EE 491 Senior Design Group Meeting

Safe Communication Between Lead and Following Vehicle

Week 2 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

This Week Accomplishments:

For this week, our project director, Vishal invited us to sharepoint. Sharepoint is where all the other groups who work on this project post documents of progress reports, resources and ideas that may interest us in the future. The sharepoint also had datasheets for the specific sensors we will be using. Our job as a group was to gather important specifications on each sensor that was listed in the file directory: Lidar, Radar, GPS and Camera. One of the most important things that we needed to find out for each component was they power supply requirement along with their operating currents since we will be responsible for powering each of them. Another thing that had to also maintain a priority was to know which pins for each port referred to; this way, if we needed an alternative solution to receive/transmit data or power them, we could find a solution for this. The listed datasheets and specifications for each device is listed as followed:

The Camera

Specifications	BFS-U3-51S5M
Interface	USB 3.1 Gen1
Power Requirements	5-24V via GPIO or 5V via USB3 Interface
Power Consumption	3 W maximum

The table above show the connection and power needed for camera.

Digital IO Control

The camera is equipped with a 6-pin GPIO connector on the back of the case:

Color	Pin	Line	Function	Description
Green	1	3	Power/Input	12V DC camera Power/Non-insolated input
Black	2	0	Opto Input 1	Opto-isolated input
Red	3	2	NC/+3.3V/GPIO	3.3V output.Current 120mA(nominal)
White	4	1	Opto Output 1	Opto-isolated output
Blue	5	N/A	Opto GND	Ground for opto-isolated I/O
Brown	6	N/A	GND	DC camera power ground

The Lidar

Sensor Cable
J1 Male

Interface Cable
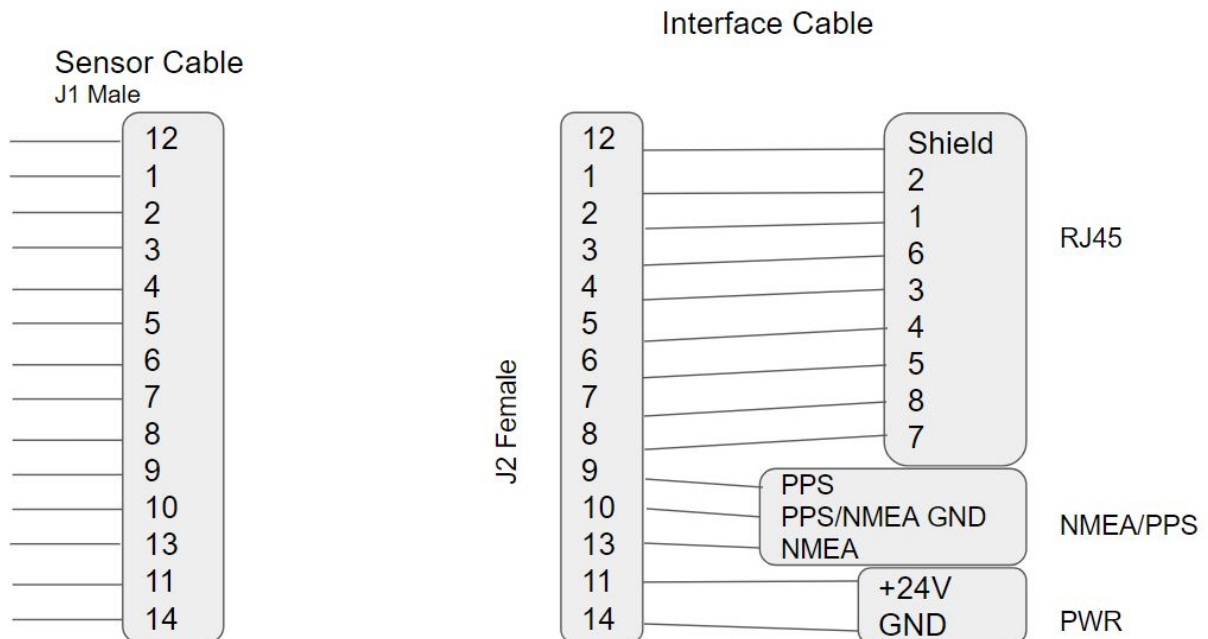
1	2	3	4	5	6	7	8	9	10	11	12	13	14
Orange	White	Green	Yellow	Blue	Clear	Brown	Light Blue	Violet	Tan or Pink	Red	Bare	Gray	Black

Power supply	24VDC/1.5A(max)
Protection	Short Circuit/Over Current/Over Voltage
Ripple	1-2%Vpp

Use Quanergy Processing Unit (QPU)
-pre configured at the factory as a complete solution that includes necessary source code, library, and third party applications.

We need also(to make it work)
Power Source
        To power the sensor, we need to do this efficiently and take the other sensors into account.(mobile battery required for all the sensors)

Mouse+keyboard+Monitor

Support computing environment.

Mounting surface

Affix the sensor(I believe the Mechanical team will probably handle this)

Ethernet switch + Power adaptor

To handle multiple sensors, Netgear ProSafe GS108 recommended

GPS/IMU module

Report position and supply the NMEA/PPS timing signals(OXTS RT3003 and VectorNav200 are supported by Quanergy)

Lidar has multiple returns(3)

Maximum, Second Strongest, and Last

Need to connect sensor to Ubunta Host computer

Page 26 really talks about the process in how to connect it

Laser Firing:

Sensor spins at 10Hz

Lasers fire at 53,828Hz

They fire at 8 different angles

(+3.2 to -18.25 degrees)

The Radar: Installation Wiring

1. Povide 24 V to Pin 1 (Battery) and Pin7 (Ignition). If using the AUT-CBL cable Pin 1 (Battery) is the red wire and pin7 (Ignition) is the white wire.
2. Connect Pin 4 (CAN Ground) the black wire on the AUT-CBL to ground.

Pin Number	Singal	Port Color
1	Battery (+24V)	Red
2	USB D+ (Green Wire)	Green (USB)
3	USB D- (White Wire)	White (USB)
4	Ground	Black
5	USB Ground (Black Wire)	Black (USB)
6	PRVCANL	Green
7	Ignition (+24V)	White
8	USB +5V (Red Wire)	Red (USB)
9	VEHCAN L	Blue

10	VEHCAN H	Brown
11	VEHCAN Shield	
12	PRVCANH	Orange
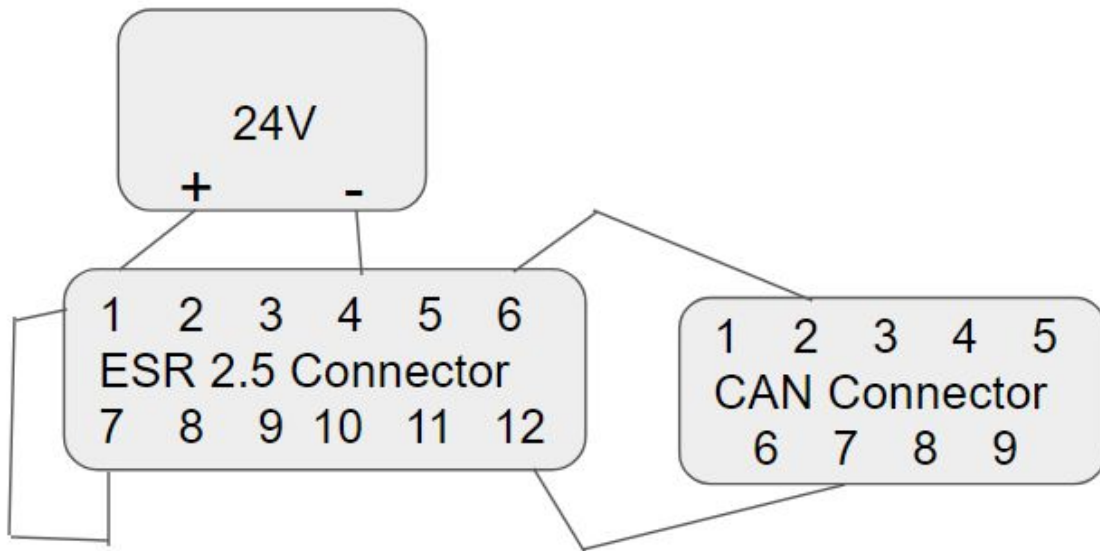
MT Software Suite

The MT Software Suite is a set of software components that can be used to communicate with the MTi and to perform more high-level routines, such as logging, exporting, a magnetic field calibration and updating of firmware. Three programs with GUIs that are important to us are Firmware Updater, Magnetic Field Mapper and MT Manager. These programs offer the possibility to configure the MTi in a very easy way. The MT Manager also can be used to communicate with MTi. The MagField Mapper is also available as SDK for integration into another application.

Individual Contributions (9/3~9/9)

Team Member	Contribution	Weekly Hours	Total Hours
Brad Stiff	Researched ways to install Linux on personal machine. Ending up putting Windows into	4	8

	developers mode and installed Ubuntu. Played with Ubuntu in Windows file system.		
Jose Candelario	Looked up information on the Lidar we were using and how to power it up.	2	5
Junho Chun	Got familiar with Radar to define powering and connections.	3	7
Justin Wheeler	Went over the whole project as a whole and had our parts defined. Started looking into ROS which is going to be used for this project.	2	3
Sang Uk Park	Started looking into the connection needed for the radar as well as other equipment we may need.	3	9
Yifan Lu	Got familiar with GPS and looked into its data sheet. Researched the specs of GPS such as power supply level and output data type. Met with client and advisor to discuss more about weekly milestones.	2	6
Zhize Ma	Go through the data sheet of camera, talk about weekly milestones	5	8

Next Week Goals:
Must get contract signature from the sponsor and rest of the group members. We must also plan a meeting with the professor next week. Try getting more data on each sensor and start planning meetings with other groups to know what they will be specifically doing with each sensor.