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"A very pragmatic generation"
Interview with the German trend researcher Sven Gábor Jánszky

Between science and fiction
How students at Technical University Dresden imagine tomorrow's mobility

United data
The Dutch approach to using big data in traffic engineering and optimization

On the road with bits and bytes
How digital natives will revolutionize the world of mobility

In less than
ten years,
digital natives will
take over the levers
of power and start
remodeling the world
of mobility to suit
their ideas and
preferences.

Dear Reader,

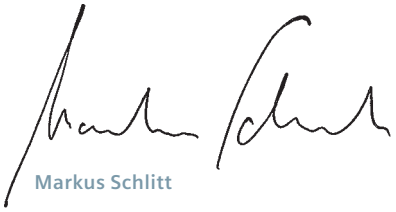
They keep checking their smartphones for messages 123 times a day on average, total 57 online hours per week, like chasing virtual Pokémons in their real city for a change, can envisage using robots as assistants and, of course, want to and will deeply transform the existing systems. As demonstrated by the quick succession of media headlines, we already know quite a lot about the so-called 'digital natives', i.e. the generation who has grown up in the midst of bits and bytes. And yet, our knowledge is still very limited.

In most spheres of life, the era of the baby boomers as key trendsetters is nearing its end. While at the moment, those 'digital immigrants' are still the ones to shape the future, including the future of mobile society, it will not be that long before the digital natives will step in: In less than ten years, says trend researcher Sven Gábor Jánszky, the first set of digital natives will take over the levers of power and start remodeling the world of mobility – and others – to suit their ideas and preferences. In the interview, the director of the renowned 2b AHEAD think tank in Leipzig describes those ideas and preferences in surprising detail.

But of course, we did not only ask a futurologist about what next-generation mobility will look like, but also representatives of the very generation concerned: a group of future traffic engineers, who are preparing today to create and develop the systems for tomorrow's mobile world. Professor Dr. Regine Gerike from Dresden Technical University found our question so fascinating that she gave her students the assignment to develop their own answers and ideas in the scope of a seminar.

What I personally find most impressive about the results is the fascinating mixture of visionary thinking, technological foresight and profound understanding of today's problems. Of a total of six student papers that we want to present in The Magazine and in our online customer magazine at **www.siemens.com/magazine/mobility/its,** you will find the first two on the following pages. As always, I wish you an enjoyable read.

Sincerely,



Markus Schlitt

Cover image: © Rinspeed

Content

Totally new travel experience

06 People born and raised in a digital world have a different outlook on many things than those born in an earlier period. Doubtlessly the world of mobility will be among the spheres of life that the Generation Y is about to shake up.

Focus

Invent

Inspire


ESORO
VDO
HARMAN

“A very pragmatic generation”

Interview ■ Trend researcher Sven Gábor Jánszky, head of the renowned 2b AHEAD think tank in Leipzig, on the worldview of Generation Y, the mobility-related preferences of digital natives and their disruptive effects on the transport systems of the future.

Biography

Sven Gábor Jánszky is the founder and chairman of the 2b AHEAD think tank in Leipzig. Over the past ten years, his numerous trend analyses and his publications in book form, such as "2020", "2025" and "The Recruiting Dilemma", have impacted the future strategies of many business sectors. With his strategy manuals on the thought patterns of people whose ideas are changing the world, "Rulebreaker", and on the redefinition of values in society and business, "Die Neuvermessung der Werte", he has emerged as the voice of the lateral thinkers and innovators in the Germany's economic landscape. German business media frequently feature interviews with Jánszky, he is often booked as keynote speaker at strategy symposia and congresses and acts as sparring partner for CEOs and innovation officers. Jánszky lives with his wife and their two children in a village somewhere between Berlin and Leipzig. In 1988, he won second place with his team in East Germany's National Youth Team Chess Tournament. His sporting achievements include climbing Mount Kilimanjaro twice and running his by now 19th marathon in New York.

Mr. Jánszky, Generation Y covers those who are now between 16 and 35 years old and are the first so-called digital natives. How do the thinking patterns of people who have never known anything other than the digital world differ fundamentally from those of their elders?
In the main, I see two key points. Firstly, Generation Y has a significantly more pronounced sense of the almost unlimited possibilities that digitalization offers – and for the enormous freedom for individuals that this entails. In contrast, many members of previous generations experience digitalization as more of a curtailment of personal freedom. A possibly even more momentous difference could be the ratio between the number of accessible options and the time available to take advantage of them. Generation Y no longer seeks to maximize their options for action, because they already have more than enough – for them the limiting factor is time. And this is exactly why time is the relevant criterion in all their decisions.

Just how great is the influence of digital natives on the daily lives of the entire population these days – and when will they definitely claim the dominant role in shaping our society?
They are already making themselves quite noticeable, but they do not yet control the levers of power in our society. As a rule you reach those levers between about 45 and 55 years of age. So Generation Y needs around ten more years until it will finally get there. However, the phenomena that we have just been describing not only apply to digital natives, but also – in a somewhat milder form – to the generation of the so-called digital immigrants. You can see this in the matter-of-course approach to using digital media that leading politicians or the CEOs of large companies generally display. So starting in about 2025 there will be a relatively smooth changeover and no sudden transition.

In view of our aging society, will the final changing of the guard take place rather later than was the case with earlier generational changes?
On no account will it be later. There is even a slight tendency in the other direction, because it has never been so easy for young people to make a huge amount of money in the early stages of life as it is today, which gives them a relatively large degree of power. The key is the start-up scene. Previously, that small part of the younger generation who wanted to change something became active in, for example, youth organizations or extra-parliamentary opposition. These days they found an innovative company and, if successful, secure much greater influence for themselves in the process.

How will the high importance that digital natives attach to the time factor change the world of mobility?
Fundamentally! Previous generations assumed that they had no way in which they could save much time when it came to mobility. That is why they wanted to make the many hours spent on the road as pleasant as possible. Hence the automotive industry developed the car we know today: as fast as possible, as safe as possible, as comfortable as possible. But the core of this automotive world view was always the presence of an active driver. Digital natives do not share this view. This begins with the fact that they consider physical mobility as a kind of no-longer-necessary evil that should be kept to a minimum.

Does that mean that, as a result of rapidly growing virtual mobility, there will be a reduction in the demand for physical mobility?
No, on the contrary. In fact, digitalization has caused the total volume of mobility – virtual plus physical – to grow tremendously. The physical share of this overall volume is decreasing, of course. It used to be 100 percent, then came the telephone and now digitalization. But as we said, here we are talking only about the relative share that physical mobility has in total mobility. In absolute terms, physical mobility continues to grow – not as strongly as mobility in the virtual space, but still significantly.

And how exactly will people travel if they do not really want to be 'on the road'?
When digital natives have to be mobile, they at least want to use the time for another fruitful activity in parallel. This in turn only works in a vehicle that does not need an active driver, in which the users can take the role of mere passengers and get involved with other things such as working, eating, playing with their children, exercising or sleeping. Ideally cars should adapt flexibly to meet the users' particular wish for parallel use at each moment, while taking them quickly and safely from A to B. So we are confronted with very different requirements that will lead to very different products – and ultimately to very different business models. ›

"Physical mobility is seen as a no-longer-necessary evil"

"Emotions are no longer relevant to mobility decisions"

In what form will these changes make themselves felt at the early stages?
A key driving force is obviously the progress in the development of self-driving cars. Since these vehicles promise to significantly reduce the number of road accidents, alongside other benefits, politicians can hardly continue to obstruct their development for much longer. That is why it is important that all currently unsolved regulatory issues should be fully clarified as soon as the first autonomous vehicles are really ready for production. Initially, autonomous cars will probably drive in special lanes while conventional cars travel in the regular lanes. But that situation may soon be reversed.

And what does the triumph of the self-driving car mean for the prevailing business models – for example, for those of the classic car manufacturers?
In my view, car manufacturers need to accept as soon as possible that in the foreseeable future they can no longer earn money from the sale of vehicles. Because the more self-driving cars will be out there and available at all times for everyone via a smartphone app, the less sense it will make for individuals to own a car just to leave it parked somewhere for about 23 hours a day – and the fewer vehicles the industry will sell. I am convinced that sooner rather than later the automakers must develop into mobility service providers. However, we should have no illusions about one thing: Tomorrow's mobility market will be more aggressively fought over than ever – with significantly more competition and rapidly falling prices. A look at the development of commodities such as electricity or telecommunications certainly gives us a pretty good idea of what will happen. By the way, this is something that digital natives consider absolutely normal for any service or product that is permanently available.

When it comes to competition, are you thinking of newcomers like Uber, Lyft & Co.?
Yes, but by no means just them. For example, we will also have to reckon with car rental companies and companies from other mobility areas such as airlines or railway operators. Even companies from right outside the sector, such as department stores or supermarket chains, may think about offering the idle capacities of their fleets to the open market for passenger or goods transport. And even if private car ownership declines significantly in the future, those who still want to buy a vehicle will not be happy for it to sit around in a parking lot when it might just as well be making money for them, for instance by delivering pizza. The first thing that will be squeezed out

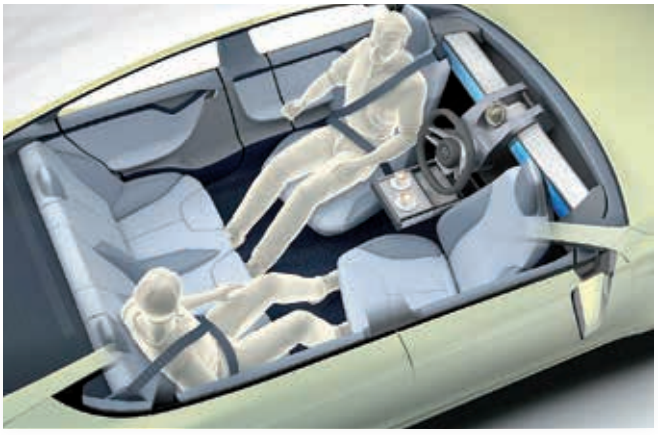
(On the right) Sven Gábor Jánszky on the stage as keynote speaker at a congress: "Digital natives consider physical mobility as a kind of no-longer-necessary evil that should be kept to a minimum."

(Bottom and left) Rinspeed's "Oasis" concept study with innovative smartphone app: "The cars of tomorrow will be autonomous vehicles, in which the users can get involved with other things than driving, for instance working, eating, playing with their children, exercising or sleeping."

"Owning a car will hardly make any sense any more"

of the market is certainly going to be the manned taxi. But I predict that, over the medium to longer term, the development will also bring additional problems for public transport.

A recent trend study came to the conclusion that public transport will have to reinvent itself. What might this process look like?
The most important factor is that the transport operators should look very closely at the questions of whom they will be competing against in the future, and for whose custom they will be fighting. Digital natives are of course going to make up an ever larger proportion of the target group for transport operators, and they are being courted by an increasing number of market players – with very affordable and highly individualized offers. In this scenario it is important to find conclusive answers. I would, for example, offer products that provide users with time benefits. In general these offer very good prospects of success. ›



Uber tests the self-driving Ford Fusion in Pittsburgh (topmost), Rinspeed "XchangEW" concept car: "We expect the first autonomous cars to be ready for mass production and to start appearing in our cities in two or three years. And by 2025 they will form a significant proportion, perhaps even a majority, of the vehicles."

"Nobody is a technophobe when it comes to their TV set"

What role will the desire for individual mobility solutions play in tomorrow's world?
A decisive one. Some relevant studies favor concepts such as those based on large self-driving taxis or minibuses with six to twelve seats. You can order a vehicle to your location at the push of a smartphone button, and it will drop you precisely at the doorstep of your destination. There are no timetables, no bus stops, no fixed routes.

Would you say that digital natives expect individual mobility to be electric?
Yes, I'd say so. On the other hand, Generation Y is not dogmatic, but rather a very pragmatic generation. This means that if from a technical standpoint there are reasonable grounds for delaying the introduction of comprehensive electric mobility, that would be no problem for digital natives for the time being. The change will just come ten years later – the main thing is that it does come.

While we're talking about time horizons, the CEO of Uber competitor Lyft predicts that car ownership will be extinct by 2025. Does that more or less fit in with your expectations?
Not really. I think this is a very American forecast. We expect the first autonomous cars to be ready for mass production and to start appearing in our cities in two or three years. And that by 2025 they will form a significant proportion, perhaps even a majority, of the vehicles. But of course there will still be plenty of people who are not members of Generation Y, who will still love their cars and remain car owners. It will therefore take quite a while before car ownership dies out.

What about the emotional state of digital natives as regards mobility? Is the car no longer a status symbol for them, and driving no longer a badge of freedom, individuality and sovereignty?
In this respect too, Generation Y has a quite rational attitude – and also a highly differentiated one, as shown by their understanding of freedom, for instance. In metropolitan areas personal freedom is actually increased by not having your own car, so young urbanites see no reason to buy one. In rural areas, the opposite is true. In such places, there are probably no providers that will bring a vehicle to the user's door within a maximum of ten minutes after it has been ordered via smartphone. So in rural regions, even digital natives will certainly continue to own cars.

A little over 20 years ago, people's fear of having to surrender control over key processes in their lives to technology would still have been a high hurdle to overcome before autonomous cars could be introduced. At that time, a survey of US students found that nearly 30 percent of respondents had strong technophobic tendencies, while in Japan the proportion was as high as 59 percent. What is the situation with digital natives?
I think nothing has changed in this respect. But technophobia basically only occurs with technologies that are

"How can traffic engineering make the entire mobility system more efficient?"

new to our lives, not those that were already there when we were born. Nobody is a technophobe when it comes to their TV sets. Digital natives are just as technophobic as all other generations, but not towards the digital technology with which they grew up.

If only half of what you predict is actually going to happen, those responsible for mobility on the local and regional level will be faced with a lot of new tasks. How can they prepare for this challenge?
This may be seen as an unusual recommendation, but in my opinion one that makes a lot of sense in view of the fundamental changes that we are facing: I'd suggest that you have a look at yourself and experience with your own body how the emerging concepts of self-driving cars and the corresponding digital control systems actually function. An ideal destination for such a self-awareness exercise would be Pittsburgh, for example, where you as a passenger in one of the self-driving Uber vehicles can already get a very good idea of the brave new world of mobility and its enormous benefits for the user. If you do not go and try it for yourself, it could happen that you will make your decisions from the perspective of the older generation – and thus possibly act against the interests of your clients. And my second urgent appeal is this: Talk to the players who are having a big impact on how future mobility will look. Talk to public transport operators, car manufacturers, airlines, car rental companies, car-sharing providers and infrastructure specialists, focusing particularly on this question: What contribution could tomorrow's public transport make – and with what concepts could it do so?

According to your vision, in which direction would modern transport technology have to develop to get fit for the future?
Technology providers would have to recognize and develop the role they want their products to play within innovative, intelligent and intermodal mobility networks. How can technology integrate the numerous subsystems with which the new transport providers will control their autonomous fleets? How can it use the available sensors to make the overall system even faster and more efficient? Technology providers may also consider whether to profit from their extensive know-how and themselves become players in the mobility market, for example by offering their own smart mobility wizard.

In order to give us a more detailed idea of the overall scenario you have been drawing, could you please answer this question: When traveling from your office in Leipzig to a lecture in New York in 20 years' time, what exactly will your itinerary look like?
Of course, I would want an intelligent digital assistant to put the sequence of steps for the entire trip together. One digital assistant, not several, that's important. I will not be taking the cheapest option, because it will involve advertising during the trip. Personally I prefer to pay a bit extra to ensure that I will not be bothered. A self-driving car will pick me up and drive me to the airport – either here in Dresden or, if it is more efficient, straight to the nearest international aviation hub, which is Frankfurt. In any case, the arrival time will have been calculated so that I lose as little time as possible at the security gate. This optimum could also involve arriving a half-hour earlier, if I have the option to sit in the lounge and continue working at the airport. If something unexpected happens after the start of the journey, the system will automatically propose a new sequence of steps. Upon my arrival in New York, a self-driving car arrives at exactly the moment I leave the airport, using something like an optical identifier to signal to me that it is reserved for me. From this moment on, the mobility assistant interacts directly with my personal organizer. It checks whether any of my appointments need to be changed as a result of the current and anticipated traffic situation – or whether a postponement means that there are new route recommendations to be followed. Where appropriate, it contacts the hotel in order to clarify the check-in or check-out times. In short, it makes sure that even on travel days that are tightly scheduled I am able to concentrate fully on the essentials – my job.

Mr. Jánszky, thank you very much for talking to us. ■

Between science and fiction

Student visions ■ Want to know what mobility will look like for the next generation? Why not simply ask the next generation – those who will actually be shaping it? A group of students studying under Professor Dr. Regine Gerike at the Technical University Dresden gave us a wide range of stimulating responses.

This subject is pervasive, in the real world as well as in the virtual one, in parliaments as well as in talk shows and lecture theatres: Anyone who is anyone is talking about 'big data' – the gigantic, digitally generated quantities of information that, according to many experts, will change the way we live together on this planet as fundamentally as almost any other technological revolution has done before. Data has long been seen as the raw material of the 21st century – a definition that is not only of great importance for the future, but includes also another key aspect: Big data is not an end in itself. It is merely the means to an end. In other words, it all depends on what you make out of it.

New medium – same primary objectives

That is also the take of Professor Dr. Regine Gerike, as she prepares the traffic engineers of tomorrow for their future work. Dr. Gerike holds the Chair of Integrated Transport Planning and Traffic Systems at the Technical University Dresden.

"This vast amount of data is simply a medium that helps us better understand the behavior of traffic and the movement of traffic flows, so that we can improve our models, forecasts and plans. In addition, big data will also provide the tools to offer entirely new services. But our primary objectives remain the same: improving accessibility as well as traffic safety and traffic quality."

Just as pragmatic is the outlook that Maria Pohle, her research assistant at the Institute for Transport Planning and Road Traffic at TU Dresden, has on the didactic significance of the new options offered by big data: "Having more data will certainly allow me to calculate many things much more precisely, but only if I know how to calculate them – and above all, why I am doing so. This means that although today's digital natives might regard some fundamental knowledge and methods as outdated, they will have to learn them anyway."

So big data will not be triggering any major change in a traffic engineer's job description? "The transformation has already started," says Professor Gerike. "For mobility and traffic management, for example, the use of big data has become an indispensable tool and is also an integral element of various areas of traffic planning and traffic engineering. We are already in the middle of the digitalization process, in the scope of which the influence of big data keeps growing. The truly innovative aspect of the applications that can be developed on the basis of big data is not the actual data itself, but the ideas that lie behind the different uses."

"How big data will transform the world of mobility"

In future a traffic engineer's creativity will be much more in demand, as will his or her ability to use the new opportunities in such a way that they generate maximum benefits. That was also why Professor Gerike immediately reacted positively when approached by The Magazine for Intelligent Traffic Systems with an enquiry regarding a feature story. Students were asked to develop their own visions under the heading "Between Science and Fiction – How Big Data is Changing the World of Mobility", presenting for instance ideas for an intelligent overall design of the networked mobility systems of the future, for individual innovative applications, or for particularly efficient methods that will allow to evaluate large data volumes.

The results are absolutely amazing in both quantitative and qualitative terms. Some contributions impress with their originality, others by their simplicity and/or their clarity. In general, no fairy palaces were constructed, but rather sketches of ideas that closely relate to reality. The more difficult task was to finally decide on the six favorites that were to be published in The Magazine. Two of them are presented on the following pages, all six contributions that have been selected will appear successively over the coming weeks in the online customer magazine at www.siemens.com/magazine/mobility/its. ›

One for all

How a common data pool, which brings together all static and dynamic information from the municipal and commercial worlds in real time, could make traffic flow more efficiently and reduce its environmental impact.

By Ralph Klingebiel, 7th-semester student of Traffic Engineering, Department of Integrated Transport Planning and Road Traffic Engineering at Technical University Dresden

The world is in the midst of a digital transformation. Catchwords such as Cloud, Big Data, Artificial Intelligence, Networking, Always Online and Digital Transformation affect not only the economy, but also the daily life of every single person. What they have in common is the idea of enriching physical objects and processes with digital services, or even digitizing them completely. Examples include photography, communication and, most recently, the human role of car driver, which can already be replaced to a certain degree by digital functions. The keyword here is 'autonomous driving'. Legal regulations and social norms are currently drawing much of the line between what is technically feasible and what is permitted. But laws will be modified and people will get used to the new opportunities.

Digitalization also affects the transport sector. New vehicles are fully interconnected, maintain a permanent connection to the Internet, receive congestion data in real time, are able to find empty parking spaces and include assistance systems that support the driver. On the basis of the widest range of personal preferences, route selection is adapted to suit the driver. For example, the user can now ask the system to suggest fuel-efficient, environmentally friendly routes or those with appealing scenery in addition to the usual options of "shortest" and "fastest" route.

Companies are entering the market that until now have been involved with completely different content. In addition, there are social trends such as the sharing economy (use instead of own) or greater environmental awareness. In recent years, all of this has led to the situation that traffic is no longer simply a question of supply (road) and demand (driving the car on it), but rather a highly complex and partially digitalized process where the optimum solution is sought out for each step. Even before setting off, travelers can combine and sort the routes, means of transport, timing, cost and comfort according to their personal preferences. During the journey, smartphones or navigation systems inform the users of any changes.

We can do this because the required data are available, a lot of data – Big Data. Providers of intermodal travel search engines evaluate countless sources such as public transport timetables, fares and connection times as well as road connections and rental bike services at the destination in order to find the optimum combination for the individual user. Different vehicle manufacturers and navigation system suppliers collect and process information provided by the police, movement data from mobile devices, traffic news, congestions reports and other data to continually optimize the current and planned routes for each user within the shortest delay. Navigation applications on the smartphone analyze the users' behavior and assist them in their daily commute to work by providing information on disruptions. They can also adjust the routes for a holiday trip to fit in with a user's preferences. Empty parking spaces can be detected by crowdsourcing, sensors installed in the car park, or through the analysis of transaction data and subsequent mathematical and stochastic processing.

The problem that the ever faster progress of digitalization faces is the fact that the change of location, i.e. actual travel, is of course still implemented using various physical means of transport within a physical infrastructure. An airline knows its load factor once the tickets have been sold, railway companies can estimate the number of passengers on long-distance routes by considering the validity periods of tickets, local transport companies know how many weekly, monthly or yearly passes they have sold – while the road is the only part of the transport infrastructure that

"I think that cities will quickly have to take action with regard to the use of big data for traffic management. Otherwise there is a risk that businesses that dominate the market will seize control of the development."

Ralph Klingebiel

has absolutely no idea who intends to use it. The reason for this uncertainty is that the wealth of data generated by the complex system of traffic with all its upstream and downstream processes is ultimately interpreted on the individual level: People make their own decisions and then show up at an unknown time in an unspecified location in the road network and exit it again just as arbitrarily.

This forces the municipalities – as the operators of the road network – to plan their provision of services and its control on the basis of statistical data from the past, relatively rudimentary information from traffic counters, cameras and induction loops, and selective measurements done by staff at particular road sections. In some cities, this data is enriched by capturing movement data from taxis and municipal vehicles. The common denominator of most of this data is that it represents a backward look. It only allows assessments and decisions to be made from hindsight: Cameras can only detect the congestion when it is already there. Traffic counters measure vehicles that have already passed by.

One way to counteract the deficit in information quality and quantity is to create a shared data platform that combines all static and dynamic information from the municipal and commercial worlds in real time. The cities' area of competence is the provision of urban infrastructure, while the companies know a lot about its actual use.

The combination of these data pools now makes many different applications possible. One of them is personalized and predictive traffic guidance and control in the city. Once a person wants to reach a destination at a certain time by a direct or indirect route, this intention is stored in the system and 'posted' on the network. This makes it possible to identify the location of potential bottlenecks and deficiencies in advance, inform people of alternatives and prepare the entire infrastructure for the load. These optimization solutions can be designed to serve a number of different purposes, such as supporting urban development or fostering environmental protection, for example by enriching the route information with recommendations on the choice of transport means.

This is just one example of how a city can use data and suitable algorithms to proactively manage the transport network and increase its efficiency. All the required data does already exist, be it at the car manufacturers, big Internet companies or providers of mobility services, or within search engines, navigation systems and on every single smartphone.

A major challenge to the implementation of such schemes in Germany is data privacy. There are two approaches to this. One is the complete anonymization of all data, which would significantly complicate communication with the user. Another conceivable solution would be to obtain a data privacy release in the form of an explicit user authorization. In the past, social media portals and other Internet services have shown that a lot of people are willing to give up some of their privacy, as long as the personal benefits – in this case, an optimized traffic flow – outbalance the loss of privacy. ›

Let the data speak

How the analysis of vehicle data that is already available today makes it possible to recognize an accumulation of atypical traffic events on specific sections of road and thus prevent accidents before they occur.

By Felix Draxler-Weber and Andreas Krause, 7th-semester students of Traffic Engineering, Department of Integrated Transport Planning and Road Traffic Engineering at Technical University Dresden

Preventing accidents helps reduce not only personal injuries and damage to property, but also the economic damage that results from the loss of time by other road users and similar side-effects of accidents. Even today, a significant amount of data is already being collected and stored in motor vehicles. However, this data is analyzed and used mostly locally. Moreover, the availability of the evaluated data or the analysis results is limited to temporary transmission and exclusively to the affected environment of the transmitting entity. This restriction prevents the use of the full potential of the data.

The vision for the future is to recognize atypical driving events such as abrupt movements of the steering wheel, emergency braking and/or obstacle avoidance maneuvers by the analysis of vehicle data in data centers. If a significant accumulation of atypical driving behavior is found to have occurred in an area yet to be defined, it may be assumed that there is a potential danger spot.

The basic data that is required for this can be supplied by the already widely deployed intelligent traffic systems and by the sensors typically installed in all new cars today, for example in the form of eCall, or of

"Our goal was to develop an idea for the use of big data to improve road safety, one which can be implemented in the relatively near future and on the basis of existing technology."

Felix Draxler-Weber (on the right)

systems for collecting acceleration and position data. Other sensors, for instance those that record the steering angle and the actuation of the pedals, are connected to every on-board computer. The transmission of this data, including position data, takes place via existing interfaces such as service ports and wireless connections (GSM module) or by uploading it into a smartphone app via Bluetooth. Here one should note that only very rapid transmission via GSM would provide immediate value to other road users.

Following transmission, the collected data is analyzed and aggregated to form a single score for comparability purposes. This process is carried out in data centers that need to be designed in a structured manner. In this case it is advisable to deploy one in each German state in order to guarantee fast and reliable processing. The calibration of the relevance test (i.e. whether a score actually indicates a hazard), must be determined in a beta test phase. In addition, a weighting of indicators should be carried out as part of this test phase in order to make the score more meaningful. Areas with an increased number of abnormal scores are likely to be hazard spots. This finding can be further substantiated by the consideration of supplementary external data such as weather conditions. In addition, the system allows for a classification of unusual events according to specific patterns, such as whether the event is sudden braking or jerky steering.

The combination of external and local data allows the system to draw concrete conclusions as to whether the accumulation of dangerous situations in that particular area is weather-related and thus short-term, or if it indicates the presence of a long-term hazard, such as sub-optimal road layout, unclear signage or similar. Real-time processing and analysis in the data center allows making these results available to other road users via a smartphone app or an on-board computer, enabling the timely issuing of warnings if several incidents are detected within a short period of time. In the case of long-term recurrence of specific incidents, recommendations or suitable signs are displayed on the routes. Software extensions can be implemented to display such messages also as part of existing applications. Another option is opened by cooperation projects such as the HERE map app, which can help the system to become accepted by a range of providers.

In the long run, the evaluated scores help the competent authorities to detect hazard areas before the emergence of accident black spots. To ensure this, the score calculation needs a high degree of quality and reliability, which depends largely on the relevance test and the quality and quantity of the sensor data. It may make sense to readjust the incoming indicators over time. Thanks to the better identification and elimination of irrelevant results this will lead to a further refinement of the results. To this end, a number of experiments are necessary in order to generate a large database in addition to the floating car data provided by the road users. Furthermore, to create a correspondingly high data density, it is advisable to schedule an initial start phase during which the results will not be passed on to the end user.

On the basis of a growing data pool and an ever higher level of accuracy of data and measurements, in the longer run it may be possible to predict accidents. The output of the results can follow the principle of accident maps. The significantly higher data density for atypical behavior and critical situations compared to the number of accidents that actually occur entails much greater data validity. In the short term, however, the focus is on improved user information. The real-time processing of the data allows the generation of a hazard map. This map would aggregate the information gathered from a large number of vehicles to point out hazard areas and draw attention to short-term events. Such advice should preferably be transmitted via permanently installed navigation systems or cooperation projects operated by leading automakers, for instance HERE. In a first step, these systems can be simply extended on the software side, enabling them to display the data sent back to the car.

The success of such a statistics-based prediction system is dependent partly on the relevant legislation, but in part also on the willingness of suppliers and car manufacturers to agree on a common standard. When it comes to the system's acceptance by the user, the issue of data protection plays a crucial role. This is why the data submitted must be anonymized so that no conclusions regarding the vehicle and/or its driver can be drawn. Furthermore, an honest information policy is recommended in order to increase acceptance.

The innovation described here can save lives, improve infrastructure and encourage drivers to be more attentive while behind the wheel. ■

"One risk that should not be underestimated when designing big-data applications in the field of mobility is the stimulus satiation of road users. That is why we have deliberately decided against a voice output for the warnings."

Andreas Krause

Essay ■ While in many regions this field is still mostly worked by solitary players, the Netherlands have already turned it into a team sport – the acquisition and use of ever larger data volumes for mobility optimization purposes. In this article, Kai Feldkamp, Program Director for Smart Mobility at Rijkswaterstaat, and Edoardo Felici, Project Manager at the Dutch National Data Warehouse for Traffic Information, describe their innovative strategy.

United data

Data is the material that fuels the development of smart mobility in the Netherlands. Better information enables us to make better choices in our daily travels – and enhances road safety and optimized accessibility of the various means of mobility. Likewise, automated driving depends on the availability of data from numerous sensors and other sources. These developments strongly impact the work of any road authority. In the Netherlands we aim to embrace the possibilities offered by smart mobility in order to meet the challenges of increasing mobility demand, rising accident numbers, and the profound wish to minimize the impact of mobility on the environment. To attain this goal, we need to invest heavily in data. This is why the Dutch road authorities took the initiative to set up the National Data Warehouse (NDW) for Traffic Information.

The common operational picture provided by this institution makes it possible to perform traffic management on a national scale and across provincial or regional borders. Also, it relieves service providers from the necessity to collect data from a variety of sources, which in turn facilitates private-sector innovations.

Further steps towards realizing the Dutch ambitions in the area of Smart Mobility include the foundation of additional organizations in the field of data, for example the Innovatiecentrale in Helmond. At this center for traffic innovation, national and international organizations can test their use cases in real-life traffic situations. In addition, the SimSmartMobility tool allows performing traffic simulations. Other interesting new institutions in this area are for instance the Rijkswaterstaat Datalab and the Delft integrated Travel and Transport Laboratory (DiTTLab) at Delft University of Technology.

In close collaboration between government bodies, market players and knowledge partners, we try to answer the question of how we can use data in order improve road safety, increase accessibility and minimize the impact of transport on our environment. The NDW, for example, set up several pilot projects to test the possible implementation of a Floating Car Data (FCD) system under real-life conditions: A data fusion pilot carried out in 2014 investigated the use of FCD as a replacement for induction loops, while the travel time pilot in Zuid-Holland in 2015 looked at the suitability of the data as a basis for providing route information. These two pilots furnished sufficient insights in the solutions and data quality of different providers for the NDW to tender national coverage of FCD on behalf of the road authorities in 2016.

Another important development in the field of data collection is harnessing the potential of the sensor information that is available from vehicles. Their on-board computer systems allow the collection of data from hundreds of different sensors. Unlocking the information that is already available within the vehicles opens up an incredible potential for asset managers and motorway operators to determine road quality, for instance the presence of potholes or slippery surfaces, or other road conditions such as the precise location of fog banks or heavy rainfall.

Germany, Austria and the Netherlands have joined forces in the

Water management center at Rijkswaterstaat: "The data future is bright – and quite a bit closer than we tend to think!"

International Cooperative ITS Corridor project. In the scope of this project, cars are to provide event-oriented data through a network of beacons, which operate on a specifically designed communication protocol (G5 Wifi-p). The aim is to jointly develop the required technical standards and overcome any legal hurdles on the way towards the large-scale roll-out of the system.

DiTTLab has been set up by the NDW as a research laboratory to investigate the possibilities of big-data warehousing. The historical database currently available at the NDW does not fully exploit the big-data potential offered by the ever growing number of sources that the NDW and other road authorities are collecting their data from. This is why at DiTTLab, a university research team collaborates with companies and government bodies to create an open-source, multi-scale and integrated environment for the assimilation of traffic data from all conceivable sources.

The ambition is to develop processes that can merge all relevant traffic and event data, thus enabling a better understanding of the origins and causes of delays. The next step will be the automatic recognition of congestions patterns within a data fusion engine. This process will provide the basis for a new generation of applications in the area of traffic prediction. It will also take our simulation capabilities to the next level since the resulting substantial increase in data relations will enable novel analyses and insights.

The Dutch approach towards the use of traffic data is based on embracing smart mobility as a way to improving road safety, increasing mobility accessibility and minimizing the impact on our environment. That is why the Netherlands are investing heavily in data. As more and more techniques are entering the arena of practical application, we may now be getting a glimpse of the true potential of the data. Our horizon keeps widening, for instance with the recently established Talking Traffic Partnership, which creates a traffic ecosystem in the field of connected and cooperative driving.

The key to further developments is close collaboration between public bodies like Rijkswaterstaat and other road authorities, private-sector businesses and knowledge partners such as universities. The most important conclusion for now is that there is still a lot of potential to be unlocked in the use of traffic data in big-data environments. The data future is bright – and quite a bit closer than we tend to think! ■

Kai Feldkamp, Program Director for Smart Mobility at Rijkswaterstaat

Edoardo Felici, Project Manager at the Dutch National Data Warehouse for Traffic Information

Discover tomorrow's mobility – with just one click

THE

Magazine for Intelligent Traffic Systems always provides you with the most exiting perspectives on mobility, but there is one downside to the print edition: not enough space to tell all the fascinating stories from the world of mobility. Our online magazine, of course, does not have any such limits. This is why we would like to invite you to drop by regularly and find out what's new. Even more information, views, reports and stories on all aspects of mobility are waiting for you at

↗ www.siemens.com/magazine/mobility/its.

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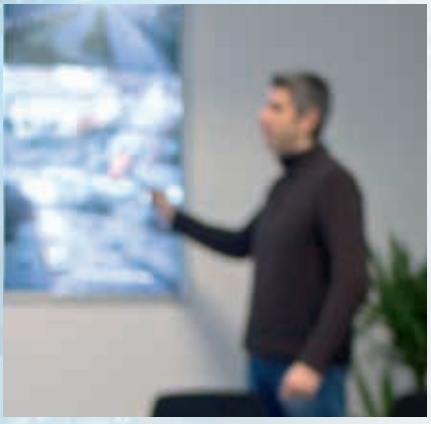


Clearing the air

Trucks, and the emissions they cause, often spell bad news for the urban environment. Yet municipalities need not resort to banning vehicles the moment emissions exceed the levels permitted by EU standards. In the German city of Potsdam, just south-west of Berlin, an environment-oriented traffic control system was installed based on a pollutant dispersion model. And for days with particularly high pollution levels, the clever tool, which integrates current traffic data with weather data, enables a whole range of additional measures. To learn more, go to:

↗ www.siemens.com/customer-magazine/en/home/mobility/clearing-the-air.html

Paths to power

Roads made of solar modules? Although at first glance the idea may seem crazy, on closer inspection it quickly becomes clear that there may be something really significant going on here. For example, France is equipping 1,000 km of roads with photovoltaic panels. And the concept is under intensive study in Germany too. The revolutionary technology could help meet the energy demand of millions of households, making it possible to shut down quite a few nuclear power plants. You will find the whole story at

↗ www.siemens.com/customer-magazine/en/home/mobility/paths-to-power.html.

"Most of us are online most of the day anyway. So why not use the web to engage in dialogue?"

Markus Schlitt, CEO Siemens ITS

Always prepared

Permanent availability is crucial, especially with systems-critical infrastructure. For those municipalities who want to be on the safe side, performance-based service contracts are a great option. Details at

↗ www.siemens.com/customer-magazine/en/home/mobility/always-prepared.html.

Anything but quiet in the South

Traffic technology in Angola ■ The country has set itself quite an ambitious goal: By leveraging its favorable location at the intersection of two trans-African transport corridors, Angola plans to become an important logistics hub for the continent. For this purpose, a road network of close to 14,000 km is under construction. The key to the future: innovative traffic control systems.

The story is somewhat reminiscent of the myth of the phoenix rising from its ashes. In the civil war, which lasted almost three decades from 1975 to 2002, a large part of Angola's road network was destroyed. Ten years later, the Ministry of Transportation was able to report that 3,325 km of road had already been paved or repaved and a further 10,400 km were under construction. In fact, despite the relative weakness of the country's infrastructure, Angola is one of very few African countries that do not currently face a significant infrastructure funding gap. Thanks to its large oil reserves, the republic on the south-west coast of Africa has the financial resources to address structural issues and rebuild is shattered infrastructure, expand the economy, modernize its cities and improve interurban connections.

The country's potential is sustained by the corresponding political will: Angola's president José Eduardo dos Santos emphasizes that rehabilitating and expanding the nation's ports, highways and railways will be essential to transforming the country into a "logistical hub of considerable importance in Southern Africa". The geographical situation is favorable: Angola is part of two major trans-African transport corridors, with the first running from north to south, linking Tripoli in Libya with Cape Town in South Africa, and the second running from east to west, linking Beira in Mozambique with Lobito in Angola.

At present, most of the freight in Angola is transported by road on trucks. Firstly because there are no inland waterways, and secondly because the few existing railway lines

have just started operation and are not yet interconnected. For people transport, trains are not really an option since service is rather irregular. In the urban context, people are mostly using the private car to get around. Those who cannot afford a car, make us of the so-called Candongas, nine-seater vans operating in a system that resembles a public transport scheme. Yet, all in all, the country is still lagging behind in terms of multimodal transport by global standards. This is going to change, however. The necessary investments in all modes have already been planned, but their start had to be delayed due to the decline in crude oil prices.

In any case, the government sees intelligent transport systems (ITS) as the key to the future: While, with 38 cars per 1,000 inhabitants, car ownership levels are still comparatively low, the rapid growth in passenger car numbers by about 10 percent every year puts huge pressures on the existing urban traffic infrastructure. The urban road network, which has already been improved in many areas, has only very limited expansion options since the cities have generally reached a relevant size by now.

This is why current plans are focusing on the implementation of a wide range of ITS-based solutions, for instance local signal actuation and dynamic signal plans, reversible-direction lanes, and also traffic information systems for route selection and deflection of traffic flows. Siemens Mobility is cooperating with local universities to investigate the deployment of these and other solutions for traffic management. In the field of interurban transport, the focus is on tolling and enforcement systems because, mainly around major cities, circular roads have been or are being built.

In Angola there is a huge backlog in terms of using innovative transport technologies. The only major project of this kind to date has been implemented in Angola's capital Luanda, where 220 ST controllers from Siemens have been in use since soon after the turn of the century.

After a somewhat half-hearted attempt at ITS implementation with the installation of low-tech controllers from China in Kilamba Kiaxi, the authorities now have definitely adopted the path towards Smart Mobility. About 680 km to the east-southeast of Luanda, in Malanje, capital of the province of the same name, a traffic management system including four solar-powered Sitraffic sX controllers was put into operation last year.

Trans-African transport corridors: Angola is part of both the north-south route from Tripoli in Libya to Cape Town in South Africa, and the east-west route from Beira in Mozambique to Lobito

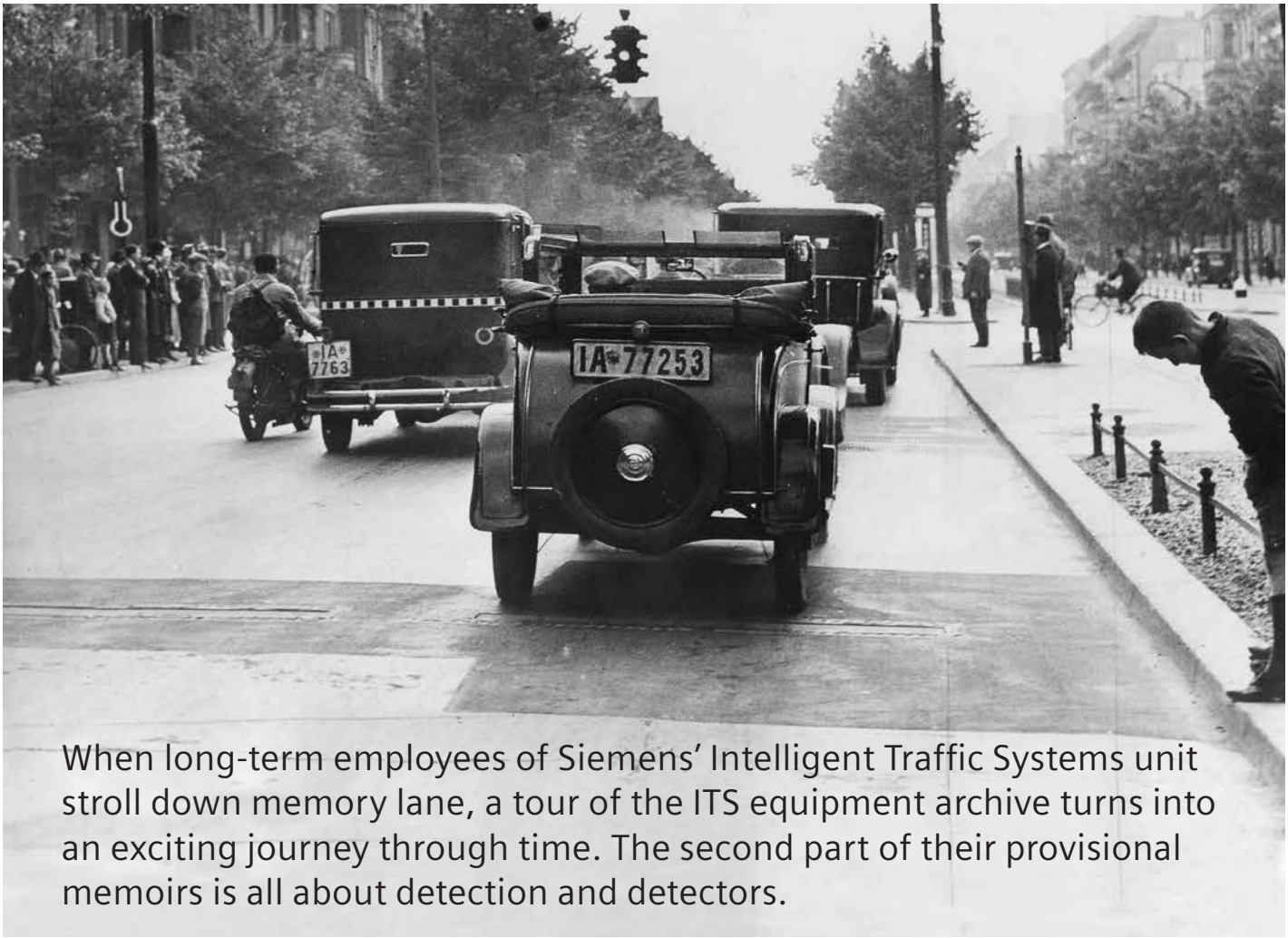
Ultimately, this future-oriented option has been chosen for three main reasons: Firstly, thanks to its independent power supply, the installed solution defies the uncertainties of the frequently overtaxed power grid. Secondly, its numerous advantages in terms of user-friendliness, flexibility, connectivity and efficiency provide exactly the kind of long-term serviceability and sustainability that the country needs to achieve its aspirations for the future. And thirdly, the choice has been informed by the unique traffic engineering consulting services offered in addition. The next milestones on Angola's rapid journey from the past directly into the future are already in sight: Besides an expansion of the system deployed in Malanje, the agenda includes two new projects to be implemented in Benguela and Lobito.

The all-inclusive no-worries service provided by Siemens Mobility is the result of perfectly coordinated team efforts. The Luanda-based staff as well as the local installation and maintenance partners are managed from the Siemens offices in Amadora, Portugal. The Portuguese engineering team also provides support during the tendering phase for all kinds of electrical, civil engineering and traffic technology issues. Once the contract has been awarded and the technical solution defined, the team creates a detailed description of the project including CAD drawings so that the partners' supervisors can efficiently manage the work on site and the physical deployment of all components. When 80 to 90 percent of those works have been completed, a team specializing in the technologies deployed is sent to the site to support the commissioning process – and to provide training to the teams of the partners and/or the end customer.

The training enables the local teams to run first-level maintenance and to assess any technical issue with the necessary level of accuracy to allow remote problem solving by the team in Amadora. This is also why, for most projects in Angola, it is standard practice to equip the controllers with remote maintenance connectivity. "This is one of the many respects in which our technology makes a difference and scores with very practical added value," says Sandra Pimentel from Siemens Portugal, and goes on to offer a glimpse into the future: "As soon as our installed base in Angola has reached a certain extent, we will build our own local competence team. Given the current growth perspectives, the time will come rather sooner than later." ■

Great discoveries in detection

History of traffic engineering, part 2



When long-term employees of Siemens' Intelligent Traffic Systems unit stroll down memory lane, a tour of the ITS equipment archive turns into an exciting journey through time. The second part of their provisional memoirs is all about detection and detectors.

1930s to 1950s

Traffic detection started out in its mechanical version. About an average human lifespan ago, in the 1930s, the first vehicle counting systems were installed to collect the required data for traffic-actuated signal switching. The first detectors came in the form of so-called contact thresholds that were installed on a baseplate embedded in the road surface. The pressure that the weight of the vehicles exercised on the construction actuated a conventional switch, which then sent the corresponding impulse to the signal controller.

As you would expect, the deployment and operation of these systems was laborious and costly: Installation involved major civil works and reliable operation required extensive maintenance and frequent replacement of certain parts susceptible to wear and damage. Still, for several decades this functional layout remained the solution of choice – at least in Europe, where those detectors that had survived the Second World War typically remained in use well into the 1950s.

This contrasts with the US, where technological development was already one step ahead at the time, with the deployment of contactless detectors – even if the first systems were based on a method that makes us chuckle today: The signal masts were equipped with directional microphones that captured the noise emitted by approaching cars and converted the acoustic signal into input for the signal switch. Drivers wanting

to make sure that the system acknowledged their presence at the intersection had to honk their horn.

1960s to 1990s

In Europe, contactless traffic detection started to be widely used only in the 1960s with the successful introduction of induction loop technology for electromagnetic detection of passing vehicles. The technical principle of modern induction loops is basically still the same, but their processing units are now equipped with microprocessors for much higher performance and a substantially extended lifetime. The reason: The embedded chips are able to compensate for the aging-related shifts in frequency that used to cause problems in earlier systems.

The induction loop is still the most widely used detection system today, a fact that is primarily due to its high level of precision. Over time, however, a whole range of innovative technologies have been introduced that offer unique advantages for specific applications. In the 1980s, for instance, the first passive infrared detectors were deployed, whose low power consumption has fueled their success on the international market.

In the 1990s, researches started to experiment with ultrasound technologies for detection purposes. For quite some time, their practical application seemed to be doomed by the sheer size of the components – until the Heimdall family set out to conquer the market. The radar detectors of this range come closest to the induction loop in terms of precision. In addition, they score with a high level of flexibility. Towards the end of the 1990s, the detection market saw the introduction of video systems, which are today considered the most cost-effective detection option for use on large intersections.

2000s and 2010s

The new century started with a quick succession of new technologies in this area. The magnetic-field detector Sitraffic Wimag, for instance, opens up a number of most welcome choices for traffic planners: Equipped for wireless communication, the system does not require any cabling works and can be installed within minutes. What is more, the distance of the detector from the controller plays as little a role as the type of road surface. The selection of the installation site can thus be based purely on traffic-engineering criteria and is not restricted by cost considerations.

A quantum leap taking traffic data recording beyond local detection has been achieved by travel-time measurement technologies, which are especially useful for further optimizing complex traffic management systems because they can deliver section-related information. In the past, such information had to be extrapolated from measurements taken at selected points, using estimation methods and models. Of course, with this procedure, there was no way of ruling out inaccuracies in the representation of reality. Such detours can now be avoided thanks to some new high-tech solutions that are able to collect the desired data directly, permitting a much more accurate calculation of congestion levels and disruptions.

This feature is offered not only by the magnetic-field detector Sitraffic Wimag, but also by innovative Bluetooth scanners: They read the Bluetooth IDs of the wireless devices that today are present in many vehicles, and are then able to re-identify the devices correctly at other scanning stations. The user-friendly Sicore camera system scores with especially precise results – thanks to its Automated Number Plate Recognition (APNR) function that achieves detection rates of more than 95 percent for vehicles travelling at speeds of up to 200 km/h and more. ■

(Page 26) Traffic detection in black and white: As early as the first half of the 1930s, Berlin's streets were equipped with the first Siemens & Halske contact thresholds.

(Page 27) Large variety, high efficiency: Today's Siemens portfolio comprises the right system for any application. The passive infrared detectors developed in the 1980s are now available in a wide range of versions. Over time, other detection technologies have been added, for example the radar detectors of the Heimdall family (top right) and the user-friendly Sicore camera system (top left)

"The paradigm shift is underway"

Interview ■ Simone Köhler, Head of Marketing for Innovative Technologies at Mobility Management at Siemens AG, identifies the key motives, necessary prerequisites and adequate tools for the transformation from automobile to intermodal society.

Ms. Köhler, until recently, most people in industrialized countries would have subscribed to the equation "private car = mobility" also in its reverse form: "mobility = private car". Does this still apply today?
Many people see this pair of equations as an obvious and apparently simple solution. But that's exactly what causes high, and sometimes extreme, traffic loads in many densely populated areas. The resulting congestion, in turn, puts an end to our theoretically limitless automotive freedom. This is why we must find ways to make public transport systems and innovative sharing schemes so attractive that mobility demand will be distributed more evenly across the different transport modes. This is the only approach that will allow us to make urban mobility faster again while minimizing the ecologic footprint of transport.

So what should be the mobility equation of the future?
For instance: "Mobility = demand-based door-to-door transport" or: "Mobility = Mobility as a Service", MaaS for short, which is the umbrella term for suitable schemes aimed at making intermodal travel as easy and efficient as possible.

Is this paradigm shift already well underway?
Yes, it is, but not all the world's regions are advancing at quite the same pace. In Europe, and in Germany in particular, there is a very well developed public transport network, and the availability of car- and bike-sharing schemes has already reached a relatively high level. This shows that there are already valid alternatives to private car use. In the US, the development has also made noticeable progress. Over there, private players in particular are driving the transformation, for instance through various ride-selling schemes. In Asia, such alternative transport services are only just starting out, but the development is breathtaking. In all this, social media are playing an important role. Moreover, the local legal framework has a huge impact on how the players position themselves. There is one thing, however, that certainly applies all over the world: Travelers anywhere can expect to have an even easier time combining different transport modes.

In Germany too, the trend towards "Mobility as a Service" used to be primarily driven by start-up companies such as moovit or Citymapper. Is it actually in the interest of public transport providers, for instance, when all of a sudden various new players are muscling in as intermediaries between their own mobility services and the travelers?
For historic reasons, in most cities, the public transport (PT) systems form the backbone of urban transport and clearly enjoy the passengers' trust. This is a strength that PT operators can – and increasingly do – leverage. This trend is going to be showcased impressively also at the Global Public Transport Summit in Montreal in May 2017. New mobility service providers are not only new competitors, but also potential partners for the deployment of new business models. PT providers can also benefit from the added value offered by digital solutions in order to study the needs of their customers in more detail and adapt their services accordingly. PT companies now have the opportunity to position themselves as holistic mobility providers – beyond their traditional spheres of rail and bus transport.

With SiMobility, Siemens is targeting public transport companies by offering a whole range of smart IT-based solutions that allow the integration of all kinds of transport services of conventional as well as complementary providers. Could you explain the system in a few sentences?
The SiMobility modules bring benefits for all involved: the users, the providers and the operators of mobility services. SiMobility tools provide the travelers with exactly the help that they need at each moment: from intermodal route planning prior to setting out, including assistance with booking and payment processes, right up to the provision of up-to-the-minute information while traveling. And the operators benefit too – in the short term from efficient tools for managing transport services and partners, and in the long term from a wealth of data as the basis for optimizing their transport offers.

Does this mean that in the future, seamless mobility will be as easy

to use for travelers as seamless telephony is already today?
Actually, this is an analogy that is often drawn when talking about "Mobility as a Service". A conceivable solution for the future is the creation of needs-based mobility packages – comparable to telephone flat rates and interregional roaming solutions – that would, for example, offer different sets of services to professionals and to students. And our SiMobility JustGo is an innovative tool for the implementation of usage-based payment schemes with which the traveler pays only those (transport) services actually used – a promising vision for the mobility of the future.

Are there already real-life deployments of SiMobility?
Yes, there are. Let me give you two examples: On the basis of our SiMobility Connect platform, we are currently deploying the Dubai Integrated Mobility Platform (DIMP) on behalf of RTA Dubai. This is one of the first intermodal mobility solutions in the region. The new sales systems of Swiss South-Eastern Railway goes one step further and combines the intermodal concept with Be-in/Be-out ticketing for PT: SiMobility JustGo enables contactless recording of transport service use via an app on the user's smartphone. The user is billed exactly for the distance traveled. This is another example for a key aspect of our Mobility-as-a-Service philosophy: We do not only want to enable the seamless integration of various transport modes, but also make them as easy to use as possible, and minimize any barriers that make switching between modes cumbersome.

Biography

- Born in 1974 in Heilbronn
- 1994-1996: Trained as an aviation administrator at Lufthansa AG in Cologne, Stuttgart, Frankfurt/Main, Nairobi
- 1996-2001: Studied business administration at Johann Wolfgang Goethe University in Frankfurt/Main; degree in business administration
- 1996-1998: Marketing Coordinator for sales in Europe and Africa, Lufthansa Cargo AG
- 1998-2000: Pricing Executive, Lufthansa Cargo AG
- 2000-2001: Consultant and Project Manager at Integra GmbH in Bad Homburg and Berlin
- 2002-2010: Various management tasks in the field of consulting at Siemens Business Services and Siemens IT Solutions and Services
- 2010-2012: Principal Consultant at Siemens Mobility Consulting
- 2012-2014: Head of Sales resp. Partner Management & Marketing at Road & City Mobility IT
- Since 2016: Head of Marketing for Innovative Technologies at Mobility Management

Besides the successful development of efficient solutions for Mobility as a Service, you are also involved in the work of various international organizations aimed at creating optimum conditions for the implementation of MaaS concepts. What are your main goals in this context?
It goes without saying that MaaS systems will only work if different transport options and the required data as well as certain standards are available. This is why we, as a specialist for all areas of mobility, have made it one of our tasks to actively drive and practically support the development of the necessary foundations in this field, for instance in the scope of the MaaS Alliance of the European ERTICO network and as a partner of the US-American City Innovate Foundation.

Ms. Köhler, thank you very much for the interview. ■

New

INTER
JECTION

Race of two worlds

Professor Dr. Stefan Bratzel, Director of the Center of Automotive Management (CAM) in Bergisch Gladbach, Germany, speaks about the new rules of the (auto-)mobility game.

Car manufacturers and big data players are about to engage in a race for who will be the one to define the future rules of (auto-)mobility. Up to now, a key rule of the game was that the prize would go to whoever succeeded in selling the customers exactly the right hardware in the form of attractive vehicles. In the future, the prevailing technological and social trends in the areas of digitalization, autonomous vehicles and mobility-on-demand will favor those who are able to provide software-based platforms offering (mobility) services tailored exactly to the customers' needs.

In this respect, the global automotive industry has disappointingly little to show to date. According to an empirical CAM study published at the end of October 2016, very few car manufacturers are already intensively exploring the provision of mobility services. Only Daimler and BMW are among the high performers, while 14 out of 19 OEMs with global reach have not yet really started any efforts in this field. On the other hand, the ability of the big data players to compete effectively in the future arena of mobility services must not be underestimated. With a market capitalization of roughly €30 respectively €50 billion, start-up companies such as Didi Chuxing or Uber have already overtaken the majority of automotive companies. Apple, the world's most valuable company, holds shares in several mobility service providers, as do Google (Alphabet), Alibaba and Tencent.

As I see it, car manufacturers will have to redefine their company structure and culture if they want to hold their ground in the midst of the imminent disruptive transformation. For this, they will need to operate the 'hardware world' and the 'digital world' as essentially separate organizations within the company, because it will be difficult to integrate the different cultures and mindsets of the two groups of employees in a single organization based on legacy hierarchies and processes. Their new digital world must be able to act quickly, radically and independently and, if need be, not let itself be limited by considerations for the old, hardware-oriented business model. ■

Top demonstrations in Down Under

Melbourne ■ "Enhancing Liveable Cities and Communities" was the official headline for the ITS World Congress 2016, hosted by ITS Australia on October 10 to 14 at the Melbourne Convention and Exhibition Centre. The choice of venue could hardly have been better since the capital of the Australian state of Victoria is said to be one of the world's most liveable cities. Among the key topics at the event: automated and connected vehicles. This was also the reason why one focus of visitor interest was on the outdoor areas, where Siemens Mobility presented its latest products and systems for Vehicle2X communication in live demonstrations. But also the company's indoor exhibition drew a large number of high-level visitors. The market for intelligent transport systems in Australia is still relatively young, but promises to pick up considerable speed in the future.

In the focus in Dubai: Siemens' innovative, sensor-based Smart Parking Solutions

New impulses set in the Middle East

Dubai ■ Over the past years, the Gulf Traffic Exhibition and Conference has continually strengthened its position as the top traffic engineering event for the entire Gulf region. And the latest edition on November 13 to 15, 2016 at the Dubai International Convention and Exhibition Centre was no exception, as proven by the new record in visitor numbers flocking to the Siemens ITS booth. Key visitor magnets included not only the smart Sitraffic sX traffic controller and the new energy-saving miracle among signal heads, Silux LP, but also the easy-to-operate Sicore camera system with automated number plate recognition function (APNR) and the innovative sensor-based Smart Parking Solutions.

Directory

Ample additional information on the different topics presented in this issue is available on the Internet, for instance here:

p. 06: "A very pragmatic generation"
↗ www.2bahead.com/en/trend-analysis/trend-analysis/detail/trendanalyse-warum-selbstfahrende-autos-kein-lenkrad-haben-werden/

p. 14: Between science and fiction
↗ https://tu-dresden.de/bu/verkehr/ivs/ivst/die-professur/inhaber-in

p. 20: United data
↗ www.rijkswaterstaat.nl/english/index.aspx

p. 28: "The paradigm shift is already underway"
↗ www.mobility.siemens.com/mobility/global/en/integrated-mobility/Pages/integrated-mobility.aspx

Highlights

Remain always abreast of developments – by regularly clicking in to our constantly updated online customer magazine.
↗ www.siemens.com/magazine/mobility/its

Soon the online version will feature new and exciting reports on the following topics:

Mobility patterns of the next generation

More facts and ideas about tomorrow's road traffic: What will the cars of the future look like? What benefits will intelligent detectors bring for road safety and traffic efficiency? And last but not least: What innovative options are available to make goods transport more environment-friendly?

Ideally networked

Elements that belong together are now growing together step by step. Road and rail transport are progressively merging into one integrated mobility system. Hence it is a must for experts on motorized individual travel to keep abreast of developments in public transport. For instance: What new opportunities do modern automation solutions offer when it comes to making rail transport more competitive?

The shared car

What new attitude towards mobility keeps driving the enormous growth rates of modern car-sharing schemes? And what changes could the shared-car concept provoke in our current transport systems?

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