Evolution of Public Transportation
Evolving Technology

Electric Battery, Hydrogen, Biodiesel, APCs, E-Farebox, Trip Planning, On-board Camera
Change
Ridesourcing, Ridesharing and Carpooling
Levels of Autonomy

Our World Today

Autonomous Vehicles “Tipping Point”
Transition from human drivers to vehicles driving

Near to Distant Future

0
HUMAN ONLY
The driver (human) controls everything: steering, brakes, throttle, power

1
MODERN VEHICLE
Most functions are still controlled by a driver, but some (like braking) can be done automatically by the car

2
MODERN PLUS
At least 2 functions are automated (like cruise control & lane-centering), but the driver must be ready to take control of the vehicle

3
PARTIAL AUTONOMY
Drivers are still necessary, but are not required to monitor the situation as with previous levels

4
FULL AUTONOMY (+ HUMAN)
Vehicles perform all safety-critical driving functions and monitor roadway conditions for an entire trip, with option for human driving

5
FULL AUTONOMY (NO HUMAN)
No option for human driving - no steering wheel or controls
Semi-Autonomous
Semi-Autonomous Car
Semi-Autonomous Bus
Semi-Autonomous Truck
Autonomous Technology
Autonomous Vehicles
Autonomous Buses

EasyMile, Navya & Olli
University Innovation

Stanford University

Virginia Tech

Massachusetts Institute of Technology

University of Michigan

Mobility Transformation Facility
6M monthly bus and rail trips

2M people in a 513 sq. mi. service area

50% of population living with ½ mi. of transit

96K monthly vanpool trips

90K monthly paratransit trips
MOD Sandbox Program

• Enhance customer experience
Project Description

Develop an application for users bridging the gap between public and private transportation modes creating a seamless and efficient travel experience for riders.
Project Approach

• Establish a **single mobile application** that combines intermodal trips with an **integrated single payment** system
• Apply **accessible technologies** to promote usability
• **Safety and security features** for incident reporting and allow rider-initiated tracking to a rider-selected person(s)
• Deploy beacon technology to accelerate **mobile ticket validation** and create demographic advertising possibilities
VM Mobility Platform
Current Passenger Information Platform
Tasks

- Project Management
- Equity and Accessibility Plan
- Independent Evaluator
- Knowledge Transfer
- System Development
- System Testing
- Field Demonstration
- Automation Demonstration Lessons Learned
- Project Report
VM Mobility Platform

Phase I

- Enterprise architecture
- Account profile
- Surveys
- Alerts
- Schedules
- Trip planning
- Mobile purchase pilot
VM Mobility Platform

Phase II

- Beacon Technology
- Mobile Ticketing
- Paratransit Integration
- Safety Notification Service
- Bus Arrival times
- Advertising Partnerships
- Additional Security
- TNC Integration
# Partnerships & Project Map

<table>
<thead>
<tr>
<th>Partner Name</th>
<th>Roles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valley Metro</td>
<td>Lead Agency of the Project, Fixed Route, Light Rail &amp; Paratransit Services Provider</td>
</tr>
<tr>
<td>City of Phoenix Public Transit Department</td>
<td>Key partner, Fixed Route/Paratransit Services Provider &amp; FTA Fund Recipient/Manager</td>
</tr>
<tr>
<td>RouteMatch Software</td>
<td>Key Partner &amp; Co-developer of the Mobility Platform</td>
</tr>
<tr>
<td>Arizona State University</td>
<td>Project Partner &amp; Student Shuttle Services Provider</td>
</tr>
<tr>
<td>Lyft</td>
<td>Project Partner &amp; TNC Services Provider</td>
</tr>
<tr>
<td>Uber</td>
<td>Project Partner &amp; TNC Services Provider</td>
</tr>
<tr>
<td>GR:D Bike Share</td>
<td>Project Partner &amp; Shared Bike Services Provider</td>
</tr>
</tbody>
</table>

![Diagram of Partnerships and Project Map](image)
Anticipated Outcomes

• **Increase**
  – RideKick usage
  – mobile ticketing adoption/usage
  – safety & security to riders and service areas
  – revenue generation from advertising channel

• **Reduce**
  – user travel time with improvements to RideKick
  – user wait time with improvements to RideKick
  – amount of traditional fare media usage
  – in-bound inquiries to customer service center
  – per trip costs on paratransit services
Recent Efforts – App Design

LAUNCH APP!

VALIDATE ACCOUNT
Recent Efforts – App Design
Recent Efforts – App Design

Passes Storage

My Wallet Section for Phase One App
Phase One contains a list of valid passes, ready to activate, display and any expired passes.

In Phase Two – this section will change and grow for further history, single/group tickets, etc.

Clear Visibility for Display to Driver & for Inspection
Recent Efforts – App Design

Accessibility Considerations

VoiceOver and TalkBack

Voiceover and Talkback speak items on the screen e.g. in iOS. User can tap once to select an item, Double-tap to activate the selected item and Swipe three fingers to scroll, hence we are cognizant of linear data display and in addition considering the ‘scripted’ text that will need to available to the visually impaired user.
Beacon Technology

RouteMatch
Local Innovation
Autonomous Bus
Potential Pilot Routes

- Site considerations:
  - Controlled environment
  - Campus setting
  - City downtown
  - Business cluster
  - Local testbed
Deployment Spectrum

Base Mobility  Economic Development  Performance Adjustment  Private Sector Needs
Implications for Riders
Implications for the Agency