



Waka Kotahi research summary

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Using in-vehicle technologies for safe and efficient driving

How can we encourage New Zealand drivers to use technology to drive safely and more efficiently?

Advanced Driver Assistance Systems can increase safe and efficient driving behaviour. In this project, researchers asked how in-vehicle technologies could be used more in New Zealand. They reviewed the literature linking in-vehicle technologies to safety and efficiency improvements and investigated what prevents or encourages their use in commercial fleets. Then, based on logic models and stakeholder insights, the researchers developed roadmaps (diagrams) and tips for prioritising the use of certain technologies.

New Zealand's vehicle fleet

Our national fleet comprises imported new and used vehicles. At the time of this research:

- 59% of all New Zealand-registered vehicles that had been manufactured between 2008 and 2020 were new imports and 36% were used imports
- 60% of our fleet were light passenger vehicles, with 49% of these being used imports, mostly from Japan
- only 15% of light passenger vehicles in New Zealand were 5 years old or less (significant because most in-vehicle technologies have only been installed in vehicles manufactured in the last 3 to 5 years).

The researchers considered five types of factory-fitted technologies in New Zealand light passenger vehicles at the time of this research:

In-vehicle technology	Overall percentage of models with	Percentage of year 2020 new models with
Autonomous emergency braking	9%	91%
Lane keep support systems	9%	87%
Blind spot monitoring	9%	63%
Rear collision warning	14%	69%
Intelligent speed alert systems	< 1%	12%

Retrofitted technologies included electronic logbooks and fleet management telematics (which monitor vehicles using a global positioning system and other technology to plot the vehicle on a computerised map). Data wasn't being collected on the numbers of these technologies being used in New Zealand. However, the researchers estimated that around 25% of our commercial fleets had some form of fleet management telematics. If used well, both technologies had good potential to reduce crashes.

Greatest savings by technology type

Where calculation was possible, the researchers found that if the technologies under study had been installed in all light passenger vehicles between 2016 and 2020, the greatest savings in casualty crashes and their social costs were:

1. Lane Keep Support – almost \$2 billion
2. Autonomous Emergency Braking – \$420 million (including pedestrian and cyclist protection)
3. Alcohol Interlock Systems – \$401 million (the driver blows into a breath tester wired into the vehicle's starter and if any alcohol is detected, the vehicle won't start)
4. Advanced Driver Distraction Warning – \$349 million.

International research has also found risks from relying on these technologies, which include:

- passive fatigue (being disengaged from the driving task, causing slower responses to risks)
- weakened driving skills
- challenges for training and educating drivers.

The above estimates for casualty crash savings accounted for these risks. Managing these risks well would make the most of the technologies' benefits.

Results from stakeholder workshops

The researchers consulted a group of stakeholders about increasing the use of safety technologies in private vehicles. Their recommendations included the following:

- Promote the existing information on the benefits of in-vehicle technologies (eg the Australasian New Car Assessment Program, and the 'My Car Does What' website).
- Provide clear information on the technologies' costs and benefits.
- Use incentives such as tax breaks to encourage the turnover of old vehicles and purchase of newer used vehicles.
- Consider mandating the technologies in both new and used imports.

For commercial vehicles, they recommended the following:

- Ensure government contracts require the most effective technologies in their fleets.
- Encourage uptake through incentives such as tax breaks.
- Encourage and support bulk buying of vehicles for fleets, to achieve discounts.
- Highlight the health and safety benefits and savings of purchasing the safest vehicles possible for fleets.
- Encourage fleet managers to buy vehicles with optional safety technologies already installed.

Recommendations

The researchers presented these results in a 'roadmap' co-creation workshop, which led to the following recommendations for Waka Kotahi:

- Set up the working groups and advisory groups outlined in their report, with clear terms of reference and governance, to coordinate the work.
- Reform data collection processes to improve monitoring. Ensure early and effective monitoring and evaluation of technologies. This information can be used in business cases or regulatory impact statements.
- Engage early with stakeholders and work with the communications group for each technology to:
 - understand industry and community needs, knowledge, attitudes and behaviours
 - ensure industry and private vehicle buyers have clear and relevant information on the technologies' costs, benefits and maintenance
 - help industry to plan and encourage early adoption of a technology by communicating clearly about plans to mandate it.
- Priorities:
 - Work towards mandating Lane Keep Assist and Autonomous Emergency Braking in new vehicles.
 - Consider mandating Blind Spot Monitoring and Rear Collision Warning systems.
 - Initiate a small working group to consider Intelligent Speed Alert system feasibility issues, and strategies to overcome barriers.
- Work towards mandating electronic logbooks or work diaries that improve compliance with fatigue laws. This may also allow greater uptake of fleet management telematics.
- Promote awareness of the benefits of driver monitoring systems and monitor their numbers over time to inform future decisions about mandating them.
- Look for ways to detect a broad range of psychoactive substances in a less intrusive way and monitor advancements in those technologies.
- Ensure ongoing education on repairing/maintaining advanced driver assistance technologies and consider a 'warrant-of-fitness' test for safety-critical technologies.
- Undertake research on providing better guidance for commercial fleets on getting the best safety and efficiency results from fleet management telematics.

Recommendations for further research

- Calculate the estimated social cost savings in New Zealand from in-vehicle safety technologies as a proportion of the total social costs of crashes over time.
- Calculate the regulatory costs of applying these recommendations, which could then be compared to the costs and benefits of other interventions. Prioritise actions accordingly.



RR 691: Use of in-vehicle technologies to assist with and encourage safe and efficient driving behaviour, Waka Kotahi NZ Transport Agency research report. Available at www.nzta.govt.nz/resources/research/reports/691