Using Third-Party Navigation Applications to Improve Transportation Operations Planning for Special Events

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Welcome to DC!
The District of Challenges

- **Sixth** most congested city in the U.S.
- Drivers spend an average of **63 hours** stuck in congestion each year
- Population of the city **doubles** daily with commuters from VA and MD
- Making the challenge multi-jurisdictional
- Two-thirds of trips made by automobile
Welcome to DC!
The District of Challenges

- DDOT is currently using a variety of TSMO and ITS solutions to address congestion from daily commuter traffic or recurring congestion.

- Seeking new solutions to begin addressing sources of non-recurring congestion.
Sources of Non-Recurring Congestion

Road Work

Special Events
Solution Development Strategy

- Cost-effective
- Implementable in the short-term
- Easily adoptable
- Innovative
- Scalable for the integration of emerging technologies
Stakeholders

R&A Engineering

Public

Travelers

Permit Holders

TNCs and Department of For-Hire Drivers

Neighboring businesses and sponsors

District Department of Transportation

Navigation Applications

Subscription data

Data sources

DDOT cameras or real-time loop detectors

Real-time traffic data & video feed

Road closures, lane closures, turn prohibitions, etc.

Probe vehicle data

Archived data (e.g., travel time, speed, OD, etc.)

Real-time, static/construction and traffic/lane closures

Locations & duration of requested road and lane closures

Permission to close public spaces

Locations of pick-up/drop-off staging areas

Location of VMS signs & placement of traffic cones

Parking restrictions

Data (e.g., occupancy)

Suggested road closures requiring policy/procure

On-scene incident data

Occupancy: Real time

WMATA

Public Agencies

MPD

District DPW

PEMA

Road works or special event department

Planned staggered opening/closing hours in exchange of incentives
Stakeholders

Travelers
- Real-time advisories on traffic conditions and road/lane closures

Permit Holders
- Locations & duration of requested road and lane closures
- Permission to close public spaces

Navigation Applications
- Road closures, lane closures, turn prohibitions, etc.

Subscription data
- Probe vehicle data

District Department of Transportation
- Archived data (e.g., travel time, speed, OD, etc.)

R&A Engineering
Two-Part Solution

Road Work

Special Events
• Short-term road closures cause non-recurring congestion

• Existing DDOT permitting system collects generic closure schedules

• DDOT desires higher-resolution information about active road closures
Solution

- Mobile or web-based application used to “clock-in” and “clock-out” of an active road closure
Simple & Quick
Minimal effort for a large return
- Multi-agency notification of active road closures
- Data-driven approach to record DDOT road closure metrics
- Improved traveler information dissemination to inform driver route choice
  - DDOT website and social media
  - Existing third-party navigation applications already used by travelers
Existing third-party navigation applications already used by travelers

- Studies show that the majority of smartphone users download ZERO new applications each month
Road Work

Existing third-party navigation applications already used by travelers

- Two of the most commonly used navigation applications
• Application in Waze highlighted for DDOTs existing participation in the Connected Citizens Partnership
  • Aims to facilitate the exchange of data between Waze and Transportation Agencies
Road Work
Impacts

• Optimal travel routing to bypass active road closures
  • Reduce travel delay
  • Increase safety of travelers and workers

• Foundation for future Connected Vehicle solution
  • Where active road-closure information could be shared directly with vehicle OBUs
  • Validate data collection procedure prior to implementation of potentially safety-critical applications
Two-Part Solution

Road Work

Special Events
Special Events

2014–2015 TMC data

2013–2015 sensor data

2015 staffing needs

2015 staffing needs

2016 staffing needs
Special Events

Before Event
- Database initialization

During Event
- Destination patterns
- Shortest path to major destinations
- Enact TSMO policies to prioritize flow on shortest paths

After Event
- Assess performance

Reassess every 30-min
# Special Events

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
<th>Location</th>
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<tbody>
<tr>
<td>1</td>
<td>@ Braves L, 6 - 4</td>
<td></td>
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<tr>
<td>2</td>
<td>@ Braves W, 5 - 3</td>
<td></td>
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<tr>
<td>3</td>
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<td>4</td>
<td>@ Yankees L, 8 - 2</td>
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<td>7</td>
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<tr>
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<td>@ Phillies L, 2 - 3</td>
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</tbody>
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**Database initialization**

- Mon-Thurs (close)
- Mon-Thurs (significant)
- Fri-Sun (close)
- Fri-Sun (significant)
Mon-Thurs
(close)
06/18
06/19
06/20
06/21
07/02
07/04
07/05
08/01
08/07
08/09

Special Events

- Database initialization
- Destination patterns
Special Events

- Database initialization
- Destination patterns
- Shortest path to major destinations
Special Events

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Recommend TSMO Policies

- Optimize signal timing and phase sequencing
- Left turn prohibition
- Promote diverse mode choices
- Encourage optimal traveler decisions through information sharing

Special Events

- Database initialization
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- Enact TSMO policies to prioritize flow on shortest paths
Special Events

Before Event

Database initialization

Destination patterns

Shortest path to major destinations

Enact TSMO policies to prioritize flow on shortest paths

Assess performance

Reassess every 30-min

During Event

After Event
Impacts

- Optimize use of available data sources
- Reduce disruptions to residential areas
- Reduce pedestrian conflicts
- Reduce travel time on key mobility corridors
- Increase reliability on key mobility corridors
- Reduce emissions
Conclusions

Two unique solutions to address non-recurring congestion in the District

First: A real-time road closure reporting application that collects specific information about active road closures

Second: A novel strategy that repurposes existing traffic data for improvements to TSMO policies during and after special events
Conclusions

The presented solutions:

• Use technology that is ready for deployment
• Promote a high benefit-to-cost ratio
• Build from DDOTs existing partnerships
• Leverage DDOTs existing data sources
• Do not require changes to existing driver behaviors
Thank You for Your Attention

Any Questions?

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