



## Participant handbook

### C-ITS Harmonisation Project

Last updated: October 28<sup>th</sup>, 2025

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### Introduction

Welcome to the Co-operative Intelligent Transport Systems (C-ITS) project. This handbook provides essential information to help you understand the research project and your role as a participant in the project. This includes information on what you will need to do and what you will experience as part of the research project.

The technologies installed in your vehicle will provide real-time alerts regarding road safety and traffic efficiency. It is important to understand the devices and the alerts you will encounter during your participation.



1 C-ITS vehicles

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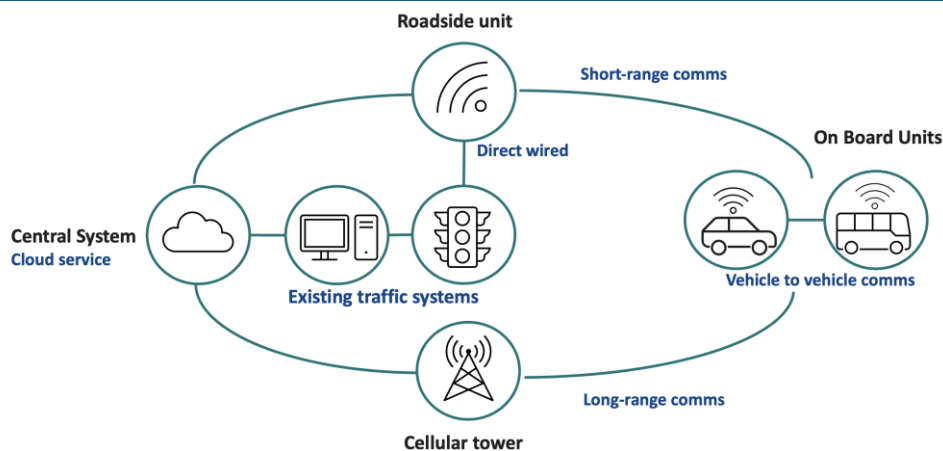
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## 1. What is C-ITS?

Co-operative Intelligent Transport Systems (C-ITS) are a suite of technologies that use sensing and wireless communication to enable road users and traffic infrastructure to share information in real-time. This should allow for drivers to make better decisions, by providing them safety information before they or their vehicle may be able to recognise it, enhancing overall traffic efficiency and safety.

### Key components:

Component	Location	Description
<b>On-Board Units (OBUs)</b>	In vehicles	OBUs include the screens in vehicles to provide drivers information and the other devices that collect and transmit data such as vehicle speed, location, and status.  OBUs receive alerts and information from roadside units (RSUs) and other vehicles to inform the driver of potential hazards or traffic conditions.
<b>Roadside Units (RSUs)</b>	Intersections	RSUs communicate with OBUs to provide information about traffic signals, road conditions, and hazards.
<b>Central Traffic Management Systems:</b>	Cloud (online)	These systems collect and analyse data from OBUs, RSUs and other traffic systems to monitor traffic conditions and manage traffic flow.  Central systems can send alerts and instructions via cellular or directly via RSUs to vehicles to improve safety and efficiency.



### 2. C-ITS system connections

## 2. The C-ITS Harmonisation Project

This project takes place at around 30 intersections across five key corridors in inner Melbourne. Intersections are equipped with sensing and communication capability to continually transmit live information about traffic and safety for road users.

Testing C-ITS in a busy urban environment will enable the assessment of how these emerging technologies can create benefits and guide future deployment in our cities. The findings from this project will inform recommendations to support Australian road authorities' adoption of C-ITS nationally.

### 2.1 Your experience as a participant

As a participant, you will drive as you normally do with a device installed in your vehicle. At the start of each drive, you will need to select your name or driver number on the installed screen. During the drive, you may notice warnings appearing on your installed screen, mostly around intersections within the test bed, but some may also appear outside of it.

You should note these warnings as you drive, but not depend on them as you are in charge of the vehicle and false alarms may occur. You will be asked to complete a few surveys at specific points during the research about these warnings and how they may have changed your driving, for which you will be reimbursed.

### 2.2 Phases

The project contains three key test phases, each will span approximately 3 months and may introduce additional safety alerts for new situations. During each phase, you will be invited to respond to 3 short surveys and 1 long survey to collect information on your experience in the project (see section 7 for more information).

Phase one	Phase two	Phase three
Phase 1 use cases		
	Phase 2 use cases	
		Phase 3 use cases
<ul style="list-style-type: none"> <li>Red light violation warning</li> <li>Pedestrian turn assist warning</li> <li>In-vehicle speed limits</li> <li>Hazard ahead warning</li> </ul>	<ul style="list-style-type: none"> <li>Pedestrian turn assist warning with video analytics</li> <li>Level crossing entry warning</li> </ul>	<ul style="list-style-type: none"> <li>Public transport priority calls</li> <li>Emergency vehicle priority calls</li> </ul>

3. Project structure & tested safety warnings

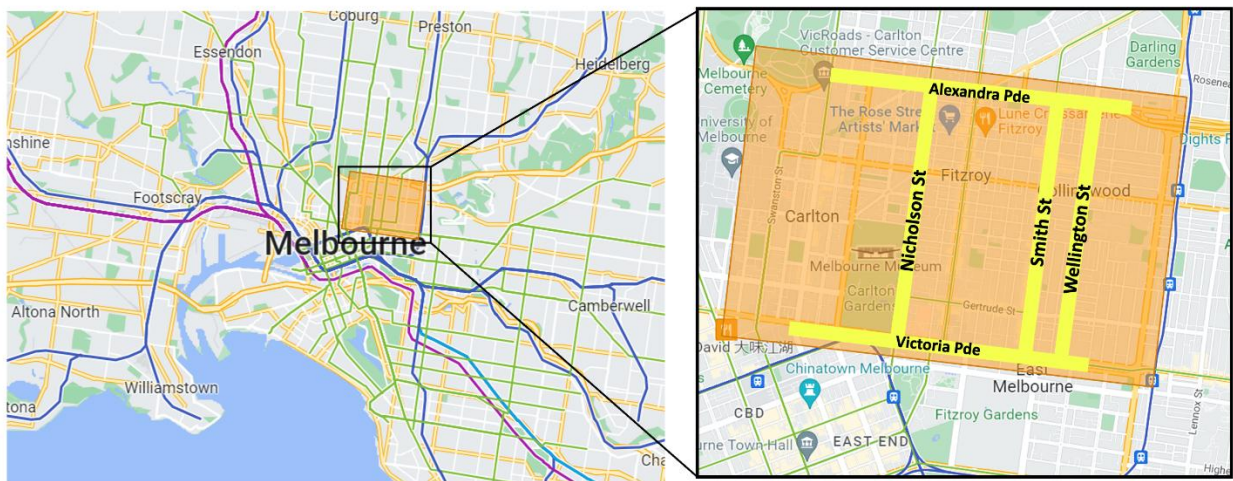
Prior to Phase One, there will be a several weeks long **Device Calibration Period**. During this period, you will be required to interact with the system to record your driving trips, but no explicit safety alerts will be provided to you. This is to ensure the installed devices are functioning correctly prior to enabling the safety alerts.

**NOTE:** The timeline shown in figure 3 is only for general reference, you will be contacted via email to confirm your continued participation at the end of each phase.

### 2.3 Location

The AIMES testbed area where the project takes place is shown in the map below. The safety messages and warnings will mostly occur when you are driving within the corridors highlighted on the map. However, some safety messages will also function outside of this area. There will be five corridors with intersections equipped with C-ITS technology to generate safety messages:

1. Victoria Parade between Hoddle and Rathdowne
2. Alexandra Parade/Princes Street between Hoddle and Rathdowne
3. Wellington Street between Victoria Parade and Alexandra Parade
4. Nicholson Street between Victoria Parade and Alexandra Parade
5. Smith Street between Victoria Parade and Alexandra Parade



4. Map of the primary test zone

### 3. Installed Hardware

To be able to receive warnings, three hardware devices will be installed in the vehicles participating in the project which make up the OBU:

- **The vehicle station.** A control unit typically installed out of the driver's view, typically under the driver's seat for standard vehicles.
- **The Human Machine Interface (HMI).** A touchscreen device attached to the dashboard/windscreen of the vehicle via suction cup, much like a typical aftermarket GPS system.
- **Antenna(s).** It enables the vehicle station to communicate wirelessly with other connected devices on the C-ITS network. There may be more than one antenna installed in your vehicle.

As a combined system, these devices are referred to as the On-Board Units (OBU). They will be installed by a qualified provider at cost to the university and will be removed at cost to the university either at the conclusion of the research or at the discretion of the vehicle owner.



5. Example of the HMI installed in a vehicle

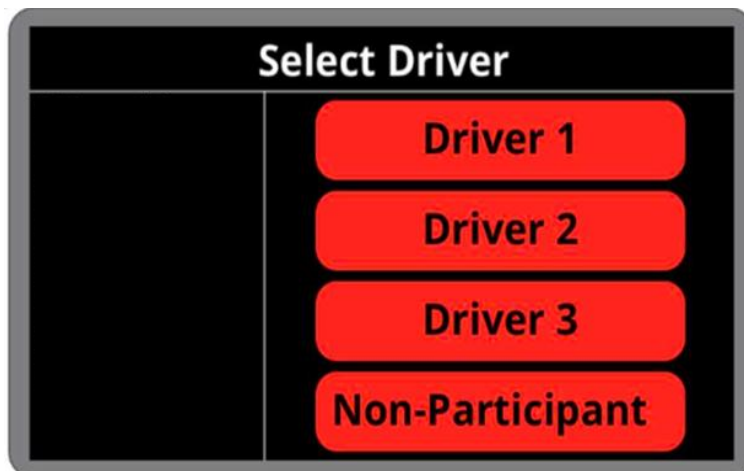
## 4. Using the Hardware – Step by Step

**Step 1:** Start your vehicle as you normally would, at which point the display will boot up as well.

**Step 2:** On start-up of the system, there will be an audio and visual acknowledgement of the HMI booting up followed by the driver selection screen where you may interact with the device. Once a driver has been selected, the HMI will enter a short signal acquisition phase (up to two minutes). During this time, the HMI's screen may be blank, and no warning services will be available. You will not need to interact with the HMI in this phase, it will automatically start to provide warnings once signals have been fully acquired.

Note: If your HMI fails to boot up, display the correct screen, has any visible damage, or becomes inoperable in any way, please alert the participant manager at **[CITS-Harmonisation@unimelb.edu.au]** as soon as possible.

**Step 3:** At the beginning of each drive, you must use the HMI's touch screen to select your driver ID number (**figure 6**). Once a driver ID is selected, the trip data will be automatically recorded, you will not need to do anything at the end of the trip.



*6. Driver Selection Screen of the HMI*

Note: Up to four drivers can be registered to each device in a vehicle. If you are one of these drivers, you will have a unique driver ID that you can select to on the screen.

**Step 4:** Drive as you normally would, obeying all traffic laws whilst also noting any warnings that are displayed on the device.

**NOTE:**

**Actual Conditions; Assumption of Responsibility:**

When using the device installed in your vehicle, you may find the actual road conditions differ from the warnings or the information displayed. You must always exercise independent judgment visually before acting on it. The University of Melbourne is not responsible for any distractions caused by the device, and you use the device at your own risk. As the driver you are responsible for obeying all road laws and maintaining control of your vehicle at all times.

*4.2 Driver data consent:*

1. Full information collected (Per trip)

- a. Once you start the vehicle, you will be prompted to select which of these 4 drivers you are, and this trip will be recorded as that driver. Your actual name is not used or stored as information; however, a driver ID will be attributed to them to ensure that we are able to analyse driving behaviours of different kinds of users. This driver ID will be provided to you. For more information, please see section 6 “Participation and Data Collection” of this handbook.

**NOTE:** If you select the wrong driver ID – start over by unplugging the device and plugging it back in.

2. Partial information collected (Per trip)

- a. If you do not wish to be registered to the trip you are undertaking OR you forget to select which driver you are OR you are not one of the pre-registered drivers, then the trip will still be recorded, but there will not be any driver attributed to that trip. This is done by either not interacting with the device upon start up or selecting that you are a non-participant.

3. No information collected (per trip)

- a. If you do not wish the trip to be recorded at all, you are able to unplug the OBU (typically plugged into the cigarette lighter socket), and the trip will not be included in the research. Please remember to reconnect the OBU again at the end of your trip.

**NOTE:** If other drivers of the vehicle are to drive the vehicle, you will need to inform them that their data will be tracked if they don't unplug the OBU, but no personal details of unregistered drivers will be recorded.

## 5. Messages and Alerts

Messages will be displayed on the screen in your vehicle. Alerts will only be generated on the screen in scenarios where the on-board unit determines you may need to act. For example:

You are approaching an intersection which has just changed from green to red. The computer determines, based on the intersection status of red, as well as your speed, trajectory, distance to the intersection and lane position, that you may be at risk of running a red light. The screen then displays a warning. If you reduce your speed sufficiently, that warning will be dismissed, however, if your speed does not decrease sufficiently, stays the same or increases, the warning will still be present until you stop, or pass through the intersection.

### **NOTE:**

This project is a research trial, the technology may not be perfect and may generate inaccurate messages or false alerts. It is important to remain vigilant. Do not blindly follow the HMI's safety messages. You are obligated to confirm the validity of the warnings before proceeding. You are also still obligated to obey all road laws. However, data collected in this project will not be directly used to prosecute you for road law violations (see section 6 for more information).

If you are noticing an excessive rate of inaccurate messages or false alerts, please alert the participant manager at **[CITS-Harmonisation@unimelb.edu.au]**.

### 5.1 HMI Screen Displays:

Once you have selected the Driver ID, you will not need to touch the screen for the remainder of the drive. From then on, the screen will have 3 potential display types:

#### Display 1 - Nothing on the screen

During the **Device Calibration Period** (see 2.1), this is the screen you will see after logging in. **This is normal.**

If you are seeing this screen **during any other phase**, please check that the HMI is plugged in.

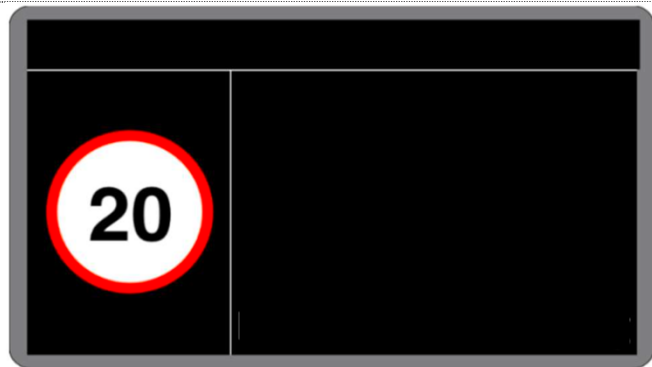
If it is, **the HMI is malfunctioning**, please alert the participant manager as soon as possible.



#### Display 2 - Speed limit only

This is the **default screen** you will see while in the trial area, with speed limits shown for the road you are driving on.

They should **automatically change for static speed limits, school zones and other variable speed signs**. If the displayed speed limits are incorrect, please alert the participant manager as soon as possible.



#### Display 3 - Speed limit and warning message

When necessary, **a warning will be presented on the right side of the screen** notifying you of a potential hazard or safety issue.

**A sound may also be played.** You should be familiar with the meanings of these symbols, which are explained below (Section 8 “Warning messages”).



**NOTE:** When you receive a warning, you do not have to interact with the screen in any way to clear it. The screen will clear automatically as you pass the event and/or change the driving speed.

Example: a red-light warning will go away if the light changes to green, or if the driver slows down indicating they will stop safely before the crossing.

### *5.2.1 How Alerts Will Appear and Sound*

- **Visual Alerts:** All alerts will be displayed on the Human-Machine Interface (HMI) installed in your vehicle. The icons will appear with accompanying messages to explain the nature of the alert.
- **Audio Alerts:** Some alerts will be accompanied by audio cues to draw your attention. For example, a soft "boop" for medium alerts and three quick "beeps" for high-priority alerts.

As some alerts do not provide an audio cue, it is recommended that you adjust the position of the HMI so that it will remain within your field of vision without obstructing your driving view.

See **section 5.2 “Warning messages”** for a full breakdown of the different alerts you may encounter when you drive through the test area with the HMI activated.

**A laminated printout of section 5 should be available in your vehicle for your reference.** Please alert the participant manager if this printout is missing.

## 5.2 Warning Messages:

Name	Information
<p><b>Hazardous Location Notification</b></p> 	<p><b>Description:</b> Alerts you to potential hazards ahead such as water on the road, road closures, debris, vehicle collisions, breakdowns, or emergency incidents.</p> <hr/> <p><b>When it occurs:</b> This alert is triggered when you approach a location with a known hazard. The data for these alerts is sourced from Vic Traffic and includes hazards on arterial roads in Melbourne. Not all hazards may be displayed.</p> <hr/> <p><b>What to Do:</b> Reduce your speed and proceed with caution. Be prepared to stop or take evasive action if necessary.</p>
<p><b>Road Works Warning</b></p> 	<p><b>Description:</b> Alerts you to upcoming roadworks, indicating that you may need to reduce your speed to the limit as posted by the roadworks.</p> <hr/> <p><b>When it occurs:</b> This alert is triggered as you approach a roadwork zone and will continue through the roadworks zone as needed. It will notify you if you exceed the speed limit within the zone.</p> <hr/> <p><b>What to do:</b> Slow down to the indicated speed limit and be vigilant for workers and machinery.</p>
<p><b>In-Vehicle Signage</b></p> 	<p><b>Description:</b> Provides real-time information about the current speed limit and other relevant road signs directly on your vehicle's display.</p> <hr/> <p><b>When it Occurs:</b> This information is continuously displayed to help you comply with speed limits and other road regulations.</p> <hr/> <p><b>What to Do:</b> Follow the displayed speed limit and other road signs to ensure compliance with traffic regulations.</p>

Name	Information
<p><b>Advance Red-Light Warning</b></p> <div>  <p><b>Red Light</b></p> </div> <div>  <p><b>Stop!</b></p> </div>	<p><b>Description:</b> First alerts you that you are likely to violate a red light at an upcoming signalised intersection. If you continue without slowing down sufficiently, a second warning and an alert noise will be triggered.</p> <hr/> <p><b>When it Occurs:</b> This alert is triggered if you are approaching a traffic light at a speed that may prevent you from stopping safely.</p> <hr/> <p><b>What to Do:</b> Reduce speed immediately and prepare to stop. Pay close attention to the traffic signal ahead.</p>
<p><b>Pedestrian warning – Left Turn/Right Turn Protection</b></p> <div>  <p><b>Pedestrian Crossing</b></p> </div>	<p><b>Description:</b> Alerts you to the potential presence of pedestrians or cyclists at an upcoming signalised intersection where you intend to turn left or right.</p> <p>The system determines your intention using a combination of your speed and lane position, it does not detect the use of your turn indicators.</p> <hr/> <p><b>When it Occurs:</b> This alert is triggered at intersections with pedestrian crossings, especially when the pedestrian crossing button has been pressed.</p> <p>NOTE: if a pedestrian button has been pressed, but the pedestrian has already crossed or decided not to cross, the alert may still be triggered.</p> <hr/> <p><b>What to Do:</b> Slow down and look for pedestrians or cyclists before making the turn. Yield to any pedestrians as required.</p>

## 6. Participation and Data Collection

Data recorded as part of this experiment is only to be used for research purposes. Drivers or operators will not be reported or held liable for poor driving conduct or breaches of road laws detected based on the data collected as part of this research. (This DOES NOT exempt you from being prosecuted for road law violations detected by any other means) Furthermore, no performance measurement will be shared outside of the project and will not be shared back to employers.

Vehicle telemetry data will be collected from the on-board C-ITS device on each test vehicle to support the analysis of C-ITS on safety and efficiency outcomes. Data categories include:

- Vehicle Speed
- Vehicle braking
- Vehicle location
- Vehicle X/Y axis rotation
- Vehicle ID (encrypted)

The collected data will be anonymised and securely stored in Amazon Web Services' (AWS) dedicated cloud platform for the purpose of the research. In the event of a data breach, no personally identifiable information such as name or email will be in the exposed data.

Your email will be the singular piece of personally identifiable information linked to your Driver ID. This data is strictly for allowing us to send you emails for surveys and compensate you for completing these surveys. To protect your privacy, this information will be managed by the participant manager, who will keep it store securely and separate from other aspects of the project. This information will not be used by researchers and will be destroyed at the conclusion of the project.

Furthermore, the participant manager is strictly bound by a Non-Disclosure Agreement (NDA), research ethics approval (reference number: 2024-29391-54145-4), and Privacy Impact Assessment (PIA) training specific to the project so as not to disclose any information collected as part of the project.

## 7. Surveys

The surveys will be conducted via the platform Qualtrics as follows:

1. A pre-deployment survey, to collect information relating to your experience with vehicles, safety messages in vehicles, signage on road etc. It will also ask for some basic demographic information such as your age, gender, and years driving. This should take 15 minutes.
2. During each phase, we will seek to conduct three short surveys, which will collect information on your experience while driving with the C-ITS equipment in the vehicle. You will be provided these surveys after your 1<sup>st</sup> warning event, 10 independent days logged, and 25 independent days with the installed hardware fully activated and logged in as the correct driver via the HMI touch screen. You are expected to complete these drives over a several months period. There is no upper limit to how many drives you may record in total.

**NOTE:** You must be logged as the correct driver for the drives to count.

3. Following the conclusion of each phase, we may seek additional feedback from you on your experience with the technology, what you would change, feedback on what use cases had the greatest or worst impact on your driving and any other comments.

### Reimbursement:

For your participation in the project, you will receive compensation in the form of gift cards, payable upon the completion of each survey.

**NOTE:** Apart from the initial pre-deployment survey, you must select your driver number on the display to qualify for survey reimbursement.

Survey type	Estimated time	Reimbursement amount
Pre deployment survey	15 mins	\$200
<b>Repeats for each test phase</b>		
1 <sup>st</sup> event survey	5 mins	\$20
10 independent days logged survey	5 mins	\$20
25 independent days logged survey	5 mins	\$20
End of Phase survey (only for those who have driven 25+ independent days while logged into the HMI)	15 mins	\$40

The reimbursement will be manually processed and sent as e-gift cards to your contact email. Please allow for up to 5 business days to receive the reimbursement after completing a survey.

## 8. Contact Information

For any questions or support regarding your participation, please contact the Participant Manager at **[CITS-Harmonisation@unimelb.edu.au]**.

## 9. Frequently Asked Questions

### **What if I do not want to record a drive?**

You can opt out of a drive being recorded against your Driver ID by not selecting any driver or selecting “non-participant” on the HMI.

You can opt out of a drive being recorded at all by unplugging the OBU at the beginning of your drive.

### **Why does it take so long for the HMI to boot up?**

The OBU uses advanced GPS enhancement techniques to achieve high positioning accuracy. To ensure the system has enough time to initialise, there is a built-in delay after you select the driver ID. During this time, the HMI screen may display a blank grid. This is normal and please allow a few minutes for the HMI to fully boot up. You may begin driving before the HMI is ready, but you will not receive any safety alerts during this time.

### **My HMI is blank, is it broken?**

During the Device Calibration Period of the project, your HMI will be “idle” and only display a blank grid (see section 5.1, Display 1). If your HMI is completely blank with no grid at all, it is not functioning.

Outside of the Device Calibration Period, your HMI should display a blank grid outside the test area, and at least display the local speed limit while inside the test area. If your HMI is completely blank with no grid at all, or only displaying a blank grid while inside the test area, it is not functioning.

**If your HMI is not functioning**, while your vehicle is parked, please check that it is plugged in. If it is, try unplugging it for a minute and re-plugging it. If the HMI is still not

functioning, please alert the Participant Manager at **[CITS-Harmonisation@unimelb.edu.au]** for further assistance.

### **If I drive recklessly or break road laws while the OBU is recording, will I get in trouble?**

As per our privacy policy, no personal information gathered by OBU's will be shared with parties outside of the University of Melbourne, including the police.

However, we do not condone dangerous driving, and you may still be prosecuted by the authorities for breach of road laws if detected by systems unrelated to this project.

### **What if I cannot participate for the full project duration?**

It is our hope that you can participate for the full duration of the project. However, we understand that it is a lengthy commitment, and you may have to exit the project early. In such cases, we hope that you will participate for 1 full phase (approximately 3 months), and you will receive reimbursements according to your levels of survey completion.

### **What if I will be away for an extended period during the project?**

We understand that there are many factors that may cause you to be away from driving, thus the project, for an extended period, such as vacations, temporarily working abroad, etc. In such cases, you may remain on the project, but may be ineligible for some surveys, thus some of the reimbursements due insufficient number of trips recorded.

If you are concerned about the effect of your extended leave on your participation, you can discuss it in detail with the Participant Manager at **[CITS-Harmonisation@unimelb.edu.au]**.

[This section will be continually updated throughout the course of the project. If you have any questions that are not included here, please contact the participant manager.]