LAUNCH CODE PRESSING ROBOT

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2.S007 Oral Design Review

Strategy/Objectives

- Goal: Maximize points in a limited amount of time
- Two robots
- Autonomy Multipliers: Launch Code, Lunar Lifter, Orbiter

Detailed Components/Plan

■ **Primary Robot**

– *Plan: Press Launch Code and Lift the lunar module (Ideal) autonomously. Lift and move the ground level flags and push some rocks on the ground level.*

– *MCM (Auto Launch Code Presser)*

– *Lunar lifter handle locking modules*

– *Flag Holder*

– *Rock Pusher*

– *Line Follower, IR Transmitter*

■ **Robot – Orbiter Estimator (Autonomous)**

– *Plan: Get on and off the orbiter and estimate the angular velocity autonomously*

– *Line Follower*

– *IMU*

– *IR Transmitter*

– *Ultrasonic Sensor*

Point Total

- **Ideally:**
- *[Autonomy] Launch Codes 40*2 = 80 points*
- *[Autonomy] Orbiter Estimation 45 points*
- *[Autonomy] Lunar Lifter 60*2 = 120 points*
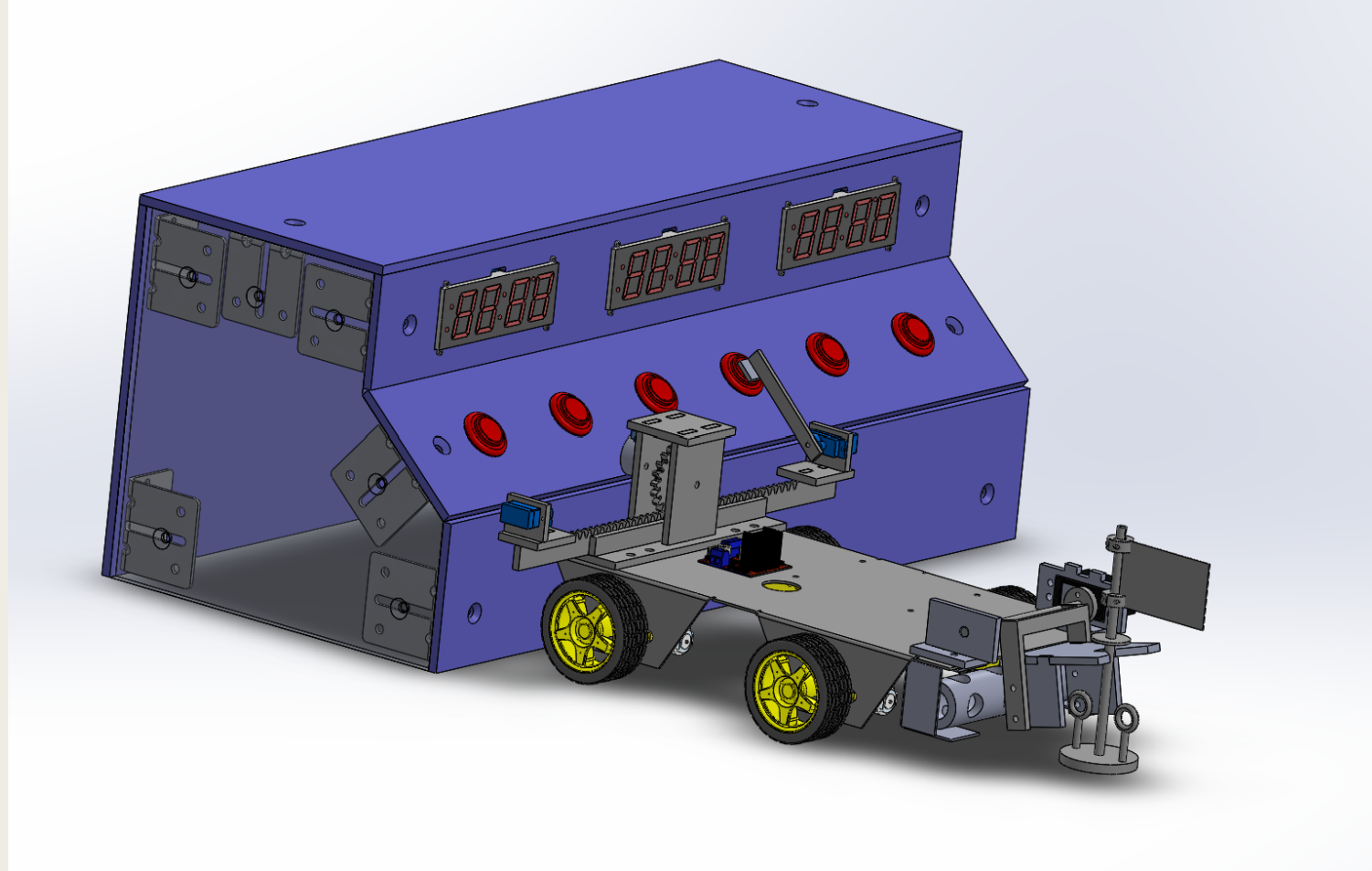- *Moon Rocks 5*6 = 30 points*
- *Flag Placement 15 * 2 = 30 points*

- **Sum**
- *80+45+120+30+30 = 305 (Hopefully!)*

MCM – Design Requirements

- Able to enter launch code in sequence and autonomously without moving the robot
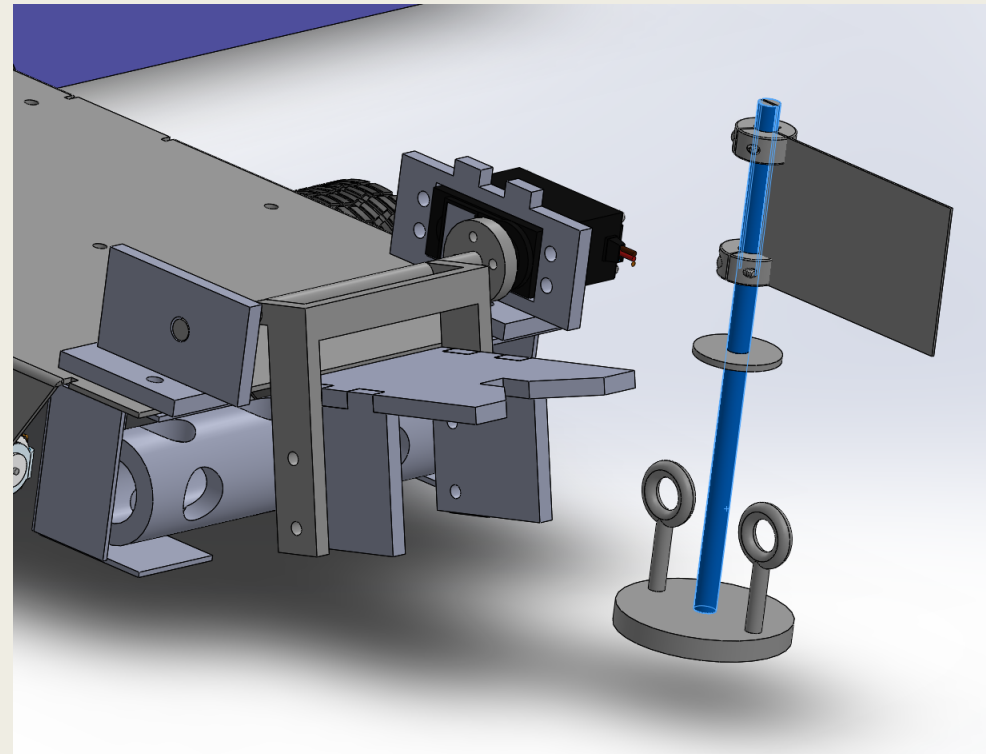
- Do it fast

- Fits in the starting box (14" x 14" x 11")
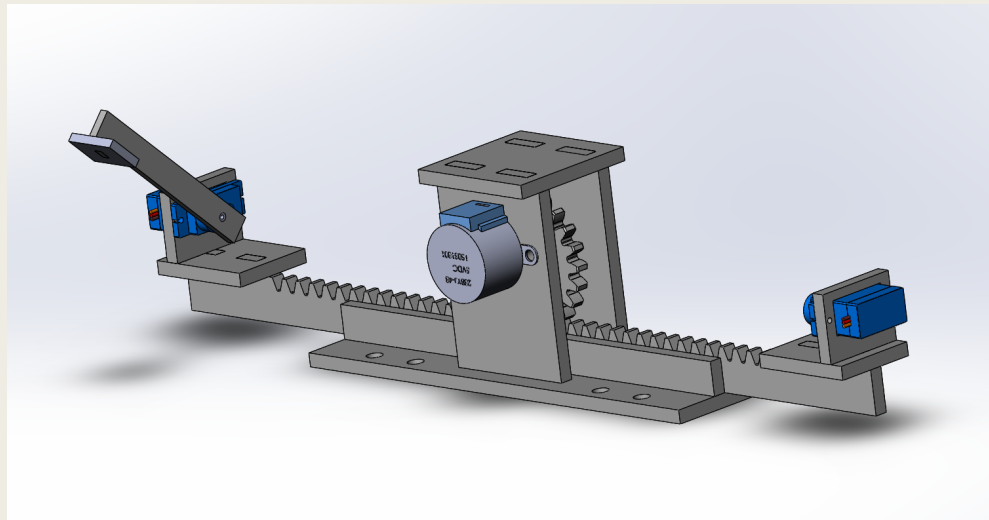
Primary robot v1 CAD

Plan for other modules (iter 1 CAD)

- Lunar Lifter Handle Locking Module

- Flag Holder

- Rock Pusher

- Iter 1 CAD problems:

– *Materials*

– *Enough Torque (?) Need more calculations before doing the next iteration*

Power Calculations

■ **<u>Primary Robot</u>**

■ Budget – 1Ah*7.4V = 7.4Wh

■ Consumption:

– *4 wheels: 5V*1.1A*4 = 22W*

– *28BYJ-48 Stepper motor: 5V*0.25A = 1.25W*

– *2 FS90 servos: 5V*0.4A*2 = 4W*

– *FS5115M: 5V*0.68A = 3.4W*

■ Lifetime:

– *22+1.25+4+3.4 = 30.65W*

– *7.4/30.65 = 0.24hours = 14.5mins*

■ **<u>Robot – Orbiter Estimator (Autonomous)</u>**

■ Budget – 1Ah*7.4V = 7.4Wh

■ Consumption:

– *2 wheels: 5V*1.1A*2 = 11W*

■ Lifetime:

– *7.4/11 = 0.67hours = 40mins*

Next Steps?

- Next iteration for the design of the primary robot

- Waterjet the chassis and the modules

- Software Development (State machines)

- Enhance the reliability and response time