***EE/CprE/SE 491 WEEKLY REPORT 3 (10/28/19 – 11/11/19)***

***Group number:***
***sdmay20-27***

***Project title:*** ***Gauss Sensor for Magnet Array Filter***

***Client:*** ***Dennis O'Neel***

***Advisor:*** ***Dr. Mani Mina***

***Team Members/Role:***

***Muhammad Lutfi Latip*** ***-Team Manager***

***Irfan Rafie*** ***– Test Engineer***

***Vishal Patel*** ***– Meeting Scribe***

***Muhammad Aiman Zulkefli*** ***– Research manager***

***Wei-nee Long*** ***– Report Manager***

o **Weekly Summary**

The objective for this week was to discuss and design the PCB design of the Hall Effect Sensors that is to be used for the Magnet Array Filter (MAF). Moreover, another aim was to discuss on the

aspects of the sensors regarding on the following topics:

1. Positioning within the collar
2. The acquisition of an arduino
3. Design of the PCB and sending the design out for printing

Based on the topics listed above, we successfully created and early design of the Hall effect sensor probes that is to be latched around the magnet ring collars in getting data on particle build ups around the filter. On top of that, the team successfully discovered few models of the Hall sensors from different companies that can be used for testing and comparing on their sensitivity and accuracy. Aside from that, we had initiated on early design of the software for the sensor that is connected to Arduino in converting analog data into digital that is to be used and transferred to the computer to be shown to the user.

o **Past week accomplishments**

• *Everyone: Discussion on Timeline and Budget*

- Discussed with the client on the overall timeline of the project, and overall budget estimation to be used later throughout the 2 semesters

• *Irfan, Vishal, Aiman: Current Gauss and Eddy Current Sensors and their capabilities and limitations*

- Researched on implementation of gauss and eddy current sensor that is to be used in detecting particle buildups in the filter and the oil engine.

- Discussed on the capabilities of the sensors in requiring data with having other

  ambient sources that has effects in the sensitivity of the sensors.

• *Lutfi: Research on other sensor technologies that might be worth investigating*

- Continuous research on other available sensors that can be utilized for this project

  that can yield better result and more efficient.

• *Irfan: Early Framework of the Coding for the Software*

- Initiated with early design on the code for the software that is to be used in

  connecting the sensor probes and Arduino in getting data measurements

- The software helps in converting analog signals from the sensor probes into digital signals to be used in recording data of the change in magnetic field caused by particle buildups in the filter
- The data will be used in early development of the threshold indicator for changing filter that will be further discussed in its implementation

• *Lutfi,*
*Vishal: Research on temperature effects towards accuracy in getting data*

- Gained knowledge on how temperature would affect the sensors in its accuracy of acquiring data

o **Pending issues**

• *Everyone: Research more how temperature and vibration affect EM properties*

- Need to conduct test bench and collect data regarding the change in EM on different type of sensors during different conditions.

• *Everyone: Research about the Clients patent*

- Need information regarding the Client's product and how the magnetic field changes when the iron particles accumulate around the filter.

o **Individual contributions**

| NAME | INDIVIDUAL CONTRIBUTIONS | Hours this week | HOURS CUMULATIVE |
|---|---|---|---|
| Muhammad Lutfi | Tested sensors to understand positioning within the collar | | |
| Irfan Rafie | Completed the code for interpreting the incoming data from the sensors and | | |
| Vishal Patel | Designed the PCB and discussed printing options | | |
| Muhammad Aiman | contacted cyride for possible usage of our collar on their vehicles and collection of their older oil | | |
| Wei-nee long | Helped in planning agenda for next week's meeting and research the possibility of using eddy currents for different metals detection | | |

o **Plans for the upcoming week**

- *Everyone: Acquiring gauss meter*

- *Reach out to cyride in order to obtain older oil filters*

• *Irfan Rafie: Adding section to choose type of vehicle in code*

  - The sensor will need to be capable of working on different types of machines therefore a
  will be necessary

• *Wei-nee Long: Research on Eddy currents*

  - Look into how we can implement the Eddy currents in order to detect different metals that
  the filter and go downstream of the system

• *Vishal Patel: Send out PCB schematic for printing and look into the need of stepping up the voltage coming out of the sensor*

- **Summary of weekly advisor meeting**

• Successfully outlined the duties that need to be done in the following weeks which includes resea
Eddy currents,Soldering the components of the board and begin testing for data collection.