Networked city

The city of Hamburg and Deutsche Telekom are equipping around 11,000 inner city parking spaces with sensors that identify available spaces for drivers and, if desired, can navigate the vehicle to the open parking spot. All the sensors should be installed by the end of 2019.

Berlin, Paris, Cologne, or Karlsruhe: Cities of all sizes are claiming to be smart cities. However, projects worldwide still largely consist of individual solutions. The patchwork, however, could soon be combined into one single system in some cities. Only then will the digitization of the urban ecosystem truly unfold its advantages. What is urgently needed: Three million people are bustling into the cities every week. This poses huge challenges to urban regions. How to prevent a total traffic gridlock or bring pollution under control? The smart city aims to solve such problems.

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It's ten minutes in Frankfurt. Nine in Berlin or Cologne. Motorists in cities looking for a parking space need to be patient – even if they opt for using a parking garage, where hunting down a spot still takes an average of six minutes. This means that motorists in Germany spend around 41 hours per year searching for parking spaces, according to Inrix, a provider of data-based traffic analysis. This costs time, is expensive, and pollutes the air in inner cities, which are already plagued by too much exhaust. Taking an economic point of view, the Inrix study states that every single motorist spends 900 euros per year searching for parking. This totals around 40 billion euros for all of Germany.

INTELLIGENT PARKING MANAGEMENT

Smart parking solutions that will help reduce traffic and exhaust emissions in city centers are, therefore, high on the agendas of city councils for smart city projects. For years now, cities have tried to lure their visitors through parking guidance systems as quickly as possible to the nearest parking garage or direct them to park and ride services outside the cities. But the stream of motorists wanting the best spot right next to the shopping zone has not wavered. According to a study by Roland Berger Strategy Consultants, motorists searching for parking still make up around 30 percent of city traffic.

Drivers in Hamburg can find parking more easily with the "Park and Joy" app. Sensors embedded in the ground register whether a parking spot is occupied or available.

Hamburg has been breaking new ground since the beginning of 2018. By the end of 2019, the Hanseatic city, aided by Deutsche Telekom, will be equipped with around 11,000 inner city parking spaces that have sensors. The sensors are embedded in the ground and use infrared radiation and magnetic fields to detect whether a vehicle is above them. Free spaces are reported to the "Park and Joy" app, which displays and navigates users to open parking. Users can pay for parking using the app and even extend the parking time at any time from their smartphones. Plus, anyone who leaves their parking space earlier than planned will be refunded money for any unused parking time.

According to a preliminary study for the smart city project, every search for parking in the city of Hamburg costs drivers 1.35 euros and causes 1.3 kilograms of carbon dioxide. "We have to start using parking spaces more intelligently than before. The app makes finding parking easier for drivers. It reduces search traffic and the burden on our roads," explains Hamburg's State Council Bernd Krösser at the start of the project in January 2018. In a later phase of the project, the Hamburg authorities want to combine searching for a parking space with the continuation of travel by bus, train, or rental bike.

NARROWBAND IOT – A KEY TECHNOLOGY

Park and Joy is a good example of how new technologies are enabling smart solutions for cities. Deutsche Telekom uses sensors for smart parking that transmit the collected information using the NarrowBand IoT (NBIoT) radio standard. The sensors are especially advantageous for broad use: They are durable and consume extremely little energy. One battery, for example, can last up to eight years, which keeps the maintenance effort for the city of Hamburg manageable. Deutsche Telekom wants to work with authorities from other cities like Dortmund, Duisburg, Darmstadt, and Bonn to install during this year the same extensive network of sensors being tested for the first time in Hamburg.

On the occasion of the UN Climate Change Conference in November 2017, the go-ahead for smart city projects was also given in Bonn. It starts with the intelligent networking
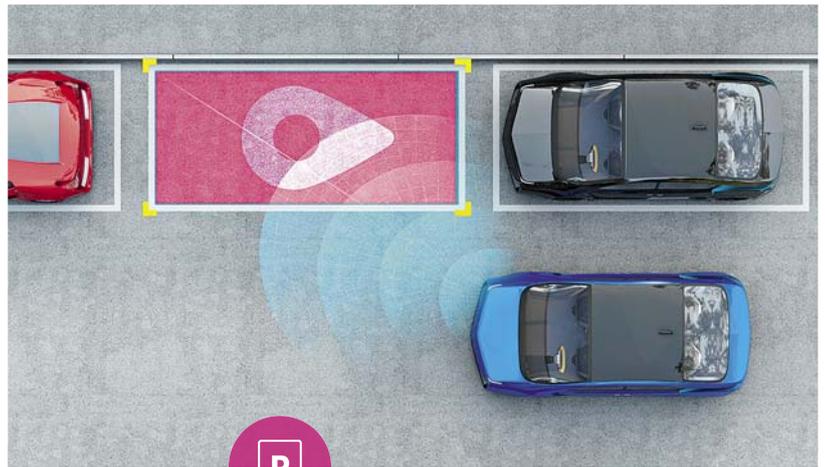
> ## "The 'Park and Joy' app reduces search traffic and the burden on our roads."
>
> **BERND KRÖSSER,**
> State Councillor of the Interior, Hamburg

The city of Bonn launched its smart city projects by intelligently interconnecting streetlights, dumpsters and air quality monitoring stations.

of street lamps, dumpsters, and the measurement of air quality. "This is an important step in the Digital Bonn Initiative," says Ashok Sridharan, Mayor of the city. "In doing so, we are strengthening Bonn as a city committed to innovation and environmental protection." To start, Deutsche Telekom is networking the first street lamps and recycling containers in Bonn's city center. Intelligent sensors and NBIoT radio technology will be used like in Hamburg. The street lamps are dimmable, darken using motion detectors, and automatically turn on and off. In addition, public utilities proactively receive a message when a bulb is damaged or needs to be replaced. The networked street lamps will save up to 60 percent of operating costs. The sensors in the recycling containers measure the level so that municipal waste management only needs to empty the containers once they are full. And overflowing containers can now also direct waste management to make extra trips. On the other hand, waste management companies save trips to containers that are still half empty.

Telekom also provides software in Bonn that is used to collect data on air quality. A street lamp sensor measures various environmental data and periodically sends it to software in the cloud for analysis. Deutsche Telekom has already installed similar solutions in 18 European cities in ten countries. Citizens and visitors in the Greek port city of Patras, for example, use smart parking spaces, like in Hamburg, and benefit from networked lighting solutions.

EUROPE'S CITIES ARE BECOMING SMART

In the Czech Republic, T-Mobile is a strategic partner in a project that collects and analyzes data from mobile networks through traffic monitoring. This allows the ability to draw conclusions about traffic flows. In the Czech Republic, the project has analyzed visits to 40 tourist hotspots; the police, fire departments, and rescue teams are using the resulting information to improve their crisis planning for major events.

The city of Bucharest is using a smart city solution specifically for the visitor management of Tineretului Park. The city wishes to offer visitors better services before and during their visit to the park. To this end, it relies on smart parking, free internet hotspots, more security, and intelligent lighting. These standalone solutions are managed using a smart city platform. All data converges here, where it is aggregated and displayed on a Deutsche Telekom dashboard. This overview of the processes in and around the park facilitates and improves the operation of the park in the capital of Romania.

In Croatia, Deutsche Telekom subsidiary Hrvatski Telekom has initiated the largest pilot project in history to create a charging network for electric vehicles. It consists of 101 charging stations in 70 cities. The solution combines the necessary infrastructure with software that allows drivers of electric vehicles to find and reserve charging stations and pay for them after charging. The cloud-based platform delivers the information in real time.

In Dubrovnik, Croatia (top picture) and Prague, Czech Republic, smart city projects have improved the use of electric vehicles and the deployment of emergency responders for major events

In Bucharest, a smart city platform handlies lighting, parking and visitor management at Tineretului Park.

CENTRAL SMART CITY PLATFORMS

The solutions in the Czech Republic, Romania, and Croatia show – albeit still on a small scale – that the smart city will only reach its full potential once the individual solutions converge in a single cloud platform where they can be managed centrally. However, according to Ralf Nejedl, Senior Vice President of B2B, previous experiences with cross-border smart city projects show that "in some locations, insufficient coordination between the departments of a city administration, as well as difficulties in cooperation between the public and private sector persist. These aspects are, however, essential to the successful implementation of a smart city project." In addition, there is usually a lack of proper smart city strategy and a coherent plan to digitize the services.
To increase the number of leading smart cities by international comparison, German cities especially need to have closer cooperation and find a holistic approach, recommends Harald A. Summa, Managing Director of eco, the Association of the Internet Industry. To accomplish this, the cities would have to find a coherent strategy that integrates many different smart city services.

"This is best achieved with a cross-segment smart city platform that links all of the services," says Summa. This is confirmed by market researchers from IDC. In a recent paper on the future of smart cities, they forecast that as many as 30 percent of major global cities this year will develop a smart city IoT platform strategy to connect devices for collecting and managing data from various city domains and technology providers.

However, manufacturer-specific protocols and data formats would need to be avoided when setting up such platforms, warns Ingo Hofacker, IoT expert at T-Systems: "An IP-based, open, scalable, and expandable horizontal smart city management platform would allow government agencies, citizens, and suppliers to connect and integrate objects and applications across the city." To accomplish this, Deutsche Telekom is relying on a multi-IoT service platform. Using a web-based application of this kind, municipalities monitor and control urban infrastructure from any device. It also lets residents track how much electricity the new street lighting saves, how the air quality has improved in the city center, or where there is free parking space by allowing anyone to access the processed data online.

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www.t-systems.com/perspectives/smart-city
www.t-systems.com/references/park-and-joy

900
euros p.a.

Drivers impose nearly a thousand euros in costs every year by just hunting for parking spaces in German city centers.

Source: Verkehrsdaten-analyse Inrix Europe GmbH

INTERVIEW

Mr. Zimmermann, intelligent street lights, a citywide broadband network for everyone, tablets in public schools, and a paperless city council. What are your smart city plans for 2018?
We will be installing a citywide high-speed Wi-Fi network throughout the entire metropolitan area. Every resident and visitor in our city will be able to surf the internet for free.

Speaking of free... Monheim am Rhein has the money to offer services to its residents free of charge. Will this continue into the future?
We plan to develop even more free services as part of our smart city activities. For example, a city bicycle network will be ready this year. Residents will be able to borrow standard bicycles as well as e-bikes, transport bikes, and children's bicycles. The details are still being worked out. Our goal, however, is to be able to offer this service to residents for about five hours per week at no charge.

Is this service part of a larger project?
Yes. We want to provide every resident in the city with a Monheim Pass. These cards will be sent out to everyone automatically with no need to request one. Residents will be able to use their card to borrow bicycles and access the city library. The ultimate goal is for residents to be able to manage all of their city services on the go by using this card. In this respect, the pass can also function as a debit card.

And what about plans for 2019?
We will continue towards becoming a smart city. And we have plenty of ideas to keep us busy. I don't have any specifics to share currently. Generally, though, we will be focusing on parks, traffic management, and other services that residents will be able to take advantage of using their Monheim Pass.

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smart-city-monheim

Smart mayor, smart city

In 2009, he was elected as the youngest mayor in the history of North Rhine-Westphalia. Five years later, he was re-elected with 94.64 percent of the vote. Today, Daniel Zimmermann, the 35-year-old Mayor of Monheim am Rhein, has managed to significantly reduce trade taxes while increasing city revenue tenfold. The city maintains cash reserves of more than 100 million euros, although it has been investing heavily in smart city projects, for example.

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