ATM Project Atlas - Executive Summary
Active Traffic Management Strategy - ODOT Region 1

Let's Keep it Moving

August 2016
# ACKNOWLEDGEMENTS

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KEY TERMS AND ACRONYMS

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<th>DESCRIPTION</th>
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<tbody>
<tr>
<td>AA</td>
<td>Activation Areas</td>
</tr>
<tr>
<td>ATM</td>
<td>Active Traffic Management</td>
</tr>
<tr>
<td>B/C</td>
<td>Benefit to Cost</td>
</tr>
<tr>
<td>CBOS</td>
<td>Corridor Bottleneck Operations Study</td>
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<tr>
<td>CIA</td>
<td>Congestion Influence Areas</td>
</tr>
<tr>
<td>ITS</td>
<td>Intelligent Transportation System</td>
</tr>
<tr>
<td>PDO</td>
<td>Property Damage Only</td>
</tr>
<tr>
<td>PS&amp;E</td>
<td>Plans, Specifications, and Estimates</td>
</tr>
<tr>
<td>PTI</td>
<td>Planning Time Index</td>
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<tr>
<td>SPIS</td>
<td>Safety Priority Index System</td>
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<tr>
<td>SRI</td>
<td>Safety and Reliability Index</td>
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<tr>
<td>STIP</td>
<td>Statewide Transportation Improvement Plan</td>
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<tr>
<td>VMS</td>
<td>Variable Message Sign</td>
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EXECUTIVE SUMMARY

WHY: IDENTIFIED NEED AND STRATEGIC STEPS

THE PROBLEM
ODOT Region 1 is facing increasing congestion along its freeway corridors. The results of this congestion are worsening safety problems and reduced system reliability.

Our region is projected to continue growing in population and employment, resulting in an increase in travel demand. The region’s existing freeway and highway system is unable to adequately accommodate the current demand. Future increases in travel demand will continue to overburden the system and further degrade safety and operations, and thus will continue to reduce freeway system reliability. The degradation of the freeway system will result in more delay, and this delay costs money (for example, when drivers waste fuel in stop-and-go traffic or when businesses suffer lost productivity because shipments are slower to arrive at their destination). High construction costs, constrained right-of-way, environmental factors, and limited public funding reduce ODOT’s ability to relieve traffic congestion through traditional capacity/infrastructure improvements.

ROADMAP TO LOWER-COST SAFETY AND EFFICIENCY IMPROVEMENTS
To address increasing operations demands and financial constraints, ODOT Region 1 has embarked on a series of projects to identify and implement lower-cost, highly effective strategies to address safety and mobility issues, while getting the most out of the existing transportation system.

PAST MILE MARKERS:
- Corridor Bottleneck Operations Study (CBOS) – Addresses recurring bottlenecks with low-cost capacity and operational improvements in Region 1.
- OR 217 – Pilot project to demonstrate the effectiveness of Active Traffic Management (ATM) strategies to improve travel reliability and safety without expensive capital projects that add capacity.
- TIGER ATM – Builds on the OR 217 project with ATM strategies that are targeted to support key economic and freight corridors in the region.

PATH AHEAD:
- Region 1 ATM Plan – Comprehensive regional ATM strategy to maximize the effectiveness and efficiency of the existing system, while improving safety and trip reliability.

WHAT: ACTIVE TRAFFIC MANAGEMENT (ATM) – IN A NUTSHELL
Active Traffic Management (ATM) is a method of improving safety and trip reliability by dynamically managing and controlling traffic demand and available capacity of transportation facilities, based on prevailing traffic conditions, using one or a combination of several real-time and predictive operational strategies.

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The primary focus of the evaluation and screening of strategies was to improve safety and reliability along the five study corridors in Region 1. Specifically, the following evaluation approach has been used for this project (see process at right). The performance metrics selected for this analysis, in order of importance, are: (1) Potential Crash Reduction, (2) Incident Delay Reduction (Freeways), and (3) Travel Time Reliability (during peak period).

CRASHES PER MILE – MEASURING SAFETY

Safety can be evaluated and quantified with a variety of different metrics. In this ATM Atlas, the measure of “crashes per mile” (frequency) is used as a primary, high-level indicator of “safety” within a segment. Other metrics (high-crash locations, Safety Priority Index System, types of crashes, etc.) are also included to support more comprehensive examinations of underlying issues, and to understand how specific ATM strategies might benefit the identified issues.

PLANNING TIME INDEX (PTI) – MEASURING RELIABILITY

For many travelers the reliability of the transportation system is just as important, if not more important, than the time it takes to get to a destination. The Planning Time Index (PTI) provides an estimate of how much additional time a traveler should budget during peak period compared to off-peak period and still arrive on time at his or her destination. For this study we used an 80 percent reliability measure, which represents arriving on time approximately four out of five working days.

SAFETY AND RELIABILITY INDEX (SRI)

The Safety and Reliability Index (SRI) is a product of multiplying the crashes per mile by the PTI. The crash component of the SRI value has slightly more than four times the influence of the PTI (reliability) component. This combined metric serves as a high-level screening and assessment tool.

HOW: PROCESS AND METRICS

• Break corridors into discrete segments to support analysis and manage implementation in operational phases.
• Determine the Safety and Reliability Index (SRI) value for each segment. The SRI helps identify the need for ATM strategies.
• Identify the effective ATM strategy for each corridor and cost each segment.
• Estimate the potential crash reduction and associated economic benefit for each segment.

REGIONAL BENEFITS

The total potential economic benefit for each corridor is the sum of the incident delay reduction cost, fuel cost savings, and crash avoidance costs for all users. These benefits can be compared to the costs, SRI values, other underlying performance metrics, and other planned projects to determine the appropriate implementation priorities.

REDUCED DELAY AND MORE RELIABLE TRAVEL TIMES

ATM systems help reduce delay (by 3 to 15 percent) and improve travel time by promoting more uniform driver behavior, smoothing the flow of traffic, and reducing traffic incidents.

ECONOMIC BENEFITS FOR ALL USERS

The annual and 20-year cost savings (combined benefits for all users) achieved by implementing any one of the individual strategies or a combination of strategies (Variable Speed and/or Queue Warning/Traveler Information) was divided by the implementation costs to determine the Benefit to Cost (B/C) ratio of the proposed ATM projects to be implemented along each operational segment.

ESTIMATED BENEFIT/COST

For every dollar spent on proposed ATM strategies, there are roughly $1.5 to $3.5 of expected economic benefits.

Cost of Regional ATM Plan

Using unit-based cost estimates developed for the TIGER ATM project, the cost to implement ATM on the five corridors is estimated at $87.7M with individual operational segment costs ranging from $425k to $7.5M.

Regional Benefits

The ability of ATM systems to provide drivers with greater awareness of traffic conditions and smooth traffic flow decreases crash frequency by 10 to 25 percent and lowers the severity of crashes by 10 to 35 percent.

Estimate the potential benefit for each corridor and cost each segment.

Regional Benefits

For every dollar spent on proposed ATM strategies, there are roughly $1.5 to $3.5 of expected economic benefits.