

# CANtech.

## AGENDA

June 10, 2020

19:00-19:30

Zoom Meeting (Video Conference)

**Purpose of Meeting:** Progress review meeting to discuss the scope and general outline of Capstone team 8 project idea, CANtech.

### **Items for Discussion:**

- Persuasive introduction, background and scope (2 mins)
- Market outline, outlining target market and size (1 min)
- Progress, outlining completed research and planning (2 mins)
- Risk and remediations, and schedule compensation (2 mins)
- Question period and followup discussion (8 mins)

# CANtech.

## MINUTES

June 10, 2020

19:00 - 19:30

Zoom Meeting (Video Conference)

### Present:

- Choong Jin Ng - Project Lead
- Takehiro Tanaka - App Design Engineer
- Enes Yazici - App Design Engineer
- Win Aung - Hardware Engineer
- Nicholas Lau - Software Engineer
- Ranjoat Chana - Systems & Requirements Engineer, Communication Officer
- Craig Scratchley (Teacher)
- Mohammad Akbari (TA)
- Chakaveh Ahmadizadeh (TA)

**Absent:** Andrew Rawicz (with regrets)

**Purpose of Meeting:** Progress review meeting to discuss the scope and general outline of Capstone team 8 project idea, CANtech.

### Minutes:

Jin called the meeting to order at 19:08. A video recording of the meeting was made with consent from all participants. The agenda items discussion began at 19:11.

#### A. Team Introduction

*Team members introduced names and roles in the project.*

**Discussion:** *Jin* was introduced as the Project Lead, *Takehiro* and *Enes* as the Application Design Engineers, *Win* as the Hardware Engineer, *Nicholas* as the Software Engineer, and *Ranjoat* as the Systems Engineer and Chief Communications Officer.

## B. Persuasive Introduction and Background of the Project

**Discussion:** *Jin* went over the background of OBD-II, current features, and issues of available products. Then, he gave the motivation of the product, and how this will be the solution.

**Key Points:**

- OBD-II used to tap into vehicle system for diagnostics
- Commercial solutions are expensive, lack features and are non-customizable
- Our product is an open-source hardware and software platform, making it customizable
- The CAN-Bus reader reads data from the car and sends it to a smartphone via a Bluetooth connection

## C. Marketing Outline

**Discussion:** *Ranjoat* discussed the targeted market, and audiences as well as the advantages and disadvantages for the product compared to similar products already on market.

**Key Points:**

- Today's consumers tend to keep their vehicles longer and are more aware of automotive aftercare
- Market segment of vehicle owners and hobbyists interested in customising our base product design (open-source option)
- Market segment of vehicle owners who can use base product features (software app and hardware) as is

## D. Current Progress Updates

**Discussion:** *Nicholas* talked about the brief information on what is CAN Bus, OBD-II and researches done on different CAN protocols. *Win* presented the requirements for the product, acceptance testing plan, and acceptable performance.

**Key Points:**

(*Nicholas*)

- CAN is a peer-to-peer network. There is no master that controls when individual nodes (ECU) want to read/write on the CAN bus.

- Further research is required to decide upon which protocols to use.
- (Win)
- The product has 2 subsystems: CAN Bus reader and smartphone app.
  - The DUT includes personal or rental vehicles for acceptance testing.
  - The product decodes messages in real-time while maintaining bluetooth connection inside 10m distance.

## E. Risk and Remediation

**Discussion:** *Enes* noted the risks of using a real car for testing of the product. He also mentioned the team's strategies for dealing with future problems. *Takehiro* outlined the risks of hardware design especially the feasibility of custom hardware design. He also noted the limited access to lab equipment.

### Key Points:

(Takehiro)

- Research design complexity and components like CANbus shield early to capture actual feasibility
- Potential access to personal lab equipment, unknown required access due to COVID-19 restrictions and possible solution to these limitations

(Enes)

- There is potential risk to vehicle CAN-bus system, so a test simulator can be utilized (use available or build new one)
- Our product being read-only eliminates some of that risk
- The team will reallocate resources as needed to maintain planning schedules and consistently measure progress

## F. Question Period and General Followup

**Discussion:** The team, teacher, and ta's ask follow up questions and outline key points related to the capstone idea presentation

- *Chakaveh, Craig* mentioned some parts of the presentation were not audible and recommended including presentation slides to help visualize ideas for future meetings

**Action:** Ranjoat will share a powerpoint with the team to collectively add slides for the next progress review meeting by July 6th

**Discussion:**

- *Mohammed* did not have any questions as major discussions were cleared in office hours
- *Craig* asked the team to clarify that we will be testing on personal vehicles and how testing on car sharing would work
  - *Ranjoat* confirmed for members who don't have access to cars for testing we will verify if Evo Car Share allows customers to access OBD-II connectors

**Action:** Jin will verify that Evo car sharing does not block access to OBD-II port for purposes of testing by week of July 6th

**Discussion:**

- *Craig* asked the team what open-source license our product would use for hardware and software.
  - *Takehiro* confirms the team is undecided and will do more research to choose the most applicable license
  - *Craig* notes there are a bunch of creative commons licenses, and the hardware can be published with some creative commons licensing. If it's completely open, people could take your design and sell it. He suggests that we might want to put some conditions on our license. However, *Craig* commented that it is nice to be open-source if you don't mind donating your work to some degree.

**Action:** Jin will research the licensing options for hardware and software by June 14th for requirements document

**Discussion:**

- *Craig* notes that *Nicholas* said some cars have added extensions for protocols that vary across manufacturers and may not be public. Your product being open source can allow some people, representing car manufacturers, to work with your platform to perhaps write a module that supports a car from their manufacturer.
  - *Nicholas* confirmed that this could be the case
  - *Craig* mentions that a potential solution is for the manufacturer to provide a compiled library that can be used by our product. This would mean that we wouldn't have the source information, but could still read the CAN Bus data

**Action:** Nicholas will research and investigate options for protocols and supported extensions by week of July 6th for design document preparation

## Discussion:

- Craig asked the oldest vehicle that can support our product
  - Jin confirms it was made mandatory in the US in 2008 and onwards and more research will be needed
  - Jin also notes that some cars made before 2008 supports CAN Bus but it is limited in scope. While OBD-II would work, it is unclear if the product will work on older vehicles.
- Craig notes that CAN Bus itself is old.
  - Jin confirms that before the US government made it the new protocol for OBD-II that the technology has been around.
- Craig asks about when OBD-II was implemented?
  - Enes explains that it started in 1996.
  - Jin briefly went over the history of OBD-II and how it came into being.
    - Key points:
      - Before OBD-II, standards of engine diagnostics were not universal across cars.
      - OBD-II was the collection of needing to test emissions and making car diagnostics universal.
      - CAN Bus is just a new development to modernise OBD-II.
      - Cars after 2008 support CAN Bus.
- Craig introduces the idea of keeping track of information in the app related to car maintenance and when service time is approaching. For example, based on how far it's driven (odometer data), can this data be extracted to determine engine oil or timing belt maintenance.
  - Jin confirms this is possible but has not been considered as a key feature yet. The team will need to look into it and what type of data manufacturers make available
- Craig comments on the project being open source allows for and may encourage manufacturers to make this type of vehicle information available
  - Takehiro confirms the team will consider adding this functionality

**Action:** Ranjoat to research adding maintenance features and service updates based on odometer readings in software application by week of July 6th for design document preparation

**G. Next Meeting Date:**

The next meeting was arranged for July 8th, 2020 from 19:00-19:30 via Zoom Meeting.

**H. Other Business**

Format and finalize requirements specification document for June 14th.

**I. Summary of Actions Items**

- **Jin** will research the licensing options for hardware and software by **June 14th** for requirements document
- **Ranjoat** will share a powerpoint with the team to collectively add slides for the next progress review meeting by **July 6th**
- **Jin** will verify that Evo car sharing does not block access to OBD-II port for purposes of testing by **week of July 6th**
- **Nicholas** will research and investigate options for protocols and supported extensions by **week of July 6th** for design document preparation
- **Ranjoat** to research adding maintenance features and service updates based on odometer readings in software application by **week of July 6th** for design document preparation

Meeting was adjourned at 19:32 due to extended question period discussions.