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DIGITALES  
NORDRHEIN-WESTFALEN  
MODELLREGION BERGISCHES STÄDTEZECK

Ministerium für Wirtschaft, Innovation,  
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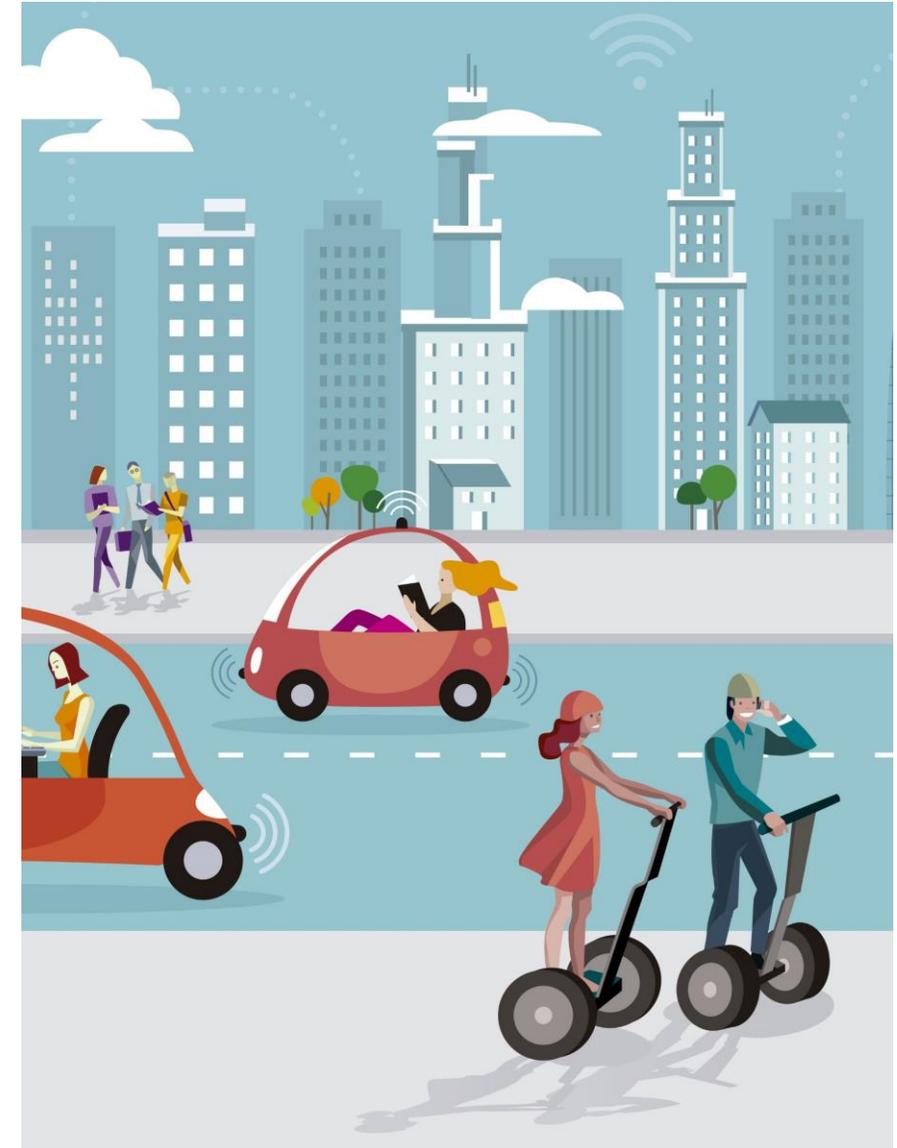
Research, development  
and real-life testing of  
future mobility solutions



**Developing and producing autonomous vehicles is just one element of the transformation of the mobility sector.**

For a successful transformation of transportation with a focus on social acceptance and ecological added value, technology development is a means to an end. Above all, process and structural changes in public transportation and mobility offerings must be initiated. For this reason, the project "Bergisch.Smart: Artificial Intelligence as an Enabler of Tomorrow's Mobility" (bergisch.smart\_mobility) is more than just research and development of new vehicle technologies.

Only one of four fields of action is related to vehicle technology. The other three fields, "Smart driving in the neighborhood", "AI-based traffic management" and "Rethinking mobility", focus on traffic infrastructure and social acceptance of AI-based mobility. The main objectives include developing sustainable solutions as an opportunity for the region, demonstrating prototypical feasibility of selected approaches, and defining standards that can also serve as a blueprint for other cities and regions.





Most tangible for outsiders is an on-demand shuttle service with electric vehicles which started in fall 2020 and is operated by Wuppertal's municipal transport company. Since then, citizens in the transport area have been able to book a London Cab, that takes them directly from the pick-up zone closest to their personal location to their personal destination.

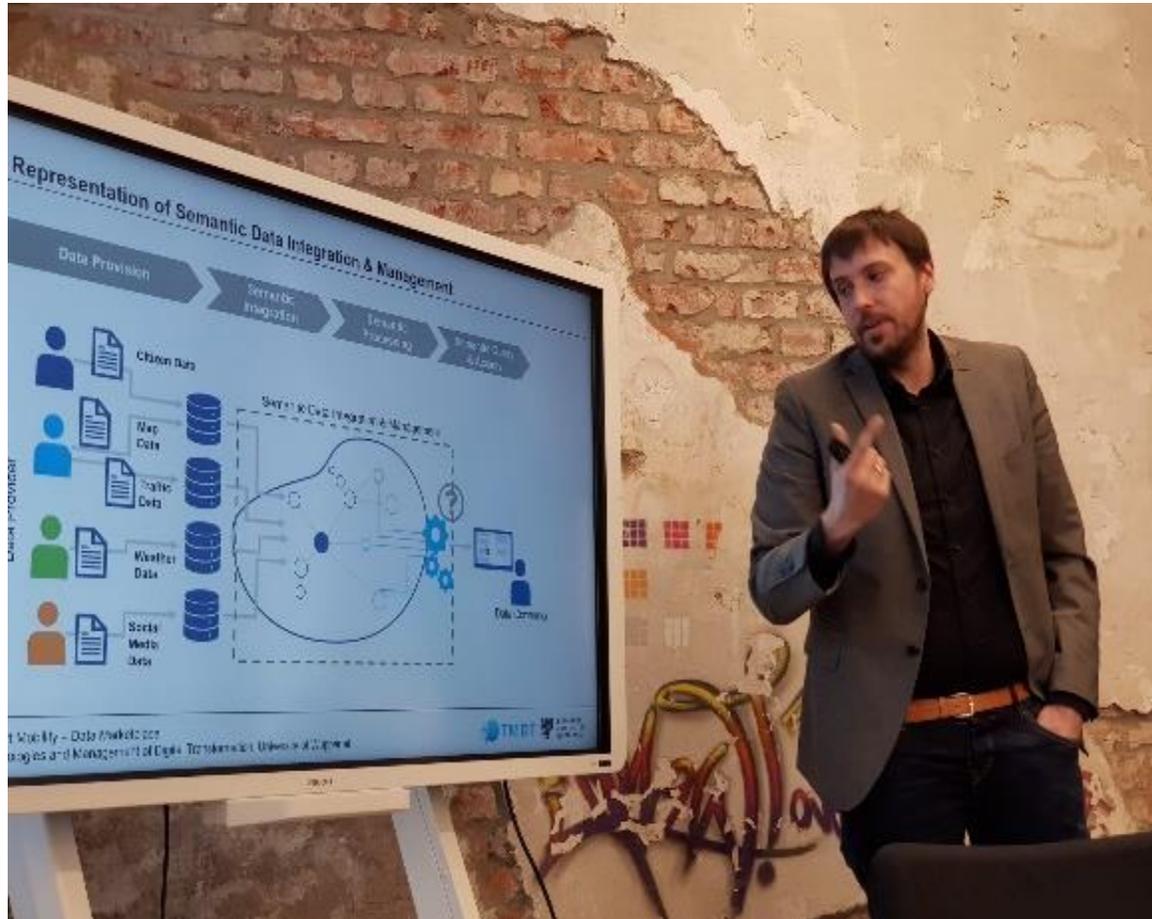


The purpose of this real-world test is to gain insights into the efficiency of the underlying algorithms for routing, pooling and billing as well as to assess the possibilities for integration with the current public transport services. Furthermore the test will analyse the potential of business model development for future autonomous shuttle services. This area mainly includes the user behavior of citizens and the pooling factor.

In addition to the London Cabs' original purpose as a shuttle service, the vehicles will also be used to test the interior sensor technology developed by project partners Aptiv Service Deutschland GmbH and Bergische Universität Wuppertal (BUW). This sensor technology is vital, for example, in regard to the road safety of vehicle occupants and the verification of compliance with social rules of conduct in future driverless autonomous shuttles.

Moreover the project will equip a vehicle with cameras and other sensors that the University of Wuppertal will use for data recording purposes in order to train algorithms and also to feed data to a digital twin of the City of Wuppertal, which will provide information to a reference map for the autonomous vehicles in the future.





In addition to the development of a digital city twin, the project is working on digitizing the city infrastructure of the cities of Wuppertal, Solingen and Remscheid. For this purpose, a data marketplace has already been created by the University of Wuppertal.

It serves as a collection point and linking platform for the individual data packages with interfaces and server capacities. Based on this practical test and implementation, the cities are developing strategies to make their own work processes more efficient. This enables them to provide information about the condition of the city infrastructure (street signs, construction sites, one-way streets, etc.) on a daily basis

As a part of the project LiDAR traffic control technology is being tested in the City of Solingen. At the current stage, the traffic analysis capability of the software is initially being compared with those of conventional traffic cameras and measurement loops.

However, the next step will be to test the direct control of traffic light phases using LiDAR sensor technology. The overall goal is to evaluate the potential applications, advantages and disadvantages of LiDAR technology compared to existing traffic analysis and control systems. The three cities, each of which currently uses and favors different systems, are working together to compare the technologies.





In order to involve the population and other stakeholders such as commercial enterprises in the transformation process, events (lunch break sessions, hackathons, etc.) and surveys will be conducted by the project partners University of Wuppertal, Bergische Struktur- und Wirtschaftsförderungsgesellschaft and Wuppertaler Stadtwerke. The basis for the surveys and events are the above-mentioned trials and the knowledge already gained from them. In addition, the research and development work also results in new projects in the field of prototype construction by local engineering companies. This also supports job security in the Bergisches Städtedreieck and provides innovation impulses for the local economy. Furthermore, the eight project partners also create links and points of contact with other projects and subject areas such as the targeted circular economy.

The project's holistic approach breaks down the transformation of the mobility sector to the area of the Bergisches Städtedreieck with social and ecological added value.