CA: B1 Topic: Implementation and extension of a model for real-time automatic matching of complementary transport needs
Code: D3-B1.2.3: Transport simulation implementation

The new IVT 2015 baseline scenario for MATSim represents a typical workday in Switzerland in the year 2015. The main population is available as a 1% and 10% sample, as well as undiluted. It features attributes, preferences, facilities and households. A cross-border population and a freight population complement the main population. The former represents people coming to Switzerland from abroad, whereas the latter represents freight traffic on a typical workday. The network and the public transport system are based on Open Street Map data and on the official SBB HAFAS schedule. Furthermore, the code developed combines the different input data to coherent, fully functional MATSim scenarios, We also proposed the default scenario configuration (configuration file, scoring function and replanning strategies). This configuration is tailored to the population and network described above. The ensemble provides a solid base for future MATSim transport studies at the IVT that will be exploited in different activities within the SCCER Mobility framework.

MATSim allwed to adress many issues energy related relevant issues:
1) Work on getting a **deeper insight into possible integrations of different shared vehicle systems with focus on the impact on energy consumption**. In this stream of work an original methodology in three stages in three stages is introduced, helping dealing with the complexity of the problem. Using MATSim, different scenarios are assessed. The published work related to this Deliverable presents preliminary results obtained by simulating two extreme-case scenarios with large-scale car-sharing and bike-sharing schemes. The results suggest, that shared mobility, if supplied at large scale and in the right mix, could indeed serve a large share of current travel demand without substantial losses in terms of generalized costs but with large benefits in terms of reduced energy consumption.

2) **Automated Vehicles (AV)** promise many benefits for future mobility. One of them is a reduction of the required total vehicle fleet size, especially if AVs are used predominantly as shared vehicles. For this work we investigated the reduction potential using a simulation approach. The **greater Zurich region, Switzerland, is the area of the study**. Different scenarios are created, combining different levels of demand for AVs with different levels of supply (i.e. AV fleet size).
It is found that, for a given fleet performance target (here 95% of all transport requests are served within 5 minutes), the relationship between served demand and required fleet size is non-linear and the ratio increases as the demand increases. So there is, as could be expected, a scale effect, which has the important implication that for different levels of demand the fleet is used more or less efficiently. We found that, if waiting times of up to 10 minutes are accepted, a reduction of up to 90% of the total vehicle fleet can be possible even without active fleet management like vehicle redistribution. Such effects require, however, that a large enough share of the car demand can be served by AVs.

3) People’s desire or the need to perform certain activities during the day drives their activity scheduling decisions. However, these decisions are dependent on the state of the transportation system, its supply and demand. The need for the tools able to deal with the kind of adaptations to the daily plans that come with these decisions, is ever growing. The introduction of new modes and services and the fast approaching era of autonomous vehicles, among other things, has increased the need for suitable tools to look at the induced/suppressed demand effects on the activity schedules.
The work associated to this deliverable provided a methodology for the adaptation of the activity schedules inside of the multi-agent transport simulation (MATSim), based on the changes of supply in the system. The first results show that the proposed methods are able to adapt people’s schedules when they are faced with shorter or longer travel times. **This work will allow, among other things, to understand better the net impact (including rebound effects) on travel related energy consumption of the introduction of new services and modal options.**