ACCESS SERVICES

US Department of Transportation
Automated Driving System Demonstration Grants
NOFO Number 693JJ319NF00001 Submission

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ACCESS SERVICES

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FHWA Automated Driving System (ADS) Demonstration Grants

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Project Name	**Paratransit Autonomous Vehicle Pilot Project**
Eligible Entity Applying to Receive Federal Funding (Prime Applicant's Legal Name and Address)	**Access Services PO Box 5728, El Monte, CA 91734**
Point of Contact (Name/Title; Email; Phone Number)	**William Tsuei/Director of IT tsuei@accessla.org, 213-270-6116**
Proposed Location (State(s) and Municipalities) for the Demonstration	**Los Angeles, California**
Proposed Technologies for the Demonstration (briefly list)	**1. SAE Levels 3 & 4 Automated Driving Technologies developed by Lilee Systems & Apollo Autonomous Driving USA 2. New Eagle Vehicle Electronic Control Units 3. Smart Infrastructure developed by Lilee Systems 4. Dispatching, Scheduling and Mobility Software Platform developed by RouteMatch Software**
Proposed duration of the Demonstration (period of performance)	**48 months**
Federal Funding Amount Requested	**$10 million**
Non-Federal Cost Share Amount Proposed, if applicable	**$6 million**
Total Project Cost (Federal Share + Non-Federal Cost Share, if applicable)	**$16 million**

Part 1. PROJECT NARRATIVE AND TECHNICAL APPROACH

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. Access is planning a Paratransit Autonomous Vehicle (AV) Pilot project in West Los Angeles based on Society of Automotive Engineers (SAE) Levels 3 & 4 automation with future expansion to Level 5 automation. Access believes that autonomous vehicles will eventually transform transit operations and can also provide significant benefits to people with disabilities and older Americans. As one of the largest paratransit operations in the United States, Access is in a unique position to test these emerging technologies as they relate to mobility for people with disabilities. Access believes this would be the world's first autonomous vehicle purpose built to be accessible and meet all ADA requirements.

Here is the high-level overview of the Access Paratransit AV pilot project based on the FHWA ADS Demonstration Grants Goals and the planned activities in each phase:

FHWA Grant GOALS:

1. **Safety**: to cover the whole operations including AV, other vehicles on the road, wayside, passengers, pedestrians and others.
2. **Data Collection:** to collect all relevant data for safety analysis to be used by all parties for rule-making, vehicle enhancements, safety improvement, …, etc.
3. **How to Team / Collaborate:** to actively share lessons learned and operational data to be all parties and to effectively foster a good ecosystem to enable AV operations

Phase I: Vehicle Creation (2 types of vehicles) – will overlap with Phase II

- Procure vehicle
- Make ADA compliant vehicle
- Make it an Autonomous Vehicle enabled
- Vehicles: Want a minimum of four (4) vehicles; Maximum of eight (8) vehicles.
    - Chrysler: (similar to Waymo vehicle) Pacifica "plug-in" electric-hybrid with an electric drive-train
    - Dodge ProMaster – conventional van (CNG powered)

Phase II: Smart Infrastructure Establishment

- Seven (7) intersections on the planned corridor will have sensors/data communications established
- Infrastructure Communication includes Traffic Signal Priority (TSP)
- Vehicle will communicate w/ Infrastructure
    - Vehicle automation will have incorporate on-board sensor information with infrastructure information (TSP) to determine (Heuristically) how to & when to proceed

Phase III: Testing & Tuning

- UC Berkeley – Partners for Advanced Transportation Technology (PATH)
    - Have an existing 400 m long test route
    - UC Berkeley will modify test route to mimic actual route for operation
- Vehicle will be tested – and tuned
    - Looking at data:
        - Collected on-board vehicle
        - Data to Infrastructure
        - Data from Infrastructure
    - Data types:
        - LIDAR
        - Laser
        - Camera
        - Dedicated Short Range Communications (DSRC) [narrow-band near range transmissions]
        - On-board
- Data storage:
    - All via 5G or 4G – to a cloud storage – all in real-time or near real-time
    - Video data may stream later (end of session or "at the yard")

Phase IV: Operations

A. Non-Revenue no less than six (6) months – could be up to one (1) year.
    a. Testing the corridor
    b. High-definition map
        i. Localize to precision of 3 cm
    c. Will operate, without passengers, with operator & engineers, and may have additional data sensors
    d. Operate with passengers, but not Access Services clientele – to reduce risk
    e. Finally will ask for Access Services' clients as volunteers

B. Revenue
    a. Full operation point-to-point
        i. No stopping to board/drop-off passengers between end-points
        ii. 15 minute headway
    b. Full operation: on-demand door-to-door services
        i. Will add ¾ mile on either side of the route as a large, geo-fenced geography for services, potentially door-to-door

Phase V: Project Wrap-Up

Usual and customary reports / presentations / lessons learned / recognition:

- Policy recommendations
- Operations Manual
- Architecture | Implementation guide
- Infrastructure recommendation
- Roadmap – next steps :
    - Access plans to relocate vehicles to highest use route(s) – working w/ local authorities in Lancaster, CA (where BYD is manufacturing electric buses)

Project Explanation:

Over the last two years, Access has been on a mission to bring new technologies to its customers. Access has introduced the 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 will be launched in April 2019 to its customers.

Access believes that autonomous vehicle technology can revolutionize how transportation services are provided to the ADA community. This technology has the potential to provide true on-demand mobility to ADA riders and can also provide other benefits to Access' operations. Here are the goals and objectives that Access Services would like to achieve:

1. Provide mobility freedom
2. Improve service quality
3. Understand operational impacts
4. Prepare for workforce changes
5. Reduce operating costs
6. Embrace new technologies for people with disabilities
7. Overcome driver shortages

To further these goals and objectives, Access is interested in pursuing a Federal Highway Administration (FHWA) Automated Driving System (ADS) Demonstration Grant for the purposes of:

a. building ADA compliant autonomous vehicles;
b. implementing smart infrastructure;
c. studying the vehicle to infrastructure (V2I) impact;
d. improving AV safety by integrating a variety of data sources;

e. integrating assistive technologies into AV operations;
f. promoting smart device usage among ADA and senior communities;
g. fostering new technology supply chains and new business opportunities;
h. sharing data and lessons learned with industry peers and research institutions;
i. enhancing mobility for the ADA and senior community.

As the lead agency on this Paratransit AV Pilot project, Access has the following collaboration stakeholders/partners in the consortium format:

Stakeholders:

a. Los Angeles City Department of Transportation
b. City of Culver City Transportation Department
c. Santa Monica's Big Blue Bus
d. VA Greater Los Angeles Healthcare Center

Key Partners:

a. Los Angeles City Department of Transportation – Infrastructure (V2I)
b. Route Match Software – Dispatching, Scheduling, User Front Facing Apps & Mobile Ticket
c. Lilee Systems – Data Communication, Vehicle Technologies, Infrastructure and Back Office Operation Center
d. Lucent/Alcatel – Communication Equipment
e. Apollo Autonomous Driving USA – Vehicle Technologies Software Stacks
f. Lone Star Handicap Vans – Vehicle ADA Modification
g. MV Transportation – Vehicle Operations & Maintenance
h. First Transit – Vehicle Operations & Maintenance
i. New Eagle – Vehicle Electronic Control Component Integration
j. Wistron – GPU/CPU equipment
k. UC Berkeley Institution of Transportation Studies – Data Analytics and Policy Recommendations

The disability and senior communities face numerous mobility challenges that affect their ability to fully participate in society. They are also the last group considered in the development of emerging technologies.

For major domestic car manufacturers, the answer to accessibility is typically to work with aftermarket vendors to retrofit vehicles. However, even though vendors are capable of building retro-fitted ADA-compliant vehicles, they have expressed no interest in building an ADA-compliant AV because it would not be profitable. Without substantial ADA-compliant AV orders, they are hesitant to invest money in this new technology.

Access Paratransit's AV Pilot Project will address the above challenges by:

1. building a fully ADA-compliant and accessible AV;

2. integrating assistive technologies to enhance accessibility and usability;
3. promoting smart device usage among disability and senior communities;
4. educating riders from these communities about AV and related assistive technologies;
5. creating business opportunities with vendor communities to allow additional improvements.

The Access Services Paratransit AV Pilot Project will introduce an ADA accessible service connecting a major light rail service with one of the region's largest Veterans' Administration medical facilities in West Los Angeles. The corridor is about 6 miles roundtrip with zone parking along Westwood Blvd. This corridor consists of speed zones of 20, 30 and 35 MPH as well as residential, commercial and industrial zones.

Access envisions a five phase approach for its Paratransit AV Pilot Project:

1. Vehicle Creation Phase: In this phase, Access is validating that the ADA community can be accommodated by an AV. Two types of vehicles will be procured and retrofitted based on the Chrysler Pacifica Plug-In Hybrid minivan and Dodge ProMaster passenger van. These vehicles will be fully ADA compliant and equipped with proper AV equipment. Access is planning to build 4 of each for high-definition map localization and operations purposes. These vehicles will be equipped with AV technologies provided by two different vendors with two different sets of equipment combinations to produce the best possible technology recommendation at the end of the pilot project.

2. Smart Infrastructure Establishment Phase: In this phase, Access is proving that V2I will greatly increase an AV's ability to navigate in a manner that is predictable and understandable to other drivers, pedestrians, and roadway users. Smart sensors, including, but not limited to, LiDAR, cameras, lasers, ultra wideband sensor, DSRC, BLE Beacon devices will be strategically placed at seven different intersections. These smart devices will not only provide object data, but also provide environmental markers for high definition map scanning, rebuilding and fine tuning. Sensors will also be placed continuously away from the traffic interactions up to 300 feet in all four directions to provide additional object data to the AV in order to enhance the safety of AV operations, especially, in dealing with unprotected left turns and zone parking situations. Traffic signal priority (TSP) data will also be provided to the vehicles for decision making purpose to again enhance the safety of vehicle operations.

3. Testing & Tuning Phase: In this phase, vehicles and smart infrastructure will be testing and tuning during this phase to make sure the vehicle can be operating safely in the driverless mode and incorporating the smart infrastructure information into vehicle decision-making processes. The vehicle testing and tuning will be conducted at:

    a. UC Berkeley PATH Richmond Field Station Facility
    b. PATH DSRC Test bed on California State Route 82
    c. Proposed services corridor in West Los Angeles

Access team will examine AV vehicle data, data to and from smart infrastructure, mobile data communication and data storage capabilities.

4. Operations Phase: The purposes of this phase are to prove effective, safe, reliable, and accessible operations as well as to observe the behavior change and acceptance by riders and other roadway users.
    a. Non-Revenue Services: AV vehicles will conduct non-revenue service on the defined corridor to update the onboard high definition map, test data transmission and accuracy, define street markings, exam smart infrastructure and tune AV related devices and sensors.
    b. Point-to-Point Circulator Services: 6-mile circulator route connecting the Veterans' Administration (VA) Greater Los Angeles Healthcare Center to the L.A. Metro Exposition Line Westwood Station. In this phase, the vehicle will have pick-ups and drop-offs at only the VA medical center and the Expo Line light rail station.
    c. On Demand Services: If time and budget permit, Access Team will pilot a demand based services based on 20-minute wait time that expands the circulator service route to ¾ mile as a geo-fenced service area. In this phase, the pick-up point can be anywhere within the expanded geo-fenced service area. The drop off point will be either the VA West Los Angeles Medical Center or LA Metro Expo Line Westwood Station.

5. Project Wrap-Up Phase: Access team will finalize and provide:
    a. Project Completion Report
    b. Policy Recommendations
    c. Operations Manual
    d. Architecture/Implementation Guideline
    e. Infrastructure Recommendations
    f. Lessons learned
    g. Next Steps Roadmap

The proposed pilot project will have a period of performance of 48 months. The following is the preliminary schedule, subject to change based on unforeseen technology and regulatory challenges:

Project Phases	**Timelines**
Vehicle Creation Phase	12 months (Parallel with Smart Infrastructure Establishment Phase)
Smart Infrastructure Establishment Phase	30 months
Testing & Tuning Phase	18 months (Parallel with Smart Infrastructure Establishment Phase)
Operations Phase	15 months

Project Wrap Up Phase	3 months toward the end of the project

GOALS

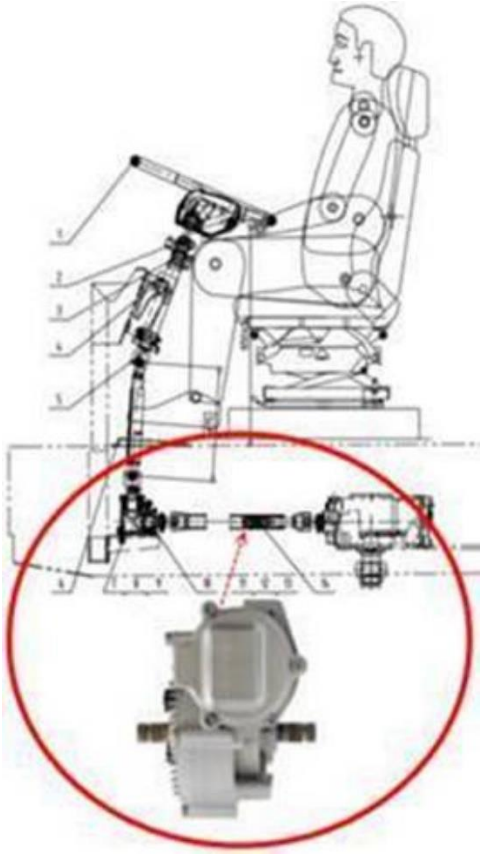
Access Paratransit AV Pilot Project aligns with and/or satisfies the following FHWA ADS Demonstration Grants Goals:

1. Safety
   This project will address the following Safety challenges:

   Vehicle Safety based on autonomous vehicle technologies:
   a. Planning: self-driving algorithm to address vehicle direction, speed, surrounding objects and object status to ensure vehicle travels safely and intelligently
   b. Perception: LiDAR, laser, camera and smart sensors to address object scanning, recognition by providing object data to facilitate the Planning function
   c. Localization: High-Definition Map and computer vision to address GPS location of all objects and locate wayside markings to ensure vehicle travels correctly on the planned route

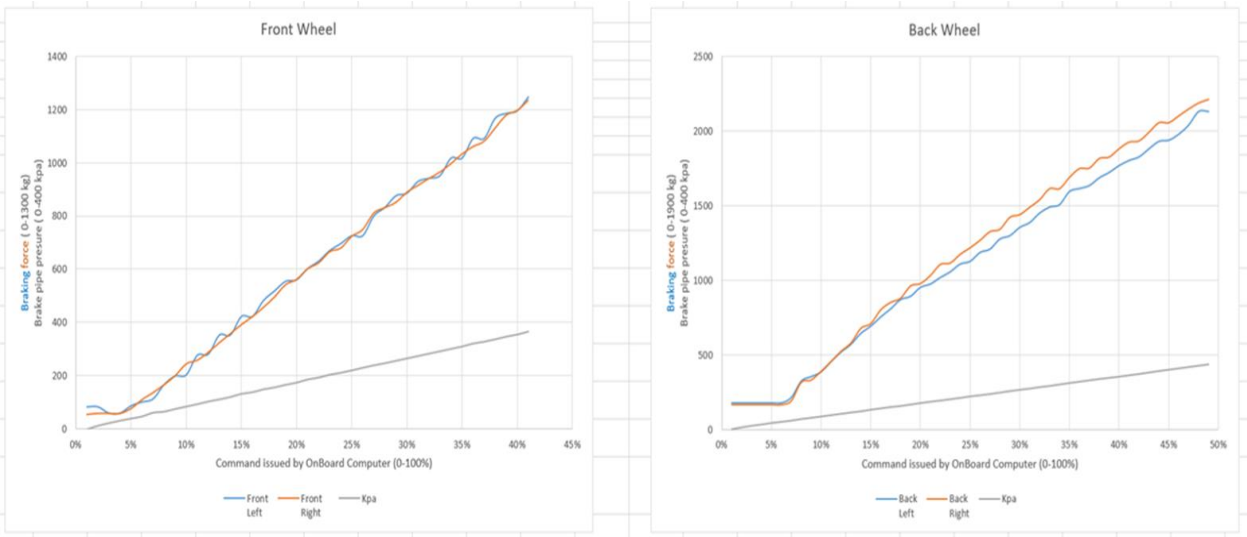
   Environmental Safety data based on smart infrastructure:
   a. Wayside: LiDAR, camera, laser and smart sensors to provide additional distance away object information that cannot be detected by AV technologies to further enhance the safety of vehicle operations to prevent similar fatal accident occurred in Tempe, Arizona
   b. Precision Docking: BLE beacon and camera to provide wayside guidance to ADA riders and to recognize them when they approach the vehicle. These will further improve the boarding safety and ease the anxiety of riders to find the AV

   Other important AV modifications include:
   a. Shifting – Need to work with the transmission vendor in order to interface with their transmission control unit (TCU) for shifting.
   b. Steering – A vehicle grade Electronic Power Steering (EPS) system will be added between steering gear and hydraulic systems to allow steering.



EPS Systems Illustration

c. Throttle – Micro controller with Control Area Network (CAN) bus interface are added between the pedal and engine control module.
d. Braking – Micro controller with CAN bus interface are added into existing air brake system. Depending on the vehicle weight, the braking curve will be different and is not in a linear pattern. Sample benchmarks are provided below.



Sampled Non-linear Breaking Curve Illustration

2. Data for Safety Analysis and Rulemaking:

   Access will work with a UC Berkeley (PATH) researcher to analyze data collected from various data sources and conduct regression analyses to correlate various data. These data will be continuously share with US DOT. PATH will host the data repository and manage the data access.

   The safety related data include vehicle data and smart infrastructure data mentioned above. Access Team will explore different sensor mixes and record the data collected accordingly. For instance, will the LiDar and camera combination be sufficient enough for the vehicle to detect objects? Or, adding additional radar to the vehicle will further improve the safety. PATH will analyze those data sets to identify the best possible sensor combinations in different locations of the vehicle exterior as well as infrastructure and how they correlate to safety by creating the safety metrics. Sample Safety Metrics include vehicle speed vs how far away the smart infrastructure need to build, what data are crucial to unprotected left turn decision making, wheel chair and visual impaired riders safety impacts while onboard the AV, etc.

   The consortium include Lilee Systems, Apollo Autonomous Driving Systems, New Eagle, Los Angeles City Department of Transportation, Access Services, UC Berkeley PATH, Lucent/Alcatel, Deloitte, MV Transportation and First Transit.

   a. The Safety Metrics will be created using the data analyzed by PATH researchers. These data include, but are not limited to:
      (1) On board vehicle data, including data inputs from LiDAR, cameras, laser and sensors;
      (2) Smart infrastructure data, including data inputs from LiDAR, camera, laser and sensors;
      (3) Traffic signal priority data;
      (4) HD map with markings.

   b. Artificial Intelligence and Machine Learning will be utilized to learn from the data set analyzed by PATH researchers. Outcomes will be deployed to the AV decision-making algorithm in real time to continue fine tuning the algorithm to ensure ADS operational safety. It will further be used to establish the baseline for the safety of ADS operations and to continue enhancing the baseline.

   c. The Access Paratransit AV Pilot project will incorporate on board vehicle data, smart infrastructure data and traffic signal priority data to facilitate decision making processes. The lessons learned and actual data collected can be easily applied as a reference to other equivalent light duty and heavy-duty vehicles with minor modifications based on the dimensions and weight of a particular vehicle. The information can also be used for regulatory or rule making purposes.

3. Collaboration.
   Access has formed the consortium to include members that specialize in ADA vehicle retro-fitting, vehicle control, autonomous vehicle technology, smart infrastructure, infrastructure construction, academic research institution, cybersecurity, smart mobility apps and operations. The consortium members include all key partners in the project as well as Los Angeles County Metropolitan Transportation Authority. Access will form a project charter, create a project management plan, including Work Breakdown Structure (WBS), tasks, milestones, deliverables and conduct regular project review meetings to coordinate the project with stakeholders/key partners, to review project progress and to mitigate the project risk. All project related information and data, without sensitive CBI and PII, will be hosted in the cloud with restricted access rights to allow the consortium members, US DOT and, eventually, the general public to review the project.

   Access will also conduct regular outreach activities to engage with riders and to keep stakeholders informed.

FOCUS AREAS

Access Services' Paratransit AV Pilot Project is aligned with the Focus Areas of the ADS Demonstration Grants requirement:

1. Significant Public Benefits
   Access' Paratransit AV Pilot Project is a large-scale project that is designed to incorporate automated driving systems with smart infrastructure to enhance the safety of the AV operations on public roads in mixed traffic conditions. This type of integration will provide significant and valuable data to understand the impact of V2I toward AV operations. This will also help federal, state, and local DOTs understand how to deploy a smart infrastructure environment to ensure the safety of AV operations with the potential to accelerate AV deployment.

2. Address Market Failure and Other Compelling Public Needs
   Access' Paratransit AV Pilot Project will retro-fit existing chassis on two types of vehicles with AV technologies to ensure they are 100% ADA compliant. Currently, no vehicle manufacturer is willing to retool their facility to manufacture a limited number of ADA vehicles (with or without AV technology). Even the ADA retro-fit vehicle vendors lack incentives to invest in enabling AV technologies. Access' Paratransit AV Pilot Project creates the opportunity to allow private sector partners to work together with federal grant support to allow the development of a 100% ADA compliant AV. This opportunity will not only serve to address the market failure to produce an ADA compliant AV, but also to satisfy the compelling public need of an accessible AV to provide enhanced mobility to the ADA and senior communities.

3. Economic Vitality
   Access' Paratransit AV Pilot Project will create positive economic impacts at the local and national levels due to the scale of the project and the expected benefits to future AV development. Access Team will be in compliance with the Buy America policy to make sure key technologies are made in the USA. The economic impacts include:
   a. ADA AV Vehicle Retrofitting: The whole supply chain of the accessible vehicle retrofitting industry and AV technology related industries. The vendors include major vehicle parts manufactures, US high tech industry such as graphics processor unit (GPU) manufacture, central processor unit (CPU) manufacture, LiDar manufacture, HD camera manufacture and software providers.
   b. Smart Infrastructure Building: The construction industry and smart infrastructure technology industries. The vendors include major construction/civil engineering/architecture firms, communication equipment manufacturers and cellular services providers.
   c. Smart Assistive Technologies: The vendors involve in new securement devices, smart sensors and mobility software with ADA focus. The vendors involve securement manufactures, software development firms, audio equipment firms and new startups with innovative products.
   d. AV Operations: The transportation services operators, both public and private. This include all public transit operations related companies.

4. Complexity of Technology
   Access' Paratransit AV Pilot Project will deploy SAE Levels 3 & 4 capable ADA compliant vehicles equipped with automation technologies. These SAE Levels 3 & 4 capable vehicles will also need to interact with a smart infrastructure to be able to make smarter and safer decisions. We will also incorporate cybersecurity from the beginning of the project to make sure we address cybersecurity concerns at vehicle, infrastructure, data and operations levels. Dummy vehicles and pre-arranged roadway users will also be introduced in the test field to prove that emerging autonomous vehicles can safely co-exist in the existing transportation ecosystem. The complexity of technology is beyond SAE Levels 3 & 4 automation technologies alone.

5. Diversity of Projects
   Access' Paratransit AV Pilot Project will engage multiple stakeholders, technologies partners, ADA and senior communities. The outcome will impact a variety of transportation markets, including public paratransit services, community dial-a-ride and non-emergency medical transportation (NEMT) services.

6. Transportation-challenged Populations
   Access' Paratransit AV Pilot Project is focusing on older adults and individuals with disabilities which are transportation-challenged populations. The project will focus on entry, egress and assistive technologies to make the individuals more comfortable in

taking the paratransit AV. We will also try to enhance the vehicle design for accessibility, usability and safety, including the securement and restraint systems for wheelchairs and other equipment for people with disabilities. We will also incorporate precision docking and beacon BLE guideway sensors to assist visually impaired individuals.

7. Prototypes
   Access' Paratransit AV Pilot Project will retrofit two types of vehicles to be 100% ADA compliant AVs. The prototype vehicles developed, once successfully tested, can be deployed to the mass market, transit agencies and transportation related companies. The chosen vehicles are:

   a. Up to four Chrysler Pacifica Plug-In Electric Hybrid Minivan
      Access Services has already completed the Pacifica vehicle study and initiated preliminary engineering for an accessible autonomous vehicle based on the Chrysler Pacifica Plug-in Hybrid minivan. Due to the hybrid battery located underneath the driver seat, it impacts the available ground clearance for ADA low-floor modification. Based on the pre-engineering design, the vehicle will be equipped with air suspension to allow the floor to be lowered 6 inches. An additional 6 inches of space will come from the raised roof design. The vehicle modifier will retest the modified vehicles to ensure vehicle meets safety standards / stopping distance / braking operation post modification due to the change in height and weight. The Access team will embed the AV equipment and sensors into the raised roof. This vehicle will serve as the prototype for future Chrysler Pacifica Plug-In Electric Hybrid minivan modifications. Illustration A shown below is a preliminary design of Chrysler Pacifica Plug-In Electric Hybrid minivan.

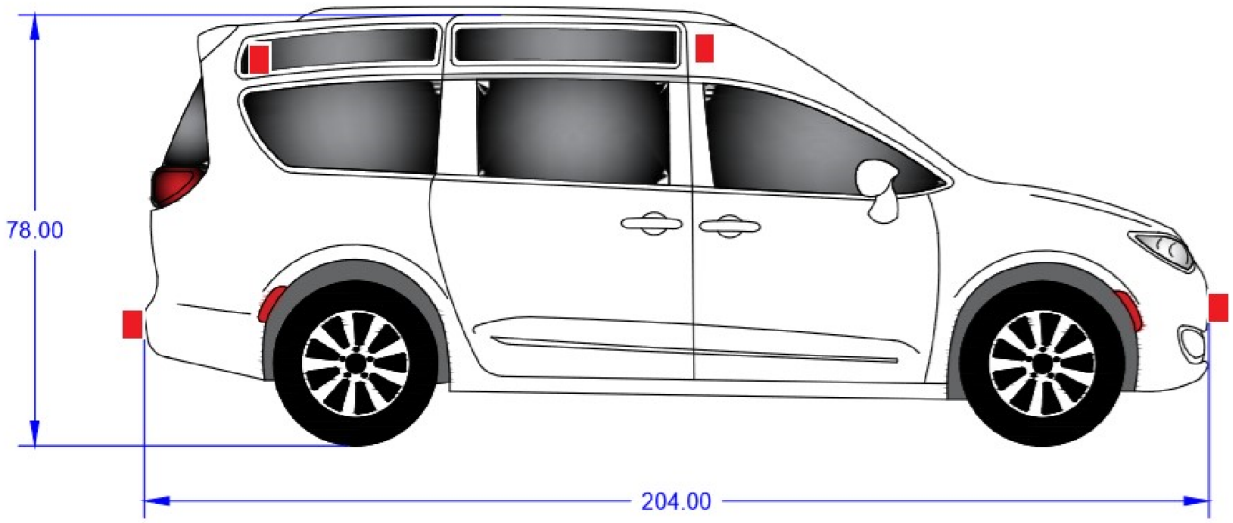


Illustration A, Preliminary Design of Chrysler Pacifica Plug-In Electric Hybrid minivan

b. Up to four Dodge ProMaster Passenger Van
   The Access team will retrofit the Dodge ProMaster passenger van by lowering the vehicle floor by 12 inches to fulfill the ADA requirement. AV equipment and sensors will be incorporated into the vehicle exterior design so it looks much more integrated into the vehicle.. This vehicle will serve as the prototype for future Dodge ProMaster passenger van modifications.

Once the ADA prototype vehicles are built, AV technology vendors will start the installation of various vehicle sensors, on board communication equipment, GPU/CPU computers and various electronic control units to enable SAE Level 3 & 4 capabilities.

Access Team will continue our tradition to assist the paratransit industry in vehicle design and assist to certify these prototype vehicles. Access Team will also share our experience and lesson learned with the transit industry and put together an AV Operations guidelines to assist other transit related peers to scale the applicable technologies across the nation with similar road environment. Access Team will actively participate in US DOT events, webinars and conference to share our demo status, results and lesson learned.

REQUIREMENTS

Access Services has already completed the route study. The Access Services Paratransit AV Pilot Project will introduce an ADA accessible service connecting a major light rail service with one of the region's largest Veterans' Administration medical facilities in West Los Angeles. The corridor is about 6 miles roundtrip with dynamic zone parking along Westwood Blvd. This corridor consists of speed zones of 20, 30 and 35 MPH as well as residential, commercial and industrial zones as illustrated below (Illustration 1 & 2).

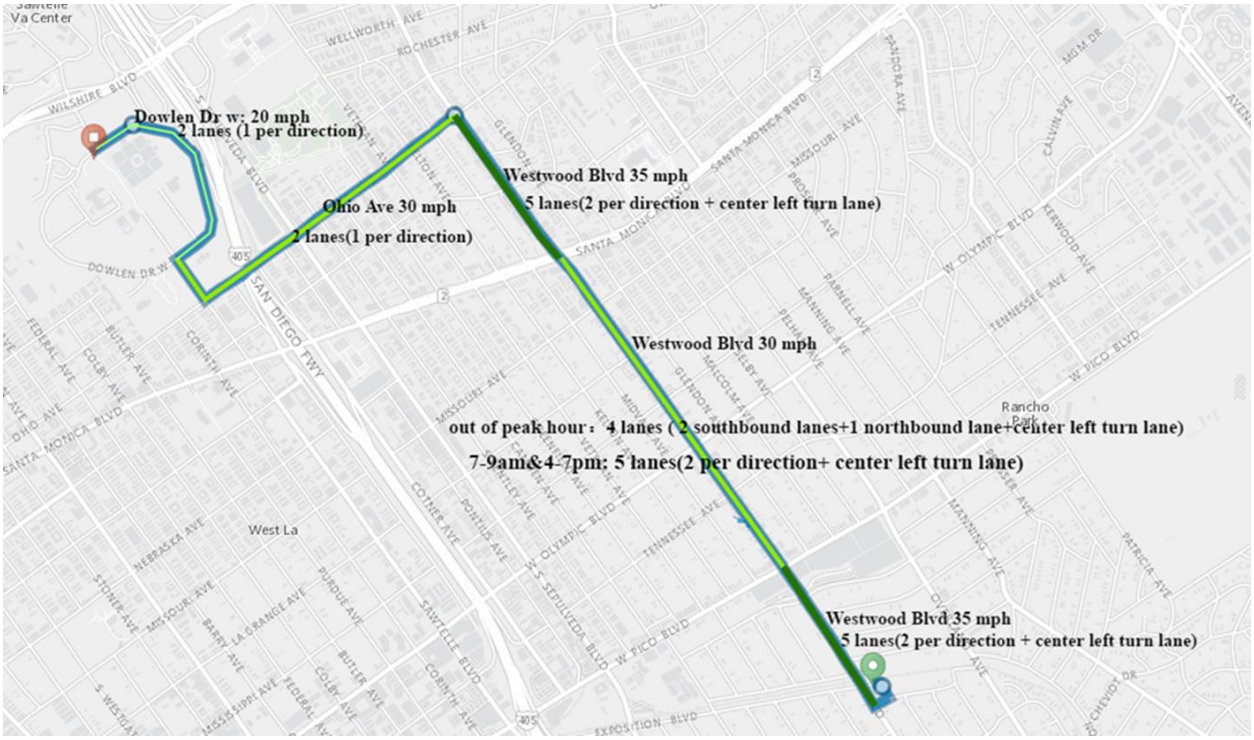


Illustration 1. Proposed Corridor Speed Zones

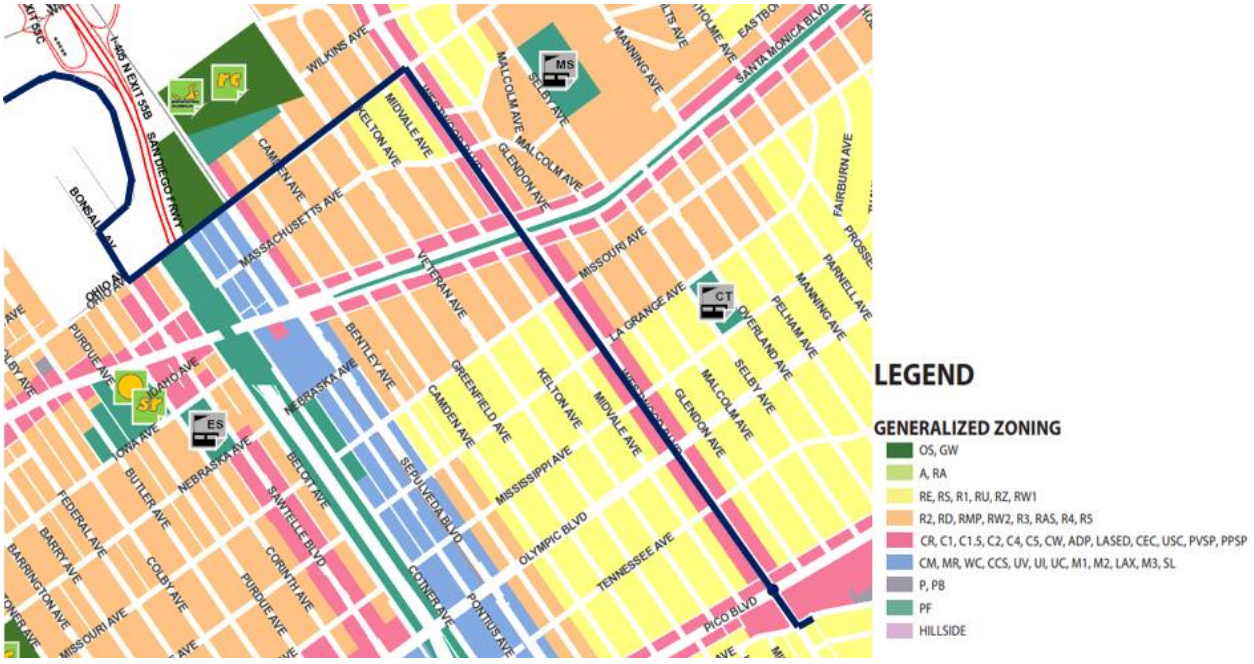


Illustration 2. Proposed Corridor Land Use Zoning

Access plans to provide a first mile/last mile connection between the light rail station and Veteran's Administration health facility at 15 minute intervals. Along the corridor, the Access team will deploy smart infrastructure at several intersections as shown in Illustration 3.

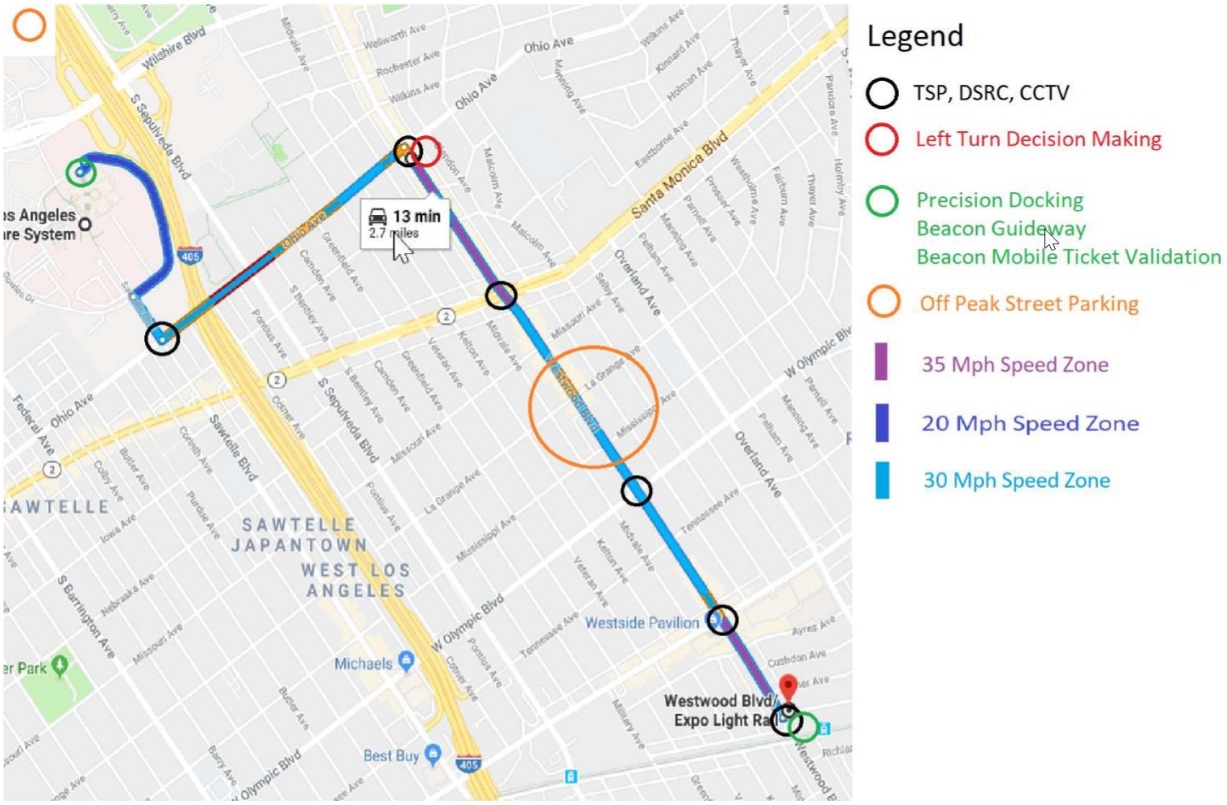


Illustration 3. Smart Infrastructure Deployment

The project will consists of the following physical demonstrations:

1. Vehicle ADA & AV Retrofitting at Tyler, TX
2. Vehicle AV Tuning & Smart Infrastructure Testing – PATH Richmond Station Facility
   Vehicle AV Tuning & Smart Infrastructure Testing – PATH Test Bed California State Route 82
3. Vehicle AV Tuning & Smart Infrastructure Testing – West Los Angeles
4. Non-Revenue Corridor Testing – West Los Angeles
5. Revenue Operations – West Los Angeles

Only location 5 will be opened to public when the revenue operations starts. The other locations will be opened to US DOT and limited to related partners only.

All the physical demonstrations data and testing data will be collected in near real time based on the pre-defined data interfaces and stored in the cloud for research analysis, safety

enhancement, and algorithm improvement purposes. The Centralized Operations Center will be able to monitor all ADA compliance AVs while conducting the demonstrations.

During revenue operations, the mobility application with accessible functions will be deployed to riders with disabilities. Riders will have the ability to view the real time location of the vehicles, the vehicle type, available seating capability and the Estimated Time of Arrival (ETA) via mobile apps or computers. Call center staffs will also be available to accommodate ADA riders without smart mobile devices.

In this pilot project, Access will also deploy a new generation of mobility solutions to assist our riders to ride on the new services. The mobility solution will also provide the service operators with valuable information relating to the service trips, riders, vehicles and pickup/drop off points. Illustration 4 below highlights the concept.

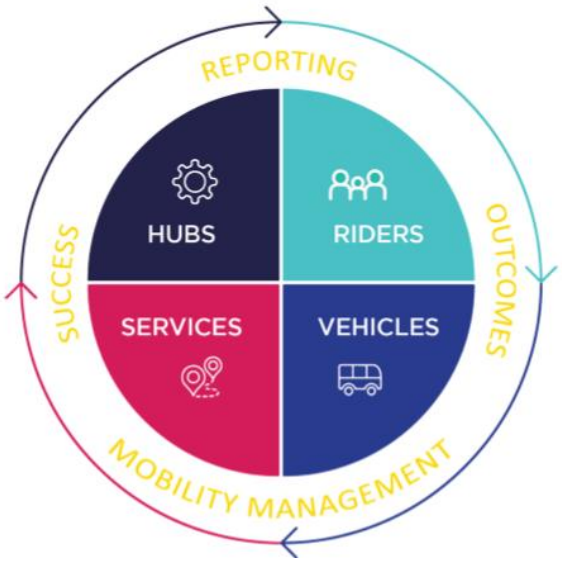
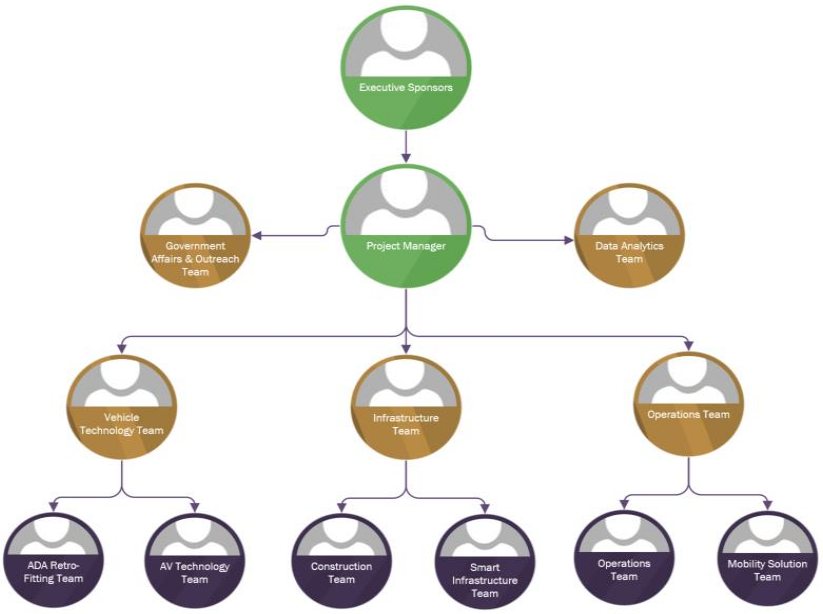


Illustration 4. Mobility Solution Concept

As stated above, Access' Paratransit AV Pilot Project will retrofit two types of vehicles with the intent of incorporating the AV equipment and sensors into the vehicle exterior design so they will not standout.

APPROACH

Due to the complexity and dynamic nature of this project, Access team will organize a project charter to manage the entire project. Here is the sample project charter:



Sampled Project Charter Organization Chart

A comprehensive project management plan (PMP) will be prepared to govern the entire project with WBS, tasks, milestones and deliverables. Weekly, monthly and quarterly meetings will be scheduled based on the project teams assigned.

With the extensive DSRC Connected Vehicle project experience, PATH will assist the Access team with the project in the following ways:

1. Experimental Design
    a. Obtain Human Use Approval from Pre-Demonstration Testing and Demonstration
    b. Obtain Vehicle-Based Data Elements and Infrastructure Data
2. Data Acquisition Testing & Verification
    a. Development of Data Acquisition Plan
    b. Pre-Demonstration Testing
    c. Modify Data Collection Plan
3. Vehicle Testing at PATH Richmond Field Station Facility
4. Vehicle Testing at PATH Test Bed California State Route 82
5. V2X Application Support
6. Data Analysis and Performance Assessment
    a. Data Logging
    b. Data processing, Filtering and Screening
    c. Data Analytics
    d. Data Visualization Tools
    e. Performance Assessment
    f. Monthly and Quarterly Updates and Summary Reports

7. Data Analysis Report & Policy Recommendations
    a. Reporting on analysis of results to define situations that challenge the AV systems;
    b. Reporting how field data experience and performance evaluation reveal necessary ADS enhancements;
    c. Policy Recommendations for City and Regulatory Bodies.

Access understands the importance of data sharing on this project to benefit the entire transit, technology, policy making and construction industries and is committed to providing data to assist in the evaluation of the safety outcomes and other measures of effectiveness, such as mobility.

Access has been committed to sharing and disseminating information about paratransit operations and accessible vehicle development since the inception of the organization. For example, Access Services devoted resources to develop the MV-1, the first accessible, purpose-built, compressed natural gas (CNG) vehicle on the market. Access has also assisted the California Association for Coordinated Transportation (CalACT) in ADA vehicle inspection and certification activities. We also sponsor numerous ADA-related trainings for municipalities, transit agencies and other organizations. Access has also been heavily involved with industry discussions on accessibility issues through the American Public Transportation Association and other groups.

Access understands the importance of sharing information, excluding privacy data, and project findings about bus automation and accessibility with the broader transit community. We will actively participate and facilitate US DOT webinars, seminars, meetings and conferences to share our experience and to help the industry move forward on these important technologies.

Access is retro-fitting an existing chassis that is in compliance with the Federal Motor Vehicle Safety Standards (FMVSS) and Federal Motor Carrier Safety Regulations (FMCSR). Therefore, Access is not seeking exemption from the Federal Motor Vehicle Safety Standards (FMVSS) and Federal Motor Carrier Safety Regulations (FMCSR), or any other regulation.

Both the Chrysler Pacifica Plug-In Electric Hybrid minivan and Dodge ProMaster passenger van are in compliance with the Buy America Act. Therefore, Access does not require an exemption under the Buy America Act or an exemption to the terms of the NOFO Clause at Section F, Paragraph 2.J. entitled BUY AMERICAN AND DOMESTIC VEHICLE PREFERENCES.

With this Paratransit AV Pilot Project, Access understands the complexity of the project and the challenges the project team will be facing in managing, communicating, and coordinating the project. Access will create a risk management/mitigation path along with the project management plan to effectively manage the risks. All hands meeting will be conducted on a weekly basis to allow information sharing among the team. Any concern, delay or issue that has been identified will be logged and tracked until it has been resolved.

From the funding management perspective, Access Finance/Accounting staff have extensive experience in managing the funds, including federal and non-federal resources. Access believes in transparency. Therefore, funding information will be shared with the team and US DOT on a regular basis. All funding information will be recorded and managed in Access' Oracle Fusion Enterprise Resources Planning (ERP) system with wide variety of reports available to conduct auditing activities.