THINKING cities

ITF 2015 SPECIAL EDITION

International Transport Forum

Published by H3 media

In association with POLIS

thinkingcities.com

Volume 2 • Issue 1
May 2015

SMART TRANSPORT FOR CITIES AND REGIONS

Planning the thinking city

Sustainable Urban Mobility Plans: how SUMPs address the mobility needs of people and business

> ***"Integrating electromobility should result in a sub-plan or sub-strategy that strengthens its role as part of a multimodal system"***

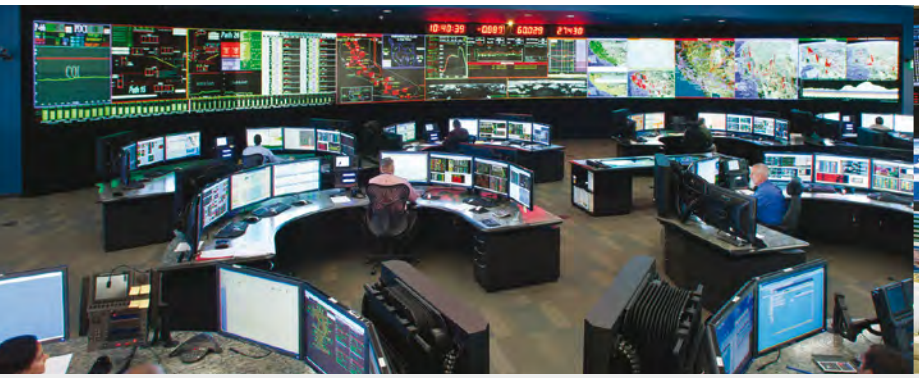
● ANTWERP ● BOLOGNA ● BREMEN ● BRUSSELS ● CATALONIA ● CHENGDU ● DRESDEN ● GHENT ● GORIZIA ● HAMBURG ● LJUBLJANA ● LJUTOMER ● NOVA GORICA ● RIVAS VACIAMADRID ● ROTTERDAM ● STOCKHOLM ● TALLINN ● THESSALONIKI

MISSION CRITICAL VIDEO WALL DISPLAY SOLUTIONS

With over 61,000 mission critical display wall installations worldwide, Mitsubishi Electric plays an essential role in keeping our modern world moving.

From Moscow to Tokyo and New York to Istanbul, Mitsubishi Electric displays operate around the clock, helping ensure the smooth running of the network and allowing operators to zoom in quickly to any potential trouble spots. With an expected lifetime of 100,000 hours. Mitsubishi Electric display wall cubes are designed and built to meet the most demanding requirements of the end user.

Where there is a need to monitor and control information flows, **Mitsubishi Electric** is there.



www.mitsubishi-displaywall.com
TOLL FREE: 888.307.0349

www.mitsubishielectric.ca
PHONE: 905.475.7728

MITSUBISHI ELECTRIC
Changes for the Better

Urban outfitters

Karen Vancluysen and **Kevin Borras** on the thinking behind this issue's overarching theme: sustainable urban mobility planning

An instrumental tool for planning the Thinking City is the Sustainable Urban Mobility Plan. Polis was one of the pioneers on the European level to promote and develop guidance for Sustainable Urban Mobility Plans (SUMPs). Over the last few years, the European Commission has also been actively promoting SUMPs as an integrated planning tool for cities that can help reach the European 20-20-20 targets and support modal shift. We share the conviction that SUMPs form the backbone of sustainable cities and serve as an important tool to reach EU targets in an integrated way.

SUMPs are also a good tool to facilitate the coordination between, and consultation with, stakeholders, including actively engaging citizens in the planning process. Any qualitative SUMP addresses stakeholder cooperation and citizens' involvement. Successful examples include the different mobility plans developed by Greater Toulouse throughout the years, where public meetings engaged several hundreds of citizens in the local planning process and a so-called Mobility Account showed the costs of different mobility measures and services both for the users and the transport

The city of Aberdeen was presented with the SUMP Award in 2012 for its active citizens' engagement and stakeholder cooperation strategy, deploying all possible tools to connect with key actors, ranging from online and paper surveys publications and websites, to the extensive use of social media. Institutional cooperation, for example between different levels of governance, is also instrumental. It covers collaboration and joint working within and across organisations in order to develop and implement a plan. Such cooperation has been identified by the European CH4LLENGE project as one of the four challenges which may pose significant barriers in the wider take-up of SUMPS in Europe Europe (http://www.sump-challenges.eu).

Without institutional cooperation on SUMP objectives and the means to achieve them, a SUMP will be partial and deliver fewer benefits. Given the integrating character of SUMPs, there are likely to have a multiplicity and diversity of actors involved in its development and implementation. Institutional landscapes will vary across cities developing SUMPs but are likely to involve issues of vertical and horizontal cooperation and also "internal cooperation" (between disciplines within the authority) and "spatial cooperation" (at the agglomeration/regional level).

> ***Public meetings engaged citizens in the local planning process and a Mobility Account showed the costs of different mobility measures and services, both for users and transport authorities and operators***

Karen Vancluysen is executive director of Polis

***Kevin Borras is editor-in-chief of* Thinking Cities**

These approaches are outlined in the four SUMP-related articles featured in this, the fourth edition of *Thinking Cities*. Gabriela Barrera cites the example of Rotterdam in her article that looks at the two main tools available for the development of local strategies in which electric mobility could be integrated: Sustainable Energy Action Plans (SEAPs) as well as SUMPs; the Spanish city of Rivas Vaciamadrid is the focus in Thomas Mourey's article that examines how SUMPs can be used to confront unprecedented explosions in population; Aljaž Plevnik reports on his home country of Slovenia's highly impressive SUMP progress, and we hear from the 2015 European SUMP Award Winner, Bremen, and the other nominated cities about what challenges in sustainable urban mobility planning have to be met.

A good example of multi-stakeholder cooperation on the European level is ERTRAC, the European Road Transport Research Advisory Council, the European technology platform which brings together road transport stakeholders to develop a common vision for road transport research in Europe, and in which Polis is actively involved. You can read more about their activities on pages 68-71 of this issue and the infographic on pages 8-9 shows how to achieve clean city logistics using the ERTRAC model.

The activities of the Polis network are also about actively bringing stakeholders together to discuss urban transport innovation, not only fostering the exchange between Polis member cities and regions, but also reaching out to industry and research actors developing new solutions to be deployed locally that can help to address the local urban mobility policy challenges of today.

We would like to draw your individual and collective attention to an even taking place from 19-20 November in Brussels, when the Polis Annual Conference will once again offer the ideal platform to unite all key stakeholders with innovative and sustainable urban mobility interests. We look forward to seeing you there.

CONTENTS

Volume 2 Issue 1 • May 2015

THINKING cities

H3B media

POLIS

THINKING Highways

A Thinking Highways publication published by H3B Media Ltd in association with Polis

Want more about transport issues concerning smart cities and regions?

Extra content is available in the online edition at

THINKING cities .com

Explore SWARCO's innovative solutions
for enhanced ROAD SAFETY | www.swarco.com/en/rms

THINKING ABOUT SUSTAINABLE TRAFFIC MANAGEMENT AND ROAD SAFETY SOLUTIONS?

SWARCO – the traffic technology corporation of Austrian entrepreneur Manfred Swarovski – is a growing international group providing the complete range of products, systems, services and solutions for road safety and intelligent traffic management.

The open OMNIA platform is SWARCO's state-of-the-art solution for smart cities and the integrated road transport environment. Modular and scalable by design, OMNIA is suitable for both large-scale systems with many applications already installed as well as for cities and regions at an early stage of ITS development.

If you want the flexibility to integrate legacy systems and leeway for future extensions,
then OMNIA is your first choice.

SWARCO I First in Traffic Solutions.

IRF PROUD MEMBER

SWARCO AG, Blattenwaldweg 8, A-6112 Wattens, Austria, T. +43-5224-58770, F. +43-5224-56070, E. office.ag@swarco.com, www.swarco.com

Editor-in-Chief
Kevin Borras (kevin@h3bm.com) +44 (0) 20 3463 9482

Executive Director, Polis
Karen Vancluysen (kvancluysen@polisnetwork.eu) +32 (0) 2 500 56 70

Art Editor
Barbara Stanley (barbara@h3bm.com)

Editorial Team
Kevin Borras, Karen Vancluysen, Dagmar Köhler

Contributors to this issue
Gabriela Barrera, Jörg Beckmann, Mauro Borioni, Yannick Bousse, Simon Clement, Jonas Ericson, Sonja Koesling, Dagmar Köhler, Andreas Kossak, Cathy Macharis, Karsten Marhold, Thomas Mourey, Matthew Noon, Thomas Otterstätter, Aljaž Plevnik, Cristina Pou Fonollà, Johannes Schleich, Pascal Smet, Ellen Townsend, Robert Trottein, Sara Velinde

Head of Broadcast Services/Presenter, Thinking Aloud in the City
Paul Hutton (paul@h3bm.com) +44 (0) 20 3463 9480

Content Development and Social Media
Katrina Chapman (katrina@h3bm.com)
+44 (0)7933 369447

Subscriptions, Circulation and Accounts
Kerry Hill (kerry@h3bm.com) +44 (0) 20 3463 9486

Group Publishing Director
Kevin Borras

Group CEO
Luis Hill (luis@h3bm.com) +44 (0) 20 3463 9485

Thinking Cities is published by H3B Media and Polis - ISSN 2054-9024

Thinking Cities is published by **H3B Media**, 15 Onslow Gardens, Wallington SM6 9QL, UK and **Polis**, rue du Trône 98, B-1050 Brussels, Belgium. This edition is distributed in Europe/RoW by Asendia and in the USA by Asendia USA, 17B S Middlesex Ave, Monroe NJ 08831. Periodicals postage paid New Brunswick, NJ and additional mailing offices. POSTMASTER: send address changes to Thinking Highways, 701C Ashland Ave, Folcroft PA 19032.

Although due care has been taken to ensure that the content of this publication is accurate and up-to-date, the publisher can accept no liability for errors and omissions. Unless otherwise stated, this publication has not tested products or services that are described herein, and their inclusion does not imply any form of endorsement. By accepting advertisements in this publication, the publisher does not warrant their accuracy, nor accept responsibility for their contents. The publisher welcomes unsolicited manuscripts and illustrations but can accept no liability for their safe return.

Printed in the UK by The Manson Group

H3B Media Group Headquarters
15 Onslow Gardens, Wallington, SM6 9QL, UK
Tel +44 (0) 20 3463 9480
Fax +44 (0) 20 8647 8725
email info@h3bm.com
www.thinkingcities.com
Join the *Thinking Highways* and *Thinking Cities* LinkedIn groups at linkedin.com and follow us on Twitter at thinkinghwys

Polis – European Cities and Regions networking for innovative transport solutions
rue du Trône 98, B-1050 Brussels, Belgium
Tel +32 (0) 2 500 56 70
Fax: +32 (0) 2 500 56 80
email polis@polisnetwork.eu
www.polisnetwork.eu
Follow Polis on Twitter: http://twitter.com/Polisnetwork

H3B Media North America
1960 Gallows Road, Suite 220,
Vienna, Virginia 22182-3827-99 USA
Tel +1-703-893-0744
email lee@h3bm.com

H3B Media Latin America
Rua Princesa Isabel, 94, conj 112,
Brooklin, São Paulo – CEP 04601-000, Brazil
Tel +55 11 5095 0096
email sebas@h3bm.com

Visit thinkinghighways.com for *Thinking Cities*' BPA Worldwide-audited sister titles, *Thinking Highways Europe/Rest of the World, Thinking Highways North America* and *Tolling Review*

Cityview

- **Urban Freight:** ERTRAC and ALICE present an Urban Freight Roadmap to Clean Logistics in the *Thinking Cities* Infographic
- **Interview:** Pascal Smet, Brussels Regional Minister for Mobility and Public Works
- **Tallinn/Chengdu:** Two disparate cities' fair bus fare strategy

ERTRAC roadmap on urban freight

Urban freight is responsible for approximately 25 per cent of urban transport-related CO_2 emissions and 30 to 50 per cent of other transport-related pollutants such as particulate matters (PM) and Nitrogen Oxide (NOx). At the same time, load factors for delivery vehicles in cities, for example, are low and potential for improvements in urban logistics is massive. "As economic centres, cities are not only the place of delivery of goods, but also the place of shipments. Improvements to achieve more efficient, clean and smart transport of goods therefore need to tackle distribution in urban areas", explains Nick Lester – hence the need for a dedicated roadmap on urban freight issues.

Drafted jointly by ERTRAC and ALICE (the Alliance for Logistics Innovation through Collaboration in Europe), the urban freight roadmap lists research priorities related to urban freight delivery, returns and urban logistics to improve the efficiency, sustainability and security of this activity.

The vision is to achieve a full integration of freight flows in cities' operations and activities that allow citizens to access the goods they require, and the goods to reach the citizens, while at the same time supporting sustainable development. Have a look at the infographic to see which four main research areas bear the biggest potential for improvement!

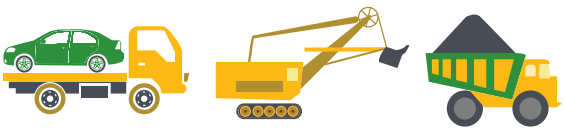
What is meant by "urban freight"?

Delivery of goods (business and private customers)

Shopping trips made by private households

Waste removal

Service transport and demolition traffic



Service vans, eg for maintenance, supply etc

How to achieve clean city logistics

- Viable business models
- Clean urban freight vehicles
- Public–private partnerships (PPP)
- Data sharing and ITS

Increase energy effiency

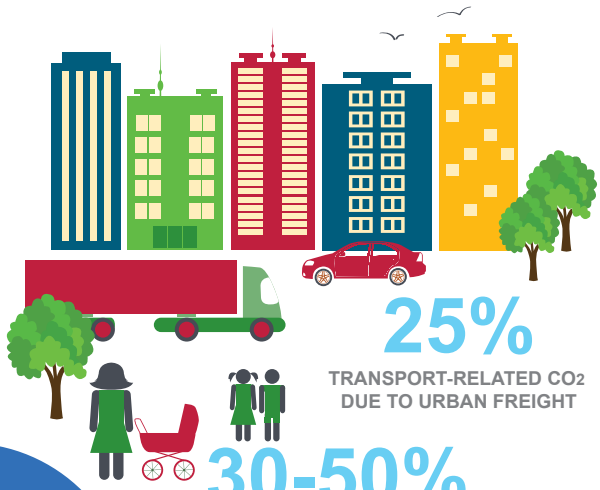
- Improve efficiency of whole urban logistics system, energy efficiency of vehicles, decarbonisation

VANS IN LONDON:
LOAD FACTOR ONLY

38%

Improve urban environment

- Increase air quality and reduce noise



25%

TRANSPORT-RELATED CO_2
DUE TO URBAN FREIGHT

30-50%

TRANSPORT-RELATED PM AND NOx
DUE TO URBAN FREIGHT

4 ways to improve city logistics

95%

B2B DELIVERIES EFFECTIVE
(ON TIME, CORRECT PLACE,
RECEIVED BY A PERSON)

B2C DELIVERIES EFFECTIVE
(ON TIME, CORRECT PLACE,
RECEIVED BY A PERSON)

70-75%

53%

LONDON CYCLING FATALITIES
INVOLVING HEAVY GOODS
VEHICLES (2008-2012)

Increase customer satisfaction and reliability

- Deliver goods on time at the anticipated place

Increase safety and security

- Reduce injuries and fatalities (especially with vulnerable road users) as well as cargo loss or damage

Investing in the sharing economy

Above and below photos by Björn Köhler

Left: Pascal Smet; top: Brussels; above: Brussels' business district

Pascal Smet is Brussels Regional Minister for Mobility and Public Works. In this role he would like to fulfil his dream of fostering sustainable urban development in Brussels. Polis's **Yannick Bousse** spoke with him about his new plan for private transport in the Brussels Capital Region and ride-sharing systems. The plan includes a legal framework for controversial apps such as Uber

What are the most pressing transport challenges in the Brussels Capital Region?

The greatest challenge for the Brussels Capital Region is high levels of congestion. We also need sufficient bicycle lanes and we will be providing massive investment in bicycle infrastructure in the coming four years. We need to reduce car ownership, use the existing car fleet more efficiently and invest in public transport, car-sharing, collective taxis and allowing peer-2-peer services such as Uber and Djump to operate under strict conditions. We also need to make our transport system greener, with electric cars and taxis.

On 5 March 2015 you set out your plan for private transport in the Brussels Capital Region. This note includes a legal framework for ridesharing systems such as Uber. What are its main features and objectives?

The plan wants first and foremost to modernise the taxi-sector and make it a qualitative, trustworthy service for the citizens of Brussels and its visitors. This means

- A transparent service (introduction of digital taximeters with external fiscal memory)
- Easy to use: launching a regional smartphone application for all taxis and installing credit card terminals in all vehicles
- Promoting mobility: by opening bus lanes and investing in collective taxis
- Reviewing fares
- Making it a viable sector: scrapping regional taxes, collectively buying petrol, insurance, vehicles for drivers, etc

Photo: Björn Köhler

Bikes, taxis, buses and trams happily share road space on Brussels' car-free Sundays

The government is also considering creating a new legal framework for new categories of private paid transport. This past couple of years new initiatives have emerged in Brussels and in Europe as a whole that combine the principles of the sharing economy with technological innovations and easy-to-use smartphone applications. Such services, which are often low-cost, allow for better use of the existing car fleet and make having a car less of a necessity and less attractive. At the same time they are not always in line with social and tax legislation and can constitute unfair competition towards the existing services.

It's the aim of this government to allow such services to operate, but in full respect of social and tax legislation. Peer-2-peer services can contribute to the mobility in the city, but should always remain an occasional activity and never constitute a mini-job. That's why we are thinking now about creating a legal framework.

Under strict conditions, services such as Djump, Uber and Lyft would be able to operate in the new legal framework.

The Brussels Capital Region SUMP (Sustainable Urban Mobility Plan), Iris 2, states that you would like to reduce road congestion by 20 per cent by 2018. How will a legal framework for ride sharing systems such as Uber contribute to reaching this goal?

By reducing the use of private cars. People are willing to leave their car at home for an affordable, easy-to-use and customer friendly service which takes them from A to B.

Photo: Björn Köhler

Jubelpark in Brussels

The central point of any such legislation is to make sure these initiatives are made possible without undercutting the larger economic sector of which they are part. It would be wrong to want to ban these activities. I think it's better to shape the future, rather than to succumb to it

The taxi sector has been vocal in their opposition to Uber. How do you plan to win their support?
The government has decided to invest €5 million in the taxi sector. There are plenty of measures in the plan that will modernise the sector and make it the qualitative service it should be.

Taxis will always be a part of the Brussels landscape. They are often the first point of contact a visitor has with the city, they are recognisable, have a fixed price and privileges such as the use of bus lanes, taxi stands, hailing, etc. More than ever taxi drivers should be ambassadors of the city and this plan will make that happen.

Uber is currently banned in Brussels. Your plan for private transport would not come into effect before January 2016 so what will happen with Uber before then?
Uber remains illegal in Brussels and our services continue to control and seize vehicles. A number of different judicial procedures are taking place. In May there was a first guilty verdict for a driver and a more general verdict will follow after the summer. If Uber does not comply with the current legal framework this situation will remain until a new framework enters into force. But this will be at the earliest in January 2016.

Are you concerned that ride-sharing systems could lead to low wage, mini-jobs with little social protection?
This is indeed a risk and the reason why the government has decided to put these services in a strict legal framework. If you want to drive your car full-time, you should become a taxi driver. Services such as Uber or Djump should always be occasional, drivers should have a clear legal status and both Uber and its drivers should respect social and tax rules in Belgium. Only by creating a clear legal framework with conditions that exclude unfair competition can we remove the risks.

Other cities such as Amsterdam, Paris and Berlin have banned Uber. The Brussels Capital Region will be the first region to create a legal framework for ride-sharing systems. Do you see the Brussels Capital Region as an innovator?
I think many other cities are considering similar options. The sharing economy is relatively new, and slowly but surely legislation is being adapted, such as with Airbnb. The central point of any such legislation is to make sure these initiatives are made possible without undercutting the larger economic sector of which they are part. It would be wrong to want to ban these activities. I think it's better to shape the future, rather than to succumb to it.

Last year, you joined the closing plenary of the annual Polis conference in Madrid and spoke about what policy agenda you saw in the new European legislative term to support sustainable urban and regional mobility. What type of support would you like to see from Europe for local mobility issues?
Europe cannot only help by making the sharing economy work, but for Brussels I think any stimulus from the European Commission in greening our city further, ranging from investments in bike infrastructure, or fiscally stimulating greener cars and the use of public transport, to major infrastructure works which also give a boost to the local economy (building park and rides, metro-lines, tunnels, etc) will be helpful.

FYI
Pascal Smet is Brussels Regional Minister of Mobility and Public Works
http://en.pascalsmet.be/pascal/
www.pascalsmet.be

Yannick Bousse is Project Manager at Polis
YBousse@polisnetwork.eu

The odd couple:

Free transit from Tallinn to Chengdu

Tallinn and Chengdu cooperated on introducing fare-free bus lines to ease critical congestion problems and boost public transport use. **Karsten Marhold** tells the story of an unlikely couple of cities that managed to set up a successful cooperation

In late 2012, Allan Alaküla, Head of the EU Office of Estonia's capital Tallinn, skimmed through Chinese media in search of possibilities to increase his city's international activities in the urban mobility area. He quickly found a candidate: Chengdu, the fourth-largest metropolitan area in China with over 14 million inhabitants and capital of Sichuan province. It raised the interest of Mr Alaküla and his colleagues when they learned that Chengdu was in the process of heavily expanding its transport system, including the bus network and metro.

Tallinn has already had partnerships with Beijing and Hangzhou, however these were, however, cultural city-twinning programs not designed for technical cooperation. "We are a member of Polis and other European city networks, and decided to additionally strengthen international cooperation beyond Europe," says Alaküla. As a consequence, Tallinn started looking for other cities in China for a focused in-depth cooperation on urban mobility. It was clear that setting up cooperation between a city

Chengdu seemed like a fitting candidate because it is still a relatively up-and-coming city on the Chinese urban mobility scene

Chengdu buses

Left: Tallinn;
Below: Chengdu

with 400,000-plus inhabitants and a Chinese mega-city like Chengdu will prove to be challenging.

Yet, Chengdu seemed like a fitting candidate in the first place because it is still relatively up-and-coming on the Chinese urban mobility scene. Located in the West of the country, its region has only recently received increased attention from the Chinese central government, who had for a long time focused on the capital Beijing and the East of the country with its Special Economic Zones. But recently, Chengdu and nearby Chongqing have moved into the spotlight, triggering massive growth in the urban area and the transport system.

BUSES ARE STILL THE GO-TO MODE

Yet the gap between East and West still shows prominently when looking at public transport in Chengdu. While the Shanghai Metro, for comparison, has been in operation since 1993 and is now one of the largest metro systems in the world with 538km and 15 lines in operation, Chengdu metro's first line only opened in 2010. A second line followed in 2012, bringing the total length of the network

Chengdu metro

to 41km. The tenfold difference illustrates why Chengdu's public transport is still heavily relying on its bus network to cater for the transportation needs of its rapidly growing population.

Zheng Yang, deputy director of the Chengdu public bus company, gives an account of the bus system that impresses with its rate of growth and size. "In 2014, 11,000 buses were in operation, up from 3000 in 2003. For several years, Chengdu Public Bus Group has been buying 1000 vehicles each year", he says. In 2015, Yang explains, the fleet is expected to reach its target size with 12,000 vehicles. "From then on, Chengdu will focus on the development of

Right: Tianfu Tong contactless payment cards are the first move towards an integrated fare system

the metro and tram networks in the city." Chengdu has also recently opened its first bus rapid transit (BRT) line, which is integrated into the newly upgraded second ring road around the city. As far as fuels are concerned, Chengdu's public buses are up to most modern standards – 90 per cent of the fleet runs on CNG, while 10 per cent of buses are electric, meaning no less than 1200 vehicles.

Yang says Chengdu has ambitious plans for the development of public transit. "Today, we have 26 per cent modal share for buses, and 5 per cent for the metro," he explains. "In the coming years, we want to reach 45 per cent for all public transit combined." As of 2014, Chengdu public transit moves 5.2 million passengers every day. Zhang also explains that as it is the case in many Chinese cities, the main challenge to transport in the city is private cars, although Chengdu is not yet facing regular air pollution or traffic deadlock as catastrophic as in Beijing or Shanghai. This helped the city to be voted into high positions in liveability rankings for China recently.

REACHING OUT TO THE CAPITAL OF FREE PUBLIC TRANSPORT

In the recent past, and since the launch of the metro network, Chengdu had started looking into improving its pricing model and fare options for public transit. With the Tianfu Tong contactless payment card, first steps have been made towards an integrated fare system – for now, metro rides and bus tickets can be charged onto the same card, but transfers are covered for bus and metro trips only separately. The card is also accepted by taxis, still one of the main modes of getting around in the city. Zhang confirms that introducing a truly integrated fare system to allow for seamless trips between metro and bus is on the city's agenda for the near future.

Chengdu is not yet subject to the levels of air pollution or traffic deadlock that Beijing and Shanghai experience

But Chengdu also wanted to go a step further and look at reducing fares or options for offering free public transport as a congestion-easing measure and there was no better place to look by way of an example of how to do it than Tallinn. The capital of Estonia is currently the largest city in the world that is applying a zero-fare transport policy since its citizens voted for its introduction in a referendum in 2012. Since 1 January 2013 Tallinn residents travel fare-free on bus, tram and trolley bus lines in the city centre. The city and its transport department have proudly adopted this unique experiment, and are not shy about promoting Tallinn as the "Capital of free public transport."

Chengdu was looking into free public transportation options as a result of a combination of serious challenges that threatened mobility in 2013. As Alaküla explains, "major upgrading works started on the second ring road around the city and created serious car traffic restrictions for people living between the second and third ring road. The city needed a measure to avoid a deadlock in this area due to congestion." Most importantly, Chengdu introduced a ban restricting cars from driving on one day of the week according to the final digit on their license plate, effectively forbidding a large number of drivers to use their car for their daily commute.

44 FREE BUS LINES AND FREE MORNING COMMUTES

The city then developed a creative congestion-relief measure in cooperation with Tallinn. "After a delegation from Tallinn had visited Chengdu and met

Chengdu wanted to look at options for offering free public transport as a congestion-easing measure and there was no etter place to look by way of an example of how to do that than Tallinn

with technical staff, the transport management department decided to make 44 bus lines between the second and third ring road free of charge while the restrictions were in place," explains Alaküla. For more than nine months, citizens were able to travel freely on routes that were strategically chosen to provide efficient access to the city center and Central Business District. "Although this was a temporary measure and somewhat of an experiment, the city took it very seriously." Chengdu was keen on understanding the effects of free public transportation for relieving congestion, on the one hand, and on boosting public transport use, on the other.

First results of the city's experience with offering free bus lines were presented by a Chengdu officials at the "Capital of Free Public Transport" conference Tallinn hosted in 2013, and the results were encouraging. While public transport use increased by 2 per cent during the time the measures were in place, traffic deadlock could be avoided. As a consequence of the generally positive experience, Chengdu decided to make travel permanently free from 5am to 7am on all buses in the city, effectively allowing a fare-free morning commute to a large part of the population.

In terms of free public transport as a congestion-easing measure there was no better example than Tallinn

KEYS TO SUCCESSFUL COOPERATION

As for the cooperation with Tallinn, the experience has been very positive and is set to be extended in the future. "We were very positively surprised with the smooth exchange between our cities," says Allan Alaküla. He has some tips for setting up effective cooperation between European and Chinese cities, though. "The language barrier needs to be taken into account, at least once it gets to the political level where everything needs to be translated. As long as the contacts remain technical, everything can be done in English, which makes things a lot easier," he says.

Alaküla adds that it is also very important to identify the mutual interest between cities and to focus on certain areas or measures. "Tallinn is a frontrunner in the field of free public transport. Despite our very different cities, we ended up being ideal partners."

Tallinn and Chengdu have signed a partnership agreement in the meantime and are now working together to develop a joint research project on free public transport. Both cities have already announced that they will send delegations to the next European conference on free public transport in Avesta, Sweden, due to take place in late 2015.

FYI
Karsten Marhold is Project Officer at Polis
kmarhold@polisnetwork.eu
www.polisnetwork.eu

POLIS

EUROPEAN CITIES AND REGIONS NETWORKING
FOR INNOVATIVE TRANSPORT SOLUTIONS

2015 ANNUAL POLIS CONFERENCE

19-20 November 2015, Brussels

Innovation in Transport for Sustainable Cities and Regions

Save the date!

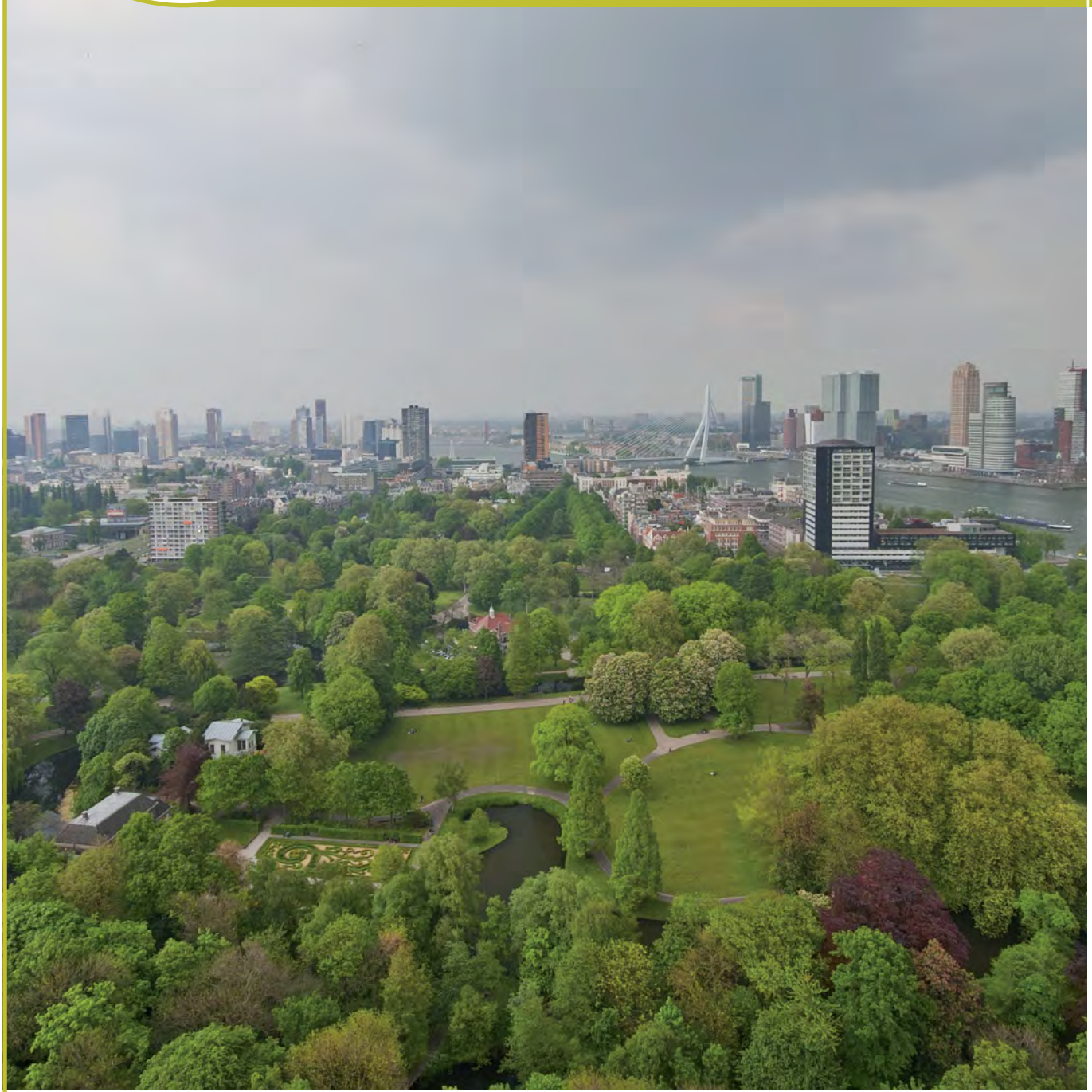
A unique opportunity to connect with 350 committed transport innovation professionals

www.polisnetwork.eu/2015conference

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

- **Electric Freight:** Are there enough e-freight vehicles to meet demand?
- **SUMP:** Rotterdam's innovative SEAP strategy
- **Antwerp:** Ensuring road users are safe as possible
- **Stockholm:** A clean fleet strategy



Electric dreams

Can electric vehicles be used to transport goods rather than people, and help achieve cleaner urban logistics? **Matthew Noon** takes a look at the availability of electric freight vehicles and its implications for local energy grids

Whether it is apples for the school lunch, arthritis medication for your mother, milk for the fridge, new pipes for the plumber, or the delivery of the birthday gift from your brother, none of this could occur without vans or trucks to move the goods.

Vital to the functioning of our cities, but often overlooked in the day to day activities, the freight sector is essential to urban living. While a lot of consideration and thought has gone into reducing the impact of private motoring, particularly through improvements to public transport and cleaner vehicles, the freight sector has generally been left behind.

The European Commission's co-funded FREVUE project (Freight Electric Vehicles in Urban Europe) demonstrates how electric freight vehicles (EFVs) can achieve clean urban logistics. The project will show that EFVs can be an economically and environmentally efficient solution to achieving emission free urban logistics. FREVUE is now reaching its halfway stage and initial findings are extremely positive.

With a range of vehicles from small vans such as the eNV200, medium sized trucks such as the UPS/TNT vehicles and up to large 19t trucks Heineken truck these vehicles have been running for tens of thousands of kilometres with no difficulty and no tailpipe emissions.

Two key issues have already been identified that are of growing importance and need to be resolved if we are to achieve the European Commission's goal of CO_2-free city logistics by 2030:

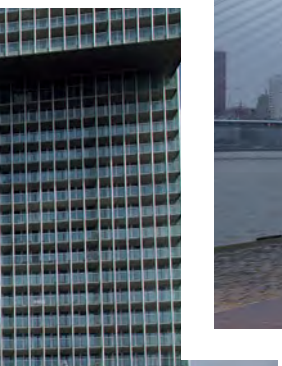
1 Vehicle Supply
2 Energy Grid

VEHICLE SUPPLY

The FREVUE project involves logistics operators from across Europe with fleets ranging from the tens into the thousands of vehicles. As such, our partners are representative of all aspects of the industry.

The main problem that they have all faced however, particularly in the ‹3.5t range, is a lack of vehicle supply.

For anybody watching the commercial vehicle market, the potential for low or zero emission commercial vehicles is huge:



Rotterdam is one of Europe's most innovative cities in terms of its use of electric vehicle fleets (UPS, left, and refuse collection, above)

- Poor air quality in our urban areas is of increasing concern
- Corporate policy and environmental reporting is seeing more businesses focus on their environmental emissions along the whole value chain
- Cities across Europe are introducing low emission zones
- Urban duty cycles are well placed for electric vehicles due to the limited overall daily range requirements
- Depot based operations make introducing the charging facilities very simple
- Although currently depressed, prices (and volatility) in the oil markets significantly impact the cash flow and balance sheet of operators whereas electricity prices are extremely low and stable.

The size of the commercial vehicle market across Europe is huge. 1.8 million new commercial vehicles were registered in 2014 with over 80 per cent (1.5 million) in the ‹3.5t range followed up by 280,000 in the 3.5t – 16t range. With large numbers of these used in urban operations the potential for manufacturers providing for this sector is huge. So where are they?

While the small electric van market is growing this segment is relatively limited to service industries and small parcels. The big potential is in the 3.5 to 7.5t range. When our partners have sought to buy electric vehicles in these sizes however, they have been hampered by a lack of supply. In fact, partners including global operators such as UPS and TNT have been forced to retro-fit existing vehicles rather than buying new.

As with any discussion concerning electric vehicles, the traditional chicken and egg problem also exists

While small manufacturers do produce 3.5-7t vehicles they are hampered by low volumes resulting in higher unit costs and they often do not have a robust after sales support mechanism comparable to other models

in this aspect of the market. While small manufacturers do produce vehicles in these sizes they are hampered by low volumes resulting in higher unit costs (after accounting for additional costs of batteries and motors) and they often do not have a robust after sales support mechanism comparable to other models. This, in most commercial settings, compromises the overall business case or imposes introduces an unacceptable level of risk.

Dutch logistics firm Bring use a fleet of electric Peugeot Partner vans

SO WHAT CAN BE DONE ABOUT IT?

Firstly, the main vehicle manufacturers (OEMs) need to be clear about their future plans for electric freight vehicles. If they do not see a commercial opportunity for themselves, this needs to be made clear so that the market can respond. Anecdotally, some logistics companies have said they are waiting until the major manufacturers produce the vehicles before committing. If that is not going to happen, this would allow smaller manufacturers to capitalise on this demand.

The average age of light and heavy-duty commercial vehicles on European roads in 2009 was 12 years. With only 15 years before the 2030 target date of CO_2 free urban logistics is reached, the vehicles that are now being introduced will, in all likelihood, be around by the target date. Unless significant numbers of new vehicles come onto the market in the next few years, we will either be faced with missing the target (except perhaps in leading cities) or imposing significant costs on the freight industry to adapt in a short period of time.

Secondly, leasing companies need to respond to the challenge and increase the number of EVs available. Many leasing companies have avoided EVs over concerns about maintenance and the expected residual value of the vehicles. There is growing body of evidence showing that maintenance requirements are particularly reduced compared to ICE vehicles which is also helping to lower costs. While some maintenance will still be required, a leasing agent with trained technicians can also address the after-sales support needs due to the greater volume of vehicles operated.

While residual value may still be a factor, new business models are being developed and as introduced by Nissan with the battery replacement schemes such as for the eNV200, allowing greater certainty.

Lastly, look to support and raise awareness of leading freight generators who are now specifying zero emission electric vehicles for their logistic requirements. Whether that is in the luxury good sector such as Gucci's deal with TNT express or the local florist who delivers with an electric van, make customer demand underpin the transition.

ENERGY GRID

While the European and domestic policy agenda are promoting emission free vehicles, for which electric vehicles are perfectly suited, there is one significant threat to a successful transition – the energy grid.

One of the strengths of electric over other alternatively fuelled vehicles is that the refuelling infrastructure is already in place. The distribution network for electricity is comprehensive, effective and efficient, allowing for electric vehicles to be recharged wherever there is a socket. However,

While residual value may still be a factor, new business models are being developed and as introduced by Nissan with the battery replacement schemes such as for the eNV200, allowing greater certainty

As our cities have evolved, land use has changed and more importantly energy consumption increased, our distribution grids have needed to increase the amount of electricity flowing through the system

there is growing concern that if we get to the desired levels of EV penetration in our urban areas that will really make a difference for our health and air quality, the energy grid will not be able to cope with the increased demand.

In many European cities, the electrical distribution grids are reflective of demand and planning considerations from the mid20th century. As our cities have evolved, land use has changed and more importantly energy consumption increased, our distribution grids have needed to increase the amount of electricity flowing through the system. Energy draw for electric vehicles are the next step in this evolution and early indications are that the network will struggle to cope.

This is unlikely to be a problem for the individual, private EV driver as they will be able to plug their vehicle in at home and re-charge without a second thought. Nor will it a problem for their neighbours or even their entire street as the utility providers (distribution network operators (DNOs)) are required to maintain a connection for your requirements. However, when it comes to charging a fleet of vehicles, such as in a depot, any additional costs can be passed onto the customer. As a result, if a company wishes to convert its fleet to electric vehicles, not only will it be, quite reasonably, charged for the vehicles and any installation of charging points, but it may also be charged for upgrading the local substation. While this has only occurred in a few instances so far, as cities move closer to low/ultra or zero emission zones this is going to occur more often and likely a limiting factor.

A private company is likely to be more than happy investing €100,000 in four or five electric vans and charging equipment for assets that they will own, however if they are also going to be charged a further €25,000, €50,000 or €100,000 plus to upgrade the local sub-station – another entity's asset for which they will receive no return, that is a different matter and would also compromise their overall business case.

This problem has already been seen in the United Kingdom, with similar concerns being shared in the Netherlands, Scandinavia and Southern Europe.

At the heart of the matter appears to be that DNO activity is a natural monopoly and as such, is heavily regulated. The regulatory framework that is applied appears to have been developed without consideration of how electro-mobility has a different public and private cost-benefit structure. The major costs of the infrastructure upgrade is being passed onto individual businesses who will not receive commensurate benefits from the investment.

No one would question if you were building a new office block for which a substation upgrade or installation was required as this would be factored into the overall business case with the benefits accruing to the occupiers in their activities. However, with electro-mobility the main benefits arising from no tailpipe emissions are seen in the improved air quality and public health. While the EV operators may gain from lower running costs and marketing benefits, the value of this does not justify the significant costs associated with the infrastructure upgrade.

How will our electricity networks cope with the predicted influx of electric vehicles?

FYI
Matthew Noon is Programme Manager at the Cross River Partnership (a public-private partnership delivering cross-borough regeneration projects in London) and FREVUE project coordinator.
mnoon@lambeth.gov.uk
http://frevue.eu/

The full package

Gabriela Barrera on what's required to design local strategies for electromobility, citing Rotterdam as a case in point

It is now broadly recognized that European cities and regions have a key role to play when it comes to the deployment of electric- or electromobility. Due to the available range of electric vehicles (EV) and the potential that captive urban fleets have, it is expected that the roll-out of EVs will primarily take place in urban areas.

To support EVs roll-out, the charging infrastructure needs to be further developed. In this sense, the recently published European Alternative fuels directive[1] requires that Members States take actions to establish, by November 2016, national policy frameworks indicating the number of publicly accessible recharging points that will be in place by the end 2020, so electric vehicles can circulate; at least in urban, suburban agglomerations and other densely populated areas.

Electromobility is also becoming one of the important measures for cities and regions to achieve sustainability goals in terms of greenhouse gases (GHG), air pollutants and noise emissions reduction. Several European cities and regions have participated in different national or EU-funded pilots and have made resources available to test and deploy EVs. They also have incorporated them in their own fleets

Rotterdam has invested €26m in 10 key sustainability tasks

Electromobility is increasingly becoming part of existing local strategies when it comes to mobility, energy and air quality"

and have facilitated their private use and purchase. Cities and regions are also investing in the set-up of public charging infrastructure and in several cases, support associated services and collaborate in the infrastructure maintenance. Therefore, electric- or electromobility is becoming increasingly part of existing local strategies when it comes to mobility, energy and air quality.

SEAPS AND SUMPS

There are two main tools available for the development of local strategies in which electric mobility could be integrated: Sustainable Energy Action Plans (SEAPs) and Sustainable Urban Mobility Plans (SUMPs). A SEAP is a key document within the Covenant of Mayors[2] in which cities define activities and measures for the reduction of CO_2 by 2020 according to given targets. The Covenant of Mayors was established by the European Commission after the 2008 EU Climate and Energy Package[3] to recognize and support local authorities' sustainable energy policies. On the other hand, Sustainable Urban Mobility Plans have been considered in EU projects since 2005 (e.g. the EU-funded project PILOT coordinated by Polis http://www.pilot-transport.org/) and are now an essential part of European policy. In the 2013 Urban

Rotterdam has an extensive network of electric vehicle charging points

Mobility Package communication[4] SUMPs are identified as an enabler for cities to deploy urban mobility measures in a cost-effective way. It also encourages Member States to actively promote SUMPs and ensure framework conditions that allow local authorities to implement local urban mobility strategies successfully.

SEAPs and SUMPs are local initiatives with common aspects when it comes to the introduction of electric vehicles: they could address the same schemes and stakeholders or consider the same measures such as public procurement. Furthermore, the SEAP GHG transport targets and baseline emissions inventories could be considered when elaborating a SUMP. Also, the SUMP carbon assessment tools could be integrated in the Urban Energy Models used in SEAPs.

In particular for SUMPs, integrating electric mobility should result in a sub-plan or sub-strategy that strengthens the role of electric mobility as part of a multimodal system. There are four main elements in the planning cycle of a SUMP that need to be considered in this integration:

- Stakeholder involvement: a SUMP is equipped to look at multilevel governance and at citizen outreach. However, the dialogue with vehicles manufacturers (OEMs) and utilities is more complex and it is not necessarily developed in the framework of a SUMP.
- Vision and objectives definition: defining common targets and priorities in a consultation process will help to set the milestones and goals to which EVs deployment will contribute. Having a consensus on these will also allow to reinforce the cooperation between different stakeholders, and will further facilitate assigning responsibilities and funding to the different measures that will be implemented.
- Developing an effective package of measures: EVs are part of a mobility system and therefore, should never be a standalone measure. However, defining how electric mobility will be part of an 'effective package of measures' could be a complex exercise for local authorities: How to balance the promotion of EVs as a collective mode versus private ownership? How to prioritise and fund the infrastructure and the procurement of vehicles? Which other measures should be included in 'the package' to maximize EVs deployment? (e.g.

REFERENCES

1 http://ec.europa.eu/transport/themes/urban/cpt/index_en.htm
2 http://www.covenantofmayors.eu/index_en.html
3 http://ec.europa.eu/clima/policies/package/index_en.htm
4 http://ec.europa.eu/transport/themes/urban/urban_mobility/ump_en.htm
5 http://www.rotterdamclimateinitiative.nl/en/programme-on-sustainability-and-climate-change-2

> ***By the end of 2011 the first charging station had been deployed in the Rotterdam area: by the end of 2014 there were 1367"***

access restrictions or preferential parking).
- Evaluation: Further steps need to be taken to ensure that a SUMP will enable the further roll-out of electric mobility. A SUMP should not only consider the EVs and charging infrastructure deployed in urban areas, but also their effect on the mobility behaviour.

The impact of current levels of EV penetration on the strategic objectives of a SUMP might be still minimal. Moreover, the 'real EV' take-up could be beyond the 5 to 10 years horizon that a SUMP has and some of the operational goals for electric mobility, such as the local grid capacity and use, are still difficult to relate to SUMP targets. Nevertheless, a state-of the-art SUMP that, together with other measures, considers the introduction of electric mobility, could help to achieve the EU-driven SUMP objectives in terms of air quality, energy efficiency and GHG emissions reduction.

ROTTERDAM'S AMBITIOUS ELECTROMOBILITY STRATEGY

The city of Rotterdam established an ambitious programme on sustainability and climate change for the period 2010 to 2014[5]. Some of the goals of this programme included, among others, the reduction of carbon emissions by half, being 100 per cent prepared for the consequences of climate change, improving air quality and reducing noise. The municipality invested €26m in 10 key tasks, stimulating sustainable mobility and transport was of these. This investment generated €400 million in private and public sustainable investments in the city. Three different aspects were considered within this one task:

- 'Clean' transportation for both passengers and goods: this resulted in the construction of cycle paths and parking facilities for bicycles, the implementation of a dynamic traffic management system and the introduction of measures for a more efficient inner city logistics. In addition, more sustainable inland and ocean shipping were encouraged.
- Cleaner, quieter vehicles: the aim was to make the city vehicle fleet more sustainable with the introduction of electric and hybrid vehicles. Moreover, the purchase and use of electric bicycles and scooters was promoted, charging infrastructure for electric vehicles was set and together with private partners, innovative electric transport projects were established.
- Introduction of other alternative fuels, in particular biodiesel for lorries.

The 'Rotterdam electric' initiative was launched, several public-and private entities worked together to open the 'Electric Transport Centre' to allow business and potential EVs users to get information on electric vehicles and to test them.

The City of Rotterdam aimed to actively support the construction of charging infrastructure for example, by co-financing the first 1000 charging points. The aim was also to ensure that at least 25 per cent of the city's fleet comprised electric or hybrid vehicles. These two last objectives were met and even exceeded: at end of 2014 a total of 1367 charging points were established in the greater Rotterdam area and 27 per cent of the city's fleet was electric.

The growth of the charging infrastructure is interesting to see. By the end of 2011 the first charging station had been deployed in Rotterdam – it was also the first in the Netherlands. By the end of 2012 100 stations had been deployed. The 14 cities surrounding Rotterdam also benefited from the tender Rotterdam issued. By the end of 2014 this resulted in a charging network of 1,650 charging points in the area. This way people living elsewhere and working in Rotterdam also have access to sustainable driving options.

The growth is attributed to a joint effort of three important factors. OEM's progressively introduced EV models at better prices, the national government issued tax incentives and the local government deployed the necessary infrastructure and communication.

FYI
Gabriela Barrera is Deputy Director of Polis
gbarrera@polisnetwork.eu
www.polisnetwork.eu

In PRAISE of safety

Ellen Townsend reports on the need to improve work-related road safety in Europe

The inauguration of the new Scheldelaan cycling path in Antwerp in 2007

Tackling road safety means looking at those outside the vehicle as well. Employers need to risk-assess all who use the roads for work whether driving, walking or cycling

An increasing number of people are on the roads for work-related purposes. This comes with certain risks: road traffic deaths[1] accounted for 39 per cent of deaths at work in 2005[2]. More than one in four deaths at work involved people 'driving a means of transport or motorised and mobile handling equipment[3]'. These numbers are unacceptable and employers are encouraged to take a stance in the face of these numbers.

Road users at work are made up of drivers and riders of vehicles used for a range of purposes (e.g. company cars, vans, pickups, large goods vehicles, buses, taxis, minicabs, emergency vehicles, construction and agricultural machinery, motorcycles, mopeds and bicycles). Additionally many people work on, or near the road, for example maintenance workers, refuse collectors, postal workers, vehicle breakdown employees and the police. Tackling road safety means looking at those outside the vehicle as well. Employers need to risk-assess all who use the roads for work whether driving, walking or cycling.

An accurate definition of work-related road accidents must include employees who are driving an employer's fleet vehicle or their own vehicle during working hours (driving 'at' work) and also employees commuting to work (driving 'to' work).

In our working lives working and driving have become inseparable. Employers have a responsibility to provide their employees with a safe environment not only in the conventional workplace but also on the

PRAISE Awards 2015: showcasing organisations that put road safety first

What have Arriva Denmark, The Hellenic Air Force, Royal Dutch Shell, Electricity Supply Board, Bolk Transport and BT got in common?

These organisations all know that prioritising road safety can help the bottom line, improve working conditions for staff, and boost customer satisfaction. And all are previous winners of a PRAISE award – for European organisations, large and small, that have committed to putting road safety at the core of their business.

The ETSC Praise award ceremony

If your organisation has a road safety programme, and the results to prove it – we want to hear from you. The competition is divided into three separate categories: SME (Small-Medium Enterprise), large company and public authority. Some of the largest employers, and some of the largest fleets in Europe are managed by public authorities. That's why the PRAISE project is also making a special effort to target this group.

To find out more, and to download an application form, please visit our website: **http://etsc.eu/projects/praise/praise-awards-2015/**

Deadline for applications: 3 August 2015.

Contact: praiseaward@etsc.eu

NOTE

1 This refers to the 'transport branch' and fatal Road Traffic and Transport Accidents in the Statistical Classification of Economic Activities in the European Community. The data do not include commuting nor do they include Ireland or the UK.
2 European Commission (2005) Causes and Circumstances of Accidents at Work in the EU.
3 *ibid*

Antwerp Port Improvements in Road Safety

Antwerp Port Authority was one of the entrants from 2014's PRAISE competition that won a runner up recognition

The Port Authority was established as an independent municipally owned company in 1997. It plays an important role in the day-to-day operation of the port of Antwerp, main port for Flanders and Belgium, the second gateway to Europe, the largest European chemical hub and the most important logistics port hub in the Hamburg-Le Havre range. There are a total of 1,650 employees who ensure that the port is able to function efficiently and can continue playing a leading role as an international seaport. The Port Authority manages and maintains the docks, bridges, locks, quays and land sites.

In 2010 the Antwerp Port Authority appointed a mobility coordinator within the Strategy and Analysis department. Their major assignment is to improve the sustainability of the work related traffic and increase as such also the work related road safety for not only the employees of the Antwerp Port Authority, but for all 60,000 persons working in the Port of Antwerp.

In late 2012 it launched 'Safe commuting within the Port of Antwerp' action plan which aims to:

- Sharing of road safety related information amongst the participating parties and the port community at large.
- A map that shows cyclists the safest route to work and gives them helpful tips to make their trip as safe as possible.
- A hotline for infrastructural problems. Individuals noticing for example a pothole in the road or any other dangerous situation can report this to the hotline that will take appropriate action.
- Information sessions for safety coordinators on programs to improve road safety within their companies, followed by an educational programme.
- A full-scale research programme on commuting safety
- An awareness campaign aimed at improving road safety by bike.

The Antwerp Port Authority also realizes that good infrastructure is crucial to road safety. Which is why the it is constantly looking at improving the roads, bridges and cycle paths in the port area. In 2007 for example, the Antwerp Port Authority renewed a 16 km long cycle path following the Scheldelaan, which is one of the major

Recreatief fietsen

Ook buiten de werkuren is iedereen welkom in de haven van Antwerpen. Met familie en vrienden de haven ontdekken op de fiets of uitwaaien langs de oevers van de Schelde. De haven biedt een unieke decor. Daarom creëerde het Havenbedrijf een toeristische fietskaart met vier routes tussen de 10 en 60 kilometer. Naast de routekaart is er aandacht voor bezienswaardigheden, uitkijkpunten en drink- en eetgelegenheden.

Wil je nog meer informatie of zelf fiets- of andere routes samenstellen? Kies dan voor de Port of Antwerp App, gratis te downloaden in de appStore of via Google Play.

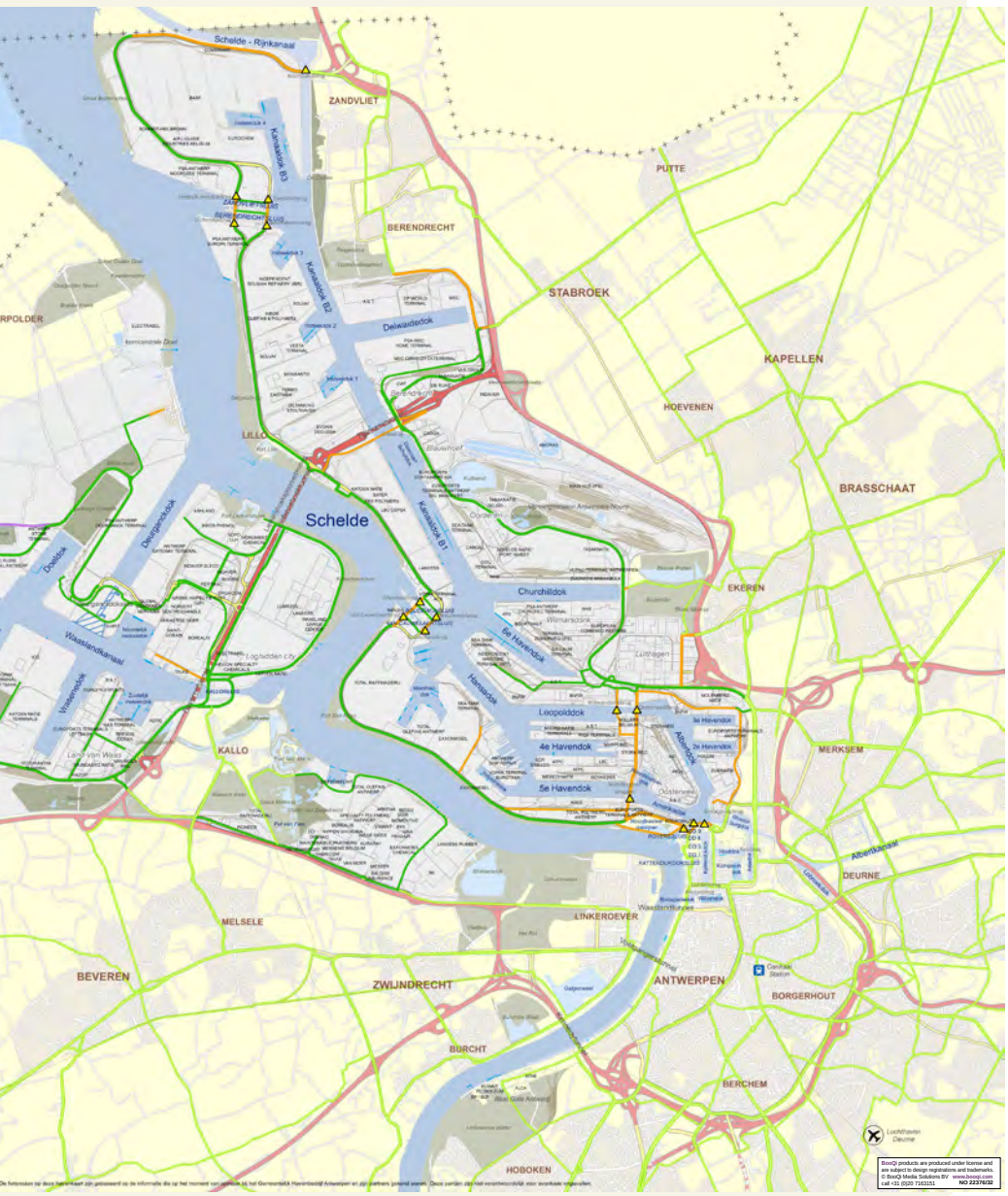
De havenfietskaart kan gratis worden afgehaald in het Mas Havenpaviljoen, Hanzestedeplaats 19, aan het onthaal van het Havenhuis (Entrepotkaai 1) of bestellen via www.portofantwerp.com

Antwerp Port Authority
Havenhuis
Entrepotkaai 1
2000 Antwerpen
T +32 3 205 20 11
F +32 3 205 20 28
E info@portofantwerp.com
www.portofantwerp.com

The launch of our 'ongeHAVENd' awareness campaign last month

The safe cycling map also gives helpful tips with the aim of making each trip as safe as possible

roads in the port, according to the latest standards for safe cycling paths. The project was budgeted for €1.5m and is very successful and frequently used. While in the period 2006-2008 30 per cent of all cycle collisions of employees took place on the Scheldelaan, in the period 2009-2011 (following the renovation) only 8 per cent of the collisions took place on the Scheldelaan. This shows that this substantial renovation contributed enormously to the improvement of the safety for cyclists on the Scheldelaan.



The safe cycling map shows the safest routes, including a 16 km cycle path following one of the major roads in the port

roads. Duty of care, health and safety compliance are legal necessities in all EU Member States, and are an essential consideration for employers. But, equally important, it most often makes sound business sense to draw up and implement a road safety action plan. Good fleet management is therefore becoming a pressing concern for employers. Yet, the know-how is often hard to find.

PRAISE

The European co-funded PRAISE projects steps in here. PRAISE (Preventing Road Accidents and Injuries for the Safety of Employees) and is run by the European Transport Safety Council (ETSC), a Brussels-based independent non-profit organisation dedicated to reducing the numbers of deaths and injuries in transport in Europe.

PRAISE helps to advance the awareness of the need for work-related road safety management and provide the know-how to employers who have to take on that challenge. The project also shows that work related road safety has benefits to other areas including health and safety, environment and legal responsibilities of employers. ETSC aims to inform and motivate by developing practical tools for employers to translate into practice. These include reports on topics such as speed management and the business case in investing in road safety. ETSC also presents employers' stories with a series of case studies. It also runs a competition spurring employers to tackle safety.

FYI
Ellen Townsend is Policy Director at the European Transport Safety Council (ETSC)
ellen.townsend@etsc.eu

Coming clean

When is a vehicle clean? And can cities and regions as local authorities drive the change when they roll out incentives or purchase vehicles for their own fleets? **Jonas Ericson** and **Simon Clement** share their views on the cities' power to make Europe's vehicle fleet cleaner

Several different attempts have been made to clean Europe's transport fleet, both through voluntary, and later compulsory, agreements with industry, requiring manufacturers to acheive a certain performance. Legal instruments, however, have the limitation that they can only get rid of the most emitting cars, they cannot foster the development of the best cars. They can cut the tail, but not pull the head.

For this one needs totally different tools. You may introduce strong incentives, like Norway has done for owners of electric vehicles, where drivers receive subsidies of several hundred Euros per month, and may drive in the bus lane. However, this is too costly an approach for most of Europe's member states and several subsidy schemes have also been cancelled abruptly when political majorities or economic priorities have changed.

THE SWEDISH PRACTISE

Sweden has taken a different approach, by using the procurement power of public entities, combined with a clear definition of a "clean" vehicle: max 120g CO_2/km (with allowances for E85 and biogas 40 per cent given the reduced overall climate impact of these fuels). Though publicly owned fleets in Sweden only comprise a very small share of the total fleet (with a significant proportion consisting of specialised vehicles) the cleaning of city fleets has made it possible to require the same from companies contracted by the city to provide services. By showing it is possible and initially being prepared to pay a little bit more for the contractor, cities have gradually cleaned taxi services, courier services, security companies, waste management etc, and today almost all taxis in Stockholm for example use biogas.

The clear and simple definition of clean vehicles, together with adjusting the tax on renewable fuels to make them slightly cheaper, has also made it possible for private companies to adopt clean vehicles in their internal fleet policies and eventually also require their business partners to do the same. This is really a success story. In fact it is so successful that the share of clean vehicles exceeded 40 per cent of all new vehicles sold in 2012, and it was possible/necessary to make the definition stricter (now 95g CO_2/km). The sales share of the more strictly defined clean vehicles is now around 15 per cent.

PUBLIC AUTHORITIES BUYING CLEAN? THE CLEAN VEHICLES DIRECTIVE

In part inspired by the Swedish success story, the European Commission published an EU directive, aiming

The clear and simple definition of clean vehicles, together with adjusting the tax on renewable fuels to make them slightly cheaper, has also made it possible for private companies to adopt clean vehicles in their internal fleet policies

Examples of alternative fuels available to Stockholm's (left) drivers

to direct the purchasing power of Europe's public authorities towards provide a large market for alternative fuel vehicles, to help reach economies of scale and reduce the price of these vehicles. However, finding a common set of requirements on Europe's public authorities with their different competences and skills is a very difficult task, especially given the significance of the car industry to the European economy. The final compromise found (Directive 2009/33/EC, known as the Clean Vehicle Directive), however was not a good one.

There are several problems with the directive which substantially reduce the possible impact:

1. It is only applicable to the direct purchase of vehicles by public authorities and public transport operators – not to wider services procured (such as road maintenance, waste management) where the use of vehicles is significant. Generally public fleets are too small to make an impact on overall sales for manufacturers.

2. There is no minimum standard established in terms of environmental performance for new vehicles – instead procurers are required to "consider" them in purchasing decisions.

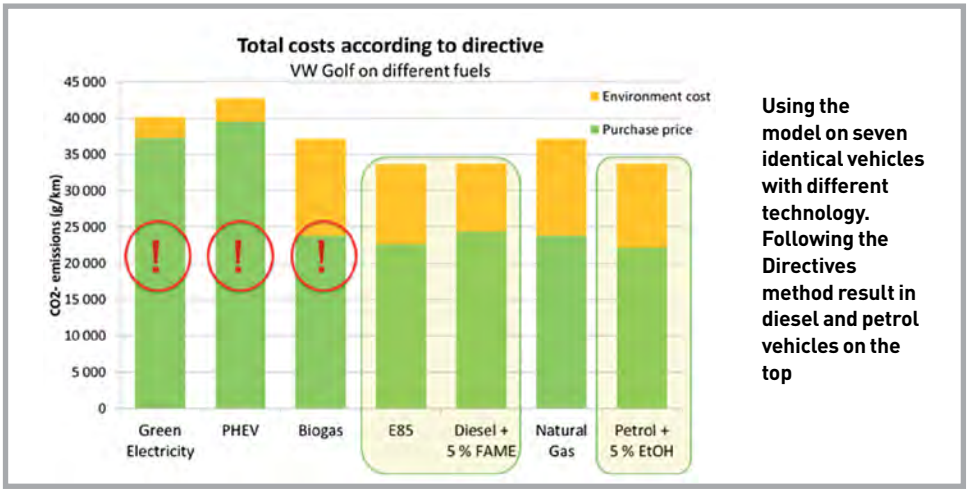
3. A method developed to monetise harmful emissions is so complicated that even experienced public procurers make mistakes and end

The Directive alone is not a sufficient tool to change the market. The main obstacles... are the purchase price, the price of the fuel and the fuelling/charging infrastructure

up with a less clean vehicle than necessary. The requested information is often hard to obtain, often missing, and – as has been evident from several real-life testing – rarely reflecting real conditions. It is evident that such a complicated method will never be voluntarily adopted by private companies, even less used by them towards business partners.

4. The method is intended to sort out the best combination of environmental performance and price. In order to do this, the Directive fixes the values of the environmental parameters (energy efficiency, CO_2 emissions and harmful local pollutants) in monetary terms. These values should ideally reflect the external costs, but while the Directive "values" energy efficiency by far the highest, cities' priorities lie with local pollutants and climate impact. Cities would prefer to buy electric or renewably fuelled vehicles – however the method in the Directive will almost always favour a fossil fuelled vehicle – especially diesel.

5. The main problem is however that the Directive alone is not a sufficient tool to change the market. The main obstacles for changing to electric or renewable fuelled vehicles are the purchase price, the price of the fuel and the fuelling/charging infrastructure. The EU has recently adopted an infrastructure Directive which may solve the charging infrastructure for EVs, but it is still missing for renewable fuels and the Commission is right now forcing Sweden to raise the taxes on renewable fuels to prevent them from being even slightly cheaper than fossil fuels.



Using the model on seven identical vehicles with different technology. Following the Directives method result in diesel and petrol vehicles on the top

SO WHAT SHOULD WE DO?

The Clean Fleets project, co-ordinated by ICLEI – Local Governments for Sustainability, has been working with cities on vehicle procurement over the last three years, and engaged with hundreds of experts in the field. The conclusion from this work is that if you wish to make a difference on the market, you need to provide a simple definition of a clean vehicle, not a complicated calculation model. In this way we provide public procurers, who are not, and can never be, vehicle experts with a model they can implement effectively – a model that the private sector can also follow, and which sends a coherent message to the market.

The Clean Fleets project, in co-operation with Polis, is currently preparing a set of policy recommendations for European and national policy makers aimed at facilitating the greater uptake of alternative fuel vehicles (AFVs) within Europe's publicly owned or controlled vehicle fleets.

FYI

Simon Clement is Sustainable Economy and Procurement, Co-ordinator at ICLEI
simon.clement@iclei.org

Jonas Ericson is Clean Vehicles in Stockholm Co-ordinator for the City of Stockholm
jonas.ericson@stockholm.se

The Clean Fleets project assists public authorities and fleet operators with the implementation of the Clean Vehicles Directive and the procurement or leasing of clean and energy-efficient vehicles. To add your voice to this discussion please email Simon Clement or visit **www.clean-fleets.eu**

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

- **Brussels:** Intelligent deliveries, off-peak freight
- **Catalonia:** Enhancing mobility with region-wide apps
- **Barcelona:** High service level buses in the Catalonian capital
- **Traffic Management:** Focus on Demand Modelling
- **Autonomous Public Transport:** Tradition mustn't be forgotten

The freight divide

Cathy Macharis and **Sara Velinde** discuss stakeholder support for two innovative urban freight solutions in Brussels

In July 2013, the Brussels-Capital Region adopted a dedicated strategy for urban freight transport in Brussels aiming to make urban freight flows more efficient and sustainable. The plan identified a list of measures that should be supported that makes Brussels a suitable place to test urban freight solutions.

During those past two years, two innovative measures were tested as part of a European-funded research project called STRAIGHTSOL. TNT Express used a Mobile Depot for its inner city express deliveries and Colruyt shifted some of its supermarket deliveries towards off-peak hours. Both tests received support from the Brussels Capital Region and from the MOBI department of the Vrije Universiteit Brussel.

MOBILE DEPOT

A Mobile Depot is a trailer fitted with a loading dock, warehousing facilities and an office. In the morning, the trailer is loaded with all inner-city deliveries for that day and is then driven to a central parking location in the city. From there, the final deliveries are carried out by dispatch riders on electrically supported cyclocargos.

TNT Express used a Mobile Depot for a period of three months (28 May 2013-22 August 2013) to undertake their pick-ups and deliveries in Schaarbeek, Etterbeek and Sint-Joost-ten-Node which are three Brussels municipalities. It is an area of just over 12 square kilometres that is densely populated and highly urbanized. There is no commercial dominance in the area and it was chosen because of its relatively high-drop density of small shipments.

Regular deliveries and pick-ups of parcels and documents in Brussels are carried out by diesel vans from the TNT Express depot at the Brussels freight airport Brucargo. For the duration of the demonstration, TNT Express serviced the demonstration area from their newly manufactured Mobile Depot. Each morning, the trailer was loaded at the TNT hub with all deliveries for that day and then driven to a predefined central location in the Parc du Cinquantenaire. The park is close to the demonstration area and the depot of the subcontractor doing the cyclocargo deliveries and provides the space that is needed for the Mobile Depot to manoeuvre and for the loading and unloading of the cyclocargos. The Mobile Depot arrived in the park around 9.15 am. From there, the deliveries and pick-ups were carried out by four dispatch riders on electrically driven cyclocargos. During the 12 demonstration

TNT Express Mobile Depot in Parc du Cinquantenaire, Brussels

Source: TNT Express

"For a period of two weeks, the largest Belgian food retailer, which operates 14 supermarkets in the Brussels-Capital Region, shifted at least one of its daily delivery trips to two selected shops to off-hours"

weeks, 1292 pick-ups and 5286 deliveries were done and 4534 cyclocargo kilometres and 2544 truck kilometres were driven.

OFF-HOUR DELIVERIES

The second innovative solution that was tested in Brussels was a shift to off-hour deliveries. In early 2014, for a period of two weeks, the largest Belgian food retailer, which operates 14 supermarkets in the Brussels-Capital Region, shifted at least one of its daily delivery trips to two selected shops to off-hours.

The environmental permit of both shops does not allow them to be delivered between 9pm and 10pm and 6am and 7am. However, to facilitate the pilot programme, the Environmental Agency of the Brussels Capital Region decided to allow a temporary exemption to the rules for a period of one week. The exemption led to a two-part trial. During the first week, from Monday to Friday, at least one early morning delivery (between 6 am and 8 am) and at least one late evening delivery (between 8 pm and 10 pm) were

carried out. During the second pilot week, from Monday to Friday, one of the deliveries that usually take place during the day (between 8 am and 8 pm) was shifted to night (between 10 pm and 6 am). On Saturday, there was at least one early morning delivery during the first week and at least one night time delivery during the second week.

The participating retailer took several measures to minimise the noise nuisance for local residents varying from an indoor delivery area or covered unloading quay to the quietest possible diesel trucks (Euro 6) as well as quiet trailers with more rubber and fewer steel components. Each shop was also equipped with a silent hand pallet truck, and each driver was provided special training on silent deliveries.

MEASURED IMPACT OF THE TWO SOLUTIONS

Demonstrating these two innovative solutions in Brussels was part of a European research project called STRAIGHTSOL. Apart from demonstrating solutions, STRAIGHTSOL also had a mission to develop an evaluation framework for urban freight transport solutions. The framework was developed by the MOBI department from the Vrije Universiteit Brussel and TNO from the Netherlands. Applying this framework to the demonstrations allowed a thorough evaluation and revealed how the solutions change the environmental, societal and economic impact of certain urban freight flows.

During the Mobile Depot demonstration, punctuality of deliveries and pick-ups dropped by 7 per cent. According to TNT Express, this can partly be attributed to the fact that this was a demonstration project and both TNT Express and its subcontractor had to adjust their operations to the new way of working. The demonstration also revealed that the use of a Mobile Depot doubled operating

Off-hour deliveries allow for the more efficient of existing road capacity

costs and required high investments to develop and manufacture the trailer while operating revenues remained the same as before.

Despite the fact that total costs increased by 3 per cent during the demonstration, there is a more reachable business case for shifting supermarket deliveries to off-hours. Business case analysis of a scaled scenario in which all supermarkets of the participating retailer that are located in Brussels would be partly delivered during off-hours revealed cost savings of about 8 per cent. These savings can primarily be attributed to reduced operational costs linked to higher average speeds and lower fuel consumption. During the night trips, the average speed increased by 48 per cent. However, during the night, it takes a driver an average 9 minutes or 17 per cent longer than during the day to unload his vehicle which can be explained by the fact that no members of staff were present to open the door and help the driver to unload. Average fuel consumption decreased by 11 per cent.

Both demonstrations were too small-scale to measure any impact on air quality or climate change. In case of the Mobile Depot, the change in number of diesel vehicle kilometres was used to calculate impact on emission of pollutants. By applying STREAM emission factors on the number of kilometres driven, calculations revealed that during the demonstration, TNT Express emitted 24 per cent less CO2 to carry out these deliveries and pick-ups. Using a Mobile Depot also has a positive impact on the air quality: the emission of fine particles (with a diameter of 2.5 micrometres or less) dropped by 59 per cent.

However, due to the use of a truck-trailer combination instead of multiple vans, the emission of nitrogen oxides increased by 48 per cent. During the off-hour deliveries demonstration, distance driven and vehicle type remained the same and there only was a shift to another time of day. The main effect impacting emissions was a decrease of the number of congested kilometres, which positively impacted the emission of pollutants. Measurements by an independent acoustic engineering company showed that the noise produced during both the manoeuvring and the loading and unloading operations can hardly be discerned

Applying an evaluation framework to the demonstrations allowed a thorough evaluation and revealed how the solutions change the environmental, societal and economic impact of certain urban freight flows

from the ambient noise when measured next to the closest housing unit. The threshold of 66 dBA, which by law cannot be exceeded more than 10 times in one night time hour, was exceeded twice at the pilot site with an uncovered loading bay and never at the site with a covered loading bay. However, the average noise levels produced during the manoeuvring towards the loading bays and parking in front of the loading bays exceeded the 42 dBA maximum which would make it impossible to carry out night deliveries under current laws.

STAKEHOLDER SUPPORT FOR GENERAL IMPLEMENTATION?

The scale of both demonstrations was rather limited which makes it difficult to assess stakeholder support for implementing the measures on a larger scale. That is why the STRAIGHTSOL evaluation framework also consists of applying Multi Actor Multi Criteria Analysis (MAMCA) which is an evaluation tool that explicitly includes the goals and objectives of all stakeholders and was developed at the MOBI department of the Vrije Universiteit Brussel.

The Mobile Depot MAMCA revealed that the objectives of the economic stakeholders (i.e. TNT Express, shippers and receivers) are fairly well addressed by business as usual while the objectives of the societal stakeholders (i.e. citizens and local authorities) are better addressed by the different Mobile Depot scenarios. The scenarios in which a toll is charged when freight vehicles enter the city address the combined objectives of all stakeholders the most. The scenario with the best chance of a consensus, however, is the scenario where nothing is changed to the demonstration except for the used capacity of the Mobile Depot (from 40 per cent during the demonstration to 90 per cent).

A further analysis of the individual stakeholders shows that the viability of investment and profitable operations criteria of TNT Express have to be met better for the MD concept to become really interesting. The analysis of the scenarios shows that this can be done by using the Mobile Depot at full capacity and by increasing the drop density. The MAMCA also showed that when using the Mobile Depot, TNT Express does create benefits for the other stakeholders for which it is not compensated. Internalising the external costs could overcome that for example. Based on our results, it would be interesting to further test the Mobile Depot under these new conditions.

A first conclusion of the off-hour deliveries MAMCA is that a shift to off-hour deliveries to supermarkets in Brussels should be capable of receiving overall stakeholder support. All stakeholders ranked the different scenarios more or less the same, and there were no scenarios that scored very high for one stakeholder and very low for another.

Scenarios with a high proportion of night deliveries are considered better by all stakeholders. The retailer prefers the scenario with the even spread throughout the day, while the other two stakeholders (citizens and local authorities) prefer more morning deliveries. The mono-actor views of the citizens and local authorities revealed that the noise that is produced remains an important aspect if more deliveries will be shifted to the night. The mono-actor view for the retailers revealed that a shift to night deliveries is only interesting for the retailer when he can do it on a large scale. Overall, the main lesson is that there is good potential to shift some deliveries to supermarkets to off-hours.

FYI

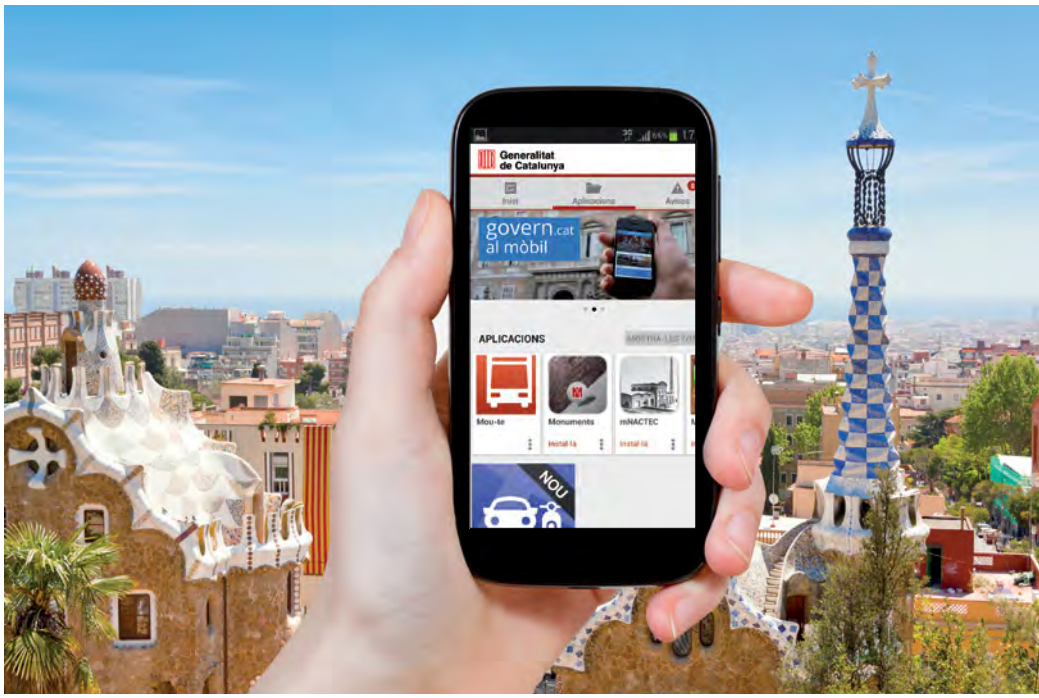
Cathy Macharis is Professor at the Vrije Universiteit Brussel. Her research group MOBI (Mobility, Logistics and Automotive Technology) is an interdisciplinary group focusing on sustainable logistics, electric and hybrid vehicles and urban mobility. She focuses on how to include stakeholders within decision and evaluation processes in the field of logistics and mobility.
cathy.macharis@vub.ac.be

Sara Verlinde is a research associate at the MOBI research group of the Vrije Universiteit Brussel. Her PhD research addresses urban freight transport solutions and mainly focusses on consolidation concepts and off-hour deliveries.
sara.verlinde@vub.ac.be

The Cat with the App

MyWay
EUROPEAN SMART MOBILITY RESOURCE MANAGER

Cristina Pou examines Catalonia's two new multimodal initiatives



The quality of our modern transport and mobility systems is constantly improving and our citizens are more demanding regarding the information provided and the new technologies. In this sense, the possibility to know how to get from point A to point B with the combination of different modes of transport (public transport+bicycle, e-scooter+public transport, etc), as well as to know the time before the next bus, or the delays and disruptions within the network in real time with alternative options, are the key issues affecting our citizens.

The Government of Catalonia has launched the first multi-modal journey planner in Spain called 'Mou-te' which is available through the website www.gencat.cat/mou-te and smartphone gencat.mobi/moute. 'Mou-te' integrates all the public and private transport modes within Catalonia (underground, urban buses, tram, regional and suburban trains, commuter buses, buses on demand, long-distance and high-speed trains) with 180 operators (public and private), more than 15,000 stops and 1230 lines. The main challenges of this project have been the several information sources with different quality of data, frequency of updates and the complexity of this huge system. Just to have an idea of the complexity, for example, the total urban buses of Barcelona (TMB) includes approximately 110 lines and for Mou-te it's more than 1230 lines. We could agree that there is no similar tool at this level, neither from any other public administration nor the private sector. Existing Apps and websites in the private sector are more focused on providing information within cities like Barcelona and the surrounding areas.

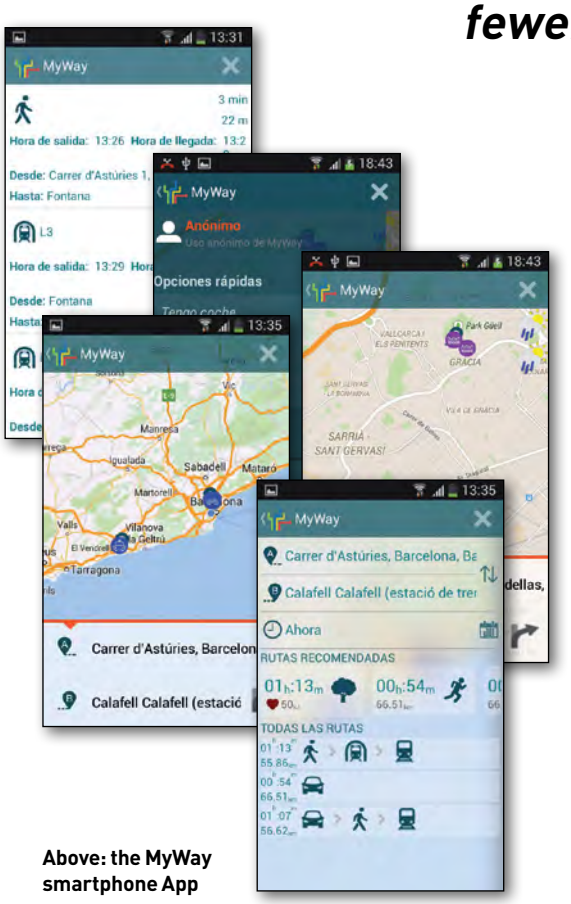
MODAL SHIFT

'Mou-te' has been recently improved in order to respond to our citizens' demands and it is currently providing a multimodal journey planner combining private cars with public transport. This has been greatly approved by our citizens as there are some areas with low-density population or with a low supply of public transport where they are now informed about the possibility of taking their car to the nearest train or bus station (with the specific route to follow) and take public transport.

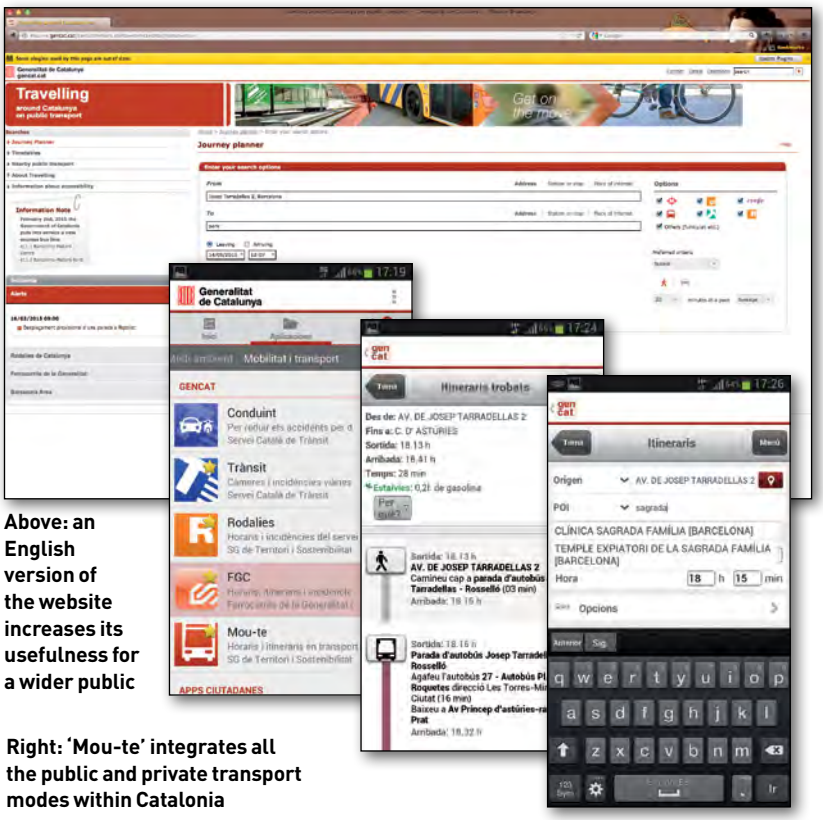
Our next challenges are focused on introducing more modes of transport like bicycle or e-scooters, providing real-time information and taking into account our citizens' preferences.

In this manner, Polis and the Government of Catalonia, in collaboration with 12 more partners

Within the MY WAY project there are three living labs where the new App will be tested: Catalonia, Berlin and Trikala: densely populated cities with a large mix of transport modes and a smaller urban area with fewer transport options



Above: the MyWay smartphone App



Above: an English version of the website increases its usefulness for a wider public

Right: 'Mou-te' integrates all the public and private transport modes within Catalonia

from ICT solutions and service providers, research organization and local authorities, are members of the European project called 'MY WAY'.

The main goal is to enhance personal mobility through smart services. It is a part-funded project under FP7-ICT Smart Cities Call with a total budget of €5m and with a €3.6m funding from the EU. The main innovative aspects of this project are to provide a fully multimodal journey planner integrating the public and private modes into a single trip, a user centric (user profile) vision of the application adapting and learning from the user experience, and the possibility to provide real time updates, delays, incidents, re-planning the trip and the booking of some services (for example, e-scooters).

Within the MY WAY project there are three living labs where the new App will be tested: Catalonia, Berlin and Trikala (Greece), a good combination of large and densely populated cities with an excellent mix of transport modes, to a smaller urban area with fewer transport options.

The Phase 1 version of the App is already available in Android and iOS and it is being tested by real users of the three living labs at the time of going to press. This first version already includes the combination of public transport, private car, bicycle, on foot and motorbikes, as well as providing a first version of the user profile.

FYI
Cristina Pou Fonollà is Head of Road Transport for the Government of Catalonia
cristina.pou@gencat.cat
www.gencat.cat

Welcome to Bus-elona

Cristina Pou introduces the new interurban, high service level bus network in Catalonia

The bus networks with high levels of service (BHLS) around Europe are mainly characterized by high frequency vehicles using modern, sustainable and accessible vehicles, with (at the very least) real-time information in stops, separated bus lanes and high demand.

In the case of Catalonia, a new interurban bus network called 'exprés.cat' has been implemented since October 2012 in order to respond to the large increase in demand (57 per cent) over the past 10 years.

The interurban bus network of Catalonia is integrated by more than 700 lines with 53.1 million trips per year. The new 'exprés.cat' network is integrated by those 40 lines that represent 40 per cent of the demand, with an average occupancy of 30 passengers per expedition.

The project represents a firm commitment of the Government to promote interurban buses as an efficient and competitive mode of transport to connect the main areas of Catalonia, where there is an increased demand for mobility – quickly, sustainably and economically.

The implementation of the network will be progressive. It began in October 2012 with the first four new lines that connect four different cities with Barcelona. Moreover, these lines run through the HOV-BUS lane with a length of 6.8 km and are located in one of the most congested highways with access to Barcelona (the C-58). This new HOV-BUS lane saw an investment of €80m.

At this time 15 express bus lines have already been implemented: 11 in Barcelona, three in Tarragona and one each in Girona and Lleida.

The 44 'exprés.cat' branded buses aid rapid identification for the user

MAIN CHARACTERISTICS OF 'EXPRÉS.CAT'

- High frequency in peak hours and new direct bus services.
- High and competitive commercial speed: use of HOV-BUS lanes, priority in traffic intersections, etc.
- Real time information to the user: bus stops with dynamic information panels updated in real time as well as information inside the vehicle. Currently, there are 47 real-time information panels installed within bus stops.
- These lines are part of the integrated fare system.
- More intermodality with other modes of transport.
- 100 per cent accessible vehicles for disabled people.
- More sustainable and comfortable vehicles: use of biodiesel and wifi inside the buses.
- New image: the new bus express network will be integrated under a new corporate image, 'exprés.cat', which brings visibility to the user and facilitate their rapid identification. Today 44 vehicles include the new brand.

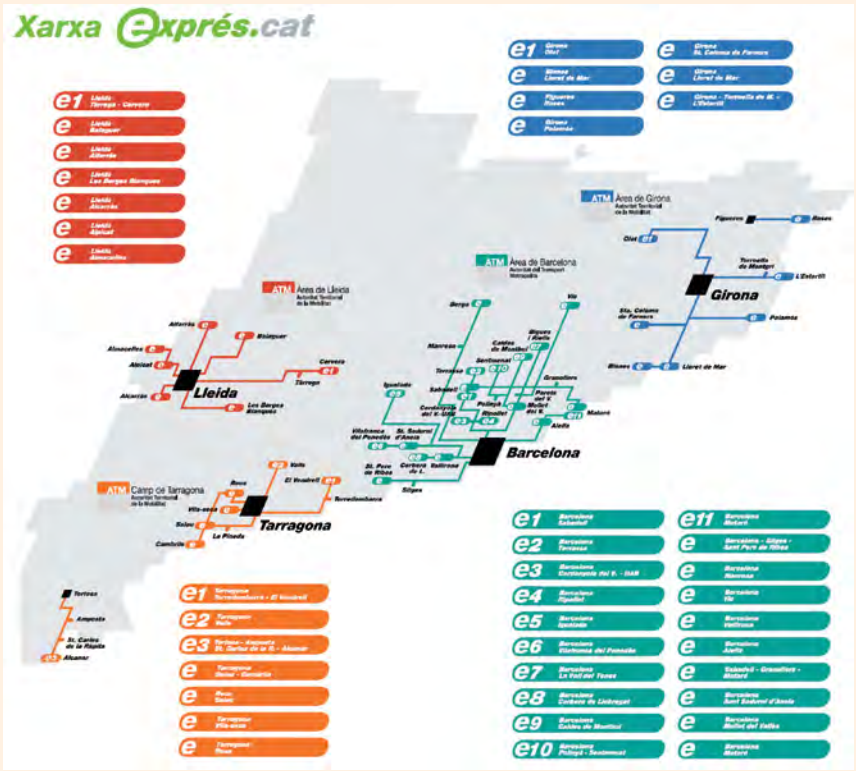
To date, 47 real-time information panels have been installed within bus stops

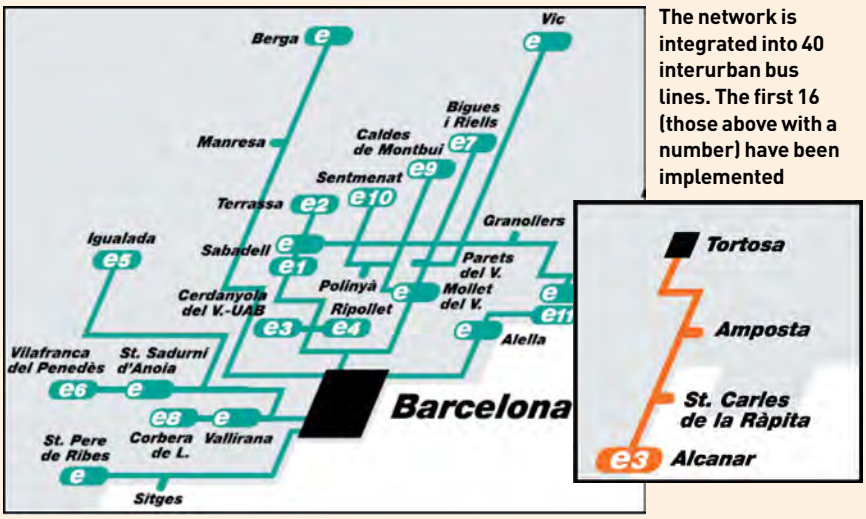
– Public-private financing. The financing implementation of this network will involve public-private participation, which will be jointly undertaken by public transport operators (private companies) providing service in these corridors and the Government. Specifically, the new vehicles will be funded by the operators (66 per cent) and the Government (33 per cent), while the production and implementation of the new image will be assumed by operators, with the real-time information equipment assumed by the Government.

'EXPRÉS.CAT' NETWORK: 40 LINES AROUND CATALONIA

The 'exprés.cat' network is integrated into 40 interurban bus lines which represent 40 per cent of demand and connect different sized cities with the four main cities of Catalonia: Barcelona (19 lines), Girona (seven lines), Tarragona (seven lines) and Lleida (seven lines).

The first 16 lines (the lines with a number in the above graphic have been implemented).





The network is integrated into 40 interurban bus lines. The first 16 (those above with a number) have been implemented

EVALUATION OF THE NETWORK

The evaluation of the network has been very positive after almost two and a half years. All the lines are seeing an increase in the number of passengers. For example, line e3 Barcelona – Cerdanyola – UAB has increased by 14 per cent, line e4 Barcelona – Ripollet increased by 29 per cent and line e6 Barcelona – Vilafranca increased by 4 per cent in all the corridors. These lines are also very appreciated by the users, receiving an average of more than 8 out of 10 points in the satisfaction surveys. For example, e4 received an evaluation of 9.1m while e1 and e2 received a score of 8.5.

The new normal

In 2015 real-time traffic management requires demand modelling, say **Johannes Schlaich**, **Thomas Otterstätter** and **Sonja Koesling**

Around 50 per cent of all Germans have a smartphone[1]. Three quarters of those access Internet content on the go and 50 per cent use apps for different aspects of day-to-day life: and these numbers are rising. Transport-related applications are in the top five of the most-used apps[2]. This includes the latest traffic information, navigation and route planning tools and timetable information. The current availability of real-time data is increasing people's expectations. "Real-time" is no longer just a buzzword but is part of the here and now, and modern traffic management can no longer shy away from it. But how can data streams be processed smartly, what are the limits to big data and how can demand modelling fill this gaping void?

Worldwide, 2.5 exabytes (or 2.5 billion billion bytes) of electronic data are produced per day. It is hard to imagine, but entirely true, that 90 per cent of all electronic data has been produced in the past two years[3]. And this statement will remain true in the future as the numbers of data sources and the volumes of information they generate are set to grow exponentially. Data on mobility behaviour make up a portion of this: With each piece of information on timetables and each route planning query, travellers disclose information on their mobility behaviour and contribute to the rise in data volume. And yet today this information is still often not available to transport managers. Their real-time information is fed from data from detectors, floating car data (FCD), automatic number plate recognition systems (ANPR) and accident- and road works reports. This is how they obtain an overview of the current traffic situation of the observed area and can react to regular disruptions thanks to their many years of experience (see image 1).

STATISTICAL VERSUS MODEL-BASED

Thanks to traffic forecasts, the transport manager is getting more and more room for manoeuvre for choosing the best measure to take. Today there are two main distinct approaches in traffic forecasting: the statistical and the model-based approach[4] (see image 2). The statistical approach uses interpolation, interference, data collection, artificial intelligence and mathematical models to compare observed time periods with historical patterns. The traffic flow and speed variables are analysed and predicted without explaining and reproducing the underlying phenomena, i.e. the interaction between the vehicles and the driver behaviour. Statistical

The statistical approach uses interpolation, interference, data collection, artificial intelligence and mathematical models to compare observed time periods with historical patterns. The traffic flow and speed variables are analysed and predicted without explaining and reproducing the underlying phenomena

techniques are suited to projecting low-volatility traffic measures or recurring traffic patterns. They come up against their natural limits, however, if there is not enough historical data from sufficiently similar situations. This happens in particular with unusual situations, when accidents occur or road works are set up.

If someone wishes to react to these situations in real-time, model-based approaches can be used for the forecasting. In contrast to statistical processes, the model-based simulation approach relies on a physical interpretation of the traffic network and conditions. This is added to the supply through an explicit simulation of the interplay between travel demand and the transport network. Model-based solutions such as PTV Optima, which can output dynamic forecasts for a time horizon of up to 60 minutes, combine for proven offline traffic modelling with real-time data and algorithms.

On this basis, a traffic model created in the traffic planning software PTV Visum, for example, shows the "typical" day (e.g. workdays or weekends) in the transport area under consideration. The transport supply and demand are then represented in the form of demand matrices. Dynamic traffic assignments calculate the time-dependent volumes and turn proportions on the network from the travel demand[5,6,7,8] (see image 3). PTV Visum passes all this information on to PTV Optima.

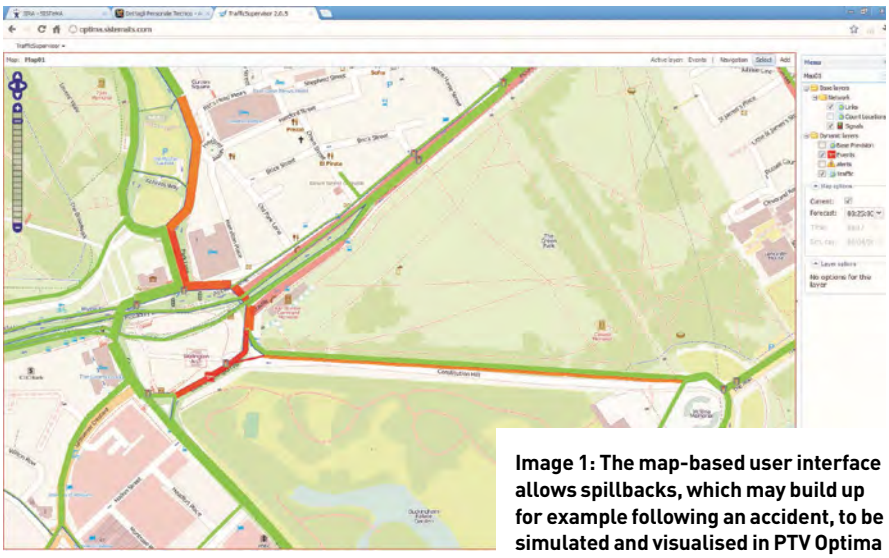


Image 1: The map-based user interface allows spillbacks, which may build up for example following an accident, to be simulated and visualised in PTV Optima

Image 2: Statistical and model-based approach in direct comparison

	Observed Data	Statistical approach	Model based approach
Traffic estimation - „What is going on?"	Maybe, with extensive measures	Yes	Yes
Traffic forecast - „What is going to happen?"	No	Only „usual" conditions	Yes
Scenario evaluation &			

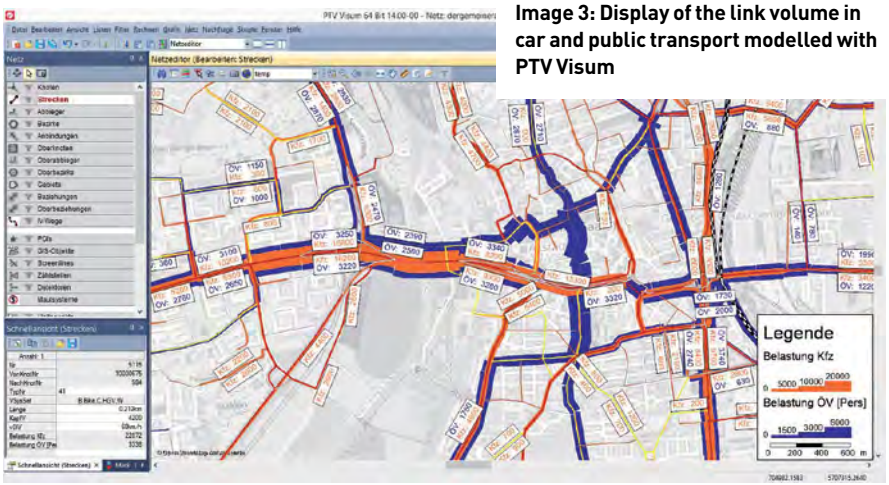


Image 3: Display of the link volume in car and public transport modelled with PTV Visum

In PTV Optima, the online data therefore comes into play. The data is used in real time in PTV Optima to adjust base model capacities, speeds or volumes from PTV Visum locally to the latest circumstances. As PTV Optima explicitly takes into account the network structure, traffic flow dynamics and travellers' route choice behaviour, it also reproduces the traffic situation for links on which no detectors have been installed (spatial distribution) and can furthermore predict the effects of planned and unexpected results (temporal distribution) and then evaluate and compare different strategic measures.

FORECASTS SOLELY BASED ON TRAVEL DEMAND

Travel demand is very often produced in the transport planning using a classic demand model. This covers the trip generation (how many routes are done for each trip purpose?), the trip distribution (what destination has been selected?) and the choice of transport (with which means of transport is the destination reached?). By modelling the decision-making behaviour in this way, the model can be made more sensitive to measures connected with typical transport planning issues[9,10]. For traffic management which emphasises private transport, on the other hand, purely empirical matrices can be used, such as those obtained with mobile data[11]. With the steady rise in the availability of real-time data, the demand matrix calculated in advance can be replaced in the long run by real-time demand from data sources which actually come about by optimising individuals' mobility (apps, navigation services, and so on). In this way, real-time data can detect not only the current traffic situation, but also the current destinations of travellers who are potentially deviating from their "typical" day. In this case too, a forecasting model is essential for predicting the traffic flow using fast assignment procedures. These are processes that are currently used in real-time traffic management.

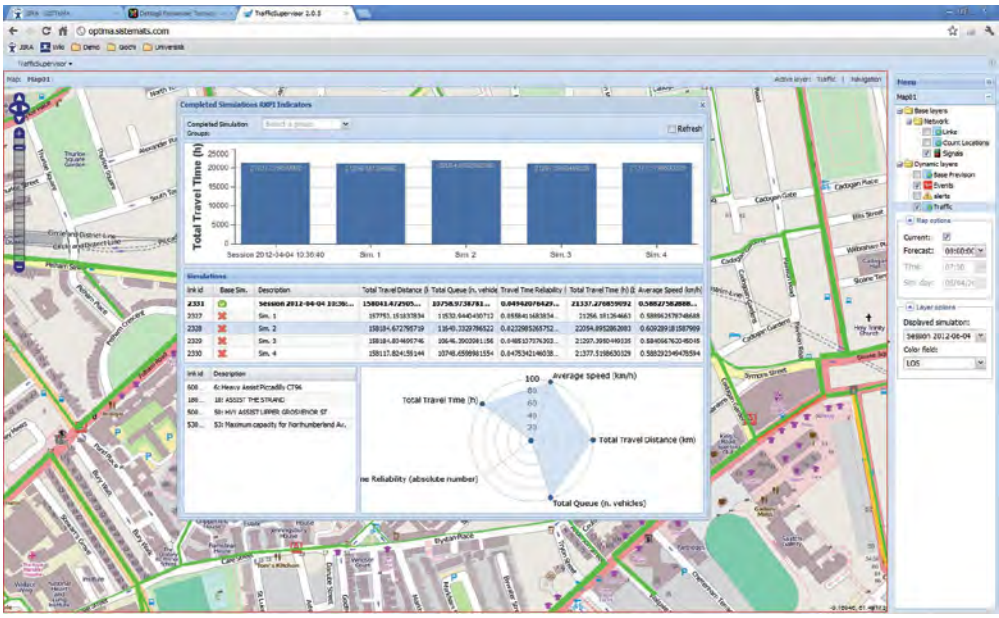


Image 4: With PTV Optima, different scenarios can be simulated in parallel and compared in real time. Parameters can be defined for this individually

THINK STRATEGICALLY, DEVELOP SCENARIOS

When disturbances are modelled into the forecasts on the network, it is necessary to react and rectify the situation. Cities and regions have different objectives in this. Transport for London (TfL), for example, measures its success by the reliability of the transport network[12]. PTV Optima is flexible in its use of Key Performance Indicators (KPI) which deliver aggregated information on the overall network status in addition to the graphical feedback, and displays the basis for a decision that can be assessed quickly (see image 4). The KPIs can be adjusted flexibly and it makes no difference whether the user has set the avoidance of traffic, the minimising of travel time or the reduction of negative effects of planned or unpredictable events as the main criteria. Typical tools for reacting to this include traffic light signals, the unblocking of traffic

REFERENCES

1 Statista (2015), Anzahl der Smartphone-Nutzer in Deutschland in den Jahren 2009 bis 2014, http://de.statista.com/statistik/daten/studie/198959/umfrage/anzahl-der-smartphonenutzer-in-deutschland-seit-2010/, Deutschland [Number of smartphone users in Germany between 2009 and 2014].

2 ARD/ZDF-Onlinestudie (2014), www.ard-zdf-onlinestudie.de, Germany [ARD/ZDF online study].

3 Cf. Barnes, J., Hitscherich, K., Koesling, S. (2014), How do you turn Big Data into intelligence? New data sources for transport modelling, white paper of the PTV Group, Karlsruhe, Germany.

4 FGSV (Road Traffic Research Association in Germany, 2012), Hinweise zur Verkehrsprognose in verkehrstechnischen Anwendungen, FGSV No. 382/1 (Information paper W1), FGSV publisher, Cologne, Germany [Instructions on traffic forecasts in traffic-related applications].

5 for further information, see G. Bellei, G. Gentile, N. Papola (2005), A within-day dynamic traffic assignment model for urban road networks. Transportation Research B 39, S. 1-29., http://www.sciencedirect.com.

6 for further information, see G. Gentile, L. Meschini, N. Papola (2005), Macroscopic arc performance models with capacity constraints for within-day dynamic traffic assignment, Transportation Research B 39, 319-338, ISSN: 0191-2615.

lanes, variable message signs and traffic information reported on the radio and Internet.

To resolve traffic jams, these tools are often used directly "on the living object". Through their experience, experienced employees in traffic management offices can of course already now choose effective strategies. However, this way makes it impossible ever to find out whether a different strategy might not have been better. Seen from this angle, is it not better to test these and their alternatives in a virtual world? Offline, in PTV Visum for example, strategies which have been developed can be introduced to the PTV Optima online environment, assessed, compared and ranked on the basis of the current traffic situation, before they are then sent onto the streets. PTV Optima is therefore capable of calculating many combinations of strategies simultaneously within a few minutes, including for large networks. This means that the best possible strategy can be applied as soon as possible. Using this process, the transport manager builds up his wealth of experience with unforeseen circumstances, develops confidence about the different scenarios and can choose from the optimal measures recommended by PTV Optima so that the traffic on the road network returns to "normal".

Traffic jam in Tokyo

© iStockphoto/Ilya Terentyev

FYI

Dr.-Ing. Johannes Schlaich is Traffic Software Product Management & Services Director at PTV Group.
johannes.schlaich@ptvgroup.com

Dr.-Ing. Thomas Otterstätter is Product Manager for Real-Time at PTV Group
thomas.otterstaetter@ptvgroup.com

Sonja Koesling is PR & Marketing Traffic Software Manager at PTV Group
sonja.koesling@ptvgroup.com
vision-traffic.ptvgroup.com

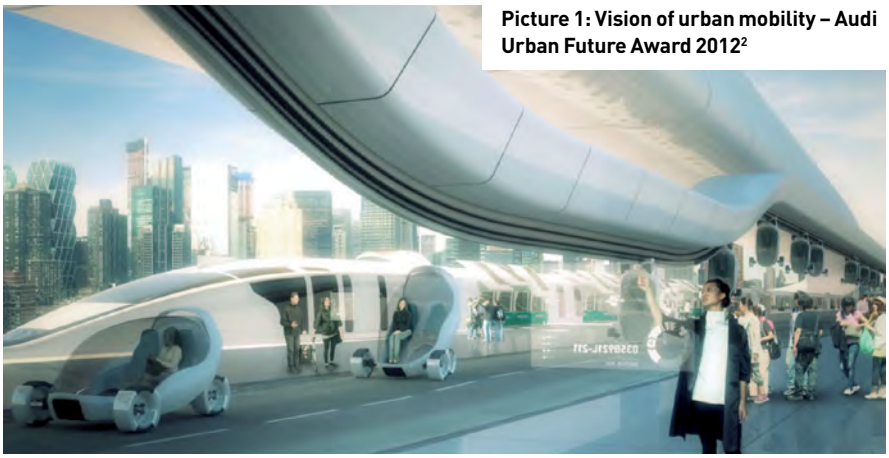
7 for further information, see G. Gentile, L. Meschini, N. Papola (2007), Spillback congestion in dynamic traffic assignment: a macroscopic flow model with time-varying bottlenecks, Transportation Research B 41, 1114-1138, ISSN: 0191-2615.
8 for further information, see PTV Group (2014), Manual PTV Visum 14.
9 Cf. Schlaich, J., Heidl, U., Möhl, P. (2013), Multimodal macroscopic transport modelling: State of the Art with a focus on validation & approval, Proceedings of the 17th IRF World Meeting & Exhibition, Riyadh, Saudi-Arabia.
10 Cf. Friedrich, M. (2011): Wie viele? Wohin? Womit? Was können uns Verkehrsnachfragemodelle wirklich sagen?, Heureka 11 conference report, FGSV (Road Traffic Research Association in Germany) Verlag, Cologne. [How many? Where to? What with? What can travel demand models really tell us?]
11 Cf. Friedrich, M., Immisch, K., Jehlicka, P., Otterstätter, T., Schlaich, J. (2011), Generating Origin-Destination Matrices from Mobile Phone Trajectories, Transportation Research Record, Issue 2196, pp. 93-101, Transportation Research Board, Washington, D.C., USA
12 Transport for London (2012), Travel in London, Report 5, http://www.tfl.gov.uk/assets/downloads/corporate/travel-in-london-report-5.pdf.

The future will not destroy the past

Dr Andreas Kossak doubts if personal rapid transit systems, robotaxis and autonomous cars are endangering classical public transit

In recent years an emerging technology has led many people to predict drastic changes in individual motorized mobility in the near future. This supposed transformation is increasingly the subject of forecasts, scenarios and fantasies, of development activities, fairs and congresses as well as of articles in scientific journals, magazines, newspapers and even the tabloids or "yellow" press. Here are some examples:

- In 2010, the "Advanced Transit Association (ATRA), an international association of active and retired transportation professionals, engineers, architects, urban planners, students, educators, and enthusiasts", published a brochure with the title "*Rethinking Transportation*" and the subtitle "*The Dream of a Fast, Safe and Clean Transportation Is Now Within Reach*". The "dream" is based on "a new, more advanced form of transit, known as **Personal Rapid Transit** (PRT); it uses automatic personal electric vehicles to provide ondemand service directly to your destination without stopping"[1].
- The transport system concept that won the "**Smart Cities Audi Urban Future Award 2012**" is based primarily on autonomous vehicles and automated guideway systems[2] (see picture 1). The transportation systems of the 2014 Audi Award is similar; the Audi – Chief stated in this context: "Mobility Revolution is the great issue for chances in the 21st Century"[3].
- Scientists of renowned US Universities (MIT, Stanford) conducted modelingbased calculations regarding the substitution of all motorized personal traffic (including transit) in the centers of metropolises by "**Robotaxis**", even during the rush hours. According to the case study for Singapore, about 250,000 such vehicles would be needed; however, the average travel time would be double compared to a "conventional" system[4].
- A progressive "**Urbanization**" has been classified for many years now as one of the most important "Megatrends" worldwide resulting in serious consequences regarding the configuration of the urban area as well as the rural transportation systems. Recently the investment bank Morgan Stanley published a "*Blue Paper: Autonomous Cars: Self Driving, the new Auto Industry Paradigm.*" In this paper it is predicted that "**Suburbanization** will be a future Megatrend", as the consequence of the introduction of autonomous cars, because "when people can do other things while they drive, more of them will live further from the denser parts of urban areas". That is the direct opposite to the hitherto addressed megatrend of "Urbanization"[4].
- According to the conviction of numerous selfappointed future and mobilityresearchers, the privately owned car will soon be termed a fossil – meaning: it will be fully replaced by the **sharing** of conventional or autonomous **cars**[5].
- The software giant **Google**



Picture 1: Vision of urban mobility – Audi Urban Future Award 2012[2]

announced having developed a fully autonomous car and to be looking for an industry partner for its massproduction[6].

- At January's **Consumer Electronics Show** (CES) in Las Vegas, several German automobile manufacturers presented their concept vehicles for autonomous cars. A slogan at the conference proclaimed that: "Self-driving cars are the next big thing."[7].

In these various scenarios regarding the future of mobility, the "classical" transit is not to be found any more. Neither one's own car nor a driver's license will be necessary for the use of autonomous cars, vehicles, robotaxis or personal automated guideway transit systems, in order to nominally serve any mobilitydemand in cities as well as in rural areas at any time, even much better than today.

This reminds me of the former slogan of a large Japanese automobile manufacturer: "Nothing is Impossible...". The euphoria in this context is founded on one hand on statements of technology and marketingoriented representatives of the related industry and on the other hand in particular on the conviction of (self-fappointed) "mobility and futureresearchers", who are fascinated by the supposedly unlimited technological possibilities.

From the qualified independent experts camp, however, increasingly critical voices addressing the manifold hard limitations of operating autonomous cars or Robotaxis in the reality of urban transport can be heard. The imagination of a golden future of carsharing is not shared by (real) experts. An example of this is the typically cautious, formulated statement of one of the leading US transport researchers: "I remain skeptical of the vision of 'a world were nobody owns their own car'"[4].

PERSONAL RAPID TRANSIT (PRT)

"Personal Rapid Transit" means guided automated cabins with two to four seats per unit. Such systems have been discussed since the end of the 1960s as the extremeconfiguration of the "New Transit Technologies". During the 1970s, around 300 variants have been on the "market of ideas" – supported, suspended, laterally guided, rolling, magnetically levitated, small, medium, largesized, etc[8].

For example, in the early 1970s it was for already the officially stated aim of the "Free and Hanseatic City of Hamburg" (Germany) and the "Hamburg Transit Association" (HVV) to establish an automated guideway transit system for serving the new housing district "Billwerder-Allermöhe" (80,000 inhabitants) and connecting it to the heavy rail rapid transit system. In 1973 the winning team of the urban planning competition for the new district got the commission to work out the technical and urban designrelated requirements for the introduction of the system[9]. Half of the planned housingdistrict was realized within a few years; however, the installation of an automated guideway transit system was not mentioned any more.

In 1979 the German DOT published a balance of "**30 years' transport policy** in the Federal Republic of Germany"; it was titled: "Transport Yesterday, Today, and Tomorrow". The chapter dedicated to public transit (headline: "Buses and Trains the solver of transit problems") started enthusiastically as follows[10]:

"In the 'cabinport' the customer is searching for his destination on a screen. He pushes a button of an automat and 15 second later he holds a paper in his hand on which the travelalternatives and the needed time for reaching his destination are described. Because he wants more detailed information, he additionally makes use of a voiceinformation from a computer. Now he puts some coins into a second automat, signs in with the code of his destination, gets a token and walks to the departure zone.

"After only some seconds a driverless cabintaxi approaches. The cabin stops, its door opens, the passenger boards the cabin, takes a seat, inserts the token into an automat, the door closes, and the cabin starts to move. Quiet, without any vibration, the cabin is crossing some tracks while leaving the cabinport, it crosses on high concrete columns several streets, passes a bustling square and approaches a second port. The speed of the cabin reduces automatically. The cabin stops and picks up two additional passengers; they feed as well the inboard automat with tokens, thus informing the computer of the cabin about their intended destination. The travel continues. Only a few minutes later our passenger reaches the port of his destination; he leaves the cabin and his seat is taken by another passenger.

Picture 2: The "Cabintaxi" in 1975 (left[14]) – Personal Rapid Transit in 2010 (right[1])

"A glance into the future of public transit indeed. However, not as far away from reality as it may seem at first glance. The technology for introducing such cabinsystems is now available; however the proposition for an economically viable operation is not yet given. Federal government, Federal States, metropolises and not at least major industrial manufacturers are working on that since many years".

In the same year (1979), on occasion of the "Status Seminar" as part of the R&D program "Transit Research" at the German Federal Ministry of Research and Technology, the implementation of an automated guideway transit system (medium size cabins) in Hamburg was announced for the following year, serving the business district "City North" and connecting it to the rapid rail system. At the next year's Status Seminar nothing was mentioned with regard to the respective project or any alternative[11],[12]. That was 35 years ago. A few limited applications have been implemented at airports (for example Fraport, Frankfurt (M) and Heathrow, London) or for connecting certain facilities to light, heavy or intercity rail stations (for example: Düsseldorf Airport and University Campus Dortmund).

Factually, automated guideway transit systems have from the very beginning been basically misleading approaches for various reasons. This refers in particular to the demand profiles of urban personal traffic as well as to the reality of urban structures and aspects of urban design – not least, while taking into account the conditions of the historical cities in Germany and in Europe as a whole.

Under the influence of a narrow-minded technology euphoria and the R&D Program at the USDOT, these realities were obviously neglected. The "Urban Mobility of the Future" was taken as being branded as "New transit technologies"[13]. About 40 years later, some of the same approaches are being propagated, though the basic boundary conditions and requirement profiles have not changed to such a degree that a revival of those ideas would be logical (see picture 2).

The car of tomorrow in1960

The car of tomorrow in 2015

Picture 3: "Autonomous driving with Daimler"[15]

In fact, the respective systems are suited more or less exclusively for special limited purposes like serving airports, university campuses, entertainment parks and large hospital facilities – in particular under European conditions. This has been proven without any doubt by the traffic reality of the last 40+ years. Their profitability is primarily represented by the technology transfer potential; this refers, for example, to intermarket and intermodal information, communication and ticketing systems, and the automation of rail systems as well as the acceleration and optimization of bus services.

The implied potential in this regard should be analyzed systematically and it should be taken full advantage of it for improving the classical transit and transport systems.

AUTONOMOUS CARS

In functional terms, the "automated guideway transit systems" are complex variants of conventional urban rail systems. Far more sophisticated is the approach to a passenger transport system that is based on autonomous cars or Robotaxis.

However, even that idea is far from new. DaimlerBenz, for example, presented in the late 1950s a "Car of Tomorrow", that drove completely autonomously. More than 50 years later, at the 2015 CES, the same manufacturer presented a version of an autonomous car that looks remarkably similar to the "historical" version – except the changed leisure behaviour of the passengers[15] (See picture 3).

Today the public discussion on this issue is shaped partly by the interests of the related industry and partly by technology euphoria, which is to a reasonable extent comparable to that in the 1970s. The decisive difference is that the decades since the 1950s have witnessed some far-from-finished but very meaningful development in terms of taking full advantage of the potential of driver assistance tools, but that progress is projected to achieve a great deal more in a very short time, resulting in fully autonomous cars.

In this extrapolation fundamental facts are neglected. The realistic possibilities and limitations of autonomous cars, road vehicles are explained by defining the fundamental characteristics of a traffic system in the sense of the empirical sciences:

- **Modern settlement and traffic structures are infinitely complex systems that are continually changing according to infinitely complex processes.**

This is in particular the case regarding urban areas. By definition such systems can only be modeled within very narrow limits and thus cannot be comprehensively mastered by technological means. One of the

leading transport researchers of the USA, the cofounder and Director of Transportation Policy of the Reason Foundation (based in Los Angeles), Robert Poole, recently commented the conclusions of some from his point of view meaningful expert discussions on the respective issue[16,17] as follows[18]:

"...while I see significant potential, the more serious literature I review, the more skeptical I become about the popular media hype of cars without any function for a driver, going anywhere on demand... Let me summarize the main points raised by this collection of experts as follows:

- Automation is inherently brittle and subject to failures.
- Hence for at least a long time, a driver must be able to take over on short notice.
- We don't really know how to provide such a transition, and the aviation experience is troubling.
- There are ambiguous situations where we may not want the automation to make the decision."

This positioning is to be seen in context with the background that in particular in California the most substantial roots of the idea of autonomous cars are to be found and that California is one of the few US States where tests of such cars on public roads are officially allowed[19].

Limited Control: As a consequence of "indefinitely complex" boundary conditions, mastering the autonomous vehicle concept will be possible only to a very limited degree, even taking into account future progress regarding programming and computer capacities. That is why qualified insiders, with good reason, are marking the limits of the practicability of autonomous cars as follows: "Cars are only able to select from what the programmer has determined"[20].

In particular in cities, the cars are closely integrated into a complex multimodal traffic environment. The behaviour of pedestrians, cyclists, children and elderly people in such an environment cannot be modeled even remotely comprehensively by a computer. Even the strongest advocates of maximal autonomous cars, vehicles admit their susceptibility to trouble – the more complex their configuration the higher the probability of malfunctions.

Traffic safety, Ethics: One of the focal points of the development of driver assistance systems is the improvement of the traffic safety. Representatives of Volvo cars that are traditionally known as being extraordinarily safe stated recently: "By 2020 at the latest no passenger of a new Volvo will by killed in an accident or even severely injured"[21]. That sounds good; however it obviously pushes aside answers to fundamental ethical questions in this context, such as:

- Who decides about the risks for people being involved in an unavoidable accident?
- How should car manufacturers decide how to weigh the deaths of in other manufacturers' cars with people sitting in one of theirs?

"Manufacturers developing and testing autonomous cars are not engaged in dealing with moral issues to date"[20]. Especially remarkable in this context is the statement of a representative of Google."We have not yet studied questions of real situations or real incidents that could be of any concern... so-called inevitable accidents have not been included in the investigations"[20].

While the laymen are fascinated by the supposed unlimited technological potential to reduce car accidents and the victims of car accidents respectively to "nearly zero" and thus conclude that the realization of a comprehensive system of fully self-driving cars is an ethical obligation of society[6], the position of qualified insiders looks completely different:

"No technology is perfect, especially something as complex as a computer; so no one thinks that automated cars will end all traffic deaths. Even if every vehicle on the road were instantly replaced by its automated counterpart, there would still be accidents due to things like software bugs, misaligned sensors, and unexpected obstacles, not to mention human-centric errors like improper servicing, misuse..."[22].

Vulnerability: The transport infrastructure is a fundamental function of our settlements and our economy. This is particularly true of the road sector. Because of that, it is of high interest to and highly susceptible to criminal activity, as well as for "experimental" cyber attacks. Digital worlds are and will vulnerable for manipulations by hackers, internet criminals and terrorists.

Legal questions: The ethical aspects of traffic safety within a system of autonomous cars and road vehicles are closely related to legal questions. This is true practically for all components of traffic law; an acceptable comprehensive solution of only the main problems in this context is unlikely. "What happens in case of a cruel accident that is not caused by any person?"[20].

Standardization, Interoperability: Our automobile transport system is composed of vehicles of a great variety of types and makes of an international industry. The share of the transport performance of foreign (licensed)

Picture 4: The Google Concept vehicle

Source: Google

HGV's using Germany's Federal highways, for example, amounts to about 30 per cent, the share of foreign licensed cars around 5-10 per cent. Hence, a complete system based on autonomous automobiles would need a degree of international standardization and interoperability far more complex than the highly complicated compendium of laws and regulations in force today.

Anybody familiar with the problems in this regard just within the European Union will easily come to the conclusion that it would take not just many years, but decades, to define and set in place the basically needed laws and regulations for large-scale operation of completely autonomous road vehicles in Europe.

Structural conditions: Some of the main drivers of the development of autonomous road vehicles are manufacturers and research institutions in the USA. That is partly due to the specific conditions that characterize American urban areas and highways:

- The width of the roads in most cities is "comfortable", the patterns of the road networks are mostly in a rectangular grid, often with a comprehensive one-way regime.
- The urban and regional transit systems carry a very modest share of all personal travel.
- The intercity road traffic mostly involves very long distances on limited access highways.

Taking that into account, the conditions for a selective application of roadvehicles being equipped with a large arsenal of driver assistance devices, and thus being able to drive autonomously under certain conditions, are by far better in the US than in Europe and Germany respectively.

Costs: Today the costs of providing a car with the devices necessary to allow driverless travel under special conditions exceed the costs of a car with conventional driver assistance systems by many times[19]. Even if one considers that the costs of the respective components would be considerably lower under the conditions of mass production, they would most probably exceed the amount being acceptable for the majority of car owners, especially if the limitations on use of the driverless mode in real-world traffic are taken into consideration. If many, most or even all autonomous cars are provided by a publicly or privately owned operator and the single vehicles are really used on average 10 times or even more than a privately owned car, the operating costs for a trip may be acceptable.

Privacy etc: Privacy concerns are some of the main obstacles against automatic tollcollection and road user charging, so is it possible to ensure privacy in a world of autonomous cars? The requirements of car owners and car users vary greatly; what about serving different requirements regarding size, comfort, space for luggage, and...? If cars are shared large-scale questions regarding hygiene and cleanliness have to be raised. Vandalism and robbery have been increasing in the motor vehicle sector for decades so how will that be combatted?

Replacement of transit: The question of a replacement of public transit services by autonomous cars was on the program of the annual meeting of the Transportation Research Board (TRB) of the US National Academies of Sciences last year in Washington, DC. Even the enthusiasts of autonomous cars argued in favour of a replacement of classical public transit only in the sense of complementing it in low demand areas as some kind of an advanced variant of "Paratransit"[23]. However, even in that regard several questions remained unanswered to date:

- What about passengers needing special assistance?
- Who are the owners and who are the operators?

CONCLUSION

The decades-long evolution of driver assistance systems in road vehicles will continue without any doubt in the future – particularly with regard to passenger safety. In this context it may be possible to approach to a certain degree a driverless movement under certain structural and traffic-related conditions. Taking into account the specific situation in Europe, this could be possible first and foremost only on limited access roads outside urban areas. Autonomous motorized (personal) traffic (guided or spatial flexible) will at least for the foreseeable future, highly probably forever, not substitute the classical urban transport or only substantial parts of it. This is true as well for a substitution of the "privately owned automobile" through car-sharing currently being enthusiastically propagated by "future theorists".

The individuals and organizations in charge of public transit in particular and in transport in general are well advised to rely on the point of view of independent qualified experts and to concentrate on taking full advantage of the huge but not yet sufficiently utilized technological potential of improving the classical systems. This refers in particular to the market and transport sector overlapping, integrating payment, information and communication systems as well as the optimization of operations in multimodal traffic environments and the automation of rail systems. The progress in the respective sectors has been far too slow over the last 30 years – in particular, it pains me to say it, in Germany.

FYI

Dr Andreas Kossak is principal of Kossak Consulting based in Hamburg, Germany

drkossak@aol.com

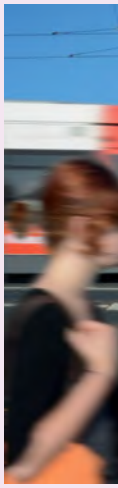
A full list of references can be found in the online version at **thinkingcities.com**

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 for everyone; the financing of public transport and transport projects generally; and regulation, planning and governance

A winning mentality

In March 2015, European Commissioner for Transport, Violeta Bulc, revealed the city of Bremen as the winner of the third edition of the European SUMP Award. This edition's theme has been the monitoring and evaluation of the SUMP. Read what the shortlisted cities of Bremen, Dresden (both Germany) and Ghent (Belgium), as well as Thessaloniki, recipient of the jury's special prize, have to say about the challenges of sustainable transport planning



Resource-efficiency in Bremen

SUMP Award Winner

***Jan Bembennek**, Desk Officer for Mobility Management to the Senator for the Environment, Construction and Transport, City of Bremen*

Which boosted your SUMP development process?
The Bremen SUMP was initiated because the previous strategic plan dating from the 1990's had been mostly completed. Bremen needed a new and fresh vision for the integrated and sustainable development of urban transport and mobility. The SUMP was approved in September 2014.

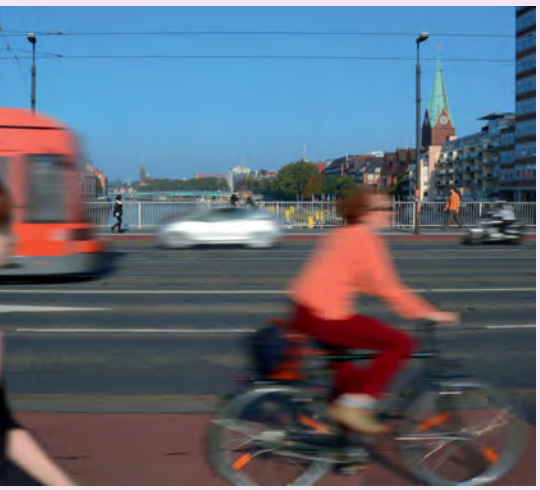
Which component of your city's SUMP is of specific strategic importance?
The Bremen SUMP has a very integrative approach and is closely connected to other local strategies, such as climate protection plan 2020, Objectives for urban development, clean air plan, and noise abatement plan. Bremen has very limited capacity to invest in large-scale infrastructure measures. Due to these financial constraints all measures have to be very cost-efficient. Our consensusbased approach included thorough analysis and strong of civic participation ensures that the SUMP goals can actually be achieved.

Which lessons have you learned throughout your SUMP process?
We consider that the strength of the SUMP process is the regular evaluation of the plan and of the different measures. A four-year evaluation cycle is considered most suitable by the municipality to collect relevant information before updating the measures. Bremen's evaluation results have identified several challenges that need actions related to private car use and the use of conventional fuels, but also related to technology and the unpredicted impact it may have on the urban mobility.

Why is monitoring and evaluation of the SUMP such a relevant topic for you?
Monitoring and evaluation are at the very core of the development of Bremen's SUMP. The city's three-round evaluation process is

Cities and towns should offer their citizens integrated mobility options that are both sustainable and meet people's mobility needs. It is increasingly recognised that sustainable urban mobility planning is key to meeting this challenge. Sustainable Urban Mobility Plans (SUMPs) define a set of interrelated measures designed to satisfy the mobility needs of people and businesses today and tomorrow.

The European Commission acknowledges the important role of SUMPs in sustainable urban mobility. The SUMP Award is the first European award scheme to recognise the efforts of cities and towns in the field of sustainable urban mobility planning. The Award focuses on a different thematic aspect each year: In 2012, the thematic focus was 'stakeholder and citizen participation'; in 2013 it was 'integration of economic, social and environmental policy criteria'; and the latest edition focused on 'monitoring and evaluation of the SUMP'.



composed of (1) a SWOT analysis, (2) a scenario analysis and (3) a cost-benefit analysis, and helps identify the most cost-efficient measures.

What will you do with the €10,000 prize money?
We would like to share our experience with innovative elements of our SUMP process with other municipalities across Europe. We will use the prize money to host a workshop in Bremen showcasing Bremen as cycle-friendly city and forerunner in the field of car-sharing, which can find more replication in other cities. The one-day workshop will be accompanied by site visits.

Long Breath in Dresden

SUMP Award Finalist

***Dr. Matthias Mohaupt**, head of department for transport development planning, city of Dresden*

Which event has kick-started the development process of your sustainable urban mobility plan?
Our SUMP process started in 2009, at the same time when Dresden took on the presidency of the Polis network. Hosting the Polis Annual Conference 2010 was the triggering event to advance with Dresden's SUMP.

Which component of your SUMP is of specific strategic importance?
Dresden's SUMP follows an integrated approach with strong interactions with spatial planning and environmental issues. Our very broad institutional cooperation and broad citizen participation are both elements of a new planning culture. A specific strategic aim is to continue the current trend: the city is growing and the car traffic volume in Dresden is shrinking.

Which lessons have you learned throughout your SUMP process?
SUMP with broad participation and involvement is a rather long lasting process! In Dresden, it took five years from the beginning until political adoption, passing all recommended steps of the planning cycle. New forms of cooperation and debating culture are important for public acceptance and create new tasks for the city. Stakeholder involvement, however, cannot replace political decisions. Intermediate City Council resolutions provide confidence and planning certainty as well as improve acceptance and integration of policy aspects.

Why is monitoring and evaluation of the SUMP such a relevant topic for you?
Monitoring and evaluation help to identify problems and to readjust the SUMP and its instruments if needed. It produces regular updates for decision makers, potential funding bodies, local stakeholders as well as institutional local and regional partners and to the public.

What's the next challenge for your city in the SUMP process?
Our next challenge is the implementation of SUMP measures. This includes continuous monitoring and evaluation every three years.

Elaborating Parking in Ghent

SUMP Award Finalist

Filip Watteeuw, deputy-mayor of Mobility and Public Affairs, City of Ghent

Which event has boosted your SUMP development process?

An important milestone were the elections of 2012 and the clear words in favour of sustainability that the inhabitants of Ghent have spoken. The new city government decided to focus on quality of life and accessibility of the city. Our SUMP is now in the final process of approval by the city council.

Which component of your city's SUMP is of specific strategic importance?

Quite unique for our SUMP is the elaborated parking plan. It is the first time in Flanders that this level of detail has been achieved in parking planning. This is crucial to realize the ambition on modal shift that is needed for Ghent. The enlargement of the pedestrian area and the banning of traffic in the city center also fits in this ambition.

Which lessons have you learned throughout your SUMP process?

The city of Ghent has learned from its own experience and from peer cities. The municipality proposes the opportunity to citizens to experiment with some measures of the SUMP so it can avoid implementing non-appreciated measures. Ghent already identifies two major challenges for the future: the adaptation to the modal shift that is at stake and how to benefit from the willingness and the particularly strong commitment of citizens.

Why is monitoring and evaluation of the SUMP such a relevant topic for you?

Only by monitoring and evaluation, a city can really know if it is on the right track and if ambitions can be reached. It is clear that good data collection and insight in processes is necessary to adjust plans and next steps in order to achieve the aimed results.

What's the next challenge for your city in the SUMP process?

It will certainly be a challenge to execute all the different elements of our plan, and we will need some years to do so. On the other hand, we realize that the planning process never stops, and we need to look into the next steps to be taken in the process of keeping our city an accessible city with a good quality of life for everybody.

Overcoming economic constraints in Thessaloniki: Special prize recognising Thessaloniki's tremendous efforts despite a difficult working environment

SUMP Special Prize

Ioannis Palestis, Chairman of Thessaloniki Public Transport Authority (THEPTA)

Which event has kick started your SUMP development process?
We took the opportunity to develop a SUMP for the Metropolitan area of Thessaloniki in the framework of THEPTA's participation in the ATTAC/SEE programme. Facing major economic and social challenges as a result of Greece's entrance in Memorandum Era in 2010, the need for practical and low cost planning alternatives was met. THEPTA's strategic SUMP was officially approved in February 2014.

Which component of your city's SUMP is of specific strategic importance?
The introduction of a tramway system in Thessaloniki has been proposed by THEPTA as a mean for urban regeneration and reduction of external costs of transport. The main target now is to find the financial resources and initiatives that will lead to the project's maturity and finally to implementation.

Which lessons have you learned throughout your SUMP process?
Sharing ideas and experiences is key to successful SUMP development. Our local Mobility Forums enabled active participation of the local stakeholders and helped communicating the SUMP to the public through campaigns, in conferences and networks. We also benefited from the support of our ATTAC transnational partners and could already identify areas for improvement for the next SUMP generation.

Why is monitoring and evaluation of the SUMP such a relevant topic for you?
Identifying problems or successes allows us to readjust the SUMP and give priority to the implementation of certain measures. Also, monitoring and evaluation allows informing the local stakeholders and decision makers appropriately in order to demonstrate that the SUMP is worth continuing or requires modifications. We have established within THEPTA an in-house SUMP quality assessment unit in order to assess the quality of public transport services, and follow up the implementation of the measures proposed within the SUMP.

What's the next challenge for your city in the SUMP process?
We intend to include travel behaviour research in new measures, integrated pricing as well as financing measures in the next SUMP generation, or to develop tools and strategies for the sustainable mobility of tourists.

FYI
Words by **Dagmar Köhler**, Communications Manager, Polis
www.polisnetwork.eu
www.eltis.org/mobility-plans

Beyond mobility

Spotlight on Rivas Vaciamadrid, 2013 SUMP Award winner

As a growing city in the neighbourhood of the Spanish Capital, Rivas Vaciamadrid adopted a Sustainable Urban Mobility Plan (SUMP) in 2010 to face the extraordinary increase in the town's population and to connect with the capital city of Madrid, writes **Thomas Mourey**. The municipality received the 2013 European SUMP Award for excellent inter-institutional cooperation

The unique increase of the population of Rivas Vaciamadrid between 1980 and 2013 (from 500 to 80,000 inhabitants) implied major changes in the city. While inhabitants mainly commuted to Madrid for work, studies or leisure in the 1980s, Rivas Vaciamadrid now provides professional, educational and recreational activities as well. Through its Sustainable Urban Mobility Plan (SUMP) the municipality intends to meet the mobility needs of its citizens on its own territory and also facilitate sustainable commuting to the capital, since still approximately 40 per cent of Rivas' population works in Madrid. The SUMP is intended to help the city to decrease greenhouse gas emissions by 50 per cent between 2008 and 2020 and to make the city carbon neutral by 2030.

WHY DID THE MUNICIPALITY RECEIVE THE EUROPEAN SUMP AWARD?

Rivas Vaciamadrid has received the European prize because its SUMP addresses social, environmental and economic aspects, and hence aims to provide sustainable mobility. The needs and preferences of the population, the financial accessibility of transport (social), the needs of industrial and commercial stakeholders (economic) as well as the energy consumption and the air pollution (environmental) were all considered when drafting the plan. In addition, the implementation of all SUMP actions were accompanied by an environmental, economic and social assessment which has been conducted by a wide range of stakeholders including local politicians, NGOs, transport operators and groups representing cyclists, pedestrians, transport users, disabled people and others.

This inclusive approach is the result of a close cooperation between the mobility department of

Rivas Vaciamadrid promotes health circuits and hence active mobility to encourage its citizens to maintain a healthy and active lifestyle

the municipality and several others including those in charge of environment, safety, education, health, youth, elderly people, sports and social welfare.

SUMP MEANS MORE THAN MOBILITY

Several measures of the SUMP definitely gave a push to different policies. By way of example, the municipality included in the SUMP the promotion of "health circuits". The measure intends to develop the use of walking and cycling paths in parks and forest areas for mobility reasons. In involving and targeting children and pupils, elderly and disabled people, this measure has a strong social impact, both on accessibility and on the health of the target groups. Moreover, in promoting active mobility, the "health circuits" contribute to both environmental efforts and the improvement of mobility.

Another example is the recent promotion of a mobile app for booking shared taxis. Considering the current lack of major public transport networks, this measure has a positive environmental effect as it reduces the number of private car and increase the occupancy rate of vehicles. The measure can also be seen from the social point of view: the accessibility is increased thanks to reduced taxi fares and the provision of a new service. Finally, the measure supports the local economy, 260 professional taxis are part of the agreement.

Likewise, through the participation of the municipality in different (international) campaigns such as the European Mobility Week, the World Environment Day or the Tree Day, Rivas Vaciamadrid has the opportunity to communicate on the links between mobility and environment. These type of events have strong positive social (through education) and environmental (through awareness-raising and punctual measures) impacts alongside with mobility effects.

FYI
Thomas Mourey is Project Officer at Polis
tmourey@polisnetwork.eu
www.polisnetwork.eu

Meet the smart people building smart cities.

Meeting of the Minds

October 20-22 in Richmond, CA — visit CityMinded.org

Rising to the challenge

Aljaž Plevnik draws a picture of the progress Slovenia's cities and regions have made towards sustainable urban mobility planning

The European Commission has proposed a new concept of sustainable urban mobility and transport planning designed to satisfy the needs of modern cities. The concept was successfully adopted in Slovenia and is becoming more and more a part of regular planning practice. The country not only successfully tested and implemented the new concept but also presented an innovative web platform for promoting sustainable mobility, which serves as a model for other EU countries and regions.

In 2003, the European Commission invited all Member States and their cities to address their transport-related challenges by developing a Sustainable Urban Mobility Plan (SUMP), which would focus on sustainable mobility and improved accessibility of urban areas. The SUMP concept puts special emphasis on the participation of citizens and stakeholders, horizontal and vertical coordination of policies, strategies and measures, as well as constant monitoring of their implementation.

Slovenia has participated in the development of this idea at the EU level from the very beginning, starting with cooperation in the first EU Expert Group on SUTP in 2003. Many concrete steps towards the national implementation of the SUMP concept followed, including testing of its fit with the national planning framework as well as its local implementation. The EU guidelines were planned for urban areas with more than 100,000 inhabitants. Since Slovenia has only two cities of this size (Ljubljana and Maribor), the Urban Planning Institute of the Republic of Slovenia (UIRS) had to modify the guidelines for Slovenian conditions and for its typically rather smaller settlements.

The SUMP concept has had great results in Slovenia. It was implemented at several different levels – at

Eleven municipalities out of 212 have developed their own SUMP and there are now more than 30 that have decided to follow suit. Most of the credit for this goes to the ongoing financial support from EU mobility projects

the level of city size recommended by the EU, but also in a small municipality and in a region. Some 11 municipalities out of 212 have developed their own SUMP (six of them in a common regional SUMP), and there are now more than 30 that have decided to follow suit. Most of the credit for this goes to the ongoing financial support from EU mobility projects (i.e. CIVITAS, IEE and Alpine space programmes) and recently to Cohesion funds, which now represent a basic backbone for the future development of these themes in Slovenia. An important reason for the success was also an early decision by the Ministry responsible for transport to get actively involved in the process.

LJUBLJANA CHOSEN AS A PILOT CITY

The first national project on SUMP in 2008 provided translation of the EU guidelines for the preparation of SUMPs, and an analysis of the national planning framework from the perspective of transferring the SUMP concept to Slovenia. After the initial more theoretical steps it was time to implement the concept in a real city. As a pilot city, UIRS chose the capital city of Ljubljana (300,000 inhabitants). Preparation of its SUMP began within the CIVITAS Elan project, which brought together five different European cities with similar challenges in urban mobility.

CIVITAS Elan provided an excellent framework for learning about SUMP and its development in practice, by ensuring sufficient financial and human resources and an international exchange of knowledge. All this strongly contributed to the implementation of this theme in Slovenia, and CIVITAS Elan project became in many ways the key facilitator of the SUMP concept in Slovenia. The development of the first pilot SUMP was followed by the preparation of national guidelines and test of the SUMP concept in a small community, both under the auspices of the Ministry responsible for transport.

TRANSLATION OF THE CONCEPT TO A SMALLER SCALE

For testing of the SUMP concept at a small scale, UIRS chose the municipality of Ljutomer in north-eastern Slovenia. It has approximately 12,000

inhabitants and faces a number of mobility challenges. Ljutomer's Mobility plan addresses these main mobility challenges together with the problem of decreasing population. The early inclusion of residents in the planning process ensured enough time to find appropriate and widely supported solutions.

Ljutomer's SUMP was selected as one of three finalists of the first EU SUMP Award in 2013, which focused on stakeholders and citizen participation. Since then, the town experienced a boost in implementing SUMP – it is consistently pursuing the target objectives and implementing the action plan. Its success has inspired many other towns in the region, with their representatives frequently visiting Ljutomer, and the city often presents its experience at different professional events.

The EU recognition helped the city to become aware of its own accomplishments and future prospects of its efforts in the field of sustainable transport. It also gave Ljutomer a new impetus and raised its ambitions to continue leading by example with introducing new innovative and exemplary solutions.

Although Slovenia had no prior experience of regional SUMPs, and despite the language barrier, Nova Gorica successfully produced an integrated cross-border SUMP for seven municipalities

REGIONAL COOPERATION FOR IMPLEMENTATION OF DEMANDING MEASURES

One of the conclusions of SUMP testing in Ljutomer was that cross-municipal cooperation must be encouraged in future to be able to implement more demanding measures and to overcome the lack of capacity in smaller municipalities. Therefore the next step introduced the testing of the concept at both regional and international cross border levels as part of the PUMAS project, which coordinates sustainable urban mobility planning in the Alpine Space. The regional implementation included the city of Nova Gorica (32,000 inhabitants), its five surrounding Slovenian municipalities (with a total of 26,900 inhabitants), and its counterpart across the Italian border, the city of Gorizia (36,000 inhabitants).

A number of stakeholders were involved in the process of drafting of the SUMP vision, objectives and measures. Their face-to-face meetings created the opportunity to provide essential information on the content of the draft report and to establish a direct dialogue with

View of the Italian city of Gorizia and its counterpart Nova Gorica across the border in Slovenia

stakeholders. Although Slovenia had no prior experience of regional SUMPs, and despite the language barrier, Nova Gorica successfully produced an integrated cross-border SUMP for seven municipalities. The draft SUMP has recently entered the local political decision-making process.

CREATION OF A COMMON WEB-BASED INFORMATION PLATFORM

With the creation of the Slovenian Platform for Sustainable Mobility in 2012, Slovenia presented an advanced approach towards supporting cities and experts in developing and implementing their SUMP, something that has become interesting and relevant for the EU as a whole.

The national web-based platform is a service for cities, municipalities and regions in the process of developing SUMP. It provides them with useful information and tools, such as national SUMP guidelines, regular lectures, trainings and workshops, newsletters, study visits, and coordination of European Mobility Week and so on. In recent years, the platform was supported by the European project PUMAS, which coordinates the development of Sustainable Urban Mobility Plans in different environments of the Alpine Space. Following its success, the project will use the Slovenian platform as a model for the Alpine Platform for Sustainable Mobility, which is going to be launched shortly.

THIRTY SUMPS IMPLEMENTED SIMULTANEOUSLY

The latest achievement of the Slovenian Ministry responsible for transportation was the decision to assign a part of its EU Cohesion funds for the development of more than 30 SUMP documents and for the implementation of sustainable mobility measures based on them. This programme is starting in 2015 and is co-financed by an Operational programme for implementation of European cohesion policy in the period 2014–2020.

For the purpose of the preparation of a large number of Sustainable Urban Mobility Plans in the following year more than 20 experts were trained by the Slovene Platform for Sustainable Mobility. These experts will be able to apply for municipal tenders for assistance required in the production of the SUMP documents. With this training, professionals in the field of transport planning gained new knowledge and insights into how to deliver an improved approach to transport planning.

It is expected that this programme will ensure that developing a SUMP will now become part of standard urban planning practice in Slovenia.

FYI

Aljaž Plevnik is researcher at the Urban Planning Institute of the Republic of Slovenia.

aljazp@uirs.si

The European Commission's support activities on SUMPs are brought together in the "European SUMP Platform". Its 2015 SUMP Conference "Sustainable mobility for everyone" will take place on 16-17 June 2015 in Bucharest, Romania.

http://www.eltis.org/mobility-plans

How co-mobility disrupts urban transport

Dr. Jörg Beckmann of the Swiss Mobility Academy prepares for the 3rd World Collaborative Mobility Congress (wocomoco)

A co-mobility cloud

Three major trends are currently transforming urban transport as we knew it: The decarbonisation of the motor-car and the deprivatization of traditional motorized individual transport are giving rise to a new mode of transport fuelled by a new sort of E/Co-Mobile – an electrified and collaboratively used vehicle. This merger of the electric and the shared car is further propelled by an increasing demotorization of personal mobility in urban areas with a revitalizing bicycle-culture across Europe.

The integration of this new kind of everyday mobility into the digital infrastructures and services of the global village, are bringing about a revolutionary transformation of classic transport business models, value worlds and policies. For many established players this transformation simultaneously means the end of their old and the beginning of a new approach to transport.

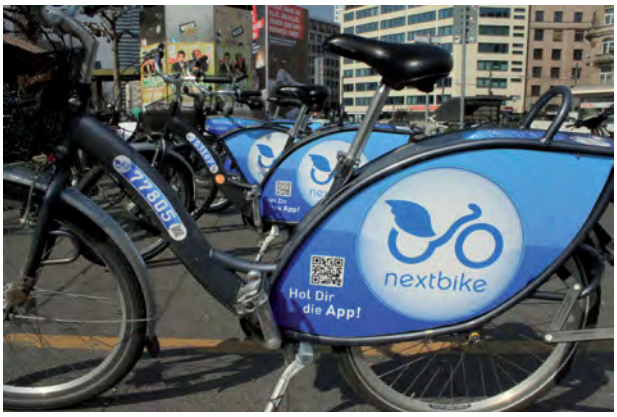
Whereas a renaissance of the bicycle has long been at the heart of sustainable transport plans, the electrified and increasingly decarbonized motor car has only recently rid itself of the negative stigma of its contested cousin, the combustion engine car, and has hence become an equally strong pillar in sustainable transport policy-making.

What yet remains underexplored is the second of the aforementioned three Ds – deprivatisation. Only with the rise of a global collaborative consumption movement, the transforming powers that evolve from taking private ownership out of individual mobility, are making their way into contemporary transport policy and planning. What emerges is a whole new world of collaborative mobility services, with four key markets: car-sharing, ride-sharing, bike-sharing and the sharing of parking spaces.

The emergence of these four new transport markets are now increasingly shaping debates on the future of urban transport, as they bring innovative players to a field formerly governed by established public transport suppliers.

Whereas a renaissance of the bicycle has long been at the heart of sustainable transport plans, the electrified and increasingly decarbonized motor car has only recently rid itself of the negative stigma of its contested cousin, the combustion engine

In order to provide a new and dynamic platform for all of these new "CoMo-Actors", the Swiss Mobility Academy, together with its partners, launched the World Collaborative Mobility Congress (wocomoco) in 2013. On an annual basis, wocomoco brings together organisations and individuals from the public and private sector involved in developing, marketing and regulating collaborative mobility solutions. The Congress's aim is to engage co-mobility leaders from across the world, get them to interact and jointly shape a new global market for collaborative mobility products, services and infrastructures. This year's third edition of wocomoco will take place in Innsbruck, Austria on 25 and 26 June, with more than 50 speakers presenting and discussing current co-mobility policy and practice.



A whole new world of collaborative mobility services has opened up

INDIVIDUAL MOBILITY + COLLABORATIVE CONSUMPTION = CO-MOBILITY

The success story of car-sharing, more than almost any other innovation in transport, has in recent years marked the onset of a new way of organising everyday transport, now widely referred to as "collaborative mobility". In the market for collaborative transport, attractive new opportunities are seeing the light of day, beyond the large technological systems of classical motorised individual transport and collective public transport by rail or road: today, these new techniques have moved beyond the status of a simple niche demand.

New Peer-to-Peer (P2P) networks are being established between collective and individual transport in which the citizen liberates his mobility from the private purchase of a mobility tool, such as an automobile (and prefers to use the vehicle without owning it), while at the same time he looks beyond just one or a few major suppliers to satisfy his mobility needs.

Private car sharers like ZipCar, carpoolers like blablacar, bike-sharing operators like nextbike, private parking-space platforms like JustPark and long distance bus transport providers, which only organize a service if a "critical mass" of users wish to travel, are all advocates of this new kind of mobility organisation. They now complement the portfolio of B2C-services offered by stationary and free-floating car sharing operators such as mobility.ch or Car2Go. Not surprisingly, this new kind of mobility focuses on the automobile, the traditional cornerstone and hub of our routine mobility, which is being reinvented yet again as it moves into the share economy.

START-UP SOCIETY

In light of these developments, transport decision-makers and suppliers are confronted with creative start-ups innovating current transport markets and challenging the

"The success story of car-sharing, more than almost any other innovation in transport, has in recent years marked the onset of a new way of organising everyday transport, now widely referred to as "collaborative mobility"

Transport decision-makers and suppliers are confronted with creative start-ups innovating current transport markets and challenging the core businesses of leading transport companies

core businesses of leading transport companies. These young "go-getters", heavily nurtured by venture capital, are joined by an established global car-industry, that is driven by the vision to re-invent itself as a holistic mobility-provider, rather than remaining a mere original equipment manufacturer (OEM). As these powerful players are moving forward, providing new services for motorised and non-motorised individual mobility, the long-lasting market-dominance of public transport suppliers or national mobility-clubs is challenged.

Particularly, national car or mobility clubs are now waking up and seek to redefine both their leitmotif and businesses, as the club's traditional value-proposition centred around the ownership and use of a private car is losing its appeal in the global share economy – especially to a growing number of predominantly younger city-dwellers in highly industrialised countries. Neither owning, maintaining and paying for a private car, nor identifying with the cultural values of classical motorisation, is a key characteristic of contemporary urban life- and mobility styles in metropolitan areas. The new urban elites have moved to convenient and on-demand taxi and limousine services, flexible and floating car-sharing, ubiquitous public transport and premium bike-ownership and sharing.

As a consequence, the third edition of The World Collaborative Mobility Congress, seeks in particular to raise awareness, built capacity amongst the national mobility clubs and help expand the clubs' core-business into the collaborative mobility market.

SUSTAINABLE CO-MOBILITY: BEYOND PUBLIC AND INDIVIDUAL TRANSPORT

But co-mobility is set to become a real challenge not only for these clubs, but a new competitor for the two familiar transport models (public and individual), because they are both having to contend with a problem which does not arise for collaborative transport, namely their cost structures. On the one hand, conventional collective public transport is becoming increasingly flexible and designed for particular target groups, while at the same time it is also becoming distinctly more expensive and requires ever more intensive use of resources. On the other hand, private individual transport with its icon, the automobile, is becoming increasingly environmentally friendly, but also more and more exclusive and expensive. With collaborative transport this problem simply does not arise. On the contrary, collaborative transport benefits in the final analysis from the capacities of its competitors that are unused today and offers a great deal of low cost and environmentally-friendly mobility with little investment.

Therefore, collaborative mobility is indeed sustainable mobility. It is economically sustainable because it makes better use of existing capacities and requires no additional investments in infrastructures. It is ecologically sustainable because, by making better use of existing capacities, it spares finite resources; then again, it is socially sustainable because it promotes new forms of communal mobility organisation.

Dr Joerg Beckmann speaking at the last World Collaborative Mobility Congress

FYI
Dr Joerg Beckmann is Director of the Swiss Mobility Academy
Joerg.Beckmann@tcs.ch
http://www.wocomoco.ch/en/

Striking the perfect balance

Transport research and development – what are the dangers of too much R and not enough D? What do we actually need to know? **Dagmar Köhler** looks for answers

Europe's transport stakeholders agree that we need cleaner, smarter and more efficient transport systems that have less adverse social, economic and environmental impacts. Step one to improvement is to undertake research, and as usual, the competition for European research funding is fierce. So, what are the priorities that Europe should focus on?

"Road transport today offers major opportunities for innovation, which are also opportunities for job creation and competitiveness in Europe", says Dr. Jean-Luc di Paola-Galloni, and brings the question on policy priorities to the agenda. Transport systems in Europe are, after all, expected to move people and goods from one location to another, to do so in a sustainable way, and by doing so, support European competitiveness and innovation in a globalized world.

"Transport initiatives will usually address all these objectives (and safety, too) but often the impacts against these primary objectives will need to be balanced off. It is rare to find a single initiative that will give both the best outcomes for competitiveness and for sustainability. The best results will usually come from a combination of initiatives in different sectors", adds Nick Lester-Davis.

Paola-Galloni and Lester-Davis represent the industry's and the public sector's views on road transport needs. The place they meet and assess road research needs is ERTRAC, the European Road Transport Research Advisory Council. Jean-Luc di Paola-Galloni is Corporate Vice-President for Sustainable Development of the automotive supplier VALEO, and also acting Chairman of ERTRAC and Nick Lester-Davis is Corporate Director for Services at London Councils and ERTRAC Vice-Chairman to represent cities and regions.

RESEARCH SPEAKS TO INDUSTRY SPEAKS TO GOVERNMENTS

ERTRAC is one of about 50 European Technology Platforms and was created in 2003 with the support of the European Commission. ERTRAC is the platform in which road transport stakeholders develop a common vision for road transport research in Europe. Research institutes such as the universities of Florence or Politecnica in Madrid sit at one table with industry associations or individual companies (such as ACEM, ERF, FIA, MAN or Volvo), and also with cities and regions that are represented by POLIS. ERTRAC members, hence, cover all the actors of the road transport system, including automotive manufacturers and suppliers, energy/fuel suppliers, research and service providers, the ITS industry, road infrastructure bodies, users, European and national bodies, and cities and regions.

The diversity of stakeholders in ERTRAC gives credibility to ERTRAC's outputs, which are research recommendations and topical roadmaps. ERTRAC's Strategic Research Agenda (SRA) advises to the

Transport systems in Europe are, after all, expected to move people and goods from one location to another, to do so in a sustainable way, and by doing so, support European competitiveness and innovation in a globalized world

European Commission when defining new research programmes. The SRA is complemented by roadmaps, which identify the paths towards a 50 per cent more efficient road transport system by 2030 compared to 2010. The most recent roadmaps cover urban freight and automated driving.

RESEARCH TO UNDERSTAND BEHAVIOUR

Eventually, all the passionate, technical and detailed discussions and final agreements in ERTRAC will help Europe to provide research funding for the most pressing challenges. ERTRAC member ECTRI (the association of transport research institutes), however, makes a strong point regarding major shortcomings in recent European transport research work programme: Environmental sustainability, road safety and vulnerable road users are underrepresented in the work programme, and, fourth, collaborative research addressing the socio-economic and behavioural challenges of transport.

"There is an urgent need for socio-economic and behavioural research", says ECTRI's Secretary General Caroline Almeras, "and we need to update our knowledge about key factors that lead to travel choices and users' behaviour, to take into account the evolution of these factors due to new lifestyle, new technologies and changing socio-economic patterns. This is especially true for transport systems with multimodal and intermodal travel options."

ECTRI believes that transport research thrives on the transdisciplinary combination of technology, economic, and societal research. This offers a way to break off from simplistic supply-matching demand, and to rather arrive at governance models that link technological factors and user behaviour as well as decision-making and planning practices – that eventually shape the demand side towards sustainable transport systems and travel behaviour. Filling the critical knowledge gap should help to better understand current mobility behaviour and allow to develop scenarios, taking full account of different stakeholder perspectives and economic realities and the influence of transport provision on society and the economy. "Efforts must be made to understand the societal drivers of the transport system since social innovation supports and is often a prerequisite of technological innovation," insists Almeras.

FYI

Dagmar Köhler is communications manager at Polis
dkoehler@polisnetwork.eu
More information:
Xavier Aertsens, ERTRAC Office Director
xavier.aertsens@ertrac.org
www.ertrac.org

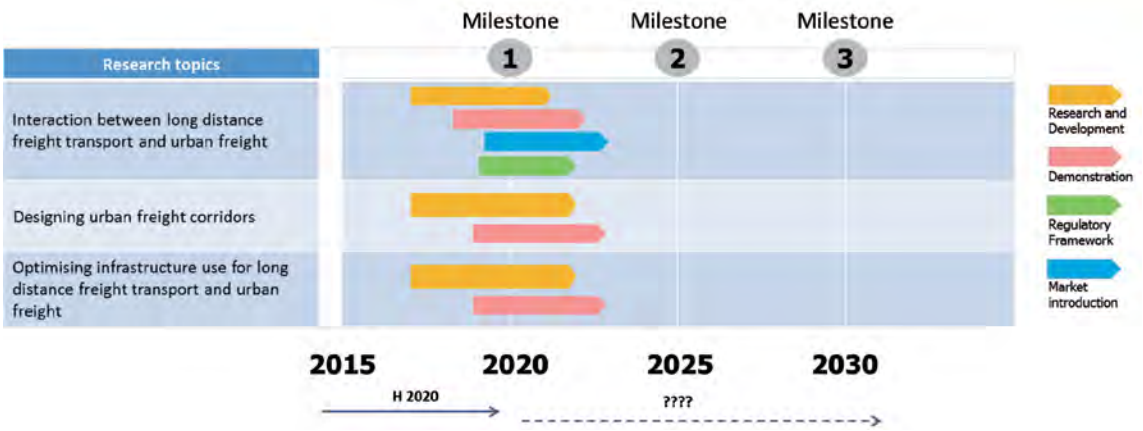


Figure 1: Enabling more efficient movements of goods through the management of the infrastructure (*ERTRAC roadmap on urban freight*, page 26)

"Roads and traffic are there to support the city, not the other way round"

Thinking Cities' **Dagmar Köhler** spoke with **Jean-Luc di Paola Galloni**, who works for Valeo group and is EGVI and ERTRAC acting chairman, and London Councils' **Nick Lester-Davis,** ERTRAC Vice-Chairman representing cities and regions

Dagmar Köhler (DK): Beyond moving people and goods, Europe's transport systems should also become more sustainable and drive European competitiveness and innovation. Can transport achieve all these goals in one go?

Nick Lester-Davis (NLD): Transport is ever only a means to an end and those ends include sustainability, safety and competitiveness. It would be wrong to promote either sustainability or competitiveness at the expense of the other. Transport initiatives will usually address both these objectives (and safety, too) but often the impacts against these primary objectives will need to be balanced off. It is rare to find a single initiative that will give both the best outcomes for competitiveness and for sustainability. The best results will usually come from a combination of initiatives in different sectors. Cities and regions are usually well placed – and certainly experienced – to understand these complex interactions and to identify the best combination of measures that will work together.

Jean-Luc di Paola Galloni (JLPG): I wouldn't make a competition in pre-eminence out of either of those two aspects of the objectives. Both are absolutely necessary. The industry is certainly the stakeholder who would always combine both objectives – there is simply no choice in a competitive world, beyond Europe. Remember the power of innovation in our sector's research activities: the automotive sector alone, and even more when seen in conjunction with infrastructure related research, is by far the most important research sector for Europe's economy. It is because a lot of industrial members and research related partners have not downsized their research expenditures during the crisis that this sector is able to deploy technology solutions that can bring clear environmental progress, more safety, more reliability in transport. During these last years a PPP like EGVI has been absolutely necessary to bring a fresh financial tool, along the EIB, to the main research players. The deficit on public infrastructure has created a negative impact; this is why this new Commission supports as we do at ERTRAC, a new effort in investment in that field.

Nick Lester-Davis, ERTRAC vice-chairman

DK: Cities and regions should offer their citizens integrated mobility options that are both sustainable and meet people's mobility needs. Where do they stand?

JLPG: Cities and region will have to play a major role in transport regulation in a more and more connected, democratically accessible and customized demand of mobility. Local and pragmatic approaches are important, growing in power and representation; on the other side member states and European decision-making bodies are making progress on procurement. There will be more complexity between local thinking and needs on one side and the dialogue with global players solution providers on the other side. This dialogue will evolve – there will be new players among which mobility providers either coming from the industry or from new start-ups.

NLD: All provision of transport services will be by multiple providers, both public and private sector, and all will have external impacts and consequences, both directly (such as with land take and noise or visual intrusion) and indirectly (such as with the longer term impact on city development). Cities and regions play the most important role within this by:

- Setting their own objectives for their region

- Assessing the overall impact of transport services and identifying areas of poor supply or unacceptable impact, looking for the best outcome for the city and region
- Regulating transport services to improve standards to meet the requirements of the city and region
- Coordinating transport services so as to provide an integrated approach to the traveler
- Establishing the public interest in investing public money into transport services in an accountable way
- Enabling transport initiatives that are in the public's interest to proceed
- In some cases, providing the most cost effective service provision

In no other way can this overview of a coordinated level of service and accountability to the people of the city or region be provided.

DK: ERTRAC brings together a uniqe range of stakeholders to align on research priorities. To what extend are ERTRAC's recommendations taken up by the European Commission?

NLD: ERTRAC should be particularly important in providing input to the Commission in identifying shared goals and issues. While it is inevitable that there will also be other factors, such as the availability of resources, which will impact on any research programme's shape, the ability of ERTRAC to provide a strategic overview of the sector is something that it is almost impossible to replicate.

JLPG: It is indeed the multi-stakeholder approach with pertinent technology solutions and orientations that brings the unique credibility to this platform and in particular for society, communities' representatives or non-industry members. This is why the integration of Polis within ERTRAC is essential. Not only the contribution to the definition of research programmes is taken into account by the European Commission, but clearly this process helps to define the research content of the future calls, namely within the H2020 framework.

DK: What is your vision of Europe's transport system of the future that makes you invest time, effort and energy in ERTRAC?

NLD: In the past it might have been seen that the development of cities and regions was dominated by the impact of roads and traffic. Indeed, some cities were consciously built around the needs of cars and traffic. That has been changing and it is critical that this continues to change so that the development of cars and traffic systems is built around the needs of cities and regions. Roads and traffic are there to

Jean-Luc di Paola-Galloni, acting Chairman of ERTRAC

support the city, not the other way round. This will help us all develop cities and regions that are strong, economically successful and sustainable over the long term. All of these will make them places where people will want to live and work. By looking at the development of roads and traffic systems, ERTRAC can identify where public investment and intervention can have the best impact.

At the same time, the speed of innovation is accelerating and the ability of cities and regions to assess these developments individually is diminishing. Through ERTRAC there can be a distillation of understanding at the start of the process both identifying and encouraging cities and regions to adapt their approach to oncoming technological innovations and establishing where developments may be technically achievable but have reduced practical value.

JLPG: I think that the complexity of the evolution of transport in our continent is unique: matching high density, growing diversification of transport demands particularly in overall aging society. I am confident on the matching connections between the level of innovation availability and consequently the services provided and their management by whatever authority or even the single citizen in charge. As far as road transport is concerned: the automation and connectivity will really revolutionize the future of transport, more than in any other transport mode. This is why we need to grow stronger together and push collaborative research, work along together in a pre-competitive and compliant way. This is our strong belief in ERTRAC. All stakeholders are putting their field's contribution to achieve a better road surface mobility for tomorrow, by all means. It is ERTRAC's duty to support this common collaborative goal. This is why ERTRAC is the right common body where collaborative research is lived, experienced at each step and by each member.

TOYOTA

SMART MOBILITY SOCIETY, Already Started

COMFORT
Next-generation telematics

ECOLOGY
Energy management

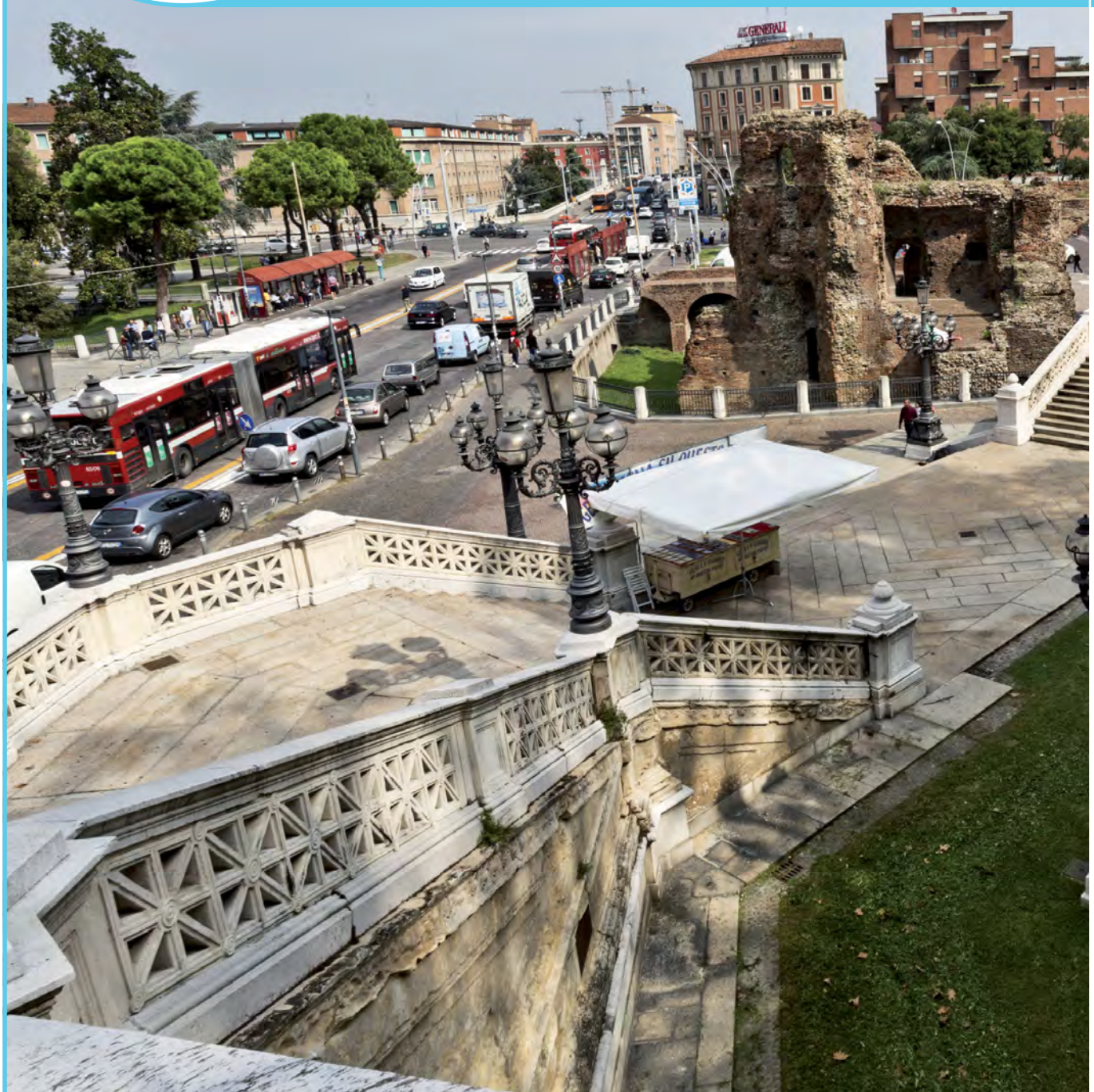
SAFETY
Cooperative ITS

CONVENIENCE
New urban transportation system

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

- **Bologna:** The city that wants to make its public transport users feel safe
- **Road Safety:** Raising awareness of Europe's biggest killer, using film



Prevention versus cure

Mauro Borioni reports from his home city of Bologna, Italy, where there is a sharp focus on security on the public transport network

One of the greatest challenges to tackle is the protection of surface transportation systems as in the city of Bologna the problem of crime prevention and protection of infrastructures for the transportation of people is a key issue

In addressing 'petty' or 'volume' crimes the SRM hopes to improve public safety and confidence around transport access points

In modern societies, and in the cities in particular, transport systems represent an essential and strategic factor. Millions of people move every day using their own vehicles or public transport commuting for study or work, going to shop or to use the services of the city, or just for leisure. As for urban areas the systems of surface transport play a major role in the life of the cities and communities that live there: motorway, bus, tram, rail and subway networks, linked and interconnected together, may be seen as the blood vessels that carry energy and feed the cities' organs.

Year by year, the surface transportation systems are more and more seen as attractive target for antisocial and criminal actions, due to their openness by design, the wide accessibility they are characterized, the number of people they serve every day, combined with their increasing complexity and interdependency. And this is true at different levels, starting with antisocial behaviors and volume crimes, such as harassing passengers at bus stops for example, up to criminal acts and terrorists attacks against critical infrastructures for transportation, as the bombing attacks against the railway system in Madrid in 2004, and against the London Underground in 2005.

SCRATCHING THE SURFACE

This all means that one of the greatest challenges to tackle today is the protection of surface transportation systems – in the city of Bologna the problem of crime prevention, and protection of infrastructures for the transportation of people is a key issue. For this reason, SRM (the agency responsible for mobility and public transport in Bologna) is currently engaged at European level in order to seek solutions and effective procedures, and make them suitable to the reality of the city and to face the proliferation of criminal acts in the context of transport systems, whether they are characterized by high or low severity.

With regard to petty crimes, the commitment of SRM originates from the awareness of the impact that they may have on public transport and how public transport is perceived by the citizens.

The term petty crime can be actually be rather misleading. Usually referring to vandalism, graffiti, shoplifting or thefts, if compared to terrorist attacks they could be seen as having a low impact. But this assumption is substantially wrong. Indeed, their impact at social and even economic level increases significantly, and they assume a great importance, especially when they are frequent and amalgamated. Petty crimes may actually undermine the social fabric of the community as it is associated with high rate of fear and general alienation from participation in community life: in this sense, the term "volume" crime would be more appropriate.

ASK THE PEOPLE

Every year SRM conducts a survey interviewing about 2,000 people living in Bologna (users and potential users of public transport). Among

several other questions, the interviewees are asked about security perception whilst using public transport, especially with regards to pick-pocketing or harassment. Findings make evident that the need to improve security is a priority.

In the last survey, security factors seemed to be of high importance for the passengers, as they received a ranking of 9.32/10 (it was 9.25/10 in 2011), higher even more than punctuality and cleanliness, and it is stated to be part of the 'expected quality'. The results of the "perceived quality" survey show that the satisfaction about the current situation regarding security is evaluated at 6.90/10 in services performed by bus in the urban and suburban areas of Bologna.

Even if some improvement has been recently registered, the service should still be improved on the security aspects in order to be considered fine by the users. Furthermore, considering the service performed by train at local level (the Metropolitan Rail Service), the factor related to perceived security is evaluated at 7/10, indicating that there is room for improvement also in this area.

The P-REACT project, funded by the European Union under the Seventh Framework Programme and in which SRM is involved as the Italian partner, offers the possibility to test a solution to increase the security (and its perception) for public transport passengers. In short, the P-REACT project is aimed to design and develop a low-cost surveillance platform able to automatically detect petty crimes and supporting the prosecution of criminals.

The solution will encompass intelligent video and audio sensors to detect petty crime incidents, a cloud based monitoring, alert detection and storage platform. The system will be tested in Bologna at the beginning of 2016: low-cost intelligent sensors (image and audio) will be installed in transport-relevant locations, and these sensors will be connected to a cloud-based Video Content Management System to process the data. An incident detected by sensors will initiate a workflow including alerting relevant security personnel, or the police, with video and intelligence information, increasing their ability to respond quickly and appropriately. Video and audio data will be stored and kept as evidence for possible future conviction purposes, in compliance with the privacy and ethics regulations at European and Member States level. Further information is available at http://p-react.eu/

Alarm buttons allow codified communications to be made with an operation centre which can contact the police if necessary. A GPS device provides its exact position

TAXI SECURITY

The solution proposed by P-REACT has met the keen interest of one of the main taxi associations in Bologna, opening up possibilities for a concrete exploitation. As directly reported by the taxi drivers, most frequent crimes affecting taxi service are mainly related to driver safety (i.e., robberies and refusal to pay), and they happen frequently outside the vehicle.

As of today, an emergency button is positioned within each taxi: once the driver activates it, a line of communication is opened with the operation center, and a codified conversation can start. If necessary, the operation center contacts the police through a direct channel. A GPS device provides the operation center with the exact position of the taxi as soon as the driver activates the alarm button.

Some taxi drivers have independently installed a video camera on their vehicle, essentially as a preventative measure, but this system

The impact of petty crime at social and even economic level increases significantly, and they assume a great importance, especially when they are frequent and amalgamated

An emergency button is positioned within each taxi – once the driver activates it, a line of communication is opened with the operation center, and a codified conversation can start

has proved to not be very reliable – particularly for criminal prosecution. Given the important role played by taxis in offering a public transport service in Bologna, particularly supporting the bus service, a test of the P-REACT platform is planned at a taxi station where vandalism will be simulated to verify the systems' effectiveness.

PROTECT AND SURVIVE

SRM is also involved as the Italian partner in the EUSTO (European Surface Transport Operators Forum) project, funded by the European Union under the "Prevention, Preparedness and Consequence Management of Terrorism and other Security-related risks Programme (CIPS 2013)" of DG Home Affairs.

The purpose of EUSTO is the coordination of national and EU-wide programmes and policies in pursuit of the objectives of Directive 114/2208, related to the protection of critical infrastructures for surface transport. Due to the interdependencies, connections, and inter-linkages between the different surface transport infrastructures, their effective protection needs the promotion of a stronger cooperation between all the actors involved, such as, owners of infrastructures, operators of transport services, public authorities in charge for security of strategic infrastructures and researchers. EUSTO will create a network between them, as an ideal platform for discussion and exchange of ideas. This way, the mutual knowledge of the Member States' security capabilities specific to terrorist crises will be increased, in order to enhance preparedness and response capabilities in case of terrorist attacks requiring mutual assistance at EU level. Further information is available at www.eusto.eu/

Despite all this, there is actually still a long way to go before the EU Directive is fully implemented. And this is true even more in Italy, where the national legislation should be completed, a complete strategy should be developed, critical infrastructures should be identified in the national territory, and appropriate initiatives for protection of critical infrastructures should be supported.

The city of Bologna is located in a strategic position in the middle of Italy, it is a primary junction for the road and rail network at national and even European level, and therefore a number of critical infrastructures are placed in Bologna. The effort put by SRM in the project EUSTO is mainly finalized to raise awareness and expertise of public and private subjects involved at local and national level in the protection of infrastructures for transport, giving advantage also by best practices implemented over the Europe, this way contributing to the improving of level of security of the whole city's transport systems.

Bologna Centrale railway station, the fifth busiest station in Italy in terms of passenger movements – about 58m per year

FYI
Mauro Borioni is a transport engineer at SRM - Public Transport Authority of Bologna,
mauro.borioni@srmbologna.it
www.srmbologna.it

Action movies

Robert Trottein explores some innovative programs aimed at reducing road deaths

Road traffic injuries are estimated to be the eighth-leading cause of death globally and the leading cause of death for young people aged between 15 and 29. This is what the LASER foundation dedicates it work to: preventing approximately 1.24 million people from dying on the world's roads every year and reducing the number of injuries as a result of road traffic crashes, estimated to be another 20 to 50 million each year.

LASER, "L'Action de Sécurité Routière en Europe" or Road Safety Actions in Europe, is a non-profit organisation that aims to increase road safety through innovative, attractive and motivating programs and actions. LASER EUROPE is a member of the United Nations Road Safety Collaboration (UNRSC). Under its LIFE programme – "Laser International Foundation Engagements" and the name of the program for European cities and regions – LASER presents the following three flagship activities:

THE EUROPEAN ROAD SAFETY FILM FESTIVAL

In the run-up to this year's European Mobility Week (16 -22 September 2015) LASER is allowing films and video clips draw attention to road safety. For the first time a European edition of the Road Safety Film Festival will take place in Brussels on Monday, 14 September 2015, under the aegis of the United Nations Economic Commission for Europe, the European Union, the United Nations Road Safety Collaboration.

The best film productions will be awarded, while the festival also facilitates meetings between stakeholders in road safety and the implementation of national and local programs. 120 participants are expected from 43 European countries emanate from public authorities, private sector, associations, civil society and European organizations.

The films are mainly clips of a few minutes in length and cover the following categories: communication and campaigns; road education; driver training; risk prevention in professional circles, innovations for road safety; video reports; films for youth and by youth.

The European jury is constituted by all the film festival participants present in Brussels on 14 September. They will evaluate the films and multimedia documents on the basis of explicit criteria: intrinsic qualities, clarity and relevance of the message, adapted to the target, quality and originality of the script, reproducibility, technical qualities (sound, soundtrack, picture, editing), cost/efficiency. The "Prize of the Public" will be presented to the

We strongly believe that broadcasting videos made by youngsters for youngsters on their communication platforms contributes to improve road safety awareness among them and help save their lives

film that receives the most votes by Internet users who have access to all the films in the competition.

GLOBAL SOCIAL MEDIA YOUTH ROAD SAFETY FILM AWARD

Multimedia is an efficient strategy of road safety awareness to reach youngsters. The Global Social Media Youth Road Safety Film Award is a campaign that seeks to participate in the objectives of the United Nations Decade of Action for Road Safety 2011-2020 and halve the number of road deaths in the world. It is also part of the European Road Safety Charter.

This youth Award aims at creating a public road safety awareness campaign among worldwide youngsters enrolled in academic institutions (schools, colleges, universities, companies, associations, NGOs and so on) by inviting them to produce short films that will be broadcast on the social media platforms they use in daily life. We strongly believe that broadcasting videos made by youngsters for youngsters on their communication platforms contributes to improve road safety awareness among them and help save their lives.

The competition seeks to mobilize worldwide youngsters aged 13-35

This campaign confirms that peer-to-peer communication is the most efficient way to sensitize young people to road safety and to foster their involvement and interest in road safety throughout the world

years old around the globe. They are all invited to create short road safety film awareness with their smartphone, cameras, GoPro, or any other tools.

The message of their video should be effective, clear and relate to problematic road safety and security issues such as drink-driving; driving under the influence of drugs; the use of phones while driving (both texting and phoning); speed; helmet use; crossings and pedestrian-awareness.

This campaign confirms that peer-to-peer communication is the most efficient way to sensitize young people to road safety and to foster their involvement and interest in road safety throughout the world by encouraging them to create works using their imagination and own means.

SUN OF LIFE, THE SUMMER UNIVERSITY OF LIFE

The Summer University (SUN) has been one of the pillars of the LIFE program for the five last years of the Decade of Action for Road Safety. The SUN of LIFE contributes to capacity building, knowledge and good practices to strengthen the skills of public officials and professionals involved in road safety.

The "universities" are not residential but are located close to the participants, to avoid heavy travel expenses, while taking into account socio-cultural, political and economic contexts of the regions. The courses consist of five day seminars for public servants (political, technical, academics, administrative), private sector (companies, media) and NGOs. The speakers are road safety experts covering topics relevant for road safety management, incl. politics, economics, engineering, law, communication, and youth policies.

FYI

Robert Trottein is founder of Fondation Laser International

robert.trottein@roadsafetyinternational.org

life@roadsafetyfilm.org

ADVANCED

SmartCycle®

Video detection of bicyclists at intersections allows for extended greens for cycling safety.

- Differentiates bicycles from vehicles
- Provides extension time for bicycles to cross the intersection safely
- Supports bicycle counting

Learn more about SmartCycle at iteris.com

Innovation for better mobility

ITERIS®

Intelligent Solutions for Traffic Surveillance

» **PoliScan**^{speed}
Fixed and mobile LIDAR speed enforcement capturing up to 3 times as many incidents as conventional systems

» **PoliScan**^{redlight}
Red light enforcement without in-road equipment such as loops and sensors, can also be combined with speed enforcement

www.vitronic.com

VITRONIC
machine vision people