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**Federal Highway
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TMCUpdate

TRANSPORTATION MANAGEMENT CENTER POOLED FUND STUDY

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HOW TO JOIN

Agencies may join the TMC Pooled Fund Study at anytime during the year by committing funds at a level agreed upon by existing participants in the study. The TMC pooled fund study was approved for 100 percent State Planning and Research Program funding. Any noncommercial agency or organization that is responsible for the management and operation of any portion of the surface transportation system is welcome to participate.

State transportation agencies interested in joining the TMC Pooled Fund Study can submit funding commitment online at the Transportation Pooled Fund Program web site at: <http://www.pooledfund.org>. (see Solicitation No. 870; SPR-2(207))

Other agencies should complete and submit the TMC Pooled Fund Study commitment form downloadable at the TMC Pooled Fund Study web site at: <http://tmcdfs.ops.fhwa.dot.gov>.

Highlights of 2007 Annual Meeting

The Transportation Management Center (TMC) Pooled Fund Study held its 2007 Annual Meeting on August 14-15 in Irvine, California. 28 practitioners from 20 participating agencies met at the Hyatt Regency Irvine Hotel to discuss the TMC Pooled Fund Study business. The two-day meeting featured:

- ❖ Progress and status report on current and future projects
- ❖ Membership strategy discussion
- ❖ Roundtable information sharing and discussions on members' experiences, upcoming plans, and questions
- ❖ FHWA TMC-related road weather management activities
- ❖ FHWA Freeway Management Program Plan and Roadmaps
- ❖ FHWA Safety R&D Program initiatives
- ❖ FHWA Office of Research, Development, and Technology activities
- ❖ TMC Tours:
 - Caltrans District 12 (Orange County) TMC
 - City of Anaheim TMC
 - Caltrans TMC Training Facility
 - Caltrans Los Angeles Regional TMC



Annual Meeting Participants



Caltrans District 12 TMC

Cathy McGhee, Virginia DOT, was elected as a new co-chair for the study. Members thanked Dave Kinnecom, Utah DOT, who had served as a co-chair for the past three years, for his leadership and contribution to the study.

Plans for the 2008 annual meeting, scheduled for July or August in Nashville, Tennessee, are under way. Meeting information will be posted

on a later day on the TMC Pooled Fund Study Web site (<http://tmcdfs.ops.fhwa.dot.gov>). ■

Feature Article: TMC Staffing and Scheduling for Day-to-Day Operations

The efficient operation of a TMC depends on the effective management of human resources. Past developments in staff planning and scheduling systems used to support the day-to-day operations of TMCs have been limited. Effective staffing and scheduling require that TMCs determine the appropriate number of employees needed to meet service demands from consumers and that the employees possess the attributes necessary to perform their work successfully.

Generating employee schedules and staffing plans requires TMCs to overcome a variety of challenges. Often, TMCs must reconcile conflicting requirements and constraints placed on staffing and scheduling systems:

- Budget constraints
- Employee preferences
- Differences in employee skills and performance levels
- Government regulations
- Workspace constraints
- Organizational policies
- Varying consumer demand

At times, a TMC may have too few employees or employees without the necessary training, causing poor service, frustrated consumers, overworked employees, and low morale. Having too many employees, on the other hand, causes financial losses and may also reduce morale if employees are not assigned enough work. Demand analysis is a technique used to translate an anticipated pattern of work (e.g., level of congestion, number of incidents, volume of calls) into work demands. Through short-term planning, the work demands can be used to determine employee scheduling requirements. Through long-term planning, the work demands can be used to determine employee staffing requirements.

The TMC Pooled Fund Study developed the *TMC Staffing and Scheduling for Day-to-Day Operations* project to create two resources for managers, supervisors, human resources personnel, and private contractors who are responsible for work analysis, scheduling, and staff planning decisions in TMCs. The first resource is a technical document that provides guidance, useful strategies, suggested approaches and techniques, and recommended practices to ensure that

TMCs make effective staffing and scheduling decisions. The second resource is a scheduling tool that automates three of the scheduling procedures described in the technical document.

The technical document is designed to meet the varied demands of TMC employees, appreciating the assorted needs and backgrounds of potential readers. Readers may use the technical document as an educational tool to increase their understanding of work analysis, scheduling, and staff planning. Or, they may use it as a reference, consulting relevant chapters as questions arise. The technical document may also be used as a starting point from which to investigate a topic with additional resources. Finally, the technical document may be used as source material to develop a training program.

Contents of the TMC Staffing and Scheduling for Day-to-Day Operations Technical Document

- Chapter 1: Introduction and Overview
- Chapter 2: Work Analysis
- Chapter 3: Scheduling Practices
- Chapter 4: Introduction to Shiftwork
- Chapter 5: Strategies for Employees
- Chapter 6: Strategies for Employers
- Chapter 7: Staff Planning
- Appendix A: Arizona TMC Case Study
- Appendix B: Operator Certification Test
- Appendix C: Shift-Supervisor Certification Test

This document provides a foundation for conducting work analysis, scheduling, and staff planning. Readers with little knowledge of or experience with work analysis, scheduling, and/or staff planning would be well advised to read all chapters related to their specific needs, and potentially the entire document to gain a full understanding of how the different human resource decisions are related and support each other.

Many readers will not need to read the entire document, especially if they already possess substantial knowledge of or experience with work analysis, scheduling, and/or staff planning. The layout of the technical document was developed to provide an easy-to-use reference. Each chapter covers a single topic, but is comprised of multiple sections to facilitate searches for information. It is anticipated that the primary function of the technical document will be to provide methods for creating a schedule.

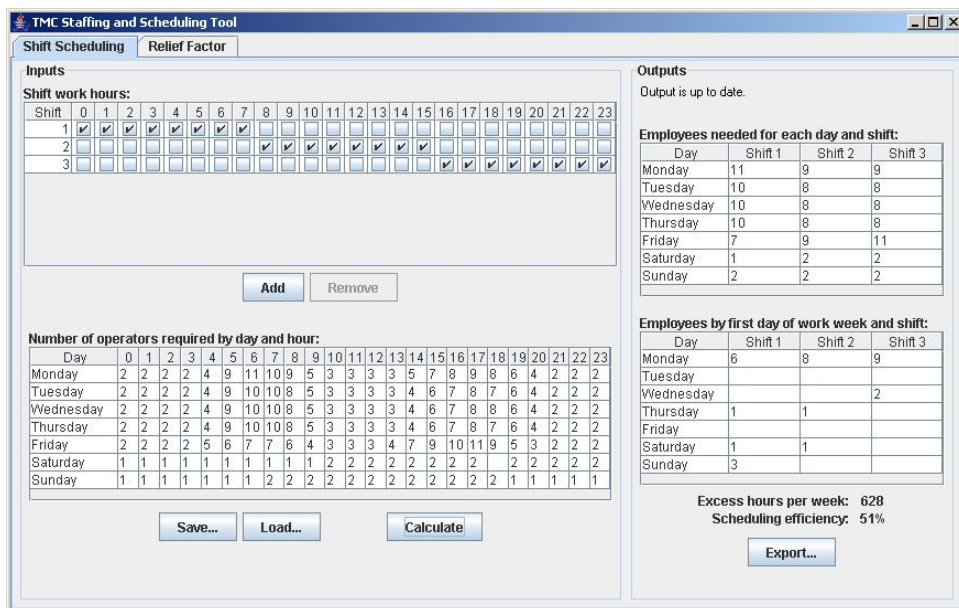
In addition, content from this document may be used to create a training program for TMC employees. Specifically, it is anticipated that Chapter 4 on Shiftwork and Chapter 5 on Strategies for the Employee may be used to offer TMC employees guidance, recommendations, and suggestions to facilitate their adjustment to work schedules, especially employees who work nontraditional hours (e.g., evening shift, night shift).

This technical document was specifically designed for TMCs in the United States and Canada. The primary audience includes managers, supervisors, human resource personnel, and private contractors who are involved with or responsible for work analysis, scheduling, and/or staff planning decisions within a TMC. Although not the target audience of the technical document, other TMC employees may find sections of the document relevant to their jobs and in their personal lives. The technical document consolidates and integrates information from a variety of resources, including scientific research and past Federal Highway Administration publications, into a single source that is accessible to practitioners.

The accompanied TMC Staffing and Scheduling Tool automated three of the manual scheduling procedures described in the technical document: shift scheduling, days-off scheduling, and the calculation of the relief factor. The tool allows users to define any number of shifts of any duration to which personnel can be assigned. The tool also allows users to enter the amount of demand (in terms of the number of operators required) for each hour of each day over a one week planning horizon. The data that users input into the scheduling algorithms is easy to modify to assess how changes in demand affect employee schedules.

The shift scheduling algorithm assigns employees to shifts with variable start times to cover the forecasted demand. A demand analysis can be used to forecast the amount of demand. The days-off scheduling algorithm assigns employees to a five-on/two-off work week based on the number of employees required each day. The number of employees required each day can be derived from the output of the shift-scheduling algorithm.

The schedules generated by the program may be exported from the program and saved for later use. Not only are both of the scheduling algorithms easy to use, both algorithms have been found to generate efficient schedules in comparison to other scheduling methods, under a variety of conditions. To evaluate the quality of each schedule generated by the tool, two numeric assessments are provided in the output: the number of excess hours per week and the scheduling efficiency. The number of excess hours per week is equal to the number of employee hours scheduled in excess of those needed to satisfy the specified demand, which is an assessment of the amount of overstaffing.



TMC Staffing and Scheduling Tool

Scheduling efficiency is the ratio of the number of employee hours required to the number of employee hours scheduled. A 100% scheduling efficiency (peak efficiency) is ideal; values less than 100% indicate overstaffing, and values greater than 100% indicate understaffing.

The tool also calculates the relief factor, or average overcoverage percentage, which indicates the number of employees that are required to cover a group of positions after accounting for employee absences (e.g., vacation days, sick leave) and other relief days (e.g., training days).

The technical document, tool, support documents, and associated outreach materials can be accessed through the TMC Pooled Fund Study maintained project webpage at http://tmcdfs.ops.fhwa.dot.gov/cfprojects/new_detail.cfm?id=63&new=2.

Quarterly Progress Report

Ongoing TMC Pooled Fund Study projects are briefly described in the following paragraphs. A complete quarterly project progress report is available on the TMC Pooled Fund Study Website (<http://tmcdfs.ops.fhwa.dot.gov>).

"Developing and Using Concept of Operations in Transportation Management Systems"

Purpose: Develop a document that describes the need for a concept of operations for a transportation management system and provides technical guidance and recommended practices for developing and using a concept of operations throughout the system's life cycle.

Champion: Manny Agah, Arizona DOT

Status: Final deliverables are undergoing 508 compliance review in preparation for web posting

Completion Date: Fall 2007

Contact: Emiliano Lopez: 410-962-0116;
emiliano.lopez@fhwa.dot.gov

"Transportation Management Center Business Planning and Plans Handbook"



Purpose: Produce a handbook that provides guidance and best practices on how to develop a TMC business plan. The handbook also outlines business-planning models that were successfully employed by transportation agencies to ensure the long-term sustainability of TMCs and associated ITS applications.

Champion: Monica Kress, California DOT

Status: Developing 508 compliance deliverables for web posting

Completion Date: Fall 2007

Contact: Raj Ghaman: 202-493-3270;
raj.ghaman@fhwa.dot.gov

"TMC Performance Monitoring, Evaluation, and Reporting Handbook"

Purpose: Develop a handbook that provides guidance and recommended monitoring practices. The handbook advises how to initiate, sustain, and use information generated from monitoring, evaluating, and reporting on TMC performance and describe roles, responsibilities, functions, and support services as they relate to traffic management.

Champion: Mark Newland, Indiana DOT

Status: Deliverables are undergoing 508 compliance review in preparation for web posting

Completion Date: Fall 2007

Contact: Raj Ghaman: 202-493-3270;
raj.ghaman@fhwa.dot.gov

"Regional, Statewide, and Multi-State TMC Concept of Operations and Requirements"

Purpose: Building off the *Developing and Using Concept of Operations in Transportation Management Systems* project, this project develops a document that provides detailed guidance on how to develop and use concept of operations and system requirements as it applies to the life cycle of a regional, statewide, or multi-state TMC.

Champion: Jim McGee, Nebraska DOR

Status: Deliverables are undergoing 508 compliance review in preparation for web posting

Completion Date: Fall 2007

Contact: Raj Ghaman: 202-493-3270;
raj.ghaman@fhwa.dot.gov

"Recovery and Redundancy of TMCs"

Purpose: Develop a technical document that synthesizes current practices and state of the practices, highlight technical issues, lessons learned, and recommended practices, and detail how to plan, develop and implement redundancy design and recover plans for TMCs and transportation management systems.

Champion: Monica Kress, California DOT

Status: Developing 508 compliance deliverables for web posting

Completion Date: Fall 2007

Contact: Raj Ghaman: 202-493-3270;
raj.ghaman@fhwa.dot.gov

"Procuring, Managing, and Evaluating the Performance of Contracted TMC Services"

Purpose: Develop a technical document that will provide guidance and recommended practice to TMC owners and managers in making decisions related to outsourcing portions, or in entirety, of their TMC or transportation management system operation to a private contractor or contractors.

Champion: John Bassett, New York State DOT

Status: Draft Annotated outline of the technical document is anticipated in November 2007

Completion Date: November 2008

Contact: Raj Ghaman: 202-493-3270;
raj.ghaman@fhwa.dot.gov

"Driver Use of Real-Time En-Route Travel Time Information"

Purpose: Assess impacts of en-route real-time travel time/delay/speed information on drivers; define the most effective way to provide en-route real-time travel time

information; and develop preliminary guidance to practitioners for delivering en-route travel time information.

Champion: Gene Donaldson, Delaware DOT
Status: Research Work Plan is anticipated in October 2007
Completion Date: December 2008
Contact: Tom Granda: 202-493-3365;
thomas.granda@fhwa.dot.gov

“Integration of TMC and Law Enforcement: Needs Assessment”

Purpose: Assess the current practices and identify issues, needs, and challenges that all involving agencies are facing in integrating TMCs and law enforcement. The results of this effort will lead to identification of a list of topics and issues to be addressed and a series of next steps to be considered in a further study that is intended to develop a product to provide necessary guidance to address agencies' needs.

Champion: John Domina, Nevada DOT
Status: Project kick-off anticipated in December 2007
Completion Date: August 2008
Contact: Tom Granda: 202-493-3365;
thomas.granda@fhwa.dot.gov

“TMC Clearinghouse Support Services, Phase 2”

Purpose: Enhance and improve the support services for the TMC clearinghouse website that will be available online in Spring/Summer 2006. The study will also evaluate consumer feedback and recommendations for enhancing and improving the features and contents of the clearinghouse.

Champion: TMC Pooled Fund Study Co-Chairs
Status: Project kick-off anticipated in December 2007
Completion Date: December 2008
Contact: Raj Ghaman: 202-493-3270;
raj.ghaman@fhwa.dot.gov

“Methodologies to Measure and Quantify TMC Benefits, Phase 1”

Purpose: Gain a better understanding of and to quantify benefits in traffic operations due to the implementation of TMCs and the systems, infrastructure, and functions associated with their operations. Phase 1 of the project will synthesize methodologies for measuring, quantifying, and evaluating costs and benefits of TMCs, as well as assess the feasibility of developing a software tool for quantifying TMC benefits.

Champion: Jim McGee, Nebraska DOR
Status: Project kick-off anticipated in December 2007
Completion Date: August 2008
Contact: Raj Ghaman: 202-493-3270;
raj.ghaman@fhwa.dot.gov

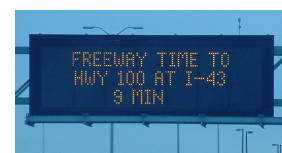
“TMC Human Factors Design Guidelines: Requirements Analysis”

Purpose: Perform a requirements analysis to identify and prioritize needs for human factors guidance in TMCs and identify an approach to the development of a guidelines document that will best support the identified user requirements.

Champion: Jeff Galas, Illinois DOT
Status: Project kick-off anticipated in December 2007
Completion Date: August 2008
Contact: Tom Granda: 202-493-3365;
thomas.granda@fhwa.dot.gov

“Developing Travel Time Information”

Purpose: Synthesize the state of the practice, successful stories, and lessons learned as well as develop a technical document that provides guidance and recommended practices on the concepts, methods, techniques, and procedures for TMCs to collect, calculate, and predict travel time information.



Champion: Jeff Galas, Illinois DOT
Status: Project kick-off anticipated in December 2007
Completion Date: February 2009
Contact: Raj Ghaman: 202-493-3270;
raj.ghaman@fhwa.dot.gov

“Requirements and Position Descriptions for TMC Support Staff”

Purpose: Build off information already compiled for operators in a previous effort and compile the needed information related to KSA's for other tasks and services required to support TMCs.

Champion: Mark Demidovich, Georgia DOT
Status: Project kick-off anticipated in January 2008
Completion Date: July 2009
Contact: Tom Granda: 202-493-3365;
thomas.granda@fhwa.dot.gov

“Techniques for Managing Service Patrol Operations”

Purpose: Identify and synthesize current best practices, state of the practices, and models and innovative techniques for managing service patrol operations.

Champion: TBD
Status: Project kick-off anticipated in January 2008
Completion Date: December 2008
Contact: Raj Ghaman: 202-493-3270;
raj.ghaman@fhwa.dot.gov

Event Calendar

October 7-10, 2007	National Rural ITS Conference, Traverse City, Michigan
October 7-10, 2007	IBTTA 75th Annual Meeting & Exhibition, Vienna, Austria
October 9-13, 2007	14th World Congress on ITS, Beijing, China
January 13-17, 2008	TRB 87th Annual Meeting, Washington, DC
March 30-April 2, 2008	ITE Technical Conference and Exhibit, Miami, Florida
June 15-19, 2008	2008 Freeway and Tollway Operations Conference, Fort Lauderdale, Florida
August 17-20, 2008	ITE 2008 Annual Meeting and Exhibit, Anaheim, California
November 16-20, 2008	15th World Congress on ITS & ITS America's 2008 Annual Meeting & Exposition, New York, New York

"Best Practices for Road Condition Reporting Systems"

Purpose: Synthesize current best practices and state of the practices in planning, design, and operation of road condition reporting systems as well as in integrating such systems with other road weather information/management systems.

Champion: Jim McGee, Nebraska DOR

Status: Project kick-off anticipated in January 2008

Completion Date: December 2008

Contact: Raj Ghaman: 202-493-3270;
raj.ghaman@fhwa.dot.gov

The following projects were selected by the TMC Pooled Fund Study members and will be initiated upon receiving contributions for the members in 2008:

"TMC Infrastructure Maintenance Management System" – Develop a software system to assist TMCs with managing infrastructure maintenance activities. Approach includes performing an assessment on available software/systems and agencies' experience. A requirements analysis will be followed to identify desired system functions and capabilities.

"TMC Staffing & Scheduling for Day-to-Day Operations, Phase 2: Software Development" – Build upon previous effort and develop an interactive software tool that TMC managers, supervisors and human resources personnel can use to quickly and easily assess available staffing resources and needs, perform the workload analysis, and make scheduling and shift operation decisions for immediate and future needs.

"Developing TMC Operator Training Program Guidelines" – Develop training and capacity building guidelines for TMC operators. These guidelines will include outlines of training modules. Processes for certification and re-certification for different operator positions will be analyzed. The project will also develop recommendations for the National Highway Institute to develop a comprehensive training program

"Knowledge Needs Assessment and Workshops for TMC Owners, Managers and Operators" – Conduct a comprehensive assessment on knowledge needs for TMC owners, managers and operators to effectively and efficiently perform their day-to-day tasks. The project will also identify issues and needs and outline strategies and recommended initiatives to address the needs and issues.

"TMC Data Capture for Performance and Mobility Measures" – Synthesize best practices and lessons learned related to collecting and archiving TMC operation data for monitoring, evaluating and reporting performance and mobility measures at system levels as well as for specific scenarios or locations. ■

Now Available

"Active Traffic Management: The Next Step in Congestion Management" (March 2007, FHWA-PL-07-012) – The Federal Highway Administration, American Association of State Highway and Transportation Officials, and National Cooperative Highway Research Program sponsored a scanning study to examine congestion management programs and policies in Europe. The scan team observed that transportation agencies in Denmark, England, Germany, and the Netherlands, through the deployment of congestion management strategies, are able to optimize the investment in infrastructure to meet drivers' needs. The purpose of this report is to describe the innovative approach to congestion management and managed lanes examined in each city, summarize the findings from the scan trip, suggest strategies that might be applicable to the United States, and recommend activities that might increase awareness and knowledge of the need

to and means for planning for congestion management and managed lanes in light of this European experience. Available at: <http://international.fhwa.dot.gov/pubs/pl07012/index.cfm>.

“Traffic Monitoring Data: Successful Strategies in Collection and Analysis” (August 2007, Transportation Research Circular E-C120, Transportation Research Board) – On May 2, 2007, the Transportation Research Board (TRB) sponsored a 1-day workshop entitled Traffic Monitoring Data: Successful Strategies in Collection and Analysis. This workshop was held for data producers and data users who were interested in better traffic data in the mid-Atlantic region of the United States. The intent of the workshop was to have an interactive forum to exchange knowledge about successful strategies in the collection and the analysis of traffic data. This document summarizes sessions that took place as part of the workshop. Available at: <http://onlinepubs.trb.org/onlinepubs/circulars/ec120.pdf>.

“Quality Control Procedures for Archived Operations Traffic Data: Synthesis of Practice and Recommendations” (March 2007, FHWA) – This report summarizes and provides recommendations for quality control procedures to be used for archived data that have been collected and saved by traffic operations systems. This report summarizes quality control procedures used in numerous archived data management systems (ADMS) implementations. This report provides recommendations for a basic set of quality control procedures that can be adopted, as well as a process to customize quality control procedures for system-specific data quality issues. This report also details the typical steps involved in quality control procedures, including the automation of quality checks, the use of manual visual review, the flagging of failed data records, and the use of metadata to document

quality control actions. Available at: <http://www.fhwa.dot.gov/policy/ohpi/travel/qc/index.htm>.

“Communicating with the Public Using ATIS During Disasters - A Guide for Practitioners” (April 2007, FHWA-HOP-07-068) – This document provides advice on use of Advanced Traveler Information Systems (ATIS) during disasters and is intended not only for state and local transportation agencies but for their partners in public safety and emergency management agencies. It offers practical guidance to managers of transportation management centers and emergency operations and to public information officers who may be called on to staff joint information centers during disasters. Five case studies of actual disasters in Georgia, California, Nevada, Utah, and Washington State show the role that traveler information has played in current practice and provide lessons for others. A concept of operations is presented that characterizes the flow of information among the people, organizations, and technologies comprising traveler information dissemination during disasters. Available at: <http://www.ops.fhwa.dot.gov/publications/atis/docpage.htm>.

“ITS Standards Advisories: Center-to-Field (C2F) Communications Profiles” (August 2007) and “Center-to-Center (C2C) Communications Profiles” (July 2007) – ITS Standards Advisories provide the ITS transportation community with information and guidance on the consideration and use of ITS standards. C2F Communications Profiles are available at: http://www.standards.its.dot.gov/Documents/advisories/adv_c2f_bg.asp; and C2C Communications Profiles are available at: http://www.standards.its.dot.gov/Documents/advisories/adv_c2c_bg.asp. ■

Member News

Traffic Management Initiatives Succeed in Reducing Congestion in New York State Fair – Utilizing a number of new and unique traffic management measures, the New York State DOT (NYSDOT) and the New York State Police were able to better manage traffic during the New York State Fair. More than 20,000 drivers successfully used E-ZPass Plus tags to pay for parking at the Fair, resulting in shorter lines and faster flow of traffic off of the highway. The State Police’s use of Highway Emergency Local Patrol (HELP) vehicles on area highways also had a significant impact on keeping traffic flowing smoothly. NYSDOT’s Mobile Command Vehicle functioned as the on-site traffic management center, and proved to be highly successful for monitoring traffic conditions, dispatching HELP vehicles, activating message boards, and generally serving as the hub of activity for traffic operations at the Fair. A special State Fair traffic webpage (www.nysfair.org/traffic) featuring live traffic video and alerts received more than 19,000 hits during the Fair and provided the public with the ability to monitor traffic in real time before leaving home.

Continued on next page

Member News

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New York State DOT and Time Warner Announce New Traffic Channel - Digital Channel 511 Shows Real-Time Capital Region Traffic Conditions – The New York State DOT (NYSDOT) launched a new traffic channel on Time Warner Digital Cable. "Traffic Now," on digital channel 511, shows real-time images from NYSDOT cameras at 16 high-traffic locations throughout the Capital District in a continuous loop, providing viewers with public access to instant traffic information. This service is part of the NYSDOT's overall initiative to bring more live travel information to the public. It is in addition to NYSDOT's travel Web site, www.travelinfony.com, which provides up-to-the-minute information on traffic conditions, congestion, accident locations, road closures, detours and weather.

Georgia Launches 511 Traffic Information Service – The Georgia DOT launched Georgia 511 system on August 15, 2007. Georgia 511 provides statewide traffic conditions, route-specific information and details on road or lane closures due to construction, incidents or weather. Estimated travel times are available for major roads within the metro-Atlanta area. Additionally, connections are available to transit providers, major airports, rideshare organizations, tourism information and 511 systems in neighboring states. An automated voice recognition system guides callers through the service. Callers can also access live operators at the TMC to report accidents, request HERO assistance or obtain additional information. Georgia 511 has launched a companion website at www.511ga.org and a toll-free number for callers from outside the state, 1-877-MYGA511.

Florida DOT Receives Management and Operations/ITS Council Award from ITS – The Florida DOT District 4 SMARTSunGuide ITS Program received the Management and Operations/Intelligent Transportation Systems (M&O/ITS) Council Project Award at the ITE 2007 Annual Meeting and Exhibit, being held August 5-8, 2007 in Pittsburgh, PA. The Program was recognized for its innovative techniques to manage the daily operations in the TMC, which include automating performance measures, creating a severe incident response vehicle and developing SMART viewer software.

Tennessee 511 Celebrates Successful First Year – In its first year of operation, more than three-quarter million people have turned to Tennessee 511 for travel information. To date, 779,442 callers have accessed the 511 system, which provides current information on statewide traffic conditions, Amber Alerts, access to TDOT's Record-A-Comment phone line, and links to 511 systems in neighboring states, like Kentucky, Virginia, North Carolina and soon Georgia. 511 uses both touch-tone and voice-activated technology. Callers can access options either by using their phone keypad or by simply speaking. Tennessee 511 can be accessed 24-hours a day, either by phone or on the internet at www.TN511.com.

Caltrain Commute Times to Run on US 101 Info Signs - Caltrans, the San Mateo County Transportation Authority and Caltrain began offering commuter travel time information system for Caltrain on the changeable message signs on US 101, between San Jose and San Francisco, which is one of the more congested corridors in the Bay Area. In addition to displaying travel times along US 101 between San Francisco and San Jose, the signs also displayed Caltrain travel times and scheduled departure times for trains at the Millbrae and Redwood City stations. Commuters can use this information to decide whether to take Caltrain or remain on the freeway. Freeway travel times are updated using anonymous information from FasTrak transponders and in-pavement detectors, and train times are based on the Caltrain schedule.

TMCUpdate is a quarterly newsletter produced by the Transportation Management Center (TMC) Pooled Fund Study. This quarterly publication highlights major TMC Pooled Fund Study activities and achievements and shares TMC related news and resources. Reproduction (in whole or in part) and broad distribution of this newsletter is strongly encouraged. The TMC Pooled Fund Study invites inquiries about articles and suggestions for TMC developments and advancements to be covered in future issues. For more information, please contact the Program Administrators, Raj Ghaman at Tel: 202-493-3270, E-mail: raj.ghaman@fhwa.dot.gov; or Tom Granda at Tel: 202-493-3365, E-mail: thomas.granda@fhwa.dot.gov; or the newsletter editor, Ming-Shiun Lee at Tel: 612-373-6335 or E-mail: ming_shiun_lee@urscorp.com.