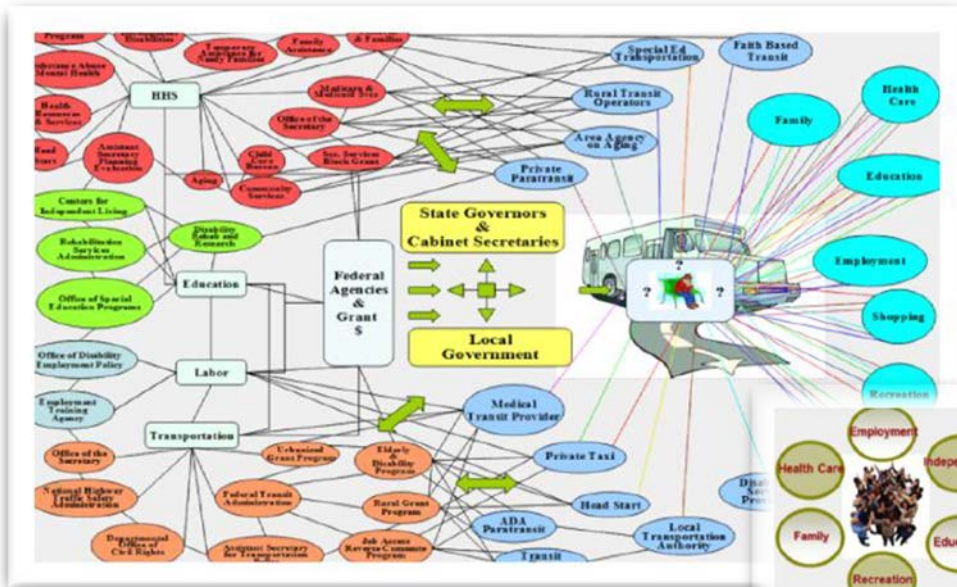# Next Generation Mobility Choices Enabled by Connected Vehicle Research

TRB ABE60 (2) Accessible Transportation Technology Subcommittee Meeting

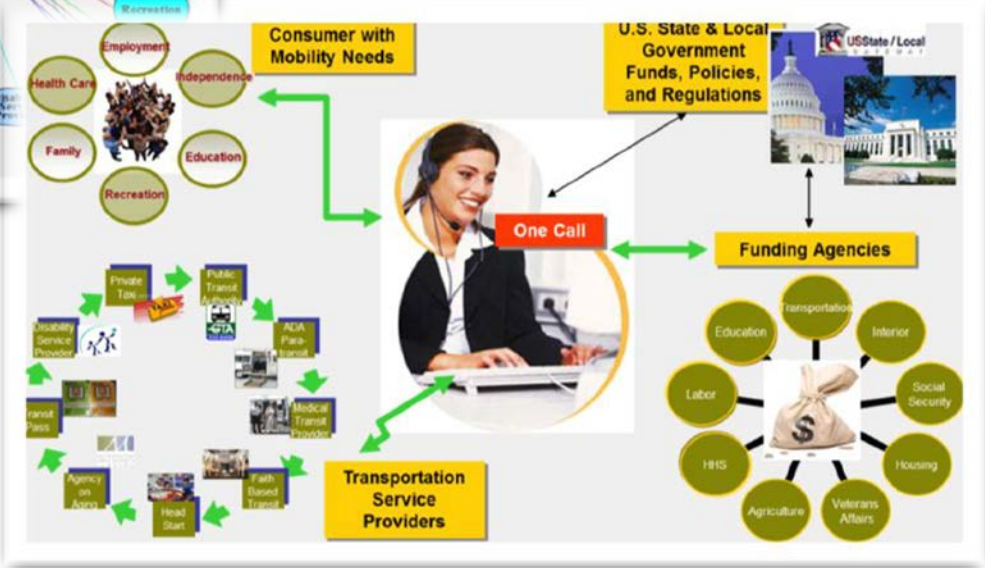Washington DC
January 14, 2013

Yehuda Gross
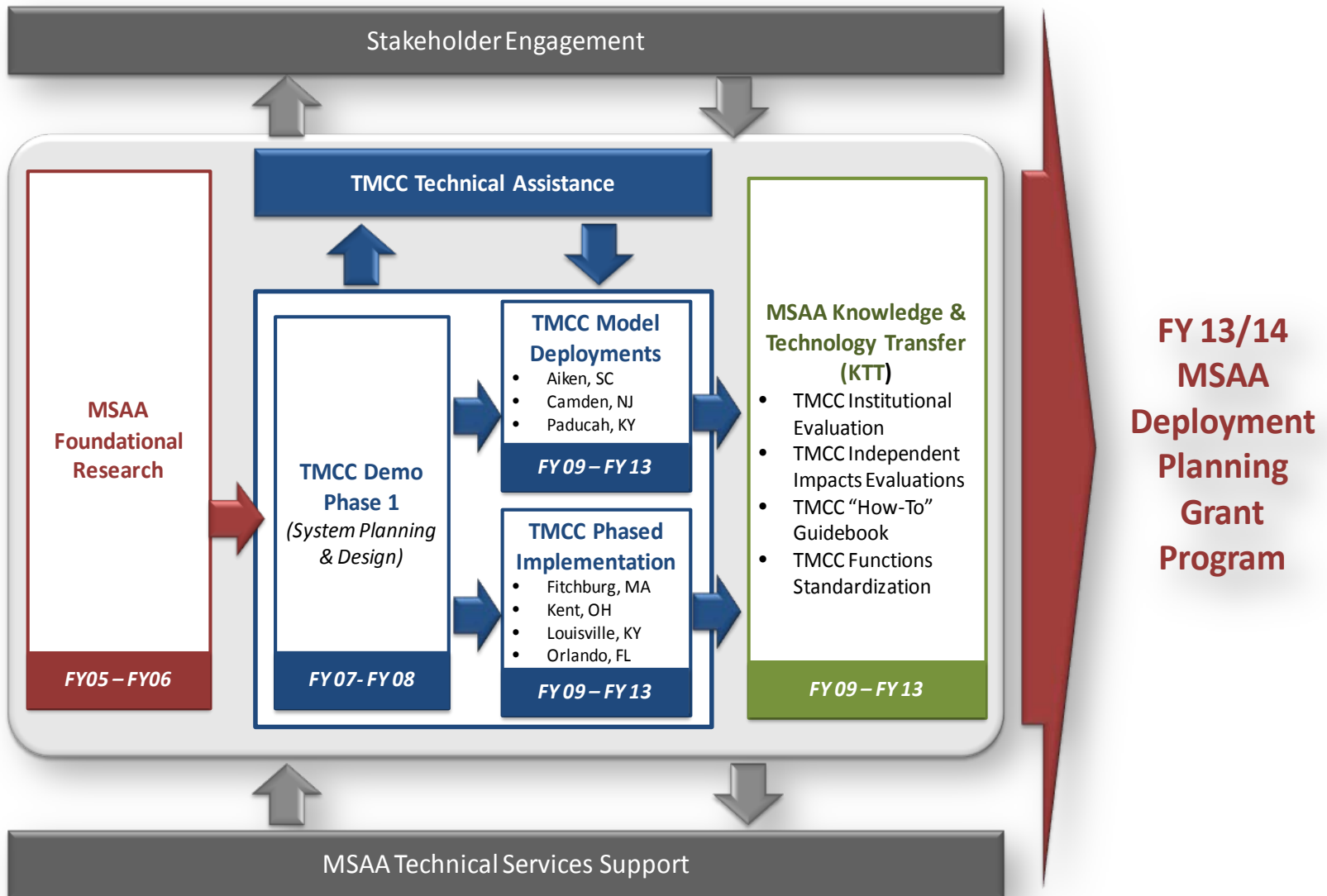USDOT ITS Joint Program Office

Mobility Services for All Americans (MSAA)

From where we were…

Moving forward….

MSAA Structure and Status

Stakeholder Engagement

TMCC Technical Assistance

MSAA Foundational Research

FY 05 – FY 06

TMCC Demo Phase 1
(System Planning & Design)

FY 07 - FY 08

TMCC Model Deployments
- Aiken, SC
- Camden, NJ
- Paducah, KY

FY 09 – FY 13

TMCC Phased Implementation
- Fitchburg, MA
- Kent, OH
- Louisville, KY
- Orlando, FL

FY 09 – FY 13

MSAA Knowledge & Technology Transfer (KTT)
- TMCC Institutional Evaluation
- TMCC Independent Impacts Evaluations
- TMCC "How-To" Guidebook
- TMCC Functions Standardization

FY 09 – FY 13

FY 13/14 MSAA Deployment Planning Grant Program

MSAA Technical Services Support

Connected Vehicle Further Advances Mobility Management

- Connected Vehicle Research encompasses a suite of technologies and applications that use wireless communications to provide connectivity:

  □ Among vehicles of all types

  □ Between vehicles and roadway infrastructure

  □ Among vehicles, infrastructure, and wireless consumer devices

Drivers/Operators

Vehicles

Infrastructure

Passengers/ Wireless Devices

All Roads, All Modes, All The Time

Connected Vehicle Environment
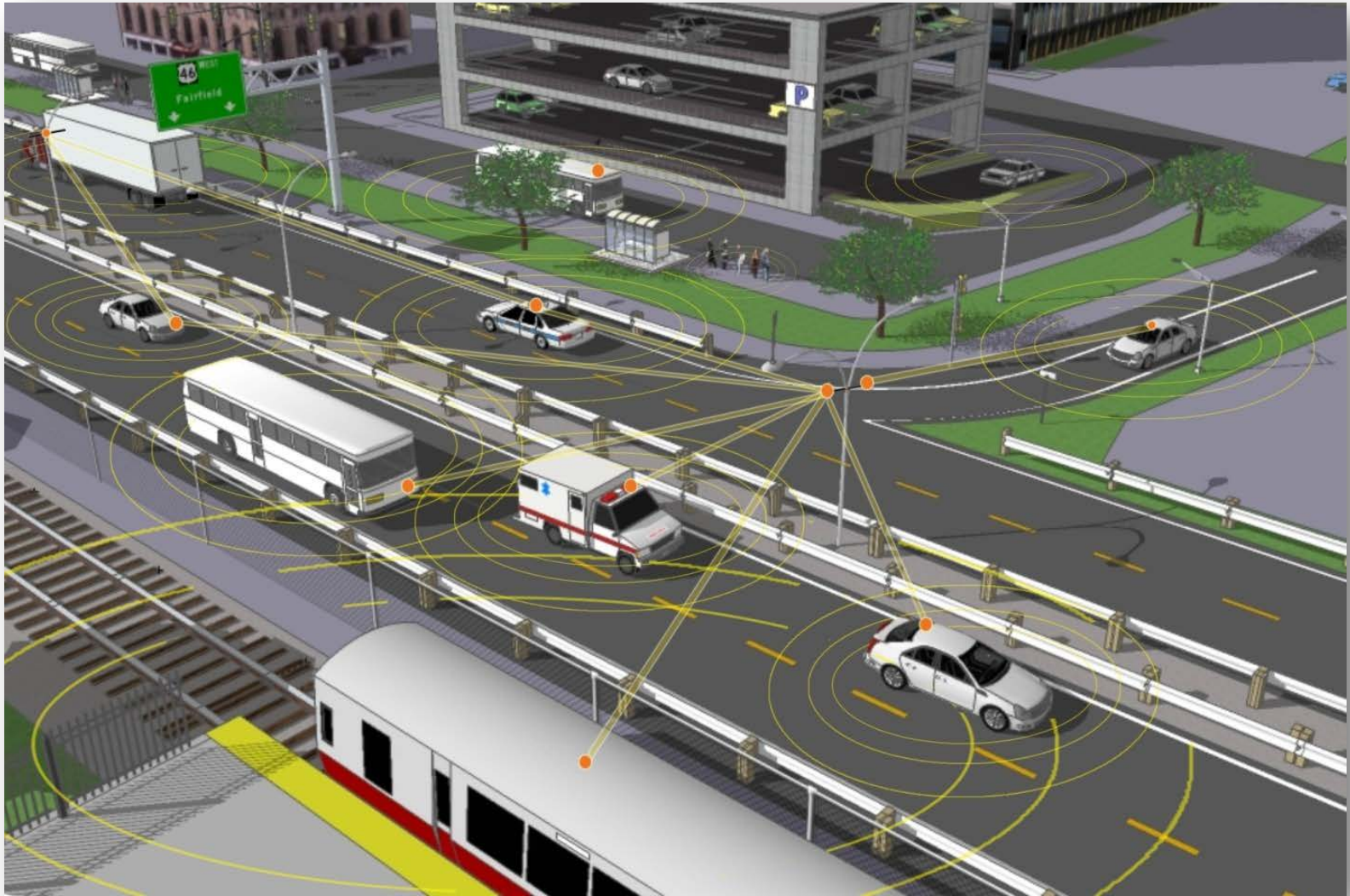
Connected Vehicle Program Structure

Applications

Safety		Mobility		Environment	
V2V	V2I	Real-time Data Capture	Dynamic Mobility Apps	AERIS	Road Weather Apps

Technology

International Harmonization of Standards & Architecture

Human Factors

Systems Engineering

Certification

Test Environments

Policy

Deployment Scenarios

Financing & Investment Models

Operations & Governance

Institutional Issues

Transit Connected Vehicle for Mobility

Applications

Safety		Mobility		Environment	
V2V	V2I	Real-time Data Capture	Dynamic Mobility Apps	AERIS	Road Weather Apps

Technology

Harmonization of International Standards & Architecture

Human Factors

Systems Engineering

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Policy

Deployment Scenarios

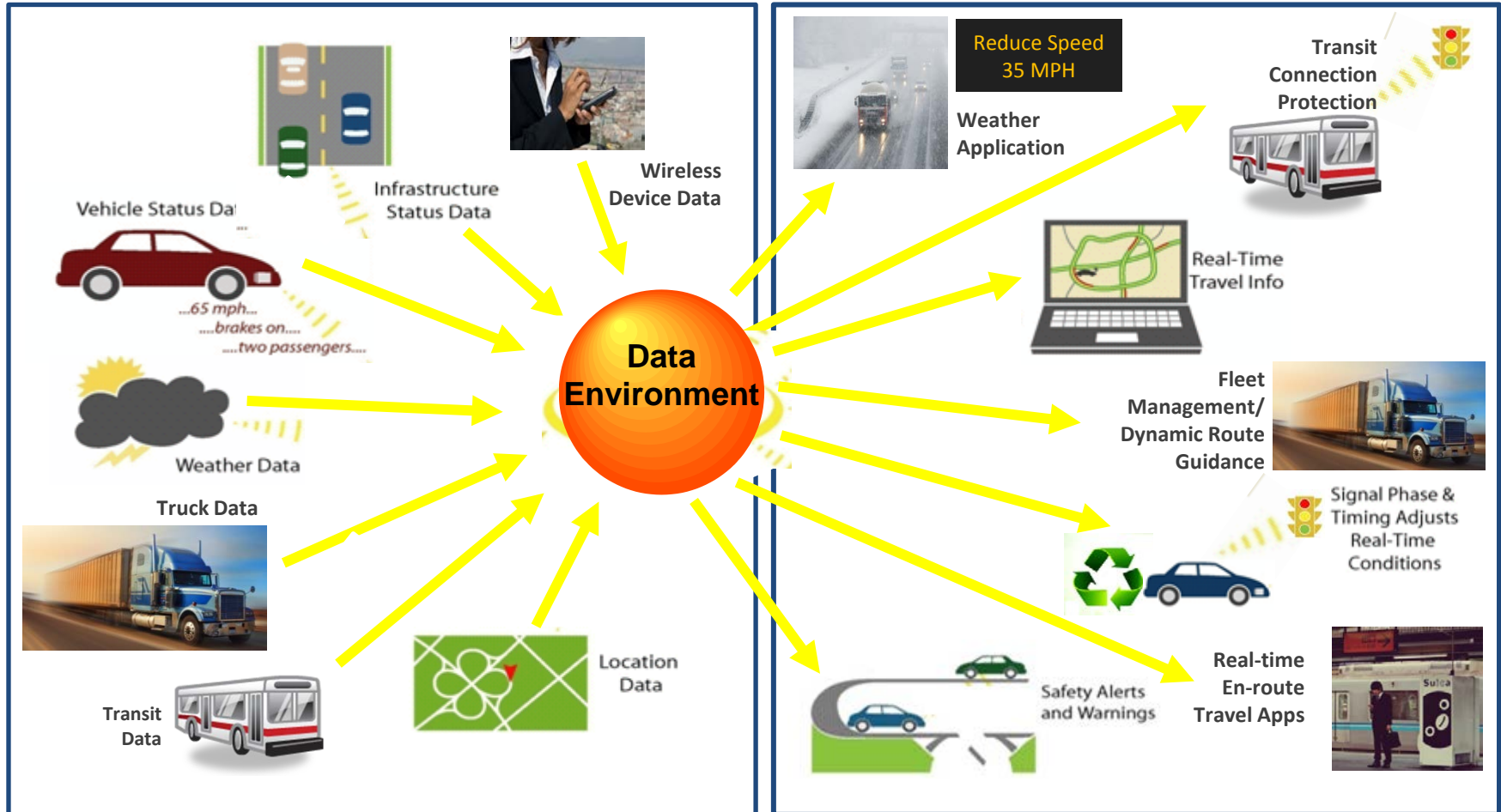Financing & Investment Models

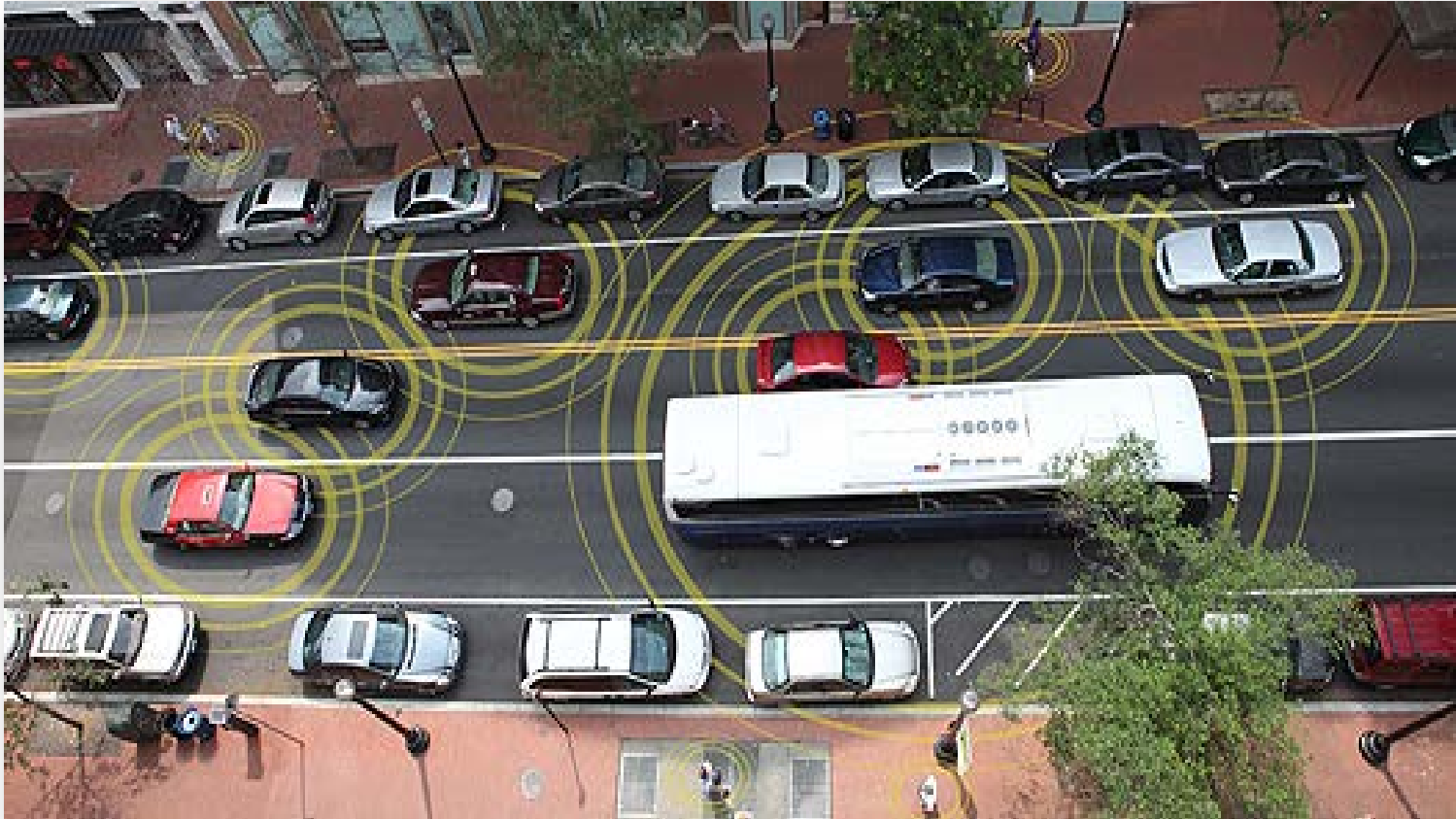Operations & Governance

Institutional Issues

Connected Vehicle Research for Mobility

Real-time Data Capture and Management (DCM)

- Vehicle Status Data — ...65 mph... ....brakes on.... ....two passengers....
- Infrastructure Status Data
- Wireless Device Data
- Weather Data
- Truck Data
- Transit Data
- Location Data

Data Environment

Dynamic Mobility Applications (DMA)

- Reduce Speed 35 MPH — Weather Application
- Transit Connection Protection
- Real-Time Travel Info
- Fleet Management/ Dynamic Route Guidance
- Signal Phase & Timing Adjusts Real-Time Conditions
- Safety Alerts and Warnings
- Real-time En-route Travel Apps

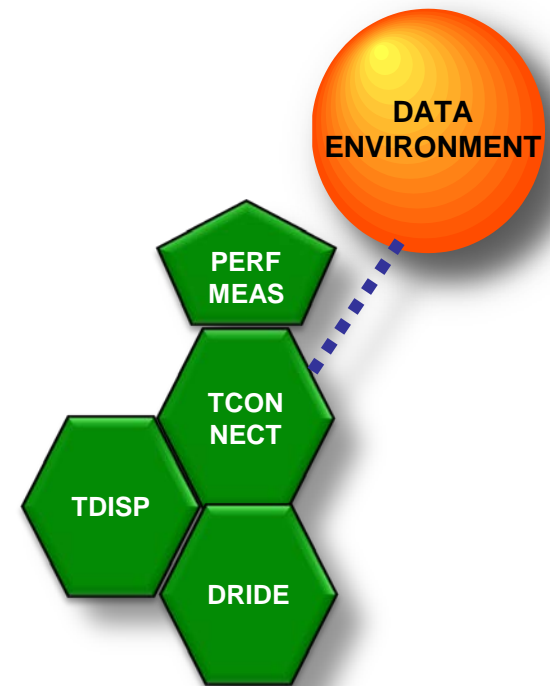# *Connected Vehicle Research for Mobility*

Integrated data environment further supports intermodal mobility management capability
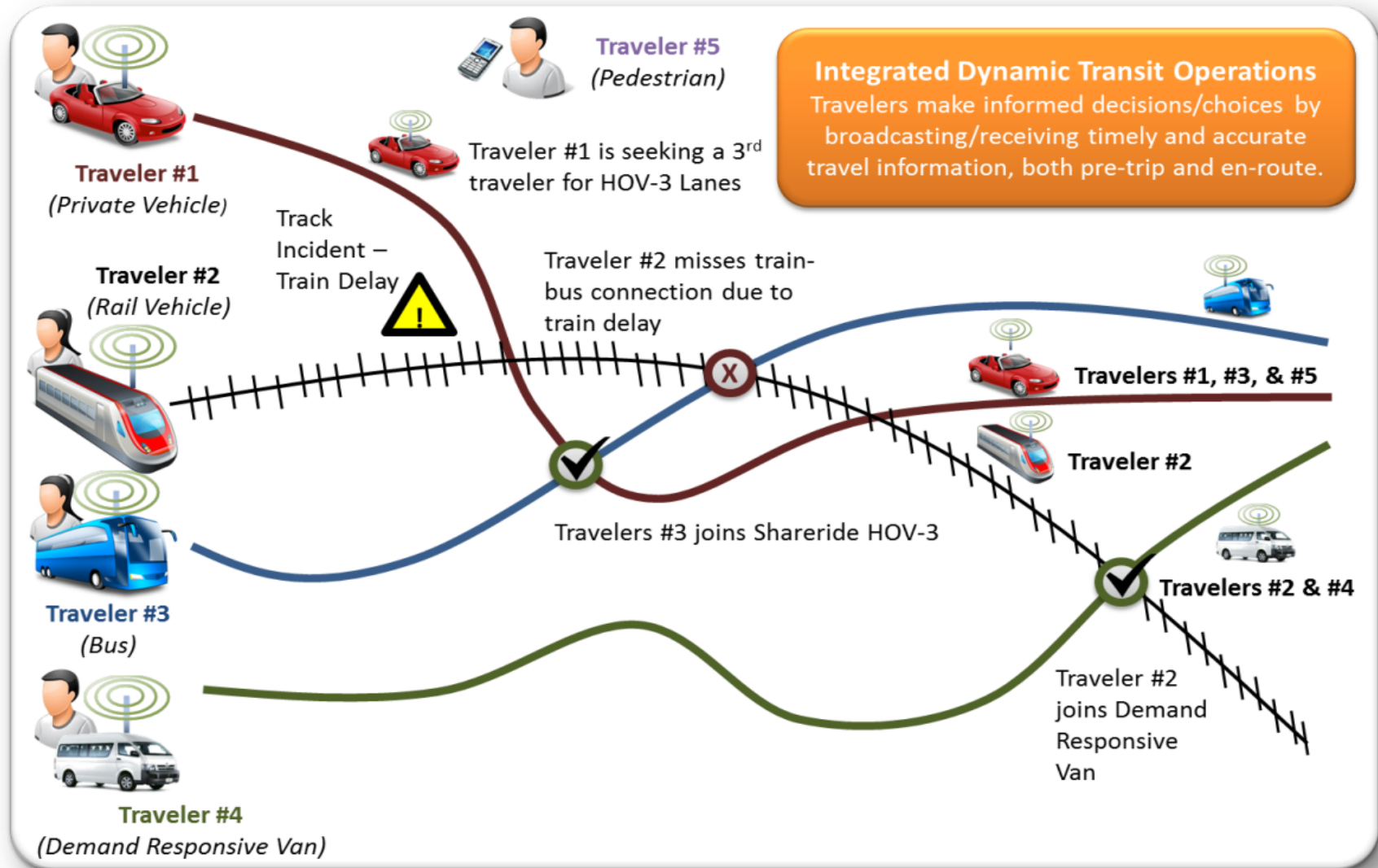
Integrated Dynamic Transit Operations (IDTO) Bundle

- One of the six mobility application "bundles"
- Led by Federal Transit Administration
- Integrated transit operations that provide dynamic scheduling, dispatching, and routing of transit vehicles, and facilitate passenger connection protection and dynamic ridesharing:
  - Dynamic Transit Operations (T-DISP)
  - Connection Protection (T-CONNECT)
  - Dynamic Ridesharing (D-RIDE)
- Next-generation mobility management integrated, traveler-oriented services

U.S. Department of Transportation

IDTO Operational Scenario

Traveler #5
(Pedestrian)

Traveler #1
(Private Vehicle)

Traveler #1 is seeking a 3rd traveler for HOV-3 Lanes

Integrated Dynamic Transit Operations
Travelers make informed decisions/choices by broadcasting/receiving timely and accurate travel information, both pre-trip and en-route.

Traveler #2
(Rail Vehicle)

Track Incident – Train Delay

Traveler #2 misses train-bus connection due to train delay

Travelers #1, #3, & #5

Traveler #2

Travelers #3 joins Shareride HOV-3

Traveler #3
(Bus)

Travelers #2 & #4

Traveler #2 joins Demand Responsive Van

Traveler #4
(Demand Responsive Van)

M-ISIG Bundle with Transit

- Multiple-modal Intelligent Traffic Signal System

- Led by Federal Highway Administration (FHWA) with FTA participation

- Comprehensive traffic signal system for complex arterial networks (passenger vehicles, transit, pedestrians, freight, and emergency vehicles):

  □ Transit Signal Priority (TSP)

  □ **Mobile Accessible Pedestrian Signal System (PED-SIG)**

   Intelligent Traffic Signal System (I-SIG)

  □ Freight Signal Priority (FSP)

  □ Emergency Vehicle Preemption (PREEMPT)

  □ Connected Eco Driving (ECO)

PERF MEAS
ISIG
TSP
PED SIG
FSP
PRE EMPT
ECO

DATA ENVIRONMENT
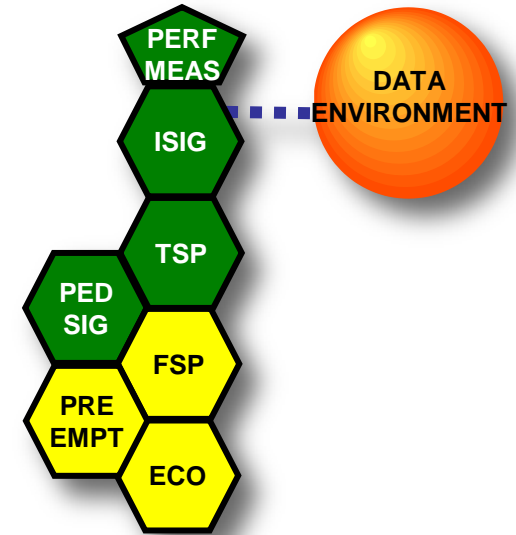
Mobile Accessible Pedestrian Signal System (PED-SIG)

- Allows an "automated pedestrian call" to be sent to the traffic controller from any personal device of registered blind users after confirming the direction and orientation of the roadway that the pedestrian is intending to cross.

- Integrates information from:
  - roadside or intersection sensors
  - new forms of data from wirelessly connected pedestrian-carried mobile devices

- Communicates wirelessly with the traffic signal controller to obtain real-time SPAT information

- Informs the visually impaired pedestrian as to when to cross and how to remain aligned with the crosswalk.

Transit Connected Vehicle for Mobility Next Steps

- Conduct IDTO Prototype Development/Testing (FY13/FY14)
  - Phase 1: intermodal ⇨ Phase 2: interagency
  - Require very strong partnership with transit providers
- Evaluate IDTO effectiveness and impacts (FY13/FY14)
- Complete TMCC "how-to" guidebook (FY13)
- MSAA/TMCC standardization (FY13/FY14)
- MSAA deployment planning grants (FY13/FY14)
- Complete M-ISIG system requirements (FY13)
- Expand the horizon of MSAA in CV environment to include **All Road, All Modes, All The Time**

For More Information…..

Yehuda Gross

Program Manager

USDOT ITS Joint Program Office

202-366-1988

yehuda.gross@dot.gov

www.its.dot.gov

U.S. Department of Transportation