Understanding the complete trip using TSMO and MOD

Bob Sheehan, ITS JPO Multimodal ITS Program Manager



Table of Contents

- Setting the stage
 - Mobility on Demand Vision
 - Defining TSMO
- The Complete Trip
- User-Focused Mobility
- Active Transportation and Demand Management
- Bring the trip chain and complete trip together
- Finishing with holistic view of multimodal management
 - Expand partnerships and integrate stakeholders
 - Expand geographic scope
 - Expand technical capability and functionality



The Mobility on Demand (MOD) Vision

The United States Department of Transportation (USDOT) uses the term Mobility on Demand (MOD) to represent its vision for future mobility. MOD envisions a safe, reliable and carefree mobility ecosystem that supports complete trips for all, both personalized mobility and goods delivery.

USDOT achieves this vision by leveraging innovative technologies and facilitating public private partnerships to allow for a user-centric approach that improves mobility options for all travelers, and delivery of goods and services.



Traveler-centric



Mode-neutral



Technology-enabled



Partnership driven





Defining TSMO

"Integrated strategies to optimize the performance of existing infrastructure through the implementation of multimodal and intermodal, cross-jurisdictional systems, services, and projects designed to preserve capacity and improve security, safety, and reliability of the transportation system"

Definition of Transportation Systems Management and Operations (TSMO) as stated in 2012 Moving Ahead Progress in the 21st Century (MAP-21) legislation



THE COMPLETE TRIP

After his doctor's appointment, Andy decides to take a spontaneous trip to meet a friend at a coffee shop in an unfamiliar part of town, Using ATTRI's pre-trip concierge, wayfinding and navigation, robotics and automation, and safe intersection crossing applications, Andy can travel with confidence throughout his trip.

5. Arrival at Destination

Andy safely arrives at his destination, while the pre-trip concierge application plans his return trip home.

1. Plan and Book a Trip

Andy uses a pre-trip concierge application to plan and book his trip from the doctor's office to the coffee shop.

4. Cross the Street

intersection, his safe intersection crossing application communicates with the traffic signal to ensure sufficient time for him to safely cross the street. and notifies him when it is safe to begin crossing. The application also

of Andy's presence in the

intersection.

۲Ì As Andy approaches an Citizens. Assoc communicates with nearby cars to notify them

2. Travel to Transit Station

An automated shuttle

(rideshare service) is dispatched to take Andy to the transit station based on his booked trip. Once there, an assistive robot helps Andy to his bus platform.

3. Ride the Bus

S

While on the bus, Andy receives direction on when to pull the Stop Request cord from his wayfinding and navigation application. After he departs the bus, the application provides Andy with turn-by-turn walking directions to the coffee shop.



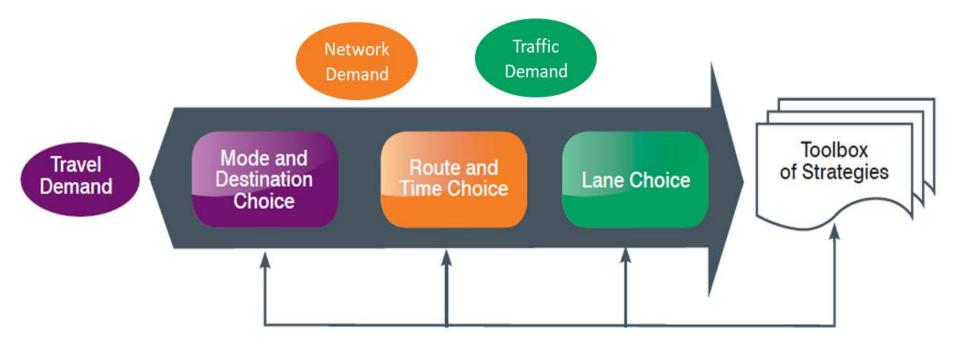


User-Focused Mobility



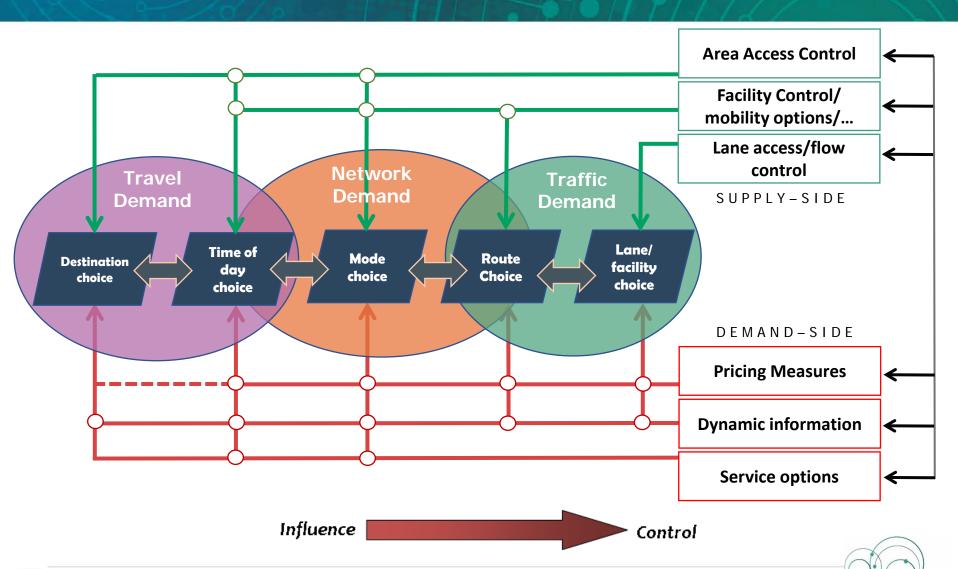


Active Transportation and Demand Management





Elaboration of trip chain - tied to complete trip management

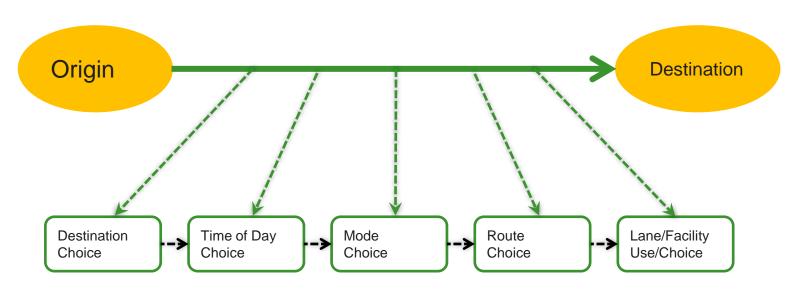






Managing Demand Through the Trip-Chain

Approaches provide travelers with choices throughout the trip chain leading to network performance optimization and increased efficiency



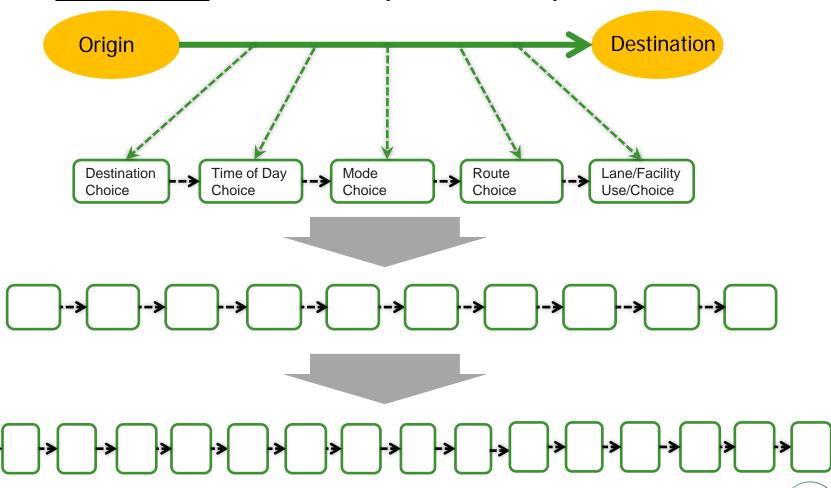
Key Takeaway: Active management occurs before, during, and at the end of the trip chain





Trip Chain - Level of detail

Key Takeaway: There are many links in a complete chain







Trip chain to Complete Trip







Dimensions of User Focused Travel

- Defines complete trips that are user focused
- By creating a standards framework, not only are trip chain needs identified, but the technology components that enable standards to work together will be aligned with standards that are needed to address traveler's needs.





More than corridors...more than regions



CITY CENTER

High-density downtown/CBD employment centers and surrounding neighborhoods

SUBURBAN

Predominantly lower-density residential users with some segregated mixed uses

EDGE CITY

Medium-density employment centers outside of the urban core

EXURBAN

Very low-density residential uses on the urban fringe

RURAL

Typically unincorporated







Many links, many providers, many jurisdictions, many operators





User Journey Map – Example 1

Mary is a recent college graduate who lives in a close-in suburb and works in the downtown of a major metropolitan area. She currently does not own a car and relies on her phone to plan her commute to work everyday. On a rainy day, she uses the MOD app to plan the best way to get to the office before 9 am.

Plan a Trip	Start a Trip	Accident delays approaching the subway station		Mode Shift M	Mode Shift	Detour Bike Path	Arrive at Rate Destination the Trip
While Mary is having her breakfast, she opens the MOD app to check her commute. The app pre-populates he trip based on her profile. She selects the fastest option to attend a meeting starting at 9 am. The geocodertranslates to OD pair into latflong locations. The MMTE generates the shortest and quickest trip based on Mary's selection. Three trip options are may available for her selection. Since it is raining, she decides to take a TNC service to the subway. Mary selects the fastest option and starts her trip.	moni The the p r The starts static The traffit the traffit the traffit Mary Mary the de the n	g the mobile app, Mary itors her trip progress. Lyft driver approaches pickup location. Lyft pickup is on time and s driving to the subway on. app notifies Mary of c delays in the first leg of rip due to an accident. trip itinerary gets updated ar estimated arrival time e subway changes. decides to get off early starts walking to catch next train.	Mary starts walking to the subway station The MOD app notifie Mary that the next subway is on time. She increases her walking speed to catch the subway arriving in 10 mins.	time.	indicated in the MOD app. Mary selects a bike an	ve n. Mary takes an alternate bike route. Her projected arrival tin	CO ₂ e*. • She rates her trip





User Journey Map – Example 2

Brian lives in a metropolitan area and does not need a car. This weekend, Brian made plans to visit his parents who live well outside the city, and transit options are limited. There is, however, a commuter train that can take him in the direction of his parents' house, but he will need to plan his options to the train, and then to their house from the train. Brian opens his MOD app and begins his planning.

G Pay pay # Pay

Plan a

- While Brian is reading his Saturday morning paper, he opens the MOD App to check for options to travel
- to his parent's house.

 Brian populates his trip information in the app based on his trip requirements.
- The trip planner generates the shortest and quickest trips based on his selections.
- Since it is a beautiful day, Brian decides to walk to a bikeshare service where he can rent a bike and pedal to his train.
- Brian ensures his credit card information is populated to use his ewallet in order to fund his entire journey.
- Brian books his trip using the MOD app and smartphone e-wallet.

Start a Trip















Uber

Mode Shift

•

Arrive at Destination

- À
- Brian leaves his house on time and begins his walk to the bikeshare docks.
- A bike is still available as indicated in the MOD app.
- Brian taps his smartphone against the contactless payment reader to verify his payment.
- Brian selects a bike and starts his trip to the next leg of his journey.

- Brian pedals toward the subway station where he will board a subway line to the commuter rail
 - station.

 Brian encounters no issues with his trip along the way and arrives at the subway station.
 - Brian docks his bike and quickly checks his MOD app to ensure that the subway and the commuter train are still on time.
 - Brian then enters the subway station.

- When Brian arrives at the subway turnstiles, Brian again taps his smartphone against the contactless reader.
- Brian realizes that the contactless reader is out of service and taps his phone against the next reader where his app is scanned successfully, and payment verified.
- The subway arrives on time and Brian boards to complete the next leg of his journey.

- When Brian exits the subway at the commuter rail station, he checks his app to ensure the train is still on time.
- Brian notices that the train is now running up to 15 minutes late due to switch problems. Since he has extra time, he reviews his trip once again to see if he can find a carshare service at an earlier stop on the same commuter rail line.
- Brian finds a carshare service near an earlier stop and books a car.
- Brian's app also instructs him that he must book a TNC service to get to the carshare from the train station.
- Brian finds a ride using one of the TNC providers and books a car using his e-wallet.
- Brian enters the train where the conductor scans his smartphone to verify payment.

Brian exits the commuter train at his intended stop.
 Brian monitors his MOD app and follows the instructions to meet his driver at the specified

G Pav

- location.

 Brian meets the driver, enters the vehicle, and they proceed to the carshare location.

 After exiting the TNC
- vehicle, Brian uses his smartphone and adds an extra tip for the driver in the MOD app.
- Brian thanks his driver and proceeds to the carshare lot to pick up his car.

Using his MOD app, Brian identifies his assigned vehicle.

CAR 2GO

- Brian scans the 2D barcode on the vehicle's window and unlocks the car.
- Brian then enters the vehicle and drives his final leg of his journey and arrives at his parents' house.
- Brian marks his trip as complete in his app, and within minutes receives a summary in his email with the total trip cost as well as other trip details.
- Brian saves his trip in his app for later use if needed.

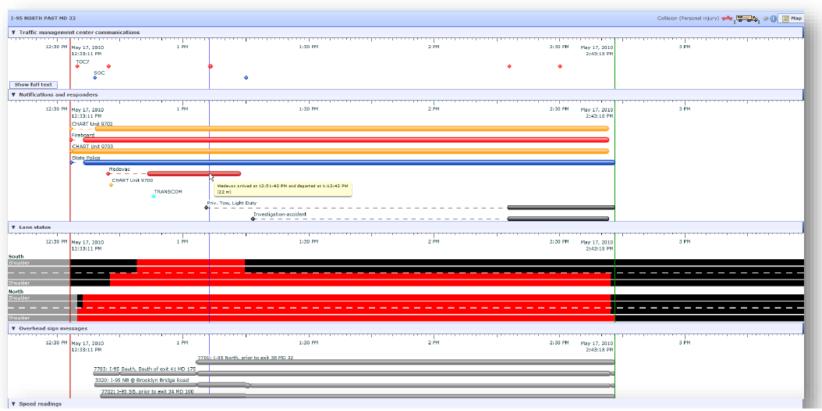




Timeline Review

Incident Timelines

Interactive timelines quickly reveal how the incident is being managed while showing the relationships between responder notifications and arrival times, lane closures, traffic queues, clearance times, communication logs, CCTV, and dynamic message signs.





Multimodal Management Processes



Expand Partnerships / Integrate Stakeholders



Expand Geographic Scope



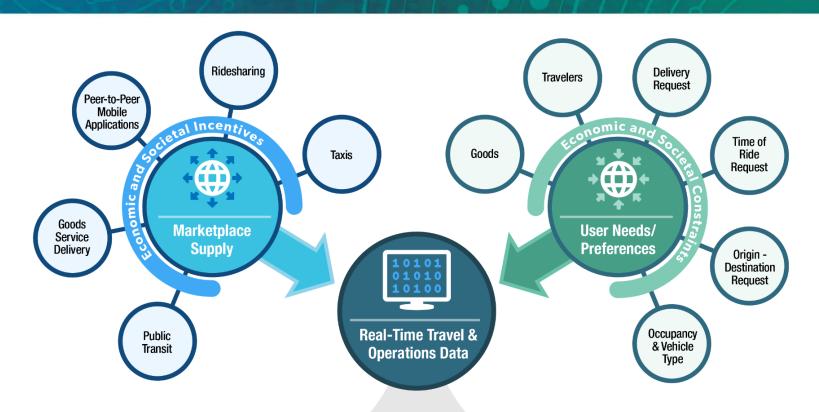
Expand Capabilities/ Enhance Functionality

- Develop and evolve system for identifying objectives that can vary with time and place
- Coordinate institutional functions to enable expanded data capture, improved data sharing, advanced data fusion and flow.
- Advance technical capabilities to enable higher temporal and spatial resolution in system data and to improve and automate data fusion processes
- Establish institutional functions to manage macro-system decision support (whether it's a federated, centralized, or hybrid system), and to enable fully coordinated response plans
- Advance technical performance of decision support systems and response and feedback processes

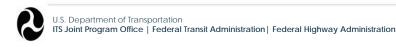




Multimodal Management to Marketplace - Next Chapter



Emerging Technologies





Thank you

Robert Sheehan

USDOT

ITS JPO

robert.sheehan@dot.gov

202-366-6817

Jim Hunt

FHWA

Office of Operations

jim.hunt@dot.gov

202-680-2679

Gwo-Wei Torng

FTA

Office of Mobility Innovation

Gwo-Wei.Torng@dot.gov

202-366-2378

Ralph Volpe

FHWA

Resource Center

ralph.volpe@dot.gov

404-985-1268

