FTA Research – Defining the Path Forward through Data Driven Decisions and Evaluation Excellence

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FTA Office of Research, Demonstration and Innovation
FTA Research Mission

To advance public transportation innovation by leading research, development, demonstration, deployment, evaluation, and implementation practices and technologies that enhance effectiveness, increase efficiency, expand quality, promote safety, and ultimately improve the transit rider’s experience.

Diagram:
- Safety
- Infrastructure
- Mobility Innovation
- Operations
- Economic Growth
  - Travelers’ Experience
FTA Research Lifecycle
Public Transportation Innovation

- Innovative Development Research
- Foundational Research
- Demonstration Deployment
- Research to Practice
- Evaluation
Performance-Based Research

- **Train staff** – taught staff performance measurement using logic models
- **Develop Tiered (Nested) Evaluation Framework** – Center for Urban Transportation Research (CUTR) now implementing FTA’s vision
- **Create new Data Scientist Position** – just hired data scientist
- **Leverage DOT Data Investments** – Secure Data Commons, National Transportation Library, Bureau of Transportation Statistics, National Transit Database
- **Research to Practice Technical Assistance Center**
## Solution – ‘Nested’ Evaluations

### Level of Evaluation

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
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<tbody>
<tr>
<td>T1</td>
<td>FTA Research Portfolio Results</td>
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<tr>
<td></td>
<td>- Assesses FTA Research plan against our strategic plan</td>
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<td></td>
<td>- Ties to FTA Agency plan</td>
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<td></td>
<td>- Integrates with OST-R and other mode plans</td>
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<td>T2</td>
<td>FTA Research Priorities Results</td>
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<td></td>
<td>- Time-series – compares year over year results (impacts)</td>
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<td>- Based upon Strategic plan goals</td>
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<td>- Builds upon T2 outcomes</td>
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<td>- Assesses how well priorities were met and how they further innovation in public transportation</td>
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<td>T3</td>
<td>FTA Demonstration &amp; Deployment Program Results</td>
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<td>- Evaluates results (outputs and outcomes) of the demonstration grant in accordance with goals and pre-determined measures</td>
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<td>- Harvets success stories for 5312 annual report to Congress</td>
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<td>- Notes further research needed or questions generated by the discovery process</td>
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<td>T4</td>
<td>Evaluation grantee activities within demonstration grant projects</td>
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<td>- Requires technical expertise in the project</td>
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<td>- Led by project manager</td>
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<td>- Establishes clear roles and accountability and process for sharing outputs and results for T1 through T3 evaluations</td>
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<td>- Strong technical assistance component for pilot grantees</td>
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Developmental Concepts for Framework Design

- FTA’s research innovation statutory lifecycle
- Nested tiers of research activity
- Layering of data
- Need to set a long-term method of demonstrating the value of FTA’s research
- Focus on well-understood measures: efficiency, effectiveness, quality
FTA Research Data Strategy

Goal: Create data analytic and business intelligence capacity

Objectives:

• Dev. Quarterly research information dashboard
• Analyze data and connect in with other Federal Data Initiative through new FTA Research Data Scientist – David Schneider
• Re-use and mine both grantee data (Public Data Access Plan management plan Fed. Requirement) and other datasets
• Utilize visualization tools to tell our success stories
Solution – Research to Practice Strategies

• Knowledge transfer through training
• Industry Diffusion
• Operation testing/demonstration
• Partnerships
• Standards Development
• Formal dissemination – webinars, training, website
• Communities of Practice
• Social network marketing
FTA Research Vision – The Path to the Future

Innovative technologies, projects, partnerships, and world-class infrastructure promote economic growth, productivity, safety, and improve quality of life in communities.
The Way Forward to Complete Trips for All
Rik Opstelten, FTA Office of Mobility Innovation

April 16, 2019
Agenda

• The MOD Vision and Mission
• 2016 MOD Sandbox- Review and Initial Findings
• Previewing the IMI NOFO
Mobility on Demand (MOD)

MOD is a vision for an integrated network of safe, carefree, and reliable transportation options that are available to ALL.
The Complete Trip

1. Plan and Book a Trip
   Andy uses a pre-trip concierge application.

2. Travel to Transit Station
   An automated shuttle (rideshare service) is dispatched.

3. Ride the Bus
   While on the bus, Andy receives direction on when to pull the Stop Request cord from his wayfinding and navigation application.

4. Cross the Street
   As Andy approaches an intersection, his safe intersection crossing application communicates with the traffic signal.

5. Arrival at Destination
   Andy safely arrives at his destination, while the pre-trip concierge application plans his return trip home.
Trends: What’s Driving MOD?

**Societal Trends**
- Over the next 30 years, the U.S. population is expected to grow by 70 million
- By 2045 the number of Americans over the age of 65 will increase by 77%

**Technological Trends**
- The transportation sector is increasingly relying on data to drive decisions and to enable innovative travel options
- 72% of Americans own a smartphone, allowing them to access to traffic and transit information to information travel choices
- Automated transportation offers transformation possibilities for safety, mobility, and accessibility

**Mobility and Environmental Trends**
- On average, Americans spend over 40 hours stuck in traffic each year, costing $121 billion
- There is growing popularity of shared mobility and shared modes, such as bikesharing, carsharing, and ridesourcing
Trends: What’s Driving Accessibility?

- 12.8% US population (2016)
- Unemployment Rate – 10.5%; Income: $22,047 (2016)
- Poverty: 24.7% (9.0%)

- 21.4 million Americas are Veterans
- Disability claims: 104,819 (2006) vs. 634,743 (2012); 45% of eligible Veterans file claims for disability
- 2.6 million deployed in 2012
- Spending: $0.93 billion (2006) vs. $5.95 billion (2012)

- 43.1 million age 65+ in 2012 or 1 in 7 people, Expected to reach 72.1 million by 2030
- Disability rates rise as people get older
- 28% live alone
Transit Agency and Private Mobility Partnerships

Partnerships Formed between Transit Agencies and Private Mobility Solutions

<table>
<thead>
<tr>
<th>Time Period</th>
<th>Number of Partnerships</th>
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<tbody>
<tr>
<td>2010 and prior</td>
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<tr>
<td>2011 - 2015</td>
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<tr>
<td>2016 - 2017</td>
<td>42</td>
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FTA Approach to Mobility Innovation

Explore emerging technology solutions and new business approaches

Enable public transportation industry to adopt innovative mobility partnerships and solutions

Facilitate widespread deployment of proven mobility solutions and partnerships
FTA MOD Program Activities

MOD Sandbox
Demonstrations and Evaluations

Performance Metrics

On-ramp Planning support

Innovation & Knowledge Accelerator

Stakeholder Engagement and Outreach

Policies and Practices
Review and Initial Findings

2016 MOD SANDBOX
2016 MOD Sandbox Projects
Results coming soon – “out of the box”

11 Projects: $7,931,080
2016 Sandbox Projects At a Glance
Use Cases from the MOD Sandbox

**Trip Planning/Payment Integration**
- Consolidates options for travelers to plan, book and pay for trips, often through mobile app

**First/Last Mile**
- Bridges gaps in the traditional transportation network by providing trips to and from transit connections

**Supplemental/Extended Service**
- Augments the traditional transportation network when transit service is insufficient or not available

**Flexible Pricing /Incentives**
- Strategies to influence traveler choice on when or how to travel using incentives or games

**Innovative Paratransit Services**
- Technologies and tools to enable more flexibility to plan, request, and pay for paratransit trips, greatly reducing booking and response times, and costs

**Parking Utilization**
- Strategies to help manage parking supply to optimize utilization and access to transit for more individuals
Out of the Box

INITIAL SANDBOX FINDINGS
Overview Findings

- **Public-Private Partnerships** can yield success
- **Inclusive planning** is key to success
- MOD has potential to **Complete Trips in all communities**. Approaches vary based on context.
- **Data and Information** are needed to understand MOD impacts, make operational changes. Challenges exist around privacy, proprietary protections, and accuracy.
- Business models must be **sustainable** for all project partners, throughout the pilot, and beyond.
- **Flexibility** is key to success, risk management
MOD Sandbox Demonstration Evaluation Plans:

- BART: [https://rosap.ntl.bts.gov/view/dot/36425](https://rosap.ntl.bts.gov/view/dot/36425)
- VTrans: [https://rosap.ntl.bts.gov/view/dot/36390](https://rosap.ntl.bts.gov/view/dot/36390)
- Pierce Transit: [https://rosap.ntl.bts.gov/view/dot/36386](https://rosap.ntl.bts.gov/view/dot/36386)
- DART: [https://rosap.ntl.bts.gov/view/dot/36657](https://rosap.ntl.bts.gov/view/dot/36657)
- TriMet: [https://rosap.ntl.bts.gov/view/dot/37168](https://rosap.ntl.bts.gov/view/dot/37168)
- RTA/Pima County: [https://rosap.ntl.bts.gov/view/dot/37169](https://rosap.ntl.bts.gov/view/dot/37169)

...More to come soon!
Advancing Complete Trips for All

PREVIEWING OF INTEGRATED MOBILITY INNOVATION
Integrated Mobility Innovation

“COMPLETE TRIP” for All

- FTA Policies and Regulations
- Accessible Transportation Technologies Research Initiative (ATTRI)
- Strategic Transit Automation Research (STAR)
- Mobility Payment Integration (MPI)
- MOD Sandbox Demos
IMI Notice of Funding Opportunity (NOFO) Goals

- **Explore** new business approaches and emerging technology solutions that support transformational mobility services
- **Enable** communities to adopt innovative mobility solutions that enhance transportation efficiency and effectiveness
- **Facilitate** the widespread deployment of proven mobility solutions that foster expanded personal mobility
IMI Demonstration Program NOFO

- **What it will do**: fund mobility innovations in three areas –
  - (a) mobility on demand;
  - (b) transit automation; and
  - (c) mobility payment integration; all with accessibility in mind

- **Who can apply**: providers of public transportation, public agencies, state/local government, tribal entities

- **How do proponents apply**: applicants may apply for any one or combination of the 3 categories shown above and described on the following slide

- **How much funding is available**: $15M total
Transformative $15M Investment

Mobility on Demand Sandbox ($8M)
- Build on the first round of Mobility on Demand Sandbox projects
- Better connect travelers to overall transportation network
- Explore new MOD accessibility models
- Examine data sharing and data collection methods allowing better understanding of impacts of transportation (economic, societal, personal)

Strategic Transit Automation Research ($5M)
- Automated Shuttles Demonstrations
- Automated Driver Assistance Demonstrations

Mobility Payment Integration ($2M)
- Leverage retail models of payment for public transportation systems
- Integrate regional payment practices (single regional payment platforms)
All progress occurs because people dare to be different.
Mobility Innovation
Complete Trips for All

Bob Sheehan
Office of Mobility Innovation
Federal Transit Administration
Outline

• Applying the complete trip
• Planning and policy implications
• Bringing it all together with the vision for Mobility Innovation
Complete Trip

1. Plan and Book a Trip
Andy uses a pre-trip concierge application.

2. Travel to Transit Station
An automated shuttle (rideshare service) is dispatched.

3. Ride the Bus/Take a TNC
While on the bus, Andy receives direction on when to pull the Stop Request cord from his wayfinding and navigation application.

4. Cross the Street
As Andy approaches an intersection, his safe intersection crossing application communicates with the traffic signal.

5. Arrival at Destination
Andy safely arrives at his destination, while the pre-trip concierge application plans his return trip home.
Planning for the Complete Trip

- Scenarios describe actual or hypothetical trips being made by individuals with specific mobility profiles.
- Individuals have characteristics that make some travel activities challenging within current transportation environments.
- The specificity of these scenarios allows for a detailed analysis of the potential challenges of different groups of travelers.
- Every trip (from Origin A to Destination B) requires travelers perform one or more of these trip activity links
Policies and Practices for Planning

• Strengths, Weaknesses, Opportunities, and Threats
• Organizational Readiness for MOD
• MOD and Equity
• Understanding the Impacts of MOD
• Integration of Mobility on Demand in the Planning Process
• Incorporating MOD into Transportation Modeling
Policies and Practices for Implementation

• Understanding the Role of the Built Environment
• Shared Mobility Implementation
• Data Management and Interoperability
• Multimodal Integration
• Integrating MOD into Public Rights-of-Way and Curb Space Management
• MOD, Taxes, and Transportation Finance
• MOD for Transportation Systems Management and Operations
# Policy Mapping

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<tr>
<th>Policy Issues</th>
<th>Institutional Issues</th>
<th>Legal Issues</th>
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<td>Awareness and Product Development</td>
<td>Changing Demographics</td>
<td>Inconsistent Laws</td>
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<tr>
<td>Funding for Development &amp; Deployment</td>
<td>The Future of Public Transportation</td>
<td>Liability and Indemnification</td>
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<tr>
<td>Funding for Pilot Studies</td>
<td>Seamless Digital and Physical Connections</td>
<td>Equivalent Level of Service</td>
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<tr>
<td>Funding for User Subsidies</td>
<td>Mobility on Demand (MOD) with Transit</td>
<td>International</td>
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<tr>
<td>Research and Development Incentives</td>
<td>Mobility on Demand Replacing Transit</td>
<td>Domestic</td>
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<tr>
<td>Enhancing Awareness of Disabilities Needs</td>
<td>Voluntary Standards</td>
<td>Privacy</td>
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<tr>
<td>Eliminating Barriers in Public Right-of-Way</td>
<td>Future of Mobility</td>
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<td>Planning for Accessibility</td>
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<td>Data Sharing and Auditing</td>
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<td>The Built Environment</td>
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<td>Technology/Innovation Transfer</td>
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<td>Retrofitting Older Infrastructure</td>
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<td>Innovation in Technology and Processes</td>
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Evolution of Research

ICM

Integrated
Collaborative
Management
Service focus

Traveler Centric
Demand-Responsive
Partnership driven
Service focus

MOD
Mobility on Demand

Complete Trip
Accessibility
All abilities
Universal Design

AllRi
Accessible Transportation Technologies Research Initiative

MSAA

HST Assets
Coordinated
TMCC
HST users

MPI
Mobility Payment Integration

Payment
Transactions
Security
Business Models
Mobility Services for All Americans

The MSAA—Improving transportation services and access with a single call.
MSAA Supports Mobility Innovation

• Facilitating Inclusion of Human Service Transportation Resources
• Providing Options to Different Market Segments
• Connecting with HST Destinations
• Promoting Equity
• Encouraging Inclusiveness
2015 MSAA Deployment Sites

Northwest Metro Denver Coordination System – Via Mobility Services

San Luis Obispo County TMCC - United Cerebral Palsy of San Luis Obispo/Ride-On Transportation

Simply Get There Trip Triage Design – Atlanta Regional Commission

Travel Management Coordination Center of Southern Wisconsin - Greater Wisconsin Agency on Aging Resources, Inc.
MSAA Program Outputs

Developer Resources/Digital Toolbox for a TMCC or Mobility Management System

- Resources for Planning and Development
- Resources for Design and Procurement
- Resources for Implementation, Testing, and Full Deployment

https://www.its.dot.gov/research_archives/msaa/developers_resources.htm
Application Priorities and Consideration

Foundational Considerations

- Standard Accessible Data Platform
- Universal Design Standards
- Integrated Payment
- Leverage Existing Technologies

- Pre-trip Concierge & Virtualization
- Wayfinding & Navigation
- Robotics & Automation
- Safe Intersection Crossing
ATTRI and Other Possibilities

Connected Citizens

Enabling Technology Solutions
- User Needs
- Data Sets
- Interoperability
- Universal & Inclusive
- Policy & Institutional Interventions

Smart Wayfinding & Navigation Systems
Pre-Trip Concierge & Virtualization
Robotics & Automation
Safe Intersection Crossing

Transportation
Healthcare
Home
Workforce

Mobility Innovation
Complete Trips for All
Mobility Innovation Principles

**Traveler-centric** – promotes choice in personal mobility driven by the specific needs of the traveler and utilizes universal design principles to capture the needs of all travelers.

**Mode-agnostic** – encourages multimodal connectivity and system interoperability where all modes of travel are considered and integrated seamlessly to achieve the complete trip vision.

**Technology-enabled** – leverages emerging and existing technologies, data connectivity, and standardization to support personal mobility choices.

**Partnership driven** – develop and leverage unique partnerships, both public and private, to accelerate deployment of emerging mobility options.
Brining it All Together

MOBILITY INNOVATION
Complete Trips for All

SUPPLY
- Mobility Services
  - Goods Delivery Services
  - Vehicles (including shared and accessible)
  - Active Transportation
  - Transportation Infrastructure & Facilities

DEMAND
- Travelers (including travelers with disabilities, older adults and other underserved communities)
- Goods (including consumers, retailers, manufacturers, distributors, etc.)

STAKEHOLDERS
- Federal, State & Local Government
- Public & Private Transportation Providers
- Transportation Managers
- Travelers & Consumers
- Banks & Insurance
- Employers

ENABLERS
- Enabling Technologies
- Business Models & Partnerships
- Mobility Data Analytics
- Payment Platforms
- Built Environment
- Policies, Regulations, & Standards
Don't let what you can't do interfere with what you can do.