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Automated Vehicle Team  
National Transport Commission Australia  
Paul Retter  
Chief Executive and Commissioner  
Level 3 / 600 Bourke Street  
Melbourne VIC 3000

**Subject:** Safety Assurance for Automated Driving Systems Consultation  
Regulation Impact Statement

## **1. Introduction**

BMW AG submits these comments in response to the National Transport Commission Australia (NTC) request for comment on its “Safety assurance for automated driving systems consultation regulation impact statement”.

BMW views the Consultation Regulation Impact Statement (RIS) as a positive first step in defining a legal framework for the deployment of automated driving systems (ADS). Further, BMW acknowledges that due to the complex and dynamic nature of development and deployment for an ADS, crafting regulations and guidelines that simultaneously promote safe, rapid release of new technologies while safeguarding road users is a challenging task. BMW would like to thank the NTC for the opportunity to comment on its Consultation Regulation Impact Statement (RIS).

BMW appreciates that the NTC is investigating different policy options in order to adapt its regulatory approach to quicken the introduction of ADS which have the potential to significantly improve the safety of the Australian roadways and provide new opportunities for mobility.

## **2. Comparison of the proposed options**

One important point that should be addressed by the NTC regardless of the chosen option are the inconsistencies between state and territory regulatory provisions. These inconsistencies will increase the cost and effort of an ADS market introduction without improving safety. These could significantly delay or even completely stop the market introduction of ADS.

In our eyes the four different proposals could potentially offer different advantages. However, until this new technology has matured sufficiently, BMW would recommend to follow Option 2 (Self Certification) because this option allows for the necessary flexibility during this important

stage of the ADS development process without prematurely prescribing a technology which may not provide the same safety potential.

For established technologies the current approach of a pre-market type approval (Option 1) following the guidance of UNECE has proven highly effective. BMW would like to encourage NTC to continue this harmonized approach by translating new UNECE regulations into new Australian Design Rules (ADRs). However, BMW sees the need of defining a temporary solution for the deployment of ADS until these new UNECE regulations (as discussed under WP.29) enter into force.

Until all ADS are covered by newly introduced ADRs, adding a self-certification to the well-established type approval process (Option 2) in order to clarify the requirements for an exemption will help to account for the safety of new assistance systems while offering sufficient flexibility to quickly introduce these new functionalities. The proposed safety features cover the crucial safety aspects an ADS development should consider and will increase public acceptance of the new technology.

In this context, BMW would like to emphasize that at this point in time, no commonly accepted state of the art for this new and innovative technology has been agreed upon, therefore there is no basis for a technical regulation to refer to. UNECE is facing this issue in its current effort to draft technical regulations for automated driving systems, which impedes a quick introduction of systems. Other countries chose more flexible approaches for the introduction of this cutting-edge technology, in order to gain safety benefit of these systems sooner. The US DOT's guidelines "Vision for safety" are a well-known example for this approach.

NTC's proposed Option 2 of self-certification thus in our view finds a good balance between a safe and quick introduction of self-driving technology and can serve as the basis for future regulations. Therefore, BMW believes this is the best solution for the time being.

As a midterm solution, BMW sees the strong need to come to harmonized international standards. We strongly support the creation of a global technical regulation (GTR) for ADS under the umbrella of UNECE in the future.

Option 3 proposes the introduction of a new legislative safety assurance system. BMW appreciates NTC's initiative to regulate the ADS separately from the vehicle, since the same ADS is likely to be installed in different vehicles. Nonetheless, BMW would recommend a harmonized ADS regulation in the long run based on the evolving UNECE regulations (WP.29, horizontal regulation). Since Option 3 would require additional organizational changes in the government's assessment process, BMW thinks that Option 2 would be better suited for a temporary solution.

The proposed option 4 introduces an additional primary safety duty on the ADSE. Since general consumer and product liability laws already provide a high level of consumer protection, the additional safety benefit of this measure is not fully clear. Furthermore, the proposed concept of imposing a not clearly specified primary safety duty to the ADSE revokes the planning criteria of the market introduction of an ADS, which might delay or even

put into question its introduction to the Australian market. Therefore, Option 4 might even reduce the safety potential of automated driving functions.

Section 6.5 (Regulatory costs to government impact) compares the financial impact of the proposed options. It is stated that the additional costs for administrating the safety assurance system “are likely to be recovered from ADSEs through fees and charges. The extent of any fees and charges has not yet been determined.” These additional costs have not yet been taken into account in the assessment of the regulatory costs to industry (Section 6.4). Even higher additional, yet not considered costs might arise from a continuing safety assurance related to an unspecified primary safety duty. Especially the request to adapt the system to changes in regulation over time is not consistent with today’s type approval and would lead to high unanticipated costs for the manufacturer, which in the end might increase the price of an ADS for the customer. This aspect might further delay a broad introduction of this technology.

### **3. Safety Features**

BMW fully agrees that ADS have great potential to improve the safety of our roadways while providing new opportunities for mobility. Since safety is the bedrock of our approach to the development and deployment of this technology, a highly elaborated toolset to assure system safety has been used from the start of development of our systems. BMW believes NTC has taken a comprehensive approach in creating the proposed safety features. However, we would like to offer some recommendations on certain safety features.

- To account for the rapid development of ADS, BMW recommends to regularly review the safety features.
- As NTC is aware, there are multiple standards that address the development of system safety, for example ISO 26262. A robust design and validation process based on a systems-engineering approach with the goal of preventing unreasonable safety risks is key.

As technology and capabilities vary widely for different automated driving systems and among OEMs, entities should develop tests and validation methods to ensure a high level of safety in the operation of their ADS-equipped vehicles.

BMW suggests that validation and test approaches should include a combination of simulation, test track, and on-road testing. Simulations (e.g. prospective effectiveness analysis) are becoming an increasingly important validation tool. OEMs and other entities should determine and document the combination of methods that are appropriate for their ADS-equipped vehicles. BMW primarily favors testing to be performed by OEMs and suppliers.

- BMW recommends that the development of algorithms for defining ADS behavior should not be made public. These algorithms will likely contain proprietary and business confidential information. BMW does, however, see the potential for the underlying logic of the safe behavior of an ADS equipped vehicle to be described generally to the public.

- BMW believes that it is important to begin an industry-wide dialogue to identify potential areas for performance-level — not solution-level — standardization regarding the interaction between automated vehicles and human road users, and to define when that is necessary. BMW believes that communicating intentions of an ADS-equipped vehicle should be limited to situations where there is a need for such communication. This is true for both the interaction with the vehicle occupants and for the communication with other road users. For example, it is important to note that there are ODDs (e.g., highway) where no additional ADS communication is needed beyond typical signaling (e.g., turn signal, brake light). For the vehicle occupant it is more important to clearly communicate the driver responsibilities and manage the mode awareness than to inform the driver about an activated automation level s/he might not be familiar with. Enhancing ADS-equipped vehicle trust through clear communication with other road users will promote public acceptance.
- BMW agrees with NTC that the ADS must operate in compliance with relevant road safety and traffic laws. BMW would kindly ask NTC to consider the harmonization of local and state traffic laws with the intention to reduce unnecessary variation of traffic laws to a minimum. This would prove very useful regarding further improvement of ADS. Alternatively, BMW recommends NTC to create a standardized data base for all relevant road traffic laws.
- We noticed that the RIS does not distinguish between Level 3 and Level 4/5 vehicles when addressing the minimal risk condition. It has to be kept in mind that for Level 3 ADS and below the human driver is deemed to be the fall-back ready user as defined by SAE J3016. Therefore the system cannot guarantee to reach a minimal risk condition under all circumstances. Consumer expectations need to be balanced with system capabilities. Missing driver interventions, independent of the root cause, will be addressed through an appropriate minimal risk condition as long as it is possible.
- BMW supports a documented process for assessment, testing, and validation of OEDR (Object Event Detection and Response) capabilities. BMW has been engaged in this complex topic through a German research project called PEGASUS, which has been internationally recognized. BMW is willing to share the progress made through this research effort in Europe with NTC.
- During design and development of automated functions, BMW takes into consideration reactions of the driver so that extensive additional training of the driver is not required. BMW aims to make the driving experience as intuitive as possible through intensive internal studies and concentration on human factors. Vehicle functions should be generally controllable while also taking into account potential misuse and inadvertent side effects of automation.

#### **4. Data recording and sharing**

- BMW recognizes that with the introduction of new sensors and technology, new data will be available if an event occurs. This data however should be limited to a crash or other physical occurrence that meets or exceeds a trigger threshold. Defining a “near miss” is subjective and should therefore not be required. A primary goal of an ADS is

to recognize the traffic situation at an early stage in order to take action to entirely avoid potential critical situations. The requirements for data storage should be aligned to those defined by UNECE (data storage system for automated driving, DSSA)

- For the development and improvement of the ADS it is important for the manufacturer to collect relevant data from all vehicles. For BMW, this data will be stored in Germany. Only by processing the data generated by vehicles worldwide, BMW can learn and adapt to the specifics of the different markets. A data storage in a specific country therefore is not feasible, since it would hinder the quick evolution of system intelligence.
- Sharing of data should be limited to authorized parties. To ensure that only authorized parties can access this data, the data sharing should always be handled by the ADSE.

## **Lifecycle/In-service Safety**

A crucial topic for ADS is to keep the system in safe condition during its usage period. While BMW sees it in the manufacturer's responsibility to adapt the ADS to changes in national traffic code and to react to arising security risks, it must be stated that the equipped hardware of a vehicle cannot be updated over the complete lifetime. An update to new technical regulations (e.g. minimal sensor ranges, updated HMI requirements ...) in the field is not feasible and should not be mandated. A common understanding for a "reasonable timespan" for the support of ADS is still under discussion on UNECE level.

## **Conclusion**

We applaud the NTC's first step in creating a regulatory framework for deploying ADS-equipped vehicles. Especially regulating the ADS instead of each vehicle equipped with an ADS is an important step to facilitate the introduction of automated vehicles. The benefits associated with automated vehicles hold the promise to reshape our understanding of mobility, increase road safety and improve our overall quality of life. Getting to this state will take time, dedication, and close collaboration between the government and mobility providers. BMW is committed to playing an active role in turning these R&D innovations into a reality. To realize the full safety potential of ADS, BMW supports a harmonized regulatory approach and recommends a close cooperation with the United Nations World Forum for Harmonization of Vehicle Regulations – Working Party 29. The proposed Option 2 of self-certification offers a good temporary solution until the international regulations have come into effect.