

Technical Memo: Transit Adaptations and Innovations in Response to the Pandemic

PREPARED IN SUPPORT OF THE:

VIRGINIA TRANSIT CRISIS RESPONSE + RECOVERY HANDBOOK



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About this Memo

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The full handbook can be found at: TransitVA.org

This memo outlines case examples of agencies employing new or innovative practices or technologies to address the challenges and safety risks associated with the COVID-19 pandemic. These case examples are organized by the following topics: technologies and approaches for enhancing safety, contactless payment, and communications.

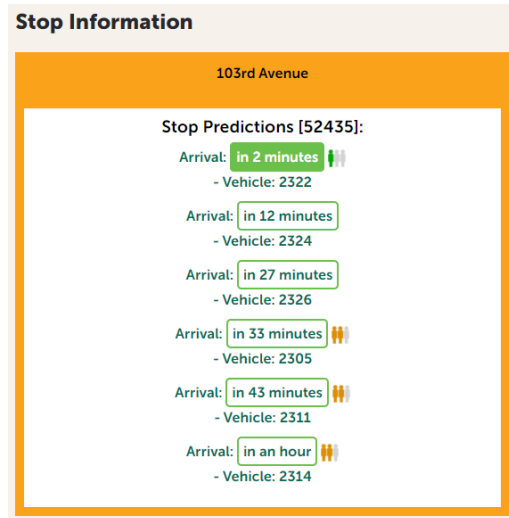
1 Technologies and Approaches to Enhance Safety

Agencies utilized existing technologies and found ways to improve upon existing technologies and systems. Additionally, they began piloting and deploying new methods to enhance operator and rider safety. These implementations had other positive effects, including boosting riders' perceptions of safety, and allowing agencies to begin safely reinstating fares. Some changes, like contactless payment systems and enhanced cleaning methods, may be permanent as opposed to short-term adjustments, such as the suspension of fares. This section highlights some common agency responses.

1.1 Real-time Crowding Information

Agencies leveraged data from automated passenger counters (APCs) to develop a picture of real-time crowding information. AC Transit in Oakland, California tested multiple methods to capture ridership data (manual passenger counts, video-based rider counts, and APCs) over the course of three months, but ultimately determined that APC data collection was the most reliable option. The agency used this data from a new service to automatically post crowding information, based on boardings and alightings, to the agency's website as shown in **Figure 1**. The real-time crowding information was also pushed to passengers via third-party apps such as Moovit and Transit.¹

Figure 1: AC Transit Real-time Information



1.2 Using Data to Predict Crowding

Another approach utilized historic data to predict crowding. Big Blue Bus in Santa Monica, California took this approach during a three-month pilot project.² Working with the app developer Transit, the agency provides recent ridership data at the stop level and Transit engineers calculate predicted crowding. The anticipated ridership levels for all routes are visible to passengers along with other real-time information in the Transit app. Riders are also able to report real-time levels through the app, which is then used to validate the predicted crowding data. Four out of five crowding predictions have been correct.³

1.3 Enhanced Cleaning and Sanitizing Methods

An [APTA white paper](#) provides an overview of cleaning and ventilation methods for rolling stock, incorporating information from other agencies such as the CDC and the Environmental Protection Agency (EPA).⁴ A distinction should be made between cleaning, which involves the initial removing of dirt and debris in vehicles and facilities, and sanitizing, which is conducted after initial cleaning has been completed with the aim of inactivating the virus.

1.3.1 Cleaning

Most agencies responded with enhanced cleaning procedures, often cleaning every bus at the end of every day. More intensive cleaning procedures require staff time and supplies, and sometimes resulted in buses being taken out of service. Green Bay Metro performed nightly cleaning of all 36 buses in its fleet, which removed them from service and disrupted operations for six hours each day.

¹ Mass Transit, [AC Transit Now Offering Real-Time Onboard Crowding Information](#).

² Mass Transit, [Big Blue Bus Pilots Predictive Crowding Levels for All Lines in Transit App](#).

³ Ibid.

⁴ APTA, [Cleaning and Disinfecting Transit Vehicles and Facilities During a Contagious Virus Pandemic](#).

1.3.2 Sanitizing

Agencies used foggers, misters, and sprayers to disinfect surfaces (**Figure 2**). CTAA [recommended](#) that agencies conduct disinfectant fogging on a regular basis; and for vehicles that transported COVID-19 positive patients, cleaning and disinfection should occur as soon as possible.⁵ Throughout the pandemic, several larger transit agencies tested the impact of using ultraviolet (UV) light to disinfect vehicles once they were cleaned. Although there are no published reports about the efficacy of this method, interim results from a study on surface disinfection indicated that “SARS-CoV-2 can be inactivated by UV-C light.”⁶ Some negative effects of UV technology include higher start-up costs than disinfectants, damage to materials such as plastic, as well as health risks associated with human exposure.⁷

Figure 2: Transit Agency Worker Sanitizing a Bus



1.4 Ventilation and Air Filters

Vehicle ventilation was another key area of focus for agencies as more became known about the pandemic and the CDC communicated that the virus was more likely to spread through the air rather than surface contact.⁸ Responses ranged from opening bus windows, which can refresh air within a bus in two minutes, to more high-tech solutions.⁹ Some agencies deployed technologies that are more commonly used in hospitals such as advanced air purification systems and filters.¹⁰ To adapt the technology for use on transit, Oahu Transit Services conducted testing using two separate systems that can disinfect both the air in the vehicle and its surfaces.¹¹ The technology, which the agency is tested on one 60-foot articulated bus and two 40-foot buses, can be used while the bus is in operation.

Air filtration was another way that agencies addressed safety. As part of a \$250,000 safety program, the Metropolitan Atlanta Rapid Transit Authority (MARTA) outfitted all 539 buses in its fleet with antimicrobial air filters in addition to installing driver barriers and mask dispensers.¹² Once these measures were implemented, MARTA resumed all-door boarding and fare collection. In late 2020, Green Bay Metro utilized funding from the Coronavirus Aid, Relief, and Economic Security (CARES) Act to install air purification on every bus in its fleet over the course of two to three months. The agency reports being satisfied with the technology and plans to continue installing it onto its fleet.¹³

⁵ CTAA, [CTAA Recommended COVID-19 Safety Protocols](#).

⁶ EPA, [Interim Results for SARS-CoV-2 Surface Disinfection with UV-March 1, 2021](#).

⁷ APTA, [Cleaning and Disinfecting Transit Vehicles and Facilities During a Contagious Virus Pandemic](#).

⁸ Ibid.

⁹ Monterey-Salinas Transit, [Road to Recovery](#).

¹⁰ Mass Transit, [A Tried-and-True Solution Makes its Debut in the Public Transit Industry](#).

¹¹ Ibid.

¹² Mass Transit, [MARTA Invests in Bus Safety Features, Resumes Front Door Boarding, Onboard Fare Collection](#).

¹³ Mass Transit, [A Tried-and-True Solution Makes its Debut in the Public Transit Industry](#).

Another common method involved changing the type of filters used on buses to better capture smaller particles. King County Metro moved from Minimum Efficiency Reporting Value, or so-called MERV-4 filters, to MERV-8; only the latter is able to capture COVID-19 particles.¹⁴ Bay Area Rapid Transit (BART) used MERV-8 as a standard in its rail prior to the pandemic but began a pilot to test the even more effective MERV-14 filters in August 2020.¹⁵ Upon completion of a successful pilot, BART was on track to install MERV-14 filters on its entire rail fleet by the summer of 2021.¹⁶

2 Contactless Payment

Some agencies turned to contactless payment to safely charge fares during the pandemic. Contactless payment, or mobile ticketing allows riders to create an online account, enter payment information, and purchase mobile tickets (example in **Figure 3**). If fare validators are installed at all bus doors, riders can board the bus from any door and scan a mobile ticket or barcode to validate their fares.¹⁷ Otherwise, riders activate the passes which then allows the operator to perform a visual inspection as riders board at the front of the bus. In response to social distancing guidelines and concerns early in the pandemic about high-touch surfaces, agencies responded by expediting the rollout of contactless payment systems.¹⁸ Contactless payment reduces interaction between passengers and operators and the usage of high-touch surfaces and can reassure riders with safety concerns.¹⁹ Once installed, these systems have the potential to not only minimize risks associated with close, physical interaction in the long-term but to improve the rider experience with all-door boarding that facilitates social distancing and speeds up the boarding process, which also positively impacts the network's overall efficiency.²⁰ Contactless fare payment capabilities can be woven into existing real-time information, trip planning, and navigation apps to provide riders with a single source for their transit needs.

Figure 3: Minneapolis/St. Paul Metro Transit Mobile Ticket



In Atlanta, Xpress, a commuter bus service that runs in 12 metro Atlanta counties, suspended fare collection between April and August 2020. In September 2020, Xpress launched a mobile payment system with a fare-capping pilot program that saves riders money by converting two one-way tickets to a round trip.²¹

Agencies that were already in the process of implementing contactless fares found ways to accelerate the rollout process. According to an [LA Metro report](#), nine agencies had already started or accelerated the implementation of contactless payment systems in response to COVID-19 in Spring, 2020.²² In the same report, LA Metro identified the implementation of contactless payment as a priority. The agency released the

¹⁴ King County Metro, [How Metro Improves Air Quality in Buses for Drivers and Passengers](#).

¹⁵ BART, [Ventilation on BART: What You Need to Know About Airflow and More](#).

¹⁶ BART, [After Successful Pilot, Denser Filters Will Be Added Throughout BART's Fleet of Train Cars](#).

¹⁷ Transit Center, [A Transit Agenda for the COVID-19 Emergency](#).

¹⁸ Sam Schwartz, [Public Transit and COVID-19 Pandemic: Global Research and Best Practices](#).

¹⁹ LA Metro, [A Path Forward](#).

²⁰ Transit Center, [A Transit Agenda for the COVID-19 Emergency](#).

²¹ Saporta Report, [Vanpool Commuters Outnumber Xpress Bus Riders as Pandemic Throws Curveballs at Transit Planners](#).

²² LA Metro, [A Path Forward](#).

TAP LA app for iOS in September 2020²³ and on Android in January 2021.²⁴ TAP LA is used to pay fares on 26 systems across LA County and for trip planning and real-time information. Riders can also use the app to pay for Metro Bike Share and to purchase reduced and low-income fares.^{25,26} Greater Dayton Regional Transit Authority (RTA) (see call-out box) integrated the Transit app into its fare collection systems in March 2019 for real-time information and trip planning.²⁷ The agency was able to quickly build upon its existing relationship with the Transit app to integrate contactless payment into the Tapp Pay in April 2020, ahead of its original launch that was planned for later in the summer.²⁸

Greater Dayton RTA

Greater Dayton RTA began the process of upgrading to their new contactless fare payment system, Tapp Pay, prior to 2020. During the pandemic, the agency faced a 50 percent drop in ridership. In order to create a safer way to pay for fares, RTA accelerated the implementation of Tapp Pay, shown in **Figure 4**, and started offering the contactless option in June 2020.²⁹ As of December 2020, RTA was serving 70 percent of pre-pandemic customer levels, and 34 percent of their daily boardings were by customers using the Tapp Pay system.³⁰ In order to incentivize both vaccinations and Tapp Pay usage, in April 2021 RTA offered a \$30 credit, the cost of a monthly pass, to all new and existing Tapp Pay customers who showed their official COVID-19 vaccination card to a staff member at any RTA transit center.³¹

Figure 4: Rider Using Tapp Pay



RTA has taken several steps to ensure that their transition to Tapp Pay is equitable. In November 2020, RTA partnered with T-CETRA to implement a program that allows customers to pay for mobile passes with cash at local retail outlets.³² In April 2021, RTA introduced Account-Based Ticketing, which allows riders to purchase smartcards from ticket vending machines and add funds to their account using cash or credit and debit cards. This allows riders who do not have a smartphone or a credit or debit card to take advantage of contactless fare payment.³³ RTA also introduced a fare capping system to ensure that riders are charged the lowest possible price for their trip. Regardless of the number of monthly trips, riders are capped at \$3 per day or \$30 in a rolling 31-day period. According to RTA's Chief Customer & Business Development Officer, Brandon Policicchio, traditional fare structures create a system where "customers who are least able to afford the upfront costs of a monthly pass end up paying more, but also end up traveling less by the

²³ Los Angeles County Metropolitan Transportation Authority, [TAP LA](#).

²⁴ Mass Transit, [Android Phones Can Now Be Used as TAP Cards on LA Metro](#).

²⁵ Los Angeles County Metropolitan Transportation Authority, [TAP LA](#).

²⁶ Mass Transit, [Android Phones Can Now Be Used as TAP Cards on LA Metro](#).

²⁷ WDTN, [Greater Dayton RTA Launch New 'Transit' App](#).

²⁸ Masabi, [Dayton RTA Teams Up with Masabi and Transit to Launch Tapp Pay Mobile Fare Payment Option](#).

²⁹ Intelligent Transport, [Fares in the Time of COVID-19: Finding the Ticket to Recovery](#).

³⁰ Intelligent Transport, [Creating a Cashless and Accessible Fare System in Dayton, Ohio](#).

³¹ WDTN, [RTA to Give Credits to Riders with New Pay Account, Those Who Have Been Vaccinated](#).

³² Intelligent Transport, [Creating a Cashless and Accessible Fare System in Dayton, Ohio](#).

³³ Intelligent Transport, [Greater Dayton RTA Launches Account-Based Ticketing System](#).

Contactless payment systems can also be used to implement fare-capping, which prevents individuals with low incomes from paying more because they cannot afford the upfront cost of a pass.

end of the month.”³⁴ With automatic fare capping, riders do not need to worry about upfront costs or calculating whether a monthly pass will give them a better deal.

Agencies recognized the equity impacts of adopting contactless payment systems. Not all riders have access to credit cards or other financial accounts that are normally linked to contactless fare payment systems. Over five percent of American households are unbanked according to a [survey](#) conducted in June 2019 by the Federal Deposit Insurance Corporation (FDIC).³⁵ Greater Dayton RTA specifically addressed the unbanked in November 2020 by making it possible to purchase fares with cash at select retail locations which can then be applied to the app’s balance (see call-out box).³⁶ This helps to serve riders that may have smartphones but do not have debit or credit cards.

Since contactless solutions are app-based and require smartphones, riders also face additional barriers in using the system in other ways: many phones are too old to install many transit apps; access to cellular data plans may be limited or the coverage unreliable; or riders may not have access to the internet at home. According to the [Pew Research Center](#), close to a quarter of adults with household incomes below \$30,000 a year do not own a smartphone. Over 40 percent of adults with incomes under \$30,000 do not have home high-speed internet services or a desktop or laptop computer. A majority of this population do not own tablets either.³⁷ In its [Metro Recovery Report](#), King County Metro acknowledged that “riders with limited access to ORCA cards and/or mobile technology are most impacted by moving toward a contactless system. This includes people with limited English proficiency, as well as people with low and no income. Ensuring that these customers do not experience new barriers to accessing Metro’s mobility services is a key goal as we resume fare collection.”³⁸ Understanding how new technology impacts riders, and the intersectionality of these rider populations (e.g., low-income, minority, persons with disabilities, etc.) impacts their access to and ability to use technology will be critical in making sure that no ridership segment is left behind.

At the same time, contactless payment systems can also be used to cap fares, which is particularly helpful for individuals with low incomes, as they can pay for a monthly pass progressively rather than having to pay for the full cost of a monthly pass at once. Several months after launching the Transit app for contactless fare payments, the Greater Dayton RTA implemented fare capping in the app in January 2021.³⁹ Closely related,

³⁴ Dayton 24/7 Now, [Greater Dayton RTA Introducing Fare Capping](#).

³⁵ FDIC, [How America Banks: Household Use of Banking and Financial Services](#).

³⁶ Mass Transit, [Greater Dayton RTA Partners with T-CETRA, Masabi to Launch New Mobile Contactless Experience for Customers](#).

³⁷ Pew Research Center, [Digital Divide Persists Even as Americans with Lower Incomes Make Gains in Tech Adoption](#).

³⁸ King County Metro, [COVID-19 Response and Recovery Report](#).

³⁹ WDTN, [RTA to Implement Fare Capping for Tapp Pay Users](#).

King County Metro also plans on evaluating the equity impacts of fare enforcement as it relates to the agency's larger equity goals.

3 Communications

In the early days of the COVID-19 outbreak, the only thing that was certain was widespread uncertainty. With little scientific research to go on, little or no preparation time, and vague or conflicting guidelines to follow, transit providers were eager for any kind of information or guidance they could find. In times like this, constant, clear communication with staff, stakeholders, and riders was critical. Advocacy organizations like the VTA and APTA, as well as some insurance providers, stepped up to the plate with timely information or policies based on the best available information.

3.1 Communications Best Practices

During interviews with transit agency representatives and discussions with SAC members, practitioners consistently cited communicating with riders, staff, and stakeholders as one of the biggest challenges during the COVID-19 pandemic. It was more difficult to engage riders due to the conditions of the pandemic, and managers and operators had to be creative with usage of existing channels such as social media. There was also a need to utilize external stakeholders to communicate information such as service changes and safety regulations to the intended audiences.

While communicating with staff who had shifted to remote work remained relatively straightforward via email and employee intranets where available, communications with frontline workers became a challenge for some agencies. WMATA tackled this issue by additionally posting staff communications to Facebook and other social media channels, making videos available on demand, and pushing information straight to staff cell phones. This allowed frontline staff and operators to access communications and stay up to date on policies through whichever communications channels were easiest to access for their situation.⁴⁰

An example of a marketing campaign to inform riders and potential riders about the agency's response to the pandemic and current conditions was Bay Transit's "Good to Go!" campaign. Over 90 percent of Bay Transit's operations is demand responsive services, for which demand dropped off precipitously as information about COVID-19's spread and infection rates became better understood and people began avoiding public spaces and services. Using a portion of its CARES Act funding, the agency developed a unified communications campaign that included printed flyers, stickers, paid advertisements, and posts on social media to spread the word on their zero-fare services, heightened sanitation procedures, policy changes, and overall safety efforts. Bay Transit organized "Ride-along" with county organizers and stakeholders to demonstrate these service changes and its commitment to operating safely even at the height of the pandemic.⁴¹

It is also important for agencies to be transparent in reporting service changes, changes in cleaning and sanitation methods, and new or modified rider regulations to attain pre-pandemic levels of ridership. These efforts can combat lingering reluctance to return to transit given the fears that riding transit posed a significant virus exposure risk. For example, GRTC decided that in order to re-establish trust in its transit system and support contact tracing efforts, it would commit to full transparency with regards to operations. GRTC published a COVID-19 response page on its website, on which it listed every sanitation measure introduced, positive test

⁴⁰ As reported by Stakeholder Advisory Committee in SAC Meeting #1.

⁴¹ As reported by Bay Transit representative during Task 2 interviews.

results, service adjustments, or policy change they enacted. Updates were also communicated to the public via their social media channels, media releases, and local news outlets.⁴²

⁴² As reported by GRTC representative during Task 2 interviews.