

Mobility for All Pilot Project

Accessible Traveler Mobile App (ATMA) Pilot Project



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ACCESS Team guided the project with oversight responsibilities, in partnership with Lilee Systems, BiDaE Technology, IT Curves, Transit Safety & Security Solutions (TSSS), Global Paratransit, Inc. and Rancho Los Amigos National Rehabilitation Center to provide vehicle communication, IoT platform establishment, software development, cybersecurity risk assessment & mitigation, and technical integration services.

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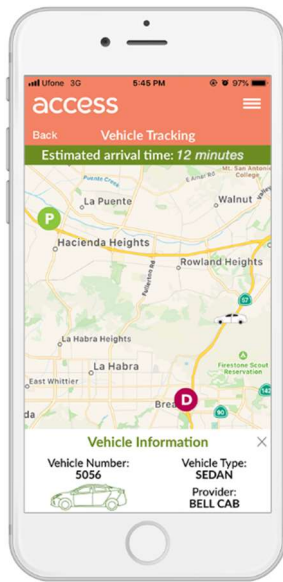
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EXECUTIVE SUMMARY

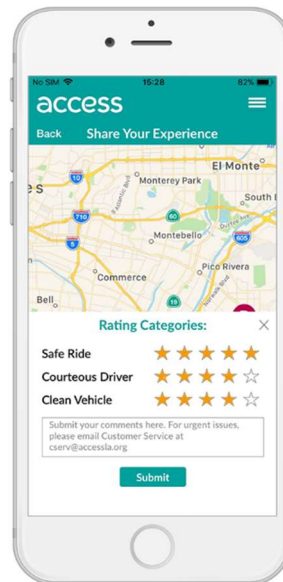
Access Services (Access), a California public transit agency and a direct federal grant recipient, provides Americans with Disabilities Act (ADA) paratransit services on behalf of 45 fixed route agencies that operate across Los Angeles County. In response to the FTA's Mobility for All Pilot Program, Access is proposing an Accessible Traveler Mobile App (ATMA) with a focus primarily on ADA transportation services that is fully compliant with the ADA Section 508 Accessibility and Web Content Accessibility Guidelines requirement. ATMA will not only allow riders to check their real-time vehicle location to receive an estimated time of arrival (ETA) for their trip, but also to book and cancel trips with an account-based mobile fare payment solution. The project involves expanding on the success of Access' existing Where's My Ride mobile app by adding complementary functionality, such as trip planning, trip booking/cancellation, and integrated mobile fare payment. The ATMA pilot project consists of testing, integrating and deployment of the new application to Access' operations in one of our service regions. Access believes that ATMA will greatly enhance paratransit and transit service quality, improve operational efficiency and will also provide significant benefits to people with disabilities and older Americans.

Over the past few years, Access has been on a mission to bring new technologies to its customers. In 2019, Access introduced a Where's My Ride smartphone application that allows its customers to track the estimated time of arrival for their paratransit vehicle and provide immediate feedback for their ride. Access believes this is the first application in the United States to integrate multiple software platforms and taxicabs into one easy to use smartphone app. Access is building on the accomplishments of Where's My Ride by introducing an online trip reservations platform that was launched in June 2019. The success of these two technology projects enable Access to understand its customers' technology acceptance capabilities and gain further confidence to continue to introduce new technologies to assist our riders in their daily life, make the ADA paratransit system more useable and to provide them with improved mobility. It is these accomplishments that led Access to decide to build upon the existing Where's My Ride mobile app to enhance the accessibility of various types of assistive technologies that will improve the usability of transit technology for the disabled community and seniors.

There are a lot of traveler mobile apps available, but none of them are primarily focused on people with disabilities and seniors. Access began development of mobile apps that primarily focus on ADA riders, such as the Where's My Ride (WMR) mobile application. As discussed above, WMR provides our riders with real-time vehicle location on a Google map with Estimated Time of Arrival (ETA), vehicle type and vehicle number via smartphones, tablets and other smart devices (as illustrated below in Graphic 1). It also provides the opportunity for our riders to provide real time feedback on our service with the ability to rate their ride experience to allow Access to further enhance our service quality (as illustrated below in Graphic 2).



Graphic 1.
WMR Mobile App with real-time ETA & Vehicle Info



Graphic 2.
WMR Mobile App Rating Screen

WMR has been a great success ever since it was first launched at the beginning of 2019. More than 9,700 users have downloaded and registered to use WMR. We have averaged more than 10,000 daily ETA requests in October 2019 with a repeat user rate of 93%. WMR not only helps Access riders, but also allows their family members as well as adult day care centers and other facilities to use the app to assist customers with their trips. Given the initial success of WMR, customers and other stakeholders have requested that WMR's functionality be expanded to allow trip booking/cancellation and mobile fare payment.

Looking at the history of public transportation, people with disabilities and older Americans have historically been the last group to be considered for innovative services. Even the new emerging transportation service providers, such as Uber and Lyft, pay little to no attention to these two groups. This unfortunate trend is also evident in existing software development, including mobile applications. Most major software production houses focus on the mass market to maximize their profits. Software developers have only added accessible technology only when required to do so when required due by changing governmental regulations. As one of the largest paratransit operations in the United States, Access is in a unique position to challenge and change the existing mobile application landscape by developing, integrating and testing accessible technologies from the start of the project as they relate to mobility for people with disabilities.

With the ATMA pilot project, Access believes this can be the starting point to change the traditional software development paradigm while meeting all ADA requirements. ATMA will be developed using an open API architecture with open source development tools to allow the flexibility for future expansion should either software developers or transit agencies desire to add additional functionality or to integrate the application into their existing scheduling/dispatching solutions.

The goals of this project are particularly important for ACCESS because ATMA pilot project addresses the agency's mission to provide ADA transportation services to ADA community in the Los Angeles County and to improve equitable access to public transportation by way of publicly available technologies, such as smart devices.

PROJECT SCOPE

ATMA is an accessible traveler mobile app that expands on the success of the existing accessible WMR mobile app that provides customers with an estimated time of vehicle arrival on Google maps, including the vehicle number and driver information, even if the vehicle is a taxicab. It allows riders to access the real time vehicle ETA 30 minutes prior to the scheduled pick up time. Access plans to convert the WMR to ATMA by expanding WMR's functions, including trip planning, trip booking, trip cancellation and integrated mobile fare payment solutions.



The ATMA pilot project scope is as follows:

1. Trip Planning

ATMA will incorporate the regional trip planner introduced by the Los Angeles County Metropolitan Transportation Authority (LA Metro). The trip planning function will allow ADA riders who are able to use transit for some of their trips to access alternative fixed-route trip options, including buses, light rail, and commuter rail.

- a. Same Day Trip Planning: ATMA will conveniently provide alternative trip options to ADA riders looking for same day services that are not currently available via next day Access paratransit.
- b. Next Day Trip Planning: ATMA will also conveniently provide alternative trip options to ADA registered riders along with the option to book an Access ADA trip. Should riders

choose to book the Access ADA trip, ATMA will automatically call up the Trip Booking function.

2. Trip Booking

Trip booking allows Access customers to book their ADA paratransit trip. Similar to booking on the phone or via Access' online reservation system, the app's trip booking function will ask the rider for their pickup address, drop off address, equipment type, personal care assistant (PCA) option, service animal option, and call out & text message option. After the information is provided, the rider will choose a pick-up time and a trip confirmation will be provided.

3. Trip Cancellation

Should the rider decide to cancel a scheduled trip, they can choose the Trip Cancellation function at ATMA and select the particular trip they would like to cancel. Once cancelled, the scheduled trip will disappear from the Scheduled Trip section and will be listed on the Cancelled Trip area.

4. Integrated Mobile Fare Payment

ATMA will provide an electronic mobile fare payment solution to Access riders in addition to the traditional fare payment methods (cash, coupon, credit/debit card). The mobile fare payment solution will be an account based payment system that is compliant with the Payment Card Industry Data Security Standard (PCI DSS). ATMA will automatically calculate and deduct the right fare. The implementation of this fare payment solution will give our customers an additional choice in fare payment and will reduce the need to use cash and coupons, which are an administrative burden on the Agency and its contractors.

5. Multi-Function Bluetooth Low Energy (BLE) Beacon Pilot Project

There are numbers of high trip volume locations around Los Angeles County, such as large hospital complexes, where customers and drivers have trouble finding each other becomes a major challenge. To address this need, ATMA will deploy BLE beacon devices on board the vehicles and at stand signs for select, high trip volume locations in Los Angeles County. Access is planning to use the BLE beacon devices for the following purposes:

a. Wayside Notification

Large complexes often have multiple meeting points marked by Access stand signs. To ensure customers and operators are meeting at the correct locations, a wayside notification function will be part of the ATMA app. The BLE beacon devices installed at the stand signs will serve as the anchor point and broadcast its signal to riders' ATMA mobile app. As soon as the riders enter the BLE beacon signal proximity, it will wake up the ATMA wayside notification function and alerts the riders to where the stand signs are and provide distance and direction based on Google map estimates. It further provides assurances that riders have reached the correct pickup points should multiple service poles/stop signs exist at large facilities/centers. This function is especially useful to riders who are visually impaired.

b. Precision Docking Notification

Access will also install bidirectional BLE beacon device on board the vehicle. This device will receive the wayside BLE beacon signal and inform the driver the vehicle has reached the correct pickup point. Once the vehicle is parked, the ramp has been deployed, the bidirectional BLE beacon will send a signal to wake up the ATMA precision docking function to inform the rider the vehicle is ready to be boarded. This function is especially useful to riders who are in mobility devices and/or are visually impaired.

c. Automatic Mobile Fare Validation

The bidirectional BLE beacon will also serve as mobile fare validator for riders who have chosen to register their mobile fare account via ATMA. Once ATMA has received the bidirectional beacon signal, it will compare the vehicle ID with the scheduled trip and the rider profile. If the information matches, ATMA will automatically activate the mobile ticket and validate the ticket. This will provide convenience to the riders as well as make the boarding process more efficient.

6. Digital Access Identification Card

ATMA will digitalize the real Access identification card with rider's picture embedded. This will eliminate the need for the riders to carry their physical identification card and potentially to reduce the cost of issuing the actual cards to the riders.

As stated, ATMA is a continuation of the existing successful WMR mobile app. The lessons learned and accumulated from the WMR mobile app implementation will definitely carry over to the ATMA pilot project.

PROJECT BENEFITS

ATMA enables customers to see the following benefits from the using the all-in-one ATMA mobile app:

1. Provide an All-in-One Convenient Mobile App for Paratransit Customers

ATMA is an all-in-one fully integrated mobile app that will provide a single entry point for the services described in the project scope section for Access customers.

2. Provide Mobile Fare Payment Alternatives

ATMA provides registered ADA riders with the opportunity to pay seamlessly using their smart phone instead of dealing with cash, coupons or other fare media. The facial ticketing solution is a great mobile fare advancement to people with vision disability.

3. Enhance Rider Experience

ATMA provides not only simplifies essential transportation functions, such as trip booking and trip cancellation, but also adds other innovative features, such as BLE beacon alerts, to further enhance the rider experience. ATMA also provide great added convenience for all users.

4. Improve Operational Efficiency/Reduce Operating Costs

By automating various business processes, from trip booking to fare payment, ATMA allows Access to improve operational efficiency.

5. Provide Scalable Mobile Apps to the Industry

ATMA continues on the same development path used by Access' innovative and successful WMR mobile app, which adopted open sources development tools and open data architecture. This enables ATMA to be used as the baseline and allows others to push the envelope based on their needs. ATMA is a scalable mobile app that can be used by the entire transit industry.

PARTNERSHIPS AND STAKEHOLDER INPUT

In the ATMA pilot project, Access Services partnered with several public sector and private sector partners. The followings are Access' project partners and their roles in the ATMA pilot project:

Partner Category	Partner Name	Partnership Function
Software Development	IT Curves in Gaithersburg, Maryland	Primarily ATMA mobile app development partner
Regional Transportation Organization	LA Metro in Los Angeles, California	Regional fixed route trip planner solution partner Regional fixed route services provider
	City of Santa Clarita Transit Department in Santa Clarita, CA	Rural fixed route services provider
Software Interface	Trapeze Software in Mississauga, Ontario, Canada	Paratransit software solution Interface partner
Cybersecurity	Transit Safety & Security, Inc.	Cybersecurity & PCI DSS solution partner
BLE Beacon Implementation Organization	Lilee Systems in San Jose, CA	Vehicle communications partner
	BiDaE Technology	Design & implement BLE Beacon solution partner
Transit Services provider	Global Paratransit, Inc.	Fleet retro-fitting partner
		ADA paratransit services provider
Health Organization	Rancho Los Amigos National Rehabilitation Center	Facility partner for wayside guidance

ACCESS and project partners have formed various subgroups in design, development, deployment and testing the mobile app. The team also engaged with focus group riders in project design and testing. The project was designed to be a collaborative effort with input from various groups and focus group riders who are subject frequent riders representing the interests of seniors, people with disabilities, veterans, and low-income populations, as well as software designers, transit providers, and health providers. Full Path assembled an Expert Panel, and a subgroup, a Technical Working Group.

More than a dozen meetings were held during the project period. Daily standup meetings were held during the software sprint cycles. The project considered, incorporated and integrated the perspectives and recommendations provided by all project participants and focus group riders.

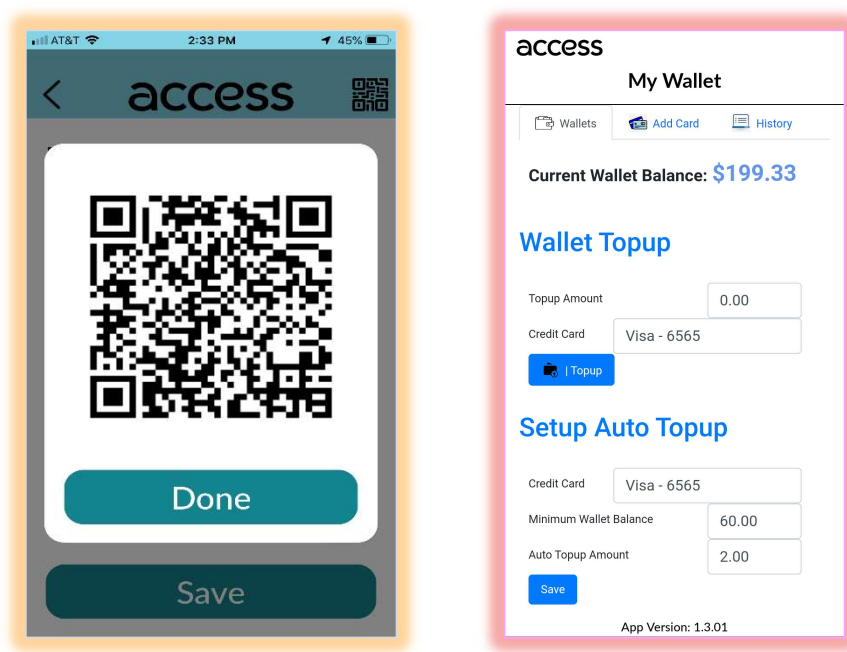
PROJECT OUTCOMES

Building on previous work of WMR mobile app, ATMA project leverages the existing WMR functions with new features outlined in the project scope section. Due to budget issue and the pilot nature of ATMA mobile app, the solution was implemented as followed:

1. ATMA Mobile App

Beta workable version of the ATMA mobile app was developed and fully tested by focus group riders. The all-in-one super app includes the following new features in addition to the existing WMR mobile app features:

- a. Fixed Route Trip Planner: the fixed route trip planner incorporated 46 different fixed routes operators published routes and schedules that conveniently provides fixed route transit services options in assisting ADA riders in their trip planning.
- b. Online Reservation/Cancellation: ADA riders can book and/or cancel their next day trips via the ATMA mobile app.
- c. Mobile eWallet: ATMA can establish the account based fare payment account that connects to the rider assigned financial institutions/payment methods with stored value and replenishment threads to automatically add value to the account for fare payment purposes. ATMA eWallet is compliant with the Payment Card Industry Data Security Standard (PCI DSS)
- d. Mobile Fare Payment: ATMA enabled mobile fare payment via dynamic QR code as an alternative to the exiting fare medias, such as vouchers, credit cards, cashes, ..., etc. Graphic 3 illustrates the QR code and eWallet screens.
- e. Automated Fare Validation: ATMA enabled automated fare validation for mobile ticket riders if they opted automated mobile fare validation feature. Once activated, mobile fare riders can board the vehicle directly without showing the QR code or via facial recognition.
- f. Facial Fare Payment: ADA riders can opt in for facial fare payment option to easily board the vehicle. Artificial intelligence(AI) based facial recognition will recognize the rider facial during the on boarding process and compare it to the facial images stored in the backend database.



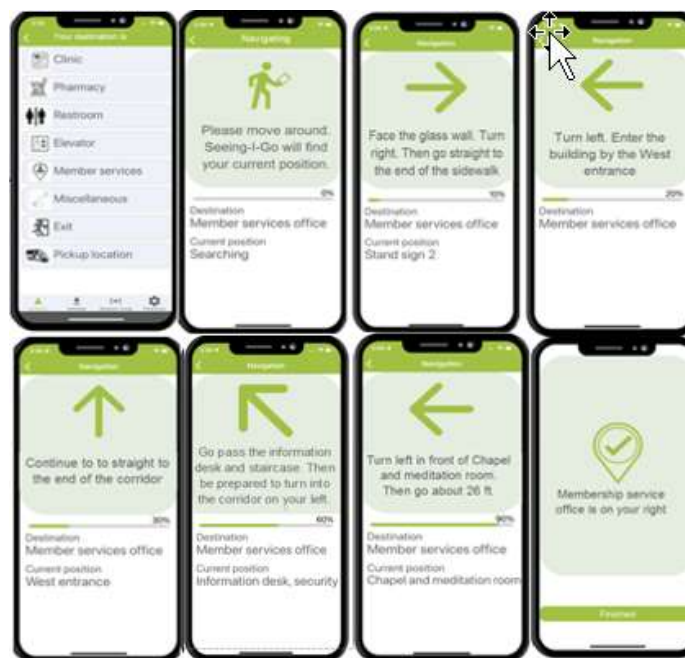
Graphic 3. WMR/ATMA Mobile App Mobile Fare(QR Code)/eWallet

2. Vehicles

Three demo ADA certified vehicles were fully equipped with BLE Beacon devices and facial recognition HD cameras with low latency mobile cellular connectivity. These vehicles in conjunction with the ATMA mobile app can provide precision docking, arrival notification and rider/vehicle verification to enhance rider confidence in riding the transit services and enhance the rider experience.

3. Facility

Working with Rancho Los Amigos National Rehabilitation Center, ATMA pilot project demonstrated the turn-by-turn way side guidance capability to assist riders and visitors in navigating the first floor at the Outpatient Building. There are 32 BLE Beacons installed at Rancho Los Amigos National Rehabilitation Center, riders and visitors can follow the way side guidance mobile app, Seeing-I-Go as illustrated in graphic 4 below, via the screens and voice assistant to their destinations, such as pharmacy, restroom, audiology, registration and entrances. ATMA mobile app incorporated Seeing-I-Go mobile app automatically. Riders can seamlessly left the vehicle at the stand sign at Rancho Los Amigos National Rehabilitation Center from ATMA mobile app arrival notification function to Seeing-I-Go navigation mobile automatically without click/open the Seeing-I-Go navigation mobile app and vice versa.



Graphic 4. Seeing-I-Go Mobile App Navigation Guidance

ATMA pilot project demonstrated how capable the assistive technologies can provide convenience, usability, assistance to ADA community and seniors. It demonstrated a well planned IoT solution in conjunction with software based mobile app can better enhance rider experience without the expensive infrastructure costs. The products developed in this ATMA pilot project are scalable and can be easily deployed at other transit properties or any transit oriented developments.

LESSONS LEARNED

Coordinating is challenging and rewarding

The coordination between partners and stakeholders is not an easy task. The project team experienced difficulties in scheduling, designing, installing, integrating and testing. The project team realized in the early stage that a coordination platform is required to keep the project team bounded together so members can understand the project status and the pain points that need immediate attention. Fortunately, with most team members are familiar with project management methodologies and SCRUM software development sprint cycles, the team quickly deployed JIRA project management platform to keep track of project progresses including the stories associated with the software development, data flow, sprint cycle statuses, ..., etc. The project team also utilizes Microsoft TEAM to conduct virtual meetings such as daily stand up meetings, system integration discussions, acceptance scenarios design, ..., etc., as well as the instance messaging capabilities to communicate with each other.

Well plan in early phases is crucial

The project spent great amounts of time in planning in early phases that have a positive impact to a relatively smooth subsequent phases of developments and testing. A well thought out project plan that incorporated parallel processes for different vendors in different technology development tracks provides a clear pathway forward to the project team members.

Be flexible is vital

The project team members recognize each other's strengths and weaknesses and respect the expertise that each other possesses. Understanding the time constraints and COVID-19 impacts, all team members are willing to accommodate each other's work schedule considering different time zones involved and open minded to accept different suggestions and recommendations while encountering issues. The flexibility presented by each ATMA project team member contribute to the final success of this demonstration pilot in a great way.

Equity considerations are the backbone

ACCESS dedicated our efforts to support the accessibility and usefulness of transit services as described in the agency's mission statement. Most ATMA pilot project team members are involved in assistive technologies that deal with equity justices from the accessibility angle. This allows the project team to focus on equity considerations at the initial stage of the project rather than as an after thought like most private entities have done in their product design and project implementation. ATMA pilot project proved if the project team really serious about the equity considerations, the finishing product will accomplish the goals if they embedded the concept at the beginning of the project design.

ONGOING OPPORTUNITIES– NEXT STEPS

ATMA pilot project has demonstrated what the potentials of assistive technologies are capable of to the transit riders, especially, ADA riders and seniors. With its modularized designed and open sources nature, the solution can be scaled based on budget/funding availability.

Access is planning to deploy the enhanced ATMA mobile app function by function at different times when fiscal budgets are approved. Here are the initial plan for mobile app modules to be implemented in different fiscal years:

Fiscal Year	Function
FY 2022/23	Online Reservations/Cancellations
FY 2023/24	Fixed Route Trip Planner, eWallet, Mobile Fare Payment

ACCESS will continue looking for funding opportunities to implement BLE Beacon IoT related functions at:

- 750+ ACCESS owned dedicated ADA certified vehicles
- 6 heavily trafficked locations
- 6 regional yards
- 2 ACCESS office locations

These will allow ACCESS riders to take advantages of the following mobile apps functions developed as part of the ATMA pilot project:

- Vehicle arrival notification
- Automated mobile fare validation
- Facial mobile fare payment
- Rider/Vehicle verification
- Turn-by-Turn Wayside Navigation

EFFECTS OF COVID-19

The COVID-19 pandemic did negatively affect this project. The ATMA project team delayed the facility BLE Beacon installation at Rancho Los Amigos National Rehabilitation Center until mid-2022 when the COVID-19 vaccination took effect on most people and State of California has gradually opened up the physical activities. Fortunately, with the early planning and coordination via virtual meetings between ATMA project team members and Rancho Los Amigos National Rehabilitation Center staffs, the BLE Beacon installation is completed and tested in less than 3 months. The ATMA project team was able to conclude the user acceptance successfully in September 2022.

CONCLUSION

As ACCESS continue working on incorporate various technologies to enhance rider experience, promote mobility freedom and support all-inclusive equity justice, we have also heard a lot about the difficulties in implementing the solutions for very narrowly targeted groups as well as the high

costs associated with the solutions to be introduced. The common scene is to address the minimum ADA requirement afterward. This is especially true to almost all private entities when they design their solution. No wonder the ADA communities constantly complained the solutions are after-thought and hard to use.

ATMA pilot project provides a proving ground to demonstrate assistive technologies:

- can greatly enhance rider experience in riding public transit
- can promote mobility freedom to ADA riders and seniors
- can be accomplished with low cost IoT solutions
- can be easily implemented if embedded in the project planning and design phases

With the success of ATMA pilot project, hopefully, this can inspire more private entities to reconsider their propositions to enable accessibility functions in their product design.