

# **EE 491 Senior Design May 2018 Group Meeting**

September 2017~May 2018

Client: Vishal Mahulkar

Advisor: Dr. Hegdey Chinmay

## **Safe Communication Between Lead and Following Vehicle**

### **Week 6~8 Bi-Weekly Report**

#### **Team Members:**

Bradley Stiff- Software Lead, Project Lead

Justin Wheeler- Software Lead

Sanguk Park- Scribe Lead, Communication Lead

Zhize Ma- Scribe Lead, Hardware Lead

Junho Chun- Hardware Lead

Yifan Lu- Hardware Lead

Jose Candelario- Project Lead, Communication Lead

#### **Past Week Accomplishments:**

This week, we looked further into the powering system for the PX2 which will function as the central processor of all data gathered by the sensors and cameras on the following car. We were able to complete any tests that were required from the RigRunner 4005i and now have been identifying any devices that will need its own power source. The PX2 is currently on the top of our list and in the past week, we have identified the power cable needed for its function. The PX2 uses a PCI-E cable which are the ones that are used to power GPU's on desktops.

The PCI-E for the PX2 uses a 12 Volt 8 pin connector which will have to be adapted to the node ports of the RigRunner. It's an 8-Pin Power Connector. We will be using a 10-Pin one and will have to create the equivalent ourselves as the connector is not easy to find and creating our

own would be simpler. The following shows a picture of how an 8 pin connector looks like and the value of each pin corresponding to our design(we will have a 9 and 10 pin so that are named on the description):



Pin	Description
1	12 Volts
2	12 Volts
3	12 Volts
4	12 Volts
5	Just floating (not attached to anything)
6	Ground
7	Ground
8	Ground
9	Ground
10	Ground

### The Software Team

A ROS node has been developed on the following vehicle for other teams to subscribe to. This will help get the GPS data to other teams without having them interface directly with our code. We're currently running ROS on our laptop with Ubuntu but will need to test on the Nvidia PX2 next. We are also going to need to research for another GPS from Xsens specifically for the lead vehicle. This GPS unit will be a lot cheaper and only needs the latitude and longitude. We will also look into the pros and cons of using a cheaper GPS as it is unclear that we actually need to have a GPS on the lead vehicle with the capabilities of the GPS on the following vehicle.

This week, we met with our project director Vishal to discuss further prospects of the progress. For our meeting, we discussed about looking at the cables and creating a list of items that we will need to connect all of the components. For our hardware team, testing feasibility of distance and an efficient powering system was our goal for the second half of our senior design. Our main concern currently is finding the GPS for the lead vehicle.

## Individual Contributions (2/24~3/10)

Team Member	Contribution	Weekly Hours	Total Hours
Brad Stiff	Followed online tutorials to learn Python with a GUI focus. I looked into various object functionality for both the tkinter and tkinter.ttk libraries. I made a GitHub repository to hold my finding.	13	71
Jose Candelario	Looked up more possible connectors needed for the PX2 and found that we need a 12 to 24 converter for both the radar and lidar. We plan on using the same converter that we already have and connecting both devices to it.	8	80
Junho Chun	Helped analyse the data we got last week from the XBee testing and also looked into possible other constraints that we may need to think of when connecting the devices.	6	55
Justin Wheeler	Developed a ROS node so other teams can acquire the GPS data more easily. Starting looking into GPS units for the lead vehicle to use.	7	59
Sang Uk Park	Communicated with with our client as well as with other groups to see where everyone was at. Found out some other aspects of the project we may still need to apply.	6	65
Yifan Lu	Ran some tests and interpreted information gathered from testing the XBees. Made conclusions	7	59

	as well as started looking for alternative methods that could yield better results.		
Zhize Ma	Soldered necessary wires together for testing components. Gathered crucial information from each device and constructed a model of the high level wiring with appropriate parameters.	6	60

## Plans for the Next Two Weeks

### Brad

- Brush up on C++ due to Nvidia 9.1 not supporting Python
- Study Java GUIs to help Anuj with project.
- Install ROS kinetic and Ubuntu Mate on new Pi. Find new way to backup, since old way lost scripts.

### Rest of the Group

- Find a cheap GPS for lead car that is compatible with the already built xsens driver.
- Look more into cables for PX2

### Hardware part:

- List the power connector for all sensors
- Solder the connector if need
- Test each sensor individually, and make sure they all worked correctly
- Connect all sensor together and make sure they can working at same time with the power from RigRunner