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„Developing our own software and IT expertise gives us an advantage“

Safety is one of Volvo's core values. The subject of safety has recently acquired even greater importance in the context of the development of highly automated driver assistance systems. Dr. Peter Mertens, Senior Vice President Research and Development at the Volvo Car Group, explains in this interview how the Swedish manufacturer can hold its own against its competitors in this area and put even greater emphasis than before on automation and accident prevention as part of its brand message.

Dr.-Ing. Peter Mertens was born in Germany in 1961. After an apprenticeship as a toolmaker, he studied production engineering at university, graduating in 1984. This was followed in 1985 by a master's degree in industrial engineering and operations research at Virginia Polytechnic Institute in the USA. In 1990, he was awarded his doctorate at the University of Kaiserslautern. Between 1990 and 1996, Mertens held a number of positions at DaimlerChrysler. These included acting as Project Leader for the Mercedes-Benz A-Class. After this he became Managing Director and CEO of Tegarom Telem-

atics GmbH, a joint venture of DaimlerChrysler Service AG and Deutsche Telekom AG, until the end of 2002. He then moved to Opel as Executive Director for compact car models. From 2004, he performed this role for General Motors in Europe and then from 2005 for General Motors worldwide. Between 2010 and 2011, he had responsibility for corporate quality at the Tata Motor Group and for worldwide quality and safety at Jaguar Land Rover. Since March 2011, he has been Senior Vice President Research and Development at the Volvo Car Group. Peter Mertens is married and has three children.

ATZ _ At Volvo you are taking a carefully considered approach to automated driving and warning us against setting our expectations too high. Realistically what do you think the next steps are?

MERTENS _ At the moment everyone is talking about autonomous driving. I think it is important for us to discuss and report on the subject and to share our plans with one another. On the other hand, I do not believe it is a good idea to make impressive-sounding announcements and promises that cannot be kept. We know that our existing accident prevention technologies are effective. They have allowed us to make significant progress towards our goal of zero fatalities. We have reached a point where we are testing highly automated cars not with test engineers on the northern loop of the Nürburgring but with end customers in normal traffic. Until end of 2017 we will have up to 100 cars driving autonomously in Gothenburg in Sweden.

“We are already allowed to drive autonomously in the city”

So a test environment like the A9 in Germany is already out-of-date?

A test route or section of the A9 where autonomous driving is permitted under certain circumstances is not really the test environment that we need. It also involves securing the necessary political will and putting in place the basic framework. Our competitive advantage lies in our cooperation with the Swedish government and the city of Gothenburg. They are partners in the „Drive Me“ project, with the result that we are already allowed to drive autonomously in the city. This is the only arrangement of its kind in Europe.

That is where you test your relatively advanced systems. Where are you evaluating the newest technologies?

For example at the AstaZero test site in Sweden. We are the one of the companies that helped to develop the site, but it is in neutral ownership. We have set up a test environment there for city safety

and autonomous driving that we use to develop our technologies further. This is all about gradually giving drivers more support and relieving them step-by-step of the task of driving. The systems also help when drivers are not paying attention.

That involves a number of risks. How do you bring the driver back into the loop in an emergency?

It's true that this can be a dangerous situation. This is why I always emphasise that in my opinion the scenarios in which the driver can lean back and relax or do other things during the journey are a thing of the future. We manage the approval for autonomous driving and the handover of the task of driving using a multi-level HMI. First of all, the driver has to make a conscious decision to choose autonomous driving. The system is then able to quantify whether autonomous driving is permitted in the area or not. If it is allowed, the system indicates this to driver by means of a green light. The gear shift paddles become a trigger switch for autonomous driving. At the same time, the driver is monitored and his or her capabilities are constantly evaluated.

What is currently permitted and what will the subsequent stages of the process be?

The first level of autonomous driving is already available, for example in our XC90. Pilot Assist is a preliminary phase of autonomous driving at low speed. But the driver must be able to intervene at

any point and should keep his or her hands on the wheel. The next stage is to offer the same functionality at higher speeds. We are launching the phase after that in the new S90: semi-autonomous driving up to a speed of 130 km/h on motorways and dual carriageways. But the driver remains in the loop.

Emergency situations do sometimes arise. In this context what do you think about the much-quoted period of 10 s in which the driver must regain control?

That's pure theory. The system has to respond to emergency situations in milliseconds. People are generally very good at identifying and understanding a situation. However, they find it more difficult to draw the right conclusions and take action quickly. Should I brake, accelerate or steer? Drivers learn this over time. The more driving experience you have, the more effectively you can avoid accidents. The systems that we have today are relatively bad at identifying situations, but once they have done so, they are very good at making the right decisions quickly. We need to combine these two things. There isn't a computer system on earth which could model the world so that it is prepared for every eventuality. There is a cosmos around my car that I have to monitor. Depending on what happens there, I have to make decisions. And to do that, I need a system that learns from experience and particularly from good experience. As a good driver, how do you manage to avoid accidents? The systems have to learn these patterns and,



“Volvo does not produce safety systems simply to achieve good ratings,” explains Dr. Peter Mertens in conversation with ATZ editors Angelina Hofacker (right) and Markus Schöttle (left)

until they are as good as a good driver, we cannot hand over the entire responsibility to them.

But aren't there limits here too? A lot of people are talking about the death algorithm.

That is a concern that we need to take seriously. Should a system be able to decide in a matter of life and death? And if it should, how does it choose between a younger and an older person? In my view that is not a productive discussion. Because ultimately the important thing is for us to succeed in saving human lives and preventing accidents with the help of the systems.

But you still need to engage in a dialogue with society.

I know that when the first autonomous car causes a serious accident there will be a wave of outrage, just as there was when the three-point safety belt was introduced in 1959. But despite the opposition to safety belts, they have saved millions of lives since then. However, there are a few situations where the consequences of an accident might have been less serious if someone had not been wearing a belt. We just need to get the balance right.

But there are some things that we don't need to worry about, such as the issue of liability.

This is why we are gathering experience in our „Drive Me“ project. We need to find out what the problems will be for

drivers, passengers and other road users and where we need to take responsibility. In autonomous driving mode, product liability applies.

Will there be a Volvo insurance policy?

That's in the planning stages. It will have a dramatic effect on customer loyalty in the insurance industry. Car manufacturers could take out group insurance policies which would lead to a quite different pricing policy. I am certain that we can allay the concerns and fears of everyone who is critical of highly automated driving.

“We just need to get the balance right”

Your goal is for no one to be seriously injured or killed in an accident in a new Volvo by 2020. How realistic is this vision?

The vision is a serious one, but admittedly it is not a promise that we can measure. We have made good progress towards achieving what is currently possible from a measurement perspective. The XC90 is our most important milestone. Realistically we will know in two to three years whether the car genuinely fulfils our expectations.

Your competitive environment is tougher than ever. Can you uphold your core values and

continue to stand out from your competitors in terms of safety?

We are further ahead than any other company with our combination of active and passive safety systems. We have the highest Euro NCAP rating ever awarded for active safety. As long ago as 2008, we launched our “City Safety” assistance system in XC60. We can identify pedestrians and cyclists by day and by night. None of our competitors are able to do this. We can also recognise large animals and prevent accidents that occur when a car turns across the oncoming traffic.

So you have a head start?

Not only that. One driving force behind the early introduction of assistance systems is a good performance in the ratings. Most manufacturers are developing their cars with these benchmarks in mind. But Volvo does not produce safety systems simply to achieve good ratings. If you look back, you will find that Volvo has achieved the best marks both in the past and in the present before specific categories were even launched. One example is the small overlap crash test. Safety is much more deeply enshrined in our culture than is the case with other OEMs.

Even in the case of autonomous driving, which has become part of the brand core of all the manufacturers?

Ultimately everyone is likely to be using the same technologies. But the skill lies in integrating all the systems so that they can identify situations, process the data and react in the best possible way. To achieve this, car manufacturers need as much in-house expertise as possible. For example, Volvo has the necessary software skills. All the decision-making algorithms and test scenarios that we use are developed by Volvo engineers. We have one of the largest databases in the industry, which enables us to simulate all the complex systems in every possible scenario, before reproducing them in reality. Developing our own software and IT expertise gives us a competitive advantage.

Dr. Peter Mertens, thank you for this interesting discussion.



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“Until the systems are as good as a good driver, we cannot hand over the entire responsibility to them,” says Mertens

INTERVIEW: Angelina Hofacker and Markus Schöttle



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