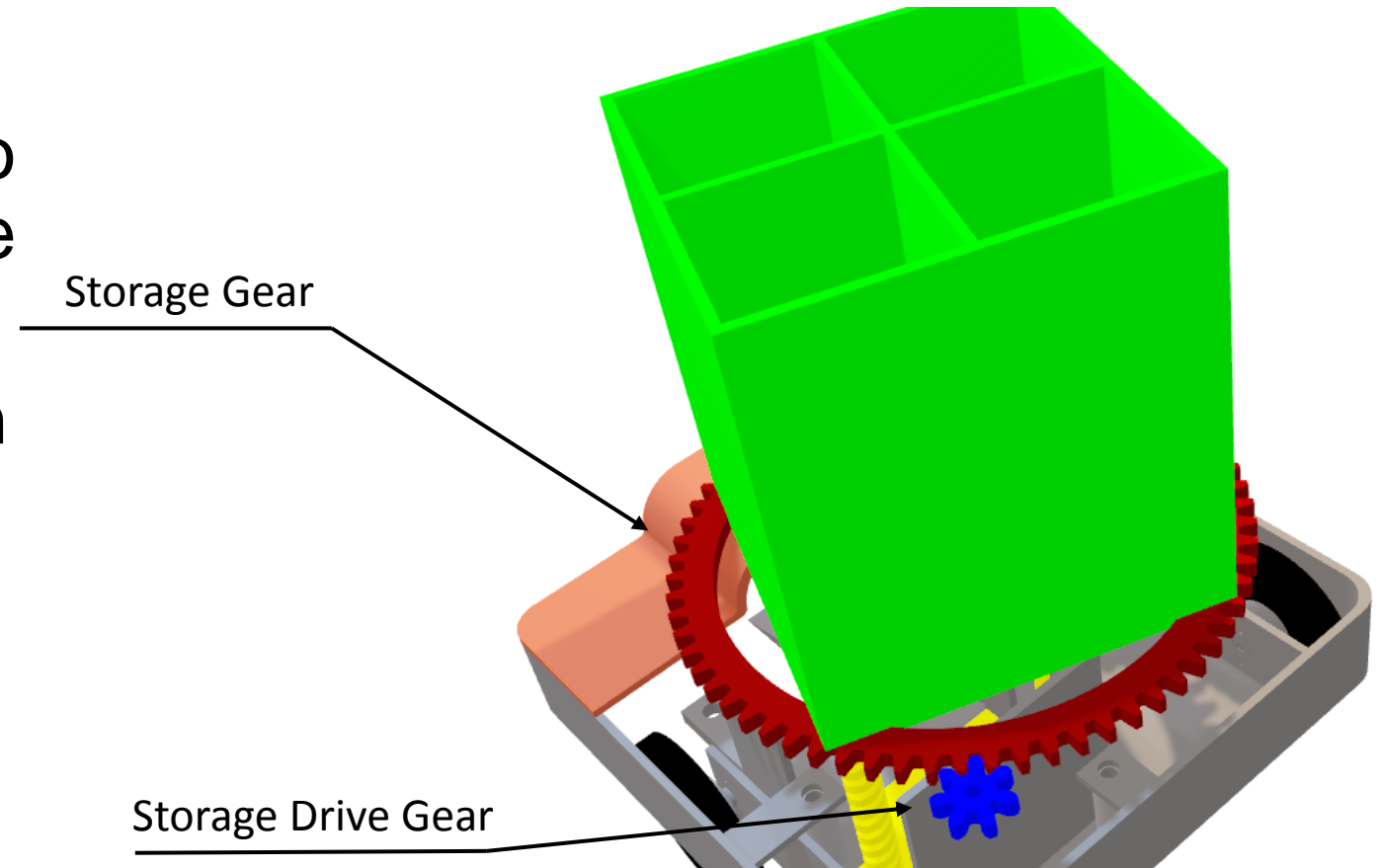
# Elevator Installation

- Transport Debris from the base plate to the storage cube
- Uses a stepper motor to drive the elevator
- One support beam and screw shaft to guide the elevator pad.



# Storage Cube with Rotation Gear

- Uses a stepper motor to rotate the Storage Cube
- The placement of the stepper motor has been shifted.
- The Storage Cube is within the defined area.



# Goals From Now to the Competition

Task	Southeast Con 2019 Hardware Competition Schedule														
	Feb 17 - Feb 23		Feb 24 - Mar 2		Mar 3 - Mar 9		Mar 10 - Mar 16		Mar 17 - Mar 23		Mar 24 - Mar 30		Mar 31 - Apr 6		Apr 7 - Apr 14
Version 3															
Version 4															
Machine Shop															
Version 5															
Software Testing															
Competition															

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# Reference

[1] *Blockstream Is Using Satellites to Beam Bitcoin Down to Earth*

*<https://www.coindesk.com/blockstream-using-satellites-beam-bitcoin-earth>*

[2] *IEEE Future Directions,*

*[sites.ieee.org/southeastcon2019/program/student-program/](https://sites.ieee.org/southeastcon2019/program/student-program/)*

