eurotransport

NEXT STOP: RTPI 2015

Real-Time Passenger Information

Successful systems in Stuttgart and Poole, plus First Hampshire's technology roll-out

Digital trends

Laurent Kocher, Keolis Group's Executive Vice President – Marketing, Innovation and Services, discusses the impact of mobile and digital technologies on public transport

Switzerland & Austria

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REAL-TIME PASSENGER INFORMATION 2015

SMART TICKETING PAYMENTS 2015

etc.venues 155 Bishopsgate, London · 24 November 2015

Craig Waters
Editor

'Smart' solutions for today's travellers

In a time where technology dominates our day-to-day lives, there is an increasing pressure on our cities to become 'smart' and enhance the quality and performance of urban services. The public transport sector has understood the importance of this and numerous projects are demonstrating that many of Europe's cities are facing the 'smart' challenge head on.

The impact of digital technologies on public transport has been overwhelming and as Laurent Kocher from Keolis explains in his article on page 24, smart infrastructure and connected transportation networks are becoming commonplace. 'Data from mobile technology is at the heart of transportation,' he writes. 'Big data analysis helps planners and operators optimise the performance of the network, the services and the customer relationship knowledge and management'. As Laurent explains further, Keolis' answer to this new digital age has resulted in the creation of their 'Plan, Book, Ticket' mobile app which supports passengers at each step of their journey. A 'smart' and innovative solution for today's traveller? Judge for yourself…

The offer of efficient and effective Real-Time Passenger Information (RTPI) systems is another 'smart' element that needs a mention.

Over in our Real-Time Passenger Information Supplement starting on page 33, we have a number of articles that all praise the effectiveness of RTPI, from using it to help passengers make the right travel choices, giving passengers more confidence in travelling by public transport, and successfully contributing to delivering a modal shift from private to public transport. But there's also an article looking at RTPI from a different point-of-view – can the industry *really* offer what passengers want?

Technology will continue to change in the years ahead with new innovations and systems being invented all the time to help improve people's everyday lives. The city public transport industry will need to keep up with the technology pace to satisfy the digital needs of many people and to ensure Europe's cities are 'smart' for the future.

Eurotransport is keen to give the industry a platform to showcase some 'smart' elements of the industry, and we are excited to soon welcome delegates to our **Real-Time Passenger Information 2015** conference on 24 November in London, this year co-located with our **Smart Ticketing & Payments 2015** conference. We have lots of industry experts and decision-makers attending, both as delegates and speakers – so sign up for your attendance and view the agenda today at **www.rtpiconference.com** and **www.smartticketingconference.com**.

Looking ahead to our sixth and final issue of 2015, published in December, we will showcase: on-going projects in Slovakia and Bulgaria; developments to the Dublin Metro infrastructure; guidelines on risks concerning cyber security; ticketing projects and technology; plus the importance of design for vehicles and rolling stock. Make sure you receive the issue by subscribing online.

As always, if you would like to contribute to a future issue of *Eurotransport* with an end-user article or an informative news item, please do not hesitate to contact me via email at cwaters@russellpublishing.com. Please also bookmark our website at **www.eurotransportmagazine.com** where you can find details of past, current and future issues, conference details, plus daily industry news updates. We are also driving our Social Media activity on a daily basis, so please join our groups on LinkedIn, Twitter and Facebook – details are below.

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www.rtpiconference.com

www.smartticketingconference.com

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We're looking for end-user industry experts from urban city public transport operators and industry association personnel to contribute free-of-charge informative and thought-provoking articles.

Can you write about TETRA technology, Real-Time Passenger Information development, Winter Operations, or advances in Safety and Security equipment?

Contact Craig Waters, Editor, via email at cwaters@russellpublishing.com for our editorial calendar or visit www.eurotransportmagazine.com.

COMING UP IN THE NEXT ISSUE:

- Eastern Europe focus
- Ticketing and Vehicle Design Supplements
- Greater Manchester's Bus Priority Scheme
- Cyber Security – guidelines on risks and developments

Published December 2015. Don't miss out on your copy – subscribe today by visiting www.eurotransportmagazine.com

SwissPass: the first step on the path to e-ticketing

With the recent nationwide launch of the SwissPass travelcard, Ueli Stückelberger, Director of the Swiss Association of Public Transport, gives comment on how he believes this "*evolution*" in public transport is the first step towards barrier-free travel.

Switzerland has one of the densest public transport networks in the world. Trains, buses, trams and ships provide public transport coverage in the cities and suburbs, between cities and into the outlying Alpine valleys. So, it's hardly surprising that due to its modest scale, outsiders describe our country's public transport system somewhat casually as 'S-Bahn Switzerland'.

And since 1 August 2015, this network has grown a little closer together with the nationwide launch of the electronic ticket – SwissPass. The SwissPass is the key to simple, customer-friendly and future-oriented access to public transport – in the city, the suburbs and the adjoining rural areas.

To begin with, the card will carry details of the GA and Half-Fare travelcards – almost half the population of Switzerland have one of these two travelcards. Additional services can be used on request, for example Mobility Car-Sharing, PubliBike in the larger Swiss cities and ski passes in many Swiss ski destinations. From 2016, these will be joined by the first travelcards for the city/urban transport networks as well as other tickets and partner offers. In short, with the SwissPass, 'S-Bahn Switzerland' has established a uniform control standard encompassing 240 independent transport companies in the public transport sector; something which we are proud of as an industry.

The new red plastic card will replace the familiar, decades-old GA and Half-Fare travelcards for all customers, who will gradually receive their travelcards automatically on the SwissPass. In simple terms, it is a chip card using the proven RFID technology, already successfully in use in ski regions. In the medium-term, some three million travellers are expected to travel using the SwissPass.

Evolution not revolution

Much was written in Switzerland about the SwissPass in the months leading up to its launch – it gained a lot of interest among people. Ultimately however, the SwissPass is an evolution, not a revolution – a first step on the path to electronic e-ticketing and a first step towards a system tailored to Switzerland. I am convinced that the SwissPass brings what has long been under discussion in the public transport sector; the first steps towards barrier-free travel.

All that is printed on the SwissPass is the customer's photo, name, date of birth and an impersonal identification number. At ticket checks, the RFID chip allows the type of travelcard bought by the passenger to be displayed on the ticket inspector's reader. This information is stored in a database.

The public transport industry attaches great importance to data protection; no personal data or services are stored on the chip. No-one can pinpoint the SwissPass and its owner or create a movement profile with the SwissPass. When a SwissPass is checked, all that is created is a 'snapshot', that is to say a control data record. No-one knows where the customer concerned got on or subsequently got off.

On the new SwissPass online portal[1], customers can access their data at any time, check the validity of their travelcard and see which partner services have been activated.

Automatic extension – a customer need in public transport

Currently, around 60% of customers extend their GA or Half-Fare travelcards seamlessly – i.e. without leaving a gap between the expiry date and the renewal date. With the launch of the SwissPass, the travelcards are automatically renewed, unless explicitly terminated by the customer. However, before the travelcard is automatically extended, customers are given clear written notification of the possible cancellation date. It can be cancelled at the ticket office, by post, online or by telephone.

Approximately 50,000 new SwissPasses are activated every week and initial experience and feedback from travellers, ticket inspectors and transport operators show that the switchover has gone well and that people in the cities, suburbs and rural areas of Switzerland are experiencing no problems with this evolution in public transport. With almost two million passengers a day, the 'S-Bahn Switzerland' has successfully mastered the first step on the way to e-ticketing.

Reference

1.   www.swisspass.ch

Credit: Alstom

Catenary-free trams for Metropolis Nice Côte d'Azur network

The Metropolis Nice Côte d'Azur tenders committee has awarded a €91 million contract to Alstom, which includes supplying 19 Citadis X05 tramsets, options for three to 18 supplementary trams, energy charging systems and a 12-year maintenance period.

Alstom's environmentally-friendly Citadis X05 trams will circulate on new Lines 2 and 3 of the Metropolis Nice Côte D'Azur east-west network, and will have various features to increase accessibility and security; including capacity for 300 people, extra-large passenger information screens, and real-time video surveillance.

The new tramway will operate catenary-free over the surface section of the route; trams will receive automatic charging in under 20 seconds whilst stopped at stations via Alstom's new ground-based static charging solution, SRS (pictured).

Christian Estrosi, Deputy-Mayor of Nice and President of the Metropolis Nice Côte d'Azur, said: "Renowned for the quality of its projects and its capacity for innovation, Alstom was able to propose competitive solutions adapted to our requirements, of which the first was the absence of an overhead catenary over the entire surface section of the line, allowing our tram to blend into its environment without disruption."

www.alstom.com
www.tramway.nice.fr

Lower cost re-design of DART Underground project proposed

Ireland's National Transport Authority has recommended to the Department of Transport, Tourism and Sport that the DART Underground project be re-examined, so that the required rail connectivity is achieved via a lower cost solution. DART Underground is a rail link proposal, from the Northern Line in Dublin just north of Connolly Station, to Inchicore on the Kildare Line. The estimated cost for the DART Underground Project is €3 billion, whilst the DART Expansion Programme is set for €4 billion. The DART Expansion Programme includes a number of line-electrification works, removal of level crossings and re-signalling, plus the expansion of fleet and depot facilities.

As a key project in the delivery of an integrated rail transport network, the DART Expansion Programme is a positive economic perspective for Dublin. Despite receiving planning approval, the DART Underground Project business case indicates that the development is not economically justified. The CPO for the DART Expansion Programme intends to search for a cheaper railway order, instead of activating the DART Underground Project. The Authority has recommended that:

1. The DART Underground Project compulsory acquisition powers of the approved railway are not activated
2. The DART Underground Project is redesigned to provide a lower cost technical solution for the project, whilst retaining the required rail connectivity
3. The DART Underground Project achieves a new railway order, together with unapproved elements of the DART Expansion Programme
4. The revised planning work for the DART Underground Project is available for construction after 2020
5. The non-tunnelled elements of the DART Expansion Programme be progressed in line with available funding.

The Minister for Transport, Tourism and Sport indicated that the forthcoming Capital Investment Plan will help advance this expansion programme.

www.nationaltransport.ie

David Brown becomes Transport for the North's Chief Executive

David Brown appointed Chief Executive of Transport for the North

Transport for the North (TfN) has announced current Merseytravel's Chief Executive/Director General, David Brown (pictured), as its new Chief Executive. He will develop TfN's future blueprint, as it builds towards statutory status from 2017.

This key appointment comes as TfN works towards the March 2016 publication of its new strategy; to transform the Northern economy through enhanced connectivity between the city regions.

"Transport for the North will be at the forefront of delivering an integrated and holistic approach to transport in the North," said David Brown. "I'm delighted to be taking up this new role within Transport for the North at a really exciting time for transport across the region and beyond."

Sir Richard Leese, Interim Chair of TfN, said: "We're delighted to welcome David into the post of CEO. His experience to date speaks for itself and there's no doubt that David will play a key role in bringing together authorities across the North of England to allow the North to speak with a single voice on the big decisions to benefit the region as a whole."

Transport Secretary Patrick McLoughlin added: "We set up Transport for the North so the region can exercise real power and make its voice heard on how we can best invest in transport. That's why we have given Transport for the North £30 million to take forward its work over the next three years."

www.transportforthenorth.com

Urban transit growth calls for new UITP office to open in North America

UITP, the International Association of Public Transport, has announced a new office opening to promote the growing urban transit projects across North America.

Present growth of North American cities is leading to major efforts to modernise existing transit systems, plus to build new integrated light-rail transit, bus rapid transit and metro systems. The new, New York City based UITP office, is the Association's first venture into North America, and will help develop growing cities through public transit.

Urban transit professional and UITP Regional Manager for North America, Andrew Bata, will head UITP's liaison office and he will share international expertise with UITP's North American members, working to connect bike and car-sharing systems with public transit and supporting the organisation of the UITP Global Public Transport Summit, in Montreal in May 2017.

Commenting on UITP's growing presence, Andrew said: "As the global centre of knowledge on sustainable mobility, I am very much looking forward to helping UITP members in North America tap in to some of the international expertise at UITP as well as showcase some best-practices from the region".

UITP currently represents 1,400 members across 96 countries. The move into North America will include some of the region's largest metro operators, including New York, Boston, Washington, Montreal and Toronto and light-rail systems such as Phoenix, Salt Lake City, Honolulu, Edmonton and Vancouver.

www.uitp.org

180m contactless London journeys in 12 months

Transport for London (TfL) recently announced that over 180 million journeys have been made using contactless payments across London's transport network in the first year since its launch. Payments using the technology now account for a fifth of all pay-as-you-go journeys.

TfL's Director of Customer Experience, Shashi Verma, said: "Introducing the technology is just one of the many ways we are making paying for transport easier for everyone travelling in London. Over 20% of our pay-as-you-go customers use contactless payment already, because it is so quick and easy."

Graham Peacop, Chief Executive of The UK Cards Association, said: "Contactless payments in the UK have soared over the past 12 months, with spending in the first half of this year more than the whole of 2014 combined. We find that once people see how fast, easy and secure contactless is for travel, they then go on to use it in other places such as when shopping or eating out."

www.tfl.gov.uk/contactless

Conference Alert
Transport for London will be participating in *Eurotransport's* forthcoming **Smart Ticketing & Payments** conference on 24 November 2015 in London. Sign-up to attend now and read the full event agenda by visiting www.smartticketingconference.com

Did you know…
To support the growth of urban transport networks worldwide, *Eurotransport* will introduce an 'International' editorial feature in each of its six issues during 2016. In issue 1 2016 (published in February 2016), the UITP's Andrew Bata will focus on developments in North America. Guarantee you receive the issue by subscribing now at www.eurotransportmagazine.com where you can also find our 2016 editorial calendar.

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Richard Field is appointed as European Sales Director at Ultrafabrics®

Ultrafabrics® the pioneer in the polyurethane synthetic leather industry, specialises in the engineering, manufacturing and distribution of the highest quality polyurethane fabrics on the market.

Richard Field has been appointed as the new European Sales Director of Ultrafabrics® Europe. Richard joins Ultrafabrics® from his recent tenure at Camira. During his time at Camira Richard held the positions of Director of European Sales (Transport Fabrics), Business Development Manager for Southern Europe, Middle East and India (Office Interior Fabrics) and European Area Business Manager (Transport Fabrics).

The high performance fabric is composed of polyurethane that is non-toxic, light weight, highly durable, has a soft handle and is easily maintained. It is also compliant with industry standards for indoor air quality and does not contain any volatile plasticizers and potentially toxic stabilizers found in PVC. One of the key benefits is that all Ultrafabrics® products have a longer life span than both PVC and genuine leather making them an ideal fabric for the application of transport seating.

New for 2015 is the expansion of the Ultraleather Pro collection to 33 colours. The softest high performance polyurethane fabric in its class, Ultraleather Pro is ideally suited for high traffic upholstery applications where look, feel and performance matter.

Uf
Ultrafabrics®

www.ultrafabricsllc.com

©Paul J Martin / Shutterstock.com

Metro passenger numbers hit 39m

The Tyne and Wear Metro in the UK (pictured) recently achieved its highest passenger figures for five years, with the number of journeys on the system passing 39 million. Nexus, which owns and manages Metro, puts the growth down to keeping ticket prices low and the introduction of smart ticketing.

Furthermore, figures recently released by the Department for Transport (DfT) showed that Metro has the fastest growing passenger numbers in the UK outside of London.

Councillor Nick Forbes, Regional Transport Lead for the North East Combined Authority, said: "The Metro is a great example of what can be achieved when local areas take responsibility for transport infrastructure. It is a success story invented and delivered in the north east and it is set to go from strength-to-strength. We are now looking ahead to see how we can build on its popularity by investing in the Metro so that it can continue to serve the travelling public long into the future. That's why our devolution proposals to government include significant investment in the Metro to make it even better and allow more passengers to use it in future."

Director of Rail and Infrastructure for Nexus, Raymond Johnstone, said: "…Metro clearly remains a very popular mode of travel…the growth in passenger journeys is a result of keeping fares low and providing flexible ways to pay and then travel on the system with a Pop card."

The DfT figures published in June 2015 show that Metro had better passenger growth than newer transit systems in Manchester, Birmingham, Sheffield and Nottingham. Metro's passenger growth has only been outshined by the Docklands Light Railway in London.

Metro ticket sales went up by 4.4% in 2014/15 financial year, with ticket revenue totalling £47.9 million.

www.nexus.org.uk

©Victor Maschek / Shutterstock.com

Recycling energy from Tube trains to power stations

In London, UK, a world-first trial that uses up-to-date technology to collect waste energy from Tube train brakes has successfully captured enough power to run a large Underground station.

London Underground (LU) used the new 'inverter' system at the Cloudesley Road substation on the Victoria line for a five-week trial, and in just one week of operation, the new technology recovered enough power to run a station as large as Holborn for more than two days per week.

The results show that the new green technology could allow LU to tap into a previously inaccessible resource, helping to reduce its overall carbon footprint and saving as much as £6 million every year for reinvestment in improving transport.

As well as saving energy, the technology has the added benefit of lessening the amount of heat generated by trains braking in tunnels, which in turn reduces the energy required to operate LU's cooling systems.

Chris Tong, LU's Head of Power and Cooling, said: "This state-of-the-art regenerative braking system has the potential to transform power stations, by unlocking massive savings and significantly reducing our energy bills. We are committed to doing more to reduce our energy use, and this technology – a world first for metro railways – is one of a number of innovations we're embracing to lower our environmental impact."

www.tfl.gov.uk

First section of London's North-South Cycle Super-highway opens

Credit: TfL

The first section of a safe, segregated cycle route that will ultimately run from Elephant & Castle to Kings Cross has recently opened.

Transport for London (TfL) has completed the two-way 800m section, from Elephant & Castle to the Peabody estate on Blackfriars Road, and engineers continue to work at pace to complete the new route which is the latest milestone in the creation of the Mayor and TfL's cycle networks to reduce road traffic across London.

Mayor of London, Boris Johnson MP, said: "This is another key moment in the evolution of cycling in our great city. We promised world-class facilities and that's exactly what's being delivered on the ground. The opening of this section of superhighway is an important part of our mission to get more Londoners cycling safely."

In 2016, cyclists will be able to travel from Elephant and Castle to Blackfriars Bridge along the new North-South route, with Blackfriars Road transformed from a car-dominated street into a new urban boulevard with almost 20,000ft2 of new space for pedestrians and a two-way segregated cycle track.

Leon Daniels, TfL's Managing Director of Surface Transport, said: "A cyclist travels along the North-South corridor every two seconds in the peak, and the new protected route will provide a direct, safer journey for thousands of new and experienced cyclists. We will continue building these routes, both here and more widely across London, thanking local residents and businesses for their patience as we do so."

www.tfl.gov.uk/cyclingvision

Did you know…
As Europe's cities become even more dedicated to providing a seamless network of public transport, *Eurotransport* will focus on the topic of Intermodality during 2016 – with the development of city cycling routes being a key element of our editorial plans. Guarantee you receive each issue in 2016 by subscribing now at www.eurotransportmagazine.com where you can also find our 2016 editorial calendar.

Get daily news updates on www.eurotransportmagazine.com

@EuroTransMag

A new Vision for transport fabrics

Camira, the world-famous transportation fabric specialist, is launching Vision, its most radical alternative to the traditional plush moquette.

Vision (pictured right) is a contemporary collection of technical textiles where lightly textured surfaces, small pattern repeats and geometric-based designs form the structure of this modern, flat-woven fabric range. The dark background colour enhances the delicate use of metallic highlights to create striking colour effects under moving light. A stunning combination of contrasting fibre types, polished and matt, create added interest and a tactile finish.

Vision is foam backed as standard making upholstering easier, and the collection meets all international bus and coach flammability standards.

The new fabric is designed to coordinate with a wide range of other trim options including leather and vinyl, to provide flexible options for combination seats using more than one material type.

Fusion

Vision follows the recent launch of Fusion, Camira's newest high wool content moquette fabric with an impressive environmental profile.

Fusion (pictured left) is 10% lighter in weight compared with traditional pile fabrics, saving raw materials, giving fuel saving potential and reducing operating costs, without compromising technical performance.

Comprising a variety of designs, the range offers a mixed palette of subtle trend colours and traditional brights – a total of 36 options are available.

James Newton, Director of Transport Sales, commented: "The launch of Vision is an exciting step for Camira and the transport industry. Although the majority of operators still want traditional moquette, which is what Fusion will service, other customers are looking for alternatives. This is something we can now offer with our radical departure into technical flat-woven fabric. We work hard to meet the needs of our customers and the continuing development of our transport fabric portfolio demonstrates this. Vision marks a new era and allows us to extend our offering to new customers within the bus and coach industry."

www.camirafabrics.com

More trams for Munich

Credit: Siemens

SWM (Stadtwerke München – Munich Municipal Authorities) and its subsidiary company MVG (Münchner Verkehrsgesellschaft – Munich Transport Corporation) have ordered an additional 22 Avenio trams from Siemens for €70 million and are scheduled for delivery from mid-2017. They will supplement the eight trams of the same type, which have already been running for passenger services since 2014 (pictured). The new order includes options for up to 124 further units, with a total value of up to €300 million.

"The vehicles we have now ordered will provide a further significant increase in the capacity of Munich's trams, explains Herbert König, SWM Director of Transportation and MVG CEO. "The options enable SWM/MVG to call on new vehicles in line with requirements in the coming years, and well into the next decade."

The basic order includes nine 2-car trains, nine 3-car trains and four 4-car trains. Each of the two-car and three-car trains will then be coupled to nine double traction trains on working days – the longest trams ever to be used in Munich at around 48m. They will then accommodate around 260 people and are intended for use on lines 20 and 21. The four new 4-car Avenios, which correspond to the eight Avenios already available in terms of their length and capacity, will be used on lines 16 and 17 to increase capacity.

www.siemens.com

After a decade of growth, Geneva now concentrates on improving service quality

Between 2003 and 2013, additions to the local tram network doubled the offer of Geneva's public transport system. But between 2014 and 2019, the picture will be different. Emmanuel Fankhauser, Network Development Manager at TPG, explains that no major infrastructure projects or developments are planned on the network, but concentration will be placed on optimisation and reorganisation of their services.

As in many other cities, the mobility strategy led by the authorities in Geneva was to bank on the development of transport supply, in particular on the tram network, in order to increase the capacity and the attractiveness of public transport. Extensions to the network over the past decade were designed in a 'star formation' radiating from the city centre in order to complement the historic Line 12 – the only tram line never to have been dismantled in Geneva – which carries passengers between the Franco-Swiss border at Moillesulaz in the east of the city, to the suburban outlays of Carouge and Lancy in the south. Since 2002, these two rail branches have been supplemented by three more, resulting in a network spanning seven diametric lines, covering common sections and making up a web of direct connections. In 2011, at the inauguration of the sixth and final branch of the tram network – a 6.4km-long stretch towards Onex-Bernex – the system also underwent a complete overhaul; from an operating system of seven combined lines to that of three completely independent lines without common sections. These developments also marked the end of a first long period of urban extension. Whilst future extensions – especially to neighbouring France – are indeed in the pipeline, planning for these is not a priority for the years to come.

Future mobility of the Greater Geneva area…

Currently, rail transport is shaping the very near future of urban mobility in Geneva. While the S-Bahn networks found in many Swiss cities are cited across Europe as textbook examples of best-practice in urban mobility, especially that of the Zürich S-Bahn which has just celebrated its 25th anniversary, Geneva is the poor relation in terms of train offering: only two lines effectively link the city centre with the outskirts. It is modest for a bi-national and cross-border agglomeration of nearly 850,000 inhabitants: the Geneva agglomeration spans across the neighbouring regions of the canton of Vaud and the French departments of Ain and Haute-Savoie. To the north, the Lausanne-

Geneva rail link is one of the busiest in Switzerland, with more than 60,000 passengers a day. To the west, much less densely populated, local trains are super-imposed with TGV lines to Paris and Lyon and offer an attractive service, although in a region with less potential travellers. There is no offer serving the east or south of the city, home on the French side to 200,000 inhabitants in the area around the town of Annemasse (around 7km from Geneva town centre). Surrounded by France on three borders, Geneva has historically not benefited from the type of rail development that it needs today.

As a consequence, the rail network lacks the critical density to fully complement with its regional rail supply TPG's light public

TPG carries over 90% of public transport journeys in the France-Vaud-Geneva region

transport system made up of trams, trolleybuses and buses. Thanks to a decade of revival, the tram network has closed this gap and must now act as an agglomeration rail service on some lines, which contributes to its success but also underlines its weaknesses: penalising commercial speed for long stretches, overload of tram connexion hubs, use of high capacity service vehicles translating into lengthier convoys and shorter interval times but, unfortunately, often in conflict with individual traffic, which weakens their operation.

…the Léman Express rail network

To be able to finally establish a true suburban rail network requires at least one 'crossing' line. This will soon be a reality with the construction (for the most part underground) of the CEVA railway line. Spanning 16km, including 14 across Swiss territory, the route will run between Geneva's main train station (Cornavin) and that of Annemasse. CEVA will also connect five main activity hubs at the heart of the agglomeration and will be the main axis of a true agglomeration network which will go by the name 'Léman Express'. The route will also be of historic importance as it will connect the Swiss SBB and the French SNCF networks, its future operators. If this network represents an extraordinary modal shift vector, it also represents a significant challenge for TPG: they will have to adapt their operation of surface

transport modes to the presence of a new, high capacity transport supply. A reorganisation of existing TPG networks – tram, trolleybus and bus – will therefore be necessary.

Taking stock: from the unprecedented growth of the TPG network…

As fate would have it, with complicated planning, reports, appeals and popular voting, works for CEVA kicked off at the same time as the final extension of the tram network was inaugurated, in late-2011. The Léman Express is planned to enter into service in late-2019 and now, in 2015, we are exactly halfway through a period of eight years during which there will be no new network infrastructures, either for tram or train. This is a good time to take stock of the first four years of this period of transition and set guidelines for the next four years.

Let us first study the impacts of the extensions to the tram network. Between 2003 and 2012, TPG's tram network routes increased from 12km to 33km. Now, with intervals of 4 to 5 minutes on each of the six branches, tram kilometres have tripled in nine years. Although trams have replaced buses on some routes, pneumatic transport modes (buses and trolleybuses) have also continued to grow. An overall growth in supply of 7% per year was accompanied by an average growth in usage of 5%. The network has thus well adapted to changes in population and employment in the region and it has also helped to significantly increase the modal shares of public transport: the share of the latter among motorised transport increased during the same period from 23% to 30%.

Stabilisation came between 2012 and 2014. First of all, because after a decade in which supply and demand had evolved in equivalent proportions, with offer stimulating demand and *vice versa*, we experienced a real leap in supply in 2012. Following a near doubling of supply in 10 years, as shown in **Graph 1**, we indeed ended up with some reserve capacity to absorb the evolution of demand, without even immediately following through with extensions.

Secondly, the reorganisation of the tram network across three independent lines stirred some discontent from users: On one hand, the regulation of the new network in urban traffic did not instantly run as smoothly as a finely tuned Swiss watch, and on the other hand, some customers (10%) had to adapt to a new way of using the network, with more transfers than before, after having been used to direct connections.
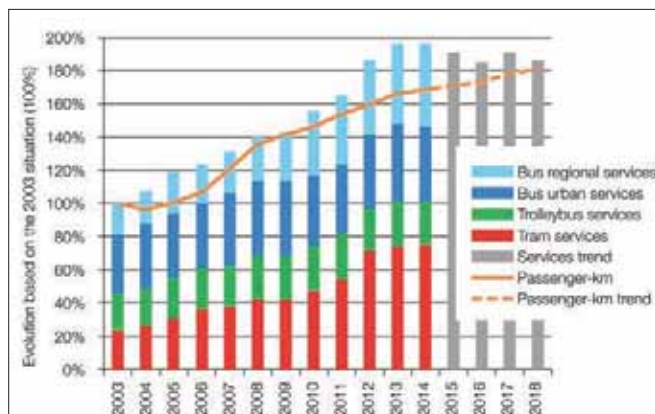
Graph 1: Evolution of the TPG offer, based on the annual places-km service of the entire network compared with passenger statistics calculated in passengers-km. The 2015-2018 trends are hypotheses.

As a result, 2012 was not the easiest year in terms of customer relations. During 2013 and 2014 TPG thus stabilised operations across its transformed network and customers adjusted to the new way of getting around. It wasn't easy for either party, but doubling the transport supply in such a short time cannot be done without conceding some previous gains. TPG, working hand-in-hand with cantonal authorities, had to observe, communicate and correct, which notably resulted in the re-introduction of a direct connection that had disappeared on the tram network – Line 18 between Carouge and Meyrin – which partially recreated the previous concept of combined lines.

Recent times have seen the new public transport master plan for 2015-2018 come into force. This document, mandated by the State of Geneva, is updated every four years and defines the desired changes in supply and network according to the mobility requirements of the region. It clearly differs from its predecessors by the modesty of its ambitions. The economic situation of the canton has deteriorated; TPG must face adverse political pressures: reductions to tariffs imposed by a public vote and a ceiling on cantonal subsidies with the inevitable consequence of a modest development of the transport supply. Population growth remains strong though. In August 2015, cantonal government statistics clearly set the tone: '…*the growth of the population within the canton of Geneva continues in the second quarter of 2015; the number of 'frontaliers' (foreign cross-border workers) in the canton is growing faster; the employment growth in the canton of Geneva is clearly accelerating in the second quarter, etc.*" This situation is not new: the attractiveness of the region makes the Greater Geneva area one of the most dynamic urban areas in Europe. We must therefore continuously adapt transport supply in accordance with the new shifts in urbanisation. Traffic conditions in Geneva pay the price of this dynamism, which is detrimental to our commercial speed and thus increases operating costs per kilometre.

…to the conscious optimisation of services

Despite this context, the public transport network remains dense and efficient, well-suited to customer needs and still benefits from a comfortable margin between supply and demand to 'hold up' until 2019. The degree of customer satisfaction has never been as high as this year, which shows that public confidence has been won back. For want of major supply developments, the company's strategy is to maintain this trend and work towards qualitative development in collaboration with our local authority, the State of Geneva.

Network and timetables

Thanks to a fleet of vehicles 100% equipped with an automatic passenger counting system, TPG has a statistical database of rare value in Europe. Analysis of this data helps identify saturation points, evolution trends and thus enables us to better adjust supply to demand – whether by increasing it or by diminishing it when it proves too generous and when a tweak allows savings on operations costs. Timetables are being harmonised for a clearer reading of frequencies (between urban and regional lines, between peak and off-peak hours) and a better connection system.

Operations

Both in financial terms and passenger attractiveness, it is essential to

work on commercial speed and regularity of travel times. Several projects are underway, including the creation of dedicated bus lanes, new traffic lights control systems, the merging of stops, the optimisation of operating procedures, etc. This is a lengthy process that involves many public partners and which will bear fruit slowly.

Vehicles

Fleets of trams, trolleybuses and buses have recently been partially completed with new vehicles, including 33 articulated 'Exqui.City' trolleybuses from manufacturer Van Hool delivered in 2014, and 32 44m-long Tango trams from manufacturer Stadler delivered in 2011. This makes the Geneva fleet one of the youngest in Switzerland. New acquisitions are not planned for the 2015-2018 period, with the

Geneva's 'Tango' trams manufactured by Stadler Rail

Credit: Stadler Rail

significant exception of vehicles equipped with a new traction mode, namely those constructed within the TOSA project which already makes partners of the consortium behind it proud, namely TPG (operator), OPI and the State of Geneva (coordinators), local energy company SIG, and technology provider ABB.

TOSA is an articulated, 100% electrical bus powered by a flash battery recharging system spread over a limited number of stops equipped with this automatic energy transfer system. Thus, TOSA carries more passengers and fewer batteries than an autonomous electric bus, yet offers operating performances identical to that of a trolleybus. After a test conducted in 2013 on a short commercial route, an entire urban belt line will be operated with this 'technology of the future' from 2017.

> **Fleets of trams, trolleybuses and buses have recently been partially completed with new vehicles**

Infrastructures

With no major changes since 2011, Geneva's public transport network won't benefit from new infrastructures over the coming years either. Large projects such as connection hubs, tram network extensions, new routes equipped for trolleybuses or lanes for buses with high level service (BHLS) will be developed later. However,

with regard to fixed installations, works are well underway for the construction of a third depot and maintenance centre. The new depot, named 'En Chardon', will, from 2019, accommodate 70 trams and 130 buses to adapt our parking and maintenance capacities which are currently too tight following the supply growth in recent years.

Sales and services

Contact channels with customers remain under constant development: with physical and virtual ticketing, passenger information in all forms, and personalised contact etc., TPG is anticipating new developments in all these domains in order to remain at the forefront of new technology. We are also actively working to ensure that our fare community, known as 'UNIRESO', can integrate SwissPass – the new national RFID card that gathers on a single support several services connected to mobility: national or regional public transport passes, car sharing schemes, bike-share schemes, ski passes, etc.

As a consequence to this whole programme, the next quantitative leap in transport services is set for late-2019 with the Léman Express and the reorganisation of the TPG supply to connect with this network that will ensue from it. For TPG, this period of stabilisation is viewed as an opportunity for optimising projects, with the goal of continuously improving the quality of our services. For the years beyond 2019, discussions are underway with the authorities around which plan of action to deploy to meet the strategic ambitions of Geneva canton, as defined in the transport master plan, 'Mobility 2030'. Reviving the extensions of the tramlines with cross-border routes into neighbouring French urban areas, developing BHLS routes with trolleybuses or with TOSA technology are as many development leads to explore. Projects exist but their prioritisation and final design shall still be studied at length.

About TPG

Geneva Public Transport (TPG) is the public transport operator for Greater Geneva. It operates a network spanning 33km of tram, 30km of trolleybus and 360km of city and regional buses across the entire territory of the Canton of Geneva and beyond into neighbouring France and the canton of Vaud. TPG operates as part of a service contract renegotiated every four years with its local authority, the State of Geneva, with whom it works closely in planning developments pertaining to the supply of public transport. TPG is part of the 'UNIRESO' fare community that brings together eight public transport companies – including Swiss and French national railway operators SBB (CH) and SNCF (FR) – offering single travel tickets to travel throughout the France-Vaud-Geneva agglomeration on their networks. As a key player in mobility, TPG carries over 90% of public transport journeys in the France-Vaud-Geneva region.

Emmanuel Fankhauser has worked within TPG since 2012. He is responsible for the unit in charge of developing the network and planning supply in collaboration with cantonal authorities and other mobility partners in the Greater Geneva area. This unit is attached to TPG's Customer division. Prior to that, Emmanuel trained as a Transport Engineer at the Swiss Institute of Technology, ETH Zurich, and worked for 12 years as a Consultant and Project Manager in a transportation planning agency.

Establishing new public transport systems to meet demand

What does the agglomeration of the Swiss city of Lucerne with around 200,000 inhabitants need the most – a bus or a tram system? Lucerne's politicians and traffic experts have discussed this question over recent years following a steady increase in frequencies on its public transport network. As Norbert Schmassmann – Head of Lucerne's public transport company VBL[1] – explains, the decision ultimately fell to a high quality bus system for the city.

Every year, more than 100 million passengers use the canton's public transport network, with nearly 10 million passengers alone using Bus Line 1 annually from the suburb of Kriens to Lucerne, making it by far the canton's most frequented public transport line, far ahead of the mainline rail transport system.

Following a referendum, Lucerne's last tram line stopped operating in 1961. One of the reasons for the closure of the tramways was that the people wanted to offer more road space to car traffic. In recent years,

car traffic has increased to such an extent that city rush-hour jams occur too often, thus affecting the operation of public transport buses because there are only a few road sections that are just for use by public transport vehicles.

Located between lakes and mountains, the city of Lucerne is topographically narrow and the city is densely built-up. There is no space to build additional or wider roads; traffic planners are therefore faced with the challenge of how the ever-growing demand for capacity

on public transport can be met with the current road conditions. In 2014, 9% more passengers than the year before travelled on Lucerne's public transport system, and over the past five years the increase has been more than 20% in total.

Bus Line 1 runs at approximately five minute intervals. In 2006, the Verkehrs-betriebe Luzern AG (VBL) used, for the first time in its history, three double-articulated trolleybuses (or 'light-trams' by HESS AG). These 25m-long buses run alongside trailer buses on Line 1.

Lucerne's public transport system is planned and financed by the Verkehrs-verbund Luzern which has decided to establish a new system known as 'RBus'[2]; the letter R stands for 'rapid'. The RBus system is an elevated standard for double-articulated trolleybus lines, which offers passengers almost all of the advantages of a tram

Some sections of the RBus network has to share road space with private car transport – thus creating journey time delays, especially in peak hours

system. Through the expansion of the offer, the rolling stock and infrastructure, the RBus system should produce an optimal transportation system for the agglomeration of Lucerne by 2025. This aim will be achieved through a progressive and coordinated approach.

The goal is to get as close to the quality of a rail transport system as possible, but at the same time take advantage of the lower-cost implications of a bus network. The Verkehrsverbund Luzern developed this system based on the concept of a Bus Rapid Transit (BRT) system, which is already being used successfully in several cities in France and South America. The RBus system is based on the cantonal structure plan in 2009, the current building programme for roads in the canton of Lucerne, the report of public transportation in Lucerne 2014-2017 and the public transport supply concept 'AggloMobil due', which is authorised by the Swiss government.

SWITZERLAND: LUCERNE

With the RBus system, the travelling time from one terminal to the other is to decrease by 10% on average. The travel time for passengers in the rush hour should be similar to that of those travelling during off-peak times and largely constant (increasing reliability). Double-articulated trolleybus lines reach the standard of a tram system in terms of comfort, image and preference.

VBL is the largest transport company in the canton of Lucerne and operates most bus routes in the city of Lucerne and its suburbs. Around 460 employees carry approximately 46 million passengers per year (combined total). In 2014, another nine double-articulated trolleybuses (manufactured by Swiss company, Carrosserie Hess AG) were delivered to Lucerne. Three vehicles of the same type were previously purchased in 2006. The new vehicles have a tram-like design with a capacity for 220 passengers, providing approximately 30% more capacity than the trailer buses which previously operated along the same route. By the end of 2017, VBL will purchase another 17 double-articulated trolleybuses for use on Bus Line 2 (Emmenbrücke–Lucerne, planned as of December 2016) and Bus Line 8 (Hirtenhof–Würzenbach, planned as of December 2017), converted to the 'RBus'system.

Further to the double-articulated trolleybuses, by 2025, numerous infrastructure measures shall have been implemented on a gradual basis. Today, the popularity of Line 1 means that buses operate alongside private car transport, which mean delays can often occur during peak hours – some sections only reach speeds

The new dedicated bus lane at Pilatusstrasse is making a big difference to journey times for passengers

of 7km/h in rush hour; many people would make their journeys faster on foot!

Enhancing the capacity of Line 1 makes sense for several reasons. Firstly, there are a lot of people already using the corridor Kriens–Luzern and further into the Rontal, on the other hand the strongest growth in demand in favour of public transport is identified in the agglomeration. From 2005 to 2010, the modal split in favour of public transport increased from 15% to 24%, which represents an increase of 60%. Furthermore, the starting point of Line 1 for such an adjustment is low. The preference for public transport in the city of Kriens has already been reflected in the scheduled road-building programme, and in accordance with the 2nd generation agglomeration programme Line 1 is to be extended to the city of Ebikon in the coming years. Around a dozen infrastructure measures are planned to be implemented gradually, including traffic management systems, road stops and additional bus lanes. The new bus lane at Pilatusstrasse in the town centre of Lucerne, near the main station, is already realising a significant improvement in journey times for passengers. This bus lane brings an effective acceleration towards the train station. Although this new bus lane only approximately 150m-long, the buses are now up to 2 minutes faster travelling to the main station bus stop. Not only are the

> *The goal is to get as close to the quality of a rail transport system as possible, but at the same time take advantage of the lower-cost implications of a bus network*

The IRMA MATRIX Passenger Counter

iris-GmbH – leading supplier of sensors for Automatic Passenger Counting (APC) – has unveiled their most recent sensor – the IRMA MATRIX. This newest generation of iris' APC sensors is based on real 3D distance measurement and detects the real contour of passengers enabling highly accurate and reliable counting.

The three-dimensional shape analysis allows distinguishing reliably between passenger and other objects like vehicle parts or luggage.

This method makes counting resistant to environmental conditions such as temperature, ambient light from bright sunshine to total darkness, floor colour, passengers' clothing surface, wet floors etc. The 3D distance imaging also allows reliable counting in crowded situations, like rush hour.

Furthermore, the distance and contour measurement principle enables the separate counting of adults and children, distinguished by height. This allows continuous gathering of reliable ridership data for different tariff models or operation optimisation.

The sensor comes with a flush mount and a surface mount housing version for smooth mechanical integration in the door cover without any adjustment. The IP65 housing avoids the ingress of moisture and thus increases the lifetime and system reliability under all weather conditions. Every sensor is tested for this IP65 protection during the iris production process. Modern interfaces like CAN and Ethernet allow easy integration to the on-board computer and enable new service features like remote configuration, remote update or image transmission from the sensor.

www.iris-apc.com

SWITZERLAND: LUCERNE

Plans are in place to extend the RBus system from Lucerne Maihof to Ebikon

double-articulated buses of the RBus system benefiting from this short bus lane, but so are all public buses reaching the main station. Every day more than 52,000 passengers travel on this new bus lane.

As a third element, in addition to the rolling stock and infrastructure measures, the RBus system will expand connections. We aim to improve the linking of tram and bus services with more connection options. Line 1 is to be extended from Lucerne Maihof to the city of Ebikon and the railway station of this city, so that passengers can transfer there from bus to train. We also plan for bus routes within the city of Lucerne to be linked in order to enable an optimal schedule for the double-articulated trolleybuses. If Line 1 is extended to Ebikon, planners expect over 12 million passengers annually.

The use of the new double-articulated trolleybuses sees the replacement of the roughly 25-year-NAW-Siemens trolleybuses. VBL has already sold 10 of these buses to Chile in the city of Valparaiso for a symbolic amount.

References
1. www.vbl.ch (in Germany only)
2. www.rbus.ch (in Germany only)

Norbert Schmassmann has been Chief Executive Officer of VBL since 1996. He studied Economy at the University of Basel and graduated as a Doctor of Economy in 1983. Norbert worked at the financial management unit of canton Basel-Landschaft as Chief Financial Officer and Chief Human Resources Officer at Basler Verkehrs-Betriebe (BVB). Norbert has been a Member of the Board of the Swiss Association of Public Transports since 2006 and has been its Vice-President since 2014. He is also President of the Council of Transport Companies in the Lucerne area. In 2015 Norbert became a Member of the Supervisory Board of the transport company Regionalverkehr Baden-Wettingen. He is also a Member of Parliament for the canton of Lucerne.

Stadtbus Winterthur: a strategy to keep up with growing demand

Steeped in history, the city of Winterthur in the canton of Zürich in northern Switzerland has seen many changes to its public transport offering over the years. But now, with areas of the city being expanded and redeveloped, plus the increase of passenger numbers, the growing demand for the city's bus network means a new strategy must be put in place. Stadtbus Winterthur's Thomas Nideröst, Director, and Reto Abderhalden, Director of Communications and Marketing, explain what is next for its operations and the challenges to be met by 2030.

The roots of Stadtbus Winterthur can be traced back to the 'Rössli' tram which started operations in 1895 – but it only ran for two years. The first tram route was opened in the middle of 1898. The heyday of the tram lasted until 1930, in which year, in a referendum, the Winterthur populace gave their approval to launch the first bus route in preference to the tram which started operations in 1931, and already by 1938 the first of the tram routes was replaced by a trolleybus route. Gradually the tram routes were closed down and the bus network was extended, and by 1957 the demise of the tram in Winterthur was apparent. By 1995 the five trolleybus routes 1, 2, 3, 4 and 6 were up and running. The construction of the Storchenbrücke bridge – a new landmark in Winterthur – first led to a temporary use of diesel buses on the ring route 4, and then later to the definitive decision to end the use of trolleybuses, for operational and logistical reasons. In 2005 the town council formally approved the transition from trolleybus to diesel bus

operations on the said route, but it was another five years before the remaining vehicle power-lines were finally removed. In 2006 the trolleybus routes 3 and 6 were merged to form the diagonal route 3. Today the Winterthur network still has three trolleybus routes.

1990: the launch of the Zürich Transport Network (ZVV)

Following their consent to the popular vote in 1981 on the use of the S-Bahn railway, the voters created the legal basis for the launch of the Zürich Transport Network (ZVV) in 1988. On 27 May 1990 the S-Bahn railway and thus also the ZVV commenced operations.

The ZVV is responsible for the overall strategic planning and the coordination, marketing and financing of public transport in the canton of Zürich. It unites more than 50 transport companies under the one organisation. To secure an efficient cooperation, the network region is divided into eight market areas with eight transport companies which

are responsible for them. They are responsible for ensuring that the operation is kept running in the different regions, the timetables are adhered to, and the allocated budgets are complied with. Subordinate to them are smaller and medium-sized, franchised transport companies and also transport contractors, who are mainly responsible for the transport services on certain routes.

Some 60% of the annual expenditure in the ZVV is covered by ticket sales and secondary revenues. The remaining costs are paid one half by the Canton of Zürich and one half by the 169 municipalities in the canton.

Stadtbus Winterthur: facts and figures

The company operates 12 city routes. Trolleybuses operate on the busiest routes 1, 2 and 3. Added to these there are five regional routes and also several night bus routes which ensure almost 24-hour coverage by public transport in the nights of Friday/Saturday and Saturday/Sunday, and connect the town centre to the suburbs and the municipalities of the conurbation.

In total the buses of Stadtbus Winterthur cover about 5 million kilometres each year, carrying some 27 million passengers. The public transport in the town of Winterthur has seen an increase of about 30% in passenger numbers over the past 10 years, with an increase in kilometres travelled of nearly 14%.

Today this service is provided by a total of 250 staff members and a fleet of 88 vehicles (34 articulated trolleybuses, 30 12m diesel buses, and 24 articulated diesel buses). On average each of our buses travels about 60,000km each year, and some of them cover about a million kilometres in the course of their working life.

> ...the buses of Stadtbus Winterthur cover about 5 million kilometres each year, carrying some 27 million passengers

All the trolleybuses of Stadtbus Winterthur are fitted with a diesel-powered emergency generator which means that they can continue to drive under their own power using the diesel generator during power cuts, or across construction sites, for quite long distances.

The diesel buses are fitted with CRT filters (Euro IV), at the least. Many of the new vehicles are, however, already fitted to a higher standard (Euro V with exhaust gas treatment), and the latest generation of diesel-powered vehicles, which have just been ordered, will be fitted with Euro VI engines.

Since 2015, Stadtbus has benefitted from the use of a modern workshop infrastructure, its own body shop, two washing plants, and a brake test bench. The transport services staff and the management, together with the control room managers, form the operational division, and with their 180 employees they form the largest part of the enterprise. This is followed by the technical department (maintenance, repairs and cleaning, as well as upkeep of the overhead lines), and the administration consisting of the management, service planning, finance and services, and marketing and communication.

Stadtbus Winterthur within the urban environment

Stadtbus Winterthur is a transport company of the Zürich Transport Network (ZVV), responsible for its market. Within the timetable

allocation procedure, and taking into account the budget from public funds to cover the annual operating costs, it plans the range of public transport services offered in the network region.

The large town quarters Töss, Seen, Oberwinterthur, Wülflingen and Hegi are very well connected to public transport and the services have been extended to match the new mobility requirements – with one exception, all the routes go via the main railway station square. This is in effect the main hub of public transport in Winterthur, and provides good streamlined connections to the efficient S-Bahn railway network, to the national Intercity East-West axis (St.Gallen–Zürich–Geneva), and to the international network. Zürich International Airport is just 15 minutes away by non-stop train. As the on-board bus advert says: *'Main station, next-stop-but-one London'*.

Where is the journey going next?
Challenges to be met by 2030

The growing numbers of passengers mean that several routes are operating at capacity limits, especially during the morning rush-hours (6:00 to 8:00). The result is overcrowded vehicles, and reduced levels of comfort. Added to this is the decline in punctuality due to the increasing traffic on Winterthur's roads, and the appeal of public transport is at risk.

What is more, new town quarters are being set up at the edge of town: more homes and workplaces are being created and all the additional mobility requirements have to be recognised and satisfied in good time.

Stadtbus Winterthur has developed an overall strategy. Based on this, and in close cooperation with the competent specialist town offices and Winterthur political authorities, a strategy for the range of services has been decided on. As a result of the development of built-up areas, a new centre will emerge to the east of the present town centre, and the changing mobility habits – in the next 20 years an increase of the total traffic of about 20% is expected – with the demand for public transport rising by 65-90%.

The strategy for the range of services indicates the direction that should be taken until 2030, and which measures should be included in the planning for the long-term so that their implementation can be as cost-effective as possible, by ensuring that they can be appropriately applied to the road construction and road maintenance projects.

> **The public transport in the town of Winterthur has seen an increase of about 30% in passenger numbers over the past 10 years, with an increase in kilometres travelled of nearly 14%**

The core elements of the strategy for the range of services are:

- Four high-performance corridors for public transport, designed according to the principle of 'double routes – i.e. that each corridor has two main routes which have different line branches from the main railway station; this facilitates a high transport capacity
- An attractive frequency of services on the main and supplementary network, in particular the staggered departure times are intended to provide a service running at a frequency of 7.5 minutes on the main route lines even in the off-peak hours

Stadtbus Winterthur is an economic success factor for the town and conurbation of Winterthur

- Conurbation routes that ensure good connections at the transfer hubs, and a rapid further journey towards Zürich
- Upgrading of the town railway stations as transfer hubs to relieve the main station as the central transfer hub.

Conclusion

Stadtbus Winterthur is an economic success factor for the town and conurbation of Winterthur. The attractive services, which are continually being adapted to the new requirements (new routes being set up, higher frequency of services, and more spacious vehicles), have contributed to the lasting, sustainable growth of the town. This has transformed the former workers' town into a service centre and city of education, with a growth in population of about 18% over the past 25 years. Thanks to the bus network, which connects both the residential areas at the edge of town with the inner city, and also connects up with the main railway station as the hub of the regional public transport network, thereby ensuring an efficient level of mobility, it has been possible to convert large derelict areas of industrial land into new uses, transforming them into appealing working and living quarters.

Thomas Nideröst has been Director of Stadtbus Winterthur since 2007. With a degree in Business Administration (HWV), he was first employed in the insurance sector, followed by seven years with the Zürich Transport Network (ZVV) in procurement, and then another seven years at the Transport Office of the Canton of Zürich, but most recently as Deputy and Interim-Director. At the national level, Thomas Nideröst has been a Member of the Conurbation Transport Committee since 2007, and since 2012 he has been on the Board of the Public Transport Association, as well as Chairman of the Committee for Bus Technology and Operations (KTBB).
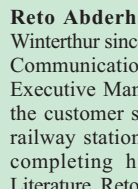
Reto Abderhalden has been working for Stadtbus Winterthur since 1999. Since 2007 he has been Director of Communications and Marketing and a Member of the Executive Management. This department also includes the customer support centre ZVV-Contact at the main railway station. Following his matriculation and after completing his degree in German Language and Literature, Reto served in various positions during the next 10 years, including Quality Manager at PostAuto Schweiz AG. Besides managing the department, his present duties include public relations, provision of information within the company, and supervising the quality assurance and environmental management, as well as implementing CD and CI.

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Juggling much-needed renovation with no service interruption

Vienna's longest underground line, the U6, currently runs for over 17km from the north to the south of the city. A trip from Siebenhirten on the southernmost edge of the city to Floridsdorf in the north takes over 30 minutes. The line celebrated its 25th anniversary in 2014 but the origins of this line date back to the imperial era and the construction of the urban railway at the end of the 19th Century. A series of historical stations designed by the renowned architect and urban planner Otto Wagner also stem from this period. As Günter Steinbauer, Chief Executive Officer of Wiener Linien explains, the network operator has for years been working on the revitalisation of these listed buildings in a project which has involved several major challenges.

Many passengers on the U6 are not aware of the fact that their daily journeys are along sections of track some of which are almost 120 years old. Back in 1898, the emperor of the Austrian-Hungarian monarchy opened the former urban railway as a pioneering public transport line for the fast-growing metropolis on the Danube which was the capital of the Habsburg Empire. Today, six of the stations on the U6 hail from the time when massive steam locomotives still chugged through the city. The electrification of the urban railway took place in 1924/25 and allowed the maximum speed of the trains to increase to 40km/h. The conversion of the historical urban railway to establish the U6 line took place from around 1980. This project also involved allowing barrier-free access and installing further safety and information-based features as well as adapting the stations to the requirements of underground train operation. The work carried out also entailed building continuous concrete track beds on the arches. But even then attention was paid to maintaining the core of the listed buildings and integrating these structures into the new underground line. The opening of the U6 underground line took place in 1989 and involved a switch to driving on the right, with the historical urban railway route forming the backbone of the new underground line. In the mid-1990s, the U6 line was extended in a number of additional phases until it ultimately operated along its current route. Despite all of the modernisation steps and conversion work, the U6 remains the only underground line in Vienna which is supplied with electricity via overhead power lines rather than a conductor rail and therefore relies on rolling stock which is different from that operating on other lines in the city.

Stations classified as listed buildings

It is no surprise that stations built around 120 years ago require considerably more maintenance work than modern structures. Several

of the stations also still bear hidden scars from bomb damage during the Second World War. The damage incurred was provisionally rectified after the end of the war in order to be able to resume operations rapidly. The former urban railway stations built by Otto Wagner form part of the historical and cultural heritage of Vienna and are classified as listed buildings. This status applies to the U6 stations Gumpendorfer Straße, Burggasse, Josefstädter Straße, Alser Straße, Währinger Straße and Nußdorfer Straße. As listed buildings, this means that the outer appearance of the buildings has to be maintained. Modernisation work is only possible in close consultation with the Austrian National Heritage Agency. Complying with the listed-building requirements is one of the major challenges involved in renovating these historical stations. The requirements entailed by the status as a listed building have to be aligned with state-of-the-art technology

U6 Station Burggasse after renovation

(fire protection, accessibility, etc.) as well as the need to maintain the structure of the building (easy-to-clean surfaces, etc.) and the requirements for regular underground train services.

A major revitalisation programme has been ongoing for several years in order to make the historical U6 stations built by Otto Wagner fit for the decades ahead. At the same time, however, the aim is also to adapt the buildings to the requirements of modern underground line services which allow trains to operate at two-minute intervals during peak times. Modern underground standards mean, for example, the installation of tactile guidance systems for passengers with reduced visibility on platforms and in other areas, modern passenger information systems, video surveillance cameras, but also of course technical installations such as those relating to power supplies and building technology. The first project started in 2011, focussing on the U6 station Josefstädter Straße. The work took over two years to complete and led to further renovation projects on other historical stations. In 2013, the historical station building and the platforms of the U6 station Burggasse

were renovated. Since 2014 and following an intensive period of planning and preparation, the work to renovate the Alser Straße station has been ongoing. In total, Wiener Linien is investing around €15 million in the complete renovation of the station building. The aim of this wholescale renovation project is also to ensure that the costs of maintenance work in the coming years are kept as low as possible. Wiener Linien decided to engage in this major project and, as a result, also to avoid having to renew the roofs and then the facades of the building after the necessary renovation of the platforms. The extensive nature of this project is bringing the entire station building up to date.

No service interruption during major renovation work

Around 30,000 passengers use the Alser Straße station on the U6 during a normal working day. Hundreds of trains stop at the station every day at intervals of just a few minutes. The aim of Wiener Linien is that renovation work is conducted in such a way that the inconvenience for passengers is kept to a minimum. It was for this reason that Wiener Linien elected to renovate the platforms at Alser Straße one at a time rather than simultaneously. For a period of around five months, only one of the platforms was out of service, with trains in the relevant direction passing through the station without stopping while the other platform remained in service as usual. The work was organised in such a way that it was always possible for the station to remain open. Despite the ongoing building work, this considerably reduced the inconvenience caused to passengers. Wiener Linien made a point of informing passengers early about the necessary work and pointing out alternative routes. During the five months that the platforms were alternatively out of use the main areas of the relevant half of the station were renovated and renewed. The old platforms were removed piece by piece and replaced with new ones. The new platforms include integrated damp protection which now prevents water

Exterior view of Alser Straße Station during renovation

penetrating the walls and causing damage as it had done in the past. As aboveground stations, the former urban railway stations are permanently exposed to the wind, rain and snow, which had led to water seeping into their structural elements and causing moisture damage. An important step was the refitting of the historical tiles originally put in place at the time of Otto Wagner and responsible for giving the stations their unique character. A tactile guidance system which is standard in modern underground construction work was integrated into the tiling, making it easier for visually impaired passengers to navigate the station. Both systems have also been installed in the main transit area of the station. The steps from the main transit area to the platforms were also removed and replaced in the course of the renovation work, as was the entire roof over each platform. The lighting was upgraded to be based on energy-saving LED bulbs, new display panels were adapted in line with the modern design of the underground system and cameras for video surveillance were also installed. Every step, every detail – even the colour of the paint for the door frames – has to be coordinated with the Austrian National Heritage Agency and every change relative to the original condition of the building has to be negotiated. The historical supports of the roof over each platform had to be restored in painstaking manual work, as did the windows and doors. It goes without saying that the walls and the facade were also renovated in the course of the project. And all of this was carried out without interrupting operations and with only minimal inconvenience caused to passengers. One particular challenge was maintaining the outer appearance of the station. The use of white paint was imposed as a requirement due to the building's listed status despite the fact that this colour is particularly difficult to keep clean and, as a result, the new stations already showed major signs of dirt only a few weeks after being painted. Marks left by shoes are particularly visible near floor level on the platforms. Due to the particular characteristics of the walls (stonework), it is not possible to remove marks with high-pressure cleaning equipment. Various protective coatings have also proven to be inadequate. In order to reduce the number of unsightly marks and in consultation with the Austrian National Heritage Agency, Wiener Linien installed stone tiles on the pedestal area of the platforms at Alser Straße station, with the aim being to reduce the marks on the walls near floor level. These tiles are also easier to clean than stonework. The second platform was re-opened at the end of August. The work still remaining, such as the renovation of the facades, will be ongoing until the end of autumn 2015, but will no longer cause any inconvenience to passengers. All of the work will be completed by the end of the year, several months earlier than originally planned.

Copyright: Wiener Linien / Johannes Zinner

Platform demolition work at Alser Straße Station

> The aim of Wiener Linien is that renovation work is conducted in such a way that the inconvenience for passengers is kept to a minimum

Further historical stations scheduled for renovation

The next major project as part of the U6 revitalisation programme is scheduled to start at the beginning of 2016, when the preparation work for the complete renovation of the Währinger Straße U6 station, which was also designed by Otto Wagner, will start. This project will be similar to that at Alser Straße, i.e. also involving the alternate closure of platforms without interrupting operations. The aim is to also completely renovate the Nußdorfer Straße station and to renew the facade of the Gumpendorfer Straße station by 2020.

The revitalisation of the U6 line, however, also involves renovation projects other than those relating to the historical stations of the former urban railway. The Thaliastraße station has also been undergoing renovation work during normal operations since 2014. Among other work, this station, which is around 35 years old, received a new roof and new platforms in autumn 2015. Besides the glass facade being renovated, accessibility and the lighting at this station have also been improved. The platforms were renewed at the Michelbeuern station in summer 2015 and a tactile guidance system for the visually impaired installed. The intention is to establish a new underground intersection here in a few years where the U6 and the new U5 lines will cross. As such, the past, the present and the future will all intersect here, with the U5 being the first underground line on the Vienna underground network to operate completely automatically.

After graduating at a technical college, **Günter Steinbauer** studied engineering at the Vienna University of Technology before joining Wiener Linien in 1982. After starting in the Infrastructure Maintenance Department, he went on to serve in numerous positions in which he facilitated the expansion of the Vienna underground network, such as the Project Leader for the extension of the U6 to Siebenhirten and as the Head of New Construction Projects. Since 2001, he has been one of the General Managers of Wiener Linien and CEO since 2004. In this position he is also responsible for vehicle technology and infrastructure. Over the course of his career at Wiener Linien, Günter has reorganised building and vehicle maintenance, been responsible for the renewal of the vehicle fleet and introduced electrically powered buses to Vienna. The further expansion of the public transport network remains one of his main focuses. His many years of experience as a member of numerous industry and lobbying groups is particularly valuable here.

DIGITAL DEVELOPMENTS

The mobile revolution in public transport

For *Eurotransport*, Laurent Kocher, Keolis Group's Executive Vice President – Marketing, Innovation and Services, discusses the impact of mobile and digital technologies on public transport and how to leverage these innovations to improve the customer experience.

For the past decade, new information and communication technologies have profoundly impacted travellers' mobility habits. Today, smartphones are expanding their reach in both the number of users and mobile capabilities. Digital, and now mobile technology, have successively disrupted industries and successful business models. These changes took time to reach the transportation industry, but the shift in the marketplace is happening now. At the same time, the ability to gather transit mobility data from smartphones and push information back to users is changing everything from operations to the commuter journey experience. Mobile technology is also at the origin of a new transportation ecosystem of creative players, from information technology companies to ridesharing players and application creators.

Transport evolution and diversification

The recent rise in investment and development of multimodal municipalities has triggered far-reaching changes. First, it has spurred the development of a wealth of transport options (bus, metro, tram, etc.), service frequency and network coverage. It has also brought back other modes, such as walking, cycling (including public bike services) and driving (carpooling, car sharing and private transportation services). Paradoxically, while today's travellers have a wide range of transport options, it is becoming more complex for them to choose an option that best meets their travel needs.

In addition to this quickly evolving transport landscape, the digital revolution is already changing how people use public transport.

According to Forrester research, smartphone ownership rates increased 7% in 2014. This massive expansion and its ensuing uses have cascaded into transport. Along with this skyrocketing use of smartphones and expanding 3G, 4G and Wi-Fi networks, we are entering the 'Information Everywhere' realm. This creates a new relationship between the public transport authority, the transport operator and the traveller, as well as new consumption and travel patterns. Access to travel information is becoming essential at every point in the customer journey – before, during and after. The notion of information everywhere encompasses access to the full range of transport options, anytime and anywhere the customer may be. It also means simplifying the distribution of all types of tickets across all modes of transport and all brands of smartphones.

Digital technology is becoming a lever to integrate, aggregate and facilitate multimodality. The goal is to offer travellers a streamlined experience that includes access to a full range of options (single or combined modes of transportation), merge them into a single solution and personalise this based on knowledge of the customer.

Digital trends in transportation

The current push in digital innovation is re-shaping transport and six significant trends are changing the face of public transportation today.

1. Real-time information everywhere

The arrival of 'real-time information everywhere' is directly linked to public transportation usages:

- 65% of smartphone owners use it during their daily commute[1]
- 23% of them use it to manage their trips[1]
- To meet the professional and private needs of their passengers, Wi-Fi transportation equipment will become a standard.

These trends are a great opportunity to make the existing transportation network more efficient, reactive and user-friendly. However, it also makes passenger's routes more varied across modes. This causes the customer relationship management to become more complex for transportation operators.

2. Smart infrastructure

Smart infrastructure and connected transportation networks are becoming commonplace. It is one of the key pieces of analytics for real-time traffic management and incident response. Data from mobile technology is at the heart of transportation. Big data analysis helps planners and operators optimise the performance of the network, the services and the customer relationship knowledge and management.

3. User centric transportation services

With real-time information and mobile geo-location, passengers have a very high expectation of adaptation and personalisation: they are the centre of the trip.

Thus, new mobile apps are allowing commuters to compare the time, cost, convenience, carbon footprint and health benefits across all modes of transport. This broadens the range of choices for customers and allows them to make decisions on-the-fly. The apps take into account users' needs, priorities and real-time conditions. Finally transportation apps have to tell you what is the best option right now.

Transportation is no more simply one mode that moves a passenger from A to B. It has to be a system connecting modes, services, technologies and designs according to the best option for passengers.

4. New sharing and community system

With social networks available on our smartphones, the growth of real-time listening and dialogue puts the sharing and community system at the heart of daily trips. In fact, 13% of smartphone owners[1] consult social networks while commuting. There are several consecutive impacts, including:

- Changes in the customer relationship with passengers
- Passengers are both consumers and producers of travel information
- Sharing systems are replacing ownership systems creating new transportation modes such as car-sharing

5. New transport models

Sharing rides, bikes, and cars and other business models are spreading, built on the recognition that empty car seats and empty vehicles form a 'wasted asset'. At the same time, there is a strong diversification of public transport modes and a strong fluctuation of usages – public transportation, taxis, VTC, self-service or car-sharing. All these new transport models are made possible by mobile phones, apps, and mobile technology.

6. Emergence of a digital & integrated multimodal platform

With so much added complexity to the transport system, it is necessary to simplify how the options are presented to the traveller. Therefore, the emergence of a multimodal digital integrator is critical and should cover the whole passenger journey regardless of:

DIGITAL DEVELOPMENTS

- The mode of transport
- The time of day
- Method of buying the m-ticket
- Validation requirements.

These six trends are ushering in a new mobile age in transport. The transport industry is experiencing disruption and transformation because of digital and mobile technology. Operators, such as Keolis, are anticipating and adapting to these changes to improve public transport for public transport authorities and travellers.

Innovation in the digital age of transportation

Keolis' answer to this new digital age takes into account two key issues: increasing travel flows and the overriding goal of easing traffic congestion in cities by shifting to modality. Keolis' mobility management platform leverages three key service solutions: plan, book and ticket:

- Plan: find the right route thanks to a multimodal and real-time trip planning
- Book: book on-line and quickly receive your itinerary and your ticket
- M-ticket: host your ticket or your monthly pass on your smartphone.

Plan-Book-Ticket is a unique, fully integrated mobile app that gives users easy access to these three key features.

Adaptable

The integrated Plan, Book, Ticket app is bundled into a white label, multi-device solution adapted to the geography. White labels make it possible to deliver specific, customised applications to cities tailored to local brands and transport solutions.

Accessible

Plan, Book, Ticket as a platform integrates APIs (for smartphones, tablets, desktops, etc.), features (itinerary searches, traffic information, etc.) and services that can accommodate third-party applications (partners, etc.) that travellers use.

Travellers are not necessarily familiar with the network brand. So the network brand alone is not enough to provide access to the full range of transport options for all traveller profiles (tourists, travelling businesspeople, etc.). Plan, Book, Ticket access is also provided via other websites and mobile applications that occasional travellers use. For example, a businessperson from out of town could access the Public Transport API from a website or a train or plane application. The tourist could access Plan, Book, Ticket from the tourism office website or application, for example, or by going on general tourist applications (e.g. Time Out) or partner applications (travel agents).
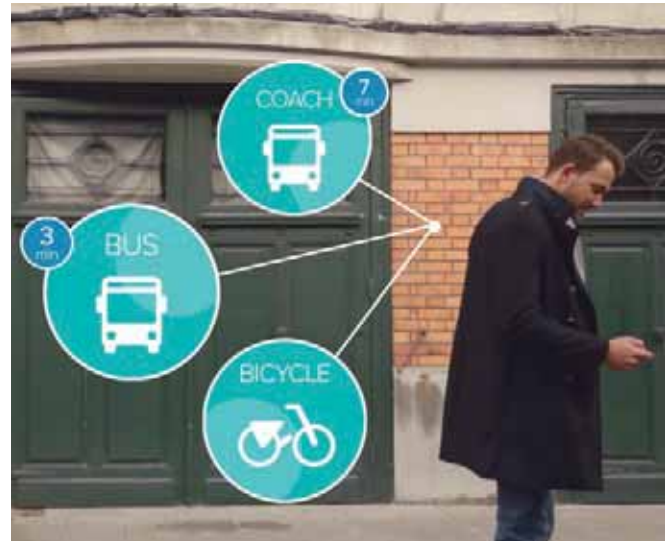
Open

The API platform is available on request from the public transport authority in Open Services to enhance Open Data policy.

The goal is to facilitate access to these solutions and their use by opening up new applications and innovations created under open-data protocols to the community, in particular to the developer community.

The Keolis Mobility Management as a platform solution in a nutshell

Via its Plan, Book, Ticket integrated platform, Keolis provides the following:

According to research, smartphone ownership rates increased 7% in 2014

- An open platform interfacing with several devices: Apple or Android smartphones, smart watches, TVs and interactive terminals, connected garments, etc.
- A platform packed with features, including:
  - Itineraries
  - Timetables
  - Nearby points of interest
  - Traffic information updates
  - Seamless services on connected objects
  - A service platform: CRM, open API, Customer Assistance, tailored to city policy
- These services are available a la carte and can accommodate all types of customers (locals and other people who know the network and brand, occasional travellers and/or visitors who do not know the brand, national and international tourists) and integrate all types of routes directly fed through city-run applications or embedded in third-party applications (tourism, travel, recreation, etc.).

With the Plan, Book, Ticket app, Keolis has created the first integrated digital solution that supports clients at each step of their journey from planning to ticket purchasing and validation, all along the route that is just right for them.

Reference

1. Data sourced from Institut français d'opinion publique (IFOP)

A graduate of the Ecole Polytechnique, **Laurent Kocher**, began his career in 1989 at IBM France as a Sales Engineer for major clients in the public and health sectors. He also participated in the creation of the IBM Global Services division in Western Europe. He was then appointed Director of Operations of the Business Consulting and Systems Integration division before becoming Head of the Business Unit for Hosting and Transactional Solutions. In 2004, Laurent was Head of the Banking and Insurance sectors within IBM Global Services. In March 2005, he joined the France Telecom Group to develop service activities for major French and International Companies. In 2009, he was named CIO of the France Telecom Group. Laurent joined Orange France in 2010 as Senior Vice President for SoHo, SMEs and Entreprises markets. From October 2011 to May 2013, he was CEO for France at the Atos Group. In January 2014, Laurent was appointed Executive Vice President for Marketing, Innovation and Services at Keolis.

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Bent Flyen
Advisor in Real-Time Information System
Flytoget

Christian Schang
Major Projects Director
SNCF

Agnieszka Jankowska
Specialist
MZA Sp. z o.o. (Miejskie Zakłady Autobusowe)

Carol Schweiger
President
ITS Massachusetts

Peter Björnlund
Director Strategic Systems
Nobina Europe AB

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Association of Train Operating Companies (ATOC)

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Nick Phillips
Accessibility Team Leader
Borough of Poole

Andreas Kunde
Divisional Manager Support and Projects
Mentz Datenverarbeitung

Jay Saw
Commercial Director
Nomad Digital

Attendees 2015

Abellio Greater Anglia, Customer Service Information Manager
Aberdeenshire Council, Public Transport Manager
Atkins, Managing Consultant
Ayrshire Roads Alliance, Engineer
Bombardier Transportation, PIS System Engineer
Bombardier Transportation, PIS Engineering Manager
Bristol City Council, Principal Public Transport Officer
Bus Users Cymru, Deputy Director for Wales
Cambridgeshire County Council, RTPI Project Manager
Chatham Waterfront Bus station, Assistant Transport Operations Officer
Dorset County Council, Travel Operations Manager
East Japan Railway Company, Assistant Manager
East Sussex County Council, Team Manager- Public Transport Services
Essex County Council, Intelligent Travel Information Development Manager
First ScotRail, Head of Passenger Information Services
Hampshire County Council, Principal Engineer
Hertfordshire County Council, Data and Research Officer
Hertfordshire County Council, Passenger Transport Manager
Leicester City Council, Team Leader, Sustainable Transport
Metro Service, Operations Manager

National Transport Authority (NTA) Ireland, RTPI Contract Manager
North Somerset Council, Public Transport Manager
North Somerset Council, Senior Transport Planning Officer
Nottinghamshire County Council, Passenger Transport Information Officer
NSB AS, Consultant
SJ AB, System Area Manager IT
South Yorkshire PTE (SYPTE), Head of Information & Technology
South Yorkshire PTE (SYPTE), Commercial Product Development Manager
Southampton City Council, Transport Technician
Southampton City Council, Transport Planner
Southeastern Railway, Passenger Experience Stratergy Manager
Southeastern Railway, Passenger Operations Manager
Translink, Graphic Designer
Translink, Head of Customer information & Marketing Production
Transport for London (TfL), Head of Marketing Services
Transport for London (TfL), Project Manager
Transport for London (TfL), Head of Technical Services Group
West Yorkshire Combined Authority (WYCA), Telematics Manager
Worcestershire County Council, Transport Systems & Technology Manager

...and many more!

REAL-TIME PASSENGER INFORMATION 2015

08:00 Registration & Coffee

08:45 **Chairman's Opening Address**
Mark Cartwright, General Manager, **RTIG**

09:00 **Keynote Conference Address** **Using real journey data to improve passenger experience and deliver commercial returns**
Louise Davies, Customer Experience Lead, **South East Flexible Ticketing (SEFT), a DfT Smart Ticketing Programme**

09:25 **Strategic insight** **Developing a Pan-TfL Customer Information Strategy - Keeping up with Rising Expectations and Demands**
Silke Elvery, Strategy and Planning Manager, **Transport for London**

09:50 **Delivering a central architecture to support the Rail Industry's Customer Information Strategy**
Jason Durk, Head of Customer Information, **Association of Train Operating Companies (ATOC)**

10:15 **International Case Study: Finland** **The Ring Rail Line Passenger Services**
Arja Aalto, Specialist, Passenger Traffic, Transport and Land Use Unit, **Finnish Transport Agency**

10:40 **International Case Study: Denmark**
Anders Borring-Møller, Programme Manager, **Movia Transport**

11:05 **Audience Q&A**

11:15 Coffee & Networking in the Exhibition Area

11:45 **Information Delivery: What are the Latest Innovations?**
Jay Saw, Commercial Director, **Nomad Digital**

12:00 **Top Tips for the successful delivery and development of a Real Time Passenger Information system**
Nick Phillips, Accessibility Team Leader, **Borough of Poole**

12:25 **Key Panel Discussion** **What Does The Public Want And How Do We Pay For It?**
Panellists include:
David Sidebottom, Passenger Team Director, **Transport Focus**
Jason Durk, Head of Customer Information, **Association of Train Operating Companies (ATOC)**
Nick Phillips, Accessibility Team Leader, **Borough of Poole**

12:45 **Audience Q&A**

13:00 Lunch & Networking in the Exhibition Area

14:00 **What are the Latest Passenger Demands?**
David Sidebottom, Passenger Team Director, **Transport Focus**

14:20 **Real-Time for Smaller Operators with AVM Light**
Andreas Kunde, Divisional Manager – Support and Projects, **Mentz Datenverarbeitung**

14:35 **The Digital Customer Journey**
Peter Björnlund, Director Strategic Systems, **Nobina Europe**

14:55 **International Case Study: France** **Best Practice in Delivering Passenger and Customer Information During Major Works on the Rail Network**
Christian Schang, Major Projects Director, **SNCF**

15:15 **International Case Study: Poland** **Poland's Largest Public Bus Transport Operator: Exploiting Real-Time bus information to develop Real-Time Passenger Information**
Agnieszka Jankowska, IT Specialist, **Miejskie Zakłady Autobusowe**

15:35 **International Case Study: USA** **Open Data: Transforming Public Transport**
Carol Schweiger, President, **ITS Massachusetts**

16:00 Afternoon Tea & Networking in the Exhibition Area

16:30 **International Case Study: Sweden** **Development of Real-Time Information on the Stockholm subway as an operator to SL and forward plans**
Henrik Dahlin, Stations Director, **MTR Stockholm**
Anne Sjögren Schmidt, Traffic and Disturbance Information Manager, **MTR Stockholm**

17:00 **Closing Panel: Question Time!**
ADDRESSING YOUR CHALLENGES
Jason Durk, Head of Customer Information, **Association of Train Operating Companies**
Christian Schang, Major Projects Director, Engineering and Projects, **SNCF**
Carol Schweiger, President, **ITS Massachusetts**

PLUS – Your final opportunities to broaden the debate – send your questions directly via Sli.do!

18:00 The networking drinks reception is held at the close of the conference sessions and all delegates, speakers and sponsors are invited to attend. This is your opportunity to exchange business cards and discuss the day's proceedings in an informal but business conducive setting.

Speakers 2015

David Hytch
Director
Parkgate Consultants

John Verity
Chief Advisor
ITSO

Gordon Hanning
Head of Concessionary
Travel and Integrated
Ticketing
Transport Scotland

Richard Allan
Commercial
Director
Northern Rail

Matthew Lewis
Swift &
Information Manager
Centro

Louise Coward
Senior Research
Advisor
Transport Focus

Robert Montgomery
Managing Director
Stagecoach UK Bus

Stephen Joseph OBE
Executive Director
Campaign for Better Transport

Matthew Hudson
Head of Business
Development
TfL (Transport for London)

Gregers Mogensen
System Director
Rejsekort

John Henkel
Acting Director
of Transport
West Yorkshire Combined Authority (WYCA)

Mohamed Bhanji
Special Advisor to the
Chief Commercial Officer
Via Rail Canada

Dave Lynch
CIO
FirstGroup plc

Erik Kolbjørnsen
Product Manager
Tickets
Ruter AS

Jenni Borg
Head of Smart &
Integrated Ticketing
DfT - Department for Transport

Dr Steve Cassidy
Managing Director,
Viaqqio
ESP Group

Attendees 2015

A.T.Kearney, Management Consultant
Arriva Portugal (North), Managing Director
Arriva Trains Wales, Commercial Apprentice
Arriva Trains Wales, Pricing & Ticketing Manager
Austria Card, Sales
Barcelona de Seveis Municipals SA, Managing Director
Cubic Transportation Systems, Business Developement Manager
Essex County Council, Passenger Transport Manager
Kent County Council, Head of Public Transport
Milton Keynes Council, Passenger Transport Manager
National Transport Authority (NTA), Head of Customer Engagement
National Transport Authority (NTA), PMO
Oxfordshire County Council, Senior Transport Planner
PayPal Europe SARL, Senior Sales, Transport Ticketing

Rail Settlement Plan, TIS Compliance & Relationship Manager
SJ AB, Booking & Payment Manager
SJ AB, Head of Distribution
SJ AB, Senior Key Account Manager
South West Trains, Distribution & Income Manager
Southeastern Railway, General Manager Revenue Enforcement & Policy
Southeastern Railway, Head of Commercial Development
The Go Ahead Group, Commercial Programmes Director
The Go-Ahead Group, Head of Retail
Transport For Athens (OASA), Chairman and CEO
Transport For Athens (OASA), Head of Oasa Policy Dept/ AFCS PP
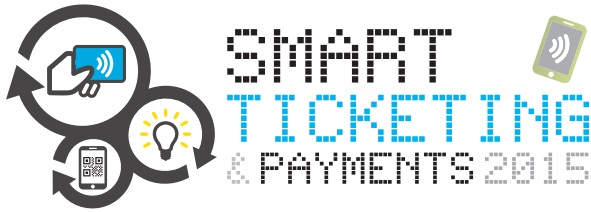**VIA Rail Canada,** Special Advisor to the Chief Commercial Officer

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SMART TICKETING & PAYMENTS 2015

08:00 Registration & Coffee

08:45 **Chairman's Opening Address**
David Hytch, Director, **Parkgate Consulting**

09:00 **The Future of Smart Ticketing:**
Jenni Borg, Head of Smart and Integrated Ticketing,
Department for Transport - UK

09:25 **Keynote Conference Address** **Smart Ticketing to Support Local Economies**
Stephen Joseph OBE, Executive Director,
Campaign for Better Transport

09:50 **Fare Collection in London: Changes and Challenges**
Matthew Hudson, Head of Business Development,
Transport for London

10:15 **The Partnership Road to Multi Operator SMART**
Robert Montgomery, Managing Director,
Stagecoach UK Bus

10:40 **Generating a new world of seamless interoperability between bus, metro, tram and rail**
John Verity, Chief Advisor, **ITSO**

10:55 **Audience Q&A**

11:15 Coffee & Networking in the Exhibition Area

11:45 **Making Mobility Services Happen: Lifestyle Integration and Transport Integration**
Steve Cassidy, Director, **ESP Group / Viaqqio Ltd**

12:00 **A FirstGroup Perspective on Smart Ticketing**
Dave Lynch, CIO, **FirstGroup**

12:25 **Key Panel Discussion:** **What does the public want and how do we pay for it?**
Panellists include:
Stephen Joseph OBE, Executive Director, **Campaign for Better Transport**
Dave Lynch, CIO, **FirstGroup**
Richard Allan, Commercial Director, **Northern Rail**
Louise Coward, Senior Research Advisor, **Transport Focus**
Matthew Hudson, Head of Business Development, **Transport for London (TfL)**

13:00 Lunch & Networking in the Exhibition Area

14:00 **Smart Ticketing, Payment and Fulfilment in Scotland**
Gordon Hanning, Head of Concessionary Travel and Integrated Ticketing, Trunk Road and Bus Operations, **Transport Scotland**

14:25 **Swift – Delivering Smart Ticketing in the West Midlands**
Matthew Lewis, Swift & Information Manager, **Centro**

14:50 **DENMARK** **The Danish Travel card: Multimodal, end-to-end smart ticketing to benefit customers**
Gregers Mogensen, System Director, **Rejsekort**

15:15 **CANADA** **VIA Rail Canada's vision for seamless door-to-door travel experience**
Mohamed Bhanji, Special Advisor to the Chief Commercial Officer, **VIA Rail Canada**

15:40 **NORWAY** **Ruter's Ticketing App - The Journey Towards Simplicity**
Erik Kolbjørnsen, Product Manager – Tickets, **Ruter**

16:10 Afternoon Tea & Networking in the Exhibition Area

16:40 **KEYNOTE AFTERNOON ADDRESS:** **Northern Rail's Retail Revolution**
Richard Allan, Commercial Director, **Northern Rail**

17:10 **CLOSING PANEL:** **Question Time!**
ADDRESSING YOUR CHALLENGES
Your Question Time Panel includes:
Dave Lynch, CIO, **FirstGroup**
Gregers Mogensen, System Director, **Rejsekort**
Robert Montgomery, Managing Director of the UK Bus Division, **Stagecoach UK Bus**
Gordon Hanning, Head of Concessionary Travel and Integrated Ticketing, **Transport Scotland**
John Henkel, Acting Director of Transport, **West Yorkshire Combined Authority (WYCA)**

18:00 **Chairman's Closing Comments**
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Credit: TfL/Phil Starling

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An exciting future for RTPI in the Stuttgart region

Real-Time Passenger Information (RTPI) in the metropolitan region of Stuttgart has grown over recent years, and a comprehensive system now exists. How did the region implement this technology and can the system get any better in the future? Horst Stammler, Head of the Transport and Tariff Association of Stuttgart (VVS), explains.

As part of the public transport innovation programme of the German State of Baden-Württemberg, VVS – or the Transport and Tariff Association of Stuttgart (Verkehrs- und Tarifverbund Stuttgart) – laid the foundations for the collection and dissemination of real-time information throughout the whole network, and a comprehensive supply of RTPI was realised within the entire VVS area. Thus, the VVS and its transport operators underwent a huge modernisation programme which included:

- The implementation of an Automated Vehicle Monitoring system (AVM)
- Construction of dozens of regional Real-Time Passenger Information displays
- Setting up a regional data hub
- The implementation of an Event Management System (EMS)
- Enhancing the existing journey planner.

BLIC GmbH[1] – the IT consultants for mobility management – was the engineering partner who was responsible for the technical specifications, tendering of the systems and project management during the implementation phases.

Stuttgart region – economy and top industry location

Located in the southwest of Germany, the Stuttgart region comprises, as a part of the federal state of Baden-Württemberg, the state capital Stuttgart and five surrounding counties. The 'birthplace of motor cars' has a population of approximately 2.7 million inhabitants and an excellent reputation for cutting-edge technology, economic strength and qualified personnel. Well-known companies like Mercedes-Benz, Porsche and Bosch are located here.

The region has a high level standard of life – for example, there's an average of 540 cars per 1,000 inhabitants, so the VVS has to

provide top-level public transport in order to be competitive in the mobility market. Currently, more than 350 million passengers per year travel by the trains and buses of one of the 40 transport operators within the VVS. Altogether, creating the prerequisites to face this challenge is:

- Regional train services (two operators over 16 lines)
- Municipal railways (one operator over 7 lines)
- Subways (one operator over 15 lines)
- Bus services (35 operators over 390 lines).

Successful five years real-time-passenger-information campaign

The central task of this campaign is the improvement of RTPI for public transport. The VVS has therefore risen to the challenge to provide RTPI throughout the whole network within a five-year period. RTPI enables customers to receive information about the latest operational conditions, not only whilst waiting at stops and stations, but to receive the information when they are in the office, at home or on the move.

Furthermore, all transport companies get updated about the current operation status of other companies throughout the VVS. This makes it possible, for example, to inform passengers who are already on-board trains about subsequent bus connections which helps to achieve successful overall management of networks.

To achieve this goal, a series of major investments in fleet monitoring technology and guidance systems was necessary, particularly for the AVM system for VVS, for RTPI displays at important locations, a central regional data hub plus a functional enhancement of the journey planner, and finally the Event Management System.

A multi-client capable AVM system – a considerable breakthrough

Within the scope of the public transport innovation programme of the State of Baden-Württemberg, the pilot project for the AVM system started in 2010 and provided the basis for the aforementioned system modules.

> *...a series of major investments in fleet monitoring technology and guidance systems was necessary*

The major challenge on the roadmap to RTPI throughout the VVS network was the generation of real-time data of small regional transport companies in rural areas. Due to the significant efforts for expenditures and organisation, these companies in general are not able to operate an AVM system on their own. A considerable breakthrough has been achieved by the set-up of the VVS-owned multi-client capable AVM system, which collects the data of different operators while simultaneously maintaining their sovereignty about these data. The system was launched with three transport operators to evaluate the organisational demands for the AVM system and coordinate the operation. Afterwards, the AVM system was provided by the VVS to all regional companies. Thus, even small transport

Autokraft orders more than 700 on-board computers with ATRON

Autokraft GmbH with its headquarters in Kiel is a subsidiary of DB Regio and the largest bus company in Schleswig-Holstein. For 70 years now, the company has ensured bus transport in the region, and today it completely or partially operates public transport in many cities with a fleet of more than 350 own vehicles. Autokraft operates long-distance routes to Hamburg and Berlin beyond the borders of its federal state.

In July 2015, Autokraft GmbH placed an order for 714 AFR 4 on-board computers and 114 handhelds of the type AMR 174 with ATRON. The high-performance devices are all equipped with mobile radio and GPS. Thanks to the installation of the latest version of the background system ATRIES, ATRON additionally ensures timetable handling according to VDV 452, ticket sale in several associations and the inspection of VDV KA eTickets in the fare zone of the Hamburg transport association (HVV). The first 250 on-board computers will be delivered in autumn of 2015; the remaining devices will follow in the first half of 2016. Matthias Unger, Head of Innovation Management, appears very content after the acceptance of the tender: "Thanks to the outstanding performance of ATRON in the last pilot project, we are able to operate the inventory devices of the FR-series as well as the newly delivered AFR 4 and AMR 174 in one system. We are very happy to be able to continue our long-term cooperation with ATRON." ATRON's Project Manager, Claudia Wegener, is also looking forward to future cooperation: "We are very proud that we were able to convince our long-term client Autokraft GmbH of the ATRON technology and are looking forward to implementing the project together."
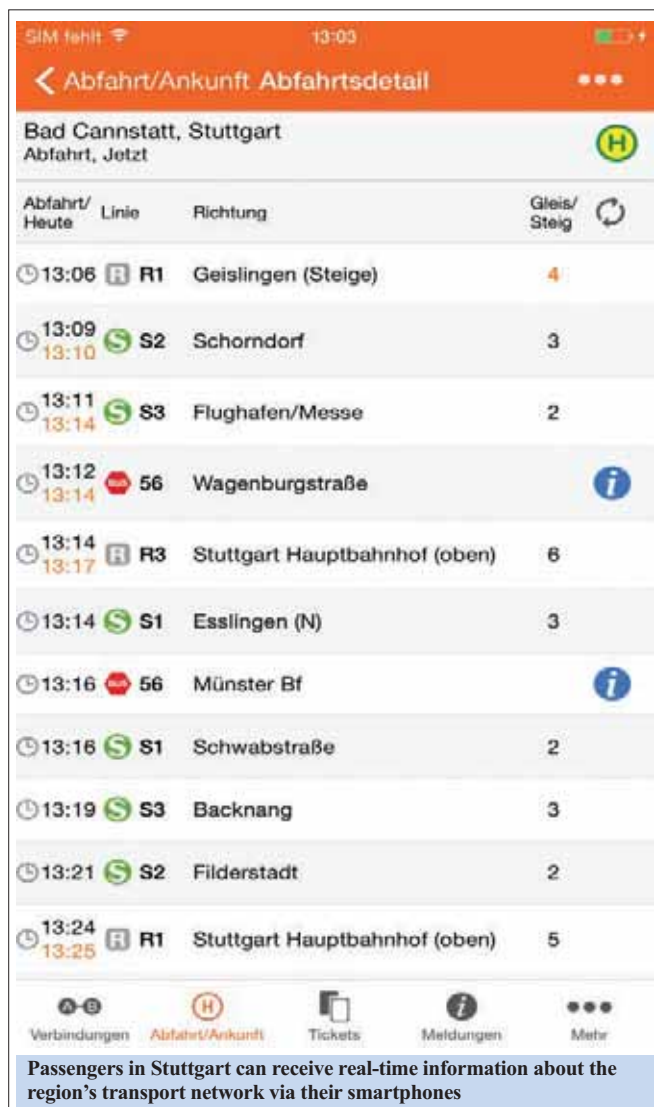
companies are now able to collect real-time data for operating purposes as well as for providing data for the passenger information system of VVS, or for connection management overlapping several operators.

Each client is equipped with a remote workstation connected to the central data server which provides a range of management functions, such as:

■ Comparison of timetabled and actual data
■ Monitoring of operating status on a map
■ Internal and cross-operator connection management
■ Data and voice communication
■ Statistical and quality reports.

The AVM system assures that the companies are receiving useful information to optimise their operating process, though are not challenged – by a too complex and expensive solution.

Based on the experiences of the pilot project and with further financial funding from the State of Baden-Württemberg, an extension of the AVM system was implemented to serve all transport operators. Up to now, there are 26 participating companies with approximately 700 vehicles providing comprehensive RTPI with nearly full coverage of the VVS region.

Passengers in Stuttgart can receive real-time information about the region's transport network via their smartphones

RTPI system and displays – access to real-time information

Now that RTPI is available, passengers need access to it. Therefore, the VVS procured and implemented a centralised RTPI system which is operated by the VVS as well as some first displays. To ensure that, for example, at a central bus station, information of different operators is provided on a single display, those displays are receiving their data directly from the journey planner.

This concept has the advantage of supporting the RTPI combined with up-to-date information about irregularities provided by the EMS.

Moreover, for test purposes, one display was equipped with a Text-To-Speech function to enable 'reading out' the information to benefit visually impaired people.

The central background system is designed to serve up to 150 displays. Subsequently, different types of displays like TFTs or LCDs have been tested to give appropriate recommendations for future procurement of RTPI displays to the regional authorities.

In the years to come, all important interchange points of municipal railway, central bus stations and other highly frequented stations will be equipped with RTPI displays.

This programme will be financed via a co-operation between the Association of the Region of Stuttgart (Verband Region Stuttgart, VRS), the counties and the cities and municipalities. It also ensures that small or medium-sized towns and cities will be equipped with those information displays. In general, for this programme the responsibilities are shared as follows:

■ VVS: responsible for data supply (content)
■ Cities and municipalities: responsible for the implementation and maintenance for displays (hardware)
■ VRS and counties: responsible for financing or funding.

Due to the high costs of stationary displays, the VVS adds QR-Codes on the printouts of its timetables for less frequented stations so mobile phone users are able to scan these codes and get linked directly to the respective virtual departure board of the journey planner.

The regional data hub – bundling of data flows

A central regional data hub has been implemented to collect and coordinate all available data of the transport companies. This data hub bundles the data flows and avoids a large number of bilateral interfaces between the different systems necessary otherwise.

Step-by-step the VVS connected the available real-time systems of other operators to this data hub. The pioneer of this was Stuttgarter Straßenbahnen (SSB) which had already implemented it in 2010 on an interface based on the CEN-SIR standard between their AVM system and the VVS real-time information system.

The second participant was the S-Bahn Stuttgart (Stuttgart municipal railway) which is providing its information via the traveller information system (Reisenden-informationssystem, RIS) of German Rail, DB. Through this, other railway companies of the DB are also providing real-time information. In the meantime the integration of the AVM system for VVS as well as the AVM system of Regiobus Stuttgart, a subsidiary of DB, has happened.

Clients for data of the central data hub of VVS are, for example, the journey planning system and AVM systems of transport companies.

To ensure continuous availability with state-of-the-art data processing and a high operational reliability, the regional data hub VVS is hosted on servers of an external provider.

To provide state-wide real-time information, a link for data exchange with the central data hub of the regional transportation company Baden-Württemberg (Nahverkehrsgesellschaft Baden-Württemberg) was set up, so that data about long-distance transport of the DB is also fed into the regional data hub of VVS.

New functions of the journey planner – mobile information is coming

RTPI station and stop displays across the Stuttgart region

The journey planner (Elektronische Fahrplanauskunft EFA) is the most important source of information for the customers of local public transport. Meanwhile, all available real-time data available at the regional data hub is integrated into the products of the journey planner – such as the 'door-to-door route planner', departures at stations, widgets, individually configurable push notifications or the 'on-trip-accompaniment' with a 'guardian angel' functionality.

Hence customers can easily access information on actual departures and even purchase tickets for the selected journeys, by using the mobile journey planner. Since 2010 it has also been possible to use the smartphone application 'VVS mobil' on an iPhone, Android or Windows phone for this access and integrated a mobile ticketing application into the VVS mobil App. Real-time information along with the above-mentioned new features caused an impressive increase of access to the VVS journey planner. Compared to approximately nine million timetable information accesses per month in 2010, there are now 40 million calls per month.

Today over 80% of all timetable information is retrieved by mobile devices – most of them via the VVS mobil app which has been downloaded more than one million times.

> *The major challenge on the roadmap to RTPI throughout the VVS network was the generation of real-time data of small regional transport companies in rural areas*

Event Management System – sharing information on irregularities via multiple communication channels

Although the availability of passenger information and AVM systems already provides significant benefits to the passengers, real-time information has hit its limit when it comes to major irregularities e.g. accidents, signal interferences or derailments. By means of the new multiple-client capable system, transport companies are able to enter messages directly into a joint system. Using predefined text modules and a clearly structured menu, passenger information is generated automatically, so that high quality messages as well as standardised wording is guaranteed.

By now, so-called mobility coordinators, e.g. of the DB, the SSB and the regional transport companies, are working with this Event Management System to share information and provide it to the customers via multiple communication channels, mainly the VVS website, the journey planner VVS mobil app and the RTPI displays. Additional channels such as social networks (Facebook and Twitter), RSS feeds or radio broadcasting should expand the existing services in the future.

Outlook

As customers are really benefitting from the new systems, the utilisation of the journey planner highly increased, in particular the use of mobile services. Pushed by this positive resonance, the VVS plans further improvements of customer support in the future. More and more vehicles are getting equipped with multi-functional displays, not only to display the next stations, but to share connection information across operators for the next station. Furthermore, other regions like Göppingen will be integrated into the existing system. The future remains exciting…🖳

References
1.	www.blic.de

Horst Stammler is Head of VVS – the Transport and Tariff Association of Stuttgart. Starting his career at the transport company in Karlsruhe, he was partly responsible for the expansion of the light-rail network in Nordbaden. After positions within the Traffic Association of Karlsruhe (as the authorised representative), at Veolia Transport and the Transport and Tariff Association of Berlin/Brandenburg (the biggest Transport Association in Germany) he joined VVS in 2009.

Increasing bus patronage through partnership working and RTPI

During the last decade in Poole in the county of Dorset on the UK's south coast, the number of bus journeys has almost doubled – the highest figures seen outside of London. The Borough of Poole's Accessibility Team Leader, Nick Phillips, explains that this patronage has increased due to the successful working-ethos of the Quality Bus Partnership, plus the success of real-time passenger information systems which travellers have rated as being an important factor for them to choose bus travel.

Poole is an expanding UK town of almost 150,000 residents on Dorset's sunny south coast. It is famous for having Europe's largest natural harbour and a busy developing Port for both passengers and freight. It is also a popular tourist destination with three miles of unspoilt golden beaches, including Sandbanks peninsula.

However, Poole is also famous for delivering the highest percentage increase in bus patronage over the last decade (outside of London). In the last 10 years, the number of journeys by bus has almost doubled from 5.3 million in 2004/2005 to 10.2 million in 2014/2015. This has been achieved despite being in an area with high car ownership and increasing traffic congestion, particularly in the summer months.

The key to this success has been a voluntary Quality Bus Partnership (QBP) with the major operators (Go-Ahead's Morebus, RATP subsidiary Yellow Buses and First), plus the three neighbouring authorities of Poole, Bournemouth and Dorset.

Originally signed in 1999, the ethos of the QBP is that *"by working together, more significant improvements can be made than working independently"*. The aim of the partnership is to create a 'virtuous circle' of improvement with the councils investing in infrastructure (high quality shelters, real-time passenger information and bus priority) to support commercial bus operation. In return, the bus operators have increased frequencies and invested £2.7 million in

their fleets to give an unrivalled daytime service of 24 buses per hour on the main Poole to Bournemouth route.

The QBP is a delivery group (and not a talking shop) with members providing a prioritised 'wish list' of capital schemes to create the right environment for commercial bus networks to flourish. This includes new bus lanes, interchanges, extended stop clearways and improved enforcement through the use of camera cars.

From the outset, the considerable value of a real-time passenger information (RTPI) system was recognised. The passenger's end-to-end journey experience is signifi- cantly enhanced by the information shown on both shelter and in-bus displays. The operator's myriad benefits of day-to-day

The aim of the Quality Bus Partnership is to ensure more significant improvements can be made than by working independently

fleet management, schedule adherence and driver:inspector voice communications were also essential to improve reliability of services overall.

Poole's 2001 bid for Department for Transport (DfT) funding to kick- start the RTPI project was successful, with the contract being awarded to Action Information Management (now part of the Trapeze group). The system was originally PMR-based with two radio masts and a maze of supporting communications links. The project attracted significant additional public and private investment and became one of the largest and most successful in the country, with 259 buses tracked and 198 displays at the busiest bus shelters across the conurbation. Departure screens were also fitted in foyers at key hospitals, super- markets, leisure centres, universities, offices and transport hubs.

The system has been at the forefront of new technology, with RTPI to mobile delivered in 2007 (the first in the South West). The introduction of new low-floor buses with luxury seating, CCTV and

smartcard ticketing, plus the complimentary infrastructure improvements have attracted new segments of passengers for whom the bus is a mode of choice. These passengers have rising expectations and the ability to check, first via mobile, how the bus is running was seen as invaluable – the system attracted 30,000 text enquiries in its first year.

In 2011, Poole was the first in the country to install bus stops with NFC tags to give real-time via passenger smartphones. This again puts customers in control of their journeys, giving real-time information at all stops (not just those fitted with displays) and maximising the benefit of the system overall.

The ability by operators to accurately quantify the effects of congestion through the RTPI system has been a significant benefit to all partners. This information has been used to identify hotspots and justify capital investment in finding a solution. As an example, the Civic Centre 'bus bypass' scheme has been delivered after it was shown that up to 4 minutes could be saved for buses travelling west on the main Bournemouth to Poole corridor. This time saving benefits 260,000 passengers each month, but also saves operators 18,000 unnecessary bus miles and 3,000 gallons of fuel each year.

In 2012, the DfT announced that the Borough of Poole (in partnership with Bournemouth and Dorset County Council) had been successful in winning both Local Sustainable Transport Funding (£12.1 million) and Better Bus Area Funding (£3.4 million). For public transport users this would provide *"a package of targeted measures to maintain the momentum of significant bus patronage growth in the conurbation"*.

This opportunity provided the resource to re-engineer the existing RTPI system, plus provide a step-change at the roadside for passengers. The procurement was led by Poole for the conurbation and split as follows:

Go-Ahead's Morebus is part of the Quality Bus Partnership

REAL-TIME PASSENGER INFORMATION
SUPPLEMENT

Lot 1: Real-Time Information

- Web-based back-office solution
- GPRS Comms
- On-bus equipment to include next stop displays and audible announcements
- Traffic signal priority
- Despatcher – Driver Voice Capability
- SIRI links to Lot 2 display provider, other operators, Dorset RTI system, Traveline.

Lot 2: Bus Shelters and Displays

- Bus shelter and display installation, maintenance
- Advertising rights
- NFC tags at shelters and stops
- Web-based back office for FMS and multi media
- SIRI link to Lot 1 RTI provider
- Off route displays and kiosks.

After an OJEU procurement process the contracts were awarded to the following successful tenderers:

- Lot 1: Trapeze
- Lot 2: Clearchannel.

All upgrades have now been completed. The ease of migration to GPRS for the RTPI base system was undoubtedly assisted by the fact that the local authorities and operator were previous customers of Trapeze.

Splitting the contracts as shown, provided particular benefits for the delivery of RTPI infrastructure at the roadside, with a single supplier solution for both the shelters and displays providing turnkey delivery. This also solves previous potential problems of multiple inspections/cleansing/electrical testing and fault reporting.

Over 90 stainless steel Landmark shelters have now been installed and excellent feedback has been received from the public who appreciate the light and airy glass roofs and full width seating in

Over 90 stainless steel Landmark shelters have now been installed and excellent feedback has been received from the public

particular. Clearchannel (through partner RSL) have successfully delivered over 120 full colour TFT displays, with significantly improved content. In addition, 120 mid-life LED signs have been upgraded to the latest communications and re-installed, allowing an increase in the number of shelters fitted overall. Journey planning kiosks and off route monitors have also been replaced/upgraded.

Fundamentally, the revised solution ringfences advertising revenue from the shelter contract to provide ongoing support for maintenance of both the shelters and displays. This is of particular importance as local authority revenue budgets become further reduced in the future.

Conclusion

The value of RTPI in the conurbation was shown by a recent survey of 800 residents, which rated real-time information as the third most important factor in encouraging people to use buses more (after improved reliability and cheaper fares). This backs similar research undertaken by Transport Focus. RTPI therefore remains an essential tool for local authorities committed to cutting carbon and congestion by securing modal shift to public transport.

Nick Phillips graduated with an Honours degree in Transport Management from Aston University and has enjoyed an interesting and varied career in the industry ever since. Nick has worked for the Borough of Poole for the last 12 years and currently leads the Accessibility Team. Responsibilities include development of public transport (bus, rail and taxi licensing) community transport and walking and cycling. The public transport remit includes close partnership working with local bus operators to secure modal shift. This has been particularly successful in Poole, with increased ridership during the last decade – one of the highest patronage increases recorded in the country. Nick project manages the Real-Time Information System for the Poole/Bournemouth conurbation and the system has recently been fully upgraded following the award of the DfT's Better Bus Funding.

Courtesy of Trapeze Group

Giving customers greater travelling confidence

Working with technology supplier Trapeze, First Hampshire has rolled out a real-time passenger information system with next stop displays (NSD) and audio announcements (NSA) over the summer. This system gives customers greater confidence to travel by bus, first of all by knowing exactly when the bus will turn up at their stop and secondly, by way of a written display or audio announcement, so that they know where they are and when to get off. Dervla McKay, General Manager of First's business in Fareham and Portsmouth, explains how the system works.

In early-2014 government funding was secured in joint partnership with Hampshire County Council, Southampton City Council and Portsmouth City Council to roll-out a real-time system which incorporated next stop audio and visual displays. Match funded by First, the project was set to change perceptions of public transport across Hampshire.

How the technology works

The Trapeze solution deployed in Hampshire consists of a singular IDR unit (Intelligent Data Router) installed on each vehicle enabling both private AVL (Automatic Vehicle Location) and public Wi-Fi communications. This links to GPRS navigation via the ticket machine, which in turn allows for live vehicle tracking and drives the next stop display and announcements.

The IDR contains two mobile SIMs, one for AVL data exchange across a private APN (Access Point Name) network to a centrally hosted communication server, onward into the Trapeze back-office environment for tracking, schedule adherence and reporting. SIRI (Service Interface for Real-Time Information) feeds into the

on-street displays and priority traffic junctions, which are managed by the local authorities. The second SIM provides public Wi-Fi access.

On-bus NSD/NSA capabilities allow both two-line LED displays and TfT (Thin film Transitor) screens to be utilised, the latter with the addition of branded images portraying the route ladders covering the next five stops, a live RSS (Rich Site Summary) feed and advertising content, all configurable for a specific service.

The Trapeze back-office environment is accessed through a web-based GUI (Graphical User Interface), providing our Controllers with a graphic, colour rich landscape on the status of each bus/route overlaid on both street map and route ladder views. This enables them to manage the headway of frequent services. Historic replays of vehicle activities assist customer services in managing customer comments. A wide range of reporting enables the operational managers to better plan each service. Some examples include, in-depth views of route performance, dwell times, time between bus stops, etc.

On-board real-time displays will give confidence to passengers in where to alight the bus

Project delivery

In order to ensure the successful and on-time delivery of the scheme, a project team was set up. The technology was first fitted to a selected few trial vehicles operating in the Fareham and Portsmouth area. During the trial period, several teething problems were worked through, while in the background, method statements for vehicle fitments and the data collection feed into the system was taking place.

One particularly interesting task was for members of the local service delivery team to sit and listen to the text to speech announcements of their local stops. This involved listening, finding errors and giving some bus stops an alternative name to the one listed in the NaPTAN (National Public Transport Access Nodes) database in order for it to be pronounced correctly.

Once deemed a success, it was then time for all the vehicles to be fitted. This was done predominately out of hours in order to ensure that service delivery was not compromised. This worked well and as each new vehicle was fitted it became 'live' on the system.

As vehicle fitment was taking place, staff training was being rolled-out, first of all to operational staff to show them how to use the tracking software and the reporting suite. Training was then rolled-out to a select

Making it all happen: the Intelligent Data Router (IDR) from Trapeze Group which is installed on each vehicle

team of engineers in each of the three depots in order for them to complete diagnostic fault finding and applicable repairs if needed.

Once all the vehicles in scope of the project were fitted, 'go live' was official.

Key benefits

The system boasts several great benefits for both the Company and its customers, including:

- The provision of free Wi-Fi to allow customers to use the internet during their journey. Customers can relax and browse the internet or catch up on some work while making their journey.
- The real-time information at key stops allows customers to see in real-time, exactly when their service will turn up, meaning no more anxious waits.
- The real-time system connects with the First Bus app available on smart phones.
- The real-time system connects with the FirstGroup website, allowing customers to click on the 'next bus' tab and check when their bus is due in real-time, from their local stop, without even having to leave the house.
- Customers with sight or hearing impairments can now see or hear the next stop announced.
- Customers new to travelling by bus can also benefit by having confidence in where to alight the bus.
- The next stop announcement facility can be broadened to include key safety information to customers.
- The live tracking on the real-time system is used by our customer services team to answer queries in real-time about the location of a service on a route that does not have on street displays.
- The suite of reporting tools based on bus stop departure times, has pro-vided the operations and commercial team with a wealth of data to make quicker, better informed decisions to improve service punctuality.
- Services fitted with TfT screens give the Company a new outlet for bespoke advertising and a news feed that keeps customers up to date with the latest news.

Challenges

As with any large-scale project that relies on many different technologies, it is not without its challenges. Software and hardware glitches were common place in the early stages of the project, but were worked through quickly by the project team. One such example was the fitment of the TfT screen on our Eclipse services, resulting in the 'bus

Buses fitted with TFT screens give the operator a new outlet for bespoke advertising

> "...one of the key priorities is making sure that small technological glitches do not interfere with the operation of the system to the customer"

stopping' sign being blocked from view, so new signs had to be purchased and installed in a different location on the vehicle.

The system depends on a number of other technology supply companies interfacing with it in order to make the on-street real-time displays operational, the priority junctions work correctly and the data on the app and web-site accurate. Companies such as JMW and Vix Acis are contracted by the local or county authorities and must work closely with Trapeze to overcome problems that can be caused by something as small as the naming convention on a piece of software.

Looking ahead, one of the key priorities is making sure that small technological glitches do not interfere with the operation of the system to the customer – either on street or on bus. Ensuring system reliability is key to keeping and building customer confidence, meaning more passengers continue to use the bus as their preferred travel mode.

The future

First are currently working towards using the real-time software to show cancellations on the street and messaging about incidents that may affect the service turning up as planned. This will ensure we get the most out of the system with regard to 'live' customer communication.

We are also hopeful that our local authority partners will secure funding to roll-out more on street next stop displays across the network.

Dervla McKay is the General Manager for First Solent with 10 years of experience in the public transport industry. She started off her career in the industry by joining the FirstGroup graduate scheme and has spent time in various operational and project roles. Dervla graduated from the University of Ulster with a BA Hons Business Studies with HR and more recently completed a MBA through the Open University. She is passionate about driving improvements and delivering the best possible service to her customers.

Is travel information getting boring?
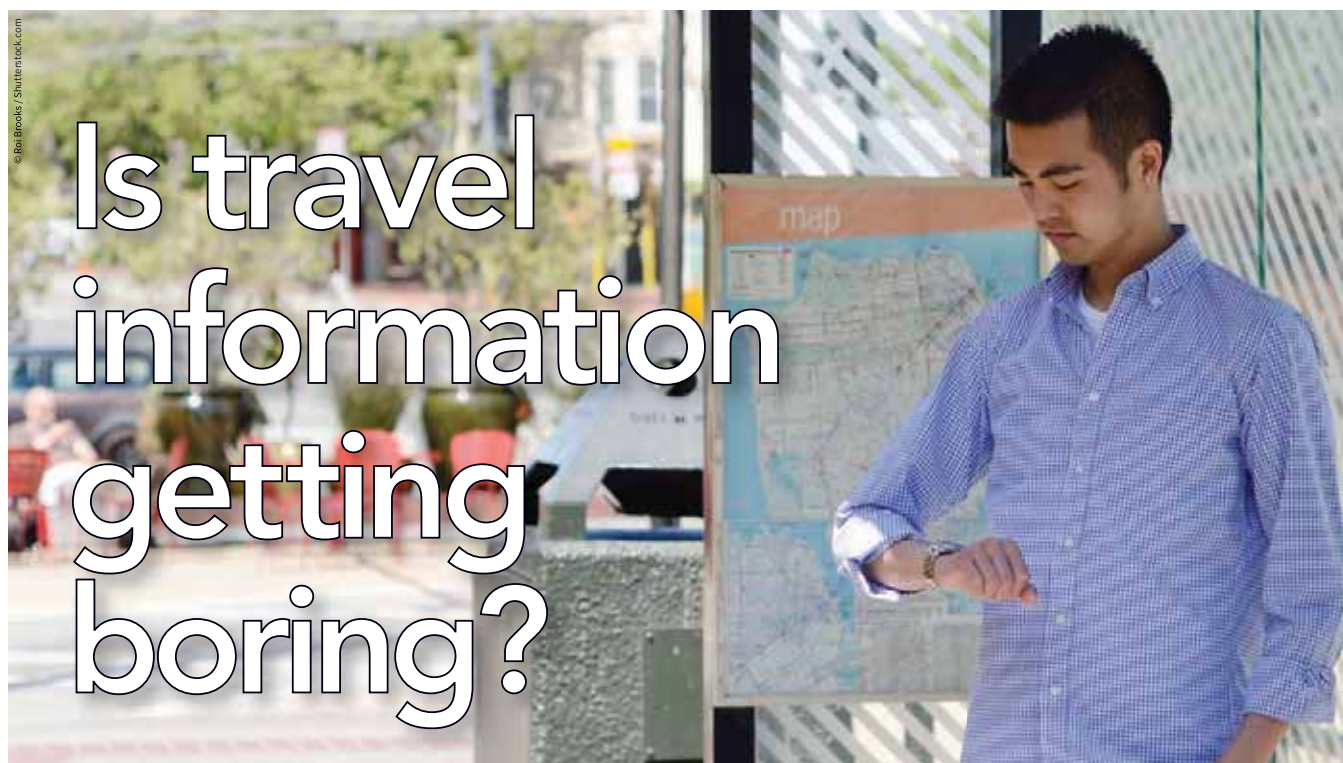
Passenger surveys show that people *do* want efficient and effective Real-Time Passenger Information (RTPI) systems in place – but can the industry offer what passengers want? Mark Cartwright, Managing Director of RTIG, takes a look at the ups and downs of RTPI – from initial projects that were popular and exciting around the time of the technology buzz, to the challenges that some systems have faced, and why?

Passenger surveys all agree that people want better quality travel information – particularly Real-Time Passenger Information (RTPI) during times of service disruption. People really do now live in an 'always-on' information age and it is seen as not merely unfortunate but actively negligent if a transport operator doesn't give passengers timely, accurate, relevant information.

Not too long ago this was a cause being championed by the politicians, and every authority in the continent was engaged in projects to improve transport RTPI. It doesn't feel like that now. RTPI is no longer 'sexy'. Projects are being downgraded or postponed, and some systems are even being turned off.

How did we get to this point? And how can this be sensible, given the increasing impatience that travellers have with poor quality information?

The pioneering days

It's worth rewinding the clock a few years to look at what, around the turn of the millennium, made RTPI projects so popular. I think there are a number of factors. First and foremost, there was the background technology buzz. Notwithstanding the 'dotcom boom and bust', this was the period in which the internet really got going, first among companies and then among people more generally. It was the age of email, Amazon and eBay, of online news stations, and Wikipedia. It was natural for people to ask: what does this mean for public transport?

Where there is a demand, a supply often follows. IT companies, large and small, created and marketed products to fill the political hunger. There was a 'land grab' as suppliers rushed to build contractual relationships with visionary – but inexperienced – customers. There was

an optimistic mood on both sides: this new technology will transform the travel experience. Technology had a 'wow factor'.

Alongside this, I think it is fair to say that there was an element of authorities creating trophy projects. In the public sector, each city wanted to be seen as savvier and more enlightened than its neighbours – to create a better business environment and provide better services to its citizens. In the private sector, there was a feeling that technology was a new area for competition: 'my services will attract more customer than yours, because I am more in tune with today's (and tomorrow's) tech-friendly traveller'.

Finally, there was genuine social pressure being felt. Travellers genuinely did value the early projects, and asked: 'why can't we have that for our services?' They made invidious comparisons between cities, and indeed between modes (air travel was an early adopter of RTPI – not least because serious problems with flight delays were common!). Before it existed, bus and rail passengers would probably have been fairly indifferent; once it has been shown to be possible, the game changed.

It's true that there was initially some resistance from the operators, who didn't like the idea of passengers being actively told their services were not on time. But, in the general mood of *information*, the projects were delivered anyway. Authorities took the line of the Duke of Wellington: *"publish and be damned!"* Today there is remarkable equanimity among operators, who realise that the advantages of passenger reassurance outweigh the disadvantages of irritation caused by delays.

It's worth reflecting, too, that this sweep of technology opportunities has been through at least two successive phases: the first

focussing on at-stop/at-station displays and announcements, and the second focussing on information accessible to customer devices. The effect of this has been disruptive on RTPI projects, because they needed to be radically re-engineered for the new connected-customer age, but it certainly extended the period of political drive.

This description now feels like the nostalgic memory of a beautiful Arcadian past. It's only missing the bus conductor, smiling and tipping his cap as he helps the old lady with her shopping.

Disillusion

So what happened? Well, the real world happened. First, there were technical issues. Systems didn't work quite as well as was hoped; inexperience in the sponsors was, alas, matched by innocence among suppliers. There were some hard early lessons in reliability, and some high-profile failures.

Not surprisingly, passengers were less than impressed by this. A system which is 90% correct is still wrong on one occasion in 10, and one bad experience will easily destroy the value of nine good ones. And a lot of systems didn't even get close to 90%. I know I am not alone in having been at a bus stop and looking at the RTPI display, only to have a regular traveller tell me *"waste of time, the system's rubbish"*.

From the political perspective, this is poisonous. A politician's natural inclination is to defend his own projects, but there is a limit to how long they will keep saying *"bear with us, it'll be great once the teething troubles are ironed out"*.

Coupled with this was the commercial reality of RTPI. In transport, in particular, authorities expect to buy things once and then have them work. Regular maintenance is not expected to extend beyond filling potholes. A system that requires continual support, and even technical staff to operate, starts to look like an expensive luxury.

Of course this commercial sting was compounded by the fiscal crisis towards the end of last decade. Different governments have taken different approaches in responding to it, but everyone has found that there is less money available for 'nice to have' projects. If there must be a choice between keeping a school open and giving bus passengers a bit of fancy technology, well, the school will probably win.

I think there is one other major factor that came into play at around the same time, and without which the current political feeling towards RTPI might be significantly more positive. That factor is innovation – or the lack of it.

I said before that the pioneering days involved a land grab in the industry. That ran its course and most substantial authorities now have one or more established suppliers. Of course continued competition happens in principle, but in the absence of anything disruptive, we have reached a kind of commercial equilibrium. To quote the Iron Duke again: *"…nothing except a battle lost can be half so melancholy as a battle won"*.

That's not to decry the efforts of suppliers in honing their product, which I know are deep and vigorous. It's just that it doesn't affect the system-level performance much. It's a bit like trying to sell a car on the basis of improved engine valves, when it still fails to start half the time.

And there is no really exciting, new, big picture story. Fifteen years ago, RTPI signs were new, visible and welcomed. Five years ago, RTPI apps were new, accessible and welcome. What's next? Well, it is still just about possible to sell non-innovations (I am thinking of the smartphone companies whose annual buy-me message appears to be something like *"now comes in blue!"*), but it isn't easy.

Boring isn't bad

So the technology has lost its political lustre, and it's not trivial to install and use. That doesn't mean it's not doing a valuable job.

People still care about travel information. I opened this article by saying that passengers routinely put 'better RTPI' at or near the top of their wish list for public transport – and I don't think that is going to change any time soon. So, although there isn't the attraction of novelty, there is still the more solid argument that it is meeting a need.

Systems *are* expensive, but they are getting both simpler to implement and more effective in use. They *are* prone to unreliability, but there is a steady improvement in everything from radio coverage to driver behaviour.

Given this, perhaps authorities should begin to look again at their transport systems. Perhaps their instinct towards RTPI was right all along.

I can't resist one last mention for the Duke of Wellington, this time about railways. He is quoted as saying: *"…depend on it, Sir, nothing will come of them!"* He later changed his mind, when he saw they were making a real difference, and (with George Hudson) made some significant contributions to rail investment. There was a man who could learn from experience.

For the past 20 years, **Mark Cartwright's** main focus has been intelligent transport systems and standards, specifically in the management of national initiatives. He is Managing Director of the public transport community RTIG, where he has led operations since 2004. He also has interests in traffic management and other ITS. Mark began his professional life in the academic world, where he taught mathematics at the Universities of Oxford and Nottingham. He has previously worked as a consultant working for clients in defence, telecoms, broadcasting, finance and energy sectors, at European, national and local levels. Mark joined *Eurotransport's* Editorial Board in January 2014.
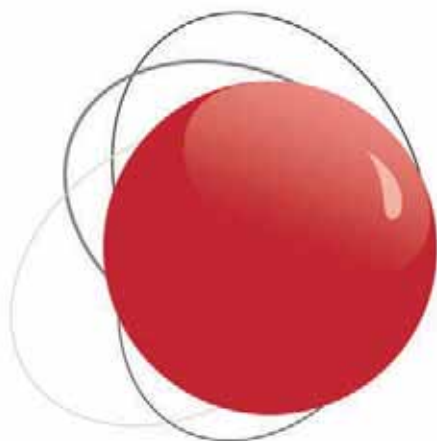
CARTES SECURE CONNEXIONS 2015 – the global event for payment, connection and identification – will be held at the Paris-Nord Villepinte Exhibition Centre on 17-19 November 2015. This year, the event will change its name to **TRUSTECH** to reflect the rapid evolution of new technologies.

This 30th edition of the sector's leading global event will showcase the world's most comprehensive range of secure payment, connection and identification solutions. This year will also see the return of the internationally recognised SESAMES awards.

CARTES SECURE CONNEXIONS becomes TRUSTECH!

CARTES SECURE CONNEXIONS was founded 30 years ago to promote a technology that had just been created: the chip card. Today, the world has changed. Multiple new technologies have emerged and, along with them, multiple uses. The name change to TRUSTECH reflects this evolution of the industry. Trust in the security of sensitive data is critical for the development of new applications and uses in our increasingly connected world. TRUSTECH aims to be the hub of the international secure-connection community and, as its slogan 'Unlimited Innovation' suggests, will strive to help market players define future strategies, develop the ways the technologies are used and generate business opportunities.

At the centre of trusted technologies

At the 2014 edition of the event, 165 countries from Europe, the Americas and Asia were represented – 80% of the 20,000 visitors and 450 exhibitors being from outside France. Around 140 international journalists were present. Over 50% of visitors were key decision-makers confirming the fact that the show is a must-attend business platform. The 2015 show will offer over 140 conferences and seven panel discussions and some 1,600 delegates will benefit from the expertise of 160 top-level speakers, 40 of them CEOs. The event's SESAMES awards for innovation have been recognised as a label of quality since 1995 and this year's central theme is 'Unlimited Innovation'.

Rapid digital transformation

It is estimated that by 2020 approximately 50% of the world's population will have access to the Internet, 2/3 of every mobile connection will involve a smartphone, and over 50% of transactions will be made with mobile devices. By 2020, there will be over 100 million smart watches in use, half the world will have national eID cards, 90% of cars will be connected and 1.2 billion mobile phones will have NFC technology. In the face of this rapid digital transformation, TRUSTECH stands out as the must-attend global event, where all technological solutions around secure-connections converge and the future of the sector takes shape.

This November, 460 exhibitors and 20,000 visitors representing finance, retail, telecommunications, government, healthcare, transport, and many other sectors from 160 countries, will converge on Paris to help define the way our digital world will evolve.

TRUSTECH is also where payment and identification markets converge to experience three days packed with added-value content.

The conference explores the macro trends that form the common innovative thread in identification, including payment and financial services such as commerce convergence and consumer behaviour, mobile wallets, electronic money issuers' business models, e-government megatrends, data protection, e-transactions, prepaid, M2M, smartcards, smart secure devices, loyalty, trusted services, authentication, access control, payment systems, SIM card, identification NFC, contactless, mobility, digital security, and mobile payment, etc.

Key features

The *Opening Summit* will invite leaders from major companies to debate on the development of our digital world and the *Premier Meeting Place* is where enterprise executives will converge to discover innovations.

The *SESAMES Awards* will reward the industry's best innovations and there will also be the Startup Challenge that will support new entrepreneurs as well as digital security innovation.

The new *Advisory Board* is composed of experts from the payment, identification and mobility industry, who work with the TRUSTECH team to ensure that the event reflects the latest trends and developments.

One stand-out new area is the new *Innovation TV* where you can listen to your peers and get an insight to the market's latest innovations. Also, the new *Innovation Playground* will be available for guests to test and play with the key features of future uses of contactless technologies.

Eurotransport is pleased to be Media Partner for CARTES SECURE CONNEXIONS/TRUSTECH 2015

Date 17-19 November 2015
Location Paris, France
Website www.cartes.com

Biogas-powered buses and decision-making during incidents

All over the world new alternative fuels are emerging to replace fossil fuels, such as gasoline and diesel. The overall benefits are great but with new fuels and technical solutions, new risks emerge. For *Eurotransport*, colleagues Anders Lönnermark from SP Technical Research Institute of Sweden, plus Johan Lindström, Peder Lindström and Petter Backlund from Fire and Rescue Greater Gothenburg, explain that first responders to incidents can often face new situations that they are not familiar with and have to make decisions that they are not trained for. Does the lack of education and experience have consequences on society, which can all come down to what kind of decision at incidents is taken?

On today's biogas-powered buses, the gas tanks are equipped with temperature fuses to ensure that the vessels do not explode due to the increased pressure resulting from heating of the vessels. The temperature fuses activate when the temperature passes approximately 110°C. This means that all of the gas is released at a high pressure out to the surroundings. In most of the known cases where CNG (Compressed Natural Gas) buses have caught fire, the temperature fuses have worked correctly and the gas has been ignited when leaving the vessel, causing a massive jet flame. Although this jet flame is a natural feature of the safety system, it can still pose a danger to the firefighters and means a greater risk for the fire to spread or for heat exposure to structures. The difficulty for the approaching fire and rescue services is to know whether the temperature fuses have reacted and if the safety nozzles have released the gas or not, creating a problem for selecting safe and efficient tactics. Furthermore, Lionel Perrette and Helmut K. Wiedemann describe in their article[1] three different fire incidents where the fire has led to explosions of vessels. The reason for these explosions was not the failure of the temperature fuse; the vessels exploded when they were heated on a single spot that did not affect

the temperature fuse. One question that has to be raised is if the only problem with biogas-powered buses is fire in the vehicle with risk of explosions, or does it involve massive jet flames? For example, what happens if the bus is involved in a traffic incident where the gas system in some way has been damaged and a leakage has occurred? For the last years in Sweden, several traffic incidents have happened where the gas system on the bus has been damaged and the rescue leader has been afraid that leakage has occurred. Then a decision needs to be taken, but it is not always obvious what would be the correct decision to take.

Biogas-powered bus traffic incident in Gothenburg

In June 2013, a traffic incident occurred in the central parts of Gothenburg, Sweden. Involved in the incident was one personal vehicle and one CNG bus. As shown in **Image 1** on page 50, the personal vehicle had only made contact with the front of the bus. The damage on the bus could only be seen as small buckles and discoloration under the front window. The difference between this incident and an 'ordinary' traffic incident was that the CNG fuelling nozzle and manometer of the

bus was located at the front, leading to the manometer being damaged in the collision, causing a small leakage of natural gas. The risk with leaking natural gas is that the gas is easy to ignite and has a flammable range from 4-16 vol %, causing a large explosive area if leakage occurs.

The rescue leader, from Greater Gothenburg Fire & Rescue Services, gave initial orders to close all the nozzles on each gas cylinder to stop the flow of gas. After one hour the gas flow had not stopped and the rescue leader began to think about the following three choices:

1. Keep the closures (150m) and wait until the cylinders are empty; this would take about four days – with high risks concerning the central Gothenburg location and all surrounding buildings and infrastructure
2. Empty the cylinders by removing each nozzle; this also meant high risks with the central location in Gothenburg, all surrounding buildings and the infrastructure
3. Towing away the bus to a safer area and then emptying the cylinders; but this posed high risks concerning possible igniting of the leaking gas with sparks from the tow-truck.

Due to high risks with all these choices, the decision was to disconnect

Image 1: A CNG bus involved in an accident; the arrow shows the position of its leakage

as many electrical devices on the bus as possible and drive the bus with the on-going leakage to its front out of the city to a safe place and then empty all cylinders. This decision had effects on the society by having a closure of 150m in the city for a few hours, and the traffic was stopped for a short time when the bus was driven out of the city. The incident commander was thinking in terms of following events, due to the nature of each alternative decision. Other decisions could have had huge consequences on both the infrastructure and the general public. Due to the complexity in the society and in technical systems (in this case biogas-powered bus), it is more and more important to think in terms of escalating consequences when the incident commander selects what kind of decision they will make. These kinds of escalating consequences can be called 'cascading effects', i.e. one incident starts and a chain of subsequent events. Depending on what kind of decision the incident commander makes, the chain of subsequent events can take different turns. One simple example of explaining this is a fire at a car repair company. Gas cylinders are stored in the building for welding equipment. The rescue leader takes the decision to evacuate the area and keep it closed for 24 hours, according to recommendations where gas cylinders are involved in a fire. Next to the car repair company is the highway and railway, which were also closed for 24 hours which had huge consequences on society.

Another interesting incident was when a tall biogas bus entered a small tunnel in Stockholm, Sweden, in 2013. The bus hit the ceiling and gas leaked from one of the gas cylinders that fell from the bus. This did not lead to any fires, explosions or injuries. However, just the risks meant that several different options and decisions had to be considered. The tunnel was closed for 11 hours, which of course had a negative effect on traffic and logistics in Stockholm. Different courses of events in this situation could have led to other cascading effects.

Cascading effects

Modern socio-technical systems are increasingly characterised by high degrees of interdependencies. Whereas these interdependencies generally make systems more efficient under normal operations, they contribute to cascading effects in times of crises. Therefore, challenges for emergency preparedness and response are growing significantly – challenges which are more and more relevant to both natural and manmade emergencies and are reinforced by the risks for cascading effects in complex emergency management environments.

Leakage of gas from the manometer

In particular, complex environments which lack adequate resilience to certain initiators will be prone to cascading effects. An escalating incident in such an environment can lead to severe cascading effects and quickly become extremely difficult for emergency services to handle. The incident can ultimately have enormous consequences with respect to life, property and the environment and for both infrastructure and the general public. These consequences can, in many situations, have both direct and indirect effects – not only in the immediate surrounding geographical area, but also across very large areas, potentially extending across borders.

The EU-project CascEff

SP Fire Research is coordinating the EU-project CascEff2 and performs the work together with 11 other partners from Europe. In CascEff, four of the main objectives are:

1. Better understanding of the cascading effect in crisis situations
2. Develop an 'Incident Evolution Tool' for predicting past, present and future crisis evolution, leading to cascading effects
3. Identification of human activities in the crisis
4. Improved incident management for present and future threats.

CascEff will improve our understanding of cascading effects in crisis situations through the identification of initiators, dependencies and key decision points. A methodology has been developed to investigate cascading effects during different occurred incidents. The knowledge from the analysed incidents together with studies of how different tools are used during an incident, are used to develop a CascEff Incident Evolution Tool (IET) which will enable improved decision support, contributing to the reduction of collateral damages and other unfortunate consequences associated with large crises. Use of the Incident Evolution Tool will be validated through its implementation into different incident management and training platforms representing different end-users in the project. A number of different scenarios, involving different cascading effects and different timelines are developed for this validation. The project has now come halfway and some results are already available at the project website[2], where it is also possible to sign-up for further information.

References

1. Safe Storage of Natural Gas on Urban Buses: Case Early Investigation and Learnings – http://papers.sae.org/2007-01-0430/
2. www.casceff.eu

Dr. Anders Lönnermark is a Senior Research Scientist in the Department of Fire Technology at SP Technical Research Institute of Sweden, where he has been employed since 1995. Anders has a long experience of performing fire tests, both in model-scale and in full-scale. In 2005 he got his PhD degree from Lund University and the title of the thesis was 'On the Characteristics of Fires in Tunnels'. Anders is co-author of the text book Tunnel Fire Dynamics. Since 2013 he has been Adjunct Professor at Mälardalen University and he is currently the Coordinator of the EU project CascEff.

Johan Lindström is a Project Leader at Greater Gothenburg Fire and Rescue Services (Räddningstjänsten Storgöteborg). He gained his Fire Protection Engineer degree in 2010 at Luleå Technical University, Sweden. Johan's main interest fields are research and development for First Responders, extinguishing systems, decision-making and operational collaboration at large incidents.

Peder Lindström started his career at Greater Gothenburg Fire and Rescue Services (Räddningstjänsten Storgöteborg) as a fire-fighter and advanced during his 35 years in duty to an incident commander. Peder now works as a part-time Project Leader at SP Fire Research in the EU project CascEff to analyse effects of decision-making.

PMRExpo is the leading European trade fair for professional mobile radio and control centres, and will take place this year in Cologne from 24 to 26 November. The easily accessible site in Cologne is where the international PMR community maintains its contacts every November. Ralf Jaeger, the North Rhine-Westphalia Interior and Local Government Minister, will once more assume the patronage of PMRExpo in 2015. The international trade fair is characterised by the variety of its exhibitors, which include German and foreign SMEs and major companies – from medium-sized German companies to multi-national groups.

German and international exhibitors will be displaying their products and innovations in the field of professional communications at Koelnmesse. Users will be able to meet manufacturers, service providers and authorities. The exhibitors include authorities and organisations with safety responsibilities (the emergency services), system and terminal equipment manufacturers, system integrators, producers of control centres, specialist dealers, distributors, developers, partners involved in wireless and safety technology, sales, service and ergonomics businesses, service providers, safety and facilities managers, network operators, planners, consultants and specialist providers. A vehicle show, including, for example, command and control vehicles or mobile base stations, rounds off what the fair has to offer.

The parallel programme of presentations will consist of the two-day PMR Conference, the one-day Control Centre Congress and different specialist forums every day, offering presentations, discussions and interactive reports providing up-to-date information, field reports and prospects for the future of PMR and control centres.

The PMR Conference offers presentations on a wide variety of subjects inlcuding: digital wireless technologies; broadband; LTE; frequencies; digital radio for the emergency services; power supply; smart grids; SCADA; cyber security; networked security; social media; disaster control; raising the alarm; communication in crises; civil defence; and indoor coverage.

Communication in crises and critical infrastructure will be taking centre stage again at the PMR Conference. As an example, the conference will also link the subject of critical infrastructure to power supplies and also offer presentations on the communications needs of energy utilities, and solutions for them.

'Communication in Crises Between Evidence and Resilience – Principles and Perspectives' will be the subject introduced by Prof. Dr. Georg Ruhrmann, Director of the Institute of Communication Research at the Friedrich Schiller University, Jena.

Also taking place on the opening day of the conference will be a panel discussion on IT security for critical infrastructure, featuring Robert Tech, Managing Director of Assecor GmbH, and Edgar Schmid, a Committee Member of PMeV, the professional mobile radio association. The discussion will be chaired by Phil Kidner of TETRA and the Critical Communications Association (TCCA). On the second day of the conference, a presentation entitled 'Critical Infrastructure and Energy Supply' will form a link with the target group of energy utilities. The speaker will be Josef Lorenz, programme manager at IABG Industrieanlagen-Betriebsgesellschaft mbH.

The wide range of corporate challenges and solutions for utilities is reflected by the presentations on communications requirements and solutions for them. Dr. Kai Daniel, who is responsible for new technologies/projects at RWE Deutschland AG and chairman of the expert 'control functions' team of the VDE network technology/ network operation committee, will report on 'Communications and System Requirements in the Smart Grid', while Roland Beißert, Managing Director of CAx soft GmbH, will deliver a field report on the 'Berlin Grid: Medium-Tension Grid Automation in a City Environment'. How two local energy utilities optimise their communications by cooperating will be illuminated by the presentation on the joint integrated communications network for municipal authorities, using the example of Karlsruhe and Ettlingen (Germany). The speaker in this case will be Klaus Gräser, Managing Director of Blickle & Scherer Kommunikationstechnik GmbH & Co KG.

The Congress on Control Centres covers the development and operation of control centres for emergency service and industrial use, and cooperative control centres, legal and ergonomic aspects and DIN standards, the integration of digital radio, the integration of social media, networked security, European safety research, public safety, civil protection, technologies, field reports, NG112, Legal aspects of operation of a modern control centre and Ergonomics.

The range of subjects at the Congress on Control Centres during PMRExpo 2015 includes contributions which extend from up-to-date field reports to forward-looking trends. The planning and establishment of control centres for the emergency services is a traditional focus

of the event. The subjects of networked security and social media will provide insights into control centre developments. The Congress on Control Centres will be chaired by Andreas Sirtl from the Berlin Fire Service. German and foreign experts representing emergency services, businesses and consultancies will contribute from widely differing perspectives.

Anton Beierwerk and Walter Degenhart from the Bavarian Police will open the Congress on Control Centres with a field report on the G7 summit at Schloss Elmau on 7 and 8 June 2015. Günter Rapp of IDH-consult – Ingenieurbüro Drägert & Harmeling GmbH will speak on the planning and establishment of control centres for the emergency services. Stephan Kruthoff from the North Rhine-Westphalia State Police Service Office will explain the current status of commissioning control centres for non-police safety measures. Fire Commissioner Dr René Mühlberger will explain crisis management at the Geretsried Fire Service Training College. Finally, Board Member Markus Ruckdeschel will introduce the German Control Centres Association, founded in 2014.

Tor Helge Lyngstøl, Director-General of the Norwegian Directorate of Emergency Communications, will report on the control centre network in Norway. Feliks Vainik from Latvia will give a talk on the Critical Messaging Association of Europe (CMA-E).

Can social media play a role in public safety? Gerhard Backfried of Sail Labs Technology GmbH will present 'Social Media and Disasters – a Blessing or a Curse? Results and conclusions of the QuOIMA (open-source integrated multimedia analysis) project'. Robert Schwerdtner of Deutsche Telekom will report on the use of social media in corporate security: 'Status Management 3.0 – Social Media as a Control Centre Management Tool, Using the Example of Deutsche Telekom AG'.

The specialist forums provide information in concentrated form and opportunities for discussion to various target groups. They are physically integrated into the trade fair and are open to any visitor with a valid ticket for the fair. The following forums will take place in 2015: PMR Forum – an overview of countries; International Forum on Public Safety Radio; Indoor Coverage Forum; Training Forum; Specialist Trade Forum; and Energy Industry Forum.

Simultaneous interpretation into English and German will be available at the PMR Conference and the Control Centre Congress. The specialist forums will be held in German or English, depending upon their focus. The speakers are experts from the PMR and control centre industry, speaking from various perspectives.

Users, manufacturers, service providers and authorities all come together at PMRExpo, making it the ideal venue for a high-level exchange of information on trends and innovations. It is the place to make new contacts and cultivate new business. The get-together for all visitors and exhibitors, always held in the show space on the first evening and serving drinks and snacks free-of-charge, has become a fixed feature in the calendar.

Eurotransport pleased to be Media Partner for PMRExpo 2015

Date 24-26 November 2015
Location Cologne, Germany
Website www.pmrexpo.de

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Contact Craig Waters, Editor, on cwaters@russellpublishing.com or call +44 (0) 1959 563 311

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Winter is coming…

Parts of Scotland can see temperatures drop to over -20°C during winter months. John Gorman, First Scotland East's Business Director, heads up the operator's approach to winter and explains that thorough advanced planning across the business is essential so that bus services can continue and help passengers travel safely and smoothly when the bad weather hits.

The Met Office has already confirmed that Britain can expect months of weather that will be colder and snowier than normal – much like the 'Big Freeze' of 2009/2010 when heavy snowfall brought transport chaos to much of the country with airports closed and train services suspended.

In parts of Scotland temperatures dropped to -8.1F (-22.3°C) as record 19 inch snowfall fell in the Highlands, lying for 102 days. In December that year, the average UK temperature was just 30F (-1C) the coldest since records began.

In 2009/2010, with rail lines closed due to drifting snow and cars unable to make it out of frozen driveways and 'snowed in' residential estates, buses were the saviour for many with journeys still continuing on main roads kept clear by the round-the-clock gritters.

So just how do transport operators prepare for – and cope – with such extremes?

> **Each depot holds approximately 20 tonnes of rock salt for the winter period**

Preparations at one such operator are already under way, even before the grim predictions by forecasters were revealed.

First Scotland East is one of three operating companies owned by FirstGroup in Scotland, and has by far the widest and most rural footprint.

Its network of 373 routes serve the city of Edinburgh, Central Scotland, East and West Lothian and down to the Scottish Borders.

A 400-strong fleet of vehicles is responsible for 22 million passenger journeys ever year, with small depots found in Balfron, Bannockburn, Galashiels, Larbert, Livingston and Musselburgh as well as outstations in Hawick, Peebles and North Berwick.

When it comes to beating the winter weather, for First Scotland East the preparation work for its drivers begins before they even leave home to start their shift and vigilance is key.

Advice leaflets are circulated to every driver asking them to allow more time for travel to work, to listen out for weather warnings and to make sure that they are dressed appropriately, with several layers of loose clothing advised to help keep their bodies insulated while out on the roads. Hoods, hats and sensible or

safety footwear to provide good grip underfoot are all recommended.

They're also asked to make sure their own home is as accessible as possible when bad weather strikes, that paths, steps and doorways are treated and clear to make sure they can get out to get to depots when scheduled.

Next is extra preparation for each driver's own journey to work. Guidance ensures they take extra time to stock of their own vehicle, making sure windows are fully clear of ice or snow to allow all round visibility before attempting to drive – a legal requirement.

Drivers cars should be 'Winter Ready' with plenty of fuel, antifreeze and windscreen wash and in the colder months they're reminded that brakes, tyres, lights, batteries, windscreens and wiper blades should be in good condition and well maintained. They're also asked to consider placing a blanket or shovel in their own vehicle for emergencies before setting out.

All First Scotland East's drivers are asked to have added awareness on their own journey to work too. It is recommended that they make a mental note of any specific disruptions which may cause operational problems for bus services and to ensure they are reported to a duty manager.

All that preparation, and that's not including the added measures that have been implemented within rural bus depots across the First Scotland East operating area.

Each depot holds approximately 20 tonnes of rock salt for the winter period and in addition, an agreement struck with local authorities sees them include bus stations and depots as part of the scheduled gritting routes they follow.

Once drivers are on shift and ready to take to the roads, looking after passengers and their safety is essential. Drivers are asked to look out for vulnerable passengers and to offer assistance if needed, for example, if they are tentative getting on or off the bus, or unsteady on their feet.

Driver training ensures they keep buses well back from the road user in front in icy or snowy weather with stopping distances up to 10 times greater. When the roads are icy, they drive the vehicles at slow speed in as high a gear as possible; accelerating and braking very gently to keep the vehicle under control and its occupants safe.

Winter preparation is key for First Scotland East so that its passengers can continue journeys during harsh winter months

> **Should a bus become stuck, a dedicated rescue crew is dispatched to assist and local authorities are immediately informed as to what routes are having trouble**

Should a bus become stuck, a dedicated rescue crew is dispatched to assist and local authorities are immediately informed as to what routes are having trouble.

This thorough approach across the business has kept more and more services on the road than ever before, getting passengers where they need to go safely and smoothly, come snow, rain or shine.

John 'Snow' Gorman, First Scotland East's Business Director, heads up the operator's approach to winter. With almost 30 years of experience, he's certainly seen it all in his time with the business having started his career started as a bus driver covering the Falkirk area back in 1986. He's undertaken a variety of roles in his progression to Business Director, from Controller, Inspector, Supervisor and Operations Manager to Operations Director and Assistant Director of the Business. Plenty of seasons have come and gone in that time and it is in no small part down to John's experience through the years that First Scotland East drivers are now arguably the best prepared in the country. He actively encourages vigilance among all staff and goes that extra mile to highlight the risks the winter season can bring. John prepared tailored winter safety tips in the form of a leaflet that has been circulated to all drivers year on year, encouraging them to make a difference simply by thinking ahead, by being prepared in order to prevent accidents or injuries to themselves, colleagues or customers – whether at home, work or travelling. It was also John who established direct links between each First Scotland East control room and the respective teams at local authorities to provide close working links to assist each other during periods of bad weather. To supplement this, he has ensured that each control room has an established link with the Met Office which provides an hourly update including weather warnings as and when they are issued. 'Be prepared for all eventualities' is John's approach and one that is serving First in Scotland East incredibly well indeed.

Seasons change but the work never ends

In Helsinki, Finland, the temperature can be +30°C in the summer and down to as low as -30°C in the winter. The variation may not be as extreme every year, but for sure, there will be a winter this year, or at least at the beginning of 2016. Michael Andersson – Technical Director of Helsinki bus operating company Helsingin Bussiliikenne Oy (HelB) – gives an overview of how its vehicles are maintained and their components taken care of throughout the year to ensure optimum service quality.

A lot of snow, freezing cold, icy and slippery roads, traffic jams… a challenging climate to run public transport?

Even if the weather forecasts are getting more precise all the time, exact dates are still not available (will they ever be?) and we just have to be well prepared. How do we prepare for the winter? As the roads can be covered by ice or snow, the buses need tyres with good grip. Water will freeze when the temperature drops below 0°C, which can cause problems in the vehicle pneumatic system (brakes, doors, suspension) – to avoid this, the air has to be dry – if there is moisture in the air, it will condense into water and freeze.

In lower temperatures, the paraffin in the diesel-fuel forms particles that block filters and stop the engine, that's why there is different fuel-quality for the winter. A cold engine with viscous oil needs a lot of torque to turn. Without properly charged batteries it won't start.

When the winter is harsh and temperatures are very low, buses have to be in good condition, and when the temperature rises again there are other challenges to contend with. At around 0°C the snow starts to melt, and to ensure visibility for the driver the windshield-wipers need to, of course, be well functioning and the washer-fluid-container must be filled up. However, we usually face other problems at this time; water leakage.

During the day heat from the passenger compartment warms the roof causing snow to melt and water trickles between joints if they aren't properly sealed. When the bus stops and cools down, the water will freeze and expand which opens the joints even more, until we have water dropping onto the passengers.

Hard times?

Maybe, but it's easier for us technicians to deal with the winter than trying to change the climate. So what has to be done? First of all, the scheduled maintenance has to take into account everything that can cause failure due to low temperatures or snow, and it also has to be

done in time. The vehicles must of course be specified according to the climate (heating, insulation etc.) – this also includes fuel, liquids and spare-parts.

In the Helsinki region the most common bus-types are 13m-long 2-axle and 15m-long 3-axle buses. Then there are some 12m-long vehicles on the feeder lines, but no articulated 18m-long vehicles. Most vehicles have low-entry with 1+2+1 doors and a 295 wheel-size. This bus-type is most suitable for operations in the snow and cold. The wheel-size is important, as a larger diameter means better ground clearance and improved driving capability (easier to force slush or snow) and together with the floor-layout (low-entry) makes the vehicle less sensitive to snow. In a low-floor vehicle with less ground clearance, the critical components in the engine-bay aren't as well protected as when the engine is upright. The buses should be equipped with floor-heating (at least near the doors) to avoid icing in the aisle making it slippery, but the lower the floor is (less insulating air between floor and ground) the

HelB works hard to ensure its buses are maintained to clear them of any snow and ice build-up so that they can get back into service as quickly as possible

more heating and insulation is needed. The waste heat from the engine is not enough to keep the passenger compartment warm; in the winter an auxiliary heater is also needed. Proper insulation in the floor, walls and ceiling decreases the heat-waste. This also applies to the windows, which should be double-glazed. The insulation of the vehicle body does not only affect the energy-consumption and comfort in a cold climate, but in the summer it keeps the heat outside with less

need for continuous air-conditioning. With a temperature difference from -30°C to +30°C, the vehicle has to be specified for both cold and warm climates.

A lot of ground-snow or icy roads at bus-stops affects operations, causing delays and unfortunately accidents. However, road maintenance is beyond the operator's range of responsibility. We report problem areas to the public transport authority who will then forward to

the responsible party. Weather-related delays don't occur regularly, and usually only last for a day or two at a time. In addition to that, it is more realistic to accept delays when the weather is exceptional than having separate schedules. The public transport in the HSL-area (the PTA, Helsinki Regional Transport) uses two schedules; summer and winter. The winter schedule starts together with the schools in mid-August and the summer schedule is applied from mid-June till mid-August.

Even if the road-conditions are strongly connected to accidents and crashes there is still certain measures for the operator. The use of proper tyres (more expensive) and implementation of the vehicle- and driver-monitoring system (which was a substantial investment) has decreased the number of severe crashes and also extended the frequency over the last years. But minor accidents do still occur and vehicles get stuck etc.

When harsh winter weather hits, buses need to be in excellent working-order to cope with the demanding temperatures and road conditions

We then just have to minimise the damage and get the vehicle back on the line as soon as possible. When the weather is tough our vehicles aren't by far the only ones in trouble, and finding a towing-vehicle may take a while. To avoid delays we have a service-truck which is fully loaded, to be able to tow a 3-axle bus, and equipped for all possible assistance that our buses may need whilst out on the wintery field.

Maintenance programme

The maintenance programme is based on mileage or time and keeps the vehicle in running condition all the time, which increases the reliability and streamlines the workshop-flow instead of carrying out special winter-maintenance in the autumn. Critical points in the maintenance programme include:

- Filters (clean and free of moisture or water)
- Pneumatic-system (no moisture or leakage)
- Batteries and chargers
- Heating-system (radiators, valves, auxiliary heater).

The only exception is the tyres, which should always be replaced in the autumn if possible, thus establishing enough grip for the winter and less friction in the summer as the tyres are half worn at that point. A different pattern is used on drive-axle tyres than on front/third axle tyres. Re-grooved more coarse tyres are used on the drive-axle, in the front M+S marked tyres work well.

The weather doesn't cause any extra actions except when it's extremely cold, then batteries, chargers and block-heaters have to be checked during weekends to make sure normal 'start-up' happens come Monday morning. The preparation time is also increased as the vehicle itself and also the equipment (ticketing machine etc.) takes more time to wake up in the low temperatures.

Of course, snow and low temperatures have a direct impact on the workshop-flow too. If the vehicle comes in from -25°C, it takes some time before the metal reaches a normal working temperature and if the chassis is full of snow, the mechanic might need a raincoat when the snow starts to melt.

Avoiding clogged filters

Most of our fleet runs on diesel-fuel which contains paraffin that can clog the filters. To avoid this there are different qualities for each season; a summer-fuel that can be used down to -5°C, a mid-season fuel that works until -15°C, and a winter-fuel for lower temperatures.

The lower the 'cloud point' of the fuel, the lighter it is, which results in higher fuel-consumption. Increased frost resistance is also linked to the price, sometimes doubling this and therefore increasing the consumption of a more expensive fuel. On the other hand, we don't want stalled engines because of frozen fuel. However, the fuel quality cannot be changed in just one night; the depot-storage is regularly full which means as the delivery is switched there will be a blend, which is then mixed with the fuel that's left in the vehicle. For every delivery and refuelling the 'cloud point' raises, but it takes up to 10 days to reach the correct level. This is a challenge in the autumn, and requires accurate forecasting, but is a benefit in the spring when the temperature is usually steadier and the frost resistance can slowly fade out.

> ...scheduled maintenance has to take into account everything that can cause failure due to low temperatures or snow

When the winter is over and the sun starts to shine brighter in the spring, the snow melts revealing the sand that's been spread out on the icy roads which dries and starts to lint causing dust-clogged radiators and air-intakes, resulting in overheating. To avoid that, the radiators have to be cleaned regularly during April to June and the air-conditioning needs servicing annually, usually during in the spring, to ensure it works when summer arrives. Seasons change but the work never ends.

Michael Andersson is Technical Director of Helsingin Bussiliikenne Oy (HelB) – a Helsinki bus operating company with a fleet of 345 citybuses (diesel, cng, ethanol and hybrid). Michael is responsible for maintenance and technical operations, the bus-fleet, ICT, purchasing and properties. Michael joined HelB in 2009 with special tasks to improve the reliability of the fleet, to streamline the service-operations and to decrease maintenance and repair costs. He has almost 15 years of experience in commercial vehicles after sales and service organisations. Previously he worked as Service Director for Iveco and Irisbus in Finland.

REMO URBAN
REgeneration MOdel for smart
URBAN transformation

The REMOURBAN[i] **project focuses on the welfare of citizens within the sustainability framework of a smart city and aims to develop and validate a number of innovative technologies plus organisational and economic solutions to meet the needs of the energy, mobility and ICT sectors. For** *Eurotransport*, **REMOURBAN colleagues Maria Angeles Gallego, Javier Olmos, Clemente Cárdenas Cuevas, Cristina de Torre and Miguel Ángel García Fuentes, all from CARTIF Technology Centre, give further details about the project and what can be expected.**

The main objective of REMOURBAN is to establish the development of a sustainable urban regeneration model that will be validated in three lighthouse cities: Valladolid (Spain), Nottingham (UK) and Tepebaşı (Turkey).

REMOURBAN will pave the way for the transformation of European cities into smarter places, therefore, replicability is a key aspect. Once it has been validated within the lighthouse cities, two 'follower' cities – Seraing (Belgium) and Miskolc (Hungary) – will implement the REMOURBAN sustainable urban regeneration model.

The REMOURBAN model will be designed to offer holistic integrated approaches in the energy and mobility sectors, plus potentially the ICT sector, in which all aspects of sustainability are taken into account.

Urban mobility is paramount to address the sustainable regeneration of cities due to the number of issues that derive from a non-sustainable and non-efficient urban transport strategy. Urban transport represents almost a quarter of all the EU transport CO_2 emissions. Conventional fuel vehicles contribute 40% of city pollution, contributing to both environmental damage and severe illnesses. Moreover, the growing population in our cities demands improved mobility strategies that counteract traffic congestion and parking problems, etc., and contribute to reduce the average journey delay and door-to-door journey time.

Some of the innovative technologies that will be validated within the REMOURBAN project include the introduction of clean fuel vehicles, in particular electric vehicles. Organisational strategies and promotion plans will complete the whole urban mobility strategy to be deployed in the three lighthouse cities, and later implemented in the follower cities.

The mobility strategy in Valladolid

Valladolid is a medium-sized city with 309,714 inhabitants within an extension of 197.91km^2[i]. Registered vehicles in the city at the end of 2012 included 136,055 cars, 13,137 motorbikes, 18,058 trucks and vans, 433 buses, 1,119 industrial tractors and 3,958 'other' vehicles. The number of sustainable vehicles in the city of Valladolid, especially pure electric vehicles (PEV) is scarce. The current 'Strategy to Promote Electric Mobility in the city of Valladolid', will support the REMOURBAN project and help turn the city into a reference point for electric mobility.

Mobility starting point

The largest share of public city transport is covered by bus which is managed by AUVASA (public transport operator). This fleet consists of 103 PLG fuelled buses, 46 biodiesel buses and one hybrid (non plug-in) bus. AUVASA buses have high capacity (33 articulated vehicles with room for more than 140 passengers) and they are all equipped with air conditioning. For accessibility, 150 vehicles have low-platforms to and 86 vehicles have access ramps. There are currently 48 bus lines in operation, with more than 500 stops – 20% of which offer passenger information thanks to a GPS system. Passenger and journey information is also available via a smartphone app. Payment is managed through contactless RFID cards and users can also get information regarding nearby stops.

There are currently 466 taxis operating in the city – the latest

SUSTAINABLE MOBILITY

20 joined the current fleet in 2008. Among them, there are several hybrids (non plug-in) and others are PLG fuelled. There's also one FEV which has been in operation since December 2011.

So far, 'last-mile' freight and logistics deliveries have been performed by means of ICE vehicles, and since May 2013, a new bicycle public sharing system known as 'Vallabici' has been available for Valladolid citizens offering 260 bicycles and 30 parking stations.

Mobility actions to be deployed
The city of Valladolid will deploy an electric fleet comprised of two buses, 20 taxis, five 'last-mile' delivery vehicles, two private City Hall vehicles and will actively promote electricity for privately owned vehicles.

Extension to Nottingham's tram network will be partly funded with money raised from introducing a Workplace Parking Levy in the city as part of the REMOURBAN project

There's already some charging infrastructure in place (34 slow charging points) and plans to upgrade them and build new ones have been set up as part of the REMOURBAN project.

The challenge is to monitor, identify and analyse the best strategies to introduce this clean technology within an urban environment alongside the city's transport plans and policies and complying with the needs of citizens.

On-board units will be installed and configured to register and transmit to a local ICT platform (and further on to a higher level ICT platform) all the necessary information to assess a number of identified KPIs (battery status, alarms, energy flows, emissions, speed, etc.).

The mobility strategy in Nottingham
Nottingham, one of the major cities in the East Midlands of the UK, is situated 209km north of London and has an official population of 305,750 which is relatively small due to its historically tightly drawn official city boundary. The wider city urban area has a population of 729,977 making it the ninth largest urban area in the UK. Nottingham leads the way in sustainable transport; it is the first city in the UK to have a stringent environmental standard for all buses entering the City Centre.

Mobility starting point
Bus travel accounts for around 34% of all trips made, far higher than other comparable cities in the UK. Nottingham City Council has introduced a Workplace Parking Levy (WPL) to tackle problems associated with traffic congestion, by both providing funding for local transport and by acting as an incentive for employers to manage and potentially reduce their workplace parking. Money raised from the WPL will go towards funding NET Phase Two (the extension to the existing tram system), the redevelopment of Nottingham Railway Station (known as the Hub Project) and will also support the popular Link bus network.

Nottingham's existing tram network carries 10 million passengers per year, taking some three million car journeys off congested roads annually. Phase 1 is 14km-long with 23 tram stops. NET Phase 2 will be a 17km-long extension with 28 new tram stops.

Mobility actions to be deployed
Nottingham City Council is developing a fleet of 50 electric buses over 2014 to serve existing Link services and the two park and ride bus services. Electric buses are zero CO_2, NOx and PM with 50% less well-to-wheel CO_2 than diesel counterparts.

The project will establish a tourist link bus service using two electric vehicles on a proposed circular route. The electricity to recharge the buses can be supplied by Enviroenergy, powered by burning the city's waste.

Currently, Nottingham has eight fast chargers that are all based in bus depots around the city. In order to increase the fast charging infrastructure in the city and demo site, 12 fast chargers available as 'on-street' chargers will be installed within the REMOURBAN project, making a significant difference to the time the buses can spend out of the depots.

The project will also develop a small local consolidation centre for 'last-mile' delivery by using small electric vehicles for the transportation of goods within the city centre, therefore reducing the number of large vehicles used for domestic and business deliveries. The solution is scalable, cost-effective, makes more effective use of existing infrastructure, plus is of particular benefit to cities and towns.

The project incorporates the City Car Club Nottingham – an hourly car hire scheme funded through the Local Sustainable Transport Fund (LSTF) and the WPL. The scheme is an alternative to car ownership and traditional car hire and provides greener transport options for local residents by using hybrid or electrical vehicles.

The mobility strategy in Tepebaşı
The Turkish district of Tepebaşı lies to the north of Porsuk River which flows through the centre of Eskişehir. The municipality is home to 39.34% of the total population of Eskişehir. The City of Eskişehir lies to the south of the capital Ankara in the north-west of Turkey, a commercial intersection since antiquity and one of the first modern cities of the Turkish Republic through industrialisation. Today, Eskişehir, with a population of around 800,000, is a modern urban region – the second biggest in Middle-Anatolia after Ankara.

SUSTAINABLE MOBILITY

Mobility starting point

Eskişehir, due to its geography and historical development in conjunction to the railroad industry, has a proportionally high presence of non-motorised transport in urban mobility. The Metropolitan Municipality has announced in its Sustainable Mobility Master Plans, an urban region based on pedestrianised, bicycle-friendly modes of transportation.

At present three tram lines with 33 trams serve the city (ESTRAM). A total of 198 buses, of which 32 belong to the Metropolitan Municipality, operate together with 379 minibuses and 467 taxis. There are also passenger boats (ESBOT) operating on Porsuk River, but these are presently only for touristic purposes, though integration into the city public transport is being planned.

Mobility actions to be deployed

Two interventions have been devised to facilitate the expansion of bicycle utilisation in the city and its integration – not just physically but also administratively/economically – to city mass transport policies, and to demonstrate plug-in-electric vehicles (minibuses and bicycles) use and charging infrastructure for future deployment.

Additionally, 6.2km expansion of cycling lanes will be established during the project; the lanes will be integrated into the urban transportation network via nodes and bike parks at the city's rail stations. A fleet of 50 smart-bikes will be rented out by Tepebaşı with the necessary charging infrastructures at appropriate locations.

Tepebaşı Municipality will purchase four e-buses operating to/from demo sites and environs as well as 17 hybrid cars that will use the charging infrastructure.

Furthermore, five parking stations and two EV charging stations will be located in the town centre and the demo site.

Expectations

The main outcome from REMOURBAN will be a model whose application will ensure the efficiency and sustainability of urban transport, conveying a better quality of life for citizens. The replicability potential of this model will guarantee transference of knowledge and be of benefit to other European cities.

Regarding the expected impact to be achieved in relation to mobility, more specifically:

- REMOURBAN will increase mobility efficiency, thus allowing a reduction of the average journey delay and the door-to-door journey time
- REMOURBAN will foster the mass market for clean vehicles in Europe; this means lower emissions of pollutants and a 5% reduction of CO_2
- REMOURBAN will impact on the citizens, increasing their awareness and participation in city life.

Acknowledgement

References

1. www.remourban.eu
2. Source: Instituto Nacional de Estadística (I.N.E.). January 2013.

Maria Angeles Gallego holds a MEng degree in Industrial Engineering from Valladolid University. She joined CARTIF in 2000 where she has been working as a Researcher and Project Manager. Her knowledge background is strongly related to predictive maintenance techniques and electro-mobility. She's been involved in several transport related projects and is currently participating in REMOURBAN in charge of mobility issues for Valladolid city. She has also been involved with other European funded projects including 'Green eMotion' where she performed an analysis of charging patterns and infrastructure planning for electric vehicles, plus 'Automotive Chassis Development for 5-Days Car AC-DC' which she developed collaborative forecasting and supply management techniques.

Javier Olmos received his PhD from the University of Valladolid and obtained his MEng in Industrial Engineering in 1998. He has been working in CARTIF for 17 years and has participated in numerous national and international projects in the areas of discrete events fault diagnosis, supervision, advanced traceability management systems, infrastructures and electric vehicles. He has led and participated in more than 15 national and international programmes and has experience of large EU projects like 'Green eMotion'. He is currently working in REMOURBAN in the tasks related to electric vehicles and mobility. He belongs to the AEDIVE Board of Directors and participates in the AENOR AEN/CTN 178 'Smart Cities' Committee dedicated to smart charging points.

Clemente Cárdenas Cuevas received a degree in Industrial Engineering in 1996 and a Ph.D. in Systems and Process Engineering in 2006, both from the University of Valladolid. In 2008 he took a degree in Business Administration and Management from the Spanish Open University. He has been working as a Researcher in the Automation and Process Control Division of the CARTIF Technology Centre since 1996 where he has conducted several regional, national and European R&D projects related to control systems, predictive maintenance and automation processes. Most recently, he has been working in the area of urban mobility in several European funded projects including REMOURBAN and 'Green eMotion'.

Cristina de Torre received the Industrial Engineer's Degree in 2006 and the MSc. Eng. in Energy Engineering programme in 2010, both from the University of Valladolid. Since 2008, she has been working as a Researcher and Project Manager in the Energy Division of the CARTIF Technology Centre. She has also been involved in many national and European projects linked mainly on integration of renewable energies in buildings, energy performance simulations, buildings energy refurbishment, energy audits, monitoring and control of solar thermal heating and cooling installations and low energy buildings. She has contributed to different national and international congresses related to renewable energies and energy efficiency. Currently she works as Deputy Project Coordinator of REMOURBAN.

Miguel Ángel García Fuentes gained Architect (2010) and MSc Arch. (2012), both from the University of Valladolid. Since 2012 he has worked as Project Coordinator and Researcher in the Energy Division of the CARTIF Technology Centre, in European RTD Projects in the framework of Smart Cities and Nearly Zero Energy Cities, focusing on energy performance improvement in new buildings and building/district renovation, Building Energy Performance Simulation (BEPS) tools and Building Information Modelling (BIM), addressing the gap of data interoperability. He participated in the coordination teams of the EU-FP7 funded BaaS and R2CITIES projects. Currently he works as Project Coordinator of REMOURBAN and OptEEmAL EU-H2020 funded projects. He is also developing his doctoral thesis about 'Energy performance improvement in existing buildings and districts towards Nearly Zero Energy Cities'. He has contributed to different national and international congresses and has participated as Invited Professor in the Master in Research Architecture, at the University of Valladolid, and in a Seminar at the Energy Institute of the Istanbul Technical University.

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