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**Inquiry into the social issues relating to land-based driverless vehicles
in Australia**

Submission by Robert Bosch (Australia) Pty Ltd

Introduction

The Bosch Group is a leading global supplier of technology and services. Operations are divided into four business sectors: Mobility Solutions, Industrial Technology, Consumer Goods, and Energy and Building Technology.

Our mobility solutions technology development is centred on the themes of connected, electrified and automated. The Bosch Group is developing automated driving technologies to increase safety and comfort and enable for the self-driving car.

This submission paper is prepared by Robert Bosch (Australia) Pty Ltd (Bosch).

Highly Automated Driving (HAD)

Bosch has been at the forefront of advanced driver assistance systems as an automotive component supplier and engineering company. In 2016, Bosch demonstrated a highly automated driving (HAD) vehicle in Melbourne at the Intelligent Transport Systems (ITS) World Congress. The vehicle is capable of between Levels 3 and 4 of the SAE Automated Driving System international new standards J3016.



The vehicle build, demonstration and further activities are a partnership between Bosch and the Victorian Government through the Transport Accident Commission (TAC) and VicRoads. Bosch is also working with the Queensland Government through the Department of Transport and Main Roads (TMR) on additional trials which will include assessments of social impact.

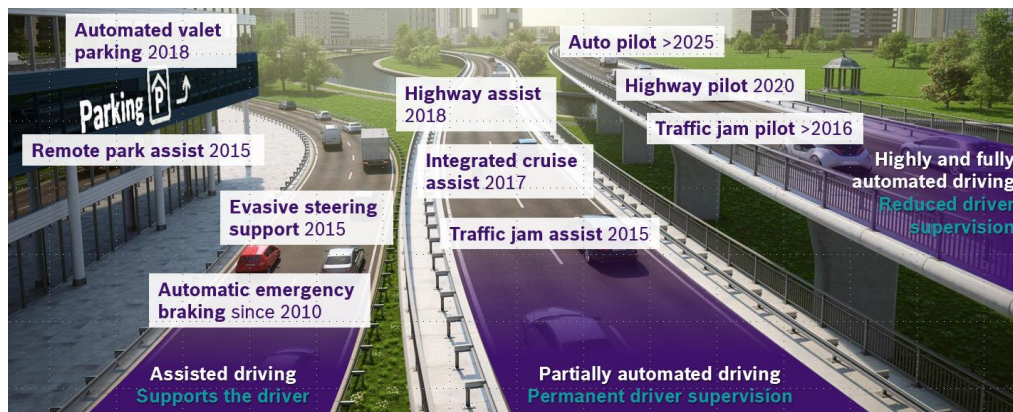
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The purpose of these activities is to inform governments and regulatory agencies of the impacts of automated vehicles and to assist them in preparing for when such vehicles become commercially available.

Social Impacts

Leading global carmakers are developing vehicles with differing levels of automation for release over the next 10-15 years. Bosch believes automation in driving will evolve with increasing features introduced to meet consumer requirements and as the technology becomes robust. A technology roadmap can be seen below.



With the introduction of new features, new driver assistance aids will also be introduced to ensure safety and acceptance and maximise individual mobility for road users.

General Acceptance

Approximately 90% of all crashes are caused by human error. Increasing the level of automation in vehicles should reduce road trauma as automated vehicles are able to detect and avoid potentially critical situations much earlier than human drivers.

Automated driving will improve traffic flow as vehicle to vehicle (V2V) and vehicle to infrastructure (V2I) communication will allow vehicles to share their relative location and traffic environments. This will result in vehicles



platooning with each other and enable increased efficiency in infrastructure (i.e. traffic lights) based on road demand.

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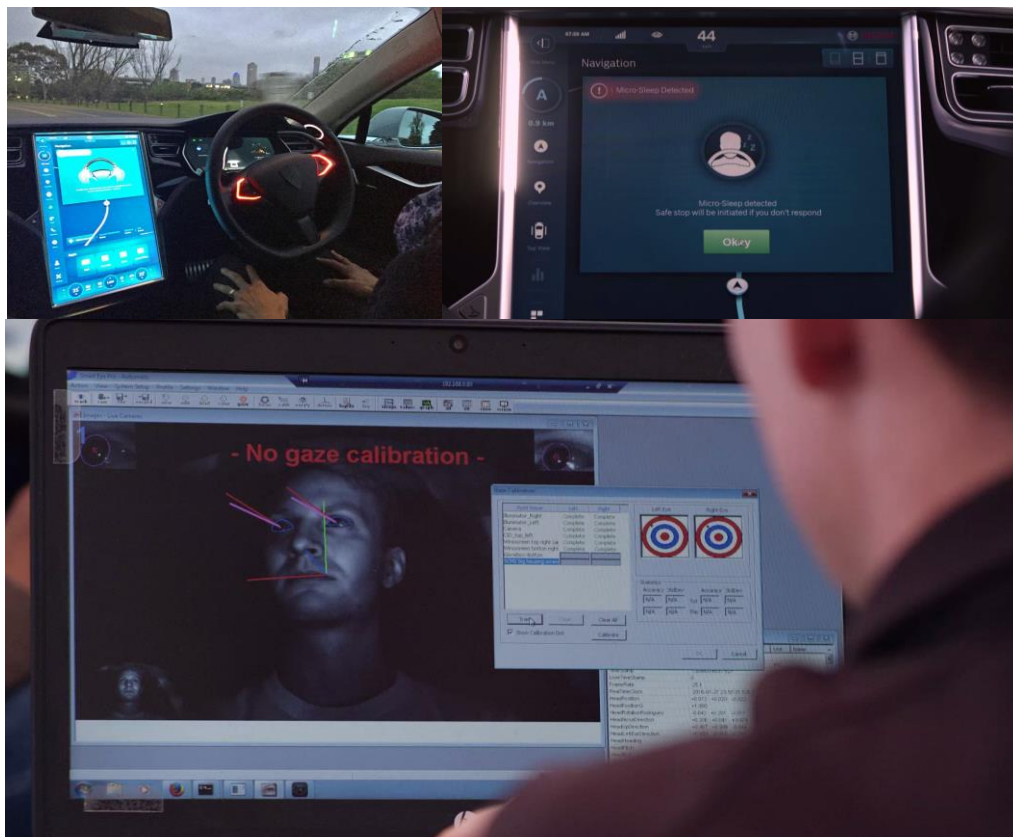
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Automated driving will increase productivity as drivers will be able to better utilise road time when vehicles are in an automated mode.

Safety

Bosch places emphasis on passenger and non-passenger safety in all development work. Our demonstration of highly automated driving (HAD) includes active safety through an advanced human machine interface (HMI).

The HMI system provides active safety for drivers of automated vehicles. The system recognises if the driver is in a state of micro-sleep or distracted. Should the driver not be able to take control of the vehicle when required, the system will provide audible warnings or come to a safe stop. Some images of the demonstration below.



It is anticipated that as automation increases, these systems will become common in vehicles.



Regulatory Status

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Trials are fundamental to understanding the impacts of automated vehicles. Whilst Bosch supports widespread adoption of automation in vehicles, it is important that these technologies are trialled and tested for local conditions, infrastructure requirements, driver behaviour and active safety systems.

Bosch believes the initial regulatory phase should be a national set of guidelines to cover trials of automated vehicle technologies as outlined by the National Transport Commission (MTC) in their discussion paper released November 2016.

Global Driverless Vehicle Initiatives

Bosch is already working with State Governments and regulatory agencies to ensure we contribute to global driverless vehicle initiatives. The vehicle demonstrated in Melbourne is the fifth, and most advanced, HAD vehicle built by Bosch globally.

Investment in infrastructure

Commercial and academic activity in automated vehicles is increasing globally. In the US, the Department Transportation has designated 10 automated vehicle proving grounds to encourage testing of new technologies. In Europe, carmakers such as BMW are investing in research facilities dedicated to automated driving.

Our unique and varied driving conditions have always been attractive to automotive engineering. An opportunity exists to invest in infrastructure and testing tracks to validate automated vehicles for local and global markets.

Investment in skills

Australian automotive engineers are globally recognised for their innovation and ingenuity. Investment in automated vehicle infrastructure, trials and capability will support the transition of skilled engineers from a declining local car industry to a sustainable and rapidly growing global industry.

Collaboration between Australian engineers and global driverless vehicle initiatives will ensure Australia is best positioned to contribute to developing new technologies.