

Self-driving vehicles, big data and IT infrastructure



Automated driving technology has the potential to fundamentally change our transportation systems. Working together with BaslerFonds and numerous other partners, we carried out an earlier study to assess the impact of self-driving vehicles on our transportation system, our transportation behavior, our infrastructure needs and our approach to spatial development. In a follow-up study, EBP has now examined the challenges that automated driving poses in connection with data sharing and IT infrastructure.

In light of advances made in the area of automated driving, cantons and cities throughout Switzerland are busy examining important transportation-related issues at strategic, technical and spatial-planning levels. For instance, automated driving relies on and helps to generate large amounts of data. What issues need to be addressed in this regard? What types of data will cantons and cities need to make available? And what types of data should they be allowed to continue to use?

Automated driving in smart cities

In the context of our follow-up study, we have essentially attempted to embed automated driving in the context of smart infrastructures and smart cities. Doing so reveals certain conflicting aims. While a priority is placed on the common good when planning smart cities and infrastructures, self-driving vehicles tend to be designed to optimize the travel experience of individuals.

Client

BaslerFonds, Association of Swiss Cities and other partners

Facts

Period 2017 - 2018

Project Country Switzerland

Contact persons

Dr. Ralph Straumann
ralph.straumann@ebp.ch

Remo Baumberger
remo.baumberger@ebp.ch



Exchange of data: vehicle-to-vehicle communication (V2V) (left) and vehicle-to-infrastructure communication (V2I) (right)

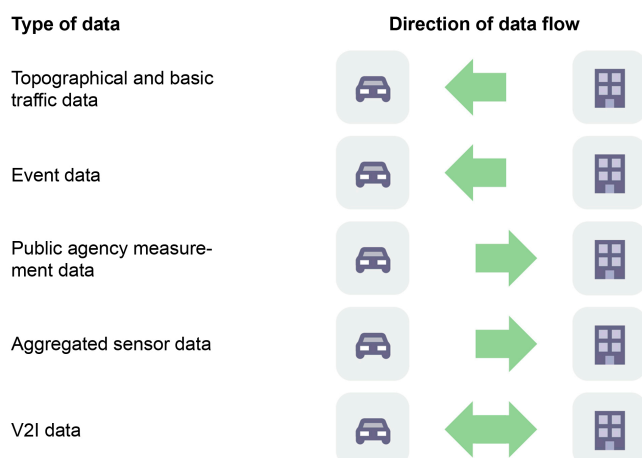
In the interest of attempting to resolve the conflicts that are likely to arise between private vehicle operators and cantons and cities as they seek to meet their goals in the area of traffic management, we began by breaking down the data relating to automated driving into the following categories:

- Sensor data
- Vehicle-to-vehicle (V2V) data
- Vehicle-to-infrastructure (V2I) data
- Aggregated sensor data
- Topographical and basic traffic data
- Event data
- Data from public agency measurements

Significance of data types relative to one another and across time

The significance of these data was estimated from the perspective of vehicle operators and public agencies in accordance with the automation level of the vehicles involved. We ascertained the need on the part of public agencies for data so as to enable improvements relating to traffic flow and safety within the existing transportation infrastructure. The data types that would likely be valuable for public agencies and that could to some extent be gathered from self-driving vehicles include the following:

- Data pertaining to traffic loads in subordinate grids
- Traffic-flow data
- Data pertaining to accidents and hazardous driving behavior
- Data pertaining to empty runs
- Data pertaining to vehicle speeds



Direction of data flow between self-driving vehicles, vehicle manufacturers and their partners (left) and public agencies (right)

Recommendations for data provision and use

We identified the relevant existing and anticipated data-flow patterns between the various parties, including vehicles, vehicle manufacturers and public agencies. Moreover, we also outlined the relevant risks and opportunities, and issued recommendations concerning: ICT infrastructure; organizational matters; data governance; standardization; and the demarcation of open data and my data. The aim of our recommendations is to help secure careful procedures that enable federal, cantonal and city agencies to do the following:

- Establish data competence in connection with transportation management and smart cities so as to be ready for the future
- Use this competence to promote the common good
- Minimize the risk of misguided investments and financing delays (e.g. in connection with accessing and providing data).

Follow-up studies as a part of a total package

The project was a part of a comprehensive [study on the large-scale introduction of automated vehicles](#). The study gave rise to a [preliminary analysis](#) and revealed a need to conduct follow-up studies relating to the following subjects:

- [Traffic engineering](#)
- [Effects on road safety](#)
- [New offerings for shared transportation](#)
- [Freight transportation and city logistics by road](#)
- [Impact on resources, environment and climate](#)
- [Challenges for cities and other urban areas](#)

Study results

We compiled our findings in a [synthesis](#): Large-Scale Introduction of Automated Vehicles – Applications and Effects in Switzerland, Report of September 5, 2018