



ACCESSIBLE TRANSPORTATION TECHNOLOGIES
RESEARCH INITIATIVE

Accessible Transportation Technologies Research Initiative (ATTRI)

Applications Workshop: Day 2

May 19, 2015



Today's Facilitator



Deborah Curtis

Highway Research Engineer, Office of Operations
Research and Development, Federal Highway
Administration (FHWA)



Welcome Back



Gwo-Wei Torng

*Director, Mobility Innovation, Office of Research,
Demonstration and Innovation (TRI), FTA*



Jeff Spencer

ITS Team Leader, FTA

Accessible Transportation Technologies Research Initiative (ATTRI)



Gwo-Wei Torng

*Director, Mobility Innovation, Office of
Research, Demonstration and Innovation
(TRI), FTA*



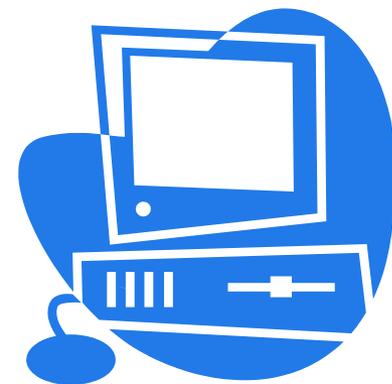
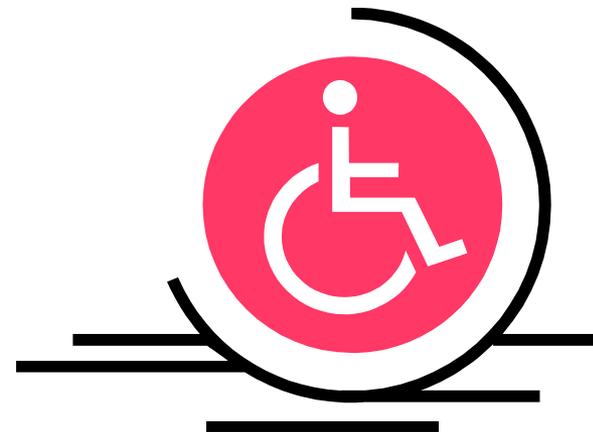
Welcome Back

- Welcome to Day 2
- ATTRI overview
- Review of Day 1 Results:
 - Results from breakout groups
 - Top applications from each technology area
 - Application recommendations for day-2 consideration



Review of ATTRI

- Understand user needs of travelers with disabilities to improve personal mobility
- Build collaboration with stakeholders to design integrated applications addressing diverse needs
- Pursue accessible and multi-modal transportation technology solutions
- Develop applications using universal design principles to ensure benefit to all travelers



ATTRI Focus

Targeted Populations



Persons with
Disabilities



Veterans with
Disabilities



Older Adults

Types of Disabilities



Vision



Mobility



Hearing



Cognitive

Enabling Technologies

ITS,
Wireless and
Sensors

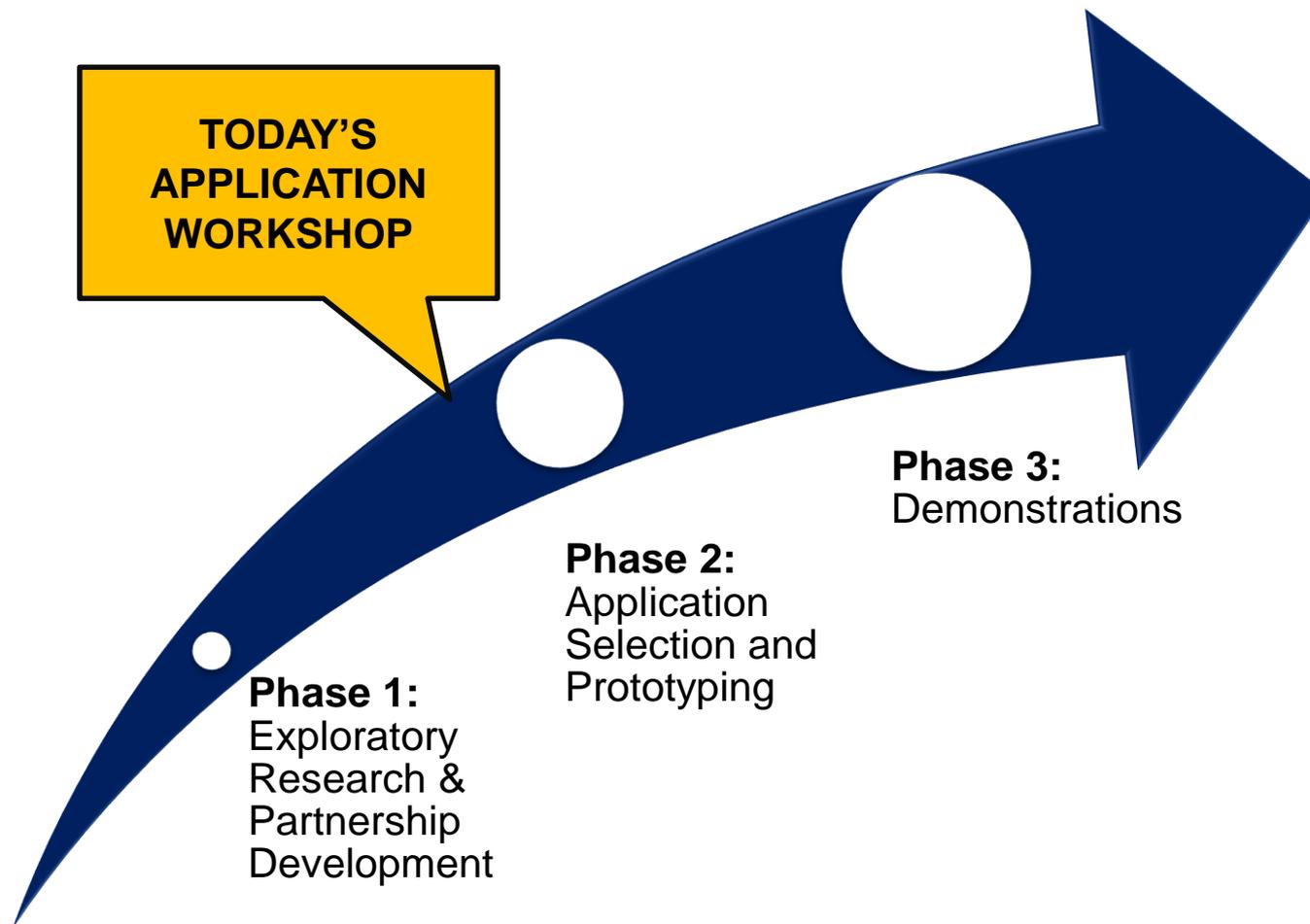
Connected
Vehicles

Automated
Vehicles/ Personal
Mobility

Robotics,
Artificial
Intelligence

Accessible
Data

ATTRI Program Trajectory

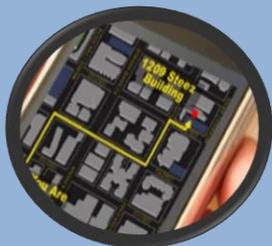


ATTRI is addressing a significant transportation problem in a comprehensive way



ATTRI Technology Research Areas

Wayfinding & Navigation Solutions



- Indoor/Outdoor navigation & orientation Apps
- Situational awareness and text recognition devices

ITS & Assistive Technologies



- Travel and emergency announcements with captioning and haptic/flashing alerts
- V2V, V2I and V2P apps for pedestrians

Automation & Robotics



- Personal mobility vehicles for first/last mile
- Virtual caregivers/concierge services with machine vision/AI, V2X

Data Integration



- Accessibility data and information systems
- Interoperability and data needs

Enhanced Human Services Transportation

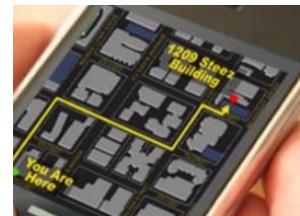


- Real-time multimodal trip planning & services
- Inclusive one-fare payment application for all travelers
- Paratransit to Fixed-route

Wayfinding & Navigation Recommendations

Navigation Systems

- Smartphone-based navigation systems for indoor and outdoor use as an affordable option
- Provide pre-trip and in-route traveler information (crowd sourced)
- Design for people with blindness, low vision, cognitive and mobility issues
- Beacons or electronic tags to interact with the built environment
- Multiple communication formats (visual, audible, haptic) including multiple languages



Wearable Technologies

- Wearable but needs to be discreet
- Connect with assistive devices already in use (e.g. white cane)



Community Navigators

- Use community volunteers to provide data on their neighborhoods.



ITS & Assistive Technologies Recommendations

- Pedestrian, vehicle, and infrastructure communication at intersections
 - Adaptive Pedestrian Signal Timing
 - Emergency vehicle and safety alerts (to and from pedestrians and vehicles)
- Real-Time situational awareness of transit system
 - Information from the system (e.g. next bus, route status, availability of accessible capacity)
 - Data from user to the system (reservations or needs for accessible technology)
- Shared use of accessible assets (e.g. school buses during the day)
- Drive by Wire systems
 - Connected vehicle technologies and applications to open more vehicle data for assistive driving systems using drive by wire



Automation & Robotics Recommendations



1. **Robo-Ped** - Automated Robotic Characterization of Pedestrian Zones
 - Crowdsourced/Fleet, networked, real-time
 - Provides Market Intelligence
 - Smartphone / Mobile App
2. **RoboScout** – Machine and robotic cross-walk assistant
 - Leverages existing ITS and V2I technologies
 - Safe and Connected
 - Link to fare media
3. **RoboSAV** - Slow-speed Automated Vehicle Connectivity
 - Provides autonomous assistance to destination in constrained environment.
 - Demand Responsive, Real-time, Ridesharing

Data Integration Recommendations

- Real-time, accessible trip planning
 - Data clearinghouse with customer profiles
- Provide operational performance/real-time information on service providers to users (transparently)
 - e.g., vehicle location
- Standardization
 - customer profiles/data
 - service provider



Enhanced Human Services Transportation Recommendations

- **Capacity Sharing**
 - Door to door multimodal service to both local and long distance trips
 - System that utilizes unused capacity from vehicles (such as paratransit vehicles) to provide additional trips
 - Begin application development with specialized trips (educational, medical, employment). Longer term: broaden system to provide additional trips including shopping and recreational
 - User friendly with easy to understand icons to request pre-programmed trips (such as 1, 2, 3 and Home)
- **Universal payment system:** Smart Card type payment system that could be used for all travel (could be app) – go across modes and agencies
- **Virtualization of routes** - for passengers and caregivers – Passengers could see their entire routes on an app with landmarks (to remove fear and facilitate independent mobility). At the same time the caregiver could help plan routes and track travelers movement



Accessible Transportation Technologies Research Initiative (ATTRI)



Jeff Spencer
ITS Team Leader, FTA



Application Workshop Day 2 Overview

- Identify the top potential technology applications based on yesterdays technology breakouts
- Use scenarios based on the 4 functional groups to continue developing and prioritizing applications from all 5 technology areas
- Following today's breakout sessions, the ATTRI team will consolidate and integrate the prioritized applications
- At the end of today we will have a poll to prioritize the potential applications to be considered for development through the ATTRI program



Vision



Mobility



Hearing



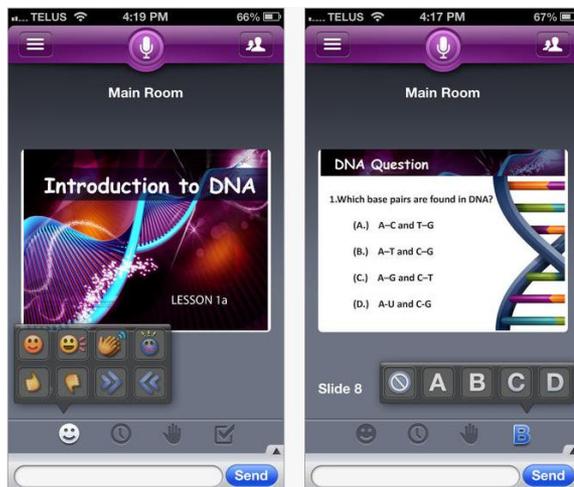
Cognition



Blackboard Collaborate

Voting Exercise

- From your smartphone or tablet, go to the app store and search **Blackboard Collaborate**
- It is a free app. Follow the instructions to download the app
- If using a laptop, follow instructions sent by email
- Alternative voting options are available upon request



Agenda – Day 2

Time	Session
8:30am	Welcome and Introductions
8:50am	Keynote Address – Ms. Judith Heumann, U.S State Department
9:30am	Breakout Session Introduction
9:45am	Breakout Sessions: Functional Areas
11:00am	Break – reconvene in the Capitol Ballroom
11:15am	Breakout Reports
12:00am	Lunch Break
1:30pm	Expert Panel
3:00pm	Break and Participant Voting
3:30pm	Voting Results
4:00pm	Workshop Summary and Next Steps
4:30	Adjourn

Keynote Speaker



Judith Heumann

*Special Advisor for International Disability Rights for the
U.S. State Department*



Breakout Session Introduction



Bob Sheehan,
Program Manager
Multimodal ITS, ITS JPO

Breakout – Functional Areas

- Vision
- Mobility
- Hearing
- Cognitive



Vision



Mobility



Hearing



Cognition



Functional Area Breakout - Purpose

- Determine the applicability of the top technologies selected on Day 1 to each scenario
 - Each scenario is intended to focus attention on a specific functional area
 - Each scenario does not represent everyone who might fall within that category
 - Consider the applicability to the broader description of the functional need category



Functional Area Breakout – Session Flow

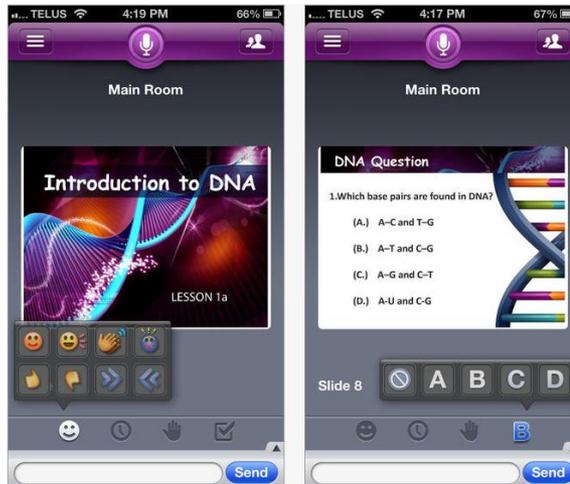
- Review ground rules and recommendations from Day 1
- Review functional area scenarios
- Discuss broader description of the category
- Discuss, clarify, edit, add and consolidate application recommendations from Day 1
- Prioritize candidate applicable technologies
- Consensus reporting on potential technologies
- Application recommendations will be synthesized for group voting



Blackboard Collaborate

Voting Exercise

- From your smartphone or tablet, go to the app store and search **Blackboard Collaborate**
- It is a free app. Follow the instructions to download the app
- If using a laptop, follow instructions sent by email
- Alternative voting options are available upon request



Breakout Sessions

1. Vision – **Capitol Ballroom**
2. Mobility – **Congressional II**
3. Hearing – **House**
4. Cognitive – **Congressional I**



Short Break





ACCESSIBLE TRANSPORTATION TECHNOLOGIES
RESEARCH INITIATIVE

Accessible Transportation Technologies Research Initiative (ATTRI)

Functional Area Breakout Results

May 18, 2015



Functional Vision Ability Recommendations

- Wayfinding and navigation based on standardization
 - Smartphone-based navigation systems for indoor and outdoor use as an affordable option
 - Real Time Data from multiple sources
 - Wearable technologies
 - Emergencies and Evacuations
 - Mapping and Beacons
 - Multi-use
 - Crowd sourcing
 - Ensure continuity between systems

- Fare payment systems
 - Tactical
 - Haptic
 - Provide feedback to the user on balances



Image Source: Thinkstock

Functional Physical Ability Recommendations

- Accessibility Data – Real-time, machine to machine communication through sensors, drones. Asset management and information distribution to users. Augmented with crowdsourced data and ratings, cloud-based shared-use, standardized data which carries user profiles, provides market and policy triggers.
- Robo-Ferry, Machine and robotic cross-walk assistant that leverages existing ITS and V2I technologies, Smartphone / Mobile App and provides real-time info to users
- Accessible Bikeshare, RoboSAV, Shared-use mobility for accessibility uses



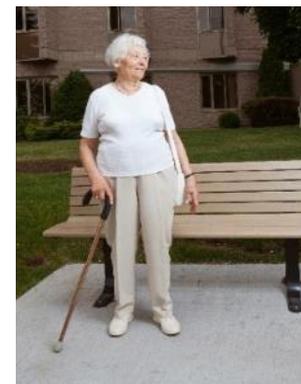
Functional Hearing Ability Recommendations



- Virtualization (application for phone/computer)
 - Pre-trip planning
 - Available resources
- Trip Execution (mobile tool)
 - Data integration
 - Real time trip information (upcoming stops, vehicles, etc.)
 - Rich emergency/detour information (all audible announcements)
 - Multiple languages
- Wearable technology
 - Use mostly commodity technology
 - Emergency alerts
 - Approaching emergency vehicles, pedestrian pathway vehicles approaching from behind, etc.
 - Some way to determine what is happening (situational awareness)

Functional Cognitive Ability Recommendations

- Pre-trip planning application
 - Simple design
 - Visual/Audible/Virtual presentation
 - Customer profile
- En-route travel assist/navigator (helps with execution)
 - Door-to-Door
 - Real time data
 - Service changes or disruptions
 - Visual/Haptic/Audible cues as alerts
 - GPS locator for tracking
- Traveler Locator/Caregiver Visibility
 - Where are you?
 - Wearable GPS
 - Connected person
 - Helps with safety at crosswalks



Lunch



Expert Panel



Mohammed Yousuf
FHWA



David Bevly
Auburn University



Bob Ferlis
FHWA



Ruth Brannon
NIDILRR



Mary Leary
FTA



Corey Clothier
Local Motors



Mohammed Yousuf

ATTRI Program Manager, Office of
Operations and Research Development,
Federal Highway Administration



Ruth Brannon

*Director, Research Sciences Division, National
Institute on Disability, Independent Living and
Rehabilitation Research (NIDILRR)*



David Bevly

Associate Professor, Auburn University



Bob Ferlis

*Technical Director, Operations Research and
Development, FHWA*



Mary Leary

*Division Chief - Rural and Targeted Programs,
Office of Program Management, FTA*



Corey Clothier

*Local Motors, AMP'D, and Applied Robotics for
Installation and Base Operations (ARIBO)
Program*

Expert Panel - Discussion



Mohammed Yousuf
FHWA



David Bevly
Auburn University



Bob Ferlis
FHWA



Ruth Brannon
NIDILRR



Mary Leary
FTA



Corey Clothier
Local Motors

Voting Process

1. We will send out an email
2. Open your e-mail on your phone and look for the message with the subject line “Voting.”
3. Click the Blackboard link in that e-mail. It will open using your newly downloaded app.
4. Alternatively, you can open you app and type:
<https://goo.gl/VBUQfq>
5. When the polling question is up on your app, choose your selected answer and respond.



ATTRI Foundational Considerations

- Standard Accessible Data Platform
 - Examples: machine to machine, crowdsourced, archived and real time data, open data, user profiles, sensors, data standards, etc...
- Universal Design Standards
 - Multiple accessible communication formats and user interfaces
- Integrated Payment
- Leverage Existing Technologies
 - Wearables, mobiles devices, in-vehicle displays, infrastructure, etc...

ATTRI Application Recommendations

- Pre-Trip Concierge and Virtualization
 - Planning, reservations, itinerary
- Smart Wayfinding and Navigation systems
 - Real-time en-route support, virtual caregiver
- Shared Use, Automated Vehicle
 - Slow speed, personal mobility, small footprint vehicle
- Safe Intersection Crossing
 - Pedestrians interface with traffic signal and vehicle receive alerts
 - Automated intersection crossing assistance

Voting Question #1

Which application do you rank with the highest priority?

- A. Pre-Trip Concierge and Virtualization
- B. Smart Wayfinding and Navigation Systems
- C. Shared Use, Automated Vehicle
- D. Safe Intersection Crossing



Voting Question #2

Which application do you rank with the **second** highest priority?

- A. Pre-Trip Concierge and Virtualization
- B. Smart Wayfinding and Navigation Systems
- C. Shared Use, Automated Vehicle
- D. Safe Intersection Crossing



Workshop Summary and Next Steps



Mohammed Yousuf

FHWA

ATTRI Program Manager



Voting Question

Which application do you rank with the highest priority?

- A. Pre-Trip Concierge and Virtualization – 8/39 (20.5%)
- B. Smart Wayfinding and Navigation Systems – 17/39 (43.6%)
- C. Shared Use, Automated Vehicle – 9/39 (23.1%)
- D. Safe Intersection Crossing – 5/39 (12.8%)

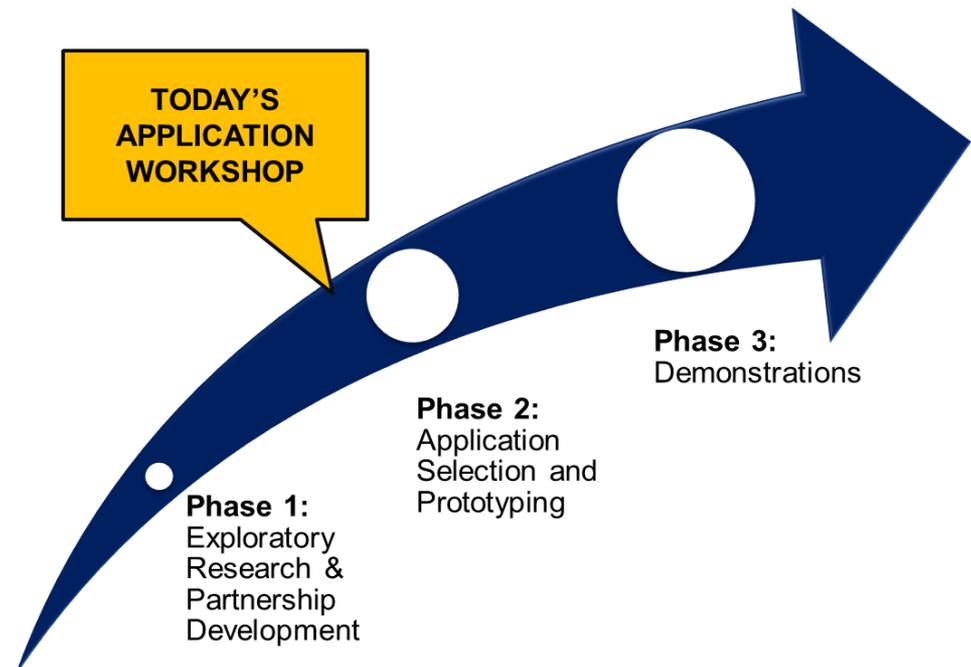
Voting Question

Which application do you rank with the **second** highest priority?

- A. Pre-Trip Concierge and Virtualization – 9/22 (40.9%)
- B. Smart Wayfinding and Navigation Systems – 5/22 (22.7%)
- C. Shared Use, Automated Vehicle – 4/22 (18.2%)
- D. Safe Intersection Crossing – 4/22 (18.2%)

ATTRI Path Forward

- Review results of user needs assessments and stakeholder outreach
- Review results of ATTRI technology scan
- Synthesize and document results of application workshop
- ATTRI Phase 2
- Begin to identify application development strategy



Phase 2 Plans & Upcoming Tasks

- Institutional & Policy Issues Assessment
- International Research Coordination
- ATTRI Social-Economic Impact
- Outreach & Coordination
- Standards Development & Harmonization
- Concept of Operations & System Requirements
- Interaction and Effects of ATTRI Applications on the Non-user

ATTRI Applications Selection

Key Future ATTRI Activities & Schedule

- ATTRI Applications Selection
 - ATTRI Applications Workshop – May 2015 - *Completed*
 - ATTRI Applications Announcement – Summer/ Fall 2015

- Stakeholder Outreach & Partnership Building
 - NIDILRR/DOT Roundtable on Accessible Transportation– June 2015
 - ITS World Congress Panel – October 2015
 - TARDEC/DOT ATTRI/ARIBO Non Users Study

- ADA 25th Anniversary Multi-Agency Challenge
 - Tentative DOL/DOT challenge on ATTRI technologies proposed for July 2015 announcement

Thank You!



Mohammed Yousuf
Research Transportation Specialist
Federal Highway Administration
Mohammed.Yousuf@dot.gov
(202) 493-3199



Bob Sheehan
Transit Program Manger
ITS Joint Program Office
Robert.Sheehan@dot.gov



Jeff Spencer
ITS Program Manager
Federal Transit Administration
Jeffrey.Spencer@dot.gov