

Executive Summary

The purpose of the lab was to become familiar with the Matlab program that allows the users to easily perform a design analysis on the AEV EEPROM data without performing the repetitive tasks involved when analyzing it by hand. The objective of the lab was to analyze the EEPROM data in order to make decisions pertaining to the design, research and coding of the AEV and see how to make certain aspects better. In order to perform better than other groups in safely acquiring the R2 unit, it is necessary to take into account the data plots in order to provide that best AEV for the transport.

Figures 1 and 2 in the appendix show the plots extracted using the matlab AEV analysis tool and can be compared to figure 3, which is the original Arduino code, to make some assumptions about the energy usage on certain commands. Figure 1 shows the relationship between power and time. Looking at the plot the team is able to identify how certain code references cause energy to be supplied in different ways, such as reversing the propellers and holding them at a certain speed after for 1.5 seconds (figure 3). Figure 2 shows the relationship between power and distance. This plot allows the group to analyze where on the track that the AEV uses the most power rather than looking at the code, which provides the team with a different perspective at looking at energy usage of the AEV.

In order to more effectively use the matlab tool, the team needs to work on a program that will complete all the desired tasks rather than one of the tasks. Once this is done, the team will be able to accurately judge the overall energy usage by the AEV and determine how it can be approved. This will include looking at possible design changes aesthetically to the AEV or changes needed in the AEV code. The team has decided on a schedule that follows based on completion: the AEV code for the whole R2 pickup mission, optimizing the design of the AEV and lastly looking at ways to improve the Arduino code. Certain team members are assigned to the stated tasks. Abrahm and Aziz will handle the overall programming aspects of the AEV while Nina and DeJonte will look into possible design changes that can be implemented into the AEV.

The design analysis tool has already proven to be a crucial factor in the team's future design process. Understanding energy distribution in matters of both distance and time has allowed the team to properly identify a plan of action in the success of the AEV to perform the future tasks at hand. It was decided for Abrahm and Aziz to handle the future programming while Nina and DeJonte come up with an alternative design. The cooperation and ease in data acquisition will allow a smoother mission where the AEV's performance in delivering the R2 unit while performing the desired tasks will be optimized by becoming more familiar with the tool.

Appendix

Figure 1

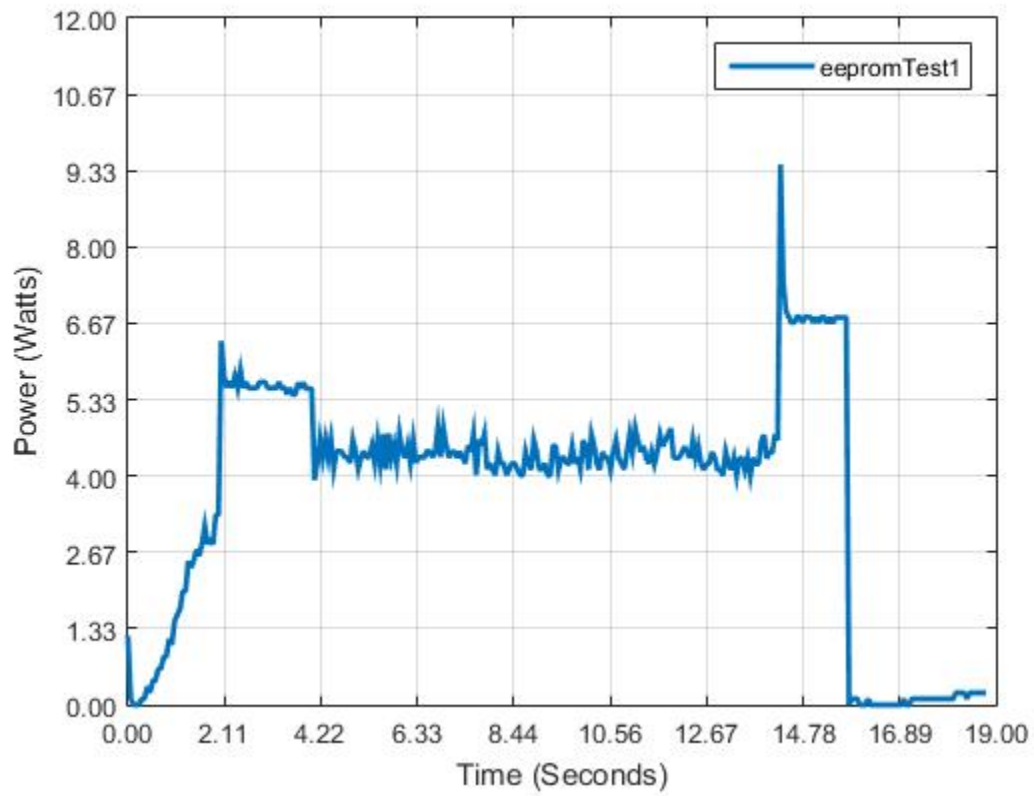


Figure 2

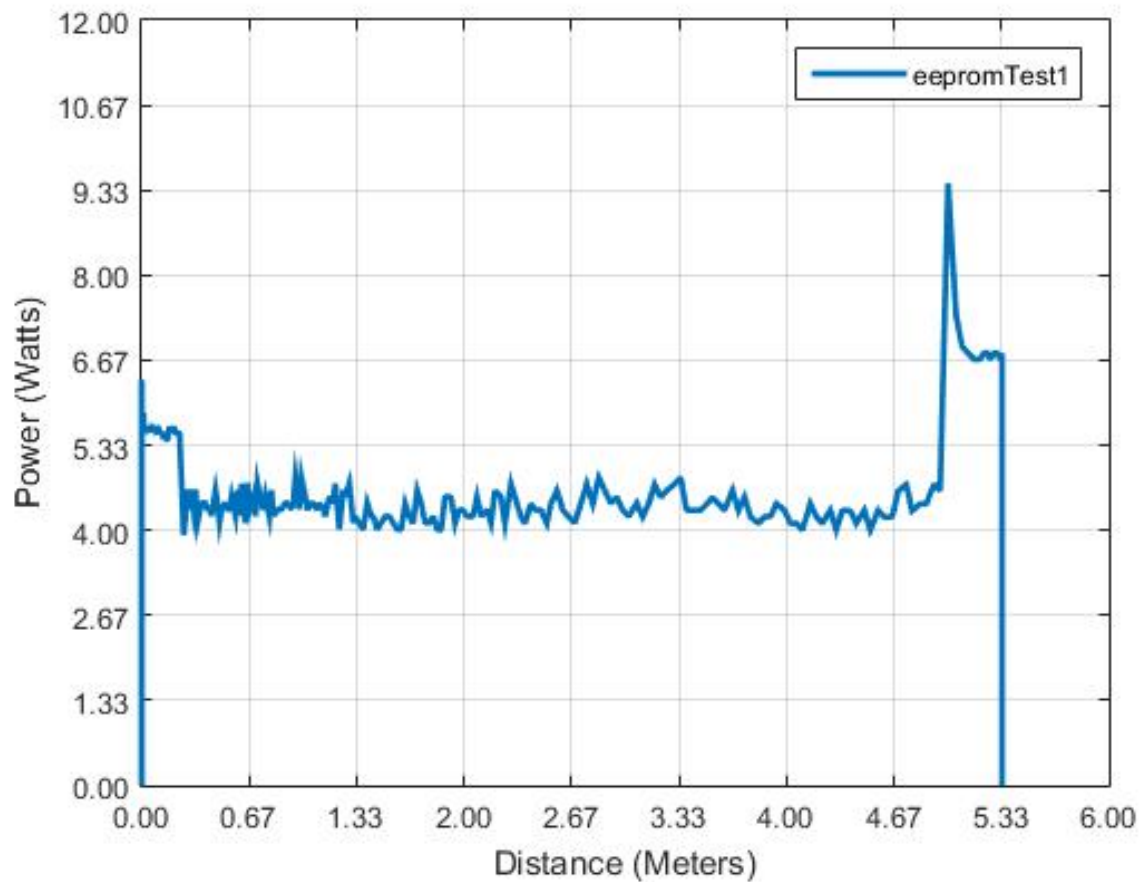


Figure 3

```
Celebrate (4,0,25,2);
```

```
motorSpeed(4,25);
```

```
goFor(2);
```

```
motorSpeed(4,20);
```

```
goToAbsolutePosition(400);
```

```
reverse(4);
```

```
motorSpeed(4,30)
```

```
goFor(1.5);
```

Accelerate all motors to 25% in 2 seconds

Set all motors' speed at 25%

Run motors for 2 seconds

All motors power to 20%

Run until position 400 marks reached

Reverse all motors

Run all motors at 30%

Run motors for 1.5 seconds