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MASS TRANSIT

BEST PRACTICES FOR INTEGRATED MOBILITY

Trip Down Memory Lane

To celebrate Mass Transit's 50th anniversary, the *Mass Transit* editorial team has put together a list of the top moments in the industry during the past five decades. PAGE 30

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Guest Opinion

From Data to Trust: Keolis' People-centered Approach to Operational Excellence

Transit systems operate for millions of passengers every day not just because of the physical systems in place, but because of the people who drive service forward and maintain those operations daily.

By Brad Thomas, Contributor

IN THE TRANSIT INDUSTRY, we often view operational excellence through the lens of efficiency, data and metrics. It doesn't stop there, though—true operational success hinges on a people-centered approach to leadership. Transit systems operate for millions of passengers every day not just because of the physical systems in place, but because of the people who drive service forward and maintain those operations daily.

Keolis operator Steven Polite conducts a pre-trip inspection at the OCTA yard in Anaheim, Calif. Photo: Keolis North America

That's why at Keolis, we focus on enhancing service delivery by improving the management and treatment of our employees. Our people-centered approach has transformed the way we manage operations for our partners, ultimately leading to better service delivery, more robust employee engagement and an improved experience for both our passengers and our clients.

Our philosophy as an organization is that employees who are valued and seen will perform at their best. We take an individualized management approach, ensuring our operators know that their work is valued and appreciated. By engaging with employees on the frontlines and providing feedback via a personalized scorecard, our managers can acknowledge and celebrate their employees' achievements while continuously encouraging them to reach even higher standards.

We also regularly host employee engagement events to establish relationships and build trust. This style of leadership cultivates noticeable improvements in employee engagement and morale. In our most recent annual employee engagement survey, 52 percent of approximately 4,000 Keolis transit employees participated, the highest engagement rate of all North American business divisions. One transit contract even had a participation rate of 95 percent.

Beyond employee engagement, we can only achieve operational excellence with trust. Trust isn't just a buzzword; it's built through consistent, honest communication and a commitment to following through on promises. By delivering on our promises, we build trust and reduce anxiety, allowing employees to focus on their work with confidence. In doing so, we're also contributing to improving metrics like attendance rates, accident rates and customer complaints.

For example, in Pomona, Calif., where Keolis is an operating partner with Foothill Transit, there are 33 passenger complaints for every 100,000 boardings and on-time performance has improved 10 percent since 2017.

Another crucial aspect of Keolis' people-centered approach is ensuring every employee understands their role and is held accountable. At Keolis, we have a management framework that supports this understanding. As part of this approach and our commitment to service-leadership, managers are expected to support their teams' ability to answer four questions:

- Where are we going?
- What is my role?
- How am I performing?
- What is my future?

This clarity reduces anxiety and fosters a sense of purpose. When employees know exactly what is expected of them and how their performance is being measured, they can confidently focus on fulfilling their obligations.

At Keolis, we've seen firsthand how a people-centered approach can drive operational excellence. By valuing our employees, fostering trust, encouraging collaboration and harnessing the power of data, we've created an environment where our people and operations can thrive.

This approach makes a better experience for our passengers, clients and workforce. As we continue to refine and expand these strategies, we're confident that we're building a sustainable model for success in the transit industry and establishing Keolis as a best-in-class operator and employer of choice.

About the author

Brad Thomas is president and COO of Keolis North America's U.S. Transit business.

People & Places

Caltrain debuted its electric fleet on Aug. 10 by hosting a VIP tour where participants boarded the trains for its historic inaugural service.
Photo: Caltrain

Caltrain debuts electric train service with VIP tour

Caltrain debuted its electric fleet on Aug. 10 by hosting a VIP tour where participants boarded the trains for its historic inaugural service. The event included a 30-minute round-trip experience, starting in San Francisco, Calif., with the opportunity to engage with federal, state, local elected officials, as well as transportation, business, labor and community leaders. The electric trains ran their first regular service on Aug 11. The new high-performance electric trains offer a better experience for Caltrain riders while providing faster and more frequent service.
MassTransitmag.com/55132336

A rendering of the CTA RLE.
Photo: CTA

CTA selects Walsh-VINCI Transit Community Partners to design and build Red Line Extension

▸The Chicago Transit Authority (CTA) has selected Walsh-VINCI Transit Community Partners to design and build the 5.6-mile extension of the Red Line Extension (RLE) Project from 95th St. to 130th St., including four new Red Line stations. The Chicago Transit Board approved the award of a $2.9 billion contract to Walsh-VINCI Transit Community Partners following a comprehensive, two-year procurement process. RLE is the largest project in CTA history and will provide faster connections from the far south side to the rest of the city of Chicago, Ill., while serving as an economic catalyst to one of the most disinvested parts of Chicago.
MassTransitmag.com/55133339

TriMet's BEBs begin service throughout Portland, Ore.

▸TriMet's new battery-electric buses (BEB) have begun providing services to residents throughout Portland, Ore. The agency notes 24 next-generation BEBs are entering service with TriMet this year. The first BEB began welcoming riders aboard Line 9-Powell in July, offering a smooth, quiet and comfortable ride between downtown Portland and the Gresham Central Transit Center. TriMet purchased the BEBs from GILLIG, a bus manufacturer headquartered in Livermore, Calif. GILLIG built the buses at its manufacturing facility in the San Francisco Bay Area and drove them about 650 miles up Interstate 5 to Portland earlier this year.
MassTransitmag.com/55135014

PSTA breaks ground on new SunRunner station near St. Pete Pier

▸The Pinellas Suncoast Transit

PSTA breaks ground on new SunRunner station near St. Pete Pier.
Photo: PSTA

Authority (PSTA) broke ground on a new SunRunner station near St. Pete Pier in St. Petersburg, Fla., on Aug. 16. The new station will give residents and visitors closer access to the St. Pete Pier, Beach Drive, the Cross Bay Ferry and the array of restaurants, businesses and hotels along the downtown St. Petersburg waterfront. The SunRunner launched in October 2022 and surpassed 1 million riders within its first year and remains one of PSTA's top-performing fixed routes.
MassTransitmag.com/55134011

HART awards CCGS contract for Honolulu rail transit project to Tutor Perini Corporation

▸The Honolulu Authority for Rapid Transportation (HART) has awarded the City Center Guideway and Stations (CCGS) contract for the next segment of the Honolulu rail transit project to Tutor Perini Corporation at a contract price of approximately $1.66 billion. The CCGS contract will include the design and construction of six rail stations and approximately three miles of elevated rail guideway. Project design will begin immediately after contract execution while the start of construction is estimated in the second half of 2025. Construction of this segment will be completed in 2030.
MassTransitmag.com/55134007

The VPRA Board advanced an agreement with Norfolk Southern Corporation to purchase the Manassas Line and gain access to the N-Line.
Photo: VPRA

VPRA Board advances agreement with Norfolk Southern Corporation to purchase Manassas Line, gain access to N-Line

▸The Virginia Passenger Rail Authority's (VPRA) Board of Directors voted to advance a new agreement with Norfolk Southern Corporation to purchase the Manassas Line and gain access to Norfolk Southern's main line (N-Line), which will increase passenger rail options for thousands of Virginians. Through the new agreement, VPRA will have the ability to extend its state-supported Amtrak Virginia service to the New River Valley sooner and at a lower cost than originally planned. In addition, the purchase of the Manassas Line will enable VPRA to increase the Virginia Railway Express' Manassas Line service in the future with additional frequencies, including evening and weekend options.
MassTransitmag.com/55136283

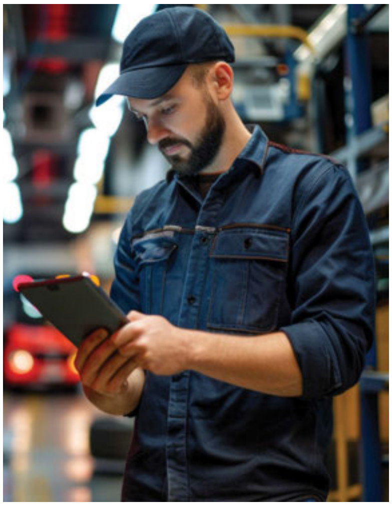
MDOT, Montgomery County Department of Transportation, WMATA to extend bus lane pilot through 2024

▸The Maryland Department of Transportation, the Montgomery County Department of Transportation and the Washington Metropolitan Area Transit Authority (WMATA) has agreed to extend its pilot agreement that allows almost seven miles of bus-only lanes on state roads within Montgomery County, Md., through at least December. The bus-only lanes along Georgia Avenue and Colesville Road were installed this summer to help move shuttle bus customers along faster during the Red Line construction work. WMATA closed a section of the Red Line to allow construction crews to build connections with the Maryland Transit Administration's Purple Line light-rail project.
MassTransitmag.com/55135592

A WMATA Metrobus.
Photo: WMATA

Maximizing Efficiency: The Power of Integrating CAD/AVL With Transit Asset Management

In today's fast-paced transit environment, effective asset management is critical to maintaining the reliability and safety of public transportation systems. With the complexity of managing a diverse range of assets—from rolling stock to fixed infrastructure—transit agencies need robust tools to streamline operations, reduce costs and ensure timely maintenance.



What role does preventative maintenance play in fleet management?
Preventative maintenance is crucial for keeping transit vehicles in a state of good repair and ensuring the safety and reliability of services. The software allows agencies to set up maintenance cycles, determine inspection frequencies and define minimum servicing requirements. By adhering to a preventative maintenance schedule, agencies can reduce errors, increase operational efficiency and extend the lifespan of their assets. The system also tracks vehicle history, providing insights into costs per mile, miles between failures and overall vehicle health.

How does the myAvail Transit Assets suite leverage data-driven reports and advanced business intelligence to enhance decision-making for transit agencies?
The myAvail Transit Assets suite offers robust data-driven reporting capabilities through its comprehensive maintenance dashboard. It consolidates data across the entire agency into an intuitive visual platform, enabling transit agencies to make informed decisions with confidence. The dashboard provides critical metrics such as the cost of planned versus unplanned maintenance, road call expenses and upcoming scheduled maintenance. Users can define key performance indicators, set specific targets and drill down into detailed analyses to gain a clearer understanding of current performance. This powerful tool also supports self-service reporting, trend exploration and other essential metrics, empowering agencies to optimize operations and enhance overall efficiency.

How does myAvail ETMS streamline work order requests and ensure efficient maintenance management across the organization?
myAvail ETMS simplifies work order management by allowing requests to be initiated from any point within the organization. Whether it's an operator identifying a failure during a pre-trip inspection or a customer service representative reporting an issue like a leaking sink at a transit center, the system seamlessly routes these requests into the maintenance management system.

Each request is prioritized, assigned and tracked until completion, ensuring timely repairs and reducing downtime. The system's integration with inventory, vehicle maintenance and general ledger modules further enhances efficiency by automatically updating inventory levels, calculating costs and generating necessary transactions. Additionally, work orders are equipped with barcodes for quick scanning, enabling real-time updates and accurate record-keeping. This comprehensive approach ensures that all maintenance activities are efficiently managed and documented, leading to a well-maintained fleet and facilities.

What is the unique advantage for an agency to have the combined functionality of a CAD/AVL and myAvail Transit Assets system?
The integration of a CAD/AVL system with myAvail Transit Assets offers a unique advantage by creating a seamless connection between real-time vehicle operations and asset management. This combined functionality allows agencies to automatically identify and track equipment deployed on buses, ensuring that maintenance needs are promptly addressed based on real-time data.

For example, when a vehicle experiences an issue, the CAD/AVL system immediately communicates this to the myAvail Transit Assets system, which can then generate a work order, check for active warranties and update the vehicle's maintenance history—all in one streamlined process. This integration not only enhances operational efficiency, but also ensures that agencies maintain a state of good repair, reduce downtime and optimize the lifespan of their assets. By bringing together operational data and asset management, agencies gain a powerful tool for making informed decisions, improving service reliability and ultimately delivering better transit experiences to their communities.

About the author

David Mugica is the director of business development at Avail Technologies, Inc.

PEOPLE IN THE NEWS

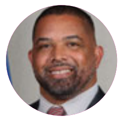
C-TRAN

Afthab Zainudeen was named C-TRAN's chief information officer. Zainudeen most recently served at TriMet in Portland, Ore., as manager of intelligent transportation systems. In his new role at C-TRAN, he will oversee the agency's information technology team, as well as various projects and the many technology components and systems used in day-to-day operations. Zainudeen brings more than 25 years of Intelligent Transportation System experience and operational knowledge.
MassTransitmag.com/55132636

California High-Speed Rail Authority (CHSRA)

The CHSRA Board of Directors has appointed **Ian Choudri** as the agency's next CEO. Choudri currently works as senior vice president for HNTB Corporation and brings more than 30 years' experience in the transportation sector, including working on high-speed rail projects in France and Spain. In his previous position at HNTB, Choudri worked with federal and state level partners on a variety of transportation and infrastructure issues. Coming into CHSRA, Choudri will focus his efforts on launching the agency's first 220-mph electrified rail system project as it moves closer to operations.
MassTransitmag.com/55132037

Metropolitan Atlanta Rapid Transit Authority (MARTA)



MARTA has brought on attorney **Steven Parker** as its new assistant general manager of external affairs. Parker will be responsible for directing and overseeing federal, state and local government affairs, community engagement, marketing, sales and communications. In this role, Parker will help develop and implement initiatives that strengthen the MARTA brand through marketing and communications campaigns, strategic partnerships and consistent community engagement. Parker was the chief innovation officer for the Transportation Security Administration.
MassTransitmag.com/55131411

Eno Center for Transportation

Patrick McKenna has been appointed president and CEO of the Eno Center for Transportation. McKenna, who is succeeding Robert Puentes, will assume his new role on Oct. 7, 2024. He currently serves as the director of the Missouri Department of Transportation. McKenna also served as the deputy commissioner for the New Hampshire Department of Transportation and chief financial officer at the United States Senate, Office of the Secretary. He currently serves as the National Safety Committee chair.
MassTransitmag.com/55133132

INIT Inc.

INIT Inc. President and CEO **Roland Staib** will be taking on a new role as chair of the board of INIT Innovations in Transportation Inc., effective Jan. 1st, 2025. He has served as a leader in the North American market for more than 20 years. By the end of the year, Staib will pass the baton to his successors. Carl Commons, currently chief sales officer, will assume the role of CEO, and Andy Singh, current COO, will become president.
MassTransitmag.com/55132080

Building a Transformational Safety Culture in Transit

Transit agencies face tremendous pressure. The workforce and leadership must balance politics, customer experience, fare policy, aging infrastructure, financial constraints and public safety concerns on a rolling and real-time basis. Transit has rapidly evolved during the past 25 years and many continue to build their transit programs and modernize on the backbone of a reality that no longer exists.

The Wathen Group works with agencies across the country and the globe and many team members have led transit agencies. We are increasingly witnessing how these challenges compound into safety concerns and have identified universal best practices we hope others can use as they rise to meet this moment.

What creates a robust safety culture?
The quality of an organization's safety culture is only as good as its relationship with its workforce. Rank-and-file workers have unparalleled insight into operational challenges and many possess the institutional knowledge of what works, what doesn't and how to reach a specific outcome. When we leverage employee feedback to identify critical issues and support strategy development, we have seen improvements in operating performance, reductions in employee injuries, increased attendance and customer and employee satisfaction.

When should agencies ask for help with their safety culture?
We often work with agencies after a significant incident but a more proactive approach can avoid those incidents entirely. The best way to fight a fire is to prevent it from happening. Transit agencies should audit their safety-related operations biennially and during leadership transitions. The assessment should not be limited to one discreet area, but conducted holistically across all verticals.

Why are some agencies unsuccessful in addressing their safety culture?
Public transit is notoriously hierarchical in structure and processes and agencies often address a discrete issue at a micro level. A safety culture cannot exist in a vacuum and must be consistent and pervasive across all departments. Agencies must shift to a holistic and consumer-driven model that centers its workforce on its mission to deliver strong operating and safety performance instead of playing "whack-a-mole" - hammering at the day's issue instead of engaging in the systemic analysis and the shifts needed. Both top-down and bottom-up participation are critical to facilitating ongoing feedback, clarifying responsibilities and ensuring accountability.

What is the "secret sauce" for The Wathen Group's approach to safety culture?
First, we help agency leadership initiate a comprehensive review process by opening themselves to feedback and supporting changes that increase transparency. This sometimes means leaning into uncomfortable dynamics, being open and vulnerable and creating a safe place for workers to share their lived experiences. The work is hard but it is vital to positive outcomes.

Often, we find agencies trying to do this work themselves while simultaneously delivering service. Without a third-party partner helping an organization look in the mirror, pull things out and reflect, it can be overwhelming.

Once leadership sets the table for the review, a robust employee engagement process must underpin the assessment and implementation phases. This process must widely disseminate the findings and allow for ongoing responses to make improvements. The implementation program must clarify responsibilities and accountabilities for delivery with feedback.

Beyond just operational safety, what does a strong safety culture provide?
A strong safety culture creates an environment that prioritizes both psychological and physical safety and security. This fosters an engaged and committed workforce and leads to better on-time performance, happier passengers and increased profitability.

A strong safety culture also takes basic practices such as gap analyses, safety management systems and safety committees to the next level. It embeds safety into every aspect of operations and strengthens teamwork. Employees, leadership, union members and customers share the common goal of getting home safely. A safety culture embodies this powerful shared vision to drive the entire organization.

About the author

Deborah Wathen Finn is president of The Wathen Group.

British Columbia awards all three contracts for Surrey Langley SkyTrain project

A rendering of the Surrey Langley SkyTrain project.
Photo: Government of British Columbia

▸The government of British Columbia has awarded three contracts for the Surrey Langley SkyTrain project. The project, which is expected to begin construction in 2024, is a nearly 10-mile extension of the SkyTrain Expo Line that will be the first rapid transit expansion south of the Fraser River in 30 years. The project will operate along an elevated guideway and include eight stations and three transit exchanges. Once complete, residents in the region will be able to travel between Langley City and Surrey Center in approximately 22 minutes and between Langley and downtown Vancouver, B.C., in just more than an hour.
MassTransitmag.com/55134291

A rendering of the VIA Rapid Silver Line.
Photo: VIA Metropolitan Transit

VIA Metropolitan Transit Board secures $102 million from Advanced Transportation District for VIA Rapid Silver Line

▸The VIA Metropolitan Transit Board of Trustees for the Advanced Transportation District (ATD) approved an agreement with Bexar County on Aug. 27 that secures $102 million from ATD revenues to fulfill the agency's local funding obligation for the VIA Rapid Silver Line, a move that now allows the agency to proceed in seeking a 50 percent match in federal funding for the $289.2 million project. The Silver Line is the second planned Advanced Rapid Transit corridor in the region and will connect the area near Our Lady of the Lake University on the west side to the Frost Bank Center on the east side, passing through downtown.
MassTransitmag.com/55136571

Hybrid buses enter service in Phoenix, Ariz.
Photo: City of Phoenix

Hybrid buses enter service in Phoenix, Ariz.

▸The Phoenix Public Transit Department has seen its first group of hybrid buses pass all tests and are now running on Phoenix, Ariz., roads. The initiative is part of the agency's work towards its zero-emissions bus fleet goal by 2040. The buses use a combination of a hybrid-electric motor and batteries and a biodiesel-fueled engine.
MassTransitmag.com/55133084

MORE NEWS AT A GLANCE

▶ The Los Angeles International Airport has received the final four Automated People Mover (APM) train cars, bringing the total number on site to 44.
MassTransitmag.com/55135712

▶ Core Transit has entered into a new contract with Complete Coach Works to lease three 2010 40-foot Gillig hybrid buses.
MassTransitmag.com/55133406

▶ King County Metro has entered a five-year partnership with INIT to provide an advanced vehicle health monitoring system and smart charge management system from CarMedialab, a member of the INIT Group.
MassTransitmag.com/55132648

▶ Sepulveda Transit Corridor Partners have partnered with Stadler Rail Cars and Siemens Mobility to provide essential infrastructure components for its transit development options to ease congestion through the I-405/Sepulveda corridor between Los Angeles, Calif.,'s San Fernando Valley and Westside.
MassTransitmag.com/55131732

▶ The Gateway Development Commission Board of Commissioners took action on two contracts that will advance the Hudson River Tunnel Project.
MassTransitmag.com/55130445

▶ The Port Authority of New York and New Jersey has selected Stantec to lead preliminary and final design work for the maintenance and control facility as a part of the planned AirTrain Newark replacement project.
MassTransitmag.com/55130221

▶ Valley Metro has contracted STV to support the seating and conceptual design of a new West Valley Bus and Paratransit Operations and Maintenance Facility.
MassTransitmag.com/55130201

Guest Opinion

Optimizing Transit Fleet Electrification With Advanced Battery Management

Managing the lifecycle of EV batteries is essential for maximizing the return on investment and operational efficiency.

By Steven Meersman, Contributor

An electric bus being charged.
Photo: Zenobē

ELECTRIFYING TRANSIT FLEETS is a pivotal step toward sustainable transportation. However, managing the lifecycle of electric vehicle (EV) batteries is essential for maximizing the return on investment and operational efficiency.

Importance of battery management

Battery management is critical for the success of transit fleet electrification projects. Proper management not only ensures reliable battery performance, but also maximizes battery life and enhances residual value, reducing the total cost of ownership of an electric fleet. Given that batteries represent a substantial portion of the investment in EVs—accounting for 40 to 50 percent of the purchase price—effective battery management is crucial. For example, an electric bus can cost around $400,000 upfront.

Understanding battery degradation

Battery degradation is an inevitable process where the battery's energy storage capacity diminishes over time. Key concepts include the State of Health (SOH), which measures a battery's capacity compared to its original state, and the "knee point," the stage at which battery degradation accelerates rapidly. This typically occurs around 70 percent SOH, signaling the need for replacement. Good battery management practices are essential to delay reaching the knee point, ensuring reliable performance and extending the battery's life.

Benefits of second-life batteries

Batteries still have significant utility after their primary life in EVs. Second-life batteries extend the usable life of EV batteries, offering lower-cost, lower-carbon energy solutions. These applications include portable power sources, on-site renewable energy storage and temporary power solutions for construction or events. What's more, repurposing retired EV batteries for these purposes contributes to a circular economy, reduces environmental impact and can drive lower first-life costs thanks to the residual value that can be assigned.

Battery-as-a-Service: A game-changer

The Battery-as-a-Service model offers numerous advantages:

- **Cost reduction:** Lower upfront costs and predictable monthly fees.
- **Risk mitigation:** The model handles battery performance, degradation, replacement and recycling.
- **Operational efficiency:** Transit fleet operators can focus on their core missions without worrying about battery management complexities.

Practical tips for transit fleet operators

Transit fleet operators can adopt various strategies to optimize battery performance and lifespan. Route allocation is crucial; varying of routes ensures even battery degradation, considered scheduling can avoid frequent ultra-fast charging. Maintaining batteries within a 10 to 90 percent state of charge can minimize degradation and training drivers to adopt efficient driving styles can further reduce energy consumption and battery wear.

End-to-end electrification

Battery management strategies have been successfully implemented in various projects in the U.S. and abroad. Several transit operators have considered end-to-end solutions that include financing of vehicles and chargers but those with a longer-term mindset are also considering the financing and management of batteries. From the funding of the batteries, to software to manage them and how they 're used in second-life applications – the practical benefits of battery management cannot be underestimated.

Conclusion

By adopting a comprehensive Battery-as-a-Service model and embracing second-life battery applications, transit fleet operators can ensure their EV batteries deliver optimal performance throughout their lifecycle.

About the author

Steven Meersman is one of the founding directors of Zenobē. He leads the electric vehicle team. In addition, he's responsible for the Delivery, Operations and Product teams.

Hydrogen Vehicle Testing at Transportation Technology Center

TTC and ENSCO have deployed a hydrogen fueling operation and storage system.

BY RON LANG, PRZEMYSLAW RAKOCZY, CONTRIBUTORS

Reducing greenhouse gas emissions in transportation remains a critical challenge, as the sector accounted for approximately 29 percent of total U.S. emissions in 2022, according to the U.S. Environmental Protection Agency. While rail is already the smallest contributor within the transportation sector, responsible for just two percent of transportation emissions, there is still a strong commitment to further improving its environmental impact.

Despite the transportation industry's heavy reliance on petroleum fuels, ongoing advancements are being made to reduce emissions even further. To address this issue, the U.S. government has updated its climate goals to reduce greenhouse gas emissions by 50 to 52 percent below 2005 levels by 2030, with a vision for a net-zero economy by 2050.

Among the potential solutions, hydrogen fuel stands out, particularly for rail transportation. The U.S. National Blueprint for Transportation Decarbonization, released in January 2023 by key federal agencies, emphasizes hydrogen's strategic role, noting that it is well-suited for applications requiring long driving ranges, rapid fueling and the ability to handle large or heavy payloads.

This article will explore the advancements in hydrogen vehicle testing at the Transportation Technology Center (TTC), including the implementation of a fully operational hydrogen fueling capability and its impact on rail and other surface transportation modes.

Hydrogen: A clean and powerful alternative

Hydrogen is a vital alternative fuel for reducing emissions, particularly when used in fuel cells, which generate electricity without combustion. Vehicles powered by hydrogen fuel cells produce no greenhouse gas emissions. When hydrogen is produced using renewable energy sources like solar or wind (known as "green hydrogen"), emissions are minimized throughout the supply chain.

As an energy carrier, hydrogen has significant advantages. It is lightweight and possesses the highest specific energy (energy content per unit of mass) among common fuels. According to a U.S. Department of Energy fuel properties comparison, one pound of hydrogen contains the equivalent energy of 0.4 gallons (approximately 2.8 pounds) of diesel fuel. However, hydrogen's requirement for large volume, high-pressure or cryogenic storage tanks reduces its advantage for smaller vehicles. Yet, for larger and heavier machinery, such as railway vehicles, these specialized storage requirements are more manageable.

Hydrogen-powered rail: The ZEMU train by Stadler

Since 2018, hydrogen-powered trains have operated in Germany and have undergone trials in other European countries. In 2019, Stadler US Inc., a U.S. subsidiary of Swiss train manufacturer Stadler Rail, received a contract from the San Bernardino County Transportation Authority (SBCTA) to deliver the first hydrogen-powered train in the U.S. This train, known as the Zero Emission Multiple Unit (ZEMU), employs a combination of hydrogen fuel cells and batteries for propulsion. By combining hydrogen with oxygen in on-board fuel cells, the train generates electricity, emitting only purified water and heat. When using green hydrogen, the entire system can achieve zero carbon emissions.

A ZEMU train.
Photo: Transportation Technology Center

Photo:

The ZEMU train consists of two cars with a power module in between, housing the hydrogen tanks and fuel cells that supply electricity to the train's traction motors. The train can seat 108 passengers and has ample standing room, reaching speeds of up to 79 mph. It is expected to begin operation in 2024 as part of the Arrow service between San Bernardino and Redlands, Calif.

The Stadler ZEMU train completed its testing at the TTC in Pueblo, Colo., and has been delivered to SBCTA for final preparations before entering service. The tests that were conducted at the TTC were performed by Stadler's test engineers, with support from ENSCO TTC personnel.

The ZEMU testing program consisted of two phases. The first phase included static tests such as static lean tests, wheel load equalization and battery charging capacity evaluations. The second phase involved dynamic on-track tests required for train acceptance. These tests assessed acceleration, deceleration, maximum speed, brake performance, electromagnetic interference radiation, Positive Train Control, train radio communication, ride quality and other key performance metrics.

A ZEMU train.
Photo: Transportation Technology Center

The second phase also included tests specific to hydrogen propulsion, verifying vehicle range, fuel consumption, propulsion performance, refueling operations and zero-emissions.

Dynamic on-track tests of the ZEMU were conducted on TTC's Transit Test Track (TTT) and the Railroad Test Track (RTT). The TTT is a 9.1-mile loop simulating urban rail settings, including tight-turn curves, while the RTT is a 13.5-mile loop designed for a broad range of speeds up to 165 mph. These tracks offered flexibility in train movements, allowing Stadler and ENSCO test engineers to evaluate various operational scenarios, which included conducting an on-track endurance test that broke the Guinness World record for the longest distance ever traveled by a hydrogen fuel cell electric multiple unit train without refueling. On March 22, 2024, the ZEMU achieved an impressive distance of 1,742.025 miles, which is approximately the same distance from St. Louis, Mo., to the ZEMU's final delivery location at the SBCTA in California.

Hydrogen fueling and storage at TTC

To facilitate hydrogen vehicle testing, the TTC and ENSCO have deployed a hydrogen fueling operation and storage system. As the only testing site in North America with a fully operational hydrogen fueling station and a dedicated onsite HAZMAT and fire department, the TTC stands out as a unique hub for advanced hydrogen vehicle testing across various transportation modes, including rail, buses and trucks.

The TTC has plans for greater expansion of hydrogen fueling and storage to meet growing demand, which includes expanded storage and facilitating research and workforce development for emerging hydrogen technologies.

Ensuring hydrogen vehicle safety

An important aspect of the emerging hydrogen fuel in transit systems is ensuring crashworthiness, fire and tunnel safety of its vehicles. The TTC is uniquely situated to conduct these tests and aid in the successful and safe deployments of hydrogen powered vehicles. First are the TTC's dedicated fire department and onsite HAZMAT subject matter experts. Having these key personnel onsite enables all hydrogen vehicle testing to be conducted safely.

Next is the TTC's ability to conduct various crashworthiness testing, including train-to-train head-on collisions, grade crossing accidents both with a train striking a highway vehicle or a highway vehicle striking the side of a train. Additionally, the TTC can perform various bus crashworthiness scenarios, including various collision scenarios and rollover events. A key element of the TTC is performing these tests with hydrogen onboard the vehicles at the time of crash testing.

Testing how these vehicles endure a fire is also important, particularly in testing hydrogen-specific safety features, such as emergency venting systems. The TTC also has the Facility for Underground Rail Security and Safety Testing (FURSST), which is a 300-foot-long underground tunnel used for testing of vehicles' response to fire or blast scenarios.

Funded by the Transportation Security Administration for the Vehicle Blast Vulnerability research project, the tunnel was primarily built for confined space blast tests. However, the FURSST is also useful for hydrogen vehicle testing in understanding how a hydrogen released in a tunnel behaves and the effects of any resultant fire.

In addition to testing, workforce development of first responders is also key with ensuring hydrogen vehicle safety. The Ambipar Response Training Center (ARTC) located at the TTC provides hands-on, live-fire training for first responders. The ARTC's training includes

About the authors

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Ron Lang is program manager for ENSCO at the TTC in Pueblo, Colo.

how to properly respond to hydrogen vehicle incidents and understand the unique attributes of hydrogen firefighting.

Supporting safety, sustainability and security

The role of the TTC, as evident by the testing of the Stadler ZEMU, extends beyond the validation of trainsets' technical specifications. It represents a commitment to fostering innovation in passenger rail transportation, ensuring that new technologies are safe, reliable and aligned with future sustainability targets. ENSCO's operation of the TTC has injected fresh momentum into this endeavor, broadening the scope of transportation modalities that can be tested and thereby supporting the industry's evolving needs.

Moreover, the TTC's support for the hydrogen fuel initiative, through the establishment of a roadmap for fueling operations and future research, underscores its role as a leader in the adoption of green energy solutions in rail transportation. This aligns with the broader industry and governmental objectives to decrease dependency on petroleum fuels and mitigate environmental impacts.

In addition to safety and sustainability, the TTC has been actively expanding its mission to include all modes of surface transportation. The insights and infrastructure developed for hydrogen fuel testing at the TTC have broader applications beyond rail, offering valuable experiences for trucking and bus sectors as well. By leveraging the TTC's capabilities, the broader transportation industry can explore and develop hydrogen-based solutions across multiple modes, facilitating a transition to cleaner, more sustainable transportation systems.

Conclusion

The TTC stands at the forefront of technological advancement and sustainability in the transit industry. Through its comprehensive testing capabilities, the TTC is not only validating the operational readiness of innovative trainsets like the Stadler ZEMU, but is also playing a pivotal role in shaping the future of safe, secure and sustainable passenger rail and bus transportation. As the TTC continues to support and facilitate these advancements, it reaffirms its essential position within the industry, ensuring the safe, efficient and sustainable movement of passengers across North America's transit systems.

Innovative Student Design Shapes **Future of DART's Next Generation Bus Shelters**

Vanessa Lopez was one of 16 college students that worked on concept designs for the agency's new bus shelters, which were installed at five bus stop locations to kick off DART's new pilot program in July 2024.

BY MARIO ZAVALA JR., CONTRIBUTOR

Vanessa Lopez put a lot of thought into what she wanted to incorporate into a bus shelter design that would work for Dallas Area Rapid Transit (DART) riders now and into the future. DART and its partners, KAI Enterprises, HDR and Tolar Manufacturing Company, made Lopez's design into a working, functional bus shelter.

This may sound like an everyday process between a transit agency and its design and manufacturing partners but this story is different. Lopez was one of 16 college students that worked on concept designs for the project, working with DART to gather ideas and rider feedback to develop what would become the transit agency's Next Generation Bus Shelter.

DART partnered with the University of Texas at Arlington's (UTA) College of Architecture, Planning and Public Affairs and the American Institute of Architects (AIA) Dallas Chapter to sponsor a student-design collaboration for new bus shelters in fall 2022. Fast forward to the summer of 2024 and those concept designs have become reality, with DART installing three versions of the new bus shelter prototypes at five bus stop locations in its service area to kick-off its new pilot program.

A resident waiting at one of DART's Next Generation Bus Shelters.
Photo: DART

"We're looking to see how these shelters and all their new features are received by our riders," said Brandi Stringer, director of mobility capital projects for DART. "Our number one goal is to provide an amenity at our bus stops that riders love and adds to their experience when riding DART."

Residents waiting at a DART Next Generation Bus Shelter.
Photo: DART

Stringer and her team developed a survey to collect feedback from DART stakeholders, including riders, on the appearance, design, construction, technological enhancements and other features of the new shelters.

The 16 UTA students who participated in the concept design program provided insights by riding the system to determine perceived strengths and weaknesses, interviewing

Residents waiting at a DART Next Generation Bus Shelter.
Photo: DART

riders, visiting and analyzing spaces at key destinations and attending focus groups with key stakeholders. DART then partnered with Tolar Manufacturing Company and utilized the UTA student concepts to create a shelter based on feedback previously gathered from DART bus riders asking what they wanted and needed from a bus shelter.

Lopez and her fellow UTA classmates used those details and their own research to create a concept shelter that earned the Texas Student Honor Award from the American Society of Landscape Architects in 2023.

"The partnership with DART was an amazing experience for our students to test their design capabilities while learning to fit in the public's everyday needs in a bus shelter," said Julia Lindgren, assistant professor of architecture at UTA. "We were honored to have our students' work recognized and now, seeing some of those ideas and concepts incorporated into the prototype bus shelters DART is using to gauge public feedback, it's even more impressive. This is the type of real-world experience you want for your students as an instructor."

DART will determine if all three of the new bus shelter prototypes will fit its needs as is, if changes need to be made to the current prototypes or if it can simplify and use a two-model system. Feedback gathered in 2023 determined that riders wanted more protection from the elements, improved lighting for safety and visibility and real-time bus arrival information as top priorities for the new design.

The new shelters incorporate those priorities within the two larger models – standard-width and slim-width shelters – and feature Alucobond in the roof panels, designed to have cooling properties beyond that of standard aluminum, and perforated back and side panels to allow for improved air flow. They also feature built-in composite high-density polyethylene benches, solar-powered LED lighting with improved light levels and remote monitoring, allowing for quicker repairs and enhanced customer safety, electronic displays that share real-time bus arrival information and allows for the agency to push out urgent messaging, including major system-wide delays or weather-related incidents that impact service, a backlit system map display and slim perforated panel that provides increased visibility for bus operators, which should reduce pass-bys.

"The Tolar Manufacturing team appreciates the opportunity to collaborate with DART staff and UTA students and faculty to turn the Next Generation Bus Shelters from concept to reality. The results reflect the commitment of Vanessa and her fellow classmates to improving the public transportation experience led by DART for a better public transportation experience for all riders that starts at the bus stop," said Patrick Merrick, executive vice president at Tolar Manufacturing Company.

The mini shelter was designed for areas that don't have the space for a larger bus shelter or don't have a high-enough ridership to qualify for a larger shelter. These smaller units are open air with a raised base with seating for two, a large, slanted roof allowing standing riders coverage from the elements and solar powered LED illumination.

DART's pilot program will run through November 2024, allowing the agency ample time to gather feedback from its stakeholders and riders while checking the responsiveness of the shelters to north Texas weather and everyday use. A final next generation bus shelter design is expected by the end of the year, which will be used throughout the DART network.

"This is the type of collaboration we want as we begin the process of modernizing and transforming our system," said Dee Leggett, executive vice president and chief development officer for DART. "From concept design to prototype delivery, these new bus shelters show we considered the needs of our customer base and delivered while adding functional value to a space in each of the cities we serve."

DART Next Generation pilot bus shelter locations include:

- Mini Shelter at Ross Avenue and Hall Street in Dallas
- Standard Shelter at Malcolm X Boulevard and Clarence Street in Dallas
- Standard Shelter at Hedgcoxe and Preston roads in Plano
- Slim Shelter at Synergy Park Boulevard and Rutford Road in Richardson
- Slim Shelter at Northwest Highway and Marketplace Drive in Garland

With ample coverage from the elements, seating for riders, increased lighting and a digital passenger information display that provides real-time bus arrival information, the Next Generation DART Bus Shelters look to enhance the customer experience while modernizing bus service across its service area.

About the author

Mario Zavala Jr. is the project communications manager in the Development Department for Dallas Area Rapid Transit.

The first automated guideway transit agency is established at West Virginia University in Morgantown, W.Va.
Photo: FTA

50TH
1974–2024
ANNIVERSARY

The first portion in the Washington Metrorail system opens for service in Washington, D.C.
Photo: WMATA

MASS TRANSIT

The first wheelchair-lift-equipped fixed-route bus begins service in San Diego, Calif.
Photo: FTA

50 Years of *Mass Transit* Timeline

To celebrate *Mass Transit's* 50th anniversary, the *Mass Transit* editorial team has put together a list of the top moments in the industry during the past five decades.

BY MASS TRANSIT STAFF

The San Diego, Calif., Trolley is completed.
Photo: FTA

In June 1974, *Mass Transit Magazine* was founded by Charles Carroll Carter, who would pass away at age 92 on May 14, 2021.

As Carter made clear in his inaugural editorial, *Mass Transit* was created with one mission: To break new ground as the first international trade magazine with comprehensive editorial coverage of "all forms of public transit in cities" and to provide a much-needed "forum for effective communication between people in every phase of the transportation industry–including local, state and federal government officials, planners and developers, manufacturers and users–the transit riding public."

To celebrate the 50th anniversary of *Mass Transit*, the *Mass Transit* editorial team has put together a list of the top moments in the industry during the past five decades.

The premier issue of *Mass Transit* magazine cost $1.
Image: Mass Transit

1974 • The Urban Mass Transportation Administration (UMTA) Act was amended to provide federal funding for urban public transportation, helping develop and expand mass transit.

1974 • The last surviving street railway systems in the U.S. (Boston, Mass., Cleveland, Ohio, Newark, N.J., New Orleans, La., Philadelphia and Pittsburgh, Pa., and San Francisco, Calif.).

1974 • The remaining two stations of the north Yonge Subway extension, Sheppard Station and Finch Station, open in March in Toronto, Ontario.

1975 • The first automated guideway transit agency is established at West Virginia University in Morgantown, W.Va.

1976 • The first portion in the Washington Metrorail system opens for service in Washington, D.C.

1977 • The Clean Air Act Amendments of 1977 set new emission standards for vehicles and provided monetary incentives for transit agencies to adopt lower-emission vehicles.

1977 • The first wheelchair-lift-equipped fixed-route bus begins service in San Diego, Calif.

1978 • The Spadina Subway line opens in January in Toronto, Ontario

1980 • The San Diego, Calif., Trolley is completed.

1983 • The Surface Transportation Assistance Act, which established formulas to apportion funds for transit agencies, was signed into law on Jan. 6.

1985 • The Expo SkyTrain Line opens Dec. 11 in Vancouver, B.C.

1986 • TriMet opens the Banfield Light Rail in Portland, Ore.

1989 • The first new commuter rail transit agency in decades, the Tri-County Commuter Rail Authority in Miami, Fla., is built.

1990 • The first National Transit Summaries and Trends report, which provided an overview of the national public transit industry and highlighted financial, operational and time series data trends, was released.

TriMet opens the Banfield Light Rail in Portland, Ore.
Photo: TriMet

An 18-mile light rail extension opened from downtown Portland, Ore., through the western suburb of Beaverton to Hillsboro, serving the fast-growing high-tech corridor in Washington County.
Photo: TriMet

The opening of the 1.2-mile RiverPlace extension lengthened the Portland Streetcar line to six miles total, with 40 platform stops.
Photo: TriMet

More than 10 years in the making, TriMet's 14.7-mile Westside Express Service Commuter Rail line opens on Feb 2.
Photo: TriMet

The Scarborough RT line was renamed the Line 3 Scarborough as part of the new line numbering for all four TTC rapid transit lines.

Photo: TTC

TriMet opens the Portland-Milwaukie light-rail transit line on Sept. 12.

Photo: TriMet

1990 • The Toronto Transit Commission (TTC) opens the Harbourfront Light Rail Transit line in Toronto, Ontario.

1991 • The Intermodal Surface Transportation Efficiency Act, which encouraged a multi-modal use of transportation, promoted safety and environmental protections and gave local communities more control over how to use federal funds, was signed into law on Dec. 18.

1991 • The Federal Transit Act Amendments of 1991, from the Intermodal Transportation Efficiency Act, changed the name of UMTA to the Federal Transit Administration (FTA).

1991 • The Clean Air Act Amendments of 1990 established strict pollution controls for transportation buses.

1992 • The National Transit Institute was established under the Intermodal Surface Transportation Efficiency Act to develop and provide training programs to the nation's public transit industry.

The Evergreen Extension of the Millennium SkyTrain Line opens, adding six stations and connecting the cities of Coquitlam and Port Moody, B.C., to the network.

Photo: TransLink

The Infrastructure Investment and Jobs Act was signed into law on Nov. 15.

Photo: White House

1998 • The Transportation Equity Act for the 21st century was signed into law on June 9, expanding funds for transportation projects and restructuring federal public transportation programs, with a focus on improving equity and accessibility.

1998 • An 18-mile light-rail extension opened from downtown Portland, Ore., through the western suburb of Beaverton to Hillsboro, serving the fast-growing high-tech corridor in Washington County.

2002 • Monthly ridership and safety and security reporting requirements are initiated under the redesigned National Transit Database (NTD).

2002 • The Millennium SkyTrain Line opens in Vancouver, B.C., joining the Expo Line.

2005 • The opening of the 1.2-mile RiverPlace extension lengthened the Portland Streetcar line to six miles total, with 40 platform stops.

2009 • More than 10 years in the making, TriMet's 14.7-mile Westside Express Service Commuter Rail line opens on Feb 2.

2012 • The Moving Ahead for Progress in the 21st Century (MAP-21) Act was signed into law, providing funding stability, promoting performance-based planning, emphasizing maintenance of transit infrastructure and encouraging innovating and safety improvements for public transit agencies.

2014 • The Scarborough RT line was renamed the Line 3 Scarborough as part of the new line numbering for all four TTC rapid transit lines.

2015 • FTA updates the Safety & Security Module in the NTD Reporting Manual to better align NTD safety data collection with data collected in the State Safety Oversight program Rail Transit Event Database.

2015 • The Fixing America's Surface Transportation (FAST) Act was signed into law, providing long-term funding stability, enhancing safety measures, supporting innovation and streamlining regulatory processes for public transit agencies.

2015 • TriMet opens the Portland-Milwaukie light-rail transit line on Sept. 12.

2016 • FTA issued a final rule requiring transit agencies develop a Transit Asset Management (TAM) plan. The TAM plan is submitted alongside asset inventory module data to the NTD and it is used by agencies to monitor and manage their capital assets, achieve and maintain a state of good repair, increase system reliability and performance, reduce operation delays, promote resilience, reduce costs and yield system improvements.

2016 • FTA establishes the Low or No Emission Grant Program, as authorized by the FAST Act, with $55 million in funding for agencies to purchase low- or no-emission buses and related infrastructure, helping reduce greenhouse gas emissions and air pollution.

2016 • The Evergreen Extension of the Millennium SkyTrain Line opens, adding six stations and connecting the cities of Coquitlam and Port Moody, B.C., to the network.

2017 • FTA updated its guidance on reportable safety events to collect data for safety events that occur on transit infrastructure.

2020 • The Coronavirus Aid, Relief, and Economic Security Act was enacted on March 23, providing emergency funding to support public transit agencies during the COVID-19 pandemic, helping to maintain essential transit services, protect jobs and ensure the safety of passengers and workers.

2021 • The Infrastructure Investment and Jobs (IIJA) was signed into law on Nov. 15. It allocated significant funding to improve public transit infrastructure and services in the U.S., addressing State of Good Repair backlogs, expanding accessibility, enhancing sustainability and promoting innovation to modernize transit systems nationwide.

2022 • As a result of the IIJA, FTA began collecting additional data from reporters, including their geographic service area coverage through the General Transit Feed Specification, as well as the number of assaults on transit workers.

For more information, visit www.MassTransitmag.com/10065314

Bay Area Transit Agencies and the 'Big Sync'

Bay Area transit agencies are syncing their schedules to help promote faster boarding, quicker connections and an overall better rider experience.

BY EMAN ABU-KHALED, ASSOCIATE EDITOR

Bay Area transit agencies are working to improve and apply synced scheduling to align transfers and connections between systems for a better rider experience. The responsibility of keeping regional and local services running smoothly and on time falls upon Bay Area Transit schedulers, planners and general managers, who constantly work to establish regional and local schedules that adapt and accommodate current events and ridership needs.

Local transit reliability and stability was tested in the height of the COVID-19 pandemic, as Bay Area transit agencies saw their ridership levels drop. During this time, riders were asking the agencies to implement better transit schedules. Local transit providers like Santa Clara Valley Transportation Authority (VTA), Alameda-Contra Costa Transit District (AC Transit), Bay Area Rapid Transit (BART) and 24 other Bay Area transit agencies came together to officially discuss the need for one synchronized schedule that incorporated the needs of each agency and their ridership. The idea set forth a series of meetings and planned programs that have helped to introduce better scheduling methods, along with stronger communication between neighboring agencies in the area.

The Santa Clara VTA is one among the 27 Bay Area transit agencies syncing their schedules to help promote faster boarding, quicker connections and just an overall better rider experience.
Photo: Santa Clara Valley Transportation Authority

Trust the process

Planning out a synced transit schedule is a process in itself. A schedule change is planned months in advance through weekly meetings between agencies, commented Santa Clara VTA Service Planning and Scheduling Manager Jay Tyree. Planning for the most recent schedule change for Santa Clara VTA, which came out the week of Aug. 12, 2024, began in March of this year.


VALLEY TRANSPORTATION
AUTHORITY
MILPITA

"All the operators get in a room every time we talk about the schedule changes coming up and we discuss what can be moved, what issues we each have and we work through them," Tyree said.

This method of programming and scheduling for transit services has gained the interest of other agencies in the area. There has been a 250 percent increase in the number of transit agencies changing their schedule concurrently twice each year and six of seven major transit providers in the Bay Area are syncing their schedule changes at least once a year. Through this collaboration, neighboring regional service partnerships have been strengthened and agencies are taking a closer look at what can be improved or improvised within its system.

Santa Clara VTA

The Santa Clara VTA has altered its scheduling to match BART and Caltrain's schedule changes, which will work towards ensuring timed transfers are maintained at various locations across the South Bay and Peninsula.

The agency is working to address ridership needs by monitoring ridership levels at certain connection points within its system.

"Transit centers that connect with Caltrain or BART or our neighboring services like Sam Trans are monitored for ridership changes over time to see what routes connections are important at," Tyree noted.

As part of making changes to its ridership service experience, Santa Clara VTA is also working to improve its operator training methods. The agency is focusing efforts on stronger courses and lessons to increase its output of operators through its training sessions. The agency is seeing a full staff on bus operators but is in search of light- rail operators to help keep services running and on time.

The agency will begin surveying its ridership in September to gage ridership satisfaction with the new transit schedule in place. Any feedback will be used in future contributions to schedule change talks.

AC Transit

Another change that was implemented through the recent schedule sync included AC Transit and Golden Gate Transit's more coordinated and improved schedules at El Cerrito del Norte Station and along Cutting Boulevard west of the

BART station. The alignment will enhance reliability for riders traveling between Marin and West Contra Costa, Calif., counties via the Richmond-San Rafael Bridge. In this iteration, the two agencies focused on coordinating transfers for AC Transit's Line 76 and Golden Gate Transit's lines 580 and 580X.

The transfers would allow a rider traveling southbound on Line 76, looking to transfer westbound across the Richmond-San Rafael Bridge via Line 580X, to no longer have to face a near-miss for the transfer at key times.

"With the new coordinated schedules, the departures are now staggered, reducing the wait time for westbound riders to approximately 10 minutes instead of 15 minutes during most of the operating day," said AC Transit Media Affairs Manager Robert Lyles. "AC Transit aims to achieve even greater improvements for riders by the end of the year. Ultimately, this alignment improves reliability for riders traveling between Marin and West Contra Costa counties via the Richmond-San Rafael Bridge."

BART Fleet of the Future train.
Photo: Bay Area Rapid Transit

The new schedule changes to AC Transit have also helped to promote faster rider boarding on southbound Line 76 at Harbour Way and Cutting Boulevard, specifically during the morning peak. AC Transit reports that riders previously had to wait 27 minutes for the next westbound Line 580 or 55 minutes for the next westbound Line 580X. With the new coordinated schedules, the wait time has been reduced to seven minutes for the next westbound Line 580X. Similar wait time improvements are being realized for southbound Line 76 riders boarding at Harbour and Cutting.

In the afternoon peak, a southbound Line 76 rider boarding at 6:31 p.m., 7:30 p.m. or 8:27 p.m. at Harbour and Cutting previously faced near misses or missed connections to the westbound Line 580, with wait times of 53 to 57 minutes for the next westbound Line 580 if a connection was missed. With the new coordinated schedules, if the rider misses a transfer, the wait time is now significantly reduced to between 13 and 17 minutes.

BART

BART is also a major player in this program to sync transit service schedules. Being one of the bigger regional transit providers in the area, BART has always shared its schedules with neighboring agencies such as Caltrain and Santa Clara VTA. Its upcoming changes to some of its rail transfers at Millbrae Station will go into effect when Caltrain launches its electric service on Sept. 21. With BART's schedule change that went into effect on Aug. 12 and Caltrain's schedule change that begins on Sept. 21, approximately 85 percent of all weekday trains will have a transfer between five and 19 minutes at Millbrae Station. On the weekend, approximately 90 percent of trains will have a transfer between five and 19 minutes. BART notes that if trains were scheduled with less than a five-minute wait, delays would frequently break the transfer and result in a longer wait.

Schedule syncing isn't a new idea to the transit industry. It can be hard to step away from something that has worked in the past to accept something that could make things better. Participating transit agencies have embraced the idea of change to invite a bright and more efficient future for local transit.

Even after the most recent schedule change, Bay Area transit agencies are still coming across issues that challenge them to find efficient solutions to improve rider experience.

Some of the issues Bay Area transit agencies are still seeing include:

- A better transfer for one end of a route may create a worse transfer for other areas of the route.
- Adding service to allow frequencies to match each system requires new funding at a time transit agencies are facing significant budget challenges.
- Transfers between BART and Caltrain at Millbrae Station don't always line up perfectly because Caltrain has four trains per peak hour and two trains per off-peak hour/weekends. BART has three trains per hour at all times. Both systems are also limited in flexibility due to key system timing points elsewhere.

The 27 agencies are currently planning for the upcoming schedule changes in January 2025. The coordinated schedule changes will help to benefit current transit riders while attracting new riders. The ultimate goal is to increase ridership by making transit more attractive and easier to use through one "Big Sync".

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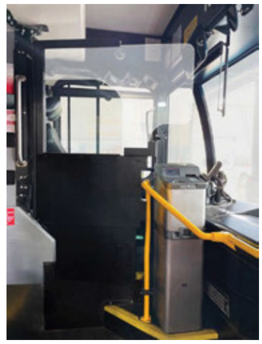

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3 Ways Unification and Digital Workflows can Break Down Silos

Choosing a unified system that links vehicles' onboard technology to land-side security systems allows fleet managers to break free of technological and organizational silos.

By Shawn Enides
Account executive,
Genetec Public Sector team

MASS TRANSIT AGENCIES are often saddled with legacy technology and various systems that serve different purposes. Retrieving and reviewing data and video can be a cumbersome process for fleet managers. Each system or tool provides a piece of the puzzle but seeing the complete picture requires tedious manual synchronization.

Choosing a unified system that links vehicles' onboard technology to land-side security systems allows fleet managers to break free of technological and organizational silos. They can streamline security, safety and operations.

Here are three of the many ways switching to a unified, open platform can benefit your mass transit organization:

> With a unified system, it's easier to retrieve the data you need and put that information to good use.
>
> **Shawn Enides**
> Genetec

1. Apply passenger counting and arrival time data to optimize route efficiency and rider satisfaction

With 99 percent accurate passenger counting technology available through modern security platforms, accurate passenger counting can happen daily, not just through periodic audits. This data isn't only useful for reporting, but also to help optimize route efficiency and ensure passenger safety. With a unified platform, you can also cross-reference ridership data with bus arrival times. This provides insights into reliability and route efficiency. Real-time data from buses can even be published to rider apps to keep transit users informed about delays or let them know if the next bus is full and when the following one will arrive.

2. Use digital workflows to improve passenger and driver safety

Nothing is more important than the safety of drivers and passengers. Most onboard emergency systems depend on the driver to call for help or press a panic button in the event of an emergency. However, modern security systems can include sensors or camera analytics that can detect potential issues. Triggers may include erratic driving, deviation from the route, gunshot detection, a fight breaking out or even distracted driving due to cell phone use. These triggers automatically notify operators, who may then view video footage to confirm the situation and respond quickly.

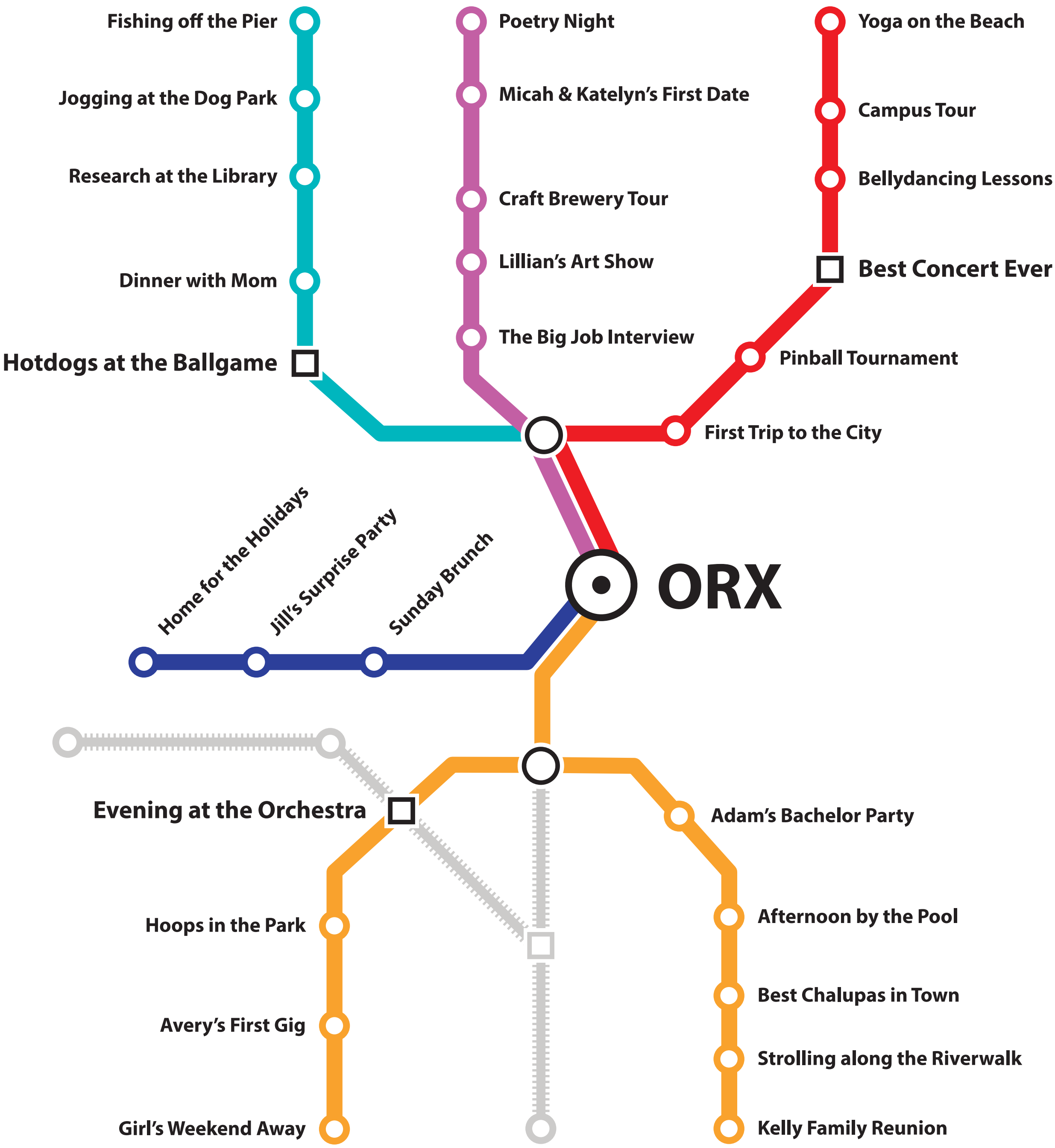
3. Share real-time security data with law enforcement to improve emergency response.

Proprietary, siloed systems introduce roadblocks to investigations. If you have different systems on different buses, you may spend valuable time figuring out which system to access to get the footage you need. It's also common for proprietary systems to use custom codecs that require special software to view the footage, creating potentially dangerous delays.

With a unified system, it's easier to retrieve the data you need and put that information to good use. If a potential onboard issue is detected, security teams can pull in additional data from land-side cameras and devices connected to the same system. Data can be quickly and securely shared with transit police, law enforcement, local sheriffs or other stakeholders. First responders have a better idea of what they'll find when they arrive so they can respond more effectively.

Power of unification for mass transit

When teams use the same system and follow the same protocols, it's easier to ensure key measures and efficiencies are in place. A unified system can help you connect your security and operational teams across different divisions through one single platform. The result is a better customer experience. Your riders get to their destinations safely and on time and your team works more efficiently and proactively.


Fishing off the Pier
Jogging at the Dog Park
Research at the Library
Dinner with Mom
Hotdogs at the Ballgame
Poetry Night
Micah & Katelyn's First Date
Craft Brewery Tour
Lillian's Art Show
The Big Job Interview
Yoga on the Beach
Campus Tour
Bellydancing Lessons
Best Concert Ever
Pinball Tournament
First Trip to the City
Home for the Holidays
Jill's Surprise Party
Sunday Brunch
ORX
Evening at the Orchestra
Adam's Bachelor Party
Hoops in the Park
Avery's First Gig
Girl's Weekend Away
Afternoon by the Pool
Best Chalupas in Town
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