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In my car, I am using an older GPS system that has served me well over the years. Unfortunately, because the New Zealand manufacturer went bankrupt, updates are no longer available. But not really a major problem. Should I drive in an area where my GPS is no longer up-to-date, there are always the reliable back-ups: The good old road map (scale 1:200,000), and of course the street signs. However what can be an annoying distraction in such cases is when my old GPS suddenly wants to interfere with my own navigation, announcing repeatedly in its disembodied voice: »If possible make a U-turn.«

A safe and uneventful trip wishes you

At Easter time the open-air horse riding season *starts in Germany. It is mostly women who are fascinated with this 1 HP propulsion system which carries them around in an autonomous way without any complicated technical assistance on which they have come to rely on in their much more powerful »auto-motive« vehicles*

Electro mobile

Germany is in The Slow Lane

Graph showing movement of Brent Crude Oil Prices *during the last three years. In spring 2016, they had fallen to about 60 percent of their previous average high.*

The powerful Daimler Benz engines *have always had a certain cachet.*

There haven't been a lot of news lately when it comes to electric cars. The quite rapid fall in oil prices may certainly have to do something with it. After a 52 week low of US$ 28.49 for Brent Crude it made a slight recovery end of March this year, up to US$ 40.17. Not surprisingly, people all over the world use again fossil fuels, as if nothing had happened since the time of the oil embargo.

Large cars are popular, particularly the Sports Utility Vehicles (SUVs). No wonder then, that their higher weight and higher aerodynamic drag makes them real gas guzzlers leading to increased fuel consumption overall. To balance this unfavorable aspect and arrive at an average acceptable fuel consumption, car manufacturers have been trying to make efforts in their production of electric cars. This has the advantage that electrical charging falls outside of fuel consumption calculations, but it also affects – in Germany – the »number« of total vehicles produced which will then used for all other calculations: electric cars are being factored at 2.5 – irrespective of the actual number of electric cars actually operating on the roads. Alone during the month of February of this year, 250,146 new cars were licensed, but among them only a paltry 0.3 percent (!) cars with electric propulsion. 61.5 million cars are being operated in Germany at present (66.2% gasoline, 32.2% diesel), but just 25,502 of passenger cars are purely electric cars.

The German Government's self-proclaimed goal to have one million electric cars on the roads by 2020 seems to be far fetched – Germany is in the slow lane when it comes to electric cars. Chancellor Angela Merkel's remarks at the National Conference on Electro Mobility on 15 June 2015 in Berlin that Germany has now the chance to get to the forefront of electric car development met understandably only with lukewarm response. At the same Conference, Mr Henning Kagermann, President of the German Academy of Science and Engineering (acatech) and at the same time Chairman of Germany's National Electric Mobility Platform, conjured an impending break-through in this field: »The German law on electro mobility will provide an additional impetus for electro mobility and create the proper general framework.« The contemplated special license tag will be an important tool for awareness of and thereby a basis for integration of electric cars

in Germany's cities and its city traffic. Free parking spots, use of bus lanes will be part of it. But this, he said, cannot be all to assure Germany's position as leading market for electric cars. Other obstacles will have to be removed, new rules be established: electro mobility will have to be fit in to the Regulations for Energy Savings and building regulation. Also required are going to be tax law adjustments, to avoid e.g., that employees can charge their vehicles' batteries at their place of work without additional tax burden, said Mr Kagermann. On the other hand, exemption from motor vehicle taxes on new cars will be reduced from currently ten years to five years.

It has been ten months since the new law on electro mobility was implemented, but I have yet to see a car with those special »E-license plates« or any electric car at all. It therefore hasn't happened yet that drivers of public transportation vehicles in Germany will cuss, as their colleagues in the Norwegian capital Oslo often do nowadays, at those darn electro cars (in Norwegian: *elbil* *) blocking again the bus lanes. And German commuters paying their tickets for using busses would show little sympathy for electric car drivers not only getting a 5,000 Euro financial aid from Federal funds towards their purchase of such a car, but also have to put up with a slowdown in public transportation because of electric cars' use of bus lanes.

Mr Wolfgang Schäuble, Federal Minister of Finances of Germany, also dampened any hopes to achieve electro mobility soon: Under present conditions, one can pretty much be sure that he will not approve Federal financial support for purchases of electric cars at the tune of 5,000 Euro per private, and 3,000 Euro per company fleet car. You can't blame Mr Schäuble for possibly thinking that someone able to afford a TESLA sports car to the tune of 100,000 Euro, or a BMW i3 compact car costing 35,000 Euro doesn't really need Federal financial aid. For potential buyers of one of these electric cars, a more pressing issue most likely will be where to park and charge their vehicle, particularly if they have in their garage already an SUV, a convertible and a full-size car.

One wouldn't be surprised that it could take some time until building laws for housing construction will be modified to have the infrastructure for electro mobility incorporated. On the other hand, many communities have already shown a positive response to the trend to electric bicycles arranging for adequate parking and charging facilities. Fast cycling lanes could provide an incentive for commuters living in suburbs to switch to electric bicycles as an alternate, cheaper and healthier way to get to and from work.❐

Privileges, such as in Oslo, for electric cars *to use the specially marked bus lanes were not considered by German communities: traffic on a freeway in Norway, with an electric car using the bus lane (note the first two digits of the license plate: »EL«) Photo: Norsk elbil forening, www.elbil.no.*

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**) In the first quarter of 2016, 18.2% of all passenger cars in Norway had purely electric propulsion (BEV = Battery Electric Vehicle).*
See: European Alternative Fuels Observvatory www.eafo.eu

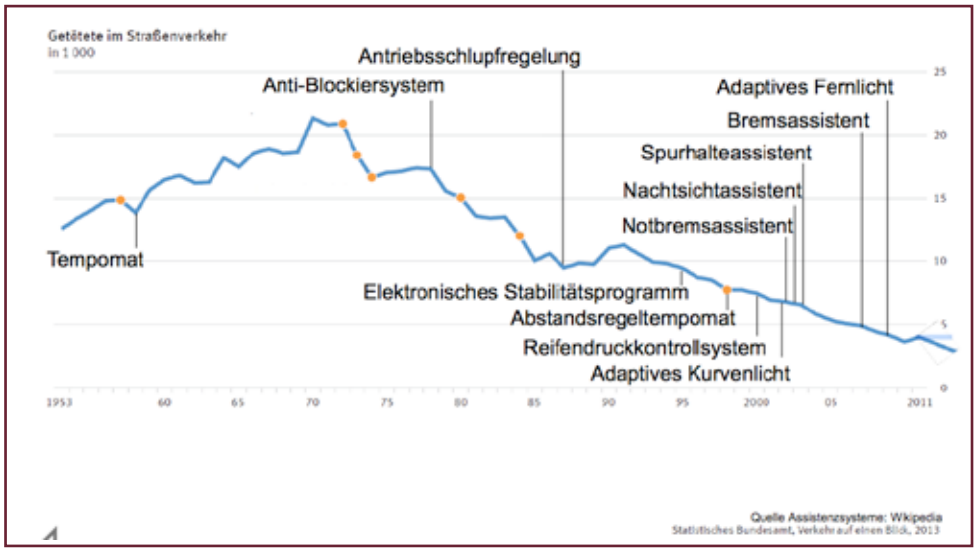
Auto mobile

Hands and Feet? No Longer Needed:

From Assisted Driving To Driverless Car

Henry Ford, the pioneer car maker, once famously said: »If I had asked people what they wanted, they would have said *faster horses*.«

Horses, however, didn't disappear completely, even though automobiles have taken over the roads. They just are no longer used for transport; rather, they are moved from place to place in high powered transportation equipment. If today, Henry Ford would ask the same question to people who keep horses, they'd say: »I want a comfortable, reasonably priced SUV that also can pull the trailer with the two horses of my daughter.« Additionally, it should be easy to handle and automatically correct for driving problems when pulling the horse trailer. Safety related assistance is of high importance to drivers. We know that systems such as Antilock Braking System (ABS) and Electronic Stability Control (ESC) have prevented many accidents, and newly developed systems or systems in development that still sound futuristic one day will also become part of a car's standard equipment. Slowly but surely human driving skills and feeling for the road will become superfluous because automated assistance systems will be better in handling tricky road situations. The term for such complex automated systems is Advanced Driver Assistance Systems (ADAS). It actually may result ultimately in driverless cars on public roads. But should it then come to an accident, the manufacturer of the car would be liable.



Number of Traffic Fatalities *(listed in the graph in '000) did decrease after introduction of car assistance systems even though traffic volume had increased.*

What to consider when it comes to driverless operations?

❶ **One will need high-resolution maps** which also need to contain environment conditions such as weather, the season, time of the day or night. Sensors will collect data on conditions inside and around the car: rpm, steering wheel position, road adhesion, measurement of distances, sizes, types of obstacles via camera, radar detection and/or light detection and ranging (LIDAR). Condition of the driver will have to be monitored constantly: is he

maybe tired or under the influence?
❷ **Communication**: Then, how will data and programs be communicated? Models and algorithms will be stored externally in the Cloud and called up from there – a kind of cloud-cuckoo land very few drivers might think of now. More than 90 percent of Cloud services are based in the U.S.A.

Germans are very well aware of the fact that in the U.S.A. considerations of protection of data and privacy are not as stringent as in Germany. Right now, no one knows how data collected from autonomous driving will be protected against unauthorized – or even legally mandated – access. The European Court of Justice has judged that only limited data handled in the Cloud are permitted to be accessed by U.S. authorities.

❸ **Artificial Intelligence** (AI) is another segment needed for autonomous driving: AI drew much public attention when IBM's DeepBlue, a chess computer, defeated world chess champion Garry Kasparov in 1997. And only very recently, in mid March 2016, the Korean Sedol Lee, one of the top champion go players, lost four times out of five against Google's DeepMind computer using its AlphaGo program; reputedly, go is a more complex game than chess. The high computational capabilities of these computers were reinforced with an automated process of deep learning.

What would be required of a deep learning process during autonomous driving?

Let's say one has an Advanced Driver Assistance System (ADAS) capable of recognizing different vehicles – trucks, passenger cars, busses, motorcycles, etc. – and reacting to their different predictable reactions. It could appropriately react, e.g., if suddenly a four-wheeled ATV would join the traffic. If unable to recognize the type of vehicle, it would immediately upload the data to the Cloud where they would be compared to other already stored data, or it would create a new data set. Sensor reaction time and data exchange, as well as exact calculation of position had to occur in real time. Functionality and communication had to be assured.

If one would imagine the following scenario: Your car equipped with ADAS stops behind a bus, at a bus stop, dropping off passengers and then slowly continuing its run. ADAS recognized the bus; also figures in the possibility of children having got off and suddenly running across the street without looking; ADAS monitors the curb ready to activate brakes if necessary.

Actually, that's something we all have learned among so many other things at driving school, and a good driver will still remember those lessons even after 50 years. But what if an impatient

Those Young Ladies On Their Magnificent Horses *had to learn that maneuvering cars with lots of HP muscle pulling horse trailers (seen parked in the background) are also an important part of their sport.*

driver tries to pass the bus veering into the oncoming lane? After all, a driver could simply ignore ADAS. Luckily, this time there were no children running into the car. But AI records the infraction, and at destination the driver can't leave the car until he has done a brief safety lesson presented by his car's computer. ADAS will present the related scenario in virtual reality.

Admittedly, such an »education program« for violators of traffic regulations has not – yet – been a subject of discussion. But already the Chief of Development at Volvo explained that systems are in development which in a similar case, a pedestrian hurriedly crossing the street in front of a truck ahead of one's own car, ADAS could recognize the situation within 50 milliseconds and automatically activate emergency brakes.

For recognizing pedestrians in the dark, Volvo has come up with an interesting suggestion: locating pedestrians over their smartphone. Since most everyone now carries one, the sensors of ADAS could communicate with the sensors of the smartphone and issue an alert for both pedestrian and driver if on a possible collision course.

At this year's CeBIT*) in Hanover, Germany, one of the questions asked of Professor Nick Bostrom, Director of the Strategic Artificial Intelligence Research Center at Oxford University, was: »When can we expect development of this super intelligence?« He replied: »Most likely within the lifetime of most people living today.« ❐

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*) CeBIT *stands for Center for Office Automation, Information Technology and Telecommuncation. It is the world's largest exhibition in its field.*

Impressum

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