METRO NEWSLETTERS on “URBAN MOBILITY AS A SERVICE”

PUBLIC MULTIMODAL URBAN, SUBURBAN AND INTERURBAN PASSENGER TRANSIT SYSTEMS WITH METRO-BUS, LIGHT-RAIL, TRAM-TRAIN, METRO-RAIL, METRO-TRAIN, REGIONAL RAPID TRANSIT, COMMUTER-RAIL, ROPE-WAY/TRAIN, MAGLEV AND HOVERCRAFT TRANSIT/PEOPLE MOVER, WATER-METRO, AUTONOMOUS PEOPLE-MOVER

TRANSPORTATION AND ECONOMIC DEVELOPMENTS IN MODERN URBAN/MEGAPOLES ENVIRONMENT

METRO Newsletter by Dr. F.A. Wingler
METRO 77, July 2019

Digitalised Rail World
Mr. Thiruman Archunan, Director – Projects, Kochi Metro Rail Limited, is in charge of all Civil works related to KMRL (Kochin Metro Rail Limited): Construction of metro stations, viaduct, track, depot, and others works related to Roads, improvements to city landscape, Place making and other NMT (Non-Motorised Transport) related works, modernised ferry services etc.

**Rail Analysis: What is the current Progress of Kochi Metro?**

**Mr. Thiruman Archunan:** The approved Phase-I of Kochi Mero Rail is from Aluva to Petta is 25.16 km with 22 stations. The stretch from Aluva to Palarivattom with 13.26 km is operational from June 2017 and up to Maharajas with total 18.22 km is operational from October 2017.
Balance stretch of 6.94 km from Maharajas College to Petta is passing through the Central Business District (CBD) of Kochi City touching the major Railway Station Ernakulam South and Vytila, the busiest junction of Ernakulum, Kerala.

"The stretch also contains one 90 m single span balanced cantilever across Railway line at Ernakulam South, which will turn as one of the iconic heavy civil construction in the city once completed."

Also a bridge namely Champakkara Bridge, a two level bridge across canal is being reconstructed by providing vehicular traffic through first level and Metro through second level.

**Rail Analysis : Please tell us about advanced Metro City in Kakanand?**

Mr. Thiruman Archunan: Kochi Metro Rail Limited is planning to develop around 17 acres of land into Metro City to a commercial entertainment zone, which will in turn become an international tourist destination. This will bring additional revenue to KMRL in the non-fare box model. For this project KMRL have called international consultancy service to develop concept Master Plan.

**Rail Analysis: Please tell us about the additional Train Sets to be added to the League of Kochi Metro?**

Mr. Thiruman Archunan: Kochi Metro is planning with 25 train sets (3 coaches in each set) for the entire Phase I corridor.

“The contract was awarded to M/s Alstom who delivered the first set on 10th January 2016. Out of 25 sets, 23 train sets arrived as on date and 11 train sets are currently under operational at a time“.
Rail Analysis: What is the current Progress for Maharaja’s College – Thykoodam Stretch? What is the expected Time line for it?

Mr. Thiruman Archunan: The Civil works of Maharajas to Thykoodam, 1 Km short of Petta, is progressing fast aiming to commence within few months. The last stretch of Phase I with 1 km & 1 station will be thrown to public in early 2020.

Rail Analysis: Please tell us about the Water Metro Project of Kochi Metro?

Mr. Thiruman Archunan: Kochi Water Metro Project aims to connect the islands in and around Kochi City through 15 routes and 78 route km. 38 boat terminals and 78 Boats with 100 pax/50 pax capacity are planned in this project with world class amenities. Kochi Water Metro Project is progressing well. All the preliminary works completed. The land acquisition is in advanced stage and tender for procurement of boats are in progress.
"The construction contract for 3 terminals already awarded and balance terminals are in advanced tender stage. KMRL aims to start its first water metro service by early 2020.

Animation of Kochi Water Metro Mobility Hub

Rail Analysis: Please let us know about your Feedbacks about Rail Analysis Magazine shared with you recently?

Mr. Thiruman Archunan: The Rail Analysis Magazine helps to keep updated on the Metro industry with latest approved as well as operational Metros. It also speaks about the latest technologies being adopted in the Industry, which is very informative.

"The article on “Potential use of artificial intelligence for Railway & Metros in India” was such an informative one in the March edition. The interview with Dr. E Sreedharan found to be the highlight of the March 2019 edition of Rail Analysis Magazine. “

May please take a note that Kochi Metro may be included in the constructional phase metro projects, since another 7 km is in construction stage. Also Phase II – Info park to Kakkanad – 11.2 km with 11 stations of Kochi Metro can be included in the planning stage Metros.

Water Metro Project to start soon; Land allotted for Boat Terminal; India

The Government of Kerala issuing a No Objection Certificate (NOC) to hand over the 1.23 acres of land at Vytttila Mobility Hub to Kochi Metro Rail Ltd (KMRL) for the construction a boat terminal for Water Metro Project.

By Narendra Shah
- 08/05/2019
KOCHI (Metro Rail News): The Government of Kerala issuing a No Objection Certificate (NOC) to hand over the 1.23 acres of land at Vytttila Mobility Hub to Kochi Metro Rail Ltd. (KMRL) for the construction of a boat terminal for Water Metro Project.

KMRL is expected to float the tenders soon for the construction of an advanced boat terminal at Vyttilla Hub. The major challenge of this terminal is the integration point of various modes of transport including road, rail and water.

The state government had earlier issued the order and instructed the agency to follow the guidelines and conditions put forth by the government.

According to the letter issued “KMRL is the agency which will be implementing the phase-II development of Vyttila Mobility Hub. The agency had asked for 1.23 acres of land at Vyttila Hub for the development of a boat terminal. The meeting convened by the Chief Secretary has recommended the allotment of land. The government has analyzed the proposal. After assessing that the agency has put forth the request for the land as per the DPR, it was decided to transfer the land.”

The KMRL will construct the biggest terminal of the water metro project at the Vyttila Mobility Hub, which will spread over 40,000 sq ft. Vyttila Mobility Hub is the special purpose vehicle (SPV) now owns 26.53 acres of land at Vyttila.

Another ferry terminal will come up at Fort Kochi which designs were selected through a competition organized by KMRL. The design submitted by a team comprising Rajiv Babu and Ameena Hamza from Chalakkudy was selected for the Vyttila Terminal while the design by Studio Homosapiens, based at Panampilly Nagar, will be used for the Fort Kochi terminal. Under the R747-crore Water Metro project, a total of 78 boats will ply on 15 routes covering a distance of 76 km through Kochi backwaters.

The VHMS, with the support of KMRL, is planning a Rs 590 crore development for Vyttila Hub in the second phase. The French agency – Agence Française de Développement (AFD) will lend Rs 472 crore on a long term loan basis. The existing bus terminal at Vyttila will be converted into an advanced Mobility Hub, interconnecting various modes of transport.
Jammu and Srinagar likely to get Light Metro, Work may begin by Dec 2019; India

A Light Metro is an alleviated project in which an engine could be driving three coaches. The project will help in facilitating the travel of people in two big cities - Jammu and Srinagar - of the state.

By Sona Sagar
- 26/06/2019

Jammu & Srinagar (Metro Rail News): Jammu and Srinagar likely to get Light Rail Transit corridors. The detail projects reports (DPR) for both the place have been completed.

The government has formed the Metropolitan Regional Development Authority (MRDA) to manage the much-hyped project to expedite various schemes.

Rajeev Ranjan, the managing director of MRDA said that if everything goes according to plan, the work on these prestigious projects could begin by the end of this year and the report will be submitted before the Union Cabinet by the next month for the final approval.

He further said, “It is not an underground project because that is not feasible in J&K.” He named the project as a light metro, which is different from the metro. It is an alleviated project in which an engine could be driving three coaches.
This project will require around Rs 10,000 crores for its completion. Rajeev Ranjan said that the project will help in facilitating the travel of people in two big cities of the state. The DPR for both Jammu and Srinagar project were prepared by the RITES- a consultancy service working for development of infrastructure in Urban transport.

Raghav Langer Chief Executive officer of Jammu and Kashmir said," We got the project report prepared last year and now it is being handled by a separate authority."

Srinagar corridor Details

Officials said the distance between the intersections will be around one kilometre. The Srinagar corridor will have 24 stations with 12 each in the two parts of the corridor. The corridor-I will be spread over 12.5 km and will begin from HMT (Shalteng) till Indra Nagar, which is close to the Army’s 15 Corps headquarters. The corridor-II will cover a distance of 12.5 km and will begin from Osmanabad till Hazuri Bagh in the heart of city.

**Jammu Corridor Details**

The Jammu city will also have a two-part corridor of 23 km length. The Corridor-I will begin from Bantalab to Greater Kalash and will have 17 stations. It will pass through the heart of Jammu city.

![Proposed Jammu Metro Rote Map](image)

Both the corridors will have major depots. The Corridor II will start from Udheywala and end at Exhibition ground and will have six stations.

The “*Metro Man*” Mr. E. Sreedharan, who was appointed as an advisor by the J&K government, had also visited the sites of both the projects and given a go ahead.
Blue Star wins Tunnel Ventilation and environmental Control Systems Contract for Mumbai Metro-3 Corridor; India

June 24, 2019 Rail News

Mumbai: The Mumbai Metro Rail Corporation (MMRC) has awarded Contract for the Tunnel Ventilation System and Environmental Control System works for the section BKC (excluding) to Mumbai Central (including) on its Colaba-Bandra-SEEPZ, Metro-3 Corridor after obtaining clearance from Japan International Co-operation Agency (JICA) as specified by the procurement norms.

Blue Star Ltd., India has been awarded the “Tunnel Ventilation System and Environmental Control System” works for Package 15 (Phase-2/Lot-1), being the most competitive among the respective bidders. The scope of work includes Design, Manufacture, Supply, Installation, Testing and Commissioning along with other associated work.

The Tunnel Ventilation System (TVS) automatically lowers tunnel air temperature during normal and congested conditions – as the case may be – and provides smoke management in tunnel during fire emergency.

The Environmental Control System (ECS) supplies fresh air for the comfort of passengers provides cooling system for critical system rooms and smoke extraction at stations during emergency.

“We are committed to providing robust and technologically advanced Tunnel Ventilation and Environmental Control Technology, which is very critical for passenger comfort and safety”, said Ms. Ashwini Bhide, Managing Director, MMRC.
The National Capital Region Transport Corporation (NCRTC) has decided to equip the European Train Control System (ETCS) on its Sarai Kale Khan hub in Delhi-Meerut corridor.

“The existing system can track the train’s position when it is running on its top speed of 100 kilometers per hour. The latest European System is capable to reflect train’s accurate position up to 160 km per hour and even above per kilometer speed.” Said NCRTC Spokesperson Sudhir Sharma.

“Through this device, the NCRTC is capable of providing accurate movement position of the train in 90-second frequency on this corridor. However, the footfall of the passengers will decide on which frequency trains would run in the future. At present NCRTC has decided to run the train in five-minute frequency on Sahibabad to Duhai patch”, Sharma added.
Duhai onwards, the trains will run be at the 10-minute frequency as less footfall is expected in this corridor. NCRTC has the wherewithal to run trains in varied frequency from seconds to minutes without any error.

In the latest budget Rs. 30,270 Crore has been allocated for the ambitious Delhi-Meerut corridor of NCRTC which is expected to be operational in 2023. The NCRTC has made a plan, considering the growing population in the National Capital Region (NCR), by constructing three main corridors in three phases- Delhi-Meerut, Delhi- Alwar, and Delhi-Panipat corridors in coming 7 years with the estimated fund expenditure of an out a lakh Crore.

This NCRTC project is established by the Central Government with the equity participation of 50 percent of four states-Delhi, Haryana, Rajasthan and Uttar Pradesh with their 12.5 percent each which rest 50 percent shares are of Union Government. The first phase of Delhi-Meerut is progressing well and is expected to be operational first of the three corridors.

Mumbai Metro requires a huge
Investment of Rs.12,940 Crores; India

By Palak Goyal - 02/07/2019
Mumbai Metro

Mumbai (Urban Transport News): The metropolitan city Mumbai has been blessed with six metro corridors beginning in 2016 and was expected to complete in March 2019. A huge investment of Rs. 12,940 crore has been made by the state government on the ongoing construction work under the Mumbai Metro rail project.

The survey shows that the total cost of the construction sums up to be Rs.68,005 crore and current investment being 19% of total estimated. The maximum amount of investment has been made on the fully underground Metro-3 (Colaba-Bandra-Seepz) corridor by MMRC.
The construction work is being done by Mumbai Metropolitan Region Development Authority (MMRDA) on five metro corridors in the city while the Mumbai Metro Rail Corporation (MMRC) is building the one.

The economic survey further shows that the MMRDA has spent Rs.1,561 crore on Metro-7, wherein 67% of the civil works has been completed, and Rs.1,351 crore on Metro-2A, wherein 63% of the civil works has been finished.

“We have a systems order of more than Rs.3,000 crore, which includes rolling stock, signalling, telecommunications, etc. This expenditure is due in the next one year,” said R A Rajeev, metropolitan commissioner, MMRDA.

The MMRDA has made a huge investment of Rs.201.30 crore on Metro-6 (Swami Samarth Nagar-Vikhroli); Rs. 227.98 crore on Metro-4 (Wadala-Kasarvadavali); and Rs. 196.31 crore on Metro-2B (DN Nagar-Mandale), while the general public is showing the protest against the three routes.

There has been reported a big clash between Powai residents who have demanded rerouting Metro line 6 while the citizens have been demanding underground routes for lines 2B and 4.

This is a serious lacuna with the authority as there were no public consultations or citizen committees set up to weigh the projects before they spend such a huge amount on it,” said AV Shenoy, a transport expert from Mumbai Vikas Samiti, who is in favor of consulting the public before starting the work.

1.11 Crore Passengers traveled in Lucknow Metro; India

June 27, 2019 Rail News

The Lucknow Metro has touched the ridership figure of 1.11 crore since metro services started in the city in 2017. “We have touched ridership figure of 1.11 crore on Tuesday,” the LMRC statement said. Nearly 60,000 passengers travel by Lucknow Metro every day, it said.
More Information:

- The statement said, Lucknow Metro trains complete on an average 331 trips everyday on the North-South corridor stretching from Chaudhary Charan Singh Airport to Munshipulia.
- It said, starting 6 September 2017, Lucknow Metro have completed 1,83,561 revenue trips till Tuesday amounting to a total of 19,76,580 kilometres.
- With time, Lucknow Metro has become synonymous with a world class state-of-the-art public transport system that’s safe, energy-efficient, inclusive and has a dedicated workforce ready to serve the passengers with the best of their abilities, it said.
- Recently, Secretary, Ministry of Housing and Urban Affairs, Government of India and Chairman of Lucknow Metro Rail Corporation Limited (LMRC), Shri Durga Shankar Mishra, reviewed the operational 23 km stretch of Lucknow Metro’s North-South corridor and the working of its various departments.
- After landing at the CCS Airport, LMRC Chairman, took the metro from CCS Airport Metro Station to Hazratganj Metro Station where he was welcomed and accompanied by LMRC MD, Shri Kumar Keshav, Directors along with other senior officials.
- During his first metro ride on Lucknow Metro, he discussed at-length about the safety features inside the train and stations, signalling and other operational aspects incorporated in Lucknow Metro.
- On de-boarding at the Hazratganj Metro Station, he was mesmerized at the exquisite artwork which pays tribute to Lucknow’s one of the most ancient and traditional art forms, the ‘Chikankari embroidery’.
- He also discussed about the upcoming Kanpur and Agra Metro projects at-length and stressed upon expediting the necessary procedures like land acquisition, clearances etc.

Telangana Government invites Bids for ‘One Telangana Card’ for all Travel Needs – Mobility Project; India

July 1, 2019 Rail News

Hyderabad Metro Rail
The Telangana Government has invited bids for designing and implementing the ‘One Telangana Card’, which can be used for payment related to travel services in the state, a senior government official said.

More Information:

- The common card system was aimed at integrating the payments related to travel services availed by the residents and visitors in Hyderabad Metro Rail, Telangana State Road Transport Corporation buses, Hyderabad Multi-Modal Transport System, autorickshaws, Ola, Uber cabs and others within the state, said Principal secretary of IT and Industries Jayesh Ranjan.
- This is a state government initiative.
- The official said, "We are looking for a consortium to participate in this project. The consortium should have a bank or financial institution as one of the partners. There has to be payment clearing house. There has to be a vendor who will supply machines (to read smart cards)."
- The successful bidder is expected to manage the implementation of smart card payments ecosystem, including the required hardware, software, network infrastructure, and related interfaces and should be able to manage the interfaces to Hyderabad Metro Rail, Hyderabad MMTS, TSRTC bus network necessary for the implementation of Common Card Mobility Project in the city, the Request for Proposal (RFP) document said.
- Telangana State Technological Services had issued RFP from prospective bidders.
- Pre-bid meeting was held in June first week.
- The bidding would be closed by July 15.

‘One Nation, One Card’

Dubbed as ‘one nation, one card’, Prime Minister Narendra Modi launched the indigenously-developed National Common Mobility Card (NCMC) in March to enable people to pay multiple kinds of transport charges, including metro services and toll tax, across the country.

Ranjan further said, "The Centre has also announced NCMC. We have decided that we will go ahead with our own card and as and when some national card is launched we will integrate ours with it."

PayTM announces Launch of Metro Route Search Feature in 10 Citied; India
Noida (Urban Transport News): India’s leading digital payments company, Paytm has announced the launch of Metro Route Search – a feature that can be used by metro rail travellers to plan their journey. The feature is available in all 10 cities that have metro rail facility including Delhi, Noida, Gurgaon, Bengaluru, Hyderabad, Kolkata, Mumbai, Chennai, Lucknow, Kochi and Jaipur.

Metro Passengers alert! Paytm has good News for you - What people of Delhi, Noida, Gurgaon and other Cities should know; India

Written By: ZeeBiz WebTeam
Updated: Mon, Jun 24, 2019 03:05 pm, ZeeBiz WebDesk

The feature is available in all 10 cities, that have Metro Rail facility including Delhi, Noida, Gurgaon, Bengaluru, Hyderabad, Kolkata, Mumbai, Chennai, Lucknow, Kochi and Jaipur.
Digital Payments Firm Paytm has announced the launch of Metro Route Search feature. The feature is available in all 10 cities that have metro rail facility including Delhi, Noida, Gurgaon, Bengaluru, Hyderabad, Kolkata, Mumbai, Chennai, Lucknow, Kochi and Jaipur. The feature can be used by metro rail travellers to plan their journey. "The feature not just suggests a route between your origin and destination, but also provides estimated travel time, fares, number of stations to traverse and interchanging station for changing lines. For scenarios where multiple routes are possible, it also recommends the best route, taking into account the travel time and number of times the metro lines are to be changed during the journey," Paytm said in a statement.

**Paytm Route Search for Metro Rail Passengers**: How to use the feature?

1. Open Paytm app and click on the ‘Metro’ icon.
2. Select your city and click on Route Search.
3. Select your origin and destination stations and click on the search button to view the routes.
4. The feature would suggest the route and also show you the journey time between the selected stations.

Announcing the launch of the metro route search feature on Paytm app, Abhishek Rajan, Vice President at Paytm said, “At Paytm, we constantly think of ways for improving the travel experience of our users. The Metro Route Search is yet another step towards offering a more convenient way for metro travellers to smartly plan their journey. We witnessed an overwhelming response to this feature within hours of making it live on the app. We have many more innovative features in the pipeline that will help improve our users’ journey experience across all modes of transport.”

**PART II: GLOBAL ACTIVITIES FOR URBAN MOBILITY AS A SERVICE**
Focused Streams: We’ll have two Streams: I. Assets and Digitalization, and II. Ridership and Mobility – so whether your focus is on the technical or the passenger, we have the session for you.

SmartMetro and CBTC World Congress – 25-27 November, Madrid; Spain

The SmartMetro and CBTC World Congress returns for its 10th year in Madrid and is the meeting place for senior metro, tram, and light rail technology experts from all global regions to discuss the major challenges cities are facing such as digitalisation, congestion, automation and shared mobility. Delegates attending the show this year will be able to:
* Have the choice of three focused streams covering signalling systems, assets and digitalisation and operational excellence and smart mobility
* Attend a site visit organised by local operator, Metro de Madrid
* Listen to C-level global speakers from operators
Siemens Mobility: Railigent® – the Solution to manage Assets smarter; Global

From UITP Global Public Transport Summit 2019
June 9-12, Stockholm, Sweden
Stockholmsmaessan, Booth No. A5010

**Railigent®** makes intelligent use of rail data and allows rail operators to improve the return from their assets. Artificial intelligence and sophisticated data analytics are the key to achieve up to 100% availability, optimized maintenance and improved operations.

**Railigent** from Siemens Mobility Services empowers you to understand your rail data, generate valuable information and get more out of your systems.

Rail transport is made more efficient, reliable and safe thanks to condition-based monitoring, data analysis and predictive maintenance concepts. Co-creation using Siemens' domain knowledge and our clients' expertise allows for comprehensive asset management and customer proximity.

Bombardier to operate and maintain San Francisco Monorail guided INNOVIA APM; USA

27 June, 2019
By Josephine Cordero Sapién

**The City and County of San Francisco has awarded Bombardier** a ten-year contract to operate and maintain the Automated People Mover (APM) at San Francisco International Airport. San Francisco uses the Bombardier INNOVIA APM 100. The contract is worth 220
million USD (193 million euros). The contract also includes an option to extend by five years.

San Francisco INNOVIA APM 100 AirTrain © Bombardier Transportation

Bombardier INNOVIA APM 100

The automated People Mover serving San Francisco airport is known as the SFO AirTrain. It first opened in 2003 and consists of two lines. The total AirTrain fleet consists of 38 APM INNOVIA 100 vehicles. The AirTrain serves nine stations over 10 km. It runs on an elevated roll guideway with rubber tired wheels, center monorail guide. It stopa at the five terminals, two airport parking garages, the Rental Car Center and Millbrae, a Bay Area Rapid Transit (BART) station.

In 2016 Bombardier won a contract for three additional INNOVIA 100 APM vehicles, a 600 m guideway extension, a new station and signalling upgrades.

The SFO AirTrain features Bombardier’s Cityflo 650 Communication Based Train Control, CBTC solution.

Elliot G. (Lee) Sander, President, Americas Division, Bombardier Transportation, said:

“With this new contract, we will continue to provide San Francisco International Airport with the operations and maintenance services as well as the INNOVIA APM vehicles and signalling technology that bring safe and reliable service to the over seven million passengers who ride the AirTrain system every year.

“We look forward to supporting the airport as it extends and modernizes the AirTrain system to meet its future mobility requirements.”
San Francisco INNOVIA APM 100 AirTrain; Pict [www.mousetroop.com](http://www.mousetroop.com)

Francisco APM Roll Guideway © Jef Poskanzer under Licence
Constantine, Algeria, Tramway extended; Algeria

04 Jun. 2019

**ALGERIA:** An extension of the Constantine tramway to the new city of Ali Mendjeli entered revenue service on May 3. The 6·9 km extension runs south from the terminus of the initial route at Zouaghi and adds five stops.

In July 2015 Entreprise du Métro d’Alger awarded a turnkey contract for the extension to a consortium led by Alstom and including Corsan, Corviam and Cosider Travaux Publics. Alstom has supplied railway systems and 24 new trams from a factory in Annaba owned by the CITAL joint venture of Alstom Transport (43%), Alstom Algeria (6%), Ferrovial (41%) and EMA (10%).

A further 3·4 km extension is under development. The initial 8·1 km route opened in 2013 between Zouaghi and Benabdellmalek.

**Thales selected as Supplier for Communication Based Train Control, CBTC, for Finch West Light Rail Line, Toronto; Canada**

26 Jun. 2019
**CANADA:** Mosaic Transit Group has selected Thales to supply signalling for the Finch West light rail line being developed in Toronto. Thales is to supply its *SelTrac Communication Based Train Control, CBTC, Technology.*

Last year Greater Toronto & Hamilton Area transport authority Metrolinx selected Mosaic Transit Group to build the 11 km light rail line from Finch West metro station to Humber College with 18 stations. The consortium comprises Aecon, ACS Infrastructure Canada and CRH Canada Group, each with an equal share. Aecon and ACS Infrastructure Canada each have a 50% share in the 30-year maintenance agreement.

Opening of the partly-underground route is scheduled for 2023, with services to be operated by Toronto Transit Corp.

**Systra wins important Line 7 Contract for Santiago Metro; Chile**

26 Jun. 2019 | Railway-News

Chile: Metro SA has awarded Systra a contract to design the rail systems, workshops and rolling stock of the new, fully automated metro line 7 for Santiago.
The government stated its plans to build line 7 of the metro back in 2017. Running from Renca (northwest) to Vitacura (northeast), it will be almost 25km in length with 21 new stations. Line 7 will run parallel to line 1 for some distance to relieve it of roughly 10,000 daily riders. Once line 7 opens, the Santiago metro network will measure 176km with 163 stations.

**Systra Project Challenges**

Systra says this project contains two key challenges. **Hervé Laurain, Managing Director, Hispanic America, Systra**, said:

“Firstly, we are going to have to work to very tight deadlines as the basic civil engineering started a year early. Also, price was an essential factor for our client, forcing us to produce fast, well and with as little iterations as possible.

“We proposed a team made up of experienced colleagues, who are familiar with the context and challenges of the Santiago metro, have received feedback on what was experienced on the automatic lines 6 and 3 (already designed by Systra), and who have already worked with the Santiago metro teams. This customised organisation will enable us to ensure the integration and coherence of all the engineering produced, without a learning curve and with great productivity.”

Having a wealth of knowledge in the field of fully automated metro lines, Systra says it will also put forward design improvements, making line 7 a “top-class project”.

Systra has been working on Chile’s railways for 50 years. It says this was a further factor that helped it clinch the deal. **Hervé Laurain**:

“Our long history in Chile reassured Metro SA. For Systra it is not about one-shot deals, we offer long-term commitment.”
Santiago de Chile Metro Expansion

Line 7 is not the only new metro line for the Chilean capital. The metro expansion plans include three new lines in total, as well as four extensions to existing lines.

Specifically, in addition to the construction of line 7, Santiago's lines 2, 3 (which only opened in January 2019), 4 and 6 are to be extended, while lines 7, 8 and 9 will be new. Of these new lines, no. 7 will be the longest, with lines 8 and 9 measuring 20km and 17km respectively. Line 7 should enter service in 2026. The line 4 and line 6 extensions as well as lines 8 and 9 will also open in 2026. The line 2 and line 3 extensions, meanwhile, will open in 2022.

Adelaide to competitively tender Commuter Rail and Tram Operations; Australia

Jul. 1, 2019
Written by Mark Carter

THE state Government of South Australia has announced that it will launch tenders for operation of Adelaide Metro Tram and Commuter Rail services, with the aim of providing better and more customer-focused services.

Commuter Rail in Adelaide

The Government says Adelaide Metro is underperforming compared with most other public transport networks in Australia and has one of the lowest comparable patronage rates and the worst level of integration.

Under the outsourcing model the government will
• enter into a performance-based franchise contract that keeps the operator focussed firmly on the efficiency and quality of service delivery,
• retain ownership of rail assets, including trains, trams, and infrastructure,
• set requirements for levels of services,
• continue to set fare prices, and
• retain revenue.

“There is no doubt that we can and must provide better and more customer-focused public transport services for South Australians,” says Mr Stephan Knoll, minister for transport, infrastructure and local government “We know that public transport patronage growth has stalled, and customers want a better level of service than is currently provided. The government guarantees maintaining the same service frequency levels and standards, and we expect an increase in service levels once this model is fully implemented.”

Tenders for Adelaide's tram services will be released immediately and are set to be included in Phase 2 of the current Bus Services Contract Tender, which will released on 2 July 2019.

Timings for the tender for commuter train services will be finalised after a market engagement process, which will begin later this year. Full transition to private-sector operation is expected by mid-2021.

Adelaide Metro Network consists of the Glenelg to Adelaide Entertainment Centre Tram service (with branches to Festival Plaza and Botanic Gardens), and Commuter Trains operating across four major lines; Belair (21.5 km), Gawler (42.2 km), Outer Harbor (21.9 km), and Seaford (36.0 km), with branches to Grange (5.5km) and Tonsley (3.9 km).

Categories: Australia/NZCommuter RailLight Rail

CRRC tests Carbon Fibre Metro Car; China

02 Jul. 2019
**CHINA:** A prototype ‘next-generation’ metro car developed by CRRC Qingdao Sifang using materials including carbon fibre has been tested in Qingdao, and plans are being developed for testing in other cities.

CRRC unveiled a Cetrovo metro vehicle at InnoTrans 2018, saying it was the first metro car with a carbon fibre bodyshell. The manufacturer has produced three prototypes, with one used for structural testing and two for trial running.

Announcing the successful completion of trials in Qingdao during June, CRRC Qingdao Sifang’s Deputy Chief Engineer Ding Sansan said the next-generation car was 13% lighter than the previous models, and along with the silicon carbide inverter and permanent-magnet synchronous motors this could reduce energy consumption by more than 15%.

Features to improve passenger comfort include sound-proof materials to reduce interior noise, and ‘smart’ air-conditioning and lighting. The windows act as touchscreen computers which passengers can use to access the internet and watch videos.

The car is designed for fully automated operation at a maximum speed of 140 km/h, compared to the 80 km/h of previous designs. An **intelligent monitoring system provides real-time fault alerts to support condition-based maintenance.**

**Transmashholding reveals new Metro Car Design; Russia**

26 Jun. 2019
RUSSIA: Transmashholding presented a mock-up of its latest metro car design at the SmartTransport trade show that took place in St Petersburg on June 19-21.

The ‘Metro 2020’ bodyshell features ‘innovative and super-technological’ aerodynamic characteristics as well as wider doors and an improved cab configuration.

TMH subsidiary OEVRZ signed a co-operation agreement with St Petersburg Metro during the event. The agreement aims to strengthen knowledge-sharing regarding technologies that can increase in efficiency and safety.
METRO NEWSLETTERS

on

“URBAN MOBILITY AS A SERVICE”

PUBLIC MULTIMODAL URBAN, SUBURBAN AND INTERURBAN PASSENGER TRANSIT SYSTEMS WITH METRO-BUS, LIGHT-RAIL, TRAM-TRAIN, METRO-RAIL, METRO-TRAIN, REGIONAL RAPID TRANSIT, COMMUTER-RAIL, ROPE-WAY/TRAIN, MAGLEV AND HOVERCRAFT TRANSIT/PEOPLE MOVER, WATER-METRO, AUTONOMOUS PEOPLE-MOVER

MOBILITY SOLUTION, TRANSPORTATION AND ECONOMIC DEVELOPMENTS IN MODERN URBAN/MEGAPOLIS ENVIRONMENT

METRO Newsletter by Dr. F.A. Wingler
METRO 78, July 2019
PART I: INDIAN ACTIVITIES AND INITIATIVES FOR URBAN MOBILITY AS A SERVICE

Urban Mobility Development in India need to look beyond Costs; India

While public Transport Systems should be able to match the Demand, they also need to be self-sustaining in Terms of Revenue.

By Alain Spohr
16/03/2019

Public Transport Infrastructure is an important indicator of progress in the global economy where growth opportunities are linked to the mobility of people, goods, and information. India currently ranks 44th in the World Bank's Logistics Performance Index, a relatively high score compared to other countries at similar income levels. This number matters not just to the transport sector, but to India’s economy as a whole.

Global population is continuing to expand and is expected to reach over 8 billion by 2030. According to the United Nations, emerging markets accounted for nearly three-quarters of the world’s urban population in 2015. India stands out as a country which will need extensive infrastructure enhancements, given that its already-high population density will increase by 22 percent by 2030. Estimates suggest that India will be home to a whopping 452 people per square kilometer.

Managing the urbanization process is likely to be the single biggest challenge that will confront policymakers in India over the next decade.

Emerging economies such as India must build and develop new infrastructure to meet basic requirements. According to RAI (Rural Access Index, developed by the World Bank), there are still 301 million people who do not have access to rural transport in India. All the country’s high-density rail corridors face severe capacity constraints. Moreover, freight transportation costs by rail are much higher than in most countries as freight tariffs in India have been kept high to subsidize passenger traffic.

As stated by the Indian Government, India requires around $4.5 trillion worth of investments until 2040 to develop infrastructure to improve economic growth and community wellbeing.

Only mass urban transport solutions can provide India's urban commuters with competent mobility
Nobody will disagree that the best thing that happened to Delhi in recent years is the metro rail. Metro has altered the character of the city in many locales. In Mumbai, the electric train service is touted to be the lifeline, catering to almost 80 percent of citizen trips.

The cost of travel, especially for the poor, has increased considerably. Walking or cycling has become risky or impractical with expanding urban sprawl. The increasing number of personal vehicles is the leading cause of environmental degradation.

What is required is a balanced focus on extending transportation infrastructure, as well as leveraging smart technology solutions. The task list is long to improve and extend public transportation infrastructure in Indian cities. The government of India is investing in various national, state and local initiatives to improve public transportation. Now there is also a need to leverage smart technology solutions to quickly improve the efficiency and capacity of public transportation and to create a high-quality public transportation system.

While public transport systems should be able to match the demand, they also need to be self-sustaining in terms of revenue

The P&L Debate is now soundless

There is always a debate on ways to make the entire system economically viable. Most metro operations begin with a low occupancy rate but as the network grows, it attracts more people from all around the city, bringing down the cost per passenger trips. Take the example of Mass Transit Railway (in Hong Kong) and The Delhi Metro Rail Corporation’s (DMRC). The Mass Transit Railway is a major public transport network serving Hong Kong and is one of the most profitable metro systems in the world. It had a farebox recovery ratio of 187 percent in 2015, the world's highest.

The level of profitability of a transit system is usually measured using the farebox recovery ratio, which is the difference between the revenue collected as fares from the users and the operating expenses.

DMRC’s earnings per kilometer have gone up by 74 percent since 2014, India’s highest. The DMRC has also been able to meet the target for the last fiscal year. According to a statement by Union Minister of Housing and Urban Affairs, the government may not even increase fares until 2020, as a result of this achievement.

Building an innovative financing Framework

It is necessary to consider innovative urban transportation financing as part of a comprehensive framework, rather than individual projects. At present, the government’s flagship urban development schemes including the Smart Cities Mission and AMRUT (Atal Mission for Rejuvenation and Urban Transformation), funds that are only a fraction of the required investment. For instance, under the Smart Cities Mission, the Government has allocated $14 billion for 100 cities to be disbursed over five years, with equal contributions from the central and state governments. This amount is by no means sufficient. Thus, the grant is to be used as a starting point to attract funding from external sources.

Local authorities, including urban transport, state-owned enterprises, and the Union government should become more attractive to private investors. Climate investors can also provide new sources of funding. In December 2016, Mexico City became the first sub-national government to issue a green bond in Latin America, which was then used to finance sustainable transport projects, including improvements to the city’s metro system.
The good news is that when there is a challenge to design projects that can attract private sector interest, the World Bank provides help to governments to design better urban rail PPPs.

The framework should seek to achieve maximized social-economic benefits to society through the implementation of the most cost-effective option for urban transportation.

**Leverage the Advantages of Localization**

The Make in India Programme significantly reduces the cost of metro rail projects by localizing manufacturing. India has already proved that it has a huge reservoir of talent and infrastructure required to create cost-efficient metro networks, which have become a benchmark technically, economically and environmentally for urban mobility all over the world.

But localization needs to go beyond manufacturing mechanical parts. It needs to cover design, manufacturing, and procurement, which can reduce the cost of metro projects as well as the lead time. The reduced cost and time to execute will allow for the faster execution of projects and improve customer satisfaction.

The number of jobs, short-term and long-term, that a metro project creates should also be considered while calculating the cost-effectiveness of a metro project. A solid localized footprint is a way forward for all the metro operators that view India as a place for innovative mobility solutions.

Finally, there is no substitute for experience. Metro projects are best handled by companies, which have been doing this all over the world and are well poised to bring their global expertise to India. They can be quality guarantors with their proven track record as a provider of advanced mobility solutions with high standards in safety and efficiency.

A robust urban rail system will be a huge advantage for growing Indian cities. A combination of the correct metrics, procurement, and industry policies, along with effective planning can make metros a shining example for the rest of the world. Metro Rails can win any argument owing to their comparative cost advantage. Let the wagon roll!

This article was first published in *money control*.

**Conferences on URBAN MOBILITY in India announced; India**

![Urban Mobility India Conference & Expo](image-url)
The Urban Mobility India Conference & Expo aims to disseminate information to the cities, whose officials attend the conference, and to help them keep up-to-date with best urban transport practices. The conference provides an opportunity for key decision makers and delegates to interact with other professionals, experts, academia, industry, civil society, technology, services providers and other stakeholders in Urban Transport both domestic and international so that the delegates can carry home ideas to develop their urban transport along a sustainable path.

And:

"Grasp the Future of Mobility".

The “Mobility India” is a two-day conference designed to help stakeholders understand the future of mobility. The main topics of this conference include autonomous vehicle mapping and testing, artificial intelligence, connected vehicle networks, automotive data, automaker strategy, e-Mobility, Urban Mobility, Mobility-as-a-Service, MaaS, and the consumer of the future.

15-km long Hyperloop Test Track to be constructed near Pune; India

July 5, 2019 Rail News
**Pune:** A 15-km long test track for Mumbai-Pune **Hyperloop** project will be constructed near Pune. The test **track** for the hyperloop is proposed to be constructed between Kiwale and Urse on the Mumbai-Pune **Expressway**, sources said.

**More Information:**

- The **PMRDA (Pune Metropolitan Region Development Authority)**, has sought assistance from the Principal Scientific Adviser to the Government of India to prepare safety guidelines for the Hyperloop.
- When completed, hyperloop can reduce the travel time between Mumbai and Pune from about 4 hours to 25 minutes.
- The high-capacity passenger and cargo hyperloop route will eventually support 150 million passenger trips annually, saving more than 90 million hours of travel time, and providing citizens with greater opportunities and social & economic mobility.
- The hyperloop system will also have the potential for the rapid movement of palletized freight and light cargo between the Port of Mumbai and Pune, creating a robust backbone for on-demand deliveries, supply chains, and next-generation logistics.
- The 100% electric, efficient hyperloop system will ease severe expressway congestion and could reduce greenhouse gas emissions by up to 150,000 tons annually.
- The Pune-Mumbai route could result in USD $55 billion (INR ₹350,000 crores) in socio-economic benefits (time savings, emissions and accident reduction, operational cost savings, etc.) over 30 years of operation, according to an initial pre-feasibility study completed by Virgin Hyperloop One.
- The hyperloop route will link central Pune, Navi Mumbai International Airport, and Mumbai in 25-minutes, connecting 26 million people and creating a thriving, **competitive mega-region**.

**Hyderabad Airport Metro Limited invites with a Request of Proposal,**
RfP, for guided Right of Way elevated Bus Rapid Transit System, BRTS, Project; India

By
Urban Transport News
-
08/07/2019

Hyderabad (Urban Transport News): Hyderabad Airport Metro Limited (HAML) having its principal offices at Metro Rail Bhavan, Rasoolpura, Begumpet, Hyderabad – 500 003 is engaged in the development of Mass Rapid Transit System (MRTS) in the city of Hyderabad and as part of this endeavor, the Authority intends to prepare a Detailed Project Report (DPR) for development of an elevated Busway Rapid Transit System (EBRTS) from KPHB to Financial District, Hyderabad, similar to the right of way Busway Metro Transit in Adelaide, Australia.

In pursuance of the above, the HAML has decided to carry out the process for selection of a Consultant for preparing the Detailed Project Report (DPR) and bid documents for the project. The consultant shall prepare the DPR in accordance with Terms of Reference specified at Schedule – 1 (the “TOR”).
The HAML invites proposals (the “Proposals”) for selection of a Consultant who shall prepare DPR for development of an Elevated Bus Rapid Transit System (EBRTS) from KPHB to Financial District, Hyderabad. The HAML intends to select the Consultant through a competitive bidding in accordance with the procedure set out.

**Corridor Description**

The corridor mostly runs along the KPHB Metro Station – KPHB Hitec City Road – Malaysian Township junction – Hitec City MMTS Station – Hitex – Hitec City Phase-II – Mindspace – IIIT – Financial District Road – Financial District. The preferred alignment is proposed to be well integrated with major public transport systems as follows:

1. KPHB Metro Station, **HMRL Metro Line-1** (Existing).
2. Hitec City MMTS Railway Station (Existing).
3. Mindspace Metro Station, HMRL (Corridor-3 Upcoming)
4. Hyderabad Airport Metro Rail Link at Raidurg (Proposed).
5. Hyderabad Metro (Phase-2) at its junction with Gachibowli – Miyapur Road (Proposed).

The proposed corridor will be fully elevated of 17 km long with stations located at a spacing of around 500 to 600 meters for easy accessibility. It shall have depots in at-grade position both at terminals and one in between for operational convenience and non-fare revenue generation.

**RFP Notice No. 2241/HAML/SE(C)/EE-I/EBRTS Corridor/2019**

**Sale of RFP Document**

RFP document can be downloaded from the Official Website of the HAML, [http://hmrl.co.in](http://hmrl.co.in). The Applicant shall submit a bid processing fee of Rs. 25000/- (Rupees Twenty Five thousand only) in the form of a demand draft or banker’s cheque drawn in favour of Hyderabad Airport Metro Limited payable at Hyderabad along with the technical bid document.

**Schedule of Selection Process**

The following schedule shall be adhered for the selection process of the consultant:

- Uploading of RfP Bid document: **04.07.2019**
- Proposal Due Date (PDD): **11.07.2019 at 15:00 hrs**
- Opening of Technical Proposals: **11.07.2019 at 15:30 hrs**
- Announcement of short list: **17.07.2019 at 11:00 hrs**
- Opening of Financial Proposal: **17.07.2019 at 11:30 hrs**
- Letter of Award (LoA): **20.07.2019**
- Submission of Performance Security: **27.07.2019**
- Signing of Agreement: **31.07.2019**
- Validity of Proposals: **90 days from PDD**

**Brief Description of the Selection Process**

The HAML has adopted a single stage two cover system selection process (collectively the “Selection Process”) in evaluating the Proposals comprising technical and financial bids to be submitted in sealed envelopes separately on Proposal Due Date.
Pre-Proposal visit to the Site and inspection of data

Prospective applicants may visit the Site and review the available data at any time prior to PDD. For this purpose, they will provide at least two days' notice to the nodal officer specified below:
Mr. NVA Prasad,
Executive Engineer,
Hyderabad Airport Metro Limited

Communications

All communications including the submission of Proposal should be addressed to:
Mr. M. Vishnu Vardhan Reddy,
Superintending Engineer (Coordination),
Hyderabad Airport Metro Limited,
Rasoolpura, Begumpet,
Hyderabad – 500003
Telangana

The Government of India shifts Focus to last Mile Connectivity in Metro Cities; India

According to data, around 329 feeder bus services have been made operational by the Central Government.

By
Vinod Shah
23/03/2019
SmartE Rickshaw flagged off by LG Anil Baijal in Delhi Metro

**New Delhi (Urban Transport News):** With metro rail systems expanding its network across India, the Union Ministry of Housing and Urban Affairs has turned its attention to improving last-mile connectivity for better commuting experience in metro cities. The Ministry has started focusing on feeder bus services, electric rickshaws, rented cycles, electric scooter services, and partnerships with cab aggregators.

According to the Metro Rail Policy launched in 2017, the objective of the Ministry is to ensure the lowest cost mass transit mode is selected for public transport. The states must make the metro self-sustaining, enhance other kinds of mass rapid transport systems, such as monorails or buses, and provide last mile connectivity, between the metro station and the commuters’ destinations.

“We have already drafted a last-mile connectivity plan across all operational metros; the aim is to provide a safe and economical ecosystem for daily commuting,” said Hardeep Singh Puri, Minister of State for Housing and Urban Affairs in a recent interview. The Central Government has already drafted a last-mile connectivity plan for 10 metros in cities such as Delhi, Bangalore, and Kochi.

The new Metro Rail policy had also aimed to enhance metro rail revenues through a feeder system. Every proposal for metro rail should necessarily include proposals for feeder systems that help to enlarge the catchment area of each metro station at least to 5 km. Last-mile connectivity through pedestrian pathways, Non-Motorised Transport (NMT) infrastructure, and induction of facilities for paratransit modes will be essential requirements for availing any central assistance for the proposed metro rail projects.

According to data, around 329 feeder bus services have been made operational by the Central Government. This includes an ambitious plan for Delhi and NCR, served by Delhi Metro Rail Corporation (DMRC).

With the objective of strengthening feeder bus services with defined service quality parameters, the Delhi Metro Rail Corporation (DMRC) is in the process of inducting (through open e-tenders) 427 buses (MIDI size battery operated/CNG air-conditioned...
buses) on 48 routes on cluster model. However, approval of the Delhi Government on sustaining the project by way of viability gap funding is awaited.

According to sources, the Central Government is also working on a pilot project involving cab aggregators which have been allotted space on rent at metro stations to set up kiosks where cabs can be booked. The DMRC has also started the process of allotment of bare spaces to the cab aggregators at all the metro stations.

The new Metro rail policy also mandates analysis of alternatives, requiring an evaluation of other modes of mass transit such as Bus Rapid Transit System (BRTS), light rail transit, tramways, metro rail and regional rail in terms of demand, capacity, cost, and ease of implementation.

“The alignment of metros such as Ahmedabad metro rail project phase-I is such that it integrates with BRTS, Indian Railways, and the city bus service at various strategic locations in both East-West and North-South Corridors for seamless connectivity. Future transit systems such as the Mumbai–Ahmedabad high-speed bullet train will also integrate with phase-I at two locations”, sources said.

Currently, Metro connectivity with BRTS at Ahmedabad is provided at nine stations. The Central Government is also working towards integrating electric vehicle transportation.

According to the Ministry of Housing & Urban Affairs, a pilot project is being undertaken by DMRC in its five metro stations; in Chennai, it is already operational in two stations of Chennai Metro; and it is also operational in Hyderabad. Another aspect of non-motorised transport includes cycle sharing services which are currently operational in metros across eight cities.

**Mahindra Electric signs MoU with SmartE to make electric Mobility more accessible; India**

*Set to introduce first 1,000 Treo range of Electric Three Wheelers in Delhi-NCR by March 2019 to drive clean, shared and affordable mobility*

By [Urban Transport News](https://www.urbantransportnews.com) 12/12/2018
Mahindra Electric and SmartE signed MoU to transform last Mile Connectivity

New Delhi (Urban Transport News): The Mahindra Electric Mobility Ltd, part of the USD 20.7 billion Mahindra Group, and SmartE, India’s largest electric vehicle fleet operator, today signed a Memorandum of Understanding (MoU) to drive electric mobility forward in India. Under the MoU, SmartE will introduce the first 1,000 Mahindra Treo and Treo Yaari electric three-wheelers in Delhi-NCR by March 2019. The company also plans to deploy a total of 10,000 Mahindra electric three-wheelers across the country by 2020.

The MoU was signed by Mr. Mahesh Babu, CEO, Mahindra Electric & Mr. Goldie Srivastava, Co-Founder and CEO, SmartE, in New Delhi.

The two leading companies in the electric mobility market have come together, to offer convenient, affordable and zero-emission last-mile connectivity, not just for the NCR region but also for major cities around the country. The partnership is an example of collaboration between companies to address India’s growing need for clean, shared and public mobility solutions, and it aims to rapidly transform the overall EV adoption rate in the country.

“As the pioneers of electric mobility, we are happy to join forces with SmartE to accelerate the adoption of electric mobility. India is witnessing rapid urbanization and metros are driving the multi-modal mobility needs of the large working population in urban cities. Our Treo range of three-wheelers will address the demand for first and last mile connectivity and transform the way urban India travels. Associations with partners such as SmartE will make it easier to adopt electric mobility and enable our cities to be more environmentally friendly”, said Mahesh Babu, CEO, Mahindra Electric while speaking on the occasion.

“We are excited to embark on this journey with Mahindra Electric in our efforts to make the last-mile commute convenient, safe, affordable and eco-friendly for everyone. We look forward to shifting to the zero-emission, cost-efficient, and more comfortable Mahindra Treo range of electric three-wheelers”, said Goldie Srivastava, Co-Founder and CEO, SmartE.
“As a pioneer in the electric mobility service space, SmartE plans to roll-out 100,000 vehicles by 2022. We believe Mahindra Electric’s solutions will play a critical role in our growth strategy,” he added.

SmartE already has an ongoing partnership with the Delhi Metro Rail Corporation (DMRC), among other organizations and delivers nearly 80,000 rides to commuters daily. SmartE has completed over 30 million pollution-freerides in the past three years since its inception and is India’s largest electric vehicle operator today.

The MoU with Mahindra specifically addresses the last-mile connectivity needs of Delhi Metro commuters. SmartE, which has already built a captive EV charging network for 800 vehicles (concurrently) will be ramping up its EV Charging set-up to support the additional 1,000 vehicles in Delhi. With this addition, SmartE’s fleet of EVs will cross 2,000 vehicles by March 2019 and will help serve over 200,000 commuters per day.

As the global pioneer in the development and production of electric vehicles, Mahindra Electric currently has over 5,000 electric vehicles on road, which have clocked more than 95 million ekms. The Treo range of electric three wheelers uses Mahindra Electric’s homegrown powertrain and Maintenance-free lithium-ion battery. The variants include the Treo electric auto and Treo Yaari electric rickshaw, both available in an industry first, hard top, weatherproof variants. With the use of exceptional light-weighting technologies and composite body panels, the Treo boasts a certified range of 170 km (eAuto) and 129 km (eRickshaw) directly addressing range anxiety in the market.

PART II: GLOBAL ACTIVITIES FOR URBAN MOBILITY AS A SERVICE

Ahead of SmartTransit LA 2019 Congress, October 28-30th:
5G to make Use of Digitalisation, Artificial Intelligence, Internet of Things, Big Data in urban, suburban and interurban public Transport Technologies for Urban Mobility as a Service

ABB Products and Solutions for Rail and Infrastructure; Global

Writing the Future of Safe, smart and sustainable Mobility Solutions; ABB

Rail is being rediscovered as a sustainable and energy-efficient form of transport, triggering investment in infrastructure, rolling stock, control systems and service. With over
100 years’ experience in delivering pioneering solutions for modern transport challenges ABB is ideally positioned to enable this green transport revolution.

From infrastructure and passenger stations to control and signaling units, tunnels and rolling stock, ABB Ability™ integrated and collaborative digital solutions for transportation allow for 24/7 monitoring, remote control, preventive maintenance, smart software upgrades and first-class certified service worldwide.

Indeed, as both passenger and freight traffic continue to increase on existing tracks and new high-speed rail projects are developed, the demand for safe, stable and reliable power is high.

Here, the key focus areas are DC voltage and AC voltage solutions. ABB’s innovative products are designed for heavy-duty industrial applications and are extensively tested to withstand the requirements of a modern transport system, helping to ensure maximum reliability for the needs of transport operators, system providers and integrators, as well as electrical contractors and installers.

ABB’s railway product offering for the electrification of infrastructure and rolling stock includes an extensive range of indoor and outdoor loose components, switchgears and modular solutions, such as eHouses and outdoor modules specially designed and tailored to comply with various railway standards around the world.

Product packaging provides simple interface engineering for seamless integration with third party offerings, in response to custom applications; and a made-to-measure bundle of services is available, on demand or in multi-year agreement, on and off customer sites.

**SmartTransit Congress – 28-30th October 2019, Los Angeles; USA, Global**
The SmartTransit Congress is the go-to event for senior transit industry figures from across North America and beyond. The event will look at how digitalization and technology is revolutionizing transit, from enhanced analytic technologies to real-time passenger information systems. With the support of local transit agency, LA Metro, SmartTransit is the event for transit executives looking to keep up with the pace of change.

By attending the event you can:

• Visit a great location: we’re moving to Los Angeles! LA Metro is supporting the event and you can see and experience their exciting network growth first-hand

• Learn directly from LA Metro: delegates will have the opportunity to LA Metro’s new line which is due to open to operations in mid-2020 at a cost of $1.8bn.

• Focus on your area: we’ll have two streams: assets and digitalization, and ridership and mobility – so whether your focus is on the technical or the passenger, we have the session for you.

• Learn from high-level speakers: we have C-level representatives from organizations including Transsdev North America, VIA Metropolitan Transit, Metro Houston, San Diego MTS, Sound Transit and many more.
“Realize that everything connects to everything else.” Those were the words of Leonardo di ser Piero da Vinci, famous Renaissance Man and one of the most brilliant humans to ever walk the face of the Earth. While Leo lived in an age far behind the advent
of trains and railways (let alone computers) his ideas regarding transport and civil engineering were far ahead of its time.

From the famous helicopter prototype to the lesser known multilevel city project, many of his ideas now live on as a real part of our daily lives, with Chicago’s multilevel streets closely resembling his project from six centuries ago by layering and segregating civilian and transportation traffic. But nowadays, a different kind of multilevel structure is emerging – and this one is all about integration instead.

Interconnectivity is an unshakeable part of the modern world, as technology enables even the tiniest and most remote devices to be constantly communicating with each other. The transportation industry is at the forefront of those changes, utilising new ticketing, signalling, and tracking systems to further advance integrated mobility and chase mobility as a service, not to mention maintenance and processes.

Ahead of SmartTransit LA 2019 October 28-30th, we put together this industry guide with the latest developments and discussions in the sector, in order to keep you up to date in some of the many topics we’ll be talking about in the three-day event in California. Executives and experts of every relevant company, operator, governmental agency, and service provider will be present, creating one of the best networking events in the planet, and we expect to see you there.

The world is an increasingly connected place, and the secret to success in this modern world is to recognise the extent of it and push all boundaries. Forge the tech and process, instead of accepting them. Be at the vanguard of that revolution, instead of trailing behind the trailblazers. That’s what we’re here for. That’s what SmartTransit is there for. As Leo said; “Realize that everything connects to everything else.”

Marcello Perricone
The Editor
www.smartrailworld.com

Platforms for Change: How Transit Connectivity offers so much more than an Internet Connection; Canada, Global

Posted by Marcello Perricone on Jul. 5, 2019


But what do those Dates signify?
They represent the years that those respective transit networks first went into operation. Yes, there have been upgrades and extensions in rail and transport worldwide, but the origins of these subways belong in another era. Whilst decades of operation grants experience and confidence, transport authorities still accommodate a far larger number of passengers (along with their greater set of demands) in the same physical space. Since most networks can’t significantly expand or alter their physical footprint without incurring major costs or service disruptions, the answer is to deploy new technologies and devise strategies that grow ridership and improve passenger experience, without causing upheaval to subway operations or budgets.

For James Woodhams, Chief Strategy Officer at BAI Communications, a solution to the challenge of modernising transit is to be found within the proliferation of the Internet of Things (IoT) and the opportunities this rapidly developing technology offers.

“We firmly believe that transit networks are the heartbeat of a city and are proud to work with a number of the busiest operators around the world,” says James. “But like the passengers that use them, you always need to be moving – growing ridership, improving the passenger experience, making better use of the data you are gaining. IoT can help with this significantly, whether that is using sensors, Machine2Machine learning, Big Data, cloud computing, or other emerging technologies, and we are already seeing how this approach can deliver connected, data-driven transport systems which can unlock new value for both operators and passengers.”

Clearly passionate about what digital technology can offer mass transport, James can offer several examples where its deployment has delivered real benefits. In Toronto – a city with a strong reputation for digital and tech excellence – BAI is working with the Toronto Transit Commission (TTC) in what is the most heavily used urban mass transit system in Canada (and the third largest in North America). BAI has a long-term partnership with the TTC to deliver connectivity across its network, and in addition to its cellular and Wi-Fi rollout, the network that BAI installed also enabled a significant update to the TTC’s fare collection operations in the shape of its PRESTO card.

The fibre network built by BAI (@BAIComms) provides the IP connectivity that enables TTC journeys using the PRESTO card via a major undertaking, with 1,600 fare payment devices now connected on BAI’s network. The use of tickets and tokens in Toronto will come to an end at the end of 2019, and PRESTO will be the sole way to pay for your journey.

A true Transport Revolution

A second example that James discusses is in New York. What might appear to be a straightforward deployment of a countdown clock on the subway network proved challenging until Transit Wireless, a majority owned BAI Communications company, worked with the MTA to come up with a solution. The NYC metro’s “fixed block” signalling system, installed in the 1930s, made delivering accurate real-time passenger information a challenge for many of the transit system’s subway lines and the solution would integrate the existing Transit Wireless network with the MTA’s cloud and Bluetooth receivers placed in every station.

These receivers communicate with devices that have been installed in trains set running on the line – as the train enters and leaves a station, the system uses its arrival and departure time to calculate the time at which the train will reach the next stop in the line, displaying the arrival times on LCD screens installed at each station. When these clocks
came online in 2016, New York was able to offer transit commuters an accurate view of train the arrival times.

“Constant connectivity is something which has become an expectation for consumers, and this now applies to their time spent on public transport,” says James. “Similarly, with the growth of intermodal travel and smart fare payment – like the advancements we’ve seen with PRESTO card – will become increasingly more in demand globally.

“But the passenger focused technologies are only part of the story of what we can deliver. **IoT can also be deployed with preventative maintenance, with AI and machine learning already helping decrease cycles for engineering teams and reduce service disruption for operators.** We are also looking at uses for the huge amounts of data that our connectivity can accrue, and identifying all the positive operational changes that can be data-driven.

For example, passenger movement can be monitored by using this data, and timetables can be amended accordingly,” continues James. **“Gaining an accurate view of passenger flow can also offer opportunities to improve safety and security – which of course is the most important aspect.”**

Caren Levy, Professor of Transformative Urban Planning at the University of London, **wrote in 2013** that the ability to access transport reflects the “right to participate” in the life of the city – not just to exist in it, but to partake fully in what it offers for work, leisure, and education. Like James’ idea of a “heartbeat”, our transport networks have never been more important, and the role of companies that facilitating the layering of various technologies upon a single network – be they passenger or operationally focused, – is only going to increase in importance in coming years.

**From East to West: Installing Subway Telecomms across the United States, with Joe Mullin, CTO of InSite Wireless (Part 1); USA**

*Posted by Marcello Perricone on Jul. 3, 2019*

The Internet has long been an indispensable part of daily life, with people routinely used to being reachable anywhere and working on the move. **With the imminent arrival of 5G, Wi-Fi in subways and trains has become more relevant than ever, so I sat down with Joe**
Mullin, Chief Technical Officer of InSite Wireless, to discuss the biggest challenges and developments around bringing a reliable, uniform data connection to a whole rail network.

The second largest private wireless infrastructure company in the US, InSite has over 2000 sites and locations, including towers, land, and antenna systems. Over the past two decades, the company has branched into the rail sector and worked with major subway operators in LA, Atlanta, and their hometown of Boston.

“From the rail transport perspective, we started relatively early, distributing antenna systems on underground subway systems,” explains Joe. “The Boston MBTA (Massachusetts Bay Transportation Authority) subway was the first one we did, in 2005. The MBTA had tried previously with two different teams to get the work done, and both failed – the cost had come in so high that nobody wanted to pay for it.”

Due to the size of tunnels and the maintenance hostile environment, companies were having significant trouble establishing a reliable, durable Distributed Antenna Systems (DAS). After the failure of previous projects, InSite was awarded the right to design, build, operate, and maintain a neutral host DAS to deliver coverage to station platforms, walkways, and on trains travelling between stations.

“We were brought in and were able to do it, working on it from 2005 until 2013. Today we have 145 underground stations and more than 21 miles of track covered,” says Joe. “The four major US wireless carriers – Verizon, AT&T, T-Mobile, and Sprint – are all in the system, and we have our local Comcast operating wi-fi on the station’s platforms.”

Due to success of the Boston project, InSite started expanding to other areas of the continental United States, providing DAs installations to Atlanta's MARTA (Metropolitan Atlanta Rapid Transit Authority) and Los Angeles County Metropolitan Transportation Authority. According to Joe, there’s a single common challenge between all of those projects: time.

"There's always a lot of work to be done between ourselves and the transit agency, to make sure we’re line with their expectations and providing them the documentation they need, getting approvals, etc," Joe explains. "In fact, no matter where we go, the biggest
challenge is getting on the tracks to perform the installation. The systems, that we were on, ran pretty much 20 hours a day, more or less, so there’s a lot of competition to get on track to get work done -- getting that priority on scheduling to get it done is always a challenge. It’s understandable from their part, but in order to get the job done, we need the time on the tracks.

"There’s so much congestion in LA that the populace is embracing public transit, so there’s a lot of subway construction going on -- when working with LA Metro, we were involved in the early planning of the subway lines, so we’re able to go in to do our installation before it starts operating," he continues. "We’ve been working on the Crenshaw line, the Regional Connector Transit Corridor, and three Purple line extensions, and it has been good -- it’s a night and day difference being able to go in there without having to worry about the resume of service or other people’s schedules."

Come back on Friday for the second part of the interview, where we discuss the increased data requirements of the modern world, the challenges brought by an ever-more taxed infrastructure, and the ways one can address and profit from them.

1G to 5G: The Demands of modern Data on public Transit Infrastructure, with Joe Mullin, CTO of InSite Wireless (Part 2); USA, Global

Posted by Marcello Perricone on Jul. 5, 2019
This is Part 2 of a three-part interview. Click here to read part 1, where we discuss InSite's work at Boston's MBTA, Atlanta's MARTA, and LA Metro’s subway systems.

Ahead of SmartTransit LA, I sat down for an extremely enjoyable talk with Joe Mullin, Chief Technical Officer of InSite Wireless in Boston. After talking about their past projects in the rail industry, I ask Joe about the current state of tech, and how the constant advances, innovations, and hardware leaps affect InSite's operations. To my surprise, he tells me the unflinching pace of progress brings more problems than solutions.

"Our job actually gets harder rather than easier. What we’re seeing -- and it isn’t just in the transit environment, but across the industry -- is that ever since the advent of the smartphone as we know it back in 2007, there’s been an incredible increase in the demand for data, quarter over quarter, year after year," he says. "It is constantly upwards-sloping the curve for usage; people started out with emailing and browsing the web, and now the normal thing is uploading and downloading pictures and videos -- the demand for data is astronomical, and it is continuing to rise."

That surge in network usage requires a robust backbone, able to not only relay the vast amounts of data, but also route the signals of multiple devices in a small area. Due to the way technology progresses in leaps and the transportation industry very much does not, service providers must plan the next step before their initial installation is even completed.

Back in the early 90s, the Washington Metropolitan Area Transit Authority (WMATA) chose Verizon -- a single carrier -- to provide the cellphone system for the entire DC Metro. The company deployed a 1G/2G network that was unable to keep up with the necessary capacity expansion, and WMATA had to rely on multiple wireless providers -- whom according to Joe, "even though they have their own agenda and want to get things done, cooperation is not their strong suit" -- to get the Metro network system to cope with the extra demand.
"You need to increase the amount of downlink power and quality uplink, and that network in DC was never built for 3G or 4G and outlived its usefulness. The MBTA (Boston) has been our longest established system, and when we rolled it out, we were basically (for all practical purposes) in a 2G world; 3G existed, but there wasn’t a lot of market penetration - it was all voice and text," explains Joe. "With the launch of the smartphone and 3G/4G and the subsequent increase in demand, we’ve been consistently upgrading the infrastructure in the subway."

"A lot of it has been additional frequency bands," he continues. "We only had two frequency bands when we started -- 850 and 900, here in the US -- and then shortly thereafter AWS came out, which was 1700 and 2100.

We’ve been adding frequency bands and going towards the higher-level, more sensitive technologies with more sensitive modulation schemes for the higher data throughput -- a much more demanding specification, but we’ve been very successful in upgrading throughout that whole process, and we continue to do it today."
It isn't all about internet speed, though. As mobiles, tablets, and laptops became cheaper to the point of ubiquity, infrastructure suddenly saw itself besieged by thousands of devices at once. Antennas were unable to handle the amount of devices in one spot, and as higher protocols increased speed and reduced coverage, a process called sectorization was kicked into overdrive.

"We're adding additional sectors today due to the increased usage demand. We originally added about twelve sectors to the subway in Boston, and we're in the process of more than doubling that now to 28 sectors. We're slicing and dicing the system to put more capacity into it," Joe says. "When we launched in LA and Atlanta, however, we had the benefit of hindsight -- we did so with a higher sector count and capability because we're anticipating the growth, so we can go ahead and increase sectorisation as needed."

Come back next week for the third and final part of the interview, where we discuss telecoms saturation and the security concerns of subway installations, alongside ways one can address and profit from them.

4G versus 5G: The Advantages and Pitifalls of Future`s wireless Standards; Global

From: www.SmartRailWorld.com
5G has been the talking point of the tech industry for quite some time, promising massive bandwidth improvements that are supposed to affect everything from Netflix to self-driving cars.

The rail industry has also been long excited by this future tech, salivating over the train tracking, user experience, and backend improvements that can be realised with it over the upcoming years. However, while the transition to 4G was already a massive jump in speed and 5G is predicted to be even bigger, it isn’t all green pastures – technology changes always bring along difficulties, and for all its many advantages, 5G has its fair share of pitfalls.

Let’s start with the good things first: the biggest draw of 5G comes from the increased capacity and frequency, which allows for more network connections; while 4G can support about 4,000 devices per square kilometre, 5G can support around one million in the same area. That higher capacity is tied to higher bandwidth, which allows each of those devices to have a much faster connection in 5G among millions of devices than they did when sharing 4G with fewer of them.

“What the 5G network promises – and it depends on the extent to which people invest in it – is that those 4G capacity limitations will largely go away,” says Stephen Farrugia, CTO of BAI Communications M in Australia. “It’s millimetre wave spectrum has huge capacity, and the high frequency means it is like using a laser pointer to communicate – each device gets great bandwidth.”

However, that increased frequency and intense bandwidth requires a more focused transmission, which leads to sparser coverage.

The implementation of 4G saw a big increase on the construction of extra towers to cover the area previously handled by a single 3G transmitter, which resulted in higher maintenance and expansion costs to provide a proper, contiguous coverage. Given the
requirements of 5G, the same thing is expected to happen when it undergoes intense implementation, as at least twice as many transmitters are needed to cover the same area serviced by 4G connections nowadays.

That higher frequency – around 1,000 MHz across the entire spectrum versus today’s 100 MHZ – also means a much smaller latency for 5G devices, reducing the time it takes for devices to respond to each other and turning even the most bandwidth-intensive operations near- instantaneous. The 20-30 milliseconds response time of current 4G connections will be reduced to 10-1 milliseconds, meaning passengers will be able to play HD and 4K videos in real-time without buffering and even game, while train operators will be able to transmit obscene amounts of data for tracking, maintenance, and ops purposes.

“Improved coverage, faster speed, and low latency will drive consumer and commercial access and usage to higher levels, says Melinda White, CEO of Transit Wireless. “A post-5G world will leverage anonymous data to inform new smart technology applications and services. Whether it be more efficient transit operations with predictive train maintenance, schedule accuracy with enhanced signalling, smart safety features, or any other topic in a virtually endless list, it all starts with a multi-network convergence strategy that includes a very robust fiber footprint.”

Of course, this optic fiber footprint requires significant expenditure in expanding and improving infrastructure. As with every new technology, emerging standards and production concerns tend to keep prices high for a few years after its initial adoption, which can quickly balloon the value of any infrastructure projects. As the technology proves itself and the kinks are worked out, prices are expected to drop down and facilitate widespread adoption. Another logistical, high-level strategic worry is in regards to air wave saturation – an increasingly more common problem as the modern world becomes ever more modern. Radios, mobiles, and satellites all communicate via radio frequencies, turning the world into a massive crisscross of frequencies as every device under the sun communicates with each other constantly. The 5G network is expected to operate on both existing LTE ranges of 600 MHz-6 GHz, as well as millimeter wave bands of 24–86 GHz, which can cause several unforeseen conflicts as data signals collide and fight for space in overcrowded airwaves.

Regardless, both the tech and the rail industry are dedicated to facing and solving these problems, as they will not only help people on their day-to-day activities and improve passenger experience, but also vastly expand the options when it comes to operational resources.

“5G is actually a mesh of networks, or a heterogeneous network where you can have massive broadband as one of the facets, critical machine communication as another facet, and then massive machine-to- machine type communication as yet another facet,” Farrugia says. “It is a network that has people there, but it is more about how it enables people to do more rather than being people-centric.”
“5G offers the potential for the capture and analysis of far more data. What you do with this data can offer huge upsides in running your network. As an industry, we are all very interested in the idea of optimising data capture, analysis and use cases. This is where 5G can intersect with IoT, and finally offer the potential to maximise the potential of IoT within the transit environment.”

Today, we are talking with Paul Chan, the Managing Director of BAI Communications in Hong Kong. Paul has spent over 30 years working in the transit communications sector, working on all sides of the industry and playing an active role in the development of technology, all the way from 2G back in the 1990s through to preparing for 5G on upcoming projects.

In a rapidly evolving communications landscape, Paul is well placed to take us through the journey from 2G to a future involving a 5G powered Internet of Things (IoT). In this exclusive interview, we look at how lessons from previous projects can help to optimise future technology, and the role that Paul and his colleagues at BAI Communications are playing in advancing the industry.

(SRW): Can you start by telling us a bit more about who you are and the career path that has led you to your current role at BAI Communications?

(PC): I started my career as an engineer in 1985. Having spent the first five years in government, I then began working for HK Telecom, managing radio communications projects predominantly in the transit sector. Having built up my experience and connections, in 1997 I moved over to Radio Frequency Engineering Ltd – the predecessor to BAI Communications here in Hong Kong. My first role as Engineering Director involved working on building out radio communications systems across large scale infrastructure projects. A large proportion of this work was for MTR (Mass Transit Railway) in Hong Kong, but we also covered airports, tunnels, convention centres, shopping centres, really any major infrastructure that required high levels of connectivity for the public, operational safety or maintenance.

The first major project for the MTR involved deploying a 2G system covering 34 stations and tunnels. This included the deployment of both mobile phone systems for passengers and public safety systems for operations staff – from drivers to maintenance staff – and for public safety staff such as the police and fire service.

This was all connected through to new control centres. That has been the bulk of my work since, working on these two streams (passenger systems and operational safety systems) and finding innovative ways to optimise systems and technology to stay ahead of the curve. I’ve seen the evolution from 2G to 3G 10 years later, and recently I’ve been working on 4G – and we’re now future proofing transit systems for upcoming 5G deployments.
We spoke to you last year about how Hong Kong has led the way in transit connectivity. What have you been working on in the last 12 months to stay ahead of the curve? I’d like to talk about the Shatin- Central Link, the newest MTR extension, that is currently under construction. It will be comprised of 10 stations and tunnels, and the first eight stations will be in operation this year, in 2019. Phase 2 will see the addition of two more stations and tunnels and is planned to be in operation by 2021. Our role has been to work with HK Telecom and Huawei to build the mobile phone system, and with the MTR to build the operation and public safety radio network.

HK Telecom engaged Huawei to use their equipment to provide a 4G system, with the capacity to easily upgrade to 5G when required – 5G licences are not yet issued in Hong Kong, but the migration path for 5G spectrum and technology is clear. 5G is coming soon, so it is vital that we prepare the network for further technological development; the active antennas and the equipment all have the necessary fibre backbone that can easily handle future upgrades to 5G when the exact frequencies and technology are confirmed. This will allow for a time saving and cost-efficient upgrade when the time comes.

(SRW): You’ve been involved with the transit industry since the early days. What are your top tips for transit operators on how to avoid costly mistakes and to future proof their communications infrastructure?

(PC): The biggest time and cost element of any communications project is the deployment of the cable infrastructure backbone. This can only be done at night outside of operational hours, and therefore there is a very high cost and long lead time to complete it – you need to start with good planning and efficient and safe methodology.

It’s also important to learn from previous projects and have a clear vision. If you factor in any extra costs now to put infrastructure in place that is capable of handling upgrades, then ultimately you will save a lot of time, cost, and disruption in the future when upgrades are required. When that happens, it is just a case of making some upgrades to technology in the equipment room and the terminal equipment, which is far easier to be replaced than infrastructure. In such a case, existing infrastructure can be retained for a longer period, offering greater value for money and less network disruption throughout the system life cycle.

(SRW): Passengers in Hong Kong are now accustomed to high levels of connectivity. What lessons have you learned about aligning operational demands and passenger expectations?

(PC): It all starts with a robust systems safety design and build process. It is important to make sure that the delivery of new communications infrastructure will not cause any hazards or safety issues, for both operational staff as well as the passengers. This is the main foundation.

If you work with the highest levels of compliance across everything from emissions, right through to potential interference with existing systems (such as compatibility with the radio-based signalling systems), then you are laying the foundations for success. Good planning and future proofing on an operational safety level gives you a rock-solid base on which to build out additional functionality for passengers.

(SRW): Based on past experiences, what do you see as the big trends over the coming years – and what is BAI Communications currently working on to address those?
I already mentioned the impending arrival of 5G, and this is something that everyone in the industry is working on. However, it is not just about providing higher capacity – 5G also offers the potential to add more sensors and connected devices into your transit network for the capture and analysis of significantly more sensor data. What you do with this information can offer huge potential upsides in running your network.

At BAI Communications, we are very interested in the potential for more sensors and connected devices and use cases. This is where we see 5G intersecting with IoT, and finally offering the potential to maximise the potential of IoT within the transit environment. We have a special task force with engineers from our offices in Canada, United Kingdom, Australia, the USA, and Hong Kong working together to share experiences and develop proof of concept applications combining 5G and IoT for the transit sector.

There are a wide range of possibilities for that. Applications, that we are looking at range from environmental, safety, and customer experience. 5G offers a far higher potential for IoT with much higher capacity and lower latency. We see exciting times ahead, as it opens the door to so many more possibilities to optimise networks – both for passengers and operators, and for public safety.

Finally, a question we ask all of our interviewees: what is your favourite rail journey and why?

Throughout my career, I’ve travelled to many countries and experienced a great range of rail and metro journeys. My personal favourite journey was on the high-speed rail route from Hong Kong to mainland China on the Express Rail Link completed last year. On a personal level, I was so impressed with the speed, comfort, cleanliness, and passenger service, as well as the quiet and efficient operation of this new line and its trains. On a professional level, it was also impressive to experience BAI Communications technology working so effectively and delivering on the promise of excellent connectivity. The Express Rail Link has 26 km of tunnels, and yet there is continuous 3G/4G coverage throughout. So this journey wins for me, as I can appreciate it both as a passenger and as someone, that has worked in the transit communications space for over 30 years. It’s great to see how far we’ve come, and I’m excited about what the future holds!

What is Communication Based Train Control, CBTC, how does it work: Global

On a short stretch of track in London, William Robert Sykes tested the first track circuit at Brixton in 1864. In 1872, William Robinson invented the first fail safe track circuit and a method of block occupancy detection was born. 140 years later, block occupancy detection using track circuits (or conventional signalling) is still in use today.

Over the past 25 years the tide is changing as CBTC solutions find their way into traditional track circuit based applications. The primary advantage of a CBTC system is its ability to allow trains to operate safely at much closer headways then is possible in a track circuit based application due to its inherent limitation.

What is Communication Based Train Control, CBTC, how does it work?
As CBTC becomes the technology of choice, track circuits will become relics of a forgotten past only of interest to museum curators and rail enthusiasts.

**But what is CBTC or Communication Based Train Control?**

Using the definition from IEEE’s CBTC standard 1474.1, section 4.1 states:

*The primary characteristics of a CBTC system include the following:*

1. **High resolution train location determination, independent of track circuits.**
2. **Continuous, high capacity, bi-directional train to wayside data communications.**
3. **Train-borne and wayside processors performing vital functions.**

In other words, a CBTC system is able to determine the accurate location of a train, independent of track circuits, using a bi-directional communication link while keeping the system safe.

**CBTC Characteristic #1**

The main feature which differentiates a CBTC system from conventional signalling is the ability to determine the location of a train independent of track circuits.

Typically this is done using transponder tags or beacons installed along the track. The tags/beacons provide the train borne unit with a course position. The tachometers installed on the axles provide the fine position.

As the train crosses tag/beacon B, the train borne unit is aware that it's located at the 200 meter mark (course position). As the train moves away, the tachometers will count how far the train has moved (fine position). Taking the course and fine position together, the train borne unit will be able to determine that the center of the train is located 247.5m away from the zero reference point.

This is a simplified description (for illustration purposes) of how a CBTC system determines the location of a train.

**CBTC Characteristic #2**

Once the train is able to accurately determine its location, this information must be relayed to the wayside unit in a timely fashion.

There are various methods to accomplish this. In the past inductive loop was utilized as a communication medium but recently over the past ten years, radio has become the
technology of choice for the majority of suppliers. As the technology matures, radio will become the default standard for the rail industry.

For a railroad application, access points are installed along the track. As the train comes within range of an access point, the train borne radio will lock onto its signal and disconnect from the previous access point.

The communication protocols utilized in this medium is usually the standard Ethernet TCP/IP or UDP/IP protocols. This gives the solution flexibility and expandability.

All data (vital and non-vital) is sent through this medium but this link is considered non-vital (TCP/IP and UDP/IP are not considered vital protocols). To maintain safety integrity, end to end vitality must be ensured. This means, the train borne and wayside unit must guarantee the information they receive is not corrupted or stale through various mechanisms (CRC, sequence numbers, Tx ID, Rx ID etc).

**CBTC Characteristic #3**

It’s not enough that a CBTC system is able to accurately determine the location of a train it also has to protect that train from all types’ failures.

Section 6.1 of 1474.1 lists the vital functions a CBTC system must perform. Reading through this section, it’s quickly apparent that these vital functions can be placed into three categories: collision avoidance, over speed protection and miscellaneous protections.

These three categories are broad in scope and therefore they cannot be covered in a single post (I plan to in future posts) but the basic definition is as follows:

- **Collision avoidance** – Is the ability of the CBTC system to keep trains safely separated from one another and from other obstacles on the guideway.

- **Over speed protection** – Is the ability of the CBTC system to accurately determine the speed of the train and to control the speed within a tight tolerance.
Miscellaneous protection – These are “one of” functions that don’t fit into any generalized category and, in my opinion, are not a fundamental part of a CBTC system. But IEEE has listed them as features that a CBTC system should protect against.

I Thought CBTC Meant Automation?

The primary characteristics defined in section 4.1 provide a basic definition of what a CBTC system is but in recent times CBTC has come to mean much more. When the term CBTC is used, it is commonly defined as an automated driverless system, but nowhere in section 4.1 is there a reference to “driverless” or “automation”.

But IEEE recognizes that there are different CBTC configurations. Section 4.2 of 1474.1 states:

This standard recognizes that different configurations of CBTC are possible, depending on the specific application. For example, a CBTC system may:

1. Provide ATP functions only, with no ATO or ATS functions.
2. Provide ATP functions, as well as certain ATO and/or ATS functions, as required to satisfy the operational needs of the specific application.
3. Be the only train control system in a given application or may be used in conjunction with other auxiliary wayside systems.

At the high end (configuration 3) we have a completely automated CBTC system with ATP (Automatic Train Protection), ATO (Automatic Train Operation) and ATS (Automatic Train Supervision) functionality. At the low end (configuration 1) is the ATP only solution as defined by the primary characteristics in section 4.1 (ATO functional requirements are described in section 6.2 and ATS in section 6.3 of the 1474.1 standard).

The type of configuration a property needs depends on the problem they are trying to solve. If the desire is to increase throughput, then a completely automated system might be needed (Configuration 3). If the desire is to add another layer of safety protection, then an ATP only solution may suffice (Configuration 1).

The point here is a CBTC does not mean “driverless.” At its most basic form, a CBTC system provides automatic protection (ATP) only. More elaborate systems may provide ATO and ATP functionality but it’s not a requirement in order to apply the label “CBTC”.

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The adoption of CBTC technologies is spreading far and wide as A) new systems demand a higher throughput and B) current systems try to squeeze more out of their existing infrastructure. As a result, a market has developed where more suppliers are entering the field. 30 years ago only one supplier provided a CBTC solution, today there are three top tier and four second tier suppliers.

The industry has entered a brave new world and the players need to become familiar with the terminology and the various technologies out there so informed decisions can be made.

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French Cities Top Light Rail benchmarking Study; France

Jul. 3, 2019
Written by Keith Barrow

French Cities have topped the rankings in a new benchmarking study into the performance of 32 tram networks around the world.

Dijon was the highest-scoring System in the medium-sized Cities Category

Trams at the Heart of the 21st Century Metropolis by Eurogroup Consulting splits the networks into three categories: recent systems in cities with more than 500,000 residents; recent systems serving cities or regions with a population of less than 500,000; and historic tram networks that have never closed.

Each network was judged against 10 performance criteria:

- tram corridor potential – percentage of stops serving activity centres in urban area, density of population along tram corridor
- speed and urban integration – tram speed/degree of segregation from road traffic, speed/distance between stops, city centre speed
- tram service offer – operating hours, off-peak service frequency, kilometres offered per resident
- pricing and ticketing – number of payment solutions on offer, level of ticketing integration with other mobility solutions
- multimodal integration – percentage of stops with public transport interchanges and individual transport connections (eg park and ride, bike sharing)
- reliability, accessibility and security – punctuality, vehicle and station accessibility, maturity of safety policy and communication
- **use of resources** – fleet use rate, intensity of infrastructure usage, number of lines and depots
- **economic viability** – kilometre production cost, coverage of operating costs
- **tram ridership** – number of trips per tram and line kilometre
- **public transport dynamic** – coverage rate for network operating costs, modal share of public transport

For the recent systems in large cities category, Lyon achieved the highest rating against the above criteria with a score of 71 out of a possible 100, followed by Paris (Line T3) with 69, Bordeaux (68) and Strasbourg (67).

French cities also performed well in the medium-sized cities category, which was led by Dijon (66), and Tours (61), followed by the Norwegian city of Bergen (58) and Stockholm (57).

Zürich clinched the top spot for cities with historic tram networks with 63 points. Vienna took second place with 60 points, followed by Brussels and Melbourne, which both scored 56.

“Rather than demonstrating a straightforward renewal, the results of the study show that the tram provides a mobility solution that complements structural transport networks, such as metro systems, as well as visibly revitalising city centres in the era of green mobility,” says Mr Philippe Menesplier, partner at Eurogroup Consulting and specialist in the transport and mobility practice.

Categories: [Light Rail News](#)

**First Mauritius Metro Express Light Rail Vehicle, LRV, delivered; Mauritius**

Jul. 5, 2019
Written by [Keith Barrow](#)

**THE Prime Minister of Mauritius**, Mr Pravind Jugnauth, attended a ceremony at Port Louis docks on July 4 to mark the delivery of the first LRV for the island’s Metro Express light rail line.
CAF is supplying 18 seven-section URBOS 100 low-floor LRVs, together with signalling, an automatic vehicle location system, tramway signal priority system, depot equipment, and a driving simulator under a €100m contract announced in December 2017.

The 45.41m long seven-section LRV will initially be transferred to the line’s depot and operational control centre at Richelieu, where testing will be carried out. Five more LRVs are due to be delivered to Mauritius by the end of the year.

Jugnauth confirmed during the ceremony that the 13 km Phase 1 linking the capital Port Louis with Rose Hill is still on schedule to open in September. The launch of operations will be marked with a period of free travel on the new line.

Categories: AfricaLight RailNews
Tags: CAFMauritius
The Colombo, Sri Lanka, Light Rail (CLR) Transit Project, which will cut down the travel time between Malabe and Fort to 32 minutes, will be officially launched tomorrow (2019/07/03), the Ministry of Megapolis and Western Development (MMWD) announced today (02.07.2019). The 16 km CLR aims to address urban transport issues in the Colombo City.
“URBAN MOBILITY AS A SERVICE”

PUBLIC MULTIMODAL URBAN, SUBURBAN AND INTERURBAN PASSENGER TRANSIT SYSTEMS WITH METRO-BUS, LIGHT-RAIL, TRAM-TRAIN, METRO-RAIL, METRO-TRAIN, REGIONAL RAPID TRANSIT, COMMUTER-RAIL, ROPE-WAY/TRAIN, MAGLEV AND HOVERCRAFT TRANSIT/PEOPLE MOVER, WATER-METRO, AUTONOMOUS PEOPLE-MOVER

MOBILITY SOLUTION, TRANSPORTATION AND ECONOMIC DEVELOPMENTS IN MODERN URBAN/MEGAPOLIS ENVIRONMENT

METRO Newsletter by Dr. F.A. Wingler
METRO 79, July 2019

Smart and Big Data to improve Rail Operations, understand Demands and predict Changes in the Age of Smart Cities; www.smartrailworld.com
PART I: INDIAN ACTIVITIES AND INITIATIVES FOR URBAN MOBILITY AS A SERVICE

Potential Use of Artificial Intelligence, AI, for Railway and Metros in India

An interview with Dr. E Sreedharan, March 2019 Edition of Rail Analysis Magazine, page 49/50:
POTENTIAL USE OF ARTIFICIAL INTELLIGENCE FOR RAILWAY AND METROS IN INDIA

In the modern day, computers, electronic gadgets internet, Wi-Fi, online services, social media, e-learning and alike have attained immense popularity. Almost everyone is glued to the screens of their smartphones, tabs, and laptops: either studying, playing games, connecting with friends on social media or busy in some work. Gadgets and quick learning have become part of our day-to-day lives. Addition to this is the machine learning that has been incorporated in various spheres. Machine learning plays a prominent role in simplifying the tasks that are humanly impossible or time-consuming. The Artificial Intelligence (AI) system gives Predictive measures.

What is Artificial intelligence?

Artificial intelligence is the study where computers are made to think the way human brains work. For example, if the user searches on the web, the advertisers follow the user on every connected social media accounts or web page that they scroll. Ever witnessed this while working on various platforms in the World of machine learning? If yes, then this is Artificial intelligence.

Utilization of Artificial Intelligence in Railways:

As Indian railways is the fourth largest network in the World, managing railways have always been a tough task for the management and Indian Government, as it needed some assistance in the operations. The introduction of Artificial Intelligence has been an elixir to the railways and the passengers using the services of railways. Artificial Intelligence has provided relief in operational delays and innovations in the customer experience and service delivery. Many Original Equipment Manufacturers (OEMs) are now investing significant resources into one of the most valuable and potentially rewarding currencies in business: big data.

Condition Based Management vs Predictive Management:

Railways have various things that needed keen observation and maintenance, like rolling stock maintenance, big data is synonymous with Condition Based Management (CBM) and Predictive Management (PM).

Rapidly expanding scale of manufacturing and asset management industry is the reason why adapting to the wider applications of advanced algorithms have become essential. Operations such as collecting real-time data about the location and performance of the asset with the help of geospatial orientation and spanning last minute, hour, day, week and beyond. The discrepancies occurring at the time of movement of trains, analysis of root causes of the failures caused by system dis-functioning can be detected and repaired timely.

AI is the future:

Application in Signalling is a field that the AI can be utilized and is being assessed. The signalling system has witnessed a marvellous change in auditing of trains that have suffered breakdowns or damages due to train collisions root cause being fault in track clearance and movement. The delays in signalling of trains have been reduced, which in turn have assisted in decreasing the delays in arrival and departure of trains.

As a result, comprehensive supervision is possible and
auditing of root causes due to failure in systems can be rectified at the earliest.

Recently held World's largest religious fest Ardh Kumbh Mela, Prayagraj from January 2019 to March 2019, which witnessed around 100 million devotees. Railway deployed machine learning systems to control the crowd of devotees, that is impossible humanly or time consuming.

Artificial Intelligence has marked its success as it managed the crowd in simplified ways connecting the real life instances with technical brains to bring out the best output. Unlike previous Kumbh Melas held in the history, this is considered as one of the best religious event organized in India ever.

**Utilization of Artificial Intelligence in Metros:**

The process of restructuring the railway, metros and aerospace is known as interlinking the technical brains with human brains.

The first ever metro of India was built in Kolkata, it had its share of pros and cons. It was a relief to daily commuters but the facilities came with some clause. The metros were built on the lines of traditional railway functioning systems. However, the Delhi Metro was a game changer as it came with all the latest technologies introduced in every department of DMRC (Delhi Metro Rail Corporation).

The Delhi metro was able to come with the latest Artificial intelligence amenities on account of the DMRC project being co-funded by renowned Delhi Government and Union Government of India.

Starting from the ticketing system- tokens and smart cards, the provision of vending machines that allows the users to operate the machines get their tickets or tokens and recharge smart cards for their journey inside the DMRC premises. The machine learns what the user wants to do with AI assistance and make the travel easier for them.

The automated systems for opening and closing of the doors of the metro and at the metro platforms are also backed by AI technology.

The geo positioning of DMRC metro trains are making trips minute after minute, delays are curbed. Artificial intelligence has made the process of metro simpler not only for commuters but also for the executives working at DMRC.

Hence, Artificial Intelligence is making its inroads in all industries and the opportunity in Railways is huge!

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**Opinion: Public Transport Systems in India; India**

*Public transport facilities are meant for carrying goods as well as people*

By **Vinod Shah**

21/06/2019
Even the remotest regions of the country are well connected by public transport system in India. Moving from one location to another isn’t an issue within the country. Railways, road transport and air transport are the main public transports available in India. In addition to, the country has a developed waterway network as well. Whilst the first two are affordable for people in general, the air transport has limited availability because of its airports and cost barrier. Common man doesn’t find air travelling affordable. Public transport facilities are meant for carrying goods as well as people.

As a carrier of goods and passengers, Indian Railways occupy a position of pride and importance. Originated during British period, it’s no parallel in this respect. Even a regular man can travel by railways. Indian Railways offers its service to every class of society. Railways occupies first place in the transport of goods. Railways are the cheapest means of public transport system. Though it boasts of its large network and effective service, it’s yet to cover the nook and corner of the country. Some areas are still outside the reach of the Indian Railways network. But there’s great difference in quality of road transport in various portions of the country.

Road transport also suffers from several disadvantages. These are specifically due to poor road conditions in both rural and urban areas. The majority of the villages aren’t linked to the mainstream of the country with well furnished roads. The smooth public road transport in urban areas leads to rise in the number of private vehicles that adds to pollution problem. Whereas, backward villages still depend upon archaic means of transports. Obviously the government is considering these aspects with positive set of mind, which is the only ray of hope, at least for now. Air transport is developing fast in India. However this facility is available in mainly big cities and metros. One can’t have this facility in small cities. Only a certain section of society can avail the advantages of air transport.

E-Bike: The Future of personal and public Transportation in India; India
GoZero Mobility launched e-Bikes in New Delhi

In the early 2000s, the idea of using e-bike or a would have been borderline absurd for most of the people around the globe. They were certainly available; however, most people did not use them, and so they weren’t very common. But now, we are embarking in 2019 and e-bikes, like many other electronic methods of transportation, are growing more popular.

An e-bike is a bicycle with a fused electric motor which can be used for momentum. Various kinds of e-bikes are available today, ranging from e-bikes that have a small motor to assist the rider's pedal-power to powerful e-bikes which lean closer to moped-style mechanism. however, all e-bikes are endowed with the ability to be pedalled by the rider and are therefore not electric motorcycles. Moreover, all e-bikes use rechargeable batteries.

**E-Bikes: A Need today**

Until a few years back, many people used to look at e-bikes as a novelty. But now, more and more people are looking at electric bikes as a convenient way of tackling hills and speeding up commutes. Electric bikes have been on the edge of breaking through for years now.

With the help of car companies, along with a new range of electric bikes, e-bikes are beginning to become another real option for moving the world away from the gas pump and toward a more sustainable future.

It's been obvious for a few years now that car companies see e-bikes as part of their future.
According to sources, within 20 years, the United States will be one of the world’s top markets for electric bicycles.

**Why are e-Bikes the Future of Transportation?**

Today, the push for sustainability seems to be gaining momentum and driving revived interest in electricity as the power behind our movements. The pace of technology is bringing us better e-bikes every year — lighter, faster, and stronger. Also, Access to bike paths and trails is getting better. Many countries from around the globe have introduced bike paths, lanes, routes, and protected lanes for e-bikes. In addition, A rapidly increasing number of cities are participating in bike shares involving e-bikes.

In conclusion, e-bikes are looking like the future of transportation — and the future is approaching quickly.

**Driverless Trains: How India is bridging the Technology & Infra Gap; India**

While certain routes on metro lines in Delhi and Hyderabad are already automated, plans are to introduce this technology even in outbound trains

Yuvraj Malik | Bengaluru  Last Updated at November 13, 2018 11:50 IST

Rail travel seems to be fast capturing the Indian imagination, with the country signing a mega Bullet train deal with Japan, and Maharashtra toying with the idea of introducing Hyperloop trains, a radically new experimental mobility solution, to drastically cut down the travel time between Mumbai and Pune.

India, known to be home to the largest railway network in the world, is steadily keeping pace with other countries in upgrading railways in terms of both, technology and infrastructure. Among other advancements, driverless train technology has already arrived at Indian ...

**The full Story**

Rail travel seems to be fast capturing the Indian imagination, with the country signing a mega Bullet train deal with Japan, and Maharashtra toying with the idea of introducing Hyperloop trains, a radically new experimental mobility solution, to drastically cut down the travel time between Mumbai and Pune.

India, known to be home to the largest railway network in the world, is steadily keeping pace with other countries in upgrading railways in terms of both, technology and infrastructure. Among other advancements, driverless train technology has already arrived at Indian shores.

Certain routes on metro lines in Delhi and Hyderabad now use Communication-Based Train Control (CBTC), a radio-based signalling system, to ply cars on tracks without a driver.
Automation systems in trains have been in use for over two decades, but serious advancements and deployment have happened only in the last five or seven years. A milestone was achieved in March this year, when the total line length of fully-automated metros globally crossed 1,000 km, according to the International Association of Public Transport (UITP), a Belgium-based non-profit organisation tracking advances in public transportation.

ALSO READ: Keen to build, export world’s cheapest bullet train coaches: India to Japan

For automated metros, France leads the pack with the largest and most advanced network in the world, followed by Canada, Singapore and the UAE. In all, 63 fully-automated lines are functional across 42 cities in 19 countries, according to UITP.

India got its first fully-automated trains in November 2017, with Delhi Metro Rail Corp and Hyderabad Metro Rail deploying trains with the new Communication Based Train Control, CBTC, signalling systems on select routes. However, metro rails in India currently use at least one driver on these vehicles, and while there is installed capability to go for full automation, it is still some time away.

“We plan to flag off the train in one or two years, once DMRC develops some comfort with the technology and rigorous testing is complete,” said Anuj Dayal, executive director at Delhi Metro.

The automated or semi-automated intra-city metro trains use the CBTC system, which enables precise, continuous and automatic communication between the trains, track infrastructure and a central control centre. Different configurations allow the train operators to implement Automatic Train Protection (ATP), Automatic Train Operation (ATO) and Automatic Train Supervision (ATS) functions, as defined in IEEE 1474, the international standard for CBTC performance and functional requirements.

In this approach, dozens of sensors are fitted not only across the perimeter of the train but also in the cab (train’s cockpit) and wayside. They continuously transmit reports on parameters such as the exact position of the train, speed, travel direction and braking distance. The data is transmitted over radio frequency, typically in 2.4 GHz band.

There are set standards of automation called GoA, or Grades of Automation. In GoA 1, trains are run by one driver, while in GoA 2 and GoA 3, the starting and halting of trains are automated and a driver is made available for operating the doors and for driving in case of emergencies. The GoA 4 standard, however, represents fully unattended train operations (UTO).

With modern CBTC systems, a major feat over traditional technology is mechanised communication between the train and tracks, allowing the locomotives to automatically and continuously adjust the speed (and minimum braking distance), while maintaining safety and comfort (jerk) requirements. This has allowed high-speed trains to run closer to each other thereby improving frequency, especially during the peak hours.
The Delhi Metro itself has plans to reduce the wait time to 90-100 seconds, from a few minutes, in the future.

Efforts are also being made to make intercity trains driverless. In September, France’s national railway operator SNCF announced the introduction of prototypes of driverless mainline trains for passengers and freight by 2023.

While France is doing it to increase efficiency, others have their own reasons. The median age in Japan, which is battling with ageing population is 46, and the country is preparing for a mass retirement of professionals who were trained in the 1980s. This will also lead to a shortage of drivers going forward. As a remedy, the country is working on autonomous trains, more out of need than choice, and plans to introduce some of those by 2020.

China and a few countries in the European Union are also pushing for automated trains at a renewed pace. At present, around 10 per cent of the metro and rail routes globally are fully automated. This figure is expected to climb to about 50 per cent (about 2,200 km of automated metro line) by 2022, UITP estimates.

First Look: India's first Driverless Metro Train; India

The Delhi Metro Rail Corporation (DMRC) will start testing these trains, equipped with cameras and sensors to make up for the lack of a real driver, from July according to reports. However, initially, the trains will be operated by Train operators. Unattended Train Operations (UTO) will start on line 8 (Janakpuri West to Botanical Garden) on July 1, followed by line 6 (ITO to Kashmere Gate section) the same month, and line 7 (Mukundpur to Shiv Vihar) from October 16, according to Dr Mangu Singh, Managing Director, DMRC. "Internationally, such trials generally take about one to one and a half years," he added.
Hyderabad Metro found wanting in first and last-Mile Connectivity: India

The Hyderabad Metro Rail project still lacks an efficient first and last-mile connectivity and a common ticket for different commutes to see a steady rise in passengers.

By Sona Sagar Metro Rail News
12/07/2019

HYDERABAD (Metro Rail News): The Hyderabad Metro Rail project still lacks an efficient first and last-mile connectivity and a common ticket for different commutes even as it sees a steady rise in passengers with the number inching towards three-lakh mark every day. Once the Raidurg station on Corridor 3 gets operational, trains with better frequency would ensure more passengers to hop in and ease crowd pressure during peak hours, but a lot more effort is needed to make the first and last-mile connectivity towards metro stations reliable and affordable.

Shuttle services are being run by some firms at Hi-Tec City and Durgam Cheruvu stations, while the L&T Metro Rail is running them from stations like Secunderabad East, Tarnaka, Mettuguda, and others. Yet, these are either insufficient or the frequency of 15-30 minutes is not working out if passengers reactions are anything to go by.

Kusuma, an IT professional who was traveling from Begumpet said that I have shifted back to MMTS, which is less-crowded and also convenient to get transport from the railway station to my office at Kondapur. Metro ride was comfortable, but after alighting at Hi-Tec City, it is a nightmare to get into shuttle bus or shared auto-rickshaws packed to capacity.

The most heard comment was Unless you share the auto, the fare is flat ₹50 or ₹100 at metro stations to travel to nearby offices or residences. Kalpana, a banking professional,
thinks it is more convenient to take a shared cab from Mahendra Hills to Jubilee Hills Check Post than travel in metro.

She said that commute by auto or cab to Parade Grounds station from home and again to the office from Jubilee Hills Check Post metro station is more than double the metro ticket fare. It is more convenient to take a shared cab with my colleagues. Or take the case of Murthy, a private sector employee, commuting to Begumpet from Bandlaguda. He changes two buses or shared autos to reach Nagole/Uppal metro station spending ₹40 in either direction.

Those sharing a cab shell out about ₹50-₹80 per head to catch the metro rail moving towards Ameerpet and from onward to Hi-Tec City. Mr. Murthy said that we have an RTC depot in the vicinity, but after a couple of months of shuttle services, they were withdrawn. Prashant M. who was travelling from Hi-Tech City to DLF tweeted that time travelled in the metro is being wasted waiting for half-hour shuttle service every day. And, the promise of a common ticket for use through metro, auto, cabs, bus, and train could have prevented unfettered fare rip-offs, but it is not in sight.

Platform Screen Door Market to be driven by rising Passenger Safety Concerns and increasing Investments in Automated Metro Trains; India

Global Platform screen door (PSD) Market forecast

By Narendra Shah

- 12/07/2019
The global platform screen door market was valued at ~US$ 600 Mn in 2014, and is expected to surpass US$ 800 Mn by the end of 2019. The platform screen door market is expected to grow at a CAGR of ~7% between 2019 and 2029, and is estimated to reach a global value of ~US$ 1,700 Mn by the end of 2029.

**New Metro Stations to lead the Way in Platform Screen Door Market**

By product type, the global platform screen doors market is segmented into semi height, half height, and full height. Full height type platform screen doors are used only for underground metro train stations. However, semi height type platform screen doors can also be installed in underground metro train stations. However, they are not as efficient as full height type platform screen doors because they do not fully cover the station up to the ceiling. Moreover, for elevated metro train stations, half height type platform screen doors can enable passengers to enter the metro train.

By station type, the platform screen doors market is segmented into new metro stations and old metro train stations. The new metro train station segment is estimated dominate the global market owing to a rapid increase in the number of metro train projects across the globe. The inherent aim behind the installation of platform screen doors is to provide safety to passengers. To do this, the railway ministries of various countries are installing platform screen doors at old metro train stations. However, half height type platforms screen doors are mostly being installed in old metro stations as their cost is lower than full height and semi height type platforms screen doors.

By platform type, the global platform screen doors market is segmented into one platform, two platform, and more than two platform. The two platform screen doors segment is projected to dominate throughout the forecast period. For these types of platforms, PMR has assumed that PSD doors are installed only on one side of platforms.

By region, the platform screen doors market has been segmented into seven regions, namely North America, Latin America, Europe, East Asia, South Asia, Oceania, and
Middle East & Africa. In these regions, East Asia and Europe are estimated to grow with a paramount share in the global platform screen doors market over the stipulated time period. However, North America and South Asia are also representing a healthy potential for the platform screen doors market owing to the rising cognizant of automated metro trains. Interestingly, platform screen doors are mainly used for automated metro trains.

**Emerging Players to account for 30% Revenue Shares**

The global platform screen doors market is characterized as consolidated owing to the presence of a limited number of manufacturers of platform screen doors across the globe. For in-depth analysis, PMR has broken down the market structure up to three levels: Tier 1, Tier 2, and Tier 3. Here, emerging players are estimated to account for a 30% share in the global market and generate ~ US$ 200 Mn revenue through the sales of platform screen doors across the world. Moreover, leading players in the global market are adopting business expansion, acquisition, and collaboration strategies in a bid to capture a significant share of the global market.

In 2018, Knorr-Bremse AG acquired 100% know-how and intellectual property rights of rail vehicle systems from Federal-Mogul to develop and produce friction materials.

In 2018, Singapore Technologies Engineering Ltd. established a new subsidiary dedicated to electronic components in China, to provide better local support for its metro rail and intelligent transportation projects.


These insights are based on a report on Platform Screen Door Market by Persistence Market Research

**Hyderabad Metro Stations into Activity Hubs soon: N.V.S. Reddy; India**

The second largest metro network after Delhi, to opening an exclusive all-women metro station, Hyderabad Metro is proving out to be an inclusive initiative.

By Narendra Shah; Metro Rail News

- 16/04/2019
Almost one-and-a-half year after the inception of Hyderabad Metro Rail continues to set new standards for public transportation in India. It is the second largest metro network after Delhi to opening an exclusive all-women metro station, Hyderabad Metro is proving out to be an inclusive initiative that is also building a greener urban city. The HMRL Managing Director, N.V.S. Reddy shares plans for future expansion and explains how growing metro is facilitating urban rejuvenation.

**How do you see Metro facilitating Urban Rejuvenation?**

**Hyderabad Metro** is slightly different from other cities metros. Here, it is a social project that offers us an opportunity to redesign a greener city for the citizens. All over the world, cities have been designed to accommodate automobiles but we have come to realize that we cannot build a city for cars. We instead built it for people, women, children and the differently-abled. This way we are incorporating more lung-spaces in metro stations. Miyapur station has close to 10 acres of land developed as a public space. Also, to reduce traffic congestions and growing carbon footprint, we have created sidewalks at stations. Also, places like Uppal and LB Nagar are now becoming commercial hubs owing to the metro. The land prices have risen from Rs 10,000 per sq yard to Rs 70,000 per sq yard in Uppal.

**How Metro is better organised for public Transportation contributing to Economy?**

We have roughly spent around Rs 17,000 crore on this project so far. The total expenditure, however, is expected to be around Rs 20,000 crore. But all this money will be recovered through indirect investments. Take the Next Galleria Mall at Punjagutta which is not only generating revenue but also large amount of employment. We are now in the process of opening four more such malls next to various metro stations which will lead to direct and indirect large scale employment opportunities. Our intention is to turn metro stations into activity hubs and provide every possible service that a human being needs which helps cut down unnecessary travel time.
What are the Last-Mile Connectivity Options?

We have a few bikes and cars as it is just the beginning. There is a long way to go for which we are encouraging more companies to contribute to bikes, cars and electric vehicles. We will soon be installing mini and electric buses to reduce pollution. We identified traffic catchment areas for every metro station up to 3 to 4 km where last-mile connectivity will be expanded to reduce dependency on private vehicles. Hyderabad is adding 5 lakh private vehicles every year and our aim is to check this explosion.

On Concerns on Damage to Heritage and religious Structures

We are ensuring that heritage structures are not touched. Old city is a completely different ball game and there are many complicated issues there. Local leadership initially raised apprehensions and that’s why the project got stalled. There are engineering solutions available and we will provide them.

What are the Expansion Plans?

We are in the process of bridging the 5 km stretch from Nagole and LB Nagar in phase two. Connection to the Airport is also a priority. By November this year, we will go up to Mind Space from were via the Outer Ring Road we will be laying an outlay for airport connectivity. Our goal is to connect to the airport from all the sides.

The interview first published in Telangana today

Shuttl Bus: An alternate Solution for corporate Employees Transit; India

By

Mannat Batra Urban Transport News

12/07/2019
Shuttl is India’s topmost and largest office commute app. It is the systematised and much-improved version of chartered bus services. It is curated on technology and data. The routes, pick-up points, and time slots are designed on the basis of customer feedback and the discoverability of these routes is solved through the consumer app,” stated CEO Amit Singh.

Gurgaon-based Shuttl runs in eight cities in the consumer and enterprise segments. It covers approximately 60,000 rides a day. It earned $11 million from Amazon and Dentsu Ventures in July.

These companies serve a certain segment of the transport market: daily urban commuters. Their main customers are employees at IT companies. Experts reckon the size of the urban commute market in India’s top cities to be between $8 billion and $12 billion.

**Why choose Shuttl?**

In present time, taxis or cabs are expensive. Carpoools restrict one’s freedom to move timely and most public transportation options aren’t comfortable. As for private vehicles, one doesn’t always want to drive in exhilarating traffic, long queues at traffic jams, petrol pumps, gas stations. lack of parking space in another issue all together.However, With Shuttl, one can avoid the above mentioned problems.

“The service is economical and the frequency is good. I can use the time to make calls or read,” said a user of Shuttl.

**Key Features of Shuttl**

Track Shuttl in real time: One can keep track of their bus on the app to plan their journey. Navigate to one’s pick up point: The Shuttl app is smart and will help one to navigate to their nearest pick up point.

**Safe & trusted:** The app is power-packed with security features like SOS alert, sharing ride details & home check.
Flexibilty: One can reschedule/cancel their ride anytime before their bus reaches the pick-up point.

Affordable: One can save money by buying their Shuttl pass using a variety of payment methods like PayTm, Razorpay, Amazon pay, Internet banking, UPI, credit/debit cards.

Kolkata East West Metro gets Safety Clearance for Communication Based Traffic Control, CBTC, Signalling; India

East West Metro completed 1000-hour trial test run recently.

By Mannat Batra; Urban Transport News

12/07/2019

Kolkata (Urban Transport News): A European company has given the safety clearance for Kolkata East West Metro signalling system in Kolkata after the utility recorded 1,000 hours of trial recently. It is planning to start commercial service in a month.

Five rakes covered 10,000 km on a 5.5 km stretch for one-and-a-half months as part of the 1,000 hours of trial, officials involved in the project said. Kolkata East West Metro, when completely operational, will connect Salt Lake Sector V with Howrah Maidan. It will stretch for approximately 16.5 km and will be running under the Hooghly river.

The initial phase is likely to be launched in a month. The trains will run 5.5 km between the Sector V and Salt Lake stations.

1,000 Hour Trial Run completed
The 1,000 hour trial had begun on May 7 after representatives of Ansaldo Signalling and Transportation Systems found a glitch during an earlier trial. It ended on June 30. Ansaldo signalling and transportation systems is an Italy-based company looking after software integration of East-West Metro.

“Some changes in the software were made during the trial run. We have received the safety clearance for the signalling system,” said an official of Kolkata Metro Rail Corporation (KMRC), the implementing agency of the project.

KMRC has sent documents to the commissioner of railway safety (CRS) for consent to begin commercial run. “We expect the consent to come in time for us to start commercial service in a month,” the official said.

The glitch in the signalling system was detected when rakes were enduring sharp curves, of which there will be several along the entire route.

“Since the East-West trains will follow an advanced operating system, it is vital to have a glitch-free signalling system,” another official said.

CBTC does not need signal posts or fixed blocks to work as trains pick up signal from the tracks. Only when a train moves will the tracks send signal to the next to start. The system sustains a safe distance between two consecutive trains and will help reduce the waiting time for commuters.

Ansaldo officials in Paris determining from digital logbooks the exact duration of the trial.

Amritsar Bus Rapid Transit System, BRTS: Dream Project takes Shape; India
**Identified priority BRT corridors**

1. Central part - Mall road, Shandari bridge, queens road
   - Length: 7.4 km
   - RoW: 20 to 200 m
   - Land use: commercial, public, semi-pubic

2. Railway Sth to India Gate
   - Length: 6.2 km
   - RoW: 45 to 60 m
   - Land use: institutional, mixed

3. Railway Sth to Verka
   - Length: 8.4 km
   - RoW: 30 to 40 m
   - Land use: residential, industrial

**New Dedicated BRTS Elevated Road**

- Diagram showing the design of the elevated road with sections for passenger and maintenance.
After skipping several deadlines, the state’s first 600-crore bus rapid transit system (BRTS) in Amritsar is set to become functional by June this year.

The State Government is confident of resolving Amritsar's Traffic Woes with its ambitious Project, that has drawn Flak over unplanned Execution (Sameer Sehgal/HT Photo)

Envisaged elevated dedicated Bus Lane as in China
After skipping several deadlines, the state’s first 600-crore bus rapid transit system (BRTS) in Amritsar is set to become functional by June this year.

The ambitious project, which was caught in controversies and drew flak not only from political parties, but also environment groups and residents, is aimed at decongesting the traffic in the holy city, which sees a huge footfall of tourists all the year round.

According to the proposal, air-conditioned buses would run on a special 31-km corridor, that will connect key areas in the city. The dedicated corridor will ensure that these buses run without any forced stoppages due to traffic chaos on the road.

**The Beginning**

Currently, commuting on city roads is a nightmare. In the past, many plans — such as the city bus project — to tackle the traffic mess have come a cropper. After many deliberations, the state government in 2013 decided to replicate the Ahmedabad BRTS model in Amritsar.

For the execution of the project, the Punjab Bus Metro Society (PBMS) was formed. It comprises officials from MC and various other departments besides the deputy commissioner (DC). The PBMS is being closely monitored by Deputy Chief Minister Sukhbir Singh Badal, who has been taking a keen interest in the project all along.

“Let the BRTS be completed, and then we will go about putting other infrastructure in place. Amritsar will soon become the most beautiful city in the country”, Badal had said in a recent meeting to review the project progress.

While the public works department (PWD -B&R) is the agency that is executing all civil works connected with the project, the PBMS has been assigned the task of purchasing the buses and will also be the in-charge of operations.

Talking to HT, PWD executive engineer JS Sodhi said the estimated cost of civil works and putting the entire infrastructure into place will be 495 crore. Around 200 crore will be
spent on purchasing 93 low-floored, airconditioned buses that will run in the dedicated corridor in the first phase.

**No VIP cavalcades on Route**

The 31.7 km route will include the dedicated corridor as well as ‘mixed traffic’ zones such as the dedicated 3 km elevated road, that runs along the general bus terminus.

“**Other than the BRTS buses, no other bus, auto or car will be allowed to run on the dedicated route.** The corridor will be out of bounds even for VIP cavalcades,” added Sodhi.

He made it clear that there will be some changes in the city bus service routes once the BRTS gets going.

The dedicated corridor lane, which will be a single road around 30-feet wide, enough for accommodating two buses simultaneously, will be sealed with iron grilles to prevent any unauthorised entry.

However, there will be openings at certain places where roads from important localities on either side join the main road through which the corridor passes.

The corridor along Batala road will be elevated and will be supported on concrete pillars. Normal (mixed) traffic --- private vehicles, trucks, buses and autos --- will run on either side of the dedicated corridor lane.

Sodhi said there will be 45 bus stops, after every 500 metres, on the entire 31.7km stretch. The construction work is on and PWD officials are confident of completing it well in time.

“At certain places, the grilles are yet to come up, but these will be installed within two months. Quality road network is being constructed within the corridor and we are hopeful of finishing it before the deadline,” Sodhi added.

The bus stops along the existing elevated road will be constructed near the general bus terminus. These will be on either side of the elevated road.

“The bus stops on the elevated road and on the elevated portion of the corridor along the Batala road will have lifts for passengers,” said Sodhi.

**Going Ahmedabad Way**

The state government has replicated the Ahmedabad BRTS model in Amritsar. A team of senior officials of the Punjab government first studied the Gujarat city’s model and then decided that it was best suited for the holy city. “The traffic density, population and various other conditions are same in Ahmedabad and Amritsar. So we are hopeful that the project will also be a success here,” said PWD executive engineer JS Sodhi.

**Why BRTS flopped in Delhi**

Officials said the project failed in Delhi as it has a high traffic density with multiple roads and bridges. “The roads intersect at many places in the national capital and this is the major reason why the project came a cropper there. The scenario is totally different in small cities such as Amritsar. The holy city has four-laned roads and the movement of
buses can be easily managed in a dedicated passage,” says public works department executive engineer JS Sodhi.

**BRTS decoded**

1. In the **Bus Rapid Transit System (BRTS)**, AC buses run within a dedicated right-of-way corridor lane. As no other traffic is allowed in the corridor, the buses run without any traffic hindrance and take less time to cover distances.

2. In Amritsar, the corridor has been constructed in the middle of the four-laned road at some places. Normal traffic will run on both sides of the corridor. For the purpose, the width of these roads has been increased.

3. At some places, the BRTS buses will run on roads with mixed traffic with no corridor --- this distance is short.

4. The dedicated right-of-way corridor lane is wide enough to allow two buses coming from opposite directions to pass each other without any hindrance.

5. There will be bus stops after every 500-metres. Special pedestrian lanes with traffic lights will allow passengers to cross over to bus stops.

6. To reach the elevated portion of the corridor, lifts have been provided.

**Amritsar Metrobus, BRTS; India**

*From Wikipedia, the free Encyclopedia*

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**Amritsar MetroBus (Amritsar BRTS)** is the bus rapid transit system (BRTS) in the city of **Amritsar, Punjab, India**. Amritsar MetroBus allows easy travel to different places in the city like the **Golden Temple, Jallianwala Bagh, Guru Nanak Dev University** and **Khalsa College** for nominal fares. The time gap or frequency between two buses on the same route is five minutes. **Amritsar MetroBus** is the second rapid transit project in North India after **Delhi Metro**

**Construction and Operation**
The project was commenced on 19 September 2013 and was launched on 28 January 2019 with the cost of ₹545 crore (US$79 million). Construction work started on 26 February 2015. In September 2016 90% of work was completed. Amritsar BRTS is based on Ahmedabad BRTS model and was constructed on the lines like Metrobus (Istanbul). Volvo Buses showed its interest in BRTS project at the holy city of Amritsar. The Amritsar MetroBus operates with 93 Air-conditioned AT buses by Tata Marcopolo. After the launch MetroBus recorder ridership of 41000 passengers within one week. Amritsar BRTS authorities sold more than 8,000 smart cards to daily passengers within a week. The transportation system is completely free for school students in uniform up to senior secondary classes. After launch, for first three month project was free of cost for commuters.

Key Features

Some of the key features of Amritsar BRTS are:

- Automatic Doors at metro Stations for passengers safety.
- Overheard bridges for pedestrians
- Two different lanes for movement of buses in both directions.
- Intersections will act as boarding place for the buses.
- Complete Air conditioned buses.
- Automated doors of all buses.
- Lifts for commuters at Metro Stations on elevated corridor.
- A special Metro smart Card similar to that like in Metro Rails.
- Smart Announcements at Metro Stations and in Metro Buses similar to those in Metro Rails.
- Retrofitted Metro Stations on elevated corridor.

Pod Cars are poised to transform Amritsar City`s Streetscape and Skyline; India

By Jim Witkin
December 16, 2011 12:00 pm December 16, 2011 12:00 pm Comment
ULTra Fairwood, an engineering company in India, announced this week that it reached an agreement with the Punjab government to build a Personal Rapid Transit system in Amritsar, an Indian city of 1.5 million about 40 miles from the Pakistani metropolis of
Lahore. The system would be based on the pod-car technology of ULTra Global PRT, which recently completed a proof-of-concept at Heathrow Airport in London.

Fraser Brown, managing director of ULTra Global PRT, said in a telephone interview that the system would consist of 200 automated electric pods, roughly 10 times the number operating at Heathrow, and would shuttle an average of 100,000 passengers per day over 3.3 kilometers, or roughly two miles, of track. Among the route’s seven station stops would be the city’s principal bus station, the railroad terminal and the Golden Temple, a major Sikh shrine.

Mr. Brown would not disclose the price of a fare, saying only that passengers would pay a comparable price to that of other modes of public transportation.

Construction on the system would begin in 2012, Mr. Brown said, with an eye toward starting service in late 2014. Aside from the larger scope and complexity of the system, the difference in climate between London and Amritsar would require alterations to the pod cars and their dedicated guideways.

“We are looking at the pods operating in temperatures of 50 Celsius [122 Fahrenheit] and in monsoon rain conditions,” said Mr. Brown. “This has required design changes to the track to cope with water runoff and a revamp in the pod air-conditioning system.” The car will also be redesigned to carry six passengers, rather than four with luggage, as it is configured at Heathrow.

He said that any changes to accommodate local conditions would not impact the fundamentals of the system.

“Besides the Heathrow proof-of-concept, we have done a lot of behind-the-scenes simulation and testing in this area,” Mr. Brown said. “We are absolutely confident the control and safety systems are scalable and robust.” He also reiterated that the safety system had received regulatory signoff in Britain.

Amritsar is the host of as many as 500,000 Sikh pilgrims on major holidays who visit the Golden Temple. Prompted by concerns about exhaust fumes damaging the building’s facade, which was built in the early 17th century, the government has banned nonessential motor vehicle traffic within a one- to two-kilometer radius of the shrine. Pilgrims consequently must walk or hire pedal-powered rickshaws to reach the temple. Mr. Brown
expects the electric-power pod-car system to accommodate up to 35 percent of these visitors.

With private investment, ULTra Fairwood will design and build the system for the Punjab government and operate it as a concession under a 30-year agreement. Fairwood would license the pod-car technology from ULTra Global PRT in a franchise-style agreement, according to Mr. Brown. His company, which is based in Britain, would receive payment for consulting services, which he estimated at £2 million, or roughly $3.1 million, over the next two years. ULTra Global would also receive an estimated £5.4 million over the 30-year concession agreement, representing a share of the fares collected. He declined to disclose the projected costs to build and operate the system, but he estimated that the system would recoup its costs to investors after five years of operation.
Ultra Global is delighted to announce that it has signed a contract with its partners China Engineering Consultants Inc (CECI) to carry out a feasibility study into the deployment of Personal Rapid Transit (PRT) within Taiwan. The agreement, the first to explore Ultra’s transport technology in Taiwan highlights the continued interest being shown in PRT across the South East Asian region. Ultra’s Head of Operations Mark Griffiths is today attending a workshop in New Taipei City to officially launch the project.

The study is a high level planning and design project which aims to increase awareness and understanding of PRT with a range of decision makers, stakeholders and members of the public and make them aware of the social and economic opportunities associated with it. Also included within the scope of the study is a specific exploration into the implementation of PRT in New Taipei City, an area which has been identified by Ultra and CECI as a location where PRT can be a lever in unlocking latent economic potential. The project which is expected to last until August 2014 will also draw on the expertise of consultants Sinclair Knight-Merz (SKM) whose own input and expertise will add considerable value to the project.

The contract is another positive step for the Bristol based developers of the technology Ultra Global who have gone from strength to strength since opening their first system in May 2011. The Heathrow pod, the world’s first commercially operational PRT system has now carried close to a million passengers and has amassed over 1,000,000 safe driverless passenger miles. The efficient operational performance at Heathrow along with the popularity of the system has resulted in tremendous interest across the world and the Taiwanese study is one of a number of studies Ultra is currently involved in.
Ultra’s Managing Director Fraser Brown was delighted to have signed the contract, saying “Our work over the past few years has identified the huge potential in PRT to provide high value, low cost, integrated transport solutions, and we look forward to working with CECI to identify how Ultra PRT can deliver a unique and bespoke response to transport requirements across Taiwan. This development is the result of a number of discussions and visits by both Ultra and CECI to Taiwan and the UK respectively and was initiated some 18 months ago.”

About Ultra Global:

Ultra Personal Rapid Transit (PRT) is a new and innovative on-demand system for developed or urban environments. It is designed to meet the need for congestion free, multi-origin, multi-destination public transport. Using small driverless electric vehicles, that run on guideways, the lightweight and flexible nature of the system enables it to be retrofitted into a broad range of environments and provide transportation that is environmentally friendly and operationally efficient. Ultra PRT has been designed with reliability and safety built-in as standard to ensure the comfort and security of passengers.

Founded by Bristol University (UK) Professor Martin Lowson in 1995, the company’s first system opened in May 2011 at London Heathrow Airports Terminal 5 and currently transports passengers to and from the Terminal’s designated Business Car Park. In addition to removing 70,000 bus journeys on Heathrow’s congested roads each year, the system has also saved 200 tonnes of Co2 per annum and has previously been voted by customers as the single highest scoring passenger service on the entire airport campus.

About CECI:

CECI was established in 1969 primarily for the purpose of uplifting Taiwan’s technology and assisting in the economic development of Taiwan and other developing countries. Over the years CECI has undertaken some of the region’s biggest civil, architectural, structural and electrical/mechanical engineering projects, and with the emergence of the electronic information age, has actively expanded its scope of services into new areas of work, including Geographical Information Systems (GIS), Global Positioning Systems (GPS), Intelligent Transportation Systems (ITS), e-commerce and biotechnology.

Tags: CECI, China Engineering Consultants Inc, Heathrow, Personal Rapid Transit, Pods, PRT, Taiwan, Transport, Ultra Global

Artificial Intelligence, AI, in Transportation Market Overview, USA, Global

The global AI in Transportation Market is expected to attain a size of $1.4 billion in 2017 and is forecasted to reach $3.5 billion by 2023, registering a CAGR of 16.5% during 2018–2023. The major factors driving the market growth are increasing concerns for driver and vehicle safety, growing focus towards reducing the transportation costs and development of autonomous vehicles.

Global Artificial Intelligence, AI, in Transportation Market; by TECHNOLOGY, SM (2013–2023)
AI refers to those computer-operated tasks which otherwise require human intelligence, such as visual perception and decision making. Transportation is an important application area for AI, involving the use of deep learning, computer vision, and natural language processing (NLP) technologies. Fully autonomous vehicles on trial, use AI based software and a set of hardware such as video camera, light detection and ranging (LiDAR), and radio detection and ranging (RADAR) sensors. Such wide scope of applications has influenced the dynamics of AI in transportation market.

On the basis of application, the global AI in transportation market can be categorized into HMI and ADAS. Of the two, HMI is estimated to account for a larger share in the global market, mainly due to its higher penetration in trucks than ADAS. However, it is estimated that during the forecast period, the penetration of ADAS will increase at a faster rate.

Based on technology, the AI in transportation market is categorized into deep learning, computer vision, and NLP. Among these, the deep learning category is estimated to account for the largest share, as this technology is being increasingly used in various AI related applications in the development of self-driving trucks. This category would also see a robust growth during the forecast period, with trucks becoming more intelligent to drive on varying situations such as road terrains and unfavorable weather conditions.

Based on process, the AI in transportation market can be categorized into signal recognition and data mining. Of these, signal recognition is estimated to account for the larger share in the global AI in transportation market. This is so because signals in the form of text, tracking, gestures, mapping etc are being increasingly used in various safety applications, such as traffic sign detection and ACC. However, the fastest growth during the forecast period is expected from data mining, with growing influence of artificial intelligence in car safety and infotainment, requiring more data in the form of images and signals to be processed and analysed.

Globally, North America is estimated to be the largest market for AI in transportation in 2017, with the U.S., accounting for a significant share in the total North American sales during the year. Europe follows it as the second largest AI in transportation market.

The end-users in both the above regions are less cost-sensitive and willing to pay extra costs for advanced safety and convenient features. This, coupled with government support in the form of funding, regulations, and industry collaborations is benefitting the AI in transportation market in the two regions. The Asia-Pacific and RoW markets are still in the nascent stage, however, are expected to grow considerably during the forecast period.

**AI in Transportation Market Dynamics**
Trends

Recently, AI in transportation industry has witnessed significant number of mergers and acquisitions, and partnership activities. For instance, in February 2018, Continental AG and NVIDIA Corporation announced that they have established partnership to create AI self-driving vehicle systems on the basis of NVIDIA DRIVE platform, with a planned market introduction in 2021 for level 3 features. The considerable number of mergers and acquisitions, open partnerships, and collaborations among existing players and start-up companies will reduce the overall cost and complexity, and increase profit. The consolidation trends in the AI in transportation market are likely to accelerate during the forecast period.

Drivers

The safe and on-time movement of goods and cargo around the globe is a costly logistical challenge across the globe. AI creates numerous opportunities to reduce costs and improve operations for trucks, thereby driving the AI in transportation market. The truck platooning technology maintains an optimum speed and distance between trucks in the group, thereby reducing the overall time spent on the road. Advanced navigation alerts the driver of the optimised routes to avoid traffic jams and speed up the deliveries.

AI based technologies such as AEB and ACC reduce driver fatigue and avoid potential road accidents, thereby saving lives and reducing delivery times. Even though implementing AI features in trucks is expensive when compared to passenger cars, the return on investment (ROI) for trucks is higher considering the reduced delivery times and improved customer satisfaction. Higher ROI is expected to benefit the AI in transportation market during the forecast period.

Restraints

The major restraint to the growth and development of AI in transportation market is the high cost of AI system. Most of the artificial intelligence applications are complex in nature and so, very expensive, which restrict its growth, especially in emerging economies. The high cost of AI system is due to the following factors:

- The cost of LIDAR/RADAR sensor, cameras, GPS devices, hard drive, graphics card and other hardware and software devices is high, and increases the overall cost of AI system.
- The need of advanced features such as blind spot detection, ADAS, ACC, and control wheel steering also adds up to the total cost of the AI system.

Owing to the high cost, the adoption of AI for the transportation sector mainly happens by bigger manufacturers only; thus, restraining the growth of the AI in transportation market.

AI in Transportation Market Competitive Landscape

Some of the major players operating in the AI in transportation market are ZF Friedrichshafen AG, Robert Bosch GmbH, Continental AG, Valeo SA, NVIDIA Corporation, Intel Corporation, Microsoft Corporation, Alphabet Inc.
Ride-sharing Startup Via, not to be outdone by Uber and Lyft, is investing meaningfully in autonomous vehicles. To this end, it today announced the launch of a driverless shuttle program in New South Wales, Australia, in partnership with the BusBot project, local bus operator Busways, local government agency Transport for New South Wales, and startup EasyMile. Via says it'll serve a community of seniors that currently lacks a public transit solution.

It's the second phase of BusBot's pilot program, which began in Marian Grove on April 2019. (The third phase will operate along a roughly 1.6-mile path from the Coffs Harbour central business district [CBD] to the jetty precinct, using existing bus stops to complement current bus services.) Service will be free for the duration of the deployment, which is expected to last 22 weeks.

“If autonomous vehicles are to reach their full potential for providing low-cost, efficient rides, they need to be shared by multiple passengers,” said Via cofounder and CEO Daniel Ramot. “Via’s sophisticated systems are able to power, in real time, the movement of millions of connected autonomous shuttles and their passengers, and we’re delighted to be working with BusBot to launch this groundbreaking service.”

When service kicks off in earnest, customers will be able to hail a car using BusBot’s smartphone app. Via’s route-optimizing and detour-minimizing algorithms will take over from there, enabling multiple riders to share a driverless bus by directing them to nearby pickup and dropoff spots.
BusBot’s electric shuttles — EZ10 — feature redundant sensors, a failsafe and redundant braking system, and “industry-grade” emergency buttons. They can travel in both directions and incorporate a fleet management system that relays data like battery level, position, speed, and estimated time to arrival to a cloud-hosted dashboard, and they’re capable of level 4 autonomous driving, meaning they can operate with limited human input and oversight in specific conditions and locations (as defined by the Society of Automotive Engineers).

Via’s foray into self-driving vehicles comes as it eclipses 50 million dynamically routed rides around the globe. The company says it has more than 70 launches and pending launches in more than 15 countries, and it last year opened its first Australian office in Sydney.

Via, which was founded in 2012 by Israeli entrepreneurs Ramot and Oren Shoval, operates a branded shuttle — ViaVan — in partnership with Mercedes-Benz (an investor) in selected regions around the world. In November, it teamed up with the Los Angeles County Metropolitan Transportation Authority to provide subsidized transportation to and from metro stations, and it also provides shuttle services at Harvard University.

Underground Airwaves: “The Security Risks of Telecomms on Subways”, by Joe Mullin, CTO of InSite Wireless (Part 3); USA, Global

Posted by Marcello Perricone on Jul. 8, 2019

This is part 3 of a three-part interview. Click here to read part 1, where we discuss InSite’s work at Boston’s MBTA, Atlanta’s MARTA, and LA Metro’s subway systems, and click here to read part 2, where we talk about the evolution of 1G to 5G and the impact it has on infrastructure.

Ahead of SmartTransit LA next October 2019, I sat down for an extremely informative talk with Joe Mullin, Chief Technical Officer of InSite Wireless in Boston. After talking about their past projects in the rail industry and the evolution of 1G to 5G, Joe told me about how his extensive work on transit occasionally left the purely consumer experience focused side and veered into slightly more important aspects of the sector.

"Our focus is primarily on the commercial side, as far as commercial wireless and the mobile operators go — that’s where we initially come from, but we get involved with public safety in some of our projects," Joe says. "There were some issues we can address, such as when a train caught on fire in 2015 in a radio dead spot in the New York tunnels. The two-way radio wasn’t working and there was no cellular coverage, so it was a really bad situation that draws attention both to the public safety need and to how wireless can act as a backup to the two-way radios."
Given the underground nature of most metro networks, coverage becomes the most important aspect of a network -- and the associated costs one of the main points of contention.

"We don’t really have issues with saturation of airwaves in deep tunnels -- the tunnels tend to be narrow single track tubes, so we’re using cables to cover their length. The bigger challenge is providing a contiguous signal, and for that we need to find the equipment location -- places to install the hardware like fibres and the amplifiers that generate the signal and power them," explains Joe.

"That can be expensive, and what we see overall in the industry is that the marginal cost for network operations for the wireless operators is increasing faster than the marginal revenue they’re getting for their service," Joe continues. "While carriers are seeing increasing costs to deliver increasing amounts of data and experiencing relatively flat revenue, we are expecting that 5G will bring efficiencies and new use cases that reverse that trend. All of our DAS networks are 5G ready on existing frequencies. We also expect that carriers will be driven by competition to keep aggressively building out their networks through additions to existing macro sites (as well as a strong need for additional macro sites) especially in suburban and rural areas, expanding on 4G technologies until 5G begins to take hold several years out."

Those worries apply not only to subway installations, but also those above the ground. 80% of all cellular usage is done from in-buildings, and as standards rise to higher data rates and the more sophisticated protocols that go into higher frequency bands, signals lose building penetration. According to Joe, "it’s much harder for carriers to budget for that, and it’s an awful lot of demands for coverage that cannot really be met."

However, not all hesitations are solely money based. In New York City, the challenge has less to do with infrastructure, and more with security concerns.

"We’re eager to go anywhere that makes sense, including wanting to be involved with the discussions in London. We were involved with the discussions in NY, and there was a strong desire from them to not cover the tunnels," Joe explains. "They don’t have the same issue as London and other places have with tunnel width -- they get multiple tracks side by
side in some areas, which is a really complicated system and makes it a major high-cost investment to get it done. New York has stations covered but not the tunnels, so there’s a need and a challenge there to get that done, but they were concerned with terrorists putting a bomb on the trains and setting it off with a cell phone under one of the rivers and flooding all the tunnels, and that is keeping them from doing it. We felt that was not the right way to go, and that’s why we didn’t pursue it in NY – but we would be very interested in doing it if that ever changes."

More than everything, it is clear the biggest hurdle is not so much the intense technology infrastructure or geographical limitations, but the initiative of companies involved to find new ways to address the challenges. According to Joe, the hardware and the expertise are all there.

"The transit system and the individual carriers should really step up and take up the responsibility to get this done, and we’ll see the benefits from the needs that need to be addressed," he says.

If you're interested in learning more about telecomms in rail and meet other brilliant speakers and companies like Joe Mullin and inSite Wireless, book your ticket now and join us at SmartTransit LA, on October 28-30th.

SmartMetro and Communication Based Train Control, CBTC, World Congress – 25-27 November, Madrid; Spain, Global

The SmartMetro and CBTC World Congress returns for its 10th year in Madrid and is the meeting place for senior metro, tram, and light rail technology experts from all global regions to discuss the major challenges cities are facing such as digitalisation, congestion, automation and shared mobility. Delegates attending the show this year will be able to:
•Have the choice of three focused streams covering signalling systems, assets and digitalisation and operational excellence and smart mobility •Attend a site visit organised by local operator, Metro de Madrid •Listen to C-level global speakers from operators across all regions •New roundtable format where delegates can participate in multiple roundtables
Sensor equipped Condition Monitoring City Tram captures Data for Optimization with the Use of Artificial Intelligence (AI); Karlsruhe, Germany

Der Eisenbahnigenieur, EI, July 2019

The Karlsruhe urban, suburban and interurban Traffic Concept is a worldwide success story with its integrated standard gauge rail-network of City Tram, Underground LRT and Railway plying on the routes of town and region with one-an-the same dual voltage vehicle, 770 V DC (on city rail network) and 15 kV AC (on the rail network of German Federal Railway, DB with 100 kmph). The LRT network reaches nowadays nearly 600 km. Commuters can travel on one and the same vehicle from one town centre to the next town centre. The longest route is 160 km.

In a joint research project, the Albtal-Verkehrs-Gesellschaft mbH (AVG) and the Karlsruhe Institute of Technology (KIT) have equipped a light rail vehicle with extensive monitoring technology. The aim is to use the monitored data to optimize the local rail traffic with methods of mechanical learning (part of artificial intelligence, AI) in terms of safety, energy efficiency and comfort. The Karlsruhe Monitoring and Data capturing tram will be used in regular operation with immediate effect.

In order to detect infrastructure damage, acceleration sensors were attached to the bogies. These are used together with GPS data to make predictions about the wear of the track systems. To optimize the energy efficiency, the overhead line voltage is continuously...
checked and the energy consumption of the vehicle and the power dissipation at the braking resistors are detected, to find out at which points it would be suitable for receiving the braking energy stationary storage. Currently, up to 30% of the braking energy is lost because there is no other track nearby that can use the energy.

In order to optimize passenger comfort, acceleration sensors are also installed in the passenger compartment. The data will be used to design driver trainings in the future. With measuring microphones in conjunction with GPS data, speed and other external monitored conditions, it will also be analyzed, why and where the annoying rail squeaking is particularly common.

In regular passenger operation, the measuring tram now records mechanical and electrical parameters as well as different environmental parameters. Source: AVG / Michael Krauth.

Uber Transit gives Denver Residents Integrated Mobility; USA

10 Jul. 2019 | Railway-News

- Science and Technology

The Regional Transportation District (RTD) in Denver has partnered with Uber and software developer Masabi to create Uber Transit, allowing passengers in the US city to use the Uber app to plan, book and pay for end-to-end transportation, including public transit.
What is Uber Transit?

Uber Transit allows passengers to use the Uber app to 1. plan their journey, and 2. purchase tickets in-app. Passengers select their destination in the Uber app and are then given ‘Transit’ as an option in the ‘choose a ride’ selector. Passengers who choose ‘Transit’ can then buy tickets for all transit options available. Furthermore, this service is not limited to standard tickets. Passengers can redeem RTD services such as day passes or monthly passes as well. Users of the app also benefit from real-time schedules and walking directions to and from transit stations. After buying a ticket, users activate them, after which they remain available even offline.

Uber Transit Trial in Denver

Denver is the first city in the world where Uber has trialled its Uber Transit service. In January, Uber Transit launched by officering real-time transit information. In May then, the ticketing capability followed. After a staggered roll-out Uber Transit is now available to all users in Denver.

The data so far have been very positive. For example, Uber trips that start or end at a transit station have grown by 11.6 percent. Repeat ticket purchases have also gone up week on week, as has the total number of tickets sold through the app. At the end of June passengers bought more than 200 tickets per week.

Passengers have purchased more than 1,200 RTD tickets via the Uber Transit app.

Mobility-as-a-Service

Dave Genova, RTD CEO and General Manager, said:

“The data we’re seeing from the launch of Uber Transit affirms that people appreciate choices, and that the future of mobility lies in providers working together to deliver on public expectations. Twelve hundred transit tickets sold within the Uber app represents 1,200 decisions actively made to take transit, after considering all options available. And for travelers who take Uber after seeing that RTD is available to them, being made aware of our services ultimately broadens our reach.”

David Reich, Uber Head of Transit, said:

“We’re using this data and insights from Denver to inform the Uber Transit experience in London, Boston and other future cities.”

Jonathan Donovan, Chief Product Officer, Masabi, said:

“Removing the friction associated with paying and using your phone as a ticket is key to encouraging more people to use public transit. [...] We strongly believe that the ability to purchase transit tickets within the Uber app in Denver will have a positive impact on ridership numbers as paying and traveling is made easier, leading more people to leave their cars at home and ride transit.”

Masabi was the obvious choice as a collaborative partner in this project. It also launched RTD’s mobile ticketing services in 2017. Its goal is to bring software-as-a-service to public transit.
Siemens Tram Assistant. The safety advantage for light rail vehicles.

How can you make vehicles and infrastructure intelligent and sustainably competitive? We know – with our digital solutions such as the collision warning system Siemens Tram Assistant. Based on radar and video sensors, it helps drivers to identify potentially dangerous traffic situations at an early stage, and thus helps to prevent accidents. In addition to the driver, it also protects passengers and other road users. In a nutshell: You can reduce repair costs and downtimes while boosting availability – thus increasing value over the entire lifecycle of your system.
Samsun Tram Line reaches Ondokuz Mayis University; Turkey

Jul. 9, 2019
Written by Keith Barrow

THE Turkish City of Samsun added 6 km to its north-south tram line on July 5 with the opening of the northern extension to the Ondokuz Mayis University (OMU) campus.

Samsun opened the initial 16 km section of its first tram line in 2010 and the completion of the OMU extension takes the total length of the line to 36 km.

Bozankaya wins Timisoara Tram Contract; Turkey, Romania

July 9, 2019 Raiway Pro
The Romanian City of Timisoara awarded the Turkish Rail Vehicle Manufacturer Bozankaya the contract for the supply of 16 five-car low-floor trams with a total value of EUR 33 million. The contract includes an option for 24 additional trams, which brings the entire contract value to EUR 80 million.

The first deliveries are expected 18 months after signing the contract, with entire project duration of 48 months.

With a length of 30 m, the trams have a capacity of 170 passengers and are able to run at speeds of 70 kmph.

The trams can run on battery power for more than 60 km, offering more flexibility in case of repairs or other disruptions to the electric network. This also allows Timisoara city to extend tram lines without having to construct additional catenary lines. This is an attractive option for historical city centres.

**Budapest Tram Line 1 reaches Kelenféld; Hungarian**

Jul. 10, 2019
Written by Ferenc Joo

BUDAPEST added three more stations to its extensive tram network on July 8 with the opening of the 1.7 km extension of Line 1 from Fehérvári út to a new terminus at Etele tér adjacent to Kelenféld metro and main line stations.
The Forints 8.63bn ($US 30m) extension was built by a consortium of Colas and Siemens.

The extension takes the total length of Line 1 to 18.3km, equal to Line 41, which was previously the longest tram line in Budapest.

Line 1 is also Budapest’s second-busiest tram line, carrying around 153,000 passengers a day as well as the city’s fastest, with an average speed of more than 22 kmph, making it faster than metro Line 1.

The extension is fully accessible for passengers with reduced mobility and track is covered in turf for most of the new section’s length. In addition to the construction of tramway infrastructure, the project included rebuilding adjoining pedestrian areas and green spaces.

The line is currently served by a mixture of older Tatra T5C5, newer Siemens COMBINO and CAF URBOS trams, with more CAF vehicles due for delivery between September and December.
The extension towards Kelenföld has been planned since the opening of the Rákóczi bridge across the River Danube in 2005. The bridge was constructed with space for two tram tracks between the carriageways of the road.

Tracks reached the bridge in 2000 but were only extended to Fehérvári út in 2015. The extension completes tram Line 1 for now, with connections to metro Line 4, long-distance buses and MÁV-Start main line train services at Kelenföld.

An extension of the line north from Bécsi út to Aranyvölgy is planned in the longer-term.

Solaris to supply up to 250 electric Buses to Milano; Italy

09 Jul. 2019

ITALY: Milano Transport Operator ATM has awarded a framework contract for the supply of up to 250 battery electric buses to Solaris.

Delivery of the base order of 40 buses is to begin in June 2020, and the contract would be worth €192m if all options are exercised.

Solaris will supply its Urbino 12 electric model. The 12 m long buses will be equipped with 240 kWh Solaris High Energy batteries that can be charged through an inverted pantograph at opportunity charging stations or using plug-in depot charging. They will power two electric motors of 110 kW each.

With capacity for 82 passengers including 26 seated, the vehicles will be equipped with air-conditioning, USB sockets, a passenger information system, CCTV and a rear-view driver's camera.

The order has been placed as part of ATM’s goal of phasing out diesel buses by 2030. Solaris had previously supplied 25 electric buses to Milano.
SOUTH KOREA: Ulsan Mayor Song Cheol-ho has announced plans for the construction of a four-line tram network in the city. Due to be built in two phases, the total cost is estimated at 1·3tr won.

The first phase is due to be completed by 2027 and foresees two routes. An 11·6 km east-west line would link Namgu Tawhwa to Sinbok, while a 13·7 km north-south line would connect the airport to the junction of Namgu and Yaim roads.

The second phase would add a 17 km route between Bukhwa-Hyangmun Administration and Donggu Daejangam Park, as well as a 6 km line connecting Sinbok with Boksan Catholic Cathedral.

The municipality has submitted the plans to the Ministry of Land, Infrastructure & Transport for approval, which is expected to announce a decision in October.

Consultants selected to develop Addis Ababa Transport Plan; Ethiopia

04 Jul. 2019

Chaotic Traffic in “developing” Addis Ababa needs modern Mobility Solution with Light Rail and Bus Rapid Transit.
**ETHIOPIA:** The Government has selected Ramboll to help it to develop a strategic infrastructure and traffic plan for Addis Ababa. The World Bank funded project focuses on sustainable urban development as the capital is experiencing a sharp increase in air pollution and traffic congestion.

Ramboll is the lead consultant in a consortium with two Italian companies and a local subcontractor. The consortium will assess the travel demand patterns and transport conditions in order to identify transport strategies with the aim of developing more low-carbon alternatives to private car use. Ramboll’s Smart Mobility division hopes to develop a demand-based transport model and plan for future infrastructure projects in the city to 2030.

**Addis Ababa’s Light Rail and Bus Rapid Transit Project** addresses the challenges rising from an aging transport system combined with fast-growing urbanization to ensure a prosperous, equitable, and sustainable city for the future.

Rapid urbanization in Addis Ababa has led to a rise in poverty and social inequality. Demand for transport has increased faster than the city can provide it and is creating health and safety risks, impeding economic development and producing more greenhouse gas emissions. The Addis Ababa 2002 - 2010 master plan highlighted increasing pressure on the city’s public transport service, due to factors including an insufficient number of buses, passenger security at transport and freight terminals and a sub-standard traffic management system.

Subsequently, the Transport Policy adopted in 2011 promotes the expansion of mass transport systems along with non-motorized mobility to achieve a more socially inclusive, economically affordable, environmental friendly and technologically advanced transport system. The policy sets the foundations for a renewed public transport system and the improvement of traffic management practices through the introduction of Intelligent Transportation Systems (ITS). The new framework has been articulated with the master plan for urban development (2010-2015) of the city. The rationale behind the initiative is
that sustainable and lasting socio-economic development of Addis Ababa can only be achieved if the transport system provides a reliable, safe, comfortable and accessible service.

Chaotic Traffic in “developing” Addis Ababa needs modern Mobility Solution with Light Rail and Bus Rapid Transit

Trams, Trolleybuses and a greener Depot for Plzeň; CZECH REPUBLIC

05 Jul. 2019

CZECH REPUBLIC: Plzeň transport operator PMDP and the European Investment Bank have signed a €50m loan agreement which will be used to finance the purchase of 34
trams and approximately 34 trolleybuses to replace existing vehicles, as well as the modernisation of the Slovany tram depot and power supply infrastructure.

To be undertaken in 2020-22, the depot modernisation includes enabling the use of rainwater to wash vehicles, the installation of green roofs and work to reduce noise.

The programme forms part of the city’s sustainable transport strategy. ‘If we want to draw more people to public transport, we need to make it comfortable and reliable’, said EIB Vice-President Vazil Hudák after the loan was signed on June 26. ‘EIB support for Plzeň will increase the quality and the safety of local transport services, thereby making them more attractive. This project will not only have a positive impact on the environment of the fourth biggest city in the Czech Republic; it will also contribute to the climate goals of the EU and its bank.’

**Brno University Tram Extension**
**Contract awarded; CZECH REPUBLIC**

04 Jul. 2019

CZECH REPUBLIC: The City of Brno has awarded Metrostav a KC1·4bn contract to build a 900 m long and partly underground extension of tram Route 8 to serve the Bohunice university campus and hospital, which are accessed by around 40 000 people every day.

The project is being supported with a grant of more than KC1bn from the EU Operational Programme for Transport, which will cover 85% of the cost.

Construction is scheduled to start later this year for opening in 2022.

The extension would branch from the existing network at Osová, and pass though a 619 m long, 9 m deep cut-and-cover tunnel under Mikuláškové Náměstí, terminating at Ulice Netroufalky. There will be two stops, at Nová Jihlavská and Bohunice Hospital, with the first being in the tunnel.
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Jorudan integrates Masabi mobile Ticketing; Japan

03 Jul. 2019

JAPAN: Masabi’s Justride SDK mobile ticketing purchasing platform has been integrated with the Jorudan journey planning and travel booking system, which has more than 10 million users throughout Japan.

The initial deployment covers Syoei Express Bus Co services, with passengers able to buy tickets directly from Jorudan’s Norikae Annai app and then store visual and barcode tickets in their phone’s virtual wallet.

Further operators are to be added in the coming months, with Masabi saying Justride SDK can be used by authorities and operators of all sizes to rapidly deploy mobile ticketing to provide an established user base with ‘a truly integrated passenger journey experience’ including journey planning, real-time information and ticketing.
'Our vision has always been to make it easier for people to get around cities using a bus, train, tram or ferry, all over the world’, said Masabi CEO Brian Zanghi on July 3. ‘We are extremely excited to expand our ticketing offering to Japan and to be integrated into the country’s leading journey planning app.’

- The NEORide consortium of seven transport agencies in the US state of Ohio have announced EZFare, a cashless mobile ticketing and fare payment app developed with Masabi which is to be rolled out by October. Other agencies are expected to join, and EZfare tickets will also be available within the Transit real-time journey planning app.

- July 09, 2019
- News, Passenger, Rapid Transit

**Saft begins CTA 7000 Series Battery System Deliveries; USA**

- July 09, 2019
- News, Passenger, Rapid Transit

Written by Andrew Corselli, Managing Editor; Railway Age, Passenger Rail News

Saft Batteries has begun battery system deliveries to CRRC Sifang America’s manufacturing facility for the Chicago Transit Authority's (CTA) 7000 series transit railcars.

Part of Saft's biggest North American contract to date, the batteries will provide backup power to vital systems—heating, lighting, door control, security cameras, etc.—on board the next generation of CTA Railcars.

The contract, signed in April 2018 following a competitive bid process, includes an initial order of battery box assemblies for 400 cars with options for an additional 446 assemblies.

“We’re thrilled to commence delivery for this important and ambitious project from our Valdosta plant in Georgia,” said Milan Sima, Railway General Manager, Saft. “CRRC is a
leader in passenger railcar manufacturing, and we have designed a 21st century battery system for a 21st century transit system. I’m proud of the work our team has completed thus far and look forward to our continued partnership with CRRC.”

“CRRC Sifang America Inc. has high performance, reliability, safety and pricing standards for the specialized components it is procuring for the CTA 7000 series passenger railcar project,” said Marina Popovic, HR Director and Chief Legal Counsel. “Meeting those standards is critical for CRRC to maintain its reputation as the leading passenger railcar manufacturer in the world, to continue building state-of-the-art innovative and reliable trains, and to deliver the highest quality products to its customers. Saft meets CRRC’s high expectations and strict requirements. Moreover, CRRC is committed to doing business with U.S. suppliers such as Saft, which has successfully manufactured batteries for various railcar projects.”

Artis Rendering of a CRRC-built CTA 7000 Series Car on the Loop.
METRO NEWSLETTERS on “URBAN MOBILITY AS A SERVICE”

PUBLIC MULTIMODAL URBAN, SUBURBAN AND INTERURBAN PASSENGER TRANSIT SYSTEMS WITH METRO-BUS, LIGHT-RAIL, TRAM-TRAIN, METRO-RAIL, METRO-TRAIN, REGIONAL RAPID TRANSIT, COMMUTER-RAIL, ROPE-WAY/TRAIN, MAGLEV AND HOVERCRAFT TRANSIT/PEOPLE MOVER, WATER-METRO, AUTONOMOUS PEOPLE-MOVER

MOBILITY SOLUTION, TRANSPORTATION AND ECONOMIC DEVELOPMENTS IN MODERN URBAN/MEGAPOLIS ENVIRONMENT

METRO Newsletter by Dr. F.A. Wingler
METRO 80, July 2019

Animation: The Future of urban, suburban and interurban Mobility in Punjab’s Cities with Right-of-Way dedicated Bus Rapid Transit (BRTS) Lanes
"The UITP Global Public Transport Summit (Stockholm 9-12 June 2019) is the largest of its kind in Public Transport and Urban Mobility and the event, where the sector will gather to discuss the current state of play and what that future will look like. Leading the debate will be UITP’s Secretary General Mohamed Mezghani."

Rail Analysis: The next UITP Global Public Transport Summit will take place in Stockholm (9-12 June 2019). What can you tell us about this edition?

Mr. Mohamed Mezghani: The next UITP Summit will be the biggest edition yet. The Summit was previously held in Stockholm in 1991, where it was known as the UITP World Congress. The growth and recognition of the Summit is something truly incredible. It has
become the largest event of its kind in public transport and urban mobility. In Stockholm we will have 280 exhibitors across 40000 m² of space. 2500 Participants and attendees will join us in Sweden with more than 10000 visitors expected per day. These are brilliant numbers! What makes the UITP Global Public Transport Summit the biggest of its kind is that we cover all modes. We have mass transit and shared modes and new players all under one roof. It is also the global reach that makes the UITP Summit special. Our worldwide attendance will reach up to 90 countries. We will also have a rich programme that covers many sectoral topics and will take place across plenary sessions, lunch sessions, poster sessions and exhibition sessions. The 2019 programme will revolve around seven main topics: customer service excellence, planning and governance for improving quality of life in cities, mobility as a service and the new combined mobility paradigm, attracting new talents and skills, operational excellence, funding and finance and harvesting innovation. These will be discussed through plenary sessions and panel discussions. Taking part in these discussions will be hundreds of high-level speakers from around the world, including CEOs, political figures and innovators. So far we have leading names from France, Indonesia, China, Australia, Canada, Kenya and Saudi Arabia, to name but a few. The UITP Summit offers something for everyone, at all times.

**Rail Analysis:** The theme for the 2019 Summit is “The Art of Public Transport”…what does the theme mean to you personally?

**Mr. Mohamed Mezghani:** The theme for each Summit edition is carefully selected. The UITP Summit always has a theme which is relevant and special to the host city. “The Art of Public Transport” is not the 2019 theme by chance! It's inspired by the Swedish metro holding the distinction of being ‘the longest art gallery in the world’. However, the theme of the Summit is more than just the artistic aspect. We are also encompassing the craft and excellence in delivering public transport; the engineering aspect, the governance of public transport. We will also cover the latest innovations, that illustrates this art. It’s also important to emphasize the key role of the people who deliver the state of the art public transport around the world. Our industry colleagues, including the very talented UITP staff, are ‘mobility artists’ – working every day to showcase public transport. The theme will show and reflect their contribution to the sector. The UITP team has been showcasing
their abilities as artists by taking pictures around the world with our stencils – not only does this show the global reach of our staff and membership, but also that “The Art of Public Transport” can truly be found everywhere!

Rail Analysis: As the biggest event of its kind in Public Transport and Urban Mobility, how important has the UITP Summit become to the sector?

Mr. Mohamed Mezghani: UITP has more than 1600 members across the globe and the UITP Summit has become so important to the sector that our members consider it a first Tier event. This is extremely flattering as they clearly view it as an unmissable event. For exhibitors – it is the event as the UITP Summit is essential to their work. There’s the chance to premiere their innovations and to showcase to the industry. Crowds come from all over the world – transport leaders and CEOs – and visitors get to hear them speak and meet them.

We also have a growing number of political figures participate, which is very important as it shows that key decision-makers view the Summit as relevant part of their calendar. The wide variety of topics on offer is also covered by the international press and media, with a very strong showing from the trade press. The first Summit was held in 1886, the year after UITP came in to being, and the numerous editions since then have built great credibility to become the best event in the eyes of the sector.
**Rail Analysis**: What makes Stockholm the best host for this edition? And what can you tell us about UITP’s relationship with 2019 local host SL?

**Mr. Mohamed Mezghani**: Stockholm is a great city to host the next UITP Summit. It has so much on offer – from being considered the safest city in Europe, to being the second most connected city in the world. Its **Urban Mobility Policy** is a model in its kind with a balanced urban planning, a multimodal public transport network and car traffic restrictions (with the congestion pricing scheme for example). It also perfectly showcases art in public transport. Our relationship with SL is very strong, we work closely on the Summit.

Moreover, our members in the Nordic Countries are actively partnering with SL making the Summit a highlight not only for Sweden but also for Finland, Iceland, Norway and Denmark. UITP only goes to cities with members and committed hosts. We don't want to organise the Summit alone – and as a member-led global association, we don't have to! In fact our relationship with the local member host is so strong that we’ve always co-hosted with a member since the first edition in 1886!
Rail Analysis: There will be hundreds of exhibitors, speakers and delegates, as well as thousands of visitors, in attendance over the three days of the Summit. What can they expect to see and experience?

Mr. Mohamed Mezghani: They can expect the opportunity to share the latest public transport developments from over the world. The sector is changing and these changes will be discussed, alongside the challenges we face. There’s a great deal going on in public transport. We have the growing development of new players, the growth of shared mobility, on demand modes and more. Digitalisation is also changing the sector and needs to continue to be discussed. It’s important to all meet together to share the experiences of change with members. All of this will be covered at the Summit – to share, and learn is very important. There’s also the chance to meet and to listen to many high-level speakers. In fact we have more than 100 CEOs from transport bodies speaking in Stockholm.

Rail Analysis: What do you hope they take away from this edition?

Mr. Mohamed Mezghani: The attendees can learn from the experience of who will be speaking and exhibiting. The networking opportunities are also very important, and there’s many on offer during the Summit. UITP organises many, as do our sponsors and our exhibitors. I would say that the Summit is best the way to develop your business by the numerous chances on offer to network. It’s also the chance to take distance from daily work – everyone in the sector is very busy all year and this is the chance to realise what is happening and how they can develop their business and come to see the public transport and urban mobility debate first hand.

Rail Analysis: And finally, can you tell our readers in one sentence why they should come to the UITP Summit?

Mr. Mohamed Mezghani: There’s so much to say about the UITP Global Public Transport Summit that you will have to kindly allow me a lengthy sentence!… The UITP Summit is the unique opportunity to learn from peers and to see the latest technological developments first hand; to see high level speakers show commitment to public transport and sustainable mobility and to interact in a friendly environment by having
fun in a very nice city like Stockholm and enjoy its white nights! I hope to see all of you join us there in June.

Exclusive Interview with Pankaj Kumar Bansal, MD-Chennai Metro; India

By Mamta Shah: Urban Transport News

27/02/2019

Urban Transport News: Congratulations! You must be feeling proud and happy after the commissioning of the Blue Line of Phase 1 of the Chennai Metro. Looking back, how would you rate the performance of the project team in achieving this milestone, after surmounting innumerable roadblocks?

Pankaj Kumar Bansal: Outstanding and exceptional performance done by our project team.

Urban Transport News: The initial cost estimate of Rs 14,000 crores, when compared to final cost of over 20,000 crores represents an overrun of more than 40%. We know that the foreign exchange rate escalation represents a substantial part of this overrun. What factors, apart from this variation, would you attribute the overrun to? By hindsight, do you feel would your planning for Phase 2 cover any particular aspect that didn't go as well as expected in Phase 1?

Mr. Bansal: The project cost sanctioned in 2009 is Rs.14,600 cr for the entire Phase I and it is estimated that the completion cost can go up to Rs. 19,058 cr, which is 30% over the sanctioned cost. The reasons for the cost overrun are mainly increase in land cost,
variations to the contracts (approx. 5% of the original cost), price escalation, foreign exchange fluctuation (4%), etc.

The variation to contracts include re-tendering of terminated contracts and execution of emergency works. The increase in land cost about 12% on the original cost is estimated on considering the enhanced compensation claims, the actual requirement of lands. During estimation, an expenditure about 4% of the sanctioned cost was proposed for property development.

However, it is highlighted that Rs. 19,058 crores is only an updation of the project cost and also, as the Phase – 1 project is nearing completion, cost expended till date is only 12% over the sanctioned cost of Rs. 14,600 crores.

Factors affecting apart from variation are Price variation, Delays in completion of project due to land acquisition, the existing geology of mixed ground condition in Chennai had adversely affected the progress of tunnelling work, limited availability of work sites and difficult situation of road traffic diversions, limited time of disposals of mucks etc., apart from non-performance by the contractor, Design built Contract.

Based on the experience& lesson learned from phase 1 all the above factors have been duly considered with proper planning including detailed design by CMRL along with, hybrid BOQ contracts including more transparency for timely execution of work.

**Urban Transport News:** Some of the big names in the construction industry were associated with this project that has just been completed. There are also reported instances of non-fulfilment of obligations in some cases leading to drastic measures, having been taken. Frankly, could the terms of the construction contracts been made better, looking at them from hindsight?

**Mr. Bansal:** There is no solution for non-performance in any contract. Most of the problems has been resolved by more transparency with CMRL in future contracts in terms of Build contract with CMRL design rather than Design and built contract

**Urban Transport News:** Talking of learning from doing, what would be the main takeaways from the Phase 1 project, in terms of “lessons learnt?”

**Mr. Bansal:** Our main takeaways from the Phase 1 project are as under-

**Mixed Ground Condition:** To be determined more preciously at closer interval while geotechnical investigation

- Passing Tunnel through Heritage building
- Coordination with other stake holders
- Planning:
  - Alignment mostly along arterial road corridors and meeting out minimum curve radius. Considerations for future road expansion and maintaining vertical clearances
  - Reduction of Station box size in Underground
- Least land
- Station Optimisation
  - The track centres optimized
  - Platform width and Safety zone minimized through provision of Platform Screen doors
- Packaging Strategy
Optimisation of Packaging
- Mixed soil conditions and its impact of TBM selection and design
- Traffic management aspects due to limited road width during execution
- Crossing of railway tracks, rivers, bridges, etc
- Provisions for additional load for future developments proposed on alignment ie for flyover
- Integration of Metro structures with existing/proposed infrastructure like flyovers
- Provisions for property development
- Closer spacing between stations to improve accessibility

- Multi-modal integration – Unique cross over experience at Chennai Central
- Challenges during execution:
  - Control of vibration and noise during execution
  - Cracks in buildings and their rectification
  - Sink hole formation and its management
  - Foam/slurry leakage and plugging of bore wells
  - Differential Settlements and underpinning/ground improvement
  - Propping of old buildings with struts

- Tunnel cross passages
- Challenges in Contract Management

All the learning’s will be taken care of forthcoming projects. Project Management tool BIM- Building Information Module Technology will be used for future project.

**Urban Transport News:** What would you rate as the single most positive aspect of this incredible journey? The public transport in this city, though it is one of the best connected in India, is overburdened. Looking ahead, will the Metro make a substantial difference?

Mr. Bansal: The most positive aspect of this incredible journey is the co-operation by the Chennai public to support CMRL by completing Phase 1.

Chennai city has witnessed rapid growth of population and vehicles. The population of Chennai was 8.9 million as per 2011 census compared to 7.04 million in 2001 census i.e. 2.37% growth. Similarly, the vehicular population of Chennai has shown a compound annual growth rate of 10%. Currently there are around 5.39 million vehicles in the city.

The city is predominately served by a bus fleet of around 3720 buses and the suburbs are supported by suburban Rail Network and an elevated suburban rail (MRTS). The present share of public transport for Chennai city is 28.4% and its share has been declining steadily.

Government of Tamil Nadu (GoTN) endeavours to increase the share of Public Transport to 46% by 2026. Metro Rail system will play an important role in decongesting the traffic and enhancing the share of public transport in the city. Metro Rail will be a-

- Faster and efficient mode of transport which reduces journey time considerably
- Eco-friendly and pollution free transport
- Low energy consumption – Since, Metro requires only 1/5th of the road based system per passenger km
- Capacity to carry very high volumes of peak hour peak direction trips
- Generates employment and will increase overall productivity
Urban Transport News: What would be your vision of a comprehensive concept to ease Urban Mobility in a sprawling and fat expanding urban megapolis like Chennai. There are initiatives in some cities in Europe and the US, apart from Japan, to exploit the digital environment, like mobile apps, to include connections to feeder services, other forms of public transport and even booking parking space. Your comments on this are welcome.

Mr. Bansal: Chennai, a fast growing city is experiencing variety of challenges. Traffic is one of the most significant challenges which the city is facing, congested roads, pollution are a strain on the environment and the overall quality of life. Strategies and measures are being devised across various cities in the world. Some of the notable solution includes,

**Electronic Journey Planner** being widely followed in London, where the real time information like congestion/traffic on a particular road, location and time of public transport systems, parking space is made available through an app called Journey Planner, through which the public can plan and opt for any kind of public transport systems.

Public Light Bus in Hong Kong also known as mini bus, complement the standard Hong Kong bus lines, serving areas that are hard to reach efficiently. With a carrying capacity of 16 Nos. these buses are typically faster and are more efficient with higher frequency. It is a major solution to overcome the last Mile Connectivity Issues.

Integrative Public Transport Model – Copenhagen is an integrative system aims to reduce traffic congestion. It brings together various transport operators in a city, through a common ticketing platform which makes things easier.

Hangzhou: Public Cycling System is one of the world’s largest public bike-sharing programmes. The city boasts 67,000 public bikes with 3,000 service points, and had an average daily renting volume of 230,000 bikes in June 2013. One reason for the popularity of the system is its ease of use. Bikes can be rented using either a smart card that can also be used for other types of public transport, or with a cash deposit paid by non-local travellers who do not have a smart card. The convenience of the bike-renting system has proved popular for daily transport and also, in particular, for travelling between different public transport services.

Some of the above proposals to ease urban mobility are under pipeline for implementation in Chennai City also. To enhance the last mile connectivity for Metro Rail system, feeder systems like mini buses, cycles, auto and share cabs are made available. Further, Greater Chennai Corporation is planning for enhanced bicycle system in the city with 4000 cycles with 240 docking stations across the city, which will encourage people to use bicycles for short commuting. Planning is under way to integrate various public transport operators at city level. The use of digital medium extensively to effectuate the above proposals would be a underlying factor.

Urban Transport News: With the Chennai Metro Rail app, you can check out the nearest metro station linked to in Google Map, modes of transportation to reach any metro station, essential information about the station, platforms, details on routes taken and in between stations, corresponding Metro fares, Parking fares for all vehicles, Train timings, Feeder Service available at stations, where to stay & dine.

Mr. Bansal: CMRL Mobile app is a dedicated application to provide you with a comfortable journey experience every time you use the metro rail service. The precise information and creative info-graphics help you grasp details on the go. CMRL had recently engaged vehicles for last mile connectivity to the passengers seamlessly from their home to the
destination and back. The integration of last mile connectivity, Parking availability and booking is under development in CMRL Mobile App for passenger convenience.

In addition to this, CMRL has also initiated to upgrade the existing infrastructure to accept QR tickets from CMRL Mobile App and also to accept Open Loop Bank EMV/ Rupay cards for payments. This will encourage cashless transactions and also save on procurement and sale of Smart cards for CMRL. For the passenger, the need to go to a Ticket counter would be reduced.

**Urban Transport News:** The estimate for the Phase II project has been trimmed by Rs 11,000 crores to Rs 69,000 crores. That means the reduced cost of building elevated stations as compared to underground ones more than offsets the increased cost of land acquisition for over ground transport. Are there other cost cutting measures planned?

Mr. Bansal: Other measures were reduction in station box size both elevated and underground stations, Reduction in entry and exit structures along with nos etc., efforts are made to optimise the use of area by public as well as system installation. Due to the above measures there is substantial reduction in land acquisition.

**Urban Transport News:** How has the Chennai Metro project fared in terms of sustainability of the environment? Any creditable achievement?

**Solar Power:**

- CMRL has installed Roof mounted Solar Panels for a capacity of 3.620 Mw power. Out of these plants daily around 14000 units of electrical energy is generated. CMRL is saving around 34% (Rs. 6.35-4.169) towards electricity cost as compared to TANGEDCO tariff, for these generated
- Installation of 4 Mw of solar panels is underway, which will further generate around 16000 units of electricity

**Water Conservation:**

- CMRL is also conscious about water conservation. In CMRL water efficient toilet fittings are
- In water taps economisers are fixed, that will restrict the water flow and save around 40 % of
- In CMRL we recycle and reuse water. There is a 150 KLD , Sewage treatment plant which treats sewage collected from entire Admin and Depot buildings and the treated water is used for toilet flushing in staff quarters ,

**Sewage Treatment:**

- In CMBT station there is Sewage treatment plant (Anaerobic type) which takes no electricity for working, generates around 5KL of treated water daily which is used for gardening.
- Installation of a Sewage treatment plant is under way at Guindy , the output of which is used for flushing the toilets. In all areas water usage is monitored by having flow meters for economic usage of water.
- CMRL stations and Depot have got platinum rating by IGBC (Indian Green Building Council) for efficient design and
Cutting of trees were minimized. So far, CMRL planted 60,000 saplings in and around Chennai City from 2010. Rare/Endangered/Red List/Trees are transplanted by adopting Miyawaki (Japanese Technic) 1280 Saplings were planted in 400 Sqm.

Entire elevated stations (13nos), Underground station (12 nos) has received Platinum Lead Rating by India Green Building Council (IGBC).

CMRL has already installed 1.6 MW of solar capacity on rooftop at Rolling Stock depot, Station buildings and car parking.

LED Lighting: All elevated and UG stations have been provided with LED lighting for saving energy.

Headquarters and the maintenance depot of Chennai Metro Rail Limited (CMRL) was awarded gold rating under Leadership in Energy and Environmental Design (LEED).

SKOCH Order of Merit for its efforts in developing a mass transit system on a par with international standards.


“Smart Infrastructure Innovation Award” for our Mobile Application Project 2017.

“GREEN APPLE AWARD FOR Environmental Best Practices 2015 (SAFETY).”

Urban Transport News: Anything else you want to share with our readers.

Last Mile Connectivity

CMRL has introduced last mile connectivity for the benefit of Metro Passengers between Alandur Metro Station to DLF cyber city IT Park. At present there are four air conditioned tempo travellers plying between Alandur to DLF at an interval of 15 Minutes with a flat rate of Rs. 20/-.

FEEDERS SERVICES FOR INFOSYS:

Infosys Buses have also been introduced from Alandur Metro Station to Mahendra City and Sholinganallur campus. A total of 6 trips are made in the morning, with 3 trips made each campus every day.

CAB FEEDER SERVICES:

Cab feeder services are available at 5 Metro Stations at a flat rate of Rs.10/-

SHARE AUTO SERVICES:

Share Auto services are available at 8 Metro Stations at a flat rate of Rs.5/- for a distance of in and around 3 km.

BICYCLE SCHEMES:

Bi-Cycle Schemes have been introduced at all metro stations for the benefit of the passengers to promote a healthier and sustainable mode of transport. These have generated an overwhelming response.

MINI BUS SERVICES BY MTC:
Mini Bus by MTC services are also available as last mile connectivity, at Koyambedu, Ashok Nagar, CMBT, Alandur, Guindy, Nehru Park, and Central Metro Stations.

BIKE RENTAL:

Bikes are available for hire at 4 Metro Stations for the convenience of passengers for the last mile connectivity.

ZOOM CAR:

Zoom Cars are available at Thirumangalam Metro Station. Around 15 zoom cars are available at Thirumangalam Metro Station.

ELECTRIC AUTO FEEDER SERVICES:

Electric autos have been as a feeder service to the metro as a pilot project. As a pilot project, a total of 3 nos of electric autos at a flat rate of Rs.10/- are shuttling between Alandur and DLF IT Park, Porur, Chennai.

OFFICE RIDE

Ford’s Corporate Shuttle Feeder Services called Office Ride have been launched at Alandur Metro Station to provide nodal connectivity from Metro Stations. A total of 5 vehicles with seating capacity for about 12 are available for now. Each vehicle under Office Ride will provide a Wi-Fi connected, air conditioned environment, elevating daily commute to new levels of comfort and connectivity.

ELECTRIC SCOOTER RENTALS

Chennai Metro Rail Limited (CMRL) launched electric scooter rentals across four Metro Stations. Vogo electric scooters will be available at Guindy, Alandur, Vadapalani and Anna Nagar Tower metro station, eventually expanding across the city.

Travelator connecting Airport Metro Station and Chennai Airport is available for the benefit of the passengers.

Urban Transport News: Is there anything about our publication (Urban Transport Infrastructure Journal) you think we could do better?

Mr. Bansal: CMRL has been fortunate to be received by the Media and Publications positively. We hope that Urban Transport Infrastructure Journal would continue to support the Chennai Metro Rail Project in the future as well.

An exclusive Interview with Mr. K.V.B Reddy, Managing Director and Chief
Rail Analysis: As we know Hyderabad Metro is largest PPP Metro project, please tell us more about the project and its interesting features?

Mr. K.V.B Reddy : As you are aware The Hyderabad Metro Rail Project is the World’s Largest Public-Private Partnership Project (PPP) in the Metro Sector. The Hyderabad Metro Rail Network covers a total distance of around 72 Km across three corridors:

Corridor I : Miyapur to LB Nagar
Corridor II : JBS to Falaknuma
Corridor III : Nagole to Shilparamam

The scope of the concessionaire – L&T Metro Rail (Hyderabad) Limited is limited to these 72 km i.e., Phase 1.

We are implementing this Project on a PPP mode under the Design, Build, Finance, Operate and Transfer (DBFOT) format. The bidding process conformed to the guidelines of the Government of India (Ministry of Urban Development, Planning Commission and Ministry of Finance). The Concession Agreement was signed by the SPV, L&T Metro Rail (Hyderabad) Limited, with the then Government Andhra Pradesh (GoAP) on 4th September 2010.

It is one of the world’s largest PPP projects in the Metro Sector. It involves construction of around 72 km of elevated metro rail in three corridors crisscrossing the city of Hyderabad, along with an opportunity of 18.5 Million sq.ft of Transit Oriented Development (TOD). Eco-friendly elevated Metro Stations will be located at intervals of roughly a kilometre.

We have taken a quantum leap from the role of a contracting firm for metro rail projects to that of a concessionaire. L&T MRHL will be a harbinger on the global platform of metro rail and open new vistas for the Indian economy.
We believe that once completed, The Hyderabad Metro Rail Project will transform Hyderabad into one of India’s most preferred cities, with integrated urban transport planning using inter-modal connectivity and convenient sky-walks, which will mark the beginning of an era of seamless commuting in India.

**Rail Analysis: What have been the Technologies utilized in the Metro Project which makes it truly special?**

**Mr. K.V.B Reddy:** There are many important technical features. The prominent ones are listed below:

The Project has incorporated various features for a CDM. The trains will be using **Regenerative Electric Braking** thereby converting the momentum into electrical energy and feeding back to power supply system while braking. Stations are open and naturally ventilated.

We have adopted advanced signaling & Train Control technology, **Communication Based Train Control (CBTC)** for Hyderabad Metro to effectively operate the trains. Hyderabad Metro was the first project in India to adopt the CBTC technology.

We are using ‘**Track Master**’ – A unique instrument for checking the parameters of Track and to enhance the quality of track installation. This has been procured from M/s. Trimble USA.

This instrument is being used in India for the second time after Chennai, L&T is the first to introduce this technology in India, both in Chennai & Hyderabad.

Simulation Study based Track design: This type of designing the Track is being adopted for the first time in the Country. In this process, prior to the Track design, the probable speed of train in a particular stretch is determined by carrying out a simulation study. Based on this data the Track is accordingly designed only for that particular speed in that particular stretch. This avoids designing the Track for much higher speeds than required. This process has the following advantages:

1. Better ride comfort to the passengers.
2. Reduces the Rail and Wheel wear.
3. Reduces loading on the Viaduct and
4. Increases the productivity in Track installation
**Rail Analysis:** By when is the Ameerpet to Hitech City Stretch of Hyderabad Metro expected to be operational?

**Mr. K.V.B Reddy:** The same has been made operational since March 20, 2019.

**Rail Analysis:** Please inform us more about the Hyderabad Metro Rail Phase-2 Project and what is the latest Progress on the same?

**Mr. K.V.B Reddy:**
1. Our scope is limited to these 72 kms i.e., Phase 1.
2. Phase 2 of the project is handled directly by the Government of Telangana State.

**Rail Analysis:** Any additional Information about the Metro Project that you would like to share with our Readers? How has it impacted the Life of the Commuter there?

**Mr. K.V.B Reddy:** We envision to create ‘The Metro Rail Experience’, deriving pride from exemplary service, enhancing value to all stakeholders and achieving progress through partnerships. We are committed to enhance the quality of life for the people through sustainable transport network, integrated with vibrant urban spaces, thereby fostering a culture of caring, learning and innovation driven by strong ethics and values.

We are creating urban space thorough integration of TODs (Retail Malls, Office Spaces, etc.,)and Metro stations by constructing skywalks providing **seamless connectivity** to passengers. Hyderabad Metro Rail is not a mere transport system, but a catalyst to change the lives of the Hyderabad is for better. While the transformation will become easy, it is this ease of getting the daily needs on the move along with weekend entertainment; through the retail innovation on metro station, which will change the lifestyles of Hyderabad forthwith.

Metro stations are largely used for seamless commute with some retail outlets fulfilling the daily needs of the commuters. HMR will uniquely cater to the needs of commuters as well as the non-commuters of its adjoining/adjacent neighbourhoods; due to its design as a foot
over bridge, coupled with retail space. All these will catapult the real estate sector creating more vibrant urban spaces there by more economic opportunities and employment.

**Major Developments:**

- **Foot over Bridge at Paradise Metro Station:** Easy and safe accessibility to areas across the road. Hyderabad Metro Rail takes another step towards providing ease and comfort to commuters. A new foot over bridge has now been opened at Paradise Metro Station for the passengers to easily cross the busy road and safely reach the nearby areas like Paradise Junction, Sunshine Hospital and Sindhi Colony.

- **Skywalk at Punjagutta Metro Station:** We have always taken the extra mile to provide ease and comfort to all its passengers. We have recently opened a skywalk for public access where our passengers can directly enter the TOD mall from the metro station. This is a good way to avoid the additional traffic and pollution on streets and enjoy the outing.
• **Women Safety** is the key challenge when it comes to public transport and we have left no stone unturned when it comes to making the system secure for women passengers. We gave a special gift to all our women passengers on Women’s Day – Dedicated half coach in every train for female passengers with 24 seats in addition to the 7 seats reserved for ladies in Last/First coach.

• Large pink signs inside coaches and on platforms have been placed which clearly mark out the Ladies Only section. While ladies’ coach, additional seats reserved for women in coaches, CCTV monitoring and the regular patrolling by station staff takes care of the major part, we also have an additional facility, implemented in November, to help in case there are any men in the Ladies Only section – WhatsApp Complaints. Anyone can send us a simple WhatsApp text with the Train Number and our team will track the train and inform the upcoming stations in its route. The station staff will board the train and request the male passenger to vacate the area. Our team also calls the customer to ensure the action was taken and to thank them for sharing their feedback.

• **Last and First Mile Connectivity** measures have significantly improved and there are many options available once you deboard the train to reach your destination. We will introduce many more facilities to make travel safe and comfortable.

**Station Facilities**

**Free Drinking Water:** Travelling can be tiring, especially during summers. To make the journey of our passengers even more comfortable, we have the facility of drinking water at all our metro stations without any extra cost.

**Free Newspapers:** Sometimes it can be difficult to get the latest news because of the travel schedules. But with Hyderabad Metro Rail, our passengers stay up to date with our complimentary newspapers in English and Telugu.

**Free Wi-Fi:** Available at selected stations to cater the needs of our passengers.

**Free Washrooms:** The convenience to our passengers is our utmost priority. We have washroom services available at all our metro stations which the passengers can avail without any additional cost. They are properly cleaned and maintained at regular intervals to avoid any inconvenience to our customers.

**Lost & Found:** Approximately 800 lost and found cases are reported till date. We have successfully returned 400 items to the customers.

This is not an easy task as it requires coordination across the entire stretch and Operations Control Centre (OCC). HMR staff have received more than 200 accolades and zero discrepancies / objections were reported in all such cases.

**TSavaari App:**

Well, as a solution to all these problems, we have developed an app called TSavaari, which is now available on Android and IOS platform on AWS Cloud. The app is an integrated transportation solution, which uses the inbuilt Journey Planner Foundation and Journey Planner Integrated Transport Experience algorithms with email / SMS notifications. This app developed by L&TMRHL not just allows passengers to plan their journey better, but at the same time doubles as an advertising platform for companies.
An Exclusive Interview with Mr. Harsh Dhingra, Management Consultant – Rail and Metro, Former Chief Country Representative – India, Bombardier Transportation; India

July 8, 2019 Interviews; Rail Analysis India

Rail Analysis: Please tell our readers about your journey in Indian Railways and how did you start?

Mr. Harsh Dhingra: My engagement with Indian Railways commenced in 1991, when I took responsibility of Product Development for Crompton Greaves Ltd. I took pride, as a team member, to get various products in field of Railway Electrification, Locomotive, Traction, Coaches and Signalling developed over next 16 years. When I left Crompton Greaves, I was leading Sales and Business Development activities for Railway segment on all India level.

During my stay in Bombardier from 2010 onwards, I was actively involved in Locomotives / EMUs and their Systems / Subsystems and Components.

My professional journey over last over 28 years in Rail and Metro segment has been in Business Development, Product Development, Sales and Marketing, Project Management, Relationship management, Interface on Policy Development, Active Involvement on new areas like PPP , Project Financing as well as Introduction of New technology in field of Electrical , Mechanical and Signalling.
I am fortunate to get associated with top class Engineers from Railways during my journey and I am glad to see overall stepped up development that has taken place in the field of Railways over the last 5 years.

Railways being the lifeline of the country has built up their current strategy to be amongst the best service provider to commuters.

This has resulted in the increased efforts to develop new products with higher level of engagements with suppliers along with the introduction and absorption of new technologies.

**Rail Analysis: What was your most challenging project as Chief Country Representative of Bombardier?**

Mr. Harsh Dhingra: I am proud to get associated and subsequently leading a technology driven company like Bombardier Transportation in India from 2010 onwards for around 8 years. Fortunately for me, I had an excellent support of dedicated and passionate Engineers and Staff, who worked as a great team to develop and supply products to Rail and Metro segment.

Bombardier Transportation is very actively involved as a reliable supplier of various items like Metro Coaches / Electrical Propulsion for Locomotives and EMUs and Signalling for Railways and Metros.

Each project in Railways or Metro is unique and comes with its own challenges. I strongly believe, if you keep the company objectives and customer expectations on top of your execution plan, the challenges will always be met.

**Rail Analysis: What was your biggest achievement while you were in office?**

Mr. Harsh Dhingra: My achievement during my days in Bombardier Transportation, is the achievement of my team. Successful timely execution of Delhi Metro Rolling Stock and
Signalling contracts and Indian Railways Locomotive and EMU propulsion contracts can be considered as the success story of Bombardier in India. I am happy since even today, when I engage with the Customer in my new role as a Management Consultant, I get very positive feedback on the capabilities of contract execution and performance of Bombardier products.

Rail Analysis: **What was your experience working on the project of Delhi Metro?**

**Mr. Harsh Dhingra:** Delhi Metro is one of the best professionally managed public sector company, and who so ever got associated with them as supplier would have enriched his or her experience.

My professional engagement with Delhi Metro has three different phases:

First phase commenced in 2007, when I was leading a consortium of Mitsubishi Corporation, Japan; Mitsubishi Electric, Japan; Hyundai Rotem, Korea and Beml, Bangalore for execution of Rolling stock contracts for Line 1, 2, 5 and 6. It was a great consortium to lead and work for. The consortium has Multi Cultural people with Multi-locational companies, who have come together to successfully execute important DMRC contracts.

Second phase commenced in 2011, when through Bombardier Transportation, I got associated with DMRC for supply of Rolling Stock for Line 2, 3 and 4 and Signalling for Line 5, 6 and 7.

Third phase commenced in 2018, when as a Consultant I am now associated to develop innovative Financing model for Line 5 Rolling stock supplies and also Introduce newer concepts of Data Processing and Management.

With over 12 years of my engagement with Delhi Metro, I personally feel proud since I have been associated for majority of Rolling stock supplied and running and for Signalling system installed.

Delhi Metro Cars supplied by Consortium of Rotem, Mitsubishi and BEML

Rail Analysis: Please tell us about your views for PPP Model in Metro against capital Purchase?
Mr. Harsh Dhingra: I am somehow not in favour of Full PPP model for Metros in India. Metros remains as subsidised social development infra structure activity and such risks will be difficult to be transferred to developers.

No developer will be ready to absorb during the construction phase, the cost overrun due to project execution delays resulting from uncertainty linked to land acquisition. In addition, during Operational phase, no developer shall be able take the ridership risk since major part of revenue gets generated from fare box collections.

We therefore have to develop a mixed PPP model where part of Fixed asset acquisition can be converted to Operational asset management to bring down the Initial project cost

Rail Analysis: You are well aware that the Metros are growing very rapidly, and where do you see India reach by the year 2030, in terms of Metros and High Speed Trains?

Mr. Harsh Dhingra: I am bullish on Infrastructure development in the field of Rail and Metro segment in India. This shall continue to be high potential growth segments over the next two decades. Indian economical growth is linked to this infrastructure development and with high aspiration levels of public to get a better commuter services, Government will explore proper funding options and solutions for this segment.

Metros needs to be introduced in all cities with over 2 Million population and potential exist to have at least 25 new metro networks in such cities and I expect around 500 km of metro network to come up in next 10 years. This is in addition to over 500 km currently under planning for Major metro cities.

With emphasis on bringing in new technology in Rail and improving the current infrastructure, the investment is going to be huge for all suppliers to take advantage.

I am a strong promoter of High Speed Segment. We have a great potential for both Semi high Speed segment (upto 160kmph ) and High Speed segment ( above 250 kmph ), and Indian Railways are moving towards introduction of that in phased manner.

I can foresee over 15000 km of Semi-High Speed segment and around 3000 km of High Speed segment by year 2030.

Rail Analysis: What was your experience at award event?

Mr. Harsh Dhingra: Rail Analysis has taken a great initiative in 2019 by introducing Awards for various categories which recognises the Industry and their efforts to become a technology provider and supplier to Railways and Metros Organisations.
The participation of Industry through the nomination process and selection of winners through a professional evaluation mechanism has resulted in the event becoming highly successful. My sincere compliments to the Rail Analysis leadership and team for such a great and successful event.

Metro Rail in India Updates from Rail Analysis India, Journal June 2019; India

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**OPERATIONAL PROJECTS:**

**AHMEDABAD METRO**

**Project Description:**
- **Transit type:** Ahmedabad Metro
- **Number of lines:** 2
- **Number of stations:** 32
- **System length:** 40.03 km
- **Track gauge:** Standard Gauge
- **Average speed:** 33 km/h
- **Top speed:** 80 km/h

**BANGALORE METRO**

**Project Description:**
- **Operator:** Bangalore Metro Rail Corporation Ltd. (BMRCL)
- **Operation Start Date:** 20 October 2011
- **Transit type:** Rapid transit
- **Number of stations:** 40
- **Operational System length:** 42.3 km
- **Number of lines:** 2 East-west corridor (Purple Line), North-south corridor (Green Line)

**Latest Updates 2019 - 20**

**Latest Updates 2019 - 20**
<table>
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<tr>
<th>Metro</th>
<th>Project Description</th>
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</table>
| **CHENNAI METRO** | Operator: Chennai Metro Rail Limited (CMRL)  
Operation Start Date: 29 June 2015  
Transit type: Rapid transit  
Number of stations: 32 operational  
System length: 45 km (operational); 54.1 km (Phase I and Extension)  
Number of lines: 2 (Blue and Green Line) |
| **DELHI METRO** | Operator: Delhi Metro Rail Corporation Limited (DMRCL)  
Operation Start Date: 24 December 2002  
Transit type: Rapid transit / Metro  
Number of stations: 271, including 6 Airport Express  
System length: 373 Km  
Number of lines: 8 colour Lines (Red, Yellow, Blue, Green, Violet, Orange, Pink and Magenta) |

**Latest Updates 2019 - 20**

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<tr>
<th><strong>GURGAON METRO</strong></th>
<th>Project Description</th>
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</thead>
</table>
| Operator: Rapid Metro Gurgaon Ltd. (RMGL)  
Operation Start Date: 14 November 2013  
Transit type: Rapid transit  
Number of stations: 11  
System length: 11.7 km  
Number of lines: 1  
No. of tracks: 2 |

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<tr>
<th><strong>HYDERABAD METRO</strong></th>
<th>Project Description</th>
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| Operator: Hyderabad Metro Rail Ltd. (HMRL)  
Operation Start Date: 29 November 2017  
Transit type: Rapid transit  
Number of stations: 48  
System length: 56.5 Km  
Number of lines: 2 (Operational); 3 (Phase I)  
No. of tracks: 2 |

**Latest Updates 2018 - 20**
**Project Description:**

**Owner:** Jaipur Metro Rail Corporation Limited (JMRL)
**Operation Start Date:** 3 June 2015
**Transit type:** Rapid transit
**Number of stations:** 9 (operational); 22 additional stations (planned)
**System length:** 9.63 km (operational); 23 km (planned)
**Number of lines:** 1 (operational); 1 (planned)

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**Project Description:**

**Operator:** Kochi Metro Rail Ltd. (KMRL)
**Operation Start Date:** 03 October 2017
**Transit type:** Rapid transit
**Number of stations:** 16
**System length:** 18.4 km
**Number of lines:** 3 (1 Operational/under construction, 1 Approved, 1 planned)

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**Latest Updates 2019 - 20**

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**Project Description:**

**Operation Start Date:** 24 October 1984
**Transit type:** Rapid transit
**Number of stations:** 32 Stations (Line 1/ North South Metro)
- 12 Stations (Line 2/ East West Metro)
- 12 Stations (Line 3/ joka - B.B.D. Bagh)
- 9 Stations (Line 4/Noapara - Barasat)
- 11 Stations (Line 5/ Baranagar - Barrackpore)
- 23 Stations (Line 6/ Airport - New Garia)

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**Project Description:**

**Operator:** Lucknow Metro Rail Corporation (LMRC)
**Operation Start Date:** September 05, 2017
**Transit type:** Rapid transit
**Number of stations:** 22
**System length:** 23.7 km
**Number of lines:** 1 (Operational) 1 (Approved) 6+ (Planned)

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**Latest Updates 2019 - 20**

May 25, 2019: Lucknow Metro Becoming A Vehicle Of Relief For The Heat Stricken Lucknowites
MUMBAI METRO

Project Description:

Owner: MMRDA, Mumbai Metro One
Operation Start Date: 8 June 2014
Transit type: Rapid transit
Number of stations: 12
System length: 11.4 km

Latest Updates 2019 - 20

NAGPUR METRO

Project Description:

Transit type: Nagpur Metro
Number of lines: 2
Number of stations: 42
System length: 43 km
Operator: Maharashtra Metro Rail Corporation Limited (MAHA-METRO)

Latest Updates 2019 - 20

NOIDA METRO

Project Description:

Owner: Noida Metro Rail Corporation (NMRC)
Transit type: Rapid transit
Number of lines: 1
Number of stations: 21
Operation will start: December 2018
System length: 29.7 km
Track gauge: 1,435 mm Standard Gauge

Latest Updates 2019 - 20

AGRA METRO

Project Description:

Project Name: Agra Metro
Owner: Uttar Pradesh Metro Rail Corporation
Transit type: Rapid transit
Number of lines: 2
Number of stations: 27
System length: 30 km (Phase 1)

Latest Updates 2019 - 20
### BHOPAL METRO

**Project Description:**

- **Project Name:** Bhopal Metro
- **Operator:** Madhya Pradesh Metro Rail Co Ltd.
- **Transit type:** Light metro
- **Number of Corridors:** 3 (planned)
- **Number of stations:** 86 (planned)
- **Track gauge:** Standard gauge
- **System length:** 198.95 km (planned)

**Latest Updates 2019 - 20**

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### INDORE METRO

**Project Description:**

- **Project Name:** Indore Metro
- **Operator:** Madhya Pradesh Metro Rail Co Ltd
- **Transit type:** Light metro
- **Number of lines:** 5 (estimated), 5 (planned)
- **System length:** 94 km (estimated)
- **Number of stations:** 89 (estimated)
- **Track gauge:** Standard Gauge

**Latest Updates 2019 - 20**

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### KANPUR METRO

**Project Description:**

- **Transit type:** Kanpur Metro
- **Number of lines:** 2
- **Number of stations:** 42
- **System length:** 43 km
- **Operator:** Maharashtra Metro Rail Corporation Limited (MAHA-METRO)

**Latest Updates 2019 - 20**

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### MEERUT METRO

**Project Description:**

- **Project Name:** Meerut Metro
- **Transit type:** Rapid transit
- **Number of lines:** 2 (Phase 1)
- **Number of stations:** 29 (Planned)
- **System length:** 35 km
- **Track gauge:** Standard gauge
- **Average speed:** 65 km/h
- **Top speed:** 80 km/h

**Latest Updates 2019 - 20**
**NAVI MUMBAI METRO**

**Project Description:**

- **Owner:** City and Industrial Development Corporation (CIDCO)
- **Transit type:** Rapid transit
- **Number of lines:** 1
- **Number of stations:** 20
- **Operation will start:** May 2019
- **System length:** 23.40 km (14.54 mi)
- **Track gauge:** Standard gauge

**Latest Updates 2019 - 20**

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**PATNA METRO**

**Project Description:**

- **Transit type:** Rapid Transit
- **Number of lines:** 2
- **Number of stations:** 23 (planned)
- **System length:** 33 km (planned)
- **Track gauge:** 1,435 mm

**Latest Updates 2019 - 20**

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**PUNE METRO**

**Project Description:**

- **Project Name:** Pune Metro
- **Operator:** Maharashtra Metro Rail Corporation Limited (MAHA-METRO)
- **Transit type:** Rapid Transit
- **System length:** 31.25 km
- **Number of stations:** 30
- **Track gauge:** Standard Gauge

**Latest Updates 2019 - 20**

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**GUWAHATI METRO**

**Project Description:**

- **Operator:** Guwahati Metro Rail Corporation Limited (GMRC)
- **Transit type:** Rapid Transit Number of lines: 4 (Phase 1)
- **Number of stations:** 54
- **System length:** 61.4 kilometres (planned) Detailed Project Report: RITES

**Project Details:**

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GWALIOR METRO

Project Description:

Transit type: Rapid transit
Operator: Madhya Pradesh Metro Rail Company Limited.
Number of lines: 3 (Proposed)
Number of stations: 100 (Projected) System length: 105 Km
Detailed Project Report: RITES

KOZHIKODE LIGHT METRO

Project Description:

Transit type: Light Metro Rail System
Number of lines: 1 (Phase I)
Number of stations: 22 (Phase I)
System length: 44 km (Phase I)
Track gauge: 1,435 mm standard gauge
Operator: Kerala Rapid Transit Corporation Limited

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LUDHIANA METRO

Project Description:

Operator: Ludhiana Metro Rail Corporation
Transit type: Rapid transit
Number of lines: 2 (Phase 1)
Number of stations: 27
Operation will start: Postponed
System length: 28.83 kilometres (planned) Track gauge: 1,435 mm Standard Gauge

SRINAGAR METRO

Project Description:

Owner: Srinagar Development Authority
Transit type: Rapid transit
Number of lines: 2
Number of Stations: 18 (estimated)
System length: 54 km

Project Details:
### SURAT METRO

**Project Description:**

- **Nodal Agency till SPV is formed:** Gujarat Metro Rail Corporation Limited
- **Locale:** Surat, Gujarat
- **Transit type:** Rapid transit
- **Number of lines:** 2
- **Number of stations:** 37
- **System length:** 40.35 km

**Project Details:**

### THIRUVANANTHAPURAM LIGHT METRO

**Project Description:**

- **Operator:** Kerala Rapid Transit Corp. Ltd.
- **Transit type:** Light Metro Rail System
- **Number of lines:** 1
- **Number of stations:** 19
- **System length:** 22.20 km
- **Average speed:** 40 km/h

**Project Details:**

### UTTARAKHAND METRO

**Project Description:**

- **Transit type:** Rapid Transit System
- **Locale:** Dehradun, Uttarakhand, India System
- **Length:** 70 km
- **Phases:** 2

**Project Details:**

### VIJAYAWADA METRO

**Project Description:**

- **Operator:** Amaravati Metro Rail Corporation (AMRC)
- **Transit type:** Rapid transit
- **Number of lines:** 3 (planned)
- **Number of stations:** 25
- **System length:** 40 km
- **Track gauge:** 1,435 mm Standard Gauge

**Project Details:**
Delhi Metro plans to run e-Rickshaws to improve last Mile Connectivity; India

By Urban Transport News - 20/07/2019

New Delhi (Urban Transport News): The Delhi Metro Rail Corporation (DMRC) has taken a big step with the aim of ending long lines, jams etc. of the battery rickshaw, Gramin Sewa etc. outside metro stations. DMRC is planning to introduce e-rickshaws in the coming days to improve last mile connectivity. At present, this service has started in Gurgaon, Faridabad and Vaishali metro stations. This will also be done at the stations of the Delhi capital. Now in Delhi, Metro is running its e-rickshaw in Dwarka.
Root will be fixed

DMRC officials said that the routes will be fixed to run e-rickshaws. They will not run side by side with the Metro, they will not be used for transport people from one metro station to another station. With the help of these, the people living in the nearby metro stations can get benefited, especially at a place where feeder buses do not reach due to the narrow paths.

Briefing the plan, a DMRC official said,

We are planning to rope in private aggregators for all stations in our network in Delhi, except for stations where plying of e-rickshaws are prohibited on the adjacent or nearby roads. These e-rickshaws will operate on fixed routes and not run parallel to metro corridors or on main roads. The e-rickshaws will only provide connectivity between metro stations and nearby catchment areas, where other vehicles such as feeder buses may not be available for last mile connectivity.

Officials said that the e-rickshaw Metro station will go up to 3-4 km. The fare for initial two kilometers will be 10 rupees. After this, Rs 5 will be charged per kilometer. There will be no more than four rides in an e-rickshaw. Parking and charging facilities will be provided at the stations only. In the coming days, the payment will be done only with the Metro Card. These e-rickshaws will also have modern facilities like GPS.

Government of India shifts Focus to last Mile Connectivity in Metro Cities; India

According to data, around 329 Feeder Bus Services have been made operational by the Central Government.

By Vinod Shah; Urban Transport News
- 23/03/2019

New Delhi (Urban Transport News): With metro rail systems expanding its network across India, the Union Ministry of Housing and Urban Affairs has turned its attention to improving last-mile connectivity for better commuting experience in metro cities. The Ministry has started focusing on feeder bus services, electric rickshaws, rented cycles, electric scooter services, and partnerships with cab aggregators.

According to the Metro Rail Policy launched in 2017, the objective of the Ministry is to ensure the lowest cost mass transit mode is selected for public transport. The states must make the metro self-sustaining, enhance other kinds of mass rapid transport systems, such as monorails or buses, and provide last mile connectivity, between the metro station and the commuters’ destinations.

“We have already drafted a last-mile connectivity plan across all operational metros; the aim is to provide a safe and economical ecosystem for daily commuting,” said Hardeep Singh Puri, Minister of State for Housing and Urban Affairs in a recent interview. The Central Government has already drafted a last-mile connectivity plan for 10 metros in cities such as Delhi, Bangalore, and Kochi.
The new Metro Rail policy had also aimed to enhance metro rail revenues through a feeder system. Every proposal for metro rail should necessarily include proposals for feeder systems that help to enlarge the catchment area of each metro station at least to 5 km. Last-mile connectivity through pedestrian pathways, Non-Motorised Transport (NMT) infrastructure, and induction of facilities for paratransit modes will be essential requirements for availing any central assistance for the proposed metro rail projects.

According to data, around 329 feeder bus services have been made operational by the Central Government. This includes an ambitious plan for Delhi and NCR, served by Delhi Metro Rail Corporation (DMRC).

With the objective of strengthening feeder bus services with defined service quality parameters, the Delhi Metro Rail Corporation (DMRC) is in the process of inducting (through open e-tenders) 427 buses (MIDI size battery operated/CNG air-conditioned buses) on 48 routes on cluster model. However, approval of the Delhi Government on sustaining the project by way of viability gap funding is awaited.

According to sources, the Central Government is also working on a pilot project involving cab aggregators which have been allotted space on rent at metro stations to set up kiosks where cabs can be booked. The DMRC has also started the process of allotment of bare spaces to the cab aggregators at all the metro stations.

The new Metro rail policy also mandates analysis of alternatives, requiring an evaluation of other modes of mass transit such as Bus Rapid Transit System (BRTS), light rail transit, tramways, metro rail and regional rail in terms of demand, capacity, cost, and ease of implementation.

“The alignment of metros such as Ahmedabad metro rail project phase-I is such that it integrates with BRTS, Indian Railways, and the city bus service at various strategic locations in both East-West and North-South Corridors for seamless connectivity. Future transit systems such as the Mumbai–Ahmedabad high-speed bullet train will also integrate with phase-I at two locations”, sources said.

Currently, Metro Connectivity with BRTS at Ahmedabad is provided at nine stations. The Central Government is also working towards integrating electric vehicle transportation.

According to the Ministry of Housing & Urban Affairs, a pilot project is being undertaken by DMRC in its five metro stations; in Chennai, it is already operational in two stations of Chennai Metro; and it is also operational in Hyderabad. Another aspect of non-motorised transport includes Cycle Sharing Services, which are currently operational in metros across eight cities.

Does Visakhapatnam Monorail deter the Metro?; India

According to public transport experts, monorail projects are better suited to cities like Visakhapatnam because it has much lower traffic density when compared to cities like Hyderabad and Delhi

By Kanika Verma; Metro Rail News

- 14/07/2019
Visakhapatnam (Metro Rail News): The budget announcement of setting up a monorail in the city has raised questions about the future of the Vizag Metro Rail (VMR) project.

According to public transport experts, monorail projects are better suited to cities like Visakhapatnam because it has much lower traffic density when compared to cities like Hyderabad and Delhi. The estimated cost to build the monorail is around Rs 150 crore per km.

A senior railway official said, “monorails have had success in Gurgaon and Mumbai. If the government is not in a position to make huge investments, the monorail will be a good option.”

However, a reliable source working in the metro rail project in Hyderabad said that according to the Metro Rail Policy, 2017, metro rail systems include monorail. Monorail has a lower capacity and higher maintenance cost, according to the source. “If there is no revenue from passenger traffic, it might become difficult to handle,” the source added.

Managing director of Amaravati Metro Rail Corporation NP Ramakrishna Reddy said that I am not able to comment on the monorail project as I am yet to receive any official instruction.

Moreover, the project is completely different from the previously proposed metro rail project.” According to technical staffers of AMRC, the need for land in monorail is less compared to the metro rail project. As per reports from studies on conducted in 2015, NAD Junction, Maddilapalem and Hanumanthawaka Junction have more than 10,000 PPHPD (passengers per hour per direction).

A city should necessarily have at least 15,000 PPHPD for a metro rail project. However, for a monorail project the PPHPD requirement in 5,000.

Punjab Cities all set to get 'Bus Rapid Transit System', BRTS: India
The major cities of Amritsar and Ludhiana are all set to acquire the internationally recognised Bus Rapid Transport System (BRTS) with Deputy Chief Minister Sukhbir Singh Badal giving his nod to replicate this system in Punjab on his ongoing visit to Turkey.

According to an official spokesman, the official delegation led by Punjab Deputy Chief Minister Sukhbir Singh Badal, which yesterday landed at Istanbul, conducted an indepth analysis of the Bus Rapid Transit System in Istanbul. Badal had a long meeting with Istanbul Electricity Tramway and Tunnel's Chief Hayri Baracli, a public sector company, which was operating BRTS in Istanbul. The company is providing integrated transport services (IT) in Istanbul, a city of more than 1 crore people, including trams, metro, area gondola (ropeway), funicular, ferries, buses and the BRTS. It successfully transports more than 750 000 people every day.

The representative of company apprised Deputy CM by giving a presentation on how the BRTS was planned, designed, executed and was being run successfully for the last five years. They also informed that more than 450 buses run on this system at an average speed of 35 KMPH. This system has reduced vehicular traffic by four lakh cars in the city as people prefer travelling on these buses which were safer faster and cheaper.

The Deputy CM with the team had a ride on a bus on 52 km long route of BRTS. Badal said that IETT was also working as a consultant with Lahore Municipal Corporation to help it plan and design BRTS in Lahore.

Badal said that they have studied the possibilities of BRTS for Punjab so that the same could be replicated there. He said that this model of BRTS would be introduced in Amritsar
and Ludhiana in its first phase and for a dedicated corridor would be created for plying of these low floor buses and no other vehicle would get an access to this corridor.

The Deputy CM said that before leaving for Istanbul, they have also studied the Delhi model, which has failed. He said that they have also studied the shortcomings which were in there in Delhi model leading to its failure. Badal said that this successful model of Istanbul will be implemented in Amritsar and Ludhiana in next two years.

Badal along with the delegation also had a meeting with an NGO EMBARQ, which carries out studies on how to make our roads and transportation system safer for pedestrians and cyclists in Punjab. The Deputy CM said that this was a New York based company with offices in Istanbul and Delhi and this company was working in with IETT to make BRTS safer and secure. The company also presented a copy of the study carried out in Istanbul to Badal.

It is pertinent to mention here that Badal along with a delegation of Punjab government was in Turkey to study the BRTS and Solid Waste Management System. The team includes P.S. Aujla, Secretary PWD, A.Venu Prasad, Secretary Housing, Ashok Gupta, Secretary Local Bodies, Anurag Aggarwal, MD PIDB, Manvesh Singh Sidhu, chief administrator PUDA, Ajoy Kumar Sinha, chief administrator GMADA and Rakesh Verma, chief administrator GLADA.
New Delhi: The Supreme Court on Friday ordered implementation of the 104 km long Phase-4 project of the Delhi Metro and directed the authorities concerned to commence construction work on the project.

More Information:

- A bench comprising Justices Arun Mishra and Deepak Gupta was told by the counsel appearing for the Delhi government that they have agreed to give a go ahead to the Phase-4 of the Delhi metro.
The apex court was hearing a matter in which the Environment Pollution Control Authority (EPCA) had recently filed a report stating that the approval for the project was held up since 2014.

There was a “stalemate” in discussions between the central government and Delhi government on certain financial aspects of the project, the EPCA report said.

It said, “The Delhi government has on April 10, 2019 communicated its direction that DMRC (Delhi Metro Rail Corporation) would not start work of Delhi Metro phase-IV till these issues are resolved.”

The stalemate came under the apex court’s scanner which said it would pass order in the matter as the “project cannot wait”.

The court was also told by the apex court that the project was “critical” and the pending issue should be resolved soon.

The Centre had told the court that project financing has been done in consonance with the Metro Rail Policy of August 2017.

Also, Metro projects of other cities like Bhopal, Indore, Kanpur, Patna and Agra have been sanctioned on the same financial pattern as of Delhi Metro phase-4.

The project is “critical as it will add another 104 km to the network” and “it is designed to join the current network and will densify it and make the system more viable and attractive to commuters”, the EPCA report had said.

**About Phase-4 of Delhi Metro**

- The Phase-4 project of Delhi Metro includes construction of a new 104-kilometer metro rail line and has 6 corridors which will connect the far fetched areas of the capital and will ease long journeys for regular metro passengers.
- The Union Cabinet, in March this year, has approved 3 out of the total 6 corridors in Phase-4 of Delhi Metro.
- The 3 corridors approved by the Union Cabinet are:
  1. Aerocity to Tughlakabad
  2. R. K Ashram to Janakpuri West
  3. Maujpur to Mukundpur
- These corridors will consist of 46 stations, of which 17 stations will be underground and the rest 29 stations will be constructed as elevated sections.
- The total length of these 3 corridors is 61.679 km.
- Out of the total 61.679 km, 22.359 km will be built underground and 39.320 km will be constructed as elevated section.
- The total completion cost of three metro corridors will be Rs.24,948.65 crore.
- The Tughlakabad – Aerocity corridor will further improve connectivity to the Airport.
- Other corridors include:
  1. Rithala-Bawana-Narela (21.73 km, elevated)
  2. Inderlok-Indraprastha (12.58 km, underground)
  3. Lajpat Nagar-Saket G Block (7.96 km, 5.89-km elevated)
- The Phase-IV project is estimated to cost around Rs 45,000 crore.
- The Delhi Metro’s Phase-4 project is expected to complete by the year 2025.

**Sarai Kale Khan RRTS Station to be India’s first Mega Connectivity multimodal Transit Hub; India**

*July 11, 2019 Rail News*
The Sarai Kale Khan RRTS Station will be the country’s first mega transit hub as 3 RRTS (Regional Rapid Transit System) corridors will converge at it, an official said. On the RRTS corridors, trains will run at an average speed of 100 kmph, according to officials.

India's first Mega Transit Hub

- Besides this, the station will also be integrated with the Hazrat Nizamuddin railway station, the Delhi Metro’s Sarai Kale Khan station and the Sarai Kale Khan ISBT, the official said.
- The NCRTC (National Capital Region Transport Corporation) plans to converge the Delhi-Ghaziabad-Meerut, Delhi-Gurugram-SNB-Alwar and Delhi-Panipat RRTS corridors at the station.
- These will make the Sarai Kale Khan RRTS station India’s first mega transit hub.
- The NCRTC will develop several multi-modal integrations along the high-speed corridors, as per a plan.
- The NCRTC is the implementing agency of the RRTS corridors.

Separate Platforms for Boarding/de-Boarding

- In view of high-passenger flow at the Sarai Kale Khan RRTS station, the NCRTC has planned that it will have separate platforms for boarding and de-boarding from trains as the doors will open on both sides, the official said.
- The “unique system” will help in optimising passenger flow and facilitate convenient commuter movement.
- Sudhir Kumar Sharma, Chief Public Relation Officer, NCRTC said, “When commuters are provided seamless integration with different public transport modes, it encourages them to leave their private vehicles behind. We have planned the network keeping demand and commuter convenience in mind.”

RRTS Trains and Stations:

- The RRTS trains will have a design speed of 180 kmph, while the operational speed will be 160 kmph.
- The average speed will be of 100 kmph.
- Trains will be available every 5 to 10 minutes.
- The Delhi-Ghaziabad-Meerut corridor will have 22 stations and two depot-cum-stations at Duhai and Modipuram.
• The distance will be covered in around 55 minutes.

**Operations by March 2023**

• **Construction** work on the 17-km long prioritised section between Sahibabad and Duhai of the Delhi-Ghaziabad-Meerut corridor is in full swing.

• While this part of the corridor will become operational by March 2023, the commercial operations on the entire Delhi-Meerut corridor will commence by 2025, the official said.

• In March this year, [Prime Minister Narendra Modi](https://en.wikipedia.org/wiki/Narendra_Modi) had laid the foundation stone of the country’s first the Delhi-Ghaziabad-Meerut RRTS corridor in Ghaziabad.

**Nagpur Metro to run on Communication Based Train Control, CBTC, at 90 kmph; Auto Train Operation will allow Driverless Metro Trains; India**

*July 17, 2019 Rail News*

**Nagpur:** The [Metro trains](https://en.wikipedia.org/wiki/Metro_train) in the city will run on [Communication Based Train Control](https://en.wikipedia.org/wiki/Communication_based_train_control) (CBTC) system. Dr. [Brijesh Dixit, Managing Director, Maharashtra Metro Rail Corporation](https://en.wikipedia.org/wiki/Sitabuldi_Interchange) (MahaMetro) gave this information in a press conference organised in Sitabuldi [interchange metro station](https://en.wikipedia.org/wiki/Metro_station) on Monday.

**More Information:**

• Already, the trial run has been started with a maximum speed of 90 kmph.

• [Mahametro](https://en.wikipedia.org/wiki/Maharashtra_Metro_Rail_Corporation) will put to use all the modern technique and [safety](https://en.wikipedia.org/wiki/Safety) measures while running train at this speed, as per the reports.

• The metro trains will run on [CBTC](https://en.wikipedia.org/wiki/Communication_based_train_control) system, which means the train can run without pilot due to [auto train](https://en.wikipedia.org/wiki/Auto_train) operation system.

• However, pilot will be there despite having the system.
• He said, “There will be a screen in the pilot’s cabin, from which he can watch the doors of complete train. Beside this, side mirror will be also there.”
• Giving a brief detail of CBTC, director, rolling stock, Anil Mathur said, “A non-visible radius of signals is there between antenna fitted in the train and a system on the track. Due to this train, itself gets the speed and stops and then restarts.”
• “If one system does not work, then there is a second system which will carry on the operation,” he said.
• Automatic Train Protection (ATP) system checks the speed of the train and it opens the door of the coaches as per the direction of the station.
• Due to this system, two trains can be run together in less distance.K

Kolkata East-West Metro receives approval for Communication Based Train Control, CBTC Signalling; India

July 13, 2019 Rail News

Kolkata: The East-West Metro project has received the safety clearance for signalling system, according to reports. In the first phase, which is likely to be launched in a month, trains will run 5.5km between the Sector V and Salt Lake stations, it said.

More Information:

• Once fully operational, East-West Metro will connect Salt Lake Sector V and Howrah Maidan covering 16.5km length.
• We have got the safety clearance for the signalling system, said an official of Kolkata Metro Rail Corporation (KMRC).
• The Corporation has sent documents to the commissionerate of railway safety for permission to start commercial run.
• East-West Metro will have CBTC (Communication Based Train Control) signalling.
• Kolkata Metro Rail Corporation Ltd (KMRCL) is a Government of India enterprise implementing Kolkata East-West Metro Corridor Project.
The line will have interchange with existing terminals of Indian railways at Howrah and Sealdah.
Running through the heart of Kolkata, bridging two of the city’s most populous areas, the corridor has been planned to drastically cut down on travel cost and time.
Normally, one would take at least an hour and a half and multiple modes of transport to travel between the extremities of the city at peak hours on a weekday.
The East-West Metro Corridor will provide the Kolkata commuter a **seamless way** to travel.

**Sound Barriers**

- The East-West Metro will have sound barriers on some stretches in Salt Lake where the tracks run cheek by jowl with residential buildings and hospitals.
- Sources said, "The sound barriers will be made of micro-perforated stainless steel sheets."
- The sound barriers to be installed along the tracks, will be imported from Taiwan.
- The source said, the sound barriers are expected to bring down the noise level by at least 20 decibels.
- It will be installed on the stretches where buildings are within 30m of the tracks.
- The perforated sheets are expected to absorb the noise produced by the movement of trains.
- The installation should be over around the time commercial run will start.

**First Look: India's first Driverless Metro Train; India**
The Delhi Metro Rail Corporation (DMRC) will start testing these trains, equipped with cameras and sensors to make up for the lack of a real driver, from July according to reports. However, initially, the trains will be operated by Train operators. Unattended Train Operations (UTO) will start on line 8 (Janapuri West to Botanical Garden) on July 1, followed by line 6 (ITO to Kashmere Gate section) the same month, and line 7 (Mukundpur to Shiv Vihar) from October 16, according to Dr Mangu Singh, Managing Director, DMRC. "Internationally, such trials generally take about one to one and a half years," he added.


Bangalore Metro Rail Corporation, BMRCL to run first Driverless Trains by 2021; India

April 16, 2019 Rail News

The BMRCL (Bangalore Metro Rail Corporation Ltd) to run driverless trains on its network by 2021, according to a report. The corporation is planning to run driverless trains on the Yellow Line (RV Road-Bommasandra), it said. This metro line will operational by 2021.

More Information:

- The driverless trains will be introduced as part of the CBTC (Communication Based Train Control) system for the Yellow Line, TOI reported.
- This is the first time that CBTC is being used in Namma Metro.
- “The technology will help us run on automated mode while the operations are monitored through control centers,” a senior official quoted as saying in the report.
- Currently, the Metro is using DTG (Distance To Go) system, in which the time between two trains is 2.5 minutes.
- The CBTC system can reduce train headway to less than 90 seconds.
The CBTC system also reduces human error and ensures passenger safety. For instance, trains will automatically maintain a distance between one another with the help of sensors on tracks.

PART II: GLOBAL ACTIVITIES FOR URBAN MOBILITY AS A SERVICE

Alstom to supply OptONIX Traction Systems to Xian Metro’s Line 5; China, France

09 Jul 2019 | Railway-News

Alstom will supply the Xian metro in Shaanxi province, China, with traction systems for 222 metro cars, equalling 37 trains. These are for phase one of Line 5. The French transportation solutions provider will also provide traction systems for 180 metro cars – 30 trains – for phase two of Line 5. The contract is worth roughly 42 million euros (47 million USD).
Alstom will supply its, which includes VVVF (variable voltage/variable frequency drive), CVS (static converters) and motors. Alstom designed and developed OptONIX especially for the Chinese market.

**Future-Gazing: What Train Stations will offer by 2030**

This contract is not Alstom’s first involvement in the Xian metro project. It has previously supplied traction systems for 246 metro cars – 41 trains – for phase one of Line 3 of the city’s metro.

Olivier Loison, Managing Director of Alstom in China & East Asia, said: “Winning these contracts demonstrate the high level of trust customers in Xian have for Alstom. We now provide traction systems gradually for over six hundred metro cars, making us one of the major traction system suppliers in the market. Xian has become another strategic market for Alstom in China.”

**UTLC ERA – Eurasian Rail Alliance Announces 2500th Train Milestone**

**Xian Metro Line 5**

Xian is the capital of the Chinese province of Shaanxi. Its metro first opened in 2011, with the fourth line opening in December 2018. Line 5 will be 45km in length and have 34 stations. Construction on the line began in 2016. Running in an east-west direction, the line is scheduled to open to the public in 2020. It connects Xi’an city with Xixian New District.

**Alstom Joint Ventures involved**

Two Alstom Joint Ventures will deliver the Traction Systems for Xian Metro:

SATEE – Shanghai Alstom Transport Electrical Equipment Co. Ltd – a joint venture between Alstom and Shanghai Electric Group established in 1999, will manufacture the traction systems.

XAYEECO – Xian Alstom Yongi Electric Equipment Co. Ltd – a joint venture between Alstom and CNR Yongi Electric Machine Factory (now CRRC) established in 2006, will supply the traction motors for the traction system.

**Top 3 Things you need to know about Underground Telecommunications; Global**

Posted by Marcello Perricone on Jul 19, 2019; Smart Rail World

Nowadays, passenger comfort goes beyond swift journeys and good seats. The invention of the internet and the smartphone connected virtually anyone to anywhere at any place or time, from the comfort of their own property to the middle of a national park, and that
constant connection has become a requirement of live in both the professional and home lives of most people around the globe.

That modern life necessity is expected both on public transport and long-range rail routes, creating immense pressure on operators and service providers to fulfil it. So in an age of constant technological advancement and evermore demanding customers, what do you need to know about communications?

Infrastructure

Radio transmissions, like waves on water, use air as a medium to move through the physical space and reach somewhere else. While radio transmissions are electromagnetic waves and can even move through vacuum, they still can’t penetrate certain materials or thickness without considerable signal loss; like an ocean wave hitting a sea wall, these radio signals can be stopped by constructs and buildings of any kind, and the ground itself is a fantastic signal blocker.

As a result, **underground transmitters and receivers are needed to spread the network below the surface**, regardless of transmission types – cell phones, wi-fi, and walkie-talkies all need amplifiers in order to reach the coverage needed in subway networks.
Nowadays, the problem is intensified due to the speed of our connections. The jump from 3G and 4G and the upcoming change to 5G all require new and more sophisticated protocols, able to use wider bands and higher frequencies to transmit data. But as technology increases and communications are replaced with faster and more sophisticated protocols, signal penetration drops considerably – and so does area coverage. What used to need a single tower to cover a few square miles might need two transmitters in 4G, and as many as 6 in 5G.

Therefore, befit hardware is necessary to cover vast stretches of underground effectively, vastly increasing the engineering work required and the price of such projects. Wireless antennas, gaped cables, and routers must be installed on platforms, tunnels, and trains to ensure a contiguous coverage of the network.

What's wrong with that?

The problem with that is two-fold: one, the price of covering underground installations balloons as network requirements increase exponentially, forcing service providers to either plan ahead for future expansion or force operators to perform costly retrofits to update an infrastructure that can no longer serve its purpose. Two, the required engineering effort depends on uninterrupted access to the system for a long time – an extremely complicated idea for public transport systems that almost run non-stop 24/7.

As a result, installation becomes an extremely tiresome proposition. Network providers need to compete with several other ongoing maintenance and installation projects going on during the short downtime of underground networks, and must fight for priority every time something big needs to be done. The bigger the project and the larger the number of equipment required, the longer the timeframe and the bigger problem – and the cost.

Airwaves

Once all those problems are dealt with, the network starts to operate and service thousands of customers a day, if not per hour. As a result of all that hardware and the constant weight of continuous transmissions, the threat of airwave saturations arises. As signalling and control systems evolve and change from analogous to digital, they rely more
and more in constant communication – which creates a problem when their frequencies match that of other devices nearby.

In 2012, Shenzhen Metro in China was repeatedly forced to halt operations for hours due to an overlap on Wi-Fi and CBTC systems, creating a huge security breach, that needed to be immediately fixed. While places like Boston and Los Angeles in the US have established standards, that prevent those issues from happening, international collaborative locations with frequent interchange of technology and services, like Europe, are more susceptible to frequency conflict and saturation due to the sheer amount of different equipment involved.

At the moment, there are both technological and legislative solutions being sought to it, such as an European standard to be adopted by every single EU country. These range from simple frequency determinations to systems that block and allow traffic depending on transport intensity and locations, and should start coming to fruition in the upcoming years.

Stadler to supply 80 TRAMLINK Trams to Milan; Italy Switzerland

15 Jul. 2019 | Railway-News

Milan: Stadler is to supply Azienda Trasporti Milanesi (ATM) with up to 80 of its TRAMLINK trams.
Having submitted the winning bid, Stadler and ATM will sign a six-year framework agreement after the objection period comes to a close. The losing bidders have been notified and they are now able to appeal the decision. Stadler will initially supply 30 trams to the network of Milan with an option to supply a further 50.

**Stadler TRAMLINK**

**TRAMLINK** is a multiple-link low-floor tram which can support up to 7 cars and is available for metre-gauge and standard-gauge networks with the ability to customise positioning of doors and individually configure interiors.

The first TRAMLINK order was placed in 2011 by Rostocker Strassenbahnen (RSAG) and now has a presence in multiple countries including Brazil, Germany, Austria and Switzerland.

**SJ, SWEDISH National Passenger Operator plans SKr 3bn Order for new regional Trains; Sweden**

Jul. 17, 2019
Written by Keith Barrow

SWEDISH National Passenger Operator SJ announced on July 17 that it is planning to invest around SKr 3bn ($US 320m) in a new fleet of 30 regional trains.

A Linköping – Stockholm – Gävle service calls at Södertälje. SJ plans to introduce new trains on these services from 2023.

Tenders will be launched before the end of the year with the first trains due to enter service in spring 2023.

SJ is planning to invest SKr 12bn in its rolling stock fleet over the next few years, including the modernisation of its X2000 tilting trains, a new fleet of 30 high-speed trains, and the upgrading of coaches used on overnight services.

**Wiener Lokalbahnen Light Rail Vehicle, LRV, Design revealed; Austria**

15 Jul. 2019 :Metro Report

**AUSTRIA:** Wiener Lokalbahnen has revealed the external design of the light rail vehicles that it ordered from Bombardier Transportation last year.

The first of the 28 m long bidirectional vehicles is due to be delivered from Bombardier’s Wien factory in the first quarter of 2021, with passenger-carrying tests on the line between Wien and Baden scheduled to begin in the summer of that year.

Deliveries of all 18 TW500 LRVs are due to be completed in 2023. The contract includes options for 16 more vehicles, and Bombardier would also undertake repairs under warranty in WLB’s workshops

As well as replacing TW100 high-floor vehicles, the LRVs are needed to introduce the planned 7½ min frequencies. The vehicles will be equipped with air-conditioning, a passenger information system, CCTV, wi-fi and LED lighting.

**Catania Metro Train Design unveiled; Italy**

11 Jul. 2019; Metro Report
ITALY: Catania Metro Operator Ferrovie Circumetnea has presented the design of its new metro trains at Giovanni XXIII station.

In February Ferrovie Circumetnea signed a framework contract with Titagarh Firema, the Italian subsidiary of Titagarh Wagons, for the supply of up to 54 two-car trainsets. A firm order for 10 sets was signed in April, with EU funding in place for these trains. These are currently being built, with the first scheduled to arrive in Catania in December 2020 or January 2021.

The trains will have capacity for 64 seated and 356 standing passengers, and will be equipped with LED lighting and CCTV. Pininfarina is responsible for the styling.

The trains are being ordered at a cost of €4m each. A contract for the next tranche of 17 sets is due to be signed later this month; this would be partly funded by €59·5m from the Ministry of Infrastructure and Transport.

The government had previously allocated €9·9m for the refurbishment of the existing fleet of eight-car sets, supplied by Firema in 2001-11.

The fleet is being enlarged in line with the expansion of the city’s sole metro line. The next extension to open is due to be the 1·7 km Nesima – Monte Po section, which has been under construction since December 2015. This is expected to open by the end of the year, following delays to the original schedule.

This will be followed by a 2·2 km extension from Monte Po to Misterbianco Centro. A further 11·5 km extension from there to Paternò recently received final approval from the regional council.

At the other end of the line, a 2·2 km Stesicoro – Palestro extension has been under construction since December 2016. This would eventually reach Fontanarossa Airport, once a further 4·2 km extension is opened. This is expected in 2024.

- A detailed feature article about Catania appears in the autumn 2018 issue of Metro Report International.
Electric Double-Decker Buses in Service in London; UK

10 Jul. 2019

UK: The first five of 37 electric double-decker buses that the BYD ADL joint venture is supplying to London operator Metroline entered passenger service on July 3.

The Enviro400EV buses are being assembled at the Alexander Dennis factory in Scarborough using a powered chassis supplied from BYD’s Komarom plant in Hungary.

The aluminium-bodied vehicles are 10-9 m long, 2 550 mm wide and 4·3 m high, with 67 seats. BYD’s 382 kWh iron-phosphate batteries give a range of up to 260 km.

The first five buses have entered service on the 14·5 km Route 43, which runs between London Bridge in the city centre and Friern Barnet in north London. The vehicles are stabled at Metroline’s Holloway garage.

‘London’s red double-decker bus is a true symbol of the city and an iconic vehicle known around the world’, said BYD Europe Managing Director Isbrand Ho. ‘The BYD ADL Enviro400EV retains the soul of the London double-decker bus, brought up to date by embracing 21st Century Technology.’

Karsan unveils Atak electric Bus; Turkey

11 Jul. 2019
TURKEY: Karsan has unveiled a battery-electric version of its Atak bus. The Atak Electric is powered by five batteries supplied by BMW with a total capacity of 220 kWh, giving it a range of up to 300 km.

The bus is 8·3 m long, 2 430 mm wide and 3 090 mm high, with capacity for up to 52 passengers depending on the seat configuration. The batteries can be charged in 5 h with double AC charging or in 3 h using fast DC chargers. Regenerative braking can recharge up to 25% of the battery capacity.

Karsan says that the Atak Electric is intended for European markets. It expects to begin series production in August at its Hasanağa factory near Bursa.

Dushanbe Trolleybus order increased; Taijkistan, Belarus

10 Jul. 2019; Metro Report
TAJIKISTAN: Belarusian Manufacturer Belkommunmash has announced that Dushanbe’s trolleybus order is to be increased from 100 to a total of 150 vehicles.

The orders have been placed as part of the Dushanbe public transport sustainable development programme which is backed by the EBRD.

The first four of the 32100D trolleybuses costing around US$250 000 each were officially unveiled in Dushanbe on May 9 and are now in service on Route 1. Each of the 12 m fully low-floor vehicles has a capacity of 22 seated and 68 standing passengers, and is capable of off-wire operation for up to 15 km.

Budapest Tram Route 1 reaches Kelenföld; Hungarya

10 Jul. 2019; Metro Report
HUNGARY: Budapest Mayor István Tarlós inaugurated an extension of Budapest tram Route 1 to Kelenföld railway station on July 9.

The 1.7 km western extension from Etele út/Fehérvári út adds intermediate stops at Bikás Park and Bártfai út. Interchange is provided with metro Line M4 at Bikás Park and Kelenföld.

Work began in late 2017. EU funds covered HUF8bn of the HUF8.6bn project, with the remainder coming from Budapest municipality.

Route 1 reached Etele út/Fehérvári út in March 2015 after it was extended over the Danube from Közvágóhíd. The line is now 18.3 km long.

Keolis to operate Paris Tram Route T9; France

12 Jul. 2019; Metro Report
FRANCE: On July 2 Île-de-France Mobilités selected Keolis to operate tram Route T9 for 5½ years.

Due to open next year, the 10 km route between Porte de Choisy on Paris metro Line 7 and the centre of Orly will serve 19 stops and provide interchange with RER lines C and D and tram Route T3a. Alstom is supplying 22 Alstom Citadis X05 trams under a contract awarded in 2016.

The contract also includes the continued operation of the Bord de l’Eau six-route bus network in the Val-de-Marne département.
METRO NEWSLETTERS

on

“URBAN MOBILITY AS A SERVICE”

PUBLIC MULTIMODAL URBAN, SUBURBAN AND INTERURBAN PASSENGER TRANSIT SYSTEMS WITH METRO-BUS, LIGHT-RAIL, TRAM-TRAIN, METRO-RAIL, METRO-TRAIN, REGIONAL RAPID TRANSIT, COMMUTER-RAIL, ROPE-WAY/TRAIN, MAGLEV AND HOVERCRAFT TRANSIT/PEOPLE MOVER, WATER-METRO, AUTONOMOUS PEOPLE-MOVER

MOBILITY SOLUTION, TRANSPORTATION AND ECONOMIC DEVELOPMENTS IN MODERN URBAN/MEGAPOLIS ENVIRONMENT

METRO Newsletter by Dr. F.A. Wingler
METRO 81, July 2019

Animation of Light Rail Transit for India’s smaller Cities
India wants to go for Light Metro Rail, LMR; India

Light Metro Rail (LMR) Systems operate with Light Rail Vehicles. Those are Tram Trains/Light Rail Transits, which can run in urban region as well on Streets as City Trams, elevated as Right-of-Way Trams or Underground as Metro, and suburban and interurban on dedicated rail tracks or governmental railway lines as Commuter Rail. The invest costs for LMR are less, the diversity is higher and adjustment to local conditions and environment is less complicated; see Part II “Global Activities…”.

Centre Proposes Light Urban Rail ‘Metrolite’, Light Metro Rail (LMR), for Smaller Cities; India

The three-coach train will have a capacity of carrying 300 passengers. Sources said the Government would provide financial assistance to states to implement the Light Urban Rail Transit System.

By Kanika Verma; Metro Rail News
22/07/2019
Animation of Light Metro Rail, LMR, for India`s smaller Cities

NEW DELHI (Metro Rail News): The Centre has proposed light urban rail transit system – ‘Metrolite’ – in small cities and towns having a lower projection of ridership, with each train having three coaches and a restricted speed of 25 kmph.

The Union Housing and Urban Affairs Ministry has issued standard specifications of the ‘Metrolite’ system which will be developed on the surface and elevated stretches.

According to the ministry, the ‘Metrolite’, which can be developed at a lower cost in comparison with an existing metro system, will also act as a feeder system to high capacity Metro.

The three-coach train will have a capacity of carrying 300 passengers. Sources said the government would provide financial assistance to states to implement the light urban rail transit system.

The ‘Metrolite’ system will have a dedicated path separating the road traffic with it. For segregation with road traffic, fencing can be provided on either side of the network.

The ministry stated that the metro rail system being developed at present is of high capacity which is required for bigger cities with very high ridership.

Seeing the success of the existing metro system, several small cities and towns want rail-based mass rapid transit system, which could be fulfilled by the light urban rail transit system.

In its manifesto, the BJP had promised to expand the coverage of the metro network to 50 cities.
Government of India plans light Rail Transit for Tier-II and Tier-III Cities; India

At present 657 km of Metro rail network is operational across country and another 800 km is under construction in 27 cities.

By Urban Transport News
- 03/06/2019

New Delhi (Urban Transport News): To boost public transportation system in Tier-II and Tier-III cities, the Central Government is planning to bring a new Mass Transport System called Light Rail Transit (Light Rail Transit, LRT, -METROLIGHT).

METROLIGHT could become a dedicated rapid rail corridors in cities and towns with tracks on surface (like railways) instead of elevated or underground stretches as is the case with Metro Rail corridors across the country.

The Centre’s Housing & Urban Affairs ministry has prepared the plan and finalised the standards and specifications for Metrolite and has sent them to the railway ministry for review.

Speaking at a conference on road safety at IIT-Delhi, Durga Shankar Mishra, Secretary, Ministry of Housing & Urban Affairs said,

The cost of Metrolite corridors would be 40% less than conventional Metro rail lines, which will make them financially viable.
The Bharatiya Janta Party (BJP) in its poll manifesto of 2019 has promised to introduce Metro rail systems in 50 cities of the country. The conventional Metro rail system, which requires huge capital investment, may not be viable in many smaller cities coming under the Tier-II and Tier-III category. According to the current population, there would not be enough ridership as well. So, in those cases the Centre can think for Light Rail system-Metrolite, which will be suitable at much less cost and will also act as feeder service from various parts of the city.

According to data revealed from the Ministry of Housing & Urban Affairs (MoHUA), at present 657 km of Metro rail network is operational across country and another 800 km is under construction in 27 cities.

After analyzing the ridership data from some Metro rail networks, such as in Nagpur, Kochi and Jaipur, it has been revealed that they are not getting good ridership and even in some corridors of Delhi Metro, the number of passenger trips is low as compared to others. The Kochi Metro is bearing an estimated annual loss around Rs 25 crores.

The official said that the story could be similar in some other Metro networks that are run and managed by some state governments. They need to find a way out to avoid such a situation. LRT-Metrolite System can address these concerns. Now, almost all cities are raising their voices for Metro network to achieve their public transport demand.

Government of India issues Standards for Light Urban Metro Rail ‘METROLIGHT’ Tram-Train System; India

Metrolite Tram-Trains will have three coaches, and the speed will not be more than 25 kilometer per hour.

By Urban Transport News

22/07/2019
New Delhi (Urban Transport News): The central government proposes to run a light urban metro rail ‘Metrolite’ for small towns of various states. These trains will be run in places, where the density of people is not high. These trains will have three coaches and the speed will not be more than 25 kilometers per hour. This train will run along the ground as well as above the pillars. It will also work as a metro feeder system, and its cost is less compared to the metro rail system. To implement the ‘Metrolite’ system in smaller cities, the Center will provide financial assistance to the states.

The Union Urban and Housing Ministry has issued standards regarding light urban metro rail ‘Metrolite’ system. According to the ministry, the Metro Rail system is being developed for the big cities where travelling of more people needed. Before common poll elections, the Bharatiya Janta Party (BJP) had promised to expand the Metro in 50 cities in its election manifesto.

It will be different Route from Road

METROLIGHT will have its own separate route from the traffic on the road, which will not be affected by its speed. To prevent from accidents, fencing will also be installed on both sides where necessary. This train will run on both the ground and the pillars, but permission to run a train on the pillar will be allowed only if it is not possible to run on the ground. The most special thing is that only 2.2 meters of space will be needed in the middle of the road to construct the train pillars.

It will able to carry 300 Passengers at a Time

There will be three coaches in this train, which will be connected to each other. The height of these low floor coaches will be 300 to 350 mm, while the length of a coach will be around 33 meters. A three-coach Metrolite can carry up to 300 passengers at a time. Coaches will be made of stainless steel or aluminum.

Tickets will be available inside the Train

Shaded platforms will be created for the Metrolite system. Although there will be no AFC Gate (Automatic Fair Collection System), platform screen door, X-ray and baggage scanner. Ticket inspector or National Common Mobility Card (system like NCMC-One Nation One card) is being considered for setting up for the Metrolite. According to the standards issued by the Ministry, a passenger will be fined with a heavy cost, if gets caught without any ticket during the investigation.

Standard Specifications for Light Urban Rail Transit, LRT, System ‘METROLIGHT’; India

Read here the complete specifications of Light Urban Rail Transit System 'Metrolite' issued by the Government of India.

By Urban Transport News
23/07/2019
The Ministry of Housing & Urban Affairs (MoHUA), Government of India has recently issued Standard Specifications of Light Urban Rail Transit System 'Metrolite' Train in various smaller cities of India. You can download the original standard specifications (policy circular and guidelines) for the Metrolite from the link given at the end of the Index.

Standard Specifications of Light Urban Rail Transit, LRT, System: “METROLIGHT”

1. Introduction

The metro rail system being developed at present is of high capacity which is required for bigger cities with very high ridership and Peak Hour Peak Direction Traffic (PHPDT). Seeing the success of metro rail in the country, several other cities with lower projection of ridership are also aspiring for rail based mass rapid transit system, which could be fulfilled by Light Urban Rail Transit System named “Metrolite” with lesser capacity at much less cost. ‘Metrolite’ would also act as feeder system to high capacity Metro. In addition to less capital cost, the operation and maintenance cost of Metrolite would also be less making the system more viable.

2. Standard Specifications

2.1 Civil Structure

2.1.1 At Grade MetroLite System:

a) As far as possible, At-Grade alignment need to be planned to bring down the civil construction cost and time.
b) The system shall have a dedicated path separating the road traffic with Metro lite system
c) For segregation with road traffic, continuous plinth/Fencing can be provided on either side of network.
d) Shelter platforms shall be planned in a staggered manner in alternate side for Up and Down lines to reduce the actual road space. In this plan, road width occupied shall be minimum 8.8 m.
e) The road width occupied by the system “AT GRADE” for both up and down lines is minimum 7.6 m outside Metrolite shelter location.
f) In case the road width does not permit, one line only can be provided on a particular road and the other line can be provided on a parallel road also.
g) The road width occupied by the system “AT GRADE” for single line is minimum 3.5 m outside shelter location and minimum 5.5 m inside Metrolite shelter.
h) As an alternative, entire road can be closed for road transport and only train can be operated with pedestrian plazas.
i) Conceptual layout of the At-grade Metro Lite shelter is attached with Annexure I & II with this report.
j) Platform width of minimum 1.12 m (NFPA -101) shall be proposed on either side of the track.
k) Metro Lite shelter roof can be optimized to 1/3rd of train -length in the platform area instead of providing roof in the entire shelter length.
l) Zebra crossings shall be provided on either side of the platforms for passenger movement from the side foot paths.
m) Respective municipal corporations shall identify all possible paths for providing at-least single track operation of Metrolite trains between two parallel roads.

n) Ring network shall be planned to reduce the head way.
o) Only at location of cross-overs, signalling equipment rooms are required at the nearest Metrolite shelter. This equipment shall be planned in an underground container below the platform with required access and ventilation.
p) AFC gates, Platform screen doors, X-ray baggage scanner and DFMD are not suggested in the Metrolite shelter. This will remove any signalling and PSD equipment rooms in the Metrolite shelter platform making it un-attended shelter.
q) Ticket validators could be installed inside the Metrolite train and shelter with NCMC / other ticketing systems.
r) With random checking, heavy penalty shall be levied on the passengers without a valid ticket in the system.
s) Road traffic system:- Integrated road and rail signalling system to be provided with priority for Metrolite system. Traffic marshals can be posted initially at crossings to enforce discipline.

2.1.2 Elevated Station:

a) Elevated Metrolite system shall be planned only when At-Grade system is not possible.
b) Road space occupied at the median shall be maximum 2.2 m for Piers.
c) Platform width of 1.12 m shall be proposed on either side (NFPA 101).
d) Concept of Concourse shall be avoided and only Platforms shall be used for passenger area. Station will be at single level platform with an under bridge (FOB) below the rail level.
e) Access to the Under bridge (FOB) could be planned with one entry/exits on the road. Vertical clearance of FOB shall be maximum 5.5 m above road level and shall be used for road crossing for general public.
f) Conceptual layout of the elevated station is attached with Annexure -2.
g) Station area can be planned with more natural lighting and natural ventilation instead of heavy closed structures.
h) AFC gates, Platform screen doors, X-ray baggage scanner and DFMD are not suggested in the Metrolite shelters. This will remove any signalling and PSD equipment rooms in the station platform making it un-attended station.
i) Ticket validators could be installed inside the train and in shelters with NCMC or other ticketing systems.
j) With random checking, heavy penalty shall be levied on the passengers without a valid ticket in the system.
2.1.3 Track:

a) Rail Gauge to be adopted is standard gauge of 1435 mm width.
b) The track curves of radius up-to 25 m shall be adopted.
c) Ballast-less track proposed in elevated sections and embedded track on road for At-grade sections
d) Concealed Point machines for operation of cross-overs shall be provided below the embedded tracks.

2.2 Rolling Stock

2.2.1 Train Configuration:

a) Metrolite trains with maximum 12T axle load is to be adopted for passenger PHPDT capacity from 2,000 to 15,000.
b) Unit shall consist of three non-separable coaches with low floor height of about 300-350 mm. Unit length shall be of minimum 33 m.
c) The track curves of radius up-to 25 m are adopted. Hence, the car body width of 2.65 m is to be adopted as the standard dimension.
d) The car structure material shall be stainless steel or Aluminium.
e) The train configuration will be of 3 car unit. Number of additional coaches of train may be decided by the Metrolite authority based on PHPDT in the initial design stage itself.
f) Train shall be capable of carrying full load passengers up-to a gradient of 6%. Individual metro authorities can decide the gradient requirements based upon the site conditions as Metrolite is predominantly planned At-grade.
g) Up-to 300 number of Passenger loading for 3-coach train unit. @ AW31 loading conditions.
h) Train shall be capable of travelling in elevated, at grade and tunnel sections.
i) Motorisation – Minimum 50 % motorized axles for the unit of 3 nonseparable coaches.
j) Maximum operational speed is 60 kmph.
k) Safety certified obstruction detection system shall be employed for the trains.

2.2.2 Emergency Evacuation System

The type of evacuation for trains is side evacuation in between both the tracks.

2.2.3 Maintenance / Depot Facility:

Due to lesser radius of curvature of trains (25 m), the size of the depot will be considerably lesser than that for Metro-railway depots.

2.3 Traction System:

a) Traction system shall be 750 V DC Over-head catenary system or embedded third rail system.
b) Catenary free technology may also be opted in short stretches where ever absolutely needed.
c) Respective cities shall decide the location and availability of the DC sub-stations required for Metrolite system.
2.4 Signaling, Telecom & AFC Systems:

2.4.1 Signalling:

a) CBTC shall be the technology to achieve the Signalling & Train Control. CBTC medium shall provide Train to OCC Rolling Stock Information transmission.
b) Metrolite System having exclusive Right of Way shall require full complement of Signalling & Train Control (CBTC (GOAI – ATP only), ATS & Interlocking’s) primarily because of:

1) Derailment prevention due to Over Speeding, especially when it is an Elevated and At Grade Section.
2) Route directions.
3) When more than one Train is required to run in one Section due to better Headway requirements/ De-congest.

c) CBTC shall allow minimising of way side cabling requirements.
d) CBTC system shall be provided with cab signalling and shall be interfaced with Road signals.
e) CBTC system shall be with safety certification of SIL4 level.
f) In case of failure of On-board ATP, train operation shall be done as per provision of MRGRI/modified MRGR for light metro.
g) No fall back system is recommended as it is required to avoid equipment at the road level. In any case, even with failure of On-board signalling, the speed is restricted to 25 kmph. Signalling shall be available in only one cab and with redundancy within the single ATC cabinet inside the cabin.

h) To reduce the cost of CBRC implementation, the following is suggested:
   – Instead of having Distributed Interlocking’s at various Stations, Centralised Interlocking at OCC with Object Controllers at Point/Crossing Stations shall be planned.
   – Reduce the number of On-Board ATP by having a Single ATP Unit for the whole Train.

2.4.2 Telecom:

(a) The system uses CCTV cameras in platforms and train communication through Tetra radio.

2.4.3 AFC

a) AFC gates, Platform screen doors, X-ray baggage scanner and DFMD are not suggested in the Metrolite shelters. This will remove any signalling and PSD equipment rooms in the station platform making it un-attended station.
b) Ticket validators could be installed inside the train and in shelters with NCMC / other ticketing systems.
c) With random checking, heavy penalty shall be levied on the passengers without a valid ticket in the system.

3. Indigenisation

a) For larger quantities (ex More than 100 coaches), the concerned metros may look at the possibility of stipulating local manufacturing of coaches and sourcing of certain components to the extent possible.
b) Systems equipment and technology should be modular such that indigenization is possible.

**Special Note:**
The above broad standards of Metrolite. Detailing, wherever required, should be done within the ambit of above standards by metro rail companies/implementing agency at the time of implementation. Any deviation from the above standards will require prior approval of Ministry of Housing and Urban Affairs.

**Jammu and Srinagar to get Light Metro Rail, LMR, in next four to five Years; India**

**RITES to submit final DPR of Light Metro Rail (LMR) project in 15-20 days.**

By Vinod Shah; Urban Transport News
06/07/2019

*Srinagar (Urban Transport News):* Announcing major boost in metro rail connectivity in the Jammu and Kashmir state, the state government informed that the work on building elevated light rail transit systems for Srinagar and Jammu cities would start soon and that the project will be completed in 4-5 years.

Addressing a press conference in Srinagar on Thursday, Dheeraj Gupta, Principal Secretary to the Jammu & Kashmir Government, Housing and Urban Development Department said that in phase one of the elevated light rail transit system in Srinagar two
corridors will be laid from HMT junction to Indra Nagar and Osmanabad to Hazuribagh. In phase II, two corridors will be built from Indra Nagar to Pampore Bus Stand and Hazuribagh to airport.

Commenting on progress on the groundwork, Gupta said that Rail India Technical and Economic Service (RITES) will complete the detailed project reports (DPRs) in next 15-20 days. Thereafter, we need to have certain approvals from the state govt and the Centre. The work would be completed in 4-5 years.

Jammu and Srinagar Light Metro: At a Glance

1. The estimated cost of the first phase of the light metro rail transit project for two cities is pegged at Rs 8500 crores.
2. J&K Government has approved the elevated corridor option for two light rail transit systems. Railway consultancy firm Rail India Technical and Economic Services (RITES) is in the process finalizing the DPRs for the both projects.
3. According to the plan, Indra Nagar and Osmanabad in Bemina to Hazuri Bagh will be connected with light metro rail in the first phase of the project. This will cover a distance of 25 km along with 24 stations.
4. In Phase II project, the metro train will connect Indra Nagar to Pampore Bus stand and Hazuri Bagh to Srinagar airport covering a distance of 17.5 kilometres along with 14 stations.
5. In Jammu city, the metro in the first phase will be from Bantalab to Greater Kailash and Udheywala to exhibition ground. The second phase metro train will run from Greater Kailash to Bari Brahamana railway station and Exhibition Ground to Satwari Chowk to Jammu airport. This corridor will be 20.5 km along with with 17 stations.
6. State government claims that the Jammu and Srinagar Light metro system will be the first in India which will have a low footprint, low noise, greater comfort, aesthetic appeal and blend with the surrounding landscape.
Vijayawada Metro | Panel opts Light Metro Rail for Amaravati; India

The Vijayawada metro, which has been in a limbo, gained impetus with the Steering Committee, constituted for the project execution, finalising the preliminary structure of the project.

By Narendra Shah; Metro Rail News
03/11/2018

Delineating Image for Light Metro to connect Vijayawada with Capital

Vijayawada: On Thursday a committee led by municipal administration P Narayana recommended Light Metro Rail system and elevated corridor for all 77 km lines as part of Amaravati Metro Rail project after discussing various transport options.

The Vijayawada metro, which has been in a limbo, gained impetus with the Steering Committee, constituted for the project execution, finalising the preliminarily structure of the project.

The meeting recommended corridor from KC canal junction to Amaravati capital city with 27 km with both Elevated and Underground options. The minister also suggested that to officials to study the advantages and disadvantages of both options of taking the corridor. The matter will be finalized after discussion with Chief Minister next week.

The four options proposed by the consultants preparing the Detailed Project Report (DPR) of the metro rail, the Steering Committee told the Amaravati Metro Rail Corporation (AMRC) to go ahead with an elevated light metro system.

The project has been proposed in three corridors in and around Vijayawada with a total length of 77 km. In the committee meeting held on Thursday, Municipal Minister P Narayana suggested that the consultant — Systra Consultants — examine the extension of one of the corridors to Amaravati.
According to the interim DPR submitted by Systra, four options – At-grade, elevated, underground, and combination of elevated and underground – were suggested. It also suggested that the State government could go with Light Rail Transit (LRT) or Light Metro. “The committee examined the phase-A of the DPR submitted on October 25 and suggested to go for Light Metro system and Elevated corridor for all 77.2 km of corridors,” a press release from Minister Narayana’s office said. Narayana is the chairman of the Steering Committee.

The three corridors proposed by the consultants include Amaravati – Pandit Nehru Bus Station (PNBS) – Nidamanuru-Gannavaram (52 km), PNBS – Penamaluru (12.5 km) and Railway Station – Jakkampudi (12.2 km). According to the press release, Minister Narayana, on the occasion, suggested the inclusion of cost estimates for the corridor from Krishna Canal (KC) junction to Amaravati Capital city – about 27 km – with both options of the elevated and underground metro.

“Minister Narayana also suggested that a study is conducted on the advantages and disadvantages of having an underground line near the airport while the remaining corridors would be elevated,” the press release said.

Smart Cities meant Cities, that are progressive with ‘universal Infrastructure’; India

Exclusive Interview of Ms. Karuna Gopal, Smart Cities Advisor and President of Foundation for Futuristic Cities, Hyderabad.

By Urban Transport News
24/12/2018
You have recently unveiled ‘VISION HYDERABAD’. Could you brief our Readers about this Vision and how will it work?

Karuna Gopal: Our Vision is to shape Hyderabad into an Economically Vibrant, Environmentally Safe, Inclusive and a Happy City.

While Economic Vitality, Environmental Safety, and Equity are the tripod on which we envisage the city’s development, we placed Happiness at the core of our vision. Today, as you know, Happiness has evolved as a quintessential, global theme for defining development.

I believe that this Vision of ours will work primarily because of our approach – First of all it’s a ‘Collective Vision’. It was prepared after several multi-stakeholder consultations. Our special attention was on 4 sections of society whose ‘voice’ was never considered in city development plans so far – Women, Senior Citizens, Disabled and the Urban Poor.

The strategies that will be distilled out of this vision document will be City – Centric and People – Centric with maximum emphasis on Collaboration. I believe City – Centricity is very important. Hyderabad’s unique requirements have to be factored in and people have to be at the core when infrastructure and services are being planned.
Perhaps the most striking feature of our vision is our focus on ‘Science of City’. Normally decisions are taken without instituting scientific studies. We want to rectify that. We believe in DATA, VIRTUALIZATION Protocols and Data MODELLING tools for forecasting. No city in India, used data modeling to predict what would happen to city’s climate resilience if 10 lakh people migrate into the city.

Why is there so much Focus on smart Cities right now? How did you come to be interested in smart Cities?

Ms. Gopal: The idea of a smart city has caught the imagination of the world more than a decade ago. As cities became the focus of development, different countries tried different models of city development based on their own ‘economic models’. For instance UK’s ‘Flat white economy’ gave rise to their ‘digital cities’ while other European counterparts looked at ‘green cities’ based on their ‘circular economy’ principles.

India entered the race much later and by then there was global consensus that Smart cities bring in prosperity with equity so our Prime Minister declared that India will create 100 smart cities.

Coming to my affinity for smart cities, I started my career in IT industry 30 years ago, moved to the Urban domain about 15 years ago. It’s natural for me to explore IT solutions for city development. In fact the first ever ‘Predictive Policing’ protocol using Big Data was developed under my guidance many years ago. Since the year 2001, through my lectures at marquee programs for IAS officers I could influence the Urban ecosystem – As I was mostly interested in ‘Urban Governance’ I developed modules, tools, guidance documents on how to bring in efficiency and transparency using technologies.

Please give our Readers some Insights into your Organization ‘Foundation for Futuristic Cities’. Brief us about its Vision, Mission and Aims for sustainable Development in the Country.
**Ms. Gopal:** Foundation for Futuristic Cities was started back in 2005 with a vision ‘Vibrant Cities for Vibrant India’.

We started this not for profit think tank to transform urban India into not only an economic engine of growth but also as an example of inclusion and sustainability.

Our methods were developing Knowledge Products, Process Innovations, Technology Tools for governance reforms.

We contributed to several CDPs (City Development Plans), City Development Strategies, as experts with multilateral agencies like World Bank, ADB etc introduced several innovations into the urban ecosystem. We built protocols for partnerships, guided city governments on how to operationalize those partnerships.

I would say we were the ‘Knowledge People’ more than 13 years ago when there was no such entity or individuals working on such innovations.

**How are you associated with the Smart Cities Mission?**

**Ms. Gopal:** The Ministry of Urban Affairs reached out to me as soon as the Prime Minister announced the **100 Smart Cities Mission**. The first concept note went from me to the Ministry. Soon after that I was a part several consultations that GOI held with state level officials. Our ‘Co-Creation’ framework developed in 2007 was incorporated into the mission guidelines. Our Initiative CITIZENSfor CITY- 2009 was recognized as a National Best practice at the launch of the Smart Cities Mission. This innovation of ours introduced back in 2009 became a kind of guiding force for citizen engagement. I was invited to speak at the launch of the mission by the Prime Minister and our publication ‘SCULPT your CITY’ was reprinted and distributed to all dignitaries at the launch in New Delhi. At the National Outreach organized by the Urban Ministry, I addressed conferences meant for Urban Secretaries of various states of the country – mostly explaining the Mission contours to them for implementation.

**Please brief our Readers about your patented Innovations; SCULPT your CITY, CORPORATES for CITIES.**

**Ms. Gopal:** ‘SCULPT your CITY’ is a Knowledge product, a publication with 21 strategies to make any city livable. These strategies were crowd sourced from more than 100 organizations through a contest called ‘CITIZENSfor CITY- 2009’.

Many solutions ranging from ‘smart parking’ to ‘smart energy' were implemented in several cities.

SCULPT your CITY highlights citizen’s willingness to stop playing critics and their readiness to partner the government for creating livable cities.

This innovation had the potential to add a rare panache to city governance.

As far as CORPORATES for CITIES is concerned, its based on the rationale **“Business cannot succeed if Cities fail”** …

The initiative is based on the premise that companies need healthy cities to provide reliable infrastructure, an educated and vital workforce, a vibrant economy, and a safe and secure environment to survive and thrive. Cities, of course, need business as an economic
driver -As such, the sustainability of cities and business are inextricably linked. This is the rationale behind CORPORATES FOR CITIES.

It is a collaborative platform that connects with public and private sector leaders from a wide spectrum of industries who share a common interest in developing a prosperous future for our Cities. This platform though conceived, developed in 2010, is going to operationalized soon by GOI.

Since the Selection of all “100 Smart Cities” Projects in India, the discussion on smart City Planning has grown substantially. What do People mean, when they describe a “Smart City”? What are some Examples of well-designed smart Cities?

Ms. Gopal: For a country like India that never focused on urbanization (believing that India lives in its villages), we have come a long way in prioritizing urban agenda. After Modiji became the Prime Minister, the Urban Transformation agenda became more accentuated.

Smart Cities have been defined in different ways by different governments. Here, in India, we said its about giving highest quality of life to a citizen. We believed in the power of ‘Data’ and scientific approach. We believed in citizen engagement. We never fought shy of saying that providing basic services like water sanitation is a part of the smart cities mission. We never spoke much about technology intensive smart cities. We were logical enough to understand that technology that ‘adequately’ addresses governance issues and makes government transparent and accountable is better than chasing technology for the sake of keeping pace with its development. For instance, when 1 Gigabit speed of internet service was provided as an experiment in some parts of the world, the citizens did not know what to do with that speed.

So smart cities for us meant cities that are progressive with ‘universal infrastructure’. Infrastructure meant for every segment of society, effective public transportation, Control and command centers for safety of a citizen and to monitor critical infrastructure real time became our priorities.

For the first time in the country we are focusing on DATA, crunching data real time for safety and security, PLACEMAKING for urban rejuvenation, citizen engagement in real sense.

Despite the Announcement of smart Cities Project, Progress on the Ground is not as swift as was expected. What is your Opinion and are there any global best Practices that India can follow?

Ms. Gopal: Just as laying the foundation takes longer than building the rest of the structure, getting the smart cities mission off ground is more about the ‘unseen’ and the ‘invisible’ changes at the institutional level.

If you have noticed, we are not taking much from the world best practices as we realize our path is quite different from the rest. We will create the best and next practices in India itself I am sure.

Some critics argue that the corporate push for smart cities has introduced a host of social policy concerns linked to top-down urban planning.
No country or city can today claim that smart cities can be built by government alone. There is a requirement for private participation. In India we haven’t gone all out to ‘corporatize’ the entire mission. We are selective in our partnerships and the quantum of private participation. Prima facie everything new and never tried before will be criticized as favouring the private sector. But remember India’s progress has to be a judicious mix of both public and private. The risk allocation, the gains share are being worked out keeping the common man as the focal point.

**Singapore is probably one of the best-known “smart Cities” today because of its’ efficient Government. And yet many People still argue that paternalistic Societies like Singapore suffer from an Innovation Deficit. What, in your View, is the Key to developing Cities, that enable “innovation Ecologies”?**

Ms. Gopal: Singapore, just like any country or city that has raced ahead in innovation has to be admired. We don’t need to see all aspects of its development or how it has reached there using what structural format. We should be sensible enough to learn from their love for ‘Big Data deployment’ in traffic management, their concept of ‘Liveable City Lab’ that focuses on sustainability relentlessly or its ambition to become the ‘Asian Hub’ of innovation. Just take the good from Singapore – that’s what makes sense for India.

**Could you elaborate on some major Investment Plans in India?**

Ms. Gopal: There’s plenty that’s in store for the nation.

Foreign Direct Investment (FDI) received in Construction Development sector (townships, housing, built up infrastructure and construction development projects) is currently at US$ 24.87 billion and the logistics sector in India is growing 10 per cent annually and is expected to reach US$ 215 billion in 2019-20.

India has a requirement of investment worth Rs 50 trillion (US$ 777.73 billion) in infrastructure by 2022 to have sustainable development in the country. There is significant interest from international investors in the infrastructure space. Some key investments worthy of mentioning are:

- The Asian Infrastructure Investment Bank (AIIB) has announced US$ 200 million investment into the National Investment & Infrastructure Fund (NIIF).
- Private equity and venture capital (PE/VC) investments in the infrastructure and real estate reached US$ 3.9 billion with 29 deals during the first half of 2018.
- Indian infrastructure sector witnessed 91 M&A deals worth US$ 5.4 billion in 2017

**According to Indian Government Data, there are only four Buses per ten Thousand People. What is your take on this major public Transport Issue in India?**

Ms. Gopal: India has been growing and growing fast. Any economy that’s on this aspirational path will have citizens using their disposable income to demonstrate their aspirations. Therefore, cars came, villas came, consumerism galloped big time.

Now we are waking up to the fact that this will not help in the long run, therefore in Smart cities mission we are giving a push to Public transportation. I am sure soon there will be a different scenario in our cities as far as private cars is concerned.
Inspired with PM Narendra Modi’s 7C components on Urban Mobility at First Global Mobility Summit, Urban Transport News has launched a bimonthly Magazine titled ‘Urban Transport Infrastructure’ to promote Govt’s initiatives on Urban Transport and Smart Cities and role of private players in the industry. Is there anything about the publication you think we could do better?

Ms. Gopal: First of all please accept my congratulations on the launch. Urban Transportation for a city is the most important aspect of development. The right modal mix of motorized and non-motorized will in fact define how ‘climate resilient’ a city becomes.

I would like to see more scientific studies on Integrated transport systems, best practices in not only in policy but civic behavior. I wish that you would also focus on ‘soft infrastructure’ like what happens when certain path breaking policies are articulated, how citizen behavior changes if transport departments change their policies, how citizens can partner in a true sense.

Your last Piece of Advice to Cities.

Ms. Gopal: I am completely convinced that cities can be REVITALIZED only if there are more hearts that resonate to the city’s needs, more minds that meditate on the solutions and more hands that shape the contours of development.

Therefore, lets’ CO –CREATE the cities we want to live in!

Exclusive Interview with Dr. Brijesh Dixit, Managing Director Maharashtra Metro Rail Corporation; India

By Krishtina D'Silva; Urban Transport News

11/09/2018
Dr. Brijesh Dixit heading Maharashtra Metro Rail Corporation, as Managing Director to implement Rs. 8680 crores. Nagpur Metro Rail project comprising 42 stations over a route length of 41.7 km and Rs. 11420 crores. Pune Metro Rail project comprising of 30 stations over a route length of 31.25 km long Mass Rapid Transit system to the city of Nagpur and Pune respectively which is world class, safe, comfortable, accessible, energy efficient and environmental friendly. Was the first employee of NMRCL on its incorporation on 18th Feb'2015 Has led NMRCL since then to tie-ups with bilateral funding agencies, KfW Germany and AFD France, promptly appointing consultants and contractors for quick commencement of work and progress thereof in a short time span and Scaling up the organization to support the progress of work. He shared latest updates with Urban Transport News about current progress and development of Nagpur and Pune Metro Rail projects. Here are excerpts of interview with us:-

1. Please highlight the special Features of Pune Metro and Nagpur Metro for our global Audience? What makes them truly special?

A: The unique and innovative features that are being implemented in the Nagpur Metro are:

- Integrating Solar Energy from inception to meet 65% of energy requirements by installing solar panels along the station rooftops, depot shed rooftops and vacant spaces
- Superior Project Management through Digital Project Management Platform 5D Building Information Modelling, BIM, to ensure project completion without any cost and time overrun and ensuring world class quality, safety and environmental protection of the project
- Multi Modal Integration, Efficient & High-Quality Feeder Service to provide First and Last Mile Connectivity right from inception and promoting public and Non-Motorized Transport
- EMV based common mobility card for seamless travel has been planned on PPP Basis. Same will be implemented at Pune, once the operation stage is reached
- Optimization and rationalization of the design of civil and system infrastructure targeting cost savings of About 10% of the DPR Cost Estimate
- Adoption of Transit Oriented Development since inception with half of revenue accruing to Maha-Metro
- Setting of state of the art ultra-modern quality Labs with Bureau Veritas at works site to test the quality of materials used in the construction works and ensure overall quality of construction
- MoU with DRDO for anaerobic Bio Digester to ensure 100% smart sewage treatment and ensure 100 % water recycling
- Designing state of the art station by adopting unique architecture features by international architects
- Non-Fare Box revenue is likely to be 50% of fare box revenues of the metro
- NOVEL CITIZEN CONNECT in the form of Metro-Samvad has been adopted for direct communication with all stake holders including citizens to involve their active participation in the project.

These same features will be carried forward to Pune as well.

A particularly noteworthy thing is about station development of Pune. A very distinct station architecture is being developed there fully reflecting the rich history, heritage, art, and culture of the great city if Pune. The stations near industrial area will reflect industrial themes. Those near historical monuments will include their theme. Stations by the
riverfront will have a reflection of that in such a way that they become the modern identity of the city and are ready to complete the rejuvenation of the surrounding areas. Rich musical heritage of the city will also be suitably included in the station design.

2. What is current Status of the Pune and Nagpur Metro Projects? Can you please tell more about the Achievements of Pune and Nagpur Metro Projects in last 3 Months?

A: Nagpur Metro Rail Project consists of 38.215 Km elevated Metro Corridor which includes 40 stations and 2 train maintenance Depots, the Alignment is divided into two corridors i.e. North-South (19.658 Km) & East-West (18.557 Km). The estimated completion Cost is Rs. 8680 crores. The total physical progress achieved till 31st July 2018 is 67.36% and the financial progress is 44.89%.

The route length of Pune Metro Rail Project is 31.25 km (26.23 km elevated & 5.02 km underground) divided into two corridors i.e. from Pimpri Chinchwad Municipal Corporation (PCMC) to Swargate (16.59 Km) and from Vanaz to Ramwadi (14.66 km) with 30 stations and two Car Maintenance Depots. The approved completion cost is Rs. 11,420 crores. The approved completion cost is Rs. 11,420 crores. The total physical progress achieved till 31st July 2018 is 22% and the financial progress is 15%.

3. When will the Trials for first Phase of both these Project start? What are the expected Completion timelines for both these Projects?

A: Trial run of the very first section of 5.4 km of Nagpur Metro Rail Project was flagged off on 30th September 2017. The Commissioner of Metro Rail Safety (CMRS) authorization was received on 16th April 2018 and currently joy rides are carried out.

The phase 1 of Nagpur Metro is expected to be completed by December 2019 with opening of 24 km by March 2019 and the remaining 14 km by the end of 2019. The Pune Metro project is expected to be completed by the end of 2021.

4. What will be the latest and modern Facilities, Commuters will have at Stations and in the Metro Trains of the both these Mega Projects?

A: Metro stations and train would incorporate some of the most advanced and state of the art facilities aimed at providing overall comfort to all those using this service.

# Some of the facilities provided at metro stations have been named here:

- State of the art metro stations incorporating aesthetic designs
- Themes and architectural designs that match the local flavor
- Escalators and lifts to cross the platform and move over to other side
- Displays and public-address system giving information about train movement
- CCTV camera network installed to track every movement in the station premises
- Child care facility room, especially for babies who need to be fed by mother
- Door Frame Metal Detector (DFMD) and Hand-Held Metal Detector (HHMD) for checking
- Baggage scanner to check every consignment that a passenger is carrying
- Automatic Fare Collection (AFC) gates for easier access to passengers
• Emphasis on maximum of natural light and sustainable material during construction
• Solar panels for use of maximizing use of non-conventional energy
• Rainwater harvesting and use of anaerobic bio-digesters for smart sewage treatment and water recycling
• Basic amenities like supply of potable water and wash rooms for commuters
• Dedicated parking slots and multi-modal integration facilities in the vicinity
• Dedicated parking lots for non-motorized vehicle parking at select stations

# While incorporating these special features at stations, Maha Metro has also included exclusive features for the specially able citizens. Some of such friendly features can thus be listed:

• Low height ticket counter
• Special bathrooms for specially able with tactile path
• Switches with instructions in Braille language
• Reserve parking and ramps for specially able
• Wider AFC gates to accommodate wheel chair to pass through

# The Metro Trains have also been designed by providing special features. The salient features are:

• LED Lighting and Displays inside the metro coaches
• Push buttons to enable passengers to talk to staff on board for help
• Fully air-conditioned coaches to provide full comfort during journey
• Reserved seating for women, elderly and those with special needs
• Modern coaches with aesthetically pleasing design and CCTV camera watch
• Automatic door opening/closing facility and VVVF drive for regenerative braking system

5. How will these Projects change the whole Scenario of the Transport Sector of both Cities? Please explore your Views about the Multi Modal Integration.

A: Nagpur, like any other major city, has, over the years, seen industrialisation and a steady rise in its population. The city has witnessed certain industrial growth and a steady progress over the years. However, the city could not cope up with these twin phenomena of rising population and industrialization. It’s high time for Nagpur to develop a better infrastructure and transport facilities. The proportion of citizens using public transport mode is as low as 10 %. The frequency of buses plying on city roads is lower than desired. This leads to heavy dependence on private transport and people use their personal transport to commute in the city. The vehicles on city roads are predominantly two wheeler which are used by school & college going students and youths of Nagpur. Nagpur Metro Rail Project will ensure a definite shift and commuters would shift from private transport to metro. This would reduce number of accidents on the roads and safeguard environment for future generations. Pune is no different from Nagpur, when it comes to traffic-related issues. The ever-increasing vehicular population on city roads, demands that a mass rapid transport system be in place in the cultural capital of Maharashtra. Stations are being planned near bus stops, railway stations and major transit routes. An efficient form of sustainable urban transport will be provided in the form of metro. This will not only reduce the traffic woes of Pune, but also help in integrating various other modes of public transport.
While Maha Metro is going ahead with project work at Nagpur and Pune in an express mode, it has also planned introduction of – Multi Modal Integration in these two cities. The concept of Multi Modal Integration envisages assimilation of multiple modes of transport to help commuters to reach from one place to another. The modes, which are planned to be integrated, include metro train, local bus service, e vehicles, taxi service etc. Bike sharing would be an integral part of this feeder service. This integration would help commuters to reach either Metro Station, work area of residence using any of the above-mentioned transport modes and then travel further using Metro train. This will ensure Last Mile Connectivity across the city.

6. Please brief us that how Manufacturing 75% of Metro Components indigenously would provide a big Boost to the Railway Industry of India?

A: In the year 2017, Government of India launched the Make in India initiative and the new Metro Rail Policy. By virtue of the ‘Make-in-India’ policy of Government of India, it has been mandated to manufacture 75% of metro components indigenously. This policy driven initiative would not only bring in the latest manufacturing technology and best practises as a boost to the railway industry but also establish a good, robust and competitive manufacturing base in India. Such an initiative would also lower the manufacturing cost of metro components as India does offer a low-cost manufacturing ecosystem.

Since the rapid urbanisation occurring in the country demands city transport development in the form of an urban metro rail system, it is fully relevant and important to optimize the manufacturing cost of metro components.

Furthermore, this GOI initiative would also boost the economic growth of the country and generate significant number of jobs which are essentially required to contain unemployment in the country.

7. What are your Views on the Progress of Metro Projects in India in last 4 Years?

A: During the last 4 years, a significant amount of operational metro rail network has been added in the country. Also, a lot of new projects have started construction, and some are in the stage of preparation of DPR. This healthy progress signifies the willingness of people to shift from private transport to public transport. This shift from private transport to public transport is sustainable in the long run. This will make cities in India livable as metro project is environment friendly and viable.

8. What are the Future Plans of the Metro Projects in Maharashtra and additional Phases of Pune and Nagpur Metro? What Role can Foreign and Private Indian Companies have in developing these Projects in Terms of Supply of Components, Parts etc?

A: Even as work on the first phase is going on in a rapid pace, the proposal and demands for second phase re on the rise. Following are some such proposals and demands:

- **Nagpur** – The second phase of Nagpur Metro Project has been conceived. It includes 35 stations and covers a distance of 48.3 km. This basically involves providing connectivity to surrounding areas and industrial townships. It encompasses providing Metro rail links to areas like Kanhan, Hingna, Butiboti,
Dattawadi and Transport Nagar. Detail Project Report (DPR) for this has been submitted to Urban Development Department (UDD), Government of Maharashtra.

- **Pune** – Similarly, Maha Metro has received requests for extension of the existing project alignment from local bodies of Pune. The demand for this includes the one from Pimpri Chinchwad to Nigdi, which covers a distance of 7 km, Swar Gate to Katraj (Pimpri Chinchwad) with a distance of 7 km and Nashik Fata to Chakan via Moshi, which spreads over a distance of 25 km. These proposals are under consideration.

- **Thane** – While work on Nagpur and Pune projects is on the fast track, Maha Metro was entrusted with the task of preparing DPR for Thane.

**Exclusive Interview with Jasmine Shah, VC, DDC, Delhi Government on e-Buses; India**

*By [Urban Transport News](https://www.urbantransportnews.com)*

- 01/04/2019

It was in March 2018, that the Delhi Government while presenting its ‘Green Budget’ for the financial year 2018-19 committed to procuring 1000 electric buses for the roads of Delhi and outlined a timeline for its implementation. A year later, the first set of global tenders for 375 buses have just been issued, following a pilot project in the latter half of 2018. In the meantime, we have heard of several other cities launching e-buses, though any major city-wide transition or significant breakthrough in terms of adoption is yet to be reported.
When will Delhi commuters finally see electric buses on their regular roads and will it prove to be more than the odd experiment in electric mobility? More importantly, can we expect an uptake that will make a dent in emissions-related pollution in the capital?

**Citizen Matters** spoke to Jasmine Shah, the Vice Chairperson of the Delhi Dialogue and Development Commission (DDC) – an advisory body to the Delhi Government — earlier in March to know more about the exact goals with regard to induction of e-buses in the capital and the journey towards that over the last one year.

**We first heard of e-Buses for Delhi in the Budget Speech of March 2018. But it was only a Week back that the first Set of Tenders were reportedly issued. Can you tell us, what has been happening over the past Year and where the Plan for Electrification of Buses stands at present?**

For us, the entire imperative to move towards electric vehicles and devise a policy around that was driven by the goal of doing whatever we could do, within the powers of the Delhi government, to fight pollution. Through the Green Budget announcement, we listed out a 26-point agenda covering 5 departments of the government, listing initiatives addressed at mitigating pollution for each department. For the Transport Department, some 6 or 7 initiatives were listed, two of which were the introduction of a fleet of 1000 electric buses and drawing up of a comprehensive EV policy. That was the starting point.

When it came to electric buses, we realized we would have to study the technology and all aspects of the project before we actually commit to investing in the buses and bringing them on to the roads. In May 2018, we appointed a consultant, DIMTS (Delhi Integrated Multi-modal Transit Systems] – a special purpose vehicle floated by the Delhi government — to do a detailed technical study on electric buses. They would also be the bid management consultant for the project.

Between May 2018 and December 2018, DIMTS conducted a thorough study and analysis, which included a study of successful global experiences. Delegations from the Delhi government (including the Minister of Transport) visited China and other locations. DIMTS itself appointed an international consultant to advise them on learnings from such global experiences.

At the end of this extremely comprehensive study, DIMTS submitted a report with detailed proposals in Jan 2019 — on charging infrastructure, different battery models, different modes of operating services, the merits of upfront subsidies versus subsidies over a period of time etc. A lot of analysis and homework went behind the proposal and report. Based on the recommendations of the DIMTS and the observations of our own transport department, we finalized the plan to induct the 1000 e-buses in Feb 2019.

**But there was a Trial run even before this Study was concluded...**

Yes, as the study was in progress, we were also in constant touch with various manufacturers of electric buses; we asked them to deploy one bus each for a trial run in Delhi. This would help us to ascertain the battery performance, the charging time for batteries etc. within the framework of conditions in the capital. Manufacturers could claim a lot, but since we are planning an induction in such a large scale, we needed to see some real data.
Three major manufacturers came forward with one bus each and for 2-3 months they ran their bus in different routes of Delhi. The entire performance was monitored very closely. That was also factored into the final report that DIMTS submitted.

**Delhi released its Draft electric Vehicle (EV) Policy for public Consultation in November 2018, much before this Report came in; so would you also incorporate Changes in that based on the DIMTS Proposals?**

There are actually two separate things here. As part of the larger EV policy and strategy, we realised that public transport, and buses, in particular, were among the things that were largely under government control and we should go ahead and do it at once. The rest of the EV policy is at a conceptual stage and we are looking at the strategy for different segments and finalising those. But if you look at all segments in transport that are to be electrified, then buses are in fact low-hanging fruit because the govt has fair control over that, and the charging infrastructure could also be set up at the bus depots, terminals etc.

After DIMTS submitted its report, in February 2019, we got Cabinet approval to acquire these electric buses and based on our own assessment of the time needed to set up depots, power infrastructure, we realised that two depots were ready for tendering. In the first week of March, we issued a global tender for 375 electric buses. The entire fleet of 1000 will be procured in phases and this is the first phase in which we will acquire 375. Once the elections are over, tenders for the rest will be issued.

**How many Buses is Part of the Trial run? What were the Findings from this Pilot?**

Three buses from three different manufacturers: Olectra BYD, PMI-Photon and JBM Solaris Eco Life.

The main aim of the trial was to gauge the technical and operational aspects — the battery capacity, recharge times, different battery chemistries etc. For example, it was only through the trial that we came to know that for one of the buses, the batteries were taking a long time to charge because the charger being used was not of sufficiently high wattage. Day time charging for the buses needs to be fast because you cannot have them grounded for long periods of time during the day.

On the whole, this was a successful pilot, with the buses running on real routes during regular commute hours. The buses were running along with our regular fleet of CNG buses on the same routes and riders or drivers did not know that the runs were being monitored, but we got useful data to help us make decisions.

**Several other Cities have launched e-Buses, but we have not heard of a resounding Success in adoption or Scaling anywhere in the Country; most of these appear to be sporadic Attempts at electric Mobility...what is Delhi doing differently?**

There are two things that make us confident that the move to e-buses will be successful.

To understand the first, we need some context. There are two models on which Indian cities are running electric buses: one is buying the buses and then running and maintaining them, which is termed the Ownership/Capex model. The other is the Gross
Cost Contract/Opex Model, where you let the private party — whoever has won the competitive bidding process — own it, maintain and operate the buses. By and large, the consensus among all experts is to go with the latter in Indian cities.

After all, we are dealing with new technology here; we have to understand battery chemistry and the like. Government officials are not expected to be on top of the technology evolution curve and hence to buy these expensive and sophisticated buses would be a risk.

That brings us to the Opex Model. Now, Delhi has been a pioneer in operating buses under that model, and that is an acknowledged fact throughout India. We have been following it right since 2011, with 1700 of our CNG buses running under this model and the entire contracting process is very mature and advanced.

If you look at the bid documents floated, which specifies how the responsibilities will be divided between the government and the private party, how financing will be done, how the service level agreements are defined and every other minute detail, it runs into hundreds of pages. All of this has been learned over time and it leads to compliance and high-quality output from the private concessionaire. So the 1000 electric buses that will be inducted in Delhi will be managed on the basis of the know how that Delhi has acquired over 8 years in successfully contracting and running buses on the Gross Cost Contract Model.

Secondly, you will find that many of the cities, lured by the FAME I subsidy offered, just went ahead and purchased these buses without enough research and planning, or the required level of technical expertise within the state transport corporations. In fact, I would say FAME I actually proved counterproductive to the successful implementation of electric mobility since the announcement for the first round of subsidies for e-buses was made in December 2017 and cities was asked to complete the tendering and bidding process within just two months if they wished to avail the subsidy. This led many cities to just rush into purchasing buses.

On the contrary, we took almost 8 months to do the entire planning, techno-feasibility assessment, figure out which depots are ready, map out each and every route and the mileage in each, map out the intermediate charging points needed for that and so on. For example, this led us to identify two different needs: parent depots where the buses would be parked overnight, and secondly, what we have termed host depots — where the buses can go for intermittent quick charging during the day whenever needed. All this took us 7 to 8 months of planning — getting permission from DTC for host depots, getting commitments from the discoms in terms of the power infrastructure, identifying land for depots etc. Only after this was done did we go for tendering.

**Speaking of Pollution Control, which is the primary Aim of Electrification of Mobility, and what is the Plan for the older Fleet of Buses?**

In Delhi, we have phased out all old diesel buses, and we have a completely CNG-powered fleet. We are not thinking of junking any CNG buses, because once you have purchased a CNG bus, its average life span is 10-12 years, and CNG is anyway a comparatively much cleaner fuel. We will not put a hard stop to any CNG bus; as and when they come to the end of their lives, we will take a decision on the replacement.

If Delhi sees an effective and successful run of these 1000 electric buses on the roads, we may very well commit that all future purchases of buses in the state will be electric buses. This is also a good time for that, because you see most of our fleet was acquired between 2007 and 2012-13, so that by 2020-21, quite a number of these will start retiring.
So, how do you see these 1000 electric Buses making an Impact on Pollution?

We are looking at urban transport policy as a strategy to combat pollution; to do so, first and foremost we have to put aside all debates — forget electric vs CNG — and strengthen public transport. You need to improve the reliability of public transport, its safety, affordability. Everything else is secondary.

We have a severe shortfall in the number of public buses in Delhi. We are right now at somewhere around 5500 buses while our interim plan is to reach 11000. Beyond that, we want to move to 16000-18000, but that is farther down the line. At present, towards attaining the 11000 goal, the Delhi government has already issued tenders for 1000 standard floor CNG buses and 1000 low-floor CNG buses, in addition to the 1000 electric buses mentioned. So 3000 buses in all are under procurement.

The first objective is to increase the accessibility and reliability of public transport, so that more people can be persuaded to move from private vehicles to these, and secondly, to do so using cleaner and zero-emission fuels.

What do you expect the Cost of the electric Buses to be?

Well, that will be known once the tendering process is complete. But since the buses are anyway going to be run on a Gross Cost Model, what really matters is the per kilometre cost of operating these buses. The bidders will quote a comprehensive amount keeping in mind the capital cost, the cost of maintaining these buses for 10-12 buses, insurance, salaries etc. They will quote an operating cost per kilometre after taking all this into account.

On the other hand, we will have conductors in the bus and whatever is collected in the fare box goes to the Delhi government. The difference between these is the viability gap, which is borne by the government. Currently, Rs 65/km is what the net cost of operation turns out to be for the standard floor CNG buses we are running on the same model. The revenue from the fare box is between Rs 30 and 32/km, so roughly 50% is the viability gap. For a low floor electric bus, the cost would definitely be higher than Rs 65. But it’s difficult to predict; there is intense competition in the EV industry and maybe we could see the costs coming down.

What are the main Challenges that you foresee?

I think it is going to be getting all the government bodies and authorities aligned to the needs. On the technology front, I think we are ready for deployment. Especially after noting the successful experiments in China, technology does not appear to be a constraint. But in any city, and especially in Delhi, we have a problem of too many authorities reporting to different lines.

Let me give you an example. Even for running these 1000 e-buses, these are the various authorities that we’ve had to bring on board. Of course, we need a buy-in from the Delhi Transport Department which is the owner of the project; then there is the DTC which is an independent statutory corporation, but they need to be brought on board because they will provide access to various host depots for day time charging of the buses. Third, we need the power department and discoms to work in sync, so that the power infrastructure can be readied within time and schedule that matches the delivery of buses. Finally, to lay power lines, or get other basic infrastructure in place, you need land — the roads. In Delhi, we
have 11 road-owning agencies! Permissions from all these have to be acquired in time. So I feel the entire challenge of a project as this is internal, hardly external.

**So, do you think setting up a dedicated EV transport Body or Authority would help to overcome this Challenge?**

I don’t think so, really. Setting up another authority to tide over problems created by multiple authorities in the first place would really only add to the mess in my opinion. We could perhaps have an empowered coordinating committee with representation from the bureaucratic heads of all these bodies. But the problem is, thanks to the unfortunate but continuous political tussle between the Delhi government and the Centre and the MCD, you can set up any number of committees but the overriding chances are that they will never show up in the meetings or deliberations.

So yes, it is challenging, but thankfully in this case, especially since there is also an environmental imperative, both the Supreme Court and the High Court are also very active. We are using funds from the Environment Compensation Charge (collected from diesel trucks crossing Delhi), which is a court-monitored fund, to finance the upfront subsidies for these buses. So we can only hope that if there are undue delays on the part of any authority, the courts will step in.

**Infrastructurally, how prepared in Delhi at this Point? Is the City ready enough to have electric Buses plying successfully on the Roads?**

There are two parts to this: there are depots and there is the required power infrastructure. Presently, we have identified two depots which are at a fairly advanced stage of construction and will be ready in the next 3-4 months. The work on the power infrastructure could commence only after we acquired Cabinet approval, so the real work has begun only now. However, we have a commitment from the discomforts, that all of this will be ready within six months. That is also the time — that is six months from the beginning of March — when we expect the first fleet of electric buses to hit Delhi roads.

The interview was taken by Ms. Satarupa Sen Bhattyaachar and first published in *Citizen Matters*.

**PART II: GLOBAL ACTIVITIES FOR URBAN MOBILITY AS A SERVICE**

Light Metro Rail common in German Townships; Germany
**LMR is in German Cities** a predominant public transport mode for Urban Mobility. The LRV or LRT run as well interurban as City Trams at grade, underground as Metro, suburban at grade on dedicated tracks and interurban as Commuter Rail (CR) on Railway Tracks. Forerunners are the cities of Dortmund, Karlsruhe, Rastatt, Bruchsal, Heilbronn, Freudenstadt, Ludwigshafen, Mannheim, Heidelberg, Darmstadt, Cologne, Bonn, Siegburg, Bad Godesberg and Nürnberg. India can learn from those shining samples. The LMR allows commuters a seamless journey from one city center to the other center.
Light Metro Rail in Germany; Line 18 Cologne/Bonn running urban Underground

Light Metro Rail in Germany; Line 18 Cologne/Bonn running urban as City Tram
Testing begins on Paris Tram-Train Extension; France

Jul. 19, 2019
Written by Keith Barrow

DYNAMIC Testing began on the 5 km branch of Paris Tram-Train line T4 from Gargan to Montfermeil on July 15, 2019.

The initial phase of testing is focusing on gauging, power supplies and signalling systems. Two of the 15 Alstom Citadis Dualis tram-trains on order for Line T4 are being used for the initial tests.

Later in the summer testing will be extended over the entire route from Bondy to Montfermeil with up to 11 tram-trains in operation at an average speed of 20 kmph. The new tram trains will also be tested on the existing Bondy – Aulnay-sous-Bois section of Line T4.

From September, tests will be stepped up on the nine-station branch to simulate real operational conditions.

The Gargan – Arboretum section is due to open in December.

Line T4 is operated by French National Railways (SNCF) under a contract with Ile-de-France Mobility.

Driverless Metro Market booming in China; Global, China

06 Feb. 2018 | Railway-News
Ling Fang, the Managing Director of Alstom’s Division in China and East Asia, tells Railway-News how her company is keeping up with the development of driverless metro systems.

Globally, there is a clear trend that more and more megacities are choosing to develop driverless metro lines. Since the first driverless metro line started operations in 1981, there are 55 fully automated metro lines in 37 cities worldwide as of July 2016, totalling 803km. But in 2017 alone, eight cities opened metro lines with Grade of Automation four (GoA4) level, representing 129 km.

This trend is not a coincidence. With the rapid urbanisation rate across the globe, cities, especially megacities, face many challenges, such as a rapidly growing population, increasingly deteriorated traffic congestion and noticeably accelerated pollution. There is an urgent need for efficient, reliable and sustainable public transport systems.

Driverless Metro Systems in China

The high-speed development of urbanisation in China makes the country lead metro growth today. And the driverless metro market is booming as a consequence.

So far, the mainland of China only has three driverless metro lines. They are the Beijing Airport Link, opened in 2008, the Shanghai Line 10, opened in 2010 and the Beijing Yanfang Line, opened in 2017.

Due to the sound performance of driverless metro lines in China and abroad, many cities in China plan to build new metro lines as driverless including but not limited to Beijing, Shanghai, Chengdu, Wuhan, Nanjing and Guangzhou.

Chengdu, Southwest China

Chengdu is located in the southwest of China. As of 2016, it has a population of 15.92 million, ranking no. 4 in China. It aims to be one of centres of the economy, of culture,
technology and foreign exchanges in China, and one of the core connecting cities along the One Belt One Road initiative.

Since its first metro line opened in 2010, Chengdu added six further metro lines, covering 179 km in total by the end of 2017. By 2020, it plans to build seven more metro lines and one tramway line to form an urban railway transport network of 508km.

**Chengdu Line 9** is the first driverless metro line in the city. It will be built in three phases. Phase one will be about 22 km long and have 11 stations. Once it opens at the end of 2020, it will connect the city’s CBD area in the southwest with city’s West Railway station in the northwest.

**Communication Based Train Control, CBTC Signalling Technology**

**Alstom’s Urbalis signalling system** will be supplied to phase one of Chengdu’s Line 9. The same signalling solution has been ordered by 56 metro lines in China, 39 of which have started revenue services. Alstom’s first joint venture in China, CASCO, is in charge of the whole life-cycle management of the Urbalis Communication Based Train Control (CBTC) signalling system in China.

CBTC signalling technology is the preferred signalling solution for driverless metro lines. From 2006 to 2016, 76% of the new fully automated metro infrastructure built was equipped with CBTC.

To operate the full driverless metro line with GoA4, the remote control centre plays a critical role. It manages a train’s motions, stopping at the right place and in the exact scheduled time, opening and closing the train doors; it even manages the operations in the event of disruption or evacuation.

Alstom has provided the CBTC signalling solution for many driverless metro lines in operation around the world, including the Beijing Airport Link, Shanghai Line 10, the Hong Kong South Island Line, the Singapore North East Line and Circle Line, and the Lausanne M2 metro line.

**Alstom to Supply CBTC Train Control and OptONIX Traction System to Nanjing Metro; China**

19 Jul. 2019 | Railway-News

**Nanjing Metro (China)** has chosen Alstom to supply the OptONIX traction systems and CBTC train control and monitoring system for the 318 metro cars, that will operate on the city’s metro line 7. It is Nanjing’s first driverless metro line. Alstom will also provide technical support. In total, the contract is worth almost 50 million euros (56 million USD).
Alstom will equip the Nanjing line with its OptONIX Traction System. Designed especially for China, Alstom reported earlier this month that it was providing the same system to Xian Metro. The two joint ventures involved in the Xian project, SATEE and XAYEECO, will also work on delivering on this order. SATEE will be responsible for the traction systems, while XAYEECO will provide the traction motors.

**Nanjing Metro Line 7**

Nanjing Metro currently has ten lines in total. Once completed, Line 7 will be 35 km long and serve 27 stations, running diagonally from the southwest to the northeast of the city. The metro network development plan envisages Line 7 having interchange stations with 11 other metro lines in the future.

**Olivier Loison, Managing Director of Alstom in China and East Asia, said:**

“This confirms Alstom’s leading role in driverless metros in China. This role stems from the performance of 28 driverless metro projects around the world, including seven in China. Compared to other metro lines, metro lines with unattended train operations can reduced required manpower by 30–70 percent, achieve higher frequency, increase space for passengers, and improve reliability by over 50 percent.”

**Driverless Metros in China**

Nanjing Line 7 is the eighth driverless line in China featuring Alstom solutions. Others can be found in the following cities: Beijing, Shanghai, Hong Kong, Chengdu and Wuhan.
Alstom Contracts for Nanjing Metro

To date, Alstom has supplied 456 metro cars to Lines 1 and 2 of the Nanjing Metro. It also also delivered traction systems for the 534 metro cars running on Lines 4, 10, S1 and S3. Lastly, Alstom was contracted to provide traction overhaul services for Lines 1 and 2.

Transit orientated Developments, TOD; Asian Regions, Global

Mastering sustainable Strategies in creating Destination Developments and liveable Cities through World Class Transit oriented Developments

Cities across the world are racing to cope with rapid uncontrolled urbanisation. As quoted by United Nations, 54% of the world’s population lives in urban areas, a number that is expected to increase to 66% by 2050. This dramatic rise in urban population necessitates reshaping the real estate landscape across the globe through Transit-oriented Developments (TOD).

TOD is a remedy for growing cities in the Asian region which to date have been characterised as unsustainable, car-dependent and transit-poor urban sprawl. TODs are seen as the road to sustainable growth. Cities now see transit as an investment for the future and realise its capability to promote economic development, enhance real estate value and increase favourable labour access. A key aspect that developers need to focus on is creating a TOD that is not just easy to manage but enhances place making and ensures the right balance between transit, residential, retail, commercial and spaces for activities within the area. TODs should enable residents to live, play and work in the same area, making cities liveable. It is also important to integrate walkability in the TOD system. This includes convenient pedestrian connections and accessibility to a variety of transit stations and nearby neighbourhoods. This indirectly helps create sustainable cities. A seamless integration between transit, the surrounding mixed-use development and residential areas are crucial in creating a world class TOD.

Marcus Evans takes great pride in organising our flagship platform “Transit Oriented Developments” large scale conference whereby this conference is specially designed to meet all transit oriented development practitioners’ demands to secure and guarantee their investments. This conference will cover various aspects of urban TOD planning and design as well as innovative development and technologies to maximise efficiency.

Stadler rolls out first Cochabamba Trams for Bolivia; Bolivia, Belarus

17 Jul. 2019, Metro Report
**BOLIVIA:** The first two Metelitsa trams that Stadler is supplying to Cochabamba have left the manufacturer’s factory at Minsk in Belarus.

One of the vehicles is being transported by road to the port of Klaipeda in Lithuania to be shipped to Arica in Chile before continuing its journey by road to Cochabamba.

The other vehicle have been transported to Olsztyn in Poland to carry dynamic tests, as this is the closest 1 435 mm gauge network to Minsk. The tests, which are expected to last around one month, will be carried out with the assistance of the Baltic Test Centre.

In February 2018 Stadler was awarded a contract to supply 12 trams for the Cochabamba project. Work on the vehicles began in October, and nine are currently in production.

The three-section vehicles are 34 m long, 2 500 mm wide and 3·6 m high with capacity for 376 passengers at 8/m².

The Asociación Accidental Tunari consortium of Joca Ingeniería y Construcciones and Molinari Rail is building the US$537m tram project, which would comprise three routes totalling 42·3 km and serving 42 stops.

**Skoda Ostrava Tram Design revealed; Czech Republic**

22 Jul. 2019 Metro Report
CZECH REPUBLIC: Tram operator DP Ostrava has published an artist’s impression of the trams that it has ordered from Škoda Transportation. Styled by Tomáš Chludil, the trams are based on Škoda’s ForCity Smart design.

Last year DP Ostrava selected Škoda to supply 40 trams for KC1·9bn. The two-section low-floor trams will be 26·5 m long with capacity for 200 passengers. They will be equipped with air-conditioning, CCTV, wi-fi and USB sockets. Deliveries are due to begin in September 2020.

Daugavpils Tram delivered; Latvia, Russia
**LATVIA:** PK TS has delivered the first of eight trams that it is supplying to Daugavpils transport operator Daugavpils Satiksme. The City Star vehicle travelled by road from the manufacturer's factory in St Petersburg.

Daugavpils Satiksme signed a €4.1m contract in November with Lithuanian company UAB Railvec, which is partnering with PK TS. Almost 80% of the purchase is covered by EU funds, with the remainder coming from the city budget.

The 100% low-floor single-section trams have a capacity of 119 passengers including 33 seated.

**Seattle light Rail, LRT, Extension Designer selected; USA**

**USA:** Seattle-Tacoma Transport Authority Sound Transit has selected Parsons as lead designer for the Federal Way Link Extension project, the company announced on July 11.

Parsons will work as part of a team led by Kiewit Infrastructure West Company, which was awarded a design-build contract earlier this year. Parsons to provide final design and engineering services during the construction phase.

Due to open in 2024, the Federal Way Link Extension will extend the light rail line south from Angle Lake to Federal Way. The 12.5 km alignment would include a mixture of at-grade and elevated track, and will serve three stops. The total cost of the project is estimated at $1.3bn.
Bogdan Trolleybuses enter service in Kharkiv; Ukraine

22 Jul. 2019; Metro Report

UKRAINE: The first two of 57 trolleybuses that Bogdan is supplying to Kharkiv have started revenue operations in the city.

The 354.5m hryvnia purchase is partly financed through a loan from the European Bank for Reconstruction & Development. The contract includes spare parts and maintenance equipment.

Deliveries of all 57 vehicles from Bogdan’s factory in Lutsk are due by the end of November. Most components are Ukrainian-made; electrical equipment has been supplied by Kharkiv-based Elektrotyzhmash.

The 12 m long T701.17 vehicles are equipped with air-conditioning but not wi-fi, as the city has decided that mobile network coverage along trolleybus routes is sufficient.

Electric Buses presented in Mendoza; Argentina

19 Jul. 2019; Metro Report
ARGENTINA: Mendoza bus and light rail operator STM unveiled 18 battery electric buses on July 11. All are equipped with lithium iron phosphate batteries.

The 12 m long buses include 12 K9 vehicles supplied by Shenzhen-based manufacturer BYD. The other six have been supplied by local manufacturer Corven in partnership with Liaocheng-based Zhong Tong Bus Holding Co. These are equipped with batteries from CATL, while the BYD buses use BYD batteries.

China’s Trackless Autonomous Rail Transit on virtual Track put through its Paces in Doha; worldwide Interest; Qatar, China

24 Jul. 2019 | Railway-News

CRRC’s Trackless Autonomous Rail Rapid Transit (ART) has shown good performance in the hot conditions of Doha, Qatar, after testing began on 17 July 2019.

Launched in June 2017 by CRRC Zhuzhou Institute, the ART system uses onboard sensors to run along a virtual track, which in turn cancels the need to lay real tracks, dramatically reducing construction time and costs compared with other rail transit systems.
Fully Electric and Fast Charging

At around 30 meters long in a three-carriage configuration the system has capacity for 300 passengers and is able to read the dimensions of the road and planning its own route in case detours need to be made in the event of traffic jams.

Powered by electricity using lithium-titanite batteries, the ART train can travel 40 km (25 miles) on a full change and can be recharged at stations en route in 30 seconds or at the end of the line in 10 minutes. The ART train can reach a top speed of 70km/h (43.5 mph)

With low-floor design enabling easy access for those with reduced mobility, the bi-directional vehicle is capable of achieving its top speed in either direction due to driver’s cabs at both ends.

Designed with Safety in Mind

While it is an autonomous system it will run with a driver for safety. However, it has been equipped with a Lane Departure Warning System and a Collision Warning System for support to keep a safe distance from other vehicles on the road.

The Route Change Authorisation analyses the traffic conditions and recommends detours to avoid congestion and keep journeys running to time.

FIFA World Cup 2022

As it is hosting the FIFA Men’s World Cup in 2022, Qatar’s transport ministry will select tenders to upgrade Doha’s transport capacity in time for the competition.

With the country’s hottest months being between July and September where temperatures average 45 C and can hit a maximum of 60 C, the ART will be tested for its power, flexibility, battery performance and air-conditioning in Doha’s high temperatures and humidity.
Worldwide Interest

Now running in Zhuzhou, Hunan province, Yonhxiu, Jaingix province and Yibin, Sichuan province, more than 100 cities across the world have taken an interest in the virtual rail transit system and discussed co-operation.

HS2 unveils Designs for Automated People Mover Feeder, APM, for Birmingham; UK

23 Jul. 2019 | Railway News

On July 16 2019 HS2, UK, revealed the designs for its new automated people mover (APM). The 20 m long driverless people mover will link Birmingham interchange station with a number of new stops. HS2 will present further designs to the public at a number of events throughout July of this year.

HS2 APM Service Route

The APM will provide commuters with faster and more frequent services to Birmingham Airport. The high-speed service from HS2’s new Interchange Station in Solihull will take 6 minutes. Additionally, the service will also run through Birmingham International Railway Station, and the National Exhibition Centre (NEC). Once the people mover is fully up and running it will carry around 2,100 passengers per hour in each direction. The APM will depart from each stop approximately every 3 minutes.

HS2’s Interchange Station will be a key gateway for Solihull and the West Midlands.

Mark Thurston, CEO of HS2 Ltd, said:

HS2 is about connecting the country, and the people mover is another example of how we will do that. This entire area in the West Midlands, and the wider regions across the UK will
be able to capitalise on the connectivity that Birmingham Interchange Station brings and the people mover is an integral part of this.

The high speed connection into Interchange Station opens up the UK Central Hub, the NEC, Birmingham International station and Birmingham Airport to new business and leisure customers who might not have chosen this area previously. With the airport being only 6 minutes from the station, it means better options for air travellers, and makes it more accessible to even more of the UK.

**HS2 APM Infrastructure**

The service route is 2.3 km long across an elevated viaduct which is 12 m tall at its highest point. The 3 stops will be fully accessible and designed using colour to provide clear navigation for passengers. The stops will also be equipped with passenger information display systems and audio announcements with live journey updates.

![Animation: APM Stop at Birmingham Interchange Station © HS2](image)

HS2 and Urban Growth Company (UGC) in Solihull worked together to include extra design elements. These further design elements will allow wider growth plans at the UK Central Hub. This includes adjusting the course of the APM as part of a major redevelopment at Birmingham International Station. The redevelopment will support new multi-modal transport exchange.

**Jonathan Bretherton, Managing Director of the Urban Growth Company, said:**

The APM will be a vital and exciting link, connecting HS2 and the Arden Cross site to the NEC and Birmingham Airport, making the whole area easily navigable for those choosing to live, work or play here. Our work to coordinate the views of local stakeholders will continue to ensure that the final APM design fully supports the economic growth we are predicting here.

In particular, our planned redevelopment of Birmingham International Station to accommodate a realigned APM, will make sure the Interchange Station is fully connected to the local and regional transport network.
HS2 Future Plans

HS2 have not yet decided the exact system which will be used to operate the APM. However, HS2 will maintain the systems in a specialised maintenance facility. The facility will be located along the viaduct on the eastern side of the M42 crossing.

HS2 is currently working to finalise the scheme design of the driverless people mover. The design showings will take place at a series of events in partnership with the UGC in Autumn 2019. Consequently, HS2 will submit an application to Solihull Metropolitan Borough Council seeking approval of matters related to design of the People Mover as required within the HS2 Act.
METRO NEWSLETTERS

on

“URBAN MOBILITY AS A SERVICE”

PUBLIC MULTIMODAL URBAN, SUBURBAN AND INTERURBAN PASSENGER TRANSIT SYSTEMS WITH METRO-BUS, LIGHT-RAIL, TRAM-TRAIN, METRO-RAIL, METRO-TRAIN, REGIONAL RAPID TRANSIT, COMMUTER-RAIL, ROPE-WAY/TRAIN, MAGLEV AND HOVERCRAFT TRANSIT/PEOPLE MOVER, WATER-METRO, AUTONOMOUS PEOPLE-MOVER

MOBILITY SOLUTION, TRANSPORTATION AND ECONOMIC DEVELOPMENTS IN MODERN URBAN/MEGAPOLIS ENVIRONMENT

METRO Newsletter by Dr. F.A. Wingler
METRO 82, August 2019

Animation for Nasik’s “METRO NEO” Rubber tired electric Light Vehicle Project on dedicated Corridor
PART I: INDIAN ACTIVITIES AND INITIATIVES FOR URBAN MOBILITY AS A SERVICE

INTEGRATED MULTI-MODAL TRANSPORT IN INDIA; India

(PDF) INTEGRATED MULTI-MODAL TRANSPORTATION IN INDIA
https://www.researchgate.net/.../276160317_INTEGRATED_MULTI-MODAL_TRA...
May 12, 2015 - INTEGRATED MULTI-MODAL TRANSPORTATION IN INDIA .... Integrated Multi Modal Transport System (IMMTS) comprises of one trip that.

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Nand Kumar
Abstract

With escalating chaotic situation of public transport and with demands caused by rapid urbanisation in India, innovative multimodal solutions and methods are being evolved and borrowed from other countries.

Chaos rules the Traffic in Mumbai

Over the last decade numerous Mass Rapid Transit Systems have come up in various cities like Metro Rail, Bus Rapid Transits and Monorails. The interlinking of these various public transport modes and various other modes is now the important issue from the user point of view.

Key Words: Multi-Modal, Sustainability, Integrated Transport, Integrated Multi Modal Transport System (IMMTS), India

Integrated Multi-Modal Transport in India

1. INTRODUCTION

In the contemporary era, majority of the Indian cities are characterized as urban areas having:

- higher densities;
- organically developed (improper land use control);
- lack of adequate physical and social infrastructure;
- especially transport infrastructure, where there is lack of proper roads and parking facilities;
- poor public transport, lack of road-user discipline, etc.

Urban transport systems in most Indian cities are under heavy strain, and have negatively affected the quality of life of urban population (Verma 2010). Facilities of mass transit in
the cities are utterly insufficient for providing fast, comfortable and convenient travel. This has resulted in heavy shift of commuter patronage from mass transit to private or personal transport, and as a consequence there is huge increase in personal vehicle ownership. The resultant effects are, increased traffic congestion and transport-borne pollution, heavy fuel consumption, poor level of service to the commuters, etc. Still, million plus cities generates more travel demands, which is not fully met by private modes of transport, as a consequence mass rapid transit system becomes mandatory for such cities, to provide better, advanced, efficient and quality transit services. Many steps are being taken by the Indian Government to promote sustainable urban transport. There are seven cities with populations in excess of 4 million. In 2019 over 300 km of Metro Rail is operating in Delhi with another 250 km of Metro Rail under construction in the first five cities. Two other cities are actively planning their rail transits. In addition, 11 cities are introducing **Bus Rapid Transit Systems**, while two more cities have them in the planning stage (Singhal, 2010).

Nevertheless, the efficiency and effectiveness of mass transits rely on accessibility of various modes in the city, design and availability of routes, incoming flow of pedestrians at station, frequency of service, etc. Transport infrastructure development, traffic management, intelligent transport technologies, the use of green and renewable fuels, higher traffic speed, less operation costs, maximum utilization of public transport, less congestion and accidents on road, easy and safe movement of pedestrian, etc. are the key parameters for sustainability of public transport facilities. In levy to suffice the never ending needs of urban commuters, authorities try to combine two or more public transport modes, to achieve easy and uninterrupted travel in the cities. The resultant process, which has evolved out of this, is **Integrated Multi Modal Transport System (IMMTS)**, that involves coordinated use of different modes and its integration to fight against road congestion, longer journey time and air pollution.

### 2. INTEGRATED MULTI MODAL TRANSPORT SYSTEM?

**Integrated Multi Modal Transport System (IMMTS)** comprises of one trip, that involves two or more than two different modes of transportation like bus, metro, car, tram, etc. - either government or privately operated - where in-between passengers have to transfer in to other mode. Some modes of transport have always been depended on other modes.

Urban Bus systems generally serve train and subway stations and often extends to local airports. A major goal of integrated multi-modal transport system in developed countries is to reduce dependence on the automobile as a major mode of ground transport and increase use of public transport. In the developing countries a variety of modes of transport are used. Changing Spectrum of Human Settlements and Planning Education ISBN 978-93-5053-361-1.

When these modes are run on the same track, the efficiency is lost over the period of time and by increase in number of vehicles. The system can otherwise help improve the efficiency if managed properly, where local bodies have defined tracks for them (Buchari 2008). This multi modal system can be helpful for the cities which have a fast rate of urbanisation and higher population densities. The main aim of IMMTS is to promote public transport in urban areas. A coordinated integration of different modes brings about reduced congestion on the road, greater convenience for commuters, efficiency and cost effectiveness. Key elements of IMMTS can be identified as:

- Transport infrastructure, on top of which transport modes operate;
- Modes of transport;
• Network representing different modes, routes and paths;
• Multi modal Trips: This is the use of people for these modes with different combinations;
• Transfer points allowing people to change from one mode to another.

In other words, **multi modal transport planning** refers to decision making, that considers various modes, such as, walking, cycling, automobiles, public transit, etc., and connections among modes so that each can play its optimal role in the overall transport system (Litman 2012). In this context, a multi **modal transport system is an integrated approach**, that incorporates all components of urban transport into a single system for efficient use of available transport resources and infrastructure for better mobility within a wide range of modal options for the commuters.

### The Various Characteristics of IMMTS are as follows (Kumar, 2009):

- Journey involving more than one mode of transportation.
- For various possibilities, use of different modes of transport is accepted.
- The policy generally does not fixate on one single mode.
- Development of seamless web of integrated transport chains, linking road, rail and water ways.
- Competition between transporters instead of between transport modes.
- Transfer node and smooth interchange flow.
- Seamless travel an important characteristic.

With the comprehensive objectives to ensure safe, affordable, quick, comfortable, reliable and sustainable access for the growing number of city residents to jobs, education, recreation and such other needs within cities; the Ministry of Urban Development, Govt. of India, formulated National Urban Transport Policy in 2006. As one of the techniques to achieve such objectives is to, “enabling the establishment of quality focused **MULTI MODAL PUBLIC TRANSPORT SYSTEMS**, are well integrated, providing seamless travel across modes”.

### 3. URBAN MULTI-MODAL COMMUTING

Public transportation systems such as train or metro systems have the most efficient means and highest capacity to transport people around cities. Therefore, multi-**modal commuting in the urban environment** is largely dedicated to first getting people onto the train network and once off the train network, to their final destination and its associated modes of transportation, consisting the integration of multiple modes. The following are the types of mixed modes approaches observed in various countries (Hine 2003):

**Integrated multimodal Transport in India**
3.1 Automobile to public Transport Modes

Automobiles are predominantly and conventionally popular as a single-mode form of transit, although, they also are accepted in various multi-modal scenarios. They can provide a short commute to train stations, airports, and bus stations, where all-day "park-and-ride" spaces are available. Cars offer commuters the relative comfort of single-mode travel, while it significantly reduces the financial and environmental costs.

3.2 Bus to public Transport Modes

Many large cities link their railway network to their bus network. This enables commuters to get to places that are not serviced directly by rail, which are often considered to be far compared to comfortable walking distance. Feeder buses are a specific example of this.

Feeder buses work best when they are scheduled according to the railway timings. Feeder buses are very successful in servicing customers' needs which helps to increase ridership patronage and therefore also improves the operating income.

3.3 Cycling to public Transport Modes: “Bike-and-Ride”

All around the world bicycles are used to get to and from train and other public transport stations, which is often called "Bike-and-Ride". Due to the threat of theft or vandalism of bicycles left at these stations, "bike and ride" transport benefits greatly from secure bicycle parking facilities. Some train/bus/ferry systems allow commuters to take their bicycles on-board, which allows cyclists to ride at both ends of the commute. In some cities a public bicycle rental programme has been implemented which allows travellers to get to and from a train station.

3.4 Transfer Facilities
In recent years, an increasing emphasis has been placed on designing facilities, that makes such transfers easier and more seamless. These are intended to help passengers move from one mode of transportation to another for example, an intermodal station may service air, rail, and highway transportation for example.

4. INTEGRATED MULTI-MODAL TRANSPORTATION CASE STUDY: DELHI

Delhi has significant dependence on its transport infrastructure. The city has a highly efficient public transport system with the introduction of the Delhi Metro. There are 5.5 million registered vehicles in the city, which is the highest in the world among all cities, while the Delhi NCR has 11.2 million vehicles. Delhi and NCR lose nearly 42 crore (420 million) man-hours every month while commuting between home and office through public transport, due to the traffic congestion. Therefore, serious efforts, including a number of transport infrastructure projects, are under way to encourage usage of public transport in the city. At 1749 km of road length per 100 km², Delhi has one of the highest road densities in India. Major roadways include the Ring Road and the Outer Ring Road, which had a traffic density of 110,000 vehicles per day in 2001. Total road length of Delhi was 28,508 km including 388 km of National Highways. Major road-based public transport facilities in Delhi are provided by DTC buses, auto-rickshaws, taxis and cycle-rickshaws.

Fig. 2: Public Transportation Modes of Delhi namely, DTC Buses; BRT Buses; Auto Rickshaw; Pedal Rickshaw; Metro and Ring Rail

Rapid increase of population coupled with large-scale immigration due to high economic growth has resulted in ever increasing demand for better transport, putting excessive pressure on the city's existent transport infrastructure. Like many other cities in the developing world, the city faces acute transport management problems leading to air pollution, congestion and resultant loss of productivity. In order to meet the transportation demand in Delhi, the State and Union government started the construction of an ambitious Mass Rapid Transit System, known as Delhi Metro in 1998. The project started commercial operations on December 24, 2002. It has set many performance and efficiency standards ever since and is continuously expanding at a very rapid pace. As of 2010, the metro operates 5 lines with a total length of 190 km and 132 stations while several other lines are under construction. Ring railway is a circular rail network in Delhi, which runs parallel to the Ring Road and was conceived during the Asian Games of 1982. The system is not popular amongst people, and it is a total failure as far as public
Transportation is considered. The major reasons for failure of the system are lack of proper connectivity, less population density in areas of reach. The network is now utilized as a freight corridor and limited passenger train services are available during peak hours.

**Delhi Integrated Multi-Modal Transit System Ltd.:** With all various modes, and its complications and chaos, there was a need for a managing and implementation agency, which was sought in form of Delhi Integrated Multi-Modal Transit System (DIMTS) Ltd. It is an urban transport and infrastructure development company. DIMTS came into being in April 2006. In July 2007 it became an equal equity joint venture company between the Government of National Capital Territory of Delhi (GNCTD) and the IDFC Foundation. DIMTS provide the concept to commissioning as well as operations, management and maintenance services, in the following areas:

- Urban Transport Planning; Project Management,
- Engineering Design and Construction Management,
- Financial Modelling,
- Public Transport Concession Management,
- Operations and Facilities Management,
- Information Technology and e-Enablement.

Transportation is the common theme behind these various areas of concerns.

5. **ASSESSMENT**

- Multi-modal commuting combines the benefits of walking, bicycle commuting, or driving with the benefits of rapid transit while balancing some of the major disadvantages of each individual mode.

- Location plays a large role in multi-modal commuting. When the commuter finds the distance between the origin and the destination too far to be enjoyable or practical, commute by car or motorcycle to the station may remain practical, as long as last mile connectivity to destination is practical by walking, a bicycle, or shuttle/feeder bus.

- In general, locations close to major transit station have higher land value and thus have higher costs of rent or purchase. A commuter can choose to live near or far according to the last mile connection availability like by walking, a bicycle, or shuttle/feeder bus, and also the rent or purchase affordability in the vicinity of that particular transit station.

- Other cost advantages of multi-modal commuting include lower fuel and maintenance costs; and increased automobile life. These cost benefits are balanced by costs of transit, which can vary in different cases.

- The effectiveness of a multi-modal commute can be measured in many ways: Speed to destination, convenience, security, environmental impact, and proximity to mass transit. Because multi-modal commutes rely on a certain degree of coordination, scheduling issues with mass transit can often be an issue. For example, a sometimes-late train can be an annoyance, and an often-late train can make a commute impractical.

- Weather can also be a factor. Even when the use of an automobile is involved, the Transition from one mode of transportation to another, often exposes
commuters to the adverse weather. As a result, multi-mode commuters often travel prepared for extreme weather conditions.

- In Indian context it is very important to integrate all various modes of transport like bus feeder services, bicycle, rickshaw, etc. with rapid transit system. It is equally important to integrate non-motorized modes (pedestrian, cycles, rickshaws, etc.) to mass rapid transits.

- It is also important that utilisation of IMMTS to its maximum capacity, depends on mobility of non-motorized vehicles and intermediate para transits.

- For IMMTS the interchanges and seamless travel are significant components of an integrated transport strategy, as these are a part of infrastructure which involves multi-modal activities.

- The biggest challenge for Indian cities would be to achieve the highest level of integration of multiple modes to shift the captive ridership of personalized transport to at least partial usage of public transport for mixed-mode travel.

6. CONCLUSION

In India, with increasing number of middle class, the personalized vehicles have also increased in many folds in last decade, which further has causes deterioration in traffic and environmental conditions. This has generated implacable need to shift mode of travel from car to walk/cycle for short journey and to public transport for long journey. Integrated multi-modal urban transportation is a step ahead to achieve this goal. IMMTS is a promising area of research and development, for near future, as well as for scientific and practical implementation of adequate infrastructure; as most of the Indian cities are pacing up for improving the transport infrastructure by carrying out various transportation projects. The case of Delhi Integrated Multi-Modal Transit System is the precursor to upcoming developments for appropriate integration of various modes of transportation in highly dense urban areas of India. The biggest challenge for Indian cities would be to achieve the highest level of integration of multiple modes to shift the captive ridership of personalized transport to at least partial usage of public transport for mixed-mode travel.

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**Government Report bats for multimodal Transport Integration; India**
Efficient, easy: People line up to buy Tickets at Seoul Railway Station.

UDD team studies public transport systems in Seoul, Singapore during World Bank-funded trip.

Mumbai: The city’s multiple modes of public transport, including suburban railway, buses, Metro Railway, Monorail and taxis, should be run by a single authority to ensure efficiency, says a report by the State Urban Development Department (UDD). It should be accessible to commuters via a single contactless card, the UDD report said.

The report proposing multimodal integration of public transport was put together by a team of UDD officers based on their study of transport systems in Singapore and the South Korean capital, Seoul. The team had visited these cities on a World Bank-funded tour to study urban transport initiatives. The Leaders in Urban Transport and Planning (LUTP-6) study tour, held from March 4-10, was organised by the Ahmedabad-based CEPT University, Union Ministry of Housing and Urban Affairs and the World Bank.

Among the 20 suggestions in the report is one which seeks the Metro and suburban railway network be equipped with buses for first- and last-mile connectivity. It also proposed a contactless card fare system, calculated on the basis of distance covered and not the mode used. This card should be used for all public transport, including taxis, the report said.

Other suggestions included giving passengers the option to convert credit and debit cards to multi-utility cards for use in public transport, promoting sharing bicycles at CST and Churchgate stations, covered walkways, a command and control centre for traffic management, major government investment in municipal bus transport in the Mumbai
Metropolitan Region and dedicated bus lanes on major thoroughfares in metro cities. It also called for the system to be convenient for the differently-abled.

**Parking Policy**

The report proposed that Mumbai Port Trust land be used for parking lots, and the city’s central business district should be accessible only by public transport. It has also advocated scrapping of private vehicles every 10 years.

It sought a comprehensive parking policy with higher charges, more penalties and use of parking spaces available with housing societies, malls, hotels and hospitals. It called for centralised information on area-wise parking, and for honking to be made a penal offence. To reduce vehicle numbers, it suggested congestion charges and entitlement certificates. The report said: “It is worthwhile to note that both countries faced similar problems as India faces today. However, these countries have through innovation, discipline and use of cutting-edge technology improved the urban transport scenario by making it accessible, affordable and acceptable. These countries have been successful in removing the stigma from public transport.”

**Urban Mobility: The Need and Future in India; India**

Published: July 13, 2019 12:48:30 AM

*As a developing nation, India cannot afford such huge investments and needs to shift from car-dependency to public transport.*

![Representational Image: At the same Time, electric Vehicles are going to be a high Priority on the Government’s Agenda, going forward](image)

By Greg Moran; Financial Express

*India’s rapid urbanisation has beleaguered its mobility.* Owing to a hike in population and income levels, India now demands 8X more transportation facilities than compared to 1980, as per World Bank database. However, high demand poses more significant threats
to the nation’s infrastructure, which hasn’t observed a similar growth rate. Let us explore the predicaments and opportunities in India’s urban mobility landscape.

The Challenge

India grapples with a host of mobility-related challenges like pollution and traffic congestion. As per a WHO study, 14 out of top-15 most-polluted cities in the world are in India. Rising pollution levels also translate into economic losses. As per current estimates the World Bank, the losses amount to 7.7% of the nation’s GDP. Indian cities are also notoriously famous for traffic congestion. As per industry reports, vehicles in some metros move at an average speed of 17 kmph. The congestion on the roads doesn’t exist in silos, and its adverse effects are carried forward to productivity and economic growth. As per the BCG-Uber report, the combined estimate of losses caused due to congestion in the top-four metro cities of India is worth more than $22 billion per annum.

The Future Perspective

For India to unlock the next wave of growth, it is essential to ramp up and optimise mobility services. The focus has to be on promoting green, clean mobility. A chief contributor to the increasing congestion on the roads is private ownership of cars. A BCG-Uber report revealed the asset utilisation of private cars to a mere 5%. These vehicles not only have low asset utilisation, but also take up a lot of space on the roads.

Besides, promoting public transport and shared mobility also has an impact on a nation’s investment in transportation. Let’s take the example of Copenhagen and Houston. While Copenhagen follows a pragmatic mix of public transport and bike lanes, Houston is heavily car-dependent. Consequently, Copenhagen spends about 7% of its GDP on transportation, while the same for Houston is 17%.

As a developing nation, India cannot afford such huge investments and needs to shift from car-dependency to public transport. For this, we need to make shared mobility solutions and public transportation systems easily accessible and safe.

At the same time, electric vehicles are going to be a high priority on the government’s agenda, going forward. Propelled by the EV30@30 scenario, India holds the potential of achieving 25% of market share for EVs. Several automotive players are bolstering indigenous manufacturing of EVs. On the part of the government, favourable policies for manufacturers and promoters of EV will go a long way in pushing the adoption. And shared mobility services are going to play a crucial role in enabling the adoption without the hassles of complete ownership.

In a nutshell, exciting times stay ahead for India’s urban mobility, ones that will be marked with greener and cleaner modes of commute. These mediums will be convenient to access by the public and secure, even for the fringes of the demographic, including women, children and the elderly.

Chinese Company China Railway Construction Heavy Industry, CRCHI, to
supply Tunnel Boring Machines for Phase 2 of Namma Metro, Bangalore; India

Bengaluru (Urban Transport News): China will play role in putting in place the infrastructure for phase 2 of Namma Metro. The contract to supply four Tunnel Boring Machines (TBMs) for the underground section from Vellara junction to Pottery Town is all set to be given to China Railway Construction Heavy Industry Corporation Limited (CRCHI). Bangalore Metro Phase 2 will mark the debut of a Chinese firm “CRCHI is a global name in TBMs and make nearly 300 of them annually”.

According to sources, a few spare parts are also being purchased along with the TBMs so that any problem can be set right immediately without waiting for them to arrive from abroad. Explaining the proposed tunneling plan as of now, another source said that the stretch has five stations -Vellara junction, MG Road, Shivaji Nagar, Bamboo Bazaar and Pottery Town. The machines will carry out boring work from one end to its first point, from Vellara junction to MG Road. The machines will then be dismantled and brought to the surface so that the MG Road station can be put in place.

A similar process will be carried out from the other end from Pottery Town towards Bamboo Bazaar. After each station, a vertical shaft will be created to bring the machine up to the ground level. While contractors for Chennai Metro and Jaipur Metro have carried out underground tunneling for the entire stretch, it will be done only in phases for Bangalore Metro Rail Project.
Bangalore Metro Phase II

Bangalore Metro Phase 2 spans a length of 72 km. Out of 13.79 km will be underground, 0.48 km at grade and 57.825 km elevated. This line will add total 62 stations to its network. Of which 12 will be underground.

About CRCHI

China Railway Construction Heavy Industry Co. Ltd., founded in 2007 (CRCHI), is a member of Fortune Global 500 China Railway Construction Corporation (CRCC). The company has developed numbers of world class core technologies with independent intellectual property rights and shaped the three production sections: tunnel boring machine, specialized tunneling equipment and rail track equipment.

CCRS conducts Fire Safety Inspection of Kolkata East-West Metro Project; India

By Urban Transport News
26/07/2019

Kolkata East West Metro

Kolkata (Urban Transport News): The Chief Commissioner of Railway Safety (CCRS) carried out safety inspection of the much awaited Kolkata East-West Metro on Tuesday. It has been found that two of the six stations on the first 5 km Sector V – Salt Lake Stadium stretch have not yet been received fire safety approval from the concern department.

In absence of fire safety approval, CRS may not grant the safety clearance to start commercial run on the stretch inspected. However, before one day before safety inspection started by CRS, Kolkata Metro Rail Corporation (KMRC) officials met fire department officers, urging them all over again for the fire safety clearances for all the six stations, but they fail to receive the same.

It is now expected that CRS may grant approval for the only 3.5 km stretch for commencement of commercial run of Kolkata Metro. If metro services started on this
stretch, the train will run up to City Centre station as the two stations ahead Bengal Chemical and Salt Lake Stadium don’t have the mandatory fire safety clearance.

On non-issuance of fire safety clearance, Jag Mohan, Director General (fire and emergency services) said,

We will take a decision, according to the law. Many issues need to be resolved first. We take decisions if there is non-compliance. There have been so many fire incidents, we must be doubly careful.

After a fire safety inspection of Kolkata East-West Metro inspection carried out by the fire department team on June 14, the team refused to issue no objection certificates (NOC) for the two metro stations – Bengal Chemical and Salt Lake Stadium stations, citing the absence of their third fire exits shown in the original plan of the station buildings.

Later, the team found that shanties and a Trinamool Congress party office at Duttabad occupied the stretch where the third fire exits for the station buildings were supposed to be built.

RITES prepares comprehensive public transport platform plan with Light Metro Rail, Ropeway, Waterway Metro and Road Transport for Varanasi; India

By Urban Transport News
26/07/

Animation: Light Metro Rail for Varanasi and dedicated Bicycle Lane

Varanasi (Urban Transport News): Railway consultancy firm Rail India Technical and Economic Services (RITES) has prepared a comprehensive public transport platform plan for Varanasi to redress the biggest problem of traffic jams. Based on the survey report, the proposed plan will cost about five thousand crores. After presentation to the Secretary of
Union Urban Development Ministry, it will be sent to the government. Secretary’s visit to Varanasi in August is proposed.

In the second term of Prime Minister Narendra Modi, there is complete focus on the release of Varanasi from the traffic jams. In order to redress the issue, the RITES has proposed for the **light metro, ropeway, waterways and road transport** under the public transport platform plan for Varanasi.

According to the reports, the city’s traffic will be divided into four parts. In it, it is proposed to run a **light metro rail** for 13 km from BHEL on Babatpur road to Lanka. It will connect BHEL to Lanka via Ardali Bazar, Nadesar, Maldahiya, Sigra, Bhelupur and will have 13 stations.

In the plans of the RITES, the old town i.e. the Panch Mahal areas have also been added. Under this, the old city will be interconnected with a 16-km long ropeway. Similarly, electric buses will be operated on the wide streets of the city and Ferries service will be started from the Pashchim Ghats to eighty **waterways**. On the lines of the proposed **inter-modal station** at Kashi railway station, four stations will be interconnected in new traffic arrangements.

Varanasi divisional commissioner Deepak Agarwal told that the RITES presented the plan. RITES is expected that the Public Transport Platform plan will be funded by the Ministry of Housing & Urban Affairs. The cost of the project is estimated to Rs. 5,000 crore. After some further improvement, the plan will be presented to the secretary of the Urban Development Ministry coming to Varanasi next month. After this, the Detail Project Report (DPR) will be sent to the Central Government for approval.

In the proposal of **RITES**, the priority has been given to construct a **Transport Hub** at the Khirkiya ghat near the Rajghat bridge under the Comprehensive Mobility Plan. The proposed Transport Hub is connected to Varanasi-Chandauli GT Road, Outer Ring Road Phase-3 and the main road to the city which is being developed as main centre for ferry services under Haldia Ganga Water Transportation. Kashi railway station is located at a distance. The route of Rajghat has also been fixed to start the Ropeway service. In the country, Varanasi will be the first city in the country which have its own **transport hub**, where the introduction of the Ropeway as the public transport will be started.

**Maha Metro to submit soon to State Government DPR of Nashik Metro “NEO” Project with Rubber-tyred AC electric Coaches on dedicated and elevated Corridors; India**

By **Vinod Shah**; Urban Transport News 25/07/2019
Nashik (Urban Transport News): The Maharashtra Metro Rail Corporation (Maha Metro) on Monday shared an information on the current progress of light metro project in the Nashik. The Nashik light metro project would be known as “Metro Neo”.

Brijesh Dixit, Managing Director of Maha Metro said that the preparation of the detailed project report (DPR) is in the final stages and it would be submitted to the state government by end of this month. After getting a nod from the Maharashtra state cabinet, it would be sent to the Central government for approval.

**Project Cost and Funding Pattern**

According to the detailed project report (DPR), the total cost of Nashik Light Metro project (Metro Neo) has been estimated between Rs 1,800 crore – Rs 2,000 crore. Out of the total project cost, 40% would be equally borne by the state government and central government. The remaining 60% fund would be raised through borrowings from the external financial institution as a soft loan.

**Also Read: Maha Metro submits feasibility Report of Nashik Metro Rail Project**

Dixit said that they are expecting the light metro project works to kick-start in the next few months and it will take around four years to complete. However, Nashik Municipal Corporation (NMC) would not have to bear any financial cost, except for leasing out its land for the bus depots on a long-term basis.

**Proposed Depots**

There is three depots has been planned to develop bus operation and maintenance, which will be located at the starting and end points of the routes.
Two bus depots will be developed near the Nashik Road railway station on a plot belonging to the Nashik municipal corporation which will cover area around 4.25 acres and 5.68 acres respectively. The third bus depot will be developed in 4.80 acres area in Gangapur.

**Rolling Stock**

Covering a distance of 32-km, the rubber-tyred AC electric coaches with a capacity to carry around 300 passengers will run on two elevated corridors. In addition to the two elevated corridors, covering a distance of 24 km, the battery-powered feeder buses will also run on two feeder routes. The both type of transport systems will cover almost 90% of the city.

The total cost of the rubber-tyred AC electric coaches would be around Rs 1.5 crore each. However, the cost of battery powered feeder buses would be around Rs.50 lakh due to the higher cost of battery.

**Charging Infrastructure**

According to Dixit, there will be sufficient charging stations will be installed on the routes, as feeder buses will run on overhead traction on the light metro project. However, there is no need for large batteries, hence the project will be cost effective.

The fare would be kept reasonable for the convenience of the common people.

**Aarvee Associates bags Order for Preparation of detailed Project Report for Right-of-Way elevated Bus Rapid Transit, BRT; India**

By Urban Transport News
26/07/2019
Hyderabad (Urban Transport News): Hyderabad based consultancy firm Aarvee Associates was awarded the contract for preparation of detailed project report (DPR) for Elevated Bus Rapid Transit System (EBRTS) project in Hyderabad city.

The Hyderabad elevated BRTS corridor is estimated to Rs.2,400 crore which will start from Kukatpally Housing Board (KPHB) to Financial District in Gachibowli.

Hyderabad Metro Rail Limited (HMRL) managing director NVS Reddy said that Aarvee Associates was awarded the work for preparation of DPR (detailed project report) at its quoted rate of Rs 106 lakh while the Indian Railways consultancy firm RITES has quoted Rs.129 lakh.

He further said that the firm has to submit the detailed project report for the elevated Bus Rapid Transit System (BRTS) project within three months, which includes alignment fixation, location of stations, traffic studies and ridership estimation, soil investigation, social and environmental impact assessment and financial model.

Only two firms namely RITES and Aarvee Associates were participated in the tenders called by Hyderabad Airport Metro Limited (HAML) for preparation of the detailed project report (DPR) for elevated Bus Rapid Transit System (BRTS) project.

After technical evaluation of the bid submitted by the firms, both were found qualified. Their financial bids were opened on Wednesday and Aarvee Associates found as lowest price bidder. Finally the work contract for the preparation of DPR has been awarded to Aarvee Associates.

The elevated BRTS corridor mostly runs along the KPHB Metro Station – KPHB Hitec City Road – Malaysian Township junction – Hitec City MMTS Station – Hitex – Hitec City Phase-II – Mindspace – IIIT – Financial District Road – Financial District. The preferred alignment is proposed to be well integrated with major public transport systems as follows:
1. KPHB Metro Station, HMRL Metro Line-1 (Existing).
2. Hitec City MMTS Railway Station (Existing).
3. Mindspace Metro Station, HMRL (Corridor-3 Upcoming).
4. Hyderabad Airport Metro Rail Link at Raidurg (Proposed).
5. Hyderabad Metro (Phase-2) at its junction with Gachibowli – Miyapur Road (Proposed).

The proposed corridor will be fully elevated of 17 km long with stations located at a spacing of around 500 to 600 m for easy accessibility. It shall have depots in at-grade position both at terminals and one in between for operational convenience and non-fare revenue generation.

**RRTS Terminal as an Integrated Transport Hub; India**

National Capital Region Transport Corporation (NCRTC), which is executing the RRTS project, has engaged a design consultant to prepare an integrated plan for the entire Sarai Kale Khan Transport Hub.

By Kanika Verma, Metro Rail News
29/07/2019
NEW DELHI (Metro Rail News): When the mega terminal catering to three Regional Rapid Transit System (RRTS) corridors comes up at Sarai Kale Khan in a few years, it will not be a standalone facility but a station that will be a part of an integrated transport hub.

National Capital Region Transport Corporation (NCRTC), which is executing the RRTS project, has engaged a design consultant to prepare an integrated plan for the entire Sarai Kale Khan transport hub.

The RRTS terminal will be quite close to the existing Inter-State Bus Terminal, Delhi Metro’s Hazrat Nizamuddin station and the Hazrat Nizamuddin railway station. During the construction of the terminal, the transport body will also undertake the renovation of Sarai Kale Khan ISBT.

An NCRTC official said that the revamp will include creating a scientific bus flow inside the ISBT, creation of pedestrian plazas, landscaping, etc. “Passenger movement between the two facilities will be completely seamless by implementing the traffic flow plan,” he said.
“The consultant has begun the design work”. “Once the integrated plan is ready, we will discuss it with all the stakeholders before its implementation,” the official added.

The RRTS terminal has been a bone of contention as the Delhi Government had last year objected to the construction of an elevated structure, which, it had said, will obstruct the proposed renovation of the Sarai Kale Khan ISBT.

The government, however, gave in-principle approval for the terminal after NCRTC agreed to prepare the revamp plan and also carry out the renovation along with the construction of the RRTS terminal.

The Sarai Kale Khan RRTS station will be spread over an area that is 50 meters wide and 300 meters long. The station is proposed to be spacious taking into account that three RRTS corridors are going to converge here. All the three corridors begin from Sarai Kale Khan and connect Delhi to Ghaziabad-Meerut, Sonipat-Panipat, and Gurgaon-Rewari-Alwar. “A total of six tracks will converge at Sarai Kale Khan,” the official said.

Railways to revamp Surat Railway Station as Multi Modal Transit Hub; India

The tender for the work has already been floated and the bids will be opened on August 14.

By Sheen Kachroo; Urban Transport News
01/08/2019
**Surat (Urban Transport News):** The Indian Railways is all set to revamp the Surat railway station as a new **multi-modal transit hub** for the city. This plan will provide seamless connectivity to the people.

In the project, the Surat railway station will have bus terminals, **Metro Rail Connectivity** and auto-rickshaw stands to facilitate the passengers. In an interview, Ravindra Bhaskar, chief public relation officer of the Western Railways (WR) said that they have decided to redevelop the Surat railway station and it will be converted into a **multi-modal transportation hub** (MMTH). The tender for the work has already been floated and the bids will be opened on August 14, 2019.

According to the officials, the estimated cost of the project is Rs 1,173 crore. This will built over 3.40 lakh sq meters of land pooled from Railways, the Gujarat State Road Transport Corporation (GSRTC) and Surat Municipal Corporation (SMC).

For implementation of the project, a special purpose vehicle (SPV) named ‘Surat Integrated Transportation Company (SITCO)’ has been formed by the Indian Railway Stations Development Corporation (IRSDC), Gujarat State Road Transport Corporation (GSRTC) and Surat Municipal Corporation (SMC).

**Explaining about the Project Bhaskar said,**

This is a first of its kind project in India, bringing together the Centre, the state and a municipal corporation. The station makeover will be done via commercial development on leasehold rights for a lease period of 90 years on the vacant railway land and air space.

It has been expected that the hub will cater to nearly four lakh passengers per day by 2033 and approximately 5.25 lakh passengers per day by 2053.

The built-up area of the station is approximately 36,950 sqm and after the renovation, it will be around 1.01 sqm.

Under this project, the station building will be constructed on at least 55,374 sqm. The platforms will have granite flooring while the existing subway and ground floor of the complex will be used for parcel services. **Skywalk Connectivity** will be provided between the railway station, 90 escalators and 30 elevators will be built in the multi-modal transport hub.

Surat is known for its diamond industry and for its textile market. Over 150 passenger trains pass through the Surat railway station.

**Indore Metro Rail to have a 4.5 km underground Stretch; India**

The corporation had planned to run metro rail only in around 2 km area between Bada Ganapati square to the railway station via Rajwada as it is densely populated and there’s less space for constructing elevated tracks and stations.

By **Kanika Verma;** Metro Rail News
INDORE (Metro Rail News): Underground tracks for proposed metro rail have been extended to around two-and-a-half km from Bada Ganapati square to the airport after MP Metro Rail Corporation Limited (MPMRCL) suggested the changes in its design.

Initially, the corporation had planned to run metro rail only in around 2 km area between Bada Ganapati square to the railway station via Rajwada as it is densely populated and there’s less space for constructing elevated tracks and stations.

In remaining about 29 km circle of the metro, the railway tracks were to be built on the elevated bridge and the same was planned to give connectivity with the airport through a foot-over bridge.

“Recently, Indore airport got international status. A plan for expansion of the airport is already underway and it also includes increasing the tunnel area.

In this situation, we will not be able to run metro rail on an elevated bridge near the airport and decided to go underground,” a senior MPMRCL official said. He said that as per the changes, now metro rail will run underground between airport to the railway station via Bada Ganapati and Rajwada.

UAD principal secretary Sanjay Dubey said, “Metro rail will come on elevated bridge from around 200 meters away from the airport towards Super Corridor to take a circle of around 27 km till Regal Square to again go underground near the railway station towards Rajwada.

Another part of the planning and execution of the project is underway”. MPMRCL has launched a social impact assessment to know the effect of the proposed metro rail project on the life and business of people residing/carrying out commercial activities alongside its route and is likely to initiate an environmental impact assessment in days to come.
Stand and Perspective of Metro Systems in China; China

Excerpts from: Dr.-Ing. Lars Schnieder in Eisenbahn Technische Rundschau ETR, July-August, 2019, page 10; DVV Media Group GmbH

As one of the most populated country on earth, China is highly depended on deploying transport systems for its megacities and major cities. In the last ten years the route lengths of existing metro systems in China have multiplied. Many cities have put metro systems
into operation for the first time. This trend will accelerate over the next five years. The development of Metro Installations in China from 2008 to 2020 in 60 cities with an overall length of 8000 km is shown the following Graph:

China is the country with the fastest developing metro installations in the world.

The construction of fully automatic metro systems will increase in the next decade worldwide significantly in dynamics. Here too, the far largest increase will take place in China.

China has eased the conditions for the construction of metro systems. Now also smaller cities are allowed to build Metros. Indeed the future aspect in economy of traffic planning and in system decision will move in the foreground. The metro will be in the future not anymore so far the "standard option" for the building of new traffic systems. There are other investment alternatives such as Bus Rapid Transits (BRT) as network supplements to be considered in big cities, which need only a fraction of the investment costs for a route kilometer.

The example of the BRT system in Guangzhous shows that also here high passenger capacities with 27,500 passengers per driving direction and hour can be realized with a lower capital expenditure. In the future, the growing financial burden on public budgets comes into the foreground, since as well as in China metro systems are not cost-effective.

Ropeway Provider Doppelmayr and Technical University of Aachen create a Symbiosis of Bottom supported automated PODCAR People Mover and Top supported aerial Gondola for an on
To push back the private car ownership traffic in favour of public transport is a mobility related challenge. Metro Rail serves only individual corridors. The capital investment costs are high, and the infrastructure has a massive impact on the building structure.

In order to serve wider township areas, feeder systems are needed. In several cities the dense building structure does not allow the needed space and room for metro rail. Metro rail alone does not solve in India’s mega cities the problems with the clogged roads by private owned cars. Other intelligent, innovative and smart technical solutions for urban Mobility with less private owned car traffic are asked.

The Technical University of Aachen in Germany have created together with the worldwide operating ropeway, gondola and ropeliner manufacturer Doppelmayr in Austria a symbiosis of an automated bottom supported people mover (APM) with a suspended aerial gondola system, having the local traffic constraints in the German towns Aachen, Cologne and Bonn in sight. For Cologne a 35 km long Gondola Ropeway along the river Rhine axis is in discussion.

The new symbiosis evolution can switch from automated PODCAR APM running on ground to an aerial suspended Gondola Ropeway. The technical challenge comes from the automatically switching intersections between electric driven undercarriage and ropeway suspension. For 2022 an experimental section at Aachen is envisaged.

To move on demand people with PODCARS is a Personal Rapid Transit (PRT), a new public transportation system designed for swift travel in congested areas.
These futuristic transport vehicles will offer an environmentally friendly, clean energy alternative for urban transportation. Pod Cars are automated driverless vehicles, that will operate on elevated/underground shuttle networks or traditional roadways in the near future using personal rapid transit systems.

The Pod Car networks will operate much like traditional rail and streetcar networks, on right-of-way elevated corridors above busy roads and highways (or underground). Pod Cars will be convenient, affordable to operate and beneficial to the environment as they are powered by electricity.

There are many companies around the world currently developing various pod cars and personal rapid transit systems. Large scale projects include the ULTra PRT system at Heathrow International Airport in London and the Masdar City pod car system in Abu Dhabi - both now in operation, and West Virginia University has been operating a PRT service since the 1970’s.

Masdar on Demand PODCAR Personal Rapid Transit in Abu Dhabi

The Last Mile to Automation – How Autonomous Vehicles could solve the Last Mile Delivery Problem; Global

From IT Chronicals
The race is on to bring autonomous vehicles to market. However, big tech and automotive companies around the world are competing not just to be the first to perfect the technology, but also to figure out the type of business model that will pave the quickest path to profitability – and solving the last-mile delivery problem for retailers, courier companies and logistic operators is looking to be a strong contender.

Much of the early conversations surrounding self-driving tech were largely focused on transporting passengers from A to B to Z – either by getting consumer-owned autonomous vehicles on the road, or robo-taxicabs. It's no secret, for instance, that Uber's endgame (after successfully disrupting the traditional taxi industry forever) is to roll fleets of driverless cabs onto the streets, picking up paying passengers and taking them wherever they want to go.

But an increasing number of companies – including automakers, tech giants, startups and courier services – are now seeing autonomous short haul parcel, package and even fast food delivery as the more lucrative and timely venture.

“The revolution in commercial vehicles will come first, then the passenger cars will follow,” said Senior Vice President of the Renault Alliance’s LCV Business Unit Ashwani Gupta. “The moment business people start believing this is going to generate additional revenue and that this is going to be more efficient, then I think they will start working on it.”

The Last Mile Challenge

For businesses with consumer goods to deliver, solving the so-called “last mile” problem – i.e. the final step in getting products to consumers’ homes – is a pressing one.

As a share of the total costs of shipping, it's the last mile that is the most substantial – comprising 53% overall, according to Business Insider Intelligence. Compounding the issue for retailers is the growing ubiquity of “free shipping” offers, meaning customers are becoming less and less willing to fork out a delivery fee, forcing merchants and their logistics partners to shoulder the cost. As such, it is towards technology solutions that
these companies are looking to drive process improvements – and autonomous vehicles are very likely to provide an answer very soon.

The race is on to bring autonomous vehicles to market. However, big tech and automotive companies around the world are competing not just to be the first to perfect the technology, but also to figure out the type of business model that will pave the quickest path to profitability – and solving the last-mile delivery problem for retailers, courier companies and logistic operators is looking to be a strong contender.

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Pesa is the sole Bidder for Iasi Tram Tender; Romania

July 22, 2019 Railway Pro
Polish Company Pojazdy Szynowe PESA Bydgoszcz Spolka Akcyjna (PESA) is the sole bidder of the tender for the procurement of 16 trams in Romanian city of Iasi. PESA is the only company which submitted a bid in the tender launched by the Romanian Ministry of Regional Development and Public Administration for the procurement of 16 trams. If all requirements are met, PESA’s offer will be accepted by the contracting authority and the company will sign the contract for the delivery of the 16 trams of 30 metres.

The total cost of the procurement is estimated at EUR 38.61 million. The contract is not divided on lots and no framework agreement will be signed.

The attribution criterion is the best quality – price report, thus the financial component will weigh 80%, while the technical component, 20%.

Trams will have a minimum capacity of 55 passengers on seats, of which at least 6 seats low-floor accessible, and a total capacity of 165 passengers standing.

The procurement project will be financed through the Regional Operational Programme. Iasi tram procurement is one of the municipality’s projects for reviving this transport mode. Previously, Iasi Municipality cancelled a tender for the procurement of 16 trams of around 26 m for lack of offers. The tender was launched in April 2019. Iasi Municipality is currently implementing three tram infrastructure rehabilitation projects financed with non-reimbursable European funds through the Regional Operational Programme 2014-2020.

Barcelona Tram Networks to be connected; Spain

26 Jul. 2019; Metro Report
SPAIN: Barcelona Transport Authority ATM announced on July 23 that it had approved the project to build a tram line along Avinguda Diagonal to connect the city’s two tram networks, which are currently not connected.

The 4·3 km route would link Francesc Macia with Glòries on metro Line 1. Francesc Macià is the terminus of routes 1, 2 and 3, which cover the western part of the city; routes 4, 5 and 6 serve the northeastern part of the city.

The project was previously rejected in a public referendum in 2010, but has been reactivated by Mayor Ada Colau. It also includes a reduction in motor traffic on Avinguda Diagonal.

**Solaris to supply 130 articulated Battery Buses to Warszawa; Poland**

24 Jul. 2019; Metro Report
POLAND: Warszawa Bus Operator MZA has ordered 130 electric buses from Solaris at a cost of 399.6m złoty, the supplier announced on July 22.

Solaris is to begin deliveries of its articulated **URBINO** 18 electric vehicles in 2020. MZA has received EU funds of 180m złoty towards the order, which includes a seven-year manufacturer’s warranty.

The buses will be equipped with 150 kWh Solaris High Power batteries and a silicon carbide voltage converter that will drive two 110 kW motors.

The batteries will be charged using plug-in depot charging via two sockets and opportunity charging through a roof-mounted pantograph. Under a separate contract, Ekoenergetyka is supplying 20 400 kW fast charging stations that would be installed at nine locations through Warszawa. The 8.3 m złoty contract includes options for seven more chargers.

**Work begins on Ankara suburban Commuter Rail Extension; Turkey**

29 Jul 2019; Metro Report
TURKEY: Construction has started on an extension of Ankara’s Başkentray suburban commuter railway from the current western terminus of Sincan to Yenikent.

The 8 km northwestern extension is being funded from public sources. Completion of the TL353m project is due by the end of June 2022.

From Yenikent a single-track line is to be built to the Kazan Soda Elektrik factory to the north. Construction of the 6·8 km alignment is being funded by the factory.

Railway infrastructure manager TCDD awarded the construction to a consortium of HCA Insaat, İmaj Altyapi Ust Yapı and Efecemler Ins Nak Madencilik, which replaces an agreement with Aga Enerji awarded in July 2018 and subsequently cancelled.

Hydrogen Fuel Cells ordered for Aberdeen Buses; Scotland UK

26 Jul. 2019; Metro Report
UK: Ballard Power Systems has won an order to supply fuel cell modules for 15 buses that Wrightbus is supplying to Aberdeen, Ballard announced on July 23.

The FCveloCity-HD 85 kW modules, due to be delivered by the end of the year, will power double-deck Street-Deck buses. The 10.9 m long vehicles with capacity for 64 passengers are due to be in service by the end of 2020 and will be operated by First Aberdeen. According to Ballard, the fuel cells can be refuelled in less than 10 min.

The project is funded by Aberdeen City Council, the Scottish government and the EU’s Fuel Cells & Hydrogen Joint Undertaking under the Joint Initiative for Hydrogen Vehicles Across Europe programme.

The six-year JIVE project aims to help with the commercialisation of fuel cell buses by addressing their higher costs relative to diesel buses, as well as availability levels and the development of reliable and low-cost refuelling infrastructure. JIVE targets a total deployment of 291 fuel cell buses across Europe.

Ballard has so far received orders for a total of 80 fuel cell modules under the JIVE programme. Its earlier-generation modules have been powering a fleet of 10 buses for Aberdeen City Council over the past several years.

25 More Light Rail Vehicles, LRV, from Siemens Mobility for San Diego; USA

31 Jul 2019 | Railway-News

- **Rolling Stock**

Siemens Mobility has been awarded a contract for 25 S700 low-floor Light Rail Vehicles (LRV’s) from San Diego’s Metropolitan Transit System (MTS).
Changing Standards

The new vehicles, which will replace the existing Siemens Mobility high-floor SD100’s, will operate on the entire 53-mile MTS light rail network and include the 11-mile Mid Coast Trolley extension. The purchase will complete the city’s transition to a fully low-floor and accessible fleet, a process which began in 2004 and should be complete by 2021.

Designed and manufactured by Siemens Mobility at its Sacramento facility in California, the S700 cars are the latest advancement in the S70 low-floor platform. Distinguishing features include an open and spacious low-floor interior with wide aisles which make it easier for passengers, wheelchairs and bicycles to navigate. Energy efficiency also features with LED lighting which uses less energy and last longer.

CEO of the Metropolitan Transit System, Paul Jablonski, said:

“The standards and expectations for public transit continue to change and we are committed to meeting the needs of our current future riders.”

MTS and Siemens Mobility

MTS and Siemens Mobility’s relationship began in 1980 when it placed an order for 71 high-floor U2 models, further orders followed in 1993, and in 2004 MTS placed the first order for 11 low-floor S70 models as passenger expectations of accessibility on public transport began to change. 45 S70 vehicles are currently being delivered as a result of a previous order.

President of Siemens Mobility’s Rolling Stock business in the US, Michael Cahill, said:

“We are grateful for the longstanding partnership we have had with MTS. San Diego’s transit system is the longest running modern light rail system in the US, and it has been a privilege to participate in its continuous growth.”

Paul Jablonski added:
“MTS operated one of the most efficient and reliable light rail systems in the US and a large part of our success is due to our long-standing working relationship with Siemens to provide best-of-class vehicles.”

Since 2004 more than 300 S70 LRV’s have started operating in eight cities across the United States. With a maximum speed of 105 km/h (65mph), the lightweight body construction which meets strict US guidelines can consist of up to five vehicles and has capacity of around 225 passengers in a three vehicle combination.

**Bozankaya signs Timisoara Tram Contract; Romania**

*July 29, 2019; Railway Pro*

Romanian Municipality of Timisoara and Bozankaya signed the EUR 33 million contract for the supply of 16 low-floor trams. The contract includes an option for 24 additional vehicles which brings the entire contract value to more than EUR 80 million. The first deliveries are expected 18 months with an entire project duration of 48 months. The five-car tram will have a total length of 30m and will have a capacity of 170 passengers.

Being able to run at speeds of 70 kmph, the new trams are fitted with battery power for an autonomy of more than 60 km, offering more flexibility in case of repairs or other disruptions to the electric network. This also allows Timisoara, the European Capital of Culture in 2021, to extend tram lines without having to construct additional catenary lines – an attractive option for historical city centres.
“Timisoara was a pioneer in urban railway transportation, with city’s railway dating back 150 years to 1869, and would continue being a trendsetter as the first Romanian city to purchase battery-powered trams,” Murat Bozankaya, owner of Bozankaya, said.

Funds for fulfillment of the contract will mostly be supplied by European Union, and funding for first 7 trams has already been allocated to Timisoara. The city applied for further funding of 14 trams, underlining their intent to purchase at least 21 trams in advance. Timisoara has a number of close co-operations with the EU for the development of the city’s transport and other infrastructure.

Railway PRO June issue offers our readers an interview with Bozankaya Chairman of the Board, Aytunç Günay, which explains company’s strategy to keep cities moving.
METRO NEWSLETTERS

on

“URBAN MOBILITY AS A SERVICE”

PUBLIC MULTIMODAL URBAN, SUBURBAN AND INTERURBAN PASSENGER TRANSIT SYSTEMS WITH METRO-BUS, LIGHT-RAIL, TRAM-TRAIN, METRO-RAIL, METRO-TRAIN, REGIONAL RAPID TRANSIT, COMMUTER-RAIL, ROPE-WAY/TRAIN, MAGLEV AND HOVERCRAFT TRANSIT/PEOPLE MOVER, WATER-METRO, AUTONOMOUS PEOPLE-MOVER

MOBILITY SOLUTION, TRANSPORTATION AND ECONOMIC DEVELOPMENTS IN MODERN URBAN/MEGAPOLIS ENVIRONMENT

METRO Newsletter by Dr. F.A. Wingler
METRO 83, August 2019

Metro Underground Tunnelling in Paris; France
PART I: INDIAN ACTIVITIES AND INITIATIVES FOR URBAN MOBILITY AS A SERVICE

Animation of envisaged Surat Multi Modal Transport Hub, MMTH; India

In India relatively little has been done to facilitate the Flow of Delivery Goods and Freight in urban Areas; India

Apparent Traffic and Transport Chaos on Jaipur’s City Roads
While Indian cities have taken steps to promote public transport to discourage the use of cars, relatively little has been done to facilitate the flow of goods in urban areas.

With the expected growth in domestic consumption, urban freight demand is increasing rapidly. Last-mile unit costs are around twice those of long-haul transport because of the high cost of disaggregating shipments for delivery and the effects of congestion.

According to an OECD report, urban freight accounts for 10-15% of total traffic in developed countries, while contributing to 40-50% of traffic-related pollution in cities. While cities have taken steps to promote public transport and discourage the use of cars, relatively little has been done to facilitate the flow of goods in urban areas and to reduce the adverse impacts of urban freight transport.

To improve urban distribution efficiency, coordinated efforts are required from both the public and private sectors. For example, some urban logistics companies are developing offsite consolidation centres for joint distribution. **Freight transport planning in cities should be integrated into the urban transport planning and traffic management process**, which is currently focused in India nearly solely on passenger transport.

For example, infrastructure should be used more efficiently on a 24-hour basis. Freight loading and unloading zones need to be carefully planned and strictly enforced, **while freight delivery routes should be designated**.

**METRO RAIL** serves Mobility only in certain corridors. The service is not reaching wider areas of towns. **METRO RAIL** does not solve the traffic problems with delivery goods and freight supply and transport in Indian cities. If one watches the traffic under the elevated metro rail structure at Gathkopar in Mumbai, it becomes obvious that the traffic constraints have not eased; partly the massive elevated structure has worsened the situation, as the author has experienced end of last year:

![Traffic Chaos under the elevated Metro Structure at Gathkopar, Mumbai; India](image-url)
INDIA: BEML has started assembling the 378 metro cars, that it is supplying to operate on three driverless lines being built in Mumbai.

Mumbai Metropolitan Region Development Authority awarded BEML a Rs30.15bn contract last year to supply 63 six-car trainsets to operate on Mumbai metro lines 2A, 2B and 7.

BEML is supplying the stainless steel bodied cars from its Bangalore factory. The 25 kV 50 Hz trainsets will be equipped with air-conditioning, regenerative braking, CCTV and real-time track monitoring equipment. They will have four sets of doors per car and capacity for 1,800 passengers.

Hyderabad Metro Rail Project, the World's largest Public-Private Partnership Project (PPP) in the Metro Sector; India
Hyderabad Metro Rail Project is the World’s largest Public-Private Partnership Project (PPP) in the Metro Sector. Metros and MRTS (Mass Rapid Transport System) are emerging as a major area for infrastructure development in major cities with high population (around 8 Million). The Metro Rail Project, once completed will transform Hyderabad as the preferred city in India with integrated urban transport planning using inter modal connectivity and convenient sky-walks, which will mark the beginning of an era of seamless commuting in India. The Hyderabad Metro Rail Network will cover a total distance of around 72 km across three corridors: Corridor I: Miyapur to LB Nagar Corridor II: JBS to Falaknuma Corridor III: Nagole to Shilparamam.

The Project will be integrated with existing railway stations, suburban railway network (MMTS) and bus stations to ensure seamless and comfortable travel.

NCRTC organizes ‘Vendor Meet-Consultation with Prospective Construction Partners’; India
NCRTC consults industry leaders from Civil, E&M and Architecture field for RRTS execution

By Narendra Shah; Metro Rail News

NEW DELHI (Metro Rail News): Regional Rapid Transit System (RRTS) is a first of its kind mobility service being implemented in India. Keeping this in mind, since its inception, NCRTC is having regular consultations with stakeholders, industry leaders, etc. for the timely and efficient execution of RRTS project. In this direction, a ‘Vendor Meet – Consultation with Prospective Construction Partners’ was organized on August 5, 2019, in New Delhi. Representatives from more than 45 reputed and leading civil, electrical and architecture firms including IRCON, HCC, ABB India Ltd, AFCONS, Siemens Ltd, Simplex India, L&T, Tata Projects, etc participated in the meeting.

Shri Vinay Kumar Singh, MD, NCRTC, Addressing the Vendor Meeting

During the meeting, NCRTC officials gave a detailed overview of the project with special emphasis on procurement strategy and packaging plan of the Delhi-Ghaziabad-Meerut Corridor. The industry captains shared their valuable insights, expectations, suggestions, and ideas about the project execution, contract design, and risk allocation framework.

Addressing the gathering, Shri Vinay Kumar Singh, MD, NCRTC, said, “Projects like RRTS are imperative for sustainable economic growth required to realize the Government’s
vision of making India a $5 trillion economy. The responsibility given to NCRTC is huge and NCRTC is committed to facilitate and create a work environment – an ecosystem in which our partners can work efficiently & confidently." Shri Singh further called on the industry to join hands with NCRTC in its endeavor to deliver excellence in this socially-oriented infrastructure project aimed at improving the quality of life of people and catalyzing polycentric, sustainable development of NCR.

“We are looking for partners to work with us and take up challenges while being a part of this ambitious project with the idea of New India and next-generation infrastructure,” said Shri Singh.

Notably, the construction work between 17 km-long Duhai to Sahibabd section of Delhi-Meerut (82 km) RRTS corridor is in full swing. The priority section is expected to become operational by March 2023 while people of the region can travel on the full corridor from March 2025.

### Rail based Light Mass Transit, LRV/LRT, for METROLIGHT - more viable! India

Seeing the success of metro rail in the country, several other cities with a lower projection of ridership are also aspiring for the rail-based mass rapid transit system, which could be fulfilled by light urban rail transit system named 'Metrolite' with lesser capacity at much less cost.

By Kanika Verma; Metro Rail News; 05/08/2019

PUNE (Metro Rail News): The metro rail system being developed at present is of high capacity which is required for bigger cities with very high ridership and peak hour peak direction traffic (PHPDT).

Seeing the success of metro rail in the country, several other cities with a lower projection of ridership are also aspiring for the rail-based mass rapid transit system, which could be fulfilled by light urban rail transit system named 'Metrolite' with lesser capacity at much less cost.
Metrolite would also act as a feeder system to the high capacity metro. In addition to less capital cost, the operation and maintenance cost of Metrolite would also be less, making the system more viable.

Zebra crossings shall be provided on either side of the platforms for passenger movement from the wide footpaths. Respective municipal corporations shall identify all possible paths for providing at least single-track operation of Metrolite trains between two parallel roads. Ring network shall be planned to reduce the headway.

Station area can be planned with more natural lighting and natural ventilation instead of heavy closed structures. AFC gates, platform screen doors, X-ray baggage scanner, and DFMD are not suggested in the Metrolite shelters. This will remove any signaling and PSD equipment rooms in the station platform making it unattended station. The system shall have a dedicated path separating the road traffic with Metrolite system.

Fencing can be provided on either side of the network. Shelter Platforms shall be planned in a staggered manner in the alternate side for Up and Down lines to reduce the actual road space.

Shelter Platform for LRT with Alstom Citadis X05 LRV; Caen, France – a economical Solution for Indian Towns with less Ridership for much less Costs?

Chennai Metro Rail launches Feeder Service Cab at Rs 10; India

This service will be made available at all stations in the next three months.
CHENNAI (Metro Rail News): Aimed at increasing patronage for metro services, the Chennai Metro Rail Limited (CMRL) has launched a **feeder service cab** at a flat rate of Rs 10 to enable metro users to travel between the stations and their residences.

According to reports, the service was launched on Monday and will help commuters book a seat in the cab and pay using their **Metro smart card**. The service was launched on Monday by the state Minister for Industries MC Sampath. The feeder service will operate through a mobile app in collaboration with Bengaluru Mega cabs Private Limited.

Designed to work like Ola and Uber cab aggregator apps, this application will enable users to choose the nearest pickup point following which the app will provide the arrival time of the cab. Every station is provided with at least five pickup points within an area of six to eight kilometers from the station. The users can either pay upfront or finish the trip and pay for the ride.

The service, which was inaugurated at the Nandanam station on Monday, will soon be made available at all stations in the next three months, CMRL said.

In January this year, the CMRL launched feeder services to the Old Mahabalipuram Road (OMR) in collaboration with Ford’s corporate shuttle feeder services. The service was launched at the Alandur Metro station and was designed to ferry commuters to their offices on the IT corridor.

CMRL started feeder services in August 2018 on a trial basis for six months. The services constituted share autos and cabs from 13 stations up to a 3 km radius from the stations. The services were also made available between 6.30 am and 9.30 pm. MTC had also run mini-bus services to some of the metro stations to ferry users to and from the stations.
PART II: GLOBAL ACTIVITIES FOR URBAN MOBILITY AS A SERVICE

How does Communication Based Train Control, CBTC, track Trains without Track Circuits?; Global

By "Naeem Ali" naeem.ali@cbtcsolutions.ca

Tracking trains using track circuits has been the conventional wisdom for the past 150 years. No single invention in the history of rail has contributed more towards safety then the track circuit. This simple invention is the foundation for block signalling and the primary method of tracking trains through a mass transit system.

However, over the past 30 years CBTC Technologies have rendered this foundational component obsolete. Therefore, how does a CBTC system track trains without track circuits?

TRACKING TRAINS IN CONVENTIONAL SIGNALLING

A track circuit is a hardwired circuit connected directly to the rail. Each track circuit area is called a block. If there is no train in this block, a power source energizes a relay indicating “no occupancy”. If a train enters the block it will short circuit the track circuit - through its axle - de-energizing the relay indicating “occupancy”.

The connection is direct from the track circuit to the relay logic in the equipment room. This design does not require the designer to verify the reported occupancy; it’s taken as gospel.
The track circuit provides complete certainty and this is the nature of conventional signalling using track circuits.

**TRACKING TRAINS IN CBTC**

A communication based (CBTC) train tracking system uses an indirect path to determine the location of the train (or occupancy to use a conventional term).

The train borne unit reports a position via a communication medium to the wayside unit, which utilizes the information to ensure there is a safe separation between trains. Unfortunately, there is no certainty that this position report is correct due to the non-vital nature of the communication medium.
Therefore, a CBTC system introduces variables that are not present in conventional track circuit based systems such as:

- The reported position may have been corrupted by the communication medium.
- Time delays induced by the communication medium.
- Total loss of communication.

These are unique problems to CBTC and their solution will not be found using conventional methodologies.

**PLAUSIBILITY CHECKS**

To address these challenges a CBTC system must verify the position report before accepting it by performing plausibility checks; a position report must be plausible before it is accepted.

Plausibility checks are a series of tests to determine the validity of the position report. There are three types of checks the wayside unit should perform:

- **Plausibility Window Test** - Does the position report fall within a plausible window?
- **Communication Test** - Is the train to wayside communication active?
- **Travel Direction Test** - Is the reported position in the correct direction of travel?

Tracking trains in a CBTC system is very different from a conventional track circuit based system. Conventional systems provide certainty whereas CBTC systems are inherently uncertain. As a result CBTC systems must perform extra checks to ensure the position reported is accurate before accepting it.

Other systems may have additional tests but I believe these are three basic tests that all CBTC systems perform in some fashion.

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**Note 1:** IEEE 1474.1 is not clear on this topic. Section 6.1.1.1 (CBTC train location/train speed determination) talks about establishing “the location, speed and travel direction” of
each train but this is discussed from the train perspective and not from the wayside perspective.

**Note 2:** The purpose of the information contained in this post is to describe high level concepts only. It is not intended to be used in a design. If anyone uses these concepts, it is their responsibility to independently review and verify their design through a proper engineering process and to ensure the system and safety requirements are addressed. The author bears no responsibility.

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**Rail on the Way to autonomous Trains and Metros; Global**

By David Briginshaw; IRJ, August 2019-08-04

**WHILE** dates for the launch of autonomous cars recede into the future and car manufacturers join forces to ramp up their already considerable investment in electric and autonomous vehicles, rail is quietly making important advances in the development of driverless and eventually autonomous trains. As we report this month (p14), Rio Tinto completed the transition to full automatic driverless operation of its entire heavy-haul rail system in the Pilbara region of Western Australia on June 14 making it the world’s first fully-automated mainline rail network.

While the *AutoHaul* project took longer and cost more than expected, it is a major step towards automating mainline railways. Full automation is already reaping benefits for Rio Tinto in terms of lower operating costs, shorter journey times, and greater reliability - vital for a company in a highly competitive market. It is also improving the efficiency of scheduling, helping to eliminate bottlenecks on the network, and boosting productivity.

Hitachi STS, which developed *AutoHaul* in cooperation with Rio Tinto, is talking to North American railways about automating freight train operations. The challenge will be far greater in North America, where multiple freight and passenger operators share the same tracks, trains are of different types and weights, and there are numerous junctions and yards as well as links to industrial plants.

Similar challenges apply in Europe. Nevertheless, progress is being made here as well. Following 18 months of research, French National Railways (SNCF) completed its first test run in July with a remotely-controlled locomotive hauled autonomous train (p5), as part of a project to develop driverless passenger and freight train prototypes by 2022.

**Fully-automated Metros have been around since 1981, when the first line opened in Kobe, Japan.**
According to the International Association of Public Transport (UITP), by the end of last year (2018) there were 64 fully-automated Metro lines totalling 1026 km in operation in 42 cities. However, the UITP forecasts a major acceleration in the development of automated metros with the total length expected to triple by 2023 to breach the 3000 km mark. Fully-automatic metro lines are forecast to account for 48% of greenfield metro projects by 2022 in terms of kilometres compared with 10% in 2018.

“Every city, that has built a new automatic metro line, always does so again,” Mr Ramon Malla, chairman of the UITP’s Observatory of Automated Metros, and director of strategic projects with Barcelona Metropolitan Transport (TMB), told IRJ at the UITP’s Global Public Transport Summit in Stockholm in June. “It is difficult to see anyone building a new line, that is not automatic.”

However, Malla says automation of existing lines is progressing slowly. “Converting a line to automatic operation is a real challenge, especially as we need to keep the service going. Cost is not the main issue; it is the complexity of managing the project and suppliers need to give operators more confidence.”

While Barcelona’s newest lines (9 and 10) are fully automated, TMB is looking to convert Line 1, its oldest and busiest line, as the rolling stock will need to be replaced soon.

Malla listed the many benefits of automating a metro line, including greater capacity, availability, and operational flexibility; elimination of human error; reduced capital and operating costs and lower energy consumption. He also says the social element is very important. “We took enough time to negotiate with the unions to pave the way for automating the rest of the network. We are unique in not having any jobs with the title of train driver. Instead, we have flexible jobs which combine different tasks. Our staffs now have more fulfilling jobs, they are more motivated, and we have less absenteeism than before. The happiness of our employees is important.”

Despite 38 years’ experience with automatic operation, improvements are still required, as Mr Paul-Edouard Basse, key account manager with Siemens, points out. He says failures
on driverless lines are very rare but when they occur “they can be dramatic.” Basse says operators need to be able to restart operation quickly to avoid stranding trains in tunnels.

He says cyber security is a must today, but was not a problem with early systems. Artificial Intelligence (AI) is expected to improve the performance of automated metro.

Big Data Culture, an evolving Strategy for IoT in Railway and Metro; Global

Aug. 2, 2019
Written by David Burroughs; IRJ

With the range of sensors and Internet of Things, IoT, solutions on the market growing exponentially, operators and infrastructure managers are gathering more data than ever. David Burroughs reports from Munich on how they are managing and using this increasing amount of data.
At Rotaia Media’s Rise of IoT and Big Data in Rail conference in Munich in May, experts from across the industry explained how they are using IoT on a daily basis.

The use of data and analytics across the railway process has moved on from its infancy and become a fully-fledged facet of everyday operations. Armed with a better idea of how their systems work and the benefits of the technology, users and developers are now looking at ways they can refine, improve and further develop the processes to maximise the benefits of the data.

At Rotaia Media’s Rise of IoT and Big Data in Rail conference in Munich in May, experts from across the industry explained how they are using IoT on a daily basis. However, a strong theme running through the discussions was data management. While companies have been interested in gathering as much data as possible, they are now beginning to take a deeper look into what data they specifically need and how to cut through the “noise” to extract meaningful insights, that could otherwise be lost.

“A human is not capable of interpreting this data and therefore we need help from computing”; Dr. Florian Auer.

“I think we are not talking about data lakes anymore, we have data oceans at this moment,” explained Plasser & Theurer director of technology and innovation, Mr. Florian Auer. “A human is not capable of interpreting this data and therefore we need help from computing such as deep learning and machine learning software to help us interpret the data and get useful data out of this.”

This was echoed by other speakers, who explained how they are switching from a “push to a pull” model of data collection – instead of pushing all sensor data into a data lake for sorting and analysis, it is instead pulled through when needed and useful, reducing the amount of work needed to generate meaningful insights.

Harvesting data without a clear view of how it will be used is a common problem, says Holland chief information officer, Mr Ken Faanes, who explained how he had attended a similar conference where the topic was discussed during a round table.
“Collecting data is easy, but it can quickly become a junk box of data, that is not useable”; Ken Faanes, Holland.

“The moderator asked everyone how they were collecting big data and what their big data mission was, and they went around the table and everyone had an idea of how they were collecting data,” he says. “The next question was how are you monetising it. Nothing. No one had an answer.

“Collecting data is easy, but it can quickly become a junk box of data, that is not useable. I think the way to fix that is to get the big data scientists working with the business practitioners to really sort out what’s valuable and what’s not”.

“They’re the only ones who can really help sort out that data to make sure you’re working with quality data because if you don’t have quality data it can lead to bad hypotheses and bad decisions.”

Mr Jørgen Torgersen, head of smart maintenance – switches and crossings for Norwegian infrastructure manager Bane Nor, encouraged operators to think of the wider picture and consider how the data could be used, including sharing it more openly.

“I think as infrastructure owners, we have a lot of data, but I understand more and more that universities and the public want to have some of this data,” he says. “I think we need to share more data publicly so we can industrialise machine learning and data intelligence.”

Culture Change

While gathering and analysing vital data is important, this work goes to waste if it is not acted upon. Railway engineers who have for years relied on tried-and-trusted methods of visual inspection can be sceptical of the validity of the technology and unwilling to rely on it.

British infrastructure manager Network Rail (NR) has been working to include staff in the process to avoid this, explained principal engineer – intelligent infrastructure programme, Mr Paul Barnes.

While his role is to develop a strategy for the company’s digital analytics programme, it would not be effective if it wasn’t fully adopted by those implementing it on the ground. Paul Barnes

“We had a lot of success installing hardware and software to interpret what was happening with our assets,” he says. “What we didn’t do perhaps as much is work out how we were going to use that in the field.”

Barnes says that while his role is to develop a strategy for the company’s digital analytics programme, it would not be effective if it wasn’t fully adopted by those implementing it on the ground. As a result, NR is putting people at the top of its new strategy.

“We’re not going to do it unless we get the culture right and the transformation, then we can start tackling the standards, the way we monitor, the analytics and the planning,” he
says. “But before we can even do that, we have to get our asset register and data architecture in order.”

**Democratisation**

NR has adopted a method of democratisation: A decision making process, that involves a whole group of people making sense of the data, putting people in there and augmenting the intelligence from the hardware and the software.

“Finally you move to a point where safety, productivity and quality of work is better because you’ve engaged the people into planning,” Barnes says. “That’s the way in which the culture is accepting the strategy and using it.”

Speaking alongside Barnes, NR signal maintenance engineer, Ms Rhiannon Jones, told delegates that while the adoption of hardware and software had initially resulted in a reduction of service-affecting failures, this had since plateaued.

**“Even with machine learning and the trials we’re conducting, people still are key to making it a success”; Rhiannon Jones, Network Rail.**

“The next charge for us is how to overcome that plateau, and that’s where people come in. We have to utilise the people on the ground, who must have the ability to use the tools,” says Jones, who works from the Leeds maintenance depot.

“Our next step as a maintenance depot is to incorporate this in our routine maintenance, rather than just reacting to alarms, that we get from our data. We’re inundated with alarms and it just gets to the point where we’re saturated.”

The depot is now exploring what long term trends can be extracted from the data pool, and how the data generated by remote condition monitoring of infrastructure assets can be used to create strategies around topics such as component renewal.

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German Rail (DB) is embracing IoT for Infrastructure Monitoring, including its Diana Platform for Monitoring Switches
An Individual Turnout’s Status is relayed to either a Desktop Computer or a Mobile Phone or Tablet app. DB hopes to fit the Sensors to more than half of its Switches by 2020

“We looked at the root causes of failures and decided that instead of replacing an entire pump unit for a certain point we would start looking at the individual components,” Jones says. “And not only does this increase the reliability of the asset, because you’re only replacing one component, it reduces the lifecycle cost, which is a great benefit to any maintenance depot.

“We are now beginning to use more machine learning, and as that develops and as we develop, we’re hoping to get over the plateau. But even with machine learning and the trials we’re conducting, people are still key to making it a success by implementing what the machines are telling us.”

Space and Time

It is not just a culture change on the ground, that is needed though. Those setting the direction at the top also need to create strategies, that leave space and time for new technologies to develop and fail before they become viable.

During the development stage of its digital strategy, Swiss Federal Railways (SBB) launched and tested a large number of concepts before deciding which ones to further develop, explained SBB head of telecom technology, Mr Manuel Dietrich. But in order to get to that stage, the company had to accept that some projects would fail and others would be a cost case before they became a viable solution.

“We achieved a lot of very successful results from the proof of concepts, but many of the cases failed or were dropped because of the business case which was not obvious,” Dietrich says.

The key was to dream big but start small with projects, that were more likely to yield results, which would then give managers and others more confidence to back bigger, more risky projects, that could take more time to show results.
We achieved a lot of very successful results from the proof of concepts, but many of the cases failed or were dropped because of the business case which was not obvious. Manuel Dietrich, SBB.

“To get confidence throughout the whole company we have to get success stories really quickly so that all the other cases can evolve slowly based on the first results, that you can prove to the organisation and show that IoT is a success,” Dietrich says, adding that it was essential to learn how to “fail with pride” in order to create an atmosphere where innovation could flourish.

“I think we had a lot of failures, but the important thing here is that we need an open culture, that accepts these failures and learns how to fail. The IoT cases will evolve. Initially, we just take it as a cost case and experiment. The business case will then evolve and will produce the results, that we expect.”

Calls to secure Radio Spectrum for Next-Generation Railway Telecoms System; Global

Aug. 1, 2017, IRJ
Written by Keith Barrow

THE Future Railway Mobile Communication System (FRMCS) will supersede GSM-R as the industry’s standard telecommunications system in the 2020s, potentially bringing “game-changing” capability. But as Keith Barrow reports from Paris, a well-defined migration plan and adequate spectrum allocation will be vital to a successful transition.

GMS-R Tower in Switzerland
Mobile telecommunications lifecycles are short, with the interval between the emergence of one generation and the next typically around 10 years. So while 4G connectivity may feel like a recent innovation, 5G is just around the corner. The 5G standard will be finalised by June 2018, enabling deployments to begin before 2020, and the first commercial use of the technology is expected to be at the Tokyo Olympics in 2020.

This rapid evolution has long been a challenge for rail, where the cost, size and implementation timescale of telecoms deployments means lifecycles are measured in decades. Railways’ investment in GSM-R is secured through a commitment by the Railway Operational Communications Industry Group (ROC IG) to continue supporting GSM-R until at least 2030. GSM-R is unquestionably a success story, but it is already yesterday’s technology. With the prospect of a successor, that can support new, potentially game-changing applications, many railways will be reaping the benefits of a next-generation telecommunications backbone well before this date.

Railways have an increasing need for their own wireless telecoms to support machine-to-machine communications and data transmission in isolated locations. As the expectations of both operators and their customers rise in line with technological advances, the need to support real-time information, remote asset monitoring, and other applications becomes more pressing. Scalable, secure, IP-based transmission networks will be needed to unlock many of the benefits of the digital railway, and the next-generation system will be vital to the future interoperability of Europe’s railways. It is therefore a key component of the digital infrastructure needed to deliver the European Commission’s vision of a Single European Railway Area.

Work to define the scope of the Future Railway Mobile Communications System (FRMCS) has been underway for several years with the support of a number of key organisations in both the rail and telecoms industries, including the European Telecommunications Standards Institute (Etsi) and the 3rd Generation Partnership Project (3GPP).

In 2014 the International Union of Railways (UIC) launched an FRMCS project with the aim of providing a set of preconditions for the technology, developing a replacement for Eirene Functional Requirement Specification (FRS), and helping to define a migration strategy. Recognising the scale of GSM-R deployment outside Europe, the UIC’s FRMCS project has now gone global, with the aim of involving key players in countries such as Australia, China, Japan, Korea, and the United States. “This means more resources, more people, more minds working together,” Mr Dan Mandoc, UIC project manager for FRMCS told delegates at the UIC’s 3rd World Conference on Rail Transport Telecoms in Paris on May 17. “We are looking for a standardised product, with as many functions as possible built into the 3GPP layer. FRMCS is going to be complex, but it will be a game-changer.”

Mandoc says the aim is to deliver the first functional requirement specification for FRMCS at the beginning of 2019.

The European Union Agency for Railways is responsible for overall coordination and has set up a dedicated Radio Coordination Working Group. It is also actively involved in spectrum issues at the European Communication Committee, supporting the European Commission on FRMCS and preparing changes to the Control and Command TSI. In addition, the agency is leading a coordination forum, which brings together stakeholders including the UIC, Etsi, the Shift2Rail research initiative, and the Unisig consortium, which is responsible for developing and maintaining the specifications for ERTMS.
The agency expects to present its first report on FRMCS to the EC at the end of the year. Industry consultation on the draft conclusions began last month and is due to be completed in September.

“We are working with stakeholders to define a successor to GSM-R,” says the agency’s executive director Mr Josef Doppelbauer. “A key challenge is that we need spectrum both for the future system and GSM-R during the migration phase. There will be massive competition for this spectrum – autonomous cars are going to need a lot of bandwidth to sustain their network – so we need to fight for our bandwidth. This will be an issue not just in Europe but globally.”

Doppelbauer says the timeline for migration will vary between countries and this will create challenges, not least in ensuring that interoperability is preserved, particularly as the legacy and future systems are likely to coexist for many years. The need to keep GSM-R running alongside FRMCS means additional harmonised spectrum will be a vital requirement, and one the industry needs to start preparing for now.

This call was echoed by suppliers from ROC IG, which is working with other industry stakeholders to define a specification for FRMCS. “Early definition of the required spectrum is a really vital issue,” says Mr Ciro de Col of Siemens. “It’s also important to define how we are going to move from one network to another.”

In a draft position paper published on May 16, the European Rail Infrastructure Managers (EIM) association and the Community of European Railways and Infrastructure Companies (CER) suggest that the 873-876MHz/918-921MHz band should be reserved in addition to the current GSM-R band for FRMCS. EIM and CER say this has emerged as “the most favourable option to reuse infrastructure investment and allow a smoother migration.”

**Uniform Bands**

The two organisations argue that uniform frequency bands would allow easier governance of spectrum management across Europe, supporting interoperability between national networks. Adopting similar frequency bands for FRMCS would also enable the reuse of existing lineside infrastructure and onboard equipment, reducing rollout costs. FRMCS frequency bands will need to be supported by the 3GPP specifications to accommodate the use of standardised products and ensure an open market for equipment.

Speaking at the GSM-R conference in Paris, Mr Carlo de Grandis, policy officer for DG Move, told delegates that bandwidth will be needed for critical interoperability and safety-related applications both during the migration phase and after the rollout of FRMCS. EU-wide spectrum allocation will also be necessary to ensure interoperability.

Members of the ROC IG also urged the industry to consider the enablers behind FRMCS. “Technology alone isn’t enough – we need to consider business and lifecycle aspects,” says Mr Thomas Karl, public transport division director for Frequentis. “5G is going to bring big changes. If we think the future railway will have the same function with the same bandwidth, that’s not wise. We mustn’t close our eyes to what is happening.”

“Our retention of GSM-R frequencies will be challenged by other sectors,” says Mr Pierre Cotelle of Alstom. “We need to be very clear about why we need it, especially during the migration period.”

According to Mr Chiel Spaans, EU Agency for Railways’ project manager for next-generation railway communications, the legal framework for FRMCS needs to ensure
interoperability is maintained during the transition phase, and provide sufficient flexibility for future updates, minimising the impact of technical evolution on the overall system.

“With GSM-R, the railways created a successful, interoperable system, but it won’t be easy to repeat that success and the future will be more complicated,” he says. “We will have a new system operating in parallel with GSM-R, which is likely to be a number of different systems. We need to keep an eye on interoperability and ensure we have enough flexibility to respond to future developments. Nobody can predict what will happen after the first FRMCS deployment in 2022, or what will happen when GSM-R is switched off, so we need flexibility.”

**Future Railway/Metro Mobile Communication, FRMCS: Next-Generation Train Radio begins to take Shape with 5G; Global**

*From IRJ, July 2019, page 32/32*

**After one year of work, a UIC team has drawn up a plan to develop the Future Railway Mobile Communication System (FRMCS) as a successor to GSM-R. The objective is to have an FRMCS demonstrator ready in 2023 and to conduct the first national trials by the end of 2024. As David Briginshaw reports from Paris, FRMCS will be designed for 5G and is seen as a game changer for railway digitalisation.**

*HERE is no doubt that GSM-R, the telecommunications element of ERTMS, has been a great success as its deployment far exceeds that of ETCS. GSM-R has been installed on*
140,000km of track in Europe and 210,000km worldwide compared with 25,167km (contracted) for ETCS in Europe and 95,589km globally. GSM-R provides seamless 2G+ connectivity between track side and on-board, improves safety through the Railway Emergency Call system and enables ETCS.

But the telecoms world has changed beyond recognition since the specifications for GSM-R were finalised in 2000. GSM-R is a 2G system whereas in the wider world the first 5G systems are being deployed this year. GSM-R is based on GSM technology which is nearing the end of its life while GSM-R sub-systems face obsolescence. GSM-R lacks the capacity to transmit the volumes of data needed today let alone in the future. Although the railway supply industry has guaranteed continued support for GSM-R until 2030, time is short given the effort required to develop, test and approve a new system, and then to start the rollout which is expected to run from 2025 until 2035.

The International Union of Railways (UIC) started the first studies for a successor to GSM-R in 2012. This led to the decision to develop the Future Railway Mobile Communication System (FRMCS) as a worldwide standard for railway telecommunications. The UIC has brought together leading European railway associations and railways as well as the telecoms standardisation bodies ETSI Technical Committee for Rail Telecommunications (ETSI TC-RT) and the 3rd Generation Partnership Project Technical Specifications Groups (3GPP TSG).

On May 14-15, the UIC held its first reveal, what has been achieved so far and outline the strategy ahead. “FRMCS is not being developed simply to replace GSM-R,” Mr Marc Antoni, the UIC’s rail system director, told delegates in Paris. “FRMCS is an enabler for game-changers such as ETCS Level 3 and ATO, a support for virtual coupling, smart maintenance, monitoring of trackside components, and connections between trains and traffic management systems.”

This view of FRMCS was reinforced by Mr Dan Mandoc, the UIC’s FRMCS director. “We plan to deliver FRMCS with, as a minimum, the same functionalities as GSM-R: train radio voice application and ERTMS game changer and enabler for railway digitalisation,” Mandoc says. “The UIC’s objective is to provide standards for the FRMCS system, that allows flexibility for the implementers but still guarantees a system, that is future proof, cost effective, fit-for- purpose and interoperable among the networks. “There will be three main work directions to provide the baseline platform for the system definition and delivery covering user requirements; system architecture interfacing with trackside and on-board equipment, and the frequency spectrum,” Mandoc explains.

The FRMCS project will investigate and perform studies for further improvement or opportunities related to sharing infrastructure, spectrum or other resources and the use of commercial non-specific equipment, based on an application approach.

The project will provide an appropriate replacement for the European Integrated Radio Enhanced Network (Eirene) Functional Requirement Specification (FRS) based on the user requirements. It will investigate future needs and add new functionalities. FRMCS will be technology independent, future proof, have an application layer approach, and will enable interoperability. Finally, FRMCS will provide an appropriate replacement for the Eirene System Requirement Specification (SRS) based on 3GPP and ETSI specifications, defining building blocks and interfaces, providing communication service to the application layer, and ensure interoperability.

Behind the FRMCS project, a steering committee will report to the UIC and the European Radio Implementers Group (Erig), and three working groups will cover functionalities,
system architecture and technology, and frequencies (Ugfa). The project will also work closely with the Telecom On-Board Architecture (Toba) working group, and will interface with the EU Agency for Railways, two European railway associations (CER and EIM), ETSI TC RT, 3GPP, Unitel, and other interested parties.

“FRMCS is designed to be a flexible and a future proof system,” Mandoc says. “It will be able to follow the evolution of radio access technologies.”

The transport system will provide the bearer Quality of Service and the priority handling, therefore critical applications, such as ETCS and ATO, will need to be Quality of Service aware, and 3GPP standards are already available for this approach. “Interoperability between communication networks can be guaranteed as long as the transport system, communication services and the mission critical applications are standardised,” Mandoc explains.

“FRMCS will need to have dedicated spectrum available for critical applications. Railways’ needs for train performance and intelligent infrastructure must also be covered and will turn out to be far more significant in quantity than current ones.” The FRMCS frequencies will be included in the 3GPP standards. 3GPP Mission Critical communication standards will be enhanced by railway requirements which envisage the use of 5G and beyond and aim for commercial off-the-shelf (Cots) equipment.

FRMCS will be based on 3GPP building blocks. An FRS and an SRS will provide a foundation for the operation of FRMCS networks and guarantee interoperability for cross-border operation. The FRS and the SRS will complete the FRMCS system and will be the base in the CCS TSI for train radio and ETCS critical applications.

“The UIC is working in close cooperation with the EU Agency for Railways and stakeholders on these specifications,” Mandoc says. “We are currently agreeing with Shift2Rail the testing approach, common purpose demonstrators, synergies and convergence.”

A timetable has already been worked out for the implementation of FRMCS. The V4.0 user requirement specification (URS) was published in the first quarter.
From relatively obscurity few years ago, the Concept of Mobility as a Service (MaaS) has risen to become a central planning consideration for city governments, public transport authorities, operators and tech. firms. Indeed, MaaS was a hot topic at the International Association of Public Transport (UITP) Global Public Transport Summit, which was held in June in Stockholm, a city where the MaaS revolution is already underway with Stockholm Local Transport (SL) bundling its services for sale via the UbiGo app.

The challenges of urbanisation, air pollution and climate change mean radical transformation of the transport system is required to meet the needs of the sustainable and connected cities of the future. As many cities are already discovering, technology can connect previously siloed travel options and integrate them through a single user interface, unleashing combined mobility, that can match the flexibility and freedom of car ownership without an expensive and underutilised asset depreciating on your driveway or cluttering a city street.

Car ownership will become less convenient as cities move towards banishing private motor vehicles from their streets. Oslo will ban cars from its city centre streets this year and Madrid will follow next year. Hamburg is building a Green Network of public spaces, that can be accessed without cars and plans to make walking and cycling dominant forms of transport, while Paris plans to ban petrol and diesel cars by 2030 and double its cycle lane network. Tellingly, all of these cities are also embracing MaaS.

With the computing power in our pockets, the rollout of 5G public networks and online subscription services such as Netflix and Spotify an increasing feature of everyday life, the public transport user is already primed for MaaS.
According to the MaaS Alliance, a Public Private Partnership (PPP) which aims to foster a common approach to MaaS and unlock economies of scale, the global MaaS sector is expected to become a business worth more than a trillion euros by 2030. But in a burgeoning market, where regulation is struggling to keep pace with technological developments and changing consumer expectations, how can policymakers ensure MaaS delivers benefits for everyone and offers a genuine alternative to car ownership?

Defining exactly what MaaS is can be difficult and there are varying interpretations of what does and does not constitute MaaS. According to the UITP, MaaS is “the integration of, and access to, different transport services in one single mobility offer with active mobility and an efficient public transport system as its basis. This tailor-made service suggests the most suitable solutions based on the user’s travel needs. MaaS is available anytime and offers integrated planning, booking and payment as well as en route information to provide easy mobility and enable life without owning a car.”

According to the MaaS Alliance, MaaS should promote: The use of a single application to provide access to mobility, with a single payment channel instead of multiple ticketing and payment operations the facilitation of a diverse menu of transport options - public transport, ride-, car-, or bike-sharing, taxi, car rental or lease, or a combination thereof an alternative to the private use of cars, that may be as convenient, more sustainable and even cheaper integrated ticketing, payment, multi/inter-modal traveller’s information and routing digitalisation as an aid to the effectiveness of the transport system; and different pricing models for different services and products.

Dr Maria Kamargianni, lecturer in transport and energy at University College London (UCL) and head of MaaS Lab, suggested in a 2017 paper, that MaaS brings two new roles into the public transport value chain: the integrator, which is responsible for bringing together the services of different public transport providers, and the operator, which packages and delivers these services to the end user (Figure 1). Either of these roles can be fulfilled by the public or private sector, depending on the model adopted - in a publicly controlled MaaS, the transport authority might act as MaaS integrator and operator. In a market driven scenario, these roles might be taken by private sector organisations. In a PPP, the public sector might take on the role of integrator and work with a private sector partner in the operator role.

“Who takes on which role? That is a key question,” Mr David Van Kesteren, CEO of Taxistop and chair of the UITP Combined Mobility Committee, said at the UITP Global Public Transport Summit in Stockholm. “As an organisation, are you strong enough, big enough, to make it a success? The commercial integrator is the most common model and in this scenario it’s the job of the integrator to make it fly. If this fails, MaaS will be lost in a moment.”

According to the UITP, it is the integrator’s job to make MaaS a success. It will be the stakeholder capable of attracting the highest number of customers and creating the most value for all the business partners in the MaaS ecosystem. The integrator could be a transport authority, a tech firm, a MaaS company, or even a bank.

Any public transport operator stepping into the role of MaaS operator needs to consider competition law, pricing and how they will ensure fair and equal access for all players. Risks in MaaS deployments include the MaaS operator becoming the ‘gatekeeper,’ disclosure of commercially-sensitive data and business information to competitors and bias in algorithms. Some observers have suggested that market-driven approaches to MaaS might deplete public transport by making access to car-based services more
convenient, and because these more-costly services might generate more profits for the MaaS operator.

Van Kesteren says successful MaaS will deliver value for every partner, with reciprocity and data deals, while allowing individual mobility providers to maintain their customer relationships.

User experience is another key consideration and must be optimised right from launch. “Quality is very important to the MaaS discussion,” says Van Kestenen. “You have one chance to change an individual’s way of thinking about mobility. You might not get another chance. You cannot do a half- and-half MaaS, it’s essential to get the quality right. If the solution you offer to the user is not high quality, he will return to his private car right away.” In Helsinki, the Whim app has been closely aligned to the needs of the user with the aim of convincing commuters to give up their cars for good. “When we assemble our products, we know that in Helsinki, an average resident makes four trips a day and the length of the trips usually varies between 2 and 30 km, and the daily travel time is 90 minutes,” Mr Sampo Hietanen, CEO and founder of MaaS Global explained in a recent blog post on the company’s website. “But when we package our products, we look at two things: first, the desirability and therefore the willingness to pay for our service must rank right next to owning a car; secondly, we must be able to influence how different modes of transport are used within the service. When we get these two factors right, we were selling for more that in great quantities, we are profitable. “To make all of this work, we must understand that we are in the operator business. We need considerable volumes to achieve success, and to get there we subsidise our offering in the beginning. If you look at how much an average user is worth to Facebook, it’s around 0.30 a month, while a mobile phone or a broadband user may be paying somewhere around É30 a month for the operator’s service.

However, if you own a car, you are paying somewhere around É500 every month. That’s the price point, that makes building a MaaS operator such a lucrative idea. MaaS is massive beyond anything we’ve experienced in digital services so far.”

As Amazon and Facebook have amply demonstrated, whoever controls the data flowing through the platform ultimately benefits from the value it generates. MaaS requires an ecosystem where multiple organisations act in collaboration outside traditional company boundaries. This can only be done successfully in an open ecosystem.

“In a digital economy, the ownership and access to data determine market dominance,” says a white paper on creating the foundations for a MaaS ecosystem, which was published by the MaaS Alliance in September 2017. “In order to build real multiplayer, multi- option market platforms, the service providers should provide each other with access to essential information in a computer-readable format, including routes, timetables, stops, prices and accessibility information.”

**Governance**

Policymakers around the globe are still waking up to the need for a governance structure to regulate MaaS deployments and ensure the technology is used in a way, that supports policy goals. Finland was the first country in the world to create a legislative framework for MaaS and the opening of data, which is so crucial for the effective functioning of MaaS ecosystems.

Adopted in April 2017, the Act on Transport Services aims to “create preconditions for digitalisation and new business models in transport,” providing a basis for “seamless” multimodal travel chains. The act, which came into effect in 2018, makes the opening of
Application Programming Interfaces (APIs) a legal requirement for mobility services and includes provisions on the interoperability of ticketing and payment systems.

As well as making multimodal travel more attractive, the legislation aims to make the operation of the Finnish transport system more cost-effective. “The new Act will create a framework for a more efficient arrangement of publicly subsidised passenger transport by utilising digitalisation, combined transport and different fleet types,” the Ministry of Transport and Communications said in 2017. “The goal set in the Government Programme is to achieve a 10% saving in publicly subsidised passenger transport.”

The lack of consistency in regulation between countries is creating challenges for MaaS. “Currently the transport sector is mode-specifically regulated which does not always favour the implementation of MaaS,” says the MaaS Alliance. “In addition, there is no harmonised way in how the MaaS operator as a new actor is handled in terms of transport regulation in different EU Member States, which may hinder the emergence of new (cross-border) services. Development of the MaaS market will rely on access and open data, open APIs and more flexible transport and mobility regulations.”

Despite the regulatory challenges, many mobility service operators are already opening up their APIs to gain access to the MaaS ecosystem and this is also helping to drive technological development. “Open data and open APIs are the foundations on which apps need to be built,” says Mr Jake Sion, COO of Canadian shared mobility startup Transit. “Transit is the number 3 navigation app in North America. We wouldn’t exist today if operators hadn’t opened their data.”

In a market ripe for disruption it is essential that public transport operators articulate their role in MaaS, ensuring that mass transit takes its rightful place at the core of the combined mobility solutions of the future. Doing nothing means big corporate interests will come to dominate the market, with negative consequences for value distribution and the ability to harness MaaS for public policy goals. In this respect, collaboration between public transport operators will be essential to share experience, develop common standards, and generate economies of scale.

“Combining mobility services is the only way to reduce the individual use of cars,” UITP Secretary General, Mr. Mohamed Mezghani, said in Stockholm. “A MaaS offer will not succeed if it is not built around public mass transit and designed to address policy goals.

Behind all the discussion about technology, the one common element is people. More than ever, people are demanding a change in urban mobility. Leaders have a responsibility to keep that at the heart of what we do.” IRJ

Urban Transport News in brief; Global

02 Aug. 2019; Metro Report
• **Nice** tram route T2 has been extended by 2 km from Magnan to Jean Médecin.
• The **Samsun** tram line has been extended northwest by 6 km from OMÜ Rektörlük / Bati Garaji to Yurtlar.
• A 2.7 km tram route that goes over the Ada Bridge over the River Sava in **Beograd** was inaugurated on July 5.
• Harsco Rail has entered into a partnership with Möser Maschinenbau, which includes the distribution of road-rail grinding machine Ro-V 149. One such machine would be located in the UK, intended for work on tram and metro networks.
• Alstom’s SATEE and XAYEECO joint ventures have won contracts totalling €42m to supply OptONIX traction systems for 222 metro cars to be supplied for the future **Xi’an** Line 5 Phase 1 and 180 cars for Phase 2.
• The last trolleybus routes in **Perm** closed at the end of June.
• SATEE and Xi’an Alstom Yongji Electric Equipment Co are to supply traction equipment for the fleet of 318 metro cars that will operate on the driverless **Nanjing** metro Line 7.
• **Sumy** has taken delivery of four low-floor T70117 trolleybuses supplied by Bogdan Motors under a 22.5m hryvnia contract.
• ABB has supplied its i-bus KNX intelligent building control system for stations and control rooms on **Shijiazhuang** metro lines 1 and 3. This includes a digital addressable lighting interface control unit for smart management of station lighting.
• GMV is to supply planning software for the **Toruń** bus network.
• **Dnipro** has started taking delivery of 20 second-hand Tatra T4D-M1 trams from Leipzig. The vehicles were modernised in 1992-95.
• Solaris is to supply 10 Trollino 12 trolleybuses to TEP **Parma** and eight to SETA **Modena**.
• UKVZ is to supply four 30% low-floor single-section trams to Krasnodar.
• ZUE is to repair and maintain tram tracks in Kraków for three years from October 2019 under a 68·4m złoty contract.
• Škoda Transtech is working with Etteplan to produce technical documentation for the ForCity Smart Artic trams that it is supplying to Tampere and the Artic trams for the Raide-Jokeri line in Helsinki.
• A geological survey has started for metro Line D in Praha.
• A realignment of a tram line in Dresden to serve Strehlen S-Bahn station was inaugurated on July 5.
• Pro-Tra Building has signed a 64·6m złoty contract to undertake utility relocation and other preparatory works for the first 1·2 km phase of a planned 7 km extension of the Wrocław tram network to Nowy Dwór.
• PKS Bielsko-Biała has ordered 26 Solaris Urbino 12 buses with CNG drives for 32m złoty.
• Canadian Prime Minister Justin Trudeau has announced C$1·3bn of federal funding towards the extension of the Montréal metro Blue Line to Anjou.
• Transport for Greater Manchester has launched account-based contactless ticketing on the Metrolink light rail network.
• The government of Québec and the City of Montréal have agreed in principle to a funding arrangement that would allow the construction of the Pink Line light rail project.
• Transport Infrastructure Ireland and the National Transport Authority have awarded Transdev Ireland a six-year contract to operate and maintain the Luas light rail network in Dublin. The contract begins on December 1 and includes options for an additional five years.
• Thales is to supply SelTrac CBTC signalling for Stage 2 of the O-Train Confederation Line in Ottawa.
• SECOTrans has selected Atkins as a subconsultant to carry out systems engineering services for Los Angeles County Metropolitan Transportation Authority.
• BYD ADL is to supply 19 Enviro400EV double-deck electric buses to National Express for use in Birmingham.

Inauguration for Alstom Citadis X05 Tram for Caen la Mer; France

29 Jul. 2019 | Railway-News

• Rolling Stock

Alstom’s latest LRV Citadis X05 tram is now running on three new lines in Caen la Mer, in France’s Normandy region.
Alstom Citadis X05 Features

This 5-car tram measures 33 metres in length with six double doors on each side. The total capacity per tram is more than 210 passengers. The design is bright and airy with more than 45 percent of the vehicle made up of window space. This will also be the first tram in France to offer passengers USB charging sockets. A further feature of these trams is that they come with six extra large passenger information displays.

The region, in which these trams will operate, exhibit steep gradients. Consequently this tram has been designed to cope with gradients of up to eight percent.

Alstom, which has recently rebranded as ‘mobility by nature’ is also focusing on sustainability. This tram therefore features LED lighting throughout as well as optimised air-conditioning. The tram is energy efficient in its operation and 95 percent recyclable. Accessibility is another key consideration.

Citadis X05 Inauguration

The inauguration event was attended by Jean-Léonce Dupont, President of Calvados region, and Hervé Morin, President of Normandy region. Agnès Monfret, EU delegate, and Stéphane Guyon, general Secretary of Calvados Prefecture as well as Emmanuel Bois, Sales Director for Alstom in France, were also present. Joël Bruneau, President of the Urban Community of Caen la Mer, and Rodolphe Thomas, First Vice-President of Caen la Mer (in charge of transport, travel and infrastructure) presided over the event.

Jean-Baptiste Eyméoud, Senior Vice President France at Alstom, said:

“Just one year after the first tram was presented at the La Rochelle site, it is with great pride that Alstom and its teams take part in this inauguration. Thanks to their reliability, availability and ease of maintenance, we have total confidence in the ability of the 26 Citadis trams to meet the growing mobility requirements of the inhabitants of the Urban Community of Caen la Mer.”

Alstom has a total of 13 sites in France. Of these, eight participated in the design and manufacture of the Citadis trams for Caen la Mer.
**Contract signed to construct Cairo Monorail; Egypt, Canada**

Aug. 5, 2019  
Written by [David Burroughs](#); IRJ

**BOMBARDIER, Orascom Construction and Arab Contractors** have signed an agreement with Egypt’s National Authority for Tunnels in Cairo to design and build two new monorail lines to connect East Cairo with the New Administrative Capital and 6th October City with Giza.

The consortium, [which was named as preferred bidder in May](#), will also be responsible for the operation and maintenance (O&M) of both lines for 30 years. The total value of the design, build and O&M contract exceeds $US 4.5bn. Bombardier’s share is worth $US 2.85bn while Orascom Construction’s share is close to $US 900m. The agreement is subject to the final signing of supplementary documents.

The 54km line from East Cairo to New Administrative Capital and the 42km line to connect 6th October City to Giza will be the first mass transit links to connect Greater Cairo with the outlying metropolitan areas. The two lines will have capacity for around 45,000 passenger per hour per direction with an operating speed of 80 kmh, providing a journey time of around 60 minutes to new Capital City and around 42 minutes to 6th October City. Orascom Construction will design and build the infrastructure and civil works, including stations, guideway structures and new depot buildings.
Bombardier will design, supply and install the electrical and mechanical equipment for the two lines including 70 four-car **Innovia Monorail** 300 trains, **Cityflo 650 Signalling** and automatic train control, the operation control centre, communication systems, platform screen doors, fare collection, power supply and power distribution systems as well as switch beams and depot equipment.

Bombardier will also provide the overall electrical and mechanical system integration, project management, systems engineering and integration, testing and commissioning for the trains and signalling as well as operations and maintenance of the vehicles and wayside systems.

**ALSTOM APS (Alimentation par Aesthetic Power Supply): Service-proven Catenary-free Tramway and Light Rail Transit Operations; Global**

**APS is a highly reliable catenary free power system, that reduces the footprint of light rail lines and preserves the aesthetics of urban environments.**

*Catenary free APS LRT Operation at Sydney, Australia*
Doing away with Catenary

Cities planning a tramway can today preserve their historical heritage and urban environment by dispensing with obtrusive overhead contact lines. Alstom’s APS ground-level power supply system is a proven alternative with equivalent performance which is currently operating in seven cities on three continents and offers safe, reliable power to trams whether in short catenary-free sections or along the entire line.

Effective and safe

Inspired by ‘third rail’ feeding systems present in metros, APS uses 11-metre segments set into the track bed between the guiding rails to supply current to vehicles as a third rail. These segments automatically switch on and off according to whether a tram is passing over them, thereby eradicating any risk to other road users. This safety principle was certified by several competent bodies all over the world.

Flexible and adaptable

Trams running on APS can also incorporate overhead line equipment and/or traction batteries, with simple and easy transition between power sources. If a line is extended, it is easy to extend the APS system with it. In addition, APS comes in two versions according to the climate encountered: a standard version for temperate atmospheres and a tropicalised version for extreme climate conditions, withstanding ambient temperatures of up to 55 °C. 92 km of single track have been fitted to date and 245 Citadis Trams have been equipped with APS technology.

From Union Station – Georgetown Alternatives Analysis Propulsion Study

FINAL REPORT:

Ground Level Power Supply

Currently two systems are being marketed that are able to provide continuous power to the vehicle at ground level while in motion without the use of an overhead line and pantograph. The two systems were developed by ALSTOM (APS) and Ansaldo STS (TramWave). One supplier, Bombardier, has demonstrated the ability of their system to provide power while in motion, but is currently deploying the system to provide in-ground recharging capability only at stops and short sections, when the vehicle is accelerating from a stop. Additional systems are in varying stages of development by suppliers with and without transit experience.

Continuous power systems offer the advantage of full vehicle performance under all normal operating conditions, including full acceleration and braking, as well as the ability to climb hills or bridge approaches and maintain high capacity passenger area cooling. The systems are immune to the possibility of being stranded without power during long delays due to traffic conditions or other events in the off-wire portion.

In systems where power is supplied to the vehicles continuously, traction power substation locations and sizes will remain the same as for a traditional streetcar system. The cost of the ground level distribution system can be up to six times the cost of an equivalent overhead contact wire due to factors such as the use of independently switched sections,
which must be of a shorter length than the vehicle to avoid exposing the public to high voltages in the street.

**ALSTOM APS**

The **ALSTOM APS** (*Alimentation par Aesthetic Power Supply*) is the most widely deployed ground level power supply. The system is currently operating in revenue service in Bordeaux (2003), Angers (2011), Reims (2011) and Orleans (2012). It is also under construction in Tours (opening Sept. 2013) and Dubai (opening Nov. 2014).

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*Doing away with Catenary: ALSTOM Catenary free Citadis APS (Alimentation par Aesthetic Power Supply) City Tram at Bordeaux, France*

Problems with the start-up of the first installation in Bordeaux have been resolved, and the City has extended the original wire-free corridor of the line from 1.8 mi (3 km) in 1999 to 16.8 mi (28 km) today. Overall the system is currently in operation on 22.9 track-miles (38.2 track-km) with an additional 14.3 track-miles (23.8 track-km) under contract. **The ALSTOM APS technology uses vehicle mounted power pick-up shoes in direct contact with a series of switched power rails installed between the running rails. These sections are only energized upon receipt of a low power, specially coded signal from the vehicle transponder, which indicates the vehicle is over that section. At all other times, the power rail segments are grounded.**

Each streetcar is equipped with the following items for operation on the APS system:

- One roof mounted Emergency Battery Set to allow the streetcar to transition through any dead power segments.
- Two sets of center truck mounted Retractable Power Pickup Shoes for current collection mounted approximately 10 ft (3 m+) apart.
- One Pickup Shoe Control Box to activate the pickup shoes and interlock with the pantograph controls.
• One roof mounted Power Control Box with additional contactors and controls for switching the power from the pickup shoes and the emergency battery set.
• Additional Cab Controls and Monitoring equipment inputs to monitor and control the vehicle APS related equipment.
• Additional Safety Grounds under the low floor section of the vehicle to suppress any possible fault conditions.

The wayside installation of the APS system is made up of the following elements:

• Low profile, sectional Power Rails – 36 ft (11m) long sections fitted with 26.25 ft (8 m) of conductor rail and 9.84 ft (3 m) of insulating rail with integral duct bank and vehicle detection loop.
• Modular, quick replacement Power Rail Control Contactors – one is located every 72.2 ft [22 m], controlling two segments of power rail.
• Insulating Joint Boxes - one is located every 72.2 ft [22 m] and joins the ends of power rails not joined at the contactor boxes.
• Substation Grounding Contactor and System Monitoring Cabinet – one is added to each substation.

In the APS system the lengths of the conductor/insulator rail segments are matched to the length of the streetcar. The lengths are set such that two adjacent active segments, followed by an inactive section at each end, are always covered by the streetcar. For a 100 ft (30 m) Citadis streetcar or longer the lengths of the individual segments and shoe spacing on the vehicle correspond to the values provided above. The current APS design will not accommodate shorter streetcars, such as the Citadis Compact, and would require redesign to shorten the segments. Shorter segments would increase the number of segments, power rail control contactor boxes and insulating joint boxes.

A variety of safeguards are designed into the system to prevent any single point failure from causing a hazardous condition. Key among these is a condition monitoring system in each substation that detects faults in any power rail segment within 200 milliseconds, disconnects and grounds the main feeder, automatically isolates the faulty segment and restores the system power to the remainder of the system in less than 2 seconds.

Electrically dead zones caused by an occasional faulty power rail segment contactor are traversed using vehicle on-board emergency battery sets with automatic transition to battery power when needed.

The proprietary APS system could in principle be retrofitted to many existing streetcars, but ALSTOM to date has not offered this system independent from procuring their matching Citadis streetcars, hence little information on the system is available directly from ALSTOM sources.

Future orders of non-ALSTOM vehicles may be capable of being fitted with transponders, controls and pick-up shoe gear similar to that used on the Citadis vehicles to allow operation on an APS equipped system, but such a supplier would be at a competitive disadvantage due to the up-front engineering cost required to design and integrate the additional equipment.

The APS system does not support regenerative braking.

All active elements of the system are fully modularized, easily accessible, and quickly changed out in case of a fault.
The APS system has been utilized in areas with snow, including Reims, France. However, road salt is not used for de-icing in cities where the APS in-street conductor technology is currently operating, a biodegradable deicing fluid is used instead. To that end, coordination is required between the local municipality and the LRT operator to ensure there is no salt exposure of the portions of the alignment equipped with the APS in-street conductor technology. The use of snow plows equipped with a special rubber end, over portions of the rail alignment with the APS in-street conductor technology is also acceptable and it is currently used in the Bordeaux tram system.

The APS power rail, like any power rail, cannot operate when it is covered by water, because such a situation would lead to current leak when the rail is powered up, and thus tripping of the circuit breaker protecting the traction power circuit. Flooding of the track bed is an exceptional situation, which should be prevented by an appropriate drainage arrangement embedded in the track.

Dubai Catenary free LRT Metro: Alstom's innovative Rail Technology takes off; Dubai, France

Posted on June 17, 2015 by Janna Starcic, Executive; METRO Magazine

For a city filled with superlatives, Dubai has added another impressive jewel to its lux landscape. The Middle Eastern city, home to the world’s tallest building, the Burj Khalifa (211 floors/2,177 feet tall), and future home of the world’s largest Ferris wheel (690 feet tall)
and the world’s largest mall (28 square miles), has added the world’s first 100% catenary-free tram system — the Dubai Tram.

**Shelter Platform Station of Catenary Free Light Rail Transit Metro at Dubai, System ALSTOM ASP**

**Project Involvement**

*Alstom Transport* was responsible for the design, integration and supply of this turnkey tramway project (the first for the Gulf region), which includes: the supply of Citadis trams, track laying, signaling — using Alstom’s Urbalis communications-based train control (CBTC) — communications systems, integrated operation control center, platform screen doors and ticketing system.

“The global value of the project is approximately $760 million, of which around 50% is Alstom’s share,” says Gian Luca Erbacci, sr. VP, Alstom Transport Middle-East & Africa Region. The electromechanical parts, including rolling stock, signaling and power supply is tabbed at an estimated $55 million, he adds. Additionally, Alstom signed a 13-year maintenance contract valued at $65 million.

The six-mile Dubai tramway, which debuted Nov. 11, 2014; features 11 Citadis trams, 11 air-conditioned stations; and connects destinations such as the Burj Al Arab Hotel area, Dubai Media City, the Marina and the metro system.

The tram is operated by Dubai’s Roads and Transport Authority (RTA), which was established in 2005. The RTA also oversees the metro, monorail, buses, taxis, intercity transport, marine transport, and roads and parking.

**Regional Growth**
The tram system includes 11 air-conditioned stations along the six-mile line, which feature information kiosks, ticket validators and vending machines, public address systems, video monitors and CCTV systems.

Since Dubai is one of the fastest growing cities in the world, providing an advanced transport network for its citizens has been high on the government’s agenda, according to Alstom’s Vincent Prou, managing director, Gulf Region.

“There is a strong desire from the Emirate to develop the infrastructure and provide an attractive business environment. The ambition is to bring the share of public transport from 13% to 30% by 2030,” Prou says.

Looking back to 1975, when there were 200,000 inhabitants in Dubai, can provide some context for the surge in growth the city is undergoing. Fast forward to 2003, the population reached one million. Today, the population has grown to 2.1 million people in a little more than 10 years. Dubai sees 10 million visitors a year via tourism and business.

“Obviously, in a city that has the world’s tallest building, they are looking for the best of the best,” Prou says of the tram system.

**Citadis Vehicle**

Dubai’s low-floor Citadis tram is 140 feet long and can carry up to 408 passengers. The air-conditioned interior offers three classes differentiated by color and comfort level — “Gold” (featuring wider seats furnished in leather, with document holders and luggage racks), “Silver” and “Women & Children” classes. The interior offers high-end comfort, “infotainment” solutions, and enhanced communications and security systems both within the stations and on-board the tram, Prou explains.

The main features of the tram’s exterior design are its diamond-shaped front nose and its external livery, which evokes the sand dunes of the Emirate, according to Xavier Allard, sr. VP, design & styling, for Alstom. When developing design concepts for the tram’s overall aesthetic, Allard says he likes to integrate images suggestive of the city itself. Another example of this visual integration with the landscape is the vehicle Alstom designed for the tram system in Reims, France, which is reminiscent of a champagne glass, hence the idea of a luxurious jewel evocative of Dubai.
Power is supplied to the tram via segmented street-level rail embedded between the running rails on the axis of the track. When the tram leaves the section, the segment is de-energized and therefore safe for cars, bikes and pedestrians to cross.

**APS Technology, Stations**

One of the cutting-edge technologies developed for the Dubai Citadis tramway is its APS ground-level power supply. This catenary-free system, which enables it to preserve the aesthetics of the city, reduces the rail system’s footprint by eliminating poles while optimizing safety and operational reliability.

Power is supplied to the tram via segmented street-level rail embedded between the running rails on the axis of the track, explains Prou. The conductive segments are switched off/on/off as the tram progresses.

“When the train is detected, the segment below the tram is automatically energized,” says Prou. “Conversely, when the tram leaves that section, the segment is de-energized and it is safe again for cars, pedestrians and bikes to cross the tram [path].”

Alstom first implemented the APS technology for the tram system in Bordeaux, France in 2003.

Other cutting-edge aspects of the tram system are the fully enclosed, air conditioned stations, featuring such amenities as touchscreen information kiosks, video broadcasting systems for passenger information and advertising, as well as contactless ticketing machines.

“A lot of attention was paid to designing bicycle paths, drop-off areas, bus stops and taxi stops,” Prou says. “So the tram interfaces nicely with other modes of transport.”

Intermodality is achieved at all stations via enhanced pedestrian access, connectivity to the metro system through two stations (3 and 5) as well as connection to the Palm Jumeriah monorail, which links the mainland to Palm Jumeriah island — a man-made island formed to look like a palm tree, which was built as a tourist destination.
The Citadis vehicle was redesigned with reinforced air conditioning units for the driver’s cabin and passenger cars to withstand weather conditions, which can reach up to 122° F during the summer months.

**Extreme Climate**

With summer temperatures in the United Arab Emirates reaching up to 122° F, the tram and its infrastructure needed to be fortified to withstand extreme weather conditions, including high humidity reaching 100% and the sandy, corrosive atmosphere.

The Citadis vehicle was redesigned, with a focus to make the electronic infrastructure more robust and air conditioning units were reinforced in the driver’s cabin and the passenger cars, Prou explains. Trams were also equipped with brushes to clear sand from the third rail and the switch boxes that power the live rail are air conditioned. Other adaptations made to the vehicle include the use of UV-resistant paint, glue, decals, cabling and electronics; and UV protection for windows.

The vehicle underwent testing in a climatic chamber at Alstom’s facilities in Vienna in addition to simulation of a mini version of the tram system at the company’s factory in LaRochelle, France.

“This allowed us to do a little bit of troubleshooting before the system was implemented in Dubai and this enabled us to drastically reduce the time for testing and commission.”

**Signaling, Supervision**

Other elements of the tram system include Alstom’s CBTC signaling system, with provides speed control and also ensures precise alignment and safe interlocking with the station’s platform screen doors. The system’s control center, which receives feeds from more than 750 cameras along the line, is integrated with the depot, allowing for supervision, communication and control of the tram service. The cameras are installed along the line, which are directly monitored by the police in Dubai; Prou says.

**Future Plans**

The Dubai tram is already a success, says Alstom’s Prou. RTA statistics indicate that 943,982 riders have used the tram in Dubai during the first three months of 2015. The RTA’s ridership expectation aims for 27,000 passengers per day, he adds, with the ambition to reach 60,000 per day by 2020.
Plans to extend the tramway line are underway, with Phase 2 set to extend the line two more miles, adding six new stops and 14 new trams. Work is expected to start in 2016. An additional segment (Phase 3) would extend the line an additional nine miles to 12 miles.

Catenary-free Light Rail Run tested in Sydney; Australia

31 Jul. 2019; Metro Report
AUSTRALIA: Dynamic testing has started on the catenary-free section of the CBD & South East Light Rail line in Sydney, Transport for New South Wales announced on July 30.

The 2 km section from Town Hall to the northern terminus at Circular Quay is equipped with Alstom’s APS ground-level power supply to allow catenary-free operation. APS uses an embedded third rail to supply power to trams, with the conductive segments live only while a tram is passing over them.

Due to open later this year, the 12 km route will link Circular Quay in the north with Randwick and Kingsford in the south, serving 19 stops. Testing on the first section of the line began last year.

Alstom is part of the ALTRAC Light Rail consortium, which has a A$2.1bn PPP contract to build, operate and maintain the route. Other consortium members include Transdev Sydney, Acciona Infrastructure Australia and Capella Capital, in addition to three equity investors: John Laing, First State Super and Acciona Concesiones.

Alstom is supplying a fleet of 60 Citadis X05 five-section light rail vehicles, which are intended to operate in 67 m long coupled pairs. The manufacturer is also supplying signalling, power supply equipment, its HESOP energy recovery system and depot equipment.

Siemens to supply S700 Light Rail Vehicles, LRV, to Portland; USA, Germany

31 Jul. 2019; Metro Report
The LRV Vehicles will operate on the Portland MAX Light Rail Transit, LRT, Network; USA.

USA: Portland Transport Agency TriMet has selected Siemens Mobility to supply up to 86 light rail vehicles, the manufacturer announced on July 29.

Deliveries from Siemens’ Sacramento plant are expected to begin in 2021. The base order of 26 LRVs would replace TriMet’s 26 Type 1 vehicles supplied by Bombardier in the 1980s.

Siemens will supply its S700 vehicle, developed jointly with TriMet. Designated by the operator as Type 6, the low-floor LRVs are based on Siemens’ S70 design, and will be fitted with Internet of Things equipment for remote monitoring.

‘Retiring our older rail vehicles with stairs and replacing them with these new vehicles will mean the entire MAX light rail fleet will be all low-floor, better meeting ADA standards and creating a better experience for all riders, no matter their physical abilities’, said TriMet General Manager Doug Kelsey. ‘These new vehicles also are a critical part of our making transit better efforts and will make the light rail system more efficient and more reliable for our customers.’

The contract includes options for up to 60 more LRVs, which would be needed for planned extensions of Portland’s MAX light rail network.

Sejong City to test autonomous Buses; South Korea

05 Aug. 2019; Metro Report
SOUTH KOREA: Trials of autonomous buses are due to begin in Sejong City from 2021, as part of a government initiative to encourage regional innovation.

Seven areas outside of the Seoul metropolitan area, including Busan, have been designated as zones exempt from or with deferred regulation. The policy aims to promote balanced national development.

Sejong City, a planned city being developed to eventually take over some functions from the existing capital of Seoul, would initially test 20 self-driving buses on selected roads. The number of is expected to grow to 200 by 2033.

The vehicles will use a 5G telecoms network to share data in real time, including with other buses. They would also be able to recognise traffic lights and build up a map of the city.

Hungary to roll out national public Transport Ticketing System; Hungary

Aug. 2, 2019; Rail Group News

THE Hungarian government has appointed a consortium of 4iG and T-Systems Magyarország to develop a national public transport ticketing system by the end of 2020 at a cost of Forints 11.2bn ($US 38m).
Coordinated by the Transport Research Institute (KTI), the system will integrate regional and long-distance rail and bus operations and ticketing systems.

The new ticketing system will offer an integrated timetable and a single call-centre for rail and bus services.

The winner of the public tendering process will also have to develop the back office systems, a dispatching centre and traffic control systems as well as supply 5300 buses with onboard computer systems with integrated ticketing machines. The contract will also include 25 street ticket machines.
METRO NEWSLETTERS on “URBAN MOBILITY AS A SERVICE”

PUBLIC MULTIMODAL URBAN, SUBURBAN AND INTERURBAN PASSENGER TRANSIT SYSTEMS WITH METRO-BUS, LIGHT-RAIL, TRAM-TRAIN, METRO-RAIL, METRO-TRAIN, REGIONAL RAPID TRANSIT, COMMUTER-RAIL, ROPE-WAY/TRAIN, MAGLEV AND HOVERCRAFT TRANSIT/PEOPLE MOVER, WATER-METRO, AUTONOMOUS PEOPLE-MOVER

MOBILITY SOLUTION, TRANSPORTATION AND ECONOMIC DEVELOPMENTS IN MODERN URBAN/MEGAPOLIS ENVIRONMENT

METRO Newsletter by Dr. F.A. Wingler
METRO 84, August 2019

Animation: ALSTOM “Make-in-India” Train-Set for Kochi Metro
PART I: INDIAN ACTIVITIES AND INITIATIVES FOR URBAN MOBILITY AS A SERVICE

Alstom rolls-out its 100th Make-in-India Metro Train; India

August 9, 2019; Railway Pro
ALSTOM has delivered the last of the 25 trainsets for Kochi Metro, by rolling out the 100th ‘Make-in-India’ metro trainset from its manufacturing facility in Sricity, Andhra Pradesh. Kochi operates a 100% ‘Make-in-India’ metro fleet entirely custom-built at the flagship manufacturing facility at Sricity.

The facility was set up as Alstom’s first global manufacturing centre for rolling stock in the Asia-Pacific region. This plant commenced operations in November 2013 and delivered its first metro train-set to Chennai Metro Rail Corporation (CMRL) in February 2014. The facility currently employs more than 600 employees and has a production capacity of 240 cars per year. The factory is currently scaling up to double production capacity and also introducing latest industrial technologies.

Alstom’s Sricity facility has made on-time deliveries of more than 420 metro cars for its Indian and international customers. This includes delivering completely indigenous trainsets to metro rail corporations of Chennai, Lucknow, Kochi and Sydney (its first international order).

Before end of this year, the facility will commence production for 248 metro cars (31 train sets of 8 cars each) for Mumbai Metro Line 3, 212 metro cars (106 train sets of 2 cars each) for Montreal Metro (Réseau express métropolitain) and 10 more train sets for Chennai Metro, which is already under execution.

Alstom Transport India extends Sri City Rolling Stock Facility in Andhra Pradesh; India
January 25, 2016

Alstom Transport India has started expanding its rolling stock manufacturing facility at Sri City, in Andhra Pradesh, Bharat Salhotra, Managing Director, Alstom Transport India said, The Hindu reports.
“We have started gradually expanding our manufacturing capacity. Over the next few months, the production capacity of rolling stocks will get enhanced to 20 metro train cars per month from seven cars per month. At a later date, we might enhance this number to 300 train cars per annum,” Salhotra said.

About the investment, Bharat said it would be significant as India was turning into an important market for Alstom after ‘several wins’ -metro rail projects. The number of employees in India had risen to 1,600 from 350 and this would reach 3,000 in three years. “We are planning to service domestic as well as overseas markets too. Over the next few years, we expect about 50 per cent of revenue to come from exports,” he said. Mentioning that the first trial run of Kochi Metro Rail was conducted successfully, he said it was the first ‘Make in India’ project to be conceptualised, designed, manufactured and tested by an Indian team. The local production was 70 per cent.

Australia’s first fully-automated, Driverless Metro Trains are made in India; India, Australia

Updated 30/05/2019

The Metro-Sets for Sydney Metro’s newest service – the fully automated North West Line train connecting Tallawong to Chatswood – have been made in India.

Australia’s first fully-automated rail service, the newly launched North West Line by Sydney Metro, has been made in India.

Sydney’s new-generation metro trains have been manufactured by Alstom. Designed in France and assembled at its centre of excellence in Sri City India, these fully automated driverless metro has been made with contributions from Alstom’s operations in Australia, Brazil, China and Belgium. Alstom has supplied 22 six-car Metropolis trains from their Sricity facility in Andhra Pradesh, India

<source srcset
THE FUTURE OF METRO COACH INDUSTRY IN INDIA; India

UITP

Metro is emerging as key solutions to fulfill demand for urban transportation in India. As per Ministry of Urban Development (MoUD), about 316 km of Metro rail is under operation and more than 500 km of Metro rail is under construction across the country. It is expected that 5 new systems will become operation by 2017, mainly Hyderabad, Lucknow, Noida, Kochi and Navi Mumbai. Some of the metro lines, like Nagpur and Ahmedabad are under construction.

The emergence of metro sector in India has also benefited construction and equipment industry. Further, it has helped to commence metro coach industry in India. The country imported the CBUs (Completely Built Units) from Germany and South Korea at the launch of Delhi Metro Rail Corporation (DMRC).

**Metro Coaches – ‘Make in India’**

The industry has covered the long way in last 15 years from being an importer of metro coaches to become exporter of coaches to other countries. 90% of the coaches supplied to Delhi metro are manufactured in India and also maiden consignment of six metro coaches made in Bombardier facility were shipped to Queensland and Sydney Metros in Australia in January 2016. Bombardier Transportation will export a total of 450 metro coaches over a period of two-and-a-half year. Further, India will also be exporting 521 bogie frames to Brazil for Sao Paulo monorail.

![Image of metro coaches](Copyright: Team-bhp)

The contract conditions of DMRC mandate a cap on upper limit of 25 per cent for production abroad while the balance is to be necessarily manufactured in India either
through tie-ups or a wholly-owned subsidiary. This conditions pushed international manufacturers to setup facility in India. This has helped to also boost establishment of ancillary units and helped generate employment.

To move up in value chain, the companies has started indigenisation process and major sub system of metro coaches have been indigenised. Other parts including window glasses, battery boxes, brake blocks, bogie frames, vacuum circuit breakers, propulsion among others are also being manufactured in India.

Manufacturing Units in India

The capital costs of Metro coaches in India are substantially lower than the rest of the world. The capital cost of a coach is around INR 89.4 million (US$ 1.35 million) in India, the cost in Vancouver is INR 160.8 million (US$ 2.5 million) and in San Francisco is INR 151.3 million (US$ 2.30 million). Three Metro coach manufacturing units have already been established in India:

<table>
<thead>
<tr>
<th>Name of the Company</th>
<th>Facility at</th>
<th>Year of Establishment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bombardier Transportation</td>
<td>Savli near Vododara (Gujarat)</td>
<td>2008</td>
</tr>
<tr>
<td>Bharat Earth Movers Limited (BEML)</td>
<td>Bengaluru (Karnataka)</td>
<td>2015</td>
</tr>
<tr>
<td>Alstom Transport</td>
<td>Sricity near Chennai (Tamil Nadu)</td>
<td>2010</td>
</tr>
</tbody>
</table>

China Railway Rolling Stock Corp (CRRC) is planning to setup its manufacturing unit in the Multi-modal International Cargo Hub and Airport at Nagpur (MIHAN).

Metro Coaches Market

The existing numbers of coaches supplied or ordered for various metro project is as follows:

<table>
<thead>
<tr>
<th>Metro Rail Project</th>
<th>Rolling Stock Suppliers</th>
<th>Coaches</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delhi Metro (Broad Gauge)</td>
<td>Consortium of Hyundai, Mitsubishi &amp; MELCO / Bombardier / BEML</td>
<td>1232</td>
</tr>
<tr>
<td>Delhi Metro (Standard Gauge)</td>
<td>BEML</td>
<td>164</td>
</tr>
<tr>
<td>Bangalore Metro</td>
<td>BEML-led consortium with Mitsubishi &amp; Hyundai</td>
<td>150</td>
</tr>
<tr>
<td>Mumbai Metro</td>
<td>CSR Nanjing (China)</td>
<td>64</td>
</tr>
<tr>
<td>Jaipur Metro</td>
<td>BEML</td>
<td>40</td>
</tr>
<tr>
<td>Kolkata Metro</td>
<td>CNR Dalian (A subsidiary of CRRC)</td>
<td>112</td>
</tr>
<tr>
<td>Chennai Metro</td>
<td>Alstom</td>
<td>168</td>
</tr>
<tr>
<td>Gurgaon Metro</td>
<td>CSR Zhuzhou (A subsidiary of CRRC)</td>
<td>36</td>
</tr>
<tr>
<td>Hyderabad Metro</td>
<td>Hyundai -Rotem</td>
<td>171</td>
</tr>
<tr>
<td>Lucknow Metro</td>
<td>Alstom Transport</td>
<td>80</td>
</tr>
<tr>
<td>Kochi Metro</td>
<td>Alstom Transport</td>
<td>75</td>
</tr>
<tr>
<td>Nagpur Metro</td>
<td>CRRC</td>
<td>69</td>
</tr>
<tr>
<td>Navi Mumbai Metro</td>
<td>CSR Zhuzhou (A subsidiary of CRRC)</td>
<td>12</td>
</tr>
<tr>
<td>Noida Metro</td>
<td>CRRC</td>
<td>76</td>
</tr>
</tbody>
</table>
(Disclaimer: Numbers released by metro operators or manufacturing agency in public domain)

**Future Demand**

As per industry estimates, there will be a demand of 2000 metro trains in India in the next 5 years (2015-2020). The Delhi Metro currently operates with a fleet of 227 train sets comprising of 128 six coach, 58 eight coach and 41 four coach trains across all its corridors. A total of 924 coaches have been ordered for the forthcoming phase of Delhi Metro including 504 coaches for the new Phase 3 corridors.

Further, new metro systems like Ahmedabad, Vijayawada, Kanpur etc. will release tender in coming months for the procurement of rolling stock.

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**DELHI ELECTRIC VEHICLE POLICY 2018 - A BIG PUSH TOWARDS ELECTRIFICATION (e-MOBILITY); India**

Wed. 28 November 2018; UITP
Government of National Capital Territory of Delhi released its draft Electric Vehicle Policy 2018. Delhi is facing major issues with air and noise pollution. Adoption of Electric Vehicles (‘EVs’) for road transport will contribute to better air quality, reduced noise pollution, enhanced energy security and reduced greenhouse gas emissions. Delhi has become the seventh state in the country to launch its own EV policy, following Karnataka, Kerala, Telangana, Maharashtra, Andhra Pradesh and Uttar Pradesh.

In 2013, Government of India launched a National Electric Mobility Mission Plan 2020. Under the mission plan, the Scheme for Faster Adoption and Manufacturing of (Hybrid&) Electric Vehicles in India (‘FAME India’) was launched in March, 2015 for two years as Phase-I, which has subsequently been extended up to 31 March, 2019. Despite Central and State government incentives, pure electric vehicle penetration currently (i.e., in 2017) remains quite low in India, about 0.1% for cars, ~0.2% for 2 wheelers and practically nil for commercial vehicles. This is mainly because of high capital cost, non-availability of charging stations and lack of supply.

Delhi Electric Vehicle Policy 2018 is trying to address some of the issues by providing incentive for both manufacturers and consumers. The policy will remain in force for the period of 5 years. The primary objective of the Delhi EV Policy 2018 is to bring about a material improvement in Delhi’s air quality by bringing down emissions from transport sector. To do so, this policy will seek to drive rapid adoption of Battery Electric Vehicles (BEVs) in a manner where they contribute to 25% of all new vehicle registrations by 2023.

The following are key incentives proposed for different categories of vehicles:

**Two-Wheelers** (should be eligible under FAME and comparable to >90cc ICE two wheelers)

- ‘Purchase Incentive’ equivalent to 50% of the demand incentive offered under FAME India.
- An additional ‘Top-up Incentive’ of up to 50% of the FAME India incentive will be provided to vehicles with swappable batteries for a period of three years from the date of notification of this policy.
- Ride hailing and two wheeler rental service providers will be allowed to operate electric two wheeler taxis subject to obtaining a commercial vehicle registration in Delhi.
• Road tax, registration fees and MCD one-time parking fee will be waived for all electric two-wheelers with an ‘Advance Battery’.
• Existing ICE two wheeler owners will get a scrapping and de-registration incentive of up to ₹15,000 per vehicle for scrapping two wheelers that are not BS [IV] certified.

Three-Seater Auto-Rickshaws (purchase and use of new electric autos with swappable batteries - ‘e-autos’)

• An open permit system will apply to approved e-autos, with no limits on the number of Auto Rickshaw Permits (‘e-auto Permits’) to be issued.
• Road tax, registration charges, MCD one-time parking fee and Auto Rickshaw Permit fees will be waived for e-autos.
• Individuals with a valid light motor vehicle driving license (DL) and a PSV badge will be eligible to apply for e-auto permits.
• Fleet owners will also be allowed to obtain and hold e-auto Permits.
• To support wide ownership and improved incomes of individual e-auto owners, the GNCTD will provide following support to individuals with a valid DL and PSV badge who want to finance the purchase of an e-auto in Delhi: (i) 5% of the purchase price (net of FAME India subsidy) will be provided as down payment subsidy to an empaneled finance provider subject to a maximum of ₹12,500, and (ii) 5% interest subvention will be provided subject to the loan amount being capped at ₹2,50,000 and a maximum loan tenor of 3 years.
• Existing TSR Permit holders will get an incentive of up to ₹15,000 per vehicle if they de-register and scrap vehicles that are more than seven years old provided they also surrender their permits.

E-rickshaws

• Delhi Financial Corporation (DFC) will provide a hire-purchase scheme for approved e-rickshaws and to drivers with a valid driving license and PSV badge. Drivers will have to provide 5% of the purchase price of the e-rickshaw as an initial deposit and pay the remainder of the purchase price along with interest at 5% over a 36 month period.
• The GNCTD will also provide following support to individuals with a valid DL who want to finance the purchase of an e-rickshaw through a DFC empaneled NBFC or Scheduled Bank: (i) 10% of the purchase price will be provided as down payment subsidy to an empaneled finance provider subject to a maximum of ₹20,000, and (ii) 5% interest subvention will be provided subject to the loan amount being capped at ₹1,80,000 and a maximum loan tenor of 3 years.

Promoting Usage of App based e-Autos and e-Cabs

• App-based aggregators and ride hailing service providers who provide mobility solutions will be invited to participate in the “App-based e-cab/e-auto user incentive scheme”.
• For all e-cab/e-auto rides taken through an App-based aggregator, the GNCTD will offer ‘cash back’ rebates for short first and last mile connectivity trips. These rebates will be capped at a maximum of 20% of trip cost and an absolute value of ₹10 per ride. The objective of the rebate will be to make an e-cab/e-auto ride at least 10-20% cheaper than an equivalent ride in an ICE cab/auto.

Buses
The GNCTD commits to pure electric buses being at least 50% of all new state-carriage buses procured for the city fleet including for last mile connectivity, starting with the induction of 1000 pure electric buses in 2019. This will help achieve a target of making 50% of the public transport bus fleet zero emission by 2023.

In addition, GNCTD will offer reasonable incentives to operators of private stage-carriage vehicles of all sizes to ensure that battery electric vehicles make up at least 50% of the entire public transport system in Delhi by 2023.

**Goods Carriers (3 Wheeler)**

- Fleet owners, businesses using three wheeler goods carriers and individual owners will be encouraged to adopt electric three wheeler goods carriers (‘e-Carriers’) by providing an additional purchase incentive equivalent to 50% of the incentive offered under FAME India.
- This ‘e-Carrier Incentive’ will be available for approved list of vehicles as notified by the Transport Department, GNCTD and will be available for the first 5000 e-carriers to be registered.
- Road tax, registration fees and MCD one-time parking fee will be waived for e-Carriers that are eligible for e-Carrier Incentive.

Further, the government is pushing measures to promote electric vehicle charging infrastructure in the city. Some of the measures proposed are:

**Private Charging Points**

The government propose changes in building bye-laws will be made to make home and work place parking ‘EV ready’.

- All new and renovated non-residential buildings with parking demarcated for more than 10 equivalent car spaces (‘ECS’) will need to have at least 20% ‘EV ready’ ECS spots with conduits installed.
- All new and renovated residential buildings, Co-op, Group Housing Societies and colonies managed by Residents Welfare Associations (RWAs) with more than 10 ECS parking space will need to make 100% of demarcated ECS parking, EV ready with conduits installed.
- The GNCTD will provide a grant of 100% of the purchase and installation cost of these charging points up to ₹30,000 per charging point for the first 10,000 charging points.
- Electricity tariff applicable for Charging Stations for e-rickshaws/e-vehicle on single point delivery (₹5.50 per kWh for supply at LT with ToD rebates as applicable) will be extended to include all charging points that are BEVC-AC001 compliant and are connected to an on-site single point of delivery meter.

**Public Charging Infrastructure** - Providing accessible public charging facilities within 3 km travel from anywhere in Delhi.

- The city will be divided into 11 ‘travel districts’ mapping onto existing revenue districts. ‘Energy Operators’ (EOs) will be invited to bid to set up charging stations in each of the travel districts.
- Concessional locations for charging stations will be made available by the GNCTD in every district along with bare minimum lease rentals.
- EOs will be selected for each travel district based on competitive bidding on the basis of lowest capital subsidy requested per charging point installation and the...
density of charging points (i.e., points/sq.km.) being installed within a two year period — this will include charging points at both Concessional locations and other sites

- GNCTD will provide a capital subsidy covering cost of chargers and installation expenses to the winning bidder in a district

**Public Battery Swapping Infrastructure**

- GNCTD will also invite bids from battery manufacturers and others interested in setting up a battery swapping business. Bids will be invited for up to three ‘Battery Swapping Operators’ (BSOs) who can operate across Delhi
- BSOs thus selected based on a competitive bidding process will have the right to set up and operate battery swapping kiosks/points within public parking zones bus depots and terminals, metro stations and other GNCTD identified locations. Space within these sites will be allocated by the GNCTD at bare minimum lease rentals
- 100% of net SGST, accrued to the GNCTD, will be provided as reimbursement to BSOs for purchase of Advanced Batteries to be used at swapping stations

Further, GNCTD will invite battery recycling businesses to establish a presence in Delhi. Appropriate protocols and investment subsidies for setting up such a business shall be notified by the GNCTD after consultation with stakeholders, especially battery and EV manufacturers. The policy aims to create an eco-system to promote electric vehicles in the city.

**ELECTRIC BUSES PROCUREMENT IN INDIA – INDIAN CITIES GOT THE VIABLE RATES**

Sat. 03 March 2018; UITP

Last 2 months has witnessed a greater action in the space of electric buses. Department of Heavy Industries (DHI), Government of India sanctioned INR 4.37 billion (US$ 67 million) for the procurement of electric buses, e-taxis and e-autos in December 2017. The
department has selected **11 cities with one million-plus population** for the procurement of 390 electric buses, and is providing funds to the tune of INR 10 million (US$ 150,000) per bus.

The department has sanctioned 40 buses for every city under the pilot project, except 15 buses each for Guwahati and Jammu. However, BMTC (Bengaluru Metropolitan Transport Corporation) in Bengaluru is considering 150 buses and TSRTC (Telangana State Road Transport Corporation) in Hyderabad has decided to take 100 buses. 10 out of 11 cities floated the tender within 15 days, except Delhi which is planning to procure 700 e-buses separately from state budget. Interestingly, all 10 cities completed the tender within one month and received good response from the industry.

The department allowed the cities to choose the procurement method from the option of – **Outright Purchase** or **Gross Cost Contract (GCC)**.

- In case of outright purchase, DHI provides 60% subsidy and the rest is provided by the State road transport corporations. 5 cities (Indore, Lucknow, Kolkata, Jammu and Guwahati) released tenders under outright purchase model.
- On the other hand, the buses would be operated and maintained by the supplier at a fixed cost per km under GCC. Under the FAME Scheme, the city expects to receive subsidy of upto 60% of the capital cost of Electric Bus over a period 3 years in three instalments of 20% each in each fiscal starting from the current fiscal year of 2017-18. 5 cities (Bangalore, Mumbai, Hyderabad, Ahmedabad, and Jaipur) have decided to invite bids under GCC.

### Bid Price in Different Cities – INR PER KM

<table>
<thead>
<tr>
<th>City</th>
<th>9 Meters AC</th>
<th>9 Meters Non-AC</th>
<th>12 Meters AC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangalore (Goldstone)</td>
<td>29.28</td>
<td></td>
<td>37.35</td>
</tr>
<tr>
<td>Hyderabad (Goldstone)</td>
<td>36.00</td>
<td></td>
<td>40.30</td>
</tr>
<tr>
<td>Ahmedabad (Tata Motor)</td>
<td>46.00</td>
<td></td>
<td>51.00</td>
</tr>
<tr>
<td>Mumbai (Goldstone)</td>
<td>57.00</td>
<td></td>
<td>51.00</td>
</tr>
<tr>
<td>Jaipur (Tata Motor)</td>
<td>70.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mumbai (Goldstone)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Cost of the electricity is borne by the authority.*

### Bid Price in Different Cities – INR MILLION PER BUS
The details of the tender floated are as follows:

<table>
<thead>
<tr>
<th>City, State</th>
<th>Number of Buses</th>
<th>Agency</th>
<th>Contract Type</th>
<th>Lowest Bidder</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangalore, Karnataka</td>
<td>150 Non-AC (Midi) / 150 AC (Standard)</td>
<td>Bengaluru Metropolitan Transport Corporation</td>
<td>Gross Cost Contract</td>
<td>Goldstone-BYD</td>
</tr>
<tr>
<td>Mumbai, Maharashtra</td>
<td>20 AC (Midi) + 20 Non-AC (Midi)</td>
<td>BEST Undertakings</td>
<td>Gross Cost Contract</td>
<td>Goldstone-BYD</td>
</tr>
<tr>
<td>Hyderabad, Telangana</td>
<td>40 AC (Midi / Standard) + 60 AC (Midi / Standard)</td>
<td>Telangana State Road Transport Corporation</td>
<td>Gross Cost Contract</td>
<td>Goldstone-BYD</td>
</tr>
<tr>
<td>Ahmedabad, Gujarat</td>
<td>40 AC (Midi)</td>
<td>Ahmedabad Janmarg Limited (AJL)</td>
<td>Gross Cost Contract</td>
<td>Ashok Leyland Limited</td>
</tr>
<tr>
<td>Jaipur, Rajasthan</td>
<td>40 AC (Midi)</td>
<td>Jaipur City Transport Services Limited</td>
<td>Gross Cost Contract</td>
<td>Tata Motors Limited</td>
</tr>
<tr>
<td>Indore, Madhya Pradesh</td>
<td>40 AC (Midi)</td>
<td>Atal Indore City Transport Services Limited</td>
<td>Outright Purchase</td>
<td>Tata Motors Limited</td>
</tr>
<tr>
<td>Lucknow, Uttar Pradesh</td>
<td>40 AC (Midi)</td>
<td>Lucknow City Transport Services Limited</td>
<td>Outright Purchase</td>
<td>Tata Motors Limited</td>
</tr>
<tr>
<td>Kolkata, West Bengal</td>
<td>20 AC (Midi) + 20 AC (Standard)</td>
<td>West Bengal Transport Corporation Limited</td>
<td>Outright Purchase</td>
<td>Tata Motors Limited</td>
</tr>
<tr>
<td>Jammu, J&amp;K</td>
<td>15 AC (Midi)</td>
<td>Jammu and Kashmir State Road Corporation</td>
<td>Outright Purchase</td>
<td>Tata Motors Limited</td>
</tr>
<tr>
<td>Guwahati, Assam</td>
<td>15 AC (Midi)</td>
<td>Assam State Transport Corporation</td>
<td>Outright Purchase</td>
<td>Tata Motors Limited</td>
</tr>
</tbody>
</table>

Tata Motors will supply 190 electric buses to 6 cities, Goldstone-BYD will supply 290 buses to 3 cities and Ashok Leyland will supply 40 buses to 1 city. Ahmedabad could not able to issue Letter of Acceptance (LoA) by 20 March 2018. These buses may be
deployed in a phased manner over the next three to six months. Some of the key findings from the latest bidding rounds are as follows:

(1) **Length agnostic subsidy** resulted in STU preference for 9 meters buses. The subsidy was based on the localisation components, rather than on the bus size. The government should encourage the procurement of 12 meters buses also as they can be used on truck routes.

<table>
<thead>
<tr>
<th>Percentage of Localization</th>
<th>Level–1 (Minimum 15% Localization)</th>
<th>Level–2 (Minimum 35% Localization)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subsidy available</td>
<td>60 % of purchase cost or ₹85.00 Lacs (whichever is lower)</td>
<td>60 % of purchase cost or ₹1.00 Cr. (whichever is lower)</td>
</tr>
</tbody>
</table>

(2) All cities completed the **bidding process within one month** to avail the subsidy under FAME-I Scheme. Most of the cities are procuring or renting the buses without detailed operation plan. The authority and the manufacturer/operator will need to work closely to ensure the deployment of e-buses on city routes.

(3) There is huge **variation in tender conditions** in different cities which results into big variation in price for both GCC and outright purchase contract.

<table>
<thead>
<tr>
<th>Minimum Assured km – Per Bus Per Day (Figures in km per day)</th>
<th>Contract Period for the Bus Operation (Figures in Years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mumbai 7, Ahmedabad 7, Jaipur 7, Hyderabad 12, Bangalore 10</td>
<td></td>
</tr>
</tbody>
</table>

* Hyderabad – Initial contract will be for 6 years and can be extended to 4 more years / ** Bangalore – Initial contract will be for 7 years and can be extended to 3 more years.

(4) The bidding round experienced very **aggressive pricing** from limited players to crowd out market. The authority should evaluate the bid price logically to find out the long term sustainability of the project.

(5) **Timely execution** is essential given only two bidders has won all the tenders and will have advantaged position compared to other players. Further, technical capability of bidders also needs to be ascertained to ensure successful execution of contracts.
(6) **Deployment of electric buses** is an opportunity for the cities to introduce new technology and change the face of public transport. Unfortunately, cities have not planned any special marketing efforts to popularise the use of electric buses.

The detailed analysis of each city is as follows:

**Bengaluru, Karnataka**

Bengaluru received the approval for the procurement of 40 electric buses. However, the city planned to procure 150 buses on gross cost. The tender was released by Bangalore Metropolitan Transport Corporation (BMTC) for the hiring of 150 AC electric buses along with charging station. The city has not finalised the ratio of 9 meters and 12 meters air-conditioned e-buses. BMTC agreed to consider the experience of bus operation outside the country. BMTC has proposed a contract period of 10 years, which will be reviewed after 7 years. The assured average km is 200 km per day per bus. The cost of electricity for the charging of the buses will be borne by BMTC.

**9M AC E-Bus Rates quoted by different Manufacturers** (Figures in INR per km)

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Rate (INR per km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goldstone-BYD</td>
<td>29.28</td>
</tr>
<tr>
<td>Tata Motors Limited</td>
<td>51.15</td>
</tr>
<tr>
<td>Ashok Leyland</td>
<td>45.75</td>
</tr>
<tr>
<td>Mytrah NH4 Energy</td>
<td>38.79</td>
</tr>
</tbody>
</table>

**12M AC E-Bus Rates quoted by different Manufacturers** (Figures in INR per km)

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Rate (INR per km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goldstone-BYD</td>
<td>37.35</td>
</tr>
<tr>
<td>Tata Motors Limited</td>
<td>60.90</td>
</tr>
<tr>
<td>Mytrah NH4 Energy</td>
<td>44.94</td>
</tr>
</tbody>
</table>

Goldstone Infratech Limited emerged as the lowest bidder for both 9 meters AC e-bus and 12 meters AC e-bus, quoted INR 29.28 per km and INR 37.35 per km respectively, without the cost of the electricity.

**Mumbai, Maharashtra**

Mumbai received the approval for the procurement of 40 electric buses from DHI. The city is already running 5 electric buses (Midi) for last 3 months, financed by Bombay Municipal Corporation (BMC). The tender was released by BEST Undertakings for the hiring of 40 electric buses under GCC. The city decided to hire 20 AC and 20 Non-AC buses. BEST has proposed a contract period of 7 years. The assured average km is 4,000 kms per month per bus (i.e. 150 km per day). The operator is responsible for the electricity and charging of the buses.
Goldstone Infratech Limited emerged as the lowest bidder for both 9 meters AC e-bus and 9 meters Non-AC e-bus, quoted INR 57.00 per km and INR 51.00 per km respectively.

**Hyderabad, Telangana**

Hyderabad received the approval for the procurement of 40 electric buses from DHI. However, the city planned to procure 100 buses on gross cost. In the Phase-I, the city will procure 40 buses and will procure remaining buses in Phase-II. The tender was released by Telangana State Road Transport Corporation (TSRTC) for the hiring of 40 AC electric buses. The city has not finalised the ratio of 9 meters and 12 meters air-conditioned e-buses. TSRTC has proposed a contract period of for 6 years initially and extendable for further 6 years in two spells 7-9th year and 10-12th year of agreement period subject to satisfactory performance and fitness of the vehicle. The assured average km is 225 kms per day per bus. The cost of electricity for the charging of the buses will be borne by TSRTC.

Goldstone Infratech Limited emerged as the lowest bidder for both 9 meters AC e-bus and 12 meters AC e-bus, quoted INR 36.00 per km and INR 40.30 per km, without the cost of the electricity.
Ahmedabad, Gujarat

9M AC E-Bus Rates quoted by different Manufacturers (Figures in INR per km)

Ahmedabad received the approval for the procurement of 40 electric buses from DHI. The tender was released by Ahmedabad Janmarg Limited (AJL) for the hiring of 40 AC Midi electric buses under GCC. AJL has proposed a contract period of 7 years. The assured average km is 72,000 km per bus per year (i.e. 200 km per day). The operator is responsible for the electricity and charging of the buses.

The city conducted first bidding round, where Tata Motors Limited emerged as the lowest bidder for 9 meters AC e-bus and quoted INR 59.00 per km. Initially, the authority disqualified Goldstone Infratech Limited for the lack of technical experience. However, the city decided to cancel the full process and invite fresh bids. Ashok Leyland emerged as the lowest bidder with INR 48.00 per km.

Jaipur, Rajasthan

9M AC E-Bus Rates quoted by different Manufacturers (Figures in INR per km)

Jaipur received the approval for the procurement of 40 electric buses from DHI. The tender was released by Jaipur City Transport Services Limited (JCTSL) for the hiring of 40 AC Midi electric buses under GCC. AJL has proposed a contract period of 7 years. The assured average km is 54,000 kms per bus per year (i.e. 150 kms per day). The operator is responsible for the electricity and charging of the buses.

Tata Motors Limited emerged as the lowest bidder for 9 meters AC e-bus and quoted INR 70.00 per km. The city received 4 bids but rejected 3 bids on the technical ground. Tata Motors was the sole bidder which qualified in technical process.

Indore, Madhya Pradesh
Indore received the approval for the procurement of 40 electric buses. The tender was released by Atal Indore City Transport System Limited (AICTSL) for the procurement of 40 Non-AC electric buses along with charging station. The city decided to opt for 9 meters air-conditioned e-buses.

Tata Motors Limited emerged as the lowest bidder to supply 40 electric buses. The price includes the FAME Subsidy component.

**Lucknow, Uttar Pradesh**

Kolkata received the approval for the procurement of 40 electric buses. The tender was released by West Bengal Transport Corporation Limited (WBTC) for the procurement of 20 AC midi e-buses and 20 AC standard e-buses, with 7 years warranty. The seating capacity of 26 and 31 passengers was fixed for midi and standard bus respectively. The authority asked for the Supply, installation and commissioning of 30 slow charging and 10 fast charging facilities stations for midi and standard buses. Minimum range of the vehicle with battery should not be less than 150 km per charge.
Tata Motors Limited emerged as the lowest bidder to supply 40 electric buses. The price includes the FAME Subsidy component.

**Jammu, Jammu and Kashmir**

Jammu received the approval for the procurement of 15 electric buses from DHI. The tender was released by Jammu and Kashmir State Road Transport Corporation (JKSRTC) for the procurement of 15 AC midi (9 meters) electric buses. The cost of provisioning and installation of charging station is asked separately.

Tata Motors Limited emerged as the lowest bidder to supply 15 electric buses at the price of INR 9.9 million per bus and will supply 4 chargers with the buses at the cost INR 1.6 million per charger. TML was sole bidder. The price includes the FAME Subsidy component.
**Guwahati, Assam**

**9M AC E-Bus Rates quoted by different Manufacturers**  
(Figures in INR Million)

Guwahati received the approval for the procurement of 15 electric buses from DHI. The tender was released by Assam State Transport Corporation for the procurement of 15 AC midi (9 meters) electric buses. The cost of provisioning and installation of charging station is asked separately.

Tata Motors Limited emerged as the lowest bidder to supply 15 electric buses at the price of INR 9.9 million per bus and will supply 4 chargers with the buses at the cost INR 1.6 million per charger. TML was sole bidder. The price includes the FAME Subsidy component.

![Tata Motors Limited](image)

Download the full report - [ELECTRIC BUSES PROCUREMENT IN INDIA – INDIAN CITIES GOT THE Viable Rates](ELECTRIC BUSES PROCUREMENT IN INDIA – INDIAN CITIES GOT THE Viable Rates)

**UITP India Office** is happy to extend invitation to attend "3rd UITP India Bus Seminar on E-mobility and Technology Innovation" on 11 May 2018 in New Delhi.

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**PART II: GLOBAL ACTIVITIES FOR URBAN MOBILITY AS A SERVICE**

**Smart Metro 2019 Advisory Board - What are the Industry's most pressing Concerns? Global**

Tue May 21 2019  By: Marcello Perricone

![SmartRail World](image)

**Smart Cities**

Viewed as an integral part of the industry’s future, Smart Cities were a big topic of interest. The board was especially interested in autonomous vehicles, that could help break down the “last mile” barrier and achieve door-to-door journeys, through the use of transport technology platforms such as City Mapper to facilitate the payment aspect of people’s journeys.
Among the benefits of that strategy is the fact such apps already have an established user base of millions of people, and their mobile platform allows the creation of bespoke tariffs for each individual journey – which can be further enhanced down the road via next-generation technologies such as face recognition.

“Now we’re thinking differently, not rigidly, how to do the last kilometre. It’s easy in Paris or London but the question is today being asked differently when going further afield. Open payment – how can I pay? You can now take your cc and pay for one trip. It’s changing mobility.”– Stephane Sanner, Alstom

Connectivity

The ever-looming arrival of 5G super-fast connectivity was an exciting topic for the Advisory Board, thanks to its potential to improve CBTC signaling and on-board bandwidth. Faster data connections would allow for safer and efficient journeys, which could translate as huge improvements in passenger experience.

On the operational side, the evolution of Operation Control Centers (OCC) would also benefit from the vastly improved internet speeds opening the door to better security monitoring, predictive maintenance, and other analytical systems. The rise of AI technology was also floated as a potential gamechanger, with the proposal that machine learning technology could potentially be used one day to adapt timetables on the fly, intensifying frequency on busier times and spreading the capacity and the traffic strain more evenly across the network.

Security Management

Improving the safety and security of the tracks and roads is always of paramount concern, and the board believes this could be achieved through a focus on integrated security control centres. Those facilities could be controlled from a central location alongside other industry sectors and operators, providing live and efficient communications in the case of a disaster, accident, or incident such as a terrorist attack. The British Transport Police infrastructure linking buses and trains in London, England, was singled out as an efficient example of such an approach.

In a side note, the integration of security monitoring tools and their collection of vast amounts of data could provide excellent opportunities to monetise data and streamline services – an area, that’s being increasingly explored as a revenue stream for major operators.

Ticketing

The possibility of introducing flexible pricing split the room, with critics of the plans agreeing that there was a real need for peak and off-peak travel for operational purposes, while supporters touted it as good alternative to the traditional busy and quiet periods.

This issue was brought into sharp focus following the UK’s rail industry desire to shake up the existing system as part of the William Review. Making flexible ticketing (and the technology, that supports it) a viable option, is a strong focus, and both AI and machine learning systems are predicted to play a strong role in the future.
Barcelona Metro tests vertical Platform Screen Doors; Spain

02 Jan. 2018 ; Metro Report

Vertical Metro Platform Screen Door at Barcelona

**SPAIN:** Barcelona Public Transport Operator TMB is to undertake what it says will be the first test of vertical platform screen doors on a metro network, with doors supplied by S Traffic of South Korea to be installed at Can Cuiàs station on Line 11 during the second half of 2018.

The doors will each comprise three panels forming a barrier 1 800 mm high, lifting upwards to enable passengers to board or leave the train. According to TMB, much wider screen apertures are possible than with horizontal doors, removing the need for trains to stop in a precise location and enabling doors to be installed on lines which operate a variety of rolling stock.

Using a platform not currently in passenger service, the trials are expected to run for at least six months, using the two-car Series 500 trainsets deployed on Line 11 which can each accommodate 300 passengers. Can Cuiàs had become the first metro station in Spain to be equipped with platform screen doors in 2008, in preparation for the introduction of driverless operation on Line 11 the following year.

Following the deployment of vertical platform screen doors on commuter routes in Asia, the Barcelona trial is to be conducted under an agreement between TMB and South Korean bodies also including the Korea Transport Institute, Woori Tech Co Ltd and the Korean Railway Signalling Association.

Vertical Platform Screen Doors Systems,
a new Solution to prevent Track Intrusion; Global

By Mohammed ZAFATI (PSD & TPPS Expert); www.systra.com

Platform Screen Door (PSD) is currently the only proven system, which prevents tracks intrusion. However, PSD can be inappropriate for Brownfield projects due to their cost, the major impact on infrastructure, the incompatibility with different types of trains already in operation or an insufficient stopping accuracy. Here, vertical platform screen doors could be an alternate solution.

Background on PSD Systems

The PSD system is a component of the transportation infrastructure, installed on station platforms, physically protecting passengers against falls on the tracks or collision with a train running in the station.

The common widely used PSD are platform screen doors, which open horizontally. It can be composed of full-height doors with complete barriers between the station’s floor and ceiling, or mid-height doors, that do not reach the platform ceiling. The PSD system helps to:

• Prevent accidental falls off the platform onto the lower track area, suicide attempts and homicides by pushing on the platform,
• Reduce the risk of accidents, especially from service trains passing through the station at high speeds,
• Improve climate control within the station, since heating, ventilation, and air conditioning are more effective when the station is physically isolated from the tunnel,
• Improve security, as access to the tracks and tunnels is Restricted,
• Improve the overall quality of service of the line operation thanks to an efficient management of passengers’ exchange.

Nevertheless, the use of PSD systems can be challenging, especially for Brownfield projects or suburban line, due to:

• Necessity to reinforce the infrastructure of existing station platforms to withstand the PSD weight,
• Significant disruption of the daily operation during the PSD deployment on existing lines,
• Necessity for legacy trains to stop very accurately in stations,
• PSD/train doors mismatch for lines using mixed fleet with varying door divisions,
• PSD high cost.

For a couple of years now, a new type of PSD is being studied: PSD which vertically moves up and down to allow or block access to the track from the platform. The screen can be composed of steel ropes, plexiglas or bars. It is lighter as traditional PSD and can be adapted to stations operating different train types or trains being manually driven.
Vertical PSD Research and Development

The VPSD systems, that are currently under test in many places in the world consist of:

• Two panels made of steel ropes, plexiglas or bars,
• A main column with driving system and lifting motors,
• A secondary column,
• A monitoring and control electronics module (train or door detection),
• An electronic device for contact detection (obstacle, detection),
• Two platform control panels (for driver and staff),
• An alarm system,
• A metallic structure with cable tray on the top of VPSD,
• A VPSD unlocking device for emergency evacuation.

The system is generally not interfaced with the signalling system. It can activated either:
• Automatically: the train sensor detects the train arrival/ departure.
• Manually: the driver commands the lift of doors after/ before train arrival/departure.

After the passengers’ exchange, the driver shall check that there no passenger remains trapped in the PSD gap prior to order the train’s departure.

The figures below illustrate the main components of the system and the different types of VPSD being developed.
Rope Barriers at Munyang Station, Korea – relaxed Alignment with Train Doors

This system was first set up for test in South Korea in 2006 (Kwangju). In Daegu (South Korea), the VPSD system has been operated since 2013. Then, it has been exported to Japan where it has been tested on several networks (Tokyo, Yokohama, Kobe).

This system is generating interest for operators worldwide. In Sweden at Stockholm’s Åkeshov metro station, a VPSD with ropes has been tested in extreme weather conditions.

In North America, it was part of a feasibility study for a Metro project.

In France, SYSTRA is involved in a VPSD research and development project for a French Company. This company intends to test a VPSD system on a pilot station of a suburban line, operated with rolling stock with different configurations. If the test is successful, the system will get deployed on the whole line.

Feedback on VPSD Experience

It is too early to draw conclusions on VPSD in terms of Life Cycle Cost (LCC), performances and availability. However, thanks to the feedback of the tests already carried out, it is possible to build a comparison table between PSD and VPSD.

<table>
<thead>
<tr>
<th></th>
<th>PSD full Height</th>
<th>PSD mid Height</th>
<th>VPSD (under Tests)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety level</td>
<td>SIL 3</td>
<td>SIL 3</td>
<td>No SIL</td>
</tr>
<tr>
<td>Capital Expenditure (CAPEX)</td>
<td>+++</td>
<td>++</td>
<td>+</td>
</tr>
<tr>
<td>Weight</td>
<td>+++++</td>
<td>+++</td>
<td>+ (ropes)</td>
</tr>
<tr>
<td>Impact on Civil Work</td>
<td>+++</td>
<td>++</td>
<td>+</td>
</tr>
<tr>
<td>Maintenance</td>
<td>+</td>
<td>++</td>
<td>+++</td>
</tr>
<tr>
<td>Interface with Train</td>
<td>Doors synchronization</td>
<td>Doors synchronization</td>
<td>No interface</td>
</tr>
</tbody>
</table>

>>
The VPSD system is yet not certified in terms of safety integrity level (SIL) according to CENELEC standards, while a PSD system can reach higher levels (up to SIL3 for some functions).

The performances of the VPSD are still lower than PSD. Indeed, traditional PSDs meet a number of material qualification and standards requirements.

Furthermore, VPSD require more maintenance compared to PSD systems: VPSD requires obstacle sensors at every door instead of PSD where sensors are used only when there’s gaps due to curved station.

**Conclusion**

VPSD systems face numerous challenges, that make them difficult to be considered as a relevant alternative to traditional PSD. However, this could be an adequate solution where the main constraints for PSD installation are not fulfilled (homogeneous fleet, stopping accuracy).

Nevertheless, such a solution could be valuable for deployments independent from signaling, enhancement of existing infrastructures and commuter lines with heterogeneous fleet.

Before becoming a serious competitor, VPSD shall now be enhanced to provide a sufficient level of safety and to improve the global LCC.

**CBTC, Communication Based Train Control, for Light Rail Transits/Trams; towards higher Levels of Automation; Mobility Solutions for Tomorrow; Global**

by Sébastien Lacroix, CBTC expert, SYSTRA

Dubai Tram fitting with CBTC system is a first, and has set a new standard in tram automation.
But what is actually the automation potential of a light rail transit/tram and what kind of challenges does it rise?
Introduction

CBTC versatility enables its boundaries to fluctuate not only in terms of functions, but also in terms of transit systems applications. Indeed, CBTC scope may nowadays legitimately englobe subsystem functions traditionally allocated to “external” systems such as ATS, SCADA, Traction Power Control, Fire Alarm systems… as these systems do impact the train service in one way or another. In terms of applications, the range of transit systems relying on CBTC, whether driverless or not, extends from heavy duty transit systems down to LRTs, in some cases, possibly APMs (Automatic People Mover).

By LRT here, we mean the kind of LRT, that needs both train spacing protection and that is running in a dedicated track, not interfering with road traffic. Recently, a new CBTC application was born and made operational with Dubai LRT/Tram, that was successfully commissioned on 12 November 2014, paving the way for a new standard of tram operation. SYSTRA played a central role as the main consultant (The Engineer) in this project, which was delivered 45 days ahead of schedule.

CBTC is a significant investment in relation with systems usually found in a tramway system: The benefits of equipping a tram system should undergo a detailed feasibility study. This article presents how CBTC functions can assist in upgrading the capabilities and performances of a tram system, and highlights some of the associated challenges.

Classic Tram Operation Reminders

The driving concept behind tram signalling is the drive- on-sight operational procedure. The driver is responsible for enforcing safe tram separation from other trams, road vehicles and pedestrians.
The driver is also responsible for respecting the wayside signalling, that is protecting the track shunting areas, as well as other signals protecting particular areas such as tight curves with low visibility, tunnel parts (if any) etc.

Finally, the driver must adapt his speed to surrounding conditions and abide by the permanent and temporary speed restrictions.

**Tram Operation Design Upgrade with a CBTC Technology**

The first obvious benefit of CBTC integration by an overlay to LRT/tram operation is the ATP function: Passing signals at danger and over-speeding are prevented. However, in Dubai, this excludes road traffic signals, which are not considered as shunting railway signals, and therefore the question of controlling SPADs (Signals Passed at Danger) arises for road crossings signals.

GOA1 as per CBTC standard IEC 62290 includes safe train separation of the trains: In this respect, a tram without this function would only qualify as a “GOA+”. In Dubai, the choice was to rely on the driver for safe train separation, whereas for more operationally demanding systems (higher max speed, shorter headways, in the future) this function may be taken over by CBTC.

The ATP function also contributes to the safe management of the Platform Screen Doors fitted on Dubai Tram stations.

The goal of CBTC is not all about safety: It is also meant to improve the line capacity by reducing headway within the ATP safety net. This performance can be met either by efficient cab-signal HMI (“in cabin signal”) and/or ATO assistance. When it comes down to tram applications, where trams are able to get very close to each other during passenger service, this is too much of a challenge for the current ATP performances, and would require the introduction of a speed control release threshold as in ETCS/ERTMS control mode, under which the ATP would ignore the tram obstacle.

The second benefit would be the use of the ATO function to control the train movement. ATO does not spring to mind when designing a signalling system for LRT/tram operation, essentially because as the tram is often operating in non-reserved track, being then subject to all kind of external events and obstacles (pedestrians, cars, etc.) The driver, capable of analyzing these events in real time should have the hand over the braking control and acceleration. However, this principle is not required for part of tracks reserved for tram operation: in this case the ATO advantages stand out and can help optimizing the tram running time, as well as ensuring a certain level of passenger comfort by limiting jerk. Nevertheless, the driver should always have the priority through a manual braking command. The ATO can also be used to provide an efficient stopping accuracy in stations:

In Dubai, where stations are fitted with Platform Screen Doors for station air conditioning purpose, a stopping accuracy of a few centimetres is needed. It is ok to run in ATO in this part as the stations configuration, equipped with Platform screen Doors and pedestrian signage makes it similar to a reserved track. The ATO does also enable the door synchronization between train and platform doors.

CBTC availability in LRT/Tram systems does not need to be that high in comparison with metro systems since this is a system, that is not only permanently operated by drivers, but also for which the driver is managing safe tram separation. The driver is also able to pass signals at danger on short notice, therefore limiting impact on line traffic. Therefore, in order to limit capital expenditures, redundancy is not an essential feat for the CBTC
architecture. However, this should not be detrimental to the system availability to avoid resorting to a potentially cumbersome manual operation of the Platform Screen Doors through alternative devices available to the driver during onboard CBTC failure (e.g. portable hard-wire as done in Dubai or wireless).

The third benefit of CBTC is its capacity to provide an integrated tram tracking and supervision function to the Operation Control center, relying on the CBTC localization function and an Automatic Train Supervision (ATS) system. In Dubai, the choice was not to perform this supervision function by CBTC but by an independent traffic control system, commonly used in classic tram projects. In addition to having the operator familiar with this tram traffic supervision tool, this would allow the operation to carry on based on rules and procedures, in case of CBTC failure.

The Dubai Tram was not only the first tram to be equipped with a CBTC, but the projected design had to take other technical innovations into account, such as ground-based traction power (i.e. no overhead contact line), and Platform Screen Door management, all these developed within a harsh local environment (temperature, humidity, salinity, dust.).

Mid-height pedestrian fencing and road crash barriers are installed along the track alignment. Therefore, crossroads and pedestrian crossings excepted, the tram is operated in a dedicated corridor, although it cannot strictly be considered as a reserved track when compared to metro systems.

Tram priority request and intersection clearing are performed by means of inductive loops in Dubai tram. Another potential upgrade would be to use the CBTC localization system to perform the same function. Here again, there is a compromise to be made between CBTC availability targets and the possibility to continue nominal operation at cross roads regardless of CBTC failures.

CBTC interest in tram application becomes more profitable for tram applications when some sections or branches of the line require higher running performance targets closer to LRTs: these higher targets can only be achieved with reserved tracks. In some cases, these applications can be referred to as “tram trains”. CBTC may enforce limited constraints on the road traffic or pedestrian shared tracks where driving on sight is the rule, as in Dubai operation mode, and then switch to a more “metro-like” GoA1 mode of operation on other sections of the line.

Depending on the track map and operational constraints, CBTC may even be adapted to the required level of tram control by alternating sections of the line ranging from:

- Continuous track to train control,
- spot track to train transmission from switchable beacons,
- on-sight driving with fixed speed limitation, assistance in road crossing management.

One challenge based on the lessons learnt in Dubai is CBTC management of road crossings: how to provide CBTC protection without impacting the running performance of the line? In Dubai, road crossings are not equipped with barriers for road vehicles: the risk of passing a signal at danger is quite different between a signalling railway signal and a tram road traffic signal.

The Future
Driving a tram equipped with CBTC represents a challenge as the driver must pay attention to the Cabsignal HMI and to the external events bound to non-reserved tracks. Future development in tram could consist in the use of additional train-borne detection devices comparable to driverless road vehicles already on trial on some roads in the USA or Sweden. Such “driver assistance system” based on stereovision cameras recently received a certification for Tram application in Germany. Another interesting development could focus on the driver HMI by providing heads-up display (HUD) in order to ease the task of the driver in non-reserved tracks. Train-borne devices could complete the range of functions provided by CBTC systems to offer an efficient signalling package customized to every client’s future tram operation need.

SYSTRA policy is dedicated to innovation through the support of these new Mobility Solutions for tomorrow.
Extension Strategies for Metro Lines in a Communication Based Train Control, CBTC, Context; Global

by Antoine STEPHAN, CBTC Expert, SYSTRA

With the continuous cities expansion and population growth, the extension of existing metro lines is becoming more and more necessary for serving the transportation needs. Unlike new metro lines constructions, existing lines extension is subject to serious challenges including interoperability, migration, and non-disruption of the existing network operation. This paper provides key hints for local authorities willing to build a strategy for extending their existing metro lines when already operated with a CBTC system.

During the last decade, the Communications-Based Train Control (CBTC) system has emerged as the main signalling system for urban railway applications, offering optimized headway performance, enhanced operation flexibility, and improved availability and safety. Today, a large number of worldwide CBTC lines are subject to on-going or future extensions to cope with the cities’ demographic expansion.

For each extension project, a specific case study needs to be carried out in the preparatory stages of the project. Engineering Companies can provide a significant support to the local authorities in defining their extension strategy, taking into account the context and particular characteristics of the line.
Requirements and Expectations

For an optimum operation, the CBTC system design of the extension should ensure full interoperability with the existing track section and existing trains of the metro line. This means that trains should be able to run on both existing main line and extension, with full transparency for the operation and the passengers.

The operation, safety and RAM (Reliability Availability Maintenance) performances of the extension are generally expected to be at least equal to the ones of the main line. A particular attention should be given to the extension border where seamless operation is expected. Trains running on the main line should not stop or reduce speed once arrived at the extension border.

For projects with long line extensions, additional trains are often required to maintain the headway performance on the whole line. Both new and existing trains are expected to be interoperable on the whole network.

Furthermore, the construction of the extension should be done without disrupting the daily operation of the main line at any phase of the project. To do so, a judicious migration strategy should be built and followed along the project execution. SYSTRA, which has a strong background in CBTC migrations worldwide, can offer a substantial support in this field to the local authorities and contractors.

Future Extensions to be anticipated

Among the CBTC metro lines requiring an extension today, some have been able to anticipate future extensions from the initial CBTC design of the main line. However, this is not always possible, which leads to increased extension complexity and requires a careful extension strategy.

It is highly recommended when possible to anticipate future extensions from the early stages of the CBTC design of the main line. For instance, when the connection location of the future extension is predefined, the signalling design of the extension border can be optimized to ensure safe and flexible migration when connecting the extension to the main line. Besides, locations for installing extension trackside equipment, such as beacons, signals and optical fibres, on the bordering track sections of the main line, can be reserved. The CBTC backbone network can be designed such as to ensure sufficient bandwidth spare for the extension and allow an easy connection to a new backbone loop for the extension. CBTC and OCC systems can be dimensioned with enough margins, allowing the addition of the extension’s new equipment without saturating the main line equipment (e.g., calculators, servers and displays).
Dubai elevated Metro controlled by CBTC

Proposed Procurement Strategies and Recommendations

The main procurement scenarios, which are generally envisaged for a new extension, are listed below.

1. **Same CBTC System for the Extension as the existing one for the Main Line**

This scenario consists in proposing for the extension the same CBTC system, and thus the same CBTC supplier, as the existing one on the main line. This implies that the supplier is maintaining the corresponding CBTC product line.

With this scenario, the interoperability is guaranteed since the system, architecture and protocols are the same on the whole line. As the upgrades on the existing track and trains are limited, the cost and execution time are reasonable, and the risk of disrupting the current daily operation is low. In addition, modifications on the existing internal/external CBTC interfaces and existing maintenance and operational procedures are limited.

However, this solution does not allow for an open tender which therefore limits the negotiations, and the extension would not benefit from the newest CBTC techniques on the market.

This solution is the most common. It is recommended when the main line is relatively new with no major obsolescence issues, and when the extension project schedule and cost are tight. Note that, although the same CBTC system is used for the extension, a newer CBTC software and/or hardware release could be envisaged for the extension as long as the compatibility with the main line system release is preserved. It is also recommended to perform an overall performance and obsolescence study on the whole line to ensure that the consequent life cycle duration meets expectations.

2. **New CBTC System for the Extension, existing CBTC System maintained for the Main Line**
This scenario allows for an open tender and a new CBTC system for the extension only, while maintaining the existing CBTC system on the main line, and thus limiting modifications on the existing track.

Today, CBTC systems from different suppliers are proprietary and not inter-compatible by default, which increases the risk of non-interoperability between the extension and the main line and not reaching the performance targets. This scenario requires a dedicated interoperability development program, that is technically risky and expensive in time and cost. Besides, dual CBTC systems would be needed on-board which is space consuming, in addition to the need of dual maintenance and training procedures, and to an increase of the internal/external CBTC interfaces complexity.

Due to its complexity, this scenario is recommended only in particular cases such as when numerous extensions within the same network are under study, or when the operator would like to connect several lines using different CBTC systems together.

### 3. New CBTC System for both the Extension and the Main Line

This scenario consists in refurbishing the main line with a new CBTC system and implementing this system on the extension, which extends the CBTC life cycle of the whole line and potentially improves the overall system performance. In addition, the interoperability is guaranteed thanks to the use of a single system.

However, retrofitting the whole line and trains leads to high cost, time and risk of disrupting the current daily operation, and requires a judicious migration strategy.

This solution is recommended when the main line CBTC system is at its life cycle’s end or is not meeting the major operational performance requirements, and the project execution time is not a constraint.

**Map of Dubai Metro Lines**

**CASE STUDY**

**Dubai Red Line Extension to EXPO 2020**
The Roads and Transport Authority’s (RTA) Dubai Metro project is one of the major flagship projects in the city of Dubai and has become part of the city’s worldwide recognition. The Dubai Red Line and Green Line form the world’s longest fully automated UTO metro network (75 km). This project was entirely led by SYSTRA/PARSONS JV, as “The Engineer” (FIDIC frame), from its feasibility study to its revenue service phase. The Dubai Metro has contributed to reducing traffic congestion in Dubai and has been a key catalyst to fast-track development and economic growth in the city.

Within the preparation of the World EXPO event, that will be held in Dubai in the year 2020, a key project connecting the existing Red Line to the EXPO 2020 site is on-going, with tight total execution duration of less than 4 years. Continuing on the success of the Dubai Metro, the aim of this extension project, also led by SYSTRA/PARSONS JV as “The Consultant” today, and “The Engineer” later, is to contribute to the enhancement of the public transport facilities in line with RTA vision for providing an effective and integrated transport system to the residents of Dubai during and after the prestigious EXPO event.

The extension consists of a new indoor and outdoor section of 14.5 km creating a junction in the middle of the Red Line and including 7 new stations, in addition to the insertion of 40 new trains. The CBTC system should ensure optimum reliability, availability and full interoperability on the whole metro network, i.e. existing and new trains should be able to run on both the main line and the extension with full transparency for the operation and the passengers. The CBTC system should be capable of operating trains in UTO mode with a maximum speed of 90 km/h and a headway of 90 seconds between trains.

Taking into account that the existing line is relatively new (in service since 09/09/2009), the tight project schedule to meet EXPO event and the interoperability concerns, the recommended procurement strategy for the extension is the one of Scenario 1, i.e. the implementation of the same CBTC system as the one existing on the Red Line, provided that the cost proposed by the CBTC supplier is reasonable. A newer software and hardware release is also foreseen for the extension, in addition to a wise selection of non-complex upgrades, that will enhance the overall system operation and maintenance, without compromising interoperability.
Conclusion

For every metro line's extension project, procurement strategy and feasibility assessment need to be carried out from the early stages of the project. Engineering Companies such as SYSTRA play a crucial role in helping local authorities build the best procurement strategy, and subsequent tender and contract packages, taking into account short-term and long-term cost, time and performance requirements as well as obsolescence and operation continuity constraints. Whenever possible, future extensions should be anticipated from the initial design of the main line.

On the other hand, extending a line is not always the best solution to counteract the city demographic growth. When the system performance reaches its limitations, building a new independent metro line should also be considered.

Need for Platform-to-Track Intrusion Detection Systems in automated Driverless Metro Operation; Global

by Antoine STEPHAN and Virginie RAOUL, CBTC Experts, SYSTRA
The “Communications-Based Train Control” is defined by the IEC 1474 standard as a continuous automatic train control system, whose intelligence goes far beyond the basic train driving. CBTC has become the heart of metro systems and, used for services with high added value, can improve availability and safety, which are the main concerns of the operators. To keep stations platforms a safe place, while the grade of automation is growing, protection systems are needed. Even if platform screen doors seem to be the ultimate solution, in some cases other detection technologies can be more suitable mainly due to cost considerations or complexity of migration and infrastructures adaptation.

Horizontal Screen Doors at Metro Rail Station

Trending signalling system for urban railway applications, the Communications-Based Train Control (CBTC) system can manage various levels of automation, providing operation flexibility, for which the system is required to fulfil specific functions of train operation and protection.

The Grade of Automation (GoA) of a line defined by the IEC 62290-1 standard characterizes five levels of automation from 0 to 4. GoA0 corresponds to a full manual mode without any automatic protection, and GoA4 represents the Unattended Train Operation (UTO), i.e. no staff is required on-board.

Automated systems, particularly without driver, imply a change in the way of operating the line. As safety always comes first, it is mandatory to protect passengers on platforms by means of protection systems so that any potential intrusion to the automated territory is detected, or even prevented.

Protection Needs in a CBTC Context

Following the IEC 62290-2 standard for urban guided transport management and command/control systems:

- In GoA0/1/2 modes, the guideway supervision is performed by the driver.
In GoA3/4 modes (driverless and unattended, respectively), the system is required to manage the guideway supervision, i.e. to prevent collision with obstacles and persons on tracks. For collision with obstacles along the track, on-board obstacle detection systems are installed under the trains and trigger a train emergency brake as soon as an obstacle is detected. For collision with passengers, as the station platforms are the main locations for passengers’ access to the train and the track, these platforms should be equipped with a protection system.

The purpose of the platform protection system is to prevent any incident in station between trains moving along the platforms and passengers waiting on the platforms, and isolate tracks from any passenger’s intrusion. The protection system is connected to the signalling system, through vital control/monitoring interfaces, allowing the following functions:

- When no train is in the station, the system will either detect or prevent any intrusion on the track. In case of any intrusion detection (e.g., passenger falling on the track) or failure leading to a risk of intrusion (e.g., platform doors open), the train run authorization in this area will be inhibited by the signalling system.
- When the train is entering the station, in case of any intrusion detection or failure leading to a risk of intrusion, the protection system will trigger through the signaling system an emergency brake of the entering train.
- When the train is correctly berthed in the station, if platform screen doors are installed, the signalling system will authorize the opening of the platform doors facing the train doors, then control the closing of the doors. The train departure will only be authorized if the platform and train doors are detected closed and locked, and the protection system is not triggering any detection alarm.

Different types of platform protection systems can be proposed today for metro stations. In order to select the most adapted solution for a given metro project, various criteria must be analyzed, including product cost, operation and maintenance cost, installation complexity, migration strategy in case of Brownfield project, platform infrastructure constraints, life cycle duration, target safety level, environmental conditions (including temperature, wind, light/sun, which could increase the risk of false detection).

**Background on Platform Protection Technologies**
Two main families of platform protection solutions are currently used for automated metro lines: Platform screen doors (PSD) and intrusion detection systems.

The installation of PSD is the dominant solution over intrusion detection systems for fully automated metro lines. The following figure provides the current total number of stations equipped with PSD vs. the ones with intrusion detection systems for fully automated metro lines world-wide, with the percentage of growth since 2006 (Ref. UITP, July 2016).

The PSD system is a component of the transportation infrastructure, installed on station platforms, physically protecting passengers against falls on the tracks or collision with a train running in the station. It can be composed of full-height doors with complete barriers between the station’s floor and ceiling, or mid-height doors that do not reach the platform ceiling. The PSD system helps to:

- Prevent accidental falls off the platform onto the lower track area, suicide attempts and homicides by pushing on the platform,
- Reduce the risk of accidents, especially from service trains passing through the station at high speeds,
- Improve climate control within the station, since heating, ventilation, and air conditioning are more effective when the station is physically isolated from the tunnel,
- Improve security, as access to the tracks and tunnels is restricted,
- Improve the overall quality of service of the line operation thanks to an efficient management of passengers’ exchange.

An alternative to PSD for protecting platforms is the use of intrusion detection systems to detect passengers' intrusion and fall on the track. This detection system is vitally interfaced with the signalling system. When an object is detected, it raises an alarm to the signalling system in order to automatically set a restrictive run authorization in the platform area, and switch traction power off when a third rail is present. For degraded operation, a bypass device must be implemented which allows trains to be operated, even when the intrusion detection system has failed.

Different technologies can be used for the intrusion detection systems, including:

- Infrared/laser, based on light interception,
- Radar, based on forms and materials identification,
- Weight/sensor panels on the track,
- Video, based on image processing.

**Advantages and Drawbacks**

The PSD system is the dominant solution for platform protection as it offers the best isolation between passengers on the platform and both tracks and running trains, which reduces risks of accidents and disruption of the daily operation. Thus, this system is highly recommended for all automated metro projects and particularly for Greenfield projects where its implementation could be easier than for Brownfield projects.

On the other hand, intrusion detection systems are subject to several challenges that make them difficult to use. These systems can barely reach a safety integrity level of SIL2 according to CENELEC standards, whereas a PSD system can achieve higher levels (mainly SIL3, with some functions achieving SIL4, such as the PSD/CBTC interfacing functions for the train run authorization at the station). In addition, these systems should be
designed to avoid false detections due to objects (papers, plastic bags…), animals (birds, cats, rats…), interference, which could directly impact the operation performance following repetitive useless trains stops. Furthermore, they require more maintenance compared to PSD systems, and their life cycle duration is relatively lower.

Nevertheless, the use of PSD systems is sometimes challenging, especially for brownfield projects, due to:

- Necessity to reinforce the infrastructure of existing station platforms to withstand the PSD weight,
- Reluctance to modify the architecture of existing stations for aesthetic reasons,
- Significant disruption of the daily operation during the PSD deployment on existing lines,
- Necessity for legacy trains to stop in stations with high stopping accuracy, PSD/train doors mismatch for lines using mixed fleet with varying door divisions,
- PSD high cost,
- Potential need to add detection systems for passengers’ entrapment between train and PSD due to rolling-stock gauge or curves in stations.

In all these cases, the intrusion detection systems could be a good alternative to PSD thanks to their low cost and easy installation. The intrusion detection systems could also be used for a temporary installation on a metro line, in order to facilitate the implementation and testing of other systems under migration, such as the signalling system, before installing the PSD.

The following table compares the main platform protection technologies vs. typical analysis criteria. It was generated from UITP data and feedbacks from different automated metro projects.

<table>
<thead>
<tr>
<th>Protection System</th>
<th>Laser/Infrared</th>
<th>Radar</th>
<th>Weight/sensor Panel</th>
<th>Video</th>
<th>Platform Screen Door</th>
</tr>
</thead>
<tbody>
<tr>
<td>Projects Examples</td>
<td>Lyon Metro Line D</td>
<td>Budapest Metro</td>
<td>Kuala Lumpur Kelana Jaya Line</td>
<td>Programs under development</td>
<td>Dubai Metro</td>
</tr>
<tr>
<td>Interferences</td>
<td>Snow, Rain, Sun</td>
<td>RF interference</td>
<td>Heavy Snow, Sand</td>
<td>Light/Sun</td>
<td>Wind</td>
</tr>
<tr>
<td>Rolling-stock</td>
<td>No specific interface</td>
<td>No specific interface</td>
<td>No specific interface</td>
<td>No specific interface</td>
<td>Doors synchronization</td>
</tr>
<tr>
<td>Duration</td>
<td>Short</td>
<td>Short</td>
<td>Short</td>
<td>Very short</td>
<td>Long</td>
</tr>
<tr>
<td>Location</td>
<td>On top or along the tracks or platform</td>
<td>Along the platform and between double tracks</td>
<td>On the tracks</td>
<td>Different spots on top of the tracks</td>
<td>On the platform</td>
</tr>
<tr>
<td>Impact on Operations</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Curved stations fitting</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Gap between train and PSD</td>
</tr>
<tr>
<td>False and non-detection</td>
<td>High, mitigated using optimization algorithms</td>
<td>Medium</td>
<td>Low</td>
<td>To be assessed</td>
<td>Null</td>
</tr>
<tr>
<td>SIL currently achieved</td>
<td>SIL2</td>
<td>SIL1/SIL2</td>
<td>SIL2</td>
<td>SIL0</td>
<td>SIL3</td>
</tr>
<tr>
<td>Overall cost</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Lowest</td>
<td>High</td>
</tr>
</tbody>
</table>
Case Study

Automation of Buenos Aires Metro Line D

The rail network of Buenos Aires city consists of 6 metro lines (A, B, C, D, E and H) in service with a total of 54 km of route serving 86 stations, and 1 tram line of 7.4 km, known as “Premetro”, serving 18 stations. SBASE, the local owner, is leading a series of improvement projects on the whole network, including upgrades and extensions of existing metro lines, and construction of new automated metro lines (F and G). One of the main projects is the modernization of Line D for which SYSTRA is supporting SBASE in the systems and operations preliminary design as the main Consultant. This project mainly consists in implementing a new CBTC system and commissioning new automated trains.

The CBTC system on Line D is expected to be put in service in 2 phases:

- **Phase 1:** All trains with passengers will be operated in CBTC GoA2 mode, with a driver. Some operations without passengers will be performed in GoA4 mode.
- These automated operations include turn-backs at both ends of the line, parking and un-parking the trains from/to some main line stations to/from the depots, and stabling and un-stabling the trains on specific track positions on the main line at the end of the daily service due to a lack of available depot stablings for the additional trains.
- **Phase 2:** All trains with and without passengers shall operate in GoA3 mode.

In order to define the optimal platform protection for Line D, all the advantages and drawbacks of protection systems listed in the previous section were analyzed, taking into account the characteristics and constraints of Line D project. The selected protection strategy, detailed below, consists in judiciously using both PSD and intrusion detection systems, in order to benefit from the advantages of each of these systems, and particularly to provide good flexibility for the CBTC migration process.
• Phase 1: In order to ensure full protection, reduce any risk of operation disruption, and guarantee the performances of the defined operational model, the PSD system will be deployed in 8 stations where automated trains will be running while passengers are waiting on platforms, from Congreso de Tucuman to Olleros stations, in Scalabrini Ortiz station, and from Tribunales to Catedral stations. In the other stations where trains will be running in GoA2 mode with a driver’s guideway supervision, the PSD system will not be deployed at the current stage, in order to respect the tight planning of this phase. Nevertheless, these stations will be equipped with an intrusion detection system (see figure hereafter), that will protect the platforms’ passengers during the automated stabling and un-stabling of some trains on the main line at the end of the daily service. This intrusion detection system would detect any remaining passenger trying to pass the edge of the platform towards the track at the end of the revenue service, and consequently request the signalling system to prevent automated trains from entering this area. Taking into account that this system will only be activated at night at the end of the revenue service, and that the probability of having a passenger remaining on the platform at that time is low, the low impact on the operation (e.g., false detection rate) and the protection safety level are acceptable.

• Phase 2: As trains with GoA3 mode will be running with passengers on the whole line, the PSD system will be installed in all the stations, and the intrusion detection system of Phase 1 will be moved to another line.

Conclusion

With the full automation of metro lines without drivers on-board, passengers’ protection on station platforms becomes mandatory. For Greenfield metro projects with fully automated trains, it is highly recommended to install PSD systems in order to achieve optimized safety and operational performances. In case of Brownfield projects, PSD systems remain highly recommended. Nevertheless, intrusion detection systems can be a fair compromise simplifying the migration process and optimizing the overall cost when PSD deployment is complex.

In the coming years, Brownfield projects are more likely to become a major factor in the transportation market. Thus, it would be worth investigating the improvement of current intrusion detection systems by the industrial providers, particularly in terms of achieved safety level and false detection rate.

Huawei eLTE Solution for Urban Rail; Global

White Paper 2015
Alstom is the world’s first train manufacturer to integrate LTE 4G into its signalling system solution, the Urbalis Fluence CBTC solution, which greatly improves the suitability of eLTE, providing a converged ground-to-train wireless communication network for metro operations. The LTE pilot project has been launched after a Memorandum of Understanding (MoU) was signed between Huawei and Alstom in April 2014. The two parties agreed Huawei would contribute the eLTE infrastructure for the pilot and optimizing the network planning to meet requirements for broadband data services, and mission critical voice trunking services. Alstom provided the train and LTE onboard technology. The pilot was carried out at Alstom’s test track near Valenciennes in France.

During the pilot, Huawei and Alstom jointly conducted several tests, including laboratory and static test on trains, dynamic test on metro tracks, and testing of eLTE multi-services capabilities. Huawei provided its eLTE Multi-service Unified Bearer Solution with a focus on multimedia applications, voice trunking dispatching, and broadband data services based on 4G LTE standards to satisfy growing demands from the rail industry.

This solution enables metro operators to ensure safe train operations by leveraging eLTE-based CBTC train signals while providing mission critical voice trunking dispatching and broadband data services such as live video streaming of CCTV images and Passenger
Information System (PIS). With the eLTE solution, metro operators are able to effectively reduce operation and maintenance costs as well as quickly obtain passenger information, therefore greatly improving the serviceability of trains.

Until now, Huawei has signed 111 eLTE network contracts and established 53 eLTE commercial networks in more than 30 countries. In the rail industry, Huawei eLTE Multi-service Unified Bearer Solution has also been successfully deployed in a number of railways around the world.

![Huawei eLTE Multi-Service unified Bearer Solution for Urban Rail Transit](image)

**CURRENT STATUS IN URBAN RAIL TRANSIT**

In recent years, public Wi-Fi access points have become a popular commodity in urban areas. Due to the explosive growth in use of multimedia devices like smart phones, tablets and notebooks, the demand on services of these devices in crowded places such as metro stations has dramatically increased. Huge numbers of Wi-Fi devices on the platforms and in the trains create chances of interference from Wi-Fi network, which threatens the safety and efficiency of train operations.

When the CBTC system uses Wi-Fi technology to implement train-to-ground communication, the external interference from 2.4G frequency band may probably force running trains to stop unexpectedly.

Besides, a Wi-Fi AP’s coverage range is only 219 yds (200 m). Trains moving at a high speed may experience frequent wireless handovers with long latency and high packet
losses, which degrades passengers’ experience on enjoying the onboard passenger information and entertainment services.

On the other hand, services for urban rail operation and management keep growing in number and diversity. However, communication networks are deployed separately for service systems, which results in high costs and complex Operation and Maintenance (O&M).

**HUAWEI eLTE SOLUTION, HELPS BUILD A SMART RAIL**

Huawei offers eLTE Multi-service Unified Bearer Solution ("Huawei eLTE Solution") for the urban rail transit industry to build a smart rail.

Based on the 4G LTE technology, Huawei eLTE Solution helps solve the existing issues in urban rail networks and improves operation efficiency through innovative designs, such as the redundant dual-network, anti-interference design, 9-leveled QoS guarantee mechanism, long-distance wireless coverage and unified O&M system, as well as the multi-service unified bearer design.

Huawei eLTE Solution ensures reliable train-to-ground communication using a dual-network architecture and redundancy design at the system, device and board levels. The use of dedicated-frequency LTE networks and technologies such as Interference Rejection Combining (IRC) and Inter-Cell Interference Coordination (ICIC) enhances the network’s anti-interference capability. When encountering interference, the eLTE network can still have available bandwidth to provide services with QoS guarantee, thereby ensuring the reliability of mission critical services.

Huawei eLTE Solution is able to deliver an excellent performance on high-speed trains. The LTE train-to-ground communication system supports 80 Mbit/s throughputs for trains travelling at speeds as high as 268 mph (431 kmph).

By constructing a unified bearer network for data services, including CBTC, PIS, trunking, and CCTV, this solution helps customers improve operating efficiency and reduce both network construction and O&M costs. By providing long-distance wireless coverage along rail lines, the solution dramatically reduces the number of devices, that are needed in complex environments such as tunnels. By implementing a unified network management system for network and terminals, the solution simplifies the system O&M.

Huawei aims to help customers build a smart rail with a reliable broadband train-to-ground communication network that greatly improves the operation efficiency and brings better experience for passengers, while reducing the O&M costs of rail.
BACKGROUND

Since 1997, the Amsterdam metro system consists of four metro routes, including Route 50, Route 51, Route 53 and Route 54. With 52 stations in the network, the metro serves major areas within Amsterdam, as well as the surrounding towns of Amstelveen, Diemen and Ouder-Amstel. The North-South Line Route 52 (Noord- Zuidlijn), is the fifth line added to the network, which will be fully in operation by 2017.

Existing systems for metro operation adopted Wi-Fi technology to implement train-to-ground communication, which can be vulnerable to external interference from the 2.4GHz frequency band. In addition, limited ability of the Wi-Fi standard to support terminal mobility created significant complexity to achieve the desired Quality of Service (QoS) for metro applications. For the new to be deployed on North-South metro line, Amsterdam Metro was researching an alternative solution for the current planned Wi-Fi solution to serve multiple services, such as Signaling & Control, video surveillance, passenger information and entertainment. Meanwhile, KPN challenged vendors to develop together the market for a managed high-availability 4G network for Amsterdam metro and finally, Huawei eLTE Solution became the first choice to perform the Proof of Concept (PoC) with Metro Amsterdam.

SUCCESSFUL eLTE TRAIN TV TEST IN AMSTERDAM METRO

In 2014, together with KPN, Huawei successfully performed a Proof of Concept (PoC) with Amsterdam Metro. KPN opened the dedicated 2.6 Hz frequency band for the test, and Huawei eLTE Solutions was used to transport the real time video stream of the surveillance cameras to the driver’s cabin. The PoC on eLTE Train TV consisted of two steps: A lab test and a field test.

During the lab test, QoS was the most important feature to be tested. By classifying priorities for different services (i.e. 64Kb/s constant bit rate, HD video stream and Best Effort data), the eLTE network required to give priority to specific services as defined by the customer. The PoC confirmed Huawei’s eLTE ability to comply with these expectations, which gave the green lights for the second step of the project.

During the field test at the platform at Central Station Amsterdam, the existing surveillance cameras on the platform were connected to the eLTE network, while a laptop was connected to the customer premises equipment (CPE). The laptop/CPE was placed inside the moving train. On the laptop, we could see the high definition images coming from the...
cameras fluently. When the laptop/CPE moved out of the station, the eLTE (2.6GHz) signal was strong enough to reach the next station (more than 700 m), which means that eLTE has a much wider range than Wi-Fi, which typically provides a range of 300 meters.

**HUAWEI eLTE SOLUTION ENSURES THE RELIABILITY OF MISSION CRITICAL SERVICES**

For Amsterdam Metro, Huawei eLTE Solution adopts a dual network redundancy design (networks A and B) with 9 levelled QoS mechanism to ensure zero interruption of mission critical services, such as CBTC and Train TV. Mission critical services are carried on networks A and B simultaneously, with the two networks backing up each other. Non-critical services are carried only on network B.

The PoC has proven to the customer that Huawei eLTE Solution provides a very robust train-to-ground communication system as alternative to Wi-Fi based network underground. And more importantly, Huawei eLTE Solution delivers QoS which will give the customer more possibilities in the future to have more operational services and offer data services to the passengers, while ensuring the reliability of mission critical services.

**BACKGROUND**

In response to an era of unprecedented growth, the City of Zhengzhou, a major transport hub in the central region of China, urgently needed to improve traffic conditions on its urban rail transit network.

The plan for Zhengzhou is to build six metro lines, a combined length of 202.53 km. The first phase of Line 1, running wholly underground, serves 20 stations over 26.2 km and is designed to permit a maximum speed of 80 kmph. Bridging the new and old districts of Zhengzhou, Line 1 has brought about a dramatic reduction in the congestion of east-west surface traffic since it became operational.

**HUAWEI eLTE SOLUTION FOR ZHENGZHOU METRO LINE 1**
A long-recognized bottleneck in urban rail systems is train-to-ground wireless transmission. In planning Line 1, Zhengzhou Metro was determined to deploy a comfortable, passenger-centric metro line that included robust wireless services.

Beginning in 2010, Zhengzhou Metro held multiple rounds of discussions with Huawei. An analysis revealed that the traditional PIS and vehicle-mounted devices were incapable of supporting the design requirements set for Line 1, including real-time information sharing, and efficiently uploading in-carriage live video surveillance data to operation centre.

Taking these findings into account, Huawei proposed an LTE-based approach to integrate PIS functions and on-board video surveillance on to a single network using LTE TDD technology over a 1795-1805 MHz carrier. The solution leverages LTE’s advantages in access performance and service bandwidth in fast moving scenarios, providing approximately 20 Mbit/s for downlink and 10 Mbit/s for uplink.

With these capabilities, the network can provide live, high-definition PIS services for travelers using Line 1, together with the transmission of train-mounted HD video surveillance data to the control centre in real time.

Another highlight of Huawei eLTE Solution is comprehensive QoS assurances that allow for the precise management of service priorities. PIS and video surveillance services are integrated on a single network. This combination of factors makes for a dramatic reduction in network investment while paving a solid foundation for rolling out new services such as CBTC and broadband trunking.

**HUAWEI eLTE SOLUTION DELIVERS STABLE AND EFFICIENT URBAN RAIL OPERATION SINCE DECEMBER, 2013**

The Zhengzhou Metro eLTE train-to-ground wireless communication system deployed for Line 1 has delivered the following benefits:

- **Strong Branding for Zhengzhou urban Rail System:** Zhengzhou Metro has built an excellent example for future urban rail transit systems with the deployment of the world’s first bidirectional, high-speed, stable and reliable eLTE train-to-ground wireless communication network.

- **Enhanced operational Security and accelerated Emergency Response:** With the eLTE system, commanders at the control centre can watch live HD video and monitor real-time data to maintain a clear view of the operator’s compartment and the passenger carriages.

- **Optimal Service Quality and Passenger Experience:** Huawei eLTE Solution provides QoS assured low-latency data transmission channels that deliver a superior experience to passengers by providing interruption-free video and information services.

Liu Hongtai, Deputy General Manager of the Operation Branch Company of Zhengzhou Rail Transit Co Ltd, comments: “As the world’s first metro line to use LTE, Zhengzhou Metro is an example for future wireless network construction on urban metro lines and provides clear evidence that LTE can meet the requirements of wireless communication in urban metro. We believe that LTE will be widely used in the future for urban metro.”
Huawei helps raise Shuohuang Railway’s annual Capacity to 350 Million Tons

BACKGROUND

Shenhua Group Corporation is a Fortune 500 company and the world’s largest coal supplier. The biggest heavy haul railway project Shenhua has invested in and constructed is the Shuohuang Railway (SHR), with a total length of 588 kilometers and passing through 77 tunnels. The railway is the second largest coal transporting route from the western part of China to the east.

In order to get more from its railway infrastructure, Shenhua set the goal to expand SHR’s capacity to transfer 350 million tons of coal. The heavy haul train running on SHR should be able to carry 20,000 tons of coal, with a length up to 2,500 meters and four locomotives distributed at the front and middle of the train. When multiple locomotives provide power for the train, in order to ensure efficient and safe train operations, it is of vital importance that they start, accelerate, and slow down in synchrony.

A wireless broadband system was required to communicate between the master-slave locomotives. However, the existing railway’s 800 MHz and 400 kHz wireless communication systems would not be able to support the railway capacity expansion with its limited coverage distance, poor reliability, and insufficient bandwidth.

HUAWEI eLTE SOLUTION TAILORED FOR SHUOHUANG RAILWAY

To help the customer address these challenges, Huawei worked with industry partners to research, plan, conduct trial tests, and engineer the construction of SHR’s new railway mobile broadband communication system since 2010. Over four years, multiple lab tests were conducted and four on-site tests were completed at the railway’s 42 kilometer trial section.

Huawei eLTE Solution has been tailored to the SHR and uses a 1.8G LTE TDD network to enable communications for 20,000 ton heavy-haul trains. Using LTE technologies with wide coverage, short latency, and high bandwidth, the Huawei eLTE Solution extends transmission distance and reduces delay. Huawei provides a full redundancy solution which ensures 99.999 percent system availability. Innovative dual-network wireless coverage and optical transmission are provided for services that are critical to train safety, such as synchronous operations and train tail control, as well as non-safety services, such as trunking communication and video surveillance. A multi-priority QoS mechanism contributes to zero interruption in critical railway operations.

Huawei also provides a unique train terminal direct routing technique to meet the particular needs of railway communication. Even when servers connecting the multiple locomotives of a train are down, synchronous control information can still be directly transmitted between the locomotives, further enhancing the safety of train operations. Meanwhile, the combination of flattened eLTE architecture with a high-speed optical backhaul network reduces the overall communication latency to less than 200 milliseconds, ensuring real-time and synchronous control of the multiple locomotives of a heavy haul train.
HUAWEI eLTE SOLUTION HELPS GREATLY IMPROVE THE ANNUAL CAPACITY

Huawei eLTE Solution successfully helps the customer raise SHR's annual coal capacity from 200 to 350 million tons. Adopting the innovative designs of dual-network, 9 leveled QoS and train terminal direct routing to preclude any possible interruption, Huawei eLTE Solution is capable of ensuring the efficient and safe operations of 20,000-ton capacity heavy-haul trains.

As a unique case for both Chinese and global heavy haul railways, it is of great demonstrative significance for the development of heavy haul railways globally.

Cao Yanping, Deputy General Manager of Shuohuang Railway Ltd., comments: “The Huawei solution greatly improved the communication systems of the Shuohuang Railway. It has created a good foundation for Shenhua to achieve a future cargo capacity of more than 350 million tons, with enhanced communication and network security.”

CAF and Shapir awarded Jerusalem Light Rail Project Contract; Israel, Spain

Aug. 8, 2019
Written by David Burroughs; IRJ

JERUSALEM Transportation Masterplan Team (JTMT) has awarded the TransJerusalem J-Net consortium, comprised of CAF and the construction firm Shapir, a €1.8bn contract to undertake an extension to the Jerusalem light rail network.

CAF Light Rail Vehicle, LRV for Light Rail Transit

The Private-Public Partnership (PPP) includes the construction of 27 km of new track, 53 new stations and various depots covering a 6.8km extension to the Red Line, and the new 20.6 km Green Line. The Red Line is currently 13.8 km long with 23 stations, and carries around 145,000 passengers daily.

The consortium will also design and supply 114 new Urbos LRVs for the Green Line, and the refurbishment of the 46 vehicles currently in service on the Red Line.
The contract includes the signalling, energy and communication systems, as well as the operation and maintenance of both lines for 15 and 25 years respectively, with the possibility of extending the term of operation.

CAF’s share of the contract is worth more than €500 m, and includes the vehicle’s supply and refurbishment, signalling, energy and communication systems and project integration. CAF will also have a 50% stake in the Special Purpose Vehicle (SPV) company, that will manage the operation and maintenance of both lines, which is expected to have a €1bn turnover.

Construction is expected to begin later this year with the new extensions fully operational by 2025.

Shikun & Binui and Egged (Israel), CRRC (China), Comsa (Spain), Efatec (Portugal) and MPK (Poland) also submitted bids for the contract.

THE CONSORTIUM MADE UP OF THE CAF GROUP AND THE CONSTRUCTION FIRM SAPHIR AWARDED THE JERUSALEM TRAM PROJECT; Israel, Spain

2019/08/08, CAF

This project is a PPP (Private-Public Partnership) scheme, and includes the construction of 27 km of new track, 53 new stations and various depots covering the entire stretch of the current Red Line (6.8 km), and the construction of the new Green Line which is 20.6 km long. The contract also includes the design and supply of 114 new Urbos Trams for the new Green Line, and the refurbishment of the 46 units which are currently in service on the existing Red Line.

The project scope of the successful consortium will also include the supply of the signalling, energy and communication systems, as well as the operation and maintenance of both lines for 15 and 25 years respectively, with the possibility of extending the term of operation.

The CAF Group’s supply part of this project exceeds EUR 500M and consists of the supply of new units and the refurbishment of existing ones, the supply of signalling, energy and communication systems in addition to project integration. The Group will also have a 50% stake in the SPV company that will manage the operation and maintenance of both lines, the business volume of which is estimated to be circa EUR 1,000M.

The project is expected to be implemented early this year with the new network fully operational by 2025.

It should also be pointed out that the TransJerusalem J-Net Ltd consortium was selected over the other bidding group, which consisted of the companies Shikun & Binui and Egged (Israel), CRRC (China), Comsa (Spain), Efatec (Portugal) and MPK (Poland).
The tram's Red Line currently extends along 13.8 km with 23 stations distributed on the route, was inaugurated in 2011 and providing transport to over 145,000 passengers on average per day. With the extension of this line and the construction of the new one the citizens of the Israeli city will benefit from a more efficient and complete railway transport network.
METRO NEWSLETTERS

on

“URBAN MOBILITY AS A SERVICE”

PUBLIC MULTIMODAL URBAN, SUBURBAN AND INTERURBAN PASSENGER TRANSIT SYSTEMS WITH METRO-BUS, LIGHT-RAIL, TRAM-TRAIN, METRO-RAIL, METRO-TRAIN, REGIONAL RAPID TRANSIT, COMMUTER-RAIL, ROPE-WAY/TRAIN, MAGLEV AND HOVERCRAFT TRANSIT/PEOPLE MOVER, WATER-METRO, AUTONOMOUS PEOPLE-MOVER

MOBILITY SOLUTION, TRANSPORTATION AND ECONOMIC DEVELOPMENTS IN MODERN URBAN/MEGAPOLIS ENVIRONMENT

METRO Newsletter by Dr. F.A. Wingler
METRO 85, August 2019

ALSTOM “Citadis Silkworm” LRV design for Songjiang suburban LRT Tram Network © Alstom
ALSTOM “Metropolis” Metro Train Vehicle Design
PART I: INDIAN ACTIVITIES AND INITIATIVES FOR URBAN MOBILITY AS A SERVICE

Who We Are

The Institute of Metro and Rail Technology (IMRT) is a first-of-its-kind institution that aims to be a knowledge leader in Metro and Rail Technology. IMRT was en the objective of producing next-generation 'techno-managers', capable of making crucial decisions using their skills and understanding of the sector. IMRT will breed professional engineers for the rail and metro industry by designing, developing, and delivering high-impact learning programs through education and research institution's strength lies in offering specialized training and education for engineering graduates as well as experienced professionals in the rail and metro space.

IMRT is promoted by Balaji Railroad systems Limited (BARSYL), a consulting firm specializing in providing niche technical and management support to the rail countries. For over 27 years, BARSYL has consulted an over 800 projects across freight, passenger, metro, and monorail systems. This gives IMRT direct access to insights, railroad experts, and incisive case studies.
IMRT understands that the industry is all about real-time, scalable impact that can play a critical role in the larger economic picture. The faculty, curriculum and the modules devised will help produce metro and railway professionals for the upcoming need in the field, tapping into their potential to make them the next generation managers.

**Vision and Mission**

To be a world-class institution responsible for moulding next-generation railway professionals, so they can create a positive impact in the rail industry.

To be a knowledge leader in the space of rail and metro by designing, developing, and delivering high-impact learning for the rail industry through education and research will symbolize the depth and breadth of knowledge a metro and railways professional needs to be able to run a critical aspect of urban transportation and ensure the human life.

**DS RAO, Member, Governing Council**

DS Rao, is an Additional Director of our Company. Mr. Rao is a Civil Engineer with over 37 years of distinguished covering Government, Public and Private Sectors. His experience covers India, Nepal, Bangladesh, UAE, Iraq and Cyprus. Some of the key assignments handled by him include: Railway Specialist to Govt. of Iraq through RITES (Ministry of Baghdad for four years to provide technical consultancy for construction of 600 km long high-speed Railway Line.

As Chief Engineer (Construction) in Indian Railways, executed tough construction Projects in Assam and neighbouring Hill states As Group General Manager IRCON and later as Director, handled ADB funded projects in India and Bangladesh of Tata Projects Ltd, managed all operations all over India as well as in Nepal, Persian Gulf countries, Cyprus.

As member of Territorial Army (Railways) restored the Railway system after 1971 war in erstwhile East Pakistan Awarded Fellowship under United Nations Programme for study tour of Railroad Systems in USA in Sep 1977.

**V RAMAKRISHNAN,; Member, Governing Council**

He brings with him decades of experience as an entrepreneur, CEO of large organizations, international expert in positioning, mergers and acquisitions. He is a member of the board on a number of domestic and international organization he is on the board of Ranbaxy-Signature, LLC, NY, USA, Member of executive board of Life Enhancing Technolog USA, Managing Director of American Generics India Ltd., India, Chairman, Lipicard Technologies Ltd., India and Corporate Strategy and Long-Term strategic issues as Director - Strategy, BARSYL. He is also a Visiting Profess University - MBA Technology Management program. He is M. Tech in Industrial Engineering & Operations Rese Kharagpur with BE in Mechanical Engineering (Honours course) from AC College of Engineering & Technology.

**SUNIL SRIVASTAVA, Member, Governing Council**

Electrical Engineer with Post Graduate qualification in Business Management has about 20 years of professional expert marketing, business planning and project management of rail infrastructure projects in India, UK, Singapore, Bangladesh. Cross functional experience in conducting and coordinating project feasibility studies, commercial documentation, and evaluation contract management, costing, and budgeting for railway projects covering urban transport, freight rail and passenger rail systems.
His experience covers Project Management of complex studies, techno-financial evaluation, design review of new rail India, UK, Syria, Germany, France, Sri Lanka, Bangladesh, Myanmar, Malaysia, Tanzania and Singapore. He also experience of International railway technology.

**Dr. P RAJA GOUNDAN**, Academic Director, IMRT

A veteran in the Signalling and Telecommunication functions of the rail and metro sector, Dr. Goundan has over 25 years in various roles, including CEO of the Integral Coach Factory of Indian Railways at Perumbur and Additional Member the Ministry of Railways. He holds a PhD and Masters in Electrical Engineering from IIT, Chennai.

Dr. Goundan is currently the Joint Director of the Center for Wireless Technology, IIT Chennai.

**Advisory Council**

IMRT is guided by an Advisory Council that gives a voice to the vision and mission of the organization. The council is also involved in critical decision-making an important role in how the programs are structured and delivered.

**SK Srivastava**

SK Srivastava is a Former Professor of Indian Institute of Science, Bangalore with several years of experience serving as an Operations advisor on Technical Education to the World Bank. He is an authority on Teaching and Research in Space Technology.

**AN Sengupta**

With Masters degrees from Harvard University and MIT in Urban Design and Architecture respectively, A N Sengupta has over 45 years of international experience as a leading urban planner and architect, with a specialization in transport-related development. He also has years of experience as a faculty of Anna Un Saud University, and Texas Tech University.

**BSC Rao**

BSC Rao comes with over 35 years of experience across the technical, commercial, concessional, financial, legal, and administrative areas in the railway sectors ac He was Executive Director of the Bangalore Mass Urban Transit System as well.

**NVS Reddy**

NVS Reddy is the Managing Director of Hyderabad Metro Rail Limited, making him the head of the world's largest Public Private Participation (PPP) Urban Tran has been a recipient of many awards, including the Railway Minister's Award for Excellence and Prime Minister's Award in recognition of his early completion of conversion projects.

**BI Singal**

BI Singal is the Director General, Institute of Urban Transport, India a professional body that also works as technical advisor to the Ministry of Urban Development of India. He has led the team responsible for the planning of Delhi Metro. He is also a Member of the Institution of Civil Engineers, London and Chartered Engineers.

**CBK Rao**

CBK Rao has over four decades of experience in the rail and metro sector, and has held various prestigious positions, including Director, Projects & Planning, DM Executive
Director, DLF. He was nominated as an independent Director to the BMRC Board and is currently on the panel of experts for Hyderabad Metro.

Kolkata all set for first underwater Metro Services under the Hooghly River; India

The time taken to cross the 520-m tunnel will be around 60 Seconds. Using the Ferry to cross the River takes 20-odd Minutes. And crossing the Howrah Bridge may take Hours if you are stuck in a Traffic Jam. This will become the first big Tunnel under any River in India.

By Kanika Verma; 20/08/2019; Metro Rail News

KOLKATA (Metro Rail News): India’s first underwater river tunnel is almost ready. As part of the east-west corridor, Kolkata Metro Rail Corporation (KMRCL) has dug tunnels below the Hooghly River to lay train tracks.

Of the 16.6-km-long east-west stretch, 520 m will be under the river bed. Constructing the tunnels has been an engineering feat. The tunnels are built more than 33 meters below the riverbed and will connect Kolkata to Howrah. The fact that not one drop of water can enter the tunnel was the biggest challenge.

The time taken to cross the 520-m tunnel will be around 60 seconds. Using the ferry to cross the river takes 20-odd minutes. And crossing the Howrah Bridge may take hours if you are stuck in a traffic jam.

The metro tunnel has several other marvels. The structure is actually made of rings that are 1.4 m wide. A special gasket has been made which will swell five times if it comes in
contact with water. In case of water ever enters the tunnel there are enough precautionary steps that have been taken.

This is the first big tunnel under any river in India. Within a few months, the metro will start running here. Here the width of the Ganga is 500 m and the tunnel is 13 m under the Ganga. The diameter of the tunnel is 5.8 m, B Dewanjee, chief engineer (civil), KMRCL said.

Talking about the safety issue Dewanjee said: The tunnel is made of concrete and we have brought the entire composed concrete and put it over here. There are hydrophilic gaskets are kept in between these concretes so that if in any case water comes inside the tunnel, the gaskets will open up. Here four-stage safeties are used so that the water cannot enter the tunnel.

Around 150 trucks of mud have been taken out every day to ensure that this entire stretch was built very smoothly. More than 1,000 workers worked tirelessly 24×7 to complete the tunnels by the due date. So what if an emergency happens? Walkways have been built and enough fire alarms have been set up. There will be a smooth process for fire tenders to enter so that the passenger evacuation route does not collide with the route that is being taken by the fire workers who will be on duty round the clock.

There have been several other challenges. The cost of the project has been rising and is likely to touch Rs 8,500 crore by the time people are able to use the entire metro system in 2021. The twin tunnels will also ease movement of trains as at no pint will two trains cross each other.

One of the challenges faced by KMRCL was to keep the old building intact in the construction site. The area is dotted with centuries-old building dating back to the British period. The foundations of these buildings had to safeguarded so that they did not crumble. As a precautionary measure, several buildings were evacuated before construction began more than 500 people were temporarily shifted and put up in hotels.

For the 1,000-odd workers too it was a huge challenge. In the tunnels the temperatures would rarely go below 50 degree Celsius, making the surroundings very hot and unbearable. The oxygen supply was also an issue.

The wait for the people of Kolkata and Howrah will soon be over. Seamless connectivity between Howrah railway station, one of the busiest in the country, and the eastern metropolis will help in saving travel time.

India’s first Underwater Metro Tunnel to have Europe-Style Tunnel under Hooghly River; India

Kolkata Metro East-West Line will connect Howrah Metro Station and Mahakaran (iconic Writers’ Building) Metro Stations. Commuters traveling between these two Stations will spend around one Minute under the River. The Metro Train will run at a Speed of 80 km per Hour.

By Kanika Verma; 29/07/2019; Metro Rail News
India’s first Underwater Metro Tunnel to have Europe-Style Tunnel under Hooghly River

KOLKATA (Metro Rail News): India’s first underwater metro rail tunnel by 2021! Kolkata Metro, which is also the country’s first metro rail network, will proudly have a European-style underwater tunnel as part of its East-West Metro project. The project is being overseen by Kolkata Metro Rail Corporation Ltd, a government of India entity. Once the project is completed, two iconic Indian Railways stations – Howrah Junction railway station (HWH) and Sealdah railway station (SDAH) – will be connected through the Kolkata Metro network.

Kolkata Metro East-West Line, Underwater Tunnel Facts:

1. Kolkata East-West Metro line is 16.6-km long. The project will be completed by 2021. A senior Railway official told PTI it would ferry 10 lakh (1 million) passengers per day by 2035.

2. The prime attraction of the Kolkata East-West Metro line is the underwater tunnel that will go beneath the Hooghly river, a distributary of the Ganga river. The twin tunnel will be 520 meters long. One tunnel would be East-bound and the other would be West-bound. The twin tunnels are being built 30 meters below the riverbed.

3. The Kolkata Metro East-West line will connect Howrah metro station and Mahakaran (iconic Writers’ Building) metro stations. Commuters traveling between these two stations will spend around one minute under the river. The metro train will run at a speed of 80 km per hour.

4. Out of the total 16.6 km long Kolkata Metro East-west corridor, 5.8 km section will be elevated and 10.8 km will be part of the underground corridor.

5. Kolkata Metro East-west corridor stations: The elevated stations of Kolkata Metro East-west corridor are Sector-V station, Karunamoyee station, Central Park station, City center station, Bengal Chemical station, Saltlake stadium station.
The underground stations of Kolkata Metro East-west corridor are Phoolbagan station, Sealdah station, Esplanade, Mahakaran station, Howrah station, Howrah Maidan.

6. Kolkata Metro East-west corridor project will cut down travel cost, time of passengers traveling across most populous areas of Kolkata, according to Kolkata Metro Rail Corporation Ltd.

7. The underwater tunnel of Kolkata Metro will provide a unique traveling experience for commuters. It will be like traveling more than a 10 storied building below the water surface for almost half-kilometer across the Hooghly. According to Kolkata Metro officials, the tunnel is a “marvel of modern technology” – a “resounding first in India” as well as a “rare venture worldwide”.

8. The underwater line tunnel beneath the Hooghly river is a state-of-the-art metro line. The Eurostar, that connects the famous Paris-London undersea tunnel, offers an apt analogy for the level of technology harnessed by KMRCL.

9. The Kolkata Metro Rail Corporation Ltd. adopted a cutting-edge latest boring process which causes no traffic snarls. The authority has procured “Earth Pressure Balance” Tunnel Boring Machines which ensures “life goes on as usual on the surface”.

Mumbai Metro Line 3 ALSTOM “Metropolis” Driverless Train Design revealed; India

Aug. 16, 2019
Written by Keith Barrow; IRJ

Mumbai Metro Rail Corporation (MMRC) awarded Alstom a contract to supply 31 eight-car driverless trains in July 2018.

The exterior and interior design of the fleet of Alstom Metropolis Trains for Mumbai metro Line 3 (Aqua Line) was unveiled by Maharashtra chief minister Mr Devendra Fadnavis on August 16.

Mumbai Metro Rail Corporation (MMRC) awarded Alstom a contract to supply 31 eight-car driverless trains in July 2018.
The trains will be assembled at Alstom India’s Sri City plant in Andhra Pradesh, with deliveries due to begin in December 2020.

The 33.5 km line north-south line from Santacruz Electronics Export Processing Zone to Cuffe Parade in Colaba is due to open by June 2021.

Titagarh Firema, Railroad Equipment Supplier, wins Pune Metro Rolling Stock Contract; India.

Aug. 15, 2019
Written by Keith Barrow; IRJ

Titagarh Firema has been awarded a Contract by Maharashtra Metro Rail Corporation (Maha Metro) to supply 102 aluminium-bodied metro cars for the first phase of the metro network in the Indian City of Pune.

Titagarh is an Indian Multinational company catering to the Global Freight and Passenger Rolling Stock Market. Titagarh Group is India’s largest manufacturer of Freight Wagons and only Indian Private Company to manufacture the Indian EMU/MEMU.

Titagarh stretches its global reach and presence through factories in India, Italy and France with offices also in Singapore and Dubai. “We cater to passenger rolling stock including double decker and single deck commuter trains, metros, trams under the brand of “FIREMA”. The product range of FIREMA expands to include electric propulsion equipment such as traction motors and vehicle control systems.
The first phase of the Pune network was approved by India’s cabinet in December 2016 and comprises the 11.5 km north-south Line 1 from Pimpri-Chinchwad Municipal Corporation area to Swargate and the 14.7 km east-west Line 2 from Vanaz to Ramwadi. Both lines are due to open in 2021.

In March Alstom was awarded a contract to equip the two lines with CBTC.

**Pune Metro to get Aluminum-bodied Coaches; India**

A Consortium formed by Kolkata-based Wagon Manufacturer Titagarh Wagons with its wholly-owned Subsidiary Titagarh Firema SPA recently won the international Bid to supply 102 Aluminum Coaches to the Pune Metro Project.

By Kanika Verma, 19/08/2019; Metro Rail News

In a first, Pune Metro to get Aluminium-bodied Coaches
PUNE (Metro Rail News): Pune Metro is set to get ultra-modern, state-of-the-art aluminum-bodied coaches. Thus far, Metros in the country have used stainless steel-bodied coaches.

A consortium formed by Kolkata-based wagon manufacturer Titagarh Wagons with its wholly-owned subsidiary Titagarh Firema SPA recently won the international bid to supply 102 aluminum coaches to the Pune Metro project. The Maharashtra Metro Rail Corporation Ltd. (Maha Metro) had issued a tender for “design, manufacture, supply, testing, commissioning of passenger rolling stock (electrical multiple units) and training of personnel”.

This will be the first time that aluminum-bodied coaches, which are said to be lighter in weight, more energy-efficient and have better aesthetics, will be manufactured in India, Dr. Brijesh Dixit, managing director of Maha Metro, said.

“The company will manufacture 25% of the coaches at their plant in Italy and 75% will be produced and commissioned at the Maha Metro coach manufacturing plant in Nagpur,” Dr. Dixit said. He said the Pune Metro project had crossed “another important milestone” with this order for coach procurement. Officials from the Pune Metro project said that initially, the trains will consist of three coaches, which will subsequently be converted into six as per requirement. They said these coaches would be fully air-conditioned with humidity control, provided with the digital route and station display and international standard interiors.

“The coaches will have 100% CCTV camera coverage. [Passengers with disabilities] will be able to travel seamlessly to/from the station entrance to the train with specially earmarked places for wheelchairs. Mobile and laptop charging facility will also be provided onboard,” a spokesperson with the project said.

The coaches are to be ergonomically and aerodynamically designed, with the coach exterior reflecting the history and cultural heritage of Pune and Pimpri-Chinchwad. They will have a maximum speed of 95 kmph and the capacity to accommodate more than 925 passengers.

“They are energy efficient and will be equipped with a regenerative braking system. They will also be capable of operating in driverless mode,” Dr. Dixit said. Pune Metro will begin operating with coaches being used by Maha Metro in Nagpur and will be augmented as and when the new coaches join the fleet.

The ₹11,420 crore- Pune Metro rail system has been projected by the Centre and the State government as a panacea to Pune’s traffic woes. In December 2016, Prime Minister Narendra Modi had laid the foundation stone for the project, just ahead of the elections to the Pune and Pimpri-Chinchwad municipal corporations.

An especially vital section in the project — comprising three lines with a total length of 54.58 km — is the elevated 23.3-km Line 3, which will bridge the city’s bustling Information Technology quarter in Hinjewadi with Shivajinagar.

Testing underway on Delhi Metro Grey Line; India
TEST running has commenced on the initial section of the Delhi metro Grey Line (Line 9), which will connect the western district of Najafgarh to the city's urban metro rail network.

Open Cutting for Transit from elevated Structure to Tunnel of Grey Line 9 at Delhi

The 4.3 km stretch from an interchange with the metro Blue Line at Dwarka to Nangli and Najafgarh is due to open next month. The remaining 1.2 km section from Najafgarh to Dhansa Bus Stand will be completed by December 2020.

Metro Work in Kanpur to begin by October, Services to start by 2021; India

This News has us super excited because the beginning of Metro Work means that within a few Years People of Kanpur would be able to avail the modern Metro Services.

By Kanika Verma 17/08/2019, Metro Rail News
Metro work in Kanpur to begin by October, Services to start by 2021

KANPUR (Metro Rail News): The dream of Kanpur Metro which has been under wraps for quite some time now is finally coming true. The metro network which is expected to bring tons of development opportunities to the city and provide people with a faster, more reliable means of transport, is finally becoming a reality!

Earlier it was reported that the Kanpur Metro has been given major NOCs from necessary departments and the plan was to begin work as soon as possible. According to new updates, the Lucknow Metro Rail Corporation (LMRC), which is also the driving force behind Kanpur Metro, has set August 19 as the date for floating the civil tenders. Hopefully, the construction work will follow suit and begin by October.

This news has us super excited because the beginning of metro work means that within a few years people of Kanpur would be able to avail the modern metro services. This will not only make our commute easy, but it would also provide seamless connectivity throughout the city.

According to a report, Kumar Keshav the Managing Director of UPMRC has assured that basic structures of the station would be prepared by 2020.

As of now, two of the metro corridors have been confirmed. The first corridor will connect IIT Kanpur to Naubasta area, covering a stretch of 26 km. The second corridor will run from Agricultural University to Barra-8, with eight overall stations and 9 km in length.

Kanpur metro is not only expected to provide connectivity but also bring about an era of rounded development and growth for the city.
Hyderabad Metro sees the highest Footfall; India

HMRL Managing Director NVS Reddy said the Number of Passengers using the Service created a new Record, and Metro Stations had registered a Record 3.23 Lakh Footfall (3.06 Lakh Ridership) on Wednesday

By Kanika Verma 17/08/2019; Metro Rail News

HYDERABAD (Metro Rail News): The Hyderabad Metro Rail on Wednesday set a new record in patronage with nearly 3.06 lakh passengers taking the Metro ride in a day. HMRL managing director N V S Reddy said the number of passengers using the service created a new record and Metro stations had registered a record 3.23 lakh footfall (3.06 lakh ridership) on Wednesday.

The Metro Rail authorities attributed the increase in ridership to the holiday rush, better connectivity to Metro stations, availability of rent-a-bicycle or a two-wheeler services at some stations. After unfurling the national flag at Metro Rail Bhavan here on Thursday, Reddy informed that the reversal work at the Hi-Tec City Metro station has been completed as well.

“The Hi-Tec City reversal works were completed in all respects and normal train services will be introduced between Jubilee Hills check post and Hi-Tec City in the next few days after mandatory safety clearances are obtained,” Reddy said, adding that the frequency of the trains would also be increased to five or even three minutes during peak hours.
“The frequency of trains will be increased to and from Hi-Tec City in all directions in a few days from now,” the HMRL MD said. The work up to Raidurg (MindSpace Junction) station was also nearing completion and trial runs would start on the Hi-Tec City-Raidurg section soon.

DMRC’s Blue Line-NMRC’s Aqua Line Interchange Walkway inaugurated today; India

Noida Metro Rail Corporation (NMRC) has built the walkway connecting Sector 51 of Aqua Line and Sector 52 of DMRC’s Blue Line. This will facilitate those traveling to Greater Noida from various Parts of Delhi.

By Narendra Shah 18/08/2019; Metro Rail News

NOIDA (Metro Rail News): Good news for the commuters who travel from Blue line to Aqua line or vice versa, a 300 m walkway between Sec-51 of NMRC’s Aqua Line and Sec-52 of DMRC’s Blue Line was inaugurated today by Durga Shanker Mishra, Secretary, Ministry of Housing & Urban Affairs (MoHUA) in presence of Alok Tandan, Managing Director of Noida Metro Rail Corporation, Dr. Mangu Singh, Managing Director of Delhi Metro Rail Corporation, PD Upadhyay, ED/NMRC, Narendra Bhushan CEO of Greater Noida Authority, Ms Kalpana Saxena, Commandant 49th Battalion of PAC and others officials.

Noida Metro Rail Corporation (NMRC) has built the walkway connecting Sector 51 of Aqua Line and Sector 52 of DMRC’s Blue Line. This will facilitate those travelling to Greater Noida from various parts of Delhi. Keeping in mind the comfort of passengers, NMRC had also provided free solar powered E-rickshaw services in this stretch to facilitate connectivity between the two metro rail networks.
PART II: GLOBAL ACTIVITIES FOR URBAN MOBILITY AS A SERVICE

World-class Cities need innovative Transport Systems; Australia, Global

White paper of BAI Communications; Smart RailWorld; August 2019

With digital technology transforming our world, digital connections are increasingly pervading our daily lives. Connectivity is no longer solely the domain of work and study. Connecting virtually and physically is easier than it has ever been.

Global transit communications and broadcasting infrastructure leader, BAI Communications, Australia, recently conducted an international study of more than 2,500 commuters in Hong Kong, London, New York, Sydney and Toronto to test its hypothesis that continuous connectivity enriches citizens and cities, and to understand how citizens believe a digitally connected public transport system can impact their lives and expectations of their city.

The resulting Continuous connectivity report reveals that digital connectivity is indeed changing our idea of what a city can offer its citizens.

The study revealed that: innovative transport systems are a defining feature of smart, world-class cities; commuters require continuous connectivity to realise the benefits of living in a smart city; and therefore, continuous connectivity transforms cities, helping citizens to be happier and more productive, and organisations to be more innovative and prosperous.

For more and more people, public transport is the link between home, work, school, and entertainment venues. There are many reasons for this, among them include cost of maintaining a car, parking limitations, restricted access in city centres, road congestion,
and despite the benefits of ride sharing, it’s still only suitable for people who can afford it and is not immune to traffic.

What becomes obvious reading the report, is that passengers’ expectations are evolving with technology and their onboard experience matters more than ever before. To travel is to connect, and connectivity while travelling is expected.

A new Generation of connected Travellers

- 99% expect public transport to do more than just get them from A to B
- 96% believe transport innovation is an important part of modern cities
- 95% deem technological advancements that improve public transport and connectivity, help ease traffic, and improve the environment to be important
- 94% believe rail networks should offer digital connectivity (and 84% believe reception blackspots are unacceptable in 2019)
- 92% would benefit and better enjoy their journey if the rail network of the future evolved.

The new generation of connected travellers is more socially conscious as well as more attuned to getting real-time information than any in the past. As such, they are increasingly demanding constant and consistent data connectivity throughout their journeys on public transport.

A Halo of Benefits

According to the Moovit Public Transit Index, the average weekday commute exceeds 80 minutes in New York, Sydney, and London. So, it’s no surprise that commuters want to make the most of this otherwise idle time.

Other than getting more work done and being contactable, around half of respondents see work-related benefits of connected travel as providing an opportunity to change working hours and job location, as well as career improvement.

It’s particularly interesting how many respondents see continuous connectivity on trains as more than work-related. More than half said they would benefit by arriving at their destination relaxed and happy, and nearly a quarter said they would work on self-improvement courses or furthering their education.

Something as simple as being able to work and study or pay bills and watch videos on the train can lead to a more enriched life.

The Defining Role of continuous Connectivity

The research findings tell us that connected public transport helps us get more done, get home before our children are asleep, be able to get to that yoga class or dinner with friends, and move out of the city to get that house with a garden.

In short, a connected and evolved transport network will improve our productivity and contribute to work-life balance.

While the Fourth Industrial Revolution has been about technology development and convergence, the Fifth Industrial Revolution is said to be taking up the human-centred
opportunities to make the world better. As we become more reliant on technology and connectivity, we are changing the way we live, work, and travel.

While long-term predictions are difficult to make, by extrapolating the survey data we see that continuous connectivity will have a defining role in reshaping the workforce, public transport, and cities.

This report offers a profound example of how a city’s smart transport infrastructure is now key to making it world-class – in a world where it is increasingly cities, rather than nations, competing for trade, investment, and reputation.

**German Federal Railway, DB, to analyse Passenger Behaviour using Big Data; Germany, Switzerland**

12. Aug. 2019 | Josephine Cordero Sapién ; Railway-News Newsletter

The Branch of Deutsche Bahn dealing with new digital business models, DB Digital Ventures, is teaming up with Teralytics. This Swiss start-up performs mobility analyses using big data, something DB believes holds far-reaching potential for a customer-oriented development of its services.

Using data obtained from mobile phones, Teralytics supplies reliable information about passenger behaviour. This will allow DB to analyse what passengers want. All this data is only available in an aggregate format and cannot be traced back to any one individual. It is fully GDPR-compliant.

Deutsche Bahn wants to double the number of passengers using its long-distance services. That would mean an increase to 260 million. The train operator also wants to win an additional one billion passengers for local transport services. **Predictive Systems** are
crucial in answering questions such as ‘What do passengers want?’ and ‘What train services and last-mile connectivity are needed?’ Deutsche Bahn wants to answer these and other questions with the help of Teralytics and in doing so implement the goals of the new strategy ‘Starke Schiene’ (‘Strong Railway’). Teralytics can help increase capacities where this is most necessary.

The representative Data can also help in the Event of a major Disruption.

Prof. Sabina Jeschke, DB Chair for Digitalisation and Technology, said:

“If a train stops today because of a fallen tree, we don’t know how many passengers are on board and we don’t know what their destinations are. Big Data analyses coupled with artificial intelligence (AI) will allow us to make targeted decisions in order to tailor the scheduling of trains or replacement services to customer needs.”

Alastair MacLeod, CEO, Teralytics, said:

“We’re helping bring more transparency into mobility. Using aggregated and anonymised mobile phone data, we can determine how passengers are moving about and what means of transport they’re using. If we can work with Deutsche Bahn to contribute to the strengthening of rail, a climate-friendly travel option, this demonstrates that these data are even of social value.”

Teralytics is the twelfth company DB Digital Ventures is partnering with. DB Digital Ventures focuses its investments on Big Data and AI as well as the Internet of Things, IoT.

Hitachi trials a smart Ticketing System; South Korea

August 14, 2019; Railway Pro

Hitachi Rail is currently testing its new developed smart ticketing system which use sensors on trains to detect an app on passengers’ smartphones as they board, removing the ticket barriers.

The company says that there would be no need to remove the phone from pockets or bags and no need for station barriers, signalling an end to queues at the barrier or ticket machine.

Passengers will be automatically charged the correct fare, and Hitachi already has proven smart ticketing technology to ensure the passenger will not be overcharged. The technology will undergo a rigorous testing programme for Trenito Transporti in Trento,
Italy, with Hitachi hoping to bring it to the UK for use on buses, trams and trains. The technology can be applied to all forms of public transport, including buses and trams, allowing faster boarding times.

“This technology has the ability to transform public transport in every corner of the country, from rural buses to city centre train stations. The common travelling woes of queues at ticket machines or trying to find the cheapest fare could be solved without even needing to reach for your pocket,” Karen Boswell, Managing Director, Hitachi Rail, said.

Contract awarded for LA Foothill Gold LRT Extension; USA

August 16, 2019; Railway Pro

Foothill Gold Line Construction Authority awarded Kiewit-Parsons JV the design and build contract for the Foothill Gold LRT extension in Los Angeles. The contract includes an USD 805.6 million base scope for the first 14.5 km of the project from Glendora to Pomona, with a two-year contract option to complete the full 20-km project to Montclair including new stations in Claremont and Montclair. The value of the total contract is USD 1.18 billion, and it will be awarded if additional funds are secured by September 2021.

The project will begin major construction in 2020 and take five years to complete to Pomona and eight years to complete to Montclair, if the contract option is activated. The Foothill Gold Line was the first Measure M-funded light rail project to break ground and is named as one of Metro’s 28 priority projects to be completed before the 2028 Olympic Games in Los Angeles.
In the last 10 months following the authority received bids from all four teams initially competing for the project that were hundreds of millions of dollars above the funding secured, Metro has worked collaboratively with the authority to ensure the project would move forward and that the design-build contract could be awarded.

Kiewit and Parsons were involved in the first two segments of the Foothill Gold Line project which were completed on-time and under budget in 2003 and 2015 respectively.

**Snowdon Mountain Railway to order Hybrid Locomotives; UK**

Aug. 13, 2019; IRJ  
Written by [David Burroughs](mailto:David.Burroughs@irj.com)

SNOWDON Mountain Railway has begun the process of replacing its existing diesel locomotives, which have been in service on the Welsh heritage railway since 1985, and has been named Clayton Equipment, Britain, as preferred supplier to supply two hybrid diesel-battery locomotives.

The locomotives will be commissioned and ready for service for the start of the railway’s 2020 season in spring next year.

The new 800 mm-gauge locomotives will be driven by high torque, maintenance-free electric motors, powered by battery traction and a diesel genset generator.
The line uses the Abt rack and pinion system for traction and braking. On descent, the diesel generator will be switched off while regenerative braking will recharge the battery.

Snowdon Mountain Railway says, this configuration will lead to significant maintenance and fuel savings as the engines are lower power units than the existing diesel locomotives, European Stage 5 compliant, quieter than the conventional diesel locomotives and will deliver significant fuel and carbon emission savings.

The new locomotives will also enable the trains to carry an additional 12 passengers.

**Shanghai Songjiang LRT Tramway extended; China**

12 Aug. 2019 ; Metro Report

![Shanghai LRT Songjiang City Tram (Alstom Citadis LRV) on reserved Track with Shelter Station](image)

**CHINA: The Songjiang Tramway** in Shanghai was extended on August 10, taking the route to 26.8 km with 40 stops.

Route T2 has been extended from Zhongchen Road to North Sanxin Road, so it now forms a circular route. Route T1 has also been extended from Jinxi Road to Xinmiaosan Road. The extension add a total of 12.9 km to the network.

Services operate every 10 min. between 06.00 and 23.00, using a fleet of 30 Alstom Citadis trams. The Shanghai Keolis joint venture of Shanghai Shentong Metro Group (51%)
Keolis (49%) is providing operations and maintenance under a five-year contract awarded in August 2018.

The eastern section of Route T1 from Xinmiaosan Road to Xinqiao Railway Station is due to open by the end of the year. This would take the network to 31 km and complete the first phase.

The initial 13.9 km stage of the Songjiang tramway opened in December. Four further routes are planned.

Keolis opens new Section of Songjiang LRT Tram Network; China, France

13 Aug. 2019 | Railway-News

French public transport operator Keolis opened a new stretch of the Songjiang light rail network on 10. August. The total tram network, consisting of two lines, now measures 27 km, with 40 stations.

The first 13.9 km of the network opened in December 2018. This tram network in the suburban Songjiang district of Shanghai should carry around 170,000 passengers per day, thereby hopefully reducing the amount of cars on the road. The population of Songjiang is 1.8 million. This opening is a milestone for Keolis, which is trying to strengthen its presence in China.

Shanghai Keolis Tram Contract

In August 2018 the Keolis-Shanghai Shentong Metro Group joint venture in China, Shanghai Keolis, won the five-year contract to operate and maintain the network. Now, in
August 2019 the JV opened a further 12.86km. The light rail network serves residential areas, universities and the Shanghai Metro. Once the remaining section of line 1 is complete – at the end of 2019 – the entire network will measure 31km and serve 46 stations.

The Songjiang Tramway is the first light rail network Shanghai Keolis is operating in China.

**Songjiang Tram Network Rolling Stock**

The trams on the Songjiang light rail network are Alstom Citadis trams. There are currently 30 units serving the two lines, with a vehicle running every ten minutes between 6am–11pm. Alstom was awarded the rolling stock contract in 2015 with the first low-floor light rail vehicle delivered in 2016.

**Keolis opens new Section of Songjiang LRT Tram Network; China, France**

13 Aug. 2019 | Railway-News

French public transport operator Keolis opened a new stretch of the Songjiang light rail network on 10. August. The total tram network, consisting of two lines, now measures 27km, with 40 stations.

The Urbino 12 buses are to replace the diesel fleets currently operating on the islands of Lido and Pellestrina. Two 125 kW motors will be powered by Solaris High Power batteries with a total capacity of 116 kWh. These will be charged through a roof-mounted pantograph as well as through plug-in chargers.

The vehicles will be equipped with air-conditioning, an entrance ramp, a passenger information system, CCTV, rear-view cameras, a pantograph camera, a touchscreen control panel and remote monitoring. The seats will be covered with an anti-graffiti coating. Solaris is also supplying nine fast chargers, six plug-in depot chargers and a mobile plug-in charger. Deliveries of the buses and charging infrastructure are due to be completed by the end of 2020.

Solaris had previously supplied 18 buses to Venezia, including 10 powered by compressed natural gas.

**Alexander Dennis’ new Hybrid Bus Model ordered for Brighton; UK**

08 Aug. 2019 ; Metro Report
UK: Brighton & Hove Bus Company has become the UK launch customer for the Alexander Dennis Enviro400ER hybrid bus.

The Go-Ahead Group subsidiary has ordered 30 of the buses, which are due to begin operating on route 5 later this year, and will run on batteries in Brighton city centre.

The double-deck Enviro400ER bus uses BAE Systems’ Electric Range hybrid technology. It can run for up to 4.8 km using 32 kWh lithium nickel manganese cobalt batteries, which are charged from an internal generator powered by the Diesel engine.

Mercedes-Benz e-Citaro Buses ordered for Hannover; Germany

07 Aug. 2019; Metro Report
The contract covers 30 rigid and 18 e-Citaro G articulated buses. The four buses from the firm order are due to be delivered this year.

The buses will be powered by 10 battery packs with a total capacity of 243 kWh. These will be recharged using a roof-mounted pantograph at fast charging stations at the termini.

The low-floor vehicles will be equipped with retractable ramps, USB sockets and infotainment TFT displays. Daimler will also supply its Sideguard Assist technology that warns the driver of pedestrians or cyclists when turning, as well as its Preventive Brake Assist braking assistance system. The buses form part of Üstra’s plan to have a fully electric public transport fleet in Hannover city centre by 2023 at an estimated cost of €53m.

**Electric Buses arrive in Santiago de Chile; Chile**

07 Aug. 2019 ; Metro Report

**CHILE**: The first 100 of 183 K9FE battery buses, that BYD is supplying to operate in Santiago, arrived at the port of San Antonio on July 31. 2019.

The vehicles left the port of Shanghai on July 1 and will travel by road to the capital. The other 83 buses from the order placed earlier this year are due to arrive in mid-August.

The 12 m long low-floor buses with 38 seats will be operated by Metbus on routes 506, 507 and 510, which run along Avenida Grecia. They are equipped with air-conditioning, wifi, USB sockets and CCTV. The batteries have a range of 250 km, and Enel is supplying three Enel X charging stations.

Last year BYD supplied 100 K9FE electric buses to operator Transantiago in collaboration with Enel.
LITHUANIA: The first of 85 Trollino 12 trolleybuses that Solaris is supplying to Kaunas public transport operator UAB Kauno Autobusai arrived in Kaunas on August 6.

UAB Kauno Autobusai signed a €29·4m contract in October, with delivery of all 85 vehicles due by the end of this year. The first trolleybus is expected to enter revenue service in the next few weeks.

The low-floor vehicles have capacity for 85 passengers. They are powered by a 150 kW asynchronous traction motor and equipped with USB chargers, CCTV, LED lighting and two passenger information screens.

Once all the Trollino 12 vehicles are delivered, UAB Kauno Autobusai would be able to withdraw all of its Škoda 14T trolleybuses, which were delivered in 1984-91. The operator is also upgrading the overhead wires on the trolleybus network.
Public Transport with Right-of-Way Bus Rapid Transit, BRT - an efficient and competitive Mode of Transport: Bus-based Mobility Option
PART I: INDIAN ACTIVITIES AND INITIATIVES FOR URBAN MOBILITY AS A SERVICE

Animation of electric Metro Bus on reserved Corridor for innovative METRO NEO Project for Nashik City, India

Elevated METRO RAIL Construction Works in India
Opinion: Public Transport Systems in India; India

Public Transport Facilities are meant for carrying Goods as well as People.

By Vinod Shah, 21/06/2019; Urban Transport News

Even the remotest regions of the country are well connected by public transport system in India. Moving from one location to another isn’t an issue within the country. Railways, road transport and air transport are the main public transports available in India. In addition to, the country has a developed waterway network as well. Whilst the first two are affordable for people in general, the air transport has limited availability because of its airports and cost barrier. Common man doesn’t find air travelling affordable. Public transport facilities are meant for carrying goods as well as people.

As a carrier of goods and passengers, Indian Railways occupy a position of pride and importance. Originated during British period, it’s no parallel in this respect. Even a regular man can travel by railways. Indian Railways offers its service to every class of society. Railways occupies first place in the transport of goods. Railways are the cheapest means of public transport system. Though it boasts of its large network and effective service, it’s yet to cover the nook and corner of the country. Some areas are still outside the reach of the Indian Railways network. But there’s great difference in quality of road transport in various portions of the country.

Road transport also suffers from several disadvantages. These are specifically due to poor road conditions in both rural and urban areas. The majority of the villages aren’t linked to the mainstream of the country with well furnished roads. The smooth public road transport in urban areas leads to rise in the number of private vehicles that adds to pollution problem.
Whereas, backward villages still depend upon archaic means of transports. Obviously the government is considering these aspects with positive set of mind, which is the only ray of hope, at least for now. Air transport is developing fast in India. However this facility is available in mainly big cities and metros. One can’t have this facility in small cities. Only a certain section of society can avail the advantages of air transport.

Opinion: There is Need for Revision of Urban Transport in a smart India; India

India’s public Transport System is being crushed under the Impact of the Auto Boom and under an indifferent Government.

By Anushka Khare, 23/10/2018; Urban Transport News

Public Transport with Right-of-Way Bus Rapid Transit, BRT, - an efficient and competitive Mode of Transport

The arterial roads of all large urban centers in India are choking during morning and evening peak hours. Many of them remain gridlocked, to the chagrin of vast multitudes of commuters, who are always in a great rush to reach their destination. The consequences of this phenomenon are catastrophic for the health of public transport in all of these metropolises. According to a media report, “The average peak hour speed of BEST buses (in Mumbai) has dropped by nearly half in a decade, from 16 km per hour in 2008 to 9 kmph today!” The situation in the peak hour must be even more asphyxiating. There is a concomitant loss of clientele, with over 1.7 million commuters opting out of bus travel daily in the same ten year period.
Not surprisingly, therefore, people are steadily shifting towards other modes of transport — be it rail, auto rickshaws, taxis or private vehicles both two-wheelers and four-wheelers. The fact is that India’s public transport system is being crushed under the impact of the auto boom and an indifferent government. The malaise is endemic across the country. Another media report states that the share of passenger trips by public transport across major Indian cities has dropped from a level of 60-80 percent to 25-35 percent.

**India’s public transport system is being crushed under the impact of the auto boom and an indifferent government.**

All of this does not bode well for the future of quality of life in all these major Indian cities which are on cusp of a vicious cycle of congestion leading to pollution, increased usage of private vehicles resulting in further congestion on the roads and increased emission of GHG and other polluting gases contributing adversely to climate change. This will evidently lead to enhanced issues of health — both physical and mental for the residents. There is an urgent need for breaking this vicious cycle to improve the quality of life in these Indian cities and bring India at par with the developed world in various indices deciphering quality of life in them. For finding solutions to this puzzle we must first find the culprits responsible for bringing in the current situation. A study by global consulting firm AT Kearney has shown that two-wheeler and four-wheeler population has registered a steady eight to 10 percent annual growth from 2014 to 2017, while there is a flat/negative growth in the bus fleet all over India. The modal mix is skewed towards cars and motorbikes/scooters. The length and area of the arterial roads in all such cities is static over all these years due to lack of space and, hence, is woefully inadequate to cope up with it.

These statistics reveal the magnitude of the problem, but any solution is possible only if we understand the psychology of an average commuter. How does one choose the preferred mode of commute? Any commuter’s primary requirement is to reach his destination at the earliest. So the average speed of the mode of transport is the most important parameter for this selection. The next important factor in the mind of the commuter is the frequency of the services. As the saying goes: “You are always late for the previous train and early for the next one.” Hence the interval between two trains/bus is very important for the commuter to decide the preferred mode of transport. The frequency of services per hour is the second most important factor for selection of a mode of transport by the commuter. A high-frequency level ensures that the commuter does not waste time in waiting for the service he wants to utilize. The third factor that may cloud his decision is the cost of the service. If the cost is not affordable, the commuter will be constrained to shift to a cheaper mode, overlooking the comfort parameter. We can hence surmise that frugality of the service is the third and the comfort of commuting is the fourth parameter on the mind of the commuter while selecting his preferred mode of commuter.

The huge popularity of the suburban rail network in Mumbai is primarily because it satisfies the first three of the above-mentioned parameters adequately. It is the fastest way of commuting in the city. It has a frequency level of three to four minutes on each of its corridors, and it is the cheapest mode of city travel anywhere in the world! So, who minds if one has to travel in ‘super dense crush load’ scenario in either a first class or a second class compartment?

It is on these very parameters that BEST, Mumbai’s municipal bus transport service, is steadily losing ground. As the average speed of the bus has plummeted down to 9 km per hour during peak hours, commuters are abandoning this mode in hordes. At the latest count, around 1.7 million commuters, as mentioned above, have daily shifted to other modes in the last decade alone. This has put enormous pressure on the remaining modes
of commute viz. rail network and the other road-based transport like taxis, private cars, and motorbikes. In the last five years, the population of four-wheelers registered in Mumbai has increased at a CAGR of 8.18 percent and that of two-wheelers at 9.4 percent. It is no surprise that the roads in Mumbai remain choked even in non-peak hours.

Given the linear geography of Mumbai, the city is constrained of its growth by the Arabian Sea on three sides. While the growth marches ahead at the northern end, the peninsula of the southern and central Mumbai remains choked, making smooth movement well-nigh tortuous as well as torturesome. An intensive use of public transport alone can retrieve Mumbai from this morass. Maharashtra government has embarked on a very ambitious programme of metro rail construction at a frenetic pace. There are 12 projects at a cost of INR 1.25 trillion (1,25,201 crore rupees) which will inject 276 kilometers of metro routes in the city. The average cost of these projects is INR 4.54 billion (454 crore rupees) per km. However, a rigorous exercise of calculating the financial returns on all of these 12 routes seems to be lacking. And while the full expanse of the metro network will take at least a few decades to bear fruit, it may suffice to say that no effort is being made to find solutions to improve the average speed of BEST buses who have been left to their plight of jostling with the teeming milieu of private cars and bikes, kali-peeli taxis, encroachments, and hawkers, not to talk of blue light, amber light and red light carrying cars with wailing sirens. The BEST authorities have come out with a surprising solution of going in for smaller size buses! They seem to have given up their fight even before firing any salvo.

It is high time that the local government starts mulling over the suggestion of reserving separate ‘bus only’ lanes on all the major arterial roads of the city. Experiments for introducing Bus Rapid Transit System (BRTS) have been tried with remarkable success in a number of metropolises all over the world, but the experience of trying it on the lawless roads of Indian cities has indeed been dampening.

The government is, instead, proceeding with alacrity on constructing metro lines in every major city of India. These are either underground (Metro III line in Mumbai) or mostly elevated. If the same elevated kind of structure is used for introducing Bus Transit, having its own ‘right-of-way” or reserved line, the cost of civil construction, as well as the cost of rolling stock, can be substantially reduced. ‘Elevated Bus Rapid Transit’ is the panacea for all ills of urban transport in India. Air-conditioned buses on elevated roads can easily clock an average speed of more than 40 km per hour at a frequency of less than a minute. It can reach a level of 18,000 passengers per hour peak direction easily and will be a cost-effective solution. Moreover, on narrower internal roads, as the width of the carriageway would be required only for a single bus passage, a looped one-way elevated bus-only mode of transit can effectively overcome the incontrovertible ‘last-mile connectivity’ problem. A win-win situation for all stakeholders.

Opinion: Underground Metro ideal, but not viable; India
Bhide said the ideal situation could be that all Metro lines are underground. But for a country and a city like ours, where we have a huge resource crunch, we have tried to find a solution.

‘Underground Metro ideal, but not viable’

MUMBAI (Metro Rail News): Mumbai Metro Rail Corporation’s (MMRC) managing director, Ashwini Bhide, said underground Metros were ideal but could not be executed in the city due to several, particularly financial, constraints.

She said, “The ideal situation could be that all Metro lines are underground. But for a country and a city like ours, where we have a huge resource crunch, we have tried to find a solution.”

She said she was not the most competent person to explain the decision to build elevated Metro corridors, but said the city’s geographical makeup put a lot of restrictions on planning public transport projects.

Ms. Bhide, who was addressing citizens at the V-Citizens Action Network event in Colaba, answered a series of questions regarding Metro 3, which is being built from Colaba to SEEPZ, including the contentious issue of a car shed proposed to be built in Aarey Colony. The car shed has been opposed by citizens and environmental groups as it involves axing 2,702 trees.

Recently, the Brihanmumbai Municipal Corporation’s Tree Authority too stalled the proposal for cutting trees after it received 82,000 objections from citizens.

Several citizens questioned the need to have it in Aarey Colony and asked why the yard was not possible in a site in Kanjurmarg, which is being proposed for the yard of Metro Line 6. “That land was not made available because there are private claims on it, litigation is on since 1996,” she said.
The land was still not available with the Mumbai Metropolitan Region Development Authority, which was looking for other options for Metro Line 6, she said. “Moreover, the land is 10 km away from our last stop. So it would have meant extending the corridor by 10 km and revising the whole design, financial closure, getting new approvals. We were still willing to do it provided the land at Kanjurmarg was available at the time,” she said.

She said the MMRC was “seriously concerned” regarding the Aarey issue as the first set of trains were expected to arrive by November 2020. If the depot is not ready by then, they would have no place to keep the trains.

E. Sreedharan is guiding Infrastructure Projects in India for more than five Decades; India

By Urban Transport News, 09/08/2019, Urban Transport News

Dr. Elattuvalapil Sreedharan, even at the age of 88, when most people might want to be tending their roses, loves engaging himself with policy makers, urban planners, civic administrators and students, sharing with them experiences gathered over 56 years of his professional life. He travelled across India and sometimes abroad, and is considered a treasure trove of information on the urban transportation, Metros, railways and other infrastructure projects.

In a recent freewheeling chat with John L. Paul, Sreedharan spoke about his life and times with grace and positivity. Here are edited excerpts:
You are India’s best-known technocrat, having taken up many challenging projects. What ignites the fire in you even today?

Dr. Elattuvalapil Sreedharan: Somehow there is a great demand for my time and expertise. When the assignment is for the good of society, I don’t pull back. It is the job satisfaction which excites me. My guru Poojya Swami Bhoomananda Tirthaji has told me that as long as I have reasonably good health, I should continue to serve society with the attitude, that it is an offering to God.

What are the things that have helped keep you on the move?

Sreedharan: I have always led a disciplined life, getting up very early in the day (4 a.m. formerly, now 5 a.m.) and going to bed by 9 p.m. I usually take a short nap after lunch. I am fastidious about exercise, be it in the open air, or regular yoga. I was a sportsman in my young days, was captain of the college football team. This addiction for regular exercise has remained with me. I was very religious in my early years — shaped by my parents that way. And I moved to spirituality, particularly after the association with my guru. I like austerity and simplicity.

Were you considered for the President’s post in 2017?

Sreedharan: I was never considered for the President’s post by any political party. This was mere kite-flying by the media. Even if I had been considered, I would have declined due to the age factor.

Which metro rail projects are you presently associated with?

Sreedharan: I am directly in charge of the 24-km Kochi Metro. I am a consultant to the U.P. government for the Lucknow, Kanpur and Meerut Metros. Likewise, I am consultant to the J&K government for the light metros in Jammu and Srinagar. Last month, I resigned from the U.P. assignment due to time constraints, but the resignation has not been accepted. In addition, officials of Mumbai Metro Line No. 3 and Delhi’s Rapid Rail Transit often consult me for technical guidance. I monitor their progress with regular visits.

Passenger patronage of Delhi Metro is high, but that’s not the case with many others. What might be the solution?

Sreedharan: Most Metros make the mistake of fixing high fares — they adopt the Delhi Metro fare or even higher, in hopes of increasing revenue. Metro is a social service and should not be guided by business considerations alone. Its fares must be affordable, to attract commuters, who rely on the road. Also, the other Metros are in the infant stage. Their network must cover most city areas. Ridership will increase only if Metro stations are within half a kilometre of commuter destinations. Link bus services and a common ticketing system must be introduced to provide door-to-door connectivity.

Metro is a social service and should not be guided by business considerations alone. Its fares must be affordable, to attract commuters who rely on the road.

Tell us a little bit about some of your most important projects.

Sreedharan: The restoration of Pamban Bridge was a work thrust on me when I was an executive engineer at Southern Railway at the age of 32. I was able to complete the task
in 46 days, as against the six-month deadline. This was a record and made possible by adopting innovative engineering methods. The 760-km Konkan Railway, which goes along the most difficult terrains ever encountered in the history of railway construction in India, was completed in seven years. This was possible mainly due to financial engineering and adoption of superior technology.

Delhi Metro, again, was thrust on me, but I was able to make it an astounding success due to teamwork and a unique work culture. In all these projects, I was single-minded in my approach and did not succumb to political and bureaucratic pressures. My philosophy was “performance is the best publicity”. I was able to get my way in these projects because of the unparalleled success of my previous projects.

What could be a sustainable solution to the maddening traffic snarls and chaos in urban India, which impose a heavy toll in the form of pollution, accidents and wastage of time?

Sreedharan: Many people would switch from private vehicles to public transport if they were convenient, safe, reliable and affordable. The government must introduce disincentives in the form of increase in road tax, surcharge on fuel, high parking fees, and so on, to increase the patronage of public transport.

You have always advocated the appointment of technocrats in crucial government posts held by civil servants. The Centre has now begun direct recruitment to such posts, overlooking IAS officers.

Sreedharan: The Indian bureaucracy as it exists today is a sad legacy of the British days. To believe that a civil service officer will fit all roles is wrong. Specialisation is a must, especially in these days of fast-changing technology. Proven technocrats must be posted in such fields. Sadly, politicians prefer generalists and they sideline technocrats.

As President of the Foundation for Restoration of National Values (FRNV), what is being done to ensure value-based development in the country?

Sreedharan: FRNV has not been able to achieve much in the last 11 years of its existence. Our flagship programme is value-based education so that individually and collectively, people have a persuasion to be honest, patriotic and show concern for society. Education being a State subject, we have not been able to achieve much in this area. Fortunately, the new draft education policy contained in the Kasturirangan report lays great emphasis on value-based education at all levels.

Is spending billions on bullet trains worth it? Or are semi-high-speed corridors a way out?

Sreedharan: High-speed trains are necessary in a vast country like ours. But they are expensive. The country committed a mistake by going in for dedicated railway freight corridors at huge expense instead of going for dedicated high-speed passenger corridors, which would have released sufficient capacity in the existing rail system for freight traffic. It is still not too late to convert freight corridors to passenger corridors. The cost difference between bullet train corridors and semi-high-speed corridors is not much. Adopting semi-high-speed corridors will again be a mistake, which cannot be corrected later (= those statements are highly questionable; comment by Dr. F.A. Wingler).
Metro Rail is considered very expensive. Does it have any cost-effective alternative?

Sreedharan: Metro Rail is no doubt very expensive; it costs ₹250 crore per km for elevated corridor and ₹450 crore for underground rail. But its capacity is anything from 45,000 to 90,000 persons per direction per hour. An alternative to such a high capacity transport is the suburban railway system, but it cannot substitute for an urban mass rapid transport system. Cheaper options like Bus Rapid Transit, Light Rapid Transit and tramways have lower passenger capacities. Roads would have to be widened for them and this is equally expensive.

(The interview is first appeared in The Hindu on August 3, 2019)

Uttar Pradesh Government launches Electric Vehicle and Mobility Policy 2019; India

By Urban Transport News, 22/08/2019

Electric Vehicle

Lucknow (Urban Transport News): With the aims to promote green mobility in the state, Uttar Pradesh Government has recently launched new Electric Vehicle and Mobility Policy 2019. Electric Vehicles are widely gaining market across the globe. Due to high pressure and fast depletion of fossil fuels, electric mobility has become necessary to reduce the impact of transportation on the environment and climate change. The recent Paris Agreement enforced in November 2016 provides to limit Carbon dioxide emissions to control global warming and threats of climate change. Electrification of the automotive industry aims at achieving the set objectives by decarbonizing the transport system.
The Indian automobile industry is one of the largest growing industry in the world, and the sector promises further growth in manufacturing sector driving the country’s economic growth. Since presently the automobile industry largely contributes to pollution, the government is promoting electric mobility towards this.

In 2018, the global electric car fleet exceeded 5.1 million from 2 million in the previous year and almost doubling the number of new electric car sales. With the rapid expansion in electric mobility, the private and public charging infrastructure has been continuously expanding. The annual growth rate of publicly available charging infrastructure was higher than the electric car stock growth rate on a global level.

The Electric Vehicle market in India is set to go enormous and is estimated to be around 80 lacs by 2020, and approximately 5 crores by 2030. Prices of Lithium Batteries are rapidly going down, thereby making EVs cheaper. Electric Vehicles Storage Opportunities (in GW) in India is anticipated to grow at CAGR 44% until 2022.

In a recent report published by FICCI and Rocky Mountain Institute, it has been estimated that India’s shift to shared, electric and connected mobility could help save up to Rs.20,00,000 Crores in oil imports and nearly 1 Giga Tonnes of carbon dioxide emissions by 2030. The report further states that the sales of 4-wheel EVs are expected to exceed that of internal combustion engines (ICEs) in India by 2027.

In order to boost the manufacturing of hybrid and electric vehicles in India, Government of India has launched the Faster Adoption and Manufacturing of (Hybrid &) Electric Vehicles in India (FAME Scheme) in 2015, under National Electric Mobility Mission Plan (NEMMP) with an aim to promote eco-friendly vehicles in the country. It has set an ambitious target of 6-7 million sales of hybrid and electric vehicles year on year from 2020 onwards in India, thereby creating wide opportunities in EV manufacturing. Extending the Scheme, Government of India has come up with FAME II, and National Mission on Electric Mobility & Battery Storage has been launched.

Indian automobile industry became the 4th largest in the world by producing a total of nearly 30.92 million vehicles including passenger vehicles, commercial vehicles, three-wheelers, two-wheelers in FY 2018-19 as against 29.09 million in FY 2017-2018 registering a growth of 6.26% over the same period last year. Domestic automobile production increased at 7.08 % CAGR between FY 2013-18.

“Make-in-India” has encouraged Companies to manufacture and invest in India: Exclusive Interview with Alain Spohr, MD, Alstom; India

From Metro Rail News

Sricity has a production Capacity of 240 Cars per Year. The Factory is currently scaling up to double Production Capacity and also introducing the latest industrial Technologies.
Mr. Alain Spohr, Managing Director, India & South Asia, Alstom has a keen understanding of the country’s business environment and also its culture and growth trajectory. Mr. Spohr has over four decades of experience in leadership and managerial roles. Mr Spohr’s strong exposure in industrial and factory operations have helped steer companies through rapid localization and cost reductions, helping business verticals secure significant market share and overall development. In this current role, his key focus is to expand Alstom’s business across all locations for optimized delivery of on-going projects within India and South Asia.

With several large projects underway in the mainline and urban networks, Alstom is uniquely positioned to meet India and Asia Pacific’s changing and growing mobility needs, believes Alain Spohr, Managing Director for India and South Asia. In an exclusive interview with Metro Rail News, Spohr talks about the recent 100th Made in India Trainset, manufacturing facility at Sricity, CBTC technology, Future expansion plan, company’s projects and strategies.

**Metro Rail News: Firstly, Congratulations for rolling out 100th Made-in-India metro trainset. What is your current market share in India?**

**Mr. Alain Spohr:** Thank you. The milestone of rolling out 100th ‘Made-in-India’ trainset is indeed a matter of pride for us. The global vision of Alstom is to become the preferred partner of our customers for transport solutions, and delivery of the centurion set to Kochi Metro reinforces this vision.

Urban transport sector in India is evolving and we are contributing to this phenomenon significantly. Currently, Alstom is part of a large number of important mobility projects in the country. Our flagship rolling stock manufacturing facility at Sricity has delivered rolling stocks for both international and domestic projects. Rolling stocks for Chennai, Lucknow, Kochi and Sydney metro projects were manufactured and supplied from Sricity. Our order book for rolling stock is healthy. We are currently gearing up to deliver Mumbai Line 3 and Montreal Metro.

Apart from rolling stock, we also provide the latest and advanced Urbalis 400 communications-based train control (CBTC) solution and other heavy engineering solutions. Our first CBTC solution was deployed at Kochi Metro. Alstom India won all the new CBTC projects awarded in FY18. Presently, India has 473 km of CBTC under execution, of which Alstom is executing close to 40%. We also won the signalling contracts to equip Mumbai Metro Line 3 as well as Mumbai Line 2A, 2B and 7, and are equipping Pune Metro lines 1 and 2 with Urbalis 400.
Metro Rail News: How “Make in India” initiative help you to set up a global manufacturing centre at Sri City, Andhra Pradesh, India?

Mr. Alain Spohr: Make-In-India has encouraged companies to manufacture and invest in India. Alstom has been a strong supporter of the initiative and promotes manufacturing and job creation at the local level. We have synchronised our business goals with the government’s outcome-focused initiatives. As a result—from manufacturing to localisation to employment—we have been able to contribute significantly to ‘Make in India’.

Sricity plant is Alstom’s first global manufacturing centre for rolling stock in the Asia-Pacific region. Established in 2012, the facility currently employs 600+ workforce and has a production capacity of 240 cars per year. In the last six years, Sricity facility has established itself as the manufacturing hub for both domestic and international clients.

As far as international orders are concerned, we completed the order of delivering 22 Metropolis trains for Sydney Metro in December last year. After the timely and successful delivery for the Sydney project, we are gearing up to commence production for Mumbai Metro Line 3, which is Alstom’s biggest urban rolling stock contract in the country. Mumbai Metro Line 3 will be 33.5-km long and will be the first and longest underground metro line in Mumbai. In addition to this, the facility is also gearing up to commence production of its second international order – Montreal metro—for which we will supply 106 trains comprising 212 coaches.

Metro Rail News: What are the features of new metro coaches and where It will be delivered?
Mr. Alain Spohr: The new Metropolis metro coaches will be delivered for Mumbai Metro Line 3. Being the business capital of the country, Mumbai requires a sustainable transport system which can match the international standards. Mumbai Metro Line 3 is Alstom’s biggest urban rolling stock order in India.

Alstom Metropolis has high benchmarks in terms of reliable and attractive metro trains. It has an extensive track record, comes with a wide range of configurations, has low lifecycle costs and a keen focus on the passenger experience. The Metropolis trainsets are configured to suit customer’s requirements, be it design, length, width or seating arrangements. The solution is fully scalable, capable of working in multiple units or being lengthened by adding additional cars. Metropolis not only operates in driver mode but also driverless, leading a growing trend for automatic train operation (ATO).

Alstom is also leading in innovation with designing energy-efficient products. Metropolis is a great example of that. Our initiatives and solutions include full electrical braking, light weight design, highly efficient power converters, regulation of climate control according to passenger load, and LED lighting. Metropolis displays low lifecycle costs due to extended maintenance intervals and easier maintenance.

The Mumbai metro cars will also have 75% motorisation, as stipulated by the Ministry of Urban Development guidelines. This will enable quick acceleration and deceleration, thereby bringing about greater efficiency in operations. It will be Mumbai's first and India’s second UTO (Unattended Train Operation) project.

Metro Rail News: What is the current capacity and expansion plan for Sricity facility?

Mr. Alain Spohr: Sricity has a production capacity of 240 cars per year. The factory is currently scaling up to double production capacity and also introducing the latest industrial technologies.

Metro Rail News: What is new in CBTC Technology?
Mr. Alain Spohr: The communications-based train control (CBTC) system is a continuous, automatic train control system, which offers improvement in essential headway and average speed performance. Alstom’s state of the art CBTC solution is Urbalis400, which uses moving block automatic train protection to shorten headways between trains. This means that more trains can be deployed, resulting in 30% higher capacity on an average. The technology is designed for metros with heavy ridership. Alstom is the first company to introduce CBTC in India with Kochi and Lucknow metro. We would also be deploying our latest generation of CBTC solution – Urbalis 400 at Mumbai Metro lines 3, 2A, 2B and 7, along with Pune Metro lines 1 and 2.

Globally, from Mexico to Italy and Singapore to Canada, clients all over the world testify to Alstom’s project management capabilities in conducting the installation and migration process. We are today a preferred partner to many transport authorities wishing to revamp and increase the capacities of their urban rail networks with Urbalis 400.

Metro Rail News: What are the next big orders expecting you for Rolling Stock?

Mr. Alain Spohr: India is a fast-emerging market in terms of sustainable mobility, and we have been a key contributor to a host of metro projects being implemented currently in the country. Several metro projects are coming up, and as a key transport player with strong
project references in the country, we would be actively participating in the upcoming opportunities in the market. As the Government is pushing for smarter cities with better mobility solutions, we hope that a lot of new opportunities will be coming our way in the near future.

**Bentley Systems’ Going Digital 2019 Event for Advancing Infrastructure attracts more than 330 Attendees in Mumbai; India**


By Narendra Shah, 27/08/2019; Metro Rail News

**MUMBAI (Metro Rail News):** Bentley Systems, Incorporated, the leading global provider of comprehensive software and digital twins services for advancing the design, construction, and operations of infrastructure, recently held its Going Digital 2019 event in Mumbai. More than 330 infrastructure professionals attended the event, which featured live demonstrations of Bentley Systems' solutions and services that help professionals learn how to integrate digital context, digital workflows, and digital components into their infrastructure projects, enabling better decision making for improved project outcomes and better performing infrastructure assets.
In his keynote presentation, Phil Christensen, senior vice president, Reality Modeling, iTwin Services, Bentley Systems, discussed how infrastructure digital twins empower users with continuous and comprehensive design review, immersive visualization, and analytics visibility to understand the impact of change and predictively model the performance of a project or infrastructure asset in the real world. He highlighted the benefits of digital workflows and how organizations can use technologies such as 3D/4D visualization, reality modeling, mixed reality, and geotechnical engineering for immersive visualization and analytics visibility.

Phil Christensen said, “It was great to see such an enthusiastic turnout for our event in Mumbai. Digital workflows are becoming integral to every infrastructure project—from design through to operations. And what we’re demonstrating here is that going digital is not merely a convenience or a useful tool, it is a necessity for designers, engineers, constructors, and owner operators to make informed decisions, optimize asset performance, and ensure the resilience of cities, sites, and buildings. Leveraging digital twins for analytics and immersive visualization of real-time project and performance conditions is a vital piece of the going digital journey.”

Participants attended insightful sessions with industry leaders from Siemens and Microsoft discussing digital twin technology and cloud solutions for industry to accelerate the digitalization of plants and smart infrastructure around the world. Paul King, industry sector director, construction, Bentley Systems gave a technology update on digital solutions and processes that can help initiate improvements in project performance and how companies that embrace emerging technologies can gain a strong competitive advantage. He also showcased Bentley’s project delivery solutions that are enabling better project team collaboration and safer, more efficient construction in the field.

The Going Digital 2019 event also included industry forums for attendees to learn about technology and solutions for their specific interests including Digital Cities; Geostructural; Rail, Road and Airport; and Process Plant.

Bentley software users from India were recognized for their outstanding projects nominated for last year’s Year in Infrastructure Awards program.
Bentley’s next Going Digital 2019 event will be held on 19 September in Moscow.

About Bentley Systems

Bentley Systems is the leading global provider of software solutions to engineers, architects, geospatial professionals, constructors, and owner-operators for the design, construction, and operations of infrastructure. Bentley’s MicroStation-based engineering and BIM applications, and its digital twin cloud services, advance the project delivery (ProjectWise) and the asset performance (AssetWise) of transportation and other public works, utilities, industrial and resources plants, and commercial and institutional facilities.

Bentley Systems employs more than 3,600 colleagues, generates annual revenues of $700 million in 170 countries, and has invested more than $1 billion in research, development, and acquisitions since 2014. From inception in 1984, the company has remained majority-owned by its five founding Bentley brothers. Bentley shares transact by invitation on the NASDAQ Private Market. www.bentley.com.

Paytm launches QR-based Tickets for Delhi Metro’s Airport Express Line; India

August 27, 2019 Rail News

New Delhi: Paytm has launched QR-based tickets for DMRC’s (Delhi Metro Rail Corporation) Airport Express Line. Now, commuters using the Airport Express Line will no longer have to stand in queues to buy tokens or worry about recharging their Metro cards.

More Information:

- They can simply purchase a QR ticket on their Paytm app.
• The QR ticket can be displayed at the Automatic Fare Collection (AFC) gates to proceed for the journey.
• QR tickets will enable commuters to book tickets without being physically present at the Metro station.
• All they need to do is open their app, enter source and destination stations, enter the total number of passengers and make payment.
• They can tap this QR ticket at AFC gate to commence their journey.
• “We are already contributing to almost 25% of passenger revenue (smart card recharges, token revenue, etc) on DMRC network. With Paytm QR tickets, we are excited to further extend & strengthen our partnership with Delhi Metro commuters,” Paytm Spokesperson said.
• Paytm provides multiple products and services for Bengaluru Metro, Hyderabad Metro, Delhi Metro and Mumbai Metro like Metro Card recharges, mobile-based ticketing and trip passes.
• Also, Paytm is the first company to launch QR-based tickets for Mumbai Metro which is now being introduced in Delhi as well.

Delhi Metro to begin Driverless Train Operations on Pink and Magenta Lines; India

August 22, 2019 Rail News

The Delhi Metro Rail Corporation (DMRC) is planning to start driverless train operations on Pink and Magenta lines by next year. From May 2020, Driverless Train Operations (DTO) will be operationalised on Pink line running between Majlis Park and Shiv Vihar and Magenta line between Botanical Garden and Janakpuri West.

More Information:
• A state-of-the-art system known as Communication-Based Train Control (CBTC) will switch to unattended train operations (UTO).
• The technology to be inducted will be more efficient.
• It will allow safer train operations as compared to older metro corridors.
• Also, it will lower the minimum distance between two trains, increasing the frequency of the trains.
• An official said that the new technology is to be operationalised on the Pink and Magenta lines in a phased manner.
• Presently, the Delhi Metro network consists of about 373 km with 271 stations.
• The network has now crossed the boundaries of Delhi to reach NOIDA and Ghaziabad in Uttar Pradesh, Gurgaon, Faridabad, Bahadurgarh and Ballabhgarh in Haryana.
• With the opening of the Majlis Park to Shiv Vihar and Janakpuri West – Botanical Garden Sections, new age trains equipped with the Unattended Train Operation (UTO) technology have been introduced.
• These trains operate with the Communication Based Train Control (CBTC) signalling technology, which facilitate movement of trains in very short frequencies.
• The DMRC today has over 300 train sets of four, six and eight coaches.

Surat Railway Station to be developed as Multi-Modal Transport Hub; India

August 5, 2019 Rail News

Surat City in Gujarat is well known in India for its Diamond industry as well as its famous textile markets. Surat railway station serves as the railhead to this bustling city and is considered as one of the busiest railway stations not only over Western Railway but also across Indian Railways. It is a major station on the Mumbai — Delhi rail corridor and caters to trains plying from North to South as well West to East and vice versa.

More than 150 passenger ferrying trains pass through this station which includes 21 trains originating/terminating here, i.e. on an average 45 trains ply daily from Surat station. The above train figures exclude the goods traffic that traverse through this important station.
Currently, Surat station is well equipped with FOBs, subway, waiting halls and rooms for men and women, retiring rooms, bathing cubicles, seats all over the station premises, water coolers, food plaza, emergency medical room, etc. to ease the journey of the passengers. Surat station has also benefited since the commissioning of the newly dualized & electrified Udhna-Jalgaon section of Mumbai Division, immensely in passenger and goods traffic in just a year of the completion of this Doubling Project.

The 307 km long Doubling project, linking Udhna in Surat district of Gujarat to Jalgaon district in North Maharashtra, has provided a fillip to growth in areas falling under this rail section which has 44 stations, 380 bridges, 31 foot over bridges, 101 platforms.

Passenger amenities like platform shelters, toilets, waiting rooms were also provided. According to a press release issued by Shri Ravinder Bhakar — Chief Public Relations Officer of Western Railway, W. Rly is taking all efforts to make the travelling experience of passengers more pleasant, convenient and comfortable.

One such step in this direction is the re-development of Surat station and to develop a Multi — Modal Transportation Hub (MMTH) which will also incorporate bus terminals, Metro, auto-rickshaws & private vehicles in an integrated hub to provide seamless connectivity. This state of the art MMTH will be built over 3,40,131 sq. m of land pooled from Railways, Gujarat state Road Transport Corporation (GSRTC) & Surat Municipal Corporation (SMC).

This is a first of its kind project in India bringing together Centre, State and local Municipal Corporation. The station redevelopment will be done via commercial development on leasehold rights for a lease period of 90 years on the vacant railway land and air space. This hub is expected to cater to approximately 4 lakh passengers per day by 2033 and approximately 5.25 lakh passengers per day by 2053.

Currently, the built-up area of the station is approx. 36,950 sqm and after the redevelopment it will be approx. 1,01,750 sqm. Shri Bhakar also stated that a special purpose company named Surat Integrated Transportation Company (SITCO) has been formed by Indian Railway Stations Development Corporation (IRSDC), Gujarat State Road Transport Corporation (GSRTC) and Surat Municipal Corporation (SMC).

The station redevelopment project of Surat station is one of the most important projects because of its geographical and economical importance. Under the redevelopment project, the railway station building will be constructed on at least 55,374 sqm. The space frame roofing across all the existing railway tracks for 100 meter on each side of the concourse shall be of 16,400 sqm and platform shelter roofing on at least 10,800 sqm.

The platforms will be furnished with granite flooring on approx. 4,000 sqm of surface area. Post the redevelopment, the parking requirement of the station will be approx. 750 equivalent car space (ECS) (439 ECS at Multilevel car parking and 311 on surface parking area). This parking system will be provided near the east-west side of the station building. The existing subway and ground floor of the existing station building will be used for parcel services.

The Skywalk connectivity between the railway station, bus terminals and the commercial area will be of 4,290 sqm. A total no. of 90 escalators and 30 elevators will be built in the Surat MMTH. Along with these, the incoming and outgoing of passengers will be segregated which will be of great help to manage the crowd at the MMTH.
Waiting rooms, seating arrangements for passengers will be shifted to the second floor and facilities such as toilets, ticket counters, enquiry counter, cloak room, parcel facility, medical room, prepaid taxi, security room, etc. will also get a top-order upgrade. The façade of the station building will be improved as well as the circulating area which will ensure proper entry and exit of commuters.

A lighting tower will be installed for proper illumination of the station area as well as modern and cost effective lighting arrangements will be made for all the platforms. The water booths and Pay & Use toilets will be renovated too. Waiting and Retiring rooms will be furnished with modern furniture for the comfort of passengers. A passenger guidance system including signages and coach indication will be placed to guide commuters for their ease.

Booking and Enquiry Offices will also get a facelift with better lighting arrangement, spacious queuing area in front of the booking windows. The Surat MMTH will be beautified with modern fixtures and art too for which architects and consultants have been hired. The whole redevelopment project of Surat station will create new landmarks for Western Railway towards the journey of progress and modernization of railways in the future.

Maharashtra approves innovative electric Bus Mass Rapid Transit ‘METRO NEO’ for Nashik City; India

Government of Maharashtra has approved a state-of-the art Mass Rapid Transit System (MRTS) for the city of Nashik. It is indeed a moment of great pride for the people/city of Nashik which has been selected for this unique, innovative and prestigious project. The rapid transport system, called METRO-NEO, is the FIRST such system being developed in this country. The task of providing an efficient, safe, comfortable, reliable, environment friendly and appropriate transport system for the city of Nashik was entrusted to Maha-Metro by Govt. of Maharashtra in Nov/Dec 2018.
The feasibility report was taken up in January 2019 and after regular consultations with Nashik Municipal Corporation, CIDCO, public representatives and other stakeholders, the DPR was prepared and submitted to the Govt. of Maharashtra for approval. Govt. of Maharashtra on 28.08.19 approved the Nashik City Metro Neo Mass rapid transit system project. The proposal will now be submitted to Ministry of Housing and Urban Affairs (MOHUA), Govt of India for final approval.

The concept of Metro-Neo was formulated after a very extensive and comprehensive technical consultations, interactions and due diligence with several stakeholders/technical experts. The system is eco-friendly, energy efficient, reliable, safe and capable of providing an efficient mass public transport system which is ideally suitable for the traffic need of cities having population similar to Nashik in India as well as similar cities abroad.

Government of India has been contemplating since long to find an optimal transport solution for cities having population of 2-3 million since appropriate MRTS has not been explored anywhere in India. The model developed for Nashik was discussed on various forums and finally Govt. of India on 21.08.2019 constituted a committee under the chairmanship of Dr. Brijesh Dixit, MD/Maha-Metro for standardization of detail specifications for a Rubber-Tyred Mass Rapid Transportation System with a view to implement this across India.

The salient features of Metro-Neo is outlined below:

- Two corridors are planned initially. Corridor one, Gangapur to Mumbai Naka, length 10 kM and 10 stations (Gangapur, Jalapur, Ganpat Nagar, Kale Nagar, Jehan Circle, Thatte Nagar, Shivaji Nagar, Panchavati, CBS, Mumbai Naka). Corridor two, Gangapur to Nashik Road, length 22 km and 15 stations (DHRUV Nagar, Shramik Nagar, Mahindra, Shaneshwar Nagar, Satpur Colony, MIDC, ABB Circle, Parijat Nagar, MICO circle, CBS, Sharda Circle, Dwarka Circle, Gayatri Nagar, Samta Nagar, Gandhi Nagar, Nehru Nagar, Datta Mandir, Nashik Road). CBS will be an interchange station where both the corridors meet.
- There will be two feeder corridors. Feeder corridor one will run between Satpur colony – Garware – Mumbai Naka. Feeder corridor two will run between Nashik Road – Nandur Naka – Shivaji Nagar.
The length of Electric Bus Coaches will be 25/18 meter and carrying capacity 200/300 passengers. The buses will have rubber-tyre and draw power from the overhead electric wire having 600-750 V DC supply. The buses will take power form overhead electric wire through railway/tram like system.

The buses will be air conditioned with automatic door closing system, level boarding, comfortable seats, passenger announcement system, and passenger information system with electronic display.

The stations will have staircase, lift and escalators with passenger information display. The station entry and exit will be provided on both side of the road to avoid road crossing by passengers.

Feeder Bus (12 m) battery-powered will run on the existing road on the 2 feeder routes i.e (i) Mumbai Nakka via Garware to Satpur Colony (12 km) and (ii) Nashik station to Shivaji-nagar via Nandur Nakka (12 km). The feeder bus batteries will get charged while operating on the main corridors that will enable seamless travel with a wider coverage. No separate charging facility will be required.

Metro-Neo system is a UNIQUE concept being adopted for the 1st time in this country. It is comfortable, rapid, Energy efficient, less noisy (compare to diesel buses) and environment friendly. The capacity of main corridors will be 15000 PHPDT (Peak Hour Peak Direction Traffic). The system has been designed for headway (peak hour) 2 minute i.e. a new service after every two minute.

The total cost of the project is Rs 2100.6 crore. Govt of Maharashtra, CIDCO and NMC share (Rs 552.19 cr) and Govt of India share (Rs 307.06+80.5 cr), total govt share Rs 939.3 cr. And remaining 1161.3 will be loan component.
The approval of Metro Neo was possible due to efforts of Shri Hemant Godse, MP, Mrs Ranjana P Bhanasi, Mayor NMC, Mrs Devyani Pharande, MLA, Mrs Seema Hire, MLA, Shri Balasaheb Sanap, MLA. Dr Brijesh Dixit, MD Maha Metro, Shri Radhakrishan Game, commissioner NMC and Shri N K Sinha, ED Maha Metro. Maharashtra Govt, MOHUA (Govt of India), CIDCO, NMC, MIDC and Maha metro jointly worked to make the project a success.

On this occasion Dr Brijesh Dixit, MD, Maha Metro said “Nashik is the first city in INDIA, which got approval for such a innovative, unique, eco friendly and first of its kind MRTS system, it will be game changer and milestone for the MRTS system in INDIA and abroad”.

**TERRATEC TBM completes first Tunnel for Mumbai Metro; India**

*August 24th, 2019 Rail News*

In early-August, TERRATEC joined workers from the Hindustan Construction Company (HCC)– Moscow Metrostroy (MMS) Joint Venture to celebrate the breakthrough of a 6.68 m diameter TERRATEC hard rock Tunnel Boring Machine (TBM), named ‘Vaitarna I’, on Mumbai Metro Rail Corporation Ltd’s (MMRCL) Line 3 project, in India.

The major milestone saw HCC-MMS JV complete the 3.82 km southbound running tunnel between Chhatrapati Shivaji Terminal (CST) and Mumbai Central stations and to become the first contractor on the project to finish an entire section of tunnel for one of the line’s seven contract packages.

With production rates of up to 24 m per day (holding the production record for the project), the TBM tunnel was driven via NATM station boxes at Kalbadevi, Girgaon and Grant Road, at an average depth of 20 m. It was successfully completed on schedule despite numerous geological and logistical challenges, including the tunnel’s proximity to the ocean, tunnelling through reclaimed land, congested working areas and excavating beneath some of the oldest buildings in the city, many over a century old.
“With TERRATEC’s support, the HCC team completed this operation in a single drive, boring through geology consisting of basalt, breccia and tuff and reclaimed sand with negligible Settlement,” said Ravi Ranjan Kumar, MMRCL’s Chief Project Manager for UGC-02. “Most of the tunnel alignment is under the oldest and most densely populated area of south Mumbai with many dilapidated residential buildings. The performance of the TERRATEC dual-mode hard rock TBM in this geology was highly satisfactory, and we now look forward to the similarly successful completion of TBM 02 ‘Vaitarna 2’.”

The machine is one of two new TERRATEC dual-mode TBMs being used on contract UGC-02, which was awarded by MMRCL in July 2016. Five other TERRATEC TBMs are also achieving good progress on the new 33.5 km-long underground corridor.

The versatile TERRATEC single shield TBMs are equipped to operate in either Open or Closed mode and have robust hard rock cutterheads, that are mounted with heavy-duty 17” disc cutters, which are interchangeable with ripper tools, and feature large bucket openings that provide a 10% opening ratio.

Other state-of-the-art features include 2,000 kW Electric Variable Frequency Drives – that allow the cutterheads to cut efficiently in harder rock zones at maximum speeds of 7 rpm and deliver an exceptional torque of 8,500 kNm to cope with more fractured zones of ground along the alignment – as well as active shield articulation and built-in two component backfilling grout systems.

“Terratec supplied a robust, powerful, TBM for the recently completed southbound tunnel on UG-02,” said Hemant Sanghvi, Assistant General Manager for HCC. “The performance
of the TBM, as well as the service and support provided by TERRATEC’s field operations team, has been very satisfactory. We look forward to TERRATEC’s continued co-operation and support for the duration of the second TBM drive.”

When complete, Mumbai Metro’s much-anticipated Line 3 will be the first underground metro line in the city. The 33.5 km-long line will connect Cuffe Parade business district in the far south to the Santacruz Electronics Export Processing Zone (SEEPZ) in the north-central with 26 underground and one at-grade station (see map).

Construction of the line is divided into seven tunnel-and-station packages, that were awarded to five contracting joint ventures in 2016. These five contractors have deployed a total of seventeen (17) TBMs with TERRATEC being the lead TBM supplier on the project with a 41% market share.

To date, the seven TERRATEC machines have completed 65% of the 22.6 km allocated to them – signifying almost half of the total 54 km of tunnelling on the Line 3 project – and hold the production records for best day and best month on the project.

MahaMetro completes Digging 18 m Shaft at Agriculture College at Pune; India

The Shaft will be used to lower the Tunnel-Boring Machines, which will excavate the Tunnel for the Underground Route.

By Kanika Verma; 28/08/2019; Metro Rail News

PUNE (Metro Rail News): The Maharashtra Metro Rail Corporation (MahaMetro) has finished digging an 18m-deep shaft at the College of Agriculture in Shivajinagar, marking the completion of a crucial step for the underground Metro rail section.
The shaft will be used to lower the tunnel-boring machines, which will excavate the tunnel for the underground route. A similar tunnel, 22m-deep, is being dug at Swargate.

MahaMetro had initiated civil work on this shaft about 12 months ago. “Controlled blast technology was used to break the hard rock beneath the surface after the soil layer was removed in the first stage of digging. The shaft is square in shape, measuring 25 meters wide on each side, and 18 meters deep,” a MahaMetro official said.

MahaMetro, which is executing two Metro routes in Pune and Pimpri Chinchwad — one from Vanaz to Ramwadi and the other from PCMC to Swargate — now plans to level the ground and construct a slab at the bottom to assist the landing of the tunnel-boring machines. “All the necessary provisions will be made in time to install the tunnel-boring machines and maintain the required depth.

Two parallel tunnels will be dug once the machines are lowered through the shaft,” an official said. MahaMetro expects to take delivery of the first tunnel-boring machine in October. The excavation of the tunnel is expected to begin in November.

“A team of MahaMetro officials will be visiting the Hong Kong-based company (which is providing the machines) to conduct various tests on the tunnel-boring machines,” an official said. Officials said that the tunnel-boring work will begin from two ends — agriculture college and Swargate.

The digging at the Swargate site is underway and has been expedited once MahaMetro cleared various hurdles related to the side. The Swargate shaft will be four meters deeper than the one at agriculture college. An official said the difference in depth was because of the condition of the soil, rock, and the requirements of the project.

“The difference will not affect the construction of the tunnel,” an official said. Both the tunnels will meet in Kasba Peth area, at the underground metro station. A MahaMetro official said that the work of digging the tunnel will first start from the agriculture college end and will be taken up later from the Swargate end. Meanwhile, MahaMetro said that it has taken elaborate measures to dump the soil extracted from the shaft at designated spots.

Hyderabad Metro on a tricky Track, running on Losses; India
They have built only 1.2 Million sq. ft. so far as against eligible 18.5 Million sq. ft. Metros all over the World lose Money and are heavily subsidized by Governments.

By Kanika Verma; 05/08/2019; Metro Rail News

HYDERABAD (Metro Rail News): Metro Rail MD NVS Reddy said that L&T Metro project is running in losses. Reacting to allegations of Hyderabad Intellectuals, a forum on Twitter, which alleged that “the Metro project has been reduced to world-class real estate project, and L&T is milking the project as they want”, Reddy said that L&T was losing money in the project. “Rs 1,300 crore per annum is the interest burden alone on the Hyderabad Metro project.

They have built only 1.2 million sq ft so far as against eligible 18.5 million sq ft. Metros all over the world lose money and are heavily subsidized by governments,” Reddy said. L&T has spent about Rs 16,000 crore on the project in which the viability gap funding is Rs 1,200 crore from the Centre.

The rest, Rs 14,800 crore was spent by L&T, of which Rs 3,000 crore is equity and Rs 12,000 crore debt.

Reddy said, “There are around 200 Metro projects in the world, and no Metro makes a profit. Governments subsidize Metro projects for survival and for increasing liveability condition of the city. In public-private partnerships, there are four or five attempts made, including Bangkok Metro, which is 35-km long, the biggest in PPP mode.” Reddy said, “I studied financially successful Metros such as the ones in Hong Kong, Tokyo, Singapore, and Taipei.

They are originally built by governments and handed over to the private sectors. We have adopted the same.” He added that 50% of the revenue came from passenger fare, 45%
from property development, and 5% from advertisements. “As per the original financial model, Metro will run into losses for five to six years, and break-even only in the seventh year, that is 2025. Currently, revenue is Rs 1 crore per day.”

When it came to the number of passengers, Reddy said compared to other Metros, Hyderabad was doing much better. “In Chennai, even after four to five years and with several incentives, there are only 50,000 to 60,000 passengers a day. After seven years of Bengaluru Metro, the figure has now reached to four lakh a day.

Hyderabad Metro will reach four to five lakh passenger figure in the next year.” He said, “There are some companies, that are into construction, and some into signaling and telecom. But L&T has end-to-end experience.” Reddy said, “They have built real estate projects in Panjagutta, Irrum Manzil, Hitech City and now in Moosarambagh. They are doing good so far.”

Hyderabad Intellectuals replied to Reddy, saying, “If L&T Hyderabad Metro project is losing money, why subsidize such huge values of public property for an unviable project? 1.2 million sqft itself looks huge, 18.5 m sqft would be staggering. If values calculated for 33 years of the lease, it’s definitely profitable multiple times.”

Drone Survey starts for Patna Metro Project; India

It has been decided in the Board Meeting of Patna Metro Rail Corporation Limited (PMRCL) to give the Work of Construction of both the Corridors of the Patna Metro to DMRC.

PATNA (Metro Rail News): Delhi Metro Rail corporation has started work on CM Shri Nitish Kumar’s dream project Patna Metro Project work start. For the first time, the work of Patna metro project is going to start on ground.
It will start from the drone survey of the alignment of both the corridors of the metro. The Delhi Metro Rail Corporation (DMRC) team is going to start this work. Significantly, the land will be marked for the metro route only on the basis of drone survey.

According to source, the metro will run on two routes in Patna. The first corridor is from Danapur to Bailey Road, Patna Junction, Ithapur via Mithapur. The second corridor is proposed from Patna Junction to Gandhi Maidan, Science College, Rajendra Nagar to Malahi Caught, Zero Mile to New ISBT.

In the board meeting of Patna Metro Rail Corporation Limited (PMRCL), it has been decided to give the work of construction of both the corridors of the Metro to DMRC. It has been sent to the cabinet for approval. DMRC has to complete the work in five years, so from today it is going to start a drone survey of both corridors. This work is to be completed between 23th August and 15th October 2019

PART II: GLOBAL ACTIVITIES FOR URBAN MOBILITY AS A SERVICE

The urban transport sector is undergoing a rapid change: As digitalisation increases it brings a great opportunity to deliver an excellent passenger experience with automated signalling systems, connected infrastructure, smart ticketing and mobility models.

Urban Transport News in Brief; Global

27 Aug. 2019  Metro Report

TSA is to supply traction motors to the seven trams that CAF is supplying for the tram project in Lund.

Uber is integrating public transport information into its app for users in Sydney.
CRRC Zhuzhou has tested its Autonomous Rail Rapid Transit articulated battery bus in Doha.

Mass Rapid Transit Authority of Thailand expects the government to approve a light rail project for Chiang Mai next year. The 12 km Red Line from Nakhon Ping Hospital to Mae Hia could open in 2027.

Liga Auto is to supply two battery buses and one charging station to Vladivostok.

An extension of Mashhad metro Line 2 opened on July 27 between Shariati and Shahid Kaveh.

The Tver tramway has closed.

MAZ is to supply 70 203T battery trolleybuses, 15 articulated and 55 rigid buses to Minsk.

Pro-Tra-Building has won a 31m złoty contract to build a 1.5 km extension of the Wrocław tramway to Nowy Dwór.

St Petersburg operator Gorelektrotrans has awarded the Belarus trading company a 172m rouble contract to supply 15 trolleybuses. These are likely to be supplied by Belkommunmash.

CAF is to supply a further seven metro trains to Napoli metro authority ANM for €60m.

Solaris is to supply five Urbino 12 electric buses to PKM Katowice.

The European Bank for Reconstruction & Development is providing a €10m loan towards the purchase of 40 trolleybuses for Poltava.

Trolleybus manufacturer Trans Alpha has bought the remaining trolleybus infrastructure in the city of Vologda.

A 5.5 km trolleybus route has opened in the south of Roma linking EUR Laurentina Metro B station with Tor Pagnotta.

Mercedes-Benz has won its first export orders for the eCitaro battery bus. It is to supply six to Norgesbuss for use in Oslo, five to Bergvarabuss in Ystad, and nine to Voyages Emile Weber in Canach, Luxembourg.

Škoda Electric is to supply eight trolleybuses to Mariánské Lázně and seven to Jihlava, both using bodyshells supplied by SOR Libchavy.

The US Department of Transportation’s Federal Transit Administration has announced a total of $84.9m in funding for 38 projects as part of its Low- or No-Emission Grant programme to support buses with alternative traction.

Alexander Dennis has signed a five-year contract to maintain the fleet of 90 Enviro500 double-deck buses used on the Metrobús BRT network in Mexico City.
Public Trial of autonomous Vehicles begins in Singapore; Singapore

27 Aug. 2019 ; Metro Report

SINGAPORE: A public trial of on-demand transport using autonomous vehicles has started on Sentosa island, and will run until November 15.

Two minibuses and two smaller shuttles operate on a private road from Silso Point to Palawan Beach taxi stand, and then along public roads to the Sentosa Development Corp office, Tanjong Beach and Sentosa Golf Club. Operations on the 5·7 km route run on weekdays from 10.00 to midday and from 14.00 to 16.00.

Passengers can book free journeys via the Ride Now Sentosa app or at kiosks along the route. Each vehicle has an onboard attendant that can take over operation in an emergency.

The vehicles have been developed by the Land Systems arm of ST Engineering in partnership with the Ministry of Transport and Sentosa Development Corp. ST Engineering has supplied its Autonomous Vehicle Management System, which analyses passenger demand and optimises route management.

On-road testing of autonomous shuttles on Sentosa began in June 2018:

Consultation begins on Saint-Denis LRT Tram Project; Réunion

Aug. 27, 2019. Written by Keith Barrow, IRJ
PUBLIC consultation began on the French Indian Ocean Island of Réunion on August 26 on plans for a €395m light rail transit line serving the capital Saint-Denis.

The 13 km line would link Le Barachois in the west with Duparc and Roland Garros Airport in the east serving 18 stations including four park-and-ride facilities.

The journey time between the terminus stations will be around 25 minutes and services are expected to operate between 05.00 and 01.00 with trams running at six-minute headways at peak times.

The project is being developed by the Intercommunal Community of Northern Réunion (CINOR) and is due to be completed in 2022.

The line will serve part of the corridor of the 42km Réunion Tram-Train Project, which was abandoned following a change of government in 2010.

Antalya adds Light Rail Transit, LRT, Line; Turkey

15 Aug. 2019 ; Metro Report
**TURKEY: Antalya Light Rail** line T3 opened on August 11, adding 12 km and 19 stops to the city’s Antray network.

T3 runs from Varsak Mezarlığı in the north to Atatürk Lisesi in the west. A three-stop extension from Atatürk Lisesi to Otogar is still under construction. Once completed, an underground stop at Otogar will provide interchange with the existing east-west route T1.

The T3 project has been built at a cost of TL700m. In the longer term it will be extended south from Otogar to Müze. This is currently the western terminus of the T2 heritage tram line, which is to be upgraded to modern standards and double-tracked. Upon completion of this work, T3 will run through to Zerdalilik in the city centre, creating a 23 km route serving 39 stops.

Antalya Municipality plans to purchase a total of 47 light rail vehicles to operate the route, of which 20 would be required for the first phase. Services are currently operated using the existing fleet of 18 Eurotem trams produced by joint venture of Tüvasaş and Hyundai Rotem and 14 five-section CAF Urbos trams.

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**Auckland Light Rail Transit; New Zealand**

Written by **David Burroughs**; IRJ

**THE New Zealand Government** has selected two preferred delivery partners for the Auckland light rail transit project.
NZ Infra, a joint venture between the New Zealand Super Fund (NZSF) and Canada’s CDPQ Infra group, and the NZ Transport Agency (NZTA) will both further develop their proposals, with a decision due to be made on the final design early next year.

The government announced in May that it had launched a procurement process for a two-line light rail network after NZSF submitted an unsolicited proposal offering to assess the viability of the project for commercial investment.

“What NZ Infra is proposing has never been considered before in New Zealand, based on a public-public investment model,” Minister of transport, Mr Phil Twyford, says. “This includes co-designing the asset with the government and its partners, with the majority of financing and risk transferred to NZ Infra.

“There are significant differences in how the two options would be financed and delivered. The NZTA is exploring a range of procurement, financing and delivery models, including alliances and public-private partnerships (PPP), and will continue to develop these.

“Both of these options for delivering light rail are credible, but neither are fully developed, and we need to understand the long-term implications. That step is critical for the government if we are to make the right decision on how best to deliver light rail for Auckland.”

Twyford said the processes will take up to six months, and will mean the project will not meet the 2020 start date originally proposed.

“I have asked the ministry of transport to manage this process, and to ensure that our Auckland Transport Alignment Project partners including Auckland Council and Auckland Transport are closely involved in this work over the coming months,” he says.
Bus Rapid Transit (BRT) - an efficient and competitive Mode of Public Transport: Bus-based Mobility Option; Global

20th ACEA Scientific Group Advisory Board
Robert Cervero, University of California, Berkeley, USA
December 2013

Bus Rapid Transit on reserved Lanes – a Mobility Option

Introduction:

Rationale and main Objectives

Bus Rapid Transit (BRT) systems have gained popularity worldwide as a cost-effective alternative to far more expensive urban rail investments. High-quality bus-based systems also better serve the low-density settlement patterns of many suburban markets and small-to-medium size cities due to the inherent flexibility advantages of rubber-tyre systems – the same vehicle that provides speedy line-haul services on a dedicated bus-lane or reserved bus-way can morph into a feeder vehicle, collecting and distributing customers on local streets.

This report reviews experiences with designing and implementing BRT systems worldwide. BRT is first defined across a spectrum of service qualities and costs. Global trends are next reviewed, highlighting cities and regions of the world with the most extensive and advanced systems.

Relationships between urban densities and BRT cost-effectiveness are noted. System designs and operations – in terms of running ways, rolling stock, route configurations,
stations, fare collections, and the like – are then reviewed. This is followed by a comparison of BRT’s cost and performance relative to urban rail transit systems.

Information on the cost-effectiveness of heavy-rail, light-rail and BRT systems relative to urban densities are also compared.

The report then turns to efforts among a handful to cities to proactively promote transit-oriented development (TOD) near BRT stations and along corridors. This is followed by discussions on the institutional arrangements, that have been introduced to effectively manage BRT services.

The report closes with discussions on BRT’s likely future given global growth projections and other pressing policy agendas in the foreseeable future.

**Conclusion:**

The future for BRT is bright. Rapid motorisation and ever-worsening traffic conditions in many rapidly emerging economies and fast-growing cities make investments in high-capacity, high-performance transit systems more imperative than ever. Mounting concerns over the long-term environmental and fiscal impacts of car-dependent sprawl, combined with global initiatives to dramatically curb carbon emissions, further favour a world of expanded transit services.

The bulk of future population growth throughout the 21st century will be in settings conducive to BRT. According to UN Habitat (2011), most of the 2 billion new urban dwellers between now and 2030 will be in cities with populations of 100,000 to 500,000. In these places, less-expensive BRT networks are likely to be more cost-effective than metros or LRT systems. Even in more mature, advanced economies, budget constraints along with continuing growth on the urban fringes favour BRT over urban rail.

For large metropolitan areas, the choice between BRT and urban rail is fortunately not either-or. In cities as diverse as Beijing, Los Angeles, Teheran, Delhi, Seoul and Mexico City, BRT and metro rail systems nicely co-exist. BRT can be both a complement to and a substitute for rail. As cities, household structures, neighbourhood designs, societal values and lifestyle choices continue to diversify, a more plural transportation landscape – one that provides a rich set of mobility options at a range of price points – is needed.

BRT stands poised to add to the mix of mobility choices over a wide range of urban contexts throughout the 21st century.

Rail versus bus is increasingly a false dichotomy. Less important than the physical apparatus – whether rubber tyres on pavement or steel-wheel-on-steel-rail – is the quality of service delivered. In this regard, BRT gets high marks.

Its versatility at linking feeder and line-haul services in the same vehicle, and thus eliminating transfers, makes it particularly well suited for lower-density settings. As existing BRT systems expand, moreover, mobility and environmental benefits can be expected to accelerate due to network effects. Each new BRT line benefits not only those living, working and traveling to the newly served corridor, but also to residents and workers on existing corridors that can now reach new destinations.

As an industry, BRT is hardly static. As the BRT matures, new trends are emerging. These include: Service and tariff integration of BRT with citywide transit services, better ways of eliciting private participation in operations, increased funding support from national
governments, BRT-oriented technology-providers from Brazil, India, Indonesia and China (Suzuki et al., 2013; Hidago and Gutiérrez, 2013).

One thing, that successful BRT cities like Bogotá, Curitiba and Seoul share in common, is a legacy of strong and visionary political leadership. Cities, that have failed to deliver the high-quality BRT services originally envisaged, such as Jakarta, Lagos and Santiago, fell short mainly because of political pressures to retain the status quo. In Jakarta’s first phase, the lack of integration between trunk and feeder vehicles, and unwillingness to prevent incumbent operators to run alongside BRT buses undermined service quality (Wright, 2011). “Ultimately, the obstacles to BRT development are more likely to be political than financial or technical.

However, for the few political leaders, who take the chance to redefine their cities with full BRT, the rewards are clear”.

![Number of Cities with BRT Systems by national and regional Settings, 2013](https://www.acea.be/uploads/publications/20th_SAG_HR)

To read more, go to: