Future Transport

A presentation for the SNUG Workshop
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WAKA KOTAHI NZ TRANSPORT AGENCY

Te Kāwanatanga o Aotearoa
New Zealand Government

Future transport

Like most countries we wave a range of wicked transport problems that we need to address

We have an opportunity to leverage new technologies and business models to transition to a smarter, environmentally friendly and safer transport system.

In order to do this, we need to know, out of the plethora of new and exciting innovations how can we best accelerate the benefits across our passenger transport and freight networks to benefit the people of Aotearoa New Zealand.

Why is Waka Kotahi interested in innovation and future transport?

The Government Policy Statement on Land Transport 2021/22-2030/31 says Waka Kotahi should:

proactively identify and remove barriers that prevent it from delivering innovation across its core business, and barriers that make it unnecessarily difficult or costly for other entities (including local government and the private sector) from advancing innovative solutions (including research) that would contribute to the objectives of this GPS

…This will also require taking a considered and deliberate approach when determining the role that Waka Kotahi should play in innovation initiatives. In some cases (where an initiative relates to Waka Kotahi core functions), this may require Waka Kotahi to play a lead role. In other cases, it may be more appropriate for Waka Kotahi to **partner with others entities in the private sector, local government or academia**

Hoe ki angitū

- Hoe ki angitū is an innovation fund
- $15m has been allocated over 2 years
- The first round is already underway

A **Mobility Lab** is the second phase of the Programme. (Still subject to funding approval)

- Designing the Mobility Lab will start in late 2022 with the aim of the Mobility Lab being operational in 2023

Hoe ki angitū

Challenge-based fund to support innovators who develop solutions that have the potential to deliver real impact for our transport system

We have selected three challenges for the first round

- How might we reduce the environmental impacts of transport infrastructure construction, operation, and maintenance activities through accelerating the use of recycled materials and sustainable practices
- How might we provide under-served communities (including iwi, rural communities and those travelling outside normal commuting times) with greater access to safe, low emission and reliable modes of transport other than the private motor vehicle?
- How might we integrate low emission first- and last-mile travel solutions into the public transport system to reduce climate impacts, congestion, and vehicle dependency?

Hoe ki angitū

- Hundreds of people took part in seminars, both online and in person to learn about the fund, and many more people contacted us directly
- 118 applications
- Wide range of applicants including community groups and iwi
- We are now assessing these and hope to announce the successful applicants in the next few weeks
- A new round of challenges is expected before the end of 2022
- These will be different than first three

The Role of the Future Transport team

- To have a greater awareness of new and emerging technologies and business models and track their development
- Identify potential benefits and opportunities for our transport system as well as the challenges they might bring
- Identify the capabilities we need to take advantage of, or respond to these, innovations

Some of the topics we are looking at

Sample topic areas

- Connected vehicles
- Automated vehicles:
  - Privately owned and operated
  - Public transport (esp automated shuttles)
  - Automated freight
- Novel vehicle types (incl aerial gondolas and micro-cars)
- Mobility as a Service (MaaS)
- Urban freight, Micro-freight
- Data – what do we need to collect and what do we need to provide?
  - Digital twins
- Embedded sensors on assets (internet of things)

Automation

Or: “Where are the automated vehicles we were promised?”

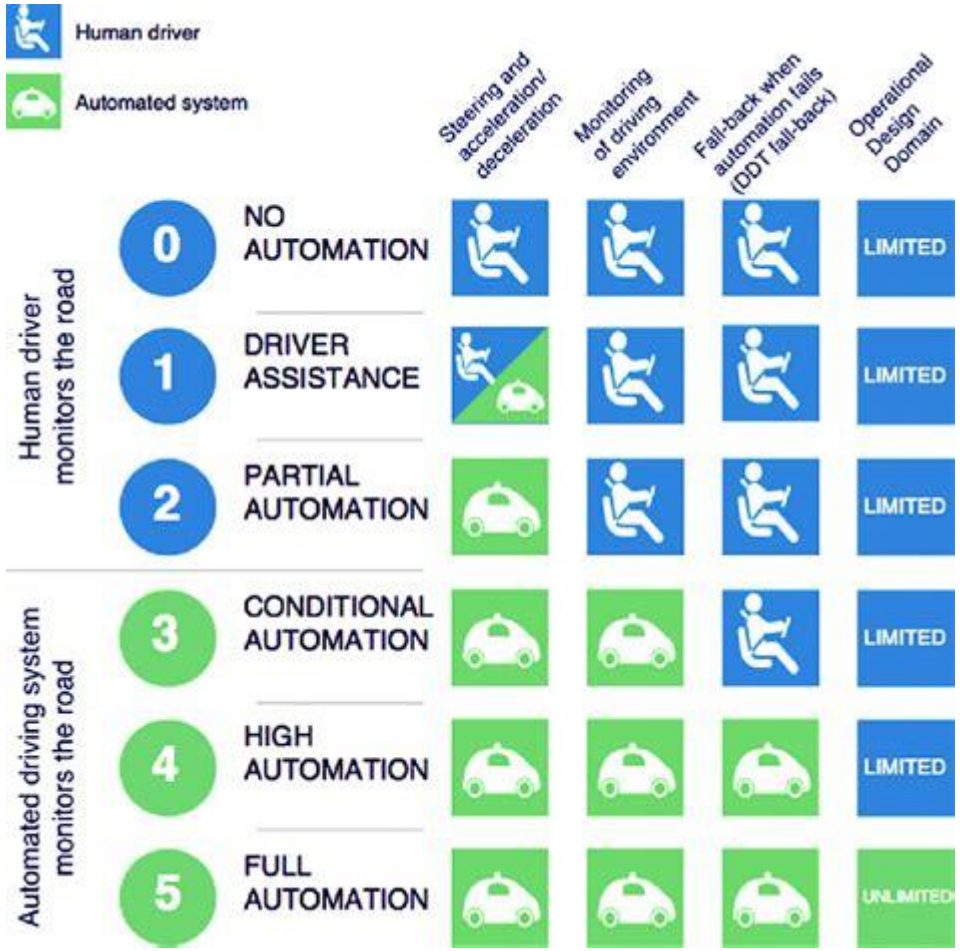
Predictions that we would have fully automated vehicles on our roads by now have clearly not come to pass

It is not certain that we will ever get to level 5 fully automated vehicles that can drive anywhere, at any time in any conditions without needing human input

There are many technical and legal barriers still to be addressed

In July 2022 Mercedes launched the first level 3 car, where the driver is not legally required to stay in control

- but it only works on some congested autobahns in Germany



Public transport and automation

The commercial deployments of automated vehicles are likely to be in public transport and freight

Small 10 – 14 speed low speed shuttles are now being widely deployed around the world

- We expect a trial in NZ soon!

Because PT works on fixed routes in cities the automation task is simpler than full L5 automation needed for so called robo-taxis being deployed in US and other countries

Automated freight is also likely to be important

COVID has greatly increased in interest in deliveries without humans

Connected vehicles continue to be developed

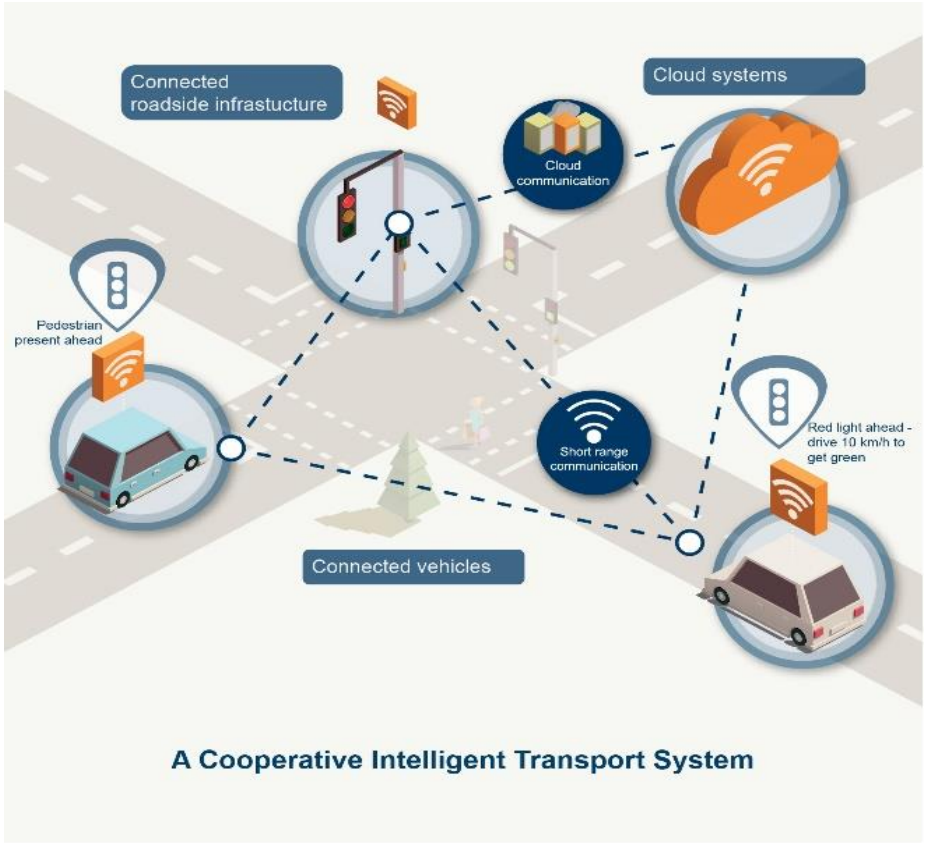
Connected vehicles or Cooperative Intelligent Transport Systems (C-ITS) are technologies that enable communication between vehicles other and infrastructure (V2V and V2X)

Signals will can be transmitted over cellular (4G & 5G) or dedicated short range communication (5.9GHz transmitters)

The technology, despite a slow start, is continuing to be developed and deployed especially in Europe

- Volkswagen has sold 500,000 cars with 5.9GHz transmitters
- Dutch have trial with 2 million vehicles

Also many trials underway including in Australia

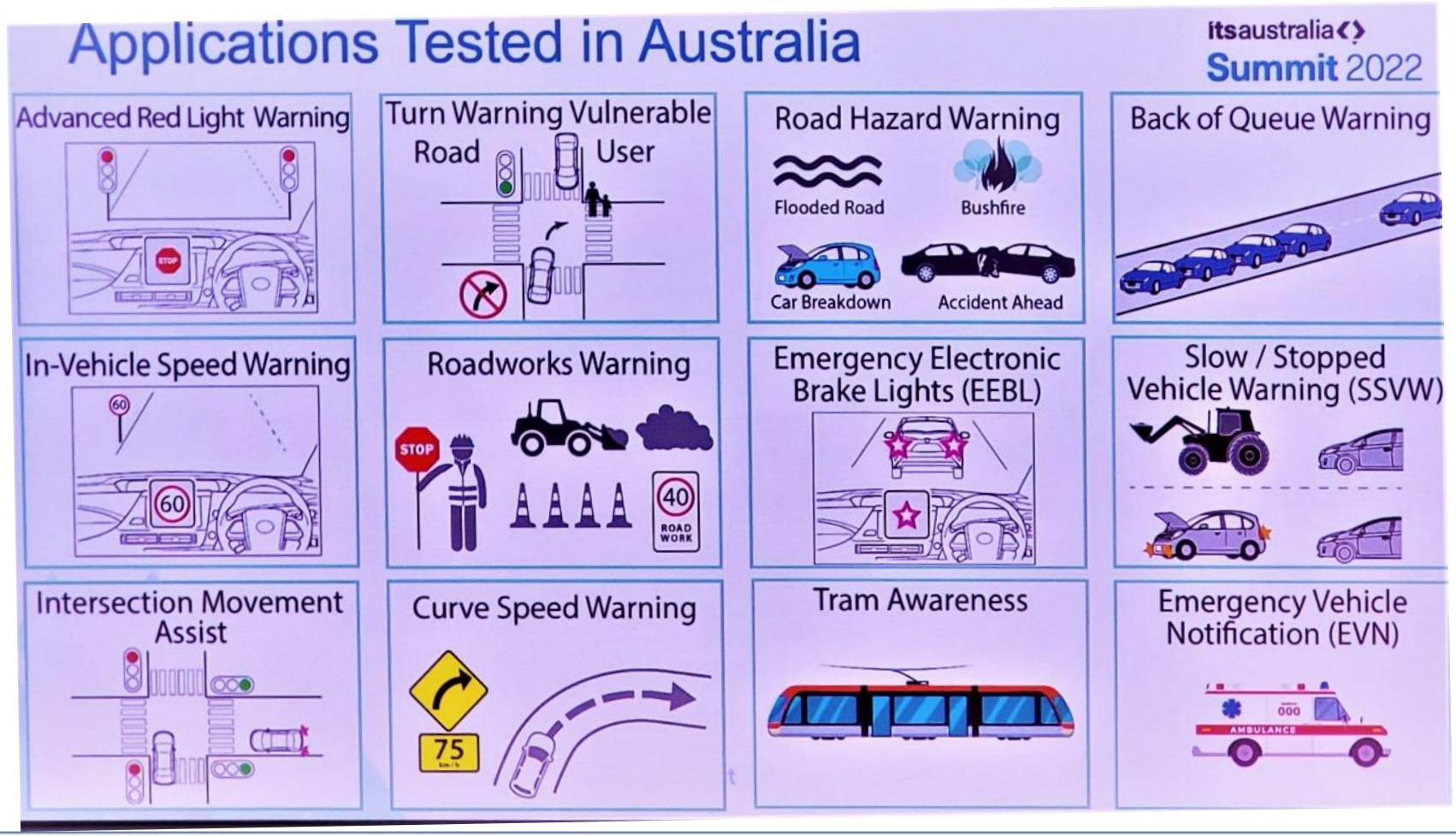


A Cooperative Intelligent Transport System

Ipswich Connected and Autonomous Vehicle Initiative (CAVI)

Two year long 350 vehicle trial in Ipswich near Brisbane

Connected vehicle (Cooperative ITS) testing



Connected vehicle trial results

- Participants were more compliant with posted speed limits in road works zones
- Participants were less likely to run a red traffic light after receiving the red-light warning
- One participant reported that the red-light warning, and particularly the alert tone, had prevented them from running a red light while driving fatigued.
- From the pilot and simulator study, the technology **has the potential to reduce crashes by up to 20 per cent** when cooperative intelligent transport systems cover 100% of the road network
- TMR recommend conducting trials as early as possible
- Transport agencies need to learn at a small scale what technologies and processes are needed for successful future deployment of C-ITS

Connected vehicle testing

- Connected vehicles are also expected to require access to highly accurate positioning information from satellites
  - including in areas where this can be difficult to receive at present, such as in built up areas (urban canyons)
  - TMR explained that one reason that Ipswich was chosen as a test site is that the land is largely flat and there are no tall buildings.
- It remains technically challenging to deploy connected vehicle technology, and many of the necessary standards are still being developed.
- There are still few vendors of the technology globally

MAAS (Mobility as a Service)

- Several Australian state governments are trialling MaaS with new apps
- The Odin pass in Brisbane is a trail open to students at the Queensland University of Technology
- NSW Opal Plus was open to 10,000 residents
- Both passes allow in-app payment for journeys that combine public transport and other modes such as taxis and e-scooters
- Both bundle a range of services for a fixed monthly price, like a mobile phone plan does

MaaS

- Aim is to get more people who are not currently using PT to use it by making it simple
- PT is to be an product of choice, not of last resort
- Odin trial saw a 25% increase in first mile/last mile travel to PT using their pass
- Both trials reported that they had seen growth in public transport usage, not just people getting cheaper travel
- Both said that the ability of public transport users to pay easily and using credit cards (not stored value like Snapper and Hop) was central to their success
- The NSW government invested A$570 million to upgrade its ticketing system and develop a dedicated app, to enable Opal+ to be deployed
- MaaS platforms provide really good data on PT usage and use of kerbsides where rides start and finish

Transport on Demand

- There were presentation from several ‘Transport on Demand’ or ‘Demand Responsive Transport (TOD/DRT) providers with results from various trials in Australian states
  - TOD is where passengers book trips in advance and share rides with other travellers
  - Usually in large vans/small buses
  - Can take people anywhere in a fixed area, not just on a fixed route,
  - Can be focused on access to a public transport station or town centre
- These are proving effective at increasing use of public transport in less-well served areas and for those with disabilities
- Presenter said that a trial in a satellite town near Adelaide had reduced demand at local park-and-ride station removing need for a costly expansion
- Examples of volunteer drivers providing community-based services using council-provided vehicles

Urban freight

Number of sessions mentioned the increase in online shopping and need to improve urban freight delivery

This is new. Micro-freight and urban freight was not being discussed at ITS conferences a few yeas ago

US data – parcels are now largest part of delivery market 131 Billion parcels in 2020 but by 2026 is it expected to reach 260 billion parcels (doubling)

Rapid growth in food and grocery delivery

Increase in delivery in top 100 global cities will result in a 36% rise in number of delivery vehicles, 11 minutes added to daily commute and congestion to increase by over 20%

For logistics companies last mile represents over half the overall costs esp wasted time looking for parking

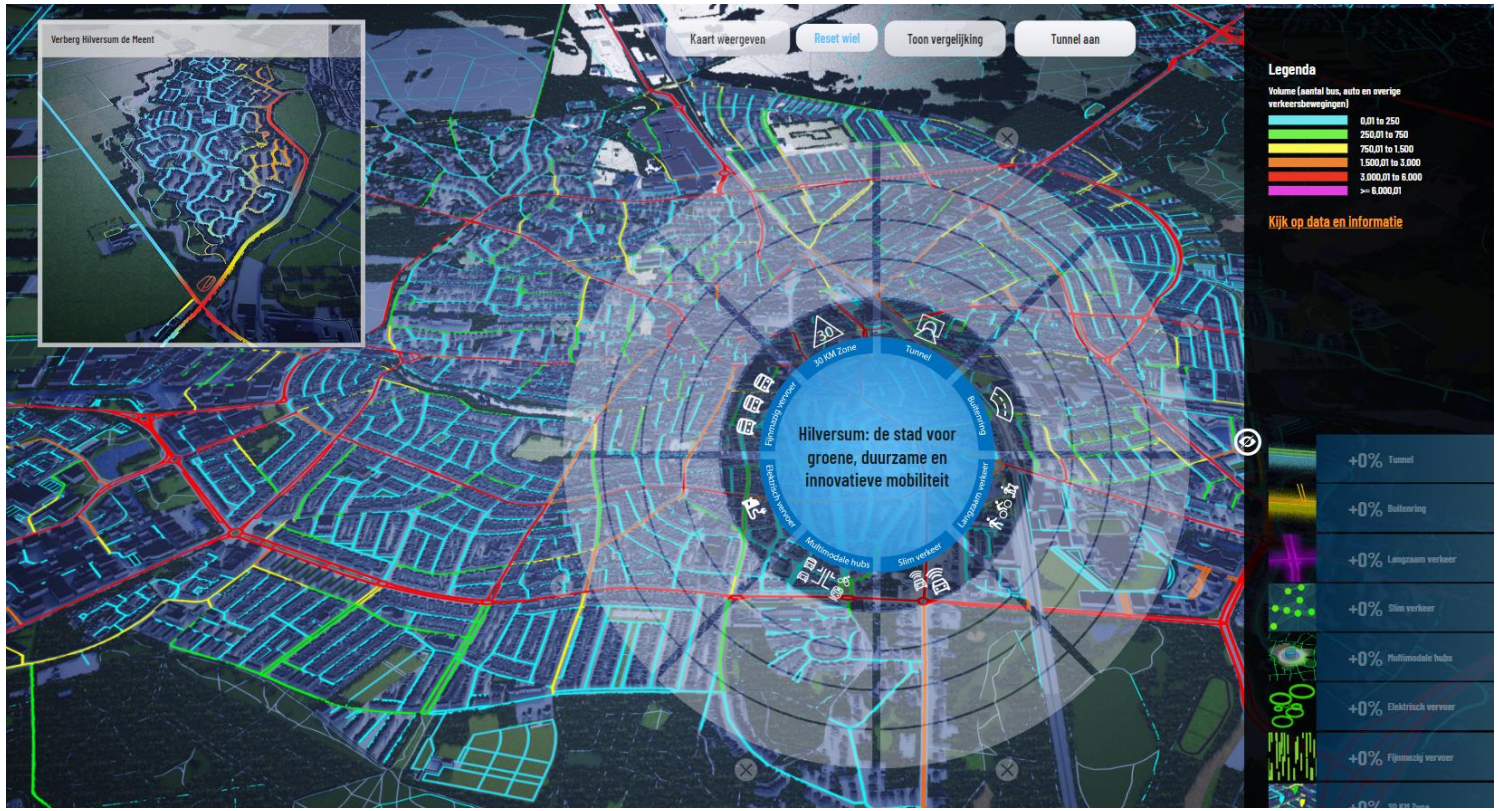
Cities need to make it safer for micro-mobility micro-freight, enable easy PUDO (pick up and drop off), provide policy leadership, enable re-moding so it is easy to break loads down

Mobility hubs

- Several speakers addressed the need to provide more options for short first and last mile travel, especially at large public transport stations
- An increasingly popular option is to deploy ‘mobility hubs’
- These group together a range of transport options for hire, ranging from e-scooters and e-bikes, to short term car hire
- Also lock boxes for parcel delivery and coffee (of course)
- Speakers said that where they are deployed successfully they greatly increased the likelihood that people would not drive to these stations

Data and 3D modelling

https://www.mobiliteitsvisie-hilversum.nl/hilversum-in-3d/



Thank you

For further information about Hoe ki angitū contact innovation@NZTA.govt.nz

https://www.nzta.govt.nz/about-us/innovations/innovation-fund/about

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