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# Rethinking Public Transit's Role in Our New Normal, and Beyond

## Rapid Changes Require Big Picture Perspective

The COVID-19 novel coronavirus pandemic has every organization rethinking virtually every aspect of its existence. It has catapulted even the most tech-resistant agencies and organizations into the technical world, accelerating the digitization of many processes that had previously not been reliant on technology.

One could argue that the public transit industry has faced some of the biggest challenges due to the pandemic. Consider that the very service the industry provides is inherently about transporting people to and from the physical workplace, medical facilities, places of learning, shopping, and dining – all while using vehicles and train cars where social distancing used to be nearly impossible.

- COVID-19 significantly increased public transit authorities' operating costs at the same time state and local emergency Stay at Home orders were implemented, severely impacting revenue. In April, 2020, transit fare revenue dropped 86%* while they undertook rigorous cleaning and sanitization procedures to maintain essential service for frontline workers.
- APTA estimates that public transit agencies face $23.8 billion* of direct additional costs and extraordinary revenue losses through calendar year 2021 due to the pandemic.
- A meaningful source of job creation, an estimated 37,000* skilled labor and construction jobs in 2020 and 34,000* in 2021 will be lost because of transit project delays and cancellations. This does not account for indirect jobs created by the industry's thousands of suppliers.

*Source:* *https://www.nytimes.com/2020/04/09/upshot/transit-battered-by-coronavirus.html

## What Does Success Look Like for Transit?

The pandemic has forced a massive shift in what mobility looks like. For the time-being, there is a greater emphasis on safety with all aspects of travel.

During key periods of the pandemic, fewer people were commuting and using transit, but there remained critical segments of the population who absolutely relied on the essential services provided. For transit authorities, success used to be the bedrock pillars of safety, reliability, and efficiency. Now, transit straddles the twin rails of combatting a pandemic and supporting economic stability. The implication for the economy cannot be understated: the safety of the passengers and the transit workers, and feeling comfortable moving safely around will benefit the economy.

The industry is pivoting to adapt, making the best possible decisions to maintain safe services that will also contain the spread of the virus, all within budgets that are tightening or even completely unknown. Transit is at the proverbial crossroads, and our leaders are all at an inflection point.

The answer for transit, much like every other industry, is solidly grounded in implementing new technologies and best practices for health and safety that rely heavily on tech within the context of industry partnerships to deliver a broad perspective. The good news is that this inflection point gives transit the technological foundation for building and enhancing operations, resulting in improvements to the passenger experience in the future.

## Monitoring Elevated Temperatures with Thermal Cameras and Scanners

Many airports, transit stations, and other areas where high volumes of people congregate or pass through have implemented some form of body temperature monitoring, usually using IR thermometers held up to foreheads. This process can be costly and labor intensive and invasive to an individual's personal space and privacy. It also presents an elevated risk of potential exposure for those performing the monitoring.

The solution for this new process lies in the implementation of thermal cameras and scanners, as the first step in a layered approach to contain potential exposure, increase safety, and decrease risk. These systems are not invasive, reduce labor costs, and minimize exposure because the monitoring is conducted remotely. Transit operators can use thermal cameras to collect anonymous data about trends, and when necessary alert individuals if temperatures are elevated and take the appropriate next step, including potential secondary testing and quarantine. The organization can even utilize videos, images, and other documentation as proof of compliance and transparency.

## 3D Lidar to Assist with Social Distancing

According to Justin Bean, Global Director of Smart Spaces and Lumada Video Insights Marketing for Hitachi Vantara, computer vision and video analytics have made available a wealth of insights and alerts using existing CCTV cameras. An emerging and complimentary technology is 3D lidar, which can be analyzed by AI to provide a real-time view of where social distancing is working and, more importantly, where it isn't occurring. "The data collected can assist in the redesign of public spaces, provide information for targeted education and policy management, all without collecting personally identifiable information (PII)," said Bean.

While safety and security enhancements are critical, transit agencies must also balance these needs with passenger privacy. This is where the use of lidar – light detection and ranging technology – can be invaluable for transit. Hitachi Vantara also provides lidar solutions that include human movement analysis technology. This solution especially protects the privacy of PII yet can be highly accurate in detecting social-distancing violations, physical intrusions, suspicious behaviors, and individuals entering hazardous areas.

## Hand Washing Behavioral Sensors

Technology developed for the healthcare and manufacturing industries can help any organization maintain best hygiene practices, especially the basic act of proper handwashing. Hitachi Vantara's Bean said that 3D lidar sensors and applications used in restrooms can be "trained" to sense proper

hand-washing activities. When people are not using proper techniques for washing, the sensors can flag this and provide analytics about which work shifts and restrooms have low compliance, so an organization can increase training and education, add displays or other measures to improve safety outcomes and help reduce risk – all without collecting PII.

According to Bean, the sensors can even assist with improving passenger flow to ensure facilities are designed to allow for proper movement, handwashing, and interactions at the appropriate frequency and convenience throughout a facility.

## Smart Operations to Balance Social Distancing with Scheduling and Passenger Convenience

Managing an effective train or bus disinfection and service schedule is a new challenge for public transit, but overcoming these obstacles requires force-multiplier technology to scale, much of which is already employed by transit agencies.

New York City added 1,100 trips from 300 extra buses to maintain service while subways are closed for the COVID-19 cleaning schedule from 1 to 5 a.m.

*Source:* https://www.nytimes.com/2020/04/09/upshot/transit-battered-by-coronavirus.html

*Disinfection Index:* For example, according to Udayan Joshi, Digital Solutions Architect, Hitachi Social Innovation Business the data collected from mobile app usage can be put to work to create an index for a transit operator to determine a disinfection schedule. Joshi said, "This data can indicate when disinfection events are best to be scheduled, including how extensive the disinfection should be, from wipe down of seats and common areas or using IR to disinfect lights, to blasting and deep cleaning. You can make it frictionless for the passenger, improve safety, and hopefully contain costs."

*Contact Tracing:* This same disinfection index can also be a vital tool in effective contact-tracing. Joshi said, "The index can help contact-tracers connect the dots, for example, if it is determined that a passenger was infected, the index and disinfection schedule can be utilized to determine who may or may not have been exposed."

In New York City, subways are shutting down overnight between the hours of 1 to 5 a.m. for the first time since the system opened in 1904 for the purpose of disinfecting the trains and 472 stations every 24 hours instead of every 72 hours. This COVID-19 cleaning schedule is expected to continue every 24 hours through September (at a minimum) when schools may open again. To supplement the loss of overnight train service for essential workers, the MTA increased bus service, adding 1,100 extra trips from 300 extra buses. 61 bus routes, including local and express routes, are expected to get a service boost, including key lines that serve hospitals.

*Dynamic Headways:* Operators need to adopt completely new asset management strategies to become more adaptable and anti-fragile in a world of change. To help with this in the era of COVID-19, and enforce social distancing while impacting the passenger experience as little as possible, one technological tool available to managers is the concept of employing dynamic headways. This concept uses AI-driven scheduling to arrange train and bus operations around the demand, in both reactive and proactive situations. In a reactive case, managers can dispatch additional capacity when the data collected through ticketing, video camera systems, and social media indicate the need for additional capacity. At times when greater social distancing is required, dynamic headways can be used to plan for additional capacity and load capabilities.

Infrastructure can be adjusted to assist in the efficient use of dynamic headways. For example, the timing of the opening of train platform doors can be adjusted to control passenger flow and manage social distancing, and electronic signs can be programmed to assist passengers in selecting train cars that have more capacity.

## Taking a Digital Fleet Perspective

The public's fear of infection has driven many people to alternative modes of transportation. This disruption has the potential to cause a major shift in traffic and congestion patterns. According to Bean, transit leaders need to innovate their business models, to eliminate limitations and make operations smarter and more predictable. "Transit must rely more on accurate data to align with the needs of the passengers," he said.

"Today's 'nice to have' is tomorrow's 'mission critical,'" said Bjorn Andersson, Senior Director of Global Industry Solutions Marketing for Hitachi Vantara. Transit must leverage digital information to start that

journey today and align their service model with the new needs of the passenger for frequency, convenience and passenger experience. Andersson compared what needs to happen in public transit to the evolution of streaming music services: "These services matched their business to the customers' demands, the market eventually adapted to it, and listeners are happily willing to pay for these services."

"A great example of technology enabling new business models is the Intercity Express Programme along the Eastern Seaboard of the United Kingdom, a project for which Hitachi provided "trains-as-a-service" with thousands of sensors generating 3.6 million data points per second. This data is used for predictive maintenance, enhanced operations, and improving service overall," said Bean. "The data actually enabled the trains-as-a-service business model by improving predictability, reducing risk, and aligning the passenger interest with that of the operator. Investment in digital is no longer a luxury, it's a necessity."

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Jian Sun, Director of Systems and Transit Sales, Hitachi Rail

## Technology Allows Transit Do What it Does Best

"The technology that drives the rideshare transportation industry was initially thought to be a threat to public transit, and occasionally for certain lines it can be. However, rideshare providers actually solved one of the biggest challenges for mass transit, that of first-mile and last-mile of transport," said Jian Sun, Director of Systems and Transit Sales, Hitachi Rail. When looked at holistically, they are perfect compliments to each other to meet the needs of passengers. "Together, these two different actors get to perform the tasks they are both best at performing and make it possible for millions of Americans to avoid the costs of a personal vehicle, and for transit agencies to improve accessibility while saving budget on lines that would not get the ridership needed to support the costs."

## Technology is Critical to Restoring Confidence in Mass Transit

"We can use our social mission and our technology to continue to help restore confidence in mass transit," said Lane Cigna, Head of External Relations & Communications, Americas, Hitachi Rail. "In fact, technology will be a critical element in rebuilding the role of public transportation as a whole."

According to the American Public Transportation Association (APTA), access to public transit is a huge factor in achieving upward mobility and moving people into jobs and out of poverty, so confidence in our transit systems must be high for the common good.

According to Cigna, when transit operators take their safety solutions and layer Hitachi's technology solutions on top, the passenger experience can be enhanced while maintaining proper health and safety protocols.

## The Community's Call to Action

The need for transit to rely on "big data" in our changed world requires partners who see the "big picture." Working with a strategic solutions partner like Hitachi Vantara, immense amounts of operational data can be gathered about vehicle occupancy and the ability to maintain social distancing, station flows and usage, personal hygiene, demand predictions for dynamic headway solutions, and a host of other information that improves safety, operations, and passenger experience.

Transit operators should take a proactive approach to implementing innovative solutions to keep people safe, while improving their operations and passenger experience. As this technology leads us forward, the transit industry can rely on providers like Hitachi Vantara to be "Co-Creators:" blending the data of the internet of things (IoT) with engineering and an understanding of the passenger experience.