

MARYLAND TSM&O STRATEGIC PLAN

MWCOG SYSTEMS PERFORMANCE, OPERATIONS, AND
TECHNOLOGY SUBCOMMITTEE (SPOTS)

August 2, 2018

Subrat Mahapatra, MDOT SHA

WHY TSM&O?

Challenges & Opportunities

General influential events:

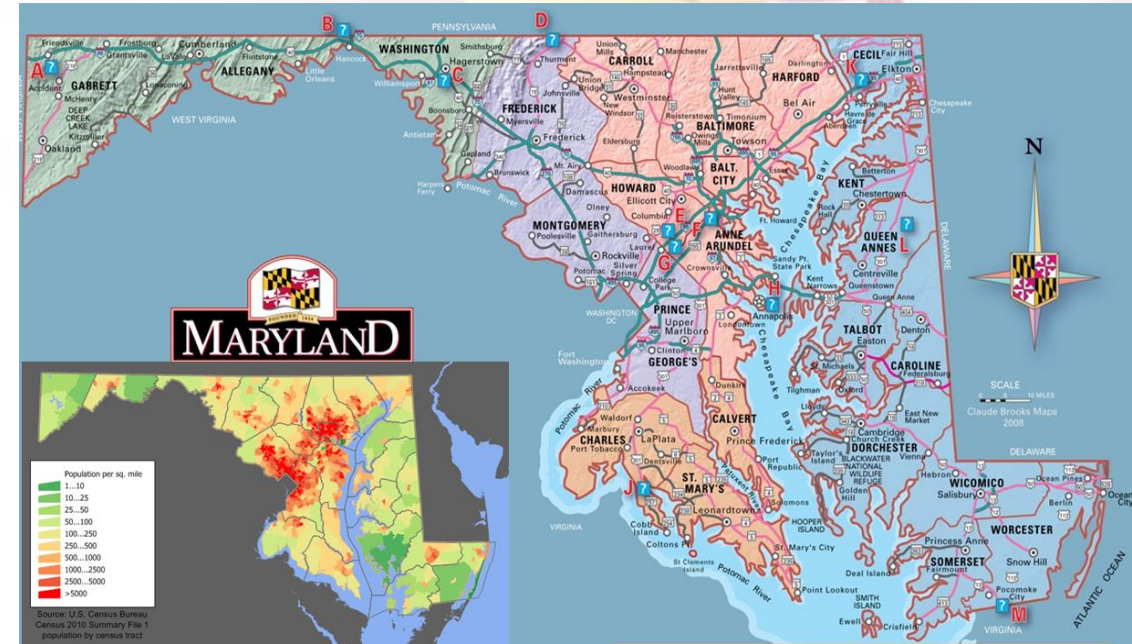
(demographic, freight, tech)

Transportation infrastructure

(age, congestion, funding)

Changes in the highway industry

(costs, emerging tech)



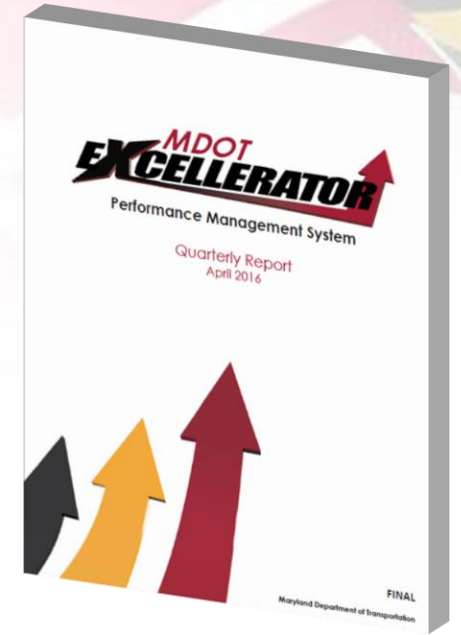
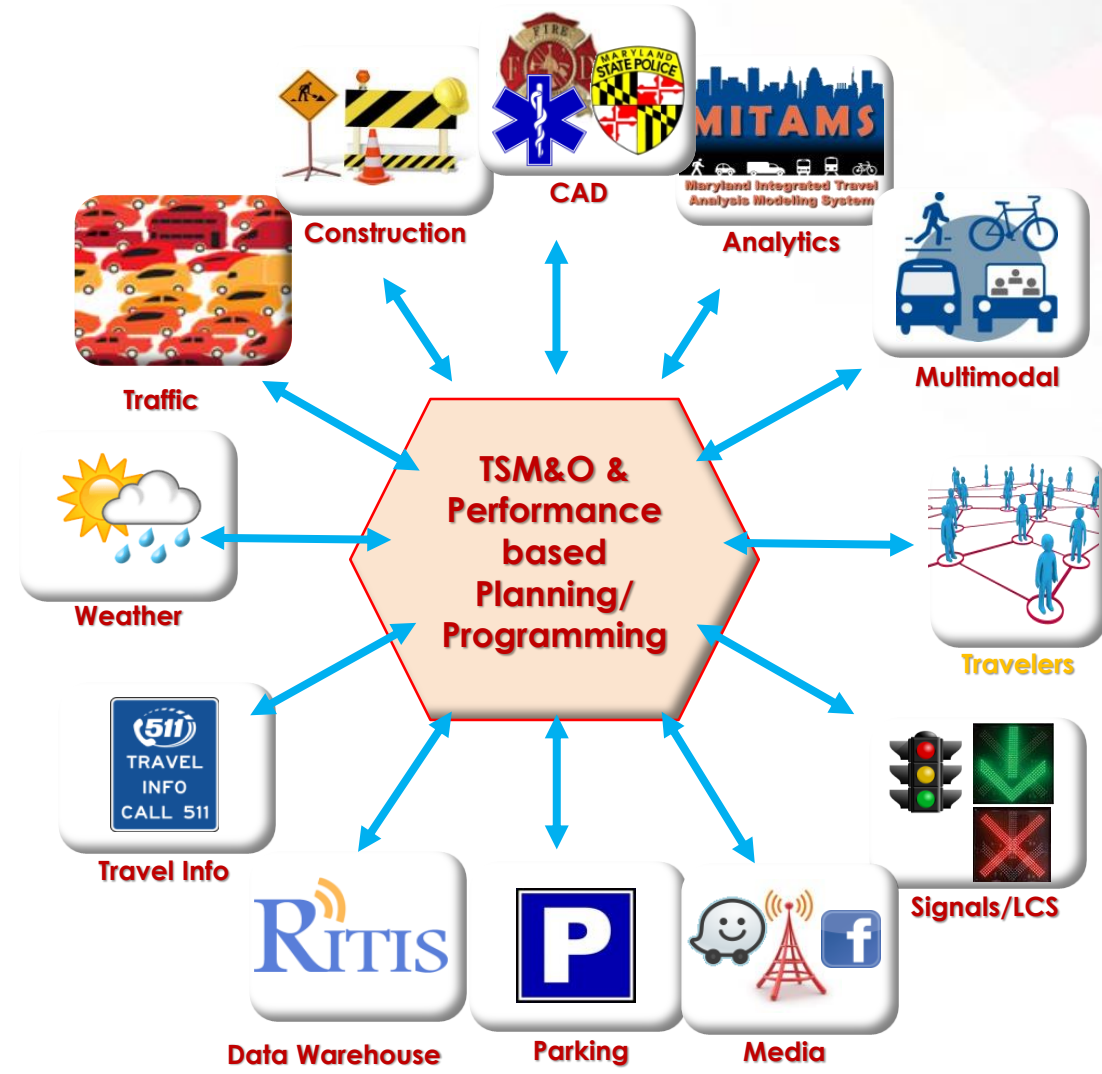
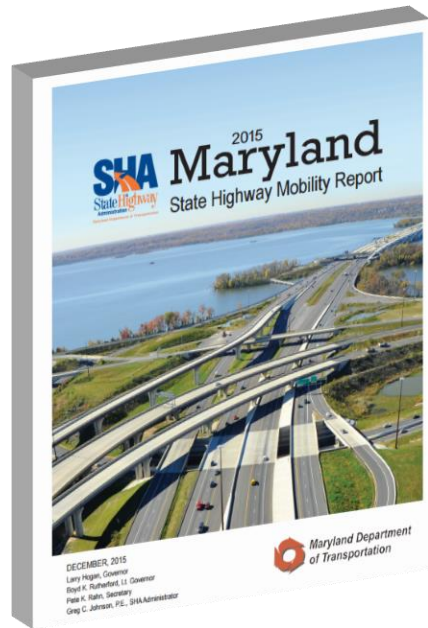
- Maryland VMT is at all time high (60 Billion in 2017)
- B-W region is one of the most congested regions
- Oversaturated conditions leads to higher unreliability
- State will have 1 million more people in coming 20 years
- 30% increase in overall VMT and truck VMT to double by 2040

TSM&O MOTIVATION

- Increased Focus on Operations
 - System Efficiency & Reliability Key Drivers
 - Freight Movement and Economy
 - Communicating Performance
 - Customer focused and Outcome Oriented
-
- Support MDOT & Administration initiatives & policies
 - MDOT Excellerator
 - MDOT SHA Mobility Report
-
- Statutory Regulatory Requirements
 - MAP-21/FAST Act
 - Managing for Results (MFR)
 - MDOT Attainment Report

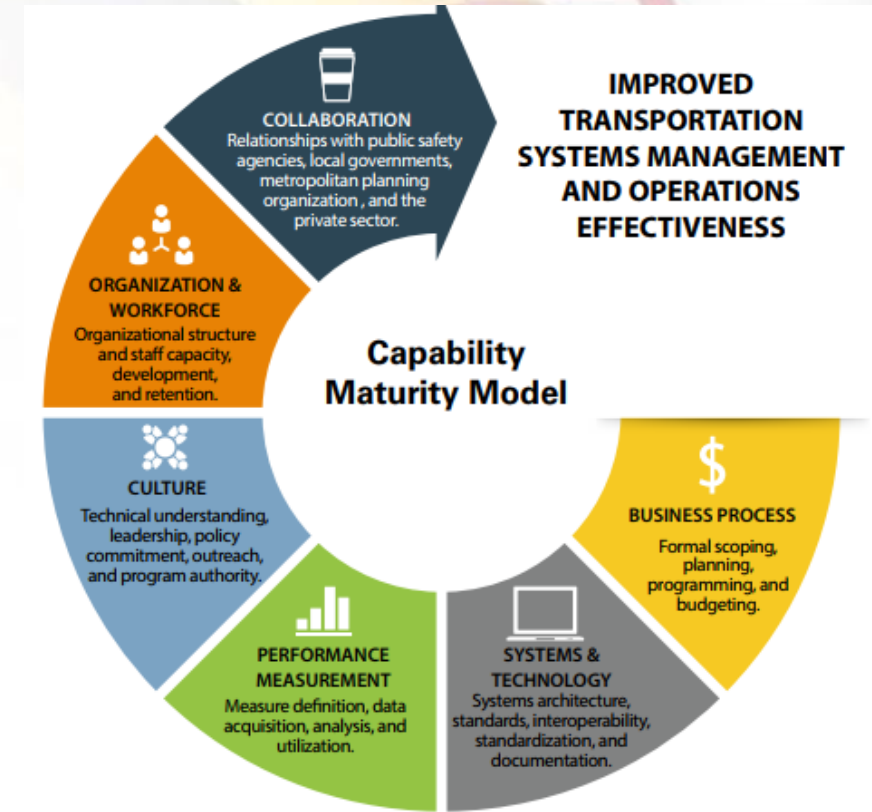


STRONG TSM&O FOUNDATIONS IN MARYLAND



TSM&O PLAN BACKGROUND

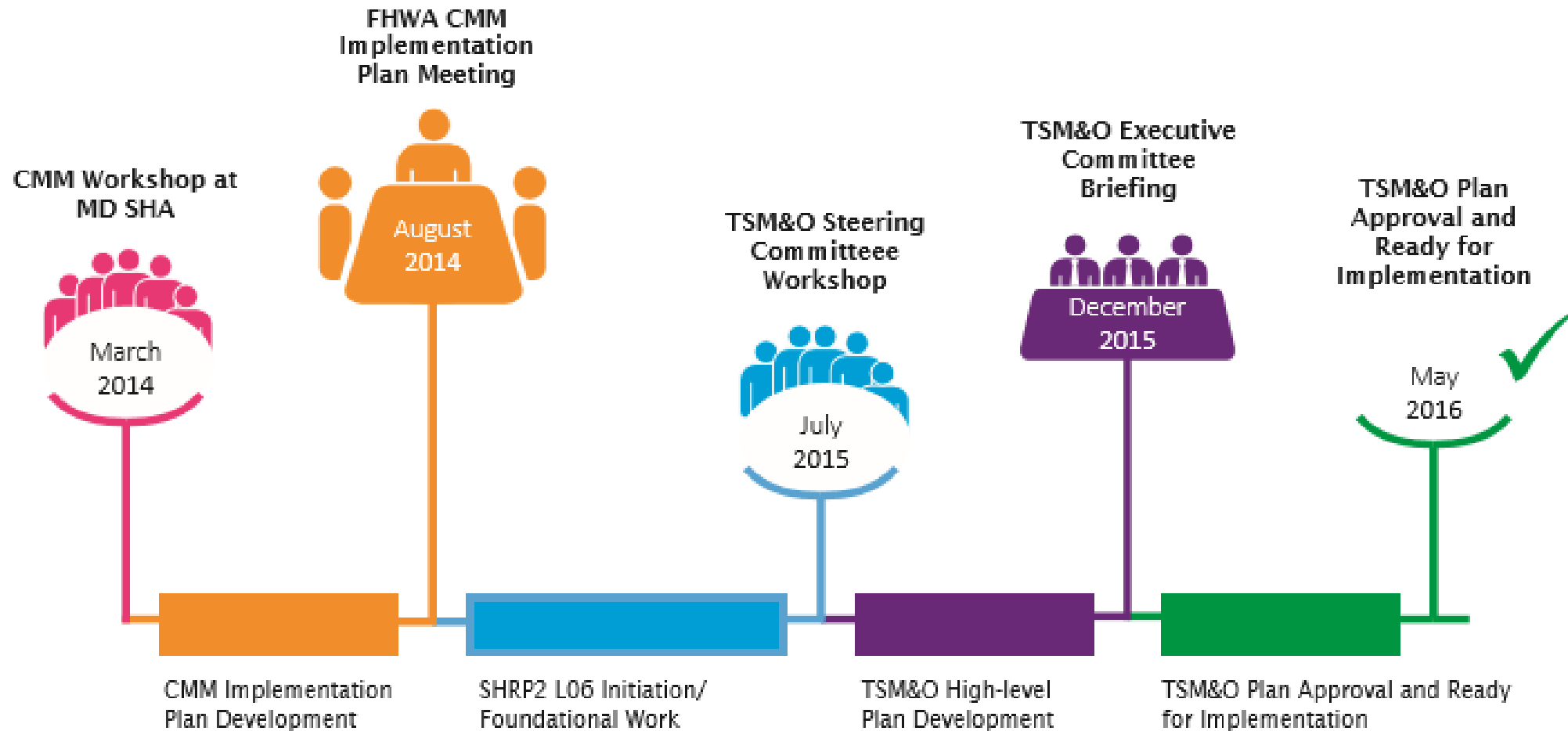
- MDOT SHA received FHWA SHRP2 L06 Implementation Assistance to “Organize for Reliability”
- CMM workshops facilitated TSM&O related conversations internally and externally.
- Outcome of the L06 project is the **SHA TSM&O Strategic Implementation Plan**



Source: FHWA/ AASHTO



MD TSM&O PLAN DEVELOPMENT TIMELINE



**TSM&O Plan officially adopted in August 2016.
FHWA CMM Post Evaluation/ Project Wrap-Up Meeting – July 2017**

MDOT SHA TSM&O STRATEGIC PLAN

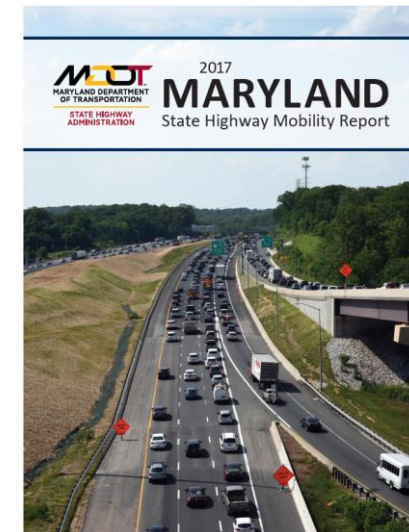
Integrated approach for planning, operations, and maintenance to improve the security, safety, and reliability of our transportation system.

Business Processes

Systems & Technology

Data, Analysis & Performance

Communications & Outreach



MD TSM&O STRATEGIC PLAN HIGHLIGHTS

Vision: Maximize mobility and reliable travel for people and goods within Maryland by efficient use of management and operations of transportation systems

Mission: To establish and maintain a TSM&O program and implement supporting projects within Maryland SHA improving mobility and reliability for all people and goods through planned operations of transportation facilities



- Summarizes a business case for TSM&O
- Establishes mission, vision, goals, objectives and performance measures for TSM&O within MDOT/SHA
- Identifies strategies and projects required to implement TSM&O
- Recommends resource needs to carry out plan

MDOT SHA TSM&O IMPLEMENTATION PLAN HIGHLIGHTS

- Action Items for Strategies, Deliverables & Outcome
- Includes responsible offices, resources needed, timelines, dependencies, and relationship to other plans

TSM&O

Goal - Develop and implement sustainable TSM&O program within SHA to implement TSM&O

Responsible offices
Office of Planning & Preliminary Engineering (OPPE) with support from Office of Traffic & Safety (OOTS), and Office of CHART

Resources needed
Staff hours, travel time reliability analysis tools, deterministic models, MD SHA managerial support

Timeline
1.1a.I. by Q 3 2016
1.1a.II. by Q 3 2016
1.1a.III. by Q 1 2017
1.1a.IV. by Q 2 2017

Dependencies
Strategies 1.2a. and 1.2b.

Existing plans supported by strategy
SHA Business Plan strategies 2.1.4, 2.1.5, 2.1.7
Maryland Transportation Plan – Quality of Service goal

Objective 1.1 - Incorporate TSM&O oriented practices in routine planning and programming business processes by 2018

Strategy 1.1a - Identify and implement means of incorporating TSM&O into relevant agency policies

Action items

- 1.1a.I. Evaluate the inclusion of reliability in MDOT mission, vision, and strategic plans.
- 1.1a.II. Develop a policy and procedure for TSM&O – Draft policy statement needs to address establishing TSM&O structure (office/functional area responsibilities). The procedure will include an institutional framework for TSM&O – including roles for steering and executive committees.
- 1.1a.III. Incorporate planning for operations in all processes within SHA - Maryland Transportation Plan 2035 and SHA Business Plan.
- 1.1a.IV. Identify methods for evaluating capacity vs. TSM&O options considering: service issues, network scale, time to implement, incremental improvement options capital operating and maintenance costs, cost-effectiveness related to relevant performance measures.

Deliverables

- 1a. Policy and Procedure to establish TSM&O structure for evaluating the benefits operational projects, side-by-side, with capacity projects.
- 1b. Inclusion of reliability in appropriate plans.
- 1c. Incorporation of TSM&O in SHA business processes.
- 1d. Report documenting quantitative improvements in travel times/speeds for Maryland based on identified TSM&O improvements. Comparison of existing eligible improvements to assess if mobility needs are met through new TSM&O projects.

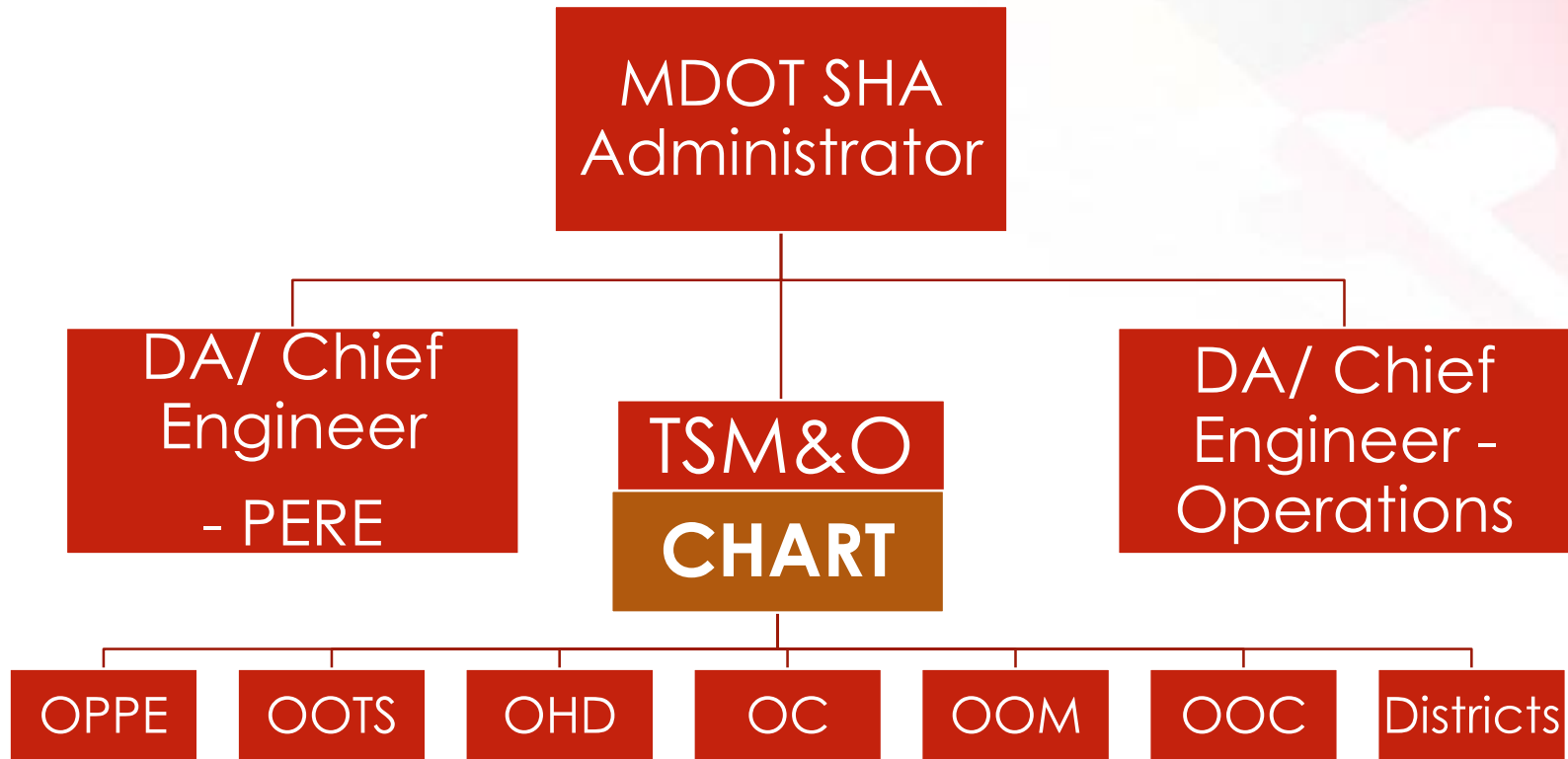
Outcome

- TSM&O processes become institutionalized in the State Highway Administration.

SHA

ORGANIZATIONAL SETUP

TSM&O Executive Committee provides strategic direction

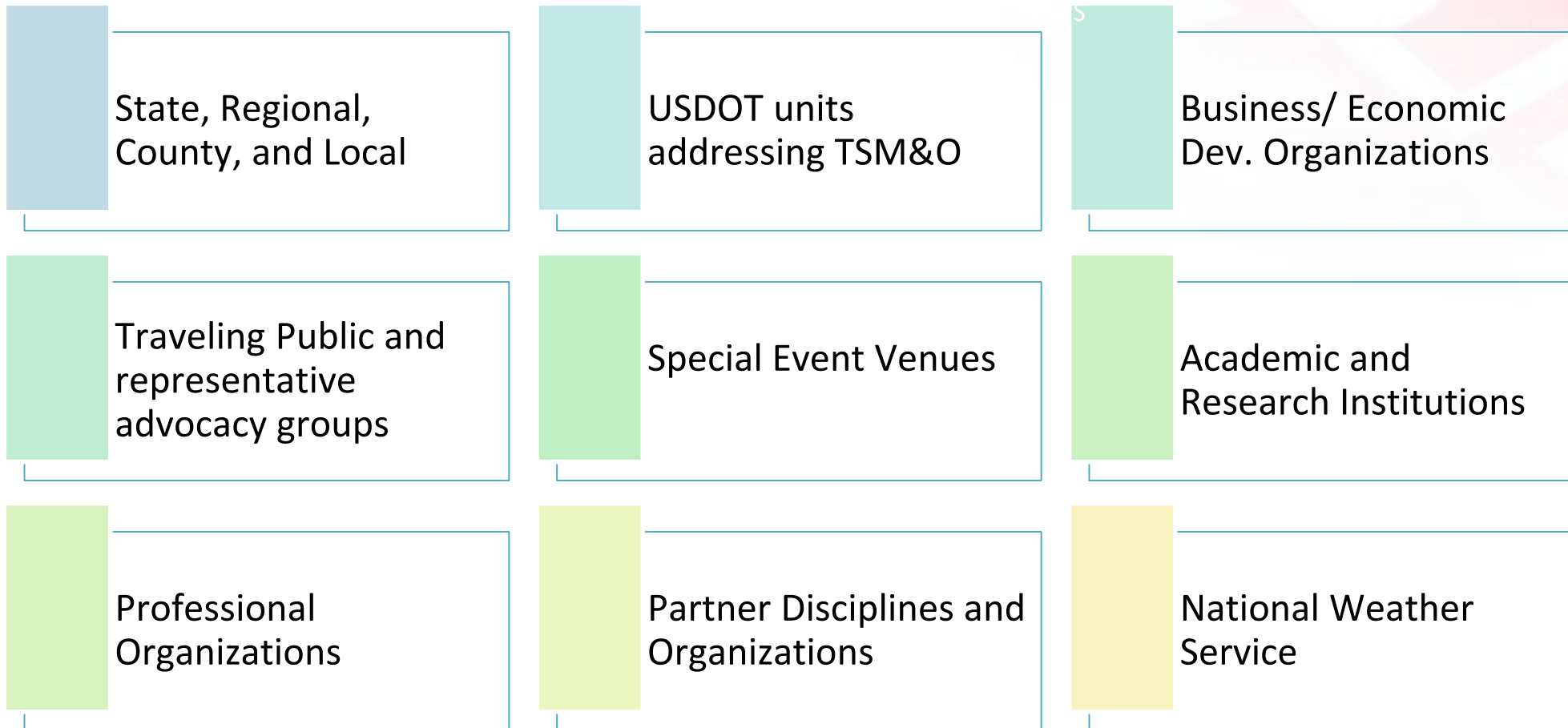


Related Org Changes:

- TSM&O Program Manager Position
- Communication Division part of CHART
- TSM&O Working Group is in charge of Implementation

PARTNERS, STAKEHOLDERS & CUSTOMERS

MDOT SHA, Other MDOT TBUs and MPOs provide the foundation



ONGOING TSM&O INITIATIVES

CHART



Cleared more than **30,000 incidents** and assisted approximately **42,000 stranded motorists**.

CAPITAL IMPROVEMENTS



11 Mobility Projects Completed in 2016 mainly at intersections, as well as a new interchange on MD 5 and widening along MD 355

Projects Under Construction Include:
I-695 from US-40 to MD 144
Widening of US 29 (Seneca Dr to MD 175)
MD 404 (Completed Nov 2017)


Projects Initiated in 2016:
I-270 Innovative Congestion Management

SIGNAL SYSTEMS



306 signals reviewed.
202 of those signals were retimed.

PARK-AND-RIDE LOTS



Provided a savings of more than **101 Million Annual VMT**


Allow more than **6,700 motorists** on a given weekday to connect to transit or ride with other commuters at **106 locations, operated in 20 counties**

PEDESTRIAN



Construction of **9 miles of new sidewalk**

ADA IMPROVEMENTS



More than 80% of sidewalks are now ADA compliant

Accessible Pedestrian Signals: **5% increase statewide**

BICYCLE



Approximately 88 miles of marked bike lanes and **6 miles** of marked shared use bike lane

HOV LANES



HOV lanes on I-270 and US 50

I-270 HOV lanes save as much as **20 minutes** of travel time in the AM and **25 minutes** in the PM peak hour

FREIGHT



Projects Completed in 2016:
4 new virtual weigh stations and improvements and 8 at-grade railroad crossings

Ongoing Initiatives:
A new National Highway Freight Network, Maryland Strategic Goods Movement Plan, Maryland Freight Story Map

In progress:
Design underway to provide 10 additional truck parking spaces on I-70 WB at South Mountain

TSM&O Initiatives



Currently implementing 2016 Transportation Systems Management and Operations (TSM&O) Strategic Plan. Initiatives include developing sample corridors for TSM&O, and a developing data supported system for performance reporting.

Nationwide Research Initiatives



7 projects are being implemented to advance mobility performance management, state-of-the-art modeling tools, and innovations for transportation planning and operations.

Connected and Automated Vehicles



Committees have been established and research is being performed related to the implementation of policies for connected vehicles and automated vehicles.

2016 Annual User Savings

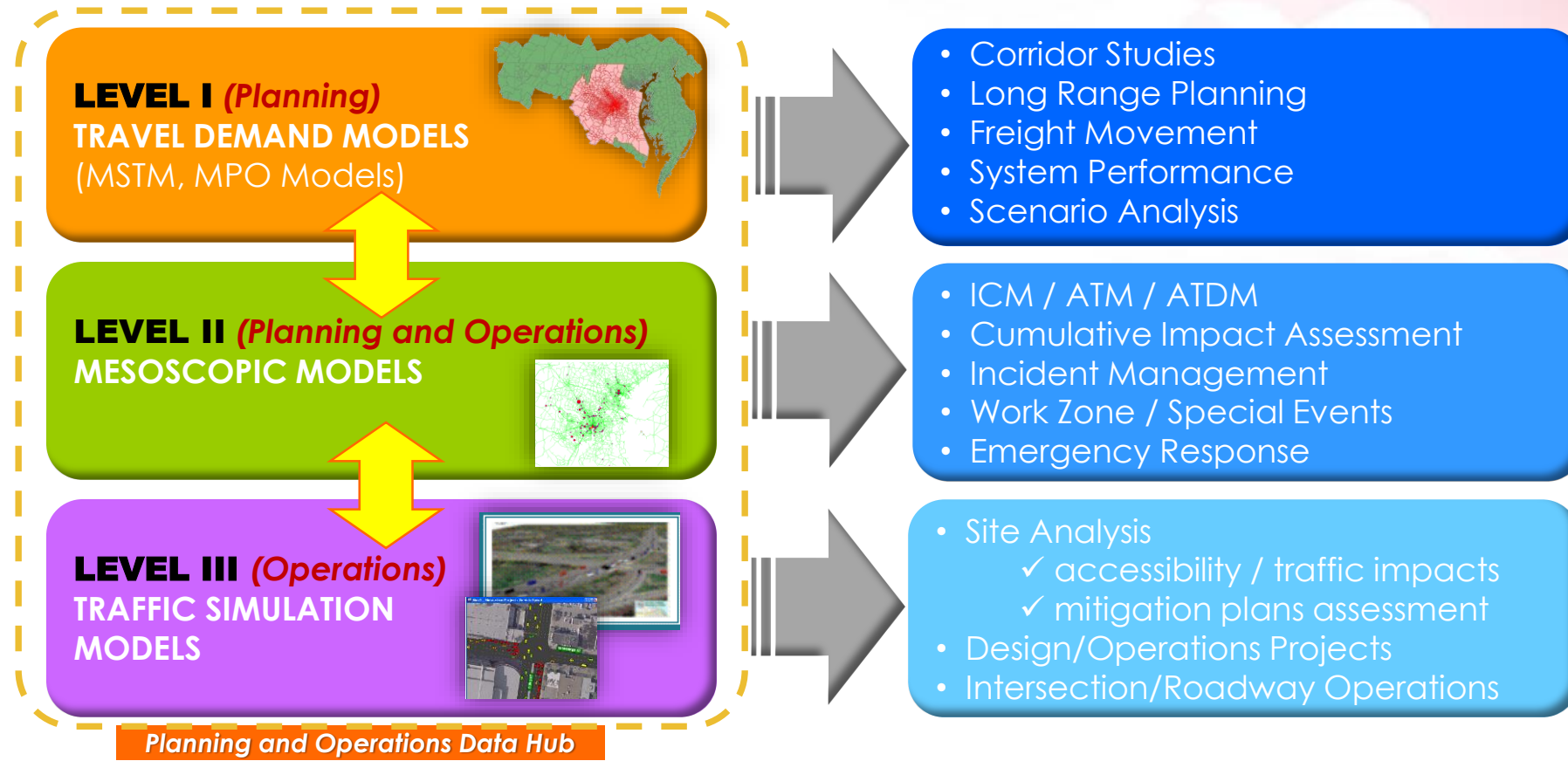
\$1.6+ Billion

CHART/ TSM&O
\$1500 Million

Capital Projects
\$29 Million

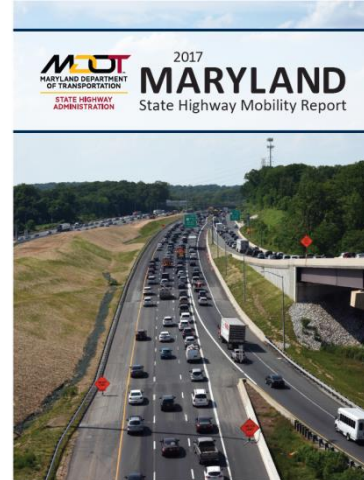
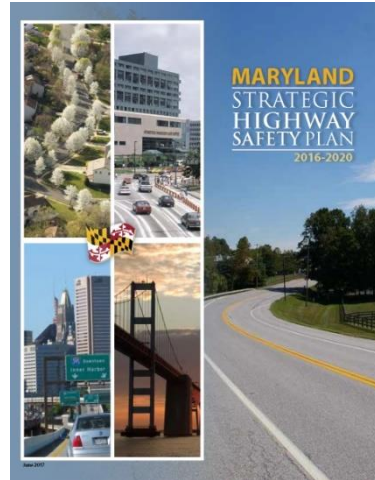
Signals & Multimodal Strategies
\$84 Million

TSM&O DECISION SUPPORT TOOLS



Other Tools – Scenario Planning Tools, Reliability Analysis Tools, Economic Analysis Tools etc.

TSM&O MASTER PLAN



- Incidents
- Closures

- Crashes

- AADT
- PTI/TTI
- Bottlenecks

- Existing Project Lists
- Funded – CTP/ TIP
- Unfunded – CLRP/ HNI



Identify Needs
 - Safety/ Mobility
 - Asset Conditions



Screening
 - Concepts, Traffic Analysis/ BCA

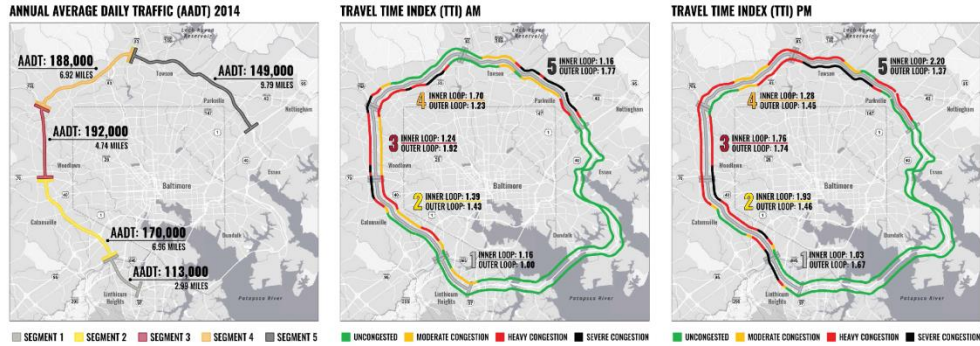


Design/ Implementation
 - OHD/ CHART/ OOTS/ OPPE/ Districts



TSM&O CORRIDOR & PROJECT PLANNING

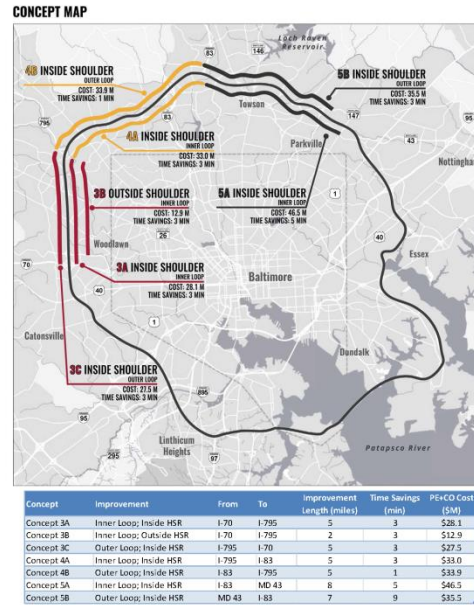
Purpose: To provide an overview of I-695 operations and to present potential HSR concepts along I-695



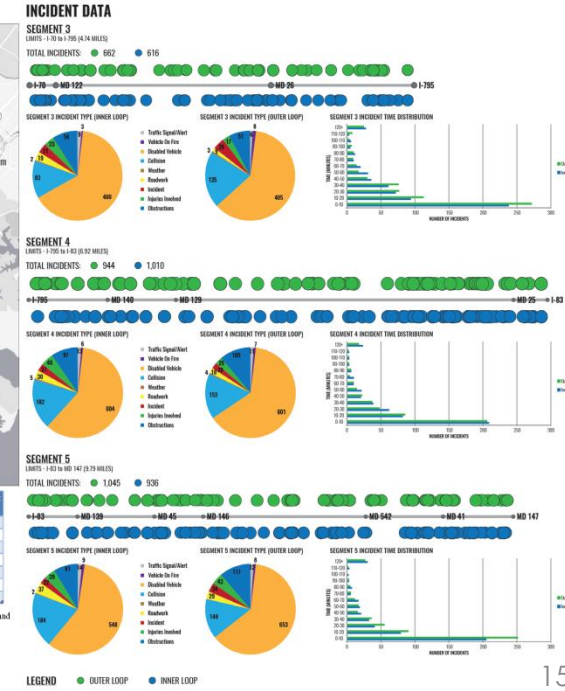
Source: AADT, Travel Time Index, Planning Time Index from MDOT SHA Mobility Report/ DSED GIS Data Services (shown as weighted average by length)

Overview: Segment 1 and Segment 2 have active projects under design/construction, therefore no concepts are proposed in those segments. Segment 3 has the highest AADT and Heavy/Severe Congestion in the AM and PM. Segment 4 has Severe Congestion in the AM (Outer Loop). Segment 5 has longest links with Severe Congestion in the AM and PM.

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State Highway Administration
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My telephone number/mobile number is: 301.221.6222



These are for planning purposes only. The concepts were developed based on aerial imagery and readily available information, and the construction estimates are cost-per-mile based on the MDOT SHA Cost Manual.



- Benefit/ Cost & LCAA
- Recommended Concept(s)
- Project Delivery Options
- Funding/ Phasing
- Design
- Implementation

- Logical Segments
- Existing Conditions
- Purpose & Needs
- Feasible Concepts
- Traffic Analysis/ Benefits
- Planning level Costs

OTHER MAJOR INITIATIVES

- Traffic Relief Plan Projects
 - P3 Initiatives (I-495/ I-270) ETLs
 - Smart Signal Corridors
 - I-695 Innovative Congestion Relief
- I-270 Innovative Congestion Management Project
- Other Projects
 - US 1 Technology Deployment Pilots
 - B-W Region ICM Con-Ops



TSM&O PERFORMANCE MEASURES

TRADITIONAL MEASURES

- ADT/ VMT
- Vehicle/ Person Delay/ Congested Miles
- Vehicle/ Person Throughput
- Average Incident Clearance Times
- Annual User Savings

NEWER MEASURES

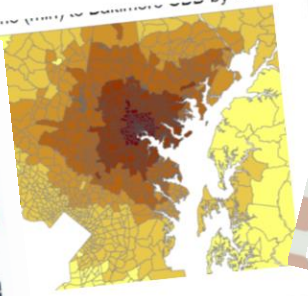
- Accessibility/Connectivity (auto, transit, non-motorized, freight)
- Reliability (auto, transit, truck)
- Market Segments (commuters, businesses, freight)
- Quality of Life/ Sustainability
- Economic Indicators
- GHG Emissions

Maryland experienced an **ALL-TIME RECORD** number of VMT in 2016.

59 Billion VMT

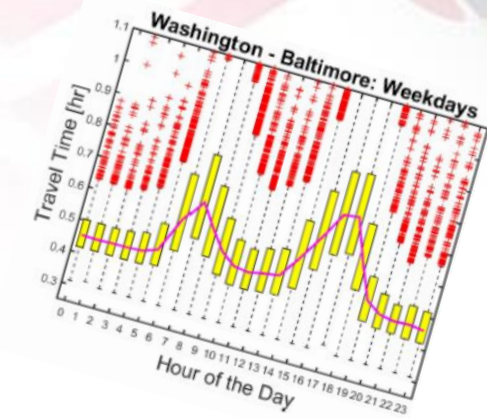
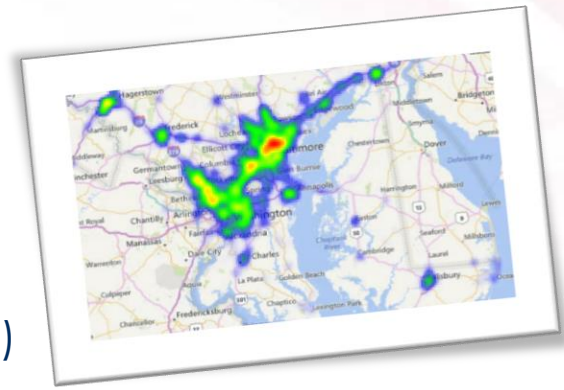
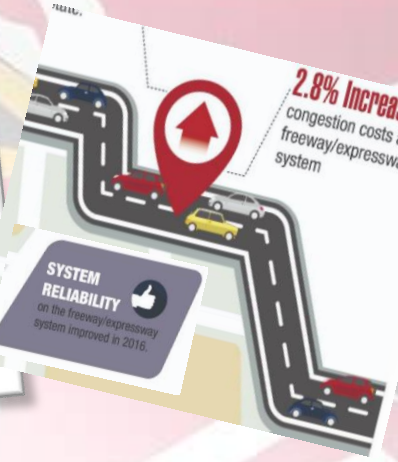


2.9% Increase FROM 2015



2.8% Increase in congestion costs along freeway/expressway system

SYSTEM RELIABILITY on the freeway/expressway system improved in 2016.



Fluctuations in Demand



Crashes



Inclement Weather



Work Zones

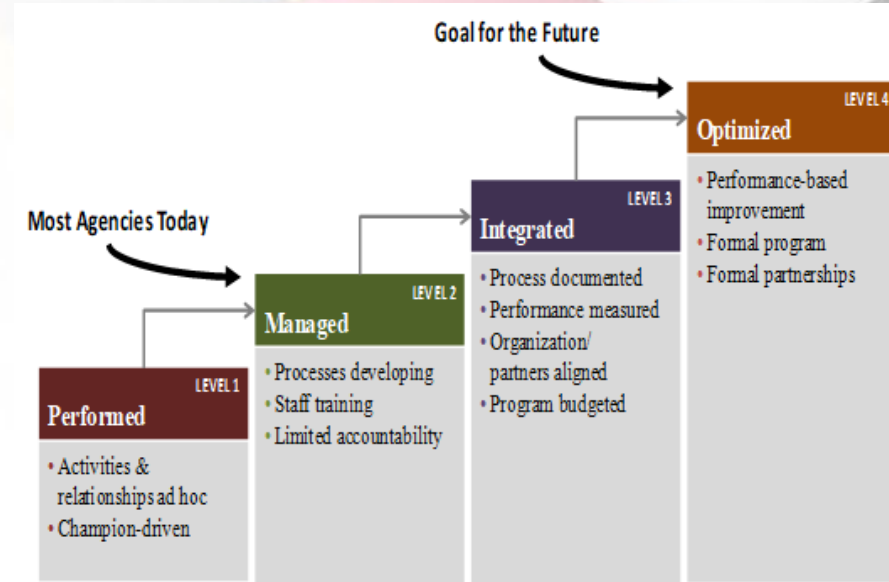


Poorly Timed Traffic Signals

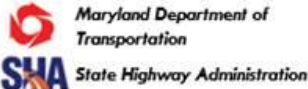


TRACKING TSM&O PROGRAM PLAN PERFORMANCE USING CMM FRAMEWORK

Dimension	2014 CMM Score	2017 CMM Score
Business Processes	3 Minus	3 Plus
Systems and Technologies	3 Minus	3
Performance Measurement	3	3 Plus
Culture	2 Minus	3 Minus
Organization and Staffing	3	3
Collaboration	2 Minus (CHART- 3)	2 (CHART – 3Plus)



TRACKING TSM&O PROGRAM PLAN PERFORMANCE



Pete K. Rahn, MDOT Secretary
Gregory C. Johnson, P.E., SHA Administrator

Vision: Maximize mobility and reliable travel for people and goods within Maryland by efficient use of management and operations of transportation systems

Mission: To establish and maintain a TSM&O program and implement supporting projects within Maryland SHA improving mobility and reliability for all people and goods through planned operations of transportation facilities

<p>Goal 1. Develop and implement a sustainable TSM&O program at SHA</p>	<p>Goal 2. Improve travel time reliability for both people and freight</p>	<p>Goal 3. Develop data- and performance-driven approaches to support TSM&O planning, programming, implementation and evaluation decisions</p>	<p>Goal 4. Improve the travelling public's experience on Maryland highways</p>
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<p>Objective 1.1. Incorporate TSM&O oriented practices in routine planning and programming business processes by 2018</p> <p>Strategy 1.1.a. Identify and implement means of incorporating TSM&O into relevant agency policies</p> <p>Strategy 1.1.b. Determine current and future TSM&O improvements and strategies that should be included in the planning process and allocate their relative effectiveness in responding to the specific causes of recurring and non-recurring congestion</p> <p>Strategy 1.1.c. Develop modifications to the SHA Project Development Process (PDP) to accommodate TSM&O</p> <p>Strategy 1.1.d. Develop a comprehensive ITS asset management process</p>	<p>Objective 1.2. Promote culture supporting TSM&O both inside and outside of SHA and raise overall TSM&O awareness</p> <p>Strategy 1.2.a. Identify staffing resources within SHA</p> <p>Strategy 1.2.b. Develop a communications and outreach strategy and associated training, outreach, and communication products</p> <p>Strategy 1.2.c. Coordinate TSM&O activities with other modal, MPOs, and local agencies with clear common objectives</p>	<p>Objective 2.1. Develop freeway and arterial master plans by April 2018</p> <p>Strategy 2.1.a. Develop Arterial System Master Plan</p> <p>Strategy 2.1.b. Develop Freeway Master Plan</p> <p>Strategy 2.1.c. Stay apprised of new applications, systems, and technologies and plan to integrate as appropriate</p> <p>Strategy 2.1.d. Work with MFTA, MDOT/MDA, and the private sector to develop and implement a coordinated and enhanced vehicle program in Maryland</p> <p>Strategy 2.1.e. Establish a framework for an institutionalized approach to support funding and implementation of operational improvements (including freight) on freeways and arterials</p>	<p>Objective 2.2. Develop Integrated Corridor Management (ICM) plans by December 2018</p> <p>Strategy 2.2.a. Focus on integrated freeway and arterial management and operations</p> <p>Strategy 2.2.b. Develop ICM Programs Master Plan for corridors that possess attributes necessary to apply ICM</p>	<p>Objective 3.1. Implement a comprehensive, system level performance measurement program to monitor mobility and reliability targets by June 2017</p> <p>Strategy 3.1.a. Develop a data supported system for performance reporting</p> <p>Strategy 3.1.b. Continue participation in research and collaboration efforts to advance TSM&O practices through FHWA, AASHTO, ITS America, University research centers, and consultants</p>	<p>Objective 3.2. Develop a TSM&O Program Performance Monitoring System</p> <p>Strategy 3.2.a. Develop a monitoring program to assess program benefits and challenges</p>	<p>Objective 3.3. Coordinate and ensure TSM&O is considered in SHA's Asset Management Program</p> <p>Strategy 3.3.a. Incorporate TSM&O into Transportation Asset Management Plan (TAMP) and TAMP Implementation</p>	<p>Objective 3.4. Include reliability in existing traffic analyses and travel forecasting modelling tools</p> <p>Strategy 3.4.a. Develop modelling tools that effectively incorporate travel time reliability and can be used to provide a framework for evaluating tradeoffs of various TSM&O operational strategies</p>	<p>Objective 4.1. Achieve a user cost savings of at least \$1 billion annually by effective congestion management and TSM&O</p> <p>Strategy 4.1.a. Provide reliable and accurate real-time modal choice information to travelers and other stakeholders at all times</p> <p>Strategy 4.1.b. Coordinate activities with other modal, MPOs, and local agencies to incentivize changing travel behavior</p>	<p>Objective 4.2. Enhance travelling public's knowledge and understanding of TSM&O operational strategies and their respective benefits</p> <p>Strategy 4.2.a. Develop education and outreach tools, including use of web-based and social media applications, targeted to the travelling public</p> <p>Strategy 4.2.b. Conduct regular surveys targeted towards the travelling public to determine level of customer satisfaction with SHA's application of TSM&O operational strategies</p>
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- = Significant Progress (>75%)
- = Moderate Progress (26%-75%)
- = Nominal Progress (5-25%)



ONGOING/ UPCOMING PROGRAM PLAN ACTIVITIES

- Release 2018 TSM&O Strategic Plan
- Develop Action Items & Timelines for each Strategy
- Release 2018 TSM&O Master Plan
- Develop business for TSM&O project development
- Launch TSM&O website, develop Communication Materials
- Develop education, training and outreach plan (internal and external use)
- Continue data, analysis and performance management products



IDENTIFY DEDICATED LONG TERM TSM&O FUNDING

LINK TSM&O WITH ASSET MANAGEMENT

LINK TSM&O TO MDOT SHA ORGANIZATIONAL MODERNIZATION EFFORTS

MDOT CONNECTED AUTOMATED VEHICLE (CAV) INITIATIVES

- MDOT is developing a CAV vision for all of Maryland
- One statewide initiative would look at land use change/policy scenarios
- MDOT SHA developed and published a CAV Strategic Action Plan.
- MDOT SHA has a CAV communications initiative that would involve outreach to MPOs and others
- Partnerships with private sector solicitations for piloting CAV technology through the Expression of Interest process.



STRONG TSM&O PROGRAM PROVIDES THE CORE FOUNDATION FOR CAV FUTURE...

MDOT CAV INITIATIVES

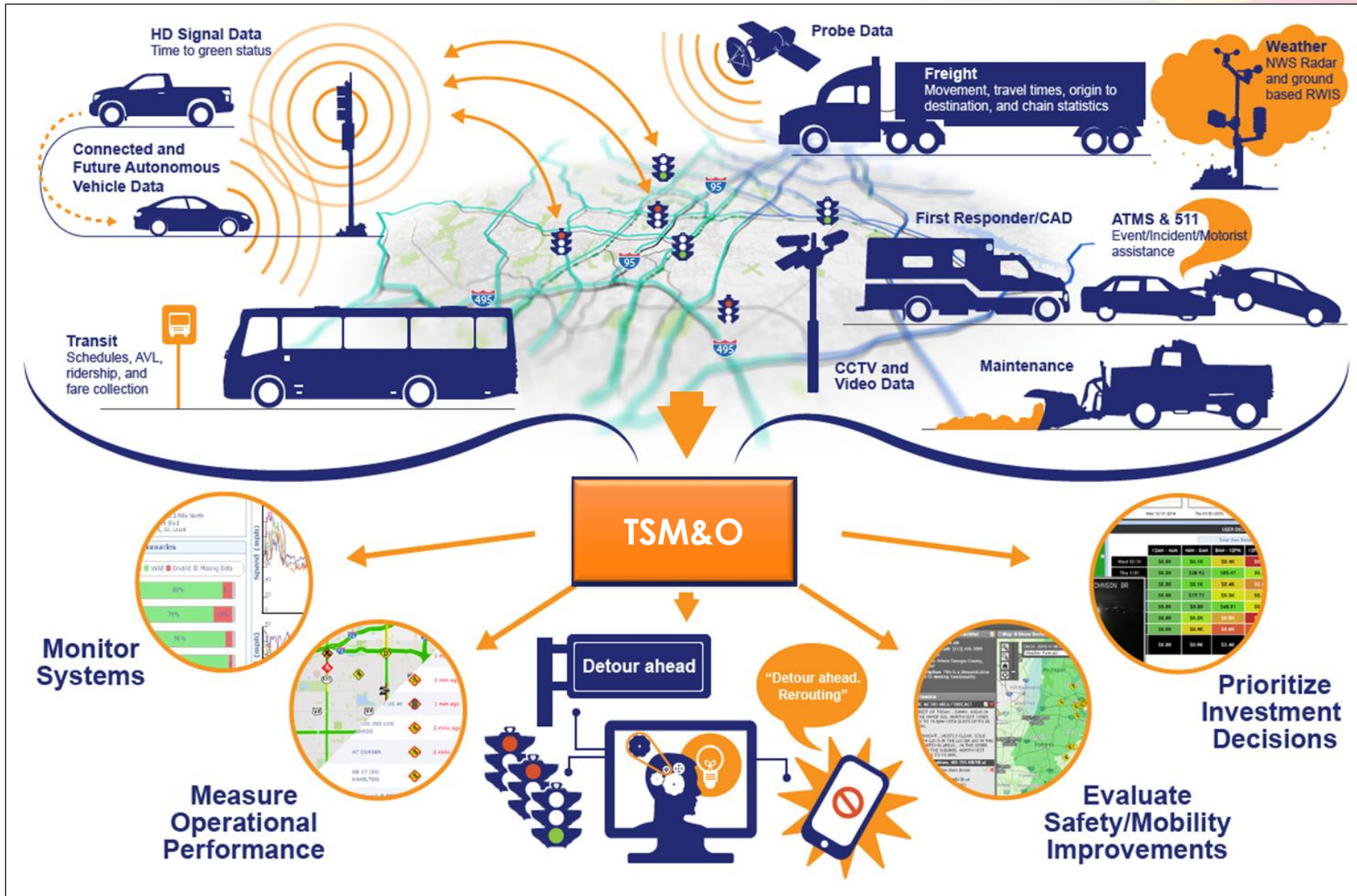
- Lessons Learned through Pilot Testing
- Partnerships & Collaboration (e.g. Aberdeen Proving Ground CAV testing)
- Telecommunications

US 1 PILOT PROJECT

- ✓ Adaptive Signal Control
- ✓ ITS Devices for incident management
- ✓ **DSRC Pilot Deployment for CV testing**



THE ROAD AHEAD !!



CONTACT INFORMATION

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