INTEGRATED CORRIDOR MANAGEMENT IN MARYLAND

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ABOUT MARYLAND

AMERICA IN MINIATURE

- Home to 6.1 million people
- 42nd in size
- 19th in population, 6th in density
- Geographic and socio-economic diversity
ABOUT MARYLAND DOT (MDOT)

MDOT comprises of six business units and an Authority

- The Secretary’s Office
- State Highway Administration
- Maryland Transit Administration
- Motor Vehicle Administration
- Maryland Port Administration
- Maryland Aviation Administration
- Maryland Transportation Authority

Unique multi-modal organizational framework for integrated transportation solutions

MDOT Excellerator drives the agency with ten tangible results and performance measures with ONE MDOT Approach
ABOUT MDOT STATE HIGHWAY ADMINISTRATION

MDOT SHA operates and maintains the numbered, non-toll routes in Maryland
- 17,000 lane-miles and 2,576 bridges

• Customer Focused
• System Efficiency & Reliability Key Drivers
• Freight Movement and Economy
• Performance Management

Huge Emphasis on Transportation Systems Management & Operations (TSMO)

ICM is a KEY COMPONENT for TSMO Implementation

Maryland Roadway Network

Maryland Traffic Volume

17% MDOT SHA Lane Miles

66% Volume on MDOT SHA Facilities
WHAT ARE CURRENT TRENDS IN MARYLAND?

• VMT is at all time high
• Nation’s 2ND highest commute times
• B-W region is one of the most congested regions in US
• Oversaturated conditions leads to higher unreliability
ONGOING MAJOR INITIATIVES WITH ICM OPPORTUNITIES

• MDOT SHA TSMO Strategic Plan
• CHART Traffic Ops Strategies
• Traffic Relief Plan Projects
  ▪ P3 Initiatives (I-495/ I-270) ETLs
  ▪ I-270 ICM Project
  ▪ I-695 TSMO Project
  ▪ Smart Signal Corridors
• MDOT CAV Initiatives
• Integrated approach for planning, engineering operations, and maintenance to improve the security, safety, and reliability of our transportation system.

• Provides Vision, Purpose, Goals, Objectives and Strategies
ONGOING TSMO INITIATIVES THAT ENABLES ICM

#### CHART
- Cleared more than 30,000 incidents and assisted approximately 42,000 stranded motorists.

#### CAPITAL IMPROVEMENTS
- TSM&O Projects Completed in 2016:
  - 10 Mobility Projects
  - 80% of the $1.6+ Billion
  - Projects Include:
    - I-695 from US-40 to MD-146
    - Widening of I-295 in Prince George's County
    - MD-504 (Completed Nov 2017)
    - Projects Initiated in 2016:
      - I-270 InnovativeCongestion Management

#### SIGNAL SYSTEMS
- 306 signals reviewed.
- 202 of those signals were retired.

#### PARK-AND-RIDE LOTS
- Provided a savings of more than $100 Million Annual UNK.
- Allow more than 6,700 motorists on a given weekday to connect to transit or walk with other commuters at 160 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 95 miles of 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! (Based on a trip by I-270 and US 50.)
- I-270 is a major route for freight.

#### FREIGHT
- Projects Completed in 2016:
  - 4 new trucking projects
  - 6 rail projects
  - A new National Highway Freight Network:
    - Maryland Strategic Intermodal Freight Hub Plan
    - Maryland Freight Network Plan
  - Designated 10 high-priority corridors.

#### TSM&O Initiatives
- Currently implementing 2016 Strategic Plan:
  - 7 projects are being implemented to advance mobility performance management, state-of-the-art modeling tools, and innovations for transportation planning and operations.

#### 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.

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2016 Annual User Savings
$1.6+ Billion

CHART/ TSM&O
$1,500 Million

Capital Projects
$29 Million

Signals & Multimodal Strategies
$84 Million
MDOT SHA CHART PROGRAM

Coordinated Highways Action Response Team

Improving mobility and safety for the users of Maryland’s highways through the application of ITS technology and interagency teamwork

- Traffic & Roadway Monitoring
- Incident Management
- Travelers Information
- Traffic Management
- Emergency & Weather Management
- Statewide Radio Communications

- Annual User Cost Savings: Over $1.5 Billion
- Average Incident Duration: 24 minutes
- Provides over 70,000 Total Responses
MARYLAND ICM FRAMEWORK

Integrated... combining or coordinating separate agencies so as to provide a harmonious, interrelated “whole”...

Corridor... a travel shed of trips anchored by one or more highway, arterial, or rail line

Management... jointly managing all the travel therein in order to achieve defined objectives

Source: FHWA
MARYLAND ICM PILOTS

• MDOT SHA received FHWA grants to develop ConOps on
  ▪ I-270 Corridor (2008)
  ▪ I-95 Corridor (2018)

• Pilots Provided Framework for mainstreaming ICM

• ICM seen as a key to TSMO success
ICM GOALS

- Improve mobility, throughput, and travel reliability
- Improve safety and incident response
- Disseminate reliable, real-time information
- Promote multi-modalism and demand management
- Promote economic vitality

*Objectives and performance measures for each goal*
ICM - CAPACITY MANAGEMENT

- SMART SIGNALS
- SPEED HARMONIZATION
- MANAGED LANES
- HARD SHOULDER RUNNING
- Ramp metering
- Junction control
- Incident management
- Traveler information
ICM - DEMAND MANAGEMENT

SHORT TERM
• Provide real-time multimodal traveler information
• Promote car-pooling, park and ride infrastructure
• Reducing transit headways
• Modifying parking policies and fees
• Incentivize trip-making/ modal choices (gamification, rewards)
• Employer Collaboration - Telework/ Flex-work
• Freight Delivery Scheduling

LONG TERM
• Land use policies and zoning (with local lead)
• Non-motorized transportation infrastructure
• Formalize ride-sharing/ ride-hailing industry partnerships
• Invest in CAV infrastructure for shared autonomous vehicles
• Alternative urban freight delivery models
ICM - HIGH LEVEL DESIGN

Virtual ICM Traffic Management Center

Transportation Management Agencies

Travelers

Application developers

Media

Public website

API and XML feed

Social media

Mobile app

Interactive Voice Response

Transportation Network

Freeway  Arterial  Bus  Rail  Parking

Incident data  Flow data  Work zone data  Parking data  Travel data  Traffic control

Traffic sensor

Data Warehouse (RITIS)

Vehicle Probe data

Weather data

Decision Support System

Modeling Engine

Simulation

Calibration

Prediction

AMS

Next-Gen High Definition AI Engine

Strategies and Operational Scenarios

Decision Thresholds

Knowledge Engine

Operator Interface

Commands to Network Operators

Virtual ICM Traffic Management Center

Transportation Management Agencies

Travelers

Application developers

Media

Public website

API and XML feed

Social media

Mobile app

Interactive Voice Response
ICM – CONTINUOUS IMPROVEMENT CYCLE

INVolVEMENT THROUGHOUT THE PROCESS

DESIGN

PLANNING

CONSTRUCTION

inNOVATION TO PROVIDE MAXIMUM VALUE

DATA DRIVEN APPROACHES FOR DECISION MAKING

CAV INCORPORATION
ICM INSTITUTIONAL FRAMEWORK

- **Partners and Stakeholders**: Collaboration is critical for ICM Success
- **Build upon existing CHART Institutional Arrangements & Agreements**
- **Formalization of Roles and Responsibilities** for Operational Scenarios

ICM steering board
MDOT-SHA, BMC, MWCOCG, USDOT

- Virtual TMC
- ICM system development
- Technical and management committee

**First Responders**
- National Park Service
- CHART
- Maryland State Police
- Local Fire Department
- Local Police

**Transit Operators**
- WMATA
- MTA
- RTA
- Ride On Bus

**Roadway Operators**
- CHART
- Montgomery County
- MoTA

**Information Providers**
- Maryland 511
- I-95 Corridor Coalition

**Technical**
- University of Maryland
- Jacobs Engineering

**Management**
- Howard County
- Baltimore City
- Anne Arundel County
- Montgomery County
- Prince George’s County
OPERATIONAL SCENARIOS

The objective of operational scenarios is to allow all stakeholders to clearly identify their expected role.

Operational Scenarios:
• describes a sequence of events and activities carried out by the user, the system and the environment,
• specifies what triggers the sequence, who or what performs each step, when communications occur and to whom or what [e.g., a log file], and what information is being communicated.

The scenarios cover all:

• Normal conditions
• Failure events
• Anomalies
• Stress conditions
• Maintenance
• Exceptions
ICM PERFORMANCE MEASURES

- Accessibility/Connectivity
- Reliability (Segment Level/ Trip Reliability)
- Market Segments (businesses, commodity flows)
- Freight Fluidity (supply chains)
- Economic Metrics
DATA TECHNOLOGY TO SUPPORT ICM

- Real time applications
- Archived data applications
- Combination of in-house tools and UMD CATT lab suite of tools (RITIS)
- MDOT Common Operating Picture
ANALYSIS, MODELING & SIMULATION TOOLS FOR ICM

LEVEL I (Planning)
TRAVEL DEMAND MODELS
(MSTM, MPO Models)

LEVEL II (Planning and Operations)
MESOSCOPIC MODELS

LEVEL III (Operations)
TRAFFIC SIMULATION MODELS

Planning and Operations Data Hub

- Corridor Studies
- Long Range Planning
- Freight Movement
- System Performance
- Scenario Analysis

- ICM / ATM / ATDM
- Cumulative Impact Assessment
- Incident Management
- Work Zone / Special Events
- Emergency Response

- Site Analysis
  ✓ accessibility / traffic impacts
  ✓ mitigation plans assessment
- Design/Operations Projects
- Intersection/Roadway Operations

Other Tools – Scenario Planning Tools, Reliability Analysis Tools, Economic Analysis Tools etc.
ICM DEPLOYMENT APPROACHES

• Implement Active Traffic Management Infrastructure

• Implement Multimodal and Demand Management Strategies
  • Implement real-time traveler information systems at P&R facilities and transit stations
  • Smart Truck Parking Systems
  • Enhancing bike routes and bike infrastructure
  • Incentivize travel choices

• Build on existing partnerships and institutional arrangements
CONTACT INFORMATION

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