# Autonomous vehicles

## In brief

- The vision of the autonomous vehicle promises more safety, less environmental pollution and comfortable mobility.
- Digitisation has found its way into the car with all its advantages and disadvantages.
- Cars are turning into data collecting, processing and transmitting machines.
- The consequences can be felt in other domains in everyday life, not just mobility.

## What is it about?

Cars are increasingly equipped with "smart" assistants. Car manufacturers promise that these systems will drive our cars completely autonomously in just a few years. This will bring major changes to our society. Concepts of ownership will change just as much as mobility behaviour. Many manufacturers expect automobiles to be shared more frequently, rented only for a short period of time, and booked as a service like taxis.

On the one hand, the new developments promise more security as human error can be minimised or even eliminated. On the other hand, environmental impact is reduced and access to transport facilities simplified. The computer replaces humans and allows for optimised engine control and autonomous driving. However, this also brings about major change in road traffic: since the invention of the wheel, all road vehicles have been steered by human beings. In the future, machines – and thus algorithms – will take decisions that, up until now, had been reserved to the human driver: a paradigm shift.

This has far-reaching consequences: autonomous vehicles are more reliable than humans only in certain areas. In others they are far from being able to reproduce accident-free driving. Since the necessary decision-making possibilities for control algorithms have to be defined in advance, it is particularly difficult to define the necessary and selectable options for each situation and to subsequently check them.

More data than ever before are collected, stored, processed and shared with third parties. To the consumer it is often unclear what data are collected and what potential consequences such process could entail.

Grafik: ITA-NG

Autonomous cars could soon be reality in mixed traffic

Until automated driving becomes an essential part of everyday life, many changes around the automobile will be necessary. In addition to legal adjustments, the fact that machines will navigate through traffic means that some areas of the infrastructure must also be "smart". Vehicles have to be supplied with data and need to connect to other units.

Because of the increasing digitisation of mobility, there is a risk of undermining privacy. The topic of data protection is becoming increasingly more important in the field of mobility. As the systems become more complex, users are more and more losing track of how, when and where data are transmitted. Furthermore, obtaining consent to using and transmitting data is becoming increasingly more difficult.

## Basic data

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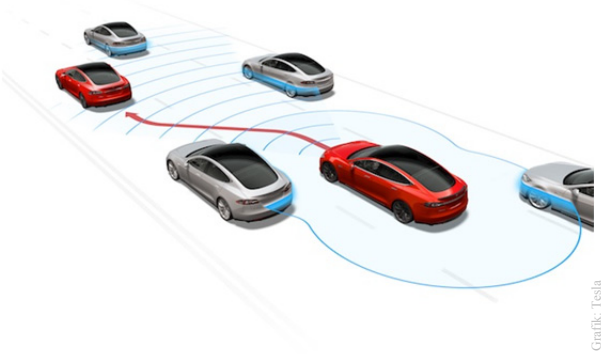
|---|---|
| **Project title:** | Connected cars |
| **Project team:** | Krieger-Lamina, J., Peissl, W. |
| **Duration:** | 01/2016 – 08/2016 |
| **Funded by:** | Federal Chamber of Labour, Department for Consumer Policy |

## Key results

Before autonomous driving will be a possibility, some challenges must be overcome. This applies, amongst other things, to the "mixed operation" of autonomous vehicles and non-autonomous vehicles, which will be the case for many decades.

In order to meet the requirements for safe autonomous driving, the detection performance of systems assessing the environment has to improve significantly.

The legal hurdles for test operations are currently being reduced worldwide. There are no provisions which deal with the changed situation with regard to liability issues and particularly with regard to data protection issues.




Highly-developed sensors are designed to reliably analyse the environment.

Data accumulated in modern vehicles attract more and more new and interested parties. From insurance companies to road planners, many stakeholders are interested in people's specific mobility and commuting patterns. It is still very unclear as to how the basic right to informational self-determination can be protected in the future. According to surveys, this is a major concern for most car users as many manufacturers have already begun collecting data.

In addition to the poorly considered impact on the labour market, more attention should also be given to IT security. Through the process of digitisation, information and communication technology (ICT) is introduced into vehicles. This comes with the advantages and disadvantages that have accompanied ICT for a long time. Today, many vehicles can still be attacked remotely and their systems "taken over". Security must not be seen in the light of data protection, but also as the absence of threats to one's health.

## What to do?

**Now is the time to act. This applies to legal changes, the development of concepts for a transformation towards sustainable traffic, and a broad societal discussion about open ethical issues.**

- Regulation needs to be adapted, especially in the areas of liability and data protection.
- In order to further strengthen Austria's good starting position in the field of automated driving, investment into research must be made, in particular in the following fields:
  - Development of necessary components
  - Impact of autonomous systems
  - Human-Machine-Interaction
  - The significance this process of change has for individuals (e.g. loss of control)
  - Concepts for the design of the transitional period.
- The safety of autonomous vehicles must be improved as a matter of urgency, bearing in mind the principles of IT security for digital components in automobiles.
- Data protection principles and the basic right to informational self-determination should be implemented, for example, by making users aware of the reasons for the collection of data and by allowing them to decide who can have access to such data and when.
- The impact on the labour market should be taken into account.
- The consequences of algorithmic decision-making should be researched and taken into account in the regulatory process.

## Further reading

ITA (2016) Connected cars. Gathering data by driving – from assistive systems to autonomous vehicles, Project report no. 2016-02, ITA: Vienna. epub.oeaw.ac.at/ita/ita-projektberichte/2016-02.pdf

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IMPRINT: Owner: Austrian Academy of Sciences; Legal person under public law (BGBl. 569/1921 i.d.F. BGBl. I 130/2003); Dr. Ignaz Seipel-Platz 2, A-1010 Vienna; Editor: Institute of Technology Assessment (ITA); Strohgasse 45/5, A-1030 Vienna; www.oeaw.ac.at/ita/en. | Frequency: The ITA Dossiers are published irregularly and publish the research results of the ITA. The ITA Dossiers are published in print in small numbers only and are made available open access to the public via the Internet portal "epub.oeaw": epub.oeaw.ac.at/ita/ita-dossiers | ISSN: 2306-1960 | This work is licensed under a Creative Commons Attribution 4.0 International License: creativecommons.org/licenses/by/4.0/ | ITA-Dossier no. 23en, October 2016 | epub.oeaw.ac.at/ita/ita-dossiers/ita-dossier023en.pdf | Co-authors: W. Peissl