



EU LIGHT RAIL CONGRESS 2023

▼ **BELOW:** Delegates engaging in conversation at the start of this year's European Light Rail Congress in Tenerife.



With two days offering case studies of the latest in urban transport technology, this year's EU Light Rail offered plenty of positivity and reasons to be excited. Geoff Butler rounds up some highlights.

La Laguna in Tenerife was the destination for the 2023 European Light Rail Congress at the wonderful La Laguna Gran Hotel, itself a UNESCO World Heritage site. The event was held on 22-23 March.

Senior and key industry professionals from light and urban rail in 12 countries across Europe brought a wealth of experience and knowledge to an event that had a theme of sustainability, using new technologies, digitalisation and green policies to offer better and more efficient public transport.

It was officially opened by Enrique Arriaga, President of MetroTenerife and Vice President of the Government of Tenerife. He spoke of the travel challenges faced daily by the island's residents, with there being an urgent need to improve all public transport, which includes extending the tramway. Tenerife's major roads are gridlocked daily from early afternoon to the end of the rush hour, and two light rail extensions planned in the north of the island will help solve this.

Kicking off the Congress was Raul Parra, Engineering Project Director from MetroTenerife, discussing these plans as well as highlighting the system as it currently stands, with high daily ridership figures close to pre-pandemic levels. The rolling stock is entirely Alstom five-car *Citadis 302s*, which are 100% low floor. The consultancy products MetroTenerife offers include the *Vía-Móvil* integrated ticketing system, SIMOVE and on-board speed monitoring, plus the removable insulating chamber for rail.

Importance of asset management

François Giraud, Alstom's Market & Product Director for LRV, talked about asset

management and how vehicle modernisation is being developed. This included options for extending the life of a tram, improving performance and functionalities, enhancing passenger experience and reducing environmental impact. The company's work covers new interior layouts, lighting, more USB sockets and on-board wi-fi.

Michael Ruffer of UITP highlighted how trams and light rail have evolved over the years, and are seen as a useful energy-efficient tool for sustainable and socially-fair urban mobility. However, he argued that costs need to be kept under control as technology and demands increase.

What does the future hold?

The past, present and future were discussed by Manuela Costa and Carlos Mota, both of Portuguese company Efacec. Signalling,



A private tour of the MetroTenerife tram depot at Santa Cruz was arranged for the afternoon of day one, with viewing of the control centre and maintenance area. Exclusive behind-the-scenes visits such as this are one of the benefits of attending the European Light Rail Congress.

safety priority management, command, control and communications have moved forward over the last 20 years, and various challenges have been overcome.

But what might the future hold? This vast, speculative subject was also covered by Mark van Bekkum from Dutch stray current specialist Microsim. He highlighted where stray current can be found in city centres, such as near hospitals, schools and universities. With new technology, current has the potential to emit electromagnetic fields, and calculating them is difficult as there are many elements to include with decoy conductors, insulating mats, rail trenches, rail wrappings (rubber profiles) and rail castings (rubber mass). The conclusion is that there is so much new territory with little experience, and with simulation being very difficult, measuring the effects is the best solution we have today.

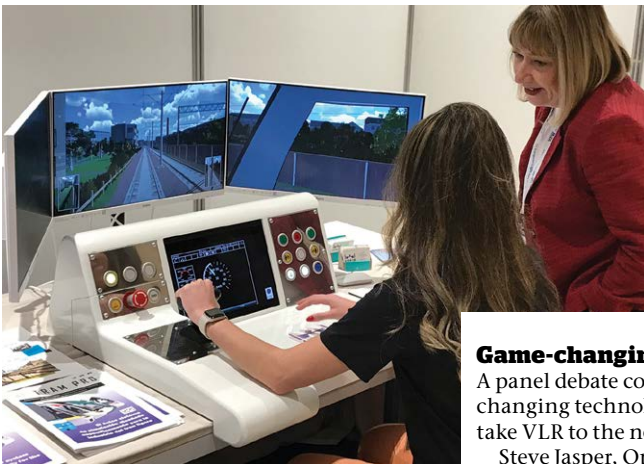
Driver assistance systems are improving safety worldwide, and Dr Ruprecht Anz of Bosch Engineering explained some new features from 2022, including emergency brake assist and speed assist, that help to mitigate fears of drowsiness and distraction. Brakes can be applied faster, speeds reduced quicker, and systems overridden. Bosch alone has more than 2100 front assist systems for 24 operators either delivered or on order.

Dr Marian Sánchez Pérez from PCM RailOne gave a fascinating insight into Rheda City, which is a ballast-free track system for trams, light rail and metros. It consists of special bi-block supports embedded into monolithic concrete slabs, and is designed for simplicity. Rheda City is adaptable for any substructure and urban restraints, embankments, viaducts, tunnels, ducts, and

Panel Discussion What do we need to take VLR to the next level?



◀ LEFT: Pictured (left to right): Tim Burleigh, Head of External Communications at Eversholt Rail, Steve Jasper, Director at Pre-Metro Operations, and Darren Smith, Group Commercial Director at Transport Design International sharing their expertise and knowledge in the first panel debate of the Congress. This covered the exciting Very Light Rail topic.



◀ LEFT: UK-based company Avansim showed off its impressive tram simulator, which it has in place at Metro de Málaga's new training facility.

Game-changing technology

A panel debate covered the topic of 'Game-changing technology: What do we need to take VLR to the next level?'

Steve Jasper, Operations Director from Pre-Metro Operations, joined Tim and Darren on stage to delve into more detail on moving people efficiently around cities, towns, and rural areas. Very Light Rail is one such scheme, adopting leading-edge technology from rail and key sectors to grow the UK railway network, including extensions and re-openings. Javier Hinojal from Alstom acted as moderator, keeping the questions flowing. They included learning lessons from trials, demonstrations, early deployment opportunities and how decision-makers can be brought on-board.

'Sustainability' popped up again with Jose Angel Santos from Metro de Sevilla describing how his system now offers sustainable mobility to the Andalusian city.

The transport sector uses the most energy in Spain, although railways are the most energy-efficient option, with speed and high passenger capacity. Carbon-neutral Metro Sevilla is fully electrified under catenary, allowing for lighter vehicles (no batteries here) to reduce energy demands. Since opening in 2009, solar panels have shown their value, and the average energy consumption per passenger fell by 61% between 2013-22, even with demand continuing to grow.

Marcos Español from Los Tranvías de Zaragoza spoke about autonomous transport and the way to full digitisation. The CAF trams have onboard energy storage systems via supercapacitors, and use batteries in the city centre. Catenary is used elsewhere, with the first CAF 100% digital depot in the world using its successful LeadMind tool. This is cloud-based, and stores and processes data and analytics on fleet management, with diagnostics using advanced analytics. Tablets enable stock control via a QR reader, corporate screens for internal communications, e-learning platforms, maintenance and calibrated tools management.

cable crossings. Any rail profile and track gauge, all signal as well as grooved types of tracks and any track cover can also be incorporated.

Rheda City has a 30% market share in Germany, and the company is also working in Qatar, North America, and Australia.

The Very Light Rail Revolution

Revolution Very Light Rail (RVLR) is certainly taking off, and European attendees paid particular interest to the presentation by Tim Burleigh, Head of External Relations, Eversholt Rail, and Darren Smith, Group Commercial Director of Transport Design International.

Together they explained how the lightweight vehicles will operate in the UK, giving cost savings on top of an efficient and first-rate passenger experience. RVLR can stimulate line re-openings and improve rail connectivity, particularly in rural areas. Lightweight RVLR vehicles are robust but still keep infrastructure wear to a minimum. There is also a high proportion of UK-sourced components, using recyclable and biodegradable materials.

The demonstrator vehicle uses hybrid diesel-electric propulsion via a pair of 2.8-litre Euro 6 turbo-charged Cummins diesel engines, generator and cooling group. There are two lithium titanate battery packs, with zero-emissions and near-silent running in stations and built-up areas at up to 20mph.

Acceleration is comparable with a modern electric train with a maximum speed of up to 105km/h (65mph). Power packs and battery packs sit on sliding rails for ease of replacement and reconfiguration. Battery-only versions are under development, and with rapid lineside recharging make a serious contender for the future of light rail. The RVLR demonstrator vehicle is close to completion.

FINANCE: THE KEY TO IT ALL

Pilar Skall from KfW IPEX-Bank explained how his firm offers financial packages for transport-based projects. They can be jointly financed between manufacturers, transport authorities, the mobility owner and operators, all with loans from the bank. This can be long-term funding with shorter term transport contracts, and securing mobility assets with transparent costings for operation and assets.

The price of the loan is potentially close to state/municipality levels, and can significantly reduce the budgetary burden in the year of investment. The mobility owner has a function limited to finance and insurance, and eased access to financing with no operational risk. For the operator, the focus is on operational excellence, an asset-light balance sheet, and the ability to submit competitive offers.

Teresa Benet, Metrotenerife's International Business Development Manager, presented her Green Bonds finance package. The public company was constituted in 2001, and moved to a public-private partnership system in 2003, with operations and maintenance included in 2007. It became a public entity in 2017, with Green Bonds issue in 2021. Finance came from the European Investment Bank at 5.25% interest for a EUR100m loan.

Although complex, the experimental Green bonds issue allowed for EUR130m of support to be issued at a newly negotiated 1.227% interest rate, making things much more viable and speeding the transition towards carbon neutrality.

Munesh Melwani, MD of Cross Capital based in Tenerife, took the Green Bond issue subject further, using the Metropolitan example. In 2020, the loans were EUR100m, supported by the European Investment Bank and others with the Green Bond solution required for debt restructuring. This allowed for a EUR150m maximum figure over 15 years with a fixed lower interest rate. The Green Bond issue was awarded a Global Light Rail Award for its ingenuity, in London last year.



▲ ABOVE: Enrique Arriaga, the Vice-President of the Government of Tenerife and the President of Metrotenerife officially opened this year's event. He is pictured (left) with Geoff Butler, Commercial Manager of Mainspring, the event's organiser.

Low-carbon concrete

Niina Salajarvi from Helsinki LRT spoke of the need to reduce emissions by using low-carbon concrete in pile slabs made of local stone. Biodiversity was also covered, preserving green areas and trees, and collecting storm water. Helsinki aims to recycle 50-80% of usable demolition material and earth, with electricity at work sites coming from renewable sources, and HVO biodiesel powering construction machines. No plastic is used for pipe material. Other ideas on trial include sound-proofing fencing, generating less dust and dirt in construction, and minimising interference.

Changing tack slightly was the final presentation of the day, given by Keith MacHale, the CEO of Transit9 of Ireland. He talked about the use of MaaS as an everyday digital trend, requiring integration for ticketing, disruption notifications and timetable updates. Some areas suitable for digital transformation include performance, people and safety management, customer services and operations management. Going forward, areas include WhatsApp messages to the customer, and AI.

A Metrotenerife depot tour was arranged for the afternoon of day one, to Santa Cruz to see the state-of-the-art depot, including the control centre. Pablo Oromí, Metrotenerife's Project Manager, described how the removable insulating chamber for grooved rail works in practice, providing electrical and acoustic insulation that speeds up rail replacement.

People vs politics in Uppsala

Day two began with a case-study from Sweden with Hans Cruse, Director of Spårvagnsstäderna, on the 2003 referendum held in Uppsala. This city not only has a tramway, but a new part of the city with heavy rail, two new commuter halts and an expanded main station. The project runs over 17km (11 miles), and has two lines with two stations. New technology is used for EM-field reduction close to the hospital and research laboratory, partially catenary-free, and using more sustainable steel and concrete products.

The referendum raised several issues, not all about transport. The public is keen on a tramway, so it looks as if it will come down to politics for progress to be made.

Delegates then enjoyed an update on Prague from Filip Jiřík, the DPP's Project Manager. The capital of the Czech Republic is very much at the forefront of promoting integrated transport, and DPP has three metro lines, 26 tram routes with 781 tramcars, and 1165 buses. Metro D line will use driverless vehicles running over 10.6km (6.6 miles) and ten stations when it opens in 2029. Recently-completed projects include an extension to Pankrác, new loop at Zahradní Město, an extension at Holyně and a new loop at Depo Hostivař, all completed between 2019-22.

In hand are project extensions at Libus, Holyne and Dedina, a new bridge at Dvorecký most, and a new depot at Hloubětín. Others over the next decade will increase the network by 36km (22 miles) to 180km (120 miles) in total. A tender for up to 200 new trams is in progress. Trolleybuses are also employed for hilly routes outside of the tram network where there is no space for track,



◀ LEFT: Metrotenerife's Project Manager Pablo Oromí showed delegates how the award-winning removable insulating chamber for rail works at the Metrotenerife depot.

▼ BELOW: The second panel debate hosted by Alstom's Director of Sales, Communications and Market Development, Javier Hinojal, covering the subject of innovative financing for new urban transport systems.



The steep slopes of the volcanic Mount Teide at the centre of the island of Tenerife are entirely unsuitable for rapid transit, but Tenerife Tourism organised a trip for the Congress attendees. Many more business conversations were had on the bus.



Digital revolution's human touch

Alex Barron, Associate Director of Imperial College, London, said that full digital transformation cannot be achieved without an employee-led culture.

The Transport Strategy Centre uses its experience and insight into how mobility can be most successful in the long term. This requires a worldwide examination of improving customer service, capacity, safety and reliability, as well as reducing costs.

Imperial uses includes Comet, Goal and Bolt to benchmark global data, which began at the start of this year. Areas investigated include comparisons of systems' strengths and weaknesses, supporting and challenging rules of thumb, and setting targets.

It also investigates improvements, what's working and what isn't, and implementing best practice. Many transport providers still have staff shortages post-pandemic and need to look at how to retain people, while competing tech companies are all accelerating their ambitious digital programmes.

Major areas of concern for operators and local authorities, such as improving their systems, as well as building new ones, was covered with some detailed finance and funding topics.

To round off the Congress, the knowledge and experience from these leading finance figures resulted in a lively panel debate about innovative financing, with Pilar Skall, Teresa Benet and Munesh Melwani really on top of the subject.

Working towards a better 2024

Delegates at the 2023 Congress were in unanimous agreement on the need for everyone to work together, sharing their experiences and best practice to move to a more sustainable and green future.

We all look forward to seeing how they are progressing at the 2024 event. **TAUT**

or lower ridership. Electric buses have been operational since 2022, and charging is compatible with trolleybuses, using energy recuperation from the trams.

Cutting down damaging noise

Caterina Lobefalo, Rockdelta/Acosta Ingenieros' Technical Manager, provided an insight into anti-vibration mats for track design using stone wall technology. Transmitted through the ground, it can lead to human discomfort, upset high precision equipment, and even damage buildings.

Rockdelta's anti-vibration mats for both ballasted and ballast-free tracks offer a reduction in ground-borne noise and protection for the ballast. Fire-resistant, they insulate against frost as well as water, are easy to install, and use natural products.

AI was covered in a presentation by Margrethe Rasmussen of Asistobe, who wants public transport to be better for all. The firm's cloud-based SaaS platform gives PTAs and PTOs the ability to plan their entire transport network, cutting costs by 10-25%.

Asistobe's award-winning (Global Light Rail Awards 2022) platform investigated the public network demand against the network concept in Bergen, Norway. Cost savings were made using the company's software while passenger numbers were increasing. Exploration of the system highlighted the passenger needs and the pressure on the network, using algorithms to predict future transport demand, cut operational costs, and reduce the carbon footprint.