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TTC faces a forced RESET

» **WITH THE ONTARIO GOVERNMENT WRESTING CONTROL** of the TTC's expansion plans away from Toronto, TTC has to work through the confusion and changes to keep commuters moving.

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WMATA launches first Energy Action Plan

▶ The plan is expected to net $16 million annually in energy cost savings and another $13 million in savings on operations and maintenance expenses by 2025.

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SamTrans launches new on demand service

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How we commute

Two recent studies analyze how North American workers travel to and from their jobs. Spoiler alert: Transit plays a big role.

There are many different reasons to utilize public transit options. If you read the *Atlas Obscura* post "18 of the World's Most Wondrous Public Transportation Options," you would have found a list heavy on whimsy and funiculars, such as Lisbon, Portugal's Elevador de Santa Justa, mixed with more traditional options such as New Jersey's "The Dinky" and New Orleans' St. Charles Streetcar Line. However, two recent studies, one in Canada and one in the U.S., focused on one important group of transit users: commuters.

Canada's national statistical office, Statistics Canada, examined the commuting patterns in the country's eight largest census metropolitan areas using data from the 1996 and 2016 Censuses of Population. Turns out, commuting patters in those eight areas, which include Toronto, Montréal, Vancouver, Calgary, Ottawa–Gatineau, Edmonton, Québec and Winnipeg, have shifted significantly.

Statistics Canada noted that this shift occurred against a backdrop of changes in the country's infrastructure system and alongside the rising number of jobs that have been created away from the city center of large metropolitan areas.

The net result is that more people in those areas listed above are making the suburb-to-city trip to work using public transit or other active modes of transportation such as biking or walking. However, when it came to suburb-to-suburb commutes, cars still dominated.

In the U.S., a life insurance company aimed at young families, Fabric, crunched several data points to determine what cities had the best public transit. Fabric's analysis looked at a transit systems' approval rating among residents, the annual trips all area residents took on transit, percentage of workers who used transit, difference in earnings between public transit and car commuters, as well as the difference in commute times between transit and car commuters, passenger miles traveled using electric power, mechanical failures per passenger mile and percentage of stations that are ADA accessible.

Approx. $8,800
Annual cost to own/ operate a vehicle

$1,000-$2,000
Annual cost for unlimited transit passes

The company's blog post noted that the average cost to own and operate a vehicle was around $8,800 a year while annual cost of unlimited transit use ranged between $1,000 to slightly more than $2,000. Fabric wrote that "American families should consider whether public transportation would be a safer, more convenient, more eco-friendly and cost-effective option."

The New York-Newark-Jersey City area topped the list with 31 percent of workers using public transit, 227.61 annual trips per person and a public approval rating of 77.5 percent. San Francisco-Oakland-Hayward, Calif., landed in the second spot with 17.4 percent of workers using transit; 126.45 annual trips per person and a 79.3 percent approval rating. Washington-Arlington-Alexandria, Chicago-Naperville-Elgin and Boston-Cambridge-Newton rounded out the top five slots.

Mischa Wanek-Libman, Editor
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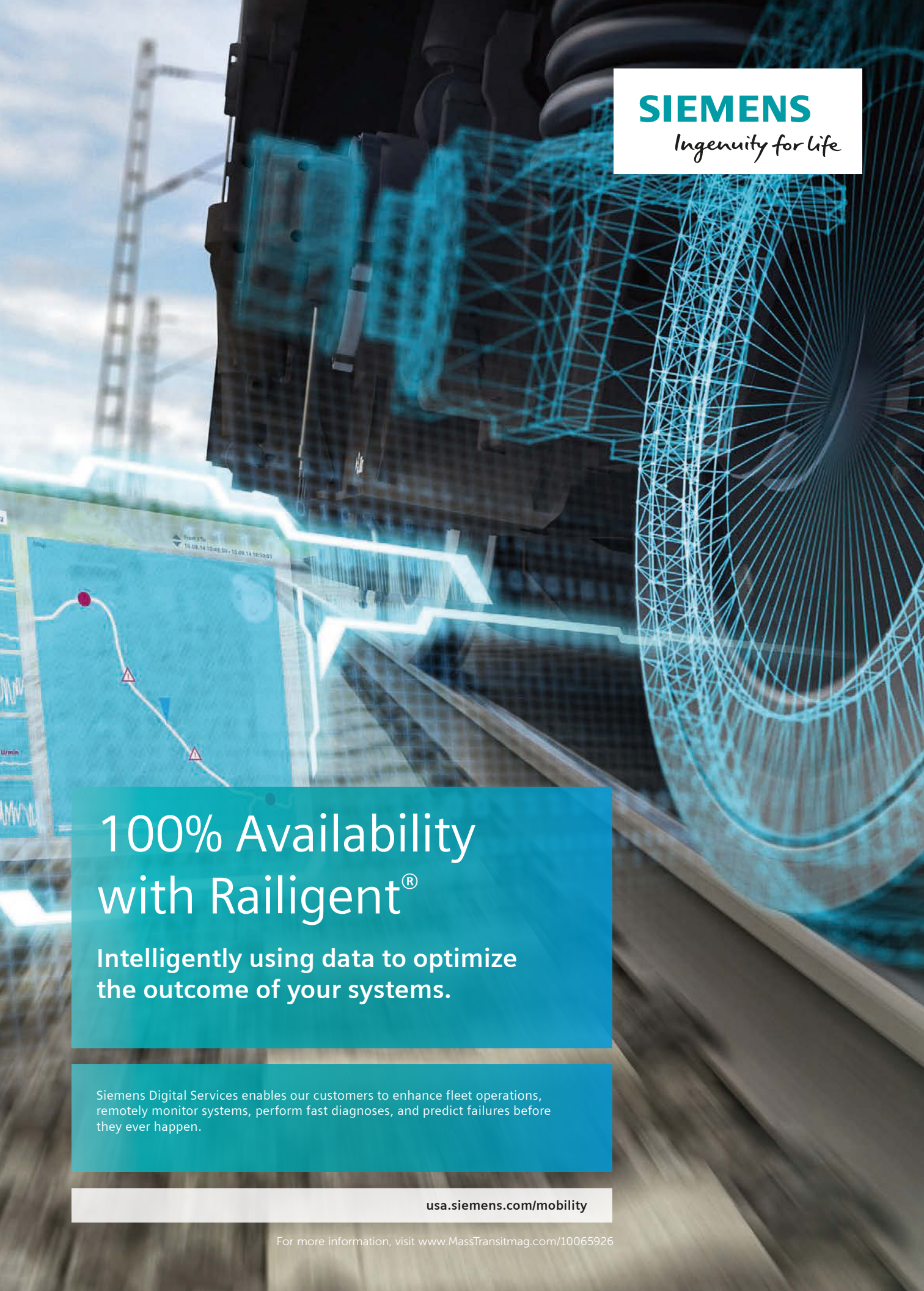


FRA SAYS the decision to deobligate the project's more than $928 million in FY 2010 funds was made following careful consideration.

FRA cancels California high-speed rail funds

The Federal Railroad Administration (FRA) cancelled its Cooperative Agreement with the California High-Speed Rail Authority (CHSRA) on May 16 and deobligated the $928,620,000 in funding marked for the project. FRA determined CHSRA violated the terms of the FY10 agreement citing repeated failure to submit critical required deliverables, as well as failure to manage and make sufficient progress to complete the project.

FRA Administrator Ronald Batory detailed the FRA's decision in a 25-page letter to CHSRA CEO Brian P. Kelly. The letter says CHSRA "consistently failed to make reasonable progress" on the project and rather than be proactive to remedy issues pointed out by the administration, the authority chose "delay and inaction."

California Gov. Gavin Newsom vowed to fight the decision in court.

MassTransitmag.com/21080937

Denver transit riders can now purchase tickets through the Uber app

▶ The Regional Transportation District (RTD) of Denver partnered with Uber and Masabi to launch Uber Transit ticketing in an effort to provide more integrated mobility options.

Following a staggered rollout over the next few weeks, all Uber riders in the Denver metro region will be able to buy RTD tickets through the Uber app and then use their phone to ride rail and bus services.

In February, RTD and Uber partnered on the first in-app integration of transit options, which allowed Denver area riders to see and consider transit route within the Uber app. This next step to allow ticket purchases through the app supports RTD's efforts to provide as near seamless travel options as possible.

"This exciting next phase of RTD's collaboration with Uber is yet another way our transit agency is leading the dialogue about mobility strategy, not just for the Denver metro region but for cities across the globe," said RTD CEO and General Manager Dave Genova. "This project broadens our reach and stays at pace with the public's needs, allowing people to plan and pay for trips from start to finish."

MassTransitmag.com/21074765

Trio of Encinitas, Calif., transit, safety and mobility projects completed

▶ Officials from the San Diego Association of Governments (SANDAG) and California Department of Transportation (Caltrans) held a community celebration May 9 to mark the completion of three projects that will improve mobility, safety and transportation choices in the area.

The three projects, the San Elijo Lagoon Double Track Project, Chesterfield Drive Improvement Projects and a segment of the Coastal Rail Train bikeway, represent nearly $100 million of investment in the city of Encinitas, Calif.

The completion of the $78-million San Elijo Lagoon Double Track Project in partnership with the North County Transit District added a second mainline track and replaced an aging timber single track rail bridge with a modern, concrete, double-tracked bridge. The project is part of work being performed to double track sections of the Los Angeles-San Diego-San Luis Obispo (LOSSAN) coastal rail corridor to improve the movement of passenger and freight trains.

The opening of the 1.3-mile Encinitas segment of the Coastal Rail Trail is part of a larger planned continuous bike route that will run approximately 44 miles between the city of Oceanside and downtown San Diego.

The Chesterfield Drive Improvements Project, completed in partnership with the city of Encinitas, included the installation of new rail crossing safety equipment, a modernized and enhanced rail crossing warning system, a multi-use bike/pedestrian path and ADA-accessible sidewalks and ramps.

MassTransitmag.com/21080228

THE DOUBLE track bridge can be seen over the San Elijo Lagoon in this file image.

Marc A. Hermann / MTA New York City Transit

THE FINAL RTS buses have been retired at NYCT, making way for a more modern fleet to better serve.

NYC Transit says goodbye to the "Big Blues & Whites"

▶ New York City bid farewell to the last of the New York City Transit Rapid Transit Series (RTS) buses on May 6. The final RTS run in Midtown and Lower Manhattan ends a near 40-year run of the blue and white buses. The buses have been replaced by a fleet of modern, low-emissions buses that include hybrid and zero-emissions vehicles, which NYC Transit says will allow it to better serve customers.
MassTransitmag.com/21079719

MORE NEWS AT A GLANCE

▶ The city of Ottawa, Ontario, Canada and TransitNEXT reached financial close on the Stage 2 Trillium Line south extension. TransitNEXT is a wholly owned subsidiary of SNC-Lavalin and will design, build, finance and maintain the new extension, and will also assume responsibility for the long-term maintenance of the existing Trillium Line.
MassTransitmag.com/21074129

▶ The Denton County Transportation Authority (DCTA) has expanded its transit offerings with its new Mobility as a Service (MaaS) contract model. DCTA's Board of Directors approved a new suite of on-call contracts that will allow the agency to allocate up to $2.4 million of its annual operating budget to offer a variety of mobility services via task orders.
MassTransitmag.com/21079430

▶ Fairfax County has awarded Transdev a five-year contract, plus 10 option years, to operate its fixed-route bus service known as "The Fairfax Connector." The base amount of the contract (start-up and first five years) is approximately $443 million.
MassTransitmag.com/21077876

▶ The Board of Directors for Southern California Regional Rail Authority (Metrolink) has awarded a $138.9-million contract to a joint venture between Talgo-SYSTRA to rebuild up to 121 Bombardier rail cars, also known as Sentinel cars.
MassTransitmag.com/21080360

▶ Cubic Corporation announced that its Cubic Transportation Systems business division was awarded and has executed a 5.5-year, $68.2 million extension contract award by the Los Angeles County Metropolitan Transportation Authority to provide field maintenance and technical support services for the TAP reginal fare payment program.
MassTransitmag.com/21080441

People in the News


Jeremiah Bryant

Omnitrans

Jeremiah Bryant has been promoted to director of strategic development at Omnitrans, after 12 years of increasing responsibilities. He will lead a team of 15 employees. Functions of the newly-formed Strategic Development Department include service planning, development planning, stops and stations, grant writing and business intelligence. Bryant has represented Omnitrans on numerous regional committees and recently graduated from the inaugural Omnitrans Leadership Development Academy.
MassTransitmag.com/21080537


Julie Kirschbaum

SFMTA

Julie Kirschbaum has been named director of transit for the San Francisco Municipal Transportation Agency (SFMTA). She had been in the position serving an acting role since October 2018. She will be responsible for the overall direction and management of the agency's Transit Division, which is largely responsible for day-to-day Muni operations. Kirschbaum has more than 20 years of transportation experience and was selected in 2017 as chief transportation officer overseeing more than 2,500 Muni staff.
MassTransitmag.com/21079937


AJ Arjanen

Trinity Metro

Jon-Erik "AJ" Arjanen has joined Trinity Metro as vice president and chief operating officer for rail. Arjanen previously served as vice president/general manager for Martin Marietta/Rock & Rail, LLC, in Lakewood, Colo., where he led a nationwide project and launched two facilities. Prior to Colorado, he worked for BNSF Railway in Fort Worth, Texas. Arjanen earned a bachelor's degree in political science from St. Mary's University in San Antonio and his MBA from Howard University in Washington, D.C.
MassTransitmag.com/21077143


Rob Antoniak

Tripshot

Rob Antoniak, the former chief operating officer for Valley Metro, has joined Tripshot. Antoniak will run the Silicon Valley-based firm's new office in downtown Phoenix as vice president of Business Development & Strategy. At Valley Metro, he led several departments, including information technology services, accessibility services, commute solutions, marketing, and vanpool services. Antoniak will also lead efforts to expand in private markets, such as non-emergency medical transit.
MassTransitmag.com/21078024


Brandon Swartley

STV

Brandon Swartley, P.E., has been named vice president of STV. As Transportation & Infrastructures Division's chief electrical engineer, he has led multidisciplinary project teams that have supported power systems infrastructure used by some of the nation's busiest rail operators. In his current role, he is responsible for all aspects of technical oversight, engineering design, project management, systems analysis, QA/QC and construction support services related to electrical power systems projects.
MassTransitmag.com/21078304

TTC Faces A FORCED RESET

With the Ontario government wresting control of the TTC's expansion plans away from the city of Toronto, TTC CEO Rick Leary has to work through the confusion and changes to keep commuters moving.

By **James Careless, contributor**

IT WAS 18TH CENTURY SCOTTISH POET ROBBIE BURNS WHO wrote, "The best laid schemes o' mice an' men gang aft a-gley." This line, which is generally translated today as "Often go awry," was aimed at an unfortunate mouse whose winter nest Burns had destroyed while ploughing.

Had Burns been living in Toronto, Ontario, Canada in 2019, he might have addressed these lines to the Toronto Transit Commission (TTC) and its CEO Rick Leary.

The reason: Like Burns' mouse, the TTC has seen its multi-billion expansion plans upended; in this case not by a plough but by the new Ontario Progressive Conservative (PC) government and its populist leader Premier Doug Ford. A former Toronto city councillor and unsuccessful mayoral candidate, Ford's unexpected rise to leading the PCs and then winning the provincial election in 2018 has given him the power to shake up Toronto mass transit.

On April 10, 2019, he delivered this shake-up – big time.

On that day, Premier Ford announced a C$28.5 billion (about US$21.7 billion) Toronto area transit expansion plan. "Our government is investing in transportation to bring relief and new opportunities to transit users and commuters," said Ford. The government news release that accompanied his announcement billed the transit plan as "the most money ever invested to get shovels in the ground and get new subways built."

(Actually, Premier Ford is putting up some of the money. In the Canadian system, mass transit expansion costs are typically shared between the city, the province and the Canadian federal government. In this case, Ford is offering to pay C$11.2 billion, which is about US$8.32 billion.)

The problem for the TTC? Premier Ford's unexpectedly sweeping plans substantially disrupt subway expansion projects that the TTC has underway.

"The TTC has already received direction from Toronto City Council to build three projects; the first being the Toronto-York Spadina Subway Extension (TYSSE) followed by the Relief Line and the Scarborough Subway Extension," said TTC CEO Rick

By the numbers

TTC passengers by mode (2017)

261,112,835
Bus

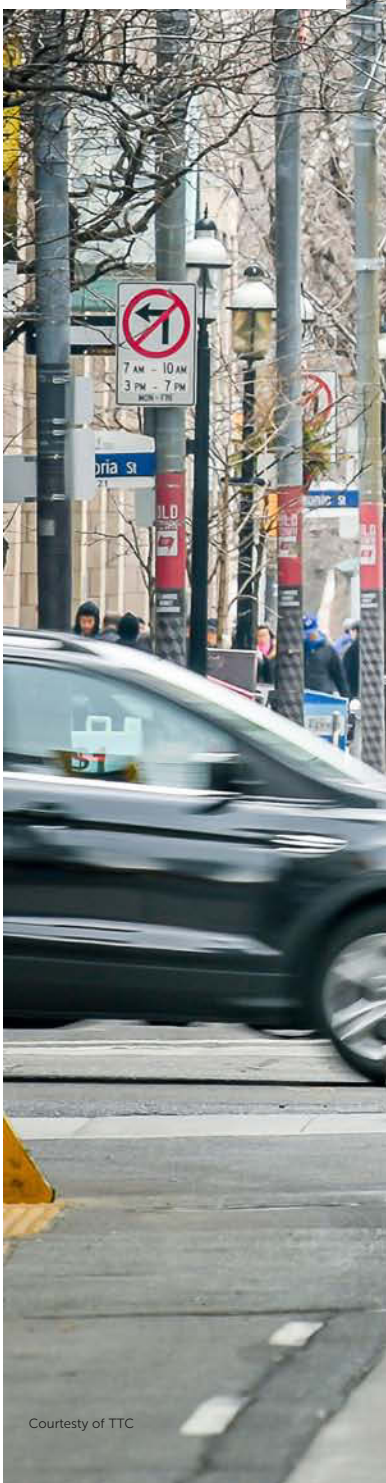
213,011,622
Subway Train

55,914,914
Streetcars

3,176,627
Scarborough RT Train

533,215,998
Total

STREETCARS HAVE been given priority as part of the King Street Transit Pilot.



Courtesy of TTC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Orientals

Leary. "The TTC is well advanced on those projects, with the intent of putting RFPs on the street in the near future. We are now assessing the province's proposals, to see where the direction will go."

That's not all that Leary has to contend with. Premier Ford's "Getting Ontario Moving Act" – which was introduced in the Ontario Legislature on May 1, 2019 – wrests the power to select and execute subway expansions away from the city of Toronto (the TTC's owner) and gives this power to the provincial government.

The government has also said it plans to transfer the TTC's existing subway system and rolling stock to the province; leaving the TTC to run it and collect fares, plus retain ownership of its buses, streetcars and light-rail transit (LRT) trains next year.

It isn't clear yet how Premier Ford's takeover of the TTC's expansion projects and existing subway system/trains will play out in practice. That's the new problem facing Rick Leary, who was busy remedying the old problems of congestion and aging infrastructure before Ford announced his plans.

"We need to know more about what this entails going forward," Leary said. "There's a lot of details to go over."

What Has Changed

The changes imposed by Premier Ford's mass transit plan, which hearkens back to ideas he espoused while in Toronto municipal politics, affect four major Toronto-area projects. Three of these – the Toronto-York Spadina Subway Extension (TYSSE), the Relief Line and the Scarborough Subway Extension – are being built by the TTC. The fourth, the Eglinton Crosstown LRT (light-rail transit) Eglinton West extension, is being built by the provincial transportation agency Metrolinx with the equipment and stations to be operated by the TTC.

Metrolinx Plans to Triple Ridership by 2031

Metrolinx, the Ontario government agency that runs southern Ontario's GO Transit train/bus commuter network, plans to triple ridership on its system over the next 15 years. That's right: Under an ambitious public-private partnership (P3) contract that the agency opened up to bidders, at the end of May 2031, GO Transit will boost its ridership from "about 60 million per year now to about 180 million–," said Metrolinx President/CEO Phil Verster.

PASSENGERS BOARDING a GO Train.

Most of the growth will come from running 2.5 times as many trains on the existing GO Transit rail network as are being run today. As well, Metrolinx plans to extend three of its rail line services and make other changes to bring more commuters and tourists onto its trains. Much of the expansion will be aimed at the southwestern city of Kitchener, which Verster describes as a growing "tech hub."

"This is hugely exciting for us," Verster told Mass Transit magazine. "What's very special about this project is that it will be by far the biggest project in North America in terms of funded value."

The Metrolinx plan – which had yet to have a dollar value assigned to it when this story was written – is being driven by population growth in the Greater Toronto Area (GTA and surrounding southern Ontario communities). According to Verster, GO Transit's ridership is growing by 7.2 percent annually.

Metrolinx is providing private-sector P3 bidders with 15 months to submit their proposals and hopes to award the P3 contract in 2021. Upgraded services would start to be rolled out by 2026.

Under the P3 plan, the successful bidder will fund and construct the expanded GO Transit system – including specifying and acquiring new engines/rolling stock – and have a 35-year maintenance contract to run the expanded service on Metrolinx's behalf. They will be paid by Metrolinx through public funding and fares earned on the supercharged transit system.

In putting the GO Transit P3 contract out for bidding, Verster was clear that Metrolinx is open to all kinds of creative proposals. This includes using a mix of electric and diesel locomotives on the expanded system (allowing GO Transit to run on Canadian National and Canadian Pacific freight rail lines if need be), implementing hydrogen fuel cell-powered engines if this makes sense over the long term, and using whatever rolling stock fits best with each bidder's proposal.

In allowing this amount of freedom, Metrolinx is encouraging P3 bidders to be innovative, and to triple ridership through operational changes and construction expansion, rather than just construction alone.

"When you have an operational focus, you can optimize your infrastructure choices and you can achieve the same capacity as you would have done just by making a capital investment in itself," said Verster.

Metrolinx's ambitious GO Transit expansion comes as Premier Ford moves to transfer responsibility for the TTC's expansion plans from the city of Toronto to the province of Ontario. Asked if this transfer will see Metrolinx taking charge of building the Toronto-York Spadina Subway Extension, the Relief Line and the Scarborough Subway Extension – plus its own Eglinton Crosstown LRT Eglinton West extension – Verster replied, "absolutely."


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Ford's biggest change is to the Relief Line, which is meant to ease traffic on the already overloaded North-South Line 1 subway along Yonge Street. Now renamed the Ontario Line, this new subway will be extended beyond the Relief Line's planned route to the Ontario Science Centre on Eglinton Avenue in the north, curving southwest to run through the existing Queen and Osgoode stations before going west to end at Ontario Place on Toronto's waterfront. It will cost C$10.9 billion (US$8.1 billion). According to media reports, this line may use automated trains or some other form of LRTs, rather than traditional human-controlled subway trains.

Meanwhile, the six-station TYSSE will extend Toronto's Line 1 subway along Yonge Street from its current termination at Finch station northwards into Richmond Hill Centre, above the City's boundaries into York Region. Priced at C$5.6 billion (US$4.16 billion), the TYSSE would be completed "soon after the Ontario Line," said an Ontario government news release.


Courtesy of TTC

TTC MOVES 28,000 people per hour on Line 1.

The three-station Scarborough Line 2 subway extension, which replaces the single station extension planned by the TTC to replace the aging Scarborough RT LRT line, is priced at C$5.5 billion (US$4.08 billion) and will be ready by 2030. This is four years later than the TTC's single station extension, which was to be in operation by 2026.

Finally, the Metrolinx Eglinton Crosstown LRT Eglinton West extension will cost C$4.7 billion (US$3.49 billion) and be "delivered before 2031".


Courtesy of TTC

Leary's Dilemma

The TTC's various expansion plans have served as political footballs for decades, with municipal and provincial politicians spending time booting them around rather than providing the TTC with consistent, adequate funding.

The result? A 1950s-vintage subway system of sufficient capacity that never seemed to break down during rush hour in the 1970s (based on this writer's personal experiences) is now increasingly overloaded and prone to constant failure. There are millions of dollars of repairs, maintenance work and necessary improvements waiting to be done, and not enough money to do them.

(Note: 1990s-era provincial funding cuts by the Mike Harris PC government put the TTC's previously healthy finances in a bind, from which it has never recovered. The TTC is now reliant on farebox revenues and municipal grants, and this amount of money is never enough.)

A case in point: A cascading system failure that began at the Line 1 Museum station early January 24, 2019 brought Toronto's morning commute to its knees. "At the peak of the chaos, trains were taking two hours and 20 minutes to travel from Vaughan Metropolitan Centre to Union Station," reported CBC News; "a journey that normally takes 45 minutes."

MORE THAN 213 million people rode TTC's subways in 2017.


Courtesy of TTC

> **"we** have to balance investing in new signal systems, upgrading our track and power, replacing tunnel linings, making sure ventilation and drainage is appropriate, and moving the amount of people that are required..."
>
> **-RICK LEARY,** TTC CEO

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*Image depicts actual occurrence – Stirling Station, Perth on 6 August 2014.

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DELKOR

STREETCAR OPERATORS wave to one another along Spadina Ave.

Rick Leary and his team are doing their best to make the TTC 'The Better Way' for commuters, as its one-time advertising slogans claim.

"It's a challenge to move 28,000 people per hour on Line 1's aging infrastructure," he said. With the limited funds the TTC has at hand, "we have to balance investing in new signal systems, upgrading our track and power, replacing tunnel linings, making sure ventilation and drainage is appropriate, and moving the amount of people that are required—while at the same time looking to the future knowing that we have to keep up with the growth that is occurring."

It is growing demand on the TTC—which already has more traffic than it can handle on Line 1 during rush hours—that is making life difficult for Leary. He would prefer not to spend money replacing the 1954-era signalling system on Line 1, but that system "can only handle 26-28 trains per hour at Yonge and Bloor South, and we know that we have to get to 32-34 trains per hour in the future. Aging infrastructure and older signal systems don't accommodate that type of throughput, so we're upgrading now to be ready for the future."

Rather than simply giving the TTC a much-needed cash influx and letting Leary and his people get on with the job, the Ford government has thrown the situation into confusion and delays with the Getting Ontario Moving Act.

Of course, the Premier's decision to recommit the provincial government to supporting mass transit directly could prove to be good news for the TTC. (Reviewing the funding legacy of Ford's 1990s predecessor Mike Harris, the *Globe and Mail* newspaper noted that "The transit systems that make the cities work are crumbling for lack of funds.") But there is also the danger that the TTC's expansion plans, and day-to-day subway operations, may be delayed and impaired in this latest round of provincial/municipal financial football.

If this happens, Rick Leary's plans to make the TTC run better today and be ready for growth tomorrow may indeed "gang aft a-gley," as Burns wrote. MT

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SPECIAL REPORT

THE STATE OF PASSENGER RAIL

We review the latest data to gain the temperature of the statistical trends impacting passenger rail.

Compiled **by Mischa Wanek-Libman, executive editor**

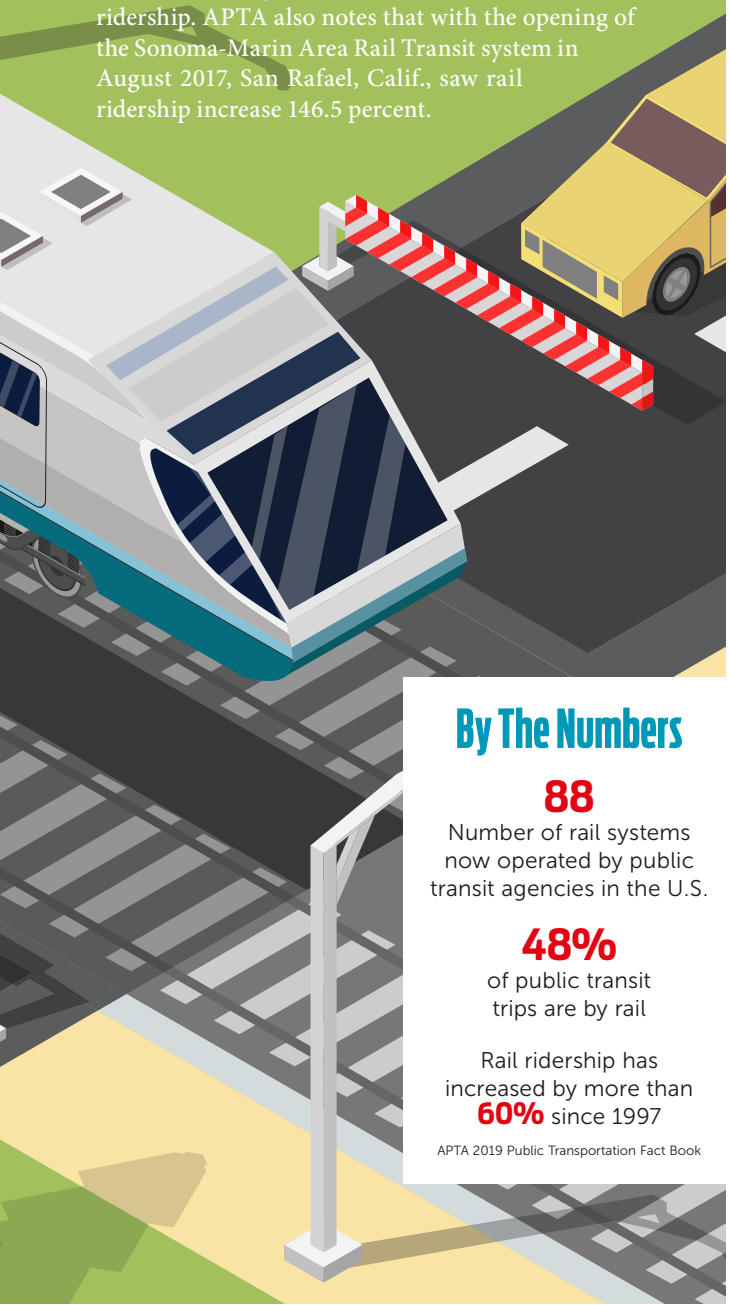
Terminology

NTD Mode Types

AG: Automated Guideway
CC: Cable Car
CR: Commuter Rail
HR: Heavy Rail
IP: Inclined Plane
LR: Light Rail
MO: Monorail
SR: Streetcar
YR: Hybrid Rail

DATA INCLUDED IN THE AMERICAN PUBLIC Transportation Association (APTA) *2019 Public Transportation Fact Book* shows rail modes account for 48 percent of all transit ridership and carry 58 percent of the passenger miles traveled. APTA's analysis of ridership data in 2018 found that, overall, transit ridership is down, but nationally, commuter rail ridership increased in 18 out of 31 transit systems while overall ridership increased by 0.41 percent. Light-rail ridership, which includes modern streetcars, trolleys and heritage trolleys, increased in nine out of 28 transit systems while overall ridership decreased by 3.0 percent and heavy rail ridership, which includes subways and elevated trains, decreased by 2.6 percent.

APTA points to the double-digit ridership increases on rail systems in Orlando, Fla., Stockton, Calif, Tampa, Fla. And Charlotte, N.C., as examples of communities large and small willing to embrace public transit with increased ridership. APTA also notes that with the opening of the Sonoma-Marin Area Rail Transit system in August 2017, San Rafael, Calif., saw rail ridership increase 146.5 percent.



By The Numbers

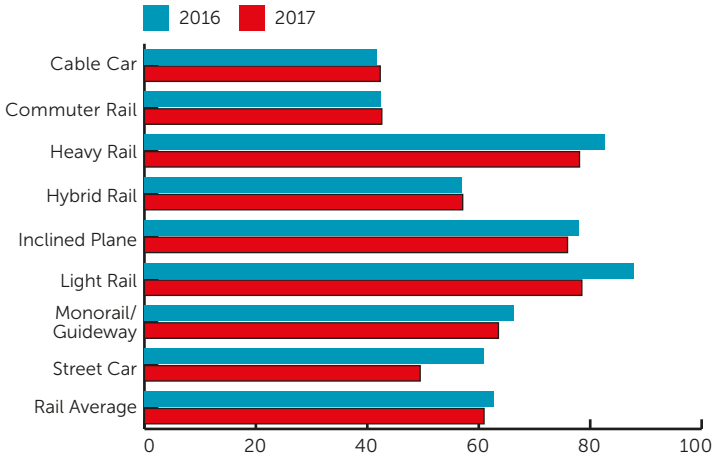
88
Number of rail systems now operated by public transit agencies in the U.S.

48%
of public transit trips are by rail

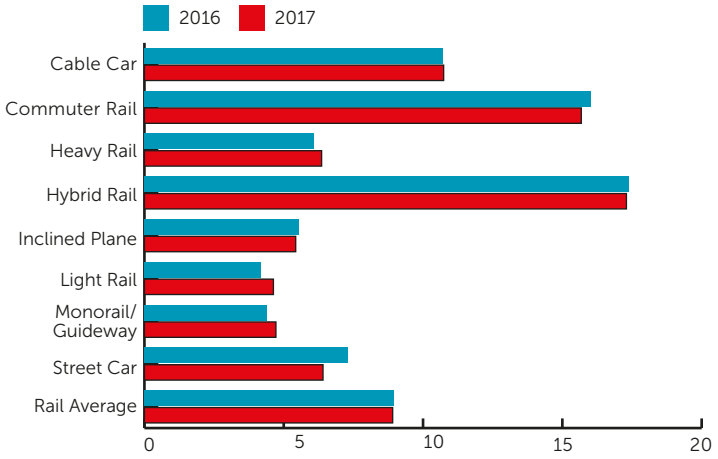
Rail ridership has increased by more than **60%** since 1997

APTA 2019 Public Transportation Fact Book

Passengers Per Hour *NTD Metrics*



Cost Per Passengers



Ridership Trends

Year	Total Ridership (000s)	Heavy Rail (000s)	Light Rail (000s)	Commuter Rail (000s)
2007	10,270,589.27	3,450,428.70	429,765.10	455,118.10
2008	10,597,931.00	3,570,826.20	462,122.00	475,738.70
2009	10,257,889.07	3,476,969.10	457,117.50	451,878.80
2010	10,172,352.00	3,530,638.90	464,977.50	452,790.60
2011	10,361,769.10	3,648,329.50	488,503.70	464,036.80
2012	10,537,187.70	3,702,571.00	510,022.90	466,433.90
2013	10,652,068.90	3,808,780.90	518,536.20	476,038.90
2014	10,736,168.74	3,939,259.40	528,478.50	490,409.20
2015	10,626,931.08	3,945,568.60	528,030.80	489,873.40
2016	10,407,891.67	3,893,768.30	548,006.00	497,038.60
2017	10,107,308.84	3,813,059.70	543,527.50	495,751.90

American Public Transportation Association

Quarterly Ridership Report

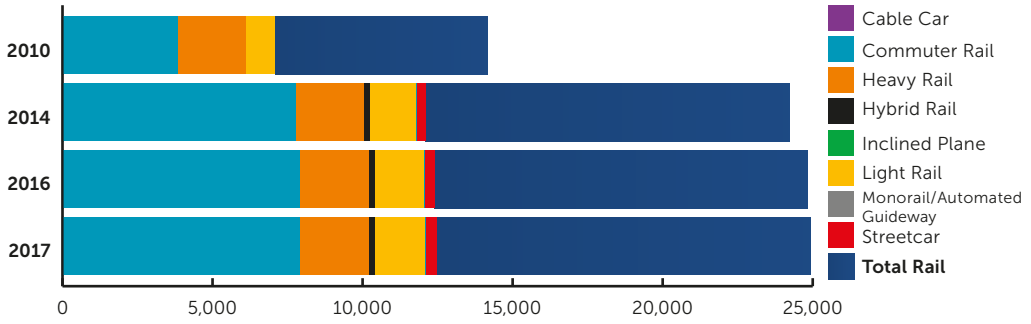
iStock

Infrastructure Spending

NEW AND EXPANDED SYSTEMS CAN ADD TO RIDERSHIP, BUT CAPITAL NEEDS ALSO INCREASE.

UNION INTERNATIONALE DES TRANSPORTS PUBLICS (UITP) published *New Urban Rail infrastructure 2018,* a statistics brief, in March 2019 looking at the developments of urban rail during 2018 with a focus on the evolution of metro and light-rail transit. UITP called 2018 "a successful year for urban rail infrastructure, despite a six percent slowdown of the growth pace." UITP data shows 121 individual urban rail projects were completed in 2018 on all continents totaling 1,270 km (789.14 miles), compared to 1,348 km (837.61 miles) in 2017. UITP explains that China continues its domination of new urban rail construction and accounts for more than two-thirds of all new metro infrastructure launched for revenue service. Regarding light-rail development, UITP's report found that Asia-Pacific outpaced other continents with North America, traditionally ranking second in LRT development, trailing behind Europe and the Middle East/North Africa in terms of new projects opened

U.S. Passenger Rail Total Miles of Track



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Rail System Capital Expenditures

Guideway	Stations	Administrative Buildings	Maintenance Facilities	Passenger Vehicles	Other Vehicles	Fare Collection Equipment	Communication & Information Systems	Other Percentages
49.79%	16.31%	0.52%	4.80%	12.90%	0.27%	0.77%	10.26%	4.39%

2017 NTD Capital Expenses

in 2018. However, the U.S. came in second to China in the most LRT developments measured in kilometers in 2018.

Even with the U.S. not keeping pace with new rail globally, APTA statistics show there were 50 more rail systems in operation at the end of 2017 than in 1987. The number of heavy rail systems during that time have remained consistent while growth in commuter and hybrid rail system and light rail and streetcar system has more than doubled.

The 14th National Light Rail and Streetcar Conference, jointly hosted by APTA and the Transportation Research Board (TRB) this past April in Jersey City, N.J., focused on a theme of "resurgence and renewal" by celebrating how far the transportation modes have come in four decades and what is being done to ensure they remain viable travel options into the future.

Thomas Furmaniak, chair of the Light Rail Technical Forum, chair of the conference's planning committee and senior director, LTK Engineering Services, told attendees that 800 route miles of light-rail have been added in the past 40 years and 19 new streetcar lines have opened since 2000. Furmaniak also noted that through 2029, approximately 220 additional miles of light rail are being planned in the U.S.

As route miles of rail systems increase, so do their capital needs. APTA's *2019 Public Transportation Fact Book* says total public transportation expenditures in 2017 were $67.7 billion, with $47.5 billion spent on operations and $20.2 billion on capital investments, with rail modes accounting for nearly 70 percent of transit's total capital investments. In 2017, heavy rail capital expenditures in the U.S. totaled $6.86 billion, commuter and hybrid rail capital expenses were $3.63 billion and surface rail capital expenses were $3.52 billion. Nearly half of all rail capital is spent on guideway needs followed by stations, rolling stock and communication and information systems.

Rail line openings since 2016

Project	Location
East Contra Costa BART Extension	Antioch, Calif.
Wachusett Extension	Boston, Mass.
LYNX Blue Line Extension	Charlotte, N.C.
Cincinnati Streetcar	Cincinnati, Ohio
Dallas Streetcar Phase 2	Dallas, Texas
Blue Line South Oak Cliff Extension	Dallas, Texas
University of Colorado A-Line	Denver, Colo.
B, R and G Lines	Denver, Colo.
E, F, R Line Extension	Denver, Colo.
Qline	Detroit, Mich.
El Paso Streetcar	El Paso, Texas
TEXRail	Fort Worth, Texas
Warm Springs Extension	Fremont, Calif.
Hartford Line	Hartford, Conn.
Green Line East End	Houston, Texas
KC Streetcar	Kansas City, Mo.
Gold Line, Foothill Extension	Los Angeles, Calif.
Expo Line, Phase 2	Los Angeles, Calif.
Perris Vally Line	Los Angeles, Calif.
Gilbert Road Extension	Mesa, Ariz.
Milwaukee Streetcar	Milwaukee, Wis.
N. Rampart Street/ St. Claude Ave. Line	New Orleans, La.
2nd Ave. Subway Phase 1	New York City, N.Y.
Oklahoma City Streetcar	Oklahoma City, Ok.
Valley Metro Rail, Northwest Extension	Phoenix, Ariz.
Sonoma-Marin Area Rail Transit	San Francisco, Calif.
First Hill Streetcar	Seattle, Wash.
Link Light Rail, University Link Extension	Seattle, Wash.
South 200 Link	Seattle, Wash.
DC Streetcar, H/ Benning Line	Washington, D.C.

APTA 2018 and 2019 Public Transportation Fact Book; various news sources

Rail Fleets

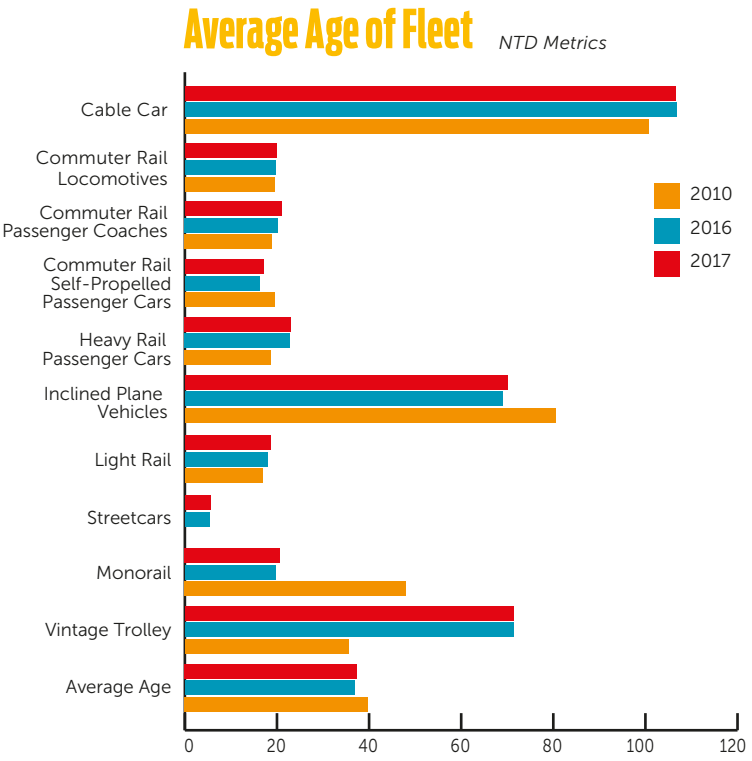
CAN A CASE FOR AUTOMATION BE MADE IN NORTH AMERICA?

UITP RELEASED ITS WORLD REPORT ON METRO Automation for 2018 in late May, which laid out the current standing of automated rail systems globally, as well as expectations of the future of automation. The report says the global passenger rail transportation network surpassed 1,000 km (621.37 miles) under automated operation in 2018.

Highlights from the report include:

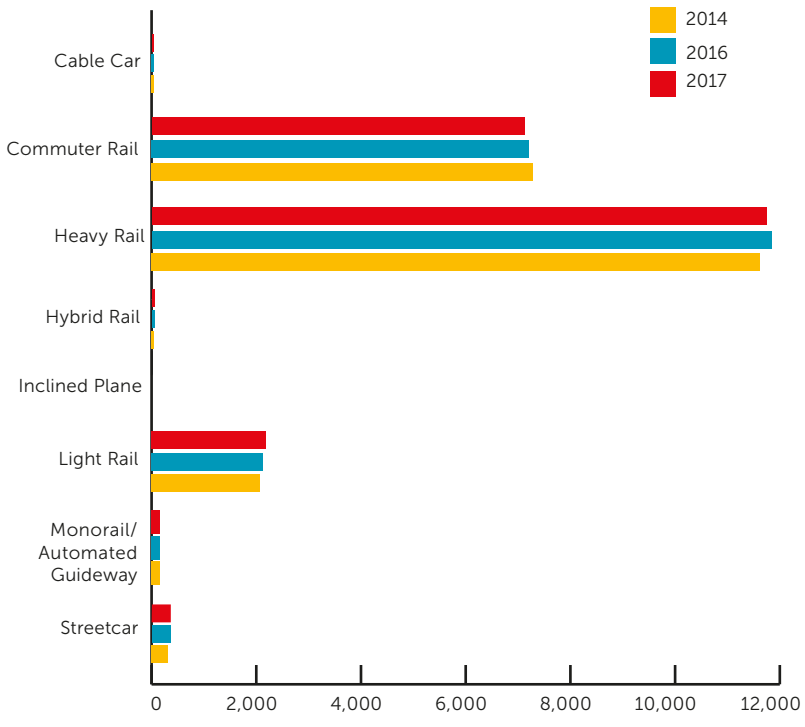
- There are now 64 fully automated metro lines in 42 cities
- There is a 27.7 percent increase in kilometers from the 2016 World Report figures
- South Korea, France, Singapore and Malaysia host half of the world's kilometers of fully automated metro lines

"In the next five years, it is expected that full automation will become the mainstream design for greenfield metro lines, increasing from the current share of 10 percent of kilometers of metro infrastructure in planning and



Active Fleet Vehicles

NTD Revenue Vehicle Inventory



2017 Average Lifetime Miles per Vehicle

733,082
Cable Car

875,652
Commuter Rail Locomotives

1,021,0273
Commuter Rail Passenger Coaches

939,708
Commuter Rail Self-Propelled Passenger Cars

1,202,360
Heavy Rail Passenger Cars

105,281
Inclined Plane Vehicles

741,954
Light Rail

89,648
Streetcars

842,461
Monorail

2,285,864
Vintage Trolley

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construction, to 48 percent by 2022," the report states.

UITP says behind this push toward automation is the strong case supporting its implementation.

"At the forefront of innovation, automation must however be understood not as a purely technological project, but as a company project. In the wake of the digitalization wave and the new smart mobility scenario, automation provides companies with a lever to attain strategic goals linked to a more human, customer orientated and flexible service," the report reads.

Safety

THE LIGHT AT THE END OF THE TUNNEL FOR PTC AND THE CERTIFICATION OF SSO PROGRAMS.

COMMUTER RAILROADS ARE BE-ginning to look beyond 2020 and what operations and capital expenditure on their networks will look like following successful implementation of positive train control (PTC). All railroads required to implement PTC either met the December 31, 2018, statutory deadline for fully implementing PTC systems or submitted requests demonstrating they met or exceeded the statutory criteria for an alternative schedule of Dec. 31, 2020.

According to Federal Railroad Administration PTC progress reports from the first quarter of 2019, five commuter railroads, including Port Authority Trans-Hudson, Metrolink, North County Transit District, Northstar Commuter Rail and Sound Transit's Sounder trains had fully implemented an FRA-certified and interoperable PTC system on all required main lines. Interoperability will be the next hurdle with commuter railroads, as a group, achieving interoperability with 19 of 65 host railroad PTC systems.

In another safety milestone this year, 31 State Safety Oversight (SSO) Programs in 30 states were certified by the Federal Transit Administration (FTA) ahead of an April 15, 2019 deadline. To achieve FTA certification, an SSO Program had to meet several federal statutory requirements, including

establishing an SSO agency that is financially and legally independent from the rail transit agencies it oversees. A state had to ensure that its SSO agency would adopt and enforce relevant federal and state safety laws, have investigatory authority and have appropriate financial and human resources. If a state had failed to meet the deadline, FTA would have been prohibited by law from awarding any new federal transit funds to transit agencies within the state until certification was achieved. MT

Number of Crossings in 2017

At Grade: Restricted Right-of-Way

5746

Street Running Crossings

1903

Total Crossings

7649

Source: NTD

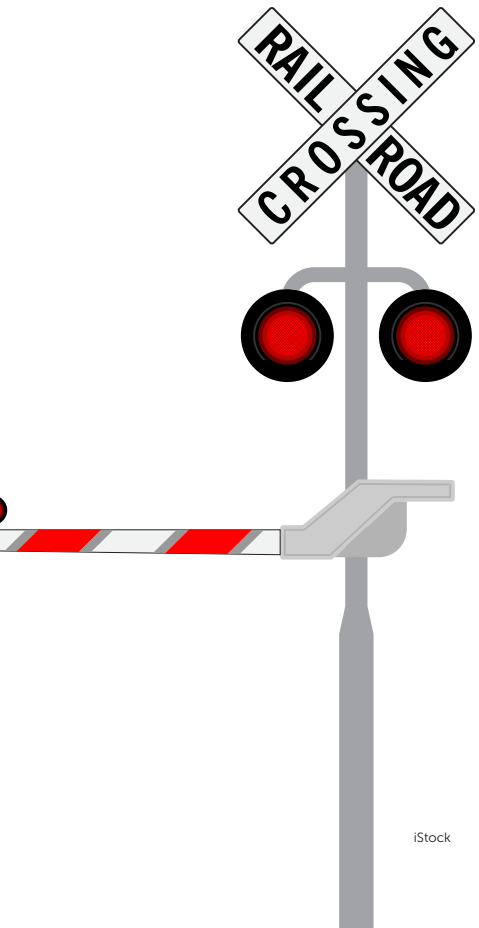
Rail transit and grade-crossing fatalities:

242

Rail transit and grade-crossing injuries:

8058

Source: BTS



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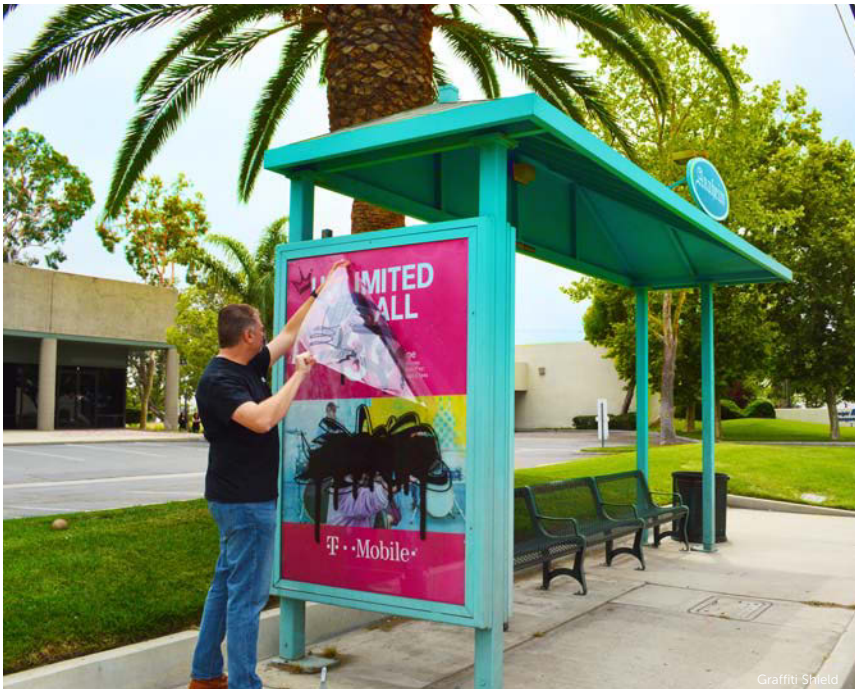

GRAFFITI SHIELD'S multi-layer product can be removed without damaging the display.

Making a **safe** and **comfortable stop**

A part of making bus shelters, stations and stops more attractive to users is providing a safe and clean environment.

By **Maile Rudebusch, contributor**

SHELTERS AND STATIONS ARE an essential part of an agency's operation. Providing amenities and additional technology at bus stops to make users feel more comfortable can increase ridership.

Utilizing remote technology

With solar energy being an increasingly popular option for stops, OutdoorLink, Inc. works to not only manage them through its SmartLink system, but manage them in a fashion that is easier for agencies.

"[SmartLink] gives the operator the opportunity to remotely control the lighting on the billboard to check in and see if it is working, to get alerts and [allows advertisers the ability] to say the lights are working how they are supposed to. It also allows you to reset schedules all through a web-based and app-based program," said Doug Pew, vice president transit products, OutdoorLink, Inc. "It's really revolutionized the outdoor advertising industry, including the digital side."

SmartLink is now being utilized in transit operations. The company's software offers remote monitoring of displays, which no longer requires that transit maintenance departments be on site to check a display's performance. Pew explained that SmartLink offers both AC and solar access for its shelters, but that solar is becoming more prominent. Pew himself was a part of increasing SmartLink's solar activity.

"In the shelter world, one of the things that I was really part of was bringing solar lighting to shelters. [Now you can have] the ability to have control and monitor when your lights are working, if they're working, if your battery is charged, if your solar panel is providing solar as it's supposed to. You can register if it is your lights, your signs or your USB charging port – which is a newer thing that has been implemented in shelters, as well. We're able to monitor all of that and tell the agency if they need service," explained Pew. "Historically, in the shelter side of things and the shelter industry, maintenance departments have to go out and manually check a lighting package to see if it's working or they wait for a call from a user or rider to hear if the light is working or not. We're giving agencies the ability to make it much more secure and offer much more protection."

Agencies are given the benefit of ensuring both public security, as well as remote control.

"The ability to control remotely and to know when your lights are working or if there is a problem and your power is out, it's really [offered] a lot of benefits to the maintenance side of the industry to know when you have a problem and when you need to service it," said Pew.

Pew explained that different agencies located in the U.S. in the west, as well as the south are turning to solar energy. Pew added that SmartLink's system offers the choice to be implemented in a current system. The system also offers additional resources that are unique to the company.

"Our device is a controller, so it can work with any existing system that is in the field today. We made it to retrofit and then we're also working with OEM's to work with them to put it in to their solar lighting packages for the agencies," said Pew. "There really is nothing else like it where you can look at your cell phone and tell that your lights are working or that you need to change the times on these lights simply through an app or from your desktop. Since it is all through cell technology, it is up to date to real time, there is no need to adjust for daylight savings [time], which, for the most part, every other controller in the market has to do, you have to go out there and have someone change times to be up to date."

Pew explained that while it is a newer system, the company has several agencies that have started implementing it into their operations.

"It's really revolutionary for them to see that the moment we set this up they can go to their cell phone and see 'wow, my lights are working and how many watts it's putting out right now. Or maybe I can see that one light is out on a system.' It just gives information that is so useful for them," said Pew.

SmartLink offers agencies the ability to access each stop through both a mobile app, as well as online. They are able to see GPS location as to which station is being affected. SmartLink also provides daily reports, allowing agencies to monitor how displays are functioning.

"We talk about safety and shelter and a lot of other things, from a user standpoint of the street furniture of the shelter, they're going to have more reliability and more lighting, which is a good thing for security," said Pew. "For the agency to have assurance knowing when their equipment is working and when it is not, when they have an issue is going to help them avoid calls from people, that's one of the things that makes this [technology] unique."

Presenting a clean shelter

Graffiti Shield, Inc. offers agencies the option of putting the company's clear coating on any advertising at bus stops or shelters. The product that Graffiti Shield offers is easily removable; an agency is able to remove it without damaging the display. Graffiti Shield also offers customization.

Mike Schuch, president of Graffiti Shield, Inc. said, "We cut everything on a laser machine or flatbed cutting machine so that when the clients actually get our protective coating, they can just clean the window, peel the protector off the window like a giant decal and just apply it. We take a lot of the headache out of the process."

Graffiti Shield also offers two additional products for use on non-glass surfaces.

"We offer a custom product that is usually color matched to metal surfaces – whether it's stainless steel or harder coated – we, as well, do printing and marketing on both of our materials. It will elevate [rider's] experience by giving the agency or the city the ability to give the community a clean environment, a graffiti free environment while they're waiting for the bus. If the bus stop is riddled with vulgar etchings it gives customers a negative connotation and maybe a thought of being unsafe in that area," said Schuch.

Schuch noted the product offers agencies an easy option for maintenance.

"Our whole premise is that it's a sacrificial and easy product that can be removed so you always have a clean environment," said Schuch. "Agencies can simply peel off [a cover] and install a new one in minutes. Previously, they would have to take off the glass and disassemble and resemble, which would take hours."

Nokia Networks

MOST WI-FI networks in place on metros are incapable of carrying both safety-critical and non-safety-critical traffic, due to limitations such as a lack of sophisticated quality of service (QoS) support and shortcomings with mobility.

Not all WIRELESS is created EQUAL

Newly available spectrum in North America is also bringing a new era in transit communications.

By **Pedro Bontempo Elmadjian, contributor**

MODERN TRANSIT OPERators are looking at the automation and Internet of Things [IoT] trends with great interest. There is the promise of shorter headways using automated trains for improved capacity. IoT sensors and closed-circuit television (CCTV) could enable greater safety, as well as preventative, pro-active maintenance. And, meanwhile, customers' appetite for high-speed, on-board services only grows. Unfortunately, all of these require safer, more secure and more robust communications systems than exist today.

The good news is that new radio spectrum in North America is also bringing a new era in transit communications, which will see private LTE networks providing a whole new platform for transit automation and improved customer services.

Modern transit and suburban rail communications systems have tended to proliferate over the years. As new applications were layered over old, however, each one adopted its own proprietary approach — whether it was signaling, emergency calls, onboard communications, telemetry or digital signage. All of which has increased complexity and operational costs. So far, the comfort of relying on the tried and true has outweighed the cost of converging these systems into one.

> Most Wi-Fi networks in place on metros are incapable of carrying both safety-critical and non-safety-critical traffic.

Part of the convergence problem has been the mix of wireless and wired systems. There has been increasing interest in wireless systems in recent years, such as Global System for Mobile Communications – Railway (GSM-R), WiMAX and Wi-Fi, which have been used for signaling, train-to-ground and onboard customer communications. Unfortunately, none of these systems is robust enough to meet all the needs of transit and rail operators. Instead, they have tended to add additional layers and increased the complexity and cost.

Despite these issues, many operators would probably put up with this heterogenous mix of communication systems if it weren't for the move to automa-

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tion. Automation of transit lines is one of the most cost-effective ways to increase capacity, which is achieved through shorter headways. However, automated subways and light rail place additional large burdens on communications. Additional CCTV cameras for obstacle detection must be installed and managed onboard, with imagery constantly sent to the control center. Numerous additional CCTV cameras are needed inside the train for passenger security. Supporting the enormous amount of data generated by these cameras requires an ultra-broadband, ground-to-train radio network.

Most Wi-Fi networks in place on metros are incapable of carrying both safety-critical and non-safety-critical traffic, due to limitations such as a lack of sophisticated quality of service (QoS) support and shortcomings with mobility. Wi-Fi also uses unlicensed spectrum, meaning both interference from other users and the risk that a hostile party could seek to jam or invade the network, undermine safety. Additionally, standard Wi-Fi does not monitor the quality of the air interface in real time, which is essential for any mission-critical service.

Fortunately, there is an answer on the way. It begins with the introduction of new wireless spectrum in North America called Citizens Broadband Radio Service or CBRS. The U.S. government has released this spectrum in the 3.5GHz band, which was previously reserved for military applications. It is specifically designated for private wireless networks using the 4G/LTE mobile protocol. These private LTE networks can be deployed not only as a replacement for WiMAX and Wi-Fi, but potentially all other legacy communications systems — greatly reducing complexity, operating costs and improving safety and reliability.

LTE is normally used by mobile telecom companies to provide broadband cellular wireless services. It is a much more robust and secure system than Wi-Fi, for instance. It is deployed worldwide and it has a well-developed ecosystem of end devices and suppliers. It also overcomes all of the issues associated with Wi-Fi. It is a highly secure, mobility-oriented standard that accommodates high bandwidth, IP-based applications with full control over QoS for real-time, full duplex voice and video applications. It has very low latencies (down to 10ms) as well, so that it can support GoA level 3 driverless train operation (DTO) and level 4 unattended train operation (UTO).

The LTE standard includes multiple encryption and authentication features, rendering it secure by default. Additionally, when properly designed, an LTE network has several mechanisms for auto-reconfiguration in case of network failure — vital for an always-on railway communication network. These attributes make LTE superior for building a radio network able to support passenger connectivity needs, along with mission-critical operational applications such as train signaling, CCTV on-board and emergency communications.

If installing mobile cellular technology in a transit network sounds daunting and expensive, the good news is that it is now almost as easy to install a private 4G/LTE network as a Wi-Fi mesh network. In fact, a 4G/LTE network requires less installation infrastructure than a Wi-Fi network, since it needs less trackside radios to achieve a similar coverage. And, yet, it is far more robust, secure and capable of supporting far greater numbers of connections per access point. In terms of size and installation, there are now small cell 4G/LTE access points that are no larger or more complicated than a Wi-Fi access point and also feature plug-and-play installation. Multi-racks of servers for the mobile packet core have now been reduced to the size of a mini desktop PC.

For those worried that LTE will soon be supplanted by 5G, don't be. Although the first 5G networks are being rolled out in 2019–2020, the ecosystem of devices and interfaces is far from mature. And, most of the features that 5G brings that are advantageous to the transit industry have already been incorporated into the later releases of 4G/LTE, including solutions that meet 5G performance levels such as jitter and delay.

Until recently, 4G/LTE has not been much discussed in the transportation space because the radio spectrum licenses have all been allocated to mobile operators. With CBRS, 4G/LTE is becoming available; capable of meeting the needs for a single converged communications system that not only supports automation and data in general, but all of the legacy communications systems as well. There are already various private LTE trials underway in the transportation space.

With private LTE, transit operators can safely and securely implement driverless technology, implement IoT, CCTV, telephony networks and provide mobile broadband on-board services for their customers. The release of the CBRS spectrum for private LTE networks is, thus, a game changer for the North American transit industry. MT

IMPROVED COMMUNICATIONS networks holds the promise of shorter headways using automated trains for improved capacity.

Pedro Bontempo Elmadjian is customer solution manager, Enterprise at Nokia Networks.

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Video Aids Agency MONITORING EFFORTS

As technology continues to develop, transit agencies are utilizing technology for security of riders, as well as providing options to monitor activity outside of buses.

By **Maile Rudebusch, contributor**

SMARTDRIVE HAS implemented cameras that have high dynamic range functionality, which give a much sharper and brighter image.

THE SECURITY OF BUSES IS A top issue for agencies; safer transport means increased ridership. One method to enhance safety is through the use of security cameras.

"We, physically on a transit bus, will install a few or up to six or seven cameras. The driver can activate a manual button if they're having an issue with a passenger or if there is an incident on the bus. In some cases, we will install multiple buttons throughout the bus. For example, we have a button on the wheelchair ramp [that a person] can push to activate the cameras," said Jason Palmer, chief operating officer, SmartDrive.

Palmer said that the footage is then stored on SmartDrive's cloud-data store.

"[Our system] will record footage and start offloading that to our cloud-data store and also send out an alert to dispatch or a manager – however it is set up – to let them know that there has been an incident on the bus." said Palmer.

SmartDrive's equipment can come with a cellular subscription. Palmer added that around 90 percent of agencies that utilize SmartDrive use the cellular subscription as opposed to WiFi.

"All of our equipment is sold along with the service, so if for example, there was a passenger incident it will go to one of our analysts, who will mark that there was a passenger incident on the bus if you need to find, locate and keep records of [an incident]," said Palmer.

One thing that always comes into question when surveillance is how effective it is.

"It's not just the resolution, but also the definition of the image and the color processing of the image. We've implemented cameras that have high dynamic range functionality, which allows the cameras to be enhanced quite a bit, giving a much sharper and brighter image," explained Palmer. "We also have engineered and developed very strong night vision capabilities, so that you are able to see around the bus even at nighttime. It will enhance the image so that you can exactly what is happening in and around the bus."

> **"We're** seeing a lot more systems on paratransit and smaller vehicles that, in the past, may not have had a video system."
>
> **-JASON PALMER,** chief operating officer, SmartDrive

Palmer notes that the system is able to start recording as soon as there is an incident, but the speed of the video's offloading is determined by the resolution at which it is being transferred, as well as if it is being sent via WiFi or cellular network.

"For our system, if [a person] activates the manual button, it will immediately start recording and offloading, but it is not a live view into the bus. It is delayed as it is being offloaded and stored in the cloud. One of the trade-offs of is that if you are doing a live view of the bus, it may not be as high of resolution as it is trying to adjust

SmartDrive

itself to the available bandwidth," said Palmer.

The company has also seen a branch off into different transportation modes.

"For a long time, investment for fixed route buses for a DVR would be justified. We're seeing a lot more systems on paratransit and smaller vehicles that, in the past, may not have had a video system. Agencies are seeing a return on investment for those camera systems. We're seeing more cameras, in the past, we may have seen two cameras, now we're seeing a lot more implementation to have four or more cameras," explained Palmer. "As we do that, we have larger harddrives, it has become more of the norm now, they have longer life and are easier to maintain."

SmartDrive is branching further into the security side of the transit industry, but also offers technology that can determine what is happening outside the bus.

"We've [developed] our radio-based camera system to be able to implement more computer vision and learning capabilities so that we're able to accurately identify things like signs, signals and pedestrians if the bus is moving," said Palmer. "I think that the industry is moving more towards intelligent smart cameras that can help the driver see and alert them of safety issues that are happening around the vehicle."

As technology continues to develop, there are continuing trends that are appearing in the field.

"I think that we will continue to see computer vision capabilities, whether it is passenger counting or security or safety. We'll see cameras not just used for recording video, but being fully capable for doing intelligent things to assist the transit agency," added Palmer. MT

SMARTDRIVE'S SR4™ Hardware has smaller footprint and supports computer vision and ADAS capabilities.

SmartDrive

Latest Technology to Improve Communication

Incremental approach leads to expansive real-time services

By Gabriel Morey
Intelligent Transportation Coordinator DASH

ALEXANDRIA, VA. ▪ When the Alexandria Transit Company (DASH) first installed our Clever Devices CAD/AVL system, our goals were simple: meet ADA compliance and dispatch more efficiently. We wanted to meet the public expectation of providing real-time information, but it was a nice-to-have, not a necessity. Now, DASH considers real-time data a core part of our service.

DASH has embraced real-time arrival predictions because they make transit easier to understand and use. Schedules are promises to customers, but they come with caveats outside the agency's control, especially in a heavy-traffic city like Alexandria. In this environment, real-time predictions do not just inform customers when the bus will arrive—they reassure them that the bus is on the way. Service alerts about schedule changes, detours and stop closures further reduce uncertainty, building trust that DASH will get you to your destination even if your normal stop is closed. However, we have learned that we must post as soon as incidents happen—the usefulness of an alert system is only as strong as staff's ability to maintain it.

How has a small agency like DASH been able offer such expansive real-time services? First, we took an incremental approach, starting with the DASH Tracker. We have deliberately expanded from there, first with real-time arrival signs and now with the upcoming OneBusAway deployment. We also sought external funding wherever possible, winning grants from the Virginia Department of Rail and Public Transit (DRPT), the Northern Virginia Transportation Commission (NVTC) and the Northern Virginia Transportation Authority (NVTA) that have paid for our digital arrival signs. However, grants are not permanent, so we are launching a signage-leasing program where local business and residential communities can rent signs from DASH. This program will allow business to enjoy the benefits of a sign for less money than buying outright while defraying the costs for DASH. Finally, we have cultivated relationships that have helped us expand our real-time systems. For instance, Metrobus owns most of the solar-powered signs in Alexandria, but we share resources to purchase, install, monitor and maintain them. The same goes for the LCD displays we've installed at local apartments, government offices and the local community college—in each location, we've established a memorandum of agreement that shares the cost of the sign.

Grants are not permanent, so we are launching a signage-leasing program where local business and residential communities can rent signs from DASH.

Transit should be a utility, something as reliable and expected as the water from our tap or electricity from the grid. While real-time data will not unsnarl traffic or reduce dwell time, it reassures customers that they will not be stranded. With creative thinking and slow, steady work, even small agencies like DASH can enjoy the benefits of real-time data.

DASH currently provides real-time predictions in three ways— (1) the web-based DASH Tracker; (2) third-party apps (notably the Transit app); and (3) a network of over 20 solar-powered digital arrival signs jointly-managed by DASH and DC Metro. Going forward, we are launching the DASHBus mobile payment app that links to the Transit app, installing more digital arrival signs and deploying OneBusAway to integrate with Metro's BusETA. We consider real-time predictions as so vital that we even hired Cambridge Systematics to create a prediction-engine fueled solely by GPS data from bus routers, so that during this summer's Metrorail platform improvement project, our contingency buses without Clever Devices will still provide estimates for customers.

Consider all variables to push performance of onboard systems

By Maria Waddy
North American Product Lead Icomera US, Inc.

ROCKVILLE, MD. ▪ With the emergence of smart cities, IoT and 5G technologies, the importance of reliable, secure, real-time onboard communications for public transportation vehicles is ever increasing.

Connectivity to the vehicle through cellular, satellite, radio and dedicated short-range communication (DSRC), as well as onboard connectivity through Wi-Fi, Bluetooth and ethernet, results in a highly sophisticated mobile communications network. While being a sizable investment for any agency,

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choosing the right solution can deliver great returns.

To get the most out of their network and onboard systems, transportation operators and agencies need to consider the network connectivity, equipment, management tools, security and the benefits for operational efficiency and the passenger experience.

The first consideration is the connectivity to, from and on-board the vehicle. Network speed, reliability and security are key factors that must be considered. The solution must be able to handle the data throughput of wireless connections, deliver the bandwidth for the data needs of the vehicle and provide maximum uptime for real-time data communications for vehicle systems and passengers.

The onboard equipment—such as routers, antennas and access points—needs to be able to withstand the mobile environment with a minimal footprint to fit in the limited space on board. It needs to be future-proof and reliable in order to provide years of service, making the most of the agency's investment. Multi-function equipment with integrated GPS, storage, memory and data processing capabilities that can host multiple third-party applications, such as video surveillance, vehicle condition monitoring, passenger counting and passenger information and entertainment systems, reduces the amount of equipment installed on the vehicle lowering initial infrastructure investments and ongoing operational and maintenance costs.

While being a sizable investment for any agency, choosing the right solution can deliver great returns.

The ability to manage and monitor the network with integrated management tools in real-time with 24/7 support allows for maximum network performance and uptime of real-time applications. Monitoring communication network coverage, signal strength and vehicle location in real-time, identifying and repairing inoperable components and controlling data limits and usage maximizes performance and helps control costs. Real-time reporting and analytics tools give managers better insights into their systems to make operational decisions faster, based on actual conditions.

The solution's data protection and information security capabilities and adherence to industry standards, such as ISO 27001 and GDPR, should be considered as well in order to protect agencies and riders. Integration with public safety networks and the addition of applications such as real-time video surveillance can also increase passenger safety and reduce liability and risk to the agency. The management tools should also proactively monitor network traffic for suspicious activity and help agencies identify and respond to cyber threats.

A high-bandwidth connection for riders not only allows passengers to be connected and productive on their journeys, it also provides an opportunity for agencies to connect with their passenger community with customized portals for Wi-Fi access, real-time passenger and ticketing information, onboard entertainment, retail and advertising applications, including location-based advertising based on route information and vehicle location. It also allows agencies to increase brand awareness and collect valuable ridership information that can be used for marketing and outreach purposes and data mining.

Investing in the right onboard connectivity solution can provide excellent returns. Agencies can optimize vehicle and fleet operations to reduce costs, improve the passenger experience to increase ridership and revenues and offer additional monetization opportunities for agencies. MT

Coming in the July/August Issue:
Best Practices for Mobile Payment

Has your agency innovated with mobile payment options? Contact our editor to share your story: mwanek@masstransitmag.com.

In Focus: Rail Vehicles & Components

View more of the latest rail vehicles and rail component products at MassTransitmag.com/rail

Plasser American Corporation Metro 4X4 tamper

The Plasser Metro 4X4 is a heavy-duty, high-performance switch and production tamping machine with fully automatic track lifting, lining and cross-leveling capabilities. It is specially designed for the stringent requirements of high-density transit and commuter lines. Plasser's PLC system is standard and touch screen monitors allow quick access to all machine functions and an integrated diagnostic system assists the operator with trouble shooting.

plasseramerican.com

Brookville Equipment Corporation Liberty™ Streetcar

Designed and manufactured in the USA, the Liberty Streetcar is a modern articulated streetcar with optional onboard energy storage system for extended off-wire operation. Following its 2015 debut in Dallas, the Liberty Streetcar has since been the modern streetcar vehicle of choice for systems in Detroit, Oklahoma City and Milwaukee. The next evolution of the Liberty Streetcar, the Liberty NXT, is currently under development and will operate in Tempe, Tacoma and Portland.

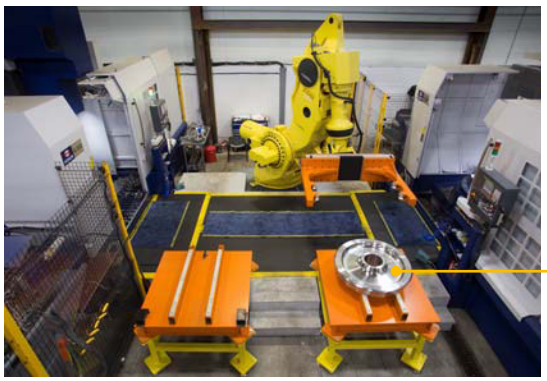
brookvillecorp.com/mass-transit.asp

MAC Products Snow-melter

MAC Products' Snow-melter is part of the Metro-North Railroad snow-melter system. The input traction power is fed through a primary or alternate 750VDC source. The output is designed to supply traction power to 12 branch snow-melter circuits and can be operated by a remotely-connected contact. In the event of control voltage failure, traction power can be redirected manually by an operator.

Equipment features include LED beacon light, door interlock, interior lighting, and interior heating. In addition, there are a series of mechanical and electrical interlocks within the circuit that allows only one power source to be connected at a time.

macproducts.net



Penn Machine Solid Wheels

Penn Machine solid wheels, made of forged steel, come in "S" Plate, Straight Plate, Stress Balanced, Tangential-Corrugated, Vibration-Optimized and Single or Multiple Wear models. The lighter-weight wheels meet the highest AAR and APTA standards, and can be customized to OEM and aftermarket applications. The wheels also accept noise dampers, substantially reducing noise and vibration. The company's two 1200mm Honor Seiki vertical turning centers in its Blairsville, Penn., facility produce wheels up to 44 inches in diameter, meeting the tightest tolerances, and a Fanuc robot assists with handling.

pennmach.com

For more information, visit www.MassTransitmag.com/10347269

PRODUCTS

RPM Tech Inc. AF1 Hi-Rail Cold Air Blower

The AF1 Hi-Rail cold air blower will clear rapidly and safely accumulating snow and ice from switches, tracks and third rails. Its adjustable nozzle allows the operator to control and direct the desired airflow to ensure precise and efficient cleaning of targeted areas.

grouperpmtech.com/en/rail-and-metro-equipment.aspx

Alstom Coradia iLint

Coradia iLint is a new CO2-emission-free regional train and alternative to diesel power. It is powered by a hydrogen fuel cell, its only emission being steam and condensed water while operating with a low level of noise. Alstom is among the first railway manufacturers in the world to develop a passenger train based on such a technology. Alstom and its partners offer a single supply source for the train, its maintenance and the required hydrogen infrastructure.

alstom.com

Miller Ingenuity ZoneGuard

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Brian M Litchfield
@CHTDirector

Finally a socially media survey that's useful. I got a combo of walking and taking the train. Everyone's Personality Matches Two Types Of Transportation — What's Yours? https://www.buzzfeed.com/apta/everyone-is-two-types-of-transportation #GetOnBoard

Christian Motley
@christianjalil

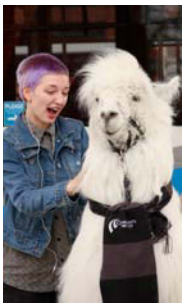
...Oh, me? I just started my day with a pretty chill ride thanks to my friends at @Lextran. Today communities all over the country are celebrating the service that #publictransit provides to residents. Headed to work? Meeting friends later? #GetonBoard.

National Get On Board Day Recap

Cherriots
@Cherriots

▶ It was the best #GetOnBoard Day ever! Thanks to everyone who came out to support transit and get a llama hug from @CaesarTheLlama. It was great to see so many smiles at the Downtown Transit Center...

PHOTO OP



THE VIEW

JON BELL
What a great day celebrating the connections we all make when we choose to ride transit. #getonboard #portland #transit

GRANT O'CONNELL
It was fun to join with others for #GetOnBoard Day to raise awareness about the need for investment in transportation infrastructure.

PERSPECTIVE

Brittany Schlacter
@BreenySchlacter

▶ Today was a good reminder of why I love my job. Access to high quality, well-funded and supported #publictransit doesn't just change lives, it changes communities. #GetOnBoard #RideTheRapid

Have something we shouldn't miss? Tag us or email us at editors@masstransitmag.com.

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Create for the future

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