LA TROBE UNIVERSITY | Centre for Technology Infusion
BRINGING IDEAS TO LIFE

Mind the Gap

Project Proposal Summary

Darebin & surroundings

Mind the Gap: Proposal summary

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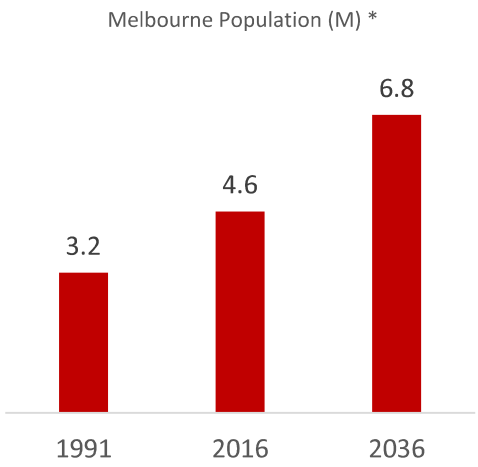
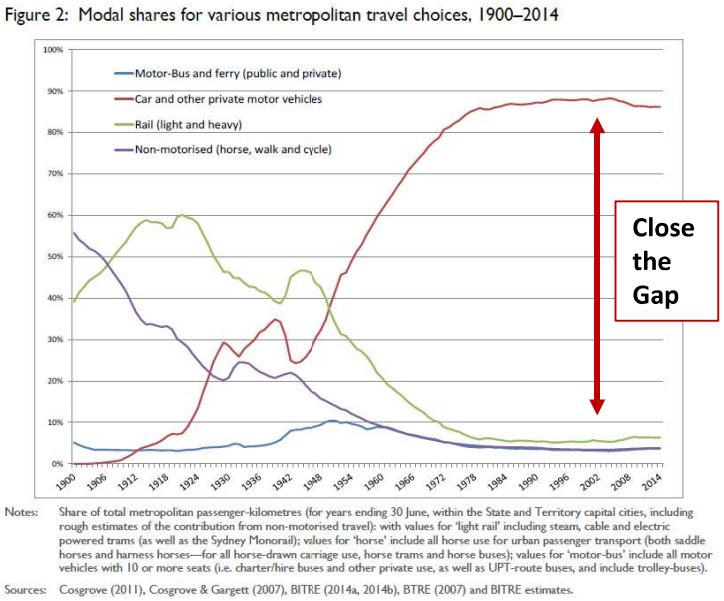
1. Why is this project needed

How to reduce individual car usage and increase shared modes of transport?

Melbourne's population is projected to double in size



The gap between individual car usage and other modes of transport



The consequence of population growth and individual car usage**

9% or 25%

Mode shift

Road capacity increase on 10% road-links

* Source: CBS, Based on linear extrapolation of '15 - '16 growth figures

** To maintain current average speeds. Source: VicRoads, 2018 – Melbourne, over 10 years

2. Project summary

Why is this project needed?

- Melbourne could grow to 6.8 M people by 2036
- No reduction of average car ownership per household
- Increased pressure on road capacity and average speeds
- Requirement to change behaviour away from individual car usage
- Requirement to 'close the gap' between demand and supply of shared transportation modes

Why is Darebin the ideal location for the trial?

1. *Darebin is host to the number 2 most congested route in Melbourne (after Hoddle street)*
2. *Darebin: 'Average travel is 14.4 kilometres in private vehicles every day and while 82% of our residents work "locally" 67% still travel to work by car."*
3. *"At the same time our public transport is overcrowded. Our main transport lines are increasingly congested, because of local population growth, and that of the fastest growing suburbs at the end of our lines"*

What are the outcomes of the program?

- An action plan: what are the top priority actions that can be implemented to reduce congestion and improve shared transport experience
- Tested new technologies:
  - Multi model transitions,
  - Ride sharing,
  - On demand shuttles,
  - Virtual priority lanes
- Fact-based, data platform for negotiation, simulation and planning
- Behavioural data: origin destination data
- Community understanding: what are the barriers and drivers

What are the critical elements to achieve mode shift?

How does this project provide the critical elements for mode shift?

1. Data

Problem	Solution
1. Lack of real time traffic data 2. Disintegrated data sources	1. Crowd sourcing data 2. Integrated data platform

2. Collaboration

Problem	Solution
Isolated initiatives	Broad collaboration: - employers - operators - regulators - local government - tech providers

4. Behavioural change

Problem	Solution
1. Emotionally, culturally rooted, irrational preferences for car ownership 2. Appeal of new solutions is hard to predict	1. Trial (not research): Longitudinal real life testing of solutions among a large sample of road users

3. New solutions

Problem	Solution
Shared transportation modes lack the convenience and perceived control of individual car usage	Test solutions leveraging today's technologies for: - Virtual priority lanes - On demand transport - Ride sharing - Priority management - Multi modal transitions

Who will lead the delivery of this project?

The Centre for Technology Infusion (CTI) is a tier one R&D Centre at La Trobe University has track record in delivering large scale technology related projects (including in ITS). CTI has been recognised by multiple Industry Innovation awards over 10 years of R&D delivery to Industry and Government clients.

* Source: CBS

2. Project summary: Low Hanging Fruit Enablers

The below enabling solutions can help drive incremental improvement

	Enablers to be developed and tested		
Objective	Optimise PT capacity to demand	Optimise PT average speed	Optimise PT user experience
Method	Optimise demand and supply: data solutions. Analyse historical traffic data from VicRoads, Google and open source data. Simulate and plan for future traffic based on growth predictions. Capture real time travel start and destinations using crowdsourced data. Use a traffic data management platform for demand response modelling: Adjust capacity of buses, ride sharing options and taxi's to off load the peak congestions.	Priority traffic lights and Virtual priority lanes. Provide public transport advantage over cars in congested area's in cost efficient manner. Plan, create and test virtual bus and tram priority lanes. Priority lanes for buses are costly infrastructure and technology can help to Optimise the use of them, or, avoid the need for separate priority lanes altogether by creating virtual priority lanes.	Collaboration: minimize congestion + over crowdedness PT Work with VicRoads, public transport operators, universities and large employers to collaboratively reduce peaks, match demand vs. supply of public transport and private road travel. Employers for instance encourage flexible start times and end times. Review and negotiate low cost tariff time (e.g., currently trains before 7 am).
Impact	Reduce congestion, improve the experience	Improve appeal of public transport by making it faster	Improve the appeal of public transport by reducing the feeling of 'over-load"

2. Project summary: Solutions

The below solutions can potentially drive step changes

	Journey Planning & Options Real time data driven mode options	Journey Control Multi-mode connections	Journey completion first and last mile
	Behavioural change **Solutions to be tested - driven by a common data platform**		
Objective	Improve public transport user experience	Improve ride sharing	Improve public transport user experience	Improve public transport user experience
Method	Holistic, real time data driven journey planning Connect real time movement data of various forms of transport including trams, buses, trains and first and last mile options Empower end users to plan based on real time information including ride sharing, last mile options	Test new ride sharing concept: the impromptu ride sharer Enable ride sharing by the click of the button, to find someone who wants to join your car to the same destination. Students traveling by car to campus could drop other students off at stations or at the destinations and earn additional funds	Multi Modal Transition Improvement Test app that allows to pre-book next mode of the journey (for instance, the bus after a train) notifying the bus driver. Provide buses with the interface and flexibility to wait when they know passengers are about to arrive at the bus stand	First and last mile: On demand shuttles/reliable pre-bookable ride sharing Test 1: On Demand PT options to provide last mile connectivity Test 2: Having a ride share (e.g. Uber, etc.) waiting for you when you arrive at the station to bring you to your destination
Impact	Improve the appeal of public transport by making it easier to control the whole journey	Reduced individual car users on the roads	Improved appeal of public transport: More control over journey	Improved accessibility of public transport

3. Activities and Outcomes

The project activities include:

- A large quantitative consumer research and trial recruitment
- Multi party co-ordination and stakeholder engagement
- Build of data-platform
  - Demand supply management
  - Demand response modelling
  - Future scenario simulation
- Priority lane management design and trial
- Integration/Build of end user apps that are driven by the data platform
- Live trials: Engage and co-ordinate Bus, Tram and Ride sharing operators
- Analysis and reporting

The project outcomes are:

- An action plan: what are the top priority actions that can be implemented to reduce congestion and improve shared transport experience
- Tested new solutions:
  - Multi model connections
  - Ride sharing
  - On demand shuttles
  - Virtual priority lanes
- Fact-based, data platform for negotiation, simulation and planning
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4. Project partners

With Darebin as the cornerstone sponsor, who will engage surrounding councils, La Trobe will be the project leader

Project sponsor & lead, app and hardware development

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Project sponsor/partner: Urban planning

City of DAREBIN

Project sponsor & partner: Trial buses and data

Dyson GROUP OF COMPANIES

Project sponsor & partner: Trial trams and data

yarra trams

Project partner: use of apps and data

UBER

Project partner: Data platform

OPTUS yes

Project sponsor

vicroads keeping victorians connected

Project partner: use traffic priority software

ADVANTECH Enabling an Intelligent Planet

Project partner:

arrb Transport Research

Project partner: access to surrounding councils

NORTHLink Networking for Economic Development

Project partner: data provider*

Intelematics CONNECTED MOBILITY

* Intelematics has indicated strong interest to be part of the project. All other partners have already provided a letter of support including their cash & in-kind commitments towards this project.

5. Project timing overview

April 2018 | May 2018 | November 2018 | June 2019 | September 2019

Set up and research

Execute contracts

Project set up: agree on goals and parameters

Set up Steering Group for Governance, define metrics to measure success and agree and roles and responsibilities

Start set up data model:
- Collate and interrogate data sources
- Data source integration and modelling

Investment logic mapping workshop

Project kick off

Milestone: Set up
Agreed project implementation plan

Data gathering
R&D Build proof of concept

End user engagement:
Conduct quantitative research
Recruit and engage trial participants.to use travel app

Collaboration and urban planning
Discuss results of quantitative data and modelling with Darebin and public transport operators to agree on immediate (future) capacity adjustments

Develop innovations
Develop new technology – end user apps
Urban priority planning
Uber: On demand, ride sharing,
Develop smart location tracker

Lab test each application

Milestone:
Approved lab tests

Trial

Install small screen with a Custom app for bus driver
Install smart GPS transponder for other transport vehicles for real time tracking

Priority planning
Simulate agreed priority lane scenario's

Engage trial participants

Conduct trials:
- Collective peak redistribution
- Priority lane modelling
- On demand
- Multi modal transitions
- Ride sharing

Monitor trial and data gathering

Milestone:
Completed trials

Evaluation and Strategy

Discuss results of Trial
Thank and inform trial participants

Assess gains made compared to baseline

Conduct cost benefit analysis of effort vs. contribution to reduction of greenhouse gas emission. Assess cost benefit of implementation at scale

Disseminate findings and recommendations to all stakeholders

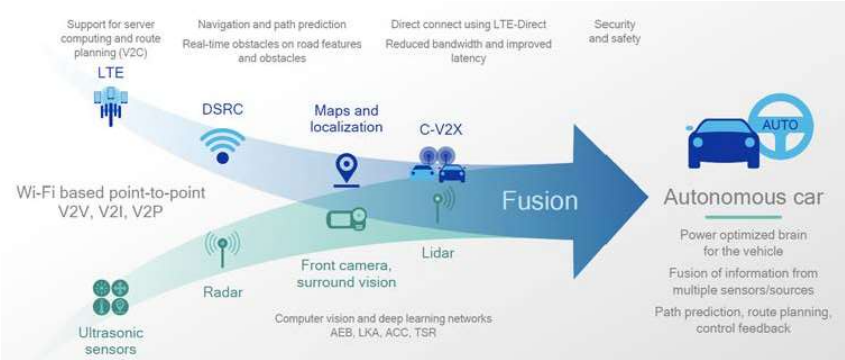
Discuss results of Trial and suggest enhancements for further implementation & roll out

Agree on further implementation and roll out

Milestone:
Approved final report

6. The Centre for Technology Infusion

Role: Project leader



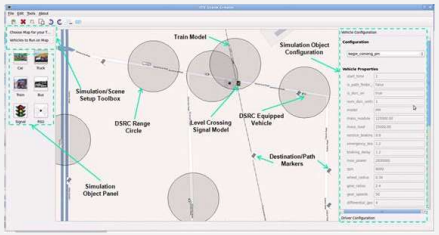
"Our Centre helps solve today's problems using new technologies. And the best way is to do that is to test technology in large scale field trials, as only then the real impact can be measured, all of the hurdles will come to light, including the human, regulatory and all the other factors that can stand in the way of technology adoption."

- Professor Ani Desai

Case study: Intelligent Transport Systems to Improve Safety at Level Crossings

Largest Safety technology trial in Victoria 2012-2013

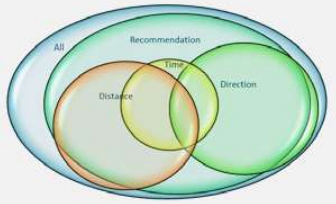
Data analysis and simulation



Safety application Development (context aware software)

Safety application: longitudinal live trials 20+ trains, 100's of cars, 2 urban, 1 rural site

Safety application evaluation



Current projects

Eastlink ITS Project
Gantry - AV communications

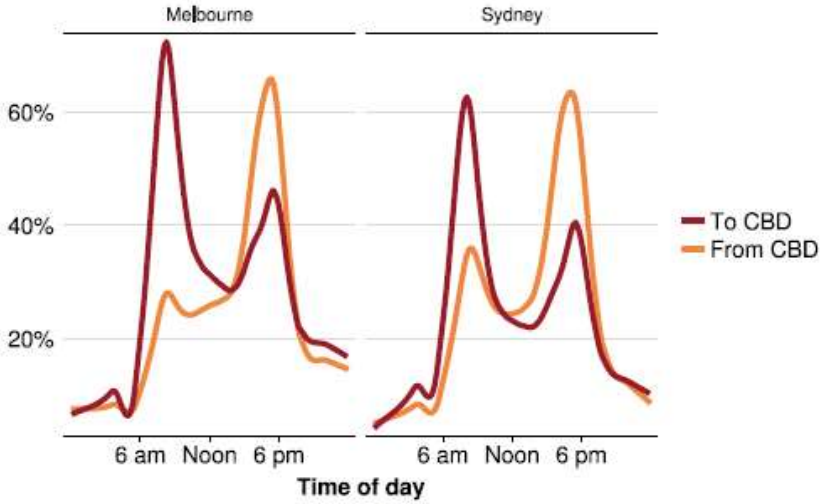
YarraTram ITS project
Virtual Priority Lanes

La Trobe Autonobus Trial

Appendix 1: Why is Darebin the ideal location for this trial

Heidelberg to CBD is the second congested route in Melbourne

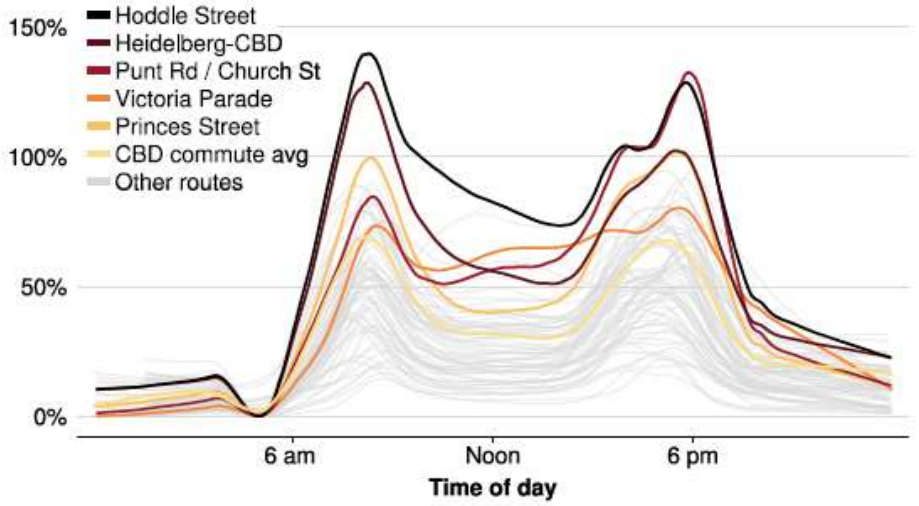
Figure 2.1: Congestion on CBD commuting trips is very similar in Sydney and Melbourne
Increase in travel time relative to free flow



Notes: Average delay is calculated as the ratio of trip duration at each point throughout the day to the minimum trip duration observed for that route over the sample period. Details of routes used here are available in Appendix C.

Source: Grattan analysis of Google Maps.

Figure 4.2: Arterial roads in suburbs immediately surrounding Melbourne's CBD are particularly delayed
Increase in travel time relative to free flow



Notes: Average delay is calculated as the ratio of trip duration at each point throughout the day to the minimum trip duration observed for that route over the sample period. Based on travel time of representative route samples collected via Google Maps available in Appendix C. Weekends and public holidays excluded.

Source: Grattan analysis based on data from Google Maps.

Appendix 2: Example inputs

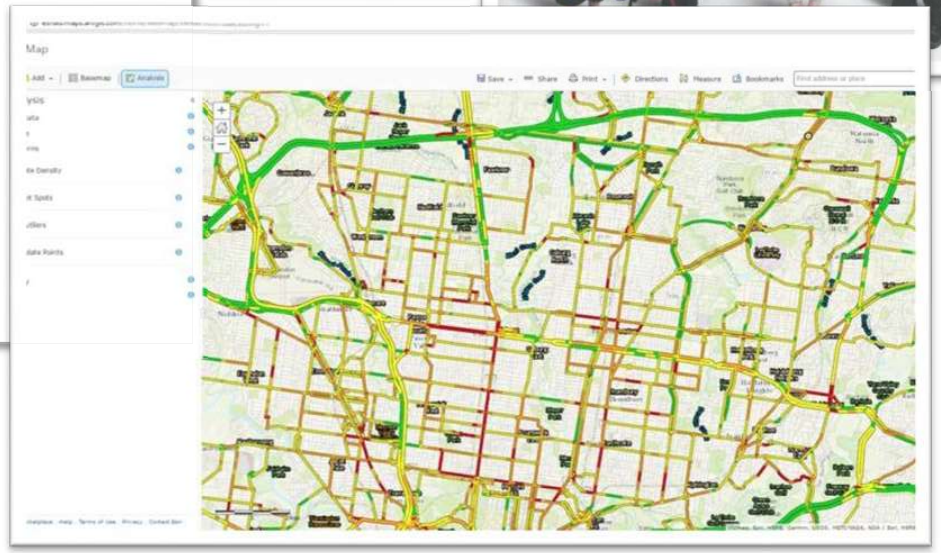
Examples open data sources

https://www.data.vic.gov.au/data/dataset/ptv-timetable-and-geographic-information-2015-gtfs

https://www.data.vic.gov.au/data/dataset/ptv-timetable-api

https://www.data.vic.gov.au/data/dataset/live_travel_time_data

PTV market segmentation study



Real time traffic modelling

Appendix 3: Example outputs

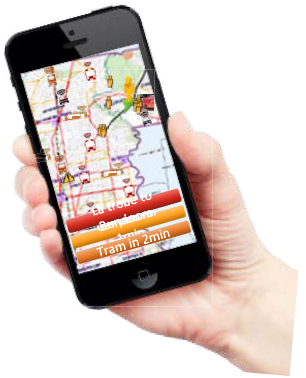
Public Transport Driver interface

Dashboard Graphical Guide System

Real time data and tracking
of bus, train, cars and tram
smart analytics

Vehicle tracking + data platform

Traveller: interface



Mobile Application including the
on demand, ride sharing and inter modal
connection services