

THINKING cities

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Launch issue
December 2013

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Tomorrow today

Kevin Borrás and Sylvain Haon welcome you to *Thinking Cities*

Never before have urban and regional planning authorities had so much information technology and data at their disposal. From smart payment to intelligent transportation systems; from passenger-generated trip information to Big Data, the keys to the truly Thinking City are now at the fingertips of those responsible for the design, planning and integration of our urban spaces and regions.

However, it is not only data and ICT that are unique to the 21st century and any call for a redefinition may influence how we live and work in the thinking city of the future.

We are in the middle of an evolution in urban planning and in particular transport planning. We are now planning for people. Sustainable transport planning is planning for people but it is not always obvious when and how we have done this. When it comes to transport management, we have to now think in terms of managing the movement of people and goods, not only in terms of vehicles.

This means that people should be the focus and at the centre of how we think about the city. We have come to something of a turning point enabled by ICT and data, something which today is eminently possible but was much more difficult in the past. So the Thinking City is the city centred around people and the services supporting them.

We are also at a defining time for cities as we are, for the first time for a century (if we believe the oracles), at the beginning of the introduction of a new vehicle propulsion technology with the progressive deployment of electric vehicles. These vehicles have a key role to play for the integration between sectors, in particular for integrating transport and energy in the city for greater efficiency and better control of the impact these human activities have on the environment.

ELECTRIC CHARGE

We are seeing, concurrently, a diversification of vehicles, the significant growth of the bicycle market and the explosion of the sales of electric vehicles – the Tesla Model S was the biggest-selling car in Norway in September, the first time an electric vehicle has headed the sales chart in Europe, but

even this was overtaken by another electric vehicle, the Nissan Leaf, in October. We are certainly living in changing, and charging, times.

Finally, it is about planning transport in the city and thinking laterally across all sectors to better address the health, environment, economic and financial challenges. Integrating transport is still a challenge, conversely and even more acute one with the possibilities offered by big data and ICT and the need to integrate energy and transport with electric vehicles. It is also a necessity as it is our only way to correctly address the great challenges we are facing: environmental challenges, climate change, the financial crisis, the demographic changes, the population explosion in some parts of the world, the complete opposite in others. Integrating transport planning with other sectors is also a smart way to better integrate urban freight into the urban environment.

Thinking Cities will chart the progress, growth, and implementation of policy and infrastructure of those cities and regions. Academics, policy makers, public servants and industrial and political leaders will provide examples of the latest thinking in social policy, mobility, sustainability and energy.

Thinking Cities will be eclectic in focus, wide in appeal and both regional and global in our outlook. Our goal is to work with cities, regions and their partners from industry, research and the associations, to make sense of these changes. *Thinking Cities* is about exchanging ideas to give a sense of reality to the concept of the Smart City, not just the sustainable city of tomorrow, but the sustainable city of today.

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only 10%
of the
earth's
population
lived in
cities. By
2010 that
figure had
soared
to 53%
and it's
estimated
that by
2050 more
than 75%
of the
world's
citizens
will be
city-
dwellers**



Kevin Borrás, Editor,
Thinking Cities



Sylvain Haon,
Secretary General, Polis

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THINKING
Highways

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Launch issue
December 2013



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Cityview

The THINKING CITIES Interviews with Gabe Klein (Chicago) and Jilmar Tatto (Sao Paulo)

Senior transport officials from two of the world's most forward-thinking cities discuss their plans for the future and how they are addressing the issues that matter most to their citizens – mobility and information >>

Cityview



"I often talk about how our authority is the department of transportation and public space – it feels like what we are trying to do is balance the needs of all the different users of the public space" *See page 10*

MISSION ACCOMPLISHED

Before stepping down from his position as Transportation Commissioner, Gabe Klein transformed the City of Chicago into a “customer-focused agency that is a national leader in technology, multi-modal innovation and sustainable design that consistently makes a positive impact on the quality of life” of its 2.6m residents. He tells **Kevin Borras** how he did it

So, what do we know? An entrepreneurial businessman, well-known for his involvement in some truly innovative transportation-related start-ups, is helicoptered in from his position as director of Washington, DC’s department of transportation with the simple remit of transforming CDOT (Chicago Department of Transportation) and then two-and-a-half years and a whole raft of inspirational projects later he’s gone, off to start his own technology company. If life really is all about what you leave behind, then 42-year old Gabe Klein has building up a hugely impressive legacy. Before leaving office, then-Commissioner Klein spoke to *Thinking Cities* about just what makes a city smart, the innovative schemes he has overseen and how some of the city’s roads are able to digest pollution.

What, I wondered, was his definition of “smart” when it’s applied to a city? Is it the infrastructure? The intrinsic culture? Its citizens? Does it come down to budget? According to Klein it is, to a certain extent, based on perception.

“Do young entrepreneurs consider Chicago to be smart? Do businesses looking at relocating to Chicago consider it to be a smart city? What about the people that live here? Do they think they are living in a smart city?” he asks, partially rhetorically. “In some ways the sign of a smart city is one that flows well and works properly based on technology that’s running in the background. Is your traffic signal system optimised? Is your digital signage reliable and clearly understood? Are their easy applications to use to figure out which mode of transportation you need to take into the office today? Does the freight flow smoothly through the city?”

From Chicago’s standpoint it’s always a work in progress. “We are always trying to progress and we are always trying to learn from other cities and even catch other cities. And we are also trying to lead which is a great place to be. In some areas we are a very smart city but in others we have a lot of growing to do.”

It wasn’t as if Klein started with a blank sheet of paper in early 2011 when Chicago Mayor Rahm Emmanuel drafted him in from the capital city.

“We are lucky that we have a really robust transit system in place,” he said before rattling off an impressive list. “We have the CTA (Chicago Transit Authority) rail system, the L which is the elevated system, the subway, the CTA bus system, the Metra Commuter Rail system which is the second or third busiest in the country, we have a regional commuter bus system called PACE and we also have Union Station that has an Amtrak service plus we have a quarter of the country’s freight running through Chicago so as you can imagine there’s a lot of technology that makes all those systems work. There’s consumer-facing technology, such as digital displays in the bus shelters and rail stations and we also have very complicated systems operated by the six class 1 railroads and their trucking partners to make sure we are cutting down on congestion and excess traffic.”

In these tough economic times people don’t want to see what they perceive as “their” hard-earned money spent on projects that aren’t deemed to be entirely necessary. When it comes to transportation, people want to get to where they are going quickly, safely and as cheaply as possible, so how did Klein,

Gabe Klein is widely credited with transforming the city of Chicago’s transportation skyline in his 2 and a half years as Commissioner



Do young entrepreneurs consider Chicago to be smart? Do businesses looking at relocating to Chicago consider it to be a smart city? What about the people that live here? Do they think they are living in a smart city?

with all his business acumen, go about convincing the Chicagoans that the money he was spending on smart transportation was a good investment and was ultimately for their benefit? There are always people who will want portions of that budget spent on something “more worthy” than mere transportation but still complain when their bus is regularly cancelled.

“There’s a number of things that we do. One is we try to take a balanced approach. When we advanced the infrastructure for cyclists and we put sensors in the streets, we also put sensors in the streets for cars at the same time. This way we are improving the traffic flow for everyone at once as we are giving cyclists their own protected bike lanes.”

If Chicago is anything like London, *Thinking Cities*’ home town, then that balance Klein talks about, is a remarkably delicate one.

“Absolutely. I often talk about how our authority is the department of transportation and public space – it feels like what we are trying to do is balance the needs of all the different users of the public space. The technology is so important because you only have so much space but when you layer on the technology it’s almost like a fibre optic network – when you layer on the technology you can multiplex that fibre and add a lot more bandwidth,” he enthuses, clearly relishing his subject.

“It’s the same sort of thing with our streets and sidewalks – when we use technology for our signals and pedestrian crossings and so on it makes the

right of way much more efficient. If it means moving people out of single-occupant vehicles and onto buses or bikes or getting them to walk or synchronising the signals so the single occupancy vehicles that do need to be on the road flow better, that’s really where the high return on investment is. When we talk to the public we have to talk about it in simple terms. We have to explain how we are helping everybody, how we are doing it at a low cost-high return ratio.”

Informing the flamboyant Klein’s unstintingly assured rhetoric is the mind of a businessman with a management operations and marketing background, he is not an engineer or an economist, something rather unique in a Transportation Commissioner. His private sector upbringing has meant that he has been able to bring something of value to the government and in turn has learned a lot about how governments work. In his 20s he ran several Bikes USA stores before moving into consulting and latterly onto ZipCar where he helped to grow that business over a four-year period. He then co-founded his own electric food vending delivery and service company, On The Fly, before being drafted by the Mayor of Washington to run their transportation department. Chicago’s Mayor Emmanuel hired him in 2011 to execute his far-reaching and markedly ambitious transportation transition plan. Klein believes his business experience has helped him transfer his success to the governmental side of the table.



Klein's forward-thinking and far-reaching plans "catapulted Chicago to the front of the nation as a leader in promoting biking, walking and public transit"

When we set off on a big program there's a whole sales proposition that goes on with the public and you have to make sure your data is on-point so you know it is going to be successful

It hasn't all been roses though as the implementation of a city-wide network of traffic cameras was just one of a number of innovations that angered the National Motorists Association. But as Chicago blogger John Greenfield put it in his chi.streetsblog.org post on 5 November, "I'd like to think he'd view getting panned by the motorists association as the highest praise for his years of work promoting Chicago streets that serve all road users, not just drivers."

"We made a permanent directional change in Chicago in terms of how people view transportation and what's important," Klein explained in a recent interview with the *Chicago Sun-Times*.

"With Mayor Emmanuel's vision and my ability to get things done, we've accomplished an amazing amount – six-to-eight years worth of work in just over two." Klein is returning to Washington DC to launch a business that promotes "transportation technology."

Ron Burke, executive director of the Active Transportation Alliance, said that Chicago was "stuck in a 1990s mentality and had not caught up with where transportation innovation had gone" before Klein took over the leadership of CDOT, a move which had seen the city "catapulted to the front" of the nation as a leader in promoting biking, walking and public transit."

THE HARD SELL

It's inarguable that cities need to become smarter, more efficient, sustainable and liveable. How is Chicago addressing these needs? Rather typically, Klein met this challenge head on with the help of one of the world's most innovative pollution-busting products.

"There are a number of things we can do. We have to pilot new activities. When we set off on a big program there's a whole sales proposition that goes on with the public and you have to make sure your data is on-point so you know it is going to be successful. We pilot things on a very small scale, we collect data about what's working and what's not working,

tweak it then put together our plan to launch it on a larger scale and then sell it to the public."

Quite often I have regretted asking an interviewee to give me an example of what they are talking about but on this occasion, it proved to be a rather significant question.

"Well, we have a street that we have named the Most Sustainable Street in America and it's in the mainly industrial neighbourhood of Pilsen. It's a neighbourhood that's going through a real shift. On one side it's industrial but on the other side it's becoming more mixed use. One side you have railroad tracks adjacent the streets, the other side it's already changed and there's shopping. We took the opportunity here to use every single type of sustainable technology that we could find, ranging from photocatalytic cement which eats smog to dual solar-wind powered sidewalk lights. We tested about 20 different technologies and for two years before and two years afterwards we are monitoring the changes."

Yes, Klein really did say that the streets of Pilsen, Illinois are paved with cement that has a digestive system.

"This is one of those pilots that takes a lot of effort but we are already seeing such a great payoff. This project, part of our overall Streetscape scheme, cost 21 per cent less to implement than the others because of the sustainable technologies we used. We are documenting whether the cement is eating the smog as it is supposed to, that the water features are working, the bioswills are performing. We are only a year or so into it but we are already seeing what's working and we are baking all those aspects into our other projects. It's an important strategy for us. Small scale, learn, large scale, but do it quickly. We have a motto here: "Make as many mistakes as you can in as little time as possible and try not to repeat them." People are terrified of getting things wrong. In relationships, in business, and especially in government. People are generally risk-averse and this creates an environment where if you can't make a mistake, you also can't excel."

CONNECTING WITH THE PEOPLE

Two and a half years is a long time in politics, especially for a CDOT commissioner, and one of the most notable changes implemented under Klein's stewardship has been in how the city connects with and to its citizens. Connectivity with the citizens, connectivity for the citizens. Power, quite literally, to the people.

"We now have NextBus and NextRail smartphone apps which you can get from the Apple Store and from the CTA website and we also have something called Chicago Traffic Tracker. This not only tracks arterial speeds and congestion in real time using the buses' GPS, it can now also predict what the traffic is going to look like three or four hours ahead based on historical data. We built that ourselves here at CDOT and we have a direct fiber link to the CTA so we get the bus data in real time."

So the people of Chicago get what they want, when they want and on what they want. A city asking its inhabitants to comment on its transportation plans isn't anything new but it looks like Chicago is going out of its way to give the people that call it home the transportation network, and crucially the modal options, they deserve. I mention something about my home town installing a tram system in 2000 after a long consultation period which included local residents.

"Well, trams are pretty expensive! But we are building the first of two bus rapid transit lines and are currently in the study phase for a second one and we are designing a BRT network. Clearly a system like this is heavily reliant on technology to make them work. It's new infrastructure so it looks and feels like rail but has the benefit of traffic signal prioritisation. We are using off-bus fare collection, making use of the apps, to make the bus as fast as possible. Also we are just launching a new smart-card system, similar to London's Oystercard, with Cubic. It's called Ventra and it's actually the first of its kind in the country in that it will have two purses so you will be able to use it as a Visa card anywhere and also pay your fares.

None of these projects are cheap and no city has a bottomless pit of money to dip into when they want to build a shiny new transportation system. One only has to look at Detroit as an example. The pit has a bottom alright, and there's barely any loose change left, let alone hundreds of millions of dollars.

Says Klein: "We spent a fair amount of money this year as we are also building a new virtual traffic management center, designed by Delcan, for the city. We also have a lot of signal interconnect



projects going on and we are launching one of the biggest bikeshare systems in the US with over 300 stations. I like to think of that as a scheme where old technology, the bicycle, is merging with new technology such as solar power, GIS, GPS, and advanced payment systems. We have to think sustainably – not just in terms of emissions but financially. We have a sustainability plan for the city and we also have one within our agency and it calls for a very specific greenhouse gas emissions reduction as well as energy reductions for vehicles, buildings, internal goals for agencies and larger macro goals as well. There's a lot going on," he concludes in his sole nod towards understatement.

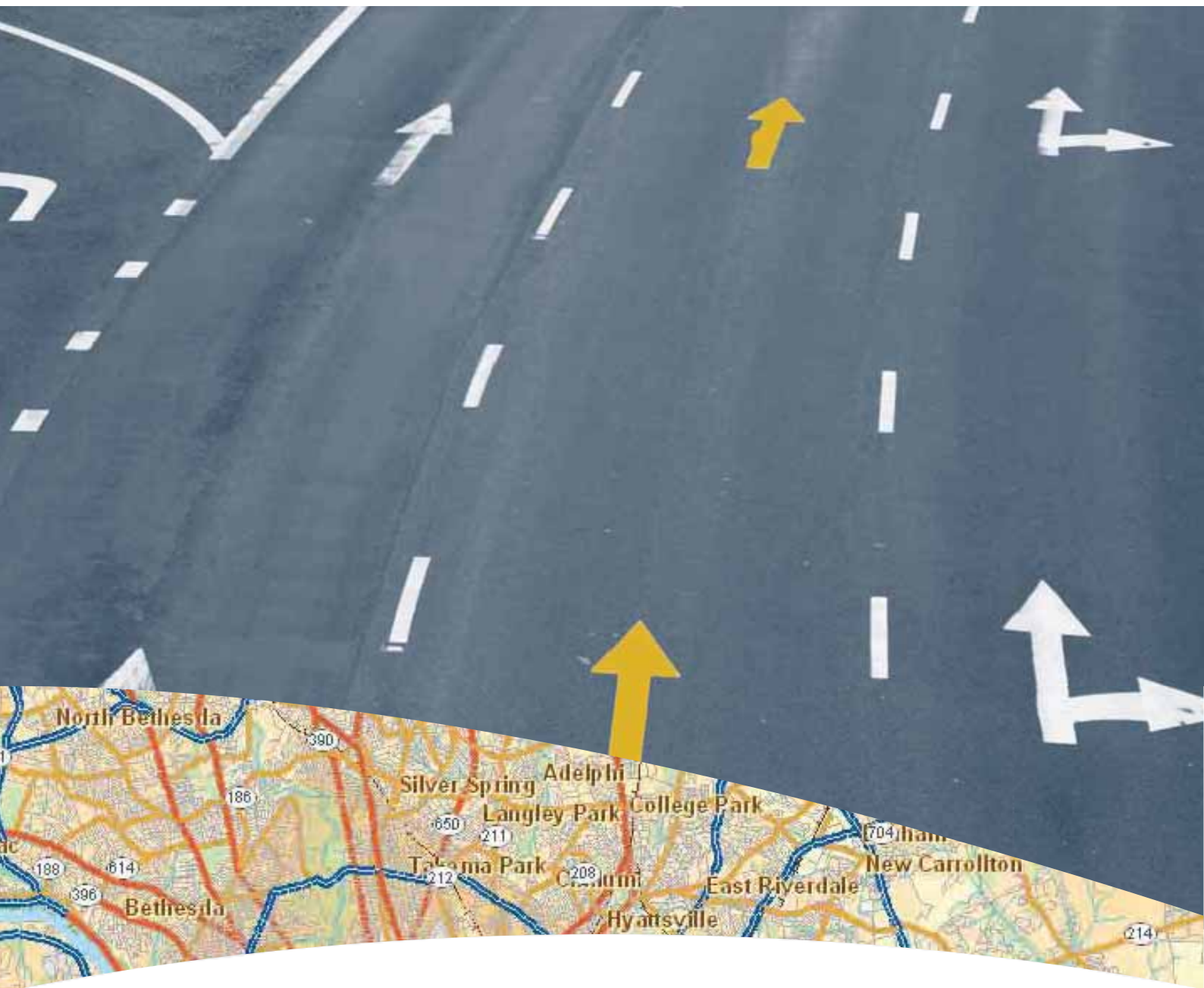
"And I didn't mention smart agriculture. That's the jurisdiction of another part of the city but we have aquaponic farms springing up that have a symbiosis between fish farming and vegetable farming. Fish waste is used to fertilise the vegetables and vice versa, which is really interesting."

Really interesting. If there's a more appropriate, though underplayed, phrase to sum up Gabe Klein's tenure as the City of Chicago's Transportation Commissioner, I would like to hear it. Whoever steps in to Klein's shoes is going to have a whole lot of thinking to do...

Mayor Rahim Emmanuel and Commissioner Klein discussing the newly released 'Streets for Cycling 2020 Plan'

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Jilmar Tatto,
São Paulo's
municipal
secretary for
transport says
public transport
is his city's
priority



“We want to democratise public space...”

Jilmar Tatto, Municipal Secretary for Transport of São Paulo, Brazil, talks to **Daniela Stoycheva** for *Thinking Cities* about his and his city's needs to make the best possible use of the available space

Polis recently met with Jilmar Tatto, the Municipal Secretary for Transport of the city of São Paulo, Brazil, to learn more about current trends and future ambitions for the transport in the city. In this interview for *Thinking Cities* he shares the transport problems that the city is facing, the solutions they are working on and his vision for a 'smart city'. A licensed federal member of the Parliament, currently exercising the function of Municipal Secretary for Transport of the city of São Paulo, Mr Tatto also presides over two transport companies – CET (Traffic Engineering Company) and SPTrans, responsible for public transport in São Paulo.

How would you describe transport in São Paulo? What are the main challenges and trends currently?

São Paulo is a city of 11m inhabitants. This scale causes significant transport problems. The economic development of Brazil led to an increase in its GDP, which brought along prioritisation of individual transport. In addition, the automotive industry was promoted as it plays a strong role in the country's economic growth. The traffic in the city is oriented from the peripheries to the city centre where the economic activities take place. All these factors added together lead to huge congestion every single day. Therefore, the newly elected mayor, Fernando

Haddad, is rethinking the whole transport system in São Paulo and developing new strategic planning methods. The new way forward suggests making public transport a priority, investing more in buses and bus rapid transit (BRT), searching for new areas of development to avoid everything being concentrated in the centre, and building new real estate close to public transport infrastructure.

As Municipal Secretary for Transport what are your priorities?

Public transport is our priority. This is the only way out of the problem. This is also what the people expect and generally they support us in that. We are doing a venturesome programme investing heavily in dedicated bus lanes. We have now 370km of dedicated bus lanes on the right-hand side and will build an additional 50km by the end of 2013 – more than it was expected to have by the end of the year. To get an idea about that dimension, until the end of last year São Paulo had only 120km dedicated bus lanes. In addition, new corridors are being built on the left-hand side (BRTs). We will invest in 150km of BRT up until 2016.

The speed limit for cars was reduced to 50km/h in order to on the one hand put pressure on the car-users and stimulate them to leave their car, and on the other to allow cyclists to share the streets with the cars. Also we are currently working on an

***Public transport is our priority.
This is the only way out of the
problem. This is also what the
people expect and generally they
support us in that***

integrated centre for mobility to control the traffic, public transport, freight, etc and have that connected with the police, emergency services and so on. For that we want to use open platforms for the integration of different services and are looking into the UTM system from the UK and the European project POSSE. We are currently making a revolution that is not often seen in the big cities of Brazil and this process is not easy as we are encountering many conflicts – with the drivers, with the shop-owners who want to have their cars parked in front of their shops, etc. Therefore, it is not easy as the whole mentality and culture of the population needs to be changed. Also, as I said, the car manufacturing industry is important in Brazil, so it is not easy to go against it.

So an expanded BRT and bus network is your strategy for a functional public transport system in São Paulo?

Not only that. We are convinced that public transport has to be done on rails. The bus is not for mass transport. São Paulo does not have adequate mass transport. We have only 134km of tram lines and 78km of metro lines, whereas we need at least

500km. The system in the city is overloaded, we have 15,000 operating buses doing 4500km per day.

What does a 'smart city' mean for you? Is a 'smart city' only about technology or also about policy objectives?

A 'smart city' is for me a city that allows people to move freely and where they are informed about all possible mobility choices – a city where people are certain about reaching their destination. A smart city is, in my opinion, a city with good infrastructure where everyone is able to move – good sidewalks for all groups of people, children, the elderly and adults, cycle lanes for cyclists and traffic calming measures to guarantee their safety.

It is a city where the public space is for everyone, shared in a democratic way. This is not what happens today as the car has precedence over public transport and the pedestrian. Moreover, a smart city is a city where the public authority can centrally monitor the movement of vehicles, people and freight through a centre using technological tools in such a way as to achieve a harmony between them. That is why a smart city needs to invest heavily in technology in order to allow the public authority to take adequate decisions. And for that we also need to search for experiences and information in different places, as Polis are doing, and apply them in the best possible way. But the smart city should not be only about technology. The human being should be at the centre of it. People's wishes about what they want to do in their city should come first. Technology and the integration of different technologies should be used to keep people informed, to benefit the people and improve their quality of life, not only for monitoring.

Is there any place for alternatives to motorized transport in São Paulo?

A big challenge for São Paulo is to first guarantee public transport for everyone. Obviously, this is not enough. Investments are also necessary to improve

Tatto is investing in a network of dedicated cycle lanes





sidewalks, to increase the number of dedicated bicycle lanes. And this is exactly what we are trying to do – create a totally new concept about the city: not to give priority to road works, but to the creation of bus lanes, not to give priority to the car, but to the bicycle. We want to ‘democratise’ public space as public space in São Paulo is not democratic. We need to win it back to have it for everyone and this conquest is difficult as it requires a change: a change in culture, strong action from the people and one day a change in mentality.

In planning your activities are you getting inspiration from other cities around the world? What are the topics on which you would be most interested to exchange information?

We have direct contacts with different places. This year I was, for instance, in London and Glasgow. We have also spoken to the mayor of Bogota, Colombia, who has implemented a BRT system. We have contacts with various authorities and experts around the world. Now we are discussing communication

São Paulo is a sprawling metropolis of 11m inhabitants

A ‘smart city’ is for me a city that allows people to move freely and where they are informed about all possible mobility choices

The smart city should not be only about technology. The human being should be at the centre of it

between the different elements in transport in São Paulo, which will be made easier by means of open specifications. Thus, we are not locked-in to one product or one company. In that respect we are looking at what is happening in the USA and now also at UTMC from the UK. A common language will make the equipment cheaper. As I mentioned before, public transport is our main priority now. That is why when looking for good practices we are predominantly interested in mass transport. Europe has good quality to offer there. But we do not exclude other good ideas that have given good results either, such as calming traffic, or other pieces of information that may solve a specific problem of mobility.

São Paulo is hosting some FIFA World Cup games next year and some Olympic events in 2016 so you will be expecting thousands of people travelling to the same place at the same time. Are these major sports events a challenge or a chance for the city's transport system?

Both! São Paulo is prepared for these events and we have the adequate infrastructure. Obviously, the World Cup is something extraordinary, especially in that Brazil adores football. The opening ceremony of the World Cup will take place in São Paulo, so we are preparing ourselves. The Federal Government, the State and the Municipal Government are all involved in a strategy for the World Cup.

We, from the transport side, also have a mobility plan for the tourists that will be coming. It takes into account technology for access, control, etc. to assist mobility especially on the day of the opening ceremony. We have also announced the day of the opening as a bank holiday that will greatly alleviate any mobility issues. The mobility plan includes moving between the game venues, as well as between those places and where the training camps of the teams will be, and of course between those places and where the main tourist points will be. The organisation is well underway and we are convinced that this



will be a big event and the city will correspond to the challenges appropriately. Our main concern is actually that the Brazilian team wins the World Cup and makes a great show. But in terms of security, mobility and information to the tourists, we are well prepared and we believe that the FIFA World Cup will leave a good legacy for São Paulo in terms of both investment and organisation.

15,000 buses are in daily operation in São Paulo

FYI

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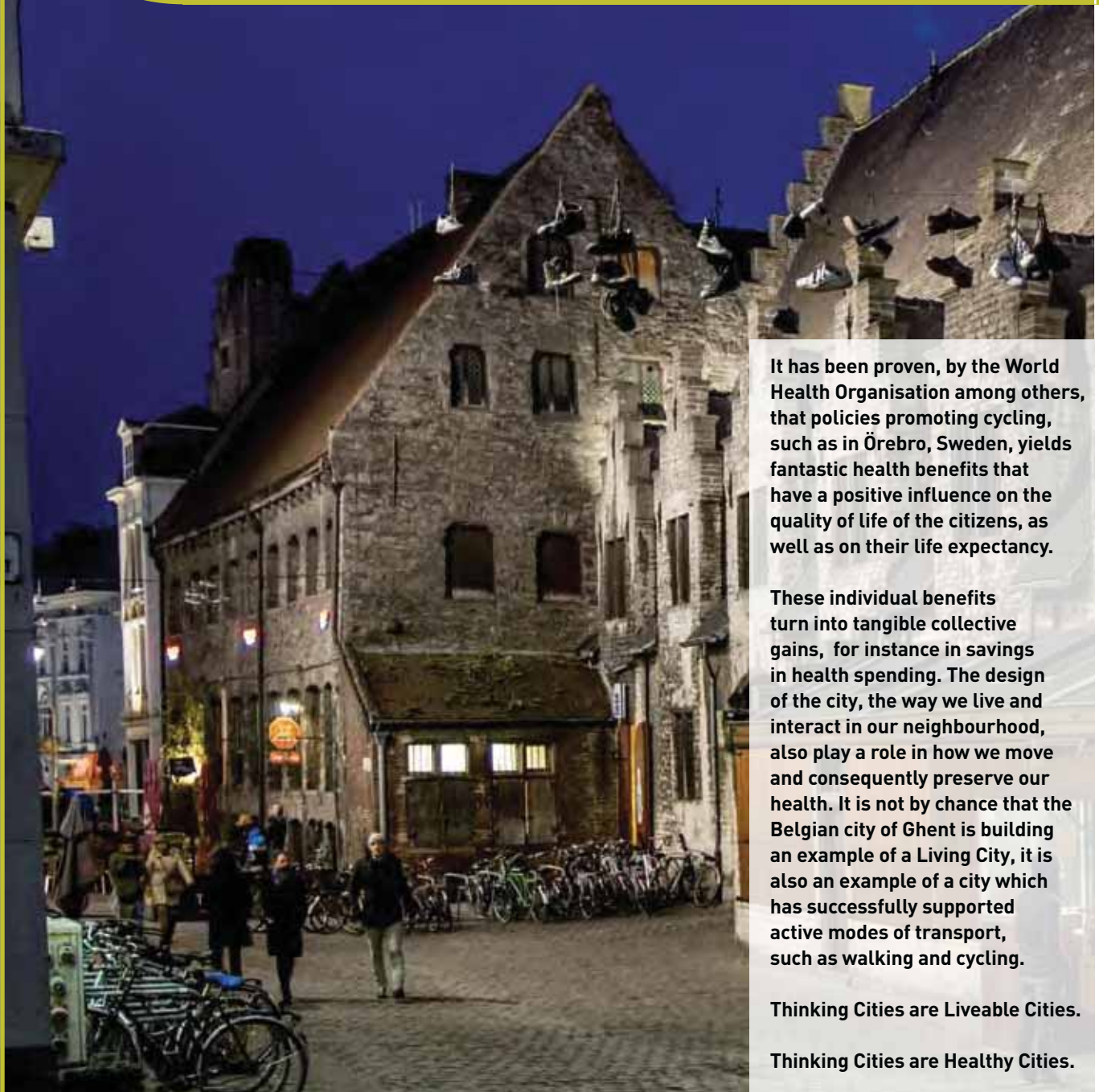
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Environment and Health in Transport

This section looks at the impact that urban and regional mobility has on the environment and on health, and how the adverse impact can be reduced

- Örebro, Sweden – cycling city
- Ghent, Belgium – living streets are the future
- Milton Keynes, UK – electric bus integration
- Rotterdam, The Netherlands – electromobility



It has been proven, by the World Health Organisation among others, that policies promoting cycling, such as in Örebro, Sweden, yields fantastic health benefits that have a positive influence on the quality of life of the citizens, as well as on their life expectancy.

These individual benefits turn into tangible collective gains, for instance in savings in health spending. The design of the city, the way we live and interact in our neighbourhood, also play a role in how we move and consequently preserve our health. It is not by chance that the Belgian city of Ghent is building an example of a Living City, it is also an example of a city which has successfully supported active modes of transport, such as walking and cycling.

Thinking Cities are Liveable Cities.

Thinking Cities are Healthy Cities.

How to make a good cycling city even better



When a group of international experts reviewed Örebro, Sweden, as a cycling city earlier this year their conclusion was: “There are no reasons not to cycle in Örebro”. But even a good cycling city can become better – **Per Elvingson** takes a closer look at recent developments and upcoming projects



All photos: City of Örebro

We want to build an attractive city accessible for everyone, also for those who cannot afford a car

The citizens of Örebro city centre use their bikes for every third trip. This means that the people living here cycle as much as those in Copenhagen, one of the cycling capitals in the world. A good reason for using the bike in Örebro, a city of just over 100,000 inhabitants 200km west of Stockholm, is that the city is flat and rather compact, which make cycling both fast and convenient. Nearly all citizens have access to a bike.

CYCLING STRATEGY

But it was not until October this year that Örebro got its first comprehensive cycling strategy. It was developed as a part of the EU-funded project CHAMP, which brings together European champion cities in the field of cycling.

"Thanks to the model developed in the CHAMP project the strategy is built on a solid ground. It started with a self assessment, followed by a peer review with experts from participating cities and consultancies. Thereafter we had internal workshops and consultations with both NGOs and regional bodies. Finally we got a decision in the City Executive Committee a few weeks ago," so says Anna Åhlgren, project manager at the City Administrative Office.

ACCESSIBILITY FOR CAR

Most of the shortcomings identified in the self-assessment and peer review process have been addressed in the new strategy. But it is also true that the strategy in itself will not be sufficient to get a big increase in cycling – it is also important to change the accessibility for cars.

Changes in the infrastructure are however on their way and the political signal is clear: The cars drivers will have to adapt to new conditions in the future. Central streets with many cars today will look different in the future and more space will be given to cyclists.

"Bikes are very space-efficient," comments Lennart Bondeson, vice-Mayor responsible for sustainability issues.

"Giving more priority to cyclists is a way to maintain high level of accessibility in a growing city. But equally important are the social aspects. We want to build an attractive city accessible for everyone, also for those who cannot afford a car."

NEW CYCLING NETWORK PLAN

In a new cycling network plan the city focuses on four different layers to optimize the network and to meet the needs of different target groups.

- Main high quality cycling corridors

FACTBOX

Örebro – key figures

Location: 200 km from Stockholm in Sweden

Inhabitants: 140,000

Km roads & streets: 419 km

Km bicycle roads & lanes: 216 km

All trips modal share cycling: 25%

(women 27%, men 23%)

Work trips modal share cycling: 30%

Inner city modal share cycling: 33%

Car ownership: 430 cars per 1,000 inhabitants

Access to a bicycle: 92%

Seriously injured cyclists per year: 6 people (2012)

Bicycle parking in the city centre: 5,800

Other: A university with around 14 000 students

In Örebro cycle paths are given priority over roads



- mainly for commuters travelling at high speed.
- City network and regional routes – high availability and secure travelling between different parts of the city. The regional routes are planned in cooperation with the Swedish Transport Administration and the Regional Development Council.
- Local network – designed for safe transfer to local destinations. Children and elderly are important groups.
- Recreational routes – leisure cycling for the citizens and visitors.

HIGH QUALITY CYCLING CORRIDORS

Örebro is the first city in Sweden to invest in this type of high-quality cycling corridors (i.e. cycle lanes). An extensive and innovative GIS-analysis is the basis for the network plan. The analysis consists of travel surveys and statistics presenting the location of residents and workplaces. Taken together, the 15 corridors will

connect the most important locations and provide fast and comfortable cycling, especially for commuters.

These cycling corridors are distinguished by orange lines separating pedestrians and cyclists, and they also have signs in the same colour. The cycle paths run continuously along the cycling corridors, meaning that cars cross the cycle paths instead of the other way round.

In addition to the continuous cycle paths, the positioning of bicycle detectors, signal poles and push buttons has been reviewed at signal-controlled road junctions.

Cycle route guidance and lighting have also been improved along the cycling corridors.

Five of the main cycling corridors have already been completed and more cycling corridors are in the pipeline this year.

“An evaluation shows that cyclists are on the whole satisfied with the cycling corridors. The continuous cycle lanes reduce the speed of motorists, thus reducing the risk of

accident and injury to cyclists,” says Anna Kero, head of infrastructure at the City Planning Department.

WINTER CYCLISTS

But even more important for the city's cyclists than an expanded cycling network is perhaps better maintenance of the existing infrastructure, not least during winter months.

Anna Åhlgren maintains that Örebro has a relatively high percentage of people who continue to cycle even during the winter. “When compared to a number of cities in Sweden and Finland, Örebro had the highest proportion of winter cyclists. More than half of the cyclists continue to cycle in Örebro despite it being winter and cold.”

Cycle paths are already given priority over roads, but the strategy also point to the need to raise ambitions regarding snow clearance and grit removal and to have a written maintenance plan for the bicycle network, and inspect the network regularly by bike.



Örebro has developed a cycling account that presents the result of the cycling measures completed during the previous year

BIKE PARKING

Bike parking is another area in the strategy, where an important aim is to provide more safe and secure possibilities. An inquiry is running for the moment to find out what kind of bike racks is favoured among local cyclists and next spring a new storage facility will be inaugurated at the central station. It will be fully automated with an electronic access system and will include recharging possibilities for electric bikes. Commuters are the main target group.

CYCLING ACCOUNT

Also the dialogue with the citizens needs to be improved. As a first step Örebro has developed a cycling account. It presents the result of the cycling measures completed during the previous year and includes several indicators, for example regarding bicycle traffic, infrastructure, maintenance, traffic safety, media and communication, citizens' satisfaction and bicycle theft. "We will do more marketing activities to certain

target groups, but we also want a better dialogue with the cyclists. An advisory committee has recently been started, both to get input of fresh ideas from the users and to increase the understanding of what is possible to reach with limited resources," Åhlgren adds.

Finally a few words about comparing the share of cyclist between cities. At the beginning of this article it is stated that the share of cyclists in the central part of Örebro is at the same level as in Copenhagen. In Copenhagen the proportion of cyclists on trips starting and ending

in the city is 33 per cent but you can count this in many different ways.

Most important is perhaps to develop methods where you can follow the trend in your own city, and also routines to make it possible to compare the result of different measures, projects and investments. This is one of Örebro's pilot projects within the CHAMP project.

The final word goes to Anna Åhlgren: "If we can show results of our efforts it will inspire our own organisation to work even better, and also justify and encourage more investments in cycling."

FYI

Per Elvingson is climate strategist for the City of Örebro

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Learn more about CHAMP at www.champ-cycling.eu. Here you can find a toolkit for making cycling strategies and examples from the participating cities, including Örebro. Örebro's cycling account can be found here as well.

The living street

What if today you could see what your street will look like in 2050? **Daniela Stoycheva** takes a peek into the future

In 2012, a group of 25 volunteer 'front runners' from the Ghent Climate Alliance (Gents Klimaatverbond), all with divergent backgrounds, came together into a so-called 'transition arena'. Thanks to the INTERREG IVB NWE project Music (Mitigation in Urban Areas-Solutions for Innovative Cities) they were given the assignment to sketch out what they envisaged to be mobility in Ghent by 2050. For five nights, the group was offered by the city of



The vision for 2050 was of liveable streets constituting a network of car-free zones concentrated around central squares

Ghent the necessary time and room to analyse the current mobility system, find out its possible flaws and work out a joint sustainable future scenario consisting of iconic projects. The proposed solutions were put together in "The Bike of Troy".

In the beginning of November 2012 these 25 members of the transition arena presented their projects in front of 100 other citizens.

One of these projects was the "Living Street". The city architect

Koen Stuyven challenged current perceptions and realities suggesting leaving cars out of the mindset, trying to make people think out of the box. What if in 2050 there are no cars around and city architects look back to 2012 and laugh at our plans for cars?

The vision for 2050 was of liveable streets constituting a network of car-free zones concentrated around central squares. Strong public transport, the bicycle, car-pooling systems and

alternative transport have sharply reduced the number of cars on the roads. Streets not leading anywhere for through traffic are now "pedestrian only". Parking a car in front of your door is only needed in case there is something to load or unload. Children can come out safely on the street and more meeting space leads to new interaction at street level. Street life becomes more intense and a more cohesive bond is forged between neighbours. Within a



walking distance there is access to a rapid transit bicycle network, a centrally located public transit stop, or one of the many 'short-cuts' that will quickly take you to your destination even on foot.

However, those present at the meeting decided that they did not want to wait until 2050 to see this street becoming a reality. Around 20 citizens from five different streets

started thinking about how they could accomplish this in Ghent now.

MAKING THE 'LIVING STREET' ALIVE

Two roads in Ghent showed readiness to be the test streets of the initiative for the month of June 2013 – Pussemierstraat and Karel Antheunisstraat. The project was presented to all citizens on the streets

by the volunteers. Neighbours would gather in a living room and make the whole street enthusiastic about the idea. Three goals were set for the project:

- experiment with sustainable mobility
- create another approach to public space
- create social interaction between the inhabitants

The idea was to organise something very local, neighbourhood-based, on a small scale, and not big crowds in the centre. The activities were not organised in advance, they would just happen spontaneously. An article in a national newspaper about the project made the idea popular among sponsors who themselves started contacting the volunteers. A large network of sponsors who participated with cash donations was

Pussemierstraat and Karel Antheunisstraat before the transformation (below and left)

Activities were often not planned in advanced but decided upon on the spur of the moment



Ghent's Living Street is owned by the citizens – it's not a project of the city administration

created, with the money used to buy a green carpet, barbecue, benches, etc., with sponsor materials, such as electric and cargo bikes, with checks for the public transport and taxis to use these means of transport instead of the private car and create sustainable mobility. People started experimenting and trying out new things on their living street. Coming back home, they would gather on the street, have a chat and relax, play music, read books, the children would play games, and ultimately create a social space instead of locking themselves inside their homes.

THE ROLE OF THE CITY OF GHENT

The 'Living Street' is a bottom-up initiative by the volunteers from "The Bike of Troy" network together with the inhabitants of the streets. It is an ownership of the citizens, not a project of the city administration. The city of Ghent wanted to create with the 'Living Street' a product people would identify with. The most important role of the city was to create this experimental space and let it happen. Ghent city administration wanted to start this as a temporary approach,

which step-by-step would motivate behaviour change and transform into something permanent. Imposing a permanent vision on the citizens from the outset would be difficult to accept and would not lead to the same enthusiasm.

Two departments from the city administration were involved in the project – the department of environment and the mobility department. The partnership with the city helped the volunteers to organise meetings with the police, garbage collection companies, etc. and obtain permits for closing the streets. The city's role was restricted to only creating the framework for the realization of the idea.

THE LEGACY OF THE EXPERIMENT

Pussemiersstraat has become significantly greener. Neighbours on the street changed the façade of their houses by submitting a common application to the city administration for funding for planting plants in front of their houses. The political consent of the city councillor for mobility was gained to make Pussemierstraat a permanent living street. More than any tangible legacy, the mindset of the people changed proving that a change in mobility behaviour is possible already today. Citizens lived through the process, taking part in every step of it and had thus time to take account of it.

Evaluation of this first edition was made by the volunteers of the Troyan Bike-network together with the city administration and VITO (Flemish institution of Technologic Research).

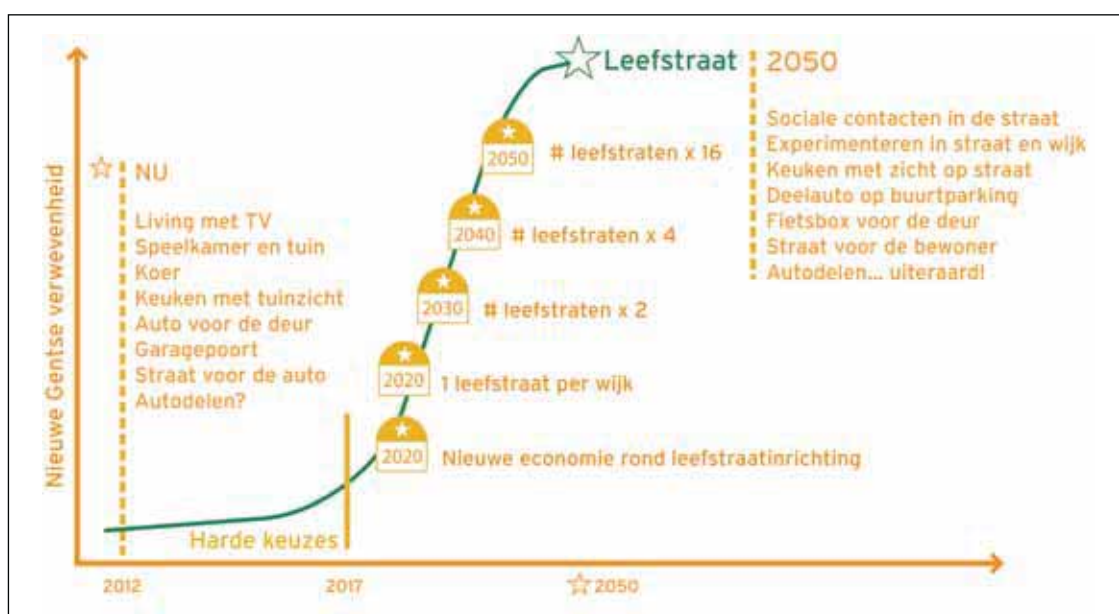


Residents have created a common social space for use by all ages engaged in a variety of activities





Plans for Pussemierstraat (above) and a project progression graph plotting the course of the Living Street (Leefstraat) up to 2050



It will be distributed to all partners involved in the project. A second edition of the "Living Street" is planned in spring 2014. The intention for this new edition is to upscale the concept so that more streets participate. A new, economy-related approach will be tested in 2014. The idea behind it is to create proximity of the food to the people living on the street and try a different kind of shopping than the type we are used to. Instead of making many individual trips to the shop, citizens will make only few big trips that would deliver the food to a close-by depot. This would be a common

depot somewhere close to the street where companies would store food and people would go and collect it by bike or on foot.

An overall objective of the project is to create a network of 'living streets' connected together in the transition arena. The ultimate goal of the project is to see how the city reacts to it, how people more widely react to it, how one can organize it and hopefully when seeing that, the government will absorb these ideas into their policies.

So does your city want to follow in the footsteps of Ghent?

FYI

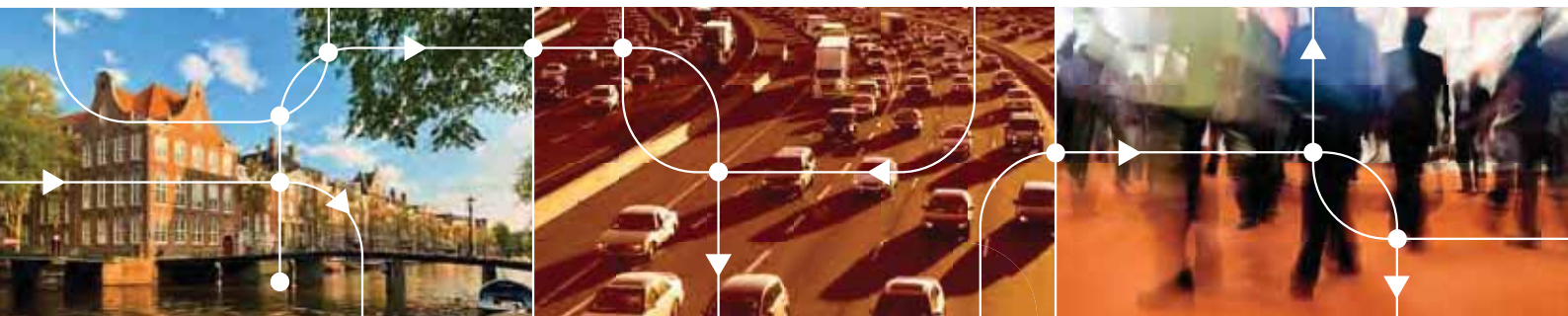
Daniela Stoycheva is a project officer at Polis dstoycheva@polisnetwork.eu. Special thanks to Mr Dries Gysels from the Department of Environment, city of Ghent, Mr Tim Scheirs from the Mobility Department, city of Ghent, and Karel Vancoppenolle, volunteer who started the 'Living Street' experiment for providing valuable information for this article.

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Electric avenue

Denis Naberezhnykh and Ben Godfrey
discusses the integration of electric buses
with the electricity distribution network



Installed IPT charger in Wolverton,
Milton Keynes, UK

The Milton Keynes demonstrator project will be installing two inductive chargers at either end of the number 7 bus route

A Thinking City can mean different things to different people. A Thinking City could be described as a city where the use of limited resources and infrastructure is optimised in order to respond to demand in real time, while trying to minimise adverse effects on the provision of other services and use of other infrastructure. By doing so, it is possible to improve the efficiency and effectiveness of existing infrastructure, leading to a more sustainable society that is able to cope with the growing demands placed on our energy and transport infrastructure in cities.

In order to achieve this long-term vision of a Thinking City, the integration or, at the very least, communication between the different elements of city infrastructure is now required.

Imagine a city where all public road transport is electric and is not restricted by battery range as it charges wirelessly directly from the road as it continues its daily operations, producing no local air pollution and drastically reducing national CO₂ emissions. In order to make sure that the local electricity distribution network is able to cope with the additional demand on the network, the buses continuously report their progress along the route along with their battery state of charge (SoC). The distribution network is then able to combine this information together with real time data on the quality of the network and prioritises charging of each bus accordingly. At the same time, other buses with excess battery



Number 7 bus route in Milton Keynes with three charger locations

capacity are able to feed power back into the grid in order to provide additional reinforcement if required. This vision of a Thinking City may not be as far from reality as it may first appear.

Demonstration of the possible impacts and opportunities of integrating elements of the transport system with the electricity distribution network is the aim of the Electric Boulevards project, a joint Western Power Distribution (WPD) – TRL, Low Carbon Network Fund (LCNF) project taking place in Milton Keynes, UK, a city some 100km north of London.

ELECTRIC BOULEVARDS

An entire bus route going all the way across Milton Keynes between Wolverton and Bletchley is being electrified as part of a demonstration programme. All eight buses on the route will be replaced with electric buses and to ensure that they are able to complete the demanding daily

duty cycle without needing to stop for recharging or running out of battery charge, the buses are being equipped with inductive power transfer (IPT) chargers that enable the buses to opportunistically charge during end of route stops through the day.

In order for this concept to be feasible and not to disrupt existing timetables, charging of the buses must happen over a very short period of time during scheduled end of route stops. This requires a very high level of power transfer of 120kW between the grid and the bus. For comparison, a typical electric car public charging post delivers between 3 and 7kW of power. Use of such high power transfer rates can place a substantial demand on the electricity distribution network and potentially introduce disturbances into it. WPD are investigating the impacts that the use of such buses and chargers can have on their distribution network and together with TRL, are investigating the feasibility of intelligently managing this impact, as well as identifying opportunities for improving the quality of the distribution network through the use of intelligent charging and vehicle to grid (V2G) applications.

INDUCTION COURSE

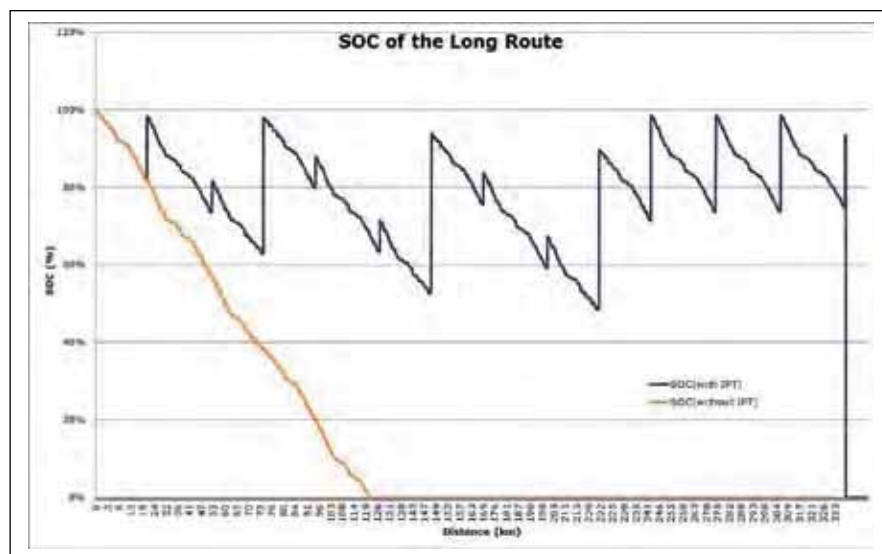
The Milton Keynes demonstrator project will be installing two inductive chargers at either end of the number 7 bus route, at Wolverton and Bletchley. In order to fully investigate both the impact of the inductive charging equipment on the

distribution network and potential for intelligent management of the chargers based on the condition of the distribution network, (without jeopardising the operation of the demonstrator), the project will install an additional, third charger at another location where the buses stop during the day – Central Milton Keynes (CMK) bus station.

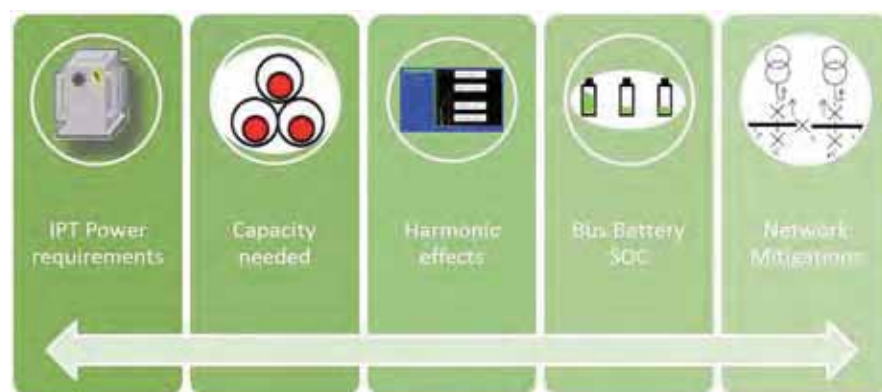
This set up, and in particular the use of the third charger, allows the project to examine the impacts on the distribution network at different times of the day and at different locations. More crucially, it allows varying when and how much power is delivered to the bus from the third charger based on the condition of the network at the time.

Of course, a Thinking City doesn't have to stop at optimisation of charging of electric vehicles in order to manage the load on the distribution network. Spare capacity of the on-board batteries in the buses could be utilised to feed power back into the network when existing loads become too high, or the power electronics in the charging equipment can be used to provide additional filtering on the network.

The Electric Boulevards project is also investigating the feasibility of such V2G applications. However, during the demonstrator it would be undesirable to discharge the vehicle battery directly and risk insufficient remaining capacity to complete the remainder of the daily duty cycle until a feasibility assessment has been carried out. Therefore, a stationary battery bank is being installed near the CMK charger in order to simulate the on-board battery of the bus by replicating the available capacity and SoC, and providing battery to grid (B2G) capability when necessary. In an actual implementation in a Thinking City, this B2G capability could be provided by the batteries on board the bus as a V2G application, at whichever location it happens to be



Example of bus battery SoC change through the day with and without the IPT charger



Issues to be considered in integration of electric bus IPT charging with the electricity distribution network

charging at the time. The additional benefit of having a battery bank near the charger is that the battery can be used to provide the energy and power required to the chargers, instead of placing the entire load directly on the distribution network at peak time. The batteries can then be recharged off peak.

PROGRESS TO DATE

The Electric Boulevards project is an example of how two separate systems, the public transport system represented by the electric buses and the energy system, represented by the distribution network, can be

combined to achieve better performance as a joint system than they would do independently. The use of electric buses reduces national CO₂ emissions and improves local air quality while the use of high powered IPT chargers makes it possible to use electric buses on a demanding route without running out of charge. At the same time, understanding IPT charger demand and bus batteries' SoC throughout the day helps to mitigate any negative impact on the electricity distribution network, while using V2G could improve the quality of the network. All elements of this system are working in harmony

THE ROAD AHEAD

The reality of Thinking Cities may not be as far away as some may think. The Electric Boulevards project is already investigating many of the elements necessary for the smart integration of transport, energy and communication systems to enable improvements in the sustainability of the transport and energy networks without the need for extensive reinforcement of the existing distribution network infrastructure.

Electric buses are due to commence their service as part of the demonstrator in Milton Keynes at the end of November. The resulting demand, load and disturbances on the network will be analysed by WPD and TRL and intelligent management of one of the chargers will be trialled. If anticipated benefits of the integrated approach materialise, then this concept could be rolled out in other cities, gradually increasing the amount of real time control over the charger power output and availability.

to achieve optimum efficiency and effectiveness while improving the overall sustainability of both systems.

To a large extent this concept has been made possible through the use of high powered IPT charging, which allows opportunistic, wireless and automatic charging of electric buses with high power and minimum driver intervention. Because the chargers can be seamlessly integrated into the road surface, they help to reduce unnecessary street clutter; are not reliant on drivers remembering to plug them in; are not subject to vandalism or accidental vehicle damage and, are capable of transferring high power without increasing the risk of electrocution.

A real time communication and control link between all of the different components of the system was not set up in the project because the risk of disruption to the bus service through real time control would be too great before the concept is proven. Therefore, the project is analysing recorded data from the electric buses used in the demonstrator; all three chargers; the battery bank and from the distribution network equipment. From this it will be possible to implement changes in how the third charger is used based on patterns identified in the analysed data.

POWER STRUGGLE

In a Thinking City set up, all of the systems would be communicating in real time and allowing real-time control of the subsystems to actively respond to demand from the vehicle batteries and load on the distribution network. This highlights the importance of the communication network in enabling the integration of the energy and transport networks. TRL's preliminary analysis shows that in order to capture and analyse sufficient data to assess and manage peak power demand and harmonic disturbances on the network, up to 63MB of data per 24 hours will need to be captured and communicated from each substation. Furthermore, up to 3.6MB of data from each stationary battery bank and up to 217MB of data from each IPT charger and each bus will be required to be captured and communicated to the back office every 24 hours. Most of this would be required to be communicated wirelessly in real time and, if large numbers of buses and chargers are in use, then high-speed wireless communication through 4G or WiMAX becomes preferential.

In order to gain an understanding of possible charger utilisation; energy demand from the network and to perform a sensitivity analysis of the anticipated demand, TRL has

carried out preliminary modelling in the project.

It was largely found that under optimal operating conditions, two chargers should provide sufficient opportunistic charging throughout the day to ensure all buses are able to complete the route with contingency battery capacity remaining of at least 35% by the end of the day.

However, with two chargers, only limited opportunity exists to reduce charging power during times of high demand or to cope with reduced charging efficiencies. The quoted efficiency for perfect alignment of primary (road coils) with secondary (vehicle coils) is 90%. Two charger arrangement could allow tolerance of reduced power transfer efficiencies of up to 70%, equivalent to 84kW, assuming all other parameters remain under optimal operating conditions throughout the day.

The addition of a third charger could allow the buses to function with much smaller batteries or to significantly reduce charger power at times of high load on the distribution network, down to 56kW. Alternatively, utilisation of chargers can be changed to minimise charger use during peak network load.

FYI

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The future is electric



ROTTERDAM.CLIMATE.INITIATIVE

Rotterdam has embarked on a new phase of electromobility as **Lutske Lindeman** and **Arjan Orange**, two of the project's main protagonists, explain to **Ivo Verhoef**



By the end of 2014 we want the city to have an infrastructure in place of 1000 charging points, and 25% of the municipal fleet should consist of electric vehicles

The tipping point will not be achieved until electric vehicles can be sold at a competitive price compared with regular petrol and diesel models

Electric transport plays a prominent role in Rotterdam's sustainability and climate ambitions. In this respect, the city maintains a clear vision on the mutual roles of the government, market parties and citizens.

"Electric transport is important for the city for several reasons, but particularly when it comes to our ambitions with respect to the reduction of CO₂ emissions and air quality improvement," according to Lutske Lindeman, programme manager of Rotterdam Elektrisch (Rotterdam Electric). "For instance, we aim to achieve a 50% reduction of CO₂ emissions by 2020 as compared with the levels of 1990. In addition, we have defined a number of policy objectives in the Rotterdam Programme on Sustainability and Climate Change (Programma Duurzaam), the Rotterdam municipal executive work programme that started in 2010 and will run until 2014."

A number of these objectives are related to electric transport. "By the end of 2014, for example, we want the city to have an infrastructure in place of 1000 charging points, and 25% of the municipal fleet should consist of electric vehicles. By 2020, we aim to have 20,000 electric cars in the city," she says.

ROLE OF THE MARKET

At this point, the main obstacle is the price of electric cars, according to Lindeman.

"They are still too expensive for many people, but this may change

quickly. Today, almost all of the major car manufacturers offer electric vehicles in their model ranges and a large number of new models are expected to be launched next year. Prices are expected to decrease as volumes increase."

Nevertheless, the market for electric vehicles is still far from mature, as Oranje states. "We have looked into the best way to contribute to this process from a government point of view." He feels that the development of new products and technologies is a role that market parties should take up.

So what is the view of the City of Rotterdam on their role in this process?

"We focus on three specific key areas that offer the best opportunities to facilitate the market," Lindeman declares. "These key areas are the development of a charging infrastructure, communication and public information on electric transport and building up a reservoir of knowledge and experience through pilot projects in conjunction with market parties and other organizations."

INFRASTRUCTURE

"The infrastructure of charging points is a prerequisite to persuade consumers to buy electric cars. Therefore, it is our job as a city to ensure that the infrastructure is in place," insists Oranje. In this process, the city acknowledges that the technology for charging systems may be subject to change in the future. "However, we have decided to develop a working

infrastructure at this point, using technology that has proven itself in practice," he says. The city is right on schedule with the installation of charging points and by the end of 2013 we will have 500 charging points in place.

"If we proceed at the same speed, I am confident that we will achieve the goal of 1000 charging points by the end of 2014."

COMMUNICATION

Raising awareness and creating support is yet another important task for the municipality when it comes to promoting electric vehicle use. Oranje says: "Our approach is tailored to the specific target groups. Apart from websites and flyers containing general information, we have set up a special information centre in the city to provide citizens and businesses with targeted advice. Furthermore, we have appointed a so-called 'EV-Makelaar'

E-networking

Rotterdam actively participates in initiatives including the following national and European networks and projects:

- Formule E-Team
- Hybrid User Forum
- Clean Fleets project
- TIDE project
- FREVUE project
- Polis
- Eurocities
- HyER
- Life+

A HANDS-ON APPROACH TO INNOVATION

Rotterdam considers innovation a key factor in realizing its electromobility ambitions. In this process, the city relies primarily on the innovative forces of local private citizens and businesses.

"Instead of simply handing out subsidies, we listen to private citizens and companies who propose initiatives, and find ways, as a municipality, to help them. We do this by leveraging our communication channels and our knowledge network, and by removing barriers in policy and regulations," says Lode Messemaker, coordinator of Innovation Projects and Vehicle Fleets of the City of Rotterdam. To illustrate his point, he provides two practical examples.

ELECTRIC URBAN DISTRIBUTION BY HEINEKEN

Early in October of 2013, Heineken beer brewery deployed the largest fully electric commercial vehicle in Europe. Heineken developed this truck in collaboration with Hytruck, G. van der Heijden Distributie B.V. and the City of Rotterdam. Heineken uses this commercial vehicle in a pilot set-up for urban distribution. "We offered Heineken facilities including a communication platform during the important Ecomobiel trade show that took place in Rotterdam in October. In addition, we conduct studies in conjunction with market parties such as Heineken into adaptation of the so-called allowed delivery times for electric freight traffic into and out of the city centre."



Flashart, Daniëlle van Leeuwen

ELECTRIC SCOOTER FACTORY (ESFA)



A Dutch manufacturer of electric scooters approached the City of Rotterdam, stating that, primarily for environmental reasons, he wanted to relocate his manufacturing operations to the Netherlands. "In order to find a location, we introduced him to the Port of Rotterdam Authority, who run the RDM Campus in the port area, a business location that was specifically set up to accommodate

startups and innovative companies. This is where the Electric Scooter Factory Rotterdam is currently located and where the company has a partnership with DAAD, an organization that helps long-term unemployed persons reintegrate into the labour market. Furthermore, we purchased ten electric scooters, and subsequently brought the initiative to the attention of our partners. Within fourteen days, he had signed one hundred orders."

Among Rotterdam's fleet of electric service vehicles is a Hybrid Volvo refuse collection truck



(electric transport broker) to visit companies to discuss and enumerate the options and opportunities of electric vehicles."

In fact, the charging points themselves prove to be particularly effective means of communication.

"I have personally experienced that people came up to me while I was charging my car and enquired about it. People are triggered once they see how it works in practice," recounts Lindeman. "Whenever people apply for a charging point, we therefore invariably write a letter to their neighbours to inform them and call their attention to electric transport."

PILOT PROJECTS AND ALLIANCES

To promote the further rise of electric cars, Lindeman firmly believes that the city needs to expand its knowledge and experience.

"This is why the city participates in



a large number of research projects and networks. To name one example, together with power company Eneco and network operator Stedin, we monitored the use of our three vehicle fleets. The results showed that

**Mrs Alexandra van Huffelen,
Alderman for Sustainability,
the City Centre and Public
Spaces and Vice Mayor of
the City of Rotterdam**



'As a world port city, Rotterdam accepts its responsibility for a sustainable future. The municipality is doing this by promoting electric transport among other things. Electric vehicles are clean, quiet and efficient. Rotterdam wishes to accelerate the introduction of this form of transport and sets particular effort to achieve the maximum results possible.'

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The infrastructure of charging points is a prerequisite to persuade consumers to buy electric cars. Therefore, it is our job as a city to ensure that the infrastructure is in place

even today, it is possible to replace 60% of our smaller vans by fully electric equivalents. These study results can also be used to convince businesses and other parties."

The city collaborates with various tiers of government and market parties at a regional, national and international level.

"This includes conducting meetings with car manufacturers in order to scope out new technologies they are working on. One of our contacts at Renault recently told us that their head office in Paris regards the Netherlands as a front runner when it comes to electric transport," says Lindeman. "I must say I was rather proud to hear that."

THE FUTURE

Lindeman continues by announcing that Rotterdam has now reached a level where it is meaningful to evaluate the concrete effects of the increased numbers of electric vehicles in the city.

"However, it is still too early to discern a material impact on CO₂ emissions and air quality," she adds. "This will have to wait until thousands of electric vehicles cruise the city streets on a daily basis. And the tipping point will not be achieved until electric vehicles can be sold at a competitive price compared with regular petrol and diesel models. In addition, the development of a mature used vehicle market is important, as is a nation-wide approach in creating a charging infrastructure network that covers the entire country, not just the large cities."

TIME FOR THE NEXT PHASE

"In the past few years, we, as a city, have contributed to the promotion of electromobility. Now, the time has come to embark on the next phase, in which we will pursue more benefits of scale, create pressure to preserve tax incentives, and strive to develop a

nation-wide charging infrastructure network," Lindeman and Oranje conclude. "The practical details will have to be fleshed out as we go along, in collaboration with the other parties involved. In any event, it is clear that we cannot afford to lose the current momentum."



Municipality of Rotterdam/Herman van Gestel

The city is right on schedule with the installation of charging points

FYI

Lutske Lindeman is programme manager of Rotterdam Elektrisch (Rotterdam Electric)

Arjan Oranje is project manager of Oplaadinfrastructuur Rotterdam (Charging Infrastructure Rotterdam)

<http://www.rotterdam.nl/elektrischrijden>

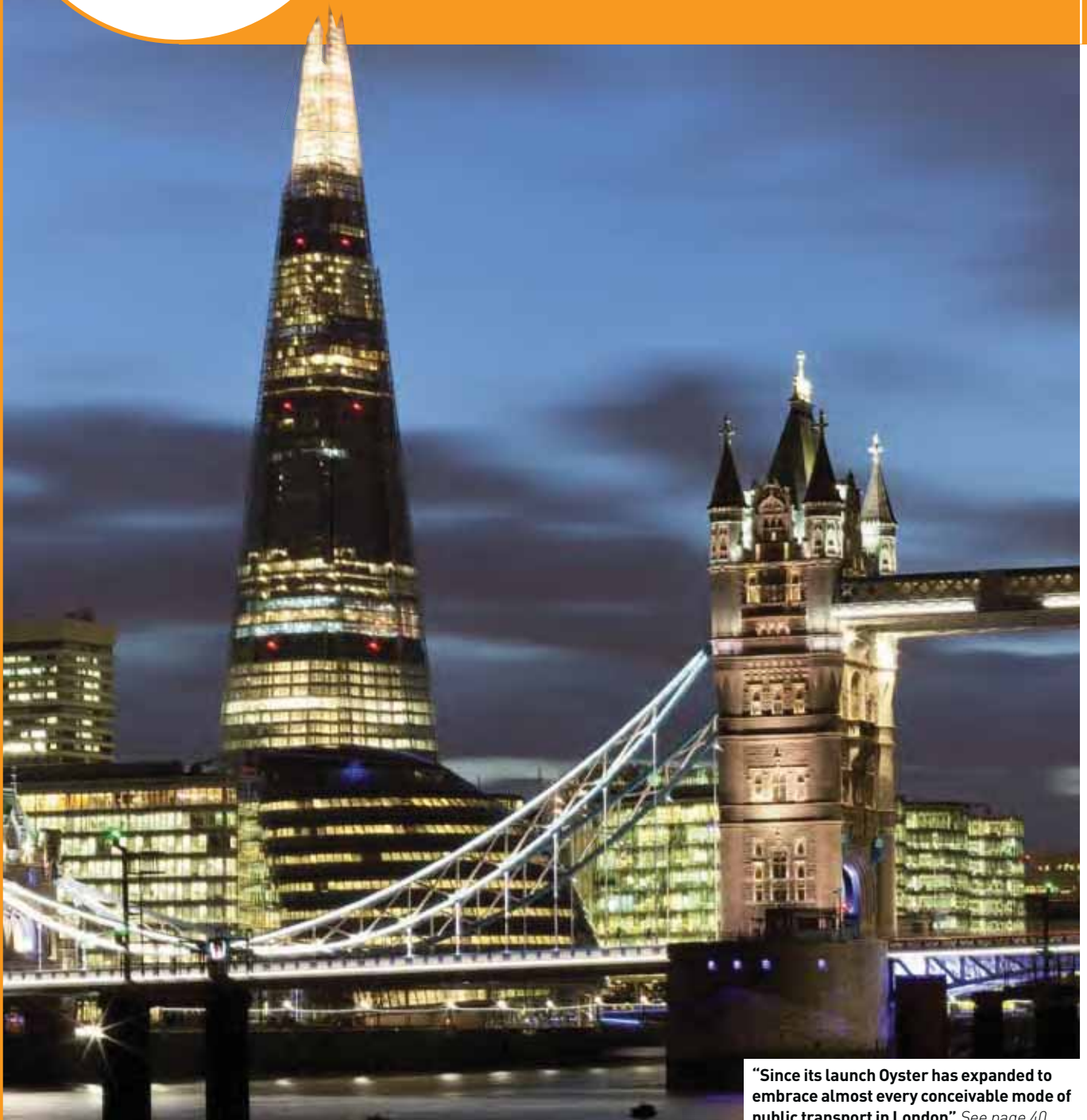
<http://www.rotterdam.nl/Stadsontwikkeling/Document/Rotterdamelektrisch/120529%20vastgesteld%20Kader%20Oplaadinfrastructuur%20auto.pdf>

Mobility, Multimodality and Traffic Efficiency

The section on Mobility, Multimodality and Traffic Efficiency addresses issues related to network management, network efficiency and innovative services, with a particular focus on Intelligent Transport Systems

- **London, UK** – back office systems
- **Turku, Finland** – urban growth and mobility
- **POSSE** – open specifications and standards
- **Social media** – its role in gathering data

Mobility, Multimodality and
Traffic Efficiency



"Since its launch Oyster has expanded to embrace almost every conceivable mode of public transport in London" *See page 40*

Playing from the back

Why the back office route to the smart city is best,
by **Phil Silver**

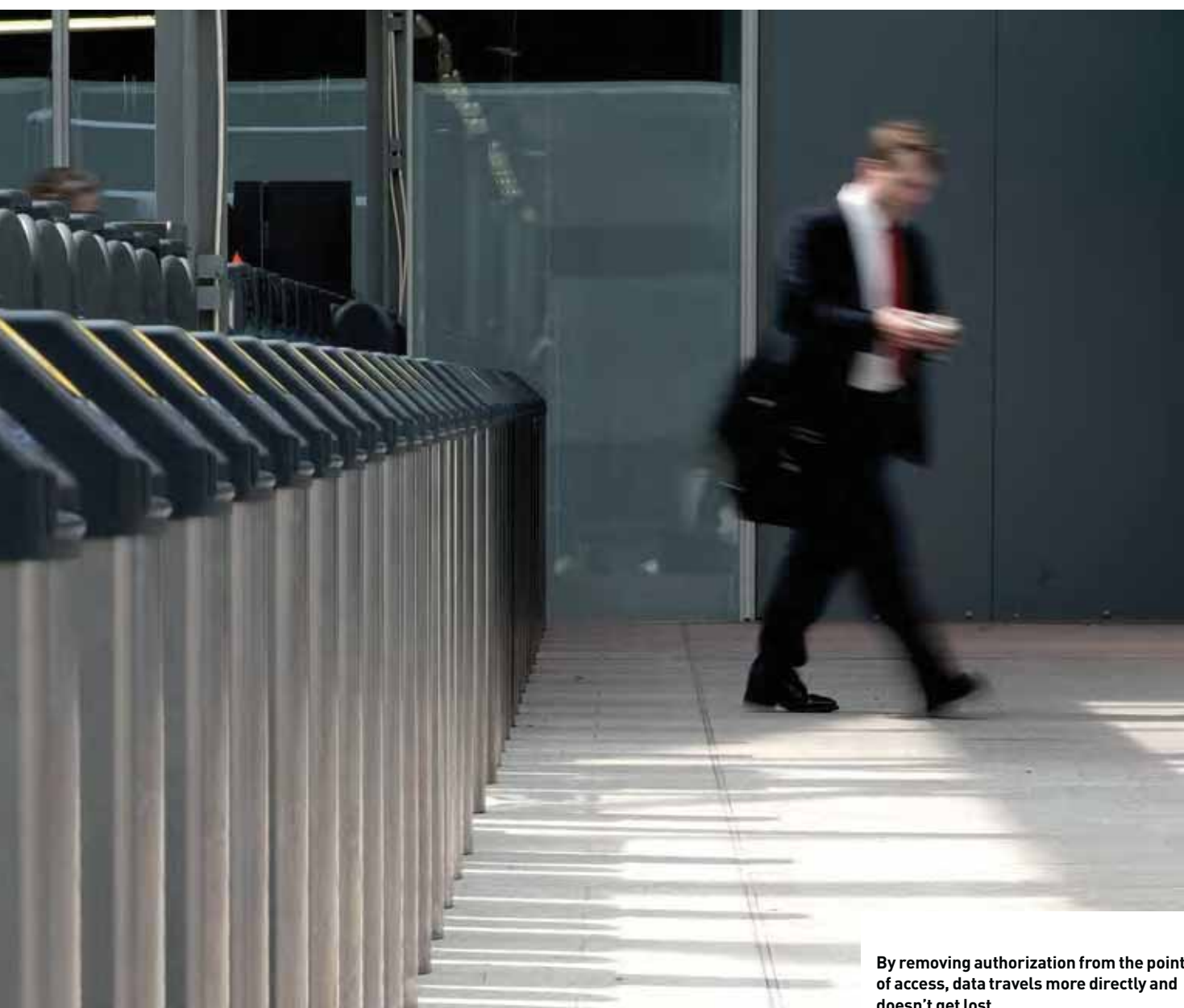
As the “smart city” concept gains currency, there is an increasing realization that a vital component will be equally “smart” urban transit networks to move people around them. In such networks real-time data from multiple transport modes (tolling stations, car parks, buses, trains and even bike-share schemes), operated by multiple agencies, are aggregated in a central IT environment and used for the benefit of all transit stakeholders. Passengers plan and buy travel easily and conveniently, from operators who know the modes and routes they usually take and can tailor travel products accordingly. Meanwhile,

operators, authorities and agencies understand who is using the network, how and when, can “talk” to them via their always-on mobile devices, and can make informed decisions about current and future transport provision. It’s a vision of intelligent transport and mobility that appeals to everyone.

The international gold standard for this concept is London’s Oyster scheme. Since its launch in 2003, Oyster has expanded to embrace almost every conceivable mode of public transport in and around London, paid for by both agency-provided and open-payment media, and is now poised to embrace the



Whether via the transponder at the toll plaza or the ticket or smartcard at the ticket barrier, the main concern was proving users were authorised



By removing authorization from the point of access, data travels more directly and doesn't get lost



Since its launch in 2003, Oyster has expanded to embrace almost every conceivable mode of public transport in and around London

city's car- and cycle-share schemes. Inspired by London's example, other cities are at various points along the road to multi-modal, multi-agency integrated transport networks.

As the systems integrator for Oyster, Cubic is engaged with a number of the operators and agencies involved in these projects.

As schemes evolve, many realise that integration is hindered by what can be described as a POS-heavy, device-centric architecture. To understand why, we need to go back a few years, to a period before integrated transport was considered feasible, when each stage of a journey — parking, tolling, ticketing, and so on — was a distinct process with its own approach to transaction

management. Integration with other modes was not a priority for the designers of each system, who instead naturally focused on controlling and facilitating access to the system. Whether via the transponder at the toll plaza or the ticket or smartcard at the ticket barrier, their concern was proving users were authorised.

Technology-wise, therefore, the focus was on communication between the media presented — token, cash, magnetic-stripe ticket, smart card, transponder — and the access-control device. In these systems all the logic resides at the access point — at the point of sale (POS), not in the back office. The problem with this architecture is it doesn't easily accommodate

the ranks of multiple devices arrayed at toll plazas or subway stations. Install these and you have to add controllers to aggregate the data from each device and pass it up the chain to a host system, and further up the chain there has to be a financial processing system to record and audit transactions, produce reports for management, and so on.

Because these functions are essentially afterthoughts bolted to the original POS-focused design rather than an organic feature of the architecture, such systems are characterised by unacceptably high levels of lost transactions, which causes auditing difficulties and generally poor reporting. Furthermore, each modal system is a silo, built

Systems can be configured to cover entire regions, taking the benefits way beyond the city boundaries, serving multiple agencies across widely distributed towns and cities

for a specific function and unable to communicate with other systems. The underlying technology in a subway fare gate system means it can't "talk" to a tolling system or a parking system, and vice versa.

Agencies pursuing integrated multi-modal transit systems are now realizing the implications of this approach, and are living with financial back office systems that are not fit-for-purpose because of the data loss between the POS device and the general ledger that goes with depending on POS collection of data. The result for some agencies has been an inability to account for transactions, and the associated problems this creates for the public authorities who are supposed to administer and control these funds.

WORK OUT FROM THE BACK

The alternative approach, developed by Cubic for London, Chicago, Vancouver and Sydney, is to rotate the architecture 180 degrees, instead locating the access-control and transaction management intelligence in a dedicated back office specifically designed to handle multiple modes and multiple operators. By removing authorization from the point of access, data travels more directly and doesn't get 'lost', so transactions are processed accurately, are auditable, and reporting is not only robust but also flexible enough to satisfy stakeholders' different requirements. Systems can be configured to cover entire regions, taking the benefits way beyond the city boundaries, serving multiple

agencies across widely distributed towns and cities.

Three factors make this approach possible. The first is the relatively recent development of reliable high-speed wireless networks to connect all the data capture and processing devices an intelligent transit system needs. The second is the ubiquity of "always on" mobile devices — particularly smartphones and tablet PCs — that enable two-way communication between the network operators and their customers.

These two factors are there for other transit system integrators to leverage. The third, I believe, is unique to Cubic: our experience in those cities I have cited has given us an in-depth understanding of the issues that determine the success of an integrated travel system. In turn — alone among integrators — we have applied this understanding to design and build a completely new platform, NextCity, that features a single scalable financial back office system specifically designed for multi-modal operation. This approach contrasts starkly with competitors whose offerings are built on integrating multiple back office systems, one for each mode; instead a single system interfaces with POS devices controlling access.

OPEN TO THE NEXT

Fundamental to the NextCity back office concept is the fact that cities do not have to replace all their legacy systems to take advantage of it; the back office is designed to interface with existing systems in order

to aggregate the data they generate. Not only does this reduce costs, aggregation means the businesses providing the transactions — the pay-by-phone parking company, for example — may benefit from economies of scale by paying lower transaction processing charges than those available from their current provider.

Costs are further minimized by building the financial and reporting systems on commercially available business intelligence, reporting and general ledger products that use open standards and thus can easily be interfaced with multiple IT systems. A welcome consequence of this non-proprietary approach has been to bring all-in-one integrated transport within the reach of smaller regions and communities that face the same transit challenges as larger conurbations, but on a lesser scale that has previously made them difficult to tackle commercially. That is now changing.

Looking to the future, demands on the back office are only going to grow as the components of the urban transport environment become increasingly integrated and increasingly higher priced. The era of POS-centric architecture has passed and future solutions will be uniformly driven from the back office.

FYI

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The Finnish article

How can urban growth be brought into sync with the increasing mobility requirements of residents and commuters? The Finnish city of Turku and Siemens Mobility Consulting have been exploring this issue and an initial study shows the positive impacts an intermodal transport concept and a new planned light rail system can have for the city, as **Eberhard Buhl** reports.

In Turku, the fifth-largest city in Finland, city planners are focusing on integrated mobility



Light rail systems can help to prevent the collapse of a city's transport system: this finding has long-since proven its validity in megacities around the world. But how do smaller cities and regions cope with their transport problems? After all, most cities worldwide are

medium-sized, with something in the region of 200,000 residents.

Turku in southwest Finland also belongs in this category. Founded in the 13th century, Turku is currently the country's fifth-largest city with just over 180,000 residents. As the center of Finland's third-largest metropolitan



Municipal transport director Sirpa Korte

Urban planning and transport planning have to support one another – that's the crucial factor in areas of new development."

Sirpa Korte, Transport Director, Turku

area, it plays an important role in culture and education. Several vocational institutions and three universities are based in Turku, including the Åbo Akademi, Finland's only purely Swedish-speaking university.

Thinking in terms of sustainability has been the norm here for some time. The Turku Climate and Environment Program of 2009, for example, aims to reduce the 1990 levels of greenhouse gas emissions per capita by 30% by 2020. Like elsewhere in the world, however, growth and prosperity are giving rise to negative impacts: the city's growing traffic volume is responsible for around a quarter of local CO₂ emissions. Noise and air pollution are constantly increasing, as are congestion and accident rates.

THE GOAL: INTEGRATED MOBILITY

The municipality wants to tackle this problem with an intermodal transport strategy. The goal: integrated mobility. The strategy, for instance, aims to increase bicycle traffic around 50% by 2030. With annual population growth of around 2%, public transport should absorb the additional transport load between the suburbs and the city center. At the same time the strategy aims to generally shorten journeys between people's homes and places of work through urban planning measures such as densification and mixed building utilization. All in all these are very sound measures, as the structural plan for the Turku region anticipates around 60,000 more residents and roughly 20,000 new jobs in the next two decades.

"If this population increase takes

place evenly across the region, as we have seen in the past, this will pose an enormous challenge to the transport systems of the city and the surrounding area," explains Sirpa Korte, director of the municipal transport authority. "More private cars place a great load on the road network, the air quality deteriorates and quality of life generally declines."

The conditions for a sustainable public transport network in Turku are certainly more favorable than elsewhere. In the central areas, at least, bus services have been steadily expanded.

"Unfortunately, the capacity of the bus lines in districts like Varissuo and Runosmäki is far from sufficient," says Korte. "And it's difficult for us to persuade more people to take the bus when there is literally no more room for extra passengers at certain times of the day."

THE ANSWER LIES IN RAIL

Examples in many cities worldwide show that light rail and tram systems, integrated into an overall strategy, prove to be popular measures for improving the use of urban space. In addition, an electric-powered public transport network can contribute significantly to attaining ambitious climate goals, such as those set in the Turku Climate and Environment Program.

Central Turku used to be served by an extensive tram network until the city decided to discontinue its operation in 1965. In the meantime priorities have changed: the city's politicians are in favour of building a new light rail system and feasibility studies for two lines are already underway. As transport director Korte explains: "Public transport has

to be good enough to make people want to use it instead of their own cars. That means smooth journeys, easy access and comfortable travel. Depending on the district in question, trams or an advanced bus system form the cornerstones of an overall transport strategy.

But how can city planners ensure that their measures will actually lead to the desired results? The municipal authorities went looking for a strategic partner with the necessary expertise in this field and opted for Siemens Mobility Consulting. The team consists of Siemens tram experts and Finnish colleagues in the region. The choice made

Finding the best way

Experts from Siemens and Turku are currently working on another study as part of a three-year cooperation agreement. They are developing a concept for sustainable city districts in order to manage the expected population growth in the most environmentally friendly way possible. Consultancy experts from Siemens are also actively involved in the creation of new urban concepts in various cities around the world. A study is currently being developed for Singapore to examine the CO₂ prevention potential of technologies in the areas of transport, residential buildings, non-residential buildings and information technology. The study also includes recommendations for action.

sense, bearing in mind the Siemens Infrastructure & Cities Sector offers solutions for transport, building technologies and electric power from a single source. The city of Turku and the Siemens project team then carried out a study to ascertain how the favourable conditions in the region could be translated into a sustainable urban solution.

SPOTLIGHT ON TRANSPORT AND REAL ESTATE

The study focused on two areas: the environmental angle was to examine the influence of the planned tram system on the development of CO₂, particulate matter and nitrogen oxide (NO_x) emissions within the city limits; and the economic aspect focused primarily on the development of real estate along the planned routes.

Economic development in the direct catchment area of a rail network is consistently positive all over the world. This is demonstrated by successful projects such as the new light rail system in Houston, Texas. The Turku planners expect to see a similar economic boost along the Blue Line, due for completion by 2025, and the Red Line, expected to open in 2035. The intention was to use the results of the study as a basis for future decision-making processes. Case studies from 10 European and US cities showed that the modal split – the distribution of the transport volume among different modes – rises by up to 163% within three to 15 years of the introduction of a tram or light rail system. Even with the most conservative scenario, public transport use in Turku could increase by at least 40% – and the effect is likely to be considerably greater. The calculations suggest that the introduction of the light rail system could prevent an around 25% rise in CO₂ emissions by 2035, which equates to 130,000 tons per year as well as a 42% increase in pollution from particulate matter. However, for the required 11.5



Korte is certain that trams like the Avenio will make urban regions more attractive. "What's more, we already have in place a universal ticket and information system for the region."

million tram journeys per year to actually be attained, municipal policy will effectively have to start promoting public transport use to the city's residents years before the system goes into operation.

As a result of such an integrated solution, merely the switch of many car and bus users to the light rail system will reduce road traffic enough to bring about an estimated 11% cut in CO₂ and around 12% in NO_x emissions. In addition, particulate emissions will fall by around 8% and – an important factor for a country with typically long winters – particulate pollution due to road gritting services and abrasion from studded tires will decline by roughly 7%.

ON THE RIGHT TRACK

Greater Turku, which includes the neighboring towns of Kaarina and Raisio, covers around 13.5 million sq metres, around 60% of which is within an 800 metre zone around the planned light rail lines. A comparison of experiences in other countries showed that an integrated light rail solution leads to above-average growth in real estate value within this zone, even by conservative estimates. The value of the municipal properties alone could rise by €58 million, thus contributing to the financing of the entire transport project.

These calculations do not even

take into account the so-called soft Factors – the greater quality of life for the residents and the increasingly positive image of the city. Once more, cases around the world show what a boost these factors can give to the economic, environmental and social development of a region in the medium term. The conclusion of this study clearly shows that Turku is on the right track with its plans for an integrated transport solution. Transport director Sirpa Korte also feels the choice is justified.

"A light rail system is a tried-and-tested means of making public transport quicker, simpler and more attractive for the city's people. In that sense, our plan is not just a transport project, but an important step toward a more pleasant life for everyone in the city center. There's no doubt about it: the light rail system heightens the appeal of our city."

FYI

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#ECC2014

EUROPEAN CYCLING CHALLENGE 2014



Photo: Beata Lenkiewicz

THINKING Aloud in the city

Following on from the success of Thinking Aloud, the *Thinking Highways* magazine podcast, Paul Hutton and Kevin Borrás bring you news, interviews and opinions from the smart transport for cities and regions sector in a new monthly internet radio show.

Episode one features interviews with Polis' Sylvain Haon, smart city pioneer Larry Yermack and TRL's Denis Naberezhnykh.

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A STRONGER VOICE FOR CITIES

Many cities and regions exchange ideas to identify solutions that can help to achieve a more liveable city or region with a more sustainable transport system. These cities meet in Polis, the network of cities and regions working towards sustainable mobility. Together, they have a strong voice towards the European Institutions and best access to network with peers and strategic players in the transport sector.

Polis membership is open to local and regional authorities and to their transport authorities, mobility agencies and local public transport organisations. Go to www.polisnetwork.eu/become-member

Bologna invites cities from across Europe to join the European Cycling Challenge 2014

The city of Bologna initiated the playful and effective European Cycling Challenge, in which European cities form groups of cyclists who track their trips and quantify CO₂ savings, thus encouraging citizens to cycle more often.

"The 'challenge mechanism' motivates individuals to join the initiative and be proud of their contribution to making the city more liveable", says Dora Ramazzotti from SRM Bologna. In 2013, over 3,000 people from 12 cities joined the 2013 Cycling Challenge and cycled more than 310,000km. At the end, team Tallinn beat Lille and Bologna to win the challenge with more than 55,000km cycled by its 480 participants.

Polis supports the Cycling Challenge, which has also been awarded with the CIVITAS Award 2013 for Public Participation. To register your city and watch a video explaining the challenge, please visit www.ecc2014.eu.

WHY JOIN?

- The Cycling Challenge has the added effect of promoting cities internationally.
- Local authorities involve citizens to reach shared goals, such as CO₂ and traffic reduction.
- Cities can access data on all cycled routes, which can support planning and validation of cycling networks.

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Open season

POSSE – opening up a new ITS reality for the thinking city, by **Suzanne Hoadley**

Intelligent transport systems (ITS) are widely implemented in cities and regions to manage traffic and to influence travel behaviour through systems such as adaptive area-wide traffic control, real-time travel information, bus priority at traffic lights, smart card ticketing and car park management and guidance, among others. ITS have largely been implemented in an un-coordinated and incremental way, due in part to the

multitude of organisations involved, the absence of a common set of open ITS standards and specifications in Europe, and the prevalence of closed, proprietary systems within the market.

Closed systems are commonplace and mean that technologies produced by different suppliers cannot (easily) interoperate within a system due to the specific way in which a technology has been designed.

Closed systems have also led to a situation of vendor lock-in for public authorities. For example, once an authority has acquired a basic urban traffic control (UTC) system to manage its traffic signals, it may be unable to buy a bus priority system or a car park guidance system from a different supplier without replacing the UTC system too. Technologies purchased from different suppliers are rarely able to operate with each

The benefits and challenges of adopting open specifications and standards

It is not always easy to capture in numbers the benefits of adopting an open systems framework, such as UTMC and OCIT/OTS, due to their flexible nature (ie, users can choose which 'parts' of UTMC and OCIT/OTS to adopt) and the different contextual framework of the users (eg, systems deployed, skills available, resources, etc) and the market situation (eg, culture of cooperation). Many 'less quantifiable' benefits have nonetheless emerged over the years and these have been confirmed in the interviews undertaken for the POSSE 'End user study'. Benefits accrue for both the customer (ie, transport authority) as well as the supplier (ie, industry). But there are also challenges for both too.

While most users agree that the ease of integration and the opportunity to operate in a mixed vendor environment and to bring down costs – the main rationale behind UTMC and OCIT/OTS – have been beneficial, users have also pointed to a number of other advantages, notably more efficient traffic operations, simplified procurement, improved customer-supplier relationship and future proofing investments. These benefits are described below, mainly from the perspective of the customer (traffic authority) except where stated. It should be highlighted that not all benefits have been experienced by both UTMC and OCIT/OTS. This is mainly due to the different starting points, driving forces and market culture behind the respective initiatives.

○ **More efficient traffic operations:** Open specifications and standards allow a better integration of ITS which enable a more holistic view of the traffic situation, a greater use of automatic responses during key events (stadium, concerts, etc), a better understanding of how systems work together and how to resolve problems as they occur (introduction of distributed systems, avoidance of traffic information silos, etc), and greater flexibility in terms of mixing and matching solutions.

○ **Cost reductions:** The impact of adopting open standards has actually been measured in financial terms within the OCIT/OTS community. A fall in the cost of buying traffic signals of up to 80% in the early beginning has been recorded, in the recent years up to 40%. Within the UTMC community, savings on capital investments and annual revenue costs have been estimated as follows: (i) a capital investment saving per authority for establishing the core regional UTMC system is in the region of 30%; (ii) ongoing annual revenue saving per authority for maintenance of a UTMC system of around 40%; and (iii) potential staff saving for operations in the region of 1.5-3.5 persons.

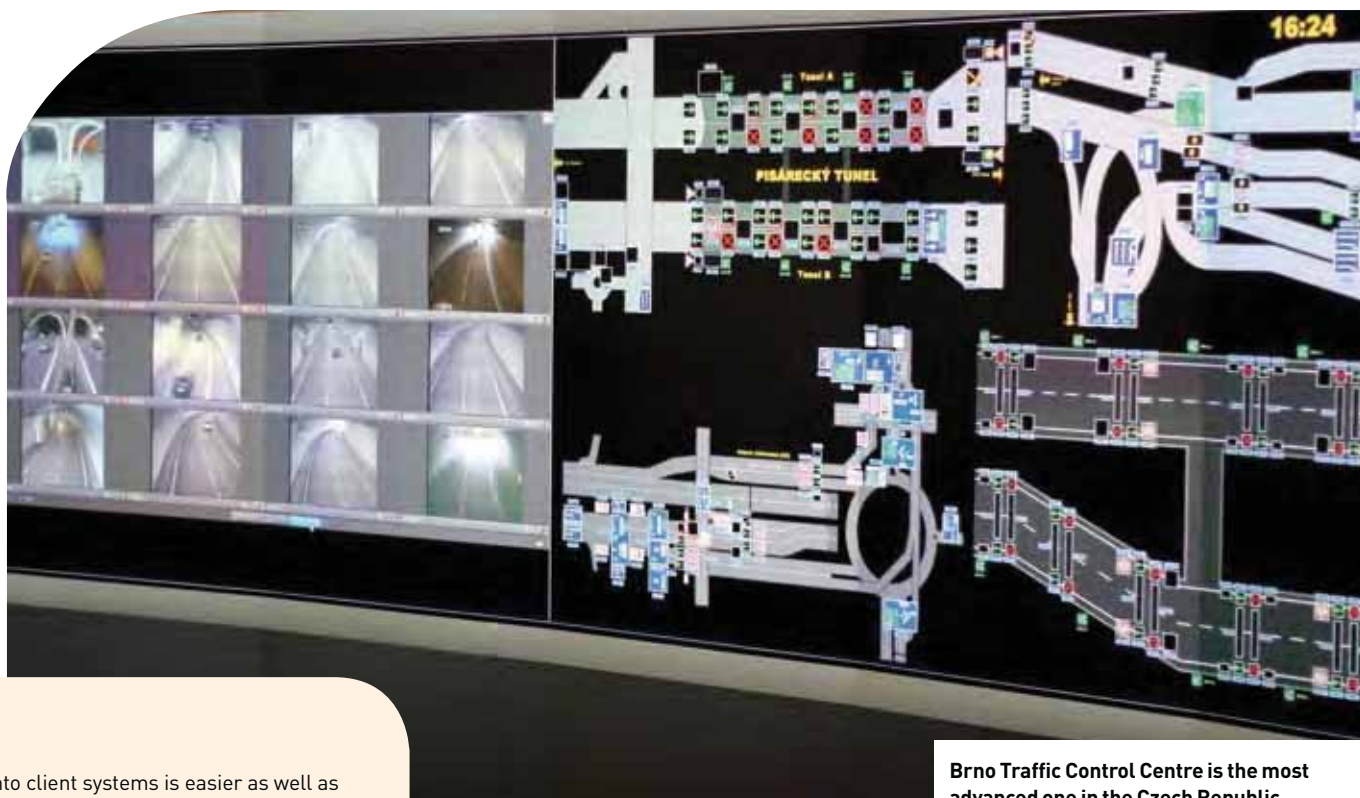
○ **Simplified and structured procurement:** The technical specifications are impartial and readily available for use in procurement, which can simplify greatly the tendering

procedures. Tendering procedures are common to all; therefore, an authority can make use of another authority's specifications and tendering document.

○ **Promoting innovation:** Open systems have scope for flexibility and evolution to keep up with technology and policy developments; the open systems framework provides a simple structure for the addition of new technology. By working together, local authorities can create enough market pull to drive industry developments, which is not achievable alone, except in the case of very large authorities. Finally, the market can increase in size, especially among outsiders and in new business areas generated by open specifications and standards.

○ **Better customer-supplier relationship:** Traffic managers know what is technically reasonable and available and can better articulate the solutions sought from industry. Industry has a better understanding of the traffic managers' needs. Clarity of technical requirements helps dialogue between buyer and suppliers – they can talk the same language in procurement specifications.

○ **Greater marketplace stability and investment safeguards:** Open interfaces support the future proofing of systems and overcome the risk of legacy systems for the traffic authorities. Integrating products



Brno Traffic Control Centre is the most advanced one in the Czech Republic

into client systems is easier as well as upgrading existing compliant products. The risks in deployment and integration have lowered significantly for suppliers.

While open specifications and standards bring many benefits, there are also some challenges:

- Legacy systems: Integrating compliant systems with legacy systems is still difficult
- Skills' changes: An open systems framework is technical by nature and can be daunting to learn about. Once this first hurdle is overcome, the framework is not difficult to work with.
- Rogue suppliers: some suppliers may claim that a product is compliant but it is not. This creates confusion and additional costs/efforts for the customer. The introduction of certification processes and interoperability testing could be a way around this.
- Challenging economic situation: cheaper proprietary systems may tempt authorities to acquire them without fully appreciating the higher costs of maintenance, upgrades and expansion associated with such systems
- Resources: maintaining and developing further an open specifications and standards framework requires resources. Quantifying the benefits, in terms of cost savings, would be beneficial.

The absence of open specifications and standards in ITS also perpetuates the monopoly that some suppliers have in a number of member states

other as they are designed to different, proprietary, specifications.

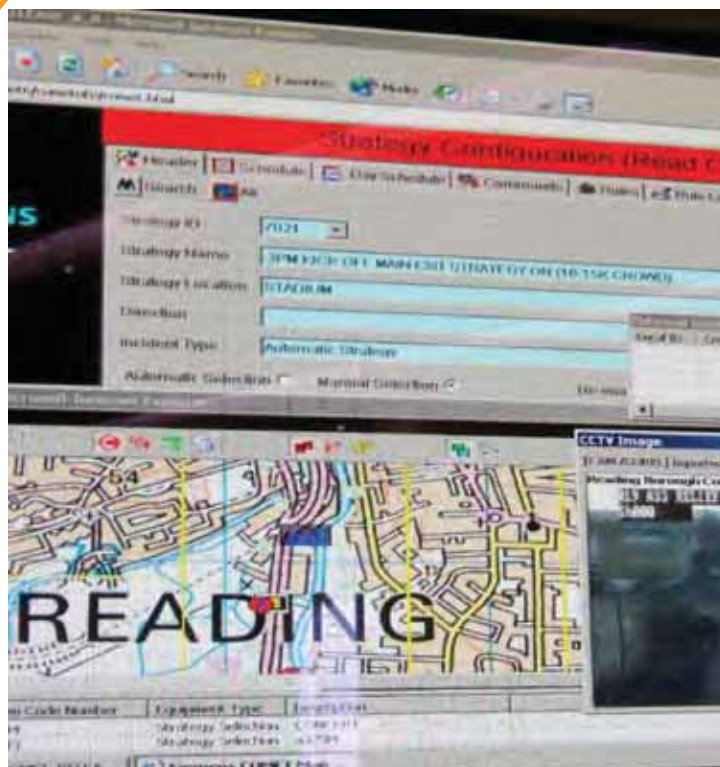
This creates an anti-competitive situation that has implications for both the public authority and the suppliers in terms of higher cost, loss of operational efficiency and lack of incentive to innovate. The absence of open specifications and standards in ITS also perpetuates the monopoly that some suppliers have in a number of member states.

OVERCOMING CLOSED ITS SYSTEMS

Two national-oriented initiatives were launched over a decade ago to overcome the closed-system nature of traffic management and ITS; they

are UTMC in the United Kingdom and OCIT/OTS in the German-speaking part of Europe. Polis invited both initiatives to a Polis members meeting in 2010 in order to learn more about them and to ascertain the interest of cities and regions elsewhere in Europe in the open systems approach. The meeting revealed that the problems of system fragmentation, vendor lock-in and market monopoly are widespread throughout the continent. Consequently, Polis decided to make this a priority topic. This led to the POSSE project supported by the EU's INTERREG IVC programme.

The main aim of POSSE is to raise awareness of the need for open



Reading Borough Council in Berkshire, UK, is the coordinator of POSSE

The city of Brno, Czech Republic, is one of the city transfer sites



Photo: Christian Lütges

Statements from selected partners

OCA

Involvement in POSSE is part of OCA's strategy to raise its international presence and awareness, to liaise with similar communities (UTMC, POLIS) and to keep in touch with the European Commission.

Through POSSE, transfer sites are able to learn from OCA's experience in using open standards and specifications (ie, OCIT, OTS, DATEX II) within their traffic management architectures. OCA is also able to obtain feedback from POSSE, mainly in relation to the specific views and needs of transfer sites, which is useful to enhance and improve the standards used and the accompanying documentation, ie, OCA's OTS Guidance, the OCIT Guidance, the Procurement Model (OCA Process Model) and the OTS-System Model considering new technology.

UTMC

UTMC is a UK-based initiative to create and sustain practical open standards for ITS, by bringing together local authorities and the supply industry. In this way, system management, integration and operation are all made more flexible and effective,

while the competitive environment creates more innovation and better prices.

UTMC has always looked to European standards as a starting point, but POSSE has provided an opportunity to engage with cities at a much more detailed level. We wanted to share our experience of creating and using open standards with non-UK cities; in the process, the UTMC framework aims to adapt to the requirements of local authorities outside the UK.

It has become clear that the European ITS market is not uniform, in many ways: political priority, levels of ITS deployment, supply market dynamics, etc. This is both a challenge and an opportunity. Specific technical aspects of UTMC may be usable, or may need to be adapted to local non-UK circumstances; equally the UTMC framework could gain significant new strength from alignment with the different perspectives in, say, Norway or the Czech Republic.


Municipality of La Spezia

La Spezia is a fast growing city with regard to ITS and wishes to bring existing ITS together with new systems and services.

Some have been in operation since 1996 (Urban Traffic Management Centre) and others are very recent and innovative (access control, parking information with on road parking slots controlled by specific sensors), a new infomobility platform for traveller information services, and a contactless smart card including bike sharing, park and ride and public transport.

The overall objective of the city is to use open specifications and standards in future ITS development specifically in relation to the open data concept (making most of the data in the ITS systems available for public use). POSSE has so far contributed to kicking off the discussion on the open ITS and the open data concept.

La Spezia is designing its own open ITS and open data implementation plan including awareness-raising measures, setting up the basic requirements for the city strategy on open ITS and open data, undertaking a feasibility analysis about existing infomobility systems in order to assess their potential to become open and to make their data open and developing the "open" reference specifications for future ITS tenders.



specifications and standards and to share the experiences of existing open system frameworks in Europe. A central objective of the project is to build the capacity of transport authorities to implement open specifications and standards. To this end, POSSE is facilitating knowledge transfer between UTM and OCIT/OTS and public authorities wishing to move towards open systems (referred to as Transfer Sites): the cities of Burgos (Spain), Pisa and La Spezia (Italy) and Klaipeda (Lithuania), the Norwegian Public Roads Administration and the Czech Transport Research Centre (CDV). With the expertise of the main technical partners, they are each developing a plan for implementing open standards and specifications.

In addition, POSSE is drawing up a good practice guide for the implementation of open specifications and standards, covering aspects such as

the reasons for Open Specifications and Standards, a description and history of the development and implementation of UTM and OCIT/OTS, the lessons learnt and the transferability issues drawing on the knowledge transfer in the POSSE project. The guide will be issued in the middle of 2014 taking into account the experiences of the Transfer Sites in drawing up a plan to implement open systems, and in a few cases, the actual adoption of open specifications and standards in national law and/or national ITS strategy.

ENGAGING LOCAL STAKEHOLDERS IN MAKING OPEN ITS SYSTEMS A REALITY

The Transfer Sites are currently promoting the concept of open ITS systems locally or nationally and are engaging with the key stakeholders to make open systems happen. To facilitate this dialogue, POSSE

literature and activities (leaflet, website, workshops, etc) are conducted in the vernacular. To enable a wider group of stakeholders to benefit from the knowledge sharing within POSSE, particularly in those countries not represented by the POSSE partners, the POSSE Forum has been set up and has now close to 20 affiliated members drawn primarily from organisations representing national and local transport authorities. In addition to knowledge sharing about POSSE, the Forum is also proving useful in uncovering other relevant initiatives in Europe and promoting discussion on what role should be played by the EU (if any) in promoting open specifications and standards.

FYI

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The next 12 months will see many POSSE tasks come to fruition and the project will culminate in the final conference at the end of 2014. To keep abreast of POSSE news and events, please register for the POSSE newsletter via the POSSE website (www.openits-posse.eu) or contact Suzanne Hoadley by email.

POSSE is coordinated by Reading Borough Council. The other partners are: UTM Ltd, OCA e.V., Polis, the cities of Pisa, Burgos, Klaipeda and La Spezia, the Norwegian Public Roads Administration and the Czech Transport Research Centre (CDV). POSSE is an INTERREG IVC project running from January 2012 until December 2014.

Norwegian Public Roads Administration

The Norwegian Public Roads Administration (NPRA) recognises the importance of open specifications and standards and the POSSE project is enabling it to learn more about existing open system approaches. The use of international standards and specifications will be central to the NPRA's ITS strategy and ITS action plan, which are important tools for the further development of ITS in Norway.

Open specifications and standards are closely linked to the definition and use of ICT- and ITS architecture. ARKTRANS, the Norwegian Framework for interoperability in the transport sector, will be adopted as the reference architecture for ITS in the strategy and the action plan. The use of ARKTRANS is a natural part of the NPRA's engagement in the POSSE project.

NPRA is planning a workshop to discuss connections and similarities between ARKTRANS and the structure of UTM and OCIT/OTS. A goal could be "when specifications are in line with ARKTRANS they also should be POSSE compatible".

CDV/Czech Transport Research Centre (representing the city of Brno)

CDV has been promoting open specifications in ITS implementation in Czech cities. The city of Brno, as the Transfer Site of the project, has identified two main fields of interest: traffic control at crossroads and parking management. Brno is already using OCIT communication between controllers and the centre so the focus has been directed at parking. In 2012, Brno carried out a parking management analysis in the city and is currently defining next steps, including the design of a parking strategy.

CDV has introduced the project POSSE to other cities too. Karlovy Vary has decided to investigate further the potential of new emerging technologies and CDV has provided a feasibility study for on street parking management in the town centre that was delivered in October 2013. This offers an opportunity to promote open specifications using DATEX II for the data output of the future system.



A virtuous cycle

Susan M. Grant-Muller and **Ayelet Gal-Tzur** discuss the role of social media in the service of transport authorities where quantity is the basis for quality

The use of social media by transport authorities and by transport operators as a way of communicating with the traveling public is already a daily reality. However this raises the question of how those involved in the transport sector can encourage the public to offer more voluntary comments, feedback and engagement in improving transport services via social media. In other words, how can the social media asset be used to the maximum potential by the transport sector.

Probably the most common social media applications that transport authorities and operators use to communicate with travellers are Facebook and Twitter. Out of the seven categories of social media defined by Sterne (ie Forums and Messages Boards, Review and Opinion Sites, Social Networks, Blogging, Micro Blogging, Bookmarking and Media Sharing), Facebook belongs to the Social Networks category whilst Twitter belongs in the Micro Blogging section.

The widespread use of these two types of social media is supported by the findings of a survey conducted in 2012 by Bregman (*Uses of Social Media in Public Transportation*, TCRP SYNTHESIS 99). Bregman's survey of 34 transport providers known to use one or more social media platforms in the United States and Canada also revealed that the vast majority of social media activity by transport agencies concerned information dissemination. In particular, the sharing of news and service alerts was

found to be the most common type of activity.

As important as these two activities are, they are not maximizing the potential of social media as a means for two-way communication between the transport sector and its customers, ie the travelling public. There is enormous potential to use the transport-related information captured by applications such as Facebook and Twitter that has been posted by the travelling public. This can act as a rich source of information concerning experiences and opinions that would traditionally be collected through other means (such as surveys) but which would require substantive resources. This is not to say that traditional surveys have lost their role in transport decision-making, but rather to regard social media as a new and unique source of complementary information.

TEXTUAL HEALING

The willingness of the public to provide transport-related content through social media means has already been demonstrated through an exploratory study focusing on transport-related Twitter messages regarding transport services to and from Liverpool Football Club matches (Gal-Tzur, Grant-Muller, Minkov, Nocera, *The Impact of Social Media Usage on Transport Policy: Issues, Challenges and Recommendations*, forthcoming in *Procedia Social and Behavioral Sciences*). This study showed that travelers voluntarily post a vast amount of messages regarding their traveling

needs, transport-related events they encounter (traffic jams, overcrowded trains and so on) and opinions regarding the quality of service of public transport.

However, a number of challenges remain in order to transform textual messages written by the users of the transport system into concrete,



A number of challenges remain in order to transform textual messages written by the users of the transport system into concrete, reliable and useful input for decision-making processes

reliable and useful input for decision-making processes. Techniques developed in text mining within other sectors (such as the semi-automated annotation of messages to categorize them by topic) are being gradually adapted for transport sector purposes. These techniques are the key for processing massive amounts

of textual information without the need for unreasonable amounts of human effort.

One of the key factors in the ability to further explore this potential and move from the research phase to the deployment phase is leveraging a high volume of user-generated transport relevant content. The larger

the corpus of messages written by the travelling public is, the higher the chances of identifying common needs and common preferences between clusters of travelers.

The inevitable question is what actions transport authorities can take to increase the size of this corpus. The most accessible and straightforward source of information is the social media accounts of the authority itself. Increasing the volume of messages posted within these accounts should therefore be the primary target of an authority wishing to exercise a fruitful bi-directional communication with the public. The most basic, yet effective measure to do so is to reply to users' messages. The one-to-one reply that takes place in the context of traditional written communication (letters between the public and the authority) doesn't necessarily apply in the social media context. For example, several messages addressing a similar topic can be answered by a single post by the authority.

Nevertheless, responding to messages posted by the public is only the most apparent means to maintain an active exchange of information with the citizens. Another means to encourage the public to post messages is to incorporate "fun" activities into the social media sites. Such activities attract people to enter the account and whilst already logged in, to take a short further step in posting a message. Such measures can span from simple features like incorporating fun videos into the sites (created by the authority itself or contributed



The one-to-one reply that takes place in the context of traditional written communication doesn't necessarily apply in the social media context



21st Century transport agencies and authorities can leverage a high volume of user-generated transport-relevant content

by the public) to more sophisticated means of transport-related games. Serious games – meaning games designed for purposes beyond sheer entertainment – is an emerging trend in many areas. Such games can serve to provide transport related ‘education’ and at the same time attract users to repeatedly enter the social media account. Contests within the social media account can also be a useful in attracting the public to be active through social media.

One example of the use of a contest by a transport authority, described in Bregmans’ report, is the one initiated by the South Coast British Columbia, known as TransLink. The agency began to use Facebook as a way to generate interest in the agency’s new fare card by holding a contest for a new name. Encouraging people to post attractive or amusing images and vote for the best image is a means already used by various bodies as an incentive to engage, and this could easily be adopted by transport authorities.

ULTIMATELY REWARDING

Rewards can also be innovative and cost effective, for example using “fame” by publicizing the contributor of the winning image may be an effective motivator.

The dedicated social media accounts of the transport agency are only one source of relevant

information on users’ needs and preferences. The second source is social media accounts handled by related bodies. Accounts of transport operators and transport-related NGOs in the vicinity of the transport authority are also likely to provide relevant and valuable information.

As the essence of social media is a means of voluntary cooperation between people for the good of all individuals engaged in this arena, it would only be natural to expand this concept to the cooperation between bodies for the common good. One of the first measures that can be taken by authorities is to become “social” with other transport-related organizations. Transport operators and transport-related NGOs who already use dedicated social media accounts to communicate with the public, are the most apparent candidates for such cooperation. Combining the transport related content held in separate social media accounts of the various bodies into one corpus will readily result in a broader and more solid foundation from which to analyse user’s perceptions of the transport system and of the quality of transport services.

The idea of cooperation with other key partners to promote transport policy goals has already been applied in other areas of transport. For example, as part of the SUNSET EU project, key partners were identified

to promote the use of the Tripzoom journey planner aimed at encouraging the use of sustainable transport modes. Finding the grounds for a win-win cooperation is the key for a successful long lasting collaboration between these partners. Ensuring the benefits for each key partner, whether a transport operator or an NGO organization, is a process based on the understanding of the goals and concerns of each.

The key message is that where both parties gain by engaging more via social media – whether they are members of travelling public, transport authorities or other third parties – social media use enters a virtuous cycle and the potential of this modern asset is more fully realized.

FYI

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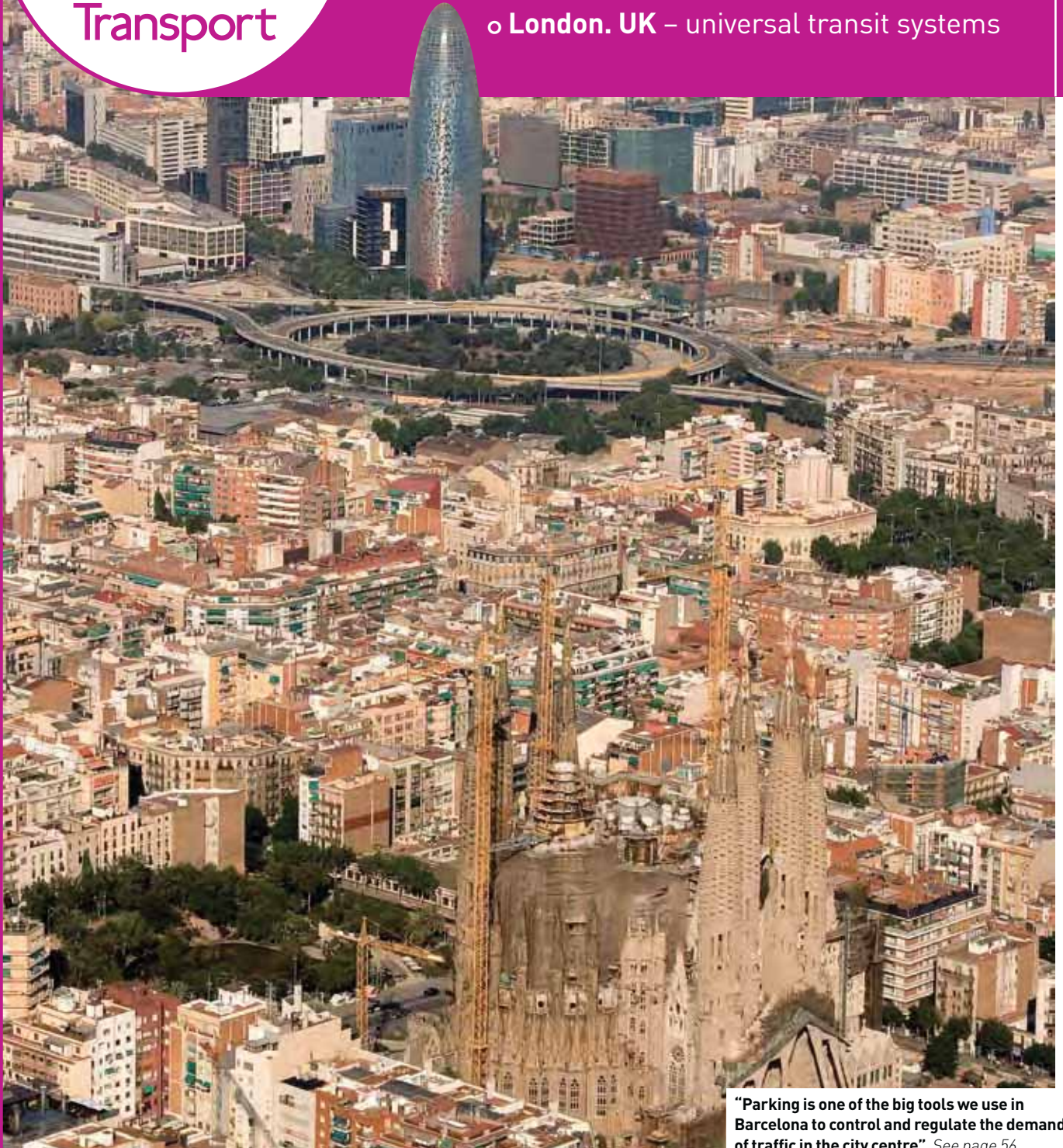
www.its.leeds.ac.uk

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Social and Economic Challenges of Transport

This section focuses on mobility for urban economic development and social policy. This includes accessibility of transport for the mobility impaired and accessibility to basic services (health centres, shops, culture, etc) for everyone; the financing of public transport and transport projects (including road infrastructure) generally; and regulation, planning and governance.

- **Barcelona, Spain** – innovation in parking policy
- **Toyota City, Japan** – Smart Mobility Society
- **London, UK** – universal transit systems



"Parking is one of the big tools we use in Barcelona to control and regulate the demand of traffic in the city centre" See page 56

Keeping the value of public space

Allocating street space to parking has become a sensitive process. On-street parking is increasingly being regulated in Europe's cities as it competes with alternative uses of public space by pedestrians, cyclists and public transport, by cafés, green space or any other human activity. **Antoni Roig Alegre** is director of the parking division at Barcelona City Hall and talks about his city's strategy to manage on-street parking and where parking regulation is necessary with **Dagmar Röllner**

Mr. Roig, you manage 54,000 on-street parking spaces in Barcelona. Doesn't this make quite a powerful tool for demand management in your city?

Yes, parking is one of the big tools we use in Barcelona to control and regulate the demand of traffic in the city centre. However, Barcelona's main problem in terms of parking is that too many people commute to work by car from the surrounding towns. We need to improve the park and ride system and put more parking facilities around Barcelona for people to change to public transport for the last part of their journey into the city.

How is this theory being put in practice?

We face two major problems here: First, we are not rich enough to implement car parks in neighbouring cities and pay for that. Secondly, we would be even poorer if we had to finance the capacity increase of public transport services to be able to carry all these extra people. So it is quite difficult to solve.

What, in practical terms, are you aiming to achieve with on-street parking regulations?

We have four objectives. Objective number one is to keep traffic congestion under control. We want to avoid congestion becoming a bigger problem and we would like to have less congestion than we have at the moment, although congestion in Barcelona is actually not that bad compared with other cities. The second goal of our work is to keep parking indiscipline in the city at a low level. The third objective we follow is to secure residents' access to on-street parking spaces. Instead of reserved spaces for residents we define tariffs that favour residents. Finally, a fourth objective, it is very important to keep the value of public space. We know the street is not only for parking, but for many other things.

Does Barcelona suffer from a "wild" parking culture?

We are talking about parking in double lanes, at pedestrian crossings

Antoni Roig Alegre is

director of the parking division at Barcelona de Serveis Municipals (B:SM), a



company fully owned by the municipality of Barcelona. B:SM manages and controls parking on Barcelona's public street network with a professional work force of 390 people. In his position at B:SM Roig is in charge of on-street parking regulation where he manages 54,000 parking spaces on Barcelona's streets. He also manages B:SM's off-street parking unit, which looks after a part of the city's off-street stock consisting of 55 publicly managed car parks.

or on curb sides, in loading zones or in disabled spaces or in hospitals, taxi stops, or even in bike, bus or taxi lanes. We are spending a lot of money to avoid indiscipline. Why? Indiscipline by itself is nothing but it creates insecurity and disturbs traffic fluidity that leads to congestion with all its negative implications. So if we control indiscipline we avoid insecure situations and we have the benefit of having a better traffic flow and much less congestion.

We are not rich enough to implement car parks in neighbouring cities and pay for that. Secondly, we were even poorer if we had to finance the capacity increase of public transport services to be able to carry all these extra people

Has the value of public space changed?

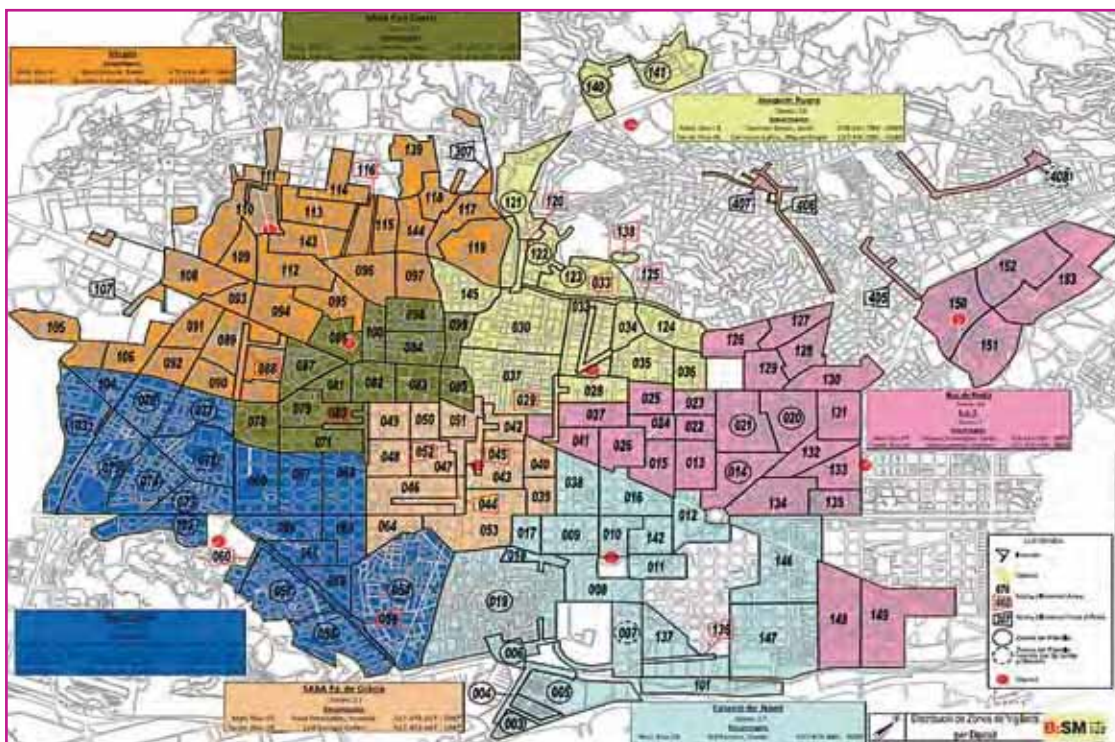
Public space, more and more, serves many more purposes than just on-street parking: pedestrians, public transport, bike lanes and so on. The remaining stock of on-street parking spaces should be used in the best way possible. Once 10 or so spaces are left for parking for example we have to see if it should be used for residents, for loading, etc. and we try to decide on the best use according to the specific demand of each single concerned area.

Which principles do you address when deciding whether or not to regulate on-street parking in a neighbourhood?

We analyse three factors. First, the degree of congestion of the detailed zone. Second is the demand of parking created by shopping or business. Residential demand is the third point: we have to see the residential parking deficit, for example if residents do not have car parks below their buildings we allocate space where residents are more favoured for parking.

Generating traffic when searching for a parking space

Barcelona is one of few cities in the world with in-depth knowledge of 'cruising'. In 2010 Barcelona measured that 17.8% of traffic in the city is caused by people searching for parking. Despite a lack of accurate data it is widely assumed that up to 30% of traffic in many big cities is due to cruising.



Map of the regulated area in the city of Barcelona. All parking spaces are regulated inside: not a single free space there. No one can expect to drive into the centre and park for free: therefore, it really acts as a congestion tax! Colors and subdivisions are only related to areas of surveillance.

Is on-street parking in Barcelona today fully regulated?

Barcelona's city centre is fully regulated, it means you will not find any parking space for which no payment is demanded or which is not dedicated for any other kind of purpose. When we started this system back in 2005, none of the districts or indeed the residents wanted to be regulated. We faced political barriers and had many local protests going on against us. It was very difficult to start.

Do you face the same barriers today?

After the first residential zones had been regulated residents realized that finding parking had actually become easier. Now we face the opposite issue where neighborhoods ask us for regulation of on-street parking because they know they will have possibilities to get their cars parked on the street. This is now the opposite problem as we are being asked to regulate little places where there is no conflict between different users. So the barriers and the tensions we have found during this process have changed dramatically from complete opposition against regulating on-street parking to asking us to regulate, even it makes no sense to do it!

Presumably people driving around searching for car park spaces a big burden on Barcelona's transport system?

I measured this in 2010 and the figures still remain valid. We measured cruising, the percentage of traffic searching for parking, and found

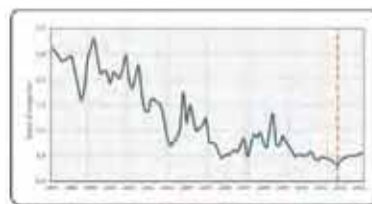
We want to make sure that the remaining stock of on-street parking spaces is used in the best way possible

an average figure of cruising at that time of 17.8%. It means that almost 18% of traffic on the road is searching for a parking space, either on- or off-street. These 18% were divided into approximately 12% of private cars and the rest were vans looking for space to do their delivery. It is

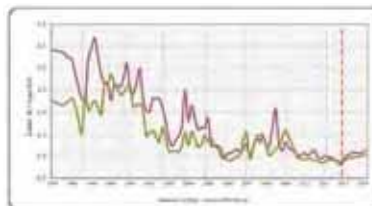
widely assumed that many of the big cities in the world have 30% of cruising. However, not many cities have figures as precise as we do.

What is your vision of Barcelona's centre with regards to parking?

Barcelona is a noisy city with dense traffic, however, the overall picture is quite normal for a city of this size and parking is not especially difficult. If you compare it with cities like Berlin it is another story though as Berlin has much quieter traffic. However, this is not only the result of management - a city's historic development and the street network have a big impact. We have been lucky in Barcelona and the large number of car parks in the city helps to meet the demand for parking. What I would do in the city centre is to better connect the off-street car parks and on-street parking in terms of tariffs and timing.



Parking indiscipline in Bcn 1997-2013. Measured every 2 months



Units are cars illegally parked on the streets each 100 meters. There has been an impressive reduction since the regulation started!

Public space, more and more, serves many more purposes than only on-street parking

FYI

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Mobility in harmony

Toshiya Hayata and **Stéphane Péan** explain the thinking behind Toyota's Smart Mobility Society and the company's long-term commitment to sustainable mobility

The fast pace of urbanization and the metropolitan development trend is prompting public and private stakeholders to tackle cities issues – congestion, safety, pollution, greenhouse gas emissions and energy saving – in a more comprehensive, integrated and sustainable approach.

Since automotive companies cannot accomplish this on their own, a process is needed for studying the relevant issues through dialogues with local authorities and civil society. Indeed, cities and regions have undeniably gained leadership thanks to greater than ever institutional and political capacity.

Nevertheless, times have changed and due to some limitations (space, budget), it is now far more complicated to expand road and transport infrastructures than in the past. Therefore, new innovative solutions should be implemented to optimize the whole existing transportation system and reduce drawbacks to society.

Through local initiatives in the four major areas of next-generation telematics, cooperative Intelligent

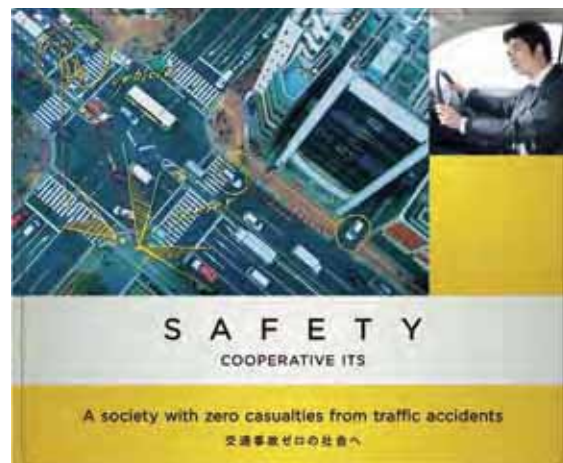
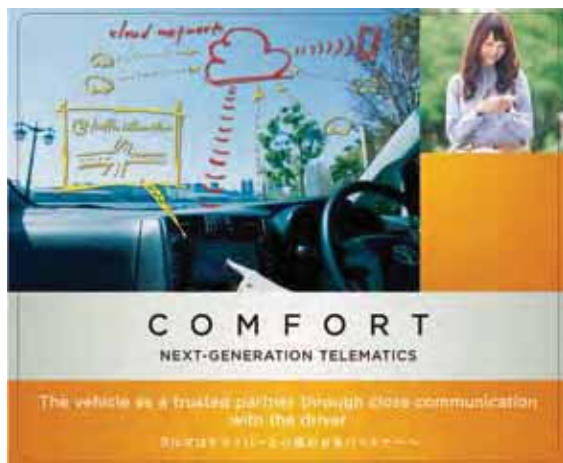
Transport Systems (ITS), new urban transportation system and energy management, Toyota is committed to enriching the lives of communities, as stated in its "Toyota Global Vision". It undertakes these projects by always taking into consideration local needs and circumstances.

TOYOTA'S VISION FOR A SMART MOBILITY SOCIETY

For almost 20 years, Toyota has been a member of the Geneva-headquartered World Business Council for Sustainable Development (WBCSD), co-chairing the Sustainable Mobility Project (SMP) that concluded in 2004 that mobility would not become sustainable if current trends continue.

In 2010, WBCSD published its "Vision 2050" that describes successful progress for sustainable mobility as "near universal access to reliable and low carbon mobility, infrastructure and information". Three years later, it launched the Sustainable Mobility Project 2.0, a major new initiative that brings global and cross-sectoral companies from

Toyota's Smart Mobility Society is divided into four pillars: Comfort, Safety, Convenience and Ecology



Cities and regions have undeniably gained leadership thanks to greater than ever institutional and political capacity

mobility-related industries together with other stakeholders to accelerate progress towards sustainable mobility and define the ideal future mobility society. This three-year research initiative (2013-2015) aims to speed- and scale-up the implementation of sustainable mobility solutions.

A GLOBAL VISION TO LEAD THE FUTURE OF MOBILITY

In March 2011, Toyota unveiled its new “Toyota Global Vision” stating: “Toyota will lead the way to the future of mobility, enriching lives around the world with the safest and most responsible ways of moving people”.

Toyota will lead industry in tackling technological advances that will spawn next-generation mobility. It will explore new possibilities in personal mobility, the convergence of information technology for automobiles and “smart grids” for optimizing energy generation and consumption.

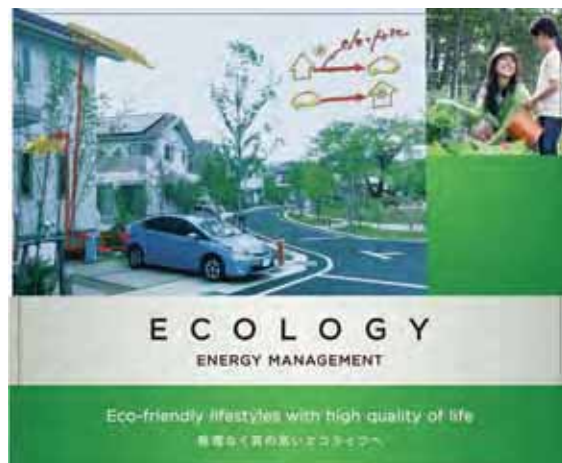
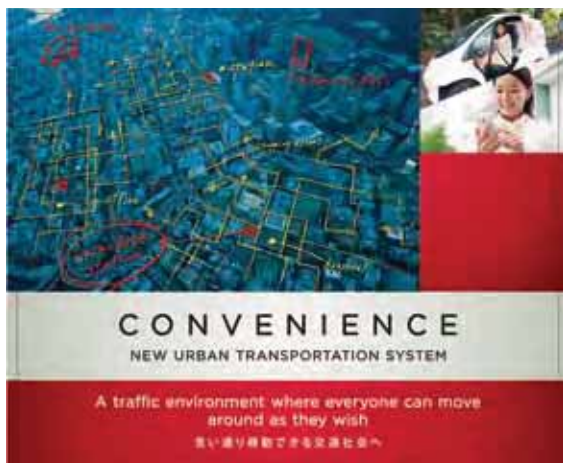
Toyota will undertake such leading edge R&D with an eye to adapting products and services to each market. Moreover, Toyota will develop low-carbon technologies and technologies for maximizing safety through interaction with the transport infrastructure to lay a foundation for sustainable and

amenable future mobility. The company will work in this and other ways to support new kinds of lifestyles, while propagating technologies for preserving environmental quality.

SMART MOBILITY SOCIETY: A COMPREHENSIVE AND INTEGRATED APPROACH

Toyota aims to create a smart mobility society that connects people, cars and the community so as to pursue society in harmony, collecting and integrating “big data” from its four potential business areas: next generation telematics (comfort), cooperative ITS (safety), new urban transportation system (convenience) and energy management (ecology). Big data is collected by the vehicle data management system (VDMS), the traffic data management system (TDMS) and the energy data management system (EDMS). Developed internally by Toyota, they compose the Toyota Smart Center, which is able to provide comprehensive and integrated solutions.

○ **Next generation telematics:** the vehicle will become a trusted partner through close communication with the driver thanks to cloud based interactive-type services that ensure comfortable



car living. Toyota provides big data traffic information to local authorities and businesses, sent automatically by vehicles (floating car data) or manually by drivers (crowdsourcing) equipped with telematics service;

○ **Cooperative ITS:** those systems provide support for safer driving. In Japan, services are being expanded with some already in operation (road-to-vehicle cooperation) or will be introduced shortly (vehicle-to-vehicle and pedestrian-to-vehicle cooperation);

○ **New urban transportation system:** this stress-free, safe and eco-friendly transportation solution suggests the optimal route to the user thanks to a multimodal route guidance and provides a short distance mobility sharing service based on ultra compact electric vehicles;

○ **Energy management:** it aims for optimized energy use in all areas of society by using information that links together homes, convenience stores, schools or industrial parks as well as vehicles (plug-in hybrids electric vehicles and pure electric vehicles) or transportation network in order to coordinate a balance of supply and demand for electrical power.

SMART MOBILITY & ENERGY LIFE IN TOYOTA CITY PROJECT

In November 2009, Japan's Ministry of Economy, Trade and Industry (METI) established the Conference on the Next-generation Energy and Social System that solicited applications from cities

willing to be sites for the testing of smart grid- and smart city-related systems and technologies but also business models. Four cities have been selected for five-year operational tests (2010-2014): City of Yokohama, Keihanna Science City, City of Kitakyushu and Toyota City.

Toyota City, a rural city located in Aichi Prefecture and home to the Toyota headquarters, established the Low-Carbon Society Verification Promotion Council gathering 50 entities, including Toyota City and private companies. It supervises the "Smart Mobility & Energy Life in Toyota City Project" ("Smart Melit" or merit) that focuses on energy management and a new multimodal urban transportation system.

The House energy management system (HEMS) links energy-generating devices (fuel cell) and energy storage devices (battery) in the home with plug-in hybrid vehicles and intelligent household appliances to optimize and make possible visualization of electric-power supply and demand and control of individual household devices. Storage batteries connected to and controlled by the HEMS support low-cost and low-carbon energy consumption in the home and can serve as an emergency power source.

The supply of electric power from vehicle batteries to the home is also tested. During normal times, vehicle batteries can store excess power from the home and from the community, contributing to efficient energy usage.

On the community level, the EDMS coordinates the balance of the electric power supply and demand within the region with the aim of achieving local production of energy for local consumption by the community. For example, if a shortage of power generated by solar panels in the community is predicted, residents will be advised to limit their energy consumption.

EDMS will also connect transportation network with the purpose to lower overall its energy use. Eventually it will enable transportation route calculations by considering the vehicle battery status, as well as regional electric power demand.

In conjunction, Smart Melit Project deploys IT and ITS technologies in order to efficiently integrate cars and public transportation for commuting and other travel purposes with the aim of reducing CO2 emissions in the transport sector by 40%. This is the purpose of the optimized multimodal transportation system known as the Harmonious Mobility Network (Ha:mo).

Ha:mo Ride is Toyota's single-journey electric vehicle sharing service



HARMONIOUS MOBILITY NETWORK (HA:MO)

Ha:mo Network is a research project that aims at testing the TDMS in urban area. This expert system optimizes the combination of public transportation and private vehicles use based on the operational status of public transport systems and traffic conditions. It collects mobility and weather data in order to create forecasts of transportation demand and congestion. Accordingly, the system can also provide appropriate recommendations to local mobility operators.

The research project focuses particularly on two Ha:mo's end-users services: a multimodal transportation information service (Ha:mo Navi) and an ultra- compact electric vehicles sharing service designed to accommodate short-distance in urban areas (Ha:mo Ride).

HA:MO NAVI : MULTIMODAL TRANSPORT INFORMATION SERVICE

Ha:mo Navi is a service based on smartphones that provides a multimodal route guidance enabling searches with the optimal combination of multiple means of transport such as walking, cars, trains, buses and taxis. It also suggests the car sharing service Ha:mo Ride as an alternative mode of transport.

By voluntarily taking into consideration cars and traffic congestion in the journey calculation, Ha:mo Navi encourages modal shift to public transportation. For the same reason, it also includes the provision of park-and-ride facility information (such as parking space availability) and enables allocation of "eco-points" based on park-and-ride facility, public transportation or car sharing use.

The scalability is the key as the more users join Ha:mo Navi the more positive effects will be made on and for the community.

HA:MO RIDE: "ONE WAY" ELECTRIC VEHICLES SHARING SERVICE FOR SHORT DISTANCE

Ha:mo Ride seeks to provide both transport convenience for users and benefit for society by supporting the optimal use of vehicle and public transportation



Ha:mo Navi is a smartphone service that provides multimodal route guidance

for short-distance travel (within a few kilometers) from a train station to the user's destination through the sharing of ultra-compact electric vehicles. Those personal mobility vehicles (PMV) have been adapted specifically for urban driving, efficient use of parking spaces, and for "last mile" mobility needs.

Above all, it is a one-way-travel car-sharing service where the user can leave the vehicle at their destination. Vehicle reservation is done with a smartphone and IC cards are used to access the vehicle. Ha:mo Ride is technically based on the one mile mobility system (OMMS), developed internally by Toyota. It is a comprehensive IT system that remotely provides reservation, billing and fleet management operations.

HA:MO FIELD-TESTS IN JAPAN AND EUROPE

In Japan, verification testing began in October 2012 as part of the Smart Mobility & Energy Life in Toyota City Project.

After a first free-of-charge trial phase in cooperation with Chukyo University (four stations, 10

Toyota aims to create a smart mobility society that connects people, cars and the community so as to pursue society in harmony



Above: Toyota launched its iRoad personal mobility concept vehicle at the 2013 Geneva Motor Show

Left: Toyota's single-seater COMS vehicles are an integral part of the Ha:mo Network

vehicles and around 100 users), the Ha:mo Ride car sharing service has extended in Toyota City, just one year later (21 stations, 100 vehicles and 1000 expected first users), shifting to a fee-based service (200 yen or €1.50 for the first 10 minutes then 20 yen per minute thereafter). Incentives have been introduced to encourage users to commute and leave the vehicle at home at (with a cost of 1 yen per minute).

Concerning Ha:mo Navi, several thousand users have already registered for free to the service. However, the advanced route guidance supported by the TDMS is at present only available within the Toyota City area although a simple route calculation can still be carried out nationally. In 2014, Toyota plans to provide recommendations based on TDMS forecasts to mobility operators.

Ha:mo Network will be also replicated in France by the end of 2014. In March 2013, Toyota signed a Memorandum of Understanding with both local authorities City of Grenoble and Grenoble-Alpes Métropole, the car-sharing service operator Cité lib (Citiz Network) and the French energy provider Électricité de France (EDF) to implement a French version of Ha:mo Network by the end of 2014. This will be a three-year project.



Representatives from Toyota, City of Grenoble and Grenoble-Alpes Métropole, Cité lib and EDF at the March 2013 signing of the Ha:mo MoU From right: Michel Gardel, Vice President of TME; Marc Baietto, President of Grenoble-Alpes Métropole; Michel Destot, Mayor of Grenoble

Toyota plans to supply 70 ultra-compact electric vehicles, including a fleet of single-seater COMS and a new PMV based on the concept car iROAD, unveiled at the last Geneva Motor Show. Besides, EDF will provide the charging infrastructure based on a network of around 25 stations, located mostly in the City of Grenoble but also further in the

metropolitan area close to railway stations and Park & Ride facilities.

The Grenoble project differs slightly to the Toyota City initiative due to its more complex organizational environment. Indeed, the number of partners and the diverse systems locally in operation require Toyota to interface its own systems such as the OMMS.

Moreover, Toyota cannot directly supply Ha:mo Navi and has to connect to "Station Mobile", a multi-modal information service already locally developed by Grenoble-Alpes Métropole.

TESTING TIMES

Field operational tests enable Toyota to acquire knowledge and know-how, and particularly devise new business models. Indeed, its purpose is to create new businesses by developing new sustainable mobility needs, taking into consideration the diversity of cities and regions.

Toyota fully intends to expand the Ha:mo Network as a commercial service to communities in Japan, Europe and into Asia and North America. By then, new trial tests might be considered.

FYI

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Capital gains

Get smart? We already are. Intelligent cities are open for business with universal transit systems, says **Will Judge**



More than 85% of all public transport journeys in London are made using the Oyster card

Over the decade in which contactless smartcard ticketing has become widespread there has also been a convergence of the ticketing and the payments industries



Contactless smartcards for public transport ticketing have become part of the normal fabric of life in many large European cities over the past decade. Ask a Londoner how his or her Oyster card works, and the chances are that they will understand the question and that you will get an answer that is correct, at least in part. Oyster cards are used for more than 85% of journeys on London's public transport system, so it should come as no surprise to hear that almost everyone who lives in London has got one and knows how to use it; for buying their preferred travel product, loading it onto their card and using it.

But ask the same Londoner about Oyster's equivalents in Europe such as the OV-Chipkaart or Navigo or Leap and they will probably look at you blankly. Which is curious, because out of the many European city transit smartcards that we could have chosen for this thought experiment, it would have been reasonable to expect that the ones provided for public transport users in Amsterdam, Paris and Dublin respectively – cities with direct connections to London and visited by hundreds (if not thousands) of Londoners every day – have a better chance than most of entering the average Londoner's consciousness.

However, they do not seem to have done so and this is a pattern that is replicated across Europe. A quick check on Wikipedia reveals that across the EU-28 there are more than 100 national or city transport smartcard schemes in operation. It is likely that each one has delivered

on its own business case and has enhanced the efficiency and appeal of public transport in its own area. But for the typical European citizen this is an aspect of life which works solely at the local level: familiarity with the locally-provided transport smartcard is high, but it is less common to find people who have devoted time and energy to getting and understanding the equivalent cards provided by cities and countries beyond their immediate locality.

IMPACTS AND IMPLICATIONS

What are the implications of this fragmented market for European cities and the public transport networks within them? The primary consequence is that cities everywhere bear the adverse effects of a lack of interoperability between contactless ticketing smartcards. Although most Europeans pass most of their time in their home city, most do travel to other cities and countries from time to time and in doing so generate very large aggregate visitor flows. As would be expected given their role as creative, leisure and business hubs, cities attract a high share of these visitor journeys and bear the brunt of the adverse effects:

- **Lost public transport revenues** – many visitors arriving in cities are people who routinely and enthusiastically use public transport in their home city but find the challenge of engaging with and understanding a new city's transport system too taxing to be worth the investment of time. These travellers can be found in the queue for

taxis at the city's airport or principal railway station and by virtue of their choice to avoid the complexity of an unfamiliar transport system they perpetuate the twin urban challenges of road congestion and worsening air quality in cities.

- **Lost business activity and revenue**

– the complexity of understanding a new ticketing system not only deters people from choosing public transport at all, but also deters those who invest time in getting and understanding the ticketing smartcard from visiting all the places they might have visited during their stay. At the margin, some visitors will be put off from making shorter, additional journeys to places of interest, cultural and leisure venues or business contacts during their stay by their anxiety about navigating the ticketing system correctly. In this sense, the openness and ease of understanding a city's public transport ticketing system can be thought of as one contributing factor to the overall sense in which a city is an attractive business and leisure destination compared with others.

- **Unproductive staff time** – almost every city's public transport system is characterised by a hard-pressed work force kept busy by the challenge of maintaining good quality, reliable services in the face of every-growing ridership and a complex interdependent set of system assets. These workers' time

is a scarce, expert resource. But all too often staff members have to be assigned to customer service and ticket sales roles to meet the needs of people arriving in the city and requesting comprehensive explanations of the public transport system and its associated smartcard. The pay-off from these tasks is high when the customer being served is a new resident: in this case, the orientation provided may result in the public transport system gaining a new, loyal and enduring customer. But for visitors spending just a short time in the city the pay-off is low or zero, as many visitors – especially those travelling for leisure or cultural pursuits – do not return often, or at all.

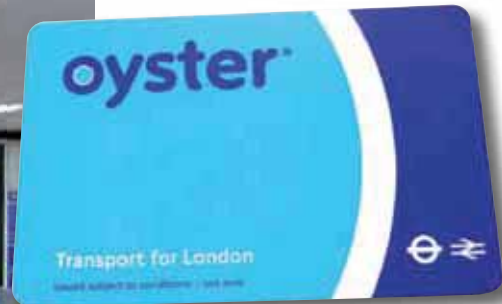
- **Wasted investment in smartcards**

– linked to the second effect is the frequency with which contactless smartcards are purchased by a city's public transport system and issued to a visitor for whom the effective operating life of the card is measured merely in days. To illustrate this point, Transport for London's public statements indicate that since the start of the Oyster programme they have issued more than 50m smartcards despite the fact that the population of the city is only about 8m (although TfL statistics show that there are over 17m unused Oyster cards in the capital with over £55m left on them in unused credit). The explanation for this difference is



that there is a constantly churning incremental population of visitors in the city, many of whom want to use the public transport system and hence get an Oyster card. While on any given day the visitor increment on the population of residents is relatively small, the number of people who have ever been a visitor to London rises rapidly over time given the rapid turnover of people within this group, and as a result so does the number of smartcards ever issued to visitors.

Some 8,500 London buses are able to accept fare payments using the Oyster card and also contactless payment cards



Over 50m Oyster Cards have been issued since the scheme was introduced in 2003



How aware are travellers of the other smart cards available across Europe?

WE (DON'T) HAVE CONTACT

Is there an alternative approach to public transport fare collection in cities that generates fewer adverse effects? Such an approach would need to meet the critical requirements of public transport operators that have driven them to adopt contactless smartcard ticketing – principally speed/throughput and the ability to support distance-based pricing by using a “check-in check-out” model.

Over the decade in which contactless smartcard ticketing has become widespread there has also been a convergence of the ticketing and the payments industries, primarily caused by the adoption of contactless technology on payment cards issued by banks. In Europe, this trend is well-established: MasterCard’s contactless payment technology has been included in cards issued by banks in 29 European countries and

more than a million retail outlets worldwide are ready to accept contactless payments.

If we consider these products against the two critical requirements of public transport operators there is actually a good match: the contactless technology allows the cards to be used at speed for low-value payments, and recent work in London and elsewhere has resulted in the creation of a set of transaction rules specifically for public transport operators that allow for distance-based pricing. And these cards are issued within the global framework for payment cards, so they benefit from global interoperability – a card issued in a person’s home city will interact correctly with a terminal device in a different city as long as both card

Visitors to London from 30 different countries have used their own payment cards to pay for transit fares

and terminal bear the right scheme branding marks.

If European cities were to decide to extend the range of contactless cards they accept for fare payment on their public transport systems to include contactless payment cards, they would be able to significantly reduce the four adverse impacts described above:

- Many visitors arriving in the city would already possess a contactless payment card that is globally interoperable and would be able to immediately “check-in” to the public transport system where they see the right payment scheme branding without having to invest time in getting a local city card and load a product onto it;
- Such visitors would be able to make spontaneous or additional trips quickly and without hassle while they are in the city;
- Public transport staff members would spend less time issuing local city cards to visitors and explaining how they function; and
- The volume of local city cards procured and issued to visitors would fall, resulting in efficiency savings for the city transport authority or operators.

Acceptance of contactless payment cards for public transport fare collection can be introduced alongside continued acceptance of existing contactless ticketing smartcards.

Arrivals from continental Europe should be able to access public transport without having to change their payment method



London has already implemented this model on its 8,500 buses, which are able to accept fare payments using the Oyster card and also contactless payment cards.

So far, visitors to the city from more than 30 different countries have used their own payment cards to pay fares this way, without needing to get an Oyster card beforehand. The next step is to extend the model to the whole public transport network in the city. Doing so will be a concrete step by the city's transport authorities to reduce the barriers to riding the system perceived by visitors and to positioning the city as a

place that is keen to attract business and leisure visitors from elsewhere in Europe.

Every other European city could capture the same benefits by taking this approach, and in doing so would enhance the degree of practical interoperability in urban public transport enjoyed by European citizens.

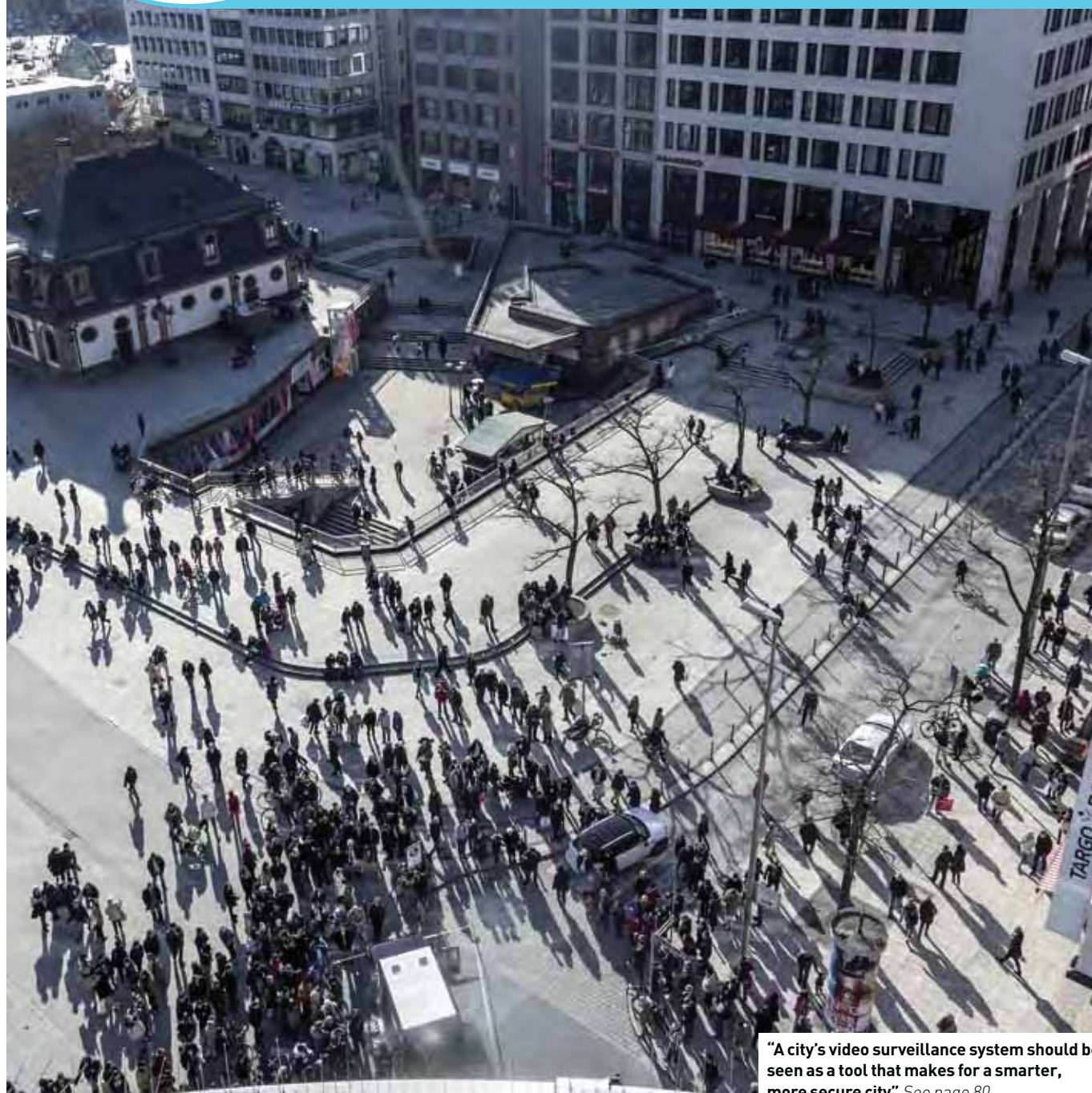
FYI

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Safety and Security in Transport

This section addresses road safety and the security of transport systems. It covers road safety policies, addressing all categories of road users and supporting the development of innovative solutions. It also covers technological innovations contributing to the improvement of road safety

- o **Frankfurt, Germany** – tackling cyclist and pedestrian fatalities
- o **Monitoring** – creating a safer city



"A city's video surveillance system should be seen as a tool that makes for a smarter, more secure city" See page 80

THE SOFT BULLETIN

How a German city is tackling the problem of cyclist and pedestrian fatalities head-on, by **Sonja Koesling**

Speeding, driving under the influence of alcohol or without wearing a seat belt, disregarding traffic lights or zebra crossings – carelessness and lack of consideration are the main causes of traffic accidents and all too often lead innocent bystanders to their peril. Some 1.24m people die annually as a result of a traffic accident – an alarming figure and one that creates awareness for improving road safety.

Worldwide, the subject is a growing priority. The European Union has announced the goal of halving the number of fatalities in Europe by 2020. By 2050, it should be reduced to nearly zero. Legal requirements such as wearing seat belts, alcohol limits and penalties for speeding have proved successful. Nevertheless, these measures alone are not enough to make “Vision Zero” a reality. Therefore cities and municipalities rely more and more on road safety works in the strategic planning process, as well as the awareness of all road users. Particular attention is paid to unprotected, often referred to as soft, users of the road, such as pedestrians and cyclists and this is certainly the case in Frankfurt.

As in many other cities, the proportion of cyclists in Frankfurt has increased steadily. Today it accounts

for around 17% of the modal split and has thus nearly tripled in 15 years. The city supports this development and promotes city cycling in order to maintain valuable reserves in the road network for the future. Improving road safety – an important issue. Establishing a positive cycling atmosphere plays an essential role.

“Motor traffic is relatively easy to regulate: You can monitor speed with cameras and penalise violations or issue parking tickets for bad parking,” says Ingmar Bolle, personal advisor to Stefan Majer, departmental head of Frankfurt transport. “But for cyclists, it is more difficult.” Cyclists usually know what is permitted and what is not. So the trick is to make them understand that traffic rules are for their own safety.

MORE THAN JUST MONITORING AND FINES

In Frankfurt, communication with cyclists is improved by means of campaigns. “We show our presence on the road, for example, integrating checks and technical inspections”, says Bolle. If cyclists are stopped, they have the opportunity to resolve technical issues right on the spot. In this case, the transport department employs a sympathetic response and clarification. “Experience shows that

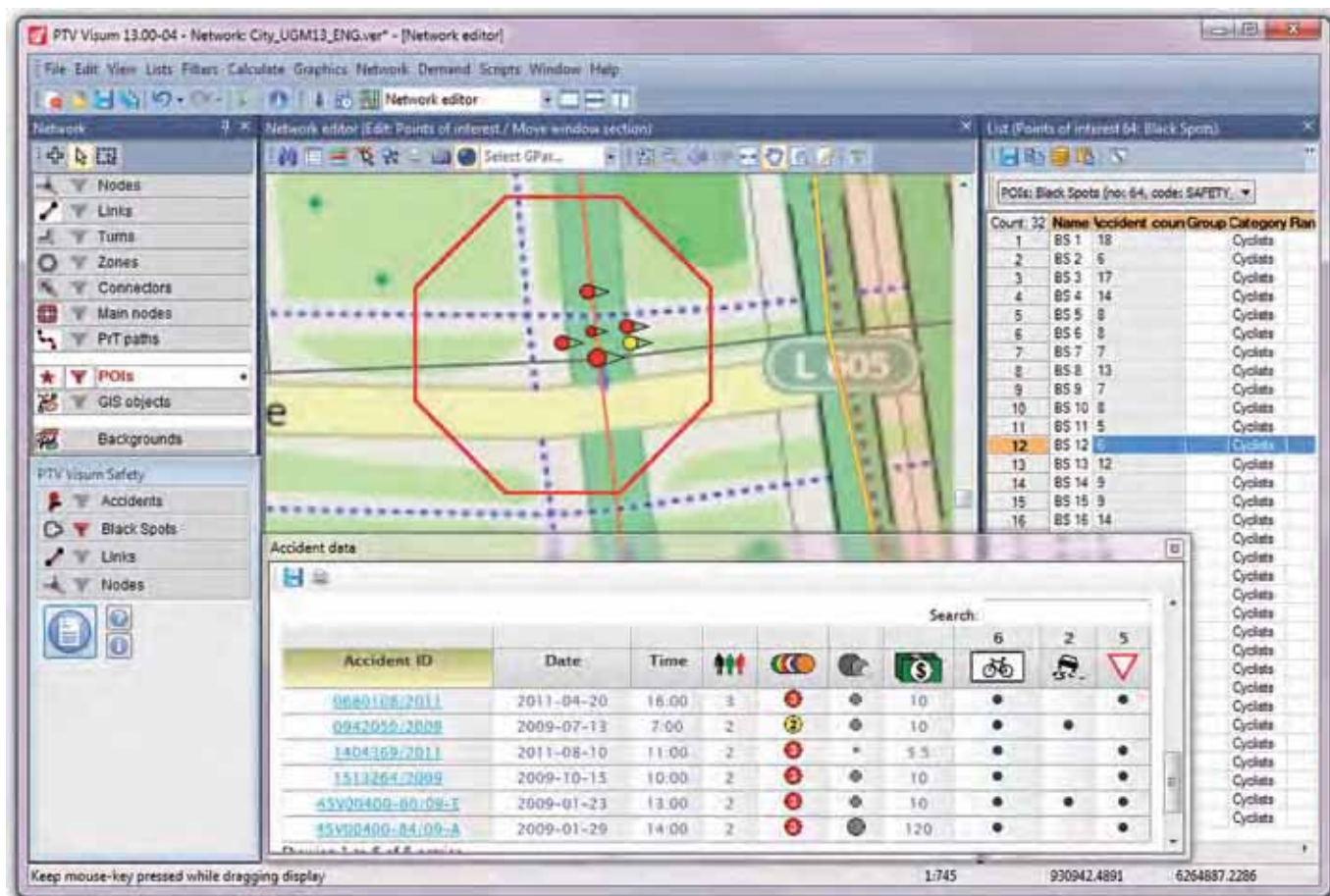


In Frankfurt cyclists now account for 17% of the modal split

Frankfurt supports and promotes city cycling in order to maintain valuable reserves in the road network for the future



Copyright: iLove Images/Corbis



PTV Visum Safety enables transport planners and authorities to identify and analyse the black spots of their networks – by filtering specific aspects such as cycling

good cycling conditions make for better safety awareness on the part of cyclists, and also ensure that bicycle traffic is actually taken seriously as a mode of transport,” says the educator. Since then, Frankfurt has ranked in the top 10 in the Cycling Climate Test of the General German Bicycle Club (ADFC). Nevertheless, for Ingmar Bolle, there is still a lot to do in the area of cycling infrastructure.

A paradigm shift has already taken

place here in Frankfurt: If roads are rebuilt or lanes are repaved, bike lanes are placed on the roadway. “In this way, we move the cyclists more into motorists’ field of vision, instead of letting them travel along behind parked cars,” says Bolle. Moreover, the city of Frankfurt puts special focus on improving existing infrastructure.

“In cycling, misconduct such as running red lights or driving on

A paradigm shift has already taken place here in Frankfurt: If roads are rebuilt or lanes are repaved, bike lanes are placed on the roadway

Analysing accident data with PTV Visum



the wrong side of the road is often encouraged by shortcomings in infrastructure – especially at intersections,” he maintains. Both of which, in Frankfurt, are the main cause of accidents involving cyclists.

To achieve improvements, Frankfurt integrates road safety work into the strategic planning process. The fact that the newly established Department of Traffic combined all responsibilities under a single political leadership in 2006 aids this project. The merging of the Office of Road Construction and Development with the Road Traffic Department and the Department for Mobility and Transport Planning into one department facilitates the exchange of knowledge and data. In this way, interactions can be better analysed and findings from the

Accident Commission can be directly involved in traffic planning. Here, PTV Euska is used, software that the PTV Group has developed for collaborative work between the police and municipal authorities in connection with the Accident Commission in Germany. Here the analytical expertise obtained has now also been incorporated into a new module of the transport planning software, PTV Visum, which the PTV Group marketed worldwide under the name of PTV Visum Safety.

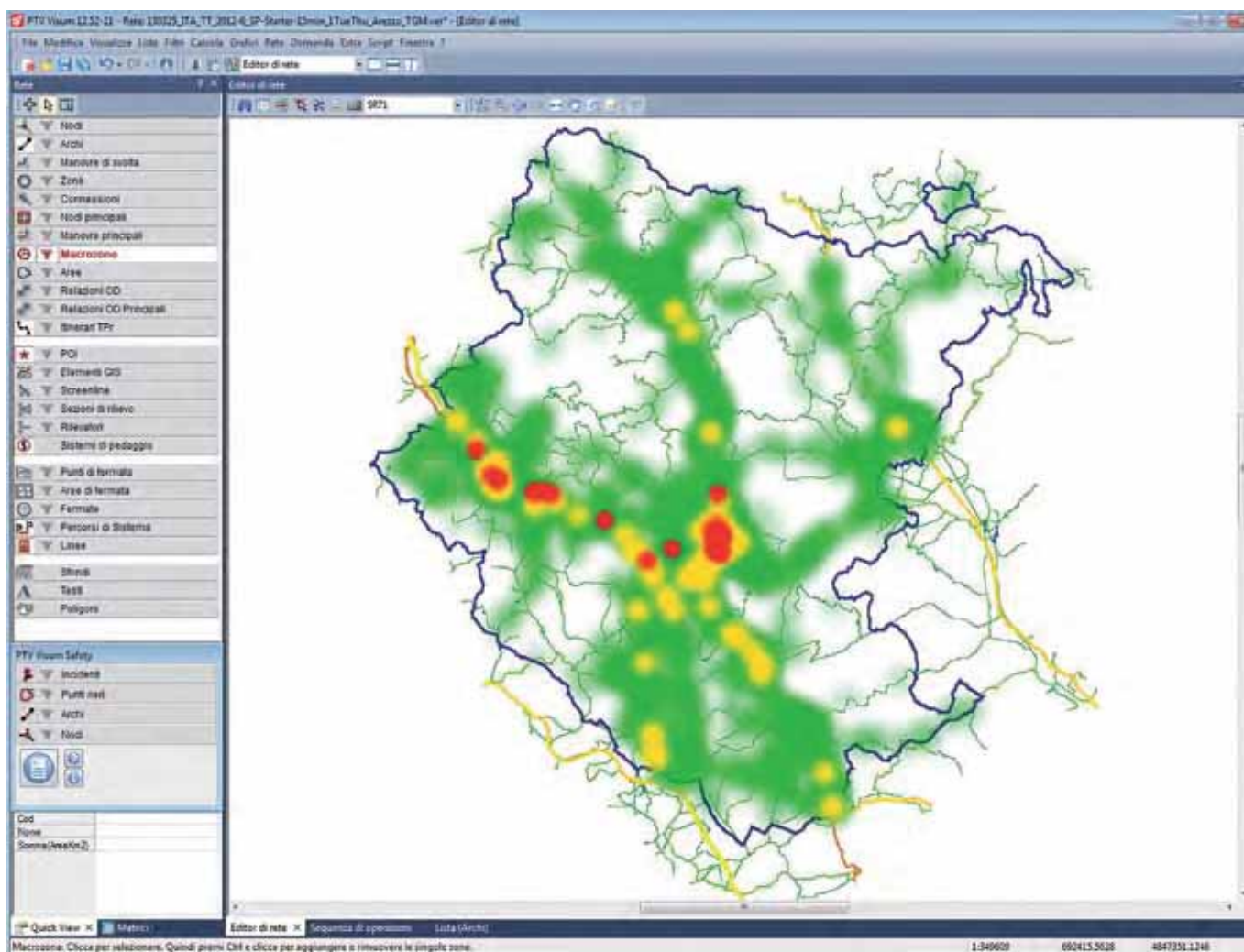
SOFTWARE IMPROVES ROAD SAFETY

PTV Visum Safety automatically recognises accident black spots based on accident data and lists them according to their severity. Depending on data availability, the planner can

retrieve detailed information for each accident and filter the accident data by attributes, e.g. accidents involving cyclists or pedestrians.

Within the module, thematic maps can be displayed: accident situation images that show the types of accidents, views with detailed accident data and so-called heat maps. These are digital maps that visually highlight roads and intersections that are particularly prone to accidents. Then in-depth analyses reveal distinctive similarities and enable the planners and traffic engineers to take targeted measures. For example, these include measures to improve the perception of cyclists and their safety, a separate signal phase for left turns at intersections, or crossing aids for pedestrians.

The software is also used in



Heat map in PTV Visum Safety

Frankfurt to identify and analyse accident black spots and accident hot spots. "Black Spot Management helps us to achieve improvements in the right places," says Ingmar Bolle. Because there are network segments and nodes that operate accident free despite apparent poor planning, while in other places action is urgently needed. So the Traffic Department found in the analysis of accident data, for example, that in certain sections of the network, driving against the traffic is the number one cause of accidents and picked out these sites for targeted campaigns. "Thanks to combined communication and control measures,

we were able to reduce the accident rate on these network segments by between 20 and 55%," he explains.

Based on the findings, the traffic department has developed a closing-the-gap programme, which incorporates statements and suggestions from citizens into the safety optimisation of transport infrastructure. The following applies: Improvements that are easy to achieve are to be implemented first, with safety deficiencies being given priority over issues regarding convenience.

Concludes Bolle: "PTV software aids us when evaluating and enables us to process all defects step by step in a sensible order".

FYI

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Smarter cities = safer cities

Andrea Sorri on how the intelligent use of intelligent technology can transform a city into a safe place to be

Cities face many challenges today. With modern video surveillance technologies cities can track, analyze and respond to incidents as and when they occur. Security cameras have evolved to be much more than static devices. Video analytics software enables cameras to automatically send alerts, to count objects and people and to analyze movement patterns. These advanced functionalities are possible because of the move from analog to IP-based video surveillance systems. This allows city officials to find answers

to questions such as how parks and public areas are being used, what caused congestions and crowds and what measures to take against crime and vandalism. Cities become smarter and safer, by evaluating and analyzing video surveillance data from parks, squares, streets and public buildings.

SOMEONE TO WATCH OVER ME

The idea of an integrated video surveillance system watching over a city and taking care of its citizens is great in theory. The main challenge with

Citizens should have the right to feel safe in their own city without feeling they are under constant scrutiny



the execution of such a plan comes from the citizens themselves. It is a matter of public privacy versus the safety of a city and its citizens, who should have the right to feel safe and secure without feeling as though they are being monitored. However, this does not need to be an issue.

In a city being watched by security cameras they only need to be placed and directed at public spaces, not into homes and businesses. And in instances where there are sensitive areas, privacy masks can be used to exclude that area from the monitored field of view. It isn't necessary to invade the public's privacy in order to make a city smarter and safer. An integrated video surveillance system supports multiple stakeholders, giving each user only access to the information they are authorized to access and which is relevant to their role. Video surveillance implemented this way benefits both those who are responsible for the safety of cities as well as the citizens living in them.

Managing a city and all that it entails, from security to planning, is complex to say the least. From parks and squares to streets and public buildings, there are any number of incidents that could be taking place, from traffic congestion at a particular junction to crime against citizens.

LOCAL CHALLENGES

Squares and parking lots tend to be very wide and open areas with potentially many events taking place simultaneously. This type of installation requires both an overview as well as the ability to zoom in on details. Cameras with pan, tilt and



City of Medellín, Colombia: Integrated video surveillance system control room

zoom (PTZ) capabilities are the best fit for such areas. Even with shadows and light reflection, a powerful zoom can provide both an overview and the necessary detail for the entire field of view. Monitoring of wide areas is further enhanced when using cameras capturing video in 16:9 format in HDTV quality.

Similar to squares and parking lots, parks are typically large areas so video surveillance equipment needs to offer high-speed coverage with precise zoom, control of the area being viewed and auto tracking for when following the route of a specific object or person is necessary. Varying light conditions and restricted visibility due to trees and foliage can also make it difficult to recognize movements. Security cameras equipped with Lightfinder technology provide detailed color video, even in darkness. It is important that the cameras can be pointed at a specific person or object for identification purposes.

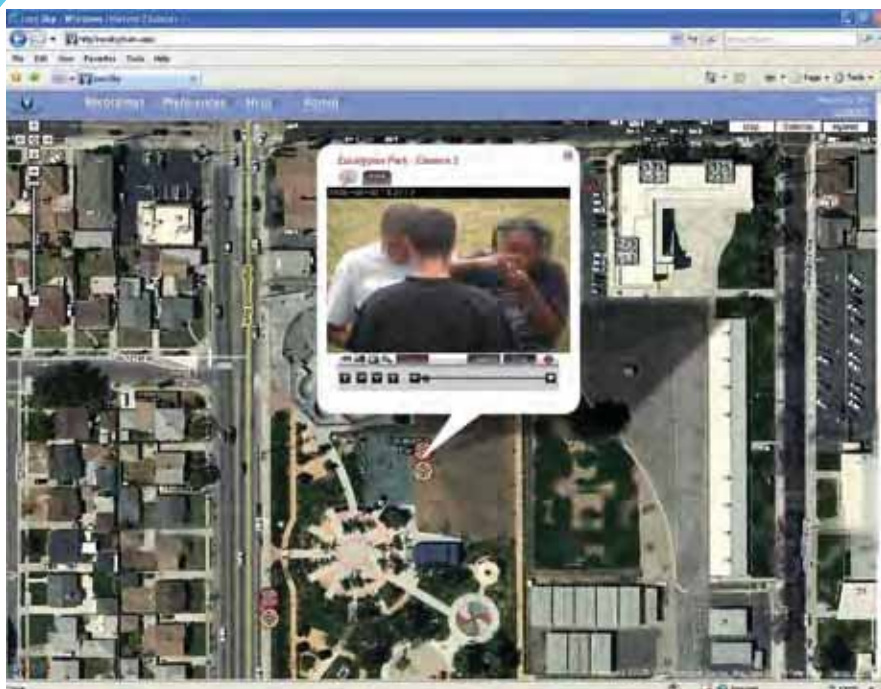
The heart of any city is its streets and intersections. If they are not flowing properly it could be detrimental, not only to the city's citizens

who may be struggling through congested roads, but also to the lifeblood of the city, its businesses. The state of the roads and traffic flow is also important when it comes to first responders and their ability to reach emergency situations as quickly as possible. Being able to receive clear images is key to the flow of the city but also for identification of faces and license plates in regards to specific instances. Installing security cameras that deliver clear images even at night or in adverse weather conditions gives the ability to identify vehicles and drivers. And with pre-sets such as wide view and optical zoom, security cameras are able to look into traffic, seeing cars head on at night. It is important in situations such as these to get both an overview and a detailed image with precise pinpointing on an object or person.

Whether it is the police or security managers who are monitoring the input from cameras, they need to be able to read license plates from a great distance and to have a quick focus on moving objects to keep track of activity in real-time as well as for post incident review.

Monitoring public buildings has its own set of challenges. Buildings tend to have large entrances, often-times with glass fronts that can make it difficult for cameras to get clear images due to the reflection off the glass and when incoming sunlight creates both very bright zones as well as very dark shadow areas. Security cameras with Wide Dynamic Range (WDR) technology provide homogeneous images without too dark or too bright zones allowing

Cities become smarter and safer, by evaluating and analyzing video surveillance data from parks, squares, streets and public buildings



City of Hawthorne, California, USA: Police officers can view video, point and zoom cameras, record events and search archived video footage using icons superimposed on a Google Maps satellite view

for clear identification of people and objects. For big spaces such as long corridors and halls within buildings, it is necessary to have cameras that can follow an object. In other parts of buildings cameras are needed to monitor gates, doors and vulnerable areas pointing in several directions, watching people and objects passing by slowly or quickly with precision.

ENABLING TECHNOLOGY

A city's video surveillance system should be seen as a tool that makes for a smarter, more secure city. For example, cameras placed in communal places such as parks and public buildings can in effect be an extension of the police force, working non-stop to support their efforts in both evidence collection but also as a real-time investigative tool. With one or more centralized control room cameras can provide access to clear images not only to city officials but also to police officers, which is particularly useful when cameras are placed in areas where police would like to be but can't due to limited resources. For example, if a police

With one or more centralized control room cameras can provide access to clear images not only to city officials but also to police officers

officer is on patrol they can view the feed coming from a park either on their smartphone or on their patrol car computer system to check if everything is OK or if their presence is needed. It is not necessary that the security cameras work with any sort of facial recognition system or pre-existing database. As long as the cameras installed have the ability to zoom in they can identify individuals. If a situation does arise, say there is incidence of violence in the park, police can look through the footage to identify suspects, where they may have gone, how they were travelling and who they may have been with.


Making cities smarter means making them safer. With modern video surveillance technologies city officials gain unprecedented insights

and are able to see what's going on. They can better understand what is happening and why. They can analyze patterns and hot spots.

An integrated video surveillance system can be shared seamlessly across departments and functions allowing city planners to retrieve the insights they need while enabling police officers and first responders in the field to view camera footage on their mobile devices.

FYI

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