**Submission No 10**

# DRIVERLESS VEHICLES AND ROAD SAFETY


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## Re: Inquiry into Driverless Vehicles and Road Safety in NSW

Volvo Car Australia appreciates the opportunity to make this submission into the Staysafe Committee's inquiry into driverless vehicles and road safety. Volvo was delighted to recently host the committee at our headquarters to discuss the latest developments in autonomous driving technology.

As a global leader in the development of autonomous driving technology, Volvo passionately believes that self-driving cars will benefit NSW drivers and society alike through reduced congestion, improved traffic safety and sustainability. Autonomous cars represent a radical shift in transport, so collaboration with jurisdictions like the NSW Parliament and transport bodies is essential to ensure that the technology provides maximum benefits to drivers and society.

In Australia Volvo has partnered with the ARRB Group to support its Driverless Vehicle Initiative which aims to explore the impacts, requirements and benefits of introducing this new technology in an Australian context. This partnership culminated in the first ever Australian driverless car trial using Volvo XC90s held in Adelaide last November.

## Semi-autonomous and autonomous technology defined

The term "driverless cars" is commonly used to describe cars equipped with autonomous technology. Volvo Car Australia believes a more accurate description of the technology is "autonomous driven cars" or "self-driving cars". An autonomous – or self-driving – car is one that can accelerate, brake and steer itself without intervention by the driver. Self-driving cars will revolutionise society, boost economies and

transform the way people manage their time. Their arrival will be the biggest change to personal transport since the invention of the car nearly 130 years ago. The various attempts at realising this vision over the years have been limited by the technology available. However, rapid advances in technology means autonomous cars are a reality today.

Volvo believes autonomous driving technology has the power to change the driving landscape in NSW forever. Not only will it make driving more convenient and productive for NSW drivers, it will dramatically improve safety outcomes by reducing traffic accidents and NSW's road toll. However, introducing fully autonomous cars onto specific NSW roads will require careful coordination and planning, and changes to current road laws, to ensure the technology is fit for purpose. Realistically, self-driving autonomous cars being driven on NSW roads is probably some decades away.

In the interim, Volvo Cars currently incorporates this technology to create semi-autonomous cars that make journeys easier and safer, while leaving the driver fully in control in accordance with local road laws. For example, in late 2016 Volvo Car Australia will launch the all-new S90 sedan in Australia with Pilot Assist function. Pilot Assist permits the car to accelerate, brake and steer autonomously, maintaining a set distance from the car in front and in lane, at speeds up to 130 km/h. Technology like Pilot Assist will underpin fully autonomous Volvo cars on NSW roads if existing road laws are changed by Parliament.

Standard safety technology like Volvo City Safety will also be included in fully autonomous Volvo cars in future. City Safety detects other vehicles, cyclists, pedestrians and, in some cases, even large animals on the road ahead. It warns the driver of hazards and will brake the car if necessary to avoid or mitigate a collision. Volvo is currently researching adapting the animal detection software for Australian conditions to detect kangaroos. Each year there are over 20,000 kangaroo strikes on Australian roads which result in over $75 million in insurance claims.

In future the fully autonomous Volvo car will incorporate technology like Pilot Assist and City Safety to give drivers the option of handing over control – and responsibility – to the car on specific roads.

Volvo believes self-driving cars have the potential to transform the world we live in and deliver enormous benefits to society. Some of these benefits include:

## Fewer crashes, better driving

In a fully driverless car future, autonomous technology will eradicate human errors, making driving safer for everyone. Self-driving cars can be programmed to obey NSW traffic laws, which means there will be less possibility for irrational, emotional behaviour behind the wheel. The potential to avoid crashes and save lives is enormous.

## Extra urban space

Cars that can park themselves will revolutionise urban planning in NSW by reducing the need for car parks next to offices and retail areas. Autonomous cars will be able to drop drivers off and then park elsewhere, returning to pick up the driver when required.

## Better traffic flow

In a future where autonomous cars communicate with each other and the road network via the cloud, traffic will flow more smoothly, easing congestion on Sydney's roads and making journeys on major roads like the M1 Pacific Motorway more enjoyable. Self-driving cars will be able to merge into traffic and plan ahead more efficiently than those with human drivers.

## Less congestion, improved productivity

Connected technology and better all-round awareness means that autonomous cars will reduce congestion on NSW roads, saving millions of wasted hours on the road. Autonomous cars will allow drivers to use their time in the car as they choose – relaxing or working as desired. The car could become an extension of the office and allow commuters to arrive at work less stressed and better prepared.

## Fewer costly accidents

By reducing human error and the likelihood of accidents, autonomous technology will drastically reduce the amount of money that is lost as a result of collisions. Traffic accidents which result in deaths and serious injuries cost the NSW economy millions of dollars each year in medical costs and lost productivity.

## New revenue streams

NSW drivers will able to relax and do other things in self-driving cars, making them a place of leisure and commerce. Online connectivity will allow those on board to shop and enjoy media, opening up new retail and marketing opportunities for brands and services.

## Better fuel economy, lower emissions

Autonomous, connected cars will be able to drive more efficiently, reducing fuel consumption and harmful emissions. Better anticipation and communication with other cars will reduce stop/start traffic and heavy braking, and they will be able to form safe, tightly packed 'road trains' that reduce aerodynamic drag at speed.

## Lighter cars

If all vehicles were autonomous and could communicate with each other, crashes would be all but eradicated. This means they could be made safe without the need for heavy protective safety features, significantly reducing their overall weight. This, in turn, would make them much more efficient.

## Easier to go electric

Zero-emissions electric cars will be a viable option in future for more drivers thanks to autonomous technology. Self-driving electric cars will be able to get themselves to and from a charging point or battery swap station, so owners will no longer need a charging point at their home or workplace.

## Safety features reduce accidents

Research conducted in the US highlights the value of cars equipped with safety features that would be standard in fully autonomous cars. The Insurance Institute for Highway Safety's (IIHS) 2016 survey found that that cars equipped with front crash prevention technology are much less likely to rear-end other vehicles.

In the first study of the feature's effectiveness using U.S.police-reported crash data, IIHS also found that cars with automatic braking reduce rear-end crashes by about 40 percent on average, while forward collision warning alone cuts them by 23 percent. The autobrake systems also greatly reduce injury crashes. The rate of rear-end crashes with injuries decreases by 42 percent with forward collision warning with autobrake.

IIHS concluded that If all vehicles had been equipped with autobrake that worked as well as the systems studied, there would have been at least 700,000 fewer police-reported rear-end crashes in 2013. That number represents 13 percent of police-reported crashes overall. Front crash prevention would be a standard safety feature incorporated into fully autonomous cars.

## World's first large-scale autonomous driving trial

In 2017 Volvo Cars will play a leading role in the world's first large-scale autonomous driving pilot project in which 100 self-driving Volvo XC90 cars will use public roads in everyday driving conditions around the Swedish city of Gothenburg. The ground-breaking project 'Drive Me-Self-driving cars for sustainable mobility' is a joint initiative between Volvo Car Group, the Swedish Transport Administration, the Swedish Transport Agency, Lindholmen Science Park and the City of Gothenburg.

The 'Drive Me' project is endorsed by the Swedish Government. The aim is to pinpoint the societal benefits of autonomous driving and position Sweden (and Volvo Cars) as leaders in the development of future mobility. The pilot will involve self-driving cars using approximately 50 kilometres of selected roads in and around Gothenburg. These roads are typical commuter arteries and include motorway conditions and frequent queues.

## Research focus areas

The 'Drive Me' project will focus on a number of areas, such as:

- How autonomous vehicles bring societal and economic benefits by improving traffic efficiency, the traffic environment and road safety
- Infrastructure requirements for autonomous driving
- Typical traffic situations suitable for autonomous vehicles
- Customers' confidence in autonomous vehicles
- How surrounding drivers interact smoothly with a self-driving car

The project began in 2014 with customer research and technology development, as well as the development of user interface and cloud functionality. The first cars will be on the roads in Gothenburg in the first half of 2017. The Drive Me fleet will consist of 100 Volvo XC90s equipped with the latest self-driving technology. The project also includes fully automated parking, without a driver in the car. This allows the driver to walk away from the car at the parking entrance while the vehicle finds a vacant spot and parks by itself.

The vehicles in the pilot project are defined as Highly Autonomous Cars, according to the official definition by the Federal Highway Research Institute (BASt) in Germany. In practical terms this means that the responsibility is handed over to the vehicle, which can handle all driving functions at the driver's discretion. The driver is expected to be available for occasional control but with a sufficiently comfortable transition time.

The 100 Volvo XC90 cars to be driven by real customers will be new models developed on Volvo's new Scalable Product Architecture (SPA). The architecture is prepared for the continuous introduction of new support and safety systems all the way to technologies that enable highly autonomous drive. The first SPA model is incorporated into the new Volvo XC90, which was launched in Australia in 2015.

Volvo Car Australia will be pleased to facilitate a visit by the Staysafe Committee to Gothenburg to observe the Drive Me trial during 2017.

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