

Mobility Operating System – the mobility center of the future

Major population centers and urban areas keep growing at a rapid pace: Every second two additional persons are moving to a city somewhere around the globe. This results, among other things, in more traffic and hence more traffic-related pollution. Today's average traffic speed of 12.5 miles/h in urban centers will continue to drop, while in many places CO₂ and NO_x emissions are exceeding the set limits already today. And then there are the traffic disruptions caused by accidents. In Germany, there is one non-minor accident every 49 seconds, in the U.S. every 5 seconds. Germany counts 4.7 traffic deaths per 100.000 inhabitants, compared to 11.4 for the U.S. The numbers for China are even worse: 0.6 seconds and 20.5 traffic deaths.

More than ever, big cities need to cope with the challenge of balancing the mobility demands of the population with the requirements of delivery transport, environmental protection and, last but not least, road safety. Against this background, public mass transit systems need to be expanded and combined with individual mobility services - for an area-wide intermodal mobility offer that will motivate city dwellers and commuters to switch from the private car to other means of transport.

A city's mobility operating system

The strategic control of the mobility ecosystem in a city calls for the central collection and analysis of the complete traffic and transport data in real time. These include, for instance, data from traffic light systems, sensors and detectors of all kinds, surveillance cameras, measurement stations for weather data, noise and air quality, data on the operational status of on-street and off-street parking facilities and the messages currently displayed on variable-message signs.

In addition, real-time data from public transport networks, taxis, car- and bike-sharing schemes, transport providers such as Uber and Moia, demand-responsive bus services, all types of autonomous vehicles and various transport services have to be gathered and processed. And then there are also all those data on traffic disruptions, road closures, construction works and major events as well as historic traffic data that must be factored in when calculating congestion prognoses and the related travel recommendations for road and rail.

The Mobility Operating System of Siemens Mobility is designed to master all this and more. The objective of comprehensive central data collection is to enable very fast processing and analysis from an overall perspective in order to help the urban traffic control center to prevent traffic jams and disruptions, steer traffic efficiently and make it more environmentally friendly, inform the affected road users as quickly as possible and offer them advice on alternative routes and means of transport. Automated data analysis facilitates the work of the operators in the control center by providing fast intervention options, decision suggestions, and forecasts.

Application case “broken-down car”

When a lane is obstructed by a broken-down vehicle, MobilityOS will learn about the incident from surveillance camera pictures or messages from the police or even the vehicle’s manufacturer. In the MobilityOS center, the employee on duty can check all relevant camera images on a screen, mark the lane as blocked for traffic via variable-message signs, reduce the permissible speed on adjacent lanes, and communicate with the police, towing services and the fire brigade.

In the background, MobilityOS calculates expected traffic jams and delays on the basis of real-time data from the surrounding road network, proposes diversion routes and continuously analyzes all relevant data. Where appropriate, the system will provide intermodal travel recommendations.

Application case “closed road”

In the case of a road closure, MobilityOS will automatically issue notifications and recommend alternative routes: Motorists are informed, for instance, that they will need an additional 20 minutes on the road and that public transport would get them to their destination more quickly. Bus lines are automatically rerouted and potential passengers along the route notified. Delivery services receive the message that the affected zone can only be reached on foot or by cargo bicycle.

Application case “major event”

One to two hours before the start of the event, the system will issue warnings - directed not only to motorists and all other road users, but also to local public transport - to circumnavigate the area around the event venue. Delivery services, too, receive the recommendation to avoid the area in the hours before the beginning and after the end of the event. Visitors, on the other hand, are informed of free parking spaces and the quickest way to get to the venue. At the same time, access traffic can be sped up via variable-message signs and situation-specific traffic light switching patterns. For the duration of the soccer match or other event, the area can be opened for normal traffic again.

Success stories

Many cities already use traffic guidance systems from Siemens Mobility. These can be considered as preliminary stages on the way to a MobilityOS that encompasses all data sources and information channels.

In Seattle, USA, Sitraffic Concert from Siemens Mobility serves as a central management platform that integrates a range of traffic management systems and data sources on weather, traffic and major events as the basis for displaying the traffic situation in real time.

For managing traffic on 1,500 km of streets and roads, the Berlin traffic management center uses a control system from Siemens Mobility that collects and processes data from eight traffic guidance systems, 22 traffic computers, 2,000 traffic lights and around 100 video cameras.

In Wiesbaden, Germany, monitoring and simulation systems help keep traffic flowing freely. The real-time analysis of traffic also allows targeted interventions in order to reduce the degree of air pollution.

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This background information and additional material are available at:

<https://press.siemens.com/global/en/event/siemens-mobility-exhibits-innovative-mobility-solutions-ces-2020>

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