Week 8

Situation:
During week nine, team H worked to complete performance test one. This consisted of testing two different designs for the AEV, so one design could be selected as the main design going forward. The team's main goals for this week were to test the effect of placing rubber strips around the wheel for increased traction, and to test out the AEV with the caboose attached, because it would unwise to pick a design based off observations solely made on just one half of the mission concept review.

Results and Analysis:
To increase grip that the wheel had on the track, the team cut slim strips off the fingers of thin rubber gloves, and wrapped them around the wheels. The team hypothesized that the rubber would increase the grip on the track, and thus, increase the stability and control of the AEV on the track. When, tested, it was found that the rubber strips severely limited the AEV's ability to begin moving, and continue moving. The rubber increased the force of friction too much, so that it was not worth pursuing because the amount of energy used to get it moving would have been far too high.
When testing the AEV with the caboose, it was found that the AEV would not even start moving under the same motor power of 25%. The team found that the motors had to be run at least 40% motor power to achieve the same speeds that the AEV had without the caboose. Also, we found that there is not much difference between the two AEV's tested in terms of carrying the caboose. Because of this, it was decided to move forward with our latest AEV design.
Other things accomplished this week in lab was that team H got a head start on the coding of our AEV. The team was successfully able to create a code that consistently stopped the AEV in front of the gate inside the two markers. Also, the team successfully developed a code that got the AEV around the rest of the track to connect with the caboose.

Takeaways:
- The rubber grips will not help the AEV, they hinder the movement of the vehicle too much
- There was not a significant difference between the two AEV's carrying the caboose.
- Team H will move forward with our newest design.
- Completed half of the code needed going forward

Week 9

Situation:
Looking ahead to Friday (Lab C for Performance Test 2-Code) Team H will continue to formulate a second code to meet the project objectives. Currently, the group has constructed a code to successfully reach the first gate, triggering the sensor and pausing for 7 seconds. However when the AEV is ran under this code, the vehicle is never really coasting. There is a constant power supplied, allowing the vehicle to run smoothly and steadily. The second code the team will use to compare to the first, will be one in which the vehicle is given more power initially and then allowed to freewheel to the gate. As a team, we will then score test the two codes, and the main criteria being tested will be, first and foremost the consistency of the run,

which has been quite evident in the current code (six out of six runs resulted in stopping before the first ate to trigger the sensor), secondly, the vehicle's energy efficiency, which is directly proportional to the code the device is ran on as well as the physical characteristics of the vehicle. Finally, moving into Performance Test 3- Energy Optimization, Team H will use the chosen design and selected software code to test small variation to optimize energy. One variable the team will test to help optimize energy efficiency will be the use of a tri-bladed propeller, personalized through 3D printing applications. We believe this will create more thrust per gram and thus more energy output per amount inputted. Another variable tested will be the reduction of useless mass. The Team may try to condense the size of the vehicle in order to make the machine more compact and lightweight. Overall, the main objective for the Team is to have the AEV successfully complete all the objectives in the MCR.

Weekly Goals:

AVE- continue to construct 2 seperate consistent codes and score test them to decipher which is most consistent and energy efficient
AVE- consider ways to optimize the energy useage
AEV- focus on completing all aspects of MCR
General- complete the PDR to be very quality work
General-continue to strive to be the most efficient team and earn a trip to the project showcase

Weekly Schedule

Task	Members	Start	End	Approx. Time
Team Meeting	Those who can make it	3-10	3-20	1 and 1/2 hours
Lab	All	3/21	3/21	about 1 hour
Work on Lab Report 9	All	3/20	3/22	about 2 hours
Lab	All	3/22	3/22	about 1 hour
PDR	all	3/22	3/24	about 4 hours

Appendix:

Appendix A:

Arduino Code

```
//To get to the Gate
motorSpeed(4,25);  //both motors run at 25%
goFor(2);  //runs at speed for 2 seconds
motorSpeed(4,20);  //adjust speed for turn set to 20%
goFor(4); // run at speed for 4 seconds

goToAbsolutePosition(349);  // moves to gate
reverse(4);  // reverses to stop at first sensor
motorSpeed(4,25); //  moves in reverse at 25%
goFor(1.5);  // reverse for 1.5 seconds to help aev stop
brake(4);  // brakes all motors to let gate open up
```

Appendix B:

Team Meeting Notes

Date: 2/16/2017

Time: 1:50-3:00 PM

Members Present: Josh Anson, Jesse Noble, & Bret Ricklic (Nate was gone for break.)

Objective:

The main focus of today's meeting was to divide up the work for progress report 9 and PDR. Afterwards we discussed the PDR and the creating models of AEV in solidworks.

To Do/Action Items:

- "Backwards Looking Summary" (Situation, Results, Analysis)- Nate
- "Forwards Looking Summary" (Situation, Weekly Goals)- Bret
- "Appendix" (Team Meeting Notes, Arduino Code, Matrices, Weekly Schedule)-Jesse
- "Formatting and Submission, Report Questions, and Take-Aways" -Josh

Decisions:
- Team H split up both PDR and Lab 9 in order to work ahead

Reflections:
- Team H feels the work coming back from break will be hard but after planning it out it will be easier to maintain.

Take Aways
- Code to get to gate and stop
- Working in solidworks to model Team H's AEV

- Design testing approach (what to look for in tests)

Weekly Schedule

Task	Members	Start	End	Approx. Time
Team Meeting	Those who can make it	3-10	3-20	1 and 1/2 hours
Lab	All	3/21	3/21	about 1 hour
Work on Lab Report 9	All	3/20	3/22	about 2 hours
Lab	All	3/22	3/22	about 1 hour
PDR	all	3/22	3/24	about 4 hours