

# Transportation Systems Management and Operations (TSM&O)

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MAG Transportation Policy Committee  
September 16<sup>th</sup>, 2015

# Overview

- ▶ ADOT Engineering and Maintenance Districts
- ▶ Transportation Systems Management and Operations (TSM&O) Division
- ▶ Travel Times

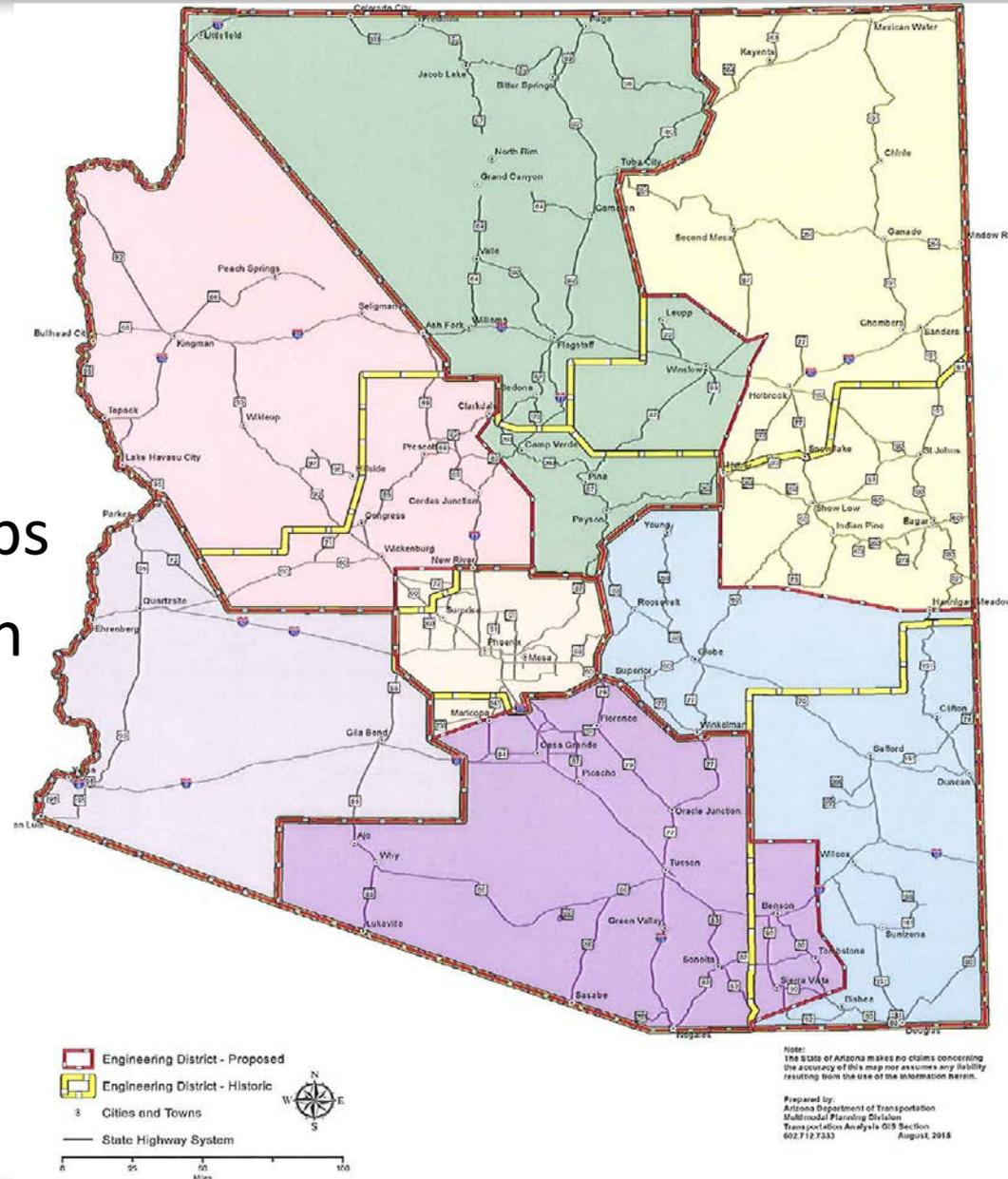
# Overview

- ▶ Governor Ducey's challenge to adopt "Processes for Daily Improvement"
- ▶ We are evaluating all functions, facilities and processes to determine new approaches and efficiencies
- ▶ ADOT has made reductions in FTEs from over 4500 in 2008 to 3950 FTEs today
- ▶ Restructuring and TSM&O are examples of Processes for Daily Improvement



# Structure moving forward

- ▶ 8 Districts
- ▶ 11 Development Groups
- ▶ 1 Major Projects Branch
- ▶ TSM&O



# Transportation Challenges...

- ▶ Congestion/delay Increasing as Economy and Population Grow but Capacity is Constrained
- ▶ High Value Placed on Reliability
- ▶ Can no Longer “Build our way out of congestion”
- ▶ 2014 AZ Crash Facts
  - Over \$3B in economic loss due to motor vehicle crashes in 2014. \$8.2M/day.
- ▶ Over 50% of all Congestion is Caused by Incidents, Work Zones, Weather, and Special Events



# What is Transportation Systems Management and Operations (TSM&O)?

- ▶ Optimize Performance of Existing Transportation Infrastructure
- ▶ Preserve Capacity, Improve the Safety and Reliability of our Transportation System



# Why is TSM&O Important?

- ▶ Better Alignment with Present and Future Operations.
- ▶ System Preservation and System Operations more Important than ever.
- ▶ Synergies Through Improved Interagency Coordination.
- ▶ Maximize Efficiency of Existing Infrastructure.
- ▶ Maximize Effectiveness of Tools and Data for Mobility, Reliability, and Safety Outcomes.
- ▶ Consistent with MAP-21.
- ▶ National Effort - Many States Implementing TSM&O (CO, FL, CA, etc.)



# Address Current and Future Needs

## ▶ Revolutionary/Rapid Technologies

- Connected Vehicles
- Automated Vehicles

## ▶ Incident Corridor Management (ICM)

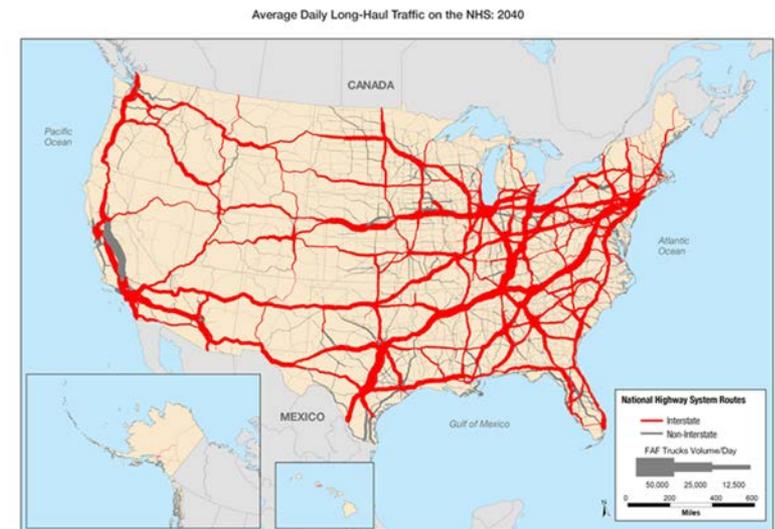
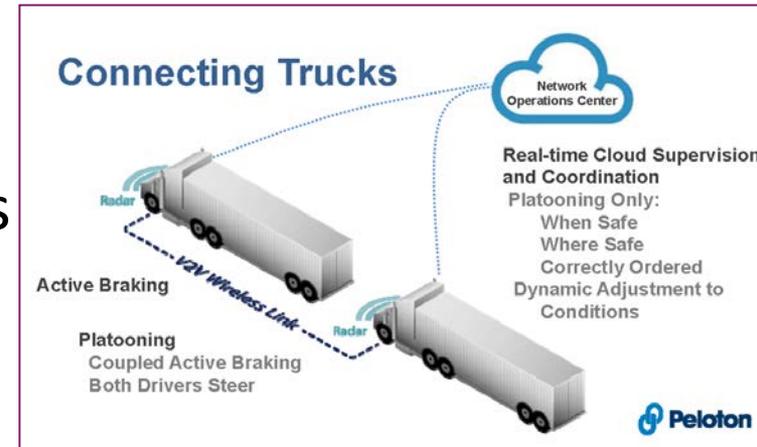
## ▶ Signal Systems Coordination

## ▶ Traffic Operations Center (TOC)

## ▶ Statewide Permitting

## ▶ Freight

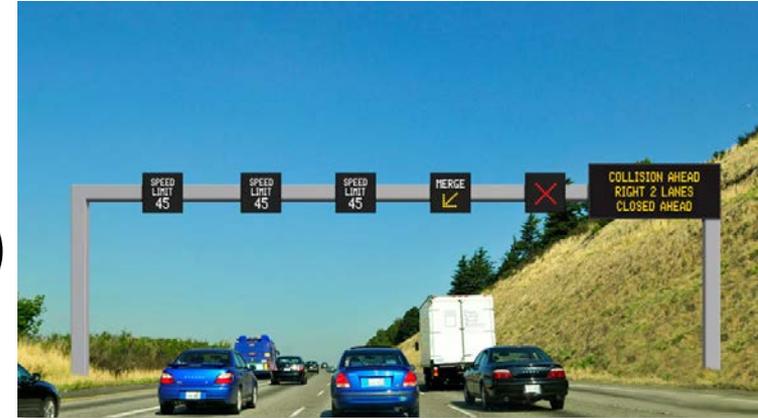
I-10 Connected Freight Corridor



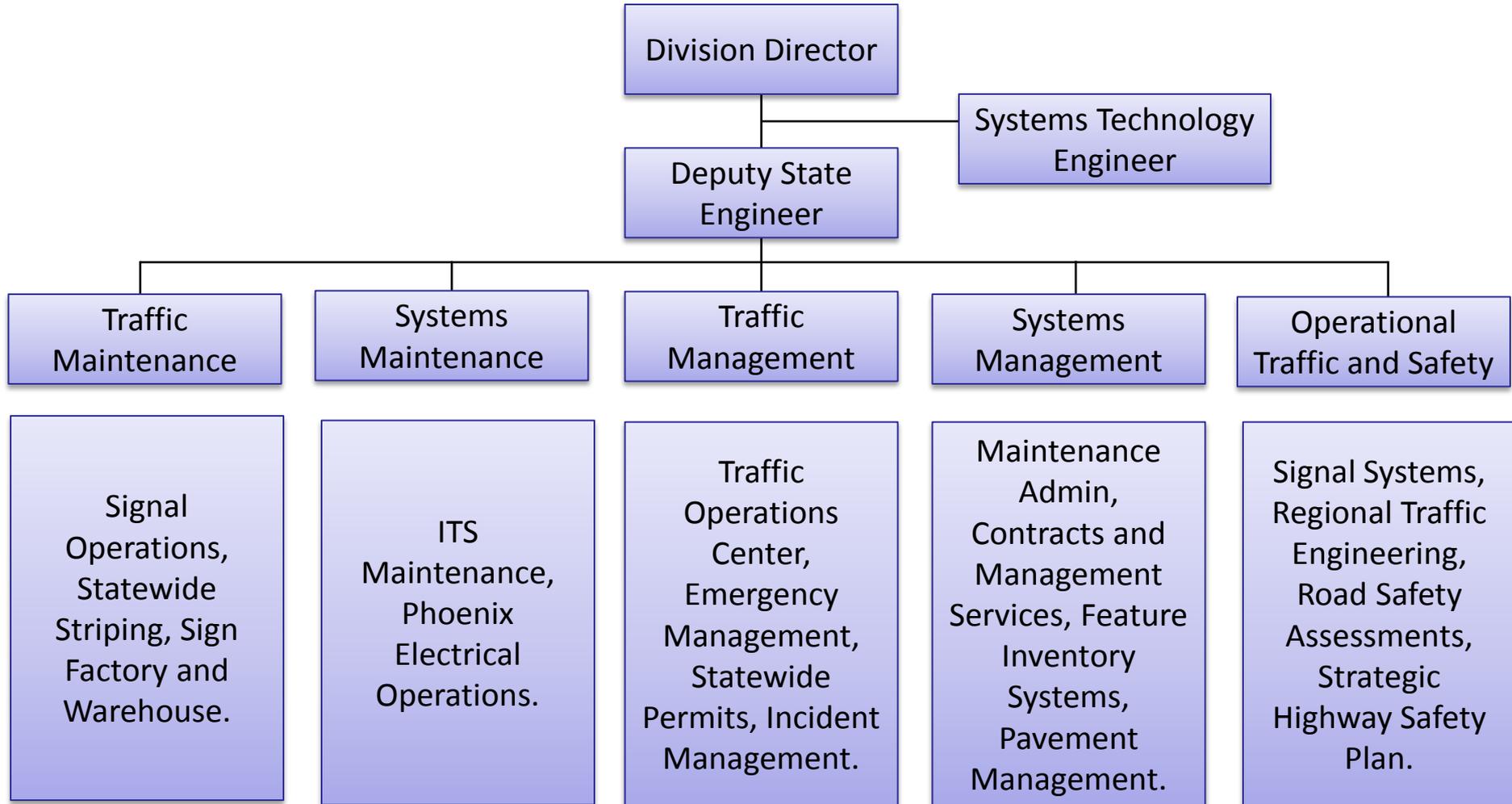
Notes: Long-haul freight trucks typically serve locations at least 50 miles apart, including trucks that are used in movements by multiple modes and real-time mileage as of 2011, prior to MW-21 system expansion.  
Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, version 3.4, 2013.

# Address Current and Future Needs

- ▶ Work Zone Traffic Management
- ▶ Traffic Incident Management (TIM)
- ▶ Emergency Management
- ▶ Travel Weather Management
- ▶ Advanced Traffic Demand Management
  - Managed Lanes
  - Variable Speed Limits
- ▶ Special Events

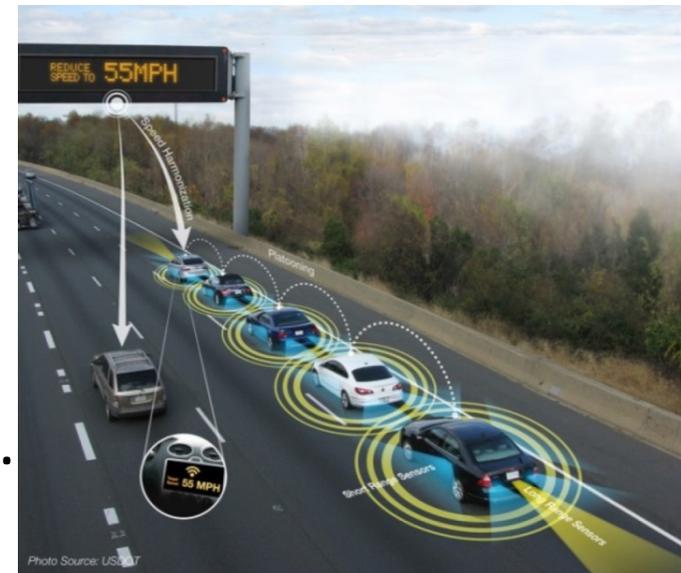


# TSM&O Division Organization



# ADOT Division Coordination

- ▶ Cross Divisional Coordination
- ▶ MVD (Licensing changes with Connected Vehicles and Autonomous Vehicles)
- ▶ IT (New technologies, Security, Big Data)
- ▶ ADOT Communications
- ▶ Enforcement Compliance Division (Ports, Weigh-In-Motion)
- ▶ Governor's Office of Hwy Safety
- ▶ DPS, Regional and Local Agencies, etc.



# Executive Order supporting the testing and operation of self-driving vehicles in Arizona - August 25, 2015

## Self-Driving Vehicle Testing and Piloting in the State of Arizona; Self-Driving Vehicle Oversight Committee

WHEREAS, with the development of new technologies, it is now possible to adapt vehicles with "self-driving technology," meaning a technology installed on a motor vehicle that provides the motor vehicle with the capability to drive without the direct or active control or monitoring by a human operator;

WHEREAS, it is in Arizona's interest to support the development of these technologies, by allowing testing and operation of self-driving vehicles on certain public roads, in order to continue to advance the technology;

WHEREAS, the State believes that the development of self-driving vehicle technology will promote economic growth, bring new jobs, provide research opportunities for the State's academic institutions and their students and faculty, and allow the State to host the emergence of new technologies;

WHEREAS, the State has the view that the testing and operation of self-driving vehicles could produce transformational social benefits such as the elimination of traffic and congestion, a dramatic increase in pedestrian and passenger safety, the reduction of parking facilities, and the facilitation of movement of residents across the State, and could beneficially contribute to other activities related to the State's transportation; and

WHEREAS, the State has a shared vision that the future of transportation and commerce relies on innovative technologies that could result in more passenger and pedestrian safety, increase mobility options, and foster economic productivity.

**NOW, THEREFORE**, I, Douglas A. Ducey, Governor of the State of Arizona, by virtue of the authority vested in me by the Constitution and laws of the State of Arizona, hereby order as follows:

(1) The Department of Transportation, Department of Public Safety, and all other agencies of the State of Arizona with pertinent regulatory jurisdiction shall undertake any necessary steps to support the testing and operation of self-driving vehicles on public roads within Arizona.

(2) Pilot programs will be enabled on campuses of selected universities in partnership with entities that are developing technology for self-driving vehicles, whereby an operator with a valid driver's license may direct a vehicle's movement, regardless of whether the operator is physically present in the vehicle or is providing direction remotely while the vehicle is operating in self-driving mode.

(3) Testing and operation of self-driving vehicles in such pilot programs shall abide by the following rules:

- (a) Vehicles may be operated only by an employee, contractor, or other person designated or otherwise authorized by the entity developing self-driving technology.
- (b) Vehicles shall be monitored and an operator shall have the ability to direct the vehicle's movement if assistance is required.
- (c) The individuals operating vehicles shall be licensed to operate a motor vehicle in the United States.

(d) The vehicle owner shall submit proof of financial responsibility, in an amount and on a form established by the Director of the Arizona Department of Transportation.

(4) The Director of the Department of Transportation may promulgate additional rules considered necessary to implement this Executive Order.

(5) There shall be established within the Office of the Governor a Self-Driving Vehicle Oversight Committee (the "Committee") to advise the Department of Transportation, the Department of Public Safety, the selected universities, and any other pertinent agencies how best to advance the testing and operation of self-driving vehicles on public roads.

(a) The Committee shall consist of one or more representatives from the Governor's Office, the Department of Transportation, the Department of Public Safety, the selected universities, and any other pertinent agency.

(b) Members shall be appointed by and serve at the pleasure of the Governor.

(c) To the extent necessary, the Committee may, based upon the results of the pilot programs, propose clarifications or changes to State policies, rules or statutes to facilitate the expanded operation of self-driving vehicles on public roads in Arizona.

IN WITNESS WHEREOF, I have hereunto set my hand and caused to be affixed the Great Seal of the State of Arizona.



*Douglas A. Ducey*  
GOVERNOR

DONE at the Capitol in Phoenix on this 25th day of August in the Year Two Thousand and Fifteen, and of Independence of the United States of America the Two Hundred and Fortieth.

ATTEST:

*Michelle Reagan*

Secretary of State

# TSM&O Division Next Steps

- ▶ Develop TSM&O Strategic Action Plan to Align with ADOT's
- ▶ Refine TSM&O Staffing Structure and Responsibilities
- ▶ Develop Performance Measures
- ▶ Roadshow within ADOT and Externally
- ▶ Go Live October 1<sup>st</sup>, 2015

## Toolkit: Sample Operations- and Safety-Focused Goals

Sample Goal Types	Sample Objectives
Mobility and Travel Options	<ul style="list-style-type: none"> <li>▪ Improve personal mobility and access to transportation.</li> <li>▪ Increase the share of trips by transit, carpooling, bicycling.</li> <li>▪ Improve transit travel time compared to auto travel time.</li> <li>▪ Increase the share of population with access to high-frequency transit.</li> </ul>
System Efficiency	<ul style="list-style-type: none"> <li>▪ Reduce delay experienced by travelers on highways and transit.</li> <li>▪ Reduce the share of highways that are congested during peak periods.</li> <li>▪ Reduce the number of hours per day that highways exceed posted speed limits.</li> <li>▪ Reduce the cost of congestion on the transportation system.</li> <li>▪ Increase average vehicle occupancy for work trips.</li> <li>▪ Increase transit load factors and fare-box recovery ratio.</li> </ul>
System Reliability	<ul style="list-style-type: none"> <li>▪ Improve travel time reliability on the freeway system.</li> <li>▪ Improve travel time reliability on the freight network.</li> <li>▪ Improve on-time performance for transit services.</li> </ul>
Safety	<ul style="list-style-type: none"> <li>▪ Reduce the number of total fatalities on the transportation system.</li> <li>▪ Reduce the number of injuries on the transportation system.</li> <li>▪ Reduce the number of pedestrian fatalities and injuries.</li> <li>▪ Reduce the number of fatalities and injuries in traffic accidents.</li> <li>▪ Reduce the number of alcohol-related fatalities and injuries.</li> </ul>
Innovation / New Technology	<ul style="list-style-type: none"> <li>▪ Improve the training and professional capacity of traffic staff through stewardship of regional training programs.</li> <li>▪ Provide the capability to monitor transit vehicle location in real-time. The location data can be used to determine real-time the transit system's schedule in real-time.</li> </ul>
Traveler Information	<ul style="list-style-type: none"> <li>▪ Ensure that reliable, multimodal, real-time traveler information is available throughout the region.</li> <li>▪ Provide roadway operations data (e.g., speed, travel times) to better inform the public in real time.<sup>8</sup></li> </ul>
Work zone management	<ul style="list-style-type: none"> <li>▪ Reduce the number of work zones (e.g., through system maintenance, combining of work zones) or duration of work zones (e.g., through completion time incentives).</li> <li>▪ Coordinate planned projects to facilitate improved traffic flow and minimize traffic impacts.</li> </ul>

# Dynamic Message Signs - Travel Times

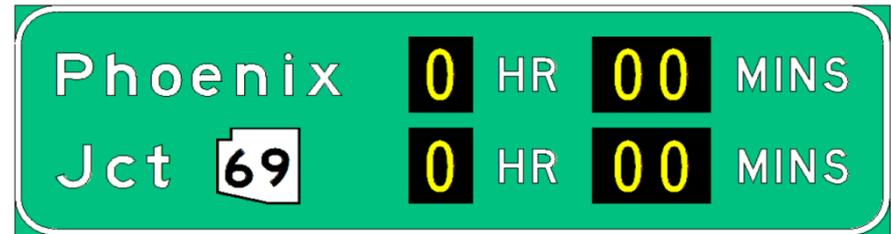
- ▶ January 2008 – Initial Pilot Deployment
  - 12 Dynamic Message Signs (DMS) for AM/PM peak-hours
- ▶ 2015 – Expanded Hours of Operation
  - 77 DMS for AM/PM
    - 5am to 11pm weekdays
    - 7am to 9pm weekends
- ▶ New features
  - Two destinations by time of day per DMS
  - Dual-panel may display all day with PSA

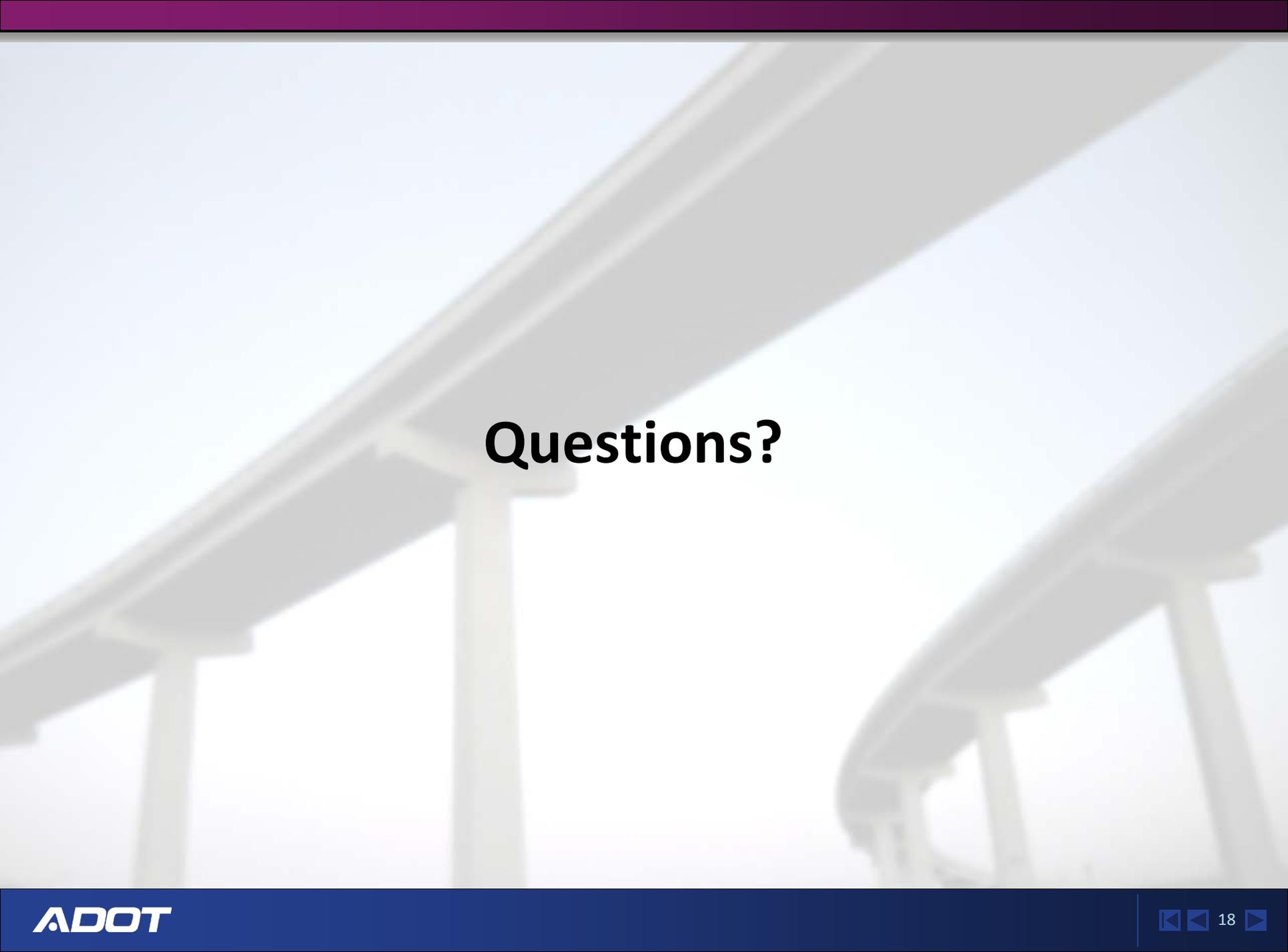




# Travel Time – 6 Month Pilot

- ▶ Implement 6 Month Pilot between Phoenix & Flagstaff - November 2015





**Questions?**