



TRANSPORT
TICKETING
NORTH AMERICA

MST

MONTEREY-SALINAS TRANSIT

MST's Open-Loop Fare Collection System Roll-Out Journey, The Lessons Learned as an Early Adopter




BROWN BAG EDITION

WHERE WE STARTED

1973
Monterey Peninsula Transit System Joint Powers Agency begins public transit service.

1974
Thomas D. Albert became the first General Manager of Monterey Peninsula Transit. Monterey Peninsula Transit (MPT) adopts a new name and color scheme.



1975
First Ride-On! published. MPT offers free rides to seniors and people with disabilities during off-peak times. Marina joins Monterey Peninsula Transit.




1977
MPT installs benches, signs, and shelters and adds two-way radios to all buses.

1978
Monterey Operations, Maintenance, and Administrative facility opens. Mini-Monarch Transit, the colorful bus with wings painted on the side, fades from the Peninsula transportation scene.



1979
Line 4 extended to Carmel Valley Village.

1980
Monterey transfer point moved to the Monterey Transit Plaza. Teletypewriter (TTY) service for people who are deaf or hard of hearing becomes available for passengers.



1981
Unification of transit services on the Peninsula and Salinas becomes a reality. Salinas Transit System and Monterey Peninsula Transit merge to become Monterey Salinas Transit (MST). MST adopts a new logo designed by a local firm to represent the "fresh, new identity to go along with the new name."




1982
Thomas D. Albert passed away. Under his guidance, Monterey Peninsula Transit & Monterey-Salinas Transit grew from a 6 bus operation to 52. Frank J. Lichtenaki becomes MST's new General Manager.

1983
On Friday, November 18, MST carried its 21 millionth rider, Ms. Deane Peavy. She was awarded a one-year supply of Fast Passes.



Monterey-Salinas Transit

50 Years of:
Connecting Communities.
Creating Opportunity.
Being Kind to our Planet.



1992
The Waterfront Area Visitor Express (WAVE) starts, sponsored by the Monterey Bay Unified Air Pollution Control District, Monterey Bay Aquarium, and the American Tin Cannery Outlet Center. MST is one of only four transit districts in the country to have an electric bus used in daily service.



1990
MST begins to accept Visa and Mastercard for pass and ticket book purchases at TDA, Monterey facility.

1993
Wheelchair-accessible vehicles added to the fleet.



1995
Operation of compressed natural gas fleet begins.

1996
MST RIDES ADA program begins.

1999
MST started a new service, "DART," a minibus that provides convenient, customized service. The service became MST On-Call in 2007.



1999
MST adds an American flag on its new fleet to demonstrate patriotism after 9/11. MST purchased property at 280 Reservation Road in Marina with the goal of building a transit center.

2001
Five MST drivers were among thousands transporting athletes, trainers, workers, and spectators at 2002 Winter Olympic Games in Salt Lake City. MST unveiled new Siemens Advanced Communication System.



1989
Service out of Salinas Transit Center begins. The campaign "Ride the Bus with Us" is aired on TV for the first time. The tune received an "Addy" award for excellence in 1990. Monterey County voters approved a 1/2 cent sales tax (Measure B) to fund transit and other projects.



1988
MST breaks record during AT&T Golf Tournament by shutting 64,000 visitors. Groundbreaking ceremony was held for Salinas Transit Center.



1987
MST started selling Summer Youth Passes. Pope John Paul II visited Monterey, and MST provided 22 buses to help shuttle people to and from Laguna Seca.

1986
Clarence J. Wright (CJW), Salinas Operations and Maintenance facility, opens. A new logo and a shorter name, "The Bus," was adopted.



1985
Monterey Operations, Maintenance, and Administrative Facility catches fire. The fire destroys the administration building. The damage is estimated to be nearly \$500,000, and employees had to work in trailers for approximately one year while the administration building was rebuilt.

WHERE WE'RE GOING

2022
Commute with Enterprise vanpool program launches. MST College EcoSmart Pass program begins. Better Bus Network launches.

2020
MST received California Transit Innovation & Resiliency Award for demonstrating innovative concepts and effective problem-solving techniques, in response to the COVID-19 pandemic.

2019
MST wins American Public Transportation Association AdWheel Award for Best Educational Comprehensive Campaign for "RealTime" bus arrival information tool. Salinas Transit Center renovations complete.



2018
MST has ribbon cutting for Monterey Bay Operations and Maintenance Facility and Salinas Mobility Services Center. New electric buses unveiled. MST wins a Federal Transit Administration Outstanding Public Service Award.

2017
MST partners with National Safe Place. MST GM/CEO, Carl Sedonyk, elected as Chair of the California Transit Association. MST partners with Transit App for RealTime bus arrival information.

2015
The first wirelessly-charged electric trolley starts service. MST is recognized as the first agency in California to use inductive wireless power transfer (WPT) technology. Bus Stop Shop (BSS) opens in downtown Monterey.




2016 **MST RealTime**
Frank J. Lichtenaki Administrative Building opens. RealTime bus arrival information is launched with Google Maps.




2014
Monterey County voters approve Measure Q with 72.45% in support. First-ever Monterey Countywide retail sales tax to support public transit.



2006
Line 55, Monterey-San Jose Express, service begins and operates through 2020.

2007
Marina Transit Exchange opens. MST started a new service, "MST On-Call," a minibus that provides convenient, and customized service.

2008
Partnership with Naval Postgraduate School begins. MST harvests locally grown mustard seed for biofuel project.



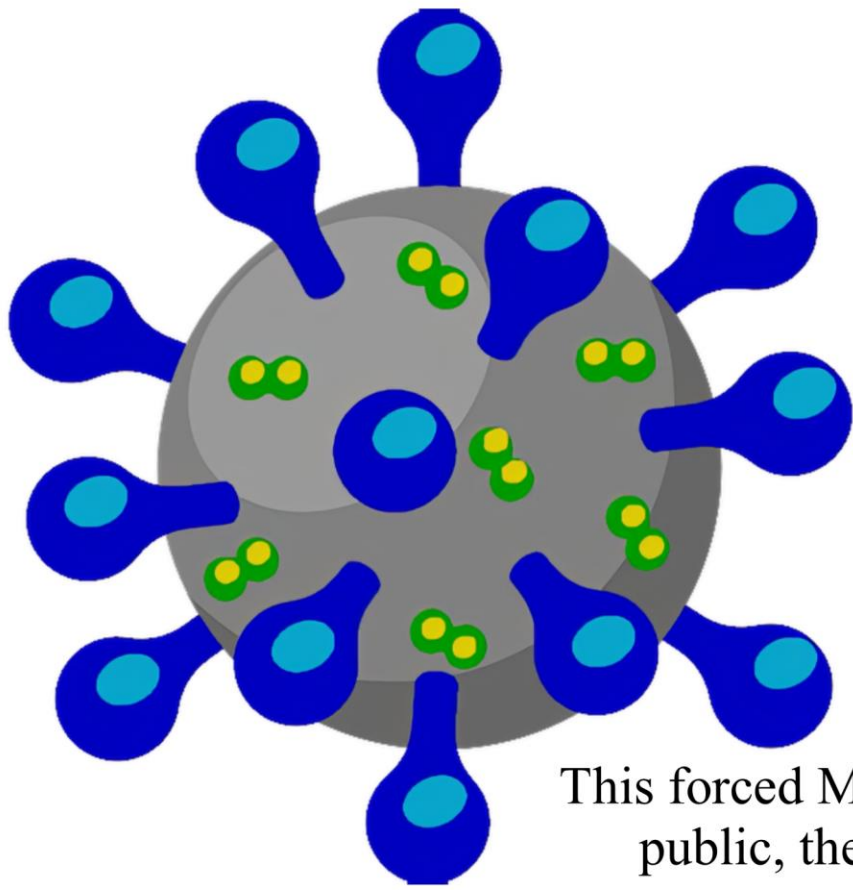
2004
The Wave became the MST Trolley. Customer Service went "hi-tech" by installing the Advanced Communications System (ACS) to assist customers calling to determine what time a bus will arrive at their stop.

2010
AB 644 creates the Monterey-Salinas Transit District incorporating the cities of Gonzales, Greenfield, Soledad, King City, and Sand City into the governance structure.

2011
MST receives the Secretary of the Army Quality of Life award.

THE GOOD





COVID

THE BAD

First identified in December of 2019, COVID rapidly spread and like many Public Transportation Agencies, by early 2020, Monterey-Salinas Transit was experiencing major disruptions to its operations.

This forced MST to re-examine how to safely support and protect the public, their drivers, and everyone in the agency charged with maintaining a critical infrastructure service.

And while fare collections were temporarily suspended, one of the re-examinations was regarding ways to move to fare collection methods that dramatically reduced or even removed the need for the physical hand-off of cash or fare media from a customer to a driver.

Otherwise known as Contactless Payments.





NFC-Based Contactless Payment Systems

THE GOOD

Established Technology
(first used in the U.K. in 2008)

Nearly all U.S. Credit and Debit Card Holders have at least one Contactless-Capable Card.

Nearly all U.S. Smartphone owners (More than 300 Million and 85% of American Adults) can make Contactless Payments.

The Technology Used in the Design and Manufacturing of Payment Access Devices (aka PADs) is Mass-Produced, Low-Cost, and Commercial-Off-The-Shelf in Nature.





Open-Loop Payment Systems

THE GOOD

Open-loop payment systems refer to payment methods that can be used to make payments without having to be part of the system itself.

By using an open-loop payment system, Public Transportation Agencies become part of a common-standards payment network supporting any payment processor that is also part of that network (VISA, MasterCard, Discover, AMEX) eliminating the need for the public to download an app, prepurchase any fare media (Tickets, Fare Card, Tokens, etc.) or take any intermediate steps to ride a Bus/Train/Whatever

By combining Contactless Payment Access Devices with the Open Loop Payment Standard, the public is given a minimalist and intuitive user experience, one that is identical to the experiences they currently have when patronizing virtually any retail operation.



Or As Easy As...

(Wait For It...)

THE
GOOD

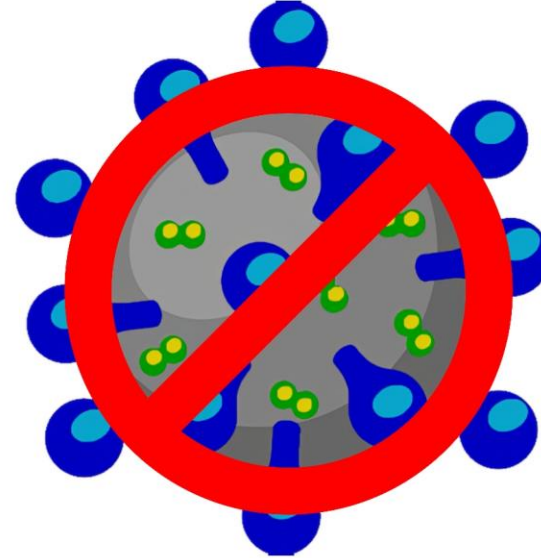


BUYING A CUP OF COFFEE!!!

With apologies to Gillian Gillett for the shameless steal...

OK - We're Onboard!

THE
GOOD



MST, working with the California Integrated Travel Project, VISA, and LittlePay decide to be a launch-partner in deploying an Open-Loop Fare Collection System, with the goal of rolling out a new (for the U.S.) service that allows the public to intuitively pay for their transit fares while keeping the physical transmission of viruses and contaminants to a minimum.



MST is Onboard... Now What?

So MST is, uh, committed to this digital transformation project... During a Global Pandemic. During a Ridership Collapse. During a Logistics and Supply Breakdown.

A Few Thoughts:



The general school of thought in a Crisis Management situation is to focus on addressing the crisis first, before attempting transformational changes.



Crisis however is also an opportunity to quickly drive change where it may have not been previously possible.



Deploying a technology initiative under these circumstances absolutely requires an agile (little “a”) mindset, with participants that are able to adjust quickly, and pause often as other competing issues arise, while remaining committed to completing the project. Even under the best of circumstances, this is hard to do.

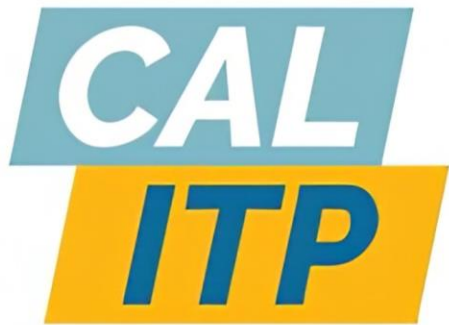
THE UGLY





A Project Begins:

THE
GOOD





A Project Proceeds: 2020



MST begins receiving prototype PADs in late 2020. The ITS Team begins work on the fleet to accommodate and install the units.



Back-end system logic is designed, some challenges surface with obtaining the data needed to consistently determine customers fares based on MST's distance-based fare structure.



Decision is made to install PADs on both the entrances as well as the exits of our fleet in order to determine the correct distance-base fare to charge. However passengers resist the dual-interaction method (i.e. not consistent the minimalist/intuitive UX philosophy)



Due to efforts to "fit" the way the PADs work to the pre-existing culture of fare intake, the system logic on the PADs grows more complicated. This results in multiple firmware updates to the PADs, often as many as several a week, and often by hand, causing very high work-load situations for the ITS Team.



PAD failures begin to occur fairly early on. While expected in an Agile, MVP-style roll-out, this occurs during the simultaneous collapse of the the world technology supply-chain. Combined with the global build and program method used by the PAD manufacturer, supply rapidly diminishes.



Customer response is very positive. In keeping with a minimalist/intuitive UX philosophy, MST is finding that customers are indeed intuitively using the devices, even with minimal advertising and promotion of their existence



A Project Goes “Live”: 2021



With the exception of the PAD supply issue, MST begins seeing stability on the system and a decision is made to “go live” in May of 2021



PAD vendor continues to promise availability of additional devices, however delivery of devices continues to see delays and the inability to obtain replacements for defective devices begins to increase



Discussion and focus begins on ways that discounting structures can be built into the systems (once again, adopting a minimalist/intuitive UX philosophy to make the customer experience as easy as possible)



The number of incidents where the breakdown of portions of the data integrations between key parts of the system (Location services, transaction services, etc...) begins to climb. While still at a level that is not impacting customers, it becomes an item of note.



MST’s long-time Director of IT makes the decision to retire in early 2021. ITS Manager assumes full responsibility for the project, as well as takes on some of the Director’s responsibilities. MST makes the decision to search for and hire a replacement Director with prior-CIO-level experience. However due to COVID challenges this position does not get filled until November 2021



Other key IT and ITS project timelines begin to slip as a result of all of these factors (exiting IT Director and loss of FTE, more FTEs being devoted to PADs than anticipated, etc...)

A Project Evolves:

1st Half 2022



New CIO (aka myself) begins to get more acquainted with the details of the project and the vendors and teams supporting it. Even so, getting detailed back-history while simultaneously managing a troubled part of the technology portion of this initiative is a challenge.



Total successful "Taps" on our system climbs past 50,000



PAD failures continue to increase. PAD vendor support continues to deteriorate. While some effort is made by the vendor (including on-site visits to determine root causes and perform repairs), the situation is devolving.



Major failures occur on the system, resulting in operational interruptions impacting our customers, the most extensive of which occurs in early June with the U.S. shut down of 3G cellular service and the inability of the PADs to switch to 4G service. Post-mortem concluded that while there were multiple factors contributing to the outage, two key items were the inability of the PADs to transition to 4G, despite assurances they could, and a lack of Information Event Monitoring (IEM) on the part of the PAD vendor, which would have shown that a system failure was occurring.



Based on feedback from the ITS Manager and with support from the MST Executive Team, the CIO begins research and discussions with other PAD vendors that have become available since the initial project test. This is only possible because the system is an open-standards and interoperable one.



Project Highlight:

1st Half 2022



In early 2022, MST became the first transit agency in the nation to provide an automated method for Senior Citizen Discounts via an Open-Loop Contactless Payment System.

However, the roll-out of this transformational service could have been a failure, as early-on technology and cybersecurity concerns were raised that forced the initial method of validation (and the ability to issue the discounted lower-fare automatically), to be pulled from availability.

Instead the team (including key vendors in this project who believed in making this solution happen) did the work to find a better approach that allows for national validation via Login.gov (vs. the original project goal of enabling just California citizens) that is both scalable and potentially applicable to any other transit agency in the United States using an Open Loop System.

This system of validation as since been expanded to include the ability for any U.S. Veteran to register for an automatic fare reduction as well.



Project Highlight:

2nd Half 2022



One of the design goals for this project was to build and implement a minimalist/intuitive system that required little or no education on the public's part on how to use it, nor needed any applications, devices, or tools beyond what most people already have.

And while it was clear that we were getting that system in place, MST had a process that was interfering that design goal, which was a multi-tiered and distance-based fare system. This system required relatively complex logic in the payments processing system and PADs, as well as forced customers to “check into” the system when boarding and “check out” of the system when departing, which was universally disliked.

Rather than continue to force a technology system that was meeting the minimalist/intuitive design goals into a fare policy that simply wasn't, MST instead chose to implement a new fare policy that was simple, time based (\$2 for 2 hours), and completely consistent with the payment user-experience standard we had set for ourselves.

This “policy” aligning with the “user experience” approach was one of the most successful changes we made during this initiative.



A Vendor Fails:

2nd Half 2022



While many, if not most, parts of this project can be considered a success, unfortunately a key component of the ecosystem needed to make this work, was, well, just not working.

By the 2nd half of 2022 it had become clear that the vendor providing our Payment Access Devices (PADs) was incapable of meeting the standards that MST had set for a successful initiative. Despite a series of remediation attempts, a recommendation was made by I.T. that MST invite other PAD vendors into the bidding process for what was to be our final, “production” system.

In December of 2022 MST awarded a multi-year purchase agreement for PADs to KUBA Group.

This was only possible because the open loop (and open standards) system allowed all the other key vendors of this system to connect to payment-processor-agnostic devices.



It did however mean that MST would have to transition from one PAD to another



A PAD Transition:

1st Half 2023



With the decision to transition to a different Payment Access Device, the Project Team had several hurdles to overcome.



Due to the demands of an irrational and demanding CIO, a goal was set to have a controlled and gradual transition from the current PADs in service to the new KUBA PADs.



Given that the design goal of having an open and interoperable system was for it to be device-agnostic, there was no theoretical reason that MST could not have both PADs in operation in our fleet at the same time.



By allowing for PAD coexistence, MST ITS could make the decisions on when and how to test, debug, and transition them.

This was the ideal approach and again, reflective of what an open standards system should be able to do.



However, it had never been tried...





A PAD Transition:

2nd Half 2023



In order to make this transition a smooth one, it would take the cooperation of both the outgoing and incoming PAD vendors, and LittlePay, with programming changes from all of them.



However, if the interoperability concept was proven out, this meant that not just MST, but any transportation agency in the U.S. would also have the option to run an interoperable-mixed mode environment, for any reason.



It would also be another first, never done before, technology achievement in our industry in a project that has had many of them to date.



And... For 10 days in late June 2023, we achieved that goal, with 10 KUBA PADs working interoperable with approximately 70 of the legacy PADs.



And Today?

By using a COTS, standards-based, mass produced Payment Access Device and Payments Processor, our current per-device OPEX/CAPEX is approximately \$100 per device per month, projected over a 3 year lifespan. (less if the PADs last longer)

With the move to KUBA PADs, our device reliability is currently running at better than “2-9” (3 device operation failures out of ~120 in the last 12 months plus 3 devices failures while testing new features)

Compared to an old-style mechanical cash and custom media fare collection system, device reliability is an order of magnitude higher, OPEX/CAPEX costs are potentially an order-of-magnitude lower, and serviceability of the devices can be performed by a technician of average I.T. support skills.





And Today?

The Contactless Payment Project has had over 300,000 successful taps since initial testing and 140,000 successful taps on our production PADs since their roll-out in July of 2023.



And usage is growing...

Today we support VISA, MasterCard, Apple Pay, Google Wallet, Samsung Pay, Fitbit Pay, with more coming soon

No MST fare media is needed, no MST app is needed, fare capping is automatic, and with a simple setup at [Login.gov](https://www.login.gov), Senior Citizen and Veterans discounted fare rates are automatic.

THE VERY GOOD



(L-R) Ezequiel Rebollar - Jacob Huggins - Adam Cardenas - Scott Taylor - Michael Kohlman
Manuel Garcia-Villarreal (not pictured)

Monterey-Salinas Transit Technology Team

About Michael



Transit Bus Driver Michael

A Long Time Ago, In a Transit Agency Far, Far Away...



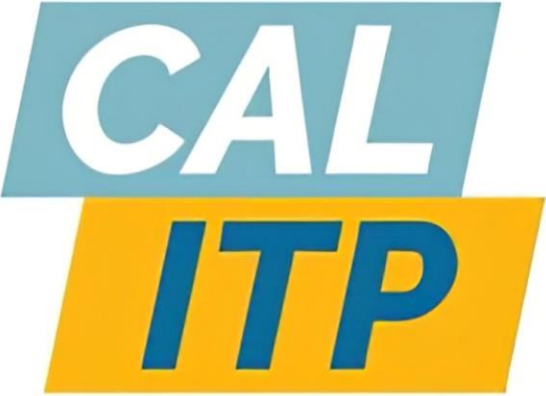
CIO Michael

A Little Older, Not Likely Any Wiser...

Michael Kohlman is currently the Chief Information Officer of the Monterey-Salinas Transit District, overseeing the agency's I.T., I.T.S., and Cybersecurity operations; having previously been the CIO of the Illinois State Board of Elections, as well as Saint Joseph's College of Indiana. Prior to his CIO roles in the Public Sector, Michael worked in a number of information technology positions in the private sector, ranging from start-ups to a global enterprise with holdings in the life sciences, transportation, and resort industries. Michael currently lives in Marina California with his wife Evelia and their English Bulldog, Rose.



IT TAKES A WHOLE DARN VILLAGE



...

How Do Public Transportations Agencies Deal With Technology Change?

→ → The code of tribal wisdom says that when you discover you are riding a dead horse, the best strategy is to dismount.

→ → In public transportation, we often try other strategies with dead horses, including the following:



Changing riders.

Buying a stronger whip.

Appointing a committee to study the horse.

Saying things like “this is the way we have always ridden this horse”.

Arranging to visit other public transportation agencies to see how they ride dead horses.

Increasing the standards to ride dead horses.

Declaring that the horse is better, faster, and cheaper dead.

And... Finally... Harnessing several dead horses together for increased speed.

2024 NoRomBasic