Group P - Ishan Taparia, Wenbo Nan, Kyle Fathauer, Jason Hahn Progress Report 3

Instructor - Dr. Parris, GTA - Sheena Marston
2/4/17

Week 3

Situation
During this week's lab, the team's main goal was to creatively design the AEV. This was important because it sets the direction of the team's future design and activities. In the following labs the team will build the AEV based on the design in this week's lab. The lab was divided into two sections. In the first section, each team member was supposed to create his own AEV design in 20 minutes. They completed this task by drawing on an orthographic drawing paper. Then in the second section, the team had a discussion about the AEV designs, examined the pros and cons of each design and came to an agreement on the final design.

Results & Analysis
From this week decided on a base design for the AEV. This design is a T shape that will used for the base of the AEV. The base of this design is to be as simple as possible. This will allow for the easier balancing, simple construction and no unneeded complexity that add weight. The general dimensions of the AEV is, 5 inches tall, 7.5 inches long and 6 inches wide. The estimated cost is 150.90 dollars. This design will allow for the AEV to complete all mission objects while be the lowest weight possible.

The design from Kyle Fathauer used a T shape base, the Arduino, battery and main mounting are through the central axis while the motors are on the outer wings. This design should allow for lower amounts of washback due to the motor's being away from the main body. It will also allow for easier balancing due to most of the weight is central. The estimated cost is 155.90 dollars. The main components of the design are to made out of 3D printed ABS plastics to keep part cost low and reduce weight. The motivation of the design was to keep the concept simple.

The design from Jason Hahn used a simple straight base with brackets extending out to support the motors which were located below the base on supports. The design also featured a triangular 3D printed nose on the front for better aerodynamics. The design allowed the motors to operate more effectively as they were located underneath the main body and could move more air effectively. The estimated cost to produce was $168.02 and mass around 400 grams. The motivation for the design was to create an aerodynamic AEV with pleasing aesthetics.

The design from Wenbo Nan used a T shape base, the Arduino, battery, two motors, a support arm and a 3D printed part which covers the body of the AEV. The 3D printed part is streamlined

which provides better aerodynamics. The motors are located at the wings of the AEV, which ensure better balance. The estimated cost of the design is $165.01 and the estimated weight is 450 grams. The motivation for the design is from the Lockheed SR-71 blackbird aircraft.

The design from Ishan Taparia features a simple T shaped design, with the motors situated on the sides of the vehicle with the vertical arm in the center. The benefits of this design are very general, to aerodynamic efficiency because of the thin materials used, and the balance is more rounded leading to a more stable vehicle. Using 3D printed motor wheels would ensure that the design is as light as possible, leading to an estimated weight of 450 grams, with a total cost of $141.88.

The main part of each of the team members design should be ABS plastic since it should be the least weight out of all the material that can be used. Most the parts on the AEV will be fabricated through 3D printing. Although 3D printing allow for production of parts that were never available before, the team will need to take into consideration that not all parts can be 3D printed easily or effectively.The general dimensions on the are five inches height, seven inches body, and 6 inches width. The esti

<u>Takeaways</u>

1) AEV -- There are many factors to consider when creating an AEV design, including the weight, location of the propeller, shape of the AEV and aerodynamics.
2) AEV -- Making sure that all connections are secure before in class testing is important
3) General -- Continuous testing is important to work out any kinks in our AEV design

Week 4

Situation

In next week's lab, the team goal is learn how to collect data the Arduino to help in the design process. The data collected will be Time, current, voltage and the number of wheel rotations. The data collected will be exported to the computer from a usb to allow for calculations to be done. The data collected will allow for an understanding of how the vehicle is performing and how to make improvement on the AEV. This data then will be imported into Matlab for more calculations and chart making to be able to better report what is happening on each run.

Weekly Goals

1. Gather data from AEV runs.
2. Work on the AEV concept design
3. Plot data from AEV run

Weekly Schedule

Table 1

Task	Teammate(s)	Start Date	Due Date	Time Need
Week 4 Progress	All	2/4/17	2/10/17	2hrs
Pre-lab Preparation	All	2/4/17	2/10/17	2hrs

Appendix

Table A1: Bill of Material for Group Concept

Name	Number	Price
Arduino	1	100.00
Motors	2	9.99
T shaped piece	1	2.00
Vertical Support Arm	1	3.00
Propeller	2	.45
Battery Support	1	2.00
Sensors	2	2.00
Sensors connector	2	2.00
Wheels	2	7.50

Total	150.90

Date: 4 - Feb- 2017
Time: 1:00 (Online)
Members Present: Wenbo Nan, Kyle Fathauer, Jason Hahn

Objective:Today's object was to continue working on Progress Report 2 and begin Progress Report 3

To do:

- Continue Progress Report 2
- Incorporate updated data into Report
- Start Progress Report 3

Decisions:

- The team will use Kyle's design for the initial AEV.

Reflections:

- Lack of communication makes working together harder.