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Planning for Active Traffic Management in Virginia: International Best Practices and Implementation Strategies (VCTIR 13-R1)

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HRTPO TTAC Meeting

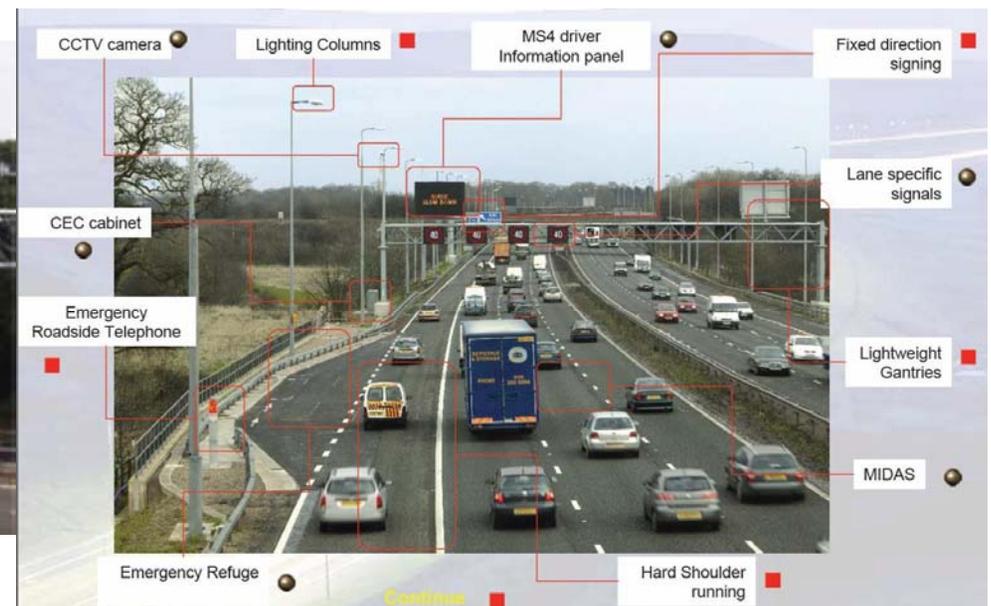
What is Active Traffic Management?

- Ability to dynamically manage recurrent and non-recurrent congestion based on prevailing conditions using technology
- Extensive experience in Europe
- Deployments in US are underway
 - Seattle
 - Minneapolis
 - Coming soon to Virginia



Common ATM Techniques in Use in Europe

- Variable Speed Limits (Speed Harmonization)
- Dynamic Shoulder Use/Junction Control
- Queue Warning Systems



ATM in Virginia

- I-66 ATM
 - \$34M contract to TransCore
 - Gainesville to DC
 - Lane control, dynamic shoulder use, adaptive ramp meters
- Safety VSLs on I-64 Afton Mtn and I-77 Fancy Gap



Purpose

- Determine the operating characteristics and effectiveness of previous ATM deployments.
- Develop guidelines regarding:
 - Conditions for use
 - Deployment considerations
 - Data needs
 - Assessment methods
- Develop guidelines for including ATM in the traditional planning and operations planning process.



Scope: Study was limited to

- Synthesis of literature to develop guidelines
- Hypothetical case study of guidelines' application
- Focused on freeways only
- Did not assess demand management techniques



Methodology

- Task 1: Review available information on ATM.
- Task 2: Review best practices for considering operational improvements in the planning process.
- Task 3: Develop guidelines for the use of ATM techniques in Virginia.
- Task 4: Develop a framework for further including ATM in the planning process.



Guidelines for ATM Deployment

1. Assess the proposed ATM deployment site to determine if it has the infrastructure and operational conditions required for the particular ATM treatment.
2. Conduct a sketch planning analysis to estimate the safety and operational impacts of the proposed ATM deployment.
3. Conduct a more detailed simulation analysis of the safety and operational impacts of the proposed ATM deployment.
4. Conduct ongoing monitoring and assessment of the safety and operational benefits of the ATM deployment.



Table 8. Conditions for Application of Variable Speed Limits (VSLs)

Traffic flow/
safety impacts

Category	Item
1. Observed Problems	A. Recurring congestion and queuing during multiple days of week
	B. High number of crashes, especially rear-end crashes, during congested periods of day
2. Infrastructure Requirements	A. Power must be available to site or able to be installed at cost-effective rate
	B. Right of way to install VSL signs and/or overhead sign gantries must be available
	C. Communications to TOC must be available
	D. CCTV monitoring of site should be present to monitor system performance
	E. VSL signs must be placed so that at least 1 is visible at all times. Signs should be placed to contain the end of queuing at site fully and extend through bottleneck that creates queuing.
	F. VSL signs should conform to speed limit sign requirements in MUTCD or VDOT must seek FHWA approval to use European style overhead signs.
	G. Sensors to support VSL operation must be installed at close spacings. Sensors should be located prior to and past any ramp entrances where flow state will change.
	H. If VSLs are to be enforced using traditional enforcement, there must be sufficient space on shoulder to permit enforcement officers to pull over violators.
3. Operational Requirements	A. A concept of operations for system needs to be developed and adhered to. Responses to incidents, weather events, and other non-recurring events should be established.
	B. VSL system should have an expert system that recommends speed limits for automatic posting and/or operator approval. The expert system should be well validated prior to deployment in field, and VDOT staff should have a clear understanding of its operation.
	C. Speed limit changes should be archived in a secure database. An archive of speed limit changes will be essential if limits will be challenged in court.
	D. TOC staff should monitor system continuously to ensure it is operating properly.
	E. Funding must be allocated to operate and maintain the system properly after installation. Well-performing sensors are critical to proper operation of VSLs and must be maintained to a high level.
4. Institutional Requirements	A. VDOT must coordinate with VSP and other enforcement agencies to develop enforcement plan for VSLs. Unless automated speed enforcement becomes legal in Virginia, VDOT will need to rely on traditional enforcement to maintain credibility of system. Items to be defined include method used to notify enforcement agencies of changes in speed limit and processes to provide official records of posted speed limit in place at a given time for court cases.
	B. VDOT, VSP, and local enforcement agencies will need to engage local judiciary to educate them on system and its legal basis. Effectiveness of system will be undermined if it is not enforced effectively.
	C. Public outreach on goals and benefits of system will be essential to gain public acceptance.
	D. VDOT should coordinate with DMV to discuss simple ways of including a mention of VSL in driver training programs.

Installation

Operations

Business case

Example of Screening Guidelines

5 ATM techniques
X
4 types of characteristics

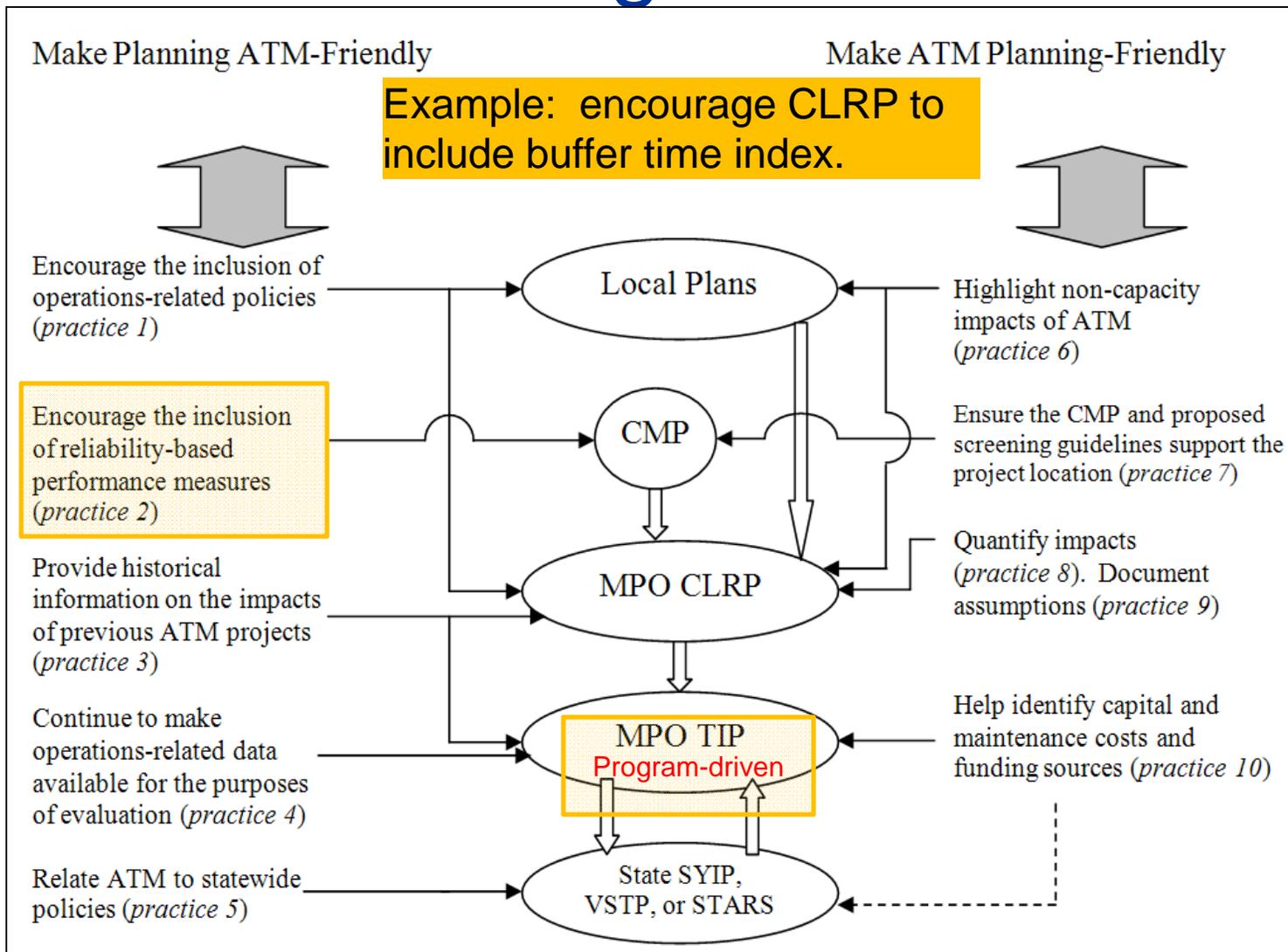
CCTV = Closed Circuit Television; DMV = Virginia Department of Motor Vehicles; FHWA = Federal Highway Administration; MUTCD = Manual on Uniform Traffic Control Devices; TOC = Traffic Operations Center; VDOT = Virginia Department of Transportation; VSP = Virginia State Police.

Some Best Practices for Considering Operations in the Planning Process

- Include initiatives directly in the CMP and relate them to ongoing system monitoring efforts.
- Include indicators of performance for operations projects.
- Imperfections are o.k.: provide some information, rather than no information, on impacts.
- Recognize ITS or operations planning efforts early in the planning process (e.g., at the corridor planning level).



Framework for Including ATM in Planning Process



Conclusions

- There is a lot of experience with ATM in Europe, but questions still remain about how transferable that experience is to the United States.
- While basic screening guidance for site eligibility, evaluation, and monitoring could be developed, hard numeric guidance could not be created due to site- and deployment-specific issues.



Conclusions

- Planning documentation suggests that operational initiatives are already considered to some degree within the planning process.
- An opportunity exists to increase the possibility that ATM initiatives will be considered by facilitating the computation of appropriate performance measures.
- Opportunities exist to influence the planning process to consider ATM techniques more fully.



Next Steps

- VCTIR is working with VDOT operations, traffic engineering, and planning to develop workshops on ATM usage
 - Decision maker level and technical staff level
- Discussions with FHWA on their ATM outreach efforts
 - Emphasis on relating TIP line items to regional goals



Questions

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- Link to Report:
 - http://www.virginiadot.org/vtrc/main/online_reports/pdf/13-r1.pdf

