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 1~2 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:

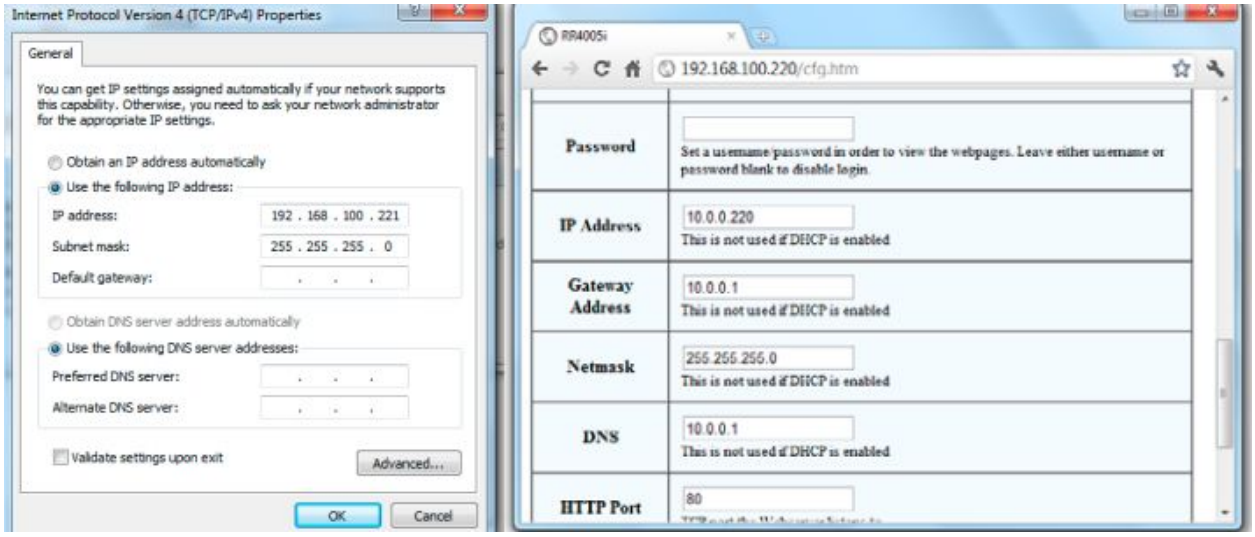
This past weeks, our hardware group started to work on the powering aspect of the project. Currently our group is responsible for the power distribution of the following sensors and devices:

- Lidar Sensor
- PX2
- GPS
- Radar
- 8 cameras
- Transmitter system (Xbee, Raspberry Pi)

The following car that we are currently working with has a power distributor called the RigRunner 4005i. The RigRunner 4005i has a configuration system via network which allows us to modify supply voltage through different ports via connection to a laptop. The configuration program is accessed via ip-address network.

The above picture is of the front part of the RigRunner that we are using. It has an LCD Display on the right, followed by next and exit buttons. Then it has NODE LED status indicators for five different channels as well as node enable buttons right below them.

The above picture has the back of the RigRunner pictured. It has an Ethernet Port on the left that can be used to configure the device as shown in the image below. This configuration allows for multiple checks that would allow us to detect current surges as well as a low source battery. Next to that picture is the Expansion port followed by five red and black ports that give out power to devices we want to plug in. lastly in the farthest right there is a DC IN Powerpole Connection that plugs into our main battery source.



The past week, our hardware group went to Intrans to run configuration tests on the power distributor attached to the following car. The power distributor has a network interface which allows us to set the output voltage for each Powerpole Node shown above. Our main objective for the RigRunner configuration was:

- Using a multimeter to verify the output voltage set in the configuration menu of the interface
- Applying resistance through a potentiometer to view current
- Looking for a way to utilize as few nodes on the power distributor when powering all of the sensors and devices.

Below is a small table of the information that we managed to gather:

Node	V	Ohms	Current mA
5	12.11	130	6
4	12.11	130	5.8
3	12.11	130	5.8
3	12.11	110	5.9
3	12.11	90	6
3	12.11	70	6.3
3	12.11	50	6.4

The ohms above is a load that we gave to the node. Below we have what was actually recorded as the input equivalent resistance to each node:

2	3	4	5
6.62Mohm	6.84Mohm	6.74Mohm	6.65Mohm

When setting the power supply, we must be aware of the configuration of the devices that will be powered. Such configurations include the voltage supply and the operating current for each of the sensors and devices that must be powered.

- The radar and lidar both have a maximum supply voltage of 24 Volts.
- The transmitter system requires a 5V power supply
- The camera has a minimum supply voltage requirement of 8 Volts
- The GPS requires 5V supply
- THe PX2 requires 12V power supply

Knowing the required supply voltage is important when we later sort out a configuration for all of the devices. Below is the main information that we got from testing:

Meeting with Sponsor

Last week, our group had a video conference with our client to discuss the plans for this semester. Over the meeting, we were able to communicate with the other groups that work on the project with us. The groups that worked with us the previous semester were:

- Robotics Group : Responsible for Object Detection
- Controls Group: Trajectory and Obstacle Evasion
- Mechanical Group: Attachment design for the sensors
- ECE Group (Our Group) : Wireless Transmission of GPS serial data and powering the sensors and devices

From the discussion, we talked about roles that the group should take for this semester. Our software team for the ECE Group will now fill in for the robotics group and help with software development, while the ECE Group continues with powering and any other tasks that need be.

Pending Issues

Currently, we have not had a formal meeting with our sponsor yet or the rest of the groups that work on the project with us. Once all the groups meet up, our group will get more info for any upcoming tasks that need to be undertaken and any requirements that need to be fulfilled. Most likely, our group will start to specialize more as we enter the testing phase where the software team will aid with any programming while the hardware team will work on the powering.

Individual Contributions (1/11~1/25)

Team Member	Contribution	Weekly Hours	Total Hours
Brad Stiff	Met up with group and discussed any plans and tasks that need to be done in preparation for this semester. As well as looked into new ways to make the transmission more effective	4	44

Jose Candelario	Went to Intrans to set up configurations for the power distributor and verified any outputs with the multimeter. Documented the configuration methods. Met up with the groups to further discuss any tasks that need to be done beforehand.	8	58
Junho Chun	Went to Intrans to help with setting up the power distributor. Documented the results and any problems we faced.	6	39
Justin Wheeler	Met with group to determine next steps for the upcoming semester. Continued research on ROS.	6	41
Sang Uk Park	Helped set up the wiring and for the power distributor. Recorded the voltages at certain configurations using a multimeter.	6	47
Yifan Lu	Helped with measuring the outputs for the power distributor. As well as researched on possible methods of testing XBees for reliability while moving.	6	40
Zhize Ma	Met with group and talk about semester plan. Help on presentation in the lecture as well as helped look into the possible connectors needed for the devices.	6	41

Plans for the Next Two Weeks

Our group plan on accomplishing the following by the upcoming two weeks:

- Set up a meeting with our sponsor and the other participating groups
- Once we get a clear to-do list for the semester, set up a project plan
- Further test the configuration for the RigRunner and start developing powering methods to power all of the sensors and devices