[Ri3D 2020] The Ohio State University
Climber Subsystem Memo
Released 01/12/20

Follow up:

What went well:
- Climbing generally worked
- Good weight to balance with other robots

What went wrong:
- Randomly opened, needs to be secured better
- The shaft broke due to driver error but could add safety switch to stop
- Couldn't roll across the bar with our system

What needs improvement:
- Needs LEDs

Mechanism Specifics / Improvements

Mechanism Description:
- **Carriage**
  - The frame is built out of sheet metal. Two 3D printed rollers hold the robot on the switch while a MiniCIM with a black compliant wheel drives us along the switch beam to balance out the switch. It is able to pivot on the bar.
- **Arm**
  - The arm is made out of two pieces of 1" square aluminum tubing
  - A spring assists the opening of the arm to avoid a failed actuation
  - The arm is extended and retracted by a cable on a winch with 35:1 gear reduction. The winch cable starts wrapped around the base of the arm past its axel, so that it lifts the arm to vertical and then slips off the end. At this point, the cable is fixed only to the elbow of the arm and pull at this point to retract the arm.

Technical Specifications:
- 5051 Aluminum Sheet Metal
- 10-32 Screws/Nuts
- ¼ -20 Bolts/Nuts
- 1" x 1" 6063 Tubing
- **Arm**
  - 1 x REV NEO Brushless Motor
  - 1 x Spark MAX
  - 1 x VersaPlanetary Gearbox 35:1 reduction
  - Spring

- Rope or Cord
- **Carriage**
    - 1 x Mini CIM Motor
    - 1 x VersaPlanetary gearbox
    - 2 x 3D Printed Rollers (See CAD files)
    - 1 x Black Compliant Wheel (60A durometer)

Gallery / CAD

Our CAD files are available at: https://github.com/firstroboticsosu/2020-CAD