

# THE CHALLENGES OF AUTONOMOUS MOTOR VEHICLES FOR QUEENSLAND ROAD AND CRIMINAL LAWS

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*This article examines the challenges of autonomous motor vehicles for Queensland road and criminal laws. Autonomous vehicles refer to motor vehicles where driver decision making has been augmented or replaced by intelligent systems. Proponents of autonomous vehicles argue that they will virtually eliminate road accidents, boost productivity and provide significant environmental benefits. The key issue is that autonomous vehicles challenge the notion of human responsibility which lies at the core of Queensland's road and criminal laws. The road rules are predicated on a driver in control of the vehicle, the intoxication regime is concerned with the person in charge of the vehicle and the dangerous driving offences require a person who operates a vehicle. Notwithstanding this challenge, it can be seen that much of Queensland's law is adaptable to autonomous vehicles. However, there are some identifiable anomalies that require reform.*

## I INTRODUCTION

This article examines the challenges of autonomous vehicles for Queensland road and criminal laws. The challenge of autonomous vehicles is that by replacing or augmenting driver decision making, existing laws that assume driver responsibility seem inadequate. Nevertheless, it is argued that much of Queensland's road and criminal laws are adaptable to autonomous vehicles. However, there are some clear anomalies that will need to be addressed to effectively maximise the safety, economic and environmental benefits of autonomous vehicles. Furthermore, there will be the need for more detailed reforms as autonomous vehicles become more widespread.

This argument is in three sections. The first section locates autonomous vehicles within a trajectory of innovation that has steadily reduced driver involvement with primary vehicle controls. The technical details of emerging autonomous vehicles will be canvassed and the safety, economic and environmental drivers for adoption will be outlined. This section concludes by identifying different 'levels' of automation for autonomous vehicles which forms the basis for the second section. This section also argues why a focus on Queensland law is appropriate and desirable.

The second section audits the challenges of the different levels of automation for Queensland's road and criminal laws.<sup>1</sup> The focus is on the substantive provisions of the rules of the road, the

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<sup>1</sup> From the perspective of Queensland criminal law, it could be said that making a distinction between the road rules and the criminal law is artificial as the road rules are a subset of the broader criminal law in Queensland. However, this paper makes the distinction for specific reasons. First, whether the regulatory offences in the

rules regarding intoxication and vehicles and specific offences under the *Criminal Code 1899* (Qld) (the ‘Code’). The concern is that as automation increases it becomes less certain that the human occupant is the person in control of the vehicle for the road rules, in charge of the vehicle for the intoxication regime and the person who operates the vehicle for the dangerous driving offences. Nevertheless, it will be shown that much of the existing law is adaptable to autonomous vehicles.

The third section examines how to reform Queensland road and criminal laws to address the identified anomalies. Reform in relation to autonomous vehicles is underway in several overseas jurisdictions. In particular some of the immediate concerns with the interaction of increasingly autonomous vehicles and the road rules that were identified could be addressed in Queensland by the adoption of the definitions of autonomous vehicle and driver to include an operator of an autonomous vehicle that have been enacted in some United States jurisdictions.

## II AUTONOMOUS VEHICLES

At first instance, autonomous vehicles seem to be a highly speculative emerging technology. The idea that human-driven motor vehicles on Queensland roads are soon to be replaced by self-driving robots might, at first instance, seem farfetched. Autonomous vehicles are a core anticipated element of cooperative intelligent transport systems (‘C-ITS’). C-ITS is the term describing technology that allows vehicles to communicate with each other and other transport infrastructure.<sup>2</sup> The roll out of C-ITS within transport infrastructure and vehicles is already underway.<sup>3</sup> The *National Road Safety Strategy 2011-2020* which was agreed to by the Commonwealth and all States and Territories expressly includes C-ITS as key technologies for creating a safer Australian road transport system.<sup>4</sup> The National Transport Commission has released in December 2013 a final policy paper endorsing C-ITS.<sup>5</sup>

Motor vehicle manufacturers have been installing C-ITS enabling technologies as original equipment in vehicles for some time. The now widespread availability in new vehicles of safety and convenience technologies such as adaptive cruise control, lane change warning/assistance, self-parking functions, electronic stability control, automatic braking and digital connectivity with mobile telephones and GPS networks forms much of the hardware for C-ITS.<sup>6</sup> Given this significant momentum on the roll out of C-ITS technologies, it is a small jump to go from C-ITS enabled vehicles to autonomous vehicles. Nissan and General Motors have both pledged

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*Transport Operations (Road Use Management—Road Rules) Regulation 2009* (Qld) are to be thought of as inclusive within the criminal law or more properly a hybrid zone between criminal and administrative law, between penal and governmental modes as it were, is an important issue (see Richard Fox, ‘On Punishing Infringements’ (1995) 13 *Law in Context* 7). Second, and more significantly, as the Queensland road rules enact the Australian Road Rules that are essentially the same as in other states, by clearly flagging how autonomous vehicles impact on the road rules in Queensland, this paper is structured to allow easy transfer of analysis to other Australian jurisdictions.

<sup>2</sup> National Transport Commission, *Cooperative Intelligent Transport Systems: Final Policy Paper* (2013) 3.

<sup>3</sup> Michigan Department of Transportation and Center for Automotive Research, *International Survey of Best Practices in Connected and Automated Vehicle Technologies: 2013 Update* (2013).

<sup>4</sup> Australian Transport Council, *National Road Safety Strategy 2011-2020* (2011) 19.

<sup>5</sup> National Transport Commission, above n 2. This policy paper emerged out of a consultation process begun by an earlier discussion paper. National Transport Commission, *Smart Transport for a Growing Nation Project: Exploring the Opportunities for Reform: Discussion Paper* (2011).

<sup>6</sup> National Transport Commission, *Regulatory Barrier to More Automated Road and Rail Vehicles: Issues Paper* (2016) 16–20.

to release fully autonomous cars to market by 2020<sup>7</sup> and Volkswagen has announced that the 2016 Audi A8 limousine will have a quasi-autonomous mode.<sup>8</sup>

The push towards autonomous vehicles is driven by a recognition that current human driven vehicles come with significant safety, economic and environmental costs. Humans make mistakes and have slower reaction times and cannot as effectively process immediate sensory data with broader level data as it is claimed intelligent systems can. By addressing the limitations of human drivers, proponents for autonomous vehicles promise improved safety, economic and environmental outcomes.

Driver-related factors (inattention, distraction, risk-taking, drugs and alcohol, inexperience) are the major cause of road accidents in Australia.<sup>9</sup> For 2011, the Centre for Road Safety determined that driver factors were present in 7725 of accidents in New South Wales while mechanical factors were only present in 886.<sup>10</sup> Road accidents remain a major killer and cause of injury in Australia. In 2012, there were 1300 fatalities on Australian roads.<sup>11</sup> In the latest report by the Australian Institute of Health and Welfare, 53 406 Australian were hospitalised due to vehicle accidents in 2008-09.<sup>12</sup> In Queensland in 2012 there were 280 fatalities and 6328 hospitalisations due to road traffic accidents.<sup>13</sup> The possibility of reducing human factors as a cause of road accidents is driving the new technologies.<sup>14</sup>

By reducing crashes, proponents also argue that autonomous vehicles will deliver economic benefit. The Australian Transport Council estimated that in 2011 the social cost of road accidents was \$27 billion.<sup>15</sup> The National Transport Commission identifies that through minimising accidents autonomous vehicles will reduce the economic burden of road accidents.<sup>16</sup> Another claimed economic benefit of autonomous vehicles is that by allowing vehicles to travel at relatively higher speeds with less space between vehicles, a greater density

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<sup>7</sup> 'General Motors Hits the Accelerator on Driverless-car Technology', *The Australian* (online), 29 August 2013 <<http://www.theaustralian.com.au/news/world/general-motors-hits-accelerator-on-self-driving-car-technology/story-e6frg6so-1226706500991?nk=4eebaeb7595fc4c5da2cb108e4970d2c>>; 'Nissan to Make Driverless Cars by 2020', *The Australian Financial Review* (online), 28 August 2013 <<http://www.theaustralian.com.au/business/latest/nissan-to-make-driverless-cars-by-2020/story-e6frg90f-1226705460560>>.

<sup>8</sup> Joshua Dowling, 'Automated Cars: Ready When You Are', *Carsguide, Courier Mail* (Brisbane), 11 January 2014, 3. See further Stephen P Wood et al, 'The Potential Regulatory Challenges of Increasingly Autonomous Vehicles' (2012) 52(4) *Santa Clara Law Review* 1423, 1428-34; Jeffrey K Gurney, 'Sue My Car Not Me: Product Liability and Accidents Involving Autonomous Vehicles' [2013] *Journal of Law, Technology and Policy* 247, 247-52.

<sup>9</sup> Judy J Fleiter, Ioni M Lewis and Barry C Watson, 'Promoting a More Positive Traffic Safety Culture in Australia: Lessons Learnt and Future Directions' (Paper presented at the Australasian College of Road Safety Conference, Adelaide, 6-8 November 2013); Vanessa Beanland et al, 'Driver Inattention and Driver Distraction in Serious Casualty Crashes: Data from the Australian National Crash In-depth Study' (2013) 54 *Accident Analysis and Prevention* 99.

<sup>10</sup> Centre for Road Safety, *Road Traffic Crashes in New South Wales: Statistical Statement for the Year Ended 31 December 2011* (Transport for New South Wales, 2012) table 12.

<sup>11</sup> Bureau of Infrastructure, Transport and Regional Economics, Department of Infrastructure and Transport, *Road Death Toll Australia December 2012* (2013).

<sup>12</sup> Australian Institute of Health and Welfare, 'Serious Injury Due to Land Transport Accidents, Australia 2008-09' (Injury Research and Statistics Series, No 67, 2012).

<sup>13</sup> Department of Transport and Main Roads, *Queensland Road Safety Action Plan 2013-2015* (2013) 4.

<sup>14</sup> National Transport Commission, above n 2, 1-2; James M Anderson et al, *Autonomous Vehicle Technology: A Guide for Policymakers* (Rand Corporation, 2014) 12-6.

<sup>15</sup> Australian Transport Council, above n 4, 4.

<sup>16</sup> National Transport Commission, above n 2, 1-2.

of vehicles could be supported on existing transport infrastructure reducing both congestion and the demand for new infrastructure.<sup>17</sup>

It has further been modelled that autonomous vehicles would deliver environmental benefits.<sup>18</sup> By increasing traffic load on existing infrastructure, it is suggested that autonomous vehicles would allow for growth without expanding the land-use footprint of existing infrastructure.<sup>19</sup> It is also suggested that autonomous vehicles would allow traffic to ‘slipstream’. This is when vehicles convey together with very little space between them. The advantage is less aerodynamic resistance and a measurable reduction in energy use for the trailing vehicles, potentially reducing transport-related greenhouse gas emissions.<sup>20</sup>

The challenge for Australia will be the transition to an autonomous vehicle transport network.<sup>21</sup> There have been some beginning steps towards the adoption of autonomous vehicles with preliminary national policy statements regarding C-ITS,<sup>22</sup> the reservation of the 5.9GHz band for C-ITS<sup>23</sup> and research and development of C-ITS technologies by the Australian transport authorities.<sup>24</sup> Notwithstanding these developments, the National Transport Commission was concerned that without the appropriate law and policy frameworks Australia could miss out on the promised benefits of C-ITS or will not anticipate and manage the risks.<sup>25</sup> It specifically recommended Australian-relevant research on the law and policy impact of increasingly more automated vehicles.<sup>26</sup>

This article responds directly to the National Transport Commission’s recommendations. It focuses on a single Australian jurisdiction – Queensland – to explore the challenges of autonomous vehicles for Queensland road and criminal laws. The decision to focus on a single state jurisdiction requires justification. The harmonisation of state road law and of the traffic related criminal offences over the past 20 years has meant that the majority of states and the Commonwealth have the same provisions.<sup>27</sup> The findings from how autonomous vehicles challenge the law in one state are strongly applicable to the other states. Focusing in detail on a single state, rather than a cursory look at all jurisdictions, allows for a detailed examination

<sup>17</sup> Bryant Walker Smith, ‘Managing Autonomous Transportation’ (2012) 52 *Santa Clara Law Review* 1401.

<sup>18</sup> Anderson et al, above n 14, 17–32.

<sup>19</sup> Walker Smith, above n 17.

<sup>20</sup> Sven A Beiker, ‘Legal Aspects of Autonomous Driving’ (2012) 52 *Santa Clara Law Review* 1145.

<sup>21</sup> Kent Acott, ‘Call for WA to Embrace Driverless Cars’, *The West Australian* (online), 30 October 2013 <<https://au.news.yahoo.com/thewest/motoring/a/19600696/call-for-wa-to-embrace-driverless-cars/>>; Garry Bowditch, ‘Driverless Cars Light the Road to Sydney’s Future’, *The Australian Financial Review* (Online), 14 October 2013 <[http://www.afr.com/p/australia2-0/driverless\\_cars\\_light\\_the\\_road\\_to\\_2RiLkcIEFbJsLPtsgyZM4K](http://www.afr.com/p/australia2-0/driverless_cars_light_the_road_to_2RiLkcIEFbJsLPtsgyZM4K)>.

<sup>22</sup> Standing Council on Transport and Infrastructure, Department of Infrastructure and Transport, *Policy Framework for Intelligent Transport Systems in Australia* (2012); National Transport Commission, above n 5.

<sup>23</sup> Australian Communications and Media Authority, *Five-year Spectrum Outlook 2013-2017* (2013) 108, 126.

<sup>24</sup> Some of these projects are discussed in the National Transport Commission, above n 2, 3.

<sup>25</sup> *Ibid* 3.

<sup>26</sup> *Ibid* 40, recommendation 7. See also National Transport Commission, above n 6.

<sup>27</sup> Paula Quinn, ‘It’s Green for Queensland’s New Traffic Laws’ (1999) 19(11) *Proctor* 14, 14–6. Most Australian jurisdictions have enacted the model road rules directly. This means that the text of the rules and even their numbering is common between Queensland, the Commonwealth, New South Wales, Victoria, Tasmania and South Australia. See *Australian Road Rules Regulations 2006* (Cth); *Australian Road Rules 2014* (SA); *Road Rules 2014* (NSW); *Road Safety Rules 2009* (Vic); *Road Rules 2009* (Tas). In the Australian Capital Territory and the Northern Territory, the Australian Road Rules are expressly adopted by the *Road Transport (Safety and Traffic Management) Regulations 2000* (ACT) and the *Traffic Regulations 1999* (NT). The only jurisdiction where the road rules are not directly based on the Australian Road Rules is Western Australia. See *Road Traffic Code 2000* (WA).

of the challenges; and given the similarity of laws, that analysis can then be projected to other states. This paper leaves to one side two significant legal issues that have been identified with the growing automation of vehicles; the question of civil liability whether for personal injury and property damage or for defective products,<sup>28</sup> and the complex issue of privacy concerns.<sup>29</sup>

When undertaking this type of project of auditing perceived impacts of an emerging technology, a common approach is to develop alternative models of how the emerging technology will manifest.<sup>30</sup> This involves thinking about the anticipated technological change and then a further examination of the likely challenges of the anticipated changes for existing law. In the context of autonomous vehicles, the United States National Traffic Safety Administration has developed a five tier graduation for automated vehicles. Their focus involves a consideration of the degree of human driver responsibility for primary vehicle controls (steering, acceleration, braking). These levels are explained in Table 1.

**Table 1: National Highway Traffic Safety Administration Levels of Automation<sup>31</sup>**

<b>Level 0 No Automation</b>	Driver is in control of vehicle controls. Vehicle can be C-ITS equipped and provide warnings to driver of hazards – but there is no connection of this hardware to vehicle control systems.
<b>Level 1 Function-specific automation</b>	Driver has overall control of vehicle but can delegate a degree of responsibility for a primary control or the vehicle can automatically take control of a primary control in a specific circumstance. Cruise control is an example of the first kind of function-specific automation. Electronic stability control and Forward Collision Avoidance Technology (‘FCAT’) are examples of the second.
<b>Level 2 Combined Function Automation</b>	Involves automation of two or more primary function that act together to replace driver control. The example is adaptive cruise

<sup>28</sup> Beiker, above n 20, 1152; Kyle Graham, ‘Of Frightened Horses and Autonomous Vehicles: Tort Law and its Assimilation of Innovations’ (2012) 52 *Santa Clara Law Review* 1241; Gary E Marchant and Rachel A Lindor, ‘The Coming Collision between Autonomous Vehicles and the Liability System’ (2012) 52 *Santa Clara Law Review* 1321; Robert W Peterson, ‘New Technology - Old Law: Autonomous Vehicles and California’s Insurance Framework’ (2012) 52 *Santa Clara Law Review* 1341; Andrew P Garza, “‘Look Ma, No Hands!’: Wrinkles and Wrecks in the Age of Autonomous Vehicles’ (2012) 46 *New England Law Review* 581; Gurney, above n 8; Sophia H Duffy and Jamie Patrick Hopkins, ‘Sit, Stay, Drive: The Future of Autonomous Car Liability’ (2013) 16 *SMU Science and Technology Law Review* 453; Anderson et al, above n 14, 143; Adam Thierer and Ryan Hagemann, ‘Removing Roadblocks to Intelligent Vehicles and Driverless Cars’ (2015) 5 *Wake Forest Journal of Law and Policy* 339; Dorothy J Glancy, ‘Autonomous and Automated and Connected Cars - Oh My: First Generation Autonomous Cars in the Legal Ecosystem’ (2015) 16 *Minnesota Journal of Law, Science and Technology* 619; Nick Belay, ‘Robot Ethics and Self-Driving Cars: How Ethical Determinations in Software Will Require a New Legal Framework’ (2015) 40 *Journal of the Legal Profession* 119.

<sup>29</sup> Brendan Gogarty and Meredith Hagger, ‘The Laws of Man Over Vehicles Unmanned: The Legal Response to Robotic Revolution on Sea, Land and Air’ (2008) 19 *Journal of Law, Information and Science* 73, 124–32; Muhammad Usman Iqbal and Samsung Lim, ‘Privacy Implications of Automated GPS Tracking and Profiling’ (2010) 29 *Technology and Society Magazine, IEEE* 39; Francesca Svarcas, ‘Turning a New Leaf: A Privacy Analysis of Carwings Electric Vehicle Data Collection and Transmission’ (2012) 29 *Santa Clara Computer and High Technology Law Review* 16; Jack Boeglin, ‘The Costs of Self-Driving Cars: Reconciling Freedom and Privacy with Tort Liability in Autonomous Vehicle Regulation’ (2015) 17 *Yale Journal of Law and Technology* 171; National Transport Commission, above n 2, 15–6.

<sup>30</sup> Kieran Tranter, ‘The Law and Technology Enterprise: Uncovering the Template to Legal Scholarship on Technology’ (2011) 3 *Law, Innovation and Technology* 31.

<sup>31</sup> National Highway Traffic Safety Administration, United States Department of Transport, *Preliminary Statement of Policy Concerning Automated Vehicles* (2013) <<http://www.nhtsa.gov/About+NHTSA/Press+Releases/U.S.+Department+of+Transportation+Releases+Policy+on+Automated+Vehicle+Development>>.

	control and automatic lane sensing. Driver still needs to be monitoring and is expected to resume full control at any time. The difference from level 1 is that the driver, when the level 2 system is operating may not be physically touching the primary controls; ie hands off steering wheel and foot off accelerator.
<b>Level 3 Limited Self-Driving Automation</b>	Involves full automated control of vehicle in specific conditions. Driver still present and capable of resuming control but with a transition period. The difference from level 2 is that with level 3 the driver is not required to actively monitor the automated driving.
<b>Level 4 Full Self-Driving Automation</b>	Vehicle fully autonomous for entirety of journey. No 'driver' required. Vehicle can operate unoccupied.

The National Highway Traffic Safety Administration table divides into three modes of automation; minimal automation (levels 0 and 1), cooperative automation (levels 2 and 3) and full automation (level 4). At levels 0 and 1, human drivers retain unambiguous control of the vehicle. At levels 2 and 3, there is a hybrid state where there is a variable division of responsibility for the primary controls and for the overall travel of the vehicle between the driver and the vehicle depending on context. At level 4 the vehicle is truly autonomous and has control and responsibility for its own passage without involvement from a human occupant. In the following section these levels of autonomy form the basis of the analysis on how vehicles at these different levels would challenge Queensland's road and criminal laws.<sup>32</sup>

### III QUEENSLAND ROAD AND CRIMINAL LAW

#### A *Queensland Road Law*

In Queensland, the road law comprises three regimes. The first are the rules of the road which are set out in the *Transport Operations (Road Use Management—Road Rules) Regulation 2009* (Qld) (hereafter 'TORUM-RR'). These provide the instructions for how vehicles should be driven on the road and provide for road signage. With the harmonisation of the road rules in 1999, the Queensland rules are based on the model Australian Road Rules as maintained by the National Transport Commission.<sup>33</sup> The second regime is the licensing of drivers by the *Transport Operations (Road Use Management—Driver Licensing) Regulation 2010* (Qld). Both the TORUM-RR and the licensing regime are made under the authority of the *Transport Operations (Road Use Management) Act 1995* (Qld). The third regime is the intoxicated driving offences under the *Transport Operations (Road Use Management) Act 1995* (Qld).

#### 1 *Road Rules and Licensing – Person in Control of a Vehicle*

The starting point for thinking about autonomous vehicles and the road rules in TORUM-RR is to imagine a situation where an autonomous vehicle has been caught breaching a road rule. The obvious issue is does the human occupant get a ticket? The answer is dependent on whether the occupant can be considered a 'driver' as defined under TORUM-RR and on the level of autonomy of the vehicle.

<sup>32</sup> This follows an emerging approach in the US literature. See Anderson et al, above n 14, xiii.

<sup>33</sup> *Transport Operations (Road Use Management—Road Rules) Regulation 2009* (Qld). On the Australian Road Rules and the Process of Reform and Adoption see: National Transport Commission, *The Australian Road Rules* (2016) <<http://www.ntc.gov.au/roads/rules-compliance/the-australian-road-rules/>>.

The TORUM-RR makes a distinction between ‘vehicles’ and ‘drivers’. Vehicles are defined as including motor vehicles, bicycles or animal-drawn vehicles.<sup>34</sup> The term ‘motor vehicle’ appears to be used in its everyday meaning as it is not defined in TORUM-RR, the *Transport Operations (Road Use Management) Act 1995* (Qld) or the *Acts Interpretation Act 1954* (Qld). Significantly, r 16 goes on to provide a relationship between vehicles and ‘drivers’. A driver is ‘the person who is driving a vehicle’.<sup>35</sup> ‘Person’ is not defined. There is a more general term of ‘road user’ that included driver, rider, passenger and pedestrian.<sup>36</sup> ‘Driver’, ‘rider’ and ‘pedestrian’ are defined as ‘persons’ in TORUM-RR<sup>37</sup> while ‘passenger’ is also defined in the *Transport Operations (Road Use Management) Act 1995* (Qld) as a ‘person’.<sup>38</sup> Queensland law provides little guidance on what or who is a ‘person’. The *Acts Interpretation Act 1954* (Qld) advises that reference to ‘person’ in Queensland legislation is to include a ‘corporation as well as an individual’<sup>39</sup> and goes on to define an individual as a ‘natural person’.<sup>40</sup> The circularity of a person in the *Acts Interpretation Act 1954* (Qld) (a ‘person’ is an ‘individual’ is a ‘natural person’) suggests a previously unarticulated assumption that person in TORUM-RR refers to a human.

The other material term is the verb ‘drive/driving’. TORUM-RR defines ‘driving’ as including ‘be in control of’.<sup>41</sup> Together these point to what might seem an obvious relationship that lies at the core of TORUM-RR. The driver (human) is the active agent, ‘in control of’ (driving) a passive object (the vehicle).<sup>42</sup> This is exactly the relationship that underpins and is manifested by specific rules. The rules apply to the driver. For example, r 20 which establishes speed limits: ‘A driver must not drive at a speed over the speed limit applying to the driver for the length of road where the driver is driving’<sup>43</sup> or r 67(2)(a) concerning stop signs: ‘The driver must stop as near as practicable to, but before reaching the stop line’.<sup>44</sup> It is the driver who is the active agent. This is reinforced by r 348 that directly connects the vehicle’s movements to the driver’s doing.<sup>45</sup>

The leading Australian authority on what amounts to driving is the Victorian decision of *Tink v Francis*.<sup>46</sup> Having indicated that it is a question of fact, Young CJ explained that:

The question whether a person in given circumstances is driving the car will often turn on the extent and degree to which the person was relying on the use of the driver’s controls ... The ordinary meaning to be attached to the word ‘drives’ when applied to a motor car should, I

<sup>34</sup> *Transport Operations (Road Use Management—Road Rules) Regulation 2009* (Qld) r 15.

<sup>35</sup> *Ibid* r 16. Rule 17 defines a rider and riding, and rule 19 goes on to expressly state that reference to a driver and driving includes reference to a rider and riding.

<sup>36</sup> *Ibid* r 14.

<sup>37</sup> *Ibid* rr 15, 17, 18.

<sup>38</sup> *Transport Operations (Road Use Management) Act 1995* (Qld) sch 4.

<sup>39</sup> *Acts Interpretation Act 1954* (Qld) s 32D(1).

<sup>40</sup> *Ibid* s 36, sch 1.

<sup>41</sup> *Transport Operations (Road Use Management—Road Rules) Regulation 2009* (Qld) sch 5.

<sup>42</sup> Douglas Brown, *Traffic Offences and Accidents* (LexisNexis Butterworths, 2006) 5.

<sup>43</sup> *Transport Operations (Road Use Management—Road Rules) Regulation 2009* (Qld) r 20. The maximum penalty is 40 penalty units.

<sup>44</sup> *Ibid* r 67(2)(a). The maximum penalty is 20 penalty units.

<sup>45</sup> *Ibid* r 348.

<sup>46</sup> [1983] 2 VR 17. This decision has been relied upon in a variety of decisions for understanding what it means to drive a vehicle. See *R v Murray* (1986) 4 MVR 331; *Mason v Dickason* (2006) 47 MVR 30; *Cooley v Lowe* [1984] Tas R 107; *Robinson v R* (1991) 14 MVR 381; *Allan v Quinlan, Ex parte Allan* [1987] 1 Qd R 213.

think, embrace the notion of some control of the propulsive force which, if operating, will cause the car to move.<sup>47</sup>

This decision authorises a pragmatic approach to determining the identity of the driver who is driving a vehicle, which involves factual considerations relating to responsibility for the primary controls, the steering, the accelerator and the brake.<sup>48</sup>

In the context of a level 4 autonomous vehicle where intelligent systems are controlling the primary controls, it would mean that the underlying assumption in TORUM-RR of human controlling a vehicle would be negated. Human occupants in level 4 autonomous vehicles would be passengers and very little of the existing TORUM-RR would apply to them except the provisions about seatbelts<sup>49</sup> and travelling in a part of the vehicle not designed for the carriage of passengers.<sup>50</sup> The ‘driver’, the entity that satisfies the definition of ‘in control of’ the primary controls, would be the vehicle itself. As such, under TORUM-RR the occupant would not be the driver and nor would the vehicle be the driver. The answer to the hypothetical question regarding who gets the ticket would be neither.

This raises the potential of anarchy on the roads as it suggests that level 4 autonomous vehicles would be unregulated by TORUM-RR. This alarmist suggestion is misplaced. Instead of the rules of road governing human drivers, it would be expected that the substantive content of TORUM-RR would become directly programmed into the vehicle; an example of the transmission of law into code that is a hallmark of the digital era.<sup>51</sup> When this happens, the substantive rules in TORUM-RR, cease being laws directed to humans but become encoded as software dictating how autonomous vehicles should navigate the transport network. However, there is little reason in a fully mature automated traffic network for individual vehicles to behave according to the current Australian Road Rules. In a network where there is constant communication between vehicles and the road infrastructure, there would be no need for traffic lights, stop signs, giving way to the right, keeping to the left, or lane markings. Vehicles could be managed so that they seamlessly integrate into a constant flow of traffic and decisions about priority could be made continuously on vehicle metrics (speed, direction, and destination) and the immediate conditions, rather than the formal hierarchies and turn-taking that underpin the current Australian Road Rules.

Level 4 vehicles could also spell the end of Queensland’s driver licensing scheme. Humans would no longer be needed to drive a motor vehicle. Section 78 of the *Transport Operations (Road Use Management) Act 1995* (Qld) establishes the licensing regime by making it an offence for ‘a person’ to ‘drive a motor vehicle on a road unless the person holds a driver licence’.<sup>52</sup> This connection, that it is a ‘person’ who is licenced to drive a motor vehicle is the underlying assumption of the licensing regime as provided by the *Transport Operations (Road Use Management—Driver Licensing) Regulation 2010* (Qld). Level 4 vehicles would not be

<sup>47</sup> *Tink v Francis* [1983] 2 VR 17 (Young CJ).

<sup>48</sup> Brown, above n 42, 6. On applicant in Queensland see *Allan v Quinlan, Ex parte Allan* [1987] 1 Qd R 213.

<sup>49</sup> *Transport Operations (Road Use Management—Road Rules) Regulation 2009* (Qld) r 265. Maximum penalty 20 penalty units.

<sup>50</sup> *Ibid* r 268. Maximum penalty 20 penalty units.

<sup>51</sup> Kieran Tranter, “‘Come a Day there Won’t be Room for Naughty Men Like Us to Slip About at All’: The Multi-Medium Outlaws of Firefly/Serenity and the Possibilities of Post-Literate Justice” (2012) 16 *Law Text Culture* 277, 293–4.

<sup>52</sup> *Transport Operations (Road Use Management) Act 1995* (Qld), s 78(1)(a) and (b). The maximum penalty is 40 penalty units or 1 year imprisonment (s 78(1)(b)) or 60 penalty units or 18 months of imprisonment if the offender was disqualified at the time of the offence (s 78(1)(a)).

‘persons’ and therefore not require a driver’s licence and occupants within level 4 autonomous vehicles, in exercising no control or supervision of the vehicle, would be unlicensed passengers.

Level 4 vehicles suggest the possible end of TORUM-RR and licensing regime as they have been known. All the law and regulation around persons driving become superseded. However, how level 2 and 3 vehicles would engage with TORUM-RR is less clear. With such vehicles, there would still be a ‘driver’ as anticipated by TORUM-RR as a human occupying the driver’s seat with direct responsibility for some of the primary controls, and/or supervising the vehicle and able to resume control of the vehicle. There are two issues.

The first issue is where, due to automation, specific decisions about the vehicle are not attributable to the ‘driver’. Take for instance a level 3 vehicle that executes an emergency stop due to an unexpected hazard. Such a situation would not be unusual; for example, the vehicle is in congested traffic and has been placed into a ‘traffic jam assist’ autonomous mode where the vehicle tracks the vehicle in front and if that vehicle brakes suddenly, the autonomous vehicle would halt. As a level 3 system, the ‘driver’ would not be required to resume control of the vehicle and could have their entire attention on another activity. However, the sudden stop might have put the vehicle into a breach of TORUM-RR by, for example, halting it in a blocked intersection. Regulation 128 concerning entering a blocked intersection is precise: ‘A driver must not enter an intersection if the driver cannot drive through the intersection because the intersection, or a road beyond the intersection, is blocked’.<sup>53</sup> It is not the vehicle that is regulated, but the ‘driver’. In this situation, the human ‘driver’ was not driving the vehicle; they did not make the decision to ‘drive through the intersection’. The entity that was ‘in control of’ the vehicle in making the decision to enter the blocked intersection was the vehicle itself. The vehicle cannot be assumed to be the driver under TORUM-RR as only ‘persons’ can be drivers. This highlights an obvious lacuna in the rules for cooperative autonomous vehicles as by having the subject of the regulation as being ‘drivers’ and not ‘vehicles’, some actions on the road by level 3 autonomous vehicles could not, on the current wording of TORUM-RR, be regulated. The question of ‘who gets the ticket’ arguably, in these circumstances, is neither.

The second issue is the reverse. It is a possibility that when a driver engages autonomous functions they have breached r 297(1) of TORUM-RR and possibly also s 83 of the *Transport Operations (Road Use Management) Act 1995* (Qld). Rule 297(1) states that a ‘driver must not drive a vehicle unless the driver has proper control of the vehicle’.<sup>54</sup> There is little guidance on what is ‘proper control’. In *Mylrea v Nye*, driving a vehicle into an area where the driver had no visibility was considered a failure to exercise proper control of the vehicle.<sup>55</sup> Section 83 of *Transport Operations (Road Use Management) Act 1995* (Qld) provides that: ‘Any person who drives a motor vehicle on a road or elsewhere without due care and attention or without reasonable consideration for other persons using the road or place is guilty of an offence’.<sup>56</sup>

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<sup>53</sup> *Transport Operations (Road Use Management—Road Rules) Regulation 2009* (Qld) r 128. Maximum penalty 20 penalty units.

<sup>54</sup> *Ibid* r 297.

<sup>55</sup> *Mylrea v Nye* (1996) 24 MVR 561, 562 (Demack J). Some caution is needed with this decision as it was not directly on r 297, rather the comments on what amounts to ‘proper control of a vehicle’ were in the context of civil liability.

<sup>56</sup> *Transport Operations (Road Use Management) Act 1995* (Qld) s 83. Maximum penalty of 40 penalty units or 6 months imprisonment.

Like other provisions of TORUM-RR r 297(1) presents a pragmatic requirement determined by the specific facts. As such a driver in a level 2 or 3 vehicle operating in autonomous mode might be seen as not in proper control of the vehicle as they might not be in physical contact with the primary controls or keeping the same level of attention on the road and surrounding traffic as would be required with a non-autonomous vehicle. A similar interpretation could be placed on s 83 of the *Transport Operations (Road Use Management) Act 1995* (Qld). Operating a level 2 and 3 autonomous vehicle would mean that the ‘driver’ would not be exercising the same level of ‘due care and attention’ as a driver of a non-autonomous vehicle. If such interpretations are placed on r 297 and s 83 then they could act as an obstacle to the use of level 2 and 3 autonomous vehicles in Queensland.

While there are some anomalies potentially generated by cooperatively autonomous vehicles and TORUM-RR, the licensing of drivers would still be required for level 2 and level 3 vehicles. This is because both levels 2 and 3 anticipate moments where the driver would resume control of the vehicles. At level 2 the driver retains ultimate control and would directly satisfy the requirements for a licence as they would be a ‘person’ ‘driving’ a vehicle.<sup>57</sup> At level 3, provided there is the possibility within any journey where the human would have to assume either direct control or level 2 supervisory control, then the ‘driver’ would still need to be licensed.

The situation seems unproblematic for level 0 or 1 vehicles. In those vehicles, the paradigm of a human driving a vehicle remains undisturbed and TORUM-RR and licensing requirements remain. However, there is a particular context where these vehicles require clarification of TORUM-RR. In level 0 or 1 vehicles, C-ITS technologies are identified as acting as driver aids, notifying drivers of hazards or emergencies, but not involving the autonomous step of intervening in the piloting of the vehicle. The National Transport Commission did in its final report observe that there was one area where C-ITS created conflicts with the existing road rules and that was the rules surrounding driver distraction.<sup>58</sup>

Rules 299 and 300 are the current rules concerned with driver distraction from televisual technologies.<sup>59</sup> It is assumed that increasing C-ITS technologies in vehicles will involve more information being communicated to drivers via in-dash screens. Rule 299 provides a penalty for a driver who can see a screen from the normal driving position.<sup>60</sup> The exception is if the screen is a ‘driver’s aid’.<sup>61</sup> ‘Navigational or intelligent highway and vehicle system equipment’ are included as a ‘driver’s aid’.<sup>62</sup> The incorporation of an in-dash touchscreen interface, which can function when the vehicle is moving as a driver or navigational aid has become standard equipment in most new passenger vehicles sold in Queensland. It seems that TORUM-RR currently provides for drivers to have screens showing C-ITS data while driving. However, the rules are directed to the existence and installation of screens. Rule 300 deals directly with distraction by prohibiting the holding of mobile phone handsets by drivers while the vehicle is moving or stationary but not parked.<sup>63</sup> This provision is technologically limited in that it concerns only ‘mobile phones’ and not a wider set of interactive smart devices such as tablets or smart watches. It does not regulate distraction directly, instead the prohibited act is the

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<sup>57</sup> Ibid s 78.

<sup>58</sup> National Transport Commission, above n 2, 27–30.

<sup>59</sup> *Transport Operations (Road Use Management—Road Rules) Regulation 2009* (Qld) rr 299, 300.

<sup>60</sup> Ibid r 299(1). Maximum penalty 20 penalty units.

<sup>61</sup> Ibid r 299(2)(b).

<sup>62</sup> Ibid.

<sup>63</sup> Ibid r 300(1). Maximum penalty 20 penalty units.

physical action of holding a phone by the driver while driving. It is an example of a technologically dependent rule – by naming a specific technological object, it faces future obsolescence when that object is superseded.<sup>64</sup> This means it does not cover distraction from C-ITS systems.

Distraction caused by C-ITS systems might be covered by r 297 in that it could be argued that a distracted driver is not in ‘proper control’ of the vehicle or by careless driving under s 83 of *Transport Operations (Road Use Management) Act 1995* (Qld). Furthermore, where the consequences of a driver’s distraction results in the vehicle becoming dangerous, criminal law provisions can be seen to apply.<sup>65</sup> However, the rise of embedded C-ITS within vehicles suggests that the current specific provisions regarding distraction are technologically limited.

## 2 Intoxicating Driving Regime – Person in Charge of a Vehicle

Queensland has two distinct provisions dealing with intoxicated driving. The first is the older provision regarding driving ‘under the influence’.<sup>66</sup> The second are the more recent rules regarding driving with a blood alcohol/drug limit over prescribed limits.<sup>67</sup>

While there are significant differences in how to determine whether a driver is intoxicated according to the ‘under the influence’ provision in s 79(1)<sup>68</sup> and the blood alcohol/drug provisions in s 79(1F), (2), (2AA), 2(A), 2(B) of the *Transport Operations (Road Use Management) Act 1995* (Qld),<sup>69</sup> for the purposes of this paper the various offences raise the same issue. The issue is not whether a human occupant of an autonomous vehicle is intoxicated by alcohol or drugs or which precise offence in s 79 their intoxication falls under. Rather, it is assumed that the occupant is intoxicated. The issue is, having assumed that the occupant is intoxicated and alone in an autonomous vehicle, whether they are guilty of an offence under s 79 or merely a passenger of the vehicle. What is to be examined is the wording, and application of that wording, in s 79 that connects an intoxicated person to a vehicle for the purposes of the offences.

There is no difference in s 79 regarding the wording that connects an intoxicated person to a vehicle for the purpose of the intoxication offences. Regardless of which intoxication offence a person is charged, the same phrasing connects a person and vehicle.

<sup>64</sup> Lyria Bennett Moses, ‘Recurring Dilemmas: The Law’s Race to Keep Up with Technological Change’ (2007) 7 *Journal of Law, Technology and Policy* 239, 270.

<sup>65</sup> See below text accompanying nn 84-106.

<sup>66</sup> Brown, above n 42, 147. On determining whether a driver is ‘under the influence’ see *Noonan v Elson* [1950] St R Qd 215; *O’Connor v Shaw* [1958] Qd R 384; *Leach v Commissioner of Police* [2009] QDC 66.

<sup>67</sup> On the inclusion of drug related intoxication into the intoxicated driving provisions see Jeremy Prichard et al, ‘Detouring Civil Liberties? Drug-Driving Laws in Australia’ (2010) 19 *Griffith Law Review: Law Theory Society* 330, 331–4.

<sup>68</sup> *Transport Operations (Road Use Management) Act 1995* (Qld) s 79(1). The basic maximum penalty is 28 penalty units or 9 months imprisonment. Penalties increase if there are repeat convictions within 5 years for specific motor vehicle offences (s 79(1A-1E)).

<sup>69</sup> *Transport Operations (Road Use Management) Act 1995* (Qld) ss 79(1F) (offence of driving over middle but not over high blood alcohol limit, maximum penalty 20 penalty units or 6 months imprisonment), 79(2) (Offence of driving over general but not over middle blood alcohol, maximum penalty 14 penalty units or 3 months imprisonment), 79(2AA) (offence of driving while relevant drug is present, maximum penalty 14 penalty units or 3 months imprisonment), 79(2A) (learner or provisional licence holder with a blood alcohol reading, maximum penalty 14 penalty units or 3 months imprisonment), 79(2B) (offence of driving with a blood alcohol reading a prescribed vehicle, maximum penalty 14 penalty units or 3 months imprisonment). Sections 2F-2I provide for increased penalties if multiple offences within 5 years.

There are three terms used in the intoxication offences to connect a person to a vehicle. They are ‘drive’, ‘attempt to put in motion’ and the more general ‘in charge of’ a vehicle.<sup>70</sup> ‘Drive’ is understood as it is under TORUM-RR as engagement with the primary controls of the vehicle.<sup>71</sup> ‘Attempts to put in motion’ covers situations where a person tried, but failed, to drive a vehicle. The classic situation is an intoxicated person trying to start a vehicle with the wrong key.<sup>72</sup> The phrase ‘in charge of’ has very broad connotations. In the early case of *Kunze v Vowles; Ex parte Vowles*,<sup>73</sup> the Queensland Supreme Court adopted an understanding of ‘in charge of’ to include a notion of responsibility.<sup>74</sup> This was only seen as negated when an intoxicated person gave responsibility of the vehicle to another.<sup>75</sup> In *Hayes v Wilson; Ex parte Hayes*, Campbell CJ defined ‘in charge of’ a vehicle as the person ‘with the capacity of driving it or putting it in motion’.<sup>76</sup> This broad notion of ‘in charge of’ is reinforced in s 124(1)(t) of the *Transport Operations (Road Use Management) Act 1995* (Qld). This provision deems that ‘any person who appears, acts, or behaves as the driver, rider, or person having the possession, custody, care, or management of any vehicle ... shall be presumed to be the person in charge thereof’.<sup>77</sup> Section 124(1)(t) provides a presumption capable of being rebutted by evidence.<sup>78</sup> Section 79(6) limits the extent to which persons can be found to be in charge of a vehicle.<sup>79</sup> This ‘sleeping-it-off’ provision allows a person who was not in the driver’s seat, was not so intoxicated as unable to ‘manifest an intention’ of refraining from driving the vehicle and the vehicle was parked in a safe place, as not ‘in charge of’ the vehicle for the purposes of the s 79 offences.<sup>80</sup>

A significant policy question arises concerning intoxicated persons in level 4 vehicles.<sup>81</sup> Based on the expansive understanding of the phrase, an intoxicated person would be ‘in charge of’ the vehicle. The intoxicated person would be capable of ‘putting it in motion’, to paraphrase Campbell CJ,<sup>82</sup> by engaging the autonomous system. Additionally, an intoxicated person alone in an autonomous vehicle would ‘appear to have the possession, custody, care, or management’ of the vehicle as understood by s 124(1)(t) and be presumed to ‘be the person in charge thereof’.<sup>83</sup> Further, as the vehicle would be in motion and not safely parked, the intoxicated person would be unable to take advantage of s 79(6). As such, it seems clear that the current law would find that an intoxicated occupant in a level 4 vehicle had committed an offence

<sup>70</sup> *Transport Operations (Road Use Management) Act 1995* (Qld) ss 79(1)(a-c), 79(1F)(a-c), 79(2)(a-c), 79(2AA)(a-c), 79(2A)(a-c), 79(2B)(a-c).

<sup>71</sup> See above text accompanying nn 41–8.

<sup>72</sup> Brown, above n 42, 18.

<sup>73</sup> [1955] St R Qd 591.

<sup>74</sup> *Brooks v Spasovski* [2004] QDC 471 [19] (McGill DCJ).

<sup>75</sup> *Ibid* [26] (McGill DCJ); *Wynne v Campbell; Ex parte Campbell* [1965] QWN 7.

<sup>76</sup> [1984] 2 Qd R 114, 128 (Campbell CJ).

<sup>77</sup> *Transport Operations (Road Use Management) Act 1995* (Qld) r 124(1)(t).

<sup>78</sup> *Wynne v Campbell; Ex parte Campbell* [1966] QWN 7; see also *Eggmolesse v Bruce* [2009] 1 Qd R 324, 325 [2–3] (McMurdo P).

<sup>79</sup> The ‘sleeping it off’ provision implements a recommendation of the Law Reform Commission (now Australian Law Reform Commission) to provide some limit to the extent of engagement with a vehicle that had been captured by the phrase ‘in charge of.’ Law Reform Commission, *Alcohol, Drugs and Driving*, Report 4 (1976) [370] and 157.

<sup>80</sup> *Transport Operations (Road Use Management) Act 1995* (Qld) s 79(6). See *Eggmolesse v Bruce* [2009] 1 Qd R 324 where a mechanic who put his arm through the window of the vehicle to start it was found to not be ‘in charge of’ the vehicle.

<sup>81</sup> Frank Douma and Sarah Aue Palodichuk, “‘But Officer, it Wasn’t My Fault...the Car Did it!’: Criminal Liability Issues Created by Autonomous Vehicles” (2012) 52(4) *Santa Clara Law Review* 1157, 1163.

<sup>82</sup> *Hayes v Wilson; Ex parte Hayes* [1984] 2 Qd R 114, 128 (Campbell CJ).

<sup>83</sup> *Transport Operations (Road Use Management) Act 1995* (Qld) r 124(1)(t).

under s 79. However, they could be seen in an analogous situation to the perfectly legal and responsible situation of an intoxicated passenger travelling in a vehicle being driven by a non-intoxicated human driver. The difference with a level 4 vehicle would be that the non-intoxicated driver would be the vehicle itself. This is clearly a discussion that needs to take place as the prevalence of level 4 vehicles increase; whether the acceptance of automation extends to allowing intoxicated persons to travel alone in autonomous vehicles or whether the current scope of s 79 remains? It might be expected that as acceptance of automation increases then there will be pressure for reforming the scope of ‘in charge of’ under s 79 to allow an intoxicated passenger to travel alone in a level 4 vehicle.

For level 2 and 3 vehicles, an intoxicated person would be considered to be either ‘driving’ the vehicle or at the very least ‘in charge of’. This seems appropriate. At levels 2 and 3, the human driver still requires engagement with some of the primary controls, supervisory oversight or the ability to take control of the vehicle if required. All three of these situations would require the human driver to not be affected by alcohol or drugs and the existing wording seems adequate. Further, as with TORUM-RR, for level 0 and 1 vehicles, humans remain drivers and the current provisions around intoxication apply.

### *3 Summary of Challenges to Road Laws*

The full roll out of level 4 automation across Queensland’s vehicle fleet possibly spells the end of TORUM-RR and the licensing regime in their current form. However, that is some way off. The more immediate concerns are the challenges posed by level 2 and 3 vehicles. While the requirement for licences for drivers would remain, there is an anomaly that actions by a level 3 system in autonomous mode – where there is no ‘driver’ piloting the vehicle in the immediate instant – falls outside of TORUM-RR. There is also the possibility that the ‘proper control’ of a vehicle provision in r 297 and the careless driving offence in s 83 could be interpreted as prohibiting the use of level 2 and 3 autonomous functions. While level 0 and 1 automation presents little challenge to Queensland road laws, they do expose some of the inadequacies of the current distraction provisions in TORUM-RR.

The intoxication driving regime seems adequate and appropriate until level 4 automation. It can be seen that an intoxicated person in a level 4 vehicle would still have committed an offence under s 79 as they would fall within the broad understanding of being ‘in charge of’ the vehicle. The argument could be made that this is an anomaly as an intoxicated occupant in a fully automated vehicle would be like a passenger in a human-driven vehicle and should not be considered ‘in charge of’ it and subject to the intoxication regime.

## **B** *Queensland Criminal Law*

The relationship between Queensland’s road laws and formal criminal law in the *Criminal Code 1899* (Qld) is a question of degree. Serious or extreme breaches of the road laws with severe consequences can result in charges under the Code. For the dedicated motor vehicle offence of ‘dangerous driving’, autonomous vehicles expose the limit of its threshold requirement of a ‘person operating a vehicle ... dangerously’. Further, it will be argued that the current criminal provisions regarding unauthorised interferences with computer systems, unlawful control of a vehicle and kidnapping could cover criminal activity associated with autonomous vehicles, such as the hacking vehicles and the digital hijacking of vehicles.

## 1 Dangerous Driving – Person who Operates a Vehicle

The primary provision relating to motor vehicles in the Code is s 328A which establishes a hierarchy of strict liability offences.<sup>84</sup> Section 328A(1) makes it a misdemeanour for a ‘person to operate ... a vehicle dangerously in any place’.<sup>85</sup> Section 328A(2) makes it a crime if the offence in s 328A(1) is committed with the aggravating factors of intoxication or excessive speed.<sup>86</sup> Section 328A(4) sets out the indictable offence where a ‘person who operates ... a vehicle dangerously ... and causes the death of or grievous bodily harm to another person’.<sup>87</sup> The key terms are ‘person’ and ‘operates a vehicle dangerously’.

Like with TORUM-RR, who is a ‘person’ in the Code is not adequately defined.<sup>88</sup> However, as has been discussed above, the *Acts Interpretation Act 1954* (Qld) suggests that ‘person’ is limited to a human or a corporation.<sup>89</sup> The vehicle itself cannot be charged with this offence. The phrase ‘operates a vehicle dangerously’ is defined in s 328A(6). The focus of the definition is on the degree of dangerousness; with a list of circumstances from the place, vehicle condition, number of persons in the vehicle and intoxication that should be considered when assessing this factor.<sup>90</sup> The Code does not provide guidance on what level of responsibility for the primary controls of a vehicle satisfies ‘operates’. Case law provides clear examples of what can amount to operating a vehicle dangerously; distraction with a mobile phone resulting in the death of pedestrians<sup>91</sup>, road rage<sup>92</sup>, hit and running<sup>93</sup>, and excessive speed and intoxication.<sup>94</sup> The focus in the cases has been on ‘dangerously’, not on the specifics of determining what level of engagement a human must have with the vehicle to satisfy the factual threshold of being the ‘person who operates’. In most cases it is unproblematic as the offender was behind the steering wheel ‘operating the vehicle’. However, the phrase ‘operates a vehicle’ in the Code can cover a wider set of factual circumstances than would fall within the ordinary meaning of ‘driving’ under TORUM-RR.<sup>95</sup> In *R v Covington*, a passenger in a lead vehicle whose actions in throwing objects contributed to the crash of a following vehicle was convicted under s 328A.<sup>96</sup> This decision seems to impose an outer limit on what constitutes ‘operating a vehicle’. The offender in *R v Covington* was actively engaged in ‘unsafe’ conduct, namely throwing bottles from a moving vehicle towards another moving vehicle.<sup>97</sup>

<sup>84</sup> *Criminal Code 1899* (Qld) s 328A; *Gleeson v McCaffery* [1989] 2 Qd R 558, 562 (Williams J).

<sup>85</sup> *Ibid* s 328A(1). Maximum penalty of 200 penalty units or 3 years imprisonment.

<sup>86</sup> *Ibid* s 328A(2). Maximum penalty of 400 penalty units or 5 years imprisonment.

<sup>87</sup> *Ibid* s 328A(4). Maximum penalty of 10 years imprisonment or 14 years imprisonment with aggravating factors such as intoxication, excessive speeding, participating in a race or leaving the scene when a person has been killed or injured.

<sup>88</sup> *Ibid* s 1. The definition of ‘person’ extends to entities capable of owning property. On the lack of clarity of ‘person’ in the Code see Colleen Davis, ‘Conjoined Twins as Persons that can be Victims of Homicide’ (2011) 19 *Medical Law Review* 430.

<sup>89</sup> See above text accompanying notes 35-9.

<sup>90</sup> *Criminal Code 1899* (Qld) s 328A(6). See generally *McBride v The Queen* (1966) 115 CLR 44.

<sup>91</sup> *R v Hopper; Ex parte A-G (Qld)* (2014) 66 MVR 522.

<sup>92</sup> *Pearce v R* (2010) 57 MVR 75.

<sup>93</sup> *R v Henderson; Ex parte A-G (Qld)* [2013] QCA 63; *R v Harris* (2008) 50 MVR 217; *R v Vance* (2007) 48 MVR 375.

<sup>94</sup> See for example *R v Nikora* (2014) 67 MVR 514; *R v TX* [2011] 2 Qd R 24; *R v Anderson* [2006] 1 Qd R 250; *R v Calder, Ex Parte Attorney-General* [1987] 1 QD R 348.

<sup>95</sup> Brown, above n 42, 17.

<sup>96</sup> *R v Covington* (2003) 39 MVR 23. This is a decision of the Queensland Court of Appeal. It considers the appropriateness of the sentence imposed on the passenger. It was not contested that the passenger who was convicted under s 328A having pleaded not guilty, was not ‘operating a vehicle dangerously.’

<sup>97</sup> *Ibid* 25 [13] (McMurdo P, Jerrard JA and Muir J agreeing).

There is an irony when considering this offence in the context of autonomous vehicles. Proponents of automation argue that the sort of dangerous driving criminalised by s 328A would be a programmed impossibility in properly working level 4 vehicles. The catch is the correct operation of the vehicle. Conceivably, autonomous vehicles could engage in dangerous driving where there are malfunctions, bugs, failure of backup systems, or false sensor readings. The question is whether the occupant inside a malfunction level 4 vehicle could be considered the person who operated the vehicle?

On the current interpretation, it is possible that an occupant in a malfunctioning level 4 vehicle would not be seen as operating the vehicle as explained in *R v Covington*. The seemingly requisite ‘unsafe’ act would be absent. However, in plain terms, the wording of s 328A of a ‘person who operates’ could be seen to cover a person who enters a level 4 vehicle and commissions it to start a journey. If the wording of s 328A was held to extend to an occupant in a dangerously malfunctioning level 4 vehicle then prima facie the occupant could have committed the offence. In this circumstance an occupant might be able to have recourse to the excuses in the Code; in particular under ss 23 and 24.<sup>98</sup> Section 23(1)(b) provides an excuse from criminal responsibility if there is ‘an event that (i) the person does not intend or foresee as a possible consequence; and (ii) an ordinary person would not reasonably foresee as a possible consequence’.<sup>99</sup> It would be arguable that an occupant in a malfunctioning autonomous vehicle, who was unaware of its malfunctioning and that lack of awareness was reasonable from the perspective of an ordinary person, would be able to rely upon s 23(1)(b). The same circumstance might also support an excuse under s 24 of the Code of honest and reasonable mistake of fact.<sup>100</sup> The mistake of fact would be that the vehicle would dangerously malfunction. Provided the occupant was honest and reasonable in their mistaken belief that the vehicle was safe, then the excuse under s 24 would be available. However, an occupant could not rely upon these excuses if they knowingly commenced travel in a defective level 4 vehicle. In that situation, the occupant could be seen in an analogous position to the offender in *R v Covington* whose unsafe conduct amounted to an offence under s 328A.<sup>101</sup>

A further consequence of malfunctioning autonomous vehicles is whether the corporate manufacturer would be considered the ‘person who operates’ the vehicle dangerously. In Queensland, corporations can be convicted of criminal offences<sup>102</sup> and the *Penalties and Sentences Act 1992* (Qld) provides a formula for imposing fines on corporations in lieu of imprisonment.<sup>103</sup> As a strict liability offence, the fact of a person dangerously operating the vehicle substantiates the offence regardless of intention. Whether the corporate manufacturer intended the vehicle to go haywire would be irrelevant. If the human occupant inside a

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<sup>98</sup> Potentially the excuse in s 25 of the *Criminal Code 1899* (Qld) relating to an extraordinary emergency might also be available; however, given an occupant in a level 4 autonomous vehicle is a passive passenger they would not have the capability to do something in an extraordinary emergency. Contrast with a driver of a human driven vehicle who would have an excuse of extraordinary emergency if they drove dangerously to avoid a more serious accident. See *R v Webb* [1986] 2 Qd R 446.

<sup>99</sup> *Criminal Code 1899* (Qld) s 23(1)(a). In *Jimenez v The Queen* (1992) 173 CLR 572, the High Court held that this excuse can apply to dangerous driving offences.

<sup>100</sup> *Criminal Code 1899* (Qld) s 24. See *R v Wilson* [2009] 1 Qd R 476 where the excuse under s 24 was available to a charge under s 328A.

<sup>101</sup> Although there do not seem to be many decisions where knowingly driving a defective vehicle, in itself, amounts to operating a vehicle dangerously. In *R v Quinlan* (1994) 21 MVR 205, the Queensland Court of Appeal did see knowingly driving a defective vehicle (with four bald tyres) was one element, among others of excess speed and alcohol that constituted operating a vehicle dangerously.

<sup>102</sup> *Acts Interpretation Act 1954* (Qld) s 46.

<sup>103</sup> *Penalties and Sentences Act 1992* (Qld) s 181A.

malfunctioning level 4 vehicle is not the person who operates it, rather its operation is being controlled by hardware and software provided by the manufacturer, the manufacturer could be regarded as committing the offence. Indeed, it need not be the manufacturer. It could be the corporate service centre that last updated the system or even the corporate suppliers of the hardware and software.

Attribution of criminal liability to corporations in Queensland uses the common law principles of identification liability to determine whether an action of an officer of the corporation can be taken as the actions of the corporation.<sup>104</sup> The test would be whether the fact of the dangerous operation of the vehicle is attributable to the 'directing mind and will' of the company.<sup>105</sup> The directing mind and will is usually the board and the chief executive. It can extend to actions of employees provided the employees are acting in accordance with directions of the directing mind and will.<sup>106</sup> In the specific context of a malfunctioning autonomous vehicle, it would seem that provided the malfunction stemmed from actions of employees in compliance with the directing mind and will of an autonomous vehicle corporation (which would involve the designing, building and programming vehicles) then there is an argument that the corporation could be seen as operating a vehicle dangerously and be subject to criminal liability under s 328A.

How this would interplay with consumer and civil liability regimes and whether authorities would actually prosecute a manufacturer in these circumstances is highly unclear. What it does show is the impact of level 4 vehicles on Queensland law will be significant and diverse; challenging TORUM-RR, the intoxication regime and potentially exposing corporate entities involved with the autonomous systems to criminal liability if an autonomous vehicle malfunctions and becomes dangerous.

The potential for criminal liability of a human occupant within a level 3 vehicle depends on the precise facts of the human's engagement with the autonomous systems. Like with level 4 vehicles, it would be assumed that correct operation of a level 3 system would not cause a vehicle to act in a dangerous manner and, as with level 4, the question becomes one of malfunction, knowledge of malfunction and the possibility of the corporate manufacturer or related entity being regarded as the 'person who operates'. However, the transition between autonomous and human drive modes of a level 3 vehicle could give rise to a person operating a vehicle dangerously in two circumstances. The first would involve a driver switching to autonomous mode when the pre-conditions for autonomous operation are not present and the excessive environmental stimulus causes the vehicle to become dangerous. The second is not resuming control of the vehicle when the vehicle disengages from autonomous mode or begins to malfunction in autonomous mode and is becoming dangerous. For level 2 vehicles the situation is clearer. In level 2 vehicles the human driver retains, at a minimum, supervisory control of the vehicle operating in autonomous mode. This would seem to satisfy the requirement that the person was 'operating' the vehicle in that, if the system started driving the vehicle dangerously, the driver would have both the technical ability and the positive obligation to regain full control of the vehicle. Finally, for level 1 and 0 vehicles human operation of the vehicle remains uncontested.

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<sup>104</sup> In this regard, Queensland is different to the Commonwealth which has a more expansive legislative scheme for identification of corporate criminal liability. See *Criminal Code Act 1995* (Cth) ss 12.1-12.6.

<sup>105</sup> *Grain Sorghum Marketing Board v Supastok Pty Ltd* (1964) Qd R 98.

<sup>106</sup> *Meridian Global Funds Management Asia Ltd v Securities Commission* [1995] 2 AC 500. See Jennifer Hill, 'Corporate Criminal Liability in Australia: An Evolving Corporate Governance Technique' [2003] *Journal of Business Law* 1.

## 2 Hacking of Vehicles

The international literature has identified several novel situations where criminal offences might arise in relation to autonomous vehicles. As a computer system, autonomous vehicles would be susceptible to hacking.<sup>107</sup> This hacking could range from installing spyware so a third party could track the movements of a vehicle to more immediate dangerous interfering with the vehicle so it crashes, or ‘kidnaps’ the occupant.

Concerning the basic situation of hacking an autonomous vehicle, the hacker would be likely to have committed an offence under s 408E of the Code. Section 408E makes it an offence to ‘use’ a ‘restricted computer without the consent of the computer’s controller’.<sup>108</sup> It seems reasonable that the processing and network components of the vehicle (irrespective of whether it is a level 0, 1, 2, 3 or 4) would fall within the definition of ‘all or part of a computer, computer system or computer network’ in s 408E(5).<sup>109</sup> Also, vehicles are already subject to significant restrictions and encryption preventing unauthorised access to its operational software. It would be expected that as the level of autonomy increases, so to would this security. As such an autonomous vehicle would be regarded as ‘restricted’ as understood in s 408E.<sup>110</sup> Finally, ‘use’ in the Code seems broad enough to cover access, the deleting of data and/or adding data.<sup>111</sup> In this context a hacker who gains unauthorised access to an autonomous vehicle’s software, even if they did not act maliciously, would have committed an offence. The difficulties of this provision, as evident by the lack of case law on s 408E, are the cybercrime policing issues of identity and jurisdictional location of the hacker and compiling sufficient evidence of the hacking.<sup>112</sup>

A potentially more ‘provable’ hack could be the circumstance where a hacker maliciously corrupts an autonomous vehicle’s software to cause the vehicle to crash injuring or killing a victim. This activity could be an offence under several provisions of the Code. It could fall with s 408E(3) or (4) where the hacking ‘causes a detriment or damage or obtains a benefit’.<sup>113</sup> However, the definitions of detriment, damage and benefit in s 408E(5) seem to be limited to pecuniary benefits, not causing physical harm.<sup>114</sup> Possibly, a hacker in this situation could be seen as a ‘person operating’ the vehicle dangerously under s 328A. This circumstance could also be an offence under s 319 where it is an offence to do ‘anything that endangers...the safe use of a vehicle, with intent to injure or endanger the safety of any person in the vehicle’.<sup>115</sup> This offence is directed to the ‘brake-line cutting’ sort of interference with a vehicle. The difficulty with s 319 is that convictions under it are rare.<sup>116</sup> Part of this might be because the

<sup>107</sup> Douma and Palodichuk, above n 81, 1157, 1164; Cyrus Pinto, ‘How Autonomous Vehicle Policy in California and Nevada Addresses Technological and Non-Technological Liabilities’ (2012) 5 *Intersect* 1, 5–6.

<sup>108</sup> *Criminal Code 1899* (Qld) s 408E(2). Subsection (3) and (4) provided more serious offences if the hacking is accompanied by aggravating circumstances. The maximum penalties range from 2 years to 10 years imprisonment.

<sup>109</sup> *Ibid* s 408E(5).

<sup>110</sup> *Ibid*. Encryption and requiring authorisations are considered the hallmarks of a ‘restricted computer’.

<sup>111</sup> *Ibid*.

<sup>112</sup> On the issue of the technical ‘proof’ of hacking under s 408E see *R v Boden* [2002] QCA 164. On the wider issue see Kieran Hardy, ‘Operation Titstorm: Hacktivism or Cyber-Terrorism’ (2010) 33 *University of New South Wales Law Journal* 474.

<sup>113</sup> *Criminal Code 1899* (Qld) ss 408E(3) and (4).

<sup>114</sup> *Ibid* s 408E(5).

<sup>115</sup> *Ibid* s 318.

<sup>116</sup> The only record of a conviction under s 319 is documented in *R v Murgha* [2012] QCA 255, where the Court of Appeal notes that the offender in that case had a prior offence under s 319 for which he received 80 hours community service.

maximum penalty of life imprisonment means that prosecutors are reluctant to charge offenders under the section. Another issue is, unlike the strict liability offences in s 328A, s 319 requires intent to ‘injure or endanger the safety of any person’, which can be difficult to prove. In the context of hacking autonomous vehicles, these difficulties with s 319 are potentially magnified by the general cybercrime policing difficulties.

A novel situation suggested by autonomous vehicles could arise where control has been hijacked by a third party who has hacked into the vehicle. At a basic level, this would be an offence under s 408E. It also could be an offence under s 408A.<sup>117</sup> Section 408A(1) makes it an offence to ‘[use] any motor vehicle...without the consent of the person in lawful possession’.<sup>118</sup> This is an offence against the person who should have lawful enjoyment of the vehicle and as there is clear authority that ‘use’ covers ‘having the vehicle under control’,<sup>119</sup> it seems appropriate to the situation of a hacker gaining control of a vehicle. A further issue would be where the hijacking of control happens with an occupant inside the vehicle. The relevant offences would be ‘deprivation of liberty’ under s 355 and the more serious offence of kidnapping under s 354.<sup>120</sup> For deprivation of liberty, the essential element is preventing the victim freedom of movement to be determined on the specific facts of a case.<sup>121</sup> Preventing a victim from leaving a vehicle<sup>122</sup> and forcibly making a victim travel in a vehicle has amounted to deprivation of liberty.<sup>123</sup> It would seem that the situation of a hijacked autonomous vehicle, where an occupant is unable to leave the vehicle or is ferried to a location that they did not wish to travel to, would be an offence under s 355. Further, if this taking is accompanied by ‘intent to gain anything from any person or to procure anything’,<sup>124</sup> then the elements of kidnapping would seem to be present.<sup>125</sup>

### 3 Summary of Challenge to Criminal Laws

Overall, Queensland’s criminal law seems adaptable to autonomous vehicles, but like with TORUM-RR and the intoxication regime, level 4 vehicles pose some challenges. The offence of dangerous driving in s 328A seems reasonably adaptable to situations where a person inappropriately interacts with the autonomous systems of a level 2 or 3 vehicle causing the vehicle to become dangerous. For a level 4 vehicle, it was assumed that only through fault or malfunction would it become dangerous. It seems likely that a human occupant within a malfunctioning level 4 vehicle would not have committed an offence under s 328A as they would either not be the ‘person who operates’ the vehicle or if they were found to satisfy that requirement, have the excuse of honest and reasonable mistake of fact under s 24. In the malfunctioning level 4 vehicle situation there is the possibility that the corporate manufacturer or related entity could be the ‘person who operates the vehicle dangerously’ and have committed the offence. Further, the ‘law on the books’ regarding hacking of computer systems appears to cover the hacking of autonomous vehicles and consequential crimes such as illegal

<sup>117</sup> *Criminal Code 1899* (Qld) s 408A.

<sup>118</sup> *Ibid* s 408A(1). The maximum penalty for the basic offence is 7 years imprisonment. If the vehicle was used with the intent to commit an indictable offence the penalty rises to 10 years imprisonment (s 408(1A)).

<sup>119</sup> *R v Judkins* [1979] Qd R 527, 530 (Dunn J).

<sup>120</sup> *Criminal Code 1899* (Qld) ss 355, 354. The maximum penalty for deprivation of liberty is 3 years imprisonment. The maximum penalty for kidnapping is 7 years imprisonment.

<sup>121</sup> *R v Awang* [2004] 2 Qd R 672, 679 (Williams JA).

<sup>122</sup> *R v El-Masri* [2003] QCA 52.

<sup>123</sup> *R v G; Ex parte A-G* (Qld) [2003] QCA 470.

<sup>124</sup> *Criminal Code 1899* (Qld) s 354(2).

<sup>125</sup> *Ibid* s 354(1). If the intent is accompanied by extortion then the aggravating offence of kidnapping for ransom would be present: s 354A. The maximum penalty for kidnapping for ransom is 14 years imprisonment: s 354A(2).

use of vehicle, deprivation of liberty and kidnapping. The difficulty with these provisions is not adequacy of coverage, rather the cybercrime difficulties of policing and gathering sufficient evidence to successfully prosecute an offender.

#### IV REFORM FOR AUTONOMOUS VEHICLES

The above discussion has identified that much of Queensland's road and criminal law seems adaptable to autonomous vehicles. Indeed, there does not appear to be any obvious obstacle with the road or criminal laws for up to level 1 vehicles.

Level 2 autonomous vehicles – where two or more of the primary control functions have been automated and the driver only retains supervisory control – seem permissible in Queensland provided the attention provisions in r 297 of TORUM-RR and s 83 of the *Transport Operations (Road Use Management) Act 1995* (Qld) are not interpreted strictly. The human occupant would still properly be seen to have 'control of the vehicle' and as such would satisfy the threshold in TORUM-RR to be considered a driver. As a driver there would still be the requirement to have a licence, vehicle control decisions made by the autonomous system would be seen under TORUM-RR as still made by the driver who retains 'control of' the vehicle, and intoxication and dangerous driving offences would apply to the human driver as they would be 'in charge' of the vehicle as required by s 79 of the *Transport Operations (Road Use Management) Act 1995* (Qld) and would be the 'person who operates' as required by s 328A of the Code.

Level 3 autonomous vehicles – where the human driver delegates the control of the vehicle to the autonomous system but is required to resume active driving when prompted – present some more challenges. There is an immediate anomaly for TORUM-RR where a human has engaged autonomous mode and the vehicle then breaches a provision of TORUM-RR. In that circumstance, there would be no 'driver' as envisaged by TORUM-RR. Human occupants in level 3 vehicles would still require a licence as there would still be the requirement for the human to drive the vehicle, as currently understood, when required. And because level 3 requires the possibility that the occupant be able to take control of the vehicle, it seems appropriate that the occupant would still be regarded as 'in charge of' a vehicle and therefore subject to the intoxication regime and would be convicted of dangerous driving if they operated the autonomous system in a dangerous manner or failed to resume control of the vehicle if the autonomous system started to malfunction.

Level 4 autonomous vehicles – where the vehicle is a self-driving robot able to travel entirely independent of human supervision in all road environments – present some serious challenges for Queensland's road and criminal laws. There would not be 'drivers' as currently understood who would be subject to the provisions of TORUM-RR. Conceivably in a fully mature autonomous transport network, the substantive stipulations of TORUM-RR could be replaced by more spontaneous and efficient algorithms. Further, the occupants of a level 4 vehicle, as they would not be the 'driver', would be a 'passenger' as currently understood in TORUM-RR and not require a licence. For the intoxication offences, the occupant would still likely be seen as 'in charge of' the vehicle and s 79 of the *Transport Operations (Road Use Management) Act 1995* (Qld) would apply. This potentially would create an anomaly where an intoxicated passenger in a human driven vehicle would not be 'in charge of' the vehicle; while the identical situation in a level 4 vehicle would, on the current law, result in the intoxicated passenger having breached the provisions of s 79. Concerning a level 4 vehicle that was malfunctioning and becoming dangerous, it would seem likely that a human occupant would not have

committed the offence of dangerous driving under s 328A of the Code. This is because either an occupant in a level 4 vehicle would not satisfy the threshold fact of a ‘person operating the vehicle’ or if they did, might be able to rely on the excuses in ss 23 and 24 provided the occupant honestly and reasonably operated the vehicle believing it to be functioning correctly. A significant possibility concerning dangerously malfunctioning autonomous vehicles is that the corporate manufacturer or related entity, as the provider and servicer of the self-driving hardware and software, might be regarded as the ‘person operating the vehicle’ and committing the offence.

Queensland’s criminal law does seem adequate in relation to autonomous vehicles with the provisions relating to computer crime, illegal use of a motor vehicle and deprivation of liberty and kidnapping. These, in combination, seem to provide detailed coverage of circumstances around hacking and taking ‘remote control’ of autonomous vehicles.

No Australian jurisdiction has made substantive progress in reforming its laws in response to increasing vehicle automation. In March 2016 South Australia amended its *Motor Vehicles Act 1959* (SA) to regulate the trials and testing of autonomous vehicles and ensure that experimental autonomous vehicles are under the civil motor vehicle liability scheme.<sup>126</sup> However, there have been reforms and reform proposals in the United States and Europe that can inform and guide reforms in Queensland.

Nevada was the first jurisdiction in the United States to legislate for autonomous vehicles in 2011.<sup>127</sup> This legislation, along with similar legislation enacted by Florida in 2012,<sup>128</sup> California in 2012,<sup>129</sup> and the South Australian amendment, is addressed primarily to the development and testing of autonomous vehicles on public roads.<sup>130</sup> The Nevada law expressly includes the requirement that there is a human occupant in the vehicle capable of assuming control,<sup>131</sup> mandates that entities wishing to test autonomous vehicles deposit a bond with the state,<sup>132</sup> and specifies the issuing of special licence endorsements for operators of autonomous vehicles.<sup>133</sup> What is clear from this legislation, and the similar laws passed by other US states, is that with the provisions regarding a human occupant there is a strong reluctance of the US legislatures to allow for level 4 vehicles. What the ‘testing’ legislation did identify was the need for a clearer set of definitions around autonomous vehicles. The California legislation defines ‘autonomous vehicles’ as a vehicle equipped with ‘autonomous technology’ ‘capable to drive a vehicle without the active physical control or monitoring by a human operator’<sup>134</sup> and level 1 vehicles are expressly excluded from the definition of autonomous vehicle.<sup>135</sup> ‘Human operator’ is further defined as the person who is seated in the driver’s seat, or if there is no person in the driver’s seat, causes the autonomous technology to engage’.<sup>136</sup> One

<sup>126</sup> *Motor Vehicles (Trials of Automotive Technologies) Amendment Act 2016* (SA), inserting a new Part 4A into the *Motor Vehicles Act 1959* (SA).

<sup>127</sup> AB 51 (Nev 2011) *codified in* Nev Rev Stat § 482A (2014); Danielle Lenth, ‘Chapter 570: Paving the Way for Autonomous Vehicles’ (2013) 44 *McGeorge Law Review* 787.

<sup>128</sup> HB 1207 (Fla 2012) *codified in* Fla Stat, Ch 316 (2014).

<sup>129</sup> SB 1298 (Cal 2012) *codified in* Cal Veh Code § 38750.

<sup>130</sup> Bryant Walker Smith, ‘Automated Vehicles are Probably Legal in the United States’ (2014) 1 *Texas A&M Law Review* 411, 500–8.

<sup>131</sup> Nev Rev Stat § 482A.070 (2014).

<sup>132</sup> *Ibid* § 482A.060 (2014).

<sup>133</sup> *Ibid* § 482A.200 (2014).

<sup>134</sup> Cal Veh Code §§ 38750(a)(1)(A).

<sup>135</sup> *Ibid* §§ 38750(a)(1)(B).

<sup>136</sup> *Ibid* §§ 38750(a)(4).

particular reform adopted in Nevada has been the changing of the distraction by mobile phone rule to allow drivers in level 3 vehicles to use mobile phones while the vehicle is in autonomous mode.<sup>137</sup>

Reform in Europe has been more limited. The UK government has announced autonomous vehicle trials but no substantive legislative reform agenda has been publicised.<sup>138</sup> One of the issues for reform in this area in Europe is that most European nations have ratified the 1949 Geneva Convention on Road Traffic and the 1968 Vienna Convention on Road Traffic. The Geneva Convention specifies that vehicles should have a driver who ‘shall at all times be able to control their vehicles’,<sup>139</sup> while the 1968 Vienna Convention requires that ‘every moving vehicle shall have a driver’ and the driver shall ‘possess the necessary physical and mental ability and be in a fit physical and mental condition to drive’.<sup>140</sup> In a detailed examination of these provisions, Bryant Walker Smith concludes that it is probable that level 3 automation would be permissible under the conventions.<sup>141</sup> Nevertheless, there has been some movement within Europe, spearheaded by the United Nations Economic Commission for Europe (‘UNECE’) on a harmonised response to C-ITS and autonomous vehicles, including possible amendments to the Road Traffic treaties.<sup>142</sup> The US reforms do provide some guidance to Queensland lawmakers in regards to the direction for reform of Queensland law in response to increased levels of automation within the vehicle fleet. Foremost, the inclusion of the definitions that California has introduced could address the problem in TORUM-RR of the relation between ‘driver’ and ‘vehicle’ for autonomous vehicles. Californian law defines the person who engaged the autonomous function as the ‘human operator’ and then includes the human operator in the definition of driver. Such an inclusion in Queensland could achieve two outcomes. The first is that it would allow a driver who engages autonomous mode on a level 2 vehicle to be regarded as in control of the vehicle. This would avoid the strict application of r 297(1) and s 83 of the *Transport Operations (Road Use Management) Act 1995* (Qld) that possibly prohibits the use of autonomous functions of a level 2 or 3 vehicle. Second, it could remove the anomaly regarding a breach of TORUM-RR by a level 3 autonomous vehicle in that the human occupant, having engaged autonomous mode, would still be deemed the ‘driver’. This would ensure that the occupant retains sufficient awareness of the vehicle’s progress to intercede if the vehicle seems about to breach a road rule.

Distraction is an obvious issue for autonomous vehicles. The C-ITS equipped non-autonomous vehicle presents a source of in-vehicle distraction that is not currently provided for by r 299 and r 300 of TORUM-RR. However, as vehicles increasingly become automated, the scope for a driver to safely be distracted – not giving their full and proper attention to the vehicle’s primary control – increases. This is what Nevada recognised in exempting operators of level 3

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<sup>137</sup> Nev Rev Stat § 482A.165(7).

<sup>138</sup> ‘UK to Allow Driverless Cars on Public Roads in January’, *BBC News* (online), 30 July 2014 <<http://www.bbc.com/news/technology-28551069>>; Parliamentary Office of Science and Technology, ‘Autonomous Road Vehicles’ (September 2013) 443 *Postnote* 1; Department of Transport, ‘Driverless Cars: Regulatory Testing Framework’ (2014) <<https://www.gov.uk/government/consultations/driverless-cars-regulatory-testing-framework>>.

<sup>139</sup> *Convention on Road Traffic*, opened for signature 19 September 1949, 125 UNTS 3 (entered into force 26 March 1952) art 8(5).

<sup>140</sup> *Convention on Road Traffic*, opened for signature 8 November 1968, 1042 UNTS 17 (entered into force 21 May 1977) art 8(1), (3). See National Transport Commission, above n 6, 26.

<sup>141</sup> Walker Smith, above n 130, 439–41.

<sup>142</sup> United Nations Economic Commission for Europe, *Road Map for Promoting ITS 20 Global Actions 2012 – 2020* (2012) <[http://www.unece.org/fileadmin/DAM/trans/publications/ITS\\_for\\_Sustainable\\_Mobility\\_Road\\_Map.pdf](http://www.unece.org/fileadmin/DAM/trans/publications/ITS_for_Sustainable_Mobility_Road_Map.pdf)>.

vehicles from the equivalent of r 300. Whether Queensland should follow suit by relaxing its distraction requirements would be an active policy debate for lawmakers and the community as autonomous vehicle numbers increase.

However, no jurisdiction has yet regulated level 4 autonomous vehicles. The US reforms, by mandating a human occupant capable of gaining control of the vehicle, essentially prohibit level 4 automation. The South Australian amendment does allow the testing of level 4 vehicles but only with specific Ministerial permission.<sup>143</sup> In Queensland, there is no immediate obstacle in the road law or criminal law to having a level 4 vehicle on the roads. Formally, vehicles and drivers are separate entities and there is no general provision that only allows vehicles with drivers on the roads. As there is no 'driver', as understood as a human in control of the vehicle, TORUM-RR and licensing provisions do not apply. This would be an untenable situation as common sense requires level 4 vehicles to act in a predictable manner in accordance with the substantive provisions of TORUM-RR, at least in the transition period where there would be a mixed fleet of level 4 and human-driven vehicles. Adoption of the US definition of driver to include an operator who has put an autonomous vehicle in motion could address this concern. In this circumstance, the occupant would still be liable if the autonomous vehicle breached TORUM-RR. This would ensure that owners and users of autonomous vehicles will expect that the vehicle is programmed in accordance with the Queensland road rules. One implication of this reform, if extended to the licensing regime is that it would mandate that at least one occupant in an autonomous vehicle be regarded as the 'driver' and hold a valid licence. This reform does not directly deal with whether an occupant in a dangerously malfunctioning level 4 vehicle has committed an offence under s 328A of the Code or whether the corporate manufacturer can be seen as the 'person who operates' the vehicle. It seems unfair that an occupant who was unaware of the malfunction should be strictly liable for the dangerous acts of the vehicle. However, it is possible that the excuses in the Code are adequate to excuse an occupant in this circumstance. The big policy question, and one that ties directly to consideration of civil liability, is whether the increasing automation of vehicles will shift liability to the manufacturers. US literature strongly anticipates that as automation of vehicles increases, there will be a mirrored migration of civil and criminal liability from occupants and owners to manufacturers.<sup>144</sup>

Subsequent reforms, like the rolling back of licensing requirements or the intoxication offences, are probably some way off. The demand or necessity for these changes will probably depend on the diffusion of level 4 autonomous vehicles in Queensland and the level of acceptance of their safety and reliability.

In summary, much of Queensland's road and criminal laws seem, at this stage, reasonably adaptable to autonomous vehicles. The criminal laws regarding unauthorised interference with a computer, unlawful control of a vehicle and kidnapping seem applicable to the possibility of hacking a vehicle and seizing remote control of a vehicle. Further, either because an occupant within a malfunctioning level 4 vehicle would not be the 'person who operates' or because they might have an excuse, they are unlikely to have committed the offence of dangerous driving.

However, some reforms are needed to allow for certainty regarding level 2 and level 3 autonomous vehicles and TORUM-RR. Adopting the definitions from the US of autonomous vehicle and extending the definition of a driver to a person who has put an autonomous vehicles

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<sup>143</sup> Motor Vehicles (Trials of Automotive Technologies) Amendment Bill 2015 (SA) s 134D.

<sup>144</sup> Beiker, above n 20, 1152; Graham, above n 28; Marchant and Lindor, above n 28; Peterson, above n 28; Garza, above n 28; Gurney, above n 8; Duffy and Hopkins, above n 28; Anderson et al, above n 14, 143.

in motion could address some of the anomalies identified with TORUM-RR. The definition would deem a driver who correctly engages the autonomous mode of a level 2 or 3 vehicle to be in proper control of the vehicle and driving a vehicle with due care and attention. The definition would also ensure that decisions about a vehicle made by a level 3 system in operation would be attributable to the human driver. If applied to the licensing regime, this reform would also extend the requirement of licensing to occupants in level 4 vehicles. Further reforms regarding distraction provisions, intoxicated driving and the extent of the licensing regime might be required as autonomous vehicles become more widespread and community acceptance of their safety and reliability increases. However, the biggest issues for consideration as automation increases will be how to best balance civil and criminal liability between the human owner and occupants of autonomous vehicles and the manufacturers and related entities when something goes wrong.<sup>145</sup>

## V CONCLUSION

This article examines the challenges of autonomous vehicles for Queensland road and criminal laws. It identifies that by replacing or augmenting driver decision making, existing laws that assume driver responsibility seem inadequate. It argues that much of Queensland's road and criminal law is adaptable to autonomous vehicles. However, there are some identifiable anomalies that will need to be addressed to effectively maximise the safety, economic and environmental benefits of autonomous vehicles. It suggests that adopting the US definitions of autonomous vehicle and driver to include an operator of an autonomous vehicle would address some of the immediate concerns with level 2 and 3 autonomous vehicles. It also suggests that as level 4 vehicles become more widespread and accepted, there might need to be further reforms to the licensing and the registration regimes and the content of TORUM-RR to allow a more spontaneous use of road space and for relaxation of the intoxication provisions to allow a single intoxicated occupant to travel in a level 4 vehicle. The need for further consideration of manufacturer liability as automation increases is also highlighted.

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<sup>145</sup> This is an important and complex issue that will require more space than this paper to explore. See National Transport Commission, above n 6.