
FCAI Submission to NTC Discussion paper: Clarifying control of automated vehicles



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(4 July 2017)

EXECUTIVE SUMMARY

The Federal Chamber of Automotive Industries (FCAI) is the peak industry organisation representing the manufacturers and importers of light passenger vehicles, light commercial vehicles and motorcycles in Australia.

The FCAI welcomes the opportunity to comment on the National Transport Commission's Discussion Paper on Clarifying Control of Automated Vehicles.

The number of advanced driver assistance systems (ADAS), that can assist the driver in the driving task, has increased in the recent years. The FCAI expects that the range of ADAS will continue to increase and will become more readily available across the new vehicle fleet. The introduction of different ADAS is part of an evolution of the automated vehicle with automated systems gradually developed and incorporated into new cars. By this process drivers will be guided step-by-step towards automation.

Road regulations and vehicle regulatory standards will be gradually developed and regulatory authorities will develop the necessary regulatory approaches for automated driving over time. Development of both road and vehicle regulations is underway at the international level via the United Nations Working Party 1 (WP.1) and Working Party 29 (WP.29) with changes to the Vienna Convention and the UN Regulation on Steering Systems (UN R79).

The FCAI recommends that Australia follows these developments and harmonises the Australian regulatory regime for automated vehicles, in both the Australian Road Rules and vehicle regulations (i.e. Australian Design Rules) with the Vienna Convention and UN Regulations (respectively) as they are developed to accommodate automated vehicles. The Australian Government has representatives involved in this process and it is imperative that the international considerations are not pre-empted by any Australian specific measures.

The FCAI supports enforcement guidelines to fill the gap between the current road rules (and driver being in control) and the future law that is still to be developed and aligned with international best practice. Once this occurs, the enforcement guidelines will need to be reviewed and updated. Also, recognising that levels of automation in vehicles (and the introduction of V2X technology) will be progressively increased over the coming years the enforcement guidelines will need to be regularly reviewed and updated.

As an interim step to the regulatory regime for automated vehicles, the FCAI supports national enforcement guidelines that are based on the human driver being in control of a vehicle with conditional automation, even when the automated driving system is engaged in the dynamic driving task. The FCAI offers to continue to work closely with the NTC to facilitate the introduction of vehicles with increasing levels of automation.

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1.0 INTRODUCTION

The Federal Chamber of Automotive Industries (FCAI) is the peak industry organisation representing the vehicle manufacturers and importers of passenger vehicles, light commercial vehicles and motorcycles in Australia.

Modern vehicles are advanced machines with a range of sophisticated mechanical and electrical components and electronic modules that are integrated to deliver the performance, safety and emissions expected by customers and government. Vehicle manufacturers are researching, developing and progressively introducing new technologies to make vehicles more automated and connected. Before the safety and environmental benefits of automated and connected vehicles can be realised a number of matters need to be considered - one of the most important of which is the regulatory environment.¹

The number of advanced driver assistance systems (ADAS), that can assist the driver in the driving task, has increased in the recent years. The FCAI expects that the range of ADAS will continue to increase and will become more readily available across the new vehicle fleet. The introduction of different ADAS is part of an evolution of the automated vehicle with automated systems gradually developed and incorporated into new cars. By this process drivers will be guided step-by-step towards automation.

Road regulations and vehicle regulatory standards will be gradually developed and regulatory authorities will develop the necessary regulatory approaches for automated driving over time. Development of both road and vehicle regulations is underway at the international level via the United Nations Working Party 1 (WP.1) and Working Party 29 (WP.29) with changes to the Vienna Convention and the UN Regulation on Steering Systems (UN R79).

The Vienna Convention on road transport was changed in October 2015 to allow automated systems to influence the driving of a vehicle, but only if it could be overruled or turned off at any time by the driver. While the Vienna Convention still requires that each vehicle must have a driver WP.1 is continuing to review the Convention and the need to clarify interpretations to the definition of driver and other related concepts for the various levels of automation.

Work is underway in WP.29 to amend the United Nations Regulation on Steering Systems (UN R79) as a core feature of automated driving is that the vehicle drives on its own to follow the road or to overtake. UN R79 currently allows for automatic steering, but only at speeds up to 10 km/hr.

The FCAI recommends that Australia follows these developments and harmonises the Australian regulatory regime for automated vehicles, in both the Australian Road Rules and vehicle regulations (i.e. Australian Design Rules) with the Vienna Convention and UN Regulations (respectively) as they are developed to accommodate automated vehicles. The Australian Government has representatives involved in this process and it is imperative that the international considerations are not pre-empted by any Australian specific measures.

¹ In this submission, the term 'vehicle' refers to light vehicles (passenger cars, SUVs and light commercial vehicles) and motorcycles.

2.0 RESPONSES TO DISCUSSION PAPER QUESTIONS

2.1 Overview of FCAI Position

There are challenges to achieve the right balance between allowing the introduction of automated vehicle technology and understanding the level of vehicle automation Australia is ready for, e.g. what level of infrastructure is required for an automated driving system.

The FCAI recognises that the NTC Discussion Paper is trying to address this challenge in the short term by developing enforcement guidelines to address the current issue with increasing levels of automation being introduced with new models/technology. The enforcement guidelines need to address the current Australian Road Rules that are based on the principle that the driver is *in control* of the vehicle.

The NTC's discussion paper is the first step in complementing the NTC recommendation (endorsed by Transport Ministers);

That the NTC develops national enforcement guidelines that clarify the regulatory concepts of control and proper control for partial, conditional, highly and fully automated vehicles. The NTC should develop guidelines that have regard to international standards and best practice and in collaboration with state and territory road, transport and police agencies and public prosecutors.

In the Discussion Paper (p.8), the NTC have outlined that the Transport Ministers' have endorsed the NTC recommendation that the human driver remains in control until a "new position is developed and agreed." The "new position" is to define an "automated driving system entity."

The FCAI supports harmonizing Australia's road rules definition of "automated driving system entity" with the international definitions. However, there is not currently an international agreement to define either an automated vehicle or "automated driving system entity." Until this happens (e.g. at WP.1 and WP.29) there cannot be a change to the Australian Road Rules, i.e. the "new position" referred to above.

The enforcement guidelines are intended to fill the gap between the current road rules (and driver being in control) and the future law that will be introduced and aligned with international best practice (when developed). Once this occurs, the enforcement guidelines will need to be changed/updated. Also, recognising that levels of automation in vehicles (and the introduction of V2X technology) will be progressively increased over the coming years the enforcement guidelines will need to be regularly reviewed and updated.

As an interim step to the future regulatory regime for automated vehicles, the FCAI supports national enforcement guidelines that are based on the human driver being in control of a vehicle with conditional automation, even when the automated driving system is engaged in the dynamic driving task.

The FCAI supports the NTC proposals in the Discussion Paper on *Clarifying control of automated vehicles* (p.7) that:

- National enforcement guidelines provide that the human driver is in control of a vehicle with conditional automation, even when the automated driving system is engaged in the dynamic driving task.

- Interpretation of *proper control* is amended to allow the human driver to not have a hand on the steering when a vehicle is operating at conditional or high automation, but introducing new indicators of *proper control* related to alertness and readiness to intervene.
- Guidelines do not have regard to the application of *proper control* to the automated driving system for high levels of automation, but that the guidelines are updated to do so when the automated driving system entity is recognised in the road rules.
- Technology solutions to assist enforcement agencies to interact with automated vehicles and to access relevant information should be included as part of the NTC's future project to regulate government access to automate vehicle data.

2.2 Context: Objectives of the national enforcement guidelines

Noting that the regulatory regime for highly automated vehicles is being developed at the UN (i.e. via both WP.1 and Wp.29), the FCAI supports national enforcement guidelines that are based on the human driver being in control of a vehicle with conditional automation, even when the automated driving system is engaged in the dynamic driving task, as an interim step to the full regulatory regime for vehicles with an automated driving system.

Question 1: Do you agree with the assumptions and objectives underpinning the NTC's work to develop national enforcement guidelines? If not, what other assumptions or objectives should be considered?

The FCAI agrees with the assumptions and objectives underpinning the NTC's work to develop national enforcement guidelines.

In particular, the FCAI notes that the NTC have stated that the enforcement guidelines should be reviewed and updated and be kept relevant as the capability of automated vehicles develop. As noted in Section 1.0 above, there is substantial work being undertaken internationally (by both UN WP.1 and UN WP.29) and the FCAI would expect that the outcomes from this activity would also result in a review and update of the enforcement guidelines and Australia's road and vehicle regulations.

Recognising that the range of ADAS, and consequently the level of automation in vehicles, will continue to increase, the FCAI expects that the enforcement guidelines will need regular reviews and updates. For example, WP.1 is currently considering the need to clarify the interpretation of the Vienna Convention in relation to the SAE Levels 2 and 4.

2.3 SAE levels of driving automation

Question 2: Do you agree that national enforcement guidelines should clarify issues of control and proper control based on SAE International Standard J3016 Levels of Driving Automation? If no, what other approach should be considered?

The FCAI agrees that the national enforcement guidelines should clarify the issues of *control* and *proper control* based on SAE International Standard J3016 *Levels of Driving Automation* as this is the most comprehensive and widely used set of definitions at this time.

If the work of WP.29 results in a more comprehensive set of definitions for levels of automated driving incorporated in UN R79, the enforcement guidelines will need to be reviewed to ensure consistency with the definitions in UN R79. UN R79 is being reviewed and expanded to include the necessary regulatory requirements for the various levels of automated vehicle steering systems, which is directly related to the ability of the driver to be *in control*. The following extract is from the Introduction to R79:²

Systems whereby the driver remains in primary control of the vehicle but may be helped by the steering system being influenced by signals initiated on-board the vehicle are defined as "Advanced Driver Assistance Steering Systems". Such Systems can incorporate an "Automatically Commanded Steering Function", for example, using passive infrastructure features to assist the driver in keeping the vehicle on an ideal path (Lane Guidance, Lane Keeping or Heading Control), to assist the driver in manoeuvring the vehicle at low speed in confined spaces or to assist the driver in coming to rest at a pre-defined point (Bus Stop Guidance). Advanced Driver Assistance Steering Systems can also incorporate a "Corrective Steering Function" that, for example, warns the driver of any deviation from the chosen lane (Lane Departure Warning), corrects the steering angle to prevent departure from the chosen lane (Lane Departure Avoidance) or corrects the steering angle of one or more wheels to improve the vehicle's dynamic behaviour or stability.

In the case of any Advanced Driver Assistance Steering System, the driver can, at all times, choose to override the assistance function by deliberate action, for example, to avoid an unforeseen object in the road.

In the case of any Advanced Driver Assistance Steering System, the driver can, at all times, choose to override the assistance function by deliberate action, for example, to avoid an unforeseen object in the road.

It is anticipated that future technology will also allow steering to be influenced or controlled by sensors and signals generated either on or off-board the vehicle. This has led to several concerns regarding responsibility for the primary control of the vehicle and the absence of any internationally agreed data transmission protocols with respect to off-board or external control of steering. Therefore, the Regulation does not permit the general approval of systems that incorporate functions by which the steering can be controlled by external signals, for example, transmitted from roadside beacons or active features embedded into the road surface. Such systems, which do not require the presence of a driver, have been defined as "Autonomous Steering Systems".

When R79 or the Vienna Convention is updated the enforcement guidelines will need to be reviewed and updated to remain consistent with the international approach and allow the introduction of new vehicle technology into Australia.

² United Nations Regulation No. 79 Uniform Provisions Concerning the Approval of Vehicle with Regard to Steering Systems

Question 3: For the purposes of enforcing *proper control*, is there value in grouping levels of driving automation according to whether vehicles are capable of automated operation?

If the NTC decides to proceed with grouping the levels of driving automation according to the various capabilities of automated operation, the FCAI recommends that the automated steering functions that are being included in UN R79 be used.

The FCAI understands that UN R79 are categorising automated steering functions by the following:

- Category A: Parking and low speed maneuvering (at less than 10 km/hr).
- Category B: Lane guidance;
 - Category B1 – ‘quasi’ continuous (no velocity or domain restrictions).
 - Category B2 – continuous, roads with grade separation, velocity less than 130 km/hr.
- Category C: Lane change manoeuvre commanded by the driver (combined with either Category B1 or B2).
- Category D: Lane change manoeuvre commanded by the system and confirmed by the driver (Can be combined with either Category B1 or B2).
- Category E: Lane change manoeuvre proposed and carried out by the system without further driver command or confirmation (includes Category B2).

Prior to introducing any groupings (or categorization) the FCAI recommends that the NTC work with the Federal Department of Infrastructure and Regional Developments’ Vehicle Safety Standards Branch (who represent Australia on WP.29) to confirm the final categorisations included in UN R79.

2.4 Who is in control of the vehicle at each level of automation?

Until the regulatory regime for automated vehicles is developed and the international regulations and standards are implemented into Australia the FCAI supports the NTC’s following key point for development of enforcement guidelines:

- The human driver remains in control of vehicles operating at partial automation because he or she must supervise the driving environment and perform some of the driving task.

Options:

The NTC are seeking feedback on the following options on how national enforcement guidelines should treat vehicles with conditional automation.

1. That the national enforcement guidelines provide that the **human driver** is in control of a vehicle operation at conditional automation, even when the automated driving system is engaged in and is performing the dynamic driving task.
2. That the national enforcement guidelines provide that the **automated driving system** is in control of a vehicle operating at conditional automation when the automated driving system is engaged in and is performing the dynamic driving task. This option would not come into effect until the automated driving system and automated driving system entity are recognised in legislation.

The NTC supported Option 1

The FCAI supports Option 1.

Question 4: Do you agree that the human driver should remain in control of a vehicle with partial or conditional automation, and that the automated driving system should be in control of a vehicle operating at high or full automation? If not, why?

The FCAI agrees that for the enforcement guidelines, the human driver should remain in control of a vehicle with partial or conditional automation, and that the automated driving system should be in control of a vehicle operating at high or full automation. As noted above this should be an interim position until the development of the regulatory regime for automated vehicles has been completed at the international forums.

The NTC paper points out that this option is underpinned by three factors:

- The human driver must still be receptive to system failures and is the fallback if something goes wrong.
- The levels of conditional automation currently supplied to the market are ADAS and are safety features to assist the driver.
- There are issues around being able to regulate “readiness to drive”, i.e. ability and readiness of a driver to take active control of the vehicle through hands on the steering wheel and/or feet on the pedals.

The FCAI would also point out that with the current levels of ADAS the driver needs to make a decision to engage the system. The driver therefore should understand the capabilities and limitations of the ADAS in their vehicle prior to making the decision to engage the system. This is no different to the responsibility of the driver to ensure they understand the capabilities of the other systems on their vehicle (e.g. brakes, mirrors, lights etc.) and are able to operate their vehicle to drive safely on the road.

The vehicle’s operating environment should be taken into consideration rather than just the level of vehicle automation for determining the indicators of proper control. As connected vehicles (and accompanying road infrastructure, i.e. V2X) are introduced into Australia the indicators of *proper control*, and the enforcement guidelines, will need to be updated to account for increasing levels of connected and automated vehicles.

Question 5: In the event that the automated driving system is determined to be in control of a vehicle operating with conditional automation, should road traffic laws introduce obligations on the human driver as supervisor of the automated driving system?

The FCAI supports the proposal that road traffic laws introduce obligations on the human driver as supervisor of the automated driving system. As noted in the NTC Discussion Paper (pp. 27-28) this approach recognises that the safety of vehicles that require human intervention still needs to be validated.

Any road traffic laws introduced into Australia must be aligned with the international approaches to automated driving systems being developed at the relevant UN forum.

The NTC Discussion Paper notes the current road traffic laws are not yet in a state of readiness to accommodate automated vehicles operated by an automated driving system. To establish an automated driving system as the legal entity responsible for the vehicle’s actions while the automated driving system is engaged, the regulatory regime will also need

to consider what information (e.g. traffic infringements) will need to be provided back to the vehicle brand to allow review of the automated driving system to provide for further product development to continue to improve the safe operation of the automated driving system.

2.5 What constitutes *proper control* for each level of automation?

The FCAI agrees with the NTC that indicators of *proper control* will vary, depending on the level of driving automation and the design capabilities of the automated vehicle.

Options:

The NTC is seeking feedback on how national enforcement guidelines should apply the proper control test to the human driver in vehicles with automated features.

1. No change to the current interpretation to *proper control*.
2. That the interpretation of *proper control* is clarified to allow the human driver to not have a hand on the steering wheel in a self-parking operation or when an automated vehicle is in automated mode. New indicators of *proper control* related to alertness and readiness to intervene (outlined in Table 2 on p. 34) should be introduced. The indicators of proper control should be reviewed as further reforms are made and the technology develops.

The NTC supported Option 2.

The FCAI supports Option 2.

Question 6: Do you agree with the suggested indicators of *proper control* for each level of driving automation (outlined in Table 2 on p. 34)? Are there any other indicators that should be included in the guidelines?

The FCAI supports the suggested indicators of *proper control* for each level of driving automation outlined in Table 2 on p.34 of the Discussion Paper. The FCAI agrees with the NTC that the benefits of updating indicators of *proper control* include:

- Recognising the safety critical behaviours and matching the indicators of *proper control*.
- Ensuring the national enforcement guidelines and police response are relevant.
- Increase consumer demand for ADAS technologies.

The FCAI would also not object to requiring the driver to be “Seated in the driver’s seat” and to be “Not asleep” for Level 4 automation in the short term (i.e. during transition to automated driving).

At full automation (Some level 4 and all level 5 dedicated automation without a human driver as shown in Table 2) all parts of the automated eco-system including road and communications infrastructure must be operating correctly.

Question 7: Should special consideration be given to automated parking functions that are partially automated and can only operate without the driver holding the steering wheel?

The FCAI agrees that automated parking functions that operate without the driver holding the steering wheel needs to be catered for in the enforcement guidelines. Table 2 (p.34) already caters for self-parking functions where the human driver is outside the vehicle. Table 2 also needs to cater for self-parking functions where the human driver remains seated in the driver's seat without "At least one hand on the steering wheel."

Questions 8: Should the national enforcement guidelines also clarify the application of due care and attention offences to automated vehicles? If so, what behaviours usually penalised under these offences require clarification when applied to automated vehicles?

The FCAI does not have sufficient expertise in this area and therefore is not able to comment on this question beyond confirming support for the Indicators of *proper control* as outlined above.

The application of any road traffic laws, including the application of "due care and attention" must be aligned with the international approaches to automated driving systems being developed at the relevant UN forum.

Question 9: Do you agree that the guidelines should not apply the *proper control* test to the automated driving system until the automated driving system and automated driving system entity are recognised in legislation? If not, what alternative approach should be considered?

The FCAI agrees that the guidelines should not apply the *proper control* test to the automated driving system until the automated driving system and automated driving system entity are recognised in legislation.

The FCAI supports the NTC's key assumption that the guidelines should reflect the current law (i.e. Australian Road Rules).

The FCAI recommends that Australia follows the developments at the international (UN) level and harmonise the Australian regulatory regime for automated vehicles, in both the Australian Road Rules and vehicle regulations (i.e. Australian Design Rules) with the Vienna Convention and UN Regulations (respectively) as they are developed to accommodate automated vehicles.

Once this is completed and the automated driving system entity is recognised in legislation it would be appropriate to review the enforcement guidelines.

However, it must also be recognised that levels of automation in vehicles (and the introduction of V2X technology) will be progressively increased over the coming years. Therefore, the enforcement guidelines will need to be regularly reviewed and updated.

2.6 How will enforcement officers know what level of automation is engaged at a particular time?

The FCAI agrees with the NTC that enforcement officers and the NTC should work closely with vehicle manufacturers to identify technology solutions to assist enforcement agencies. The FCAI, as the light vehicle manufacturers association offers to continue to work closely with the NTC to facilitate the introduction of vehicles with increasing levels of automation.

Question 10: Do you agree that the guidelines should only specify enforcement agency interaction with automated vehicles once the technology capability of automated vehicles is more developed and enforcement practices implemented in overseas jurisdictions? If not, what alternative approach should be considered?

The FCAI supports the NTC proposals that:

1. Enforcement agencies and the NTC should work closely with vehicle manufacturers to identify technology solutions to assist enforcement agencies to interact with automated vehicles.
2. Options to facilitate enforcement agency interaction with automated vehicles should be included as a key objective in the NTC project to regulate government access to data.
3. National enforcement guidelines should be updated to identify a process for enforcement agency interaction with automated vehicles once the technology capability of automated vehicles is more developed and enforcement practices implemented in overseas jurisdictions.
4. When the safety assurance system is implemented, it should provide an additional regulatory mechanism to manage the interaction between enforcement agencies and automated vehicles.

The FCAI offers to continue to work closely with the NTC to facilitate the introduction of vehicles with increasing levels of automation.

3.0 CONCLUSION

The FCAI welcomes the opportunity to provide a submission to the NTC's Discussion Paper: National guidelines for automated vehicle trials.

The FCAI member companies recognise the potential for automated and connected vehicles to provide significant safety and environmental benefits to Australia through reductions in crashes and congestion.

Development of both road and vehicle regulations is underway at the international level via the United Nations Working Party 1 (WP.1) and Working Party 29 (WP.29) with changes to the Vienna Convention and the UN Regulation on Steering Systems (UN R79).

The FCAI recommends that Australia follows these developments and harmonises the Australian regulatory regime for automated vehicles, in both the Australian Road Rules and vehicle regulations (i.e. Australian Design Rules) with the Vienna Convention and UN Regulations (respectively) as they are developed to accommodate automated vehicles. The Australian Government has representatives involved in this process and it is imperative that the international considerations are not pre-empted by any Australian specific measures.

As an interim step to the regulatory regime for automated vehicles, the FCAI supports national enforcement guidelines that are based on the human driver being in control of a vehicle with conditional automation, even when the automated driving system is engaged in the dynamic driving task. The FCAI offers to continue to work closely with the NTC to facilitate the introduction of vehicles with increasing levels of automation.