



MARYLAND TRANSPORTATION OPERATIONS SUMMIT

2008

BETTER MOBILITY THROUGH IMPROVED
TRANSPORTATION OPERATIONS

SUMMARY OF PROCEEDINGS

WHITE PAPER

FINAL
AUGUST 2008



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MARYLAND TRANSPORTATION OPERATIONS SUMMIT

BETTER MOBILITY THROUGH IMPROVED TRANSPORTATION
OPERATIONS

EXECUTIVE SUMMARY

INTRODUCTION

On May 1, 2008, the Maryland Transportation Operations Summit was held at the Conference Center at the Maritime Institute in Maryland and allowed participants to engage in an open dialog to explore opportunities for coordinating transportation operations among modes, jurisdictions and levels of government. The first-of-its-kind summit brought together Maryland state, regional and local transportation and public safety agencies to discuss:

- Current national perspectives on highway and transit operations;
- Current status of highway and transit operations in Maryland;
- Agency plans and visions for improving and mainstreaming operations in Maryland; and
- Next steps for expanded and integrated agency efforts to enhance operations.

Agency and other spokespersons offered assessments on state and national progress on an operations continuum. They shared their respective plans for achieving agency operational visions.

Specific areas of focus included: institutional arrangements and barriers, technological advancements and utilization, interoperability, regional and multi-modal coordination, travel safety, incident and emergency management, congestion management, best practices, current and future leaderships, and next steps/future directions [refer to Appendix A to view the Summit Program]. The goal of the summit was to give attendees a better awareness of national and statewide operations, innovative practices, and emerging operations technologies and tools to begin setting the direction for the future advancement of statewide transportation management and operations in Maryland. This post-summit white paper is only an initial step towards achieving this goal. It is anticipated that the Operations Summit will become a regular event and that workshops focusing on specific operational areas will be held throughout the year.

Participation in the Maryland Transportation Operations Summit (MTOS) included a total of 264 people representing a wide range of individuals working in transportation operations from Maryland senior officials to field operations personnel; Federal, State, regional and local organizations; and other interested parties including the Maryland Motor Truck Association and American Automobile Association. A list of MTOS participants, along with contact information, is contained in Appendix C. Appendix C also includes a summary of participant distribution by agency/organization.



Sponsorship and organizational support of the Summit was provided by organizations involved in transportation operations such as the Maryland Department of Transportation (MDOT) and its modal administrations, county and local departments of transportation and transit agencies, the Intelligent Transportation Society of Maryland, the Federal Highway and Transit Administrations, the I-95 Corridor Coalition, and others [see following table for a complete list.]

▪ Federal Highway Administration	▪ Maryland State Police
▪ Federal Transit Administration	▪ Washington Metropolitan Area Transit Authority
▪ Transportation Security Administration	▪ Baltimore Regional Transportation Board
▪ Maryland Department of Transportation	▪ National Capital Region Transportation Planning Board
▪ Maryland State Highway Administration	▪ University of Maryland CATT
▪ Maryland Transportation Authority	▪ I-95 Corridor Coalition
▪ Maryland Transit Administration	▪ ITS Maryland
▪ Maryland Emergency Management Agency	▪ ITS America

Note that all presentations made during the MTOS and handouts used in afternoon Break-out Sessions can be downloaded from the Intelligent Transportation Society of Maryland (ITS MD) website reading room at:

http://www.itsmd.org/index.php?page_id=8

SUMMARY AND KEY THEMES OF MTOS MORNING SESSIONS

WELCOME SESSION

The Honorable Beverley Swaim-Staley, Deputy Secretary, Maryland Department of Transportation, provided the “welcome” address to the MTOS attendees on behalf of Governor Martin O’Malley. Ms. Swaim-Staley noted that the Governor and Secretary of the Maryland Department of Transportation are committed to providing safe and efficient transportation systems – safety and mobility are top priorities.

Key Themes:

- Take advantage of our collective knowledge base to *explore opportunities for multi-modal coordination and share ideas across transportation modes and across levels of government;*
- While Maryland has been a leader in the area of operations, *we must do more to move operations forward beyond where we are today – building our way out of congestion is not an option so we must work together to develop innovative tools, strategies, and technologies to optimize our transportation infrastructure and improve safety and mobility for all travelers.*



PLENARY SESSION #1: OPERATIONS FROM A LEADERSHIP PERSPECTIVE

Plenary Session 1 was moderated by Deputy Secretary Swaim-Staley and included the following panelists:

- Neil Pedersen, Administrator, Maryland State Highway Administration
- Paul Wiedefeld, Administrator, Maryland Transit Administration
- Randolph Brown, Director of Operations, Maryland Transportation Authority
- Jeffrey Paniati, Executive Director, Federal Highway Administration

Each panelist made remarks signifying operations from their perspective as a state or federal transportation leader. **For a complete summary of each speaker's remarks, please refer to the full document.**

Mr. Pedersen emphasized the importance of operations to the Maryland State Highway Administration (SHA) in that what SHA does “in essence affects everyone.” His remarks focused on the importance of incorporating operations into planning, mobility and congestion relief, investment in the CHART program and its major benefits, Office of Traffic and Safety investments in operations, homeland security and evacuation plans, regional operations coordination efforts, and traveler information.

Mr. Wiedefeld discussed the Maryland Transit Administration's (MTA's) primary role in supporting the operation and efficiency of the overall transportation system in Maryland by *getting cars off the road*. His remarks covered MTA operational statistics and a number of improvement initiatives underway in the areas of ridership, efficiency, and safety.

Mr. Brown discussed what the Maryland Transportation Authority (MdTA) is doing to reduce congestion while minimizing the need for additional capacity through the use of technology in tolling and demand management. He emphasized the success of *E-ZPass*, the need to incorporate operations into project planning, the fact that new technologies will impact operational needs and policies, and how MdTA is organizing to better support operations.

Mr. Paniati made a formal presentation titled “*Reducing Congestion – Tools of the Trade*”. The presentation covered the crisis of congestion in our nation, the U.S. DOT Congestion Initiative (emphasizing the need to bring transportation supply and demand into alignment), highlights of the sites selected for participation in the Congestion Initiative (with some emphasis on HOT to HOV conversion potential), technology and operations roles in delay reduction, traveler information, and signal timing.

Key Themes:

- High-level agency goals of reducing the impacts of congestion are clearly synergistic and opportunities for multi-agency and multi-modal coordination to achieve these goals should be explored.
- The safety of Maryland transportation system customers is a top priority from all modal perspectives.
- There is a need to improve the incorporation of operations into the project and transportation planning process.

- In confronting congestion from a policy perspective, there is a need to examine the true relationship of transportation supply, demand, and pricing.
- Build on existing technology and operations accomplishments and expand capabilities in promising areas such as traveler information through implementation of 511, travel times on DMS, and other potential opportunities.

PLENARY SESSION #2: OPERATIONS FROM A MANAGEMENT PERSPECTIVE

Plenary Session 2 was moderated by Mike Zezeski of the Maryland State Highway Administration and included the following panelists:

- Richard Steeg, Virginia Department of Transportation
- Beverly Hill, Maryland Transit Administration
- Richard Dye, Maryland State Highway Administration

Each panelist made remarks signifying operations from their perspective as a manager responsible for (or in support of) operations of the transportation system. **For a complete summary of each speaker's remarks, please refer to the full document.**

In introducing the session, Mr. Zezeski highlighted some of the challenges that Maryland will be facing in the future and the point that, from his perspective, transportation system operations management will be the best way to get the most out of our transportation systems. The challenges emphasized projected growth of congested NHS routes and movement of truck freight in the I-95 Corridor through 2035. Projected growth in VMT was also presented both with and without better operations and he used the project growth rates to make the case for Maryland to be aggressive in adopting an integrated multi-modal approach to operations.

Mr. Steeg focused his discussion on regional coordination and communication and the efforts underway through the Metropolitan Area Transportation Operations Coordination (MATOC) Program. MATOC is a multi-agency regional DOT function that is intended to facilitate interagency real-time transportation information and data sharing, enabling coordinated management of transportation systems, incidents, emergency response, and public information needs. He discussed the MATOC focus as well as its background and status. He also discussed the Regional Integrated Transportation Information System (RITIS) and how this system functions to support MATOC.

Ms. Hill highlighted her department's role within MTA and its responsibility for running transit services and day-to-day management of operations. She noted that operations is always under pressure to do more, to do it better, faster, but with less resources and under the umbrella of ever increasing regulatory constraints. She discussed her departments' respective priorities for improving performance in the area of rail and bus operations and some the critical needs her operations face.

Mr. Dye's presentation emphasized some key points related to the relationship between technology and operations. For example, too often, agencies operate based upon the technology that they buy or build. History shows at the end of a development effort, the user's view is seldom the winner. If we want to know what is needed for better operations, **ASK OPERATIONS**. He went on to discuss the tools CHART has developed, the information



available in CHART, and how CHART has evolved to become a critical tool in enhancing multi-agency coordination and communication.

Key Themes:

- Adopting an integrated multi-modal approach to operations can curb impacts of project VMT growth.
- Operating regionally and playing together with both traditional and non-traditional partners “in the same sand box” is critical to how Maryland evolves its current operations capabilities.
- Operational needs must drive technological deployment, not the other way around.
- Agency operations personnel continue to be asked to do more with less. For example, increased management emphasis on data collection for improved system performance measure tracking is important; however, resources must be made available to support enhanced performance tracking efforts.

SPECIAL SESSION: CONGESTION MANAGEMENT

The Honorable James Simpson, Administrator of the Federal Transit Administration, shared his perspective of congestion management. He noted that on behalf of President Bush and Secretary Peters, he was happy to be participating in the Maryland Transportation Operations Summit. Administrator Simpson covered a number of topics in his remarks including **(for a complete summary of his remarks, please refer to the full document):**

- FTA’s fiscal 2008 and 2009 budgets and program priorities;
- Our lack of resources to adequately develop transit and transportation infrastructure;
- Lack of funding to re-invest in legacy system to keep in good repair;
- Gap in resource needs vs. what we have;
- Need for new revenue models – congestion pricing;
- Promise of congestion pricing based on cities that are doing it;
- Use of public-private partnerships on capital transit projects; and
- Supporting transit oriented development (including his acknowledgement of Governor O’Malley and Secretary Porcari for supporting more transit-oriented development in places like Prince George’s County).

Key Themes:

- Due to lack of funding for both capital transportation infrastructure and existing transportation infrastructure maintenance we need to look well beyond the fuel-tax model towards more innovative revenue development models such as congestion pricing.

- Developing new ways of paying for and using transportation infrastructure will require leaders to make tough and courageous decisions about what it will really take to build and sustain a world class transportation infrastructure.
- We cannot allow geopolitical boundaries to stop us from doing the right thing – especially in the Baltimore-Washington corridor.

PANEL DISCUSSION: ASSESSING OPERATIONS MATURITY

This special panel session focused on assessing operations maturity from an organizational perspective – that is providing a technique for evaluating the effectiveness of an organization’s processes from an operations oriented perspective. Panel participants were:

- Phil Tarnoff, University of Maryland Center for Advanced Transportation Technology; and
- Stephen Lockwood, Parsons Brinckerhoff

Mr. Tarnoff focused on defining organizational maturity, the history of the concept and its relationship to the transportation community, and its application at a micro-level (incident management). Mr. Lockwood then followed with a discussion of assessing organizational maturity at a more macro-level (agency wide). Both Messrs. Tarnoff and Lockwood encouraged agencies to use the presented assessment techniques to identify their level of organizational maturity.

Key Themes:

- Organizational maturity is a technique for evaluating the effectiveness of an organization’s processes. The objectives focus on repeatability, effectiveness, performance measurement, and optimization. Organizational maturity is not another quality initiative, is not a prescriptive approach defining processes to be followed, nor a directive from external organizations or senior management – it is a way of “getting your act together”.
- Organizational maturity model is based on a similar framework used successfully in the information technology industry.
- The organizational maturity model provides a formalized transparent self appraisal process that will allow agencies to enhance their operational effectiveness.

SUMMARY OF AFTERNOON BREAK-OUT SESSIONS

The afternoon session of the Maryland Transportation Operations Summit included six Break-out Sessions. The sessions and corresponding facilitators are identified below.

Session A: Managing Congestion and Planning for Operations — Raja Veeramachaneni

Session B: Incident and Emergency Management — Alvin Marquess

Session C: Improving Travel Safety through Operations — Tom Hicks

Session D: Systems Interoperability and Providing Public Information — Glenn McLaughlin



Session E: Regional and Multi-Modal Coordination — Andrew Meese

Session F: Integrating Homeland Security and Transportation Operations — Mike Fischer

Each facilitator was provided a similar framework to organize the discussion and conduct of the session. The facilitator worked with a pre-determined group of individuals (discussants) who are considered knowledgeable in the break-out session topic area. The discussants helped the facilitator engage the MTOS participants in the discussion. While the facilitators were given broad flexibility in organizing their respective sessions, they were asked to lead their session participants through the following questions:

- *Where are we now?* That is, what is the current state-of-the-practice in Maryland and the region?
- *Where should we be?* What should we be doing, but are not? What are the best practices in your respective topic area from around the country? What should Maryland and the region's model programs in your topic area look like in approximately five years?
- *How do we get there?* What are the broad steps to achieving the model program? What are some of the practical and institutional challenges?
- *How do we measure progress?* What are some of the applicable metrics for assessing success?
- *How does this discussion relate to the theme of the Summit?* The theme of the Summit is *Better Mobility Through Improved Transportation Operations*. The Summit's goals are to continue to incorporate different modes and agency levels in the operations process and to include innovative practices and emerging technologies in regional operations.

While this format was not followed to the letter, all break-out sessions generally resulted in setting the stage for follow-on actions, mainly by emphasizing answers to *Where should we be* and *How do we get there?* Each facilitator was provided with a note-taker to help log the discussion.

Following are the session summaries provided by each facilitator during the Report Back and Wrap-Up closing session. **For details of the discussions related to each session, please see the full document.**

SESSION A: MANAGING CONGESTION AND PLANNING FOR OPERATIONS

Facilitator: Raja Veeramachaneni, Maryland State Highway Administration. Mr. Veeramachaneni opened his summary remarks by noting that Maryland is NOT going to put up with congestion anymore. Key highlights of his session were noted as follows.

- We need to better define what is meant by level of congestion.
- The “standard” as what constitutes congestion varies by area (e.g., rural vs. urban)
 - We need to focus more on measures that emphasize travel reliability
 - We need to figure out how to communicate these measures with our customers

- The traditional transportation planning process is defined over a long time horizon (20-30 years) whereas planning for operations is done with the next few months in mind. We need to figure out a way to link these horizons.
- We must keep management of human error in mind as we plan and build our transportation systems.
- We need to expand our emphasis of traffic incident management beyond highways to arterials and look at incident management from a “system level”.
- Providing traditional capacity enhancements (e.g. lane additions) is becoming more challenging as we don’t have the right-of-way. Operations improvements will be critical to addressing congestion.
- Finally, we need champions to focus on the issue of planning and operations.

SESSION B: INCIDENT AND EMERGENCY MANAGEMENT

Facilitator: Alvin Marquess, Maryland State Highway Administration. Following are the highlights of the session discussion and outcomes:

- *Advertise Maryland Move IT! Law* – Maryland has a Move It! law but it is not widely known by Maryland motorists. Marketing efforts should be increased.
- *Command Vehicles* – We need policies in place to better utilize command vehicle resources. We also need better regional procedures for using these resources.
- *Standard Policy for Towing Across State* – concerns related to tower liability can reduce the effectiveness of quick clearance policies. Legislation should be passed that would exempt towers from liability for services performed at incident scenes at the direction of the Incident Commander (except for gross negligence).
- *Slow Down/Move Over law* – These laws require motorists to slow down and move over when approached by response vehicles responding to an incident. Forty-one (41) states have these laws but only 24 have included towers. The group felt that including towers was important and should be pursued.
- *Safety Clothing Laws* – As of November 24, 2008 all traffic incident management responders will be required to wear ANSI approved high visibility safety garments.
- *Multi-day Incident Training* – Training is done for large-scale incidents and evaluations, but rarely is training conducted for multi-day incidents like the tornado in LaPlata.
- *After Action Reviews* – In order for After Action Reviews to be effective, all participants that responded to the incident need to be completely **honest** about what happened during the incident and **open to constructive criticism**.
- *Specific Traveler Information for Motorists* – In the future, it would be great if motorists could go to a web site and select specific travel information they want for



specific times of day. Then, that information could be e-mailed to them daily. Thus, they could receive information about their rush hour travel routes as they are ready to leave for home or the office.

SESSION C: IMPROVING TRAVEL SAFETY THROUGH OPERATIONS

Facilitator: Tom Hicks, Maryland State Highway Administrator. Following are the highlights of the session discussion and outcomes:

- More enforcement is needed on our roadways to promote safer driving practices. This includes automated enforcement;
- Safety programs should not suffer due to lack of funds;
- Maintaining safety and mobility in work zones is extremely important to maintain the level of service (LOS) of the transportation system;
- Improvements to our transportation system (e.g., intersection designs) so they are pedestrian and bicycle friendly;
- The urgency to produce safety related information/documentation needs to be revisited (e.g., placing key safety information in the Motor Vehicle Administration Driver's Handbook).
- Public information and education programs are important. These programs need to target drivers of all ages. Education that promotes safer practices while changing modes of transportation should also be considered; and
- Safety programs need to address all modes of transportation.

SESSION D: SYSTEMS INTEROPERABILITY AND PROVIDING PUBLIC INFORMATION

Facilitator: Glenn McLaughlin, Maryland State Highway Administration. Following are the highlights of the session discussion and outcomes:

Where is Maryland Now?

- In the area of system interoperability and providing public information in Maryland, the consensus appears to be that incremental progress is being made, albeit many would say the progress is not as fast as it could or should be.
- There are a number of existing collection, management, and information dissemination mechanisms in place; however, there are significant data/information issues that must be addressed:
 - Coverage
 - Temporal
 - Quality
 - Types
 - Sources
 - Security
 - Data Archiving

- Various Audiences
- Lack of well defined roles for the public and private sector

Where Should We Be?

- We need more detailed / proactive and complete information tailored and delivered to the end user. For example, Maryland should be aiming for the provision of pre-trip and en-route traveler information that includes real-time decision support for choosing alternative routes (including arterials) and alternative modes.
- There needs to be a robust relationship between the private sector and public sector along with well defined roles for delivering specific types of services to end users based on needs.
- From a system interoperability / data exchange perspective, we have extremely thorough multi-modal and regional “situational awareness”.

How Do We Get There?

- There is no one owner of the problems/issues that have been identified (and that have been around for a long time). Given the many players involved, a collaborative approach to addressing the issues is required.
- While the previous bullet notes the need for collaboration amongst players, it was also mentioned that there needs to be a champion to push to get us where we need to go and to have implemented the paradigm shifts that will likely be required in order to be successful.
- We need to define detailed objectives of what we want to see accomplished and use these objectives to further define the roles of the public and private sector.
- From an operations perspective, operations agencies already collect data for their operational needs. What operational needs are not being addressed by current data collection capabilities (e.g., travel times)? Are there multi-modal operational opportunities that can be exploited?

How Do We Measure Progress?

- Ultimately, we will know if we are successful if the public gets the traveler information they want and they are satisfied with it. From a private perspective, it’s as simple as: is the public satisfied enough to the point they are willing to pay for it?

SESSION E: REGIONAL AND MULTI-MODAL COORDINATION

Facilitator: Andrew Meese, Metropolitan Washington Council of Governments. Following are the highlights of the session discussion and outcomes:

Where Are We Now?

- Some successes, but there is more we can do. Many opportunities to take advantage of.
- We must deal with highway and transit capacity limitations.

Where should we be?

- Need to provide information to enable people to make better decisions.
- Getting operations funding on the table with capital funding is important.
- Operations activities such as developing a Concept of Operations is not necessarily understood at the senior executive level.
- Multi-modal coordination by mode and roadway functional classification is important.

How do we get there?

- We have done the planning, now time to act.
- Build on I-270 Integrated Corridor Management ConOps to get planning and operations together.

How do we measure progress?

- Need to develop 3-5 meaningful performance measures that are applicable regionally.
- Focus on reliability as a performance measure.

How does this discussion relate to the theme of the Summit?

- A regional view in regard to multi-modal transportation operations is essential.
 - This will help use existing resources better.

SESSION F: INTEGRATING HOMELAND SECURITY AND TRANSPORTATION OPERATIONS

Facilitator: Mike Fischer, Maryland Department of Transportation. Following are the highlights of the session discussion and outcomes:

- Need to balance need for security with need for system efficiency. Video cameras are the main tool for enhanced security of the transportation infrastructure. Sharing video infrastructure between Transportation Operations and Security requires early planning and understanding the needs of both, otherwise a clash of policies and operational issues may ensue.
- Need to provide domain awareness:
 - Preventative pressure;
 - Responders need to know what they are responding to;
 - Need to be able to manage incident scene remotely;
 - Need interoperable systems to share data/information;
 - Need to be able to archive information from incidents.
- The federal government can encourage security enhancements through prioritization of funding and education.

- Security procedure and tools need to be incorporated and contribute to day-to-day operations – otherwise they will not be effective during emergencies.
- Technology can support solutions, but they are not solutions in themselves.
- Must account for legacy systems – they are always with us and we need to use them.
- We need to move forward incrementally....we can't build the ultimate solution all at once.
- How do we measure success? Every day that we don't have an event/incident is success.

MARYLAND TRANSPORTATION OPERATIONS SUMMIT – POTENTIAL ACTION ITEMS

Following is a list of potential action items resulting from the MTOS. This list of action items could be addressed in a number of ways: through specific workshops, studies, scanning tours, R&D, or direct implementation (or some combination thereof). In addition, there may be opportunities to match action items with conferences or workshops that are being held in other areas of the country. The appropriate next step is to prioritize the action items and determine how best to achieve them.

- Examine the true relationship of transportation supply, demand, and pricing – include the potential for establishing an overall congestion pricing program in Maryland.
- Identify specific multi-agency and multi-modal operational opportunities, establish goals, and determine how best to work together to achieve the goals.
- Using the Baltimore metropolitan area as a target area, identify and implement strategies for strengthening the relationship between operations and the transportation planning process. Identify and enlist the help of a “champion” to help make this happen.
- Conduct agency organizational assessments using the techniques identified in the Organizational Maturity Model.
- Identify and implement new congestion performance measures using best practices from around the world. Develop 3-5 meaningful measures that can be implemented regionally. Examine the potential for travel time reliability as a meaningful measure.
- Identify potential multi-modal system performance measures looking at best practices around the nation and world.
- Identify the resource requirements for expanding traffic incident management beyond highways to arterials and other modes.
- Expand marketing efforts for Maryland's Move-It! Law.



- Develop policies and procedures for coordinated use and deployment of mobile command vehicles.
- Develop a standard policy for towing across the state.
- Implement a Slow Down / Move Over law in Maryland.
- Develop multi-day incident management training exercises – examine possibility of using simulation to provide training exercises.
- Identify and implement best practices for maintaining safety and mobility in work zones.
- Identify and implement best practices for pedestrian and bicycle friendly intersection designs.
- Identify and implement best practices in public information and education programs targeting drivers of all ages.
- Define detailed objectives of what the state wants to accomplish in the area of traveler information. Use objectives to identify respective roles of public and private sector.
- Identify and enlist the support of a champion (or champions) for providing multi-modal traveler information and bring the public and private sectors together to accomplish.
- Identify and implement best practices in protecting transportation infrastructure focusing on maintaining a balance between security needs and the need for system operational efficiency.

MARYLAND TRANSPORTATION OPERATIONS SUMMIT EVALUATION SURVEY RESULTS

A web-based survey containing 20 questions was sent to each MTOS attendee. Of the 264 MTOS attendees, a total of 73 responded to the survey or 28% of the participants. A summary of survey results are included in Appendix B. Note that not every person who responded answered every survey question. Overall, the survey results were extremely positive, but there is room for improvement in future conferences such as this. Some highlights of the results include:

- Of 73 respondents, 52% “agreed” and 20% “strongly agreed” that Overall, the Operations Summit met their expectations and was worth their time. Note that 12% “disagreed” and 3% “strongly disagreed”.
- Of 73 respondents, 45% “agreed” and 31% “strongly agreed” that the Operations Summit should be an annual event. Note that 4% “disagreed” and 0% “strongly disagreed”.
- 41 respondents offered suggested topics for future conferences.

- Of 69 respondents, 49% “agreed” and 20% “strongly agreed” that the morning sessions did a good job of conveying the status and challenges associated with Operations in Maryland. Note that 4% “disagreed” and 7% “strongly disagreed”.
- Of 58 respondents, 41% “agreed” and 34% “strongly agreed” that the afternoon break-out session attended met their expectations and was worth their time. Note that 9% “disagreed” and 2% “strongly disagreed”.
- Of 57 respondents, 32% “agreed” and 44% “strongly agreed” that the format of the afternoon break-out session attended helped generate audience participation. Note that 11% “disagreed” and 2% “strongly disagreed”.
- Of 52 respondents, 91% liked the format of the afternoon break-out sessions.
- 25 respondents provided suggested topics for future break-out sessions.
- Overall, the conference facility received high marks for quality of the auditorium, lunch facility, and food. Some did not give high marks to the quality of the break-out session room.



MARYLAND TRANSPORTATION OPERATIONS SUMMIT

BETTER MOBILITY THROUGH IMPROVED TRANSPORTATION
OPERATIONS

INTRODUCTION

On May 1, 2008, the Maryland Transportation Operations Summit was held at the Conference Center at the Maritime Institute in Maryland and allowed participants to engage in an open dialog to explore opportunities for coordinating transportation operations among modes, jurisdictions and levels of government. The first-of-its-kind summit brought together Maryland state, regional and local transportation and public safety agencies to discuss:

- Current national perspectives on highway and transit operations;
- Current status of highway and transit operations in Maryland;
- Agency plans and visions for improving and mainstreaming operations in Maryland; and
- Next steps for expanded and integrated agency efforts to enhance operations

Agency and other spokespersons offered assessments on state and national progress on an operations continuum. They shared their respective plans for achieving agency operational visions.

Specific areas of focus included: institutional arrangements and barriers, technological advancements and utilization, interoperability, regional and multi-modal coordination, travel safety, incident and emergency management, congestion management, best practices, current and future leaderships, and next steps/future directions[refer to Appendix A to view the Summit Program]. The goal of the summit was to give attendees a better awareness of national and statewide operations, innovative practices, and emerging operations technologies and tools to begin setting the direction for the future advancement of statewide transportation management and operations in Maryland. This post-summit white paper is only a small initial step towards achieving this goal. It is anticipated that the Operations Summit will become a regular event and that workshops focusing on specific operational areas will be held throughout the year.

Participation in the Maryland Transportation Operations Summit (MTOS) included a total of 264 people representing a wide range of individuals working in transportation operations from Maryland senior officials to field operations personnel; Federal, State, regional and local organizations; and other interested parties including the Maryland Motor Truck Association and American Automobile Association. A list of MTOS participants, along with contact information, is contained in Appendix C. Appendix C also includes a summary of participant distribution by agency/organization.



Sponsorship and organizational support of the Summit was provided by organizations involved in transportation operations such as the Maryland Department of Transportation (MDOT) and its modal administrations, county and local departments of transportation and transit agencies, the Intelligent Transportation Society of Maryland, the Federal Highway and Transit Administrations, the I-95 Corridor Coalition, and others [see following table for a complete list.]

▪ Federal Highway Administration	▪ Maryland State Police
▪ Federal Transit Administration	▪ Washington Metropolitan Area Transit Authority
▪ Transportation Security Administration	▪ Baltimore Regional Transportation Board
▪ Maryland Department of Transportation	▪ National Capital Region Transportation Planning Board
▪ Maryland State Highway Administration	▪ University of Maryland CATT
▪ Maryland Transportation Authority	▪ I-95 Corridor Coalition
▪ Maryland Transit Administration	▪ ITS Maryland
▪ Maryland Emergency Management Agency	▪ ITS America

DOUG ROSE – SUMMARY OF INTRODUCTORY REMARKS

Mr. Doug Rose of the Maryland State Highway Administration chaired the MTOS proceedings. He welcomed the participants to Baltimore and the first-ever Maryland Transportation Operations Summit. He described the purpose and goal of the Summit (which are listed at the top of the previous page). Highlights of Mr. Rose’s remarks follow.

- As a member of AASHTO’s Subcommittee on Systems Operations and Management, he wanted to mention the Subcommittee’s vision:

“To support AASHTO’s vision through the incorporation of highway operations and management as an integral component of institutional and technical excellence”

- And the Subcommittee’s mission is:

“To champion concepts, policies, resources, research, organizational structures and institutional relationships that integrate operations and management into the activities of member agencies”

- Three of SHA’s six strategic goals include:
 - The advancement of State DOTs in their organizational structure and focus on operations;
 - Enhanced use of performance monitoring and measurement to operate systems on a real-time 24/7 basis; and
 - Enhanced development and deployment of technology, standards and best practices.
- Mr. Rose went on to note that, in the past, state departments of transportation have mostly concentrated our efforts and dollars in the expansion of our system capacity as the principal mode of providing improved service for the users. Because of the



increasing constraints on system capacity increases and the inability of spot capacity improvements to significantly improve mobility and safety, a significant amount of consideration is now being directed towards incorporating operations into agency missions and plans.

- He closed by borrowing a quote from one of the Cooperative Highway Research Program papers that defines System Operations and Management as “managing the existing transportation system to maintain or improve its current performance anticipating or responding to changing conditions – recurring or nonrecurring”

The MTOS is intended as an important first step in a larger effort to develop a broader, more cohesive operations program in Maryland.

WELCOME

The Honorable Beverley Swaim-Staley, Deputy Secretary, Maryland Department of Transportation, provided the “welcome” address to the MTOS attendees on behalf of Governor Martin O’Malley. Ms. Swaim-Staley noted that the Governor and Secretary of the Maryland Department of Transportation are committed to providing safe and efficient transportation systems – safety and mobility are top priorities. Ms. Swaim-Staley then summarized the goals of the MTOS which served as the overall charge to the MTOS participants:

- Take advantage of the collective knowledge base represented at the MTOS to *explore opportunities for multi-modal coordination and share ideas across transportation modes and across levels of government*; and
- While Maryland has been a leader in the area of operations, *we must do more to move operations forward beyond where we are today* – building our way out of congestion is not an option so *we must work together to develop innovative tools, strategies, and technologies to optimize our transportation infrastructure and improve safety and mobility for all travelers.*

PLENARY SESSION #1: OPERATIONS FROM A LEADERSHIP PERSPECTIVE

Plenary Session 1 was moderated by Deputy Secretary Swaim-Staley and included the following panelists:

- Neil Pedersen, Administrator, Maryland State Highway Administration
- Paul Wiedefeld, Administrator, Maryland Transit Administration
- Randolph Brown, Director of Operations, Maryland Transportation Authority
- Jeffrey Paniati, Executive Director, Federal Highway Administration

Each panelist made remarks signifying operations from their perspective as a state or federal transportation leader.

NEIL PEDERSEN REMARKS

Mr. Pedersen opened his remarks by noting SHA's recently celebrated 100th birthday. The agency should be proud of its accomplishments, but should also take stock of future challenges. SHA is very focused on safety and reducing fatalities and injuries on Maryland roads. Operations and management is a key part of SHA's overall strategy to reduce crashes. As part of SHA's vision to provide its customers with a world class highway system, the agency has invested tremendous resources in the operations and management of its highways during the past several years and will continue to do so in the future.

Mr. Pedersen enlisted the audience's support in using the MTOS to help shape the future and direction of transportation operations in Maryland. He then provided the following context for Maryland operations from an SHA perspective.

- SHA has begun the process of incorporating Operations into the planning process. Agency project managers with responsibility for Operations are including planned operations oriented improvements in the SHA Consolidated Transportation Program and the long-range transportation improvement plan.
- Over the past several years, the SHA Business Plan goal for Mobility and Congestion Relief has focused on several operations-related objectives including:
 - Reduction of incident congestion delay;
 - Reduction of delay by a measurable percentage for all signals that are retimed annually;
 - Increasing the miles of pedestrian and bicycle facilities by a measurable percentage annually;
 - Providing reliable and accessible real-time traffic information to travelers and other stakeholders at all times;
 - Increasing the amount of SHA's sidewalk system that is Americans with Disabilities Act (ADA) compliant to be a measurable percentage annually; and

- Continuing improvements to SHA’s ability to respond and recover from natural disasters and man-made incidents annually.
- Through the CHART Program, SHA maintains a high degree of focus on Operations. The mission of CHART is “to improve the mobility and safety of highway users through the application of ITS technology and interagency teamwork.” Between 1990 and 2007, over \$300 million has been invested in CHART. Those dollars were directed towards acquiring and implementing various Intelligent Transportation Systems (ITS) and state-of-the-art technologies geared for efficiency in operations. Examples of the technology investments include:
 - A first of its kind in the nation Statewide Operations Center (SOC) supported by three full-time regional Traffic Operations Centers and two seasonal Traffic Operations Centers;
 - More than 220 closed-circuit television cameras located strategically at the State’s highest traffic pressure points to monitor freeway traffic and roadway conditions 24 hours per day, 7 days a week;
 - At least 70 Dynamic Message Signs (DMS) and over 30 Highway Advisory Radios (HARs) throughout the state for the dissemination of real-time traffic, weather, homeland security and other information (including Amber alerts to hundreds of thousands of highway users); and
 - Over 55 Roadway Weather Information Systems (RWIS) throughout the state for the collection of real-time roadway weather condition data for the use of system management and dissemination to the traveling public.
- The investment in CHART has translated into a number of major benefits for the citizens of Maryland and some of these benefits¹ were summarized for calendar year 2006.
 - There were a combined total of 44,000 responses to incidents and motorist assists;
 - There was a reduction in delays due to incidents of about 37.5 million vehicle-hours;
 - The average incident duration with a CHART response was 23 minutes compared with a duration of 68 minutes without a CHART response;
 - There were an estimated 834 fewer secondary incidents; and
 - There was an estimated cost savings of \$1.09 billion to Maryland motorists resulting from the reduction in delays due to incidents.

¹ Based on an annual performance evaluation of the CHART Program conducted by the University of Maryland.

- Over the next ten years, SHA plans to invest more than \$220 million in CHART to continue to improve mobility and safety of motorists statewide. This additional investment will also provide for the expansion of the CHART program to rural and growing areas of the state.
- Mr. Pedersen next provided a synopsis of SHA's huge investments in highway operations and safety improvement programs over the past ten years under the umbrella of SHA's Office of Traffic and Safety. These investments include \$400 million on a safety and spot improvement program including projects aimed at geometric improvement of intersections and high accident rate locations. Another \$337 million was spent on a traffic management program aimed at improved safety and congestion relief. Projects include, for example:
 - Traffic signal modification and coordination;
 - Traffic signs and structures improvements; and
 - Implementation of small ITS projects.

Over the next six years, SHA plans continued investment in these Office of Traffic and Safety programs to the tune of about \$500 million. Approximately \$26 million will be dedicated to a crash prevention program that funds minor geometric improvement projects such as turning lanes, roundabouts, and pedestrian refuge islands. In addition, this funding will support continued modification and coordination of traffic signals and the conversion of more than 3,500 signals under state control to LED.

- Since the events of 9/11, SHA has focused part of its operations improvement program on homeland security and evacuation planning. SHA continues to be very active in the development of emergency evacuation plans geared towards emergency response for both natural disasters such as hurricanes, and man-made disasters, such as terrorist attacks. Specific activities noted in this area included:
 - The development of a Baltimore Region Protective Action Plan in collaboration with the Baltimore Metropolitan Council and the Maryland Emergency Management Agency (MEMA);
 - A National Capital Region Transportation Emergency Plan in collaboration with the Metropolitan Washington Council of Governments and MEMA;
 - Continuous enhancement to the Ocean City hurricane evacuation plan including development of simulation programs by the University of Maryland that can be used to support evacuation response;
 - Participation in local and regional emergency preparedness exercises;
 - Development of Continuity of Operations Plans (COOP) for various SHA offices and facilities in the event of a shut-down of any of them due to any type of catastrophe;
 - Development of comprehensive all-hazards regional emergency operations plans; and



- Providing Incident Command System training to SHA emergency managers in compliance with National Incident Management System (NIMS) requirements.
- In the area of Regional Coordination, Mr. Pedersen noted the following ongoing efforts to work with regional and local partners to improve mobility and safety:
 - SHA is represented as a member of the newly established Metropolitan Area Transportation Operations Coordination (MATOC) program in the National Capital Region. The MATOC program's focus is on operations and management and includes the District, Maryland, and Virginia Departments of Transportation, the Washington Metropolitan Area Transit Authority, and the National Capital Region Transportation Planning Board at the Metropolitan Washington Council of Governments (MWCOG).
 - SHA has long been involved in the Baltimore Regional Operations Coordination (B-ROC) Committee and its Washington counterpart, the D.C. Regional Operations Committee (ROC). These two committees of state, county, and city transportation, safety and law enforcement agencies work together to improve operations and coordination activities in their respective regions.
 - Through MATOC, SHA is working with its partners to develop a Regional Integrated Transportation Information System (RITIS) that is geared towards fusing and sharing regional multi-modal transportation information to serve both regional traveler information needs and regional transportation management needs.
 - SHA has long supported the Capital Wireless Information Net (CapWIN) program in partnership with Virginia and the District. CapWIN provides a multi-disciplinary, multi-agency, and multi-jurisdictional foundation for greatly enhanced transportation/public safety data sharing and communications.
 - SHA continues to work with the Metropolitan Washington Council of Government's Regional Emergency Support Function – 1 (Transportation) and the Baltimore Metropolitan Council's emergency preparedness committees to develop transportation-centric homeland security type protective actions and evacuation plans for the Washington and Baltimore regions respectively.
- Traveler information continues to be one of the major functional areas of SHA's operations program. Mr. Pedersen noted that SHA's goal continues to include the dissemination of both pre-trip and en-route traveler information to the traveling public on a real-time basis. Some recent significant activities in the area of traveler information include:
 - Using data and information collected from RITIS, CHART, and other regional and agency data and information collection systems, SHA is in the process of establishing a Maryland "511" traveler information phone service and website that will provide travelers with real-time updates on traffic and transit conditions that can assist them at any point before or during their journey.

- SHA is working on providing travel time messages on selected dynamic message signs along a number of highways throughout the state for the benefit of Maryland motorists.
- SHA will continue to look for opportunities to cooperate and work with private sector partners to develop and implement innovative technology projects such as the I-95 Corridor Coalition's probe technology project and the Mobility Technology traffic data collection project to enhance its traveler information efforts.

In closing, Mr. Pedersen re-emphasized the need for the development of creative and innovative solutions and strategies, and the application of new and proven technologies to assist SHA in the management and operations of existing and future highway systems. He summarized the challenge to the MTOS participants by noting:

- System capacity is not increasing at the same rate as demand;
- Maryland's population is projected to increase by 20 percent (from 5 to 6 million by 2020);
- At the same time, Maryland's travel demand is expected to increase by more than 42 percent from 52 billion to 74 billion vehicle miles traveled;
- Between 1995 and 2004, vehicle miles of travel on the State system grew by 25.1 percent and the number of lane miles by only 1.9 percent; and

Even if SHA builds all the major projects in various stages in the capital program, the level of service will not improve dramatically. So the challenge is "How are we going to make up the difference and satisfy the needs of our customers?" Mr. Pedersen believes the answer lies in system management and operations and reducing demand through strategies such as mode shift to transit and telecommuting. So he encouraged everyone to roll-up their sleeves and get to work and help brainstorm the way towards ***Better Mobility Through Improved Transportation Operations***.

PAUL WIEDEFELD REMARKS

Mr. Wiedefeld discussed the Maryland Transit Administration's (MTAs) primary role in supporting the operation and efficiency of the overall transportation system in Maryland *by getting cars off the road*. To make his point, he provided a specific example by noting that 13% of the people moving south in the I-95 corridor in the morning are on MARC (Maryland commuter rail) trains. Mr. Wiedefeld then continued to put his agency's operations in perspective for the MTOS participants.

- MTA is responsible for operating a safe, clean, and reliable transit service that transports over 330,000 riders per day or nearly 100 million per year.
- MTA picks up and discharges passengers at over 8,000 bus stops and 89 rail stations every day.

- MTA operates a fleet of 900 urban and over the road buses; over 300 smaller vans and sedans for paratransit services; 100 subway cars; 50 light rail vehicles; 35 commuter rail locomotives; and 122 commuter rail cars.
- MTA has identified a clear goal: to increase ridership by 10,000 people per day. This will be accomplished by providing safe, clean, and reliable service and by increasing the miles and hours of service overall.

Mr. Wiedefeld then shared some of the improvement initiatives underway at MTA along with on-going challenges in the areas of ridership, efficiency, and safety.

- Ridership is MTA's core mission and there are a number of initiatives underway to improve ridership including:
 - Improving how well performance is assessed. For example, the MTA Business Plan shows how each unit of the agency will contribute to the ridership goal.
 - Improved communication through and enhanced web-based trip planner and e-mail notifications to customers.
 - A number of service improvements such as:
 - Reduced headways on subway from 22 min. to 11 min.;
 - Extend light rail from Penn station to Camden Yards;
 - New early morning service (before 5am) to BWI and Sunday morning service beginning at 5am;
 - Additional PM peak and late night MARC trains;
 - Equip entire fleet of buses with bike racks; and
 - \$2 million worth of new off peak services starting in June.

Mr. Wiedefeld noted plans to add metro lines in Baltimore (red and green lines) and in Washington, D.C. (purple line). The challenge will be finding the funding for these projects and maintaining community support.

- Efficiency is critical to MTA because they are using limited state and federal tax dollars, as well as fares, and the public demands an efficiently run system for their investment. Some of the activities MTA has undertaken to improve efficiency of operations include:
 - Converting the entire bus fleet to hybrid diesel electric vehicles which use 23% less fuel;
 - Purchasing 26 fuel efficient locomotives;
 - Replacing single-level commuter rail cars with bi-level coaches;
 - Enhancing customer information with an enhanced trip planner powered by Google and providing real-time bus arrival information at 200 key bus stops;
 - Speed up light rail in central business district by working with Baltimore City to coordinate traffic signals – could save 4-6 min. between Timonium and downtown.

Some of the challenges facing improved efficiency efforts include aging facilities (Metro is having its 25th anniversary, Light rail 15 years); For the commuter rail, MTA does not own the tracks/facilities that they operate on (CSX does) which creates an operational challenge (e.g., CSX priority is oriented more towards freight movement than passenger movement). Demand on MARC continues to increase – MARC is at capacity today, every day there are more and more standees. Keeping up with demand in the face of rising gas prices will be a growing and difficult challenge.

- Safety is critical to MTA because of the volume of people being moved in a single vehicle or on one facility. Customers depend on MTA to have safe equipment and operators to get them to their destination. Some activities underway to ensure customer safety include:
 - Safety and occupational training for all employees;
 - A re-training program for drivers;
 - An implemented policy on seat-belt and cell-phone use;
 - Continued redeployment of police resources through relentless analysis of crime trends;
 - Expanding CCTV coverage in Metro and Light Rail stations and consolidating monitoring at a new facility; and
 - Cooperating with other law enforcement agencies and TSA to deal with potential threats to the system or customers.

The biggest challenge facing MTA from a safety perspective is the fact that the system is completely open...anyone can walk in and start using it (unlike an airport with strict security checks).

Mr. Wiedefeld concluded his remarks by emphasizing MTA's desire to partner with other modals like SHA to increase the number of people the MTA system carries so the whole transportation system can function better.

RANDOLPH BROWN REMARKS

Mr. Brown's remarks emphasized the efforts of the Maryland Transportation Authority (MdTA) to reduce congestion while minimizing the need for additional capacity through the use of technology in tolling and demand management. He also described how technology changes impact MdTA's operational needs and policies and how MdTA is evolving as an agency to improve operations. MdTA is responsible for the design, construction, maintenance, operation, and law enforcement of the bridges, tunnels, and turnpikes which make up the seven toll facilities under its control. MdTA is an independent state agency funded by toll revenue.

Mr. Brown initiated his technology discussion with *E-ZPass*. In the past, MdTA toll plazas were some of the major congestion points in the rush hour traffic reports. With the introduction of electronic toll collection, much of that has changed. Generally, the capacity of the toll plazas equal or exceed the capacity of the facility itself and this has been without the addition of new toll lanes. The following statistics were provided on MdTA's use of electronic tolling:

- Dedicated electronic toll collection lanes can process 1,200 vehicles per hour per lane compared to just 350 cars per hour per lane in cash lanes.
- More than 763,000 *E-ZPass* Maryland transponders are in use with 17 million in use system-wide [the InterAgency Group includes 23 toll agencies that manage the *E-ZPass* system from Virginia to Maine and including Illinois].
- More than 55% of all traffic at Authority facilities use *E-ZPass* electronic toll collection. In 2007, *E-ZPass* traffic volume increased 6% from the previous year.
- The Fort McHenry Tunnel, Baltimore Harbor Tunnel, and Francis Scott Key Bridge regularly exceed 60% *EZ-Pass* usage.

To maintain the upward trend of *E-ZPass* use, the MdTA has initiated activities such as:

- Marketing *EZ-Pass* with multi-media efforts including trade-shows, print, radio, and billboard advertising;
- Converting additional lanes to electronic toll collection when demand increases;
- Upgrading the *E-ZPass* system to the next generation of electronic toll collection which will allow for higher speeds, improved violation enforcement, and improved customer service.
- Convert some of the toll lanes at the Fort McHenry Tunnel to higher-speed dedicated lanes similar to the higher speed lanes at the Francis Scott Key Bridge.

Mr. Brown noted that, in some cases, additional capacity will come from expansion combined with the use of technology. MdTA is constructing Express Toll Lanes on I-95 from the Baltimore City line to north of White Marsh. This upgraded facility has been designed to ease congestion and improve safety on the most congested portion of I-95 north of Baltimore City. The express lanes will offer drivers the choice to travel in one of four general purpose lanes (as they do now) or pay a toll to travel in one of two adjacent Express Toll Lanes that will be managed to maintain congestion-free conditions. The project area is approximately 10 miles in length and stretches from just south of the I-95/I-895 split in northeast Baltimore to just north of MD 43 in White Marsh.

According to Mr. Brown, technology is not the only solution as there is a need to incorporate operations into the project planning process. Some examples provided included:

- The MdTA Division of Operations and MdTA Police were involved early in the planning of both the Intercounty Connector (ICC) and I-95 Express Toll Lanes. Incident management plans were developed using preliminary design plans. Additional access points were investigated before the final design was completed. Resource needs and staging points were identified early in the process.
- Snow removal will be a major challenge at the new I-95/I-695 interchange. Once complete, the interchange will include two 1-mile long elevated ramps. With operations involved early on, investigation of mobile snow melters and other forms of snow and ice control could be fully explored.

- Operations must be involved early in the planning phases so that maintainability can be considered during the development of ITS projects. Are projects designed to allow easy access to ITS devices? Are maintenance contracts and/or in-house skills in place to maintain devices? These questions must be answered early in the planning process.

Mr. Brown then went on to describe how new facilities and new technologies will affect operational needs and policies.

- The ICC and the I-95 Express Toll Lanes will be opened as congestion priced facilities in an effort to manage demand. Open road tolling will be used to help alleviate congestion associated with toll booths. New business rules will be required for:
 - Toll operations – need to define how the system will operate and what data it will provide for use in management of the facility;
 - Establishing toll rates – need to define how data will be used to implement variable toll rates; and
 - Toll violation enforcement – need to define how a potential escalation of violations will be mitigated in an open road tolling environment.
- New operational practices and tolling schemes will be a first for Maryland customers. Once new practices and policies are established an extensive customer education process must be implemented. One avenue being explored is working with the Motor Vehicle Administration to include education about tolling facilities in the Driver's Handbook.
- Currently, customers will stop in dedicated electronic toll collection lanes looking for a toll collector. As dangerous as this is on a conventional toll collection plaza, MdTA cannot have customers stopping on an open road toll facility.
- In the longer term, MdTA will begin studying open road tolling at some existing facilities. Some considerations involved will be impact to current employees and how to shift from traditional collection in the toll lanes to customer support in the back office.

Mr. Brown then discussed how MdTA is organizing to better support operations by:

- Documenting operational procedures – MdTA is in the process of documenting incident response procedures paying particular attention to staff that has been around for a long time. The goal is to document their knowledge before they retire.
- Improving through training at all levels of response – one big improvement since 9/11 has been better training for responders, specifically on the Incident Command System.
- Improving operational practices through table top exercises and drills.
- Improving the use of after action debriefings on major incidents.



- Improving processes before capital investment decisions are made by including all divisions in the project review and selection process. This should include Engineering, Construction, Strategic Development, Information Technology, Finance, Operations, and MdTA Police.

In closing his remarks, Mr. Brown summarized with the following points:

- MdTA will continue working to reduce congestion by using electronic tolling to eliminate delays at plazas and manage demand through congestion pricing;
- MdTA will continue to define and document business rules and prepare plans to educate the customer;
- MdTA will look internally to improve skills through better documentation and training;
- MdTA will evaluate the impacts of new technology on its workforce; and
- MdTA will continue to involve Operations and Police in the project planning and development phase.

JEFFREY PANIATI REMARKS

Mr. Paniati's remarks were done in conjunction with a PowerPoint presentation. A copy of Mr. Paniati's presentation can be downloaded from the Intelligent Transportation Society of Maryland website reading room at:

http://www.itsmd.org/index.php?page_id=8

Congestion was noted to be at the top of FHWA's list of priorities and managing operations is viewed as a large part of the congestion solution. The MTOS agenda is great with many national leaders in the field, including many here in Maryland. The MTOS was noted as an opportunity to take a step up and reach beyond the progress that has been made to date. Some highlights of Mr. Paniati's presentation/discussion follow.

- Mr. Paniati provided an anecdote involving his wife's use of Maryland State Police's *Move-IT* form, noting how well it worked to assist with exchanging information and getting her vehicle out of the travel lane quickly. He used this as an example of the importance for transportation and law enforcement to work together and noted the strong relationship between Maryland State Police and Maryland SHA.
- Congestion exacts a heavy price in terms of impacts to commuting costs, quality of life, and productivity. Maryland is not alone in battling congestion nationwide; \$200 billion per year is wasted on an annual basis. Congestion has increased dramatically over the past 20 years in the 85 largest U.S. cities.
- The USDOT Congestion Initiative aims to relieve urban congestion by, among other activities, promoting operational and technological improvements. One of the major reasons for the initiative is to examine better ways of bringing supply and demand into alignment. The failure to properly price travel on highways is a root cause of

congestion. The price of highway travel (gas taxes, registration fees, etc.) bears little or no relationship to the cost of congestion. Unlike other public utilities, the public expectation is that the “service” is free or does not change with changes in demand. Allocating transportation services via pricing is more efficient than rationing by delay.

- The urban areas involved in the Congestion initiative include Miami, Chicago, Minneapolis-St. Paul, Los Angeles, San Francisco, and Seattle. Some of the proposed urban congestion initiatives include:
 - HOV to HOT lane conversions
 - Dynamically priced shoulder lanes
 - Moving from fixed to variable bridge tolls
 - Pricing existing free lanes
 - Active traffic management through lane/speed control
 - Parking Pricing
 - Express transit services / bus rapid transit
- The Minnesota experience with converting HOV to HOT lanes has been particularly successful and USDOT would like to see more programs like this in the US.
- A 2005 national study of sources of highway congestion showed that 25 percent of all congestion is due to traffic incidents. Incident management programs such as those in Maryland are key to addressing this source of congestion. Georgia’s traffic incident management program was also cited as a model program.
- Improving traveler information is a key strategy that USDOT is promoting to reduce congestion. It was noted that 511 is now accessible to 47 percent of the US. Travel times on Dynamic Message Signs (DMS) are now available in 38 cities nationwide and 28 of the top 40 metropolitan areas. Mr. Paniati noted that he would like to see travel times on DMS here in this region. The city of Houston was specifically noted as an example of where the provision of travel times on DMS is working well, especially in encouraging route changes.
- Improving traffic signal timing is a low cost approach to congestion reduction with benefit-cost ratios as high as 40:1. Of the 330,000 traffic signals in the US, about 75% could operate more efficiently. Denver was cited as a good example where better signal timing has made a difference with reductions in delay on the order of 41,000 veh-hours per day.
- Mr. Paniati closed with a quote from Secretary Peters:
 - “Mobility is one of our country’s greatest freedoms, but congestion...limits predictable and reliable movement of people and goods and poses a serious threat to continued economic growth.”

PLENARY SESSION #2: OPERATIONS FROM A MANAGEMENT PERSPECTIVE

Plenary Session 2 was moderated by Mike Zezeski of the Maryland State Highway Administration and included the following panelists:

- Richard Steeg, Virginia Department of Transportation
- Beverly Hill, Maryland Transit Administration
- Richard Dye, Maryland State Highway Administration

Each panelist made remarks signifying operations from their perspective as a manager responsible for (or in support of) operations of the transportation system.

MIKE ZEZEFSKI REMARKS

Mr. Zezeski introduced the panelists and made some opening remarks in conjunction with a few PowerPoint slides. A copy of Mr. Zezeski's slides can be downloaded from the Intelligent Transportation Society of Maryland website reading room at:

http://www.itsmd.org/index.php?page_id=8

Mr. Zezeski highlighted some of the challenges that Maryland will be facing in the future and the point that, from his perspective, transportation system operations management will be the best way to get the most out of our transportation systems. The slides portraying the challenges to be faced were from a recent I-95 Corridor Coalition Strategic Vision workshop.

- The first slide showed a map of the National Highway System in 2035 with NHS routes exceeding a Volume to Capacity ratio of 1 highlighted in red. It was noted that the entire Northeast corridor, including the Washington-Baltimore area, was solidly in the red.
- The next slide showed incredible projected growth in truck freight in the I-95 Corridor. Mr. Zezeski noted that special attention must be paid to the impacts of this increase in truck freight on I-95, I-70, and I-81 as there is no way these facilities can accommodate such a large increase in truck traffic -- there needs to be a plan for truck freight in Maryland and throughout the corridor.
- The final slide showed vehicle miles of travel (VMT) growth rates projected through 2055 based on a number of alternative scenarios. It was noted that the projected rates based on scenarios involving operations and management strategies were less than those without the strategies. This is what we are trying to achieve with better operations and Maryland needs to be aggressive in adopting an integrated multi-modal approach.



RICHARD STEEG REMARKS

Mr. Steeg's remarks were done in conjunction with a PowerPoint presentation. A copy of Mr. Steeg's presentation can be downloaded from the Intelligent Transportation Society of Maryland website reading room at:

http://www.itsmd.org/index.php?page_id=8

Mr. Steeg's presentation/discussion focused on regional coordination and cooperation with emphasis on the Metropolitan Area Transportation Operations Coordination (MATOC) Program. Some highlights of the presentation/discussion follow.

- MATOC is a regional function that facilitates interagency real-time transportation information and data sharing, enabling coordinated management of transportation systems, incidents, emergency response, and public information needs.
- Funding support for MATOC was provided through a SAFETEA-LU earmark under the leadership of Congressman Moran's office.
- MATOC was officially kicked off in March 2008 as an independent entity of its "owners":
 - Virginia Department of Transportation
 - Maryland Department of Transportation
 - District Department of Transportation
 - Washington Metropolitan Area Transit Administration
 - National Capital Region Transportation Planning Board at the Metropolitan Washington Council of Governments (MWCOCG)
- MATOC's core business functions include: Regional Operations Planning; Regional Operations Coordination; Regional Information Systems; and Finance & Administration.
- MATOC is intended to better support operations coordination of transportation agencies for regional incidents with an expected duration of 2-24 hours. Example regional incident types are train derailments, major bus/rail transit accidents, major truck accidents, etc.
- MATOC oversees the Regional Integrated Transportation Information System (RITIS) project. RITIS is a data fusion system to support MATOC activities by compiling real-time traffic and transit data from agencies around the region, putting it together in a common format, and enabling it to be shared with agencies, the media, and the public. A prototype is now in operation with many of the envisioned functions sharing information with several agencies.
- MATOC (and RITIS) will enhance existing ad-hoc agency notification, coordination, data collection, and data exchange practices by providing an increased level of automation and interagency process documentation (e.g., standard operating procedures).

BEVERLY HILL REMARKS

Ms. Hill is the Assistant Deputy Administrator of Operations at the Mass Transit Administration. Her department is responsible for running transit services and day-to-day management of operations. Operations is always under pressure to do more, to do it better, faster, but with less resources and under the umbrella of ever increasing regulatory constraints.

In the area of rail operations, the priority is on improving performance with limited resources. In an effort to account for lack of resources, MTA has been implementing a significant amount of technology such as scheduling software, route adherence software, automatic passenger counters, automatic vehicle location, hybrid buses, etc. Critical operational needs include:

- Improved communications infrastructure;
- Homeland security issues including access control and emergency response; and
- Increased training needs as the need for training due to new technology has increased significantly.

In the area of bus operations, bus services face the same congestion problems SHA must address on the highways. It is becoming increasingly difficult to maneuver buses in and out of traffic. Ideas such as signal pre-emption have been floated for enhancing bus operations; however, they have been discussed for 20 years and it's still not happening.

Ms. Hill closed her remarks by emphasizing a few lessons learned:

- Capacity and scheduling challenges never end and are addressed daily. There is increased pressure to increase data gathering for performance measurement, but resources are needed for better measurement.
- Software has helped with doing a better job of scheduling and conducting capacity analysis.
- Improving ridership relies on enhancing the “feel” of transit – if it doesn't feel better (cleaner, faster, etc.) customers won't use it. A significant amount of time and resources are being spent on improving the “feel” of transit service.

RICHARD DYE REMARKS

Mr. Dye's remarks were done in conjunction with a PowerPoint presentation. A copy of Mr. Dye's presentation can be downloaded from the Intelligent Transportation Society of Maryland website reading room at:

http://www.itsmd.org/index.php?page_id=8

Mr. Dye's time was shortened; however, he was able to highlight the following key points of his presentation/discussion:

- While the session focus seems to be on how agencies are effectively using or planning to use technologies to improve operations, a proposed alternative is to determine what is needed for better operations, then determine the optimum mix of technologies to support the operations.

- Too often, agencies operate based upon the technology that they buy or build. History shows at the end of a development effort, the user's view is seldom the winner. If we want to know what is needed for better operations, **ASK OPERATIONS**.
- CHART has accepted that non-highway agencies need to know what they are doing, to allow them to see what they are doing, and have some say in how it's done. CHART has even decided to share its software tools for others to use. For example, SHA has shared CHART tools that allow multiple agencies to access CHART event types such as:
 - Action Event – often used by Maryland Aviation Administration for parking messages around BWI;
 - Congestion Event, Disabled Vehicle Event, Incident Event – used by State Highway and Transportation Authority for roadway events;
 - Planned Roadway Closure Event – this event is auto populated by district offices through the permitting system;
 - Safety Message Event – often instigated by public affairs; and
 - Special Event – often used by Law Enforcement and Emergency Services.
- The key is to get data out of the CHART system to the people who need it. This has required that CHART let other people play in “their sandbox”.
- Other innovative ways for addressing increased travel demand include CapWIN, RITIS, provision of travel times on DMS, 511, and expanding CHART capabilities to 3rd parties through common, secure IP protocols.

Mr. Dye wrapped up his remarks by running through some example screen shots of the CHART application showing the types of data captured, shared, and how the software supports incident management operations. He noted that while there are always significant challenges in operating and maintaining a system like CHART, the system has, overall, been a huge success story.

SPECIAL SESSION: CONGESTION MANAGEMENT

The Honorable James Simpson, Administrator of the Federal Transit Administration, shared his perspective of congestion management. He noted that on behalf of President Bush and Secretary Peters, he was happy to be participating in the Maryland Transportation Operations Summit.

Mr. James S. Simpson was sworn in as the Federal Transit Administrator on August 10, 2006. He began his career in transportation over 30 years ago as a tractor-trailer driver for a local moving company while attending college and developed the company into an international transportation company.

The U.S. Department of Commerce has honored Jim with an International Trade Award for service excellence. His other honors include being the first recipient of the “Employer of the Year Award” from the American Moving and Storage Association. In 1993, he was a finalist in the Ernst & Young/NASDAQ’s “National Entrepreneur of the Year” award.

In 1995, New York Governor George E. Pataki appointed, and the State Senate confirmed, Mr. Simpson as a Commissioner of the New York State Metropolitan Transportation Authority where he served for 10 years on the Finance Committee, the New York City Transit Committee and the Governance Committee. Additionally, he was Chairman of the Real Estate & Planning Committee and the Safety and Security Committee. Immediately following 9/11, he was designated the primary MTA Board liaison to the Governor’s and Mayor’s Offices in coordinating transit activities at the World Trade Center site.

JAMES SIMPSON REMARKS

After discussing his thoughts on the recent issues surrounding the Dulles rail project, the Administrator went into his formal remarks. He made the point that, as a former truck driver, he can attest to the fact that Maryland has great roads!

- FTA is in a reasonably strong position right now to invest in urban and rural capital transit projects across the country – the kinds that truly enhance mobility for millions of Americans who want to get out of their cars and take public transit. FTA’s fiscal 2008 budget includes \$9.5 billion for public transportation – an all-time high level of funding. FTA’s proposed 2009 budget seeks \$10.1 billion – including a record setting \$1.62 billion in capital investment funds for the New Starts program and more funding for urban formula and rail modernization grants as well as rural areas that currently lack transit options.
- FTA has made major funding commitments to four of the largest capital transit projects in the nation’s history – including three historic rail projects in the New York region and a new light rail system in Seattle.

- While Maryland does not have a major transit project in FTA's New Starts pipeline at the moment, that is subject to change if the leadership at the MTOS has anything to say about it.
- FTA remains firmly committed to investing billions of dollars in viable transit projects that meet strict evaluation criteria – projects that can be delivered on time, on budget, and with the promised benefits. Mr. Simpson takes being a good steward of the taxpayer's dollars very seriously. FTA cannot afford to fund transit projects that aren't likely to succeed.
- No matter how carefully FTA invests funds there are not sufficient resources to help America develop transit and transportation infrastructure that's needed for the future to keep our economy moving. Nor is there enough funding to re-invest in the legacy transit systems that already exist to keep them in a state of good repair. The issue of "state of good repair" will be front and center when Congress takes up new authorization legislation for transportation programs after 2009.
- The DOT calculates that we need roughly \$22 billion per year to improve the condition and performance of our nation's existing transit systems through 2024. That is 70 percent higher than all transit capital spending in 2004.
- The Highway Trust Fund is projected to run a deficit of \$3 billion by 2009 and these revenues are declining at a time when commodity prices for materials to build infrastructure are escalating.
- Meanwhile, the problem of congestion is not going away. It affects the Baltimore-Washington region's ability to provide the mobility that's so vital to keeping this a workable, livable corridor for millions of people and their employers. The Brookings Institution recently reported that if we implement congestion pricing in about 100 metropolitan areas, we'll raise three times what we raise through the Highway Trust Fund now. This is money currently unavailable now – money that could be used for building new transit options, keeping existing transit and transportation systems in good repair, and mitigating traffic congestion.
- The reality is that the taxes and fees paid now to use transportation infrastructure assets do not reflect their true long-term economic costs – and never really have.
- A proposal by the Metropolitan Washington Council of Governments to introduce new tolls on the B-W Parkway and other roads and bridges in the region could generate an estimated \$2.75 billion per year. This could help offset the hundreds of millions of dollars that the Maryland General Assembly has recently "borrowed" from the state's transportation fund to help balance the budget.
- Tolling and congestion plans are not unproven – cities like Stockholm, Rome, London, Singapore, and other cities already know first-hand that congestion pricing works. In some of these places, congestion pricing models have reduced urban traffic by 20 percent or more and increased transit usage. In the U.S., cities like Miami, Minneapolis, and Seattle are using DOT funds to develop congestion pricing plans (see Mr. Paniati's remarks above).

- Our transportation infrastructure has reached a tipping point – we cannot do business as usual and we can't expect 20th century solutions to solve 21st century problems. Over the past 25 years, highway funding has increased 100 percent – thanks in large part to fuel taxes – yet congestion has increased 300 percent.
- FTA is trying public-private partnerships on capital transit projects where there's a need for additional funding sources. Grantees would contract with private partners to design, build, finance, operate, and maintain transit facilities – from rail and bus stations to parking garages. There are potential advantages gained by supplementing public funding with private equity and debt transferring long-term financial risk to the private sector and speeding up project construction and delivery which may reduce costs on some transit projects. Three locations have been selected for demonstrations – Houston, Denver, and Oakland.
- FTA is also supporting more transit-oriented development by encouraging local transit agencies to lease or sell federally financed land to private developers. FTA is also working with the U.S. Department of Housing and Urban Development to identify ways to improve linkages between transit and transit-oriented development and affordable housing.
- Administrator Simpson applauded Governor O'Malley and Secretary Porcari for supporting more transit-oriented development in places like Prince George's County where thousands of acres near Metro stations are ripe for development.

In closing, Administrator Simpson noted that we need leaders willing to make tough and courageous decisions about what it will take to build and sustain a world-class transportation infrastructure to keep our economy moving. And in the Baltimore-Washington corridor, we cannot allow geopolitical boundaries to stop us from doing the right thing for everybody who lives, works, and travels across Maryland, D.C., and Virginia. It's also not about highways versus subways or one mode of travel versus another – It's about people! He challenged the MTOS participants to find the courage and vision to solve our transportation problems today for the sake of our children and grandchildren tomorrow.

PANEL DISCUSSION: ASSESSING OPERATIONS MATURITY

This special panel session focused on assessing operations maturity from an organizational perspective – that is providing a technique for evaluating the effectiveness of an organization’s processes from an operations oriented perspective. Panel participants were:

- Phil Tarnoff, University of Maryland Center for Advanced Transportation Technology; and
- Stephen Lockwood, Parsons Brinckerhoff

Mr. Tarnoff focused on defining organizational maturity, the history of the concept and its relationship to the transportation community, and its application at a micro-level (incident management). Mr. Lockwood then followed with a discussion of assessing organizational maturity at a more macro-level (agency wide). Both Messrs. Tarnoff and Lockwood encouraged agencies to use the presented assessment techniques to identify their level of organizational maturity.

Messrs. Tarnoff and Lockwood’s remarks were made in conjunction with PowerPoint presentations, copies of which can be downloaded from the Intelligent Transportation Society of Maryland website reading room at:

http://www.itsmd.org/index.php?page_id=8

PHILIP TARNOFF REMARKS

Following are highlights of Mr. Tarnoff’s remarks.

- Organizational maturity is a technique for evaluating the effectiveness of an organization’s processes. The objectives focus on repeatability, effectiveness, performance measurement, and optimization. Organizational maturity is not another quality initiative, is not a prescriptive approach defining processes to be followed, nor a directive from external organizations or senior management – it is a way of “getting your act together”.
- Organizational maturity is defined in terms of five process oriented maturity levels:
 - Level 0 – INCOMPLETE: complete disorganization;
 - Level 1 – PERFORMED: ad-hoc operations with relationships not completely coordinated;
 - Level 2 – MANAGED: processes are fully documented and staff is trained;
 - Level 3 – ESTABLISHED: fully coordinated operation with performance data systematically collected and applied; and
 - Level 4 – PREDICTABLE: Strong sense of teamwork with full understanding of processes and performance objectives.

- Mr. Tarnoff noted that most agencies today are probably at Level 1 or 2 of Organizational Maturity.
- A matrix was presented that could be used for self assessment of organizational maturity based on criteria that has been established for each cell. Rules have been developed for identifying an organizational maturity level using the matrix. For example, a formal appraisal process should be used in the assessment that involves all management levels and is both collaborative and actionable.
- The Organizational Maturity model is based on a similar model developed by Carnegie Mellon University known as the Capability Maturity Model (CMM). The CMM is used for Information Technology projects. The CMM was funded by the Department of Defense and has been adopted by more than 30 organizations.
- The CMM “family tree” for IT projects includes branches specific to IT development, acquisition, and service delivery. It is proposed that a new “tree” be planned that emphasizes CMM for operations within Departments of Transportation. Mr. Tarnoff went on to explain the successful impacts of CMM on IT projects.
- Mr. Tarnoff then went through a specific example of assessing organizational maturity with respect to incident management processes (see presentation for details of example assessment). It was noted that preliminary efforts working in collaboration with real agencies have demonstrated the value of the concept.

STEPHEN LOCKWOOD REMARKS

Mr. Lockwood’s remarks/presentation focused on “institutional architectures” to advance operational strategies within an organization. The premise is that there is likely a correlation between institutional structure and success of operations and operations management. His work is funded under a Strategic Highway Research Program (SHRP 2) initiative. Following are highlights of Mr. Lockwood’s remarks.

- Similar to Mr. Tarnoff’s organizational maturity level concept, Mr. Lockwood’s presentation emphasized operations capability maturity levels from a macro-level organizational perspective. That is, from an operations perspective, how are they organized?; how are they staffed?; how is staff trained?; what are the relationships between internal departments and external agencies?
- The overall approach to the SHRP 2 project is too:
 - Identify effective state DOT operations programs;
 - Determine the combination of capabilities in the more effective agencies;
 - Determine the institutional architecture to support increased levels of maturity; and
 - Identify change strategies to achieve the supportive institutional architecture.
- Operations capability maturity levels defined by Mr. Lockwood’s work include:

- Level 1 – AD HOC: Ad hoc operations with relationships not fully coordinated;
- Level 2 – MANAGED: Processes are fully documented and staff is trained;
- Level 3 – INTEGRATED: Agency organization is fully coordinated and performance driven.

Mr. Lockwood thought most agencies are at a Level 1 with a few leaders at Level 2. The future goal is Level 3. In concert with each level as defined above is the concept of an institutional support architecture. This support architecture identifies the scope of various organizational dimensions with respect to a particular level. These dimensions include, for example, organizational culture, leadership, authorization, resources, structure, etc. The operations maturity levels and supporting institutional architecture are highly interdependent in that an organization cannot move from Level 1 to Level 2 on the operational maturity scale without a concurrent movement in the underlying supporting institutional architecture (refer to presentation for more detail).

- Some “rules” of Operations Capability Maturity include:
 - Continuous improvement (effectiveness) is objective;
 - Improvement requires consistent processes, measurement, documentation, and training;
 - The levels are incremental combinations of process establishment and measurement;
 - Each level builds on the previous level via establishing more supportive institutional arrangements.
- Some of the potential benefits of the Operations Capability Maturity Model identified include:
 - A shared vision of what is “best practice”;
 - A common language for discussing the state of play;
 - Vertical and horizontal management relationships;
 - A formalized, transparent (self) appraisal process;
 - Suitable to any type of organization by size or problems.

MTOS BREAK-OUT SESSIONS

The afternoon session of the Maryland Transportation Operations Summit included six Break-out Sessions. The sessions and corresponding facilitators are identified below.

Session A: Managing Congestion and Planning for Operations — Raja Veeramachaneni

Session B: Incident and Emergency Management — Alvin Marquess

Session C: Improving Travel Safety through Operations — Tom Hicks

Session D: Systems Interoperability and Providing Public Information — Glenn McLaughlin

Session E: Regional and Multi-Modal Coordination — Andrew Meese

Session F: Integrating Homeland Security and Transportation Operations — Mike Fischer

Each facilitator was provided a similar framework to organize the discussion and conduct of the session. The facilitator worked with a pre-determined group of individuals (discussants) who are considered knowledgeable in the break-out session topic area. The discussants helped the facilitator engage the MTOS participants in the discussion. While the facilitators were given broad flexibility in organizing their respective sessions, they were asked to lead their session participants through the following questions:

- *Where are we now?* That is, what is the current state-of-the-practice in Maryland and the region?
- *Where should we be?* What should we be doing, but are not? What are the best practices in your respective topic area from around the country? What should Maryland and the region's model programs in your topic area look like in approximately five years?
- *How do we get there?* What are the broad steps to achieving the model program? What are some of the practical and institutional challenges?
- *How do we measure progress?* What are some of the applicable metrics for assessing success?
- *How does this discussion relate to the theme of the Summit?* The theme of the Summit is *Better Mobility Through Improved Transportation Operations*. The Summit's goals are to continue to incorporate different modes and agency levels in the operations process and to include innovative practices and emerging technologies in regional operations.

While this format was not followed to the letter, all break-out sessions generally resulted in setting the stage for follow-on actions, mainly by emphasizing answers to *Where should we be* and *How do we get there?* Each facilitator was provided with a note-taker to help log the discussion.



SESSION A: MANAGING CONGESTION AND PLANNING FOR OPERATIONS

SESSION BACKGROUND

Maryland must address congestion from several dimensions, including urban commuter slowdowns to Eastern and Western Maryland recreational traveler traffic jams. As the population in Maryland increases and transportation agencies struggle to adapt with limited resources, roadways are carrying more vehicles per lane mile than ever before. Transit systems can also be congested but in many cases offer alternatives for commuters. A National Congestion Initiative is underway through the U.S. Department of Transportation, as the extent of the problem has been recognized at the national level.

In addition to managing congestion through operations on a day-to-day basis, planning must also take place. Traditional transportation planning has focused on long-range capital planning, as is appropriate with major construction activities, but increasing operational activities has brought on the recognition that planning for operations is also important. By its nature, planning for operations tends to be somewhat shorter term than capital planning. Stakeholders can be somewhat different and the relative mix of capital vis-à-vis operations and maintenance expenditures is often quite different. To ensure appropriate consideration for operations, a rigorous planning process must be in place and it must be seen in the broader context of transportation planning – not as a separate stand-alone activity. Mainstreaming operations planning is necessary to ensure maximum performance of the overall transportation system.

This session was facilitated by Raja Veeramachaneni of the Maryland State Highway Administration. Break-out session discussants were:

- Egua Igbinosun, Maryland State Highway Administration
- Rick Backlund, Federal Highway Administration
- Eileen Singleton, Baltimore Metropolitan Council
- Melissa Williams, Maryland Transportation Authority

Session notes were taken by Nikolas Pakulla of Telvent Farradyne.

Mr. Veeramachaneni provided the group with a handout which provided some statistics on the growing congestion problem in Maryland. The handout can be downloaded from the Intelligent Transportation Society of Maryland website reading room at:

http://www.itsmd.org/index.php?page_id=8

SESSION SUMMARY

Mr. Veeramachaneni went through the handout and made the following additional observations:

- One of the graphs provided showed the growth of annual vehicle miles traveled for interstates and freeway in Maryland based on Metropolitan Washington Council of Governments and Baltimore Metropolitan Council data. The point was made that the trend, both nationally and locally, is that vehicle miles traveled is beginning to flatten out as a result of gas prices, congestion, and other factors. While there is no data for 2006 and 2007 (the data is compiled every three years), it is expected that there won't be a significant change in vehicle miles traveled in the next report.

- Two of the slides addressed the strategies being used to combat congestion. Adding highway capacity is the conventional approach. One issue noted was that of access management even though highways are access controlled – the issue is the constant requests for adding new interchanges and entrances on our highways which increases congestion.
- Some comments on other ongoing activities noted were:
 - The ICC will be a toll managed lane facility with congestion pricing
 - Focus on transit oriented development – building close to transit facilities
 - New land use strategies – moving people closer to work and jobs closer to people

Mr. Veeramachaneni then made the following points to lead off the discussion:

- It is important to involve planning for operations in the planning process as operational strategies will affect congestion. We can't build our way out of congestion.
- With respect to safety, no amount of deaths is acceptable.
- People accept a certain level of congestion depending on where they live. For example, in Baltimore, traffic moving 30 mph on I-695 may be acceptable whereas people living in rural Montana wouldn't accept a 4 minute delay.
- What other "ITS" or operations oriented solutions are there?

Mr. Backlund provided a brief synopsis of what is being done at the national level with regard to planning:

- He mentioned a program under SAFETEA LU which emphasizes congestion management and the ultimate goal of getting metropolitan planning organizations working together with operations.
- FHWA is working to develop a best practices guide book that will engage both planners and operators. A comment was made that DOTs need to include more focus and input from multiple modes to enhance cooperation between the modes.
- FHWA is working on different types of operations and safety objectives for small and large transportation systems.
- Overall, Mr. Backlund reiterated the point that more collaboration is necessary between planners and operators.
- The main federal role is trying to take lessons learned from around the country and pass them on to state and local agencies.

Eileen Singleton made the following comments based on her experience at the Baltimore Metropolitan Council:

- Ms. Singleton mentioned that the traditional transportation planning focus is on recurring congestion and that the Baltimore MPO does not have an institutional process in place that focuses on operational strategies designed to address non-recurring congestion.
- Performance measures tracked include travel time and delay.
- BMC has been working to integrate ITS/operations into the planning process, but the methodology for doing so is probably not as robust as it could be. They are working on trying to figure out how to better incorporate operations into their process.
- Ms. Singleton noted that it would be best if the MPO had more interaction with operations staff.

Next to speak was Melissa Williams from MdTA. Some highlights of points she made include:

- We need aggressive incident management.
- While Ms. Williams hates to admit it, the increasing gas prices help deal with congestion. People need to come up with other ideas of how to deal with it.
- For example, move to a 4-day work week as a temporary means to help reduce congestion.
- Not everyone uses transit and people will continue using cars no matter what. However, even a little mode shift is good.
- The Bay Bridge experimented with congestion pricing -- the toll was lifted/or substantially lowered during off-peak times (10pm – 7am); however, this had minimal impact. A question was asked about advertising and marketing for this as most people in the session had not heard of it. Ms. Williams replied that marketing efforts were extensive.

Next to speak was Eguia Igbinosun of SHA. Highlights of points made include:

- Mr. Igbinosun wanted to follow up on Mr. Veeramachaneni's slide listing current ITS and operational strategies to add some that were missing.
 - Traffic Management – plays a huge part
 - Incident Management – Basically what CHART program is focused on:
 - The push now is to expand incident management from major highways onto the arterials. For example Montgomery County, MD has service patrol vehicles operating on arterials; DC has a service patrol program that started 2-3 years ago; and Prince George's County is also working on establishing a program.
 - Traveler Information Dissemination – from his perspective, the private sector is best positioned to implement methods for delivering information directly to the end user and helping travelers navigate around actual incidents.

- Road Weather Information Systems - used to manage weather related incidents (e.g. snow events).
- Mr. Igbinosun also commented on the previous discussion of integrating ITS/operations into the planning process. One significant issue is the disparate time frames of ITS/operations projects and traditional capacity enhancement projects. ITS/operations projects are relatively fast moving from planning to implementation. CHART does their own plans which can have 1, 2, 5, or 20 year horizons; however, even the short-term plans can be out of date relatively quickly.

Mr. Veeramachaneni brought back the discussion to ask where there currently is in place, if anywhere, a long-range plan that incorporates operations?

- Mr. Backlund noted the availability of FHWA's operations website which has examples of ITS projects that have been incorporated into long-range plans and coordinated through the MPO².
- A session participant reiterated Mr. Igbinosun's point that planning for operations tends to be short-term.
- A side question/comment: How do we best determine which ITS technology to use on a corridor?
 - Mr. Backlund noted that the FHWA best practices guidebook (coming out soon) will show how this has been done in locations around the country.
 - A point was made that a regional ITS architecture can be useful in this regard. The architecture is best on operational needs, but is technology neutral – only when a project is ready to go to design is technology selected.
- A question was brought up for the planners: When trying to incorporate ITS/operations into planning, are there specific metrics out there with regard to safety?
 - Ms. Williams responded that it can be said that less congestion in turn will save lives.
 - Mr. Backlund responded that there are a number of metrics and factors considered and each MPO determines their weight when evaluating potential solutions.
 - Ms. Singleton responded that BMC just finished developing a regional long-range plan and they do not have a good way to compare traditional capacity enhancements to operational improvements. For example, how do you compare the benefits of adding a lane vs. adding safety patrols? Long-range plans are very specific. For example, by 2025 we will add this lane here and we will accomplish this specific metric.

² The FHWA Office of Operations Website is: <http://ops.fhwa.dot.gov/>

- Mr. Backlund noted that, from an operations perspective, a state DOT is looking 2 years down the road to implement an ITS solution. This time horizon is not consistent with long range plans.
- Ms. Singleton commented that the people who are making the decisions are not the operations staff; rather, they are the people who are “used” to making decisions oriented around traditional capacity improvements (it’s what they’ve been doing for the past 30 years).

Mr. Veeramachaneni summarized the discussion noting that the planning horizon is much longer than the life of the technology. He mentioned that the Seattle approach is a possible case study and that the Puget Sound MPO does a lot of work with Washington State DOT using speed harmonization, ITS, and operations to increase system efficiency (e.g., active traffic management such as peak period shoulder use) instead of just adding lanes. Shoulder use can be beneficial; however, there can be opposition due to safety concerns – both for the traveling public and emergency response personnel.

Mr. Veeramachaneni turned the discussion towards performance measures and metrics. How do we set goals for congestion and what criteria should be used? What are urban congestion vs. rural congestion performance goals? Following are highlights of various responses.

- Generally, goals should include both short term and long term.
- Practices in DC may not be the same as in Baltimore, for example, we study how many jobs are available within 45 minutes of an area. Travel time frequency may be different in different areas.
- Ms. Singleton said travel time reliability is a potential operations measure.
- Ms. Williams noted that an example metric is to maintain LOS better than D in all toll lanes. Once LOS D is reached the toll increases (as an example of managed lanes using congestion pricing).
- A comment was made that there needs to be congestion on the non-managed lanes otherwise nobody would use managed lanes.
- Law enforcement mentioned potential safety issues related to the merging of HOT lanes and regular use lanes, especially if the regular lanes are under congested conditions.
- The point was made that the real goal should be to manage and meet customer expectations. One potential solution is doing more marketing so that people can understand how solutions benefit them.
- A comment/question was made regarding metrics. Should they be:
 - Consistent and applied uniformly in all areas?
 - Temporal?
 - LOS based?

- Some combination thereof?

Mr. Veeramachaneni mentioned customer expectations are critical and reliability is a good way to meet them. A facility may be congested, but if it's like that day in and day out at that particular time, then at least expectations are met.

- Mr. Backlund made the point that NY and NJ roadways are so saturated and tight on space that they physically cannot be widened. Current plans call for the addition of zero highway lane miles. The main projects in the region are transit oriented as well as freight.
- Another point was made that areas grow accustomed to recurring congestion and what is considered unacceptable delay is regional.
- Mr. Igbinosun suggested that we start with the current facility capacity and focus on the congested areas that we can't live with. Then we determine a set of strategies to address these areas and let the public help us pick them. Based on the selected strategies, they can then be prioritized based on available resources.

Mr. Veeramachaneni noted that Long Range Planning should include operations in the mix. He asked the question how does an MPO define "operations"?

- Mr. Backlund replied that many MPO's define operations in accordance with travel demand management strategies.
- Ms. Williams noted that she needs to implement projects within 10 weeks to 10 months. The time horizon of a long range plan (20 years or even 10 years) is way too long.

Mr. Veeramachaneni then asked the operations representatives: What can a planner do to help operations?

- Mr. Backlund answered that planners can help simulate if there is a way to tie in operations with modeling.
- The comment was made that there needs to be programmed resources (e.g., an ITS architecture for planners).
- Mr. Zezeski made the comment that \$2.4 billion will be spent to build the ICC. Imagine what \$2.4 billion could do if it were spent on operations. There is a significant return on investment on operations improvements.
- Law enforcement made the comment that when it comes down to it, most of the time it's not the roads that are the problem, but the people on them – many crashes occur due to human error. By the same token, the facility may contribute to human error. Mention was made of the use of raised lane markings in Georgia which have helped people stay in their lanes.
- Mr. Backlund noted the Seattle model where operations personnel work with planners. They even work together in the area of maintenance operations (snow removal).

- Ms. Singleton mentioned that we need to find champions to help address these issues and to move us forward in getting something accomplished.

Following is an overall synopsis of the session discussion:

Where are we now?

- Programs administered under SAFETEA-LU
- Working with federal guidance such as the FHWA Best Practices Guide Book
- Existing ITS system operations resources such as CHART
- BMC - traditional planning process focus is only on recurring congestion
- MPO and ITS timelines do not fit within the same planning horizon
- Inter-jurisdictional data communication and information dissemination are not great
- ITS solutions do not have specific performance metrics associated with them, therefore very difficult for MPOs to include
- Many dissatisfied customers due to travel time variability and they don't have information needed to make better travel decisions

Where should we be?

- Where MPOs can plan for ITS solutions using reasonable goals and performance measures
- Where all jurisdictions within the state can readily communicate and share information, and have this be readily accessible to the public so they can make more informed decisions
- Better customer satisfaction, more reliability in travel time, and better information dissemination
- Having some type of "architecture" that planners can use to include ITS solutions

How do we get there?

- DOTs need to include more focus and input from separate modes to ultimately allow and enhance more cooperation between the modes
- More collaboration between planners and operators
- Expand incident management onto the arterials
- Better PPP relationships to help private companies get travel data/information to end users

- Look at other DOTs who have successfully integrated long-range planning and operations
- Better performance metrics for ITS/Operations related solutions so planners can integrate them into their planning horizons
- Inform the public about the limited resources available
- Find champions

SESSION B: INCIDENT AND EMERGENCY MANAGEMENT

SESSION DESCRIPTION

Unanticipated highway and transit incidents account for a substantial portion of overall delay in Maryland and nationwide. Planned special events and work zones can affect traffic as well. Agencies can reduce the amount of congestion by proactively responding to incidents, events, work zones, and other traffic and travel impediments with an emphasis on such activities as:

- Quickly opening lanes or rail lines,
- Implementing strategies to reduce the likelihood of secondary incidents,
- Providing early and accurate decision-critical traveler information, and
- Shifting travelers to alternative modes and routes.

In addition to the more typical incidents, Maryland is also susceptible to emergencies ranging from natural disasters (e.g., heavy snow storms, hurricanes) to human-caused events (e.g., nuclear power plant and other industrial failures, terrorist attack). These emergencies inevitably have an impact on transportation systems. Sometimes the emergency directly impacts the systems (e.g., a snow storm) and steps must be taken to clear and keep open those systems. In other situations, transportation systems are vital for response and recovery efforts (e.g., evacuation of populations, shipments of emergency goods). Transportation operators need to be prepared for these emergencies.

This session was facilitated by Alvin Marquess of the Maryland State Highway Administration. Break-out session discussants were:

- Janet Harrison, Maryland State Police (MSP)
- Betty Cornwell, Towing and Recovery Professionals of Maryland (TRPM)
- Wayne Jubb, Maryland Transportation Authority (MdTA)
- Mark Miller, Washington Metropolitan Area Transit Authority (WMATA)

Session notes were taken by Kathy Frankle of the University of Maryland Center for Advanced Transportation Technology.

SESSION SUMMARY

Following are the highlights of the session discussion and outcomes:

- *Advertise Maryland Move IT! Law* – Maryland has a Move It! law but it is not widely known by Maryland motorists. It was stated that some public service announcements had been developed using a song from a Disney movie - “Move It-Move It.” However, no one had ever heard them on the radio. The group felt that the law should be marketed more to reduce unnecessary traffic congestion.
- *Command Vehicles* – We need policies in place to better utilize command vehicle resources. We also need better regional procedures for using these resources.
- *Share Resources/Interagency Sharing Procedures* – The group felt that there would be a benefit if there could be a mechanism in place for agencies to share resources. For example, if MSP could utilize a county command vehicle for an incident that occurred in or near that particular county.
- *Answering Services for Towers* – Betty Cornwell from TRPM indicated that many times towers do not have the right equipment sent to the scene because they are not getting the proper information from the police on scene. MSP stated that many times they get an answering service and provide them with the accident details. MSP would provide them with pertinent details that they wanted to convey, but the answering service person typically does not know enough to ask what might be critical follow up questions about the incident. Hence, when contacting the tower to respond to the scene, the answering service may not convey what is really required and the wrong equipment may get dispatched. The group felt that the towers should not use an answering service if they are not getting the detail they need.
- *Slow Down/Move Over law* – The towers of Maryland are working with State Legislators to include towers as a responder in the Move Over/Slow Down bills. Many responders are injured or killed on the roadway because motorists do not slow down or move over if there is an incident or disabled vehicle. Forty (41) states have these laws but only 24 have included towers. The group felt that including towers was important and should be pursued.
- *Liability Legislation for Towers* – Legislation should be passed that would exempt towers from liability for services performed at incident scenes at the direction of the Incident Commander (except for gross negligence). Currently, there is a great deal of liability exposure for towers if there is a non-consensual recovery of a vehicle and its cargo in order to get the roadway cleared to allow traffic to move freely again.
- *Safety Clothing Laws* – As of November 24, 2008 all traffic incident management responders will be required to wear ANSI approved high visibility safety garments. The National Towing Association has provided a training video called “Roadside Safety-Dress for Success” to help towers select appropriate and compliant safety garments.
- *Multi-day Incident Training* – Training is done for large scale incidents and evaluations, but rarely is training conducted for multi-day incidents like the tornado

in LaPlata. Issues such as transferring incident command after a set number of hours on scene need to be addressed before an incident happens.

- *After Action Reviews* – In order for After Action Reviews to be effective, all participants that responded to the incident need to be completely **honest** about what happened during the incident and **open to constructive criticism**. This is the only way that future incidents can be handled more efficiently.
- *Specific Traveler Information for Motorists* – In the future, it would be great if motorists could go to a web site and select specific travel information they want for specific times of day. Then, that information could be e-mailed to them daily. Thus, they could receive information about their rush hour travel routes as they are ready to leave for home or the office.

SESSION C: IMPROVING TRAVEL SAFETY THROUGH OPERATIONS

SESSION DESCRIPTION

Americans are becoming more mindful of the severe toll from the fatalities and injuries that occur on our highway system. In addition, transit agencies want to ensure the safety and security of their patrons. Consequently, a larger focus is being placed on traveler and traffic safety. By improving safety, and by thereby reducing incidents, highway and transit operators can improve their operations, which may lead to improved throughput.

In 2006, Maryland held a successful Traffic Safety Summit, which resulted in a list of recommendations for next steps. From the highway perspective, the Traffic Safety Summit was used as a backdrop to the discussion.

This session was facilitated by Tom Hicks of the Maryland State Highway Administration.

Break-out session discussants were:

- Lon Anderson, American Automobile Association (AAA)
- John Rotz, Maryland State Highway Administration
- Marcelino Romero, Telvent Farradyne
- Ron Keele, Washington Metropolitan Area Transit Authority
- Bala Akundi, Baltimore Metropolitan Council

Session notes were taken by Warren Henry of Jacobs Engineering Group, Inc.

To fuel the discussion, Mr. Hicks provided the group with a three page handout listing various topics/items related to safety and operations. Reference was also made to the Maryland Strategic Highway Safety Plan (SHSP). The handout can be downloaded from the Intelligent Transportation Society of Maryland website reading room at:

http://www.itsmd.org/index.php?page_id=8

SESSION SUMMARY

After giving everyone a moment to review the handout, Mr. Hicks asked the scheduled discussants to spend a few minutes discussing/revealing their thoughts about any issues that affect the current/future state of safety within our region. A summary of each discussant's response is provided below.

- Lon Anderson (AAA) – According to Mr. Anderson, safety is an expensive commodity and highway designs/plans that are developed around excessively low budgets are, more often than not, to the detriment of a safety plan/program. In his words, “when funding is low, safety programs tend to suffer.” As far as the current needs of the region are concerned, he feels that more enforcement is needed on our roads. There is a shortage of law enforcement officers on the highways due to a lack of qualified personnel and a strain on agencies to support homeland security projects. He feels that it is necessary to find ways to increase the level of enforcement on our roadways, which will help to reduce aggressive driving, speeding and other moving violations throughout the state.
- Mr. Anderson also took the time out to state his opinion about plans to use the shoulders on our interstate highways to accommodate High Occupancy Toll (HOT) lanes. He feels that using the shoulders on interstates as a method to increase capacity is not wise. Traffic on the shoulders of an interstate is not a safe practice and should not be considered. If more capacity is needed, modifying the geometry of the roadway would be a more suitable option.
- John Rotz (MDSHA – Motor Carrier Division) – Mr. Rotz started out by introducing himself and described to everyone what he is challenged with on a daily basis at the State Highway Administration (SHA). John stated that his observation of different projects/programs, over the years, has revealed that efforts relating to mobility and safety are often working against each other. He feels that our focus as transportation professionals should be geared towards finding better ways to make these programs, not only work together, but complement each other. As far as improvements associated with his expertise are concerned, he feels that efforts towards the installation of automated enforcement on freeways would be an excellent way to improve safety while maintaining/enhancing mobility. A few suggestions include efforts to automate all commercial vehicle inspections (electronic identification, weigh in motion devices, rolling inspection, etc.). According to Mr. Rotz, some companies have already started to perform wireless inspections to detect speed and various mechanical problems that affect their equipment.
- Marcelino Romero (Telvent Farradyne) – Mr. Romero's concerns during this break-out session were geared towards improving ways to maintain safety and mobility at work zones during the construction of transportation infrastructure. To achieve this, according to Mr. Romero, increased incident and emergency management along with high level transportation management is key. Transportation professionals need to start thinking of better ways to maintain the level of service (LOS) during the construction of infrastructure. More stringent regulations may be required as well since he is of the opinion that contractors are not concerned about the ways their activities affect LOS and mobility. Countermeasures to reduce speeding and aggressive driving in work zones are also imperative.

- Ron Keele (WMATA) – Mr. Keele relayed to the group that WMATA’s main focus is currently geared towards the safe mobility of commuters and pedestrians throughout the region. Considering the rising fuel prices, WMATA expects the number of transit users/riders to increase considerably. With this in mind, improvements will have to be made to the current transit system. He feels that any improvements made to the current transit and general transportation system needs to be pedestrian/bicycle friendly as the number of riders and cyclists will be steadily rising.
- Bala Akundi (BMC) – Mr. Akundi’s main concern was that the fatality rate in our area is too high and needs to be addressed. In 2007, our region experienced 650 fatalities on the roadway. The Baltimore area alone was responsible for a third of that figure. He feels that the focus on producing safety related information is lacking. Documents related to incidents, fatality rates, and/or safety have a slow turnover rate and the urgency to get these documents published should be revisited. The promotion of safety to the younger driver is also important.

After the scheduled discussants finished relaying their thoughts to the group, Mr. Hicks opened up the floor for general questions and discussions. The general consensus throughout the group was that more public education programs needed to be implemented. Driver education is the key to roadway safety. It was also felt that this should start with our youth. Some of the participants even felt that taking driver education out of our schools was a great disservice to the region. With this in mind, it is imperative that parents be proactive and take issues of driver safety into their own hands. They have the power to influence the roadway practices of young adults and teenagers. Safe travel between modes of transportation should also be promoted.

To wrap up the Break-out session, Mr. Hicks once again thanked everyone for participating and the group went over the highlights of the discussion. The recommendations of the discussants and participants towards improved safety through operations are as follows.

- More enforcement is needed on our roadways to promote safer driving practices. This includes automated enforcement;
- Safety programs should not suffer due to lack of funds;
- Maintaining safety and mobility in work zones is extremely important to maintain the LOS of the transportation system;
- Improvements to our transportation system need to be pedestrian and bicycle friendly;
- The urgency to produce safety related information/documentation needs to be revisited (e.g., placing key safety information in the Motor Vehicle Administration Driver’s Handbook);
- Public information and education programs are important. These programs need to target drivers of all ages. Education that promotes safer practices while changing modes of transportation should also be considered; and

- Safety programs need to address all modes of transportation.

SESSION D: SYSTEMS INTEROPERABILITY AND PROVIDING PUBLIC INFORMATION

SESSION DESCRIPTION

Transportation operators need to reliably gather and process transportation system information and then exchange this information between their agencies and staff, as well as with other agencies and staff. The number and type of different information exchange mechanisms is increasing, ranging from the traditional phone, to e-mail and radio notification, to new automated data exchange systems such as the prototype Regional Integrated Transportation Information System (RITIS). By designing information systems with an emphasis on interoperability and standards, agencies can maximize the opportunities for enhanced data exchange and integration with other systems, both local and regional.

Enhancing transportation system information available to operators increases the information available to travelers through the various means of traveler information distribution. Currently, travelers receive information from a variety of sources including radio traffic reports, dynamic message signs, and the Internet. Traveler information systems have been tested in the Baltimore and Washington areas, and many valuable lessons learned have come from these tests. Currently, Maryland is working on the development and deployment of a 511 system to supplement other information sources.

This session was facilitated by Glenn McLaughlin of the Maryland State Highway Administration. Break-out session discussants were:

- Rick Dye, Maryland State Highway Administration
- Bob Jordon, Maryland Transportation Authority
- Michael Pack, University of MD Center for Advanced Transportation Technology
- Bob Rupert, Federal Highway Administration

Session notes were taken by Tom Jacobs, University of Maryland Center for Advanced Transportation Technology

Participants in this Break-out session discussed three overarching themes related to:

- **Information Collection** including types of information that needs to be gathered and methods for gathering information;
- **Information Management** including types of information to be shared, preventing information overload, information routing, managing sensitive or private information, and security requirements for information systems; and
- **Information Dissemination** and Archiving including methods for sharing information among agencies, methods of sharing information with the public, public agencies vs. private company roles, and archiving requirements.



These themes and the related questions that were used to facilitate the Break-out session discussion can be downloaded from the Intelligent Transportation Society of Maryland website reading room at:

http://www.itsmd.org/index.php?page_id=8

SESSION SUMMARY

The following summary was prepared based on the break-out session discussants' and participants' input to the topics and related questions posed by the facilitator. The documented input has been formatted into the following general guiding questions for all break-out sessions:

- Where is Maryland now?
- Where should Maryland be?
- How does Maryland get there?
- How is progress measured?

Where is Maryland Now?

- In the area of systems interoperability and providing public information in Maryland, the consensus appears to be that incremental progress is being made, albeit many would say the progress is not as fast as is could or should be.
 - In the area of data collection, the point was made that systems such as CHART, MdTA's toll systems, and the Regional Integrated Transportation Information System (RITIS), have a considerable amount of information/data that is currently being collected. However, agencies/organizations may not know this data exists and even if they do, they may not know what to do with the data [this point of not knowing what to do with the data was made multiple times]. Concerns regarding information overload were noted as being very real.
 - By the same token, the amount of real-time data available for some operational needs such as the provision of travel time messages on DMS is inadequate. Maryland currently has a mix of public and private data collection sources. It's possible that the entire collection and dissemination function could be privatized, but end user needs must be taken into account (needs of the traveler and needs of agency operators are somewhat synergistic, but different).
 - The point was made that there are two sides of the equation. On the one side, we have public agencies (e.g., DOTs) that need data for operations and their traveler information programs and sometimes they are getting it from 12 different sources. While not ideal, that's as good as we can get currently. On the other side of the equation, there is the consumer's (traveler's) need for better information than they are currently getting so our current collection and delivery mechanisms do not go far enough. For example, in-vehicle navigation devices don't provide good real-time data because there isn't any. It's clear that in-vehicle navigation systems will continue to increase and users will demand better real-time info. If the information is good and it helps them, they will pay for it and the private sector will continue to invest in both collection and distribution. The key point is that the business model will drive the market for traveler information.

- From a purely data exchange perspective (between operational agencies), the point was made that the current lack of real-time system to system data exchange does not keep agencies from doing things operationally. Automated real-time data exchange is a good idea and we need to be moving in that direction but the lack of perceived benefit from operations personnel means data exchange doesn't float to the top of the system development priority list—therefore, it doesn't always make into software build schedules.
- There are a number of existing collection, management, and information dissemination mechanisms in place; however, there are significant data/information issues that must be addressed:
 - *Coverage* – we should be working towards being able to provide specific alternate route and mode information. That means we need better real-time data on arterials and alternate modes. While good real-time data may actually exist on alternative modes, we're not necessarily thinking multi-modal in our operational strategies and we need to be.
 - *Temporal* - how quickly are we getting data/information and are there alternative sources that could be better at providing timely data (e.g. getting incident info from CAD systems. How often are we getting detector information – 10 minute updates may not be enough.
 - *Quality* - what is good versus bad data and how do we figure out which is which?
 - *Types* – are we getting all types of data that are needed such as weather or physical related conditions of the roadways? More than one person noted that it is “scary” what vehicle computer systems know about their environments – how do we get this information and harness it? One major component missing in our operations management is real-time parking management (e.g., where is the next available space in a Metro parking garage, or if it's full, where is the next closest garage with space?). We need to work parking management into our operational systems so we can provide better information to the traveler.
 - *Sources* – we need to continue using as many data/information sources as we can. It was pointed out that there is still value in human observation as a point of reference (call in from the road) – don't discount the value of people providing information. In addition, CAD can be a good source of incident information as demonstrated in areas around the country. The number of sources and how they inter-relate could play into how overall data collection resources are managed. For example, getting related data from disparate sources (e.g., CAD and media information about the same incidents) may negate the need to invest the last bit (e.g. 10%) of additional detection/monitoring infrastructure on a particular roadway.
 - *Security* -- there may be limits to being able to exchange data as security can be an issue. It was noted that, in one particular operational agency, people will still use CD's to transfer data because the data cannot be sent over the agency network. Security is sometimes viewed as hindering the process of getting

something done; however, there was a counterpoint that security issues can be addressed if they really need to be and you are willing to take the steps to do so—many times “security” becomes the scapegoat for not really wanting to do something.

- *Data Archiving* – at least one mention was made of Freedom of Information Act (FOIA) issues with data archiving. Real or perceived issues related to FOIA can cause agencies not to want to store data. A related issue is that state rules are not always clear regarding storage of electronic data and that’s because most rules were written when archiving involved paper/files stored in boxes. From a slightly more positive perspective, it was noted that at least FOIA allows for tracking who’s asking for the data. We shouldn’t let FOIA issues keep us from making data/information accessible to the users who need it (the web was mentioned as a specific portable and highly accessible method for getting data).
- *Various Audiences* – there are a number of different audiences for data/information and the information must be tailored based on audience need and “medium” used to deliver/access the information. Example audiences mentioned included operations staff, engineers, and travelers. Engineers may want detailed data/information whereas travelers information that is condensed, clear, accurate, and to the point. It was also noted that there may be differences in end user needs even within a particular audience. For example, traveler information needs are different depending on whether the traveler is local or from out of town.
- *Lack of well defined roles for the public and private sector* – as noted previously, future transportation system users in Maryland will expect real-time en-route information as part of, for example, their in-vehicle navigation system. The question becomes – who can best provide this type of service? It is likely that public/private roles will be “intermingled”; however, in the case of this specific example, public/private roles in Maryland have not been explicitly defined. There seemed to be general consensus that the private sector is better at getting information distributed directly to the end user (traveler) whereas the public sector might be better at getting information distributed “to the masses.”

Where Should We Be?

- We need more detailed / proactive and complete information tailored and delivered to the end user. For example, Maryland should be aiming for the provision of pre-trip and en-route traveler information that includes real-time decision support for choosing alternative routes (including arterials) and alternative modes. Studies have shown that this is the type of information the traveling public wants.
 - It was mentioned that text messages with route specific traveler information should be delivered to end users.
 - Again, in-vehicle navigation with GPS, on-board vehicle computer systems, and “On-Star” type systems all have a great deal of promise in helping getting us to where we need to be. The issues of who does what (public vs. private) need to be addressed as noted previously.

- Systems can be tailored to provide levels of detail pertinent to where information is going or delivery device being used. In addition, use of “subscription” type services (for both vehicle and transit modes) provide travelers with capability to tailor the type and amount of information they want to receive. This can be effective in avoiding information overload.
- There needs to be a robust relationship between the private sector and public sector along with well defined roles for delivering specific types of services to end users based on needs.
- From a system interoperability / data exchange perspective, we have extremely thorough multi-modal and regional “situational awareness”.

How Do We Get There?

- There is no one owner of the problems/issues that have been identified (and that have been around for a long time). Given the many players involved, a collaborative approach to addressing the issues is required.
- While the previous bullet notes the need for collaboration amongst players, it was also mentioned that there needs to be a champion to push to get us where we need to go and to have implemented the paradigm shifts that will likely be required in order to be successful. The question is – who is going to be that champion?
- We need to define detailed objectives of what we want to see accomplished and use these objectives to further define the roles of the public and private sector. Further, the public sector needs to work with the private sector to seek opportunities for private sector investment. The suggestion was made to include lawyers, bankers, etc. to find out what it’s going to take to make the private sector invest in traveler information and to come up with a business model that allows all of us (public and private) to meet the objectives we want accomplished.
- From an operations perspective, operations agencies already collect data for their operational needs. What operational needs are not being addressed by current data collection capabilities (e.g., travel times)? Are there multi-modal operational opportunities that can be exploited? A re-examination of these types of needs can help answer the question of what agencies can do with the data/information they are currently collecting and identify data/information gaps.
- From an operations (and a non-technical) perspective, the point was made that we need to do a better job of documenting operational procedures and processes. It was noted that there are many senior managers who have these procedures/processes in their heads and when they retire, the procedures/processes are gone. The people component to operations cannot be ignored.

How Do We Measure Progress?

- Based on defined detailed objectives of what needs be accomplished (see previous bullet), an initial measuring system can be established – how are we doing in terms of meeting our objectives. Depending on how the objectives are defined, performance measures consistent with the objectives could be defined.

- Ultimately, we will know if we are successful if the public gets the traveler information they want and they are satisfied with it. From a private perspective, it's as simple as: is the public satisfied enough to the point they are willing to pay for it?

SESSION E: REGIONAL AND MULTI-MODAL COORDINATION

SESSION DESCRIPTION

Maryland has many transportation players across many modes and jurisdictions, all with unique roles in transportation system management, safety, and security. Many of these players have overlapping jurisdictions and interests. Along key corridors in Maryland, roadways and major transit rail lines run side-by-side or close by to one another. Moreover, bus and other public transportation services use the roadways as well. Day-to-day operating decisions in the road or transit mode, as well as long-term planning and scheduling, can have an impact on both the road and transit modes. In particular, major incidents on either the roadways or rail lines will have ramifications for the other. Recognizing the mutual effects on one another, modal agencies are looking towards the developing field of Integrated Corridor Management or ICM. ICM attempts to look at a corridor from a more global perspective and ensure that appropriate modal considerations are taken into account in planning, construction and operational activities. In this way, the traveler can be best served.

This session was facilitated by Andrew Meese of the Metropolitan Washington Council of Governments. Break-out session discussants were:

- Gary Erenrich, Montgomery County Department of Public Works and Transportation
- Rick Gordon, Prince George's County Department of Transportation
- Chris Letnaunchyn, Carroll County Department of Public Works
- Richard Steeg, Virginia Department of Transportation

Session notes were taken by Imran Inamdar of Telvent Farradyne.

SESSION SUMMARY

Mr. Meese introduced the discussants and provided an overview of how the break-out sessions will be convened. The purpose of the break-out was to address the following questions with regard to regional and multi-modal coordination:

- Where are we on regional multi-modal coordination?
- Where should we be?
- How do we get there?
- How do we measure progress?
- How does this discussion relate to the theme of the Summit?

Andy asked the attendees to provide their inputs on the challenges to coordination, methods to identify multi-regional events, need for preplanning, and processes involved. He also asked the attendees to discuss challenges other than communication issues such as day-to-day multi-modal operations issues and transit-roadway operations coordination. Following are highlights of the session discussion.

- Mr. Letnaunchyn gave an overview of the Baltimore Regional Operations Committee (BROC). BROC was established in the year 2000 to foster communication, cooperation, and coordination on day-to-day operations. It is comprised of multiple agencies and disciplines such as fire & EMS, MDOT, and MTA. He listed some accomplishments and activities of BROC:
 - Medical examiner form to quickly move a dead body in case of a fatality to facilitate opening the roadway,
 - Memorandum of regional cooperation to help provide statewide notifications in case of an incident on a roadway of a certain severity and duration. This memorandum works fairly well and is very helpful. Timing of the notification is important.
 - Spanish language field guide to help field responders.
 - Traffic incident management conferences in other jurisdictions.
 - Traffic incident management training course.
 - Participation in FHWA self assessment.
 - Transportation Subcommittee – work for urban area security work group. Public works side has road maintenance personnel from different counties who meet regularly to foster cooperation.
 - Looking at a contra-flow case study and best practices in contra-flow operations.
- Mr. Steeg provided an overview of the Metropolitan Area Transportation Operations Coordination (MATOC) effort. The national capital region is under-prepared for managing major regional transportation incidents. Some operators in NOVA don't know their counterparts in MD and there is a need to facilitate coordination. The agencies have developed some ad hoc working relationships at the "doer" level but there are no formal policies for the various states and jurisdictions in the region to communicate and coordinate during incidents. The biggest issue during incidents is lack of situational awareness. The idea here is for specific entities to manage the overall consequence of the incidents. The NOVA customer base has high expectations and no tolerance for missteps. It is important to determine the players, points of contact, roles and responsibilities and the most efficient ways to communicate during incidents. Hence, MATOC is developing a Concept of Operations for the metropolitan area for information and data exchange between agencies during incidents. It is important to note that MATOC is not managing incidents. The MATOC by-laws are structured so that other parties can become part of the organization. The MATOC effort will include the installation of a virtual workstation for regional coordination which will operate on a separate SOP and protocols, and might be rotated periodically between the different agencies in the region. There is a need to engage the right people and to measure effectiveness of MATOC so that it can be conveyed to the host organization how they performed during incidents with regional impacts.

- Mr. Gordon noted that in most agencies, lower-level employees seem to know each other but at higher levels turnover is an issue. For planned events such as the Woodrow Wilson Bridge construction the agencies looked at adding buses, park n ride lots, considered buying buses for WMATA, provided funding for communication devices for emergency management during construction, established crash team with total station surveying equipment for VSP to quicken accident investigations, funded emergency management programs for tow trucks, provided alternate routes information through media, contacted truckers to get them to use alternate routes during construction. The most important part is getting the word out to the public through newspapers, DMS, HAR etc so that they can make better decisions.
- Mr. Erenrich provided an overview of the Integrated Corridor Management (ICM) Initiative. The Maryland I-270 Corridor is one of the 8 pioneer ICM sites selected by FHWA. ICM on I-270 poses different issues because of the multi-modal, multi-jurisdictional nature of the corridor. All networks in the corridor are running at capacity. More coordination is required between the agencies. There is also a need to provide accurate, reliable real-time traveler information both pre-trip and en-route. The focus of the I-270 ICM effort is to use existing tools with some value-added additions to manage the existing transportation infrastructure and help the public make mode / route decisions.
- Mr. Letnaunchyn talked about traveler information in the Baltimore region and mentioned the study on travel times.
- Mr. Erenrich suggested adding more parking management and bus information. Mr. Meese asked if buses are redeployed in response to incidents. Mr. Erenrich responded the buses are redeployed but that it takes time to react. They don't have buses for MARC beyond Frederick. Having highway and transit co-located in the TMC is very helpful for communication. He also noted that the number of transit buses available to Ride On provides no elasticity for extending service during emergencies.
- Mr. Steeg noted that travel time and traveler info are different. It is essential to provide information that has meaning and at the right place and right time. For instance, most signs on I-66 are in the wrong place and hence are not very useful to the public. A related point was made that on I-66, the problem is the unpredictability of the congestion and traveler information is needed to help motorists make route choices.
- FTA limits the number of buses a transit system can have based on size of area. In response to a question whether the spare bus ratio is too low and needs to be changed, Mr. Erenrich responded that the federal policy is not necessarily an issue. The problem with extra buses is cost, money to buy and maintain, and there isn't enough space to store the buses when they are not in service.
- Mr. Letnaunchyn mentioned that on the express toll lanes being built in Baltimore, they are trying to provide comparative info on toll lanes and ordinary lanes. There is a need to present this info way ahead of time but the problem is the distance to

provide this information is very short. They are also looking at HAR to help traffic safety.

- Mr. Steeg noted that situational awareness is a big problem. There is little situational awareness for arterials. Over the years, a balance has been fine-tuned between interstate and arterials. He noted that coordinating highways and arterials is as much an issue as multi-modal coordination. In Virginia the operators contact traffic signal personnel during incidents. The biggest challenge is to get thousands of jurisdictions to get their information from CAD for incident notification. Jurisdictions have no incentive to provide information from CAD.
- A question was posed regarding jurisdictional boundaries: In considering operations between state boundaries and those of the MPO, which is the most challenging? Mr. Steeg responded that none of them have been problematic. MPOs have a broad and strategic perspective. There is a need to formalize the relationships and hence MATOC is important. There are ad hoc mechanisms but they are not necessarily consistent. Mr. Meese noted that there is rarely any kind of boundary and turf problems between agencies. Data is important. It is important to provide information to operator, public, freight shipper etc., so that they can make decisions at the right time. In fact, inter-modal is more difficult than inter jurisdictional (e.g., WMATA and MARC and Ride On don't always talk to each other).
- Mr. Erenrich noted that there are approximately 100,000 riders a day on Ride On. The buses are delayed in congestion. Hence, the County is looking at strategies such as queue jumping and traffic signal priority to facilitate schedule adherence.
- In response to a question regarding measurement and performance for multi-modal coordination, Mr. Steeg responded that the key is to measure similar parameters in a consistent manner. Delay is an important performance measure. We need a manageable number of performance measures that can be focused on. Managing expectations, reliability and feedback from public is important. We should be careful as to what we define as a performance measures which may be reliability, time to clear an accident, and duration. There is a need to provide the right information to people. Credibility is important.

Following is a synopsis of the discussion based on the Break-out Session questions posed by Mr. Meese.

Where are we now?

- Some successes, but there is more we can do. Many opportunities to take advantage of.
- Transit capacity limitations.

Where should we be?

- Need to provide information to enable people to make better decisions.
- Getting operations at the planning table is important.

- Operations activities such as developing a Concept of Operations is not necessarily understood at the senior executive level.
- Multi-modal coordination by mode and roadway functional classification is important.

How do we get there?

- We have done the planning, now time to act.

How do we measure progress?

- Need to develop 3-5 meaningful performance measures that are applicable regionally.
- Focus on reliability as a performance measure.

How does this discussion relate to the theme of the Summit?

- A regional view in regard to transportation operations is essential.
 - This will help use existing resources better.

SESSION F: INTEGRATING HOMELAND SECURITY AND TRANSPORTATION OPERATIONS

SESSION BACKGROUND

In the post 9/11 environment, the need for coordination and integration of homeland security and transportation operations is increasing. In August 2007, a new federal public law implementing recommendations of the 9/11 commission was enacted. The law authorizes and requires, among other things, the improvement and strengthening of communications interoperability for first responders, unified incident command during emergencies, critical infrastructure protection, and transportation security planning and information sharing. This law plus other directives continues to accentuate the need for increased coordination between transportation agencies and other agencies involved in homeland security, at the local, regional, state, and national levels.

Maryland, given its location next to the District of Columbia and along the heavily populated I-95 Corridor, has been a leader among states in organizing to provide enhanced homeland security. Maryland has also recognized that transportation is a key piece in the homeland security puzzle from at least several perspectives:

- Protecting critical infrastructure
- Improving evacuation planning and execution
- Attaining communications interoperability, including voice, 700 MHz, and CAD-RMS systems, with connections to transportation-related networks
- Adjusting commercial vehicle enforcement to focus more on security.

There have also been increasing requirements for training in the National Incident Management System (NIMS) among first responders, which includes transportation operations personnel. Other initiatives that include coordination between homeland security and transportation operations are currently underway in Maryland.

This session was facilitated by Mike Fischer of the Maryland Department of Transportation. Break-out session discussants were:

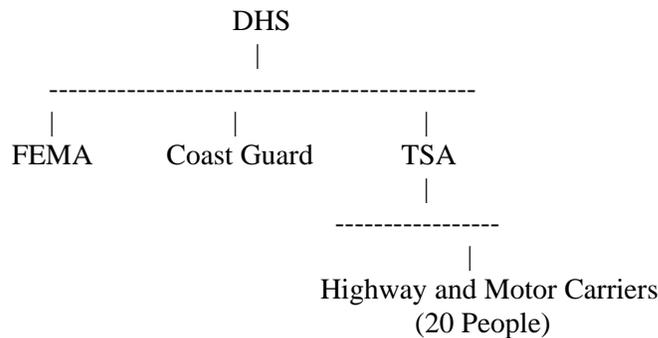
- Tom Henderson, Capital Wireless Information Net (CapWIN)
- Ray Cotton, Transportation Security Administration
- Rick Williams, Maryland Transportation Authority
- Earl Lewis, Maryland Transit Administration

Session notes were taken by Stan Young of the University of Maryland Center for Advanced Transportation Technology.

SESSION SUMMARY

Mr. Fischer kicked off the discussion by posing the following question: How do you balance the need for homeland security with an operationally efficient and safe transportation system?

- Mr. Cotton responded by first explaining the relationship between DHS and the TSA Highway and Motor Carriers Office (see diagram below).



- He noted that TSA alone cannot do much to enhance the security of the transportation infrastructure. TSA needs the support of State and local governments, as well as industry and the general public to thwart acts of terrorism. They can require and encourage state and local activities through the use of funding, grants, or regulation.
 - Examples of concerns his office addresses:
 - 1.2 million trucking companies and associated drivers
 - Thousands of bridges and tunnels to protect
 - 25,000 school buses carrying 500,000 children
 - The movement of hazardous goods along a highway requires a special endorsement on a commercial driver’s license. The list of hazardous materials is currently 4,000 items long. If a terrorist needed a vehicle to deliver a vehicle born improvised explosive device (VBIED) or to simply induce terror, a school

bus is a much easier vehicle to access. School districts may be hesitant to require any stricter guidelines on school bus drivers or systems due to increased costs.

- He provided an example of how his office would partner with States for security – Missouri has a pilot program to train inspectors to perform corporate security review of companies. Federal personnel trained the state personnel to properly inspect and establish the security vulnerability of the trucking companies’ operations. This volunteer program has resulted in several thousand assessments in Missouri, many more than federal personnel could have accomplished alone. The program is now being expanded.
- An example of partnering with existing processes – The FHWA requires bridge inspections every two years for most structures. TSA is partnering with states to include elements of a security review as part of the normal inspection process. Many safety concerns reflect directly on security concerns. Combining the inspection reduces duplication of effort.
- Issues with traffic Operations and Transportation in general: We need to level the Playing Field – Security must be institutionalized in the day-to-day procedures to be effective. If the processes that contribute to a more secure facility do not also contribute to other operational concerns, they will soon be abandoned. Security must be sold similar to safety – incorporated into all processes – not just tacked on.
- Mr. Lewis discussed security from a transit perspective, noting that transit presents an interesting challenge. Public transit is inherently an open system. Prior to 9/11, the primary security issues were vandalism and personal security related to the interaction of riders. Post 9/11, the security concerns were overlaid on the process. MTA received only one extra person, namely an executive manager, to deal with the increased security concerns.
- The challenge is to integrate new security processes and the new relationships that good security requires. Important aspects:
 - Transit riders must be included as eyes and ears of the system.
 - The organization must increase/enhance their preparedness to not only thwart threats, but deal with incidents when they occur.
- Mr. Henderson noted that the effectiveness of the mission of the Department of Homeland Security depends on/ or is predicated on interoperability. Although everyone (including National, State and Local agencies) agree on the concept, they all stumble in carrying it out.
 - All agencies aspire to interoperability, but budgets and processes are not prioritized to reflect the importance of interoperability.
 - Infrequency of major events that require interoperability plays against the “sense of preparedness” that is needed for major events.

- Interoperability tools need to be used on a day-to-day basis, not pulled out for special events.

Interoperability in communications encompasses voice, data, and eventually video. While data is coming along, interoperable voice systems are not quite there. Conventional systems tend to bog down due to the amount of traffic during major events. Interoperability suffers from a lack of a common vocabulary (though this is being addressed by NIMS). An example of this from the CapWIN development was the attempt to create a common data description of an incident from both the law enforcement perspective and the transportation perspective. The final solution was not to combine the events, but rather display both in context so that the human can easily identify it as a common event and pick out the necessary data from the various event descriptors.

Mr. Henderson noted that, generalizing from that experience, technology is rarely the solution in itself, only an enabler to a solution. Ultimately a human must discern and make decisions.

Mr. Williams noted that the basic objectives of Transportation and ITS can be at odds with security. Bridges and tunnels are constructed for uninhibited flow of traffic – which makes security extremely difficult. Surveillance offers a great example:

- All the cameras installed for ITS can theoretically be used for security. However, one of the basic premises of security is the storage of the video for 60 to 90 days for forensics. Most of the ITS systems in use can only store short segments of video. Not only do the technical systems lack sufficient storage capacities, the governing principles of ITS (not to be intrusive or use video for any purpose other than traffic management) are at odds with the philosophy of use of video for security.
- Balancing the needs of ITS and those of security becomes difficult, particularly if not addressed from the outset. Including all stakeholders in a project also means the security community. ITS systems currently have technology to monitor tunnels for stalled vehicles. These cameras are observed by civilian personnel to watch for traffic and safety obstructions. A security person watching the same video would provide the security aspect.
- The basic tools of security are guns (appearance of security) and fences (removal of access). Transportation facilities cannot be cordoned off with fences, so video surveillance is one of the chief deterrents available to exhibit a security presence.

The next question posed by Mr. Fischer was where do we need to go, and as a follow up, how do we get there?

- Mr. Lewis responded by listing the four tenets of security:
 - Protect;
 - Prevent;
 - Respond;
 - Recover.
- Technology can help us get where we need to go by:
 - Enhancing interoperability (data & voice)
 - Creating real-time access to critical data (video, records, etc.)

- Streamlining access control (or unified access control) to facilities and data
- Enhancing CCTV to create a visible random presence that deters threats.

- Mr. Williams noted that ITS and Security concerns should be merged and systems planned to provide for both. For examples, the Fort McHenry Tunnel serves 120 thousand vehicles per day. Automated license plate readers could be used both for security reasons as well as travel time analysis. Security and Transportation operations personnel should reside in the same building. Bridge security concerns should be served with existing cameras used for transportation operations. Ultimately this will require rebalancing of the privacy vs. security philosophy to accommodate Homeland Security issues.

- Mr. Henderson mentioned that funding ultimately drives priorities. The federal government can lead by prioritizing how grants and other funds must be allocated.

- Transportation operations can't be sacrificed or compromised for the sake of security. Security must be integrated into the existing system, on a day-to-day operations process. Like safety, it is never a final goal or an accomplished mission, but addressed in day-to-day operations, planning and policy. Electronic systems must support day-to-day activities as well as emergency situations involving multiple jurisdictions. If the tools are not used on a day-to-day basis, they most certainly will not be used in emergencies.

- One issue that we must continue to keep in mind is that legacy systems are always with us and we need to engineer new or related systems with this in mind. Improvements are incremental in nature, not wholesale changes.

- Mr. Cotton noted that interoperability is key. Federal agencies have the same interoperability problems as the states and locals.

Key efforts and legislation include:

- Transportation Workers ID Card
- Real ID ACT
- Domain Awareness through highway surveillance and fusion of data
- Layered security approaches
- Education

Mr. Fischer added that key technology benefits expected in the near term include:

- iCCTV (intelligent CCTV which includes some level of automated monitoring)

- CAD-RMS (Computer-aided Dispatch and Records Management Systems)

- Improved Interoperability

In summary, the major themes of the discussion were:

- Video cameras are the main tool for enhanced security of the transportation infrastructure. Sharing video infrastructure between Transportation Operations and

Security requires early planning and understanding the needs of both, otherwise a clash of policies may ensue.

- The federal government can encourage security enhancements through prioritization of funding and education.
- Security procedure and tools need to be incorporated and contribute to day-to-day operations – otherwise they will not be effective during emergencies.
- Technology can support solutions, but they are not solutions in themselves.

CLOSING SESSION: REPORT BACK AND WRAP UP

The closing session involved a brief “report back” from each of the break-out session facilitators followed by a “wrap up” by Mr. Doug Rose of the Maryland State Highway Administration.

SESSION A: MANAGING CONGESTION AND PLANNING FOR OPERATIONS

RAJA VEERAMACHANENI SUMMARY REMARKS

Mr. Veeramachaneni opened his summary remarks by noting that Maryland is NOT going to put up with congestion anymore. Key highlights of his session were noted as follows.

- We need to better define what is meant by level of congestion.
- The “standard” as to what constitutes congestion varies by area (e.g., rural vs. urban)
 - We need to focus more on measures that emphasize travel reliability
 - We need to figure out how to communicate these measures with our customers
- The traditional transportation planning process is defined over a long time horizon (20-30 years) whereas planning for operations is done with the next few months in mind. We need to figure out a way to link these horizons.
- We must keep management of human error in mind as we plan and build our transportation systems.
- We need to expand our emphasis of traffic incident beyond highways to arterials and look at incident management from a “system level”.
- Providing traditional capacity enhancements (e.g. lane additions) is becoming more challenging as we don’t have the right-of-way. Operations improvements will be critical to addressing congestion.
- Finally, we need champions to focus on the issue of planning and operations.

SESSION B: INCIDENT AND EMERGENCY MANAGEMENT

ALVIN MARQUESS SUMMARY REMARKS

Following are the highlights of the session discussion and outcomes:

- *Advertise Maryland Move IT! Law* – Maryland has a Move It! law but it is not widely known by Maryland motorists. Marketing efforts should be increased.

- *Command Vehicles* – We need policies in place to better utilize command vehicle resources. We also need better regional procedures for using these resources.
- *Standard Policy for Towing Across State* – concerns related to tower liability can reduce the effectiveness of quick clearance policies. Legislation should be passed that would exempt towers from liability for services performed at incident scenes at the direction of the Incident Commander (except for gross negligence).
- *Slow Down/Move Over law* – These laws require motorists to slow down and move over when approached by response vehicles responding to an incident. Forty-one (41) states have these laws but only 24 have included towers. The group felt that including towers was important and should be pursued.
- *Safety Clothing Laws* – As of November 24, 2008 all traffic incident management responders will be required to wear ANSI approved high visibility safety garments.
- *Multi-day Incident Training* – Training is done for large scale incidents and evaluations, but rarely is training conducted for multi-day incidents like the tornado in LaPlata.
- *After Action Reviews* – In order for After Action Reviews to be effective, all participants that responded to the incident need to be completely **honest** about what happened during the incident and **open to constructive criticism**.
- *Specific Traveler Information for Motorists* – In the future, it would be great if motorists could go to a web site and select specific travel information they want for specific times of day. Then, that information could be e-mailed to them daily. Thus, they could receive information about their rush hour travel routes as they are ready to leave for home or the office.

SESSION C: IMPROVING TRAVEL SAFETY THROUGH OPERATIONS

TOM HICKS SUMMARY REMARKS

Following are the highlights of the session discussion and outcomes:

- More enforcement is needed on our roadways to promote safer driving practices. This includes automated enforcement;
- Safety programs should not suffer due to lack of funds;
- Maintaining safety and mobility in work zones is extremely important to maintain the LOS of the transportation system;
- Improvements to our transportation system need to be pedestrian and bicycle friendly;

- The urgency to produce safety related information/documentation needs to be revisited (e.g., placing key safety information in the Motor Vehicle Administration Driver's Handbook);
- Public information and education programs are important. These programs need to target drivers of all ages. Education that promotes safer practices while changing modes of transportation should also be considered; and
- Safety programs need to address all modes of transportation.

SESSION D: SYSTEMS INTEROPERABILITY AND PROVIDING PUBLIC INFORMATION

GLENN MCLAUGHLIN SUMMARY REMARKS

Following are the highlights of the session discussion and outcomes:

Where is Maryland Now?

- In the area of systems interoperability and providing public information in Maryland, the consensus appears to be that incremental progress is being made, albeit many would say the progress is not as fast as it could or should be.
- There are a number of existing collection, management, and information dissemination mechanisms in place; however, there are significant data/information issues that must be addressed:
 - Coverage
 - Temporal
 - Quality
 - Types
 - Sources
 - Security
 - Data Archiving
 - Various Audiences
 - Lack of well defined roles for the public and private sector

Where Should We Be?

- We need more detailed / proactive and complete information tailored and delivered to the end user. For example, Maryland should be aiming for the provision of pre-trip and en-route traveler information that includes real-time decision support for choosing alternative routes (including arterials) and alternative modes.
- There needs to be a robust relationship between the private sector and public sector along with well defined roles for delivering specific types of services to end users based on needs.
- From a systems interoperability / data exchange perspective, we have extremely thorough multi-modal and regional "situational awareness".

How Do We Get There?

- There is no one owner of the problems/issues that have been identified (and that have been around for a long time). Given the many players involved, a collaborative approach to addressing the issues is required.
- While the previous bullet notes the need for collaboration amongst players, it was also mentioned that there needs to be a champion to push to get us where we need to go and to have implemented the paradigm shifts that will likely be required in order to be successful.
- We need to define detailed objectives of what we want to see accomplished and use these objectives to further define the roles of the public and private sector.
- From an operations perspective, operations agencies already collect data for their operational needs. What operational needs are not being addressed by current data collection capabilities (e.g., travel times)? Are there multi-modal operational opportunities that can be exploited?

How do We Measure Progress?

- Ultimately, we will know if we are successful if the public gets the traveler information they want and they are satisfied with it. From a private perspective, it's as simple as: are people satisfied enough to the point they are willing to pay for it?

SESSION E: REGIONAL AND MULTI-MODAL COORDINATION

ANDREW MEESE SUMMARY REMARKS

Following are the highlights of the session discussion and outcomes:

Where are we now?

- Some successes, but there is more we can do. Many opportunities to take advantage of.
- We must deal with highway and transit capacity limitations.

Where should we be?

- Need to provide information to enable people to make better decisions.
- Getting operations funding on the table with capital funding is important.
- Operations activities such as developing a Concept of Operations is not necessarily understood at the senior executive level.
- Multi-modal coordination by mode and roadway functional classification is important.

How do we get there?

- We have done the planning, now time to act.
- Build on I-270 Integrated Corridor Management ConOps to get planning and operations together.

How do we measure progress?

- Need to develop 3-5 meaningful performance measures that are applicable regionally.
- Focus on reliability as a performance measure.

How does this discussion relate to the theme of the Summit?

- A regional view in regard to multi-modal transportation operations is essential.
 - This will help use existing resources better.

SESSION F: INTEGRATING HOMELAND SECURITY AND TRANSPORTATION OPERATIONS

MIKE FISCHER REMARKS

Following are the highlights of the session discussion and outcomes:

- Need to balance need for security with need for system efficiency. Video cameras are the main tool for enhanced security of the transportation infrastructure. Sharing video infrastructure between Transportation Operations and Security requires early planning and understanding the needs of both, otherwise a clash of policies and operational issues may ensue.
- Need to provide domain awareness:
 - Preventative pressure;
 - Responders need to know what they are responding to;
 - Need to be able to manage incident scene remotely;
 - Need interoperable systems to share data/information;
 - Need to be able to archive information from incidents.
- The federal government can encourage security enhancements through prioritization of funding and education.
- Security procedure and tools need to be incorporated and contribute to day-to-day operations – otherwise they will not be effective during emergencies.
- Technology can support solutions, but they are not solutions in themselves.
- Must account for legacy systems – they are always with us and we need to use them.



- We need to move forward incrementally....we can't build the ultimate solution all at once.
- How do we measure success? Every day that we don't have an event/incident is success.

MARYLAND TRANSPORTATION OPERATIONS SUMMIT WRAP UP

DOUG ROSE REMARKS

Mr. Rose thanked all the facilitators for their summaries noting that he heard at least a dozen potential action items that potentially could result from the break-out sessions. He also thanked the discussants and session participants for their hard work and excellent input.

Mr. Rose went on to provide a summary of key themes that he noted during the morning sessions:

- Building our way out of congestion is NOT an option – we need to work together to develop innovative tools & strategies to optimize our infrastructure and improve safety and mobility for all travelers.
- We need to include operations in our planning processes and we need a more collaborative approach between planners and operations staff in these processes.
- Safety is a top priority – we need to use operations to reduce fatalities.
- Traveler information has great possibilities for return on investment...we need to move forward with 511 and travel time on DMS and look for other opportunities.
- Staff training for operations is critical.
- System maintenance is a critical challenge- one we cannot fail to meet.
- We need a “NEW mindset” in working together to figure out innovative ways to pay for transportation operations and infrastructure – including keeping the existing system in a state of “good repair”.
- We need to include operations staff when deploying technology – their operational needs must drive technology use, not the other way around.
- We need to assess our organization using the framework developed to assess organizations for operations. Based on the assessment, we can figure out how to move to the next level of operations maturity.

In closing, Mr. Rose noted that, overall, the concept of management and operations is well appreciated in Maryland. We don't need to be sold on it, but we do need to do more. However, as we move forward, we can't do so in a vacuum – open, frequent, and timely communication is the key. And continuing to build relationships between all operational areas IS A MUST!



Overall, he thought the MTOS was very successful. He encouraged everyone to provide feedback to a web-based evaluation that they would be receiving shortly. Should the MTOS be an annual event? Again, he encouraged the participants to let him know through the survey. He also noted that a post-Summit summary of proceedings/white paper would be available within 2-3 months.



APPENDIX – A

MARYLAND TRANSPORTATION OPERATIONS SUMMIT PROGRAM

Douglas Rose, Deputy Administrator/ Chief Engineer for Operations, Maryland State Highway Administration, Presiding

7:30 – 8:00	Registration and Breakfast	
8:00 – 8:30	Welcome	<i>Auditorium</i>
	<ul style="list-style-type: none"> • The Honorable Beverley Swaim-Staley, Deputy Secretary, Maryland Department of Transportation 	
8:30 – 9:30	Plenary Session #1: Operations from a Leadership Perspective	
	Moderator: Deputy Secretary Swaim-Staley	<i>Auditorium</i>
	Presenters:	
	<ul style="list-style-type: none"> • Neil Pedersen, Administrator, Maryland State Highway Administration • Paul Wiedefeld, Administrator, Maryland Transit Administration • Randolph Brown, Director of Operations, Maryland Transportation Authority • Jeffrey Paniati, Executive Director, Federal Highway Administration 	
9:30 – 9:45	Break	
9:45 – 10:45	Plenary Session #2: Operations from a Management Perspective	
	Moderator: Michael Zezeski, Maryland State Highway Administration	
	Presenters:	<i>Auditorium</i>
	<ul style="list-style-type: none"> • Richard Steeg, Virginia Department of Transportation • Beverly Hill, Maryland Transit Administration • Richard Dye, Maryland State Highway Administration 	
10:45 – 11:15	Special Session: Congestion Management	<i>Auditorium</i>
	<ul style="list-style-type: none"> • The Honorable James Simpson, Administrator, Federal Transit Administration 	
11:15 – 12:00	Panel Discussion: Assessing Operations Maturity	<i>Auditorium</i>
	<ul style="list-style-type: none"> • Philip Tarnoff, University of Maryland • Stephen Lockwood, PB Consult 	
12:00 – 1:30	Lunch – The dining room is located in Building 2. Please take your lunch ticket with you.	

1:30 – 3:00

Break-out Sessions

A: Managing Congestion and Planning for Operations – Room A302

- Facilitator: Raja Veeramachaneni, Maryland State Highway Administration

B: Incident and Emergency Management – Room A111

- Facilitator: Alvin Marquess, Maryland State Highway Administration

C: Improving Travel Safety Through Operations – Room A303

- Facilitator: Tom Hicks, Maryland State Highway Administration

D: Systems Interoperability and Providing Public Information – Room A304

- Facilitator: Glenn McLaughlin, Maryland State Highway Administration

E: Regional and Multi-Modal Coordination – Room A305

- Facilitator: Andrew Meese, Metropolitan Washington Council of Governments

F: Integrating Homeland Security and Transportation Operations – Room A307

- Facilitator: Michael Fischer, Maryland Department of Transportation

3:00 – 3:15

Break

3:15 – 4:30

Closing Session: Report Back and Wrap-Up

Auditorium

APPENDIX – B

ATTENDEE SURVEY RESULTS SUMMARY

1. Overall, the Operations Summit met my expectations and was worth my time.						
	Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree	Response Count
Please rate your opinion.	20.5% (15)	52.1% (38)	12.3% (9)	12.3% (9)	2.7% (2)	73

2. The Operations Summit Conference should be an annual event.						
	Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree	Response Count
Please rate your opinion.	31.5% (23)	45.2% (33)	19.2% (14)	4.1% (3)	0.0% (0)	73

In response to making the MTOS an annual event most participants agreed that an annual event would be beneficial and encouraged the interaction between the various agencies that attended. Samples of other feedback provided included having a similar event in DC or have a DC representative participate, involve topics of interest to law enforcement and first responders, and have a way to report the status of forward movement in problematic areas discussed during the MTOS.

3. I thought the overall length of the Operations Summit was:			
			Response Count
Just Right		74.3%	52
Too Long		10.0%	7
Too Short (could have been 1.5 - 2 days)		15.7%	11



4. What topics would you suggest be included in a future conference such as this?	Response Count
	41

The numerous responses given to what topic would you suggest be included in a future conference such as the MTOS included some of the following. Opening a session for cargo/freight/commercial vehicles, strategic development on how to increase communication between MDOT and first responders as well as the coordination between local/state and agencies/jurisdictions, developing a unified incident response plan including cross agency training. Homeland security, emerging technologies, and evacuation preparedness issues were also provided.

5. Any suggestions or comments based on your overall experience at this conference? Please identify any memorable highlights of the program.	Response Count
	34

When respondents were asked to provide feedback or identify a memorable highlight they offered the following suggestions. Facilitators and speakers did a great job in the afternoon sessions, would have liked to attend more than one break-out session, the variety of issues and speakers were great and the break-out sessions should have been longer.

6. Any suggestions or comments on the conference location and facilities?	Response Count
	48

In response to the facilities, the majority provided outstanding feedback praising not only the location but the facility, availability of parking as well as the food. Some other suggestions included maybe rotating the location around the Washington, D.C. Metropolitan region, using community college facilities, and having better coffee.

7. Overall, I thought the morning sessions did a good job of conveying the status and challenges associated with Operations in Maryland.							
	Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree	Did Not Attend	Response Count
Please rate your opinion.	20.3% (14)	49.3% (34)	17.4% (12)	4.3% (3)	7.2% (5)	1.4% (1)	69

When asked if the morning sessions succeeded in conveying the status and challenges associated



with operations in Maryland, participants provided the following feedback. The majority agreed that the status and challenges were conveyed and discussed at length; some participants said this topic could have been a lot shorter. Others suggested using PowerPoint presentations where the slides could have been handed out or emailed to participants and including in this discussion the operations of airports and seaports.

8. Please rate the quality of Plenary Session #1 “Operations from a Leadership Perspective” moderated by the Deputy Secretary with MDOT Modal Administration and FHWA Executive Director as speakers.							
	Exceeded Expectations	Above Average	Average	Below Average	Poor	Did Not Attend	Response Count
Please rate your opinion.	7.7% (5)	41.5% (27)	32.3% (21)	4.6% (3)	4.6% (3)	9.2% (6)	65

When asked to provide a rating for the Plenary Session #1, participants remarked: would like to have heard about identifying opportunities for modal cross connects, the speakers and session were great, and the discussion about the future goals and needs was great.

9. Please rate the quality of Plenary Session #2: “Operations from a Management Perspective”.							
	Exceeded Expectations	Above Average	Average	Below Average	Poor	Did Not Attend	Response Count
Please rate your opinion.	7.5% (5)	28.4% (19)	41.8% (28)	7.5% (5)	4.5% (3)	10.4% (7)	67

Participants provided the following feedback to the quality of Plenary Session #2. Concentrate on less management and more front line discussion, needed more details, good representative panel, good discussion on regional coordination/communication, and the panel was more interesting as they addressed the issues that we may be able to fix.

10. Please rate the quality of the Special Session: “Congestion Management”.							
	Exceeded Expectations	Above Average	Average	Below Average	Poor	Did Not Attend	Response Count
Please rate your opinion.	9.2% (6)	41.5% (27)	27.7% (18)	1.5% (1)	0.0% (0)	20.0% (13)	65

The Special Session: Congestion Management received an above average rating and participants provided the following feedback. Simpson was good and his message was very relevant, this should be a regular topic of the summit and should include congestion management of overcrowded buses, trains, etc., excellent discussions, statistics were informative. This was the most refreshing speech I have attended in a very long time - relevant, honest, and funny but sincere. I take my hat off to the Administrator. James Simpson of the FTA came to “lay it on the line” and succeeded.

11. Please rate the quality of the Panel Discussion: “Assessing Operations Maturity”.							
	Exceeded Expectations	Above Average	Average	Below Average	Poor	Did Not Attend	Response Count
Please rate your opinion.	12.3% (8)	24.6% (16)	30.8% (20)	9.2% (6)	3.1% (2)	20.0% (13)	65

The following feedback was provided for the average rating of the Panel Discussion: Assessing Operations Maturity.” While the presentation was commended for being good, some participants expressed that this topic was irrelevant, theoretical, confusing, and way over many people’s heads. Others noted that it was fascinating, the speakers were exceptional; it was obvious they came to encourage thinking outside the box, and maybe if examples from multiple disciplines were given it might have been helpful.

12. Please indicate which afternoon break-out session you attended:	
	Response Percent (response count)
Managing Congestion and Planning for Operations facilitated by Raja Veeramachaneni, Maryland State Highway Administration.	10.4% (7)
Incident and Emergency Management facilitated by Alvin Marquess, Maryland State Highway Administration.	14.9% (10)

Improving Travel Safety Through Operations facilitated by Tom Hicks, Maryland State Highway Administration.	20.9% (14)
Systems Interoperability and Providing Public Information facilitated by Glenn McLaughlin, Maryland State Highway Administration.	19.4% (13)
Regional and Multi-Modal Coordination facilitated by Andrew Meese, Metropolitan Washington Council of Governments.	10.4% (7)
Integrating Homeland Security and Transportation Operations facilitated by Michael Fischer, Maryland Department of Transportation.	13.4% (9)
Did not attend an afternoon break-out session.	13.4% (9)
Total responses	67

13. The afternoon break-out session I attended met my expectations and was worth my time.						
	Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree	Response Count
Please rate your opinion.	34.5% (20)	41.4% (24)	13.8% (8)	8.6% (5)	1.7% (1)	58

14. The format of my afternoon break-out session generated audience participation.						
	Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree	Response Count
Please rate your opinion.	43.9% (25)	31.6% (18)	12.3% (7)	10.5% (6)	1.8% (1)	57

The following was provided in response to whether the format of the afternoon break-out sessions generated audience participation. Would have been better to have broken up into smaller groups and discussed particular questions and brought it back to the group for peer discussion. It was a good discussion despite trying to staying on target, this was an excellent session and being able to freely participate provides a better understanding with a smaller group. Definitely could have used some more time (with a short break in the middle).

15. Did you like the format of your afternoon break-out session?		
	Response Percent	Response Count
Yes	91.2%	52
No	8.8%	5
	Total Responses:	57

The following feedback was provided about the format of the afternoon break-out sessions. Some participants would have liked to see more interaction/exchanging of ideas among attendees, others would have liked to have more time to further discussions, and one participant suggested letting attendees choose more than one session to attend.

16. What topic(s) would you suggest be included in a future break-out session?	Response Count
	25

When asked for a suggested topic for a future break-out session, participants provided the following feedback. Less management, more topics dedicated to front line people, the Maryland strategic highway safety plan, signal operations, more on managing long-term incidents in the NIMS/ICS environment, discuss security and how all transportation modes are affected by terrorism, and future plans for furthering operational practices.

17. Please rate the quality of the Conference Auditorium:						
	Exceeded Expectations	Above Average	Average	Below Average	Poor	Response Count
Please rate your opinion.	35.3% (24)	50.0% (34)	14.7% (10)	0.0% (0)	0.0% (0)	68

The following feedback was provided on the quality of the conference auditorium. Very comfortable, easy to hear, no view is obstructed, sound quality is good, and there is really not a bad seat in the auditorium at the Maritime Institute.

18. Please rate the quality of the lunch facility:
--

	Exceeded Expectations	Above Average	Average	Below Average	Poor	Response Count
Please rate your opinion.	47.0% (31)	43.9% (29)	9.1% (6)	0.0% (0)	0.0% (0)	66

When asked to provide feedback on the quality of the lunch facility the responses included: Excellent, buffet tables always exceed expectations, clean and efficient service, very nice atmosphere for an event such as this one, the management of the facility is professional grade, and more signage directing the group would have been helpful.

19. Please rate the quality of the lunch food:						
	Exceeded Expectations	Above Average	Average	Below Average	Poor	Response Count
Please rate your opinion.	49.2% (32)	33.8% (22)	16.9% (11)	0.0% (0)	0.0% (0)	65

When asked to provide feedback on the quality of the lunch food the responses included: Excellent, variety and quality of the food was excellent, would have like to have seen more spices and condiments available, incredible selection, good quality foods, and the quality of the roast beef at the carving station was too fatty.

20. Please rate the quality of your break-out session room:						
	Exceeded Expectations	Above Average	Average	Below Average	Poor	Response Count
Please rate your opinion.	10.3% (6)	32.8% (19)	50.0% (29)	5.2% (3)	1.7% (1)	58

The following feedback was provided on the quality of the break-out rooms. Overall nice facility, would have liked to have tables so note taking would have been easier, and would have liked to have the panel in front of the audience instead of mixed in with audience.

APPENDIX – C

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2008 Maryland Transportation Operations Summit Attendee Summary

Registered Attendees	303
Final Attendees	264
Registered, but did not attend	55
Walk-on registrants	16

Agency/Company	Attendees
AAA	2
Andhra Pradesh Transportation Department	10
Anne Arundel County	1
Anne Arundel County - Traffic	3
ARINC	2
B.W. Zimmerman & Associates	1
Baltimore City DOT	1
Baltimore Metropolitan Council	2
Calvert County Transportation	1
Carroll County, DPW	2
City of Alexandria	3
City of Annapolis	2
City of Baltimore	1
City of Baltimore, Dept of Transportation	1
City of Fairfax, DPW	1
City of Salisbury	1
Daniel Consultants	3
Delcan	1
District Department of Transportation	7
DMJM Harris	1
DPW&T	1
DPW&T- STS Transportation	1
E-Squared Engineering	1
Federal Highway Administration	8
Federal Transit Administration	3
FHWA - Office of Operations	3
FHWA DelMar Division	2
Frederick County, MD	1
Green's Garage	1
Harford County	1
Harford County Emergency Operations	1
He Delivers International, Inc.	1
Howard County Traffic Engineering Division	1
I-95 Corridor Coalition	1
IBI Group	1

Agency/Company	Attendees
Jacobs	1
Maryland Aviation Administration	1
Maryland Department of the Environment	1
Maryland Department of Transportation	4
Maryland Department of Transportation - TSO	1
Maryland Emergency Management Agency	3
Maryland Highway Safety Office	2
Maryland Motor Truck Association	1
Maryland Port Administration	1
Maryland State Highway Administration	35
Maryland State Highway Administration - CHART	1
Maryland State Highway Administration - District 4	2
Maryland State Highway Administration - OOTS	2
Maryland State Police	29
Maryland State Police - Waterloo Barrack	1
Maryland State Police Commercial Vehicle Enforcement Division	1
Maryland Transit Administration	3
Maryland Transportation Authority	6
Maryland Transportation Authority Police	10
Meridian Environmental Technology	1
Montgomery County DPWT	1
Montgomery County Police Department	1
Montgomery County Transit - Ride On	2
Morgan State University	4
Motion Maps, LLC	1
MSU National Transportation Center	1
MWCOG	4
National Park Service	1
North Carolina Department of Transportation	1
Open Roads Consulting Inc	1
Parsons Brinckerhoff	3
PBS Rentals of MD	2
PBS&J	1
Pennsylvania Turnpike Commission	5
Potomac Crossing Consultants	1
Prince George's County	1
Prince George's County DPW&T	3
Prince George's County OEM	1
Prince George's County Police Department	2
RAM Consulting Corporation	1
RK&K	2
Sabra, Wang & Associates, Inc.	1
SAIC	1
Sensys Networks	1

Agency/Company	Attendees
Telvent Farradyne	12
The Louis Berger Group	4
Towing & Recovery Professionals of Maryland	2
Traffic.com, Inc.	1
Transit Riders Action Council of Metropolitan Baltimore	1
Transportation Security Administration	1
University of Maryland	3
University of Maryland CATT	6
URS Corporation	1
US DOT/FMCSA	1
VHB, Inc.	1
Virginia Department of Transportation	3
Whitman Requardt & Assoc./MdTA	1
WMATA	5
Woodrow Wilson Bridge Project	1