

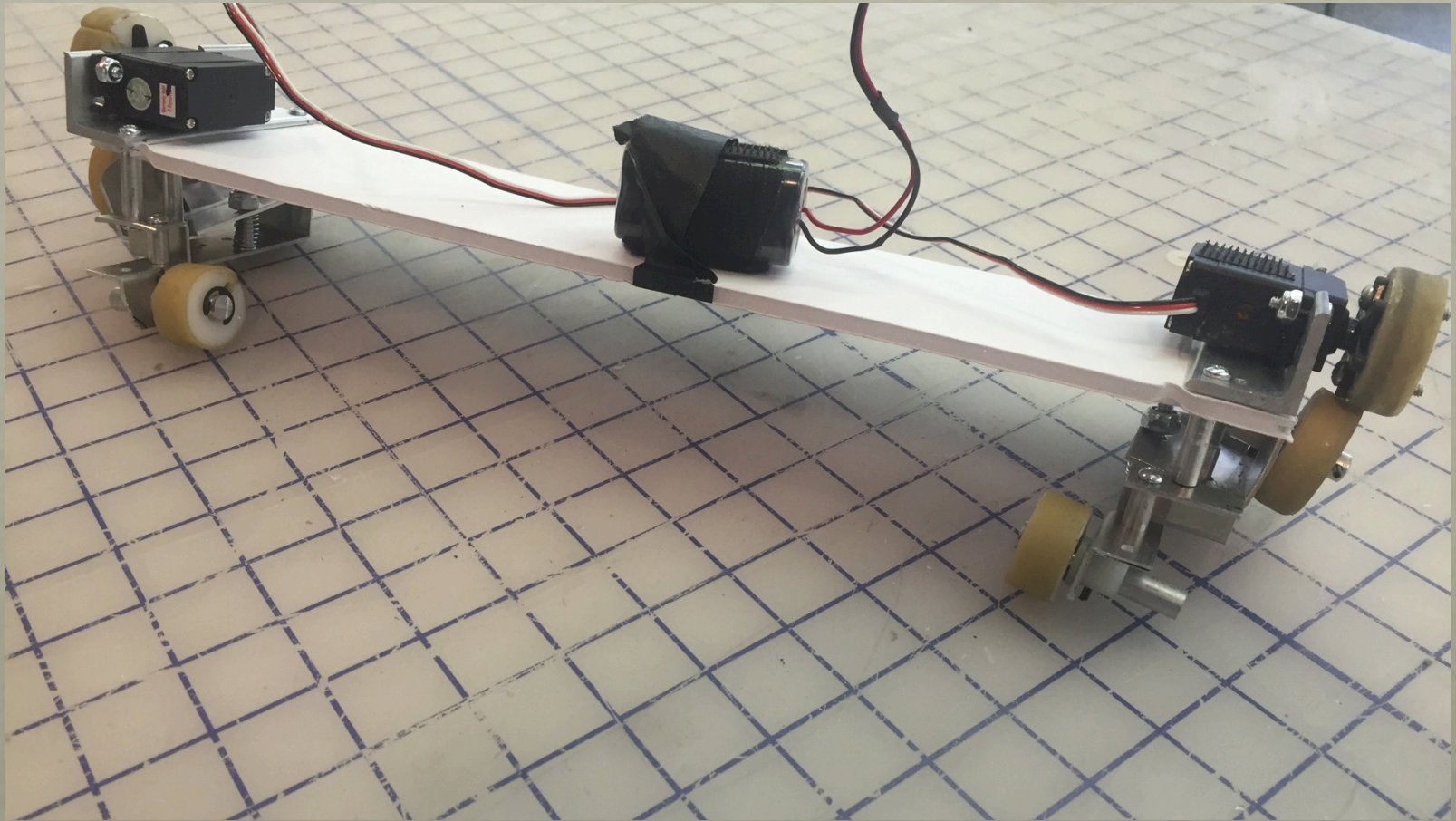
MILESTONE #9-ORAL DESIGN REVIEW

Yasmin Chavez

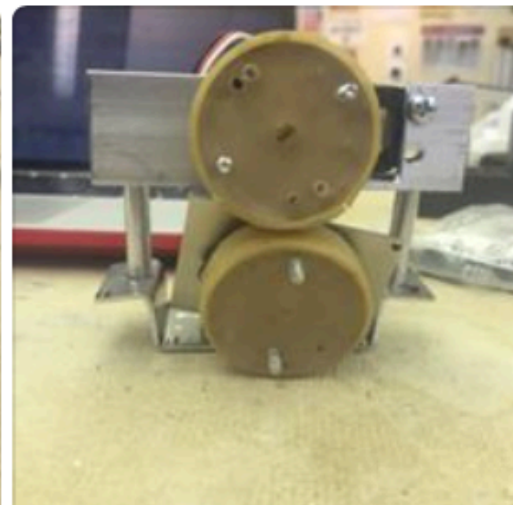
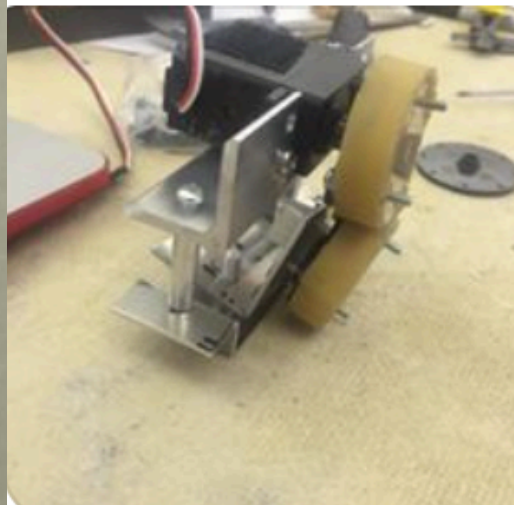
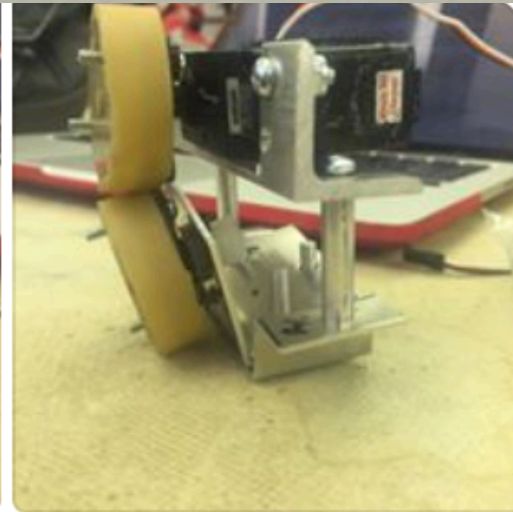
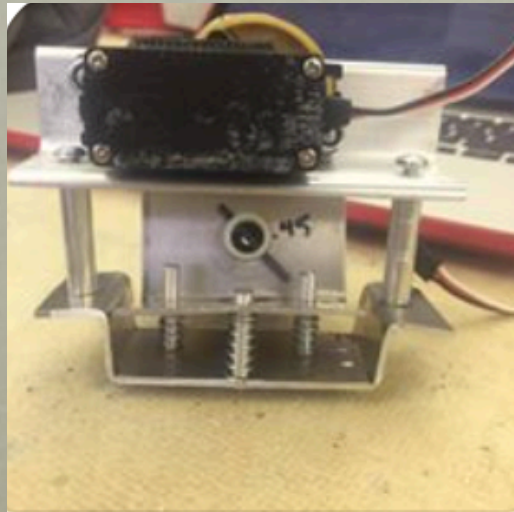
STRATEGY

- Start during autonomous period
- Midnight Ride[38 Points]
- Pick up balls [at least 6]
- Munitions Hiding in 1st Chute [126 Points]
- Total: 164 Points

CURRENT PROGRESS



MCM: HILL CLIMBER



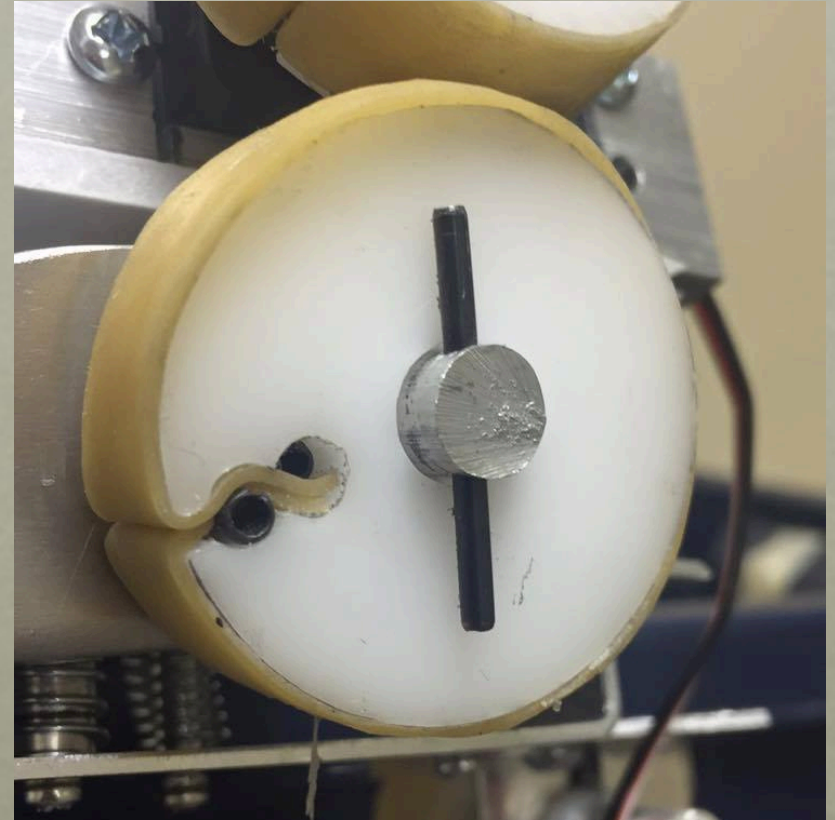
MCM: HILL CLIMBER

Materials:

- Delrin
- Rubber Band
- Epoxy
- 1/8 Roll Pin

Advantages:

- Rubberband doesn't slip off
- Custom Wheel Size
- Clean



WHEEL RADIUS CALCULATIONS

- To be adjusted after robot is completed*
- From homework:

$$r_{\text{wheel}} = V_{\text{in}} K_t / 2mgR$$

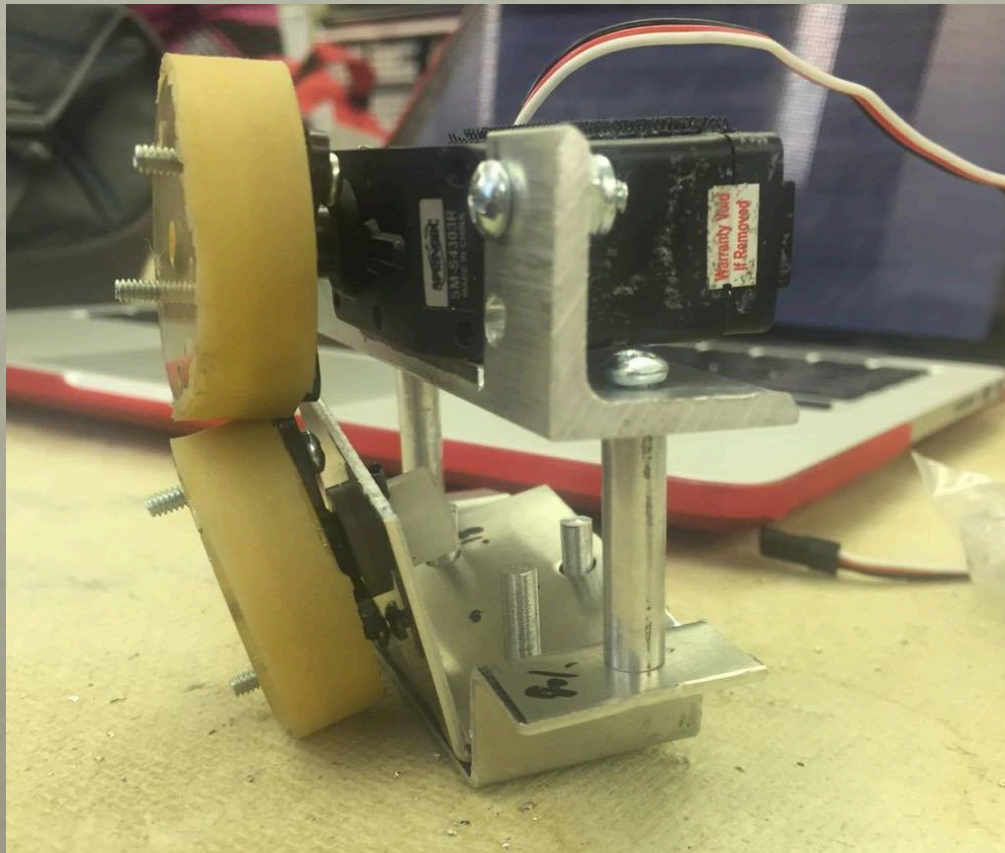
- $V_{\text{in}} = 4.8\text{V}$
- $K_t = V_{\text{in}} / \Omega_{\text{no load}} = (4.8\text{V}) / (7.3 \text{ rad/sec}) = .658\text{Nm/A}$
- $m_{\text{estimated}} = 1 \text{ kg}$
- $R = V_{\text{in}} K_t / T_{\text{stall}} = (4.8\text{V})(.658\text{Nm/A}) / (.471\text{Nm}) = 6.71\Omega$

$$r_{\text{wheel}} = (4.8\text{V}) * (.658) / (2)(1)(9.8)(6.71) \\ = .024\text{m} = .98 \text{ in}$$

WHEEL RADIUS-WEIGHT RELATIONSHIP

- $r_{\text{wheel}} = V_{\text{in}} K_t / 2mgR$
- As weight increases... r_{wheel} decreases

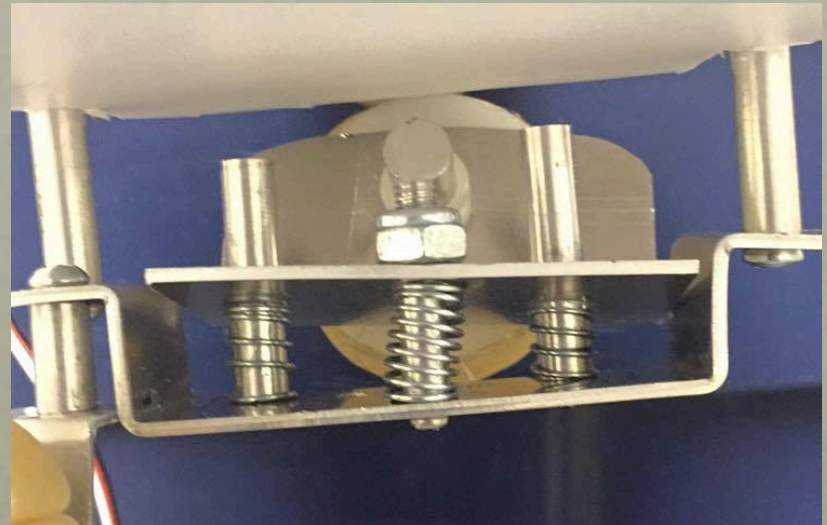
MCM: HILL CLIMBER



MCM: HILL CLIMBER

Materials:

- 5/16 Rod
- Springs
- #10 Nut
- #25 Screw
- Aluminum



Advantages:

- Adjustable Grip on the Rail
- Don't have to worry about the changes in height/slope of the rail

GRIP FORCE

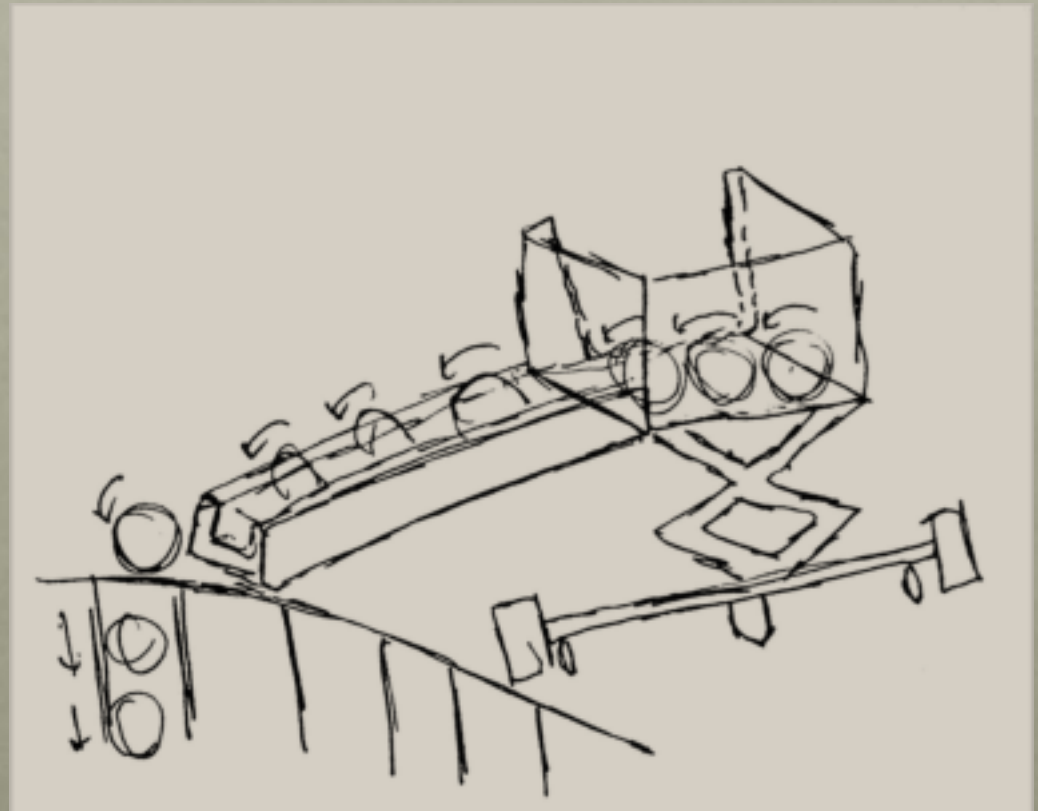
- $F_{\text{measured}} = \mu N$
- $F_{\text{measured}} = 51\text{bs} = 22.24\text{N}$
- $\mu_{\text{rubber-stainless steel}} = .64$



$$N_{\text{one module}} = 22.24\text{N} / .64 = 34.75\text{N}$$
$$N_{\text{two modules}} = 69.6\text{N} = 151\text{bs}$$

MUNITIONS HIDING

- Box-Style
- Lifts up
- Long “arm” angles down to chute



SCHEDULE

Date	Goals	To-Do
4/13	Drivable Robot	-Add Servo to Front Wheels -Attach Caster-replacement
4/14	Ball Box	-Fabricate Box -Design Lifting Mechanism
4/15 [no 2.678 lab]	Ball Manipulator	-Fabricate Lifting Mechanism
4/19 [no class]	Ball Release	-Design & Fabricate Release Mechanism
4/20	Integration	-Put all 3 Together -Re-do Base Plate

SCHEDULE [CONT.]

Date	Goals	To-Do
4/21	Controller Programming	-Switch to PS or Figure out how to use RC one.
4/22	Light Detector	-Figure out how..
4/25	Autonomous Climb	-Write Code
4/26	Modify	
4/27	Modify	

Questions?