

STATEMENT

OF

Volvo Car Corporation

BEFORE THE:

HOUSE COMMITTEE ON ENERGY & COMMERCE
Subcommittee on Digital Commerce and Consumer Protection

Self-Driving Cars: Road to Deployment

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PRESENTED BY:

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Chairman Latta and Ranking Member Schakowsky, thank you for inviting me today to testify on behalf of Volvo Car Corporation (VCC) on how to responsibly deploy self-driving cars.

Safety is the founding principle of VCC. VCC invented the safety belt and then gave away the global patent in order to save lives. It has been estimated that this one act could have saved over 1m lives globally. It is our vision that no one should be killed or seriously injured in a new Volvo by 2020. At VCC it has always been and it will always be – safety first.

According to the latest US crash causation study, 94% of all crashes are due to human error. In 2016, traffic fatalities remain at epidemic levels. At VCC, we are appalled that 1.2 million people around the world are killed in traffic crashes annually – with over 35,000 of those deaths occurring in the U.S. alone. Self-driving cars and active safety technologies save lives.

VCC and the US Market

VCC is headquartered in Gothenburg Sweden and was founded in 1927. In 2016, Volvo Cars had global sales of 534,332 cars in about 100 countries. VCC has been in the US since 1955 and currently has 296 dealers in 47 states that employ 9,634 people in the US. In 2016, Volvo Car USA (VCUSA), based in Rockleigh, New Jersey sold 82,724 units. VCUSA has 454 direct employees in the US and 296 employees in New Jersey.

In 2015, VCC announced its first US manufacturing facility and this plant will initially create 2,000 new Volvo car jobs and will be operational in 2018. The plant located just outside Charleston, South Carolina is an industrial investment of around \$500 million and it underlines VCC's long term commitment to the US market. It will be an integral part of VCC's global manufacturing footprint and it will serve the US and export markets. The new plant will also have significant multiplier effects on the local area. VCUSA has operation in California where we employ 79 people.

The benefits of self-driving cars

VCC believes autonomous vehicles are an incredible opportunity to redesign the concept of personal mobility and to improve traffic safety. So it is critical that policymakers have a

legislative framework ready, before the technology arrives on the market. Thus, VCC has been working with key stakeholders (government, consumers and academia) in the US, China, and Europe to assure the necessary framework is in place.

Self-driving cars when operating autonomously will also create a smooth traffic flow. This will reduce congestion and carbon emissions. So there is a clear environmental benefit to these vehicles because they will improve air quality.

Self-driving cars can also park themselves, preferably outside city centers. Longer term this opens up for more efficient city planning. In the US, it is estimated that 1/3 of city centers in the US are parking spaces. In addition, AD (autonomous drive) vehicles significantly enhance mobility for those who cannot get a traditional driver's license.

Self-driving cars can also provide major benefits to the consumer. The average US commuter spends about 1 hour a day in monotonous highway commuting. Converting this time to something more productive and allowing the driver do something else while the car is responsible for the driving. These benefits will not be realized unless vehicles are truly autonomous (SAE level 4). At this technology level, the driver hands over control to the vehicle and the driver is no longer responsible for monitoring the system. The system does the driving and does not rely on the driver as a fall back. This will mean that the vehicle will not be dependent on getting the driver back in the loop and the car will be able to handle all situations that may occur on the road. These are major benefits.

Testing

Drive Me is a research collaboration between partners representing both the public and private sectors and academia. Drive Me has seven partners: the Swedish Transport Administration (Transportstyrelsen), the Swedish Transport Agency (Trafikverket), Lindholmen Science Park, Chalmers University, Autoliv, City of Gothenburg and Volvo Car Corporation.

The aim of our Drive Me project is to develop unsupervised autonomous cars (SAE level 4). The first batch of cars have already hit the roads of Gothenburg in 2017 and they will require driver supervision. Via this research we will learn about the technology and the human

behaviour. Based on the data and conclusions that this research will provide us, VCC will evolve towards unsupervised autonomous cars.

After comprehensive internal testing and risk assessment, real customers will operate these cars on public roads. Technology will be introduced in a step-wise manner. Initially it will be supervised and later it will be unsupervised. This will give us valuable customer input and insight in the early development phase so that we can fine-tune our systems. VCC believes it is critical to use real customers on public roads in order to capture all the human aspects of self-driving. Our goal is to define the technology based on the role of the driver – not the other way around. This is critical for AD advancement and it cannot be captured in closed designated test areas.

This program is likely to be the largest autonomous driving pilot to date and the only program with real customers driving autonomous cars. Drive Me will also provide integral insights into the societal benefits of making autonomous vehicles a natural part of the traffic environment. Similar Drive Me pilots are planned for London and China. VCC is also considering a US pilot but given the uncertainty regarding various US state proposals, laws and regulations, VCC is not at this point ready to commit to a similar project in the US.

Joint development with innovative partners

In addition to the Drive Me project, VCC has launched two joint development projects on AD technology. In August of 2016, VCC and Uber announced a partnership to develop next generation autonomous driving cars. Uber will add its own self-developed autonomous driving systems to the Volvo XC90. VCC will use the same base vehicle (XC90) for the next stage of its own autonomous car strategy, which will involve fully autonomous driving (SAE level 4).

Last month, VCC and Autoliv established a new joint venture called Zenuity to develop software for autonomous driving and also for driver assistance systems. Zenuity will develop new ADAS (advanced driver assist systems) products and AD technologies. The new company is expected to have its first driver assistance products available for sale to all

automakers by 2019. Shortly, thereafter Zenuity will follow with AD technology and this will also be for sale to entire auto industry.

Deployment of Self driving cars

VCC plans to offer customers in selected cities in Europe, the US and China unsupervised self-driving cars (SAE level 4) by 2021. These cars will be able to operate autonomously under normal traffic conditions on selected commuter roads. In the future as technology evolves, unsupervised driving in more complex traffic situations will be possible. It must always be 100 % clear to the driver who's driving and the vehicle should not be dependent on getting the driver back in the loop.

When these cars are in autonomous mode, VCC believes the product liability should no longer rest with the driver, but should be assumed by the manufacturer. Therefore, in 2015 VCC announced that Volvo Cars will assume liability for SAE level 4 vehicles if a crash or incident is a result of a defect in the AD technology. This is of course provided that the handover is conducted properly and the car has not been misused.

US Patchwork and NHTSA FAVP

However, despite these important developments and major technological advances, the US lacks the critical consistent national framework to advance these life-saving technologies. Currently in the US, there is a patchwork of varying state requirements and proposals that could deter AD technology.

In 2016 after several states took various approaches to AD regulation, NHTSA issued the Federal Automated Vehicles Policy (FAVP). This voluntary guidance applies to AD vehicles that are SAE level 2, 3, 4 and 5. Since fully autonomous vehicles (SAE level 4) are where we will see the benefits, VCC strongly supports the FAVP's inclusion of levels 4 and 5.

Section II of the FAVP provides a recommended structure for states that seek to pursue legislation or regulation of testing or deployment of AD vehicles. VCC supports the following NHTSA statement: "DOT strongly encourages States to allow DOT alone to regulate the performance of HAV technology and vehicles." Unfortunately, this section does

not discourage nor prevent states adopting modifications to this policy. Additionally, it does not prevent states from going in various other directions with regard to AD policy. Therefore, the NHTSA guidance does not effectively prevent a patchwork of state policies on testing and operation.

In fact after the issuance of the FAVP, there has been a dramatic uptick in state activity. In just the last two months, over 48 AD bills have been introduced in 20 states. See Attachment 1 map of the US. Thus, the US still runs the risk of slowing down the development and introduction of autonomous driving technologies by making it difficult for car makers to test, develop, certify, and sell AD cars.

The FAVP also creates uncertainty by requiring state sign-off before testing. The guidance requires that states submit the “voluntary” Safety Assessment letters as a pre-requisite for any AD testing at the state level. The current California proposal requires testing before deployment. If every state were to adopt this kind of proposal manufacturers would need to first test in all those states before deployment.

While the goal of the FAVP and its model state policy is to clarify the federal role vs state role on AD technology, the states are continuing to act at time when the federal and state roles are in flux. NHTSA regulates the car and its technology and states regulate drivers licenses, licenses plates etc. With automated driving when the AD system is engaged, the car is the driver and this creates uncertainty with regard to the traditional roles. VCC recommends NHTSA discourage state activity in order to prevent a patchwork and allow OEMs to self-certify to the NHTSA guidance rather than a separate state-by-state approval process.

The FAVP contains many ambiguities that need further clarification especially with regard to data sharing, notification of safety system performance and on the impact of our current systems already on the market. The FAVP was effective upon issuance and can be modified at any time without giving automakers lead time. This is particularly challenging because it is essential for VCC and the auto industry to have certainty and lead time for the auto manufacturing process.

US Government should promote the right technologies for self-driving cars

Congress and NHTSA should encourage and start by building confidence in crash avoidance technologies. These features which include systems that assist the driver or automatically act in order to prevent or mitigate crashes (such as automatic emergency braking systems, lane departure warning systems, pedestrian detection, and braking systems) are the precursors for self-driving cars. This will improve traffic safety well before self-driving technology reaches the market. The vast majority of the active safety systems sold on the market are the result of OEM voluntary action not regulation. VCC has an extensive list of these life-saving systems (See attachment 2 – VCC technologies)

Congress should encourage NHTSA to immediately update the New Car Assessment Program (NCAP) to include crash avoidance technologies in the rating system. The US NCAP program, as initiated by NHTSA in 1979, has for many years served as a role model for the creation of similar programs in Europe, Asia, Australia and Latin America. Most of these rating programs have already adopted or plan to adopt test procedures and assessments of active safety systems that have been or will be incorporated in the overall rating score. The US NCAP now stands out as an antiquated program among the other consumer rating programs around the globe.

NCAP is a market incentive and an effective method to accelerate market uptake. VCC, therefore strongly believes that crash avoidance performance evaluations should be included in NCAP and also in the 'Stars on Cars' rating (Monroney label). Vehicles that do not have crash avoidance technologies should not get 5 star crash ratings.

Congress and NHTSA should set the laws and regulations with respect to vehicle technology and vehicle performance. States should not adopt onerous OEM test requirements and should not ban or delay deployment of level 4 and 5 AD vehicles. Congress should encourage NHTSA to update the FAVP with an explicit request that states refrain from legislation and regulation of AD vehicles. VCC believes Congress should consider incentives for states that do not set any vehicle performance requirements or for states that stay within the parameters of the NHTSA model state bill.

Conclusion

Self-driving cars have major potential benefits for safety, society and the consumer. Active safety systems are precursors of self-driving technology and therefore should be promoted by inclusion in the US-NCAP safety rating system.

The current US patchwork of numerous and various state bills and laws on testing and deployment of self-driving cars could however discourage market entry and stifle AD development. It would also represent a competitive disadvantage for the USA in the global race to reap the benefits of job creation that this technology provides. In the US, autonomous vehicles should be allowed to seamlessly cross state lines.

Thank you for the opportunity to be here today. I am happy to answer any questions.