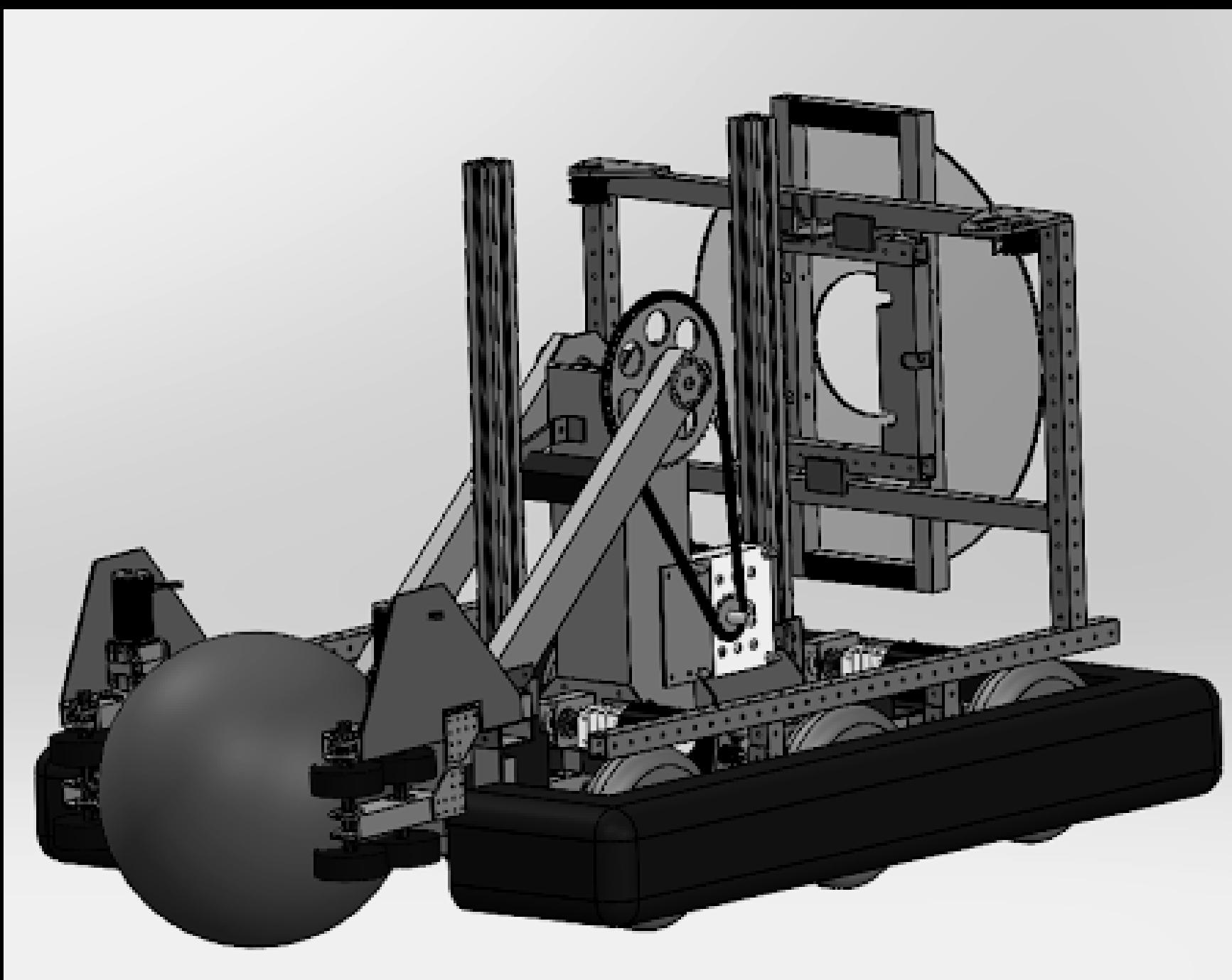


01

Raymond Ma
FRC 1310

Robotic Design



02 TABLE OF CONTENTS

Early Robot Designs

- Cargo
- Hatch
- Climb
- Overall structure

Strategic Planning

- Early Prioritization of Mechanisms
- Pros & Cons

Current Subsystems Design

- Drivetrain
- Hatch Mechanism
- Arm Mechanism
- Intake Mechanism
- Climb Mechanism

Revisions & Improvements

- Problem Solving
- Improvements

03

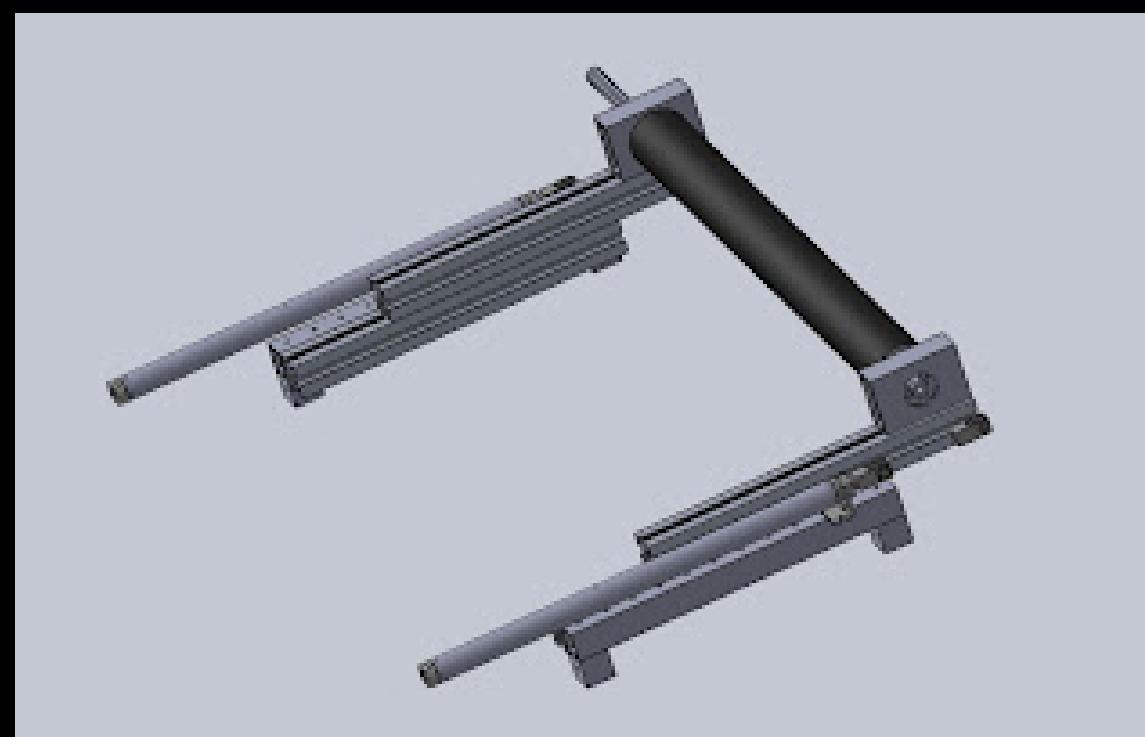
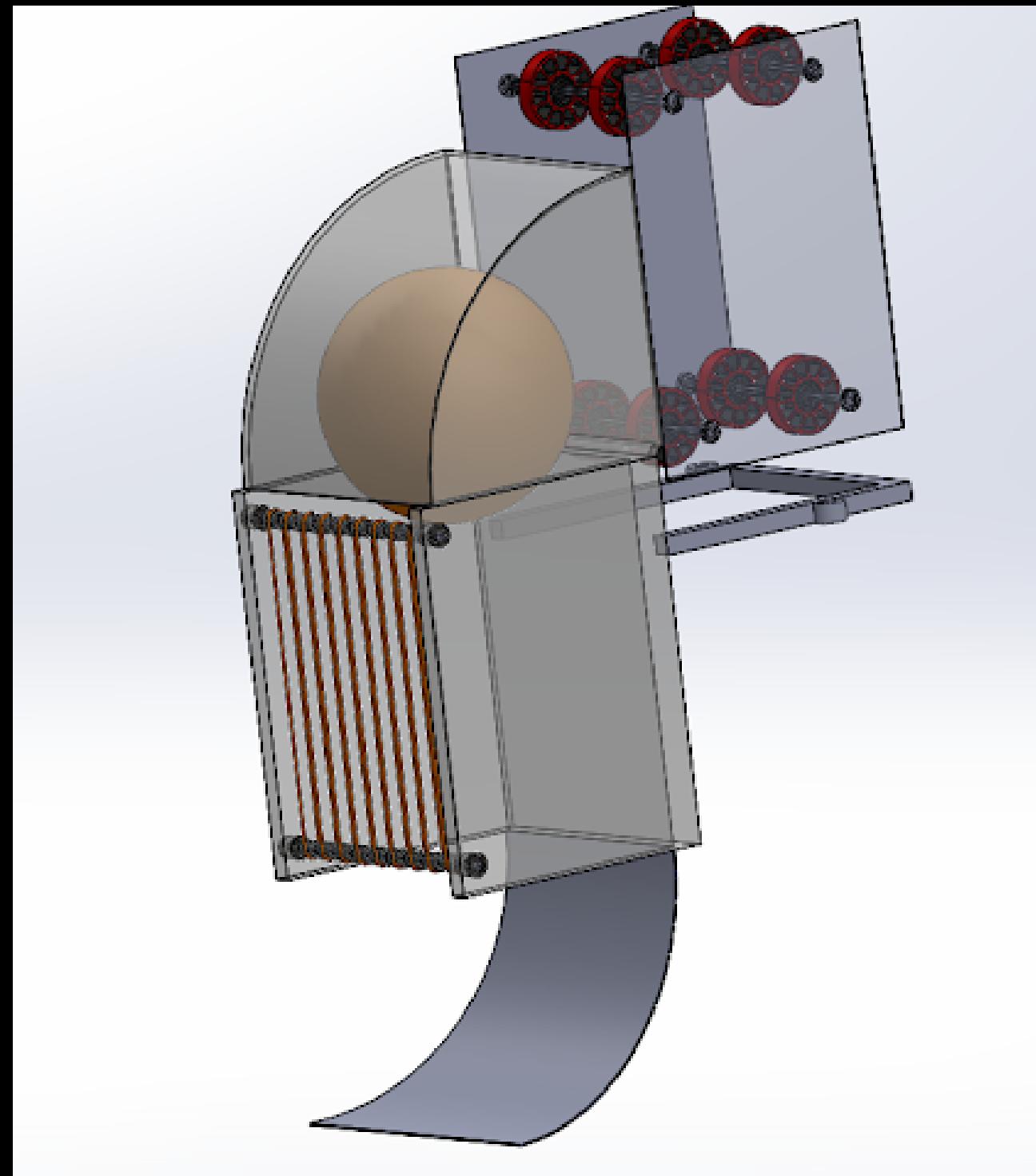
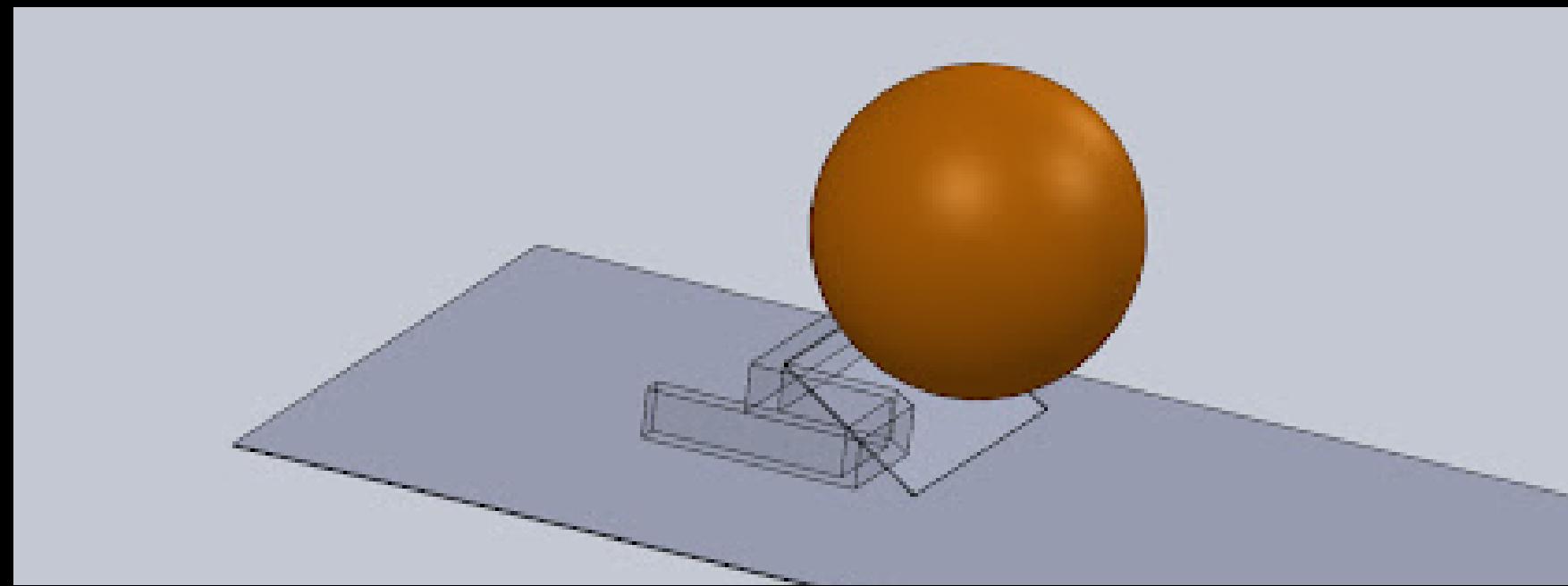


Early Robot Designs

- Cargo
- Hatch
- Climb
- Overall Structure

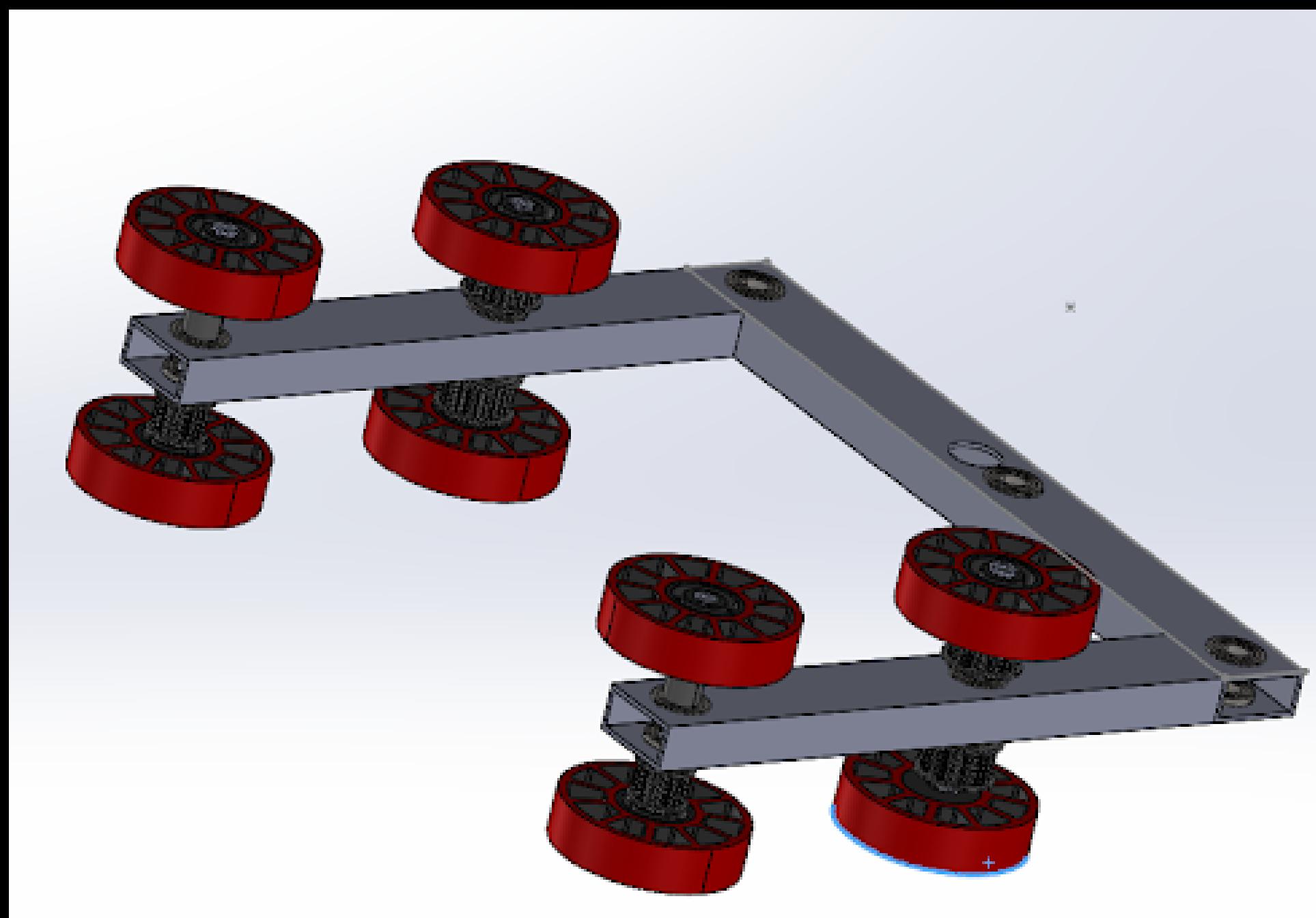
Early Designs 04

- Cargo

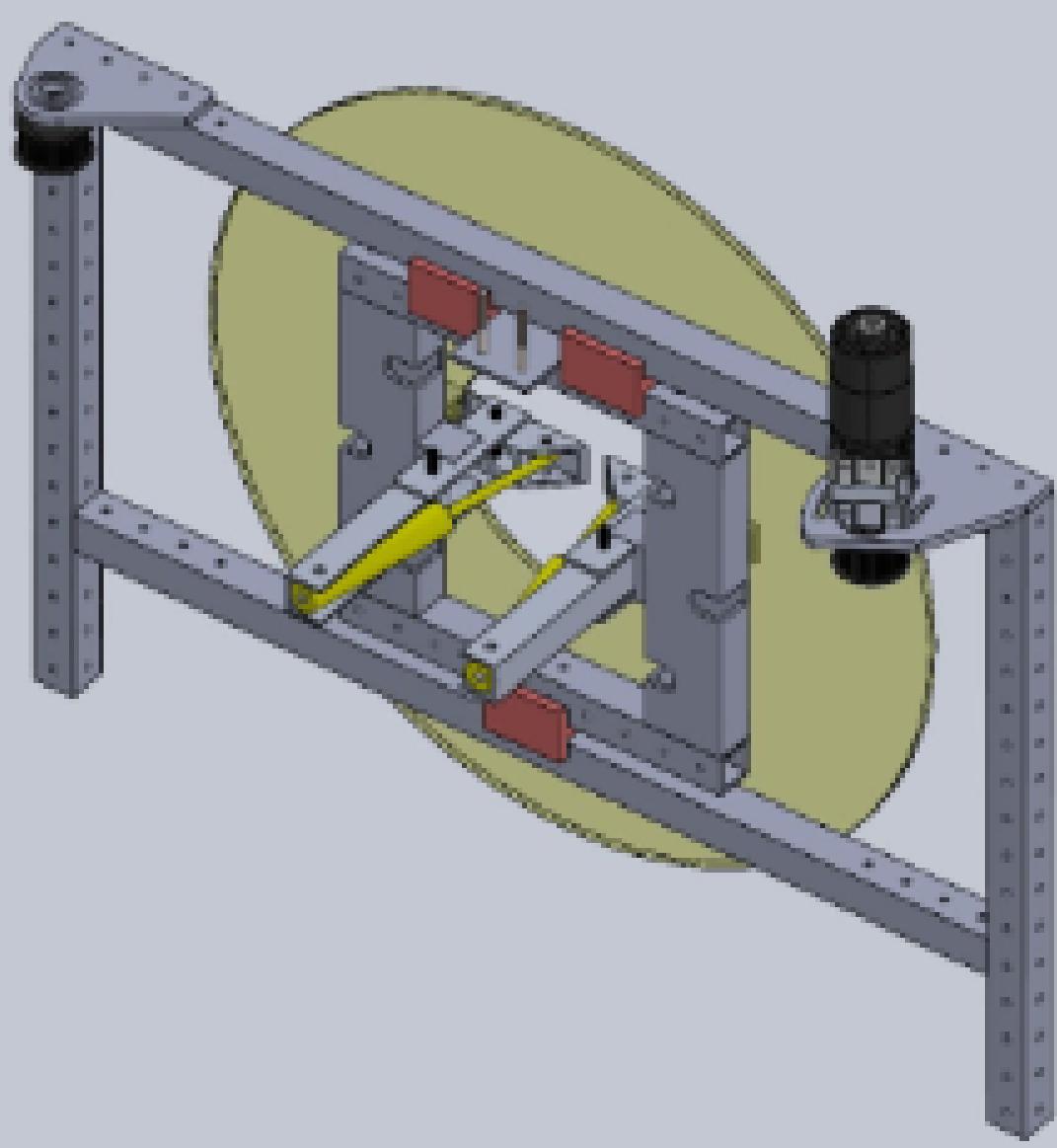
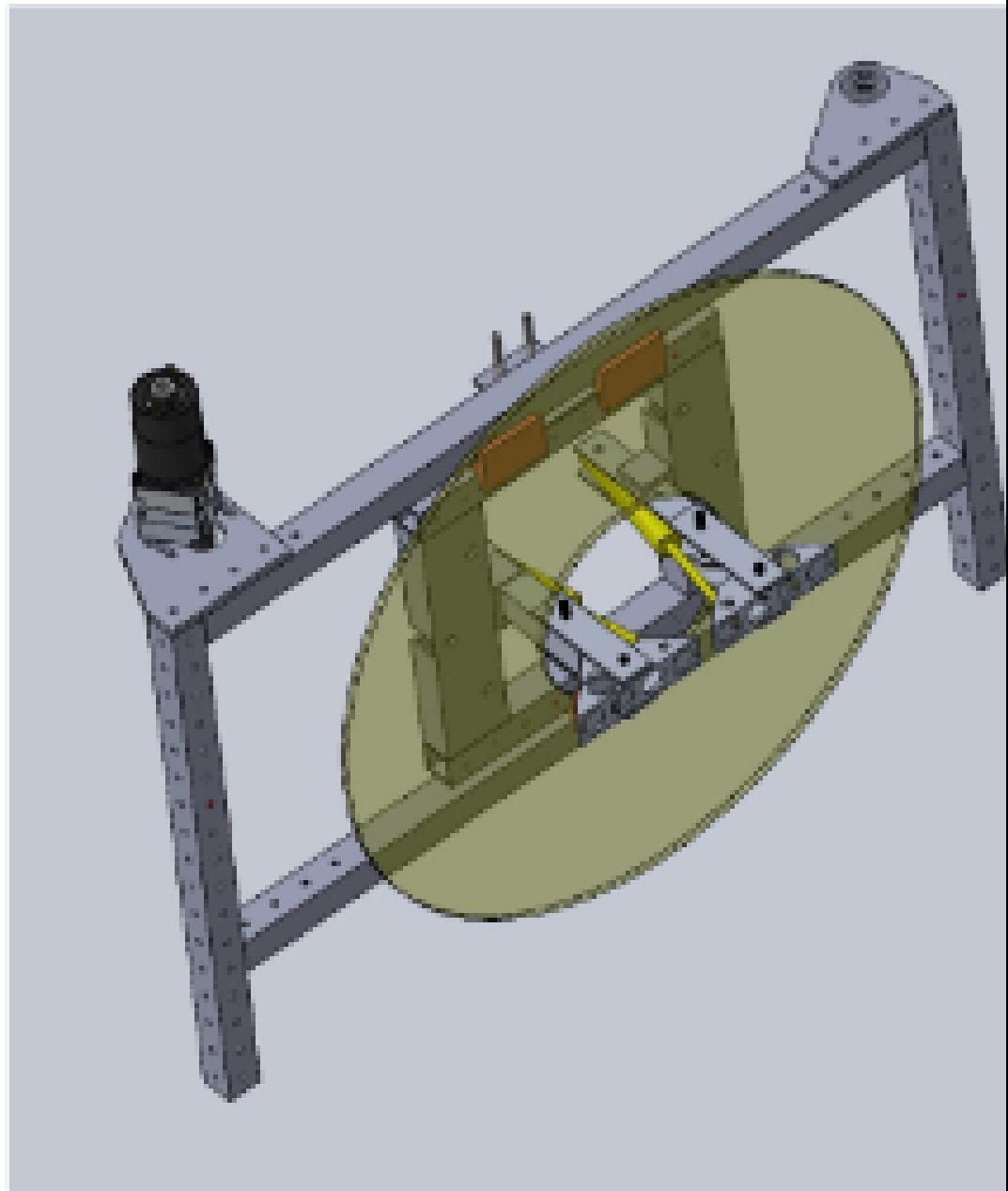
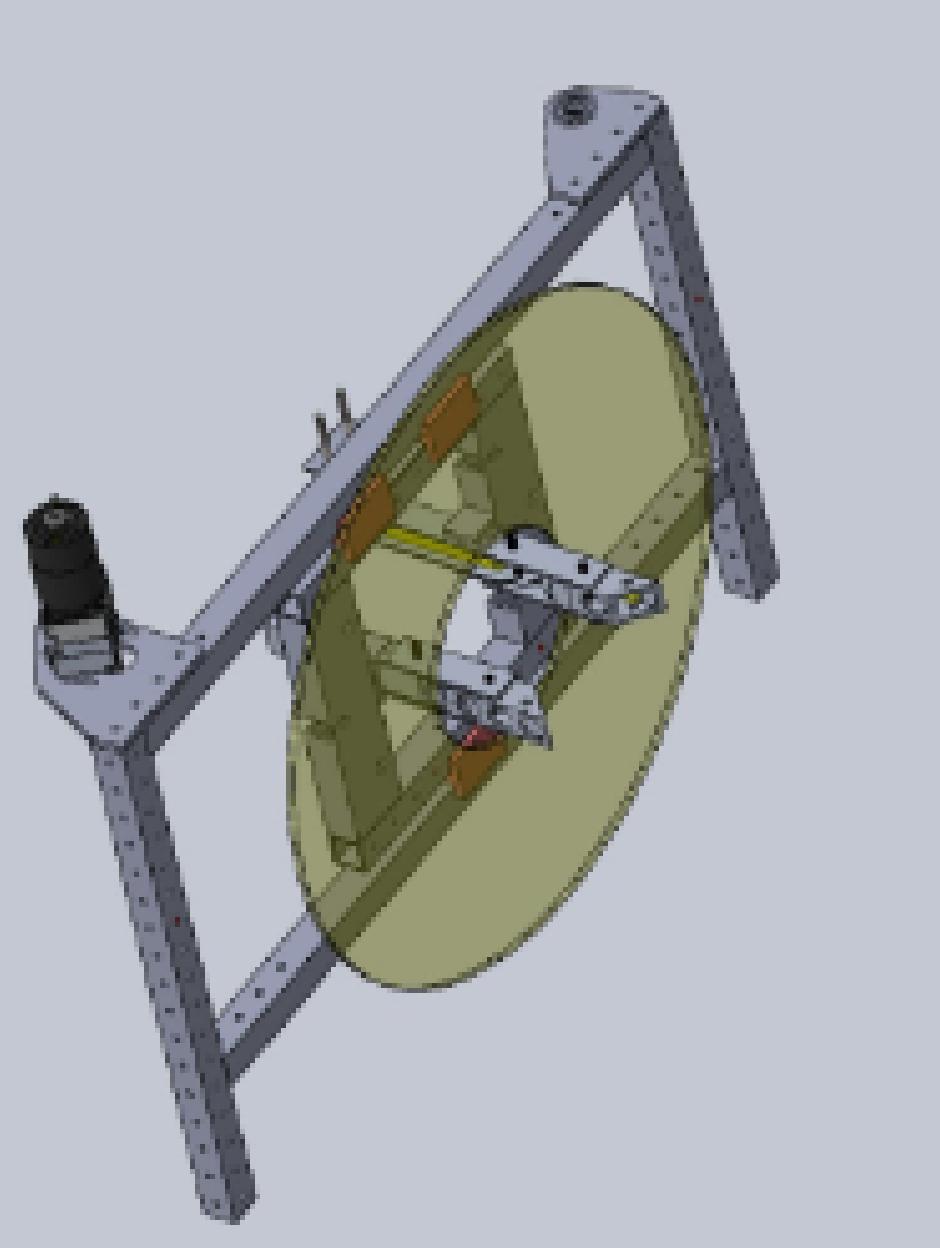


Early Designs 05

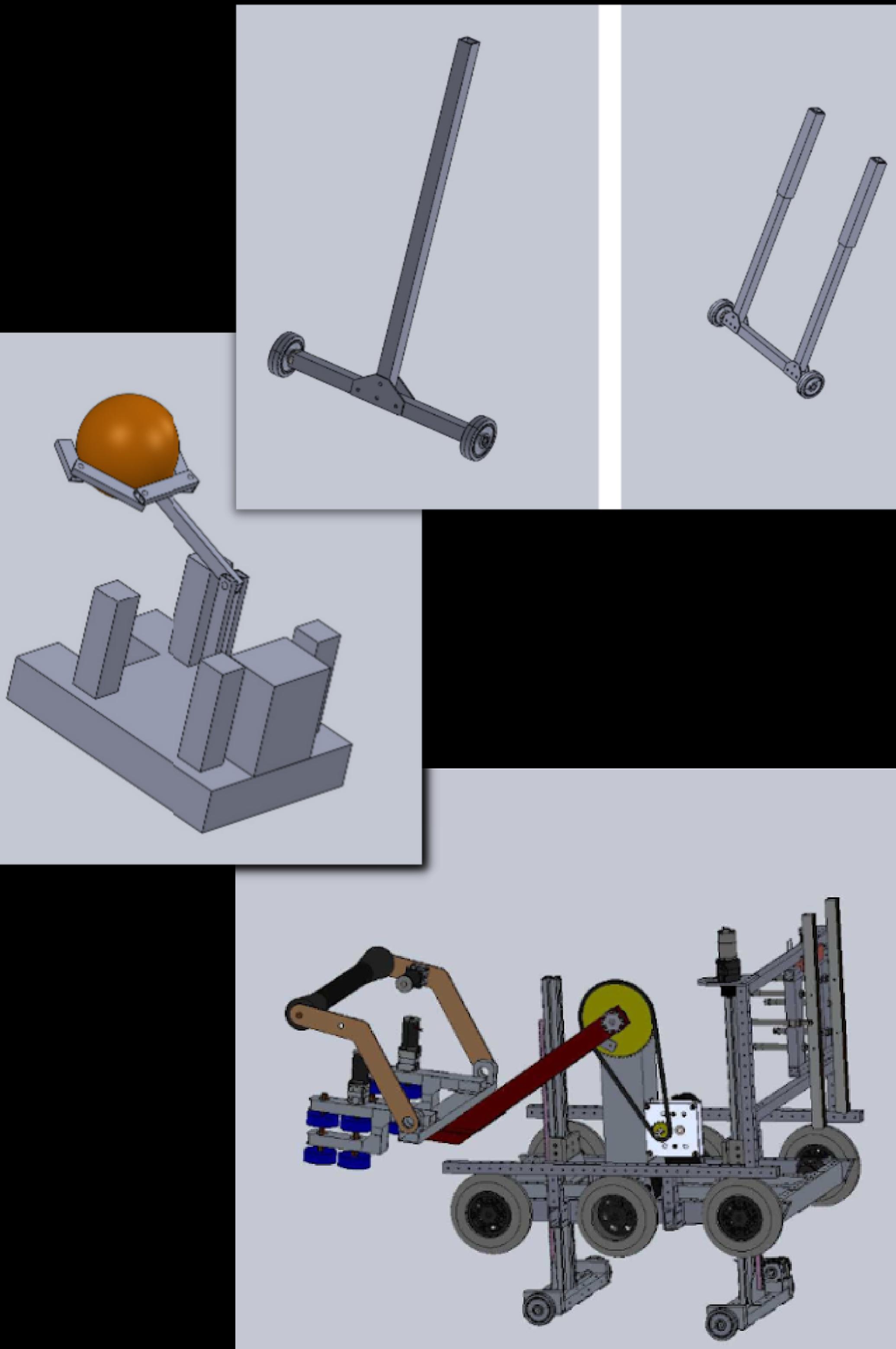
- Cargo



Early Designs 06



Early Designs 07





08

Strategic Planning

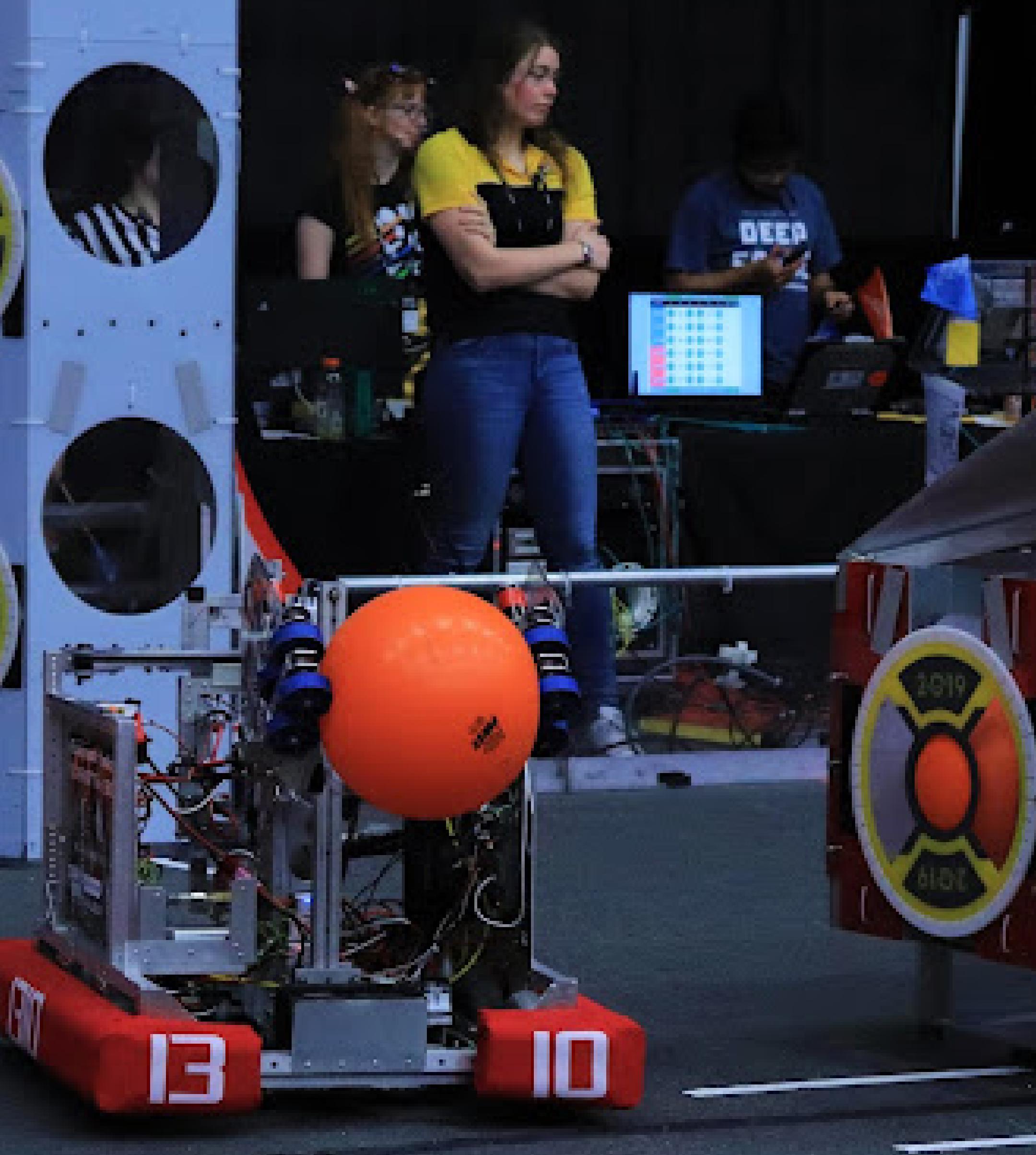
- Early Prioritization of Mechanisms
- Pros & Cons

09

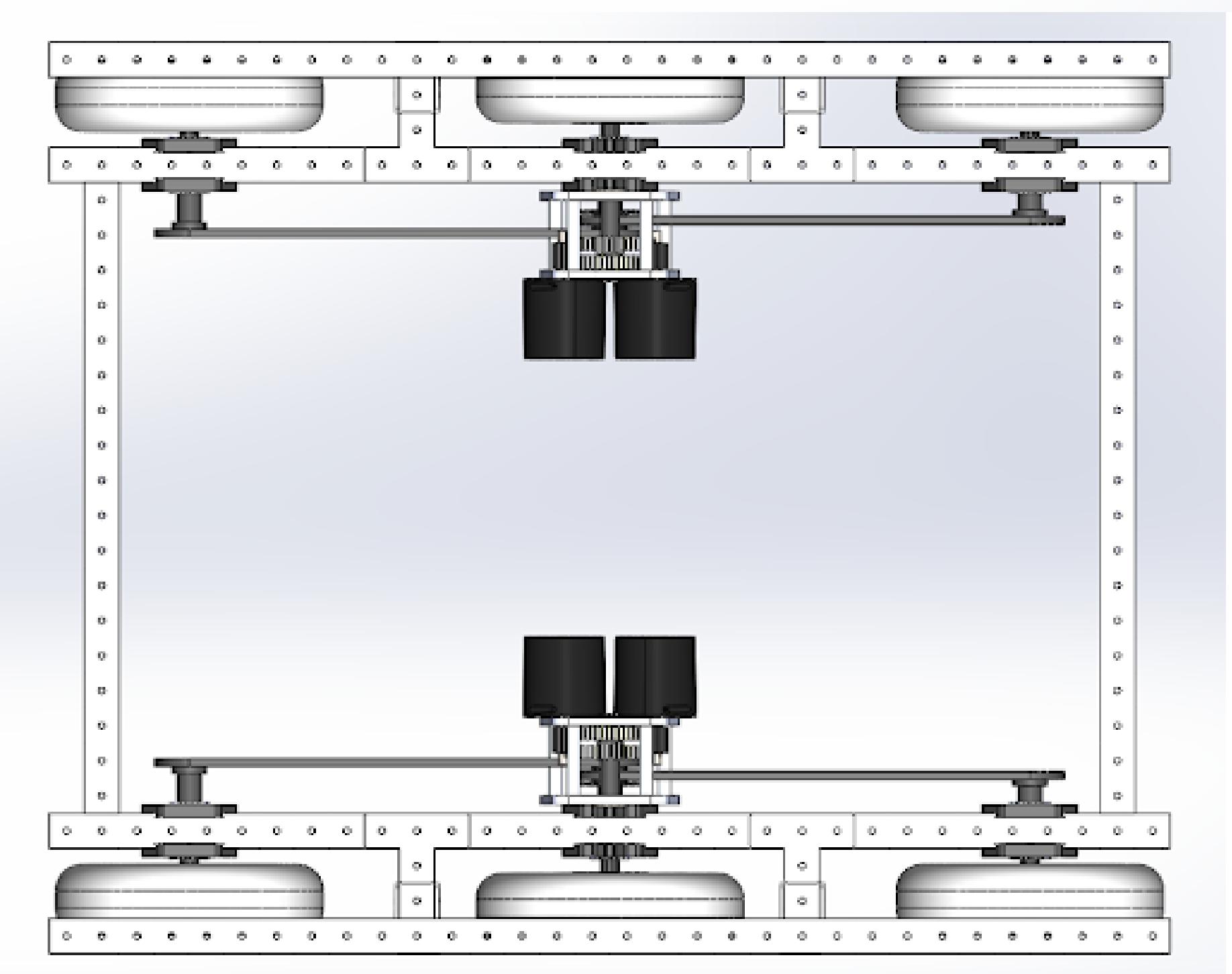
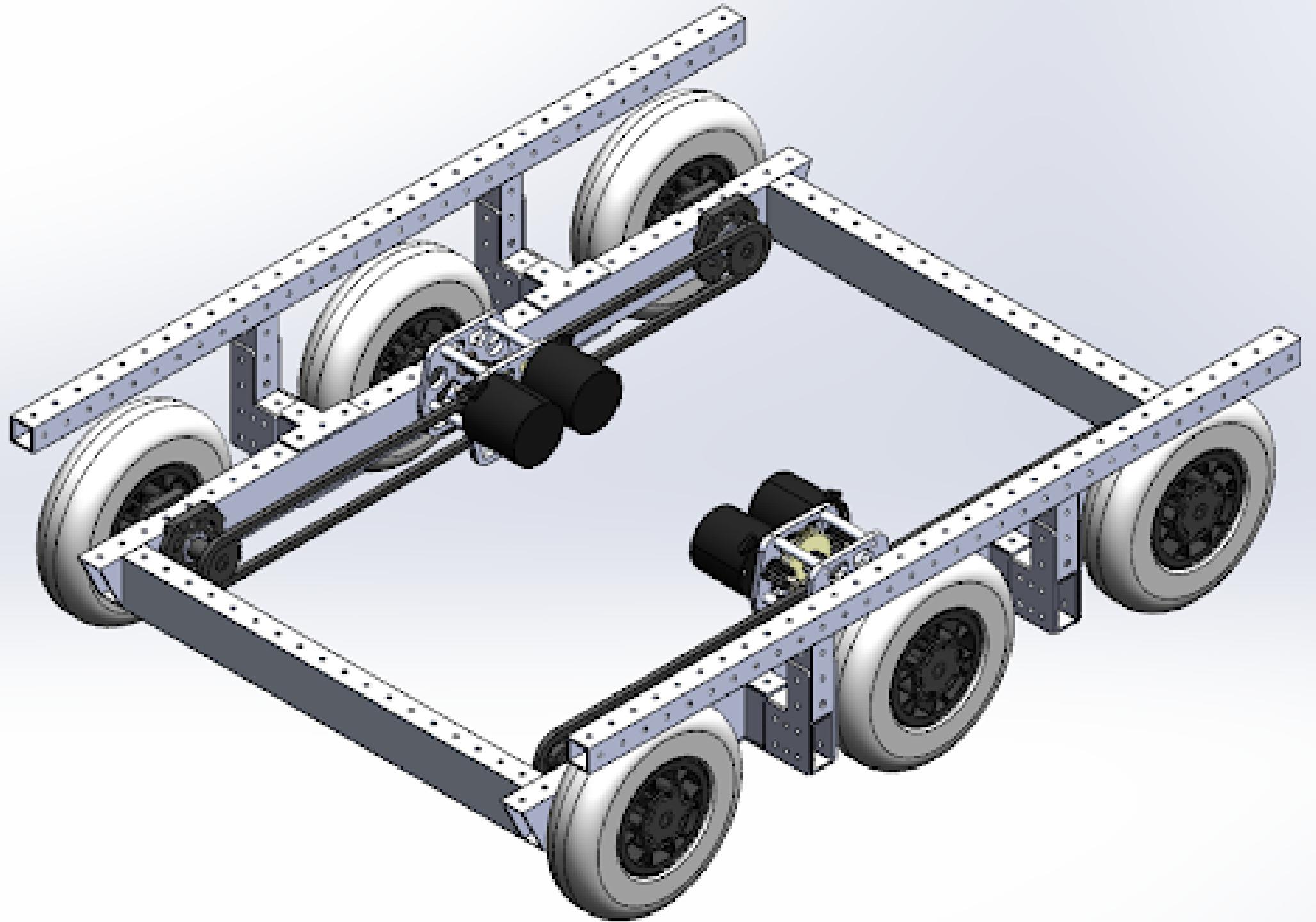
Early Prioritization/Goals of Mechanisms

- 1. Drive Train - Get off second level
- 2. Hatches from Human Player
- 3. Place hatches at low-level
- 4. Obtain balls from the ground
- 5. Place balls in cargo ship
- 6. Place balls in low-rocket
- 7. Level 2 platform climb

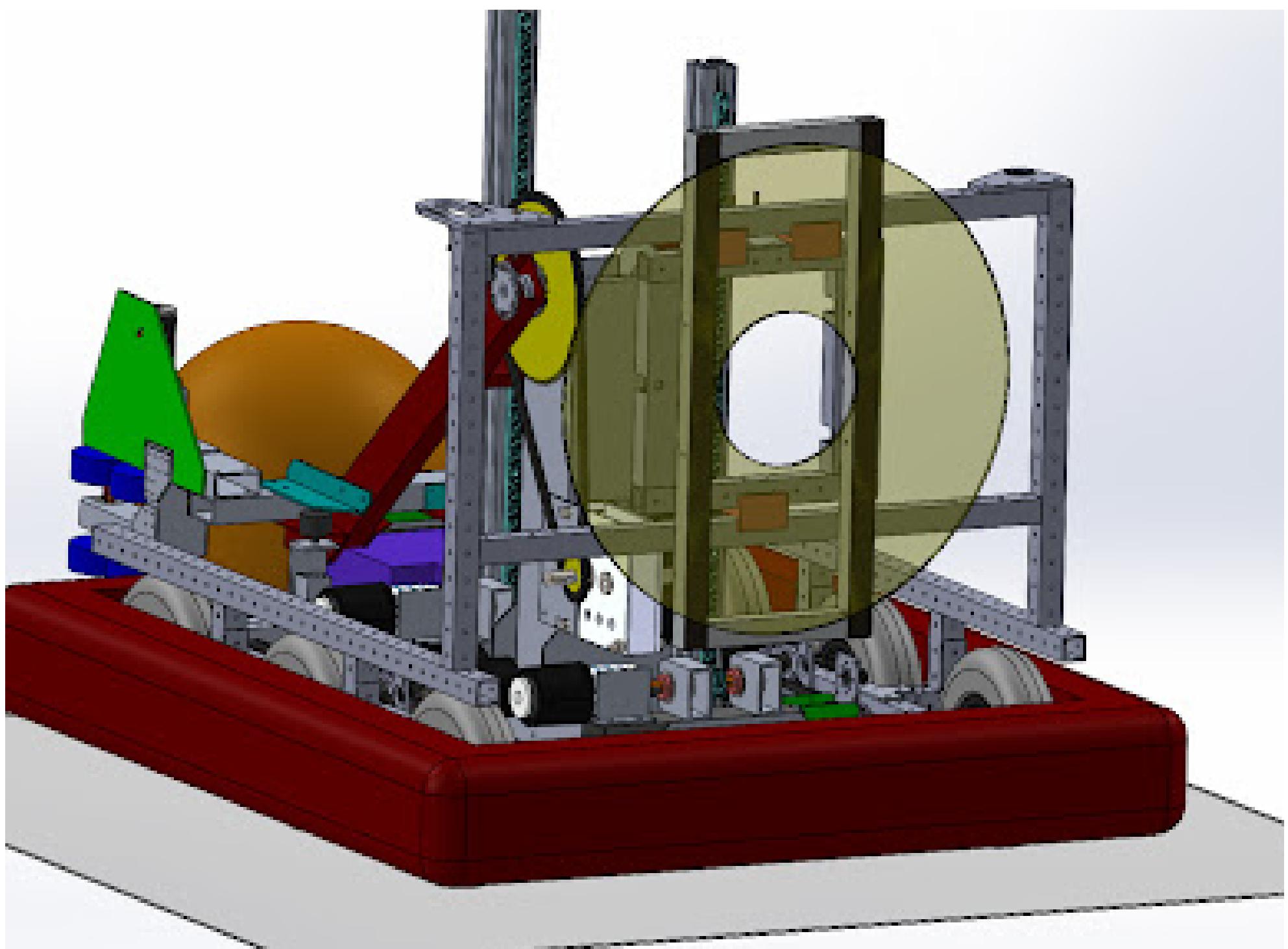
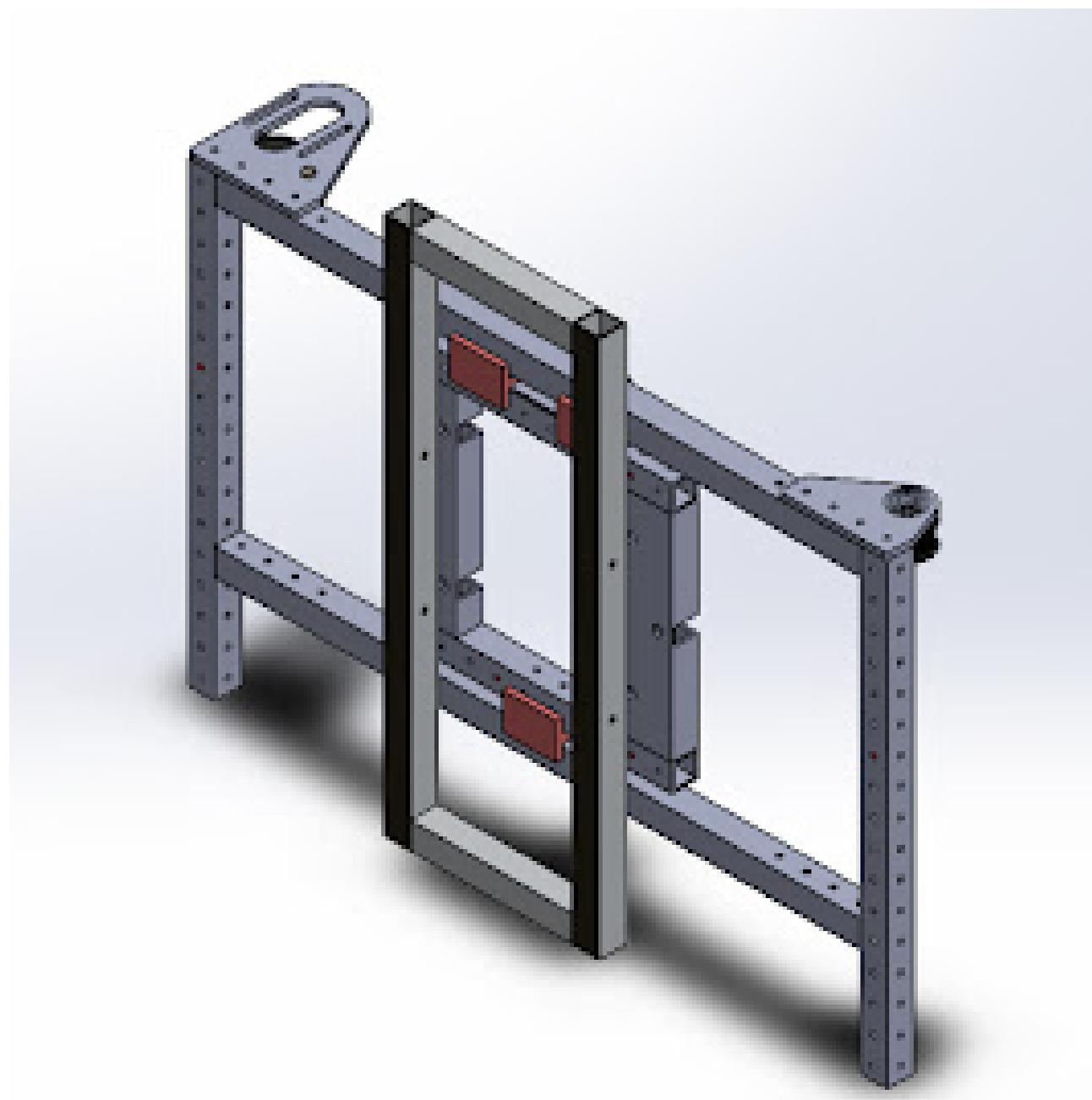
Concept	Pros	Cons
Low pivot arm	SimpleLow center of gravity	Ball placed/shot straight
High bot	High rocketRanking point for full rocket	TippyExtra mechanism to liftHeavy
Climb	PointsRanking points	Extra weightTime consuming
Velcro Hatch Mech	QuickSimpleDoesn't have to be centered	Less accurateLess reliable
Hatch mech carriage	AccurateReliable	More complicatedTime consuming
Horizontal Intake	Centers easily	Cargo can deflect off the wheels if not head-on
Roller	Can pick up from a wider rangeCenters cargo	WeightMore complications



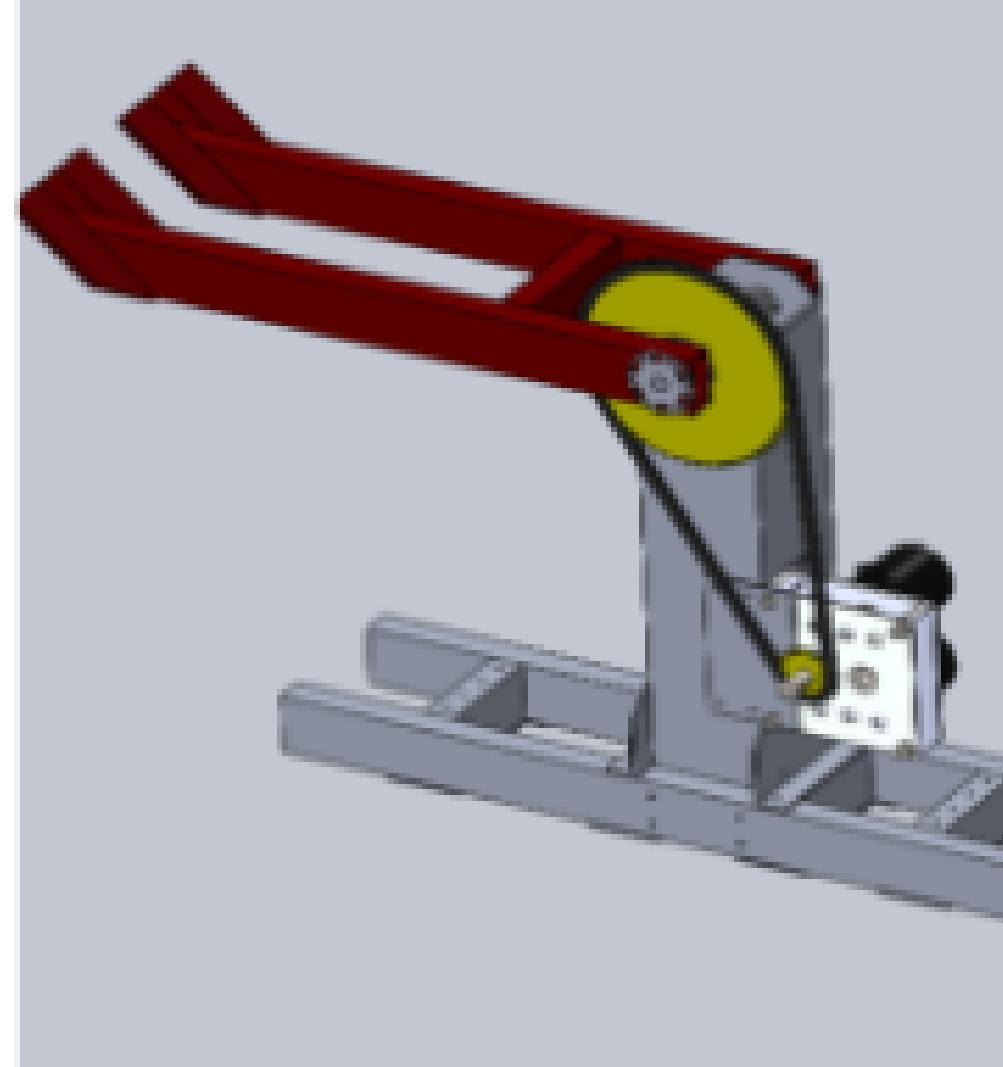
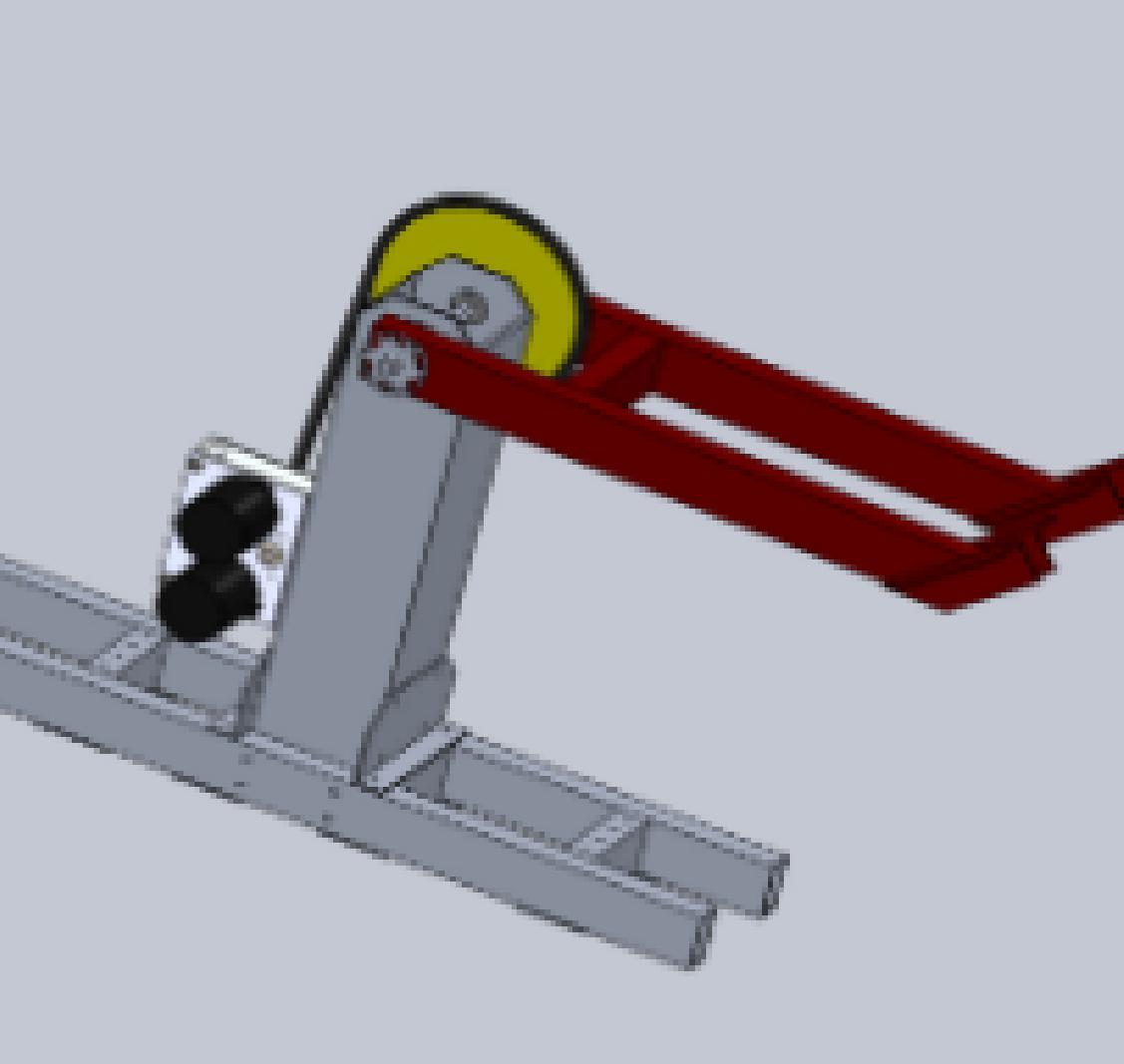
10 CURRENT SUBSYSTEMS



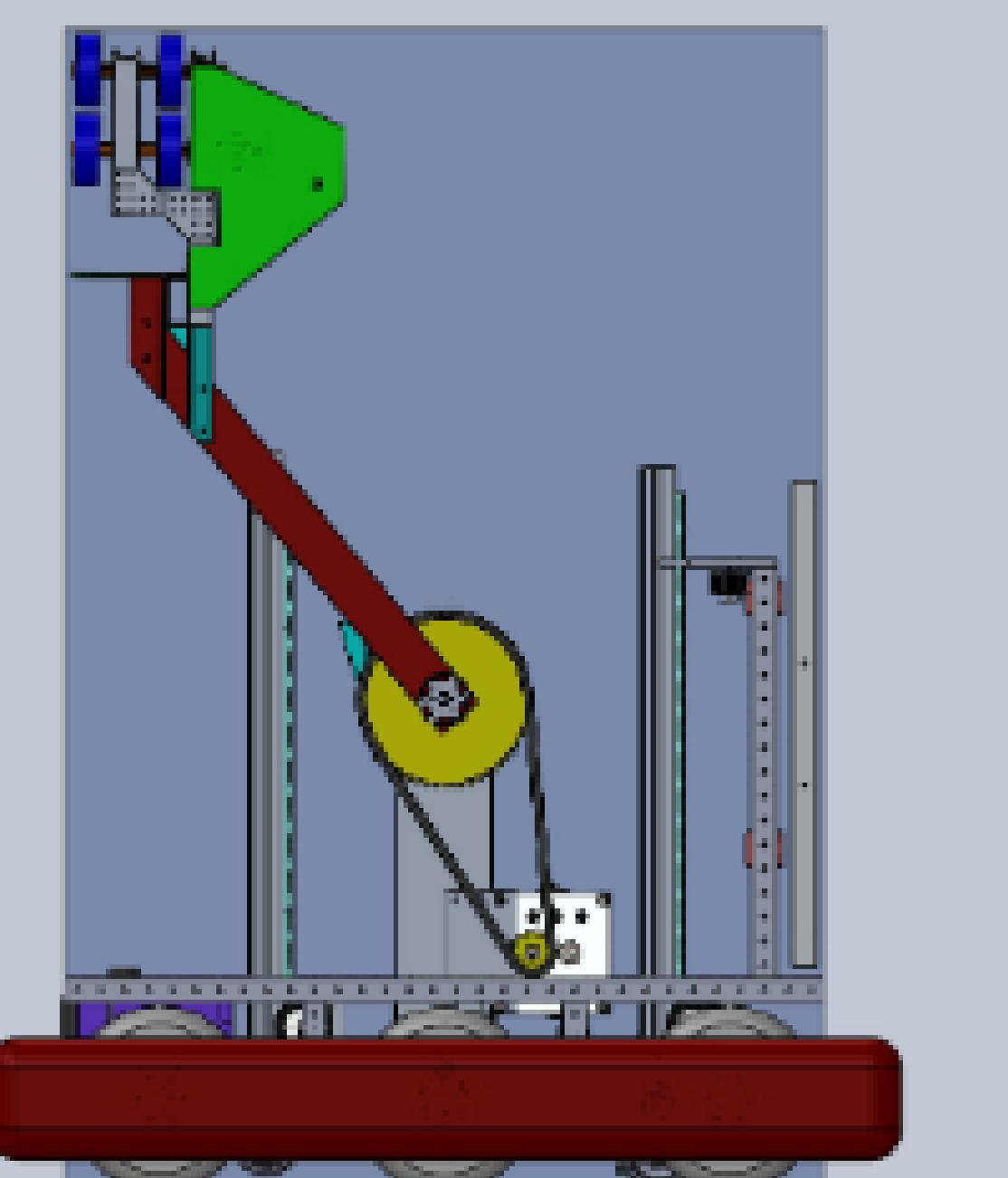
11 DRIVETRAIN



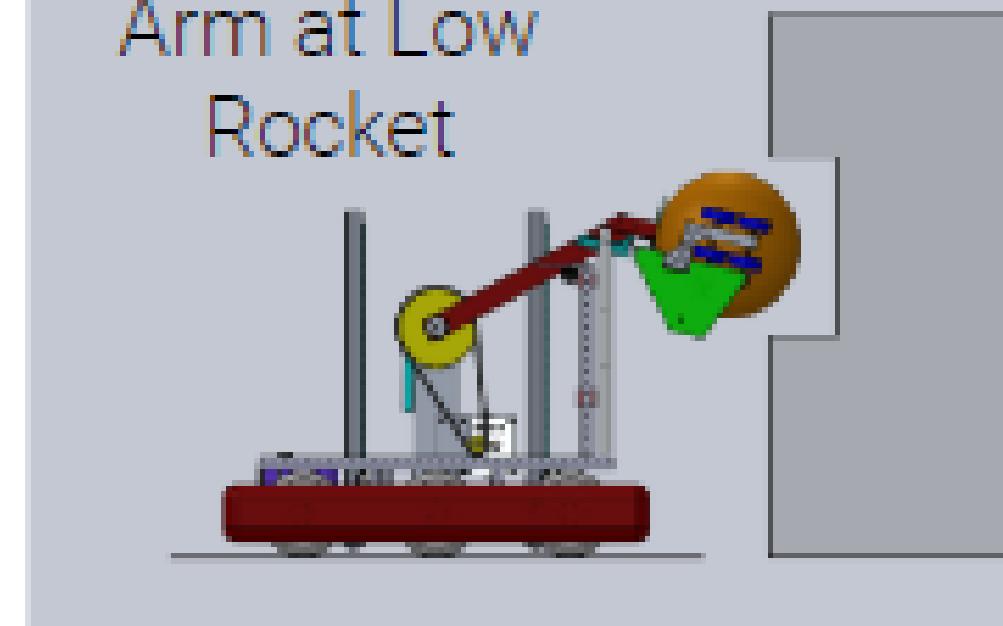
12 HATCH MECH



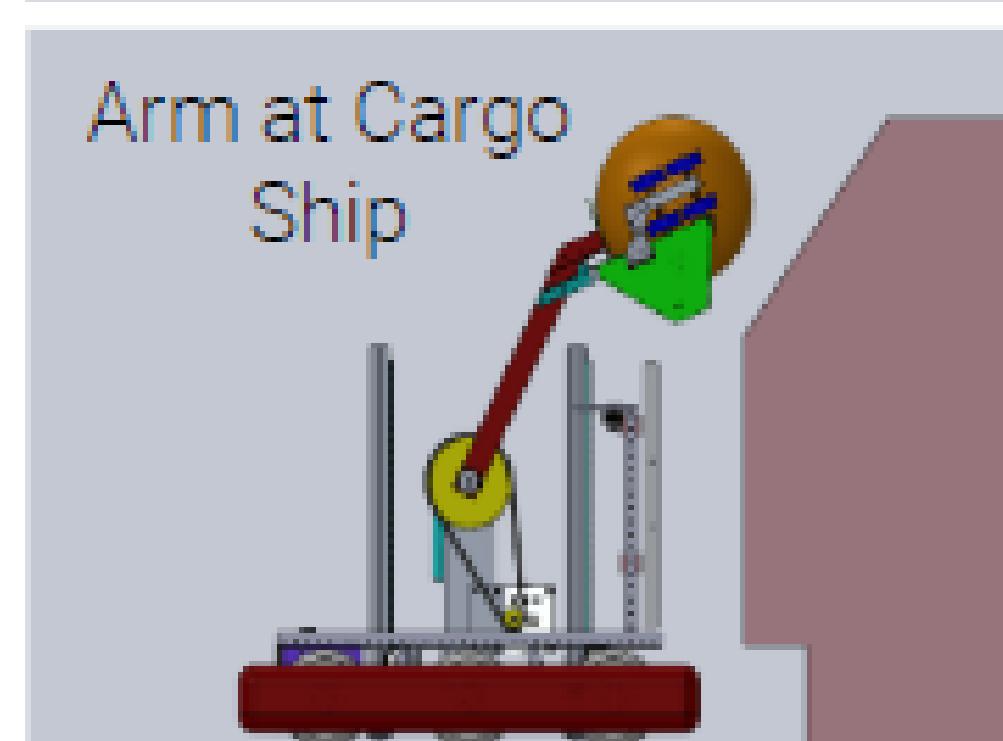
Arm in Frame Perimeter



Arm at Low Rocket

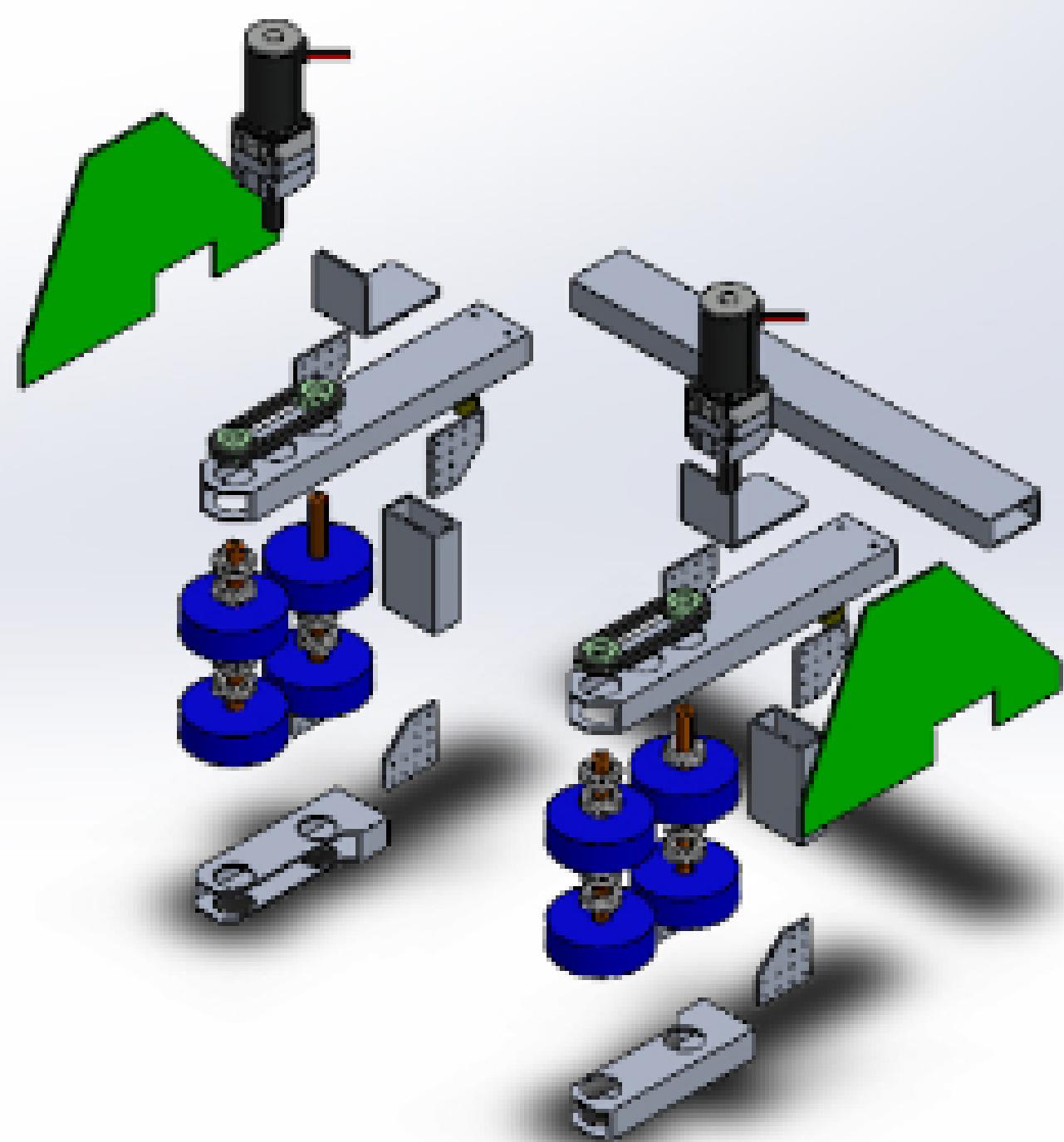
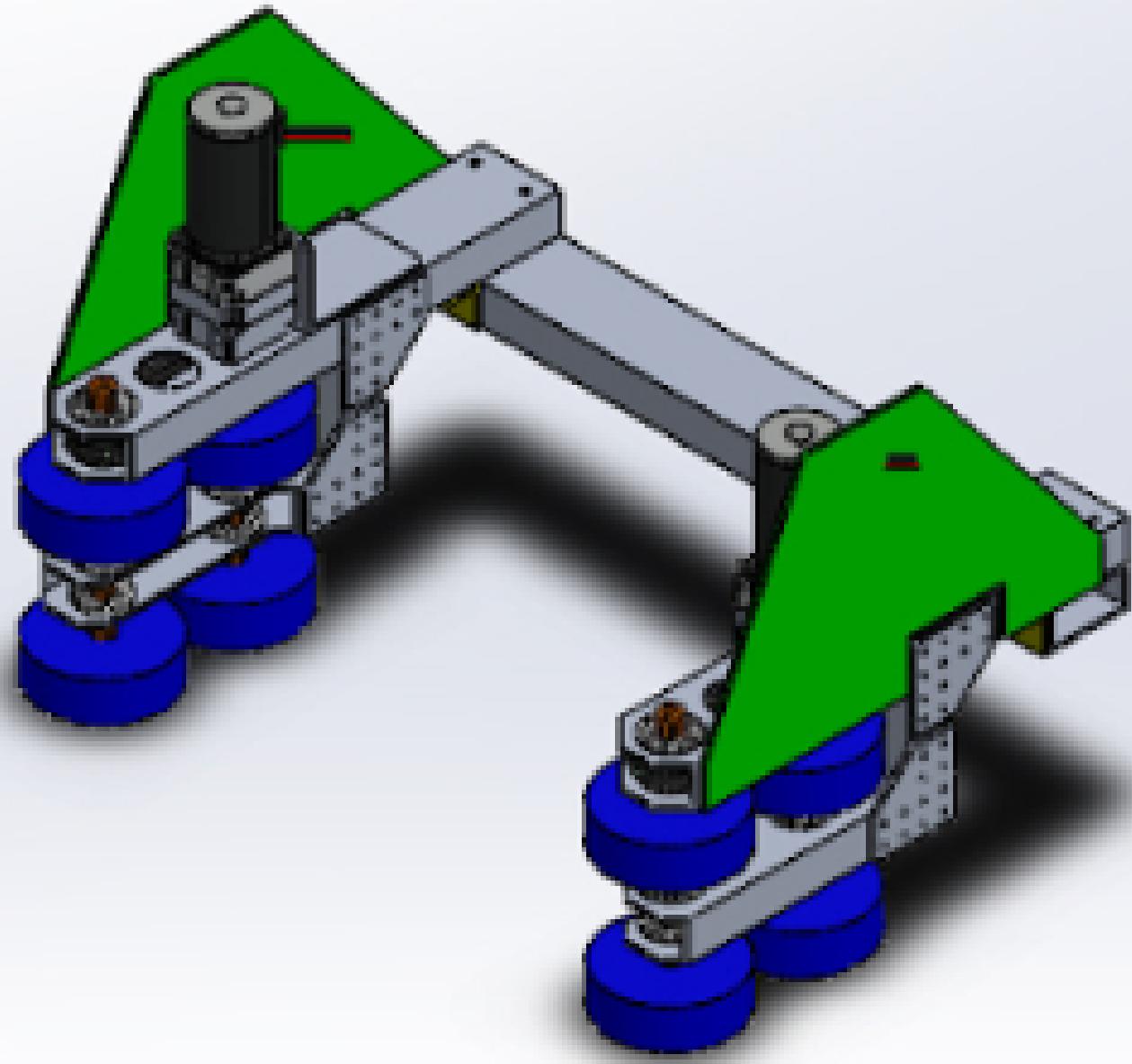


Arm at Cargo Ship



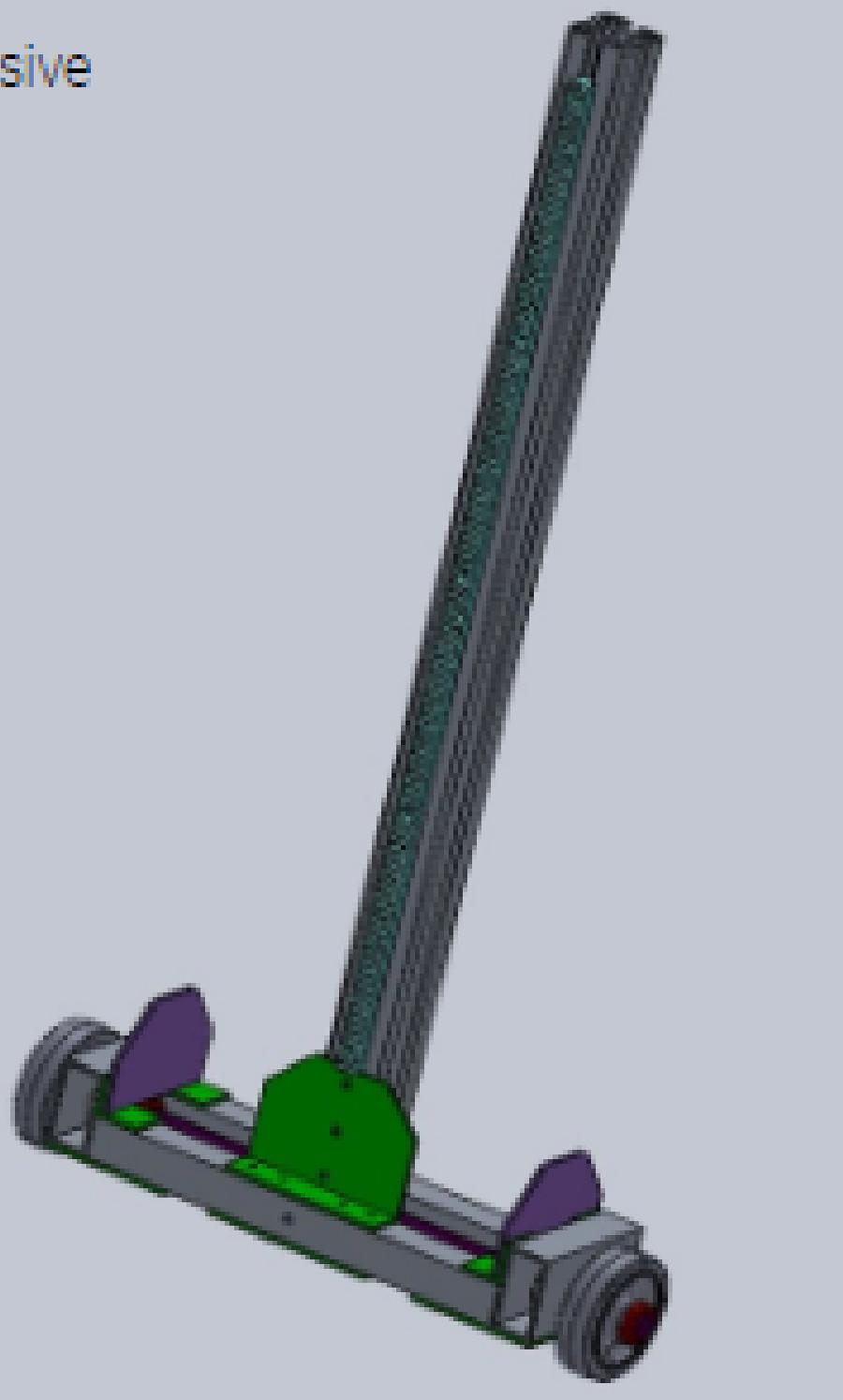
13

ARM MECH

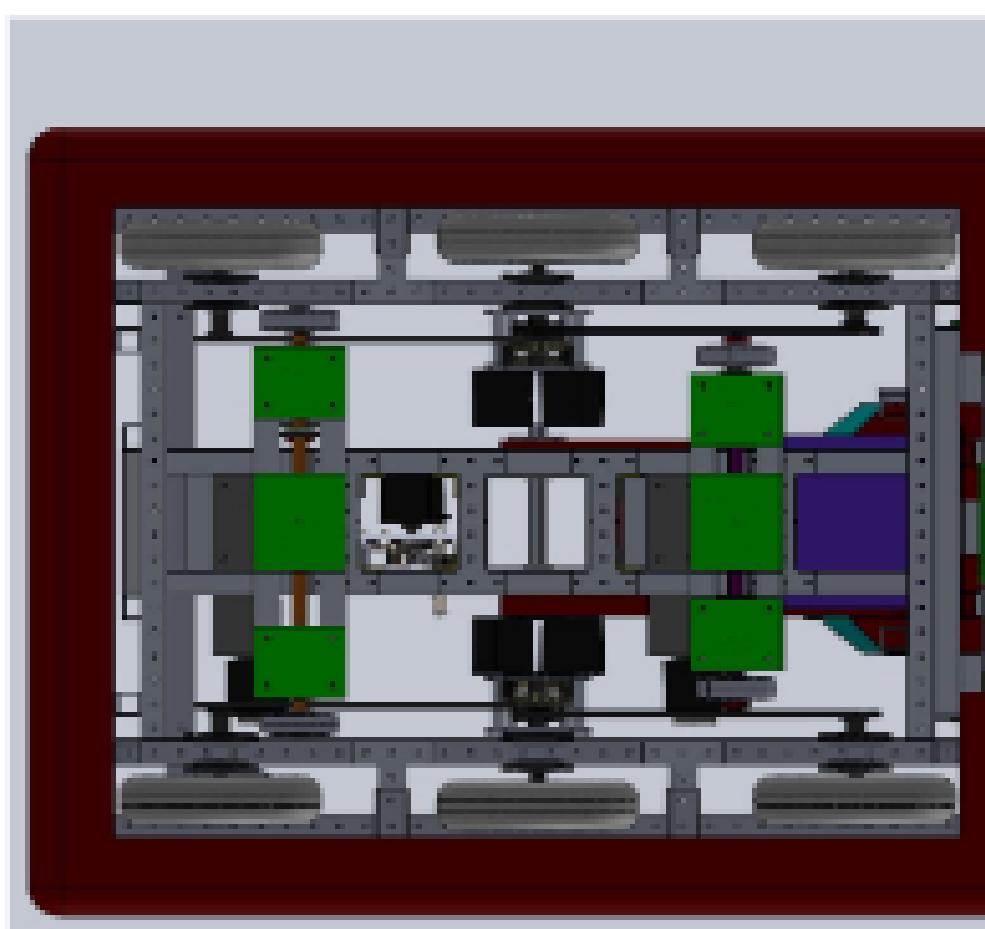
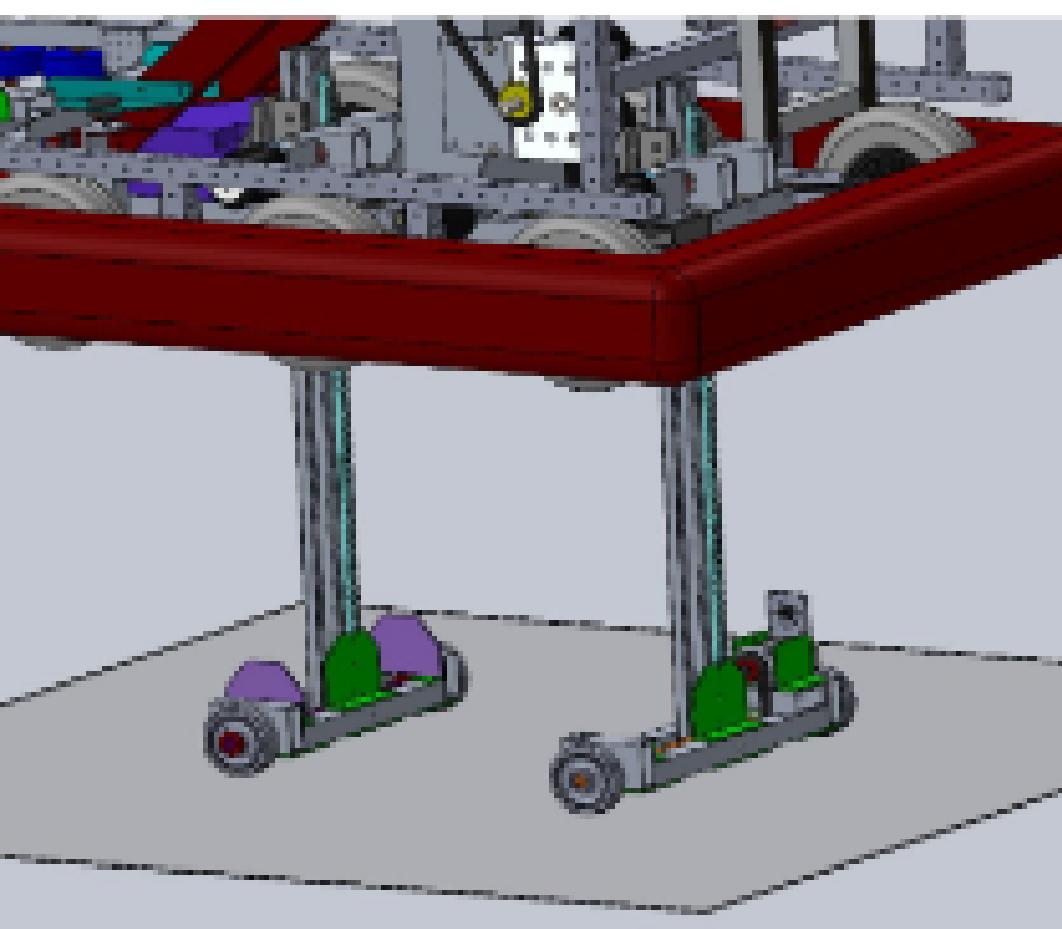
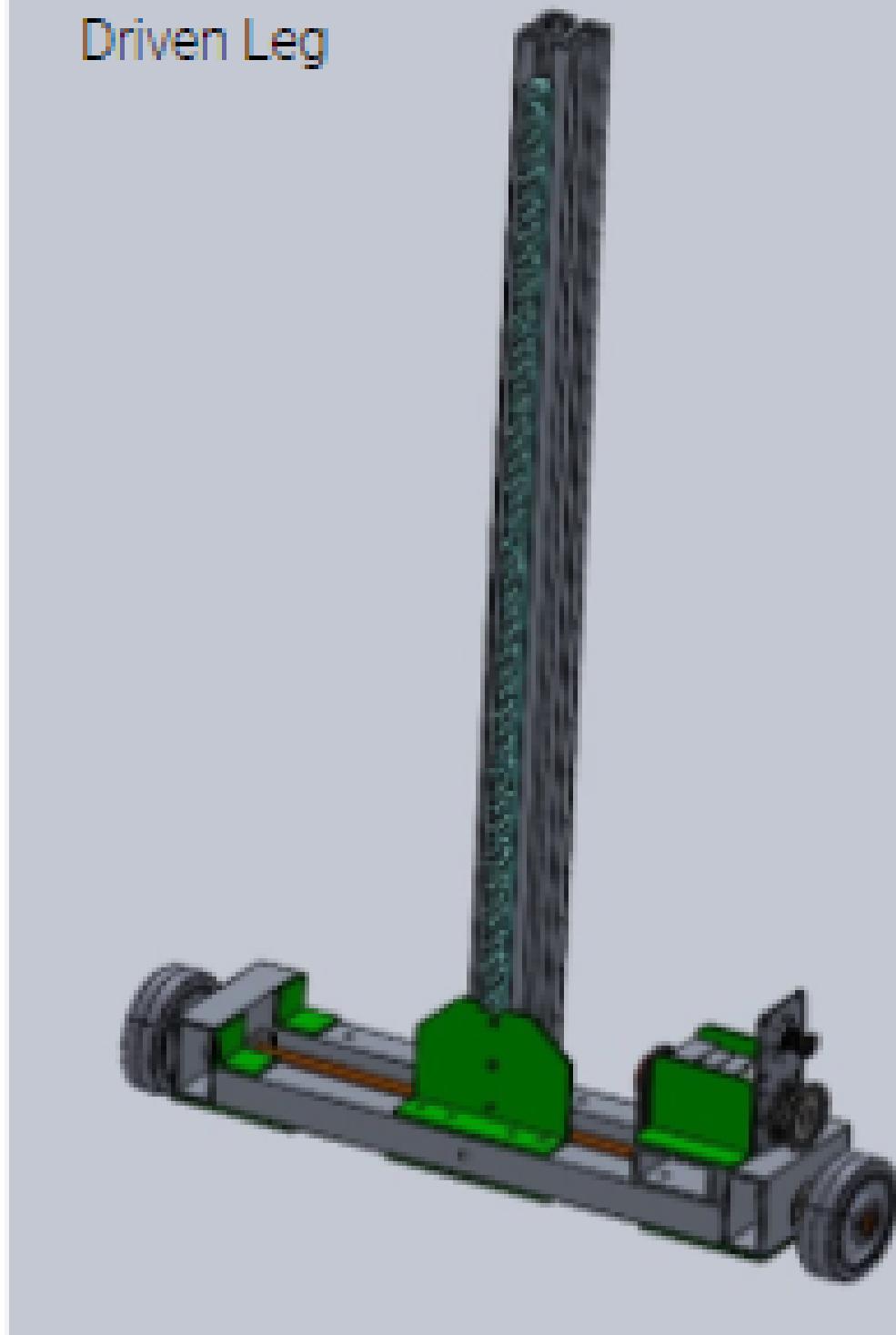


14 CARGO MECH

Passive Leg

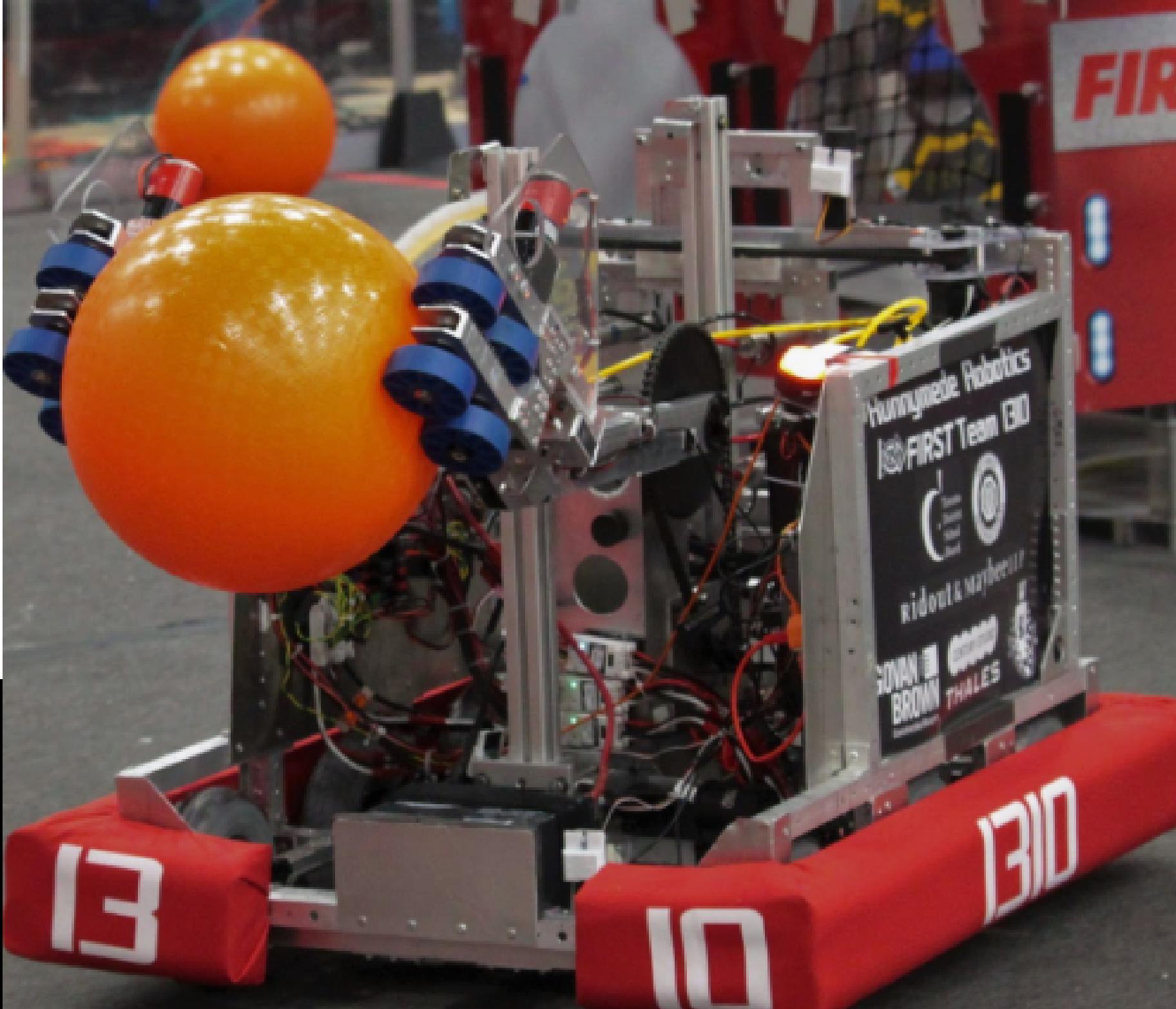


Driven Leg



15

CLIMB MECH



16 Revisions & Improvements

Problem:

17

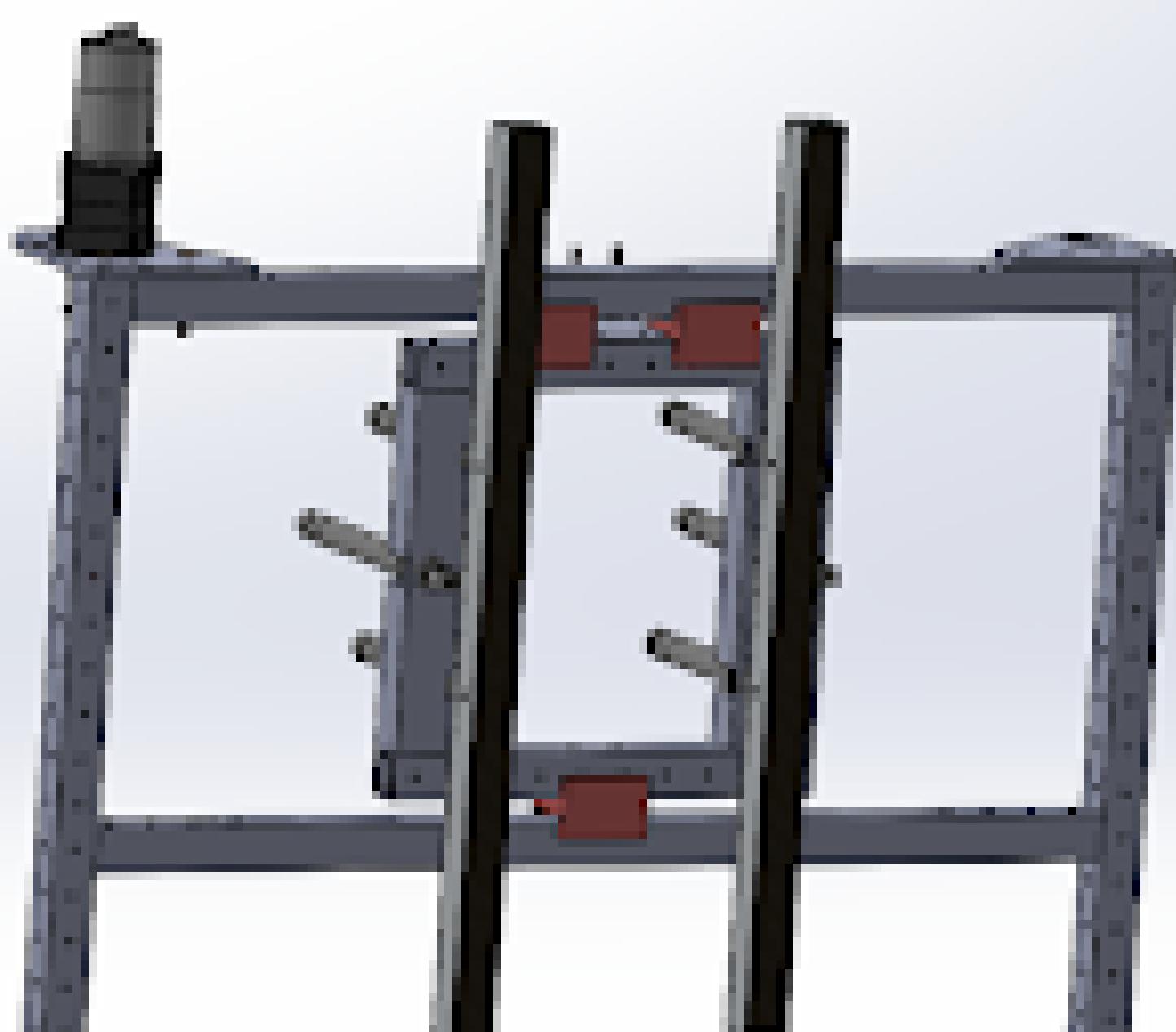
- Hatch panel was falling off the robot

Solution #1:

- Added two horizontal bars with velcro on the top and bottom

Solution #2:

- Made pistons eject at different times



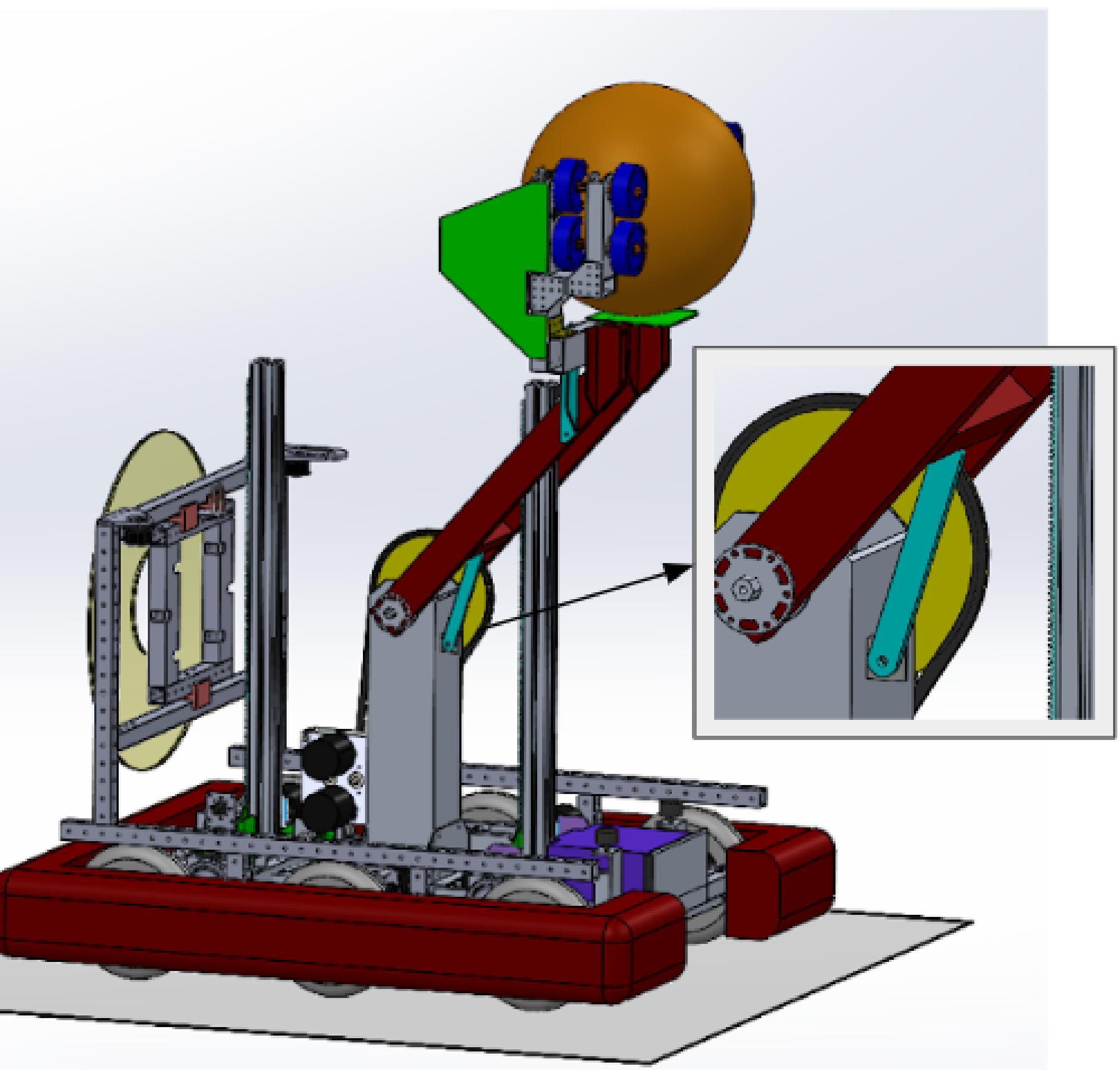
18

PROBLEM:

Arm did not have a set point to stay in perimeter

SOLUTION:

- A passive perimeter lock was added



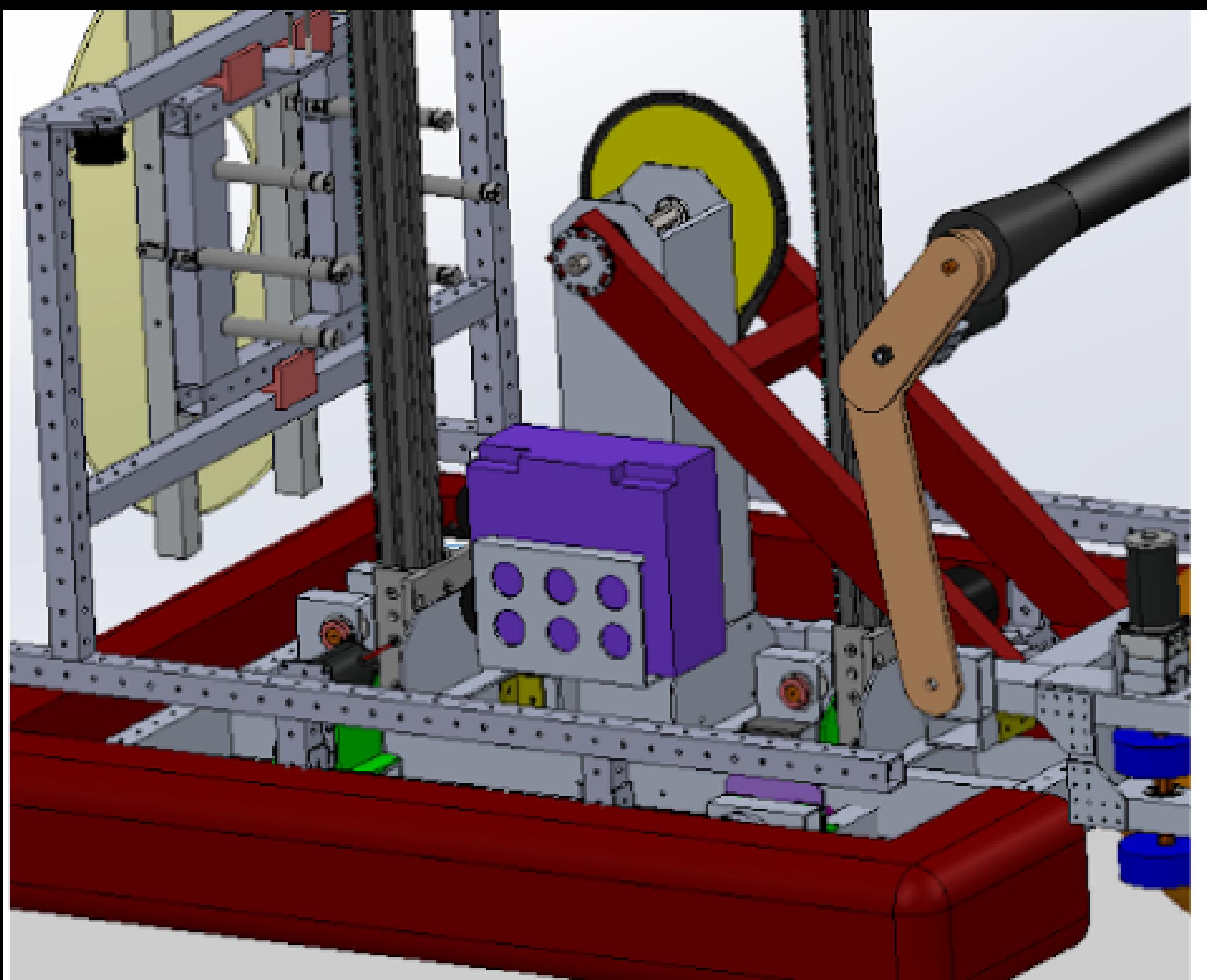
Perimeter Lock

Problem:

- Tipping while climbing

Solution:

- Battery and compressor moved to front of robot



Old Battery Location

20



THANK YOU

Team 1310

Raymond Ma
Software Engineering @ McMasterU

raymond.ma003@gmail.com