

# Orchard Harvesting and Pruning Platform

## Problem:

The current system for picking and pruning fruit trees is labor intensive and physically demanding. Specific problems include:

- 🍎 Inefficient use of time:
  - Constant repositioning of ladder
  - Emptying picking bags frequently
- 🍎 Safety risks:
  - Using ladder to pick fruit up to 15 feet high
  - Using ladder on uneven terrain
  - Workers are burdened with heavy picking bags



Team Top Pick:

Dillon Turnbull Zachary Howard Dhari Aldehani Vince Schwartz

## Goal:

Design a platform that will increase the safety and efficiency of picking and pruning fruit trees. This platform will be capable of:

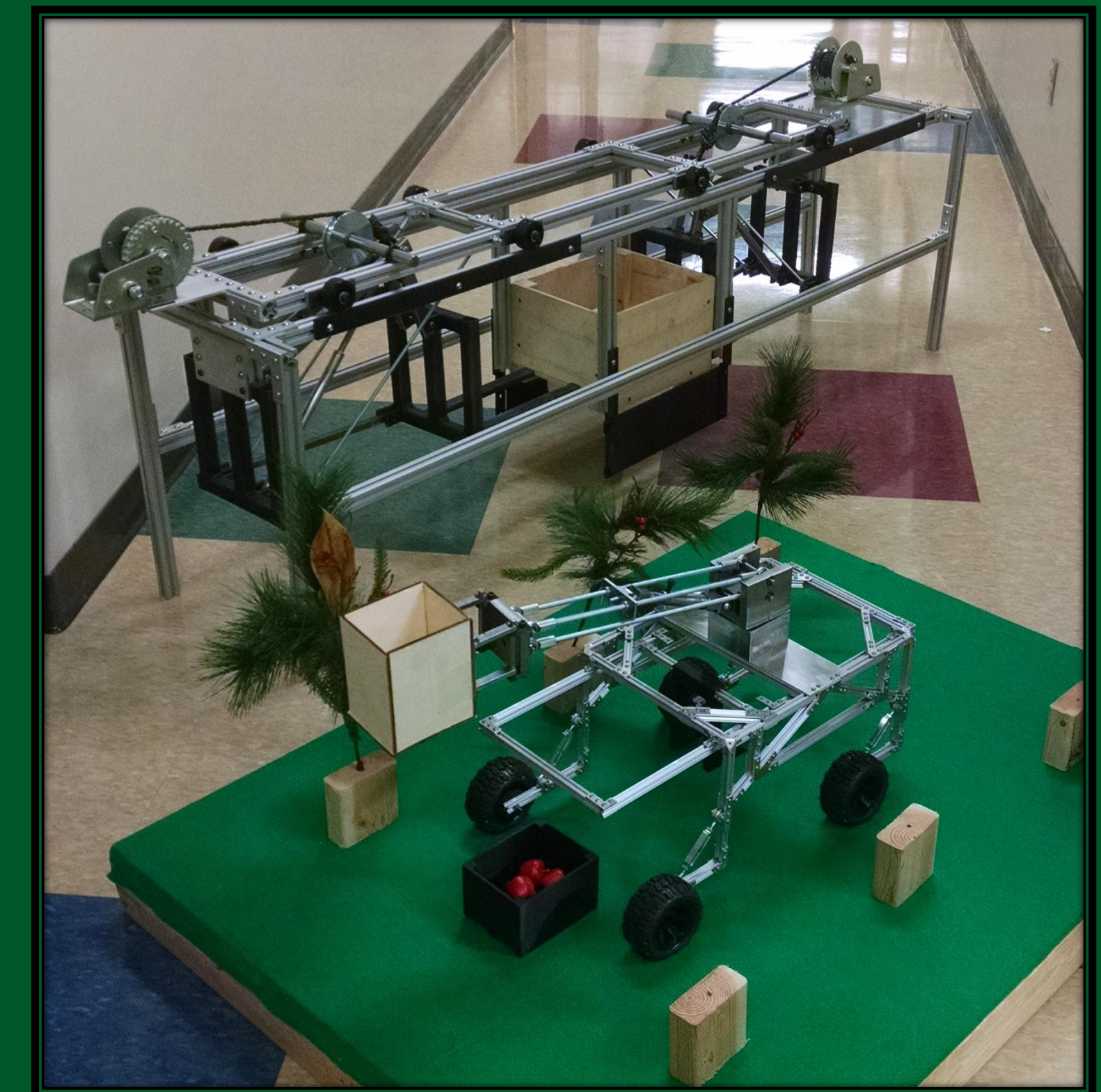
- 🍎 Vertical movement of up to 10 feet
- 🍎 Lateral movement of 3 feet into tree
- 🍎 Self-leveling on uneven slopes up to 30%
- 🍎 Fruit collection and transportation

## Project Learning:



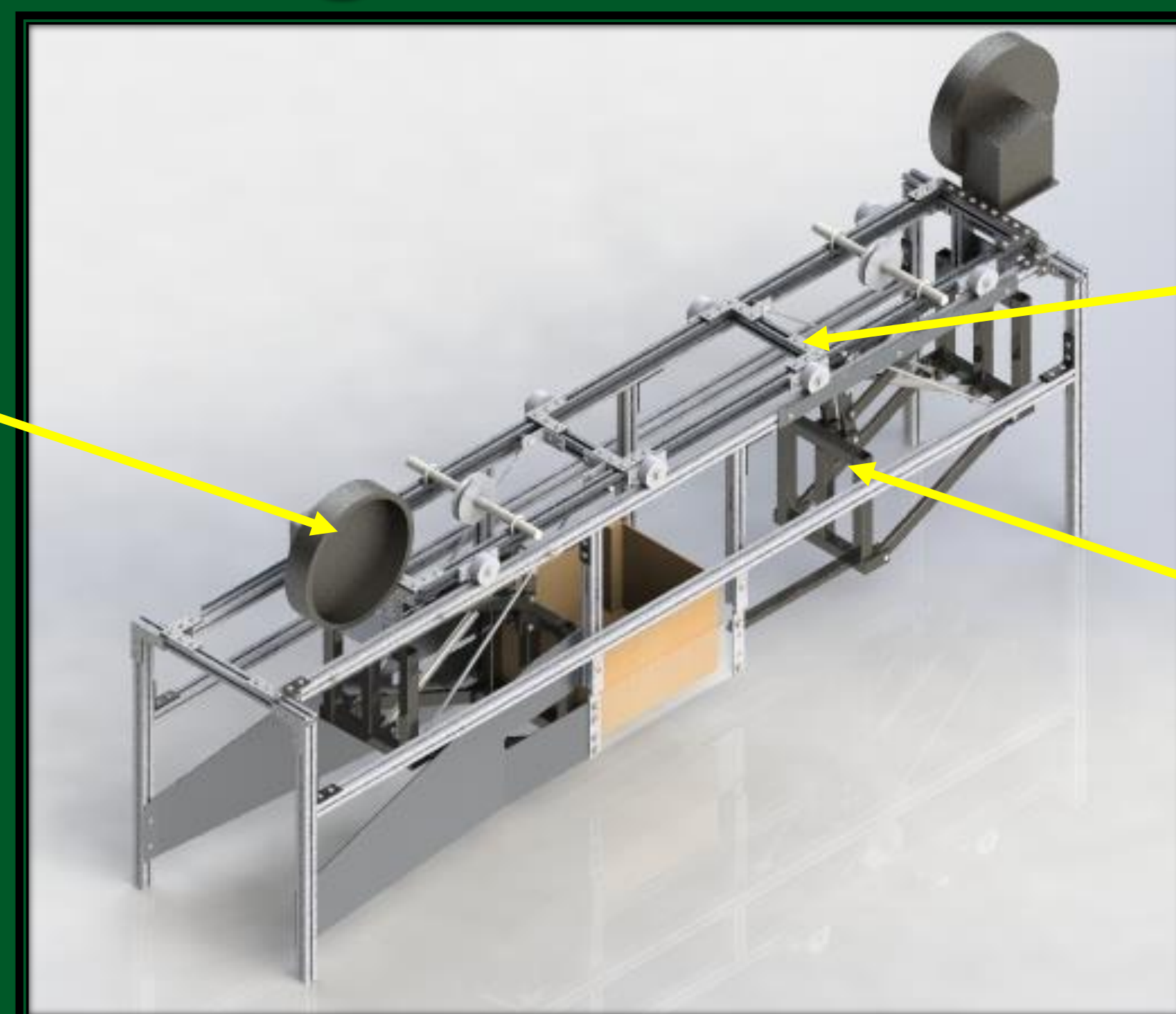
The team visited a local orchard to provide insight for their design. A mock-orchard on an adjustable incline was created to demonstrate proof of concept.

## Solution:



To provide proper illustration for the entire system, two scaled models were built. A 1:10 scale model shows how the chassis, self leveling system, and boom will coordinate to provide a safe and efficient platform. The 1:4 scale model provides a larger, more detailed look at how the bin management system will work.

## Design: 1:4 Scale

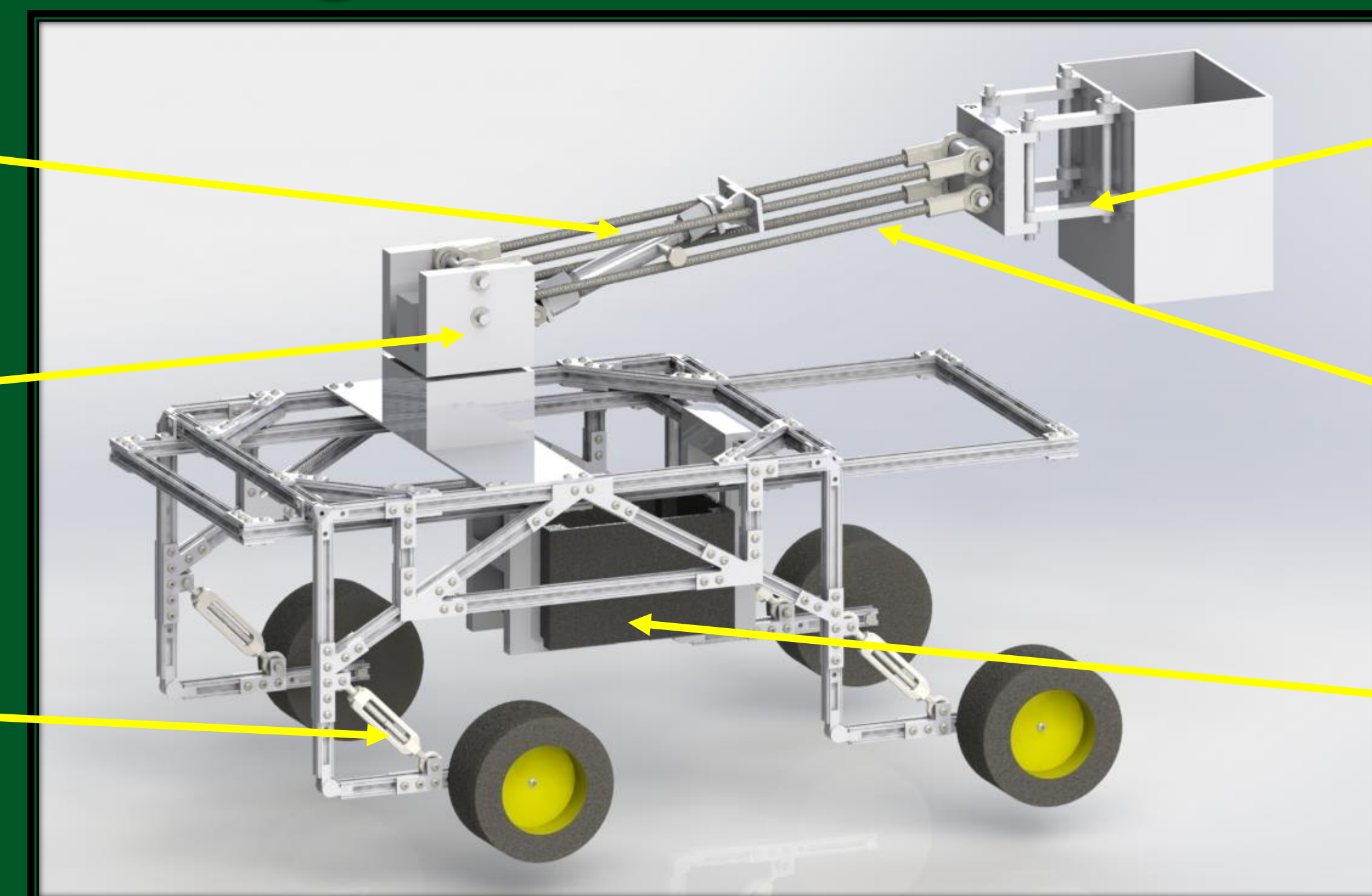


Winch system to simulate hydraulics that move forks up and down

Forks roll on tracks to allow bin to be picked up and set down while driving forward

Tractor forks are used to handle bins

## Design: 1:10 Scale



Boom allows for large vertical range of motion

Rotation at base increases lateral movement of bucket

Independent hydraulics at each wheel allow for leveling on any surface

Wrist-like mechanism allows for increased lateral movement of bucket

Load bearing beams and support rods ensure bucket stays level

Bin transportation allows for continuous picking