Week 6

Situation

Lab 5 was used to investigate what designs for the AEV should continue to be developed. The group created certain success criteria that would be important in making the AEV run proficiently. A reference design was created and tested on the track to judge its performance according to the success criteria. Each design that the team had created was then scored with respect to the reference design. The success criteria for these designs were given a "+" if it was better than the reference design, a "-" if it was worse, or a "0" if it was the same. The scores for the designs were then added up to determine if they were overall better than, worse than, or equal to the reference design in total. The scores were used to decide which designs the group should continue to develop, which designs the group should combine with others, and which should be eliminated completely. It helped show which parts of the designs were good and which parts needed to be improved upon.

Results & Analysis

A concept screening and concept scoring spreadsheet were constructed to help determine which idea is the best to develop and design to create the AEV vehicle. In addition, the spreadsheets incorporated the most important attributes that are necessary in the final design of the project. These attributes included aerodynamics, cost efficient, balanced front to back, balanced left to right, durability, simplicity/ plausibility, power efficiency, servo motor present, and efficiency backwards. First, a concept screening spreadsheet was made to determine whether the different design sketches from each member were better or worse in a specific attribute when compared to the reference design. The reference design for the spreadsheets was the design used in the previous labs to run the codes rather than the one provided. This was because the one used in lab was easy to see, when tested, how well it adhered to the desired attributes in the spreadsheets. Then, a concept scoring spreadsheet was created to factor in the importance of each attribute as well as a more flexible ranking of the sketches (on a 1 to 5 scale) on how well each sketch adheres to each attribute. For the attributes, the weight from largest to smallest went as follows: efficiency, efficiency backwards, balance left to right and aerodynamic (tied), simplicity/ plausibility and balance front to back (tied), cost efficiency and durability (tied), and finally servo motor. Based on the assigned values for each attribute, none of the sketches created by anyone in the group performed well enough in the attributes collectively to score higher than the reference sketch. From A to D, the scores for the sketches increased, but even the highest score (for sketch D) of 2.2 couldn't beat the 3.04 score from the reference sketch. As a result, the group decided to come up with a new design. The new design was much more simplistic and was a completely different concept than the four sketches. The new design built the AEV vertically with the motors, battery, and Arduino on the vertical base piece that would be custom made through 3D printing.

Takeaways

1.) Our designs did not take into account the AEV moving backwards which needs to be considered.
2.) When brainstorming, it is important to consider the whole project instead of focusing on one small part.

Week 7

Situation

Lab 7 will be used to finalize which design will be used moving forward and to test and improve the chosen design throughout the period. Questions will be asked about the mission, particularly how picking up the R2D2 is accomplished. The group will use the lab period to construct the AEV so that it can be verified that it functions as planned. This is important because designs do not always perform as well as intended, so it must be tested to find any potential issues. The group will also use the lab period to work on the Preliminary Design Review presentation. Included with our presentation will be a PowerPoint for visual support, which will be the focus during the lab period. PowerPoints can be very beneficial to go along with an oral presentation and help the audience follow along.

Weekly Goals:

1.) Create a powerpoint that goes over the preliminary design status for the group AEV and also gives a brief summary of labs 00-06
2.) Continue innovating and make the AEV design more power efficient than the reference design.

Weekly Schedule

Task	**Teammate(s)**	**Start Date**	**Due Date**	**Time Needed**
Lab 6 Progress Report	All	2/18/17	2/22/17	3 Hours
Lab 6	All	2/22/17	2/22/17	1 Hour 20 Min
Pre-lab reading/quizzes	All(separately)	2/21/17	2/22/17	30 mins
Update Portfolio	Adam	2/22/17	2/28/17	30 mins
Construct New Design	Aaron	2/22/17	2/26/17	45 mins

Appendix

Arduino Code:

```
celerate(4,0,25,3);
goFor(1);
motorSpeed(4,20);
goFor(2);
brake(4);
reverse(4);
motorSpeed(4,25);
goFor(2);
brake(4);
```

Team Meeting Notes

Date: 19-Feb-17
Time: 2:00pm
Members Present: Aaron Mckinley, Adam Boes, Christian Considine and Spencer Lohmeier
Topics Discussed: Week 6 Progress Report & PDR Presentation Worksheet

---

Objective:
Today's focus was to work on the Week Progress Report and to complete the PDR Presentation Worksheet.

To do/Action Items:

- Progress Report (AM, CC, SL, AB)
- Meeting Notes (SL)
- Backwards Situation (AB)
- Results & Analysis (AM)
- Comparison Chart (CC)
- PDR Presentation Worksheet

Status Summary:

Final decisions are being made on the design for our AEV. All group members have put together their own individual ideas into the making of this project and the final design will be a representation of that. The Comparison Chart has done a great job at helping us decide as a group what is the best option to go forward with in our design. The final design should be decided here in the coming week.

Reflection:

- Continue working together as a team
- Continue to split up the work
- Each group member needs to continue with their roles on the team in order to complete certain assignments

Concept Screening and Scoring Spreadsheet

	Reference	Sketch A	Sketch B	Sketch C	Sketch D
aerodynamic	0	+	+	+	+
cost efficient	0	-	-	-	-
balanced (Front to Back)	0	-	-	+	+
balanced (L to R)	0	0	0	0	0
durablility	0	+	-	-	0
simplicity/ plausiblity	0	-	0	0	0
efficiency (power)	0	-	-	-	0
servo motor	0	0	0	0	0
aesthetic appeal (cool factor)	0	+	+	+	+
efficient backwards	0	-	-	-	-
# of 0	10	2	3	3	5
# of +	0	3	2	3	3
# of -	0	5	5	4	2
Total	0	-2	-3	-1	1
Decision	Eliminate	Eliminate	Eliminate	Eliminate	Elimintate

Weight	Reference Score	Sketch A Score	Sketch B Score	Sketch C Score	Sketch D Score
15%	2	3	3	3	3
5%	5	2	2	2	2
10%	3	2	2	4	4
15%	4	4	4	4	4
5%	3	4	1	1	3
10%	5	1	3	3	3
20%	2	0	1	1	1
2%	0	0	0	0	0
0%	0	5	5	5	5
18%	3	0	0	0	0
100%	27	21	21	23	25

Weighted scores	Ref WS	A WS	B WS	C WS	D WS
	0.3	0.45	0.45	0.45	0.45
	0.25	0.1	0.1	0.1	0.1
	0.3	0.2	0.2	0.4	0.4
	0.6	0.6	0.6	0.6	0.6
	0.15	0.2	0.05	0.05	0.15
	0.5	0.1	0.3	0.3	0.3
	0.4	0	0.2	0.2	0.2
	0	0	0	0	0
	0	0	0	0	0
	0.54	0	0	0	0
	3.04	1.65	1.9	2.1	2.2