

EU LIGHT RAIL 2019

Geoff Butler explores some of the key debates from this year's two-day congress in Brussels.

This year's EU Light Rail event couldn't have come at a more appropriate time. Following celebrations across the Belgian capital to mark 150 years of its tramway network, delegates congregated at the magnificent Musée du Transport Urbain Bruxellois in Woluwe-Saint-Pierre for two days of discussion on the future of urban travel. Concentrating on innovation, safety and sustainability, delegates heard presentations from across Europe on 16-17 May.

Jan Pannus, Director of Tram Movement from Brussels operator STIB-MIVB, outlined the current projects on the city's tramway, including the new 2km (1.25-mile) extension to line 8 and a new multi-modal interchange at Roodebeek. The creation of this new EUR24.5m (EUR14.5m from the Region and EUR10m from STIB-MIVB) line includes the creation of multi-modal corridors with bi-directional cycleways and footpaths, and the planting of an additional 46 trees.

The city is also preparing for the arrival of its next-generation *Flexity* trams, confirming the next tranche of 30 trams in May from the framework for up to 175 vehicles signed with Bombardier in April 2018. In addition to boosting capacity on the existing network, the extra vehicles will be required following the recent approval of extensions to Neder-over-Heembeek and Tour & Taxis. The first vehicles are due to arrive in mid-2020.

Moving to another of Europe's great systems, Filip Jirik from Dopravn. podnik hl. m. Prahy (DPP) updated delegates on the Czech capital's ambitious expansion plans. Mr Jirik explained that Prague's tramway is the busiest in Europe, with 440 vehicles required during peak hours; 170 trams/hour pass through some of the network's busiest junctions. Despite high car ownership (818 vehicles per 1000 residents), public transport usage has increased in recent years to 59% of the total journeys made each year.

While Tatra's are still firmly implanted in the minds of passengers, Mr Jirik highlighted the importance of the new Škoda 15T vehicles, now accounting for 60% of services in peak hours. Approximately 77% of stops have been upgraded for low-floor services, with a target of 2025 for network-wide barrier-free access.

Other infrastructure improvements since 2009 have seen rails and support structures replaced across 47% of the network, with grass track installed where feasible. The growing 15T fleet is also necessitating modernisation of depot facilities, with three of the seven already completed and a fourth in progress.

Tramway investment was designated as a strategic priority by the city council in 2017, outlining a development programme to 2030 that includes many new lines and extensions. One project highlighted was the 1.9km (1.2-mile) extension from Modřany



Delegates were treated to a tour of the new Marconi tram depot, with demonstrations including STIB's process for rerailing trams.

in the south of the city to Libuš to connect with the future metro line D. An area of high population density and development, this is due to begin construction next year for completion in 2022. Two other extensions and two new turning loops are to open in the next five years, including the return of trams to Wenceslas Square. (For a detailed overview of public transport in Prague, see *TAUT* 978).

Embracing the digital

EU Light Rail also saw a focus on the role of technology in changing the way authorities, operators and maintainers improve services for passengers and stakeholders.

Caroline Villien from Grenoble (France) showed how her Transdev subsidiary is implementing Mobility as a Service (MaaS) principles to not only increase patronage on SÉMITAG's transport network, but also drive efficiencies and create better travel experiences.

Ms Villien estimated that the MaaS market could be worth as much as USD1.76trn by 2030 as travellers seek to integrate all their transportation options into one accessible on-demand service with a single payment channel.

The steps taken in Grenoble include a range of digital tools that are already the "essence of SÉMITAG's management and customer relations strategy," Ms Villien told delegates. This includes digital methods of purchasing tickets, receiving news updates about various travel modes, loyalty offers via the Club AvantAG platform, and interacting with both operational staff and other users.

The take-up has been impressive. A Twitter 'robot' launched in September 2018 now answers questions about basic travel options and disruptions; an update about kind-spirited locals helping to clear tram tracks of snow received 142 000 views.

Since the launch of SMS ticketing in December 2017, 180 000 people have used the service during the first year alone, buying an average of six tickets each. The average age of these users is 35, with 15% living outside

Grenoble. Interestingly, 25% said they would not have paid at all if SMS was not available as they don't carry cash anymore. Although a great success (accounting for around 6% of single-trip journeys), this service was only ever seen as a 'quick fix' and will disappear once contactless payments are introduced.

A very different example of technology being used across the lifecycle of an urban rail system was presented by Ian Rowe of UK-based consultancy Ian Rowe Associates. The 'digital twin' is an increasingly common term (see *TAUT* 965 and 967 for more), but Mr Rowe demonstrated how this concept could be used for the planning, operations and maintenance of both new and existing infrastructure, including visualisation, training and the planning of responses for 'what if' scenarios.

The key enablers of this technology are advances in both computer graphics (derived from the gaming industry), the affordability of hardware and progressions in Artificial Intelligence, he suggested, now making it affordable for systems of all sizes. His accompanying exhibition demonstrated the latest simulators for both drivers and control rooms that showcased elements of the digital twin developed for systems across Europe.

Autonomy and safety

While driverless operation is commonplace in metro environments, Matthias Hofmann and Tobias Koch from Siemens Mobility gave an update on the progress of the company's autonomous tram trials in Potsdam (Germany). They demonstrated how operating in open urban environments requires new solutions that can continuously survey the surroundings and react in an "intelligent" manner.

Utilising proven technology from the automotive industry, Siemens has qualified its use for light rail applications. The basis of the system is three types of sensor: lidar, radar and camera, allied to a controller that feeds back to onboard systems. The clever bit is the complex set of algorithms that "understand traffic



▲ Matthias Hofmann from Siemens Mobility gave an overview of developments with the company's trials with autonomous tram operation in Potsdam.



▲ Old meets new: Surrounded by classic trams and buses, Tram-Pro demonstrated the latest in AI-powered tram and control room simulators.

situations and predict development, assess risks and define actions," they explained.

From the initial tests, the partnership between Siemens and ViP Potsdam has established that autonomous driving is feasible based upon readily-available technology, but that adaptation to tram-specific operation is the big challenge. This competence is being expanded, with progress to further sections of the Potsdam network to gauge the system's effectiveness in a range of scenarios and also provide the validation of sensor perception in all weather and light conditions. This will clarify and inform homologation requirements.

The development of Siemens' "Teaching trams to drive" initiative can only be done "in the field", it was explained, as complex situations can only be learnt in real-life traffic environments. The next steps include the validation of the case for depot automation, reducing labour effort for regular shunting operations (sanding, washing, maintenance etc) and the shortening of tram start-up and shut-down procedures.

From the UK, Peter Cushing of the Light Rail Safety and Standards Board (LRSSB) gave an overview of the new organisation's work around the creation of a common governance structure for the industry. He said the LRSSB's key objectives are to close gaps in safety performance across the industry; reduce operating and risk assessment cost by the application of an industry risk model; support the training and development of safety and standards professionals; provide a platform for benchmarking; develop and maintain standards that will drive down the costs of future schemes; and remove bespoke and over-engineered design from systems.

A great deal of work has already been undertaken, he explained, with the eventual aim of benchmarking the LRSSB's work across Europe and further afield.

Long-term sustainability

François Bausch from the Luxembourg Government outlined his administration's significant investment in transport over the coming decade. The Minister of Mobility and Public Works also explained how this is affecting the headline-grabbing plan to make public transport free from 1 March 2020.

The key driver for this investment is coping with a national population that has

grown by 40% in the past 20 years, as well as catering for the 190 000 daily visitors from neighbouring France, Belgium and Germany. The objective by 2025 is to reduce congestion and improve mobility options at peak hours, while transporting 20% more people than in 2017. This implies increasing the number of public transport passengers by 50% within eight years and increasing car occupancy from 1.2 to 1.5 people per car.

This requires a number of key paradigm shifts, he explained. The first is a focus on moving people, not vehicles; the second is to recognise that mobility is a challenge for all – not just the state – to address; the third is to 'anticipate and not firefight' by anticipating demand and planning for it.

He described the success of the opening of the capital's first tramline in driving modal shift, while also outlining plans for a high-speed tramline to link Luxembourg City with



▲ François Bausch detailed his government's plans for free public transport for all from 2020.

Esch-sur-Alzette. Although the country's second 'city' is too small to justify a tramline of its own, it is growing and commuting to and from the capital is a slow process, he said.

The A4 motorway is heavily-congested, with 20 buses per hour, but rather than adding a third traffic lane, the plan involves the introduction of a 100km/h (60mph) interurban tram to link the existing system in the capital, extending the tramway to strategic urban destinations in Esch-sur-Alzette while also incorporating cycleways.

The free transport initiative will be financed by existing taxation, he explained, and will be valid on all public transport paid for by the state within Luxembourg's borders. There are ongoing negotiations with French, Belgian and German authorities for cross-border journeys, with the vision that the move will "free up staff to focus on passenger service rather than passenger control."

Arnoud Koopmans from Lankhorst Mouldings offered a wide-ranging overview of sustainability and the 'circular economy', emphasising how we need to change our view of waste from a problem to a resource.

Lankhorst specialises in the use of polymers for track components, and sleepers in particular. Polymers could form part of the solution to long-term sustainability challenges within this circular economy, he explained, with a lifecycle of up to 80 years and the potential to be recycled between three and seven times. Other advantages of polymer sleepers include improved damping, sound and vibration mitigation over wood or concrete, also requiring less energy to be transformed into the finished product, he added. In recent years, the company has supplied polymer sleepers for the Amsterdam Metro and bridge sleepers for the MRT Prasarana KL, Malaysia.

Mr Koopmans argued that a number of preconditions are required for a successful circular economy: a worldwide vision for material use (up to 50 years); the importance of reducing the transportation of materials for manufacturing; a more integrated supply chain approach and a new methodology for tenders that includes a basis of circular product design wherever possible. **TAUT**

› All images by Bernd Reuß and Geoff Butler. For more detail on the other presentations at EU Light Rail 2019 visit www.mainspring.co.uk