

Guide to Transportation System Management and Operations in the Genesee-Finger Lakes Region



GENESEE TRANSPORTATION COUNCIL

How does Transportation System Management and Operations affect you?

If you've ever been caught in a traffic jam, waiting at a bus stop wondering when the next bus will arrive, or unsure of where a bicycle trail will take you, you know that uncertainty can have a negative impact on your travel experiences. Transportation Systems Management and Operations strategies enable travelers to make informed travel decisions by reducing the uncertainty associated with all forms of transportation. Reduced uncertainty leads to increased productivity because people and businesses can make more efficient use of their resources, such as time, fuel, and vehicles.



As a result, anyone using the regional transportation system can benefit from Transportation System Management and Operations strategies, whether it's a commuter making his routine morning trip to work, a family out for a weekend bike excursion, or a delivery truck driver trying to stay on schedule.

What is Transportation System Management and Operations?

Transportation System Management and Operations (TSMO) strategies increase the safety, reliability, and efficiency of the regional transportation system by improving infrastructure, increasing coordination among public and private agencies, and maximizing the use of scarce resources through:

- Infrastructure improvements such as building safer and more efficient intersections; installing Intelligent Transportation Systems (ITS) instrumentation such as traffic cameras and Dynamic Message Signs; providing real-time updates on bus arrivals through electronic signs, text message alerts and smart phone applications; and enhanced site design such as sidewalks to link buildings with nearby bus stops.
- Increased coordination such as establishing formal interagency agreements on topics such as traffic signal maintenance and operation, work zone and incident management, and emergency management cross-training exercises.



- Maximizing resource use by allocating financial and personnel support to cost-effective programs and projects such as reducing incident response times, using sensors to monitor infrastructure for potential maintenance concerns, and providing additional sources of traffic data to operations personnel, thus allowing them to manage the transportation system more efficiently and productively.

What are the benefits of TSMO?

TSMO benefits include:

- Improved Mobility
- Increased Safety
- Reduced Costs



Improved Mobility

Mobility is the ability of people and freight to get where they need to go. Improving mobility increases efficiencies for the traveling public by reducing time and fuel spent moving between the places where business and personal activities occur.

TSMO strategies improve mobility by providing travelers with information they can use both before and during a trip to plan a route, decide the best time to travel, and determine the best mode (car, carpool, bus, bicycle, on foot, etc.) to use to reach a destination. Improved mobility leads to a better quality of life because less time spent behind the wheel means more time to spend on more rewarding and productive activities.

In addition, the mobility benefits of TSMO strategies include access management techniques that improve the accessibility of specific buildings and locations.

Increased Safety

When traffic incidents occur, TSMO strategies improve emergency response by enabling faster detection, response, and clearance. This reduces the time needed to clear an incident scene and return traffic to its normal flow. In addition, notification of the incident can be broadcast to the public through websites, Highway Advisory Radio (HAR), Dynamic Message Signs (DMS), and text message and e-mail alerts, which gives drivers the choice to take a different route and avoid any travel delay caused by the incident.

TSMO programs improve overall public safety by providing travelers with timely and accurate information about adverse weather conditions, traffic incidents, work zones, and other potential hazards.

TSMO programs support increased Homeland and personal security by monitoring key facilities and enabling faster emergency response to potentially threatening situations. For example, security cameras on a bridge can detect suspicious activities and alert authorities to potential public safety threats.



Reduced Costs

TSMO strategies generate many financial benefits for both the public and private sectors. By making more efficient use of existing road space, TSMO strategies can increase road capacity for less money, time, and disruption than the traditional method of increasing capacity by building or expanding roads.

This frees up money to invest in preventive maintenance projects that extend the life of transportation facilities.



The low implementation costs of TSMO strategies require less public funding than do large-scale infrastructure projects. As

a result, public funds that would have been spent on infrastructure construction can be redirected towards other community needs, transportation or otherwise. Businesses directly benefit from TSMO strategies because they reduce freight delivery times and costs such as fuel and vehicle wear and tear, allow buyers and sellers to track goods, and reduce the likelihood of thefts and incidents that could disrupt freight schedules.



How is TSMO used in different places?

TSMO strategies can be used in urban, suburban, and rural places. They are often most beneficial in developed places where they impact the greatest number of people and vehicles, but they can provide important benefits in other places as well.

In all places, TSMO strategies can increase road capacity, streamline traffic flow, reduce traffic congestion, augment public transit services, decrease freight delivery times, enhance pedestrian and bicyclist safety, and improve air quality by cutting vehicle emissions.

How are TSMO strategies applied in the Genesee-Finger Lakes Region?

TSMO strategies have been successfully used to improve the safety, reliability, and efficiency of the regional transportation system. Long-term inter-agency commitments to TSMO programs has provided the Greater Rochester area with an outstanding ITS network. Financial services publications, such as Forbes and Kiplinger's, consistently rank commute times in metropolitan Rochester among the best in the nation.

Regional Traffic Operations Center

The Regional Traffic Operations Center (RTOC) serves as the headquarters for transportation management and operations programs. Opened in 2002, the RTOC houses personnel from the Monroe County Department of Transportation (MCDOT), the New York State Department of Transportation (NYSDOT), the New York State Police, and the Monroe County Airport Authority. RTOC personnel monitor the regional road network 24 hours a day, seven days a week.

MCDOT and NYSDOT operate about 450 remotely controlled traffic signals from the RTOC. RTOC personnel use Closed-Circuit Television (CCTV) traffic cameras to detect traffic incidents and dispatch work crews to handle emergency signal repairs. By housing personnel from several agencies, the RTOC facilitates interagency collaboration and rapid incident response, which in turn supports effective traffic management.

In rural places, TSMO strategies can be used to notify drivers of potential dangers on the road ahead, such as a sharp curve, railroad crossing, or narrow bridge; protect the traveling public and wild animals through animal-vehicle collision avoidance systems; and streamline freight shipping with automated inspection systems at truck weigh stations.

Lastly, the growth of the tourism industry in places like the Finger Lakes wine country or in the communities around Letchworth State Park is leading to greater opportunities for the use of TSMO programs to help visitors navigate unfamiliar trails and roads.



A HELP Truck supports first responders by guiding traffic through an incident scene.

Highway Emergency Local Patrol Program

One program that has generated significant safety and efficiency benefits for a modest investment is NYSDOT's Highway Emergency Local Patrol (HELP) program. Established in 2004 and supported by private sector sponsors, the HELP trucks patrol three designated patrol areas, or "beats," on the region's expressways during the morning and evening rush hours. They respond to incidents ranging from disabled vehicles to major crashes. HELP trucks can provide a range of services, including jumpstarting batteries, changing tires, and helping emergency responders manage an incident scene. As a result of these services, disruptions to traffic flow are minimized or eliminated altogether.

Technology Initiative Driving Excellence (TIDE)

The Rochester-Genesee Regional Transportation Authority (RGRTA) began implementing the TIDE project in 2007 to improve customer service by increasing the efficiency of bus fleet maintenance and operations. The TIDE project will improve transit vehicle maintenance by installing sensors on Regional Transit Service (RTS) buses that provide alerts about mechanical problems, thus reducing the possibility that a small but undiagnosed problem will grow and cause costly damage to the vehicle and inconvenience to passengers.

TIDE will improve transit operations by equipping buses with technologies such as Automatic Vehicle Location, which allows dispatchers to track each bus as it moves along its route; automatic stop announcements that provide verbal notification to riders when a bus reaches a stop; and an electronic fare collection system that will streamline the fare payment process. A critical operations improvement will be the use of a Computer Aided Dispatch system to improve the ability of transit operators to efficiently dispatch buses and repair vehicles.



TIDE communications upgrades include the installation of electronic signs in several locations around the region that provide real-time information to customers on when the next bus will arrive, and e-mail and text message notifications to subscribers regarding bus arrivals, service alerts, and other pertinent information. Looking further ahead, one important improvement to the region's transit service will be Traffic Signal Priority (TSP), which will help buses stay on schedule by holding green lights for buses as they approach an intersection.

Future Opportunities

There are many future opportunities for expanding the use of TSMO strategies on our regional transportation system. One of the greatest opportunities is the ongoing development of a truly integrated regional traveler information system that provides real-time updates through websites, e-mails, and text messages on traffic and



transit conditions, weather information, work zones and traffic incidents, and other information that enables travelers to make informed transportation choices.

Other key opportunities include the ongoing installation of Intelligent Transportation System instrumentation, which will improve traffic and incident management capabilities. The availability of new data from sources such as real-time traffic monitoring sensors means that transportation planners and operators can more accurately identify problems, determine solutions, and take action to head off potential future problems before they occur.

Lastly, the expansion of TSMO strategies both in this region and nationwide may directly benefit the regional economy as local technology firms explore the possibilities of developing innovative new products and services to support TSMO initiatives.

Intelligent Transportation Systems (ITS)

As the previous discussion indicates, Intelligent Transportation Systems (ITS) are a collection of powerful technologies used to implement many TSMO strategies. ITS components currently deployed or planned for deployment in the Genesee-Finger Lakes Region are described below:

Traffic Signal Operations

Remote-controlled traffic signals allow operators to set signal timing plans that maximize the efficiency of traffic flow during normal conditions. Operators can also adjust signal timing to lessen the impact of incidents, special events, and adverse weather on traffic flow. Lastly, traffic signal control systems allow for prompt detection and correction of signal maintenance problems.

Dynamic Message Signs (DMS)

A Dynamic Message Sign is an electronic sign that displays alerts to drivers regarding travel conditions, such as incidents, road closures and detours, and travel times. A Dynamic Message Sign can be either permanently installed in one location, or portable so that it can be moved from one place to another.

Highway Advisory Radio (HAR)

While driving, travelers can tune into a Highway Advisory Radio broadcast to learn about traffic congestion, work zones, crashes, adverse weather conditions, and other events that could cause travel delays. These broadcasts provide travelers with an opportunity to take a detour and avoid becoming caught in the delays.



In addition to providing information about traffic conditions to drivers, Dynamic Message Signs are used for AMBER Alert broadcasts.

Traffic Cameras

A Closed-Circuit Television (CCTV) network of strategically positioned traffic cameras on the regional expressway and arterial network provide real-time images of road conditions. Operators use these visuals to monitor traffic flow and detect hazards, such as incidents and adverse weather, that could impact travel. The public can use these images to see how much traffic is on a road before deciding whether or not to travel on it.

Advanced Traveler Information Systems (ATIS)

Advanced Traveler Information Systems provide up-to-date information to travelers through websites, email and text alerts, and smart phone applications. ATIS can help travelers decide when to leave, what route to take, and whether to travel by car, bus, bicycle, or on foot.

Road Weather Information System (RWIS)

Road Weather Information Systems are sensors installed on or near a roadway that monitor weather conditions, such as temperature, wind speed and direction, visibility, precipitation rate and type, snowfall accumulation, and road surface moisture, and relay this data to the RTOC. This information is publicized through ATIS and HAR.

Fire Preemption System

Over 300 intersections in Monroe County are equipped with Fire Preemption technology, which allows large fire trucks to trigger a green light as they approach an intersection when responding to an emergency call. This helps the trucks reach incident scenes sooner and reduces the chances of a serious crash involving a large, heavy, quickly moving truck.

Transit Signal Priority (TSP)

Transit Signal Priority systems use sensors to detect approaching transit vehicles and alter traffic signal timing to improve transit performance. For example, a TSP system could help a bus stay on schedule by extending the duration of a green light to allow the bus to pass through the intersection.



RTOC personnel monitor the regional transportation system in the Operations Center's control room.

Protecting citizen privacy

Many citizens share a concern over the loss of privacy due to the increasing prevalence of traffic cameras, sensors, Global Positioning Systems, and other devices present in public places and personal vehicles.

In response to this concern, in 2005 MCDOT adopted NYSDOT's statewide privacy policy regarding the use of CCTV traffic cameras. This policy restricts camera operation to authorized personnel who view images in a wide-angle mode that prevents details which could identify an individual driver, such as license plate numbers, from being seen. The camera software includes privacy screening that blocks certain areas from view. The only times that a camera is zoomed in to provide an additional level of detail is when it is used to detect, verify, and help coordinate the emergency response to a traffic incident.

During normal operations, images generated by CCTV are not recorded and can only be transmitted in real-time or through a limited time delay data feed. These images are broadcast online to give the public the ability to see them, but they are not archived for future use.

Making good use of tax dollars

Given the financial constraints that public sector agencies expect to operate within during the coming years, reduced funds will be available for transportation. Many of the available transportation funds in this region will be invested in preservation and maintenance projects to keep the roads and bridges that we have in good condition. As a result, transportation agencies will turn more to TSMO strategies to achieve system improvements such as increased safety, mobility, reliability, and efficiency without incurring large taxpayer-supported costs.



More Information

Websites:

For more information on Transportation Systems Management and Operations and Intelligent Transportation Systems, please see these websites:



USDOT Planning for Operations: <http://plan4operations.dot.gov/index.htm>

USDOT Research and Innovative Technology Administration: <http://www.its.dot.gov/>

NYSDOT Intelligent Transportation Systems Program:
<https://www.nysdot.gov/divisions/operating/oom/transportation-systems/systems-optimization-section/ny-moves>

Intelligent Transportation Society of America: <http://www.itsa.org/>

For more information on local agencies that participate in transportation systems management and operations planning, please see these websites:

Monroe County Department of Transportation: <http://www.monroecounty.gov/dot-index.php>

New York State Department of Transportation: <https://www.nysdot.gov/index>

New York State Thruway Authority: <http://www.thruway.ny.gov/index.shtml>

Rochester Genesee Regional Transit Authority: <http://www.rgrta.org/>

Genesee Transportation Council: <http://www.gtcmpo.org/>



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