

DIRECTED TECHNOLOGIES AUSTRALIA

**NATIONAL TRANSPORT COMMISSION
DEVELOPING TECHNOLOGY-NEUTRAL ROAD RULES FOR DRIVER DISTRACTION
CONSULTATION REGULATION IMPACT STATEMENT PAPER (CRIS)**

RESPONSE SUBMISSION FROM DIRECTED TECHNOLOGIES AUSTRALIA

AUGUST 2019

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INDUSTRY RELEVANT EXPERIENCE - DIRECTED TECHNOLOGIES AUSTRALIA

- Directed Technologies is a Victorian based, Victorian owned and operated automotive and consumer electronics solutions supplier and developer that manufactures and distributes leading brands throughout Australia and New Zealand.
- With over 20 years' experience in the Australian and New Zealand automotive and consumer electronics categories, Directed has a strong track record of success. Directed was one of the world's first manufacturers to develop specific car security solutions for late model vehicles and continues to lead the global market in the development of world first and Australia first truck technology with integrated telematics, navigation and IOT plug and play ecosystem solutions.
- Directed designs, develops and manufactures products locally for truck manufacturers and importers. These products include audio visual navigation systems, truck tracking telematics modules, dual wiring harnesses for street sweepers, tyre pressure monitoring systems, digital video recorders (dash cams), daytime running lamps, driver safety apps, AI based fleet management solutions, fleet manager apps, and many other products.
- In essence, Directed is the local technology 'division' arm of many truck brands, therefore Directed has not only experience in development and manufacture of in-vehicle technologies but also local knowledge of the implementation of these solutions within the unique Australian context to support driver and vehicle safety enhancement and the reduction of driver distraction.
- Directed OE products are installed in over 250,000 vehicles and trucks and over 800 fleets in Australia.
- As one of many tech suppliers around the world, Directed has local competency that is world leading.

DIRECTED STATEMENTS REGARDING THE CRIS

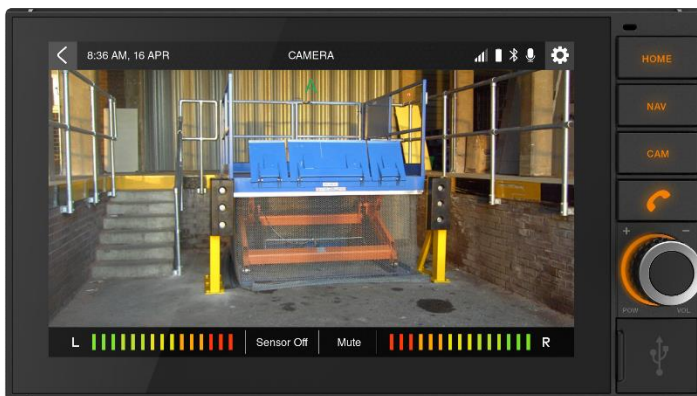
- At Directed we acknowledge the work of the NTC and related organisations in this important area and welcome the opportunity to input to the R.I.S.
- We believe that key driver vehicle interaction and communications are best served through ISO accredited OEM designed, developed and manufacturer approved integrated in-vehicle systems as they are designed to manage driver distraction, are developed to maximise driver safety and afford the best possible human interface via voice, alerts, text, gesture control and more.
- We note that while commercial heavy vehicle drivers are referenced throughout the CRIS, suggestions of how to manage their day to day in cabin activity and their interactions with technology to complete their work is rarely referenced. However, there is significant reference to ride sharing use cases. There are almost 4 million commercial vehicles registered in Australia yet only roughly 80,000 rideshare drivers nationally. The CRIS however considers allowing rideshare drivers the benefit of interacting with device screens while driving in order to accept a fare yet expects commercial drivers to pull over, turn their engine off and apply their handbrake before they can touch any device screen like an in dash dispatch system or safety alert. This approach seems unbalanced and not economically rationalised. Directed support the current phone free legislation and recommend that appropriately HMI / GUI designed, and airbag / ADR compliant systems are the only ones that should be permitted to provide driver interfaces irrespective of 'actor type' 'use cases'.
- All other functions can be undertaken as suggested by the CRIS including by voice or gesture control.
- We feel it is important to note that OEM designed in-dash systems including the Graphical User Interfaces and HMI including system operation are designed to safely and contextually interact with the way a commercial vehicle is being driven
 - How the vehicle is being driven. eg: speed, fast versus stationary
 - Where the vehicle is being driven. eg complex urban built up area versus well protected freeway, around school zones, traffic lights, roundabouts etc.
 - When the vehicle is being driven eg: Day/Night/Dry/Wet etc.

- OEM designed systems are generally contextually aware unlike mobile phones or tablets as they are part of the vehicle and can sense vehicle Controller Area Network (CAN bus) signals. These can be leveraged for example to not permit screen interaction whilst moving, not to receive a call when harsh braking, not to show a job when indicators are on.
- OE screens and voice solutions are also designed to integrate safely within vehicle systems. New vehicles including trucks have an increasing number of airbags, and tablets or phones can easily be mounted in the airbag explosive inflation path. OE screens are incorporated into the design of the vehicle in a compliant way that will not harm the driver in the case of an incident.



Example of Directed Technologies OE Australian designed in-vehicle 'factory' navigation driver alert system which is designed for the vehicle with appropriate GUI / HMI including steering wheel control integration, voice distraction free alerts, speed relevant HMI control etc. The system has tyre pressure monitoring and alert, seatbelt and park brake alarm, reversing and lane change cameras and a wireless phone charge pocket to encourage phones to be paced out of reach and out of view. Phone calls are able to be managed by the driver via the steering wheel controls and voice recognition. Copyright Directed Electronics and HINO Australia.

It is potentially dangerous to have an aftermarket device like a tablet or smartphone alerting a driver of a routine task (eg: a new job), when the driver is diverting his attention to the task at hand, particularly when driving in urban areas with mixed traffic, bicycles, pedestrians, etc. These tasks and alerts can safely and easily be delivered to a driver through integrated OEM alert systems. For example, when an integrated OEM safety system unit is operating and the driver engages reverse gear, all multimedia stops in order to show the reverse picture to the driver. This is not the case with tablets, phones etc. An in dash AVN is capable of managing basic tasks via voice and gesture control, as per the image below.



Close up of reversing camera with reversing sensor on screen display. Copyright Directed Electronics and HINO Australia.

- With a majority of, if not all new commercial vehicles available in Australia being released to the market with a factory option of navigation, Bluetooth, voice control and more, that all enable safe interaction with in vehicle technology, we believe there is a case for mandating commercial vehicle navigation and in dash vehicle systems as compulsory in Australia as these systems provide glance free touch free driver assistance via voice.
- With the further implementation of the “glass cockpit” concept as first introduced by Mercedes Benz, information is being delivered to the driver safely and securely ensuring the driver has their hands on the wheel and their eyes and mind on the road at all times.
- Whilst further research, will be valuable as systems continue to evolve, it is now the time for application & legislation. We believe there needs to be a strong mandate between heavy vehicle truck manufacturers and authorities to truly harness the potential of these safety technologies which are designed to minimise driver distraction and enhance driver road use safety, and infrastructure safety. For example, it is entirely feasible to prevent bridge strikes by mandating truck navigation as navigation can deliver alerts with less distraction than reading complex road signs whilst on the move.



Example of complex signs required to be read whilst travelling at speed which a navigation system will accurately provide a simple voice guidance instruction for.
Copyright acknowledged to HERE Maps



Example of obscured (low bridge ahead) or damaged (low bridge) signs which navigation will avoid via distraction free voice guidance
Copyright acknowledged to Google

- The impost to the community for failing to do this is so significant that it can no longer be ignored. However, it is only OEM developed solutions that afford the required minimisation of driver distraction outcomes and are developed with the safety of drivers and the general public in mind.

- At present, whilst there is recognition of technologies such as airbags, Electronic Stability Control and Lane Departure Warning Systems there is no regulatory positive recognition of driver fatigue and distraction reduction technology. The same can be said of management of In Vehicle systems. Some people see this lack of regulatory recognition as a barrier to adoption, as it means there is no unbiased support available to help operators integrate this type of technology into their business nor positive encouraging fiscal environment to do so.
- There is no lack of technology, there is simply a lack of harnessing its positive potential and encouraging adoption through positive financial means (tax concession, incentive rebate etc) or mandating driver distraction supportive technology in the truck space. Without the strong uptake of basic driver distraction reduction technology such as navigation, industry is unable to justify an accelerated investment in further development of supportive safety technologies. This hampers the development of more advanced driver distraction solutions and technologies.
- Directed would also like to acknowledge the National Road Transport Association's submission to the CRIS, especially point 42 of its submission being "NatRoad also supports a clear exemption for all technology that enhances the driving task and is an aid to heavy vehicle drivers and operators. No matter how the road rules change this exemption must be part of the law." (1)

DIRECTED TECHNOLOGIES RESPONSE TO QUESTIONS POSED IN THE CRIS**Question 1: What other factors should be considered in the problem statement?**

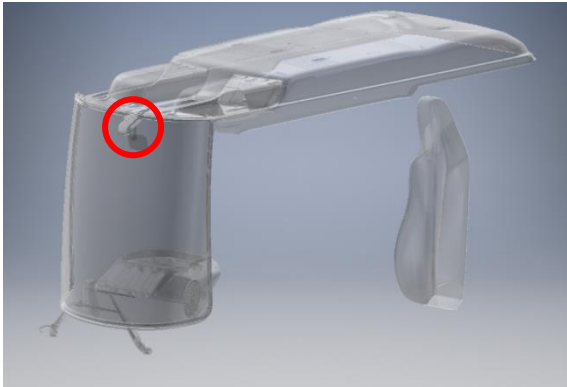
In-vehicle technology is somewhat demonised in the CRIS and referencing reports, however these technologies afford drivers significant safety benefits. Reversing cameras, lane change assist, collision avoidance, adaptive braking, tyre pressure monitoring, navigation all utilise audible, HUD, or screen alerts. More sophisticated technologies are on their way (mirror free mirror cameras to name just one). There is a focus on preparing for autonomous driving however in the long intervening period we have much to gain in the inevitable technology march. There is also insufficient focus on the rise of external distractions such as digital billboards which have no driver workload awareness unlike in-vehicle factory solutions.

Rather than looking to technology as the greatest distraction, we seek to ask the question "how can technology quickly and affordably minimise driver distraction while still acting as a drivers' aide, all the while within existing and proposed new road laws"? Even billboards could be made contextually aware of traffic speed, weather conditions, time of day aware etc

Question 2: Has the consultation CRIS provided enough evidence to support the case for government intervention? What else should be considered and why?

Mobile Phones have clearly been the key focus of previous citable research, and the psychology behind the suspension of implied risk to the driver from using mobile phones while driving has been extensively discussed in the CRIS. Other elements that should be considered are 3rd party devices being mounted in the path of a potential airbag deployment and the injury those devices can cause in that instance, making the Takata airbag recall look minor in comparison. There is extremely high potential for injury if a mobile phone or tablet is catapulted at a driver or passenger by an airbag during an accident. We note that currently the NHVR is proposing legislation that Electronic Work Diaries (EWDs) must be viewable on phones and tablets with reminders, thereby encouraging driver device distraction and introducing dangerously untethered items in cabins. While Directed does not disagree with the benefits of EWD's, the method in which they are interacted with and the hardware they are recommended to be interacted with give significant cause for concern.

Directed is suggesting a more integrated approach to technology usage in Australia with OEM designed and approved in dash systems coupled with voice and gesture controls to maintain drivers' road ahead attention to the driving task. We support the concept of developing "technology-neutral road rules for driver distraction" with the assumption they are not developed to be restrictive of purpose designed technology provided by OEMs. We also support the concept of accessories requiring integration back to the Audio Visual Navigation (AVN) system that is integrated to the vehicle. Those accessories can include but are not limited to Dash Cameras, reversing cameras, ADAS systems, cruise control, Heads Up Displays, Tyre Pressure Monitoring Systems, lane departure warning systems and much more.



Directed has locally developed a sophisticated OE approved truck navigation system that completely integrates with an in-dash OEM AVN system
Copyright Directed Electronics

Question 3: Are there issues relevant to developing technology-neutral road rules for driver distraction not covered by the process for addressing the problem?

Indeed, the Problem Statement calls out that “Innovation has made it difficult to differentiate between functions that could distract drivers and functions that may improve safety outcomes. The Australian Road Rules do not distinguish between functions likely to cause distraction and those needed for the driving task (or where they can improve driving performance).”

It should also be noted that simply setting these rules, no matter how clear they are, they will need extensive public exposure as an educational programme to clarify these rules to road users. It may be that all road users are required to complete a questionnaire sent by EDM or post that ensures they have read these rules and understand them, not only to reduce their own risk of injury or infringement but most importantly, the safety of other road users. National or state-based media campaigns will also be required.

Question 4: Can you provide evidence that would support a different treatment for cyclist distraction?

No

Question 5: Do the proposed examples for proper control reduce the uncertainty about compliance with the offence in road rule 297(1)? What other elements do you think could be incorporated?

The examples of proper control in the CRIS are very general in nature to allow for all considerations. As the Australian Road Research Board noted in its submission to the issues paper, the behavioural responses to engage with the source of distraction (eyes off road, mind off road, hand(s) off wheel) are most likely the direct cause of driving performance impairment (Chevalier, Cunningham & Roberts, 2019). (2)

While the suggestion of defining control as per below seems all encompassing:

- Lateral and longitudinal motion control
- Velocity control
- Responding to objects, events and other road users

.....it would seem appropriate to include the cognitive element of control beyond the mostly mechanical element as proposed for changes in rule 297(1) to include “eyes on road, mind on road, hand(s) on wheel”, so as to further reduce the uncertainty about compliance with the offence in road rule 297(1).

Technology can also be of great control assistance as a driving aide in such regard. Features like A.D.A.S (Advanced Driver Assistance System) rely on electronics and often include firmware elements and human machine interface elements. The development of these cutting-edge systems is governed by international safety standards like IEC-61508 and ISO-26262. (3)

Advanced driver assistance systems are in constant development, but there are a number of different options that are available in the market today including:

- Adaptive Cruise Control
- Adaptive Light Control
- Automatic Braking
- Blind Spot Detection
- Collision Avoidance Systems
- Driver Drowsiness Detection
- GPS Navigation
- Hill Descent Control
- Intelligent Speed Adaption
- Lane Departure Warning
- Night Vision
- Tyre Pressure Monitoring

While auto manufacturers develop these A.D.A.S technologies both as a drivers' aide and a competitive advantage or marketing edge, they are predominantly developed to improve driver safety, attentiveness and control, and are developed strictly to international safety standards. They are constantly analysed in order to optimise usability and avoid negative impact on drivers' workload, distraction, and emotional response. (4)

Question 6: Are the four options clearly described? If not, please describe the areas that may be missing.

Yes.

Question 7: Is the status-quo option an accurate representation of the current state of the Australian Road Rules in relation to driver distraction? If not, please describe further.

It would be fair to say that very few drivers would be fully aware of all elements that are Allowed or Not Allowed as per the Status Quo as detailed in Table 1.

For example, in a recent article by ABC news Australia "Mobile phone payments ban at takeaway drive-throughs spark motorist backlash" (5) public confusion is turning to public backlash as they accuse police of translating the definition of "public roads" to include a drive through take away lane as it is private land that allows public access. This is a more extreme example, but there seems to be a requirement for not only a clear definition of what is permissible in technology use but also where and when these technologies can be used. This is creating a problem with no direct connection to the rules' policy intent, which is the safe use of technology devices by drivers." (6)

Question 8: Are there any high-risk distracting behaviours and interactions that have not been addressed by the proposed new offences?

Listening to audio via headphones which is now increasingly common or third party distractions such as bright digital billboards which have been removed from the previous state road rules. i.e. *Victorian Road Safety (Traffic) Regulations 1988 Regulation 306. Display of dazzling lights*

Question 9: Can you propose an alternative approach for discouraging long eyeglances off the roadway that is enforceable in practice?

None that are “enforceable”. However technology in the form of cameras and software is readily available from Directed and other sources that use machine learning to analyse the eye movement of drivers and can alert them for many infringing actions including drowsiness, distraction, hands off wheel, eyes off road, smoking, eating, device interaction, reading, writing and more. The active specification of driver distraction reducing safety supportive technologies, such as in-vehicle OEM screen and voice assistance, by Government fleet buyers would quickly send a flow through message to non government fleet buyers and manufacturers and thereafter to the mass market.

Question 10: Can you propose an alternative approach for discouraging high-risk voice-based interactions that is enforceable in practice?

While it is purported that voice interactions have a higher potential to cause accidents than the base line, it is our opinion that the NTC should carefully consider the implications of legislating against voice interactions in car. In-vehicle car navigation systems have been commercially available in Australia since 1997. Directed have been supplying Voice interaction with navigation systems since 2007. Mass market portable navigation devices have had voice input control also since 2007. We do not believe it is reasonable to enforce restriction of voice interactions for the purpose of managing (distraction with) in vehicle technology. We believe factory designed and supplied voice recognition provides an effective method of contextually relevant control and has the potential to enhance vehicle safety. Indeed, the conclusions of the CRIS frequently suggest voice recognition as a viable solution to dealing with the restrictions placed on drivers by legislating against visual manual technology interaction.

As the CRIS points out (7) “.....as we discussed in subsection 3.2.1, various studies suggest that using voice-controlled functions may be less detrimental to driving performance than visual manual interactions with technology (Simmons et al., 2017, cited in Goodsell, Cunningham & Chevalier, 2019). Any banning of voice controls would also represent significant enforcement challenges. Police members are likely to find it difficult to be able to distinguish someone on a hands-free phone call from someone using voice controls to compose a text message or someone singing along to music. Under these circumstances there is a risk that police enforcement would be either overzealous or too lenient.”

Question 11: Would a fully outcomes-based approach effectively mitigate the safety risks from diverse sources of distraction?

It has the potential to do so, however as the CRIS points out, a “Performance Based” approach relies exclusively on a drivers’ understanding of generic and general guidelines of in vehicle technology use, and the risk assessment in the CRIS also suggests that this has the potential to increase the potential for driver distraction caused accidents rather than reduce them.

Question 12: Does the proposed combination of prescriptive and performance-based components in the hybrid option sufficiently address all the sources of distraction that can significantly reduce driver performance? If not, please elaborate.

No it does not, however it does consider many sources of distraction, and others are so many and varied that they will be extremely difficult to manage within the report. Those further distractions include but are not limited to: passenger interaction, animal and pet interaction, external influences (eg billboards both still and moving images), other drivers / road rage, lack of driver focus in traffic jams, challenging road conditions, road works, variable speed signs, frequently changing road restrictions, weather and more. The question is wide scoped as there is an endless list of sources of potential distraction.

Question 13: Do you agree with the impact categories and assessment criteria? If not, what additional impact categories or assessment criteria should be included?

The conclusions in the impact categories section are based on subjective assumptions that are trying to quantify the cost of fatalities, injuries and property damage using a minimal factor approach. There are many thousands of variables involved in driver distraction and their cause and effect will vary significantly. It is with this in mind that while Directed finds it almost impossible to make suggestions of alternative impact categories and assessment criteria, it is worth pointing out that making critical decisions based on one benefit versus one cost eg the cost of a phone mount for 5% of the driving population versus the benefit of rideshare drivers not having to spend time pulling over to accept new fares, has an extremely high potential for error across a wider base and should not be the basis of setting wide reaching road laws. A further impact category to be considered is the beneficial reduction to health budgets through collision reduction, the economic benefits of navigation in preventing countless bridge strikes, and indeed the economic benefit of broader local employment and industry development of technology design and supply of these technologies.

Question 14: Does our analysis accurately assess the road safety benefits for each reform option? Please provide any further information or data that may help to clearly describe or quantify the road safety benefits.

Please see answer to question 13.

Question 15: Has the consultation CRIS captured the relevant individuals or groups that may be significantly affected by each of the options? Who else would you include and why?

The consultation CRIS has captured many relevant individuals including the general public, and rideshare drivers, however the CRIS seems to only make a passing reference to commercial vehicle drivers or technology suppliers. While consideration is given to commercial requirements for devices such as “video-based safety-enhancing functionalities (for example, rear-view screens, passenger safety cameras for buses, dashboard cameras, load monitoring cameras for trucks and trailers and other closed-circuit television security cameras), which is adapted from the exemptions for driver’s aids in rules 299 and 300” (8), in absence of the legality of text based interactions as suggested in the “Hybrid” option, the CRIS suggests the only alternatives available to commercial drivers for on board systems interaction (eg Dispatch receipt acknowledgement, delivery messages etc), is either to fully park their truck with the engine off and the handbrake on to allow a screen touch to acknowledge receipt of a job, or otherwise complex voice recognition systems will need to be fitted as standard in new commercial vehicles or retrofitted to vehicles currently on the road. A factory touch display interaction with well designed graphical user interface and system cognition of driver load (e.g. stationary versus moving) should be promoted not banned.

The CRIS suggests in Section 8.3 “Efficiency” under “Option 2 Prescriptive” (and hence “Option 4 Hybrid” but default), both of which options are the preferred options of the CRIS Authors, that:

“8.3.2 Option 2: Prescriptive

Under the prescriptive option, a driver will be unable to use mounted devices to, say, type addresses. This may result in some courier type businesses requiring technological investments such as voice enabled navigation systems to continue to operate without pulling over to accept jobs or enter addresses into navigational devices or apps.

Voice activated navigational systems can cost upwards of \$150. Assuming 20 per cent of small couriers would be required to purchase such a device (or equivalent solution) to continue to operate, and these devices have a three-year useful life, the total cost to such businesses would be \$150,000 (Table 19).

As established in the status quo option, many rideshare drivers use ride-matching apps that are currently not compliant with existing rules. The prescriptive option would remove the implicit requirement that they pull over to accept client matches thus resulting an indicative burden reduction of about \$1.2M.” (9)

Navigation is standard on many vehicle types and can be standard in all new vehicles obviating the need to fit aftermarket devices. The CRIS makes the assumption that a saving of \$1.2m to rideshare drivers outweighs a cost of \$150,000 at \$150 per commercial vehicle (for 1,000 vehicles) to add voice recognition technology and keep drivers hands off interactive screens while driving. Both of these assumptions are flawed as the concept of a saving of \$1.2m to rideshare operators is an opportunity cost saving to a theoretical current state, however the assumption that only 1,000 commercial vehicles will need to upgrade to voice activation is also a highly flawed suggestion given there are over 3.8 million commercial vehicles on the road in Australia today. The cost of adding voice recognition to each would easily surpass \$1,000 per vehicle, putting the true cost of converting all commercial vehicles to almost \$4,000,000,000. It is fair to say the CRIS estimate of \$150,000 is significantly underestimated.

Question 16: Has the consultation CRIS used an appropriate analytical method for assessing the benefits and costs of the options? What else should be considered?

please see answer to question 13 and 15. The cost impact to the economy and health budget of not permitting in vehicle factory displays has not been modelled.

Question 17: On balance, do you agree that the preferred option best addresses the identified problem? If not, which option do you support?

While Directed agrees that a Hybrid option as a combination of prescriptive and performance based components is the most likely path forward, as per previous elements discussed in this CRIS response, there is much work to do to separate regulation from light and heavy vehicles and there is also great risk of advanced drivers' aides that assist with driver attentiveness and productivity being caught up in general sweeping regulation through the implementation of “technology neutral” road laws being implemented. In short, a generic regulation does not always mean “one size fits all”.

SUMMARY

In summary Directed appreciates the opportunity to be able to provide input into this very important initiative.

Directed believes that accelerated adoption of properly designed and manufacturer approved safety systems with screen and voice interfaces should be a priority to continue to enhance road safety in Australia. These systems can be contextually aware and do not pose a risk to the vehicle safety systems such as during airbag deployment.

In vehicle display and voice technologies have provided valuable assistance to drivers for many decades in Australia, from reversing cameras reducing reversing deaths, truck navigation reducing collisions with infrastructure such as bridges, reducing the work load of commercial vehicles, passenger vehicles and novice drivers when driving on unfamiliar roads, to advising of tyre pressure alarms and pre-collision alerts to name a few.

Legislation and regulation have provided a valuable role in advancing vehicle safety as has industry innovation. Whilst seatbelts are mandated, few other supportive technologies are, and many of these have a display in the system, including seatbelt warning displays. Directed as a leading local supplier of connected vehicle safety technology commends the drive by the industry to continue to invest funds for the development and adoption of increasingly sophisticated safety systems.

Outside the automotive industry there is strong support for the uptake of market changing 'technology' such as solar cells or LED lighting, however there is no such support for the automotive industry for buyers to include or adopt advanced safety technologies. This should be considered as a priority measure.

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