Plan – Control – Regulate Traffic Flows

What makes public transport attractive? In view of the rising cost of gasoline and the desired energy transition, creative and sustainable answers to this question are essential. A research group in our division "Mathematics for Vehicle Engineering" is investigating how public transportation pays off for companies and passengers. At the same time, it is also looking at individual transportation: The goal is flow instead of standstill.

The Opel traffic circle in Kaiserslautern is a traffic junction that often impedes the flow of traffic. The Fraunhofer ITWM provides suggestions for the optimization.

Bus and rail passengers want reliable connections, high frequency rates and low fares. Transport companies must operate economically and sustainably: In addition to being attractive to their customers, they also have to consider operating costs and the resulting environmental impact.

LinTim Expands the VMC®-Family

"An optimal traffic system consumes as little energy as possible, covers all needs at the same time and also allows traffic to flow," says project manager Dr. Michael Burger, describing the noble goal. "With our methods and tools from the 'Virtual Measurement Campaign' (VMC®) software family, we can simulate and model individual road traffic highly efficiently, and now we're adding public transport to the mix. That's why we integrated the LinTim software into our VMC® family." The tool was originally developed in the working group of our institute director Prof. Dr. Anita Schöbel.LinTim stands for "Lineplanning and Timetabeling," but it can do much more than lines and timetabling. VMC® LinTim includes algorithms for stop, line, circulation and trip planning, as well as delay management. In addition, it can analyze, assess and optimize the energy demands of deployed vehicles depending on the environment. All methods are integrated into a library and can interact with each other in the various planning stages. VMC® LinTim therefore also finds solutions that are not visible with classical approaches. "In this way, we support traffic planners who, up to now, have mostly used their empirical knowledge as a basis for planning," says Michael Burger.

Simulations Reduce Downtime

In a simulation study, Burger's team is also investigating traffic flows and traffic light control at the Opel traffic circle in Kaiserslautern – a traffic junction in the west of the city that connects the industrial park, highway and bypass. The neuralgic point combines a traffic circle with a traffic light system and regularly produces traffic jams. Our researchers were able to show that an adapted traffic light control – based on traffic data, models and modern mathematical methods – offers great potential for significantly higher flow rates. The tool was developed in the working group of our institute director Prof. Dr. Anita Schöbel.

VMC LINTIM