10
A New Network for the Silicon Valley
SANTA CLARA VALLEY TRANSPORTATION AUTHORITY
An innovative apprentice program, testing the latest technologies and complete service overhaul are underway to help VTA better serve its community.

14
Project Update: Fare Collection
Customizable farecards allow for riders to easily pay fares without stopping at a kiosk or counter.

16
Bus Electrification: Choosing the Right Charging Method
Deciding between overnight and in-route charging differ from the needs of each agency.

20
The Wheel Whisperer: Sound Transit’s Good Neighbor Program
An intelligent vibration and flat spot monitoring system enables Sound Transit to ensure trains with unacceptable vibration enter the critical zone.

24
Top 7 Security Mistakes When Designing a Mobile App
As transit systems embrace mobile apps as a new way of connecting with customers, it is crucial that they prioritize security.

26
Avoid Transit App Nightmares
Despite everyone’s best efforts software gets hacked.
ANTA CLARA VALLEY Transportation Authority serves an expansive geographical area. As VTA General Manager Nuria Fernandez described it, it’s a “suburban city.” The challenge of coming up with the right balance for mobility in a spread-out area where 90 percent of the residents drive means they’re looking to balance transportation options for congestion management.

Fernandez said, “We’re not just about buses and trains, we’re also responsible for congestion management. I’m looking for solutions to the ones who want to continue driving, looking for solutions for people who are currently driving but wouldn’t mind riding public transportation if it was more convenient for them ... and then looking for people who are very environmentally conscious and they want to ride their bicycles, they want to walk ...”

Maximizing Service
To better meet those mobility needs in the Silicon Valley, VTA is in the process of a massive overhaul of its routes. Trying to serve everyone in a time when ridership has been declining because of a surge of alternative options, Director of Communications and Marketing

By Leah Harnack
An innovative apprentice program, testing the latest technologies and complete service overhaul are underway to help VTA better serve its community.

By the Numbers
- 90% of residents drive
- 70% of highest ridership potential is serviced by VTA
- 30% of ridership is in outlying locations

SANTA CLARA VALLEY

By the Numbers
- 90% of residents drive
- 70% of highest ridership potential is serviced by VTA
- 30% of ridership is in outlying locations

Maximizing Service
To better meet those mobility needs in the Silicon Valley, VTA is in the process of a massive overhaul of its routes. Trying to serve everyone in a time when ridership has been declining because of a surge of alternative options, Director of Communications and Marketing

By Leah Harnack
An innovative apprentice program, testing the latest technologies and complete service overhaul are underway to help VTA better serve its community.
Bernice Alaniz said they’ve been working with consultant Jarrett Walker to improve the frequency and convenience to make public transportation more desirable.

In the Silicon Valley, in addition to the transportation network companies which have grown everywhere in popularity, there are many corporate shuttles. Through area studies, they’ve seen that 15 percent of the people on those shuttles would be on transit if those shuttles weren’t provided.

“There are all these options,” Alaniz said, “I think there’s a place for all of them … but how do we all work together to solve this mobility and congestion problem?”

Currently VTA is 70 percent providing service where there’s the most potential and where there’s the highest ridership potential and about 30 percent is making sure it serves the south Santa Clara County, the smaller towns, the outlying areas to ensure those people have access.

“The sweet spot was 85 percent service based on utilization and demand and 15 percent on that outlying coverage issue,” Alaniz said. “As we propose this, there are some places that will lose, but maybe public transit fixed-route service isn’t the best solution for that area and how do we make some of those other delivery models and coordinate with them?”

The Bay Area Rapid Transit (BART) Silicon Valley project is the biggest project in the county and will be constructed in two phases. It involves a 16-mile extension of BART into the Silicon Valley, with six stations. It includes relocation of the existing Union Pacific Rail Road tracks and utilities, drainage improvements, grade separation projects and is being managed by VTA. The Berryessa Extension is a 10-mile, two station extension that is expected to begin passenger service by the end of 2017. The second phase will include a 5-mile subway tunnel through downtown San Jose and will extend BART an additional 6 miles and will include four stations.

Part of the VTA system service redesign is incorporating that new service, and that will change the way VTA runs its trains. While a system can’t move its tracks, VTA will reallocate the way it runs its trains and its transfer points to create more direct routes to employment centers.

“We’re going to have 23,000 people on opening day from the BART system coming in to Santa
When the Innovation Center was first getting started in 2014, Miskell said they spent a lot of time going out and talking with customers, trying to better understand what mattered to people most was more time with family. Alaniz said above environmental concerns or saving money, people want the option that gives them the most time with their family and this redesign will offer more frequent service.

At the Forefront of Innovation

Technology is born in the Silicon Valley and Fernandez said they have a responsibility for driving that technology being so close to the heart of it. She said, “If we’re this close and we can’t even test these things or at least get a sense of working with the tech companies as to where this technology is going, we have missed that opportunity.”

VTA has formed partnerships with a number of the tech companies and is working with them to advance technology. The Innovation Center at VTA has modular pieces of the system, including the integral parts of the bus system and rail system, so that technology can be tested there, or they can be tested in mobile units.

Chief Technology Officer Gary Miskell explained the Innovation Center is more of a concept, but it’s a physical space, as well. “The idea was, you can say you’re being innovative, but we ground it with a physical place.

“We try to create an environment where those who have ideas about transit technology or transportation technology can come and meet,” Fernandez said.

When the Innovation Center was first getting started in 2014, Miskell said they spent a lot of time going out and talking with customers, trying to better understand where the technology issues were and what capabilities customers were looking for.

It’s an ongoing learning process and while some projects may not initially go as planned, but there’s always something learned. VTA ran a pilot Flex program, where they were serving an area using an on-demand-type service, similar to a transportation network company. While they found running a pure on-demand service may not be the right operation, Miskell said it taught them enough that a variance could be utilized.

This summer, he said they are working with RideCell to continue the Flex capabilities and apply it to their paratransit service so that instead of calling ahead, it could be on demand.

They are also looking to use that Flex capability with other technology to incorporate in other ways. As Miskell described it, they are looking for ways to give riders more control over their environments.

The Smart Stop was an idea they created and found a vendor — CHK America — willing to build it. The stop and bus can communicate with each other. If it’s cold and dark, the person at the stop has the ability to put in a stop request. The bus could let people at the stop know if the bike rack is full or empty or how many wheelchairs are on board. The Smart Stop allows riders to plan trips with access to all of the tables and schedules.

Incorporating this with their experience from Flex, they are looking to have Smart Stops at a local community center where there are three major bus stops about a mile in each direction that today people have to walk to. With the Smart Stop, the person could walk to the stop and signal to get picked up. “The Smart Stop can be built in to a whole situation,” explained Miskell.

VTA is looking to some of the larger companies near stops to sponsor these Smart Stops. “They would pay enough to sponsor one at that location and one where we want to put it, where you couldn’t get a sponsorship,” Miskell said.

He shared a variety of other projects that VTA has underway, as well, including utilizing artificial intelligence and collision avoidance technology.

VTA is working with Rosco and they have four buses with Mobile-eye collision avoidance installed on them. Miskell said, “It’s in the early stage and we’re trying to make it better and better.” While not quite ready for “prime time,” he said, they anticipate purchasing that capability on future vehicles as they do replacements.

The National Science Foundation (NSF) awarded a 3-year grant to UC Santa Cruz to fund a research project aimed at helping passengers that are visually impaired to navigate VTA. IBM Research was the principal industrial partner for the project that relies on beacons — manufactured by Kontakt.io — on the vehicles and at the bus stops, which navigates the route for the passenger. RouteMe2 software tells the person where they need to turn, whether or not the vehicle pulling up is their bus or train, and whether or not they’re at the front door.
By the Numbers

**The BART**

**16 mile extension**
- 6 stations

**Part 1 Berryessa**
- 10 mile extension
  - 2 stations

**Part 2**
- 6 mile extension
  - 2 stations
- 5 mile subway

---

**Grow Their Own**

VTA is in a position that many agencies are facing: 40 percent of its workforce could retire at any time. Chief Operating Officer Inez Evans said looking at the retirements VTA had coming up, “40 percent of my operators, light rail operators, supervisors, could all walk away and all of that institutional knowledge could walk out with them. We had to come up with a different strategy.”

She said Tom Fink, a former VTA employee and member of the local Amalgamated Transit Union, came up with the concept of the Joint Workforce Investment (JWI) program. She said he was prompted to come up with this because they were seeing so many people not completing the training process. “They were seeing the massive amount of investment VTA was making in training all these people and they weren’t staying.”

With today’s program, when a new operator comes on board they go through a 9-week training course. The graduation for that is on a Wednesday, then Thursday and Friday are JWI classes. Thursday they meet with their mentors, learn about the program and learn what the year ahead in the apprenticeship is going to look like. Friday they ride on the mentor’s route, splitting the time driving. Jamaine Gibson, JWI apprenticeship coordinator, said the new operator can see how the mentor deals with everything while driving and then the mentor gets a chance to observe and evaluate the new operator.

Part of the program includes getting college credits for classes they go through, with everything from customer service to transit leadership. Gibson said it’s the things operators have always done, but now it’s to the point it’s recognized as a skill.

“Most people talk about coach operators, they don’t see the value in it. You’re just ‘driving a bus.’” He continued, “Really, you’re carrying those people’s lives in your hand, those family’s lives. That’s a big responsibility.”

Gibson came to VTA in 2011 after being laid off from his manufacturing job. He started as an operator, went through the apprenticeship program and now is the JWI apprenticeship coordinator, which includes putting together the meetings, doing the paperwork for the college piece of the program, all while still driving a bus.

He said that’s the unusual part that other agencies often ask about, as he’s a union member and coach operator. “They’re like, ‘Who’s watching you?’” he said. “It’s the trust we’ve built between the union and the VTA. We really do it because we want to see the people come in, succeed and that’s going to make VTA successful.”

A huge part of the success for the operators is the mentor component. At the end of the initial training, they are assigned a mentor for a year, though from talking to staff, the mentors go beyond that official timeframe.

Mentors have a patch on their uniform and often when any operator needs someone to talk to, they know they can approach any mentor to get support. Though Gibson’s been with VTA six years now and is a mentor himself, he said he still talks to his mentor every week. “It never stops,” he stressed. “You end up building this relationship; they never go away.”

The biggest hurdle in starting the conversation about a program like this. Evans explained they look at the data to show the value of the program. Customer complaints, accidents, attendance, overtime and retention are some of the data points she mentioned and said that they’ve all seen a positive change. Regarding retention, Evans said they have seen the dropout rate significantly decrease to the single digits.

Evans agreed the biggest challenge is getting buy in from both management and the union because it’s a different concept. “It’s not typically the marriage that is thought of, but I think we’ve been able to prove … we’re all on the same side. We all have the same goal to put serviced out,” she said. “We’re not here to talk about our contract; we’re here to talk about our primary goal, which is serving our community.”

“[You have to] get the union and management to understand you have to leave all of what happened at contract negotiations behind because the community doesn’t care about that.”

“Management has to come to the table with the understanding that it’s a roundtable, everyone is equal, and the union has to be the same way.”

Trust is key in a successful program.

While often operators are getting direction from management that doesn’t have firsthand experience of what it’s like on the operator end, Gibson said, “Now we have the voice to say, ‘We know what you want, but this is what it looks like on the other end.’”

The trust to be able to say as a manager, ‘I’m OK listening to your idea; it may not be what I thought of, but let’s try it your way.’ That’s huge.”

Technical Training Supervisor Maurice Beard agrees that trust is a huge component in the success of the program and that both sides of the equation have to be flexible and have an agreed upon end goal.

“Realistically, there has to be coaches on the road; revenue service has to trump everything,” he said. “We can be as touchy feely about all this as possible, but if we don’t have enough people to cover revenue service, that JWI meeting may get cancelled because we have to go do the job.”

He emphasized, “There’s an understanding on both sides. The flexibility is a big thing.”