Operations Activities and Use of Inrix Data in the Baltimore Region

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Baltimore Metropolitan Council

AMPO Operations Work Group

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Overview

• The Baltimore Region

• Overview of Operations Activities

• Overview of Use of Inrix Data / VPP
The Baltimore Region

- Over 2.6 million people, 20th most populous metro area
- Major employment center and tourist destination
- Adjacent to National Capital Region
- MPO is the Baltimore Regional Transportation Board (BRTB)
Operations Activities
Regional Operations Committees

Baltimore Regional Transportation Board

Management & Operations Partnership

Traffic Incident Management for the Baltimore Region

Traffic Signal Subcommittee

Transportation & Public Works Committee
Traffic Incident Management for the Baltimore Region (TIMBR)

- Initiated in 2000 as the Baltimore Regional Operations Coordination (B-ROC) Committee
- Meets bi-monthly
- Mission: Enhance **communication**, **cooperation**, and **coordination** across jurisdictions, agencies, and modes to improve responder and motorist **safety**, enhance **mobility**, and ultimately, **improve traffic incident management**.
- Receives consultant support funded by Maryland State Highway Administration
- No funding is allocated for large regional TIM projects
Member Agencies

- Local
  - Public works/transportation
  - Police
  - Fire
  - Emergency management

- State
  - Transportation (highway, transit, port)
  - Police
  - Fire
  - Emergency management
  - Environment
  - Medical Examiner

- Federal
  - Naval Academy
  - Transportation
  - US Coast Guard
  - US Park Service

- Other
  - Consultants
  - Baltimore Metropolitan Council
  - Metro. Washington Council of Governments
  - Towing & Recovery Professionals of MD
  - University of Maryland
## Overview of TIMBR Activities

### Field Guides / Forms
- Spanish Language Field Guide
- Maryland Statewide Incident Management Coordination Field Guide
- Medical Examiner Form

### Training / Awareness
- Traffic Incident Management Conferences
- On-line Traffic Incident Management Training Course
- Traffic Incident Management Self Assessments
- FHWA Traffic Incident Management Workshop

### Plans
- Contingency Transportation Emergency Management Plan
- Traffic Incident Response Coordination Plan

### Topic-Specific Task Forces
- Escorted Motor Ride Task Force
- Funeral Procession Task Force

### Agreements
- Memorandum of Regional Cooperation
Overview & Status of TIMBR Activities

• Summary table showing:
  Topic, Project, Status, Result

• Result Legend

- Completed, in use, well-received
- In development, progressing well
- May be completed but not in use / product not maximized
### Overview & Status of TIMBR Activities

<table>
<thead>
<tr>
<th>Topic</th>
<th>Project</th>
<th>Status</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Field Guides / Forms</td>
<td>Spanish Language Field Guide</td>
<td>Completed</td>
<td>Printed and distributed throughout the State</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Used widely</td>
</tr>
<tr>
<td></td>
<td>Maryland Statewide Incident Management Coordination Field Guide</td>
<td>Needs to be updated</td>
<td>Guide needs to be updated</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Could then be sent electronically</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Costly to print</td>
</tr>
<tr>
<td>Medical Examiner Form</td>
<td></td>
<td>Completed</td>
<td>Available, but need to educate police about its use</td>
</tr>
<tr>
<td>Training / Awareness</td>
<td>Traffic Incident Management Conferences</td>
<td>Sept 19-20, 2001</td>
<td>Very successful</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Nov 20, 2003</td>
<td>Interest in future events</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Apr 15, 2008</td>
<td>Funding needed to hold future events</td>
</tr>
<tr>
<td></td>
<td>On-line Traffic Incident Management Training Course</td>
<td>In development</td>
<td>Will be completed in July 2012</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Anticipated to be useful when completed</td>
</tr>
<tr>
<td>TIM Self Assessments</td>
<td></td>
<td>Conducted as a region in 2003, 2004, 2007, 2009</td>
<td>Initiated productive discussions about needs and potential projects</td>
</tr>
<tr>
<td>FHWA TIM Workshop</td>
<td></td>
<td>Conducted in September 2011</td>
<td>Helped identify some next steps / action items for TIMBR</td>
</tr>
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</table>
# Overview & Status of TIMBR Activities

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</table>
| Plans                        | Contingency Transportation Emergency Management Plan | Completed                                  | ▪ Compiled useful information  
▪ Incorporated into Regional Protective Action Coordination Guidelines  
▪ Will be included in Evacuation Support Documents currently being developed                                                  |
| Traffic Incident Response Coordination Plan | Completed                          |                                             | ▪ Compiled useful information  
▪ Information will be added to Maryland Statewide Incident Management Coordination Field Guide                                     |
| Topic-Specific Task Forces   | Funeral Procession Task Force        | Task Force has completed its work           | ▪ Completed Funeral Procession Guidelines; distributed to police and fire chiefs from elected officials, and to SHA  
▪ Created Funeral Procession Contact List that is updated quarterly by BMC staff                                                      |
| Escorted Motor Ride Task Force | Started Fall 2011, ongoing           |                                             | ▪ Issue of concern and interest by law enforcement in the region, and in neighboring regions  
▪ Anticipate outcome will include common guidelines for the region                                                                       |
| Agreements                   | Memorandum of Regional Cooperation   | Signed by all jurisdictions, MDOT, MSP      | ▪ Manual notification is difficult to implement / maintain  
▪ Full implementation not likely until automated                                                                                       |
Traffic Signal Subcommittee

• Initiated in 2002
• Provide a forum for the region’s traffic signal engineers, managers, and field staff to discuss issues of common concern
• Identify and undertake projects that improve the operation and coordination of the region’s traffic signals
Regional Signal Forum

• 5 Signal Forums held since 2004
• 6th scheduled for November 7, 2012
• Brings together signal technicians, managers, operators, equipment vendors, state, local, federal and private sector representatives
• Over 100 attendees
• Link to the 2011 Signal Forum
CMAQ Funding

- 4 local projects supported by the signal subcommittee received CMAQ funds for Adaptive Signal Control Technology (ASCT) application – approx. total $800,000
- 1 project in Anne Arundel County – completed – 8% reduction in overall daily travel time, 26% reduction in delay, 13% reduction in fuel usage and 8% reduction in emissions
Transportation & Public Works Committee

- Initiated in 2006 under BRTB and Urban Area Homeland Security Work Group to address day-to-day operations as well as emergency operations in public works.

- Members include operations representatives from local and state DPW/DOT agencies.
Overview of T&PW Activities Supporting Day-to-Day Operations

• Held 3 half-day operations forums on the following topics:
  – Snow Plow Operations
  – Roadside Mowing / Street Sweeping / Tree Trimming
  – Road Maintenance

• Low cost (host jurisdiction provided bagels and coffee)
Overview of T&PW Emergency Prep Activities

- Contraflow Decision Support Tool
  - UASI funds

- Evacuation Support Trailer
  - UASI funds

- Transportation-Focused Evacuation Tabletop Exercise
  - UASI and UPWP funds

- Traffic Management / Evacuation Model
  - UASI funds

- Baltimore Region Evacuation Traffic Management Document
  - UASI & UPWP funds

- Terrorism Awareness Training for DPW/T Field Staff
  - UASI funds

- Disaster Debris Tabletop Exercises
  - UASI funds

*Unified Planning Work Program
**Urban Area Security Initiative
Using Inrix Data through Vehicle Probe Project Suite
Regional Integrated Traffic Information System

• Automated data sharing, dissemination, and archiving system
• Developed by University of Maryland CATT Lab
• Functions include:
  – real-time fusion and exchange of regional transportation data
  – data archiving
Vehicle Probe Project Suite

Vehicle Probe Project Suite Dashboard
Explore the impacts of and relationships between bottlenecks and traffic events in real-time and at previous points in the past.

Massive Raw Data Downloader
Download raw probe data from our archive.

Congestion Scan
Explore the rise and fall of congested conditions on a stretch of road.

Historic Probe Data Explorer
View aggregated data from previous points in time.

Bottleneck Ranking
Rank bottlenecks and discover which ones have the greatest impact.

FAQs
Frequently asked questions and their answers.

Tutorials
Learn how to use each of the tools in the suite.
How We Are Using the VPP

• Congestion Management Process
  – Significant component
  – Initiated Quarterly Bottleneck Reports
• Quickly investigate impacts of special events / construction
• Supplement GPS speed data
• Performance Measures (in development)
  – Travel Time Index, Others TBD
  – Working with MPOs from DC to NYC
Quarterly Bottleneck Report

Top 10 Bottlenecks in the Baltimore Region
1st Quarter 2012

By Impact Factor (Number of Occurrences x Average Duration in Minutes x Average Length)

<table>
<thead>
<tr>
<th>Location</th>
<th>Average Duration</th>
<th>Average max length (miles)</th>
<th>Occurrences</th>
<th>Impact Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>I-695 CW @ MD-26/Exit 18</td>
<td>2h 17m</td>
<td>7.29</td>
<td>160</td>
<td>159,757</td>
</tr>
<tr>
<td>I-95 N @ MD-100/Exit 43</td>
<td>1h 43m</td>
<td>7.33</td>
<td>107</td>
<td>80,816</td>
</tr>
<tr>
<td>I-695 CCW @ Edmondson Ave/Exit 14</td>
<td>1h 25m</td>
<td>4.74</td>
<td>185</td>
<td>74,501</td>
</tr>
<tr>
<td>I-695 CW @ MD-147/Harford Rd/Exit 31</td>
<td>1h 50m</td>
<td>6.71</td>
<td>89</td>
<td>65,656</td>
</tr>
<tr>
<td>I-695 CCW @ MD-139/Charles St/Exit 25</td>
<td>1h 11m</td>
<td>3.65</td>
<td>218</td>
<td>56,553</td>
</tr>
<tr>
<td>I-95 N @ MD-43/White Marsh Blvd/Exit 67</td>
<td>2h 13m</td>
<td>8.57</td>
<td>36</td>
<td>41,055</td>
</tr>
<tr>
<td>I-95 S @ MD-155/Exit 89</td>
<td>58m</td>
<td>3.98</td>
<td>156</td>
<td>36,044</td>
</tr>
<tr>
<td>I-695 CCW @ MD-2/Ritchie Hwy/Exit 3</td>
<td>1h 35m</td>
<td>3.40</td>
<td>106</td>
<td>34,227</td>
</tr>
<tr>
<td>I-695 CCW @ MD-144/Frederick Rd/Exit 13</td>
<td>1h 30m</td>
<td>8.86</td>
<td>41</td>
<td>32,683</td>
</tr>
<tr>
<td>I-695 CW @ MD-41/Perring Pkwy/Exit 30</td>
<td>1h 23m</td>
<td>4.64</td>
<td>76</td>
<td>29,243</td>
</tr>
</tbody>
</table>

If the reported speed falls below 60% of the reference speed, the road segment is flagged as a potential bottleneck. If the reported speed stays below 60% for five minutes, the segment is confirmed as a bottleneck location.
Quarterly Bottleneck Report

#1 Ranked Bottlenecks in the Baltimore Region - 1st Quarter 2012

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<td>159,757</td>
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Notes: Normal inner-loop congestion extended from I-95 to Liberty Rd, with the greatest delays between MD 144 and the lane drop at I-70. High-volume ramps from Security Blvd, I-70 and US 40 contributed to the congestion.

Source: Skycomp report

From VPP

Staff analysis
Average Speed for I-695 from MD-140/Reisterstown Rd/Exit20 to MD-542/Loch Raven Blvd/Exit 29

17:00 in 2010

Causes of Congestion:
Congestion was most severe between I-695 and Providence Rd. Factors contributing to this long-standing and extended congested zone: merging and weaving associated with traffic at each interchange; and a lane drop (to 3 lanes) at MD-45/York Rd.

Source: Skycomp

What is being done to relieve congestion?
Upgrade existing I-695 to an 6 lane freeway from I-695 to I-95 (east) including the MD-139/Charles St interchange (11.39 miles). Project is currently in the engineering phase. Construction is not funded.

Source: SHA Project BA635_21

Staff analysis

From VPP

Readings for MD-45/York Rd/Exit 26

Readings below speed thresholds

- < 45 mph
- < 30 mph
- < 15 mph

Percent of Readings

Hour of day
Congestion on SB - 4/9-13 Morning Peak

Mon

Tue

Wed

Thurs

Fri

0% 15% 33% 50% 66% 85%

Raw speed as a percent of the free flow speed
Congestion on SB - 4/16-20 Morning Peak

Raw speed as a percent of the free flow speed
Advantages of VPP Probe Data

• Continuous monitoring (24/7/365)

• Probe-based speed data is superior to location-fixed detector speed data

• Complements other traffic data sources; enables more robust congestion analyses
Issues

- No traffic volumes
- Technical details regarding data collection and processing remain unrevealed
- Must rely on the VPP verification process
- Current VPP coverage is limited (esp. arterials)
- Uncertainty of funding for future data purchases
Conclusions

• VPP data shows congestion in the same locations as traditional GPS floating car trials
• Arterial coverage currently expanding; continue to supplement with GPS data
• VPP is very beneficial, cost effective tool – We will continue to identify uses for it
For More Information

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