

Design Review: Game Mech

(DATE: 2/4/2016) wk: 4

Purpose of Review:

We wish to gain approval for the design for our boulder intake/outtake mechanism to be mounted on Drive Train's frame, so we can begin construction ASAP

Objective:

- Have a mechanism that can effectively capture the ball.
- Have a mechanism that can eject the ball forward.
- Have a mechanism that can hold the ball for transportation.
- Have a mechanism that will not cause damage to: ball, robot, or field.
- Complete said mechanism before Feb. 17 and allow time for testing

Previous Action Items:

- Re-affirm: Belts versus tubing
 - Neither - wheels
- Making prototype for testing belts, not just tubing and wheels
 - Prototype has belts, tubing, and wheels, using wheels though
- Discuss location of camera, guaranteed that the ball will not affect vision
 - In shooting direction, not affected by arms

More Action Items

- Cost analysis on replacing surgical tubing
 - N/A - using wheels
- Will the high roller be able to pick up the ball? , (when removable arm is removed for safety reasons)
 - No- too high
- Finish sensor layout design
 - One potentiometer - on left motor of robot
 - 3 limit switches
- Will we always avoid sallyport / Drawbridge ?
 - Yes, not major priority on strategy list
- Prototype Armless robot when need to push the ball (Last resort if not self-aligning)
 - Will take arm off of already-made prototype

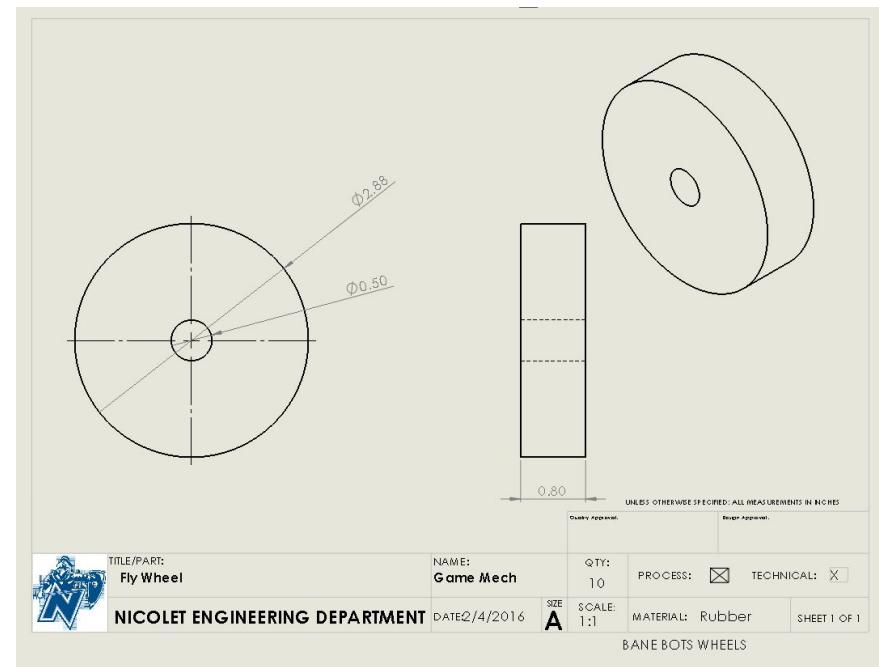
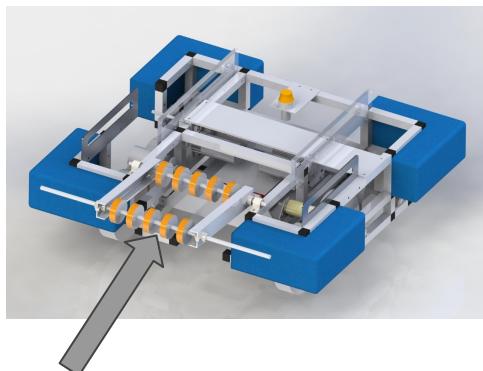
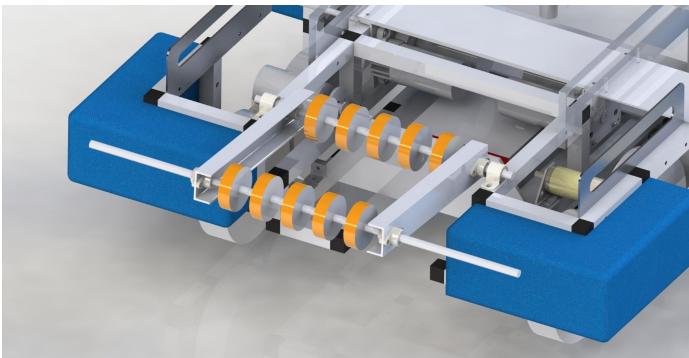
Selected Design: Wheels

After testing the prototype, we decided to only install BaneBots wheels. Testing indicated this was equally effective, on top of eliminating the risks associated with surgical tubing.

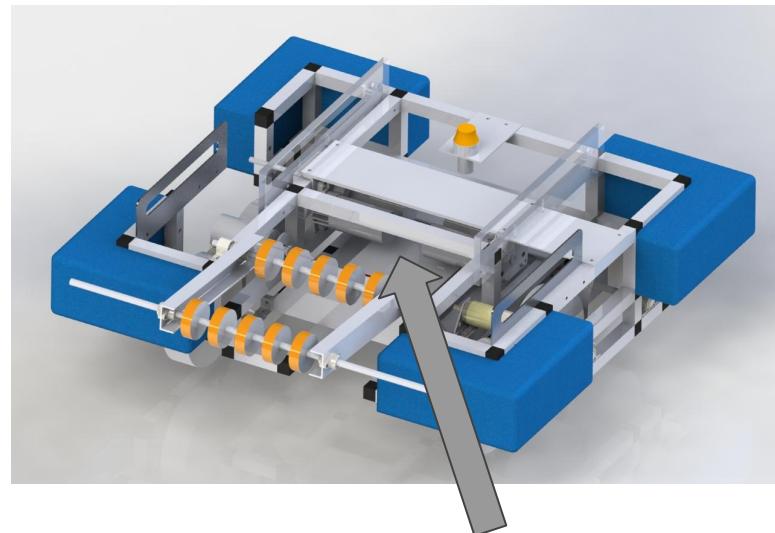
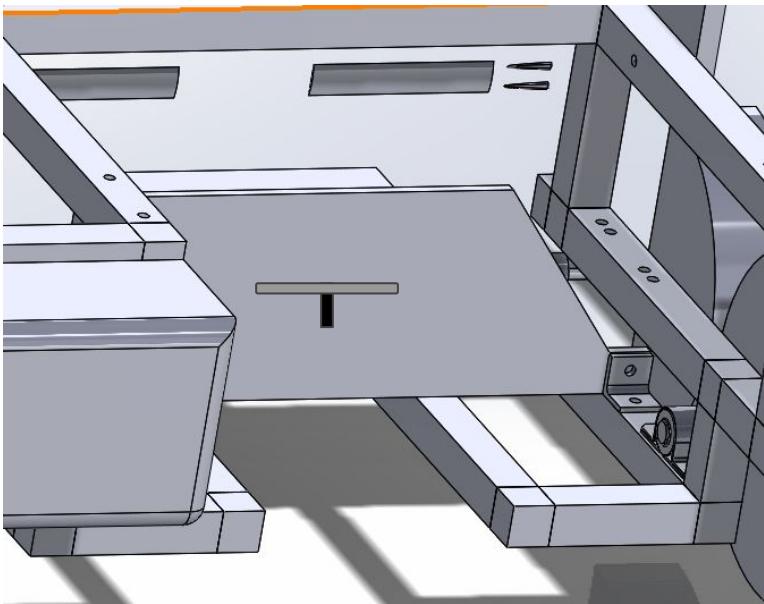
Also, we want to attach mecanum wheels to the outside of the arm axle to decrease the need for driver accuracy

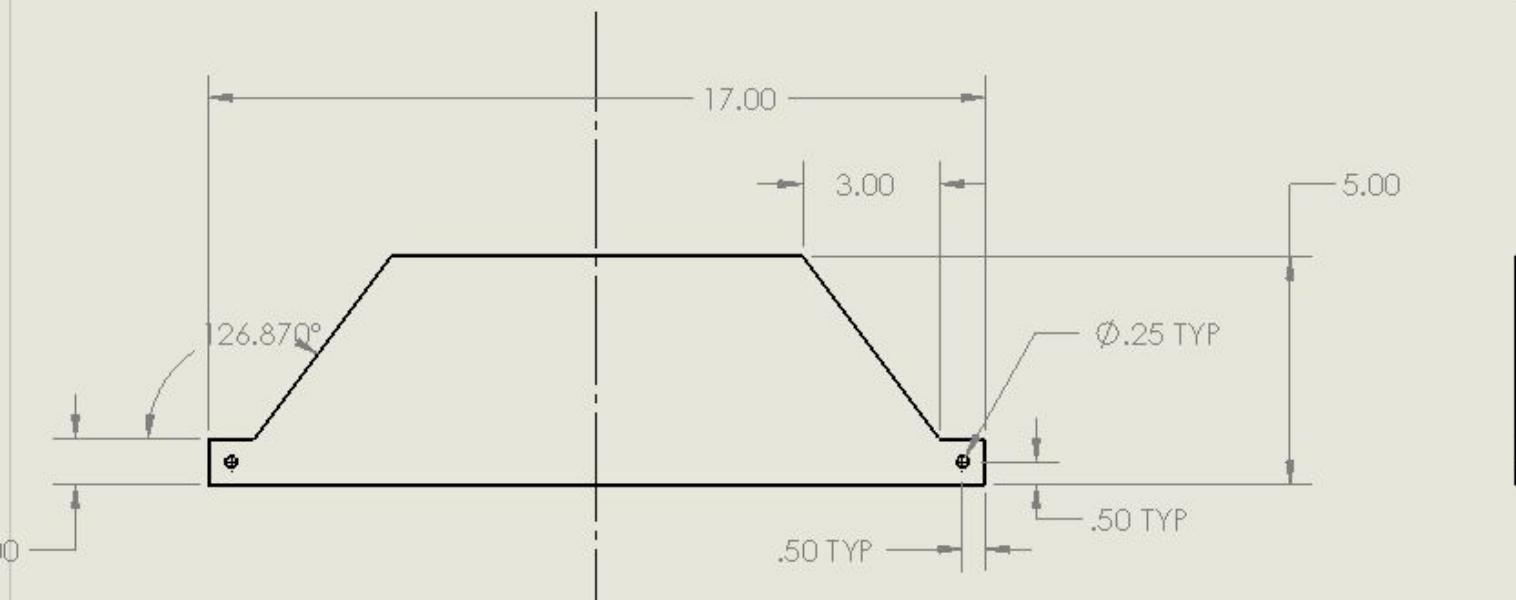
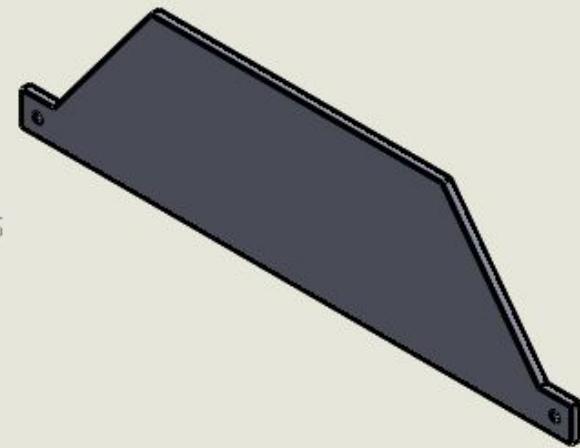
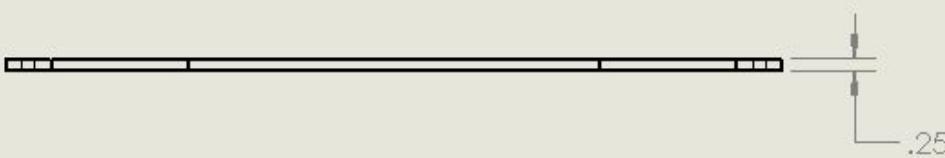
We retain our design of two rotating, mobile axles.

Selected Design: Wheels

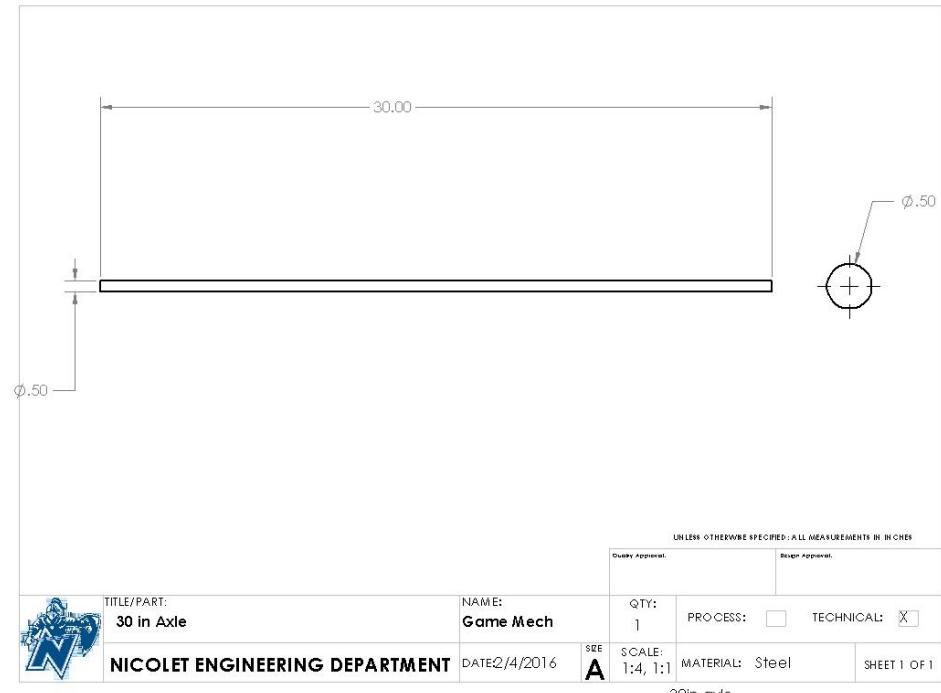
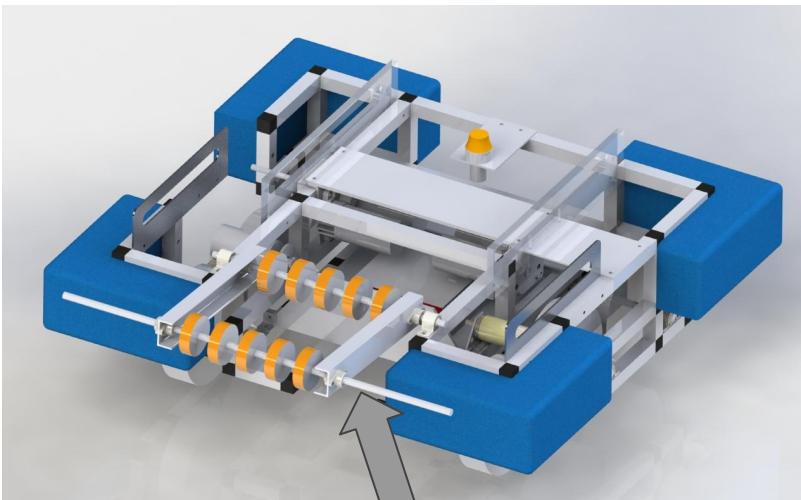


Selected Design: Hard Stops (ball)

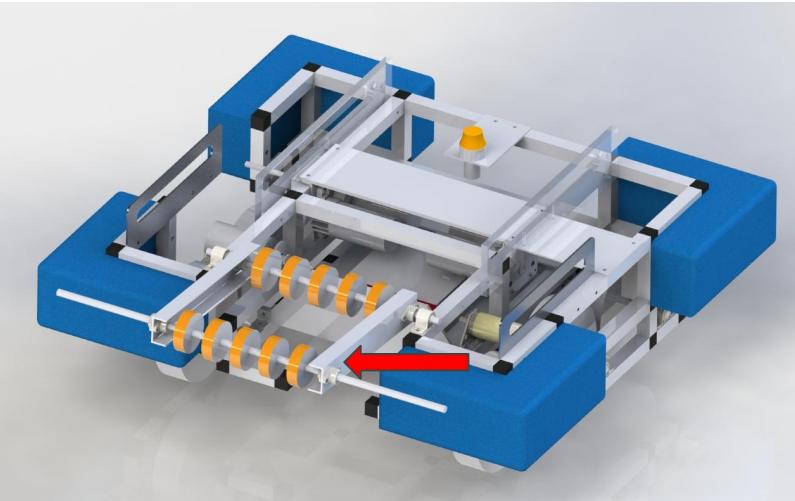




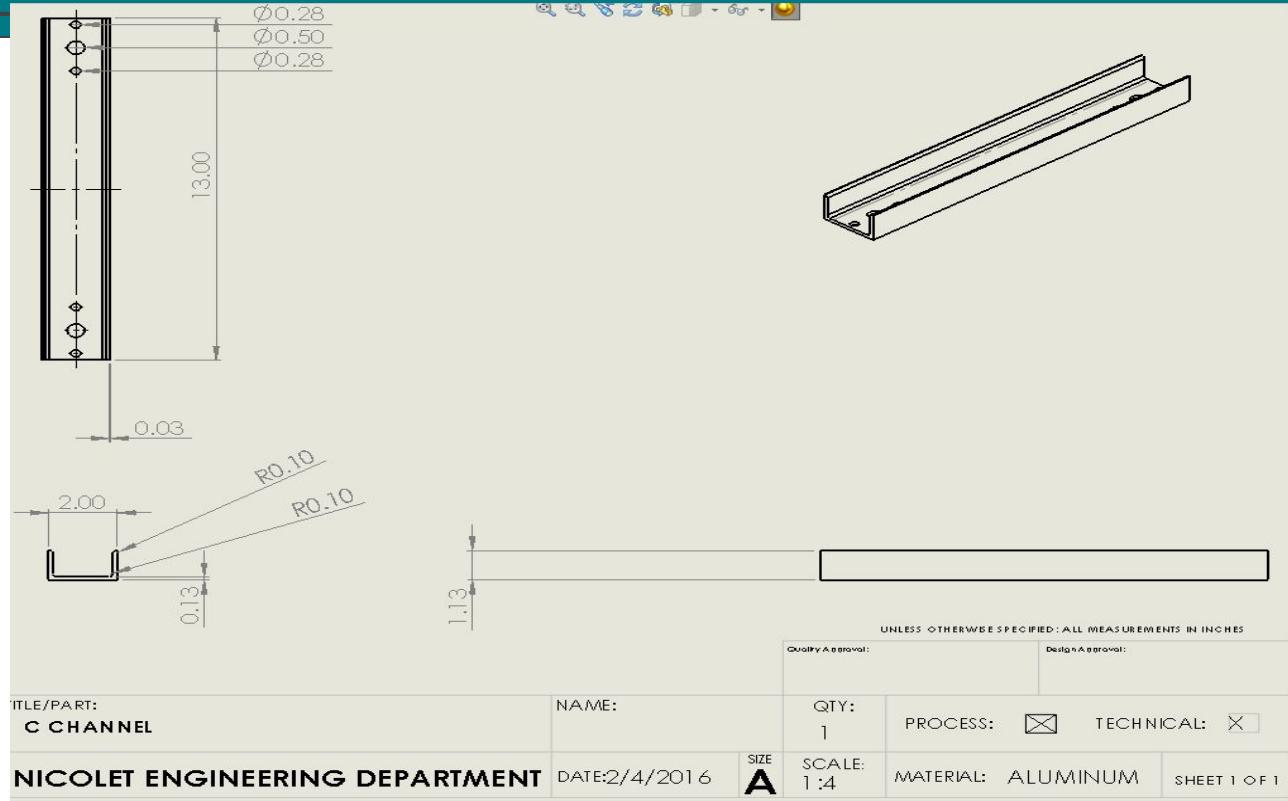
30 in Axle



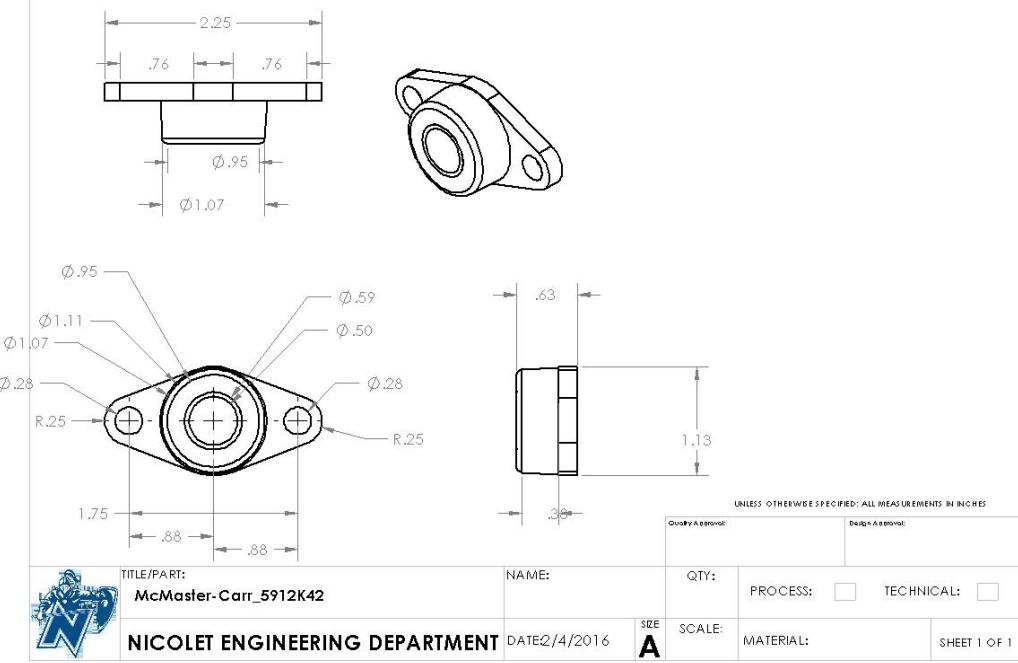
Arm



Arm



Ball Bearing



Rationale:

We effectively capture the boulder, energetically eject it, and do not harm it.

Without bands, there are fewer parts to fail, and lower maintenance.

Risks:

Have yet to test the placement of the hard stop.

Wheels can't accelerate the boulder enough to eject it with only one row of wheels

Arm is too heavy-- can't maintain stationary

Contingencies:

Test hard stop

Increase motor RPM or make a low:high gear ratio

Arm doesn't have to maintain a single position for most of the match

Dependencies:

Drive- have frame completed in a timely manner

Programming- have code that is compatible with our design

Recommendation:

We now need the Executive Board to vote on approval of our design so we can begin final construction of the mechanism.

Action Items: comic sans edition

- Why February 17th (It is the date of the reveal)
- If the limit switches don't work will ball Shooting out of the robot
- Put limit switch on the side to make contact with the ball
- Time for axle to stop spinning
- Ball crushed when shooting out of the mech (if axle won't stop)
- Look into "Big Arcade Button" (Contingencies of it being caught / ripping arm off)
- Look into beam break again (But lights could interfere) (even though Programming said they would have to code from scratch determined in the meeting previously)
- Slippage? Will the ball run without ball the limit switch be pressed
- Hard stop tweaking
- Problems with using non back driving motor.
- Will programming maintain position, "nonono don't do that" (command)
- Shaking/ Bracing (with size it shouldn't be a problem)
- Standardizing three terms to be used in the presentation/
- Motor able to spin with new wheels
- Limit switches placement