Transportation Systems Management and Operations (TSMO)

Brent Cain, PE
Assistant Director - TSMO

Arizona Conference on Roads & Streets

March 24, 2016

Direction

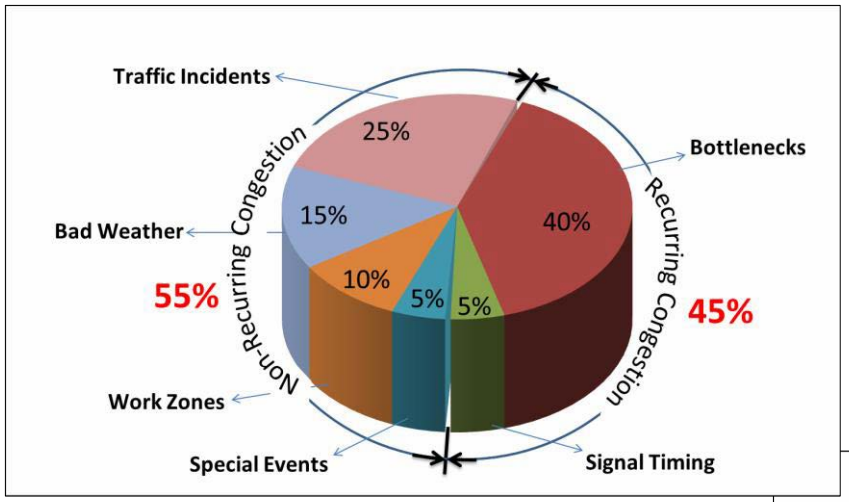
- Arizona's Governor challenge to adopt "Processes for Daily Improvement"
- We are evaluating all functions, facilities and processes to determine new approaches and efficiencies
- ADOT has made reductions in FTEs from over 4,500 in 2008 to less than 4,000 FTEs today
- Restructuring and TSM&O are examples of Processes for Daily Improvement
- ADOT Director Halikowski's support of new TSM&O Division

Transportation Challenges…

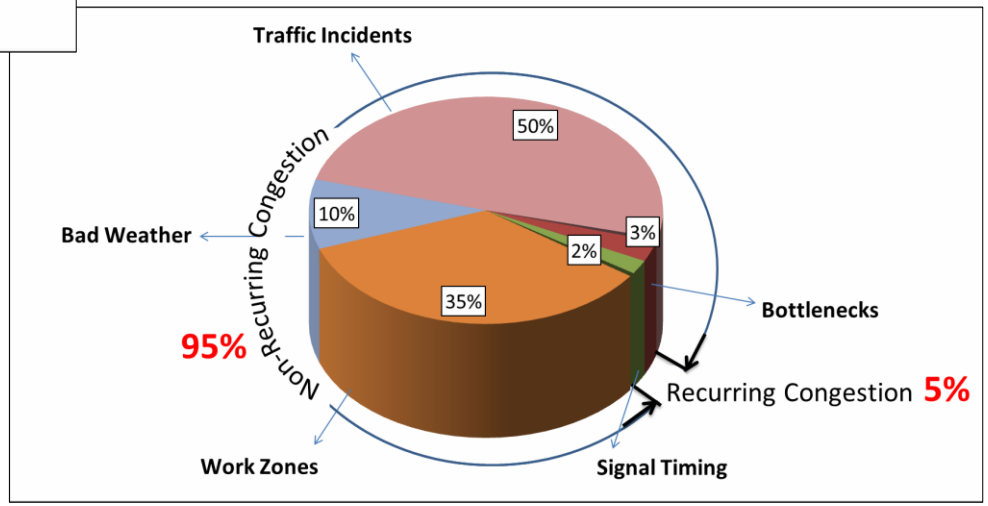
- Congestion/Delay Increasing as Economy and Population Grow but Capacity is Constrained
- High Value Placed on Reliability
- Can no Longer "Build our way out of congestion"
- 2014 AZ Crash Facts
  - Over $3B in economic loss due to motor vehicle crashes in 2014. $8.2M/day

Transportation Challenges…

Sources of Congestion in Urban Areas



Sources of Congestion in Rural Areas



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

TSM&O Vision and Mission

- **Vision**

  "To operate our transportation system for safe, reliable, efficient, and cost effective means of transporting people, commerce, and data."

ADOT's Strategic Plan Goals:

1. Advance and protect the transportation system
2. Make transportation personal
3. Create a high-performing organization

- **Mission**

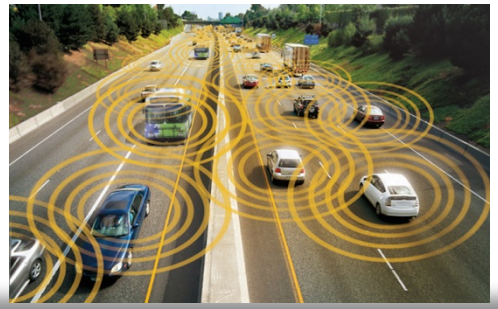
  "Integrated program to optimize the performance of existing infrastructure through implementation of systems, services, and projects to preserve capacity and improve reliability and safety of our transportation system."

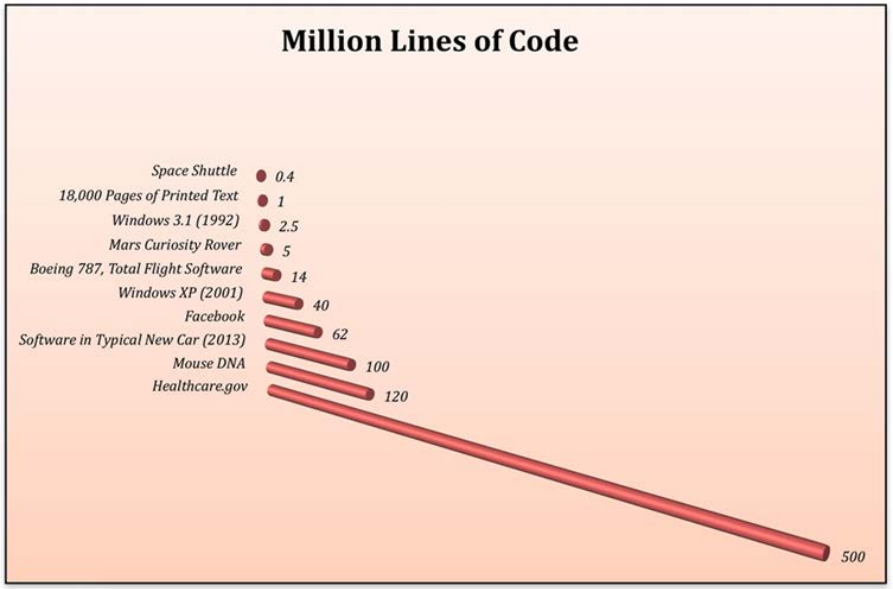
Why is TSM&O Important?

- Better Alignment with Present and Future Operations
- System Preservation and System Operations more Important than ever
- Synergies Through Improved Interagency Coordination

Why is TSM&O Important?

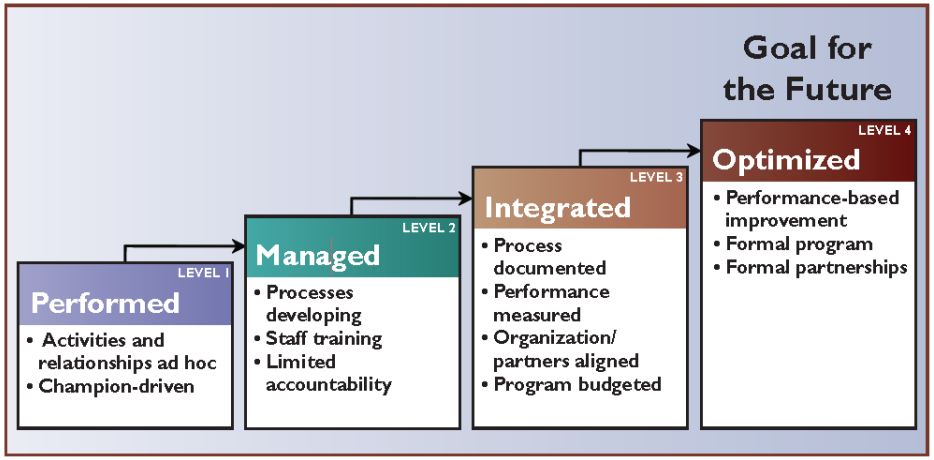
- Maximize Efficiency of Existing Infrastructure
- Maximize Effectiveness of Tools and Data for Mobility, Reliability, and Safety Outcomes
- National Effort - Many States Implementing TSM&O
- Advancing Technologies

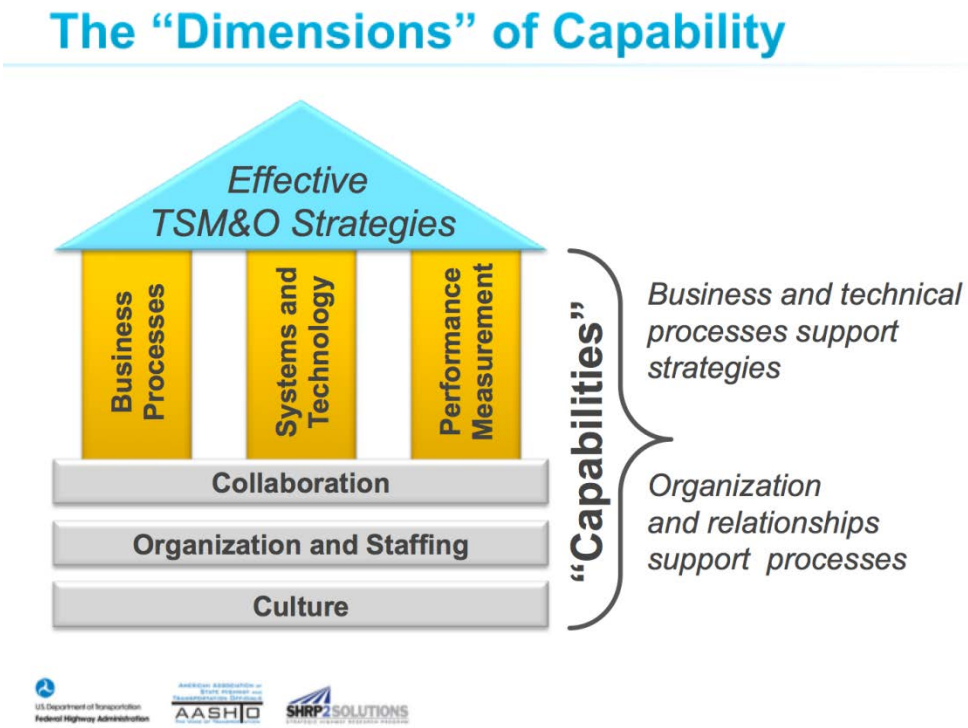




TSM&O Capability Maturity Model

- 6 Dimensions
- ADOT Self Assessment March 2014





TSM&O Functions

- Integrated Corridor Management (ICM)

- Traffic Operations Center (TOC)
- Signal Systems Coordination

TSM&O Functions

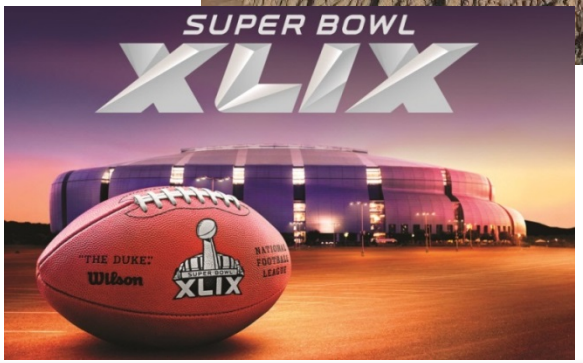
- Work Zone Traffic Management
- Travel Weather Management
- Advanced Traffic Demand Management
  - Managed Lanes
  - Variable Speed Limits

TSM&O Functions

- Traffic Incident Management (TIM)

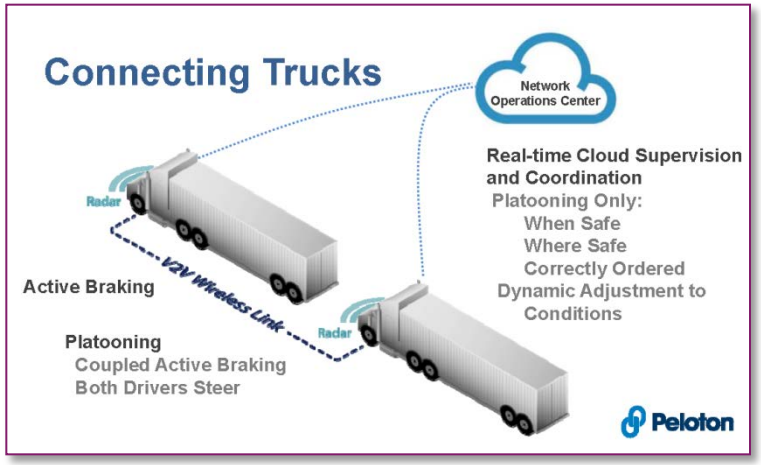
- Emergency Management

- Special Events

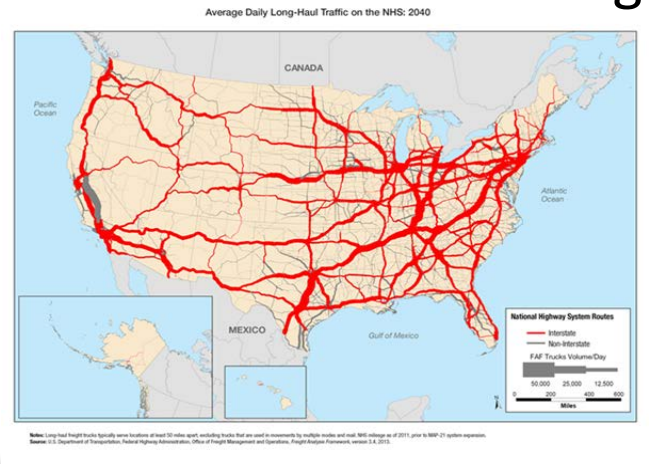


TSM&O Functions

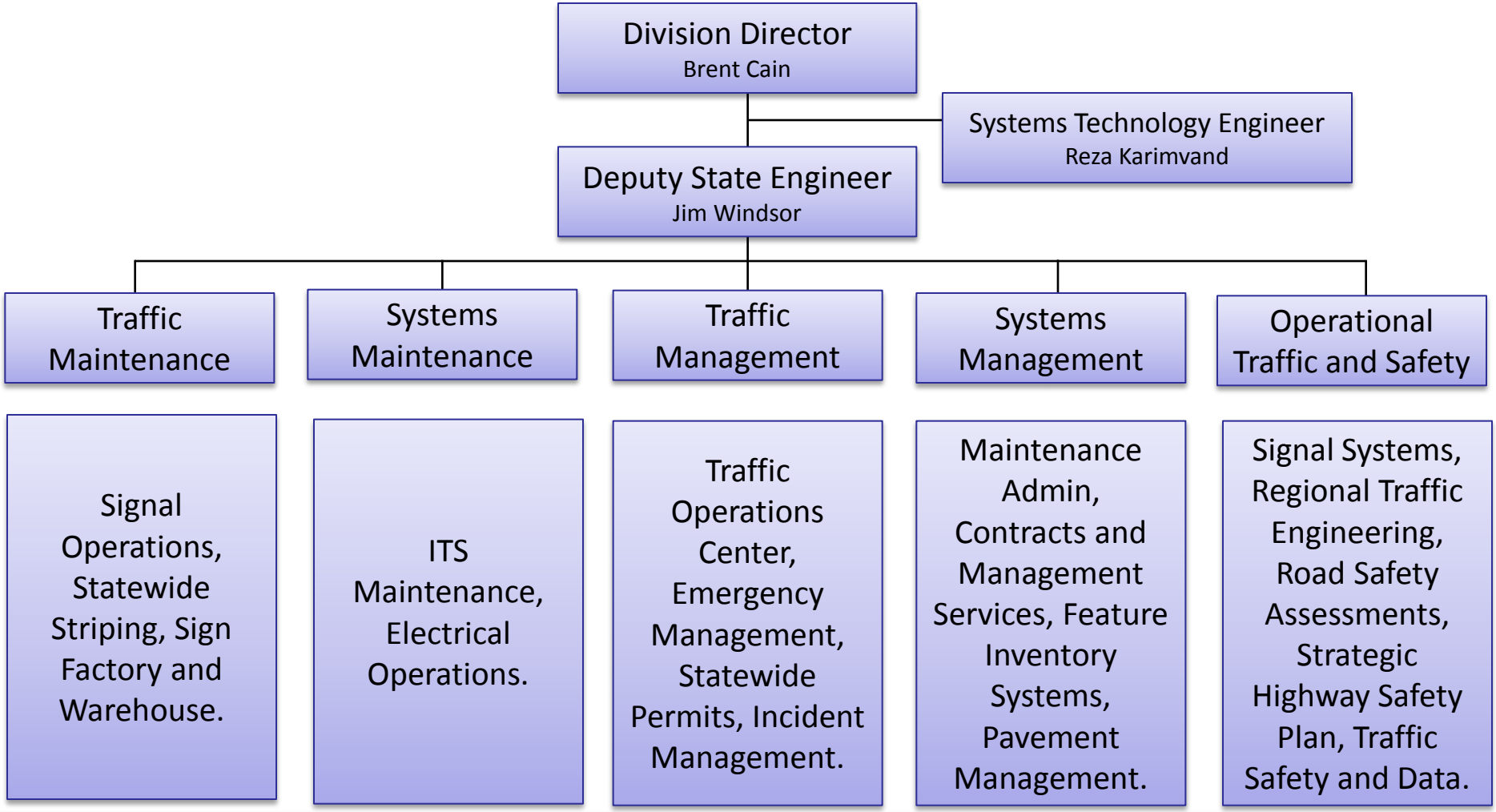
- Revolutionary/Rapid Technologies
  - Connected Vehicles
  - Automated Vehicles



- Statewide Permitting
- Freight
  - I-10 Connected Freight Corridor

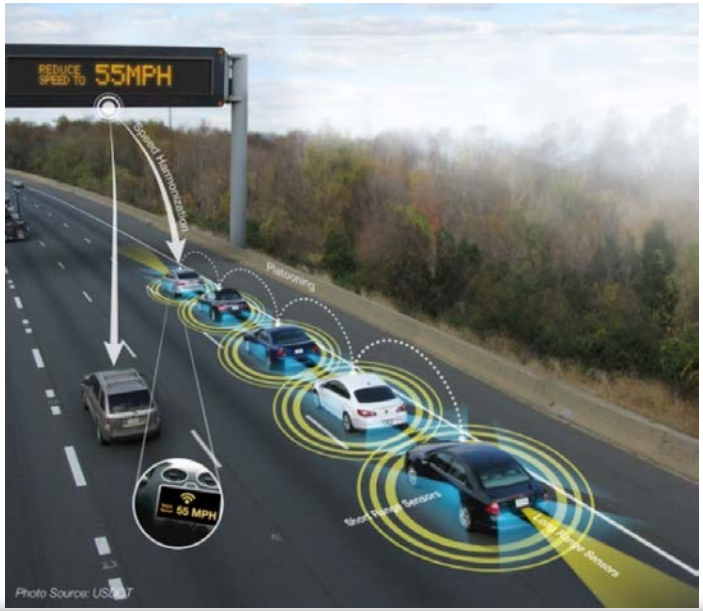


TSM&O Division Organization



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, FHWA, 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.

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:

Secretary of State

Moving Forward

- Develop TSM&O Strategic Action Plan to Align with Overall Plan
- Went Live October 1st, 2015
- Refine TSM&O Staffing Structure and Responsibilities
- Develop Performance Measures (Reza Karimvand)
- Current Efforts within ADOT (James Windsor)

Questions?

Brent A. Cain, PE
Assistant Director for TSM&O
ArizonaDOT
bcain@azdot.gov
602-712-8274