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DISC GOLF LAUNCHER

Introduction

Disc golf frisbees do not have a standardized metric to describe their behavior. GRIP6 wants to break into the world of disc golf with a machine that can test specific frisbee flight characteristics such as launch velocity, rotational velocity, launch angle, and release angle. Each characteristic must have an independent mechanism for testing and validation.

1 Rotating

To maintain both rotational and linear velocity, the disc will rest upon a coaster that travels the length of the track.

A **Rotation Wheel:** To control the rotational speed, we send speed commands over a Bluetooth connection to a motor mounted inside the driving wheel, which spins the disc. This circuit illustrates the connection to the battery, controller, motor, and Bluetooth module.
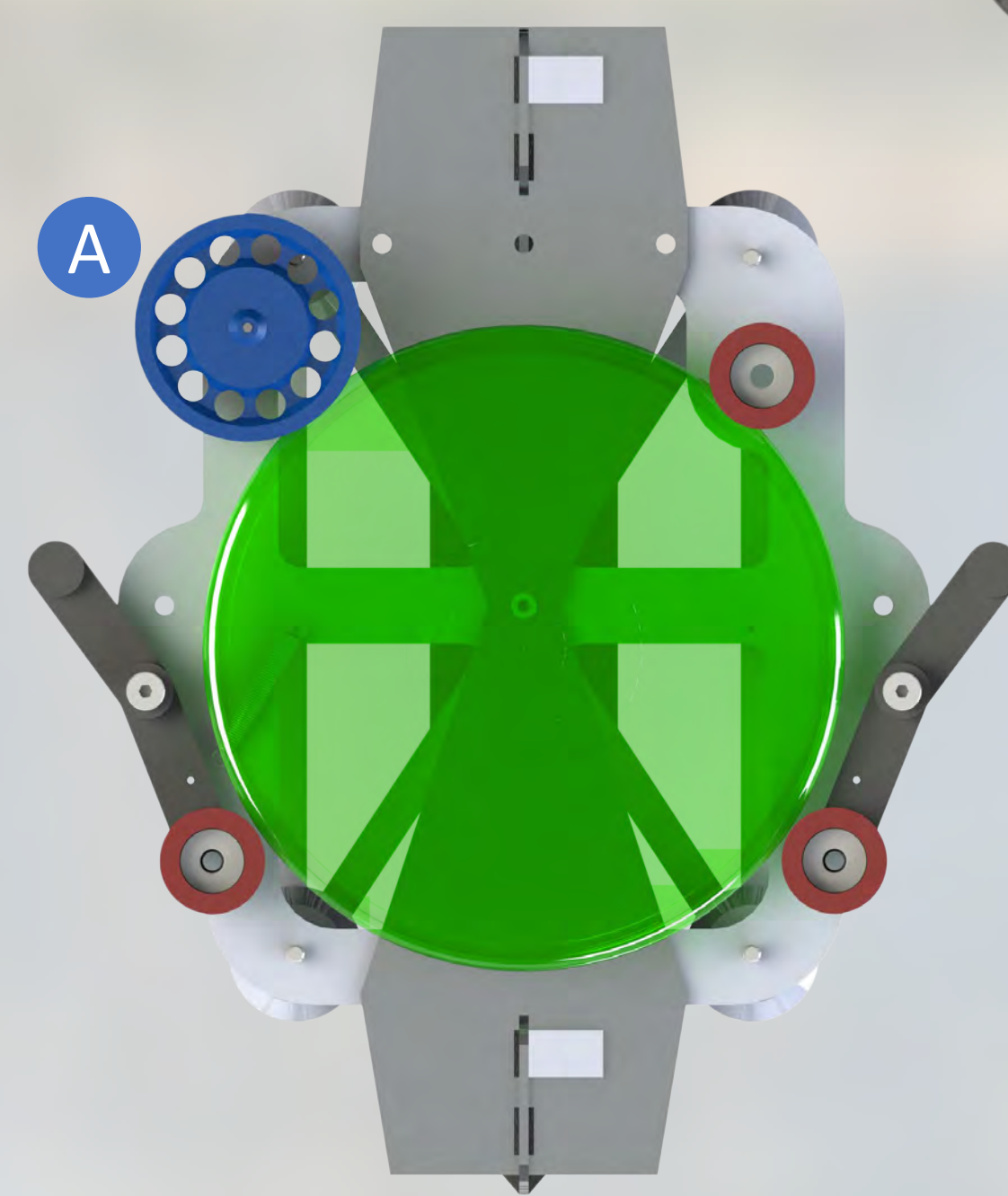
2 Launching

To achieve the desired linear velocity, the coaster is accelerated through a system of powered wheels. Three sets of wheels accelerate the coaster to a desired speed between 40 – 85 mph
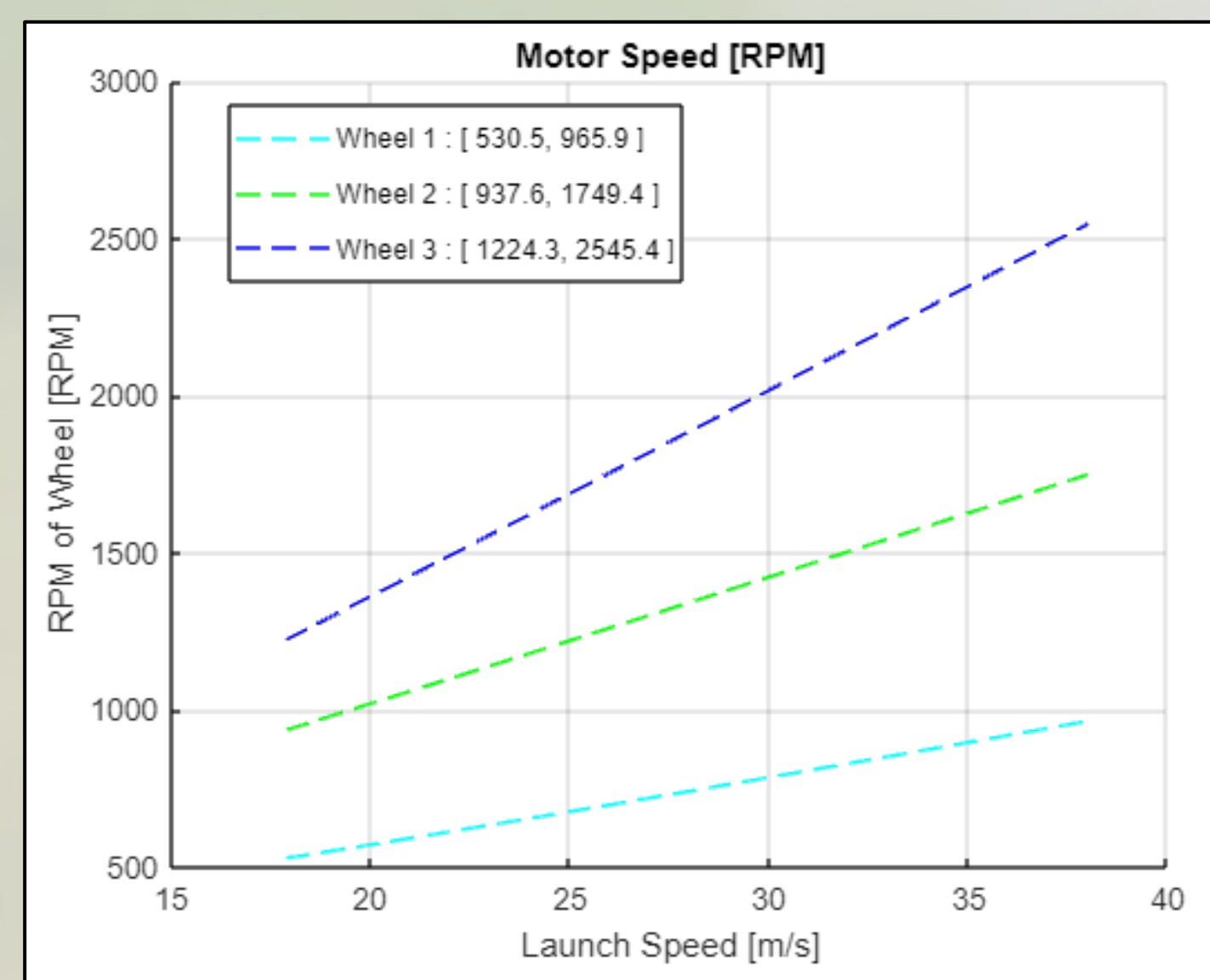
By equating the required kinetic energy for acceleration of the coaster to the rotational energy stored in our flywheels, we can find the required RPM of each wheel pair to reach a required exit velocity.

Motor Speed [RPM]
Wheel 1 : [530.5, 965.9]
Wheel 2 : [937.6, 1749.4]
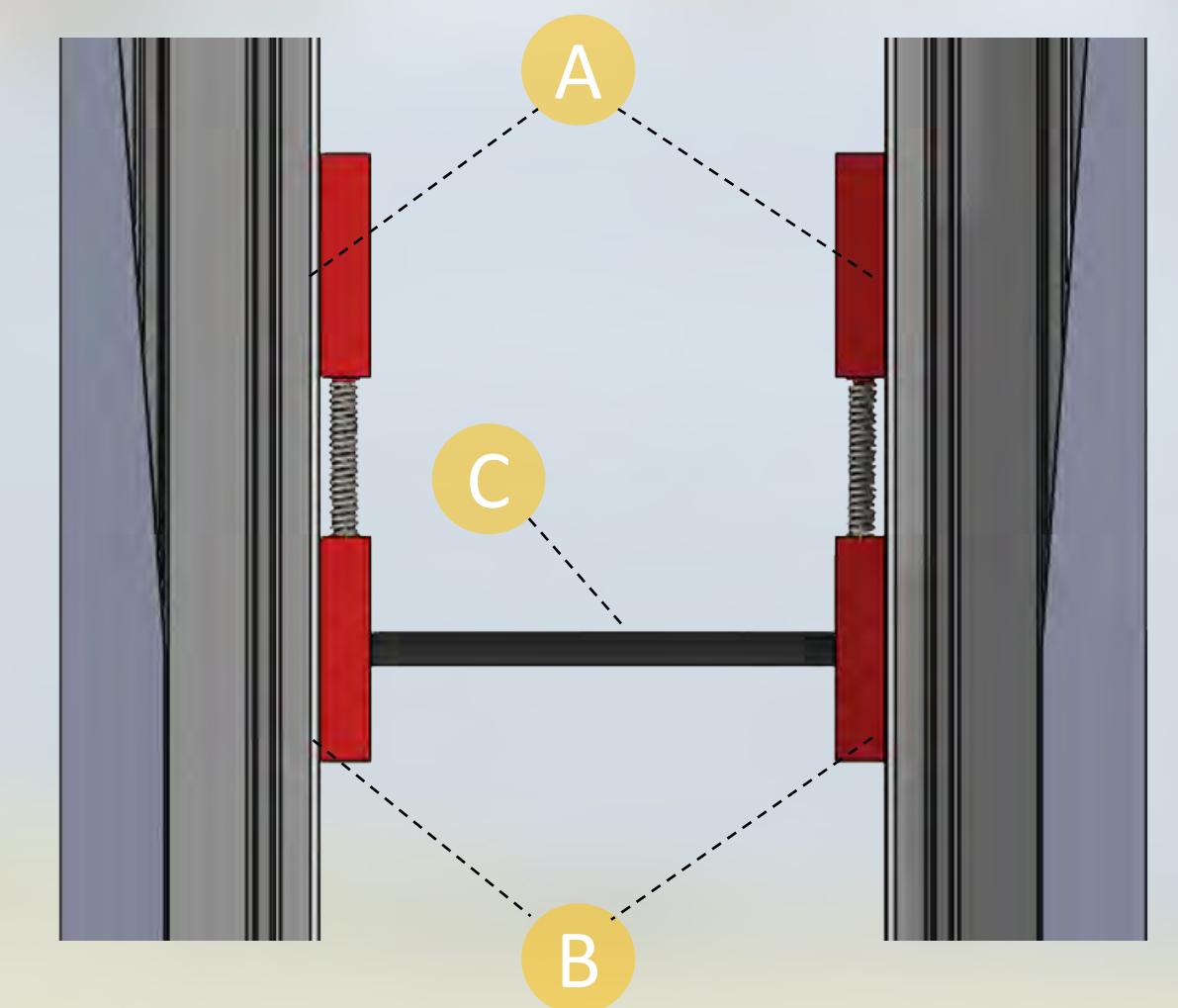Wheel 3 : [1224.3, 2545.4]

3 Releasing

Before the coaster is brought to a stop, it must prepare for release to allow the disc to continue forward.

A **Release Clamps:** Disc is held in place on coaster by spring-loaded clamps.

B **Release Rails:** Release rails push clamps out of way to allow disc to travel freely out the forward end of coaster during deceleration.

4 Stopping

A system of springs and dampers brings the coaster to a stop as it nears the end of the track.

A **Fixed Blocks:** Two blocks are fixed to the track to hold the deceleration system in place

B **Sliding Blocks:** Two aluminum blocks are attached to the track with linear bearings that allow the parts to slide freely along the track.
They are connected to the fixed blocks by a spring and damper system

C **Crossbar:** The fin of the coaster meets the crossbar, which allows it to interact with the deceleration system

Electrical System

The main system accepts user input, controls the accelerator motor pairs, and sends data to the coaster electrical system.

- Entire system powered by one wall outlet
- User input accepted through TFT touchscreen (shown on right)
- User input sent to three large DC motors with a power of ½ HP
- User input also sent to coaster system using Bluetooth

MOTOR STATUS
M1 M2 M3 MR
Accel Status   R Status
6 13 20   300
Accel Speeds   R Speed
Adjust Accel Spd
+5   -5
Adjust Rotor Spd
+20   -20