

Strategies for Improving Traveler Information
Final Report

final
report

prepared for

Michigan Department of Transportation – Office of Research and Best Practices

prepared by

Cambridge Systematics, Inc.

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date

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1.0 Introduction

This report documents the Michigan Department of Transportation's (MDOT) research project *Strategies for Improving Traveler Information*. The project was conducted by the MDOT in conjunction with their Office of Research and Best Practices. This research provides the MDOT a systematic view of the state of the practice of Advanced Traveler information Systems (ATIS), explore the capabilities of research currently being conducted, and provide a clear roadmap for how MDOT can grow and enhance their own ATIS capabilities. With limited funds available in today's fiscal environment, this type of research is critical to ensure that limited funds are targeting the greatest needs most effectively.

The Cambridge Systematics, Inc. led this research effort with the support of Kimley-Horn & Associates, Inc. of Michigan (KHAM) and EPIC ▪ MRA. The project consisted of three tasks:

- Literature Review;
- Survey of Travelers; and
- Survey of other States.

The results of this research effort are documented in this final report.

2.0 Literature Review

This literature review summarizes the body of knowledge on Advanced Traveler Information System (ATIS) programs, including discussion of topics such as the lessons learned from existing programs, the value of traveler information, how travelers prefer to access information, and what models of successful ATIS programs exist. The review focuses on the latest research on ATIS. Special consideration is also given to tourism and rural ATIS applications. The review is also intended to serve as a reference guide to aid any further research by MDOT and its partners.

This literature review assumes the reader has a basic understanding of what ATIS is and how it works. For readers new to the topic, the Federal Highway Administration (FHWA) report *Managing Demand Through Travel Information Services* is recommended as a starting point.

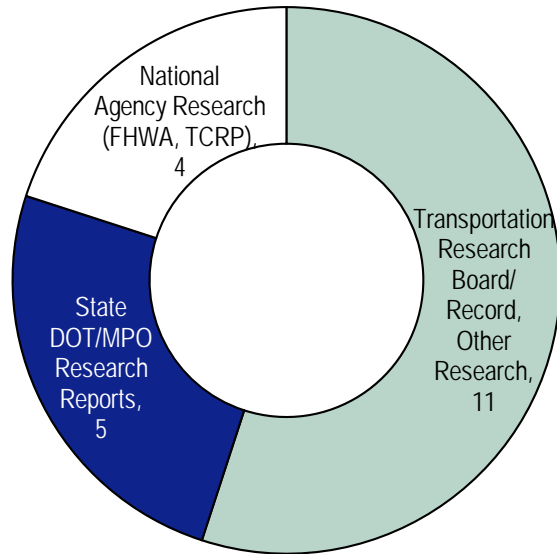
2.1 METHODOLOGY

An initial scan for literature to aid this project was conducted by the MDOT Office of Research and Best Practice (ORBP). The scan covered the databases TLCat, TRIS Online, TRR, and TRB's Research in Progress. It included key terms: traveler information, public, private, partnership, 511, Intelligent Information Systems, Advanced Transportation Information Systems, Intelligent Transportation Systems (ITS), ATIS, tourism, survey, driver, and behavior. This scan returned 30 articles which were published in English from 2003 to 2008.

Subsequent scans of Transportation Research Board (TRB) research were conducted by the study team including the years 2008 through 2010, along with searches of other transportation research agency publication libraries such as the Federal Highway Administration (FHWA), the National Cooperative Highway Research Program (NCHRP), the Transit Cooperative Research Program (TCRP), and Cambridge Systematics. Scans were also conducted for published reports from state departments of transportation (DOTs).

Of the available articles, 20 were selected for detailed summary, which can be found in Section 1.2. Figure 2.1 shows the breakdown of the articles reviewed among three categories: TRB/TRR and other research, which covers the latest peer-reviewed university-based research efforts in advancing the state of the practice; national agency research, which typically synthesizes research and best practices to share with a variety of state and local agency stakeholders; and state DOT/metropolitan planning organizations (MPO) research, which often is developed by agencies or agency researchers to address a problem or answer a question specific to their state or region. All articles are listed in Section 1.3.

Figure 2.1 Literature Review Report Types



2.2 KEY FINDINGS

Table 2.1 summarizes the key findings of ATIS studies and reports and the potential lessons that could be applied to MDOT's efforts to develop an ATIS program. Summaries of the 20 reviewed articles follow, grouped by topic questions.

Table 2.1 Summary Findings

Title	Prepared for	Key Findings	Relevance to MDOT
Advanced Traveler Information System Study	MORPC	<ul style="list-style-type: none"> • Managing the public’s expectations is critical. • Effective marketing strategies are needed to promote the availability of ATIS tools. • Partnerships are key to a robust traveler information system. • Successful ATIS programs are embracing the trend toward personalized user information. • Successful ATIS programs are embracing the trend of “pushing” information to users through mobile applications. • Radio and television are the most commonly used sources of traveler information. Motorists show increasing interest in receiving information through mobile devices. • Businesses are interested in ATIS programs such as 511 but have low levels of awareness for existing traveler information options. 	<ul style="list-style-type: none"> • MDOT should manage the public’s expectations as part of a necessary marketing effort to promote any ATIS program. • MDOT should consider technology trends including: personalized user information, “pushing” information to mobile users, and generally targeting mobile devices. • MDOT should coordinate with media outlets for marketing and outreach. • MDOT should promote understanding of existing and new ATIS resources to the business community.
Managing Demand Through Travel Information Services	FHWA	<ul style="list-style-type: none"> • Traveler information successfully helps manage transportation demand. • Traveler information still has untapped potential. • Traveler information is relatively inexpensive to implement and can be done quickly, but requires an ongoing commitment from a transportation agency. • Public agencies should monitor the success of their traveler information systems to maximize their investment. • Public and private organizations can learn from failed traveler information systems. • Traveler information will need to be made available as a public service for most ATIS to be successful. • Cooperation between public and private agencies is a necessary element for success. • Marketing to raise awareness is an essential component of a successful traveler information program. 	<ul style="list-style-type: none"> • MDOT should make an ongoing commitment to any ATIS program undertaken. • MDOT should carefully monitor system performance. • MDOT should coordinate a marketing effort to promote any ATIS program.
Leadership in Regional Transportation Operations	TRB	<ul style="list-style-type: none"> • The elements of strong leadership, effective institutions, and sufficient resources determine the success of regional transportation operations programs. • Successful leadership will secure stable funding, the attention and support of senior management, and involve all key agencies. 	<ul style="list-style-type: none"> • MDOT should take a leadership role in any Michigan ATIS program and take steps to secure funding and engage stakeholders, focusing on gaining the support of senior management.

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Title	Prepared for	Key Findings	Relevance to MDOT
Real-Time Traveler Information Services Business Models: State-of-the-Practice Review	FHWA	<ul style="list-style-type: none"> • A wide variety of public-private partnership models exist. Generally, the most success was found within models with significant ownership and involvement by the public sector. • Developing public sector policies to guide involvement in private sector business is growing in importance. • Both public and private sector roles and responsibilities are shifting in this area. • Private sector focus on development of business-to-business models will continue to encourage innovation. 	<ul style="list-style-type: none"> • Public-private partnership will provide significant opportunities for MDOT in the area of traveler information, but MDOT should maintain a strong role in the partnership. • There is a variety of structural and contractual options for public-private partnership. MDOT should carefully review options to leverage resources. • Kansas DOT emerges as a model of statewide 511 implementation success and Utah DOT may be a model for tourism-focused 511 enhancement strategies.
Route Preferences and the Value of Travel-Time Information for Motorists Driving Real-World Routes	Minnesota DOT	<ul style="list-style-type: none"> • Drivers find ATIS valuable for reduction in travel-times but also for factors (personal, social, psychological) related to certainty. • Travelers show a willingness to pay for travel-time information but generally no more than \$1 per trip. • Driver route preferences are complicated and rely on many factors outside of travel-time. 	<ul style="list-style-type: none"> • MDOT should seek to measure (as a benefit) all factors that drive a traveler’s benefit from traveler information rather than merely travel time reduction. • Given the complexity of drivers’ route preferences, MDOT should seek to accommodate a variety of trip alternatives rather than merely the fastest. MDOT should not focus solely on the Interstate System.
Considering Route Diversion as a Real-Time Crash Prevention Strategy on Urban Freeways	TRB	<ul style="list-style-type: none"> • Route diversion can be used to reduce both the rear-end and lane-change crash risk on an urban freeway in real-time. • Longer diversion distances increase safety benefits. 	<ul style="list-style-type: none"> • MDOT should explore ATIS-based route diversion as a contributor to its safety objectives. • MDOT should market the safety benefits of ATIS programs internally and externally. • MDOT should carefully consider route diversion lengths to ensure the ideal balance between crash risk reduction and travel time management.
Evaluating Traveler Information Impacts on Commercial and Noncommercial Users	TRB	<ul style="list-style-type: none"> • Increased electronic dissemination of traveler information in incident conditions can significantly improve average and total travel times. • Higher percentages of truck traffic lead to greater benefits for ATIS, given the higher value placed on time by commercial users. 	<ul style="list-style-type: none"> • MDOT can generate the greatest benefits in areas with high volumes of commercial vehicles and should prioritize deployment in these regions/corridors.
Congestion, Risk Aversion, and the Value of Information	TRB	<ul style="list-style-type: none"> • When faced with a choice between a “safe” route and a “risky” route, drivers that are moderately risk-averse are most likely to seek information and benefit from it. 	<ul style="list-style-type: none"> • MDOT can benefit from ATIS programs that provide drivers with information to decide between reliable routes and faster but less reliable options.
Effectiveness of Traveler Information Tools	NCDOT	<ul style="list-style-type: none"> • Traveler information can provide significant time savings. • Coordinated public information campaigns are very effective for planned major work zones. • Traveler information users rely on this information to make travel decisions. 	<ul style="list-style-type: none"> • ATIS should be coordinated with major and minor construction projects to see significant time savings. • Extensive and well-planned public information campaigns should accompany ATIS deployment for planned projects.

Title	Prepared for	Key Findings	Relevance to MDOT
Synthesis of Customer Needs from Rural Traveler Information Surveys	TRB	<ul style="list-style-type: none"> • Rural travelers value road and weather condition information, followed by construction information, over other traveler information such as alternate routes, traffic delays, and incident locations. • Rural travelers are most likely to respond to traveler information by allowing more travel time, given their limited options in changing their route or mode. 	<ul style="list-style-type: none"> • MDOT should recognize the value of road and weather condition information to rural travelers, particularly in severe winter weather.
Evaluation of the Pennsylvania Turnpike Advanced Traveler Information System (ATIS) Project, Phase III	Pennsylvania Turnpike Commission	<ul style="list-style-type: none"> • General motorists prefer information early in their trip and seek information on traffic conditions, weather conditions, and route maps. Truckers have similar information needs but greater need for route information (for long-haulers). • General motorists and truckers find commercial radio, VMS, HAR, and service/rest area signage useful. 	<ul style="list-style-type: none"> • MDOT should tailor ATIS options to their users and focus on the information they value the most.
Transit, Call Centers, and 511: A Guide for Decision-Makers	TCRP	<ul style="list-style-type: none"> • There has been a historical lack of transit agency participation in 511 due to perceived limited customer benefit and potential strain on transit call center resources. • 511 participation bears no significant cost or risk to transit agencies, though limited customer benefits are generated. • Based on peer agency experience, transit agencies will generally see enough benefit to justify participation in 511. • For 511 administrators, including transit information can improve the breadth of information available to customers and generate buy-in for 511 as a multimodal resource. • 511 administrators should strive to make basic transit information available for almost all transit agencies in their region and more detailed information available for larger agencies with significant customer bases. 	<ul style="list-style-type: none"> • MDOT should actively engage transit agencies and promote the benefits of 511 participation. • MDOT should seek to provide basic information for all transit agencies in the State through an ATIS program. • MDOT should seek to provide more detailed transit information for major transit agencies in the State, such as Smart.
Evaluation of Eastern Kentucky Rural Highway Information Project 511 Tourism Service	Kentucky Transportation Cabinet	<ul style="list-style-type: none"> • Tourism-focused 511 calls are different from typical 511 calls and require a different operations concept. • High-quality data that are regularly updated are necessary. • Typical 511 operator training needs to be expanded for tourism-focused calls. • Marketing rural tourism 511 services is most successful through roadside signage and radio/TV ads. 	<ul style="list-style-type: none"> • Rural, tourism-focused 511 can be successful, but requires a different model than typical 511 in data management and operator service and training. • Marketing of rural, tourism-focused 511 should be primarily target users while driving (roadside signage and radio ads). • MDOT should identify tourism anchor destinations, such as National Parks, and prioritize information and advertising toward these resources.

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Title	Prepared for	Key Findings	Relevance to MDOT
Advanced Traveler Information System for Alpine Leisure Trips	TRB	<ul style="list-style-type: none"> • Tourists in a skiing destination region found value in traveler information resources. • The most valued information was real-time traffic conditions and routing options. • First-time visitors were more likely to access information than regular visitors. • Compliance with the data (willingness to change route and trip times) indicated that the traveler information could improve real traffic conditions. 	<ul style="list-style-type: none"> • MDOT should target the tourism market by providing high-quality real-time traffic conditions and routing options for the most critical tourism routes. • The greatest return from the tourism market will likely be with first-time visitors, so MDOT should focus on easy-to-use services with en route marketing to promote awareness.
Tourism Business and Intelligent Transportation Systems	TRB	<ul style="list-style-type: none"> • Business managers in local economies dependent on tourism showed low awareness of existing ITS resources. • Business managers had a lasting negative reaction to 511 information that was perceived as deterring tourism. 	<ul style="list-style-type: none"> • MDOT should coordinate with business leaders (particularly those dependent on tourism) to publicize existing ITS programs and develop support for tourist-friendly traveler information programs.
Best Practices of Rural and Statewide ITS Planning	FHWA	<ul style="list-style-type: none"> • Several successful rural ITS programs consider the creation of manageable regional coalitions and teams key to success. • Rural ITS programs require a common vision and the outreach and education to get everyone on the same page to be successful. • Focusing on providing a consistent level of service on roadways throughout the region can help rural ITS programs identify and get attention for needed projects. 	<ul style="list-style-type: none"> • MDOT should consider how rural parts of the State will be represented and form regional coalitions of stakeholders if needed to supplement existing organizations. • Successful rural ITS programs will require outreach and education resources.
Assessing the Benefits of Traveler and Transportation Information Systems	TransNow, Washington DOT, U.S. DOT	<ul style="list-style-type: none"> • It is important for ATIS to show benefits in a quantifiable and defensible manner. • The simulation software package IDAS is an effective way to develop benefit-cost measures. • Local impact settings should be determined and applied when using IDAS. 	<ul style="list-style-type: none"> • MDOT should focus on demonstrating the cost effectiveness of ATIS deployments. • IDAS represents an opportunity to measure ATIS cost effectiveness if local impact settings are applied.
Toward a Strategy for Cost-Effective Deployment of Advanced Traveler Information Systems	TRB	<ul style="list-style-type: none"> • Investment strategies in ATIS must consider the accuracy and coverage of their system and balance improvements in these areas to generate greater user benefits. • Understanding of the day-to-day travel variability will help planners identify system needs and appropriate technologies. • ATIS needs to perform at a certain level of accuracy and initial improvement investments should focus on this area. • Once accuracy is acceptable, investments should focus on improving coverage levels. 	<ul style="list-style-type: none"> • MDOT should first identify the goals of their system in coverage and accuracy. • MDOT should develop a detailed understanding of the day-to-day variability of travel times on their network to select the most appropriate technologies and data processes. • Initial/existing investment should focus on achieving an acceptable level of accuracy. • Once acceptable accuracy is achieved, the system can be expanded.

Title	Prepared for	Key Findings	Relevance to MDOT
Model Deployment of a Regional, Multimodal 511 Traveler Information System	U.S. DOT	<ul style="list-style-type: none"> • Agencies should focus 511 implementation on near-term, high-priority objectives. • Voice recognition implementation is challenging and resource intensive. • A vigorous, targeted marketing program is needed to promote 511 deployment or added features. • Agencies should thoroughly investigate institutional and technical issues associated with data input from partner agencies. • Agencies should incorporate mechanisms for capturing user feedback for system evaluation. 	<ul style="list-style-type: none"> • MDOT should clearly identify their priorities for an ATIS program and focus on achieving near-term, high-priority objectives. • Deployment of 511 should be accompanied by a vigorous marketing campaign, relying in part on Dynamic Message Signs (DMS). • MDOT should work closely with partners to resolve data issues early in the process. • MDOT should carefully consider local roadway data needs and encourage local agencies to develop/refine data processes to compliment the ATIS program. • MDOT should develop a mechanism for user feedback.
Usability Testing and ATIS web sites	TRB	<ul style="list-style-type: none"> • The usability of ATIS web sites for functions such as trip planning can be improved, particularly for older drivers, by factors such as high color contrast, large font sizes, and sparing use of pull-down menus. 	<ul style="list-style-type: none"> • MDOT should consider accessibility issues for all users, particularly older drivers, in design of ATIS interfaces.

What Lessons Can Existing ATIS Programs Teach Us?

The Mid-Ohio Regional Planning Commission (MORPC) 2009 *Advanced Traveler Information System Study* included a detailed review of exemplary ATIS programs ranging from San Francisco's 511 program to Transport for London. The study identified five key lessons to be learned from these organizations:

- **Managing the public's expectations is critical.** Traveler information does not eliminate congestion. Unrealistic expectations placed on a new ATIS program will only dampen enthusiasm for real results. The public should be informed of how ATIS tools can be an important part of an overall transportation strategy to limit congestion while expanding transportation options for users.
- **Effective marketing strategies are needed to promote the availability of ATIS tools.** An ATIS program can only be effective if travelers are widely and regularly using it. Such programs require marketing to make travelers aware of the potential benefits of using the program and provide them with basic information on how to access the program. In the case of San Francisco's 511 system, a fall 2008 radio campaign resulted in higher than typical system usage, and awareness of the 511 ATIS program increased from 48 percent in 2008 to 61 percent in 2009 according to a poll conducted by Godbe Research.
- **Partnerships are key to a robust traveler information system.** ATIS programs are reliant on data quantity and quality to attract and retain users. The partnerships that enable ATIS operators to receive and share that data are critical. A successful ATIS program should find ways to leverage data that are already available from public and private sector organizations. In addition, the program should leverage different ways of disseminating information through ATIS tools, the media, and public and private partners. In several of the reviewed ATIS programs, relationships with transit agencies were mentioned as being important given the difficulty of maintaining accurate and timely transit information.
- **Successful ATIS programs are embracing the trend toward personalized user information.** User needs are transitioning from wanting comprehensive traveler information to now wanting personalized, specific information. An example of an ATIS tool that encourages personalization is the "My 511" function of San Francisco's 511 system, which allows users to access personalized web pages that highlight the data they are most interested in. With personalizable information, users can routinely access corridor-specific information rather than filtering through a regional snapshot to access the information relevant to their trips.
- **Successful ATIS programs are embracing the trend of "pushing" information to users through mobile applications.** Users can specify their data needs and receive notifications on their phones based on their specifications. For example, Salt Lake City's MyCommuterLink enables

registered users to receive notification alerts of incidents on freeways. The alerts can be sent to any device capable of receiving e-mail or text messages, such as personal computers, cellular phones, PDAs, and text pagers. Users customize their alert profiles by indicating the type of incidents they are interested in and the time of day they want to receive alerts.

FHWA's *Managing Demand Through Travel Information Services*, in addition to providing a thorough comprehensive overview of traveler information systems, offers additional lessons learned from existing ATIS programs.

- **Traveler information successfully helps manage transportation demand.** Travel improvements have been documented in helping travelers avoid or manage delays, access transit, and form carpools. Other benefits include helping bicycle commuters, improving on-time reliability, and balancing access in tourism areas with other goals such as environmental stewardship.
- **Traveler information still has untapped potential to manage transportation demand.** New technologies create new opportunities for travel information.
- **Traveler information is relatively inexpensive to implement and can be done quickly, but requires an ongoing commitment from a transportation agency.** Agencies need to devote the ongoing resources to maintain system quality.
- **Public agencies should monitor the success of their traveler information systems to maximize their investment.** Agencies need to identify where benefits outweigh costs and research what features and information are important to their users and users of peer systems.
- **Public and private organizations can learn from failed traveler information systems.** Early traveler information systems have experienced failure and difficulties due to many reasons such as technological problems, inadequate understanding of traveler behavior, poor execution, and insufficient promotion. Each of these failures holds a lesson for new systems.
- **Traveler information will need to be made available as a public service for most users to be successful.** Few fee-for-service models have proven successful in this field.
- **Cooperation between public and private agencies is a necessary element for success.** In this case, the study refers to the need for coordinated planning efforts, such as during large special events.
- **Marketing to raise awareness is an essential component of a successful traveler information program.** Agencies have seen usage increase significantly in response to a well planned promotion.

This study introduces many critical points that are covered in greater detail later in this section.

The TRB study *Leadership in Regional Transportation Operations* contends that strong, effective leadership is a critical element in determining the performance

of regional transportation operations. Along with having effective institutions and sufficient resource endowments, effective leadership can be the difference between success and failure for regional transportation operations such as ATIS programs. A case study of the Transportation Operations Coordinating Committee (TRANSCOM) in the New York-New Jersey-Connecticut metropolitan region concluded that TRANSCOM represents a successful model of organizational development and institutional adjustment for transportation operations in a large multistate region. The Port Authority of New York and New Jersey showed strong leadership in this case by guaranteeing funding and soliciting other agencies' financial contribution. Stable funding, the attention and support of senior management, and the involvement of MPOs were all considered key elements for a successful leadership model.

From the study one can conclude that for any regional transportation operations program, leadership plays a critical role in developing and sustaining the necessary partnerships between stakeholder agencies.

What Is the Most Effective Model for ATIS Partnerships?

Real-Time Traveler Information Services Business Models provides a thorough review of the shifting roles of public and private sector stakeholders in collecting, aggregating, maintaining, and disseminating traveler information. The emergence of 511 has driven increased public sector interest in traveler information and the public sector is assuming greater responsibility for data aggregation and enhanced and personalized information. The private sector is taking a greater role in data collection, taking advantage of opportunities in the mobile device market as an information outlet, engaging in value-added reseller (VAR) roles, developing business-to-business information supply chains, and exploring national models, given the historical lack of success with regional models. Other trends include the increased focus on probe data and greater availability of transit data.

The report provides a continuum of public sector options for partnering with private sector entities, ranging from the greatest public sector control to the greatest private sector control.

Public sector-funded operations offer the least risk and the most public sector control but also the least potential for revenue and utilization of emerging private sector technology. The case studies of AZTech™ and Oregon DOT's Trip Check are explored as examples of public-centered operations. Notably, Oregon DOT partnered with the Oregon Travel Information Council, a "self-funded state agency" that manages the State's logo sign program, to generate revenue to support Trip Check, which has developed into a mature and successful traveler information system. In the contracted operations model, a variation of public sector-funded operations, private sector entities serve under a termed contract in a fee-for-service arrangement. Advantages to this method include strong public sector control and branding, the ability of the public sector to contract with multiple entities (taking advantage of different skill sets), and the ability to

capitalize on private sector innovation. Reviewed programs discuss contracting strategies and highlight the variety of options available.

Franchise operations rely on the public sector supporting some or all of the operations for the traveler information system. Sustained private sector revenue generation is a critical component and the major challenge of a successful franchise operation. This model, though a strong idea on paper, has not proven sustainable on a regional level as high costs outweigh the revenues from a limited regional target audience. The report studies Virginia DOT's efforts at partnering with the private sector to utilize tourism-related advertising revenue to cover costs for traveler services, an effort which ultimately collapsed as revenue fell short.

Finally, private sector-operated and -funded models operate without direct funding from the public sector. This model typically has the highest risk and offers the least control for the public sector, but also has the greatest potential for revenue generation and greatest opportunity for tapping into private sector innovation. The American Automobile Association (AAA) Michigan hotline is reviewed as an example of a mutually beneficial arrangement. Revenue-generating models include free services supported by advertising, subscription models, and free basic information with premium services for a fee.

The report concludes that the most successful business models have had significant ownership and involvement by the public sector, but that private sector partnerships offer excellent opportunities to improve traveler information. It will be increasingly important for the public sector to develop policies to guide their involvement in private sector business activities.

Does Advanced Travel Information Provide Value? Are Users Willing to Pay for It?

The Minnesota DOT report *Route Preferences and the Value of Travel-Time Information for Motorists Driving Real-World Routes* assesses travelers' willingness to pay for pre-trip travel-time information on alternative routes. It aims at determining the value of ATIS service to the traveler beyond travel-time reduction, including the factors of other personal, social, safety, and psychological impacts from certainty into the value equation. By incorporating these factors through a variant of the stated-preference methodology where drivers actually drove the selected set of routes, the report was able to determine the route preferences of drivers who drove on real-world roadway alternatives and determine the usefulness of travel-time information to these drivers.

The study concluded that drivers find ATIS valuable for more reasons than just travel-time reduction. Travelers showed a willingness to pay for travel-time information, but generally no more than \$1 per trip. It was evident that the route preference decisions of drivers are complicated and influenced by a number of factors beyond travel-time. The study concludes with options for more detailed

surveys and studies, including the potential for a combination of GPS vehicle positioning systems with pre- and post-experiment surveys.

The TRB Study, *Considering Route Diversion as a Real-Time Crash Prevention Strategy on Urban Freeways*, concludes that route diversion (frequently enabled by advanced traveler information) can be used to reduce both the rear-end and lane-change crash risk on an urban freeway in real-time. Analysis using the PARAMICS micro-simulation model also showed that diverting vehicles a longer distance away from their original entry helped to increase the safety benefits. However, the study recognized that longer diversion distances increase travel time. This study helps demonstrate the overall roadway safety benefits that ATIS programs can have on crash prevention.

Evaluating Traveler Information Impacts on Commercial and Noncommercial Users, a TRB study, concludes that substantial network performance benefits can be obtained by disseminating traveler information. Model estimations showed significant average and total travel time reduction (up to nine percent) by increasing the percentage of electronic traffic information dissemination in incident conditions. With higher truck volumes as a percentage of total network traffic, greater travel cost savings are realized as the value of time for commercial vehicles is significantly higher than for noncommercial users.

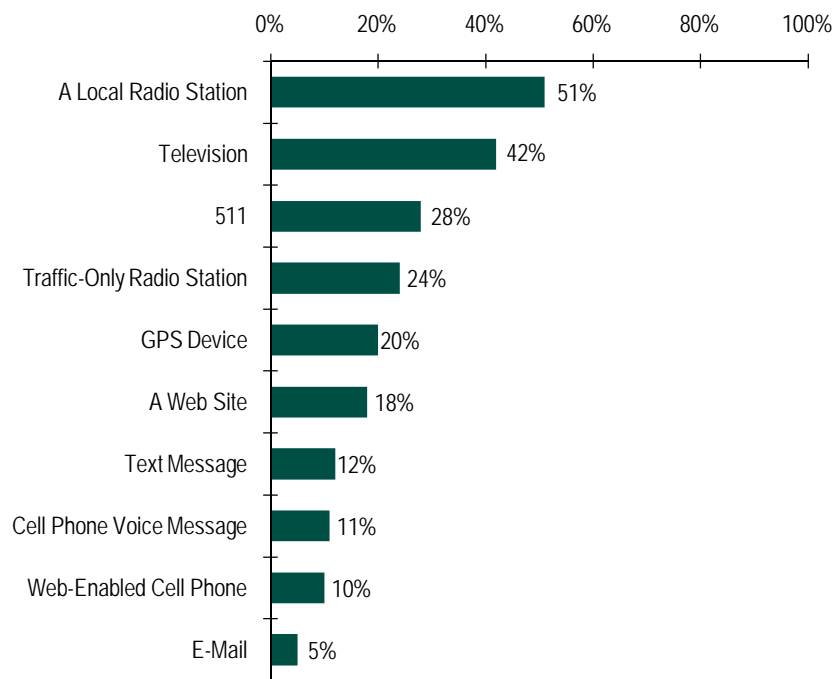
The 2007 study, *Congestion, Risk Aversion, and the Value of Information*, builds on the finding that traveler information is valuable but also considers risk-averse behavior. Based on complex decision-modeling, the paper concludes that, when presented with a “safe” route and a “risky” route where travel times fluctuate from day to day, a risk-averse driver will always take the safe route and not seek traveler information. The least risk-averse drivers will take the risky route and not seek traveler information. Drivers with moderate risk-aversion will actively seek traveler information and these represent the customer base for ATIS programs. The study further concludes that private information (available free to an individual) is the most helpful form of information (for an individual driver) and exceeds the benefits of having no information, having free information (for the traveling public), or having costly information (for the public).

How Do Travelers Access Advanced Travel Information? What Information Do They Use?

Effectiveness of Traveler Information Tools, a detailed analysis for North Carolina DOT, concluded that traveler information tools can provide significant benefit for planned incidences such as construction projects. Detailed modeling of an I-40 work zone showed that advanced traveler information provided significant time savings (a nearly 50 percent reduction in many cases). A comprehensive and well-planned public information campaign, including coordination with the media and deployment of ATIS assets, was shown to be effective. Travelers rely on the information to make travel decisions. This analysis did not study the effectiveness of ATIS on unplanned incidents.

The MORPC, *Advanced Traveler Information System Study*, contains a telephone survey of traveler information perceptions and preferences. The survey found that radio and television were by far the most commonly used sources of traveler information, that almost all drivers found DMS at least somewhat useful, and that awareness of specific ATIS programs in the Columbus region was fairly low. About 53 percent of drivers surveyed prefer to receive information through some variety of mobile device such as a cell phone or GPS device. In this region, which does not have 511 service, over two-thirds of those surveyed said they would definitely or probably try the service if available.

Figure 2.2 Survey Response on How Drivers Access Traveler Information



Source: MORPC Advanced Traveler Information System Study.

This study also included a nonscientific survey of the traveler information perceptions and preferences of Columbus area businesses. Businesses reported low levels of awareness for existing traveler information resources but liked the idea of 511 service for their employees' use. They showed skepticism on traveler information's return on investment.

The TRB study, *Synthesis of Customer Needs from Rural Traveler Information Surveys*, focuses specifically on the traveler information most important to rural travelers. Through a review of the findings from six western states' surveys, the study concluded that road and weather information are the most important types of traveler information for rural travelers, followed by construction information. Information on alternative routes, traffic delays, incident locations, and road conditions within city limits were found to be less important. The

study recommends that agencies providing traveler information for rural travelers should focus on the road, weather, and construction information.

Broadcast media was the dominant method for rural travelers to receive information, but telephone was a major source as well, along with DMS and camera images. Rural travelers indicated their most likely response to information was to allow more time for the trip, reflecting their more limited options (compared to urban travelers) in selecting an alternative route or mode.

A study prepared for the Pennsylvania Turnpike Commission entitled *Evaluation of the Pennsylvania Turnpike's Advanced Traveler Information System (ATIS) Project, Phase III* found that a high percentage of travelers on the Turnpike (over 50 percent) sought some type of travel information before making their trip.

Based on a mail survey, motorists most commonly sought traffic conditions, weather conditions, and route maps. They preferred to receive information early in their trip, but felt it was important for information to be available both before and during trips, particularly in times of bad weather and during severe congestion. Motorists felt the most useful media for receiving travel information were commercial radio, Variable Message Signs (VMS), and Highway Advisory Radio (HAR). Motorists showed a high degree of satisfaction with existing VMS and HAR services in their ability to communicate clearly. Displays at service/rest plazas also received high ratings.

Truckers, who filled out separate surveys, most commonly sought route maps, route information, and weather conditions. Those truckers with time-sensitive cargo showed greater interest in traffic conditions. Truckers used more frequent in-vehicle communications including CB radios and cellular telephones. Truckers found radio, VMS, and HAR useful, with more truckers using HAR than general motorists, though the HAR option was still not well known (only 15 percent knew of it). Long-haul truckers placed a high value on reliable and understandable information for roadways they had traveled infrequently. Computer and Internet use was much lower for truckers.

What Is the Role of Transit in Advanced Traveler Information Systems?

The Transit Cooperative Research Program (TCRP) 2009 report, *Transit, Call Centers, and 511: A Guide for Decision-Makers*, provides an overview of transit agency participation in 511 and the reasons for a historical lack of integration between transit and 511 despite the national 511 program being developed with a strong multimodal focus in mind. Transit administrators have generally declined involvement in 511 operations because of unclear benefits to users and the possibility of strain on transit call center resources. 511 administrators have likewise often failed to include transit considerations in 511 programs due to unclear benefits and difficulty persuading transit agencies to be involved.

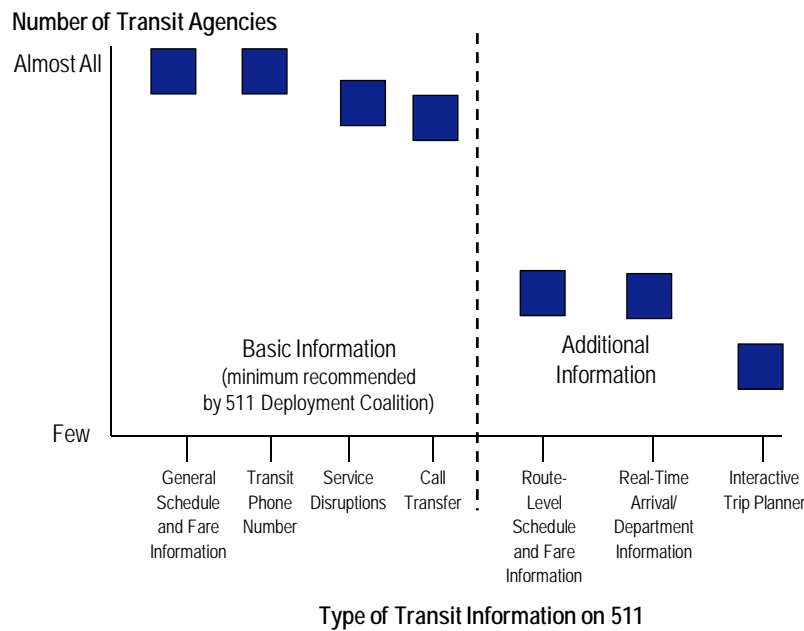
In the TCRP report, it is discovered that just over half (22) of the 42 total 511 systems in the United States in 2009 had no transit presence or content and few

9) met the minimum transit requirements recommended by the 511 Deployment Coalition. The Coalition’s guidelines recommend that every 511 system include basic information such as schedules, fares, routes, and service interruptions for every transit agency in the 511 service area and an opportunity to transfer from the 511 call center to the transit call center.

The study concludes that participating in 511 bears no significant cost or risks to transit agencies, but generates limited customer benefits. The benefits for transit agencies include strengthening relationships with other transportation agencies and the possibility of reaching a small set of additional customers. For 511 administrators, including transit can generate additional buy-in for 511 as a multimodal resource and improve the richness of information available to 511 customers. The study finds that most transit agencies will derive sufficient benefit to warrant basic information participation in 511. Figure 2.3 highlights recommended levels of transit agency information to be included in 511 systems.

The recent MORPC, *Advanced Traveler Information System Study*, recommended that transit be included as an element in the MPO’s ATIS program. One of the MPO’s major objectives was to reduce single-occupancy vehicles and promote transit service. This was an important element of their ATIS vision. With significant advances in transit data management technology, such as automated vehicle location (AVL), information sharing with web-based tools has become much simpler.

Figure 2.3 Recommendations for Transit Agency Information Shared through 511 Telephone Systems



Source: Transit, Call Centers, and 511: A Guide for Decision-Makers.

How Can the ATIS Model Perform Effectively in Rural and Tourism Situations?

The *Evaluation of the Eastern Kentucky Rural Highway Information Project 511 Tourism Service* report focuses on the performance of the Kentucky Transportation Cabinet's (KTC) 511 Tourism Service, following the implementation of tourist information services in southern and eastern Kentucky. The program was run through the Southern and Eastern Kentucky Tourism Development Association (SEKTDA), which teamed with private-sector partner Senture. Kentucky was one of the first to adopt a tourism-focused 511 application.

Several lessons were learned in the development of the rural region tourism 511 program. High-quality data were essential as were methods to collect and update data frequently and consistently. Tourism-focused calls require greater detail than simple directions and SEKTDA developed a comprehensive training program to ensure operators were knowledgeable about attractions. A new definition for a "good" 511 call had to be established as tourism-focused calls require greater operator attention rather than the quick response to a specific question typical for 511 calls.

The program experienced positive growth in calls and high satisfaction levels in customer surveys. The most effective methods of marketing the service were through 511 roadside signs and through radio and television ads. Marketing lessons learned include targeting users while they are driving through roadside and radio advertisements, and repeating the same simple message. Users surveyed stated that directions were the most important information, but also placed high levels of importance on information about Kentucky State Parks, lodging, restaurants, and general travel services.

The TRB study, *Advanced Traveler Information System for Alpine Leisure Trips*, surveyed skiing tourists in the region of Salzburg, Austria, to test their appreciation for and the usefulness of providing traveler information resources for this tourism-dependent area. Travelers indicated they found value in the information, but the quality was highly important. Regular visitors were less likely to access information (depending more on their prior experiences and knowledge) compared to first-time visitors. Reliable real-time traffic information along with routing information was the most sought after data. Researchers concluded that compliance with the data (driver's willingness to alter travel routes and times) was high enough to improve overall travel conditions.

The TRB study, *Tourism Business and Intelligent Transportation Systems*, sought to determine whether ITS had a noticeable impact on the local economy of gateway communities to Maine's Acadia National Park. The economy is heavily dependent on tourism and parking and congestion ranked highly among surveyed business managers as major issues. Advanced traveler information was considered as a potential solution. Most business managers were unaware of existing ITS resources, such as electronic signage, but supported additional

traveler information efforts. However, many business managers remained skeptical of 511 services because of a problem that occurred when the program first launched in Maine. The initial problem involved 511 reporting that parking lots were full, an action that many business managers felt would deter the visitors their economy depends on. The study concluded it is essential for agencies supporting ITS efforts to market it not only to the end user, but also to engage and coordinate with businesses for support.

The FHWA report, *Best Practices of Rural and Statewide ITS Planning*, includes a series of guidance highlights derived from case studies on rural ITS programs. Many are similar to the general ITS guidelines and mechanisms discussed earlier, but some focus more narrowly on the needs of rural ITS programs. Several successful rural ITS implementation efforts are commended for creation of manageable regional coalitions and teams. These programs emphasized the need for a common vision, outreach, and education as essential elements to implement successful programs.

The report recommended agencies focus on ensuring a consistent level of service for all roadways in the area. This results in a needs-driven approach rather than a broad congestion relief emphasis that can generate attention for projects.

How Can ATIS Managers Effectively Assess Their System's Performance?

Assessing the Benefits of Traveler and Transportation Information Systems explores the options state DOTs (specifically Washington DOT) can use to measure the benefits of ATIS. The report concluded that the ITS Deployment Analysis System (IDAS) is an effective option for assessing benefits. (*IDAS is developed and maintained by Cambridge Systematics.*) The study contends that ATIS is generally believed to be one of the most cost-effective investments that a transportation agency can make, but that a reliable and defensible system for proving that cost-effectiveness is needed. The study reviews three key methods: field surveys, simulation software, and surveys. IDAS is classified as a simulation software and the authors contend it is a simple inexpensive alternative to field studies for benefit evaluation. Surveys are seen as useful for customer satisfaction, but fall short on the quantifiable conclusions necessary for benefit/cost analysis.

IDAS is a “sketch” planning tool intended for screening and prioritization all ITS projects, not just ATIS projects. The software evaluates benefits in terms of vehicle miles traveled (VMT), vehicle hours traveled (VHT), volume-capacity (v/c) ratios, and vehicle speeds throughout a given network. IDAS was selected as the software simulator of choice (over alternatives such as SCRITS, PREUVIIN, and HOWLATE) because it is sponsored by U.S. DOT, is a progressive software (continually updated), is inexpensive and user-friendly, uses readily available data, is compatible with the leading travel demand forecasting models, and evaluates the benefits of 69 ITS treatments (11 of which are information-based). The report concludes that IDAS is an effective tool when local values are developed for the program's impact settings.

The report contains a useful summary of U.S. DOT established goals for ITS and corresponding performance metrics. The report also contains a detailed description of willingness-to-pay surveys, IDAS case studies, and recommended IDAS impact values for Washington DOT.

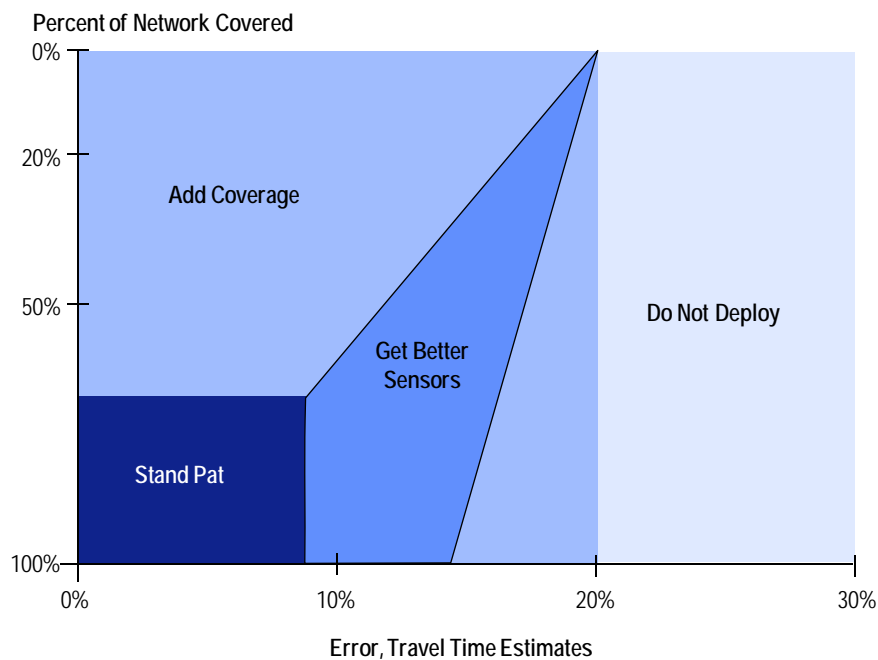
What Investments Should ATIS Managers Make to Improve Their Systems?

Toward a Strategy for Cost-Effective Deployment of Advanced Traveler Information Systems, a report prepared for TRB, studies the sensitivity of user benefits to the accuracy of an ATIS and explores how benefits vary across some basic coverage strategies. The report studies potential ATIS benefits in the Los Angeles area, relying on the HOWLATE (heuristic on-line web-linked arrival time estimation) simulation methodology.

This report focuses on the important roles of ATIS accuracy (correctly estimating and sharing travel times within an acceptable margin of error given the day-to-day variation of travel times) and surveillance coverage (the number of roadway miles for which traveler information is available). At times it is better to invest in improved accuracy, such as when coverage is extensive but accuracy is low, and at other times it is best to invest in improved coverage, such as when accuracy is high but coverage is limited.

Through detailed model analysis, this report generates the decision-making model for ATIS investments shown in Figure 2.4.

Figure 2.4 Potential Decision-Making Regimens for ATIS Investment



Source: *Toward a Strategy for Cost-Effective Deployment of Advanced Traveler Information Systems*.

It further offers the following guidance for ATIS investment management, simplified for this literature review:

- If initially deploying ATIS, first identify the day-to-day variability of travel on major roadways and select technologies and data processing techniques that are appropriate.
- To improve ATIS, first focus on understanding the accuracy of current posted travel times.
- If accuracy is poor, make investments to improve it.
- Once accuracy improves, then focus on increasing ATIS geographic coverage.
- Be aware of the final goals, where additional ATIS deployment will generate additional costs but not generate additional benefits.

The findings of this paper are focused on urban ATIS deployment strategies, but may still be applicable in a regional or statewide context with some variation.

The U.S. DOT study, *Model Deployment of a Regional, Multimodal 511 Traveler Information System*, explores the degree of success achieved by the Arizona DOT in implementing the U.S. DOT National 511 Model Deployment Program, an update to existing 511 services. The Model Deployment program sought to improve 511 user interfaces and make comprehensive data available to drivers.

The study offers five key lessons that may be of value to agencies undertaking Model Deployment or deploying 511 program for the first time.

- If specific, near-term impacts are important, prioritize and focus your 511 implementation. 511 deployers are strongly encouraged to utilize a directed, “problem-solving” approach to achieve the highest priority objectives by concentrating resources in these areas.
- Expect to spend considerable resources on implementing voice recognition. The successful application of voice recognition to 511 systems is challenging and resource intensive.
- Pursue a vigorous, targeted 511 marketing program to promote awareness. Deploying or upgrading service is not sufficient to attract new customers. Greater outreach is needed. DMS is one useful marketing tool.
- In the early planning stages, thoroughly investigate institutional and technical issues associated with data input from partner agencies. Coordinating with partner agencies is key to success. The study also recommends vigorously building support among local agencies for their input of roadway information.
- Incorporate mechanisms for capturing user feedback for system evaluation. Developing a procedure to quantitatively measure the users’ level of satisfaction with new or existing features without negatively impacting their service experience can go a long way toward improving the system.

The TRB study, *Usability Testing and ATIS Web Sites*, focused on the potential for improving one critical tool in traveler information sharing, ATIS web sites. The study focuses on trip planning, one of the major activities an ATIS web site can offer drivers, and principally focused on the user group of older drivers. The study found that simple modifications to web sites can improve their ease of use for older drivers, highlighting successful elements such as high contrast in color scheme, large font sizes, and sparing use of pull-down menus.

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3.0 Survey of the Traveling Public

3.1 METHODOLOGY

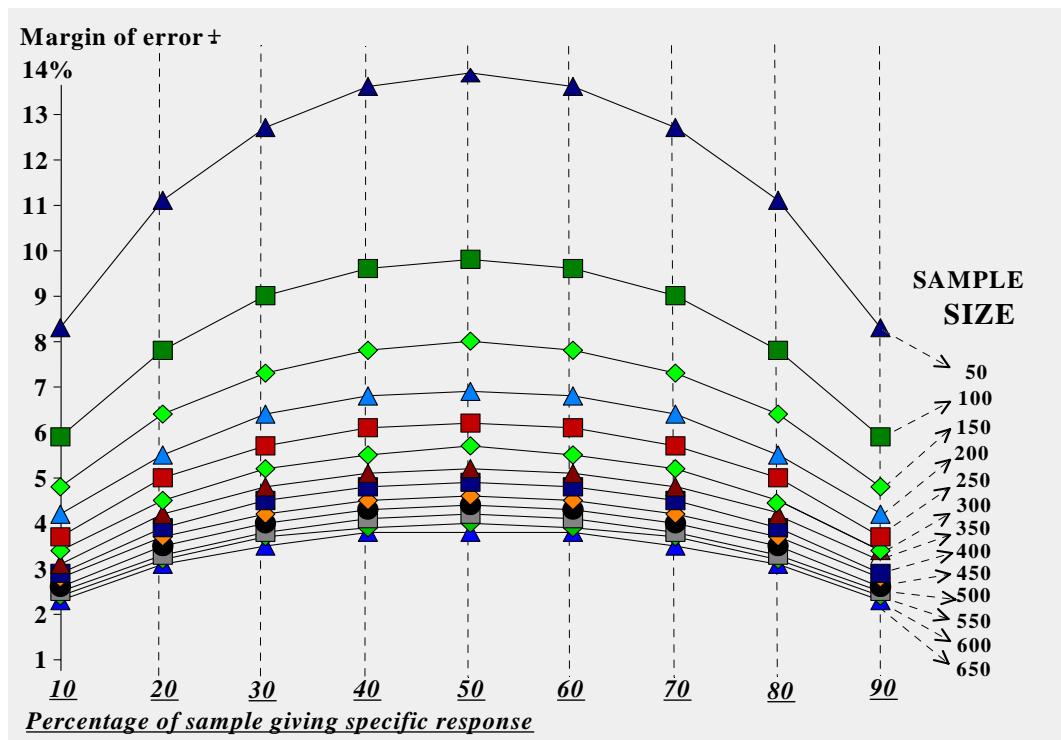
The Study Team administered interviews with 600 Michigan residents from April 22nd to the 25th, 2010. An analysis of this survey revealed that a disproportionate number of older residents had been sampled so the decision was made to augment the sampling with an additional 109 respondents age 35 and younger. This oversampling based on age was conducted on June 5th and 6th, 2010 and resulted in an overall survey sample of 709 respondents. Respondents were included in the sample if they were 18 years of age or older and used Michigan roads either as a motorist or a passenger on public transit. They were chosen using an interval method to randomly select households with commercially listed phone numbers. The sample was stratified so every area of the state is represented in the sample according to its contribution to the State's total population

In interpreting survey results, all surveys are subject to error; that is, the results of the survey may differ from that which would have been obtained if the entire populations were interviewed. The size of the sampling error depends on the total number of respondents to a particular question. The table on the next page represents the estimated sampling error for different percentage distributions of responses based on sample size. For example, 53 percent of the 686 respondents qualifying for the question reported that they "Never" listen to traffic reports on the radio (Q.11). As indicated on the chart on the next page, this percentage would have a sampling error of plus or minus 3.7 percent. That means that with repeated sampling, it is very likely (95 times out of every 100), that the percentage for the entire population would fall between 49.3 percent and 56.7 percent, hence 53 percent \pm 3.7 percent.

Table 3.1 Sampling Error By Percentage (at 95 in 100 Confidence Level)
Percentage of sample giving specific response

Sample Size	10	20	30	40	50	60	70	80	90
	% Margin of Error ±								
700	2.2	3.0	3.4	3.6	3.7	3.6	3.4	3.0	2.2
650	2.3	3.1	3.5	3.8	3.8	3.8	3.5	3.1	2.3
600	2.4	3.2	3.7	3.9	4	3.9	3.7	3.2	2.4
550	2.5	3.3	3.8	4.1	4.2	4.1	3.8	3.3	2.5
500	2.6	3.5	4	4.3	4.4	4.3	4	3.5	2.6
450	2.8	3.7	4.2	4.5	4.6	4.5	4.2	3.7	2.8
400	2.9	3.9	4.5	4.8	4.9	4.8	4.5	3.9	2.9
350	3.1	4.2	4.8	5.1	5.2	5.1	4.8	4.2	3.1
300	3.4	4.5	5.2	5.5	5.7	5.5	5.2	4.5	3.4
250	3.7	5	5.7	6.1	6.2	6.1	5.7	5	3.7
200	4.2	5.5	6.4	6.8	6.9	6.8	6.4	5.5	4.2
150	4.8	6.4	7.3	7.8	8	7.8	7.3	6.4	4.8
100	5.9	7.8	9	9.6	9.8	9.6	9	7.8	5.9
50	8.3	11.1	12.7	13.6	13.9	13.6	12.7	11.1	8.3

Figure 3.1 Percentage of Sample Giving Specific Response



3.2 EXECUTIVE SUMMARY

EPIC ▪ MRA was commissioned as a subcontractor to Cambridge Systematics, Inc. as part of their more comprehensive contract with Michigan Department of Transportation concerning strategies for improving traveler information. Specifically, EPIC ▪ MRA was used to conduct a statewide survey of adult residents with a primary focus of measuring awareness, use and opinion concerning various traveler information methods currently in use or being considered for use.

In keeping with MDOT's research goals, much of the survey was devoted to asking respondents about different types of traveler information sources, how useful the respondents found each of them to be and, whether or not information from the several sources caused them to alter their travel plans. For those who receive traffic information, they tend to find it useful and accordingly, many alter their travel plans based on the information. As will be seen, however, a large segment of the traveling public does not regularly consult available non-commercial information sources.

3.3 KEY FINDINGS

1. The vast majority of respondents – 93 percent – use Michigan roads exclusively as drivers, with just under six-in-ten (57 percent) being on the roads at least three days a week engaged in a commute to either work or school, or both.
2. Of the commuters (55 percent of the entire sample of 709) nearly all – 93 percent – travel alone in a car. Four percent reported being in a carpool, and 1 percent each reported using public transit or a bicycle.
3. The amount of time spent on a commute is fairly evenly distributed across time length ranges split into 5-minute increments of less than 5 minutes to more than 45 minutes.
4. Approximately one-third of all travelers indicate that they obtain traffic report information via radio and/or television traffic report segments. The vast majority of this subset also responded that the reports are useful to them, and that they have changed their travel plans based upon them.
5. More than two-thirds of travelers (69 percent) reported having observed alternate route information on an overhead electronic display. Of the six types of information displayed on such signs, “alternate route” and “travel time” information were recalled by the greatest number of travelers (69 percent and 67 percent, respectively), with “air quality alerts” being recalled by the fewest (13 percent) number of respondents. Seventy-five percent of travelers report that the information observed on the overhead signs is useful and most – 59 percent – report having changed their travel plans based on the information.

6. Over eight in 10 travelers (83 percent) report having seen a portable traffic information sign. Nearly all of these respondents indicate that they are useful, and over two-thirds reports having changed their travel behavior based on the information conveyed on a portable sign.
7. Fixed overhead signs are considered more useful than portable signs on trailers; however, this opinion is held only by a plurality of 44 percent to 37 percent.
8. Roughly one-third of all drivers (31 percent) reports owning a GPS device, although just over one in 10 indicated that their GPS also displayed traffic information. Better than three-quarters of those who own a device that displays traffic information report using their GPS for traffic information at least a few times a year. About one-third of all travelers (32 percent) indicates that they are at least likely, if not almost certain, to have an in-car GPS device within the next two years.
9. Fewer than one in five of all respondents (19 percent) report knowing at least “a little”, about MDOT’s web site, “MiDrive”. Of these, approximately two-thirds (63 percent) report visiting the site at least, “a few times a year”, and it is used predominantly for construction information updates. Of the users of the site, there is near unanimity (97 percent) that it is at least, “somewhat useful” and a strong 84 percent report having changed their travel plans based on the information. The alternative traffic information web sites travelers most frequently cited were Google maps, Mapquest and Yahoo maps.
10. Three in 10 of all respondents report owning a web-enabled cell phone, but few of them (11 percent) indicated using it to find traffic information. However, all 23 of these respondents reported that they found the web information obtained via their phone to be at least “somewhat” useful.
11. Of 11 recited types of travel information, respondents deemed “Roadway construction information” and, “Information on alternate routes” to be the most useful – at 95 percent and 90 percent, respectively. Respondents reported, “Comparisons of different modes of transportation, like travel time by car versus by public transportation” and, “Public transit information...”, to be least useful – at 25 percent and 28 percent respectively.
12. Over seven in 10 of all respondents report recreational travel in excess of 50 miles at least a few times a year. These travelers are most reliant on TV and radio traffic reports for pre-trip planning, although AAA, GPS devices and web sites such as Mapquest also have significant usage. Ninety percent of these respondents reported that they DID NOT use the MiDrive web site for pre-trip planning. When asked to name which one or two sources would be the most convenient for them to find traffic and other travel information, radio, television and web sites were the three most mentioned.
13. Of the 40 percent of all respondents who have ever used a social media web site, only 6 percent were aware that MDOT provides traffic information on

Facebook and Twitter. Just over four in 10 of these (17 individuals) have ever availed themselves of this information resource.

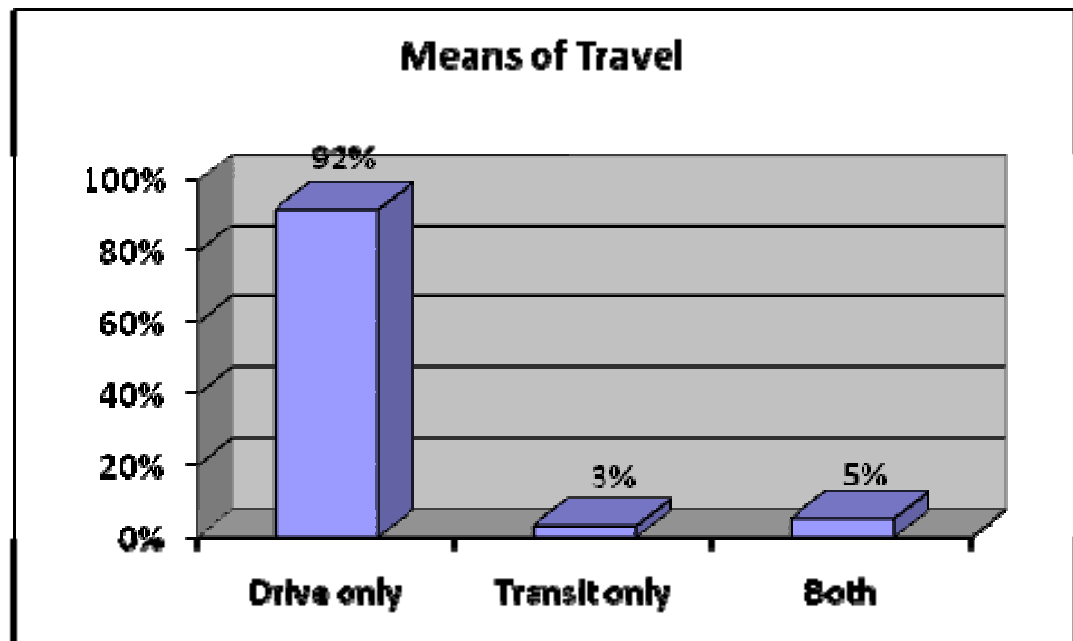
14. More than three-quarters of all respondents (78 percent) reported having stopped at a highway rest area. Among these individuals, 85 percent expressed the opinion that providing real-time traffic information at a rest stop would be at least “somewhat” useful.

3.4 QUESTION-BY-QUESTION RESULTS

Means of Travel and Commuting Information

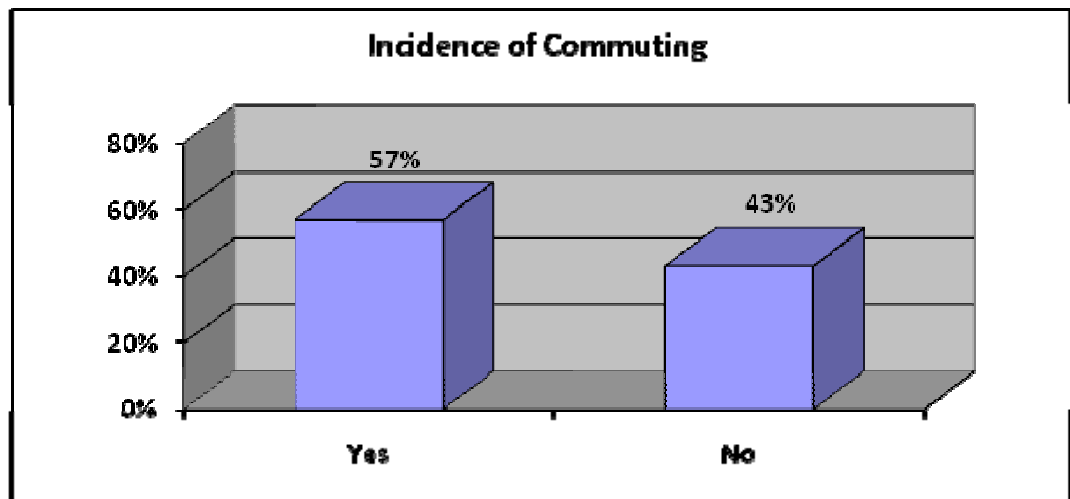
Vast Majority of Travelers Do Not Use Public Transit

As an initial qualifying question, respondents were asked if they travel on Michigan roads and if so, by which means. Only three percent reported exclusive use of public transit, with another five percent saying they use both public transit and drive in a private vehicle.



Over One-Half of Drivers Commute, Most Driving Alone for About 16 to 20 Minutes

Among the respondents who reported driving on Michigan roads, just under six in 10 – 57 percent – reported they commute to either work or school or both, at least three days out of the week.

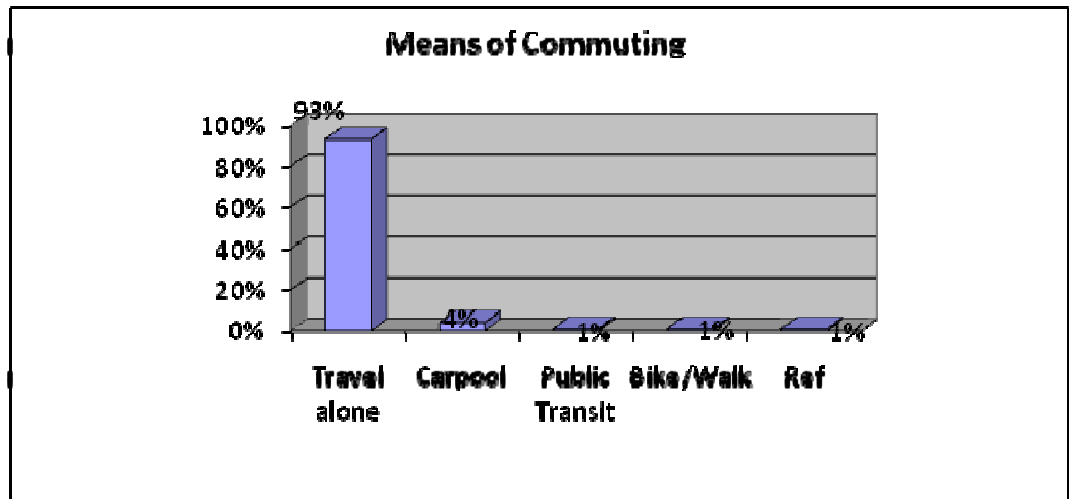


Subgroups responding “Yes” in proportions significantly higher than the norm included:

Q.2 Commute N=686 – “Yes” Higher than 57%:

- 81% Men under 50
- 78% Find MiDrive Very useful
- Changed plans based on MiDrive
- 76% Under 50
- 74% Age 18-35
- 73% Visit social web sites “Most/Many” days
- 72% Women under 50
- 70% Have a web-enabled phone
- 69% Know “A lot/Some” about MiDrive
- Changed plans based on other sources
- 67% Have basic GPS
- 66% MRA Central region
- Consult other web sources
- College educated
- 65% Listen to radio reports
- 64% Changed plans based on reports
- Oakland County residents
- MDOT Grand Region

Among commuting respondents, nearly all reported that they travel alone in their vehicle during their commute.



As shown in the table below, the median commute time for all commuters is in the 16- to 20-minute range

N=385	
7%	5 minutes or less
16%	6-10 minutes
15%	11-15 minutes
17%	16-20 minutes
20%	21-30 minutes
14%	31-45 minutes
11%	More than 45 minutes
-	Undecided/Refused

Subgroups reporting commute times of more than 20 minutes in proportions significantly higher than the norm included: Q. 5 Commute Time N=385

21-30 Minutes – Higher than 20%:

- 27% *Have real time GPS*
Changed plans based on MiDrive
College educated men
- 26% *Listen to radio reports weekly*
Radio reports “Very” useful
Older college educated
- 25% *“Sometimes/Seldom” on social network*
Age 41-49

24% *Changed plans based on radio reports*

Know “A lot/Some” about MiDrive

Men over 50

MDOT University Region

- 31-45 Minutes – Higher than 14%:

20% *MDOT University Region*

19% *Have a web-enabled phone*

“Sometimes/Seldom” on social network

Wayne County residents

18% *Know “A lot/Some” about MiDrive*

Age 50-55

- More than 45 Minutes – Higher than 11%:

27% *Consult other web sources*

22% *Changed plans based on other sources*

Younger college educated

MDOT Grand Region

21% *MiDrive “Very” useful*

Changed plans based on MiDrive

17% *“Sometimes/Seldom on social network*

16% *Portable signs “Very” useful*

In a follow-up question for the handful of respondents (N=16) who reported using a carpool, 31 percent indicated using an MDOT “Park & Ride” lot at least, “a few times a month”, with 69 percent saying they have never used MDOT’s lots.

Most Driving Done on the Weekends, least After 6:30 PM

In another question aimed at framing a picture of travelers’ driving habits, respondents were asked if they were on the road during certain periods of the day and week. Eighty-six percent of the traveling public reported being on the road – either as a driver or a passenger – on Saturdays, Sundays or both. At 54 percent, the hours after 6:30 PM saw the least number of travelers. The table below illustrates the distribution from most to least:

	Yes	No	Undec
On either a Saturday, Sunday or both	86%	14%	–
During the day between 9 a.m. and 3:30 p.m.	67%	33%	–
The evening rush, 3:30 p.m. to 6:30 p.m.	67%	33%	–
The morning rush, 5:30 a.m. to 9 a.m.	59%	41%	–
During the evening after 6:30 p.m.	54%	45%	1%

Subgroups reporting commute times during the morning rush in proportions significantly higher than the norm included:

Q. 6: Morning Rush, 5:30-9:00 AM N=579- Higher than 59% “Yes”:

- 84% Older college educated
- 80% Men under 50
- 79% Commuters
- 78% Age 41-49
- 77% Age 30-40
- 70% Age 50-55
- Age 18-35
- MDOT Grand Region
- 69% Have seen o.h. air quality
- Visit social web sites “Every day”
- 68% MiDrive “Very” useful
- Have a web-enabled phone
- College educated
- College women
- 67% Listen to radio reports weekly
- Changed plans based on MiDrive
- College men
- 66% Know “A lot/Some” about MiDrive
- Women under 50
- 65% Radio reports “Somewhat” useful
- 64% EPIC ▪ MRA West Region
- Oakland County residents

63% *Changed plans based on radio reports*

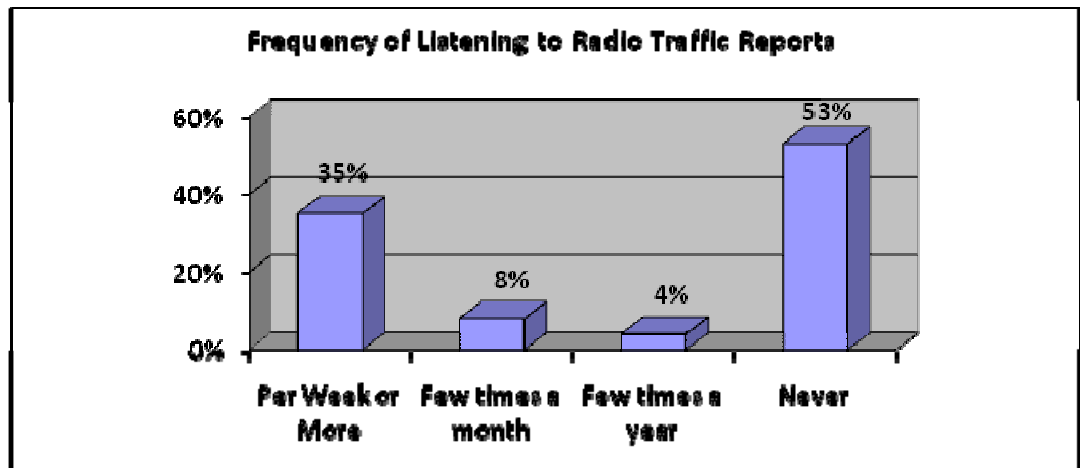
Have basic GPS

African Americans

Traditional Sources of Travel Information

Over One-Half Never Listen to Traffic Reports on the Radio

Fifty-three percent of travelers reported never listening to traffic reports on the radio, while 35 percent said they listen to them, “a few times a week or more”, and another 12 percent listened to the radio reports, “a few times a month or more” (8%) or, “a few times a year” (4%).



Subgroups reporting listening to radio reports a few times a week or more in proportions significantly higher than the norm included:

Q 11. N=686 listen to radio reports few times a week or more, higher than 35%:

85% *Radio reports “Very” useful*

61% *Macomb County residents*

54% *TV reports “Very” useful*

50% *Changed plans based on TV reports*

49% *Wayne, Oakland, Macomb residents*
Watch TV report weekly

47% *MDOT Detroit-Metro Region*

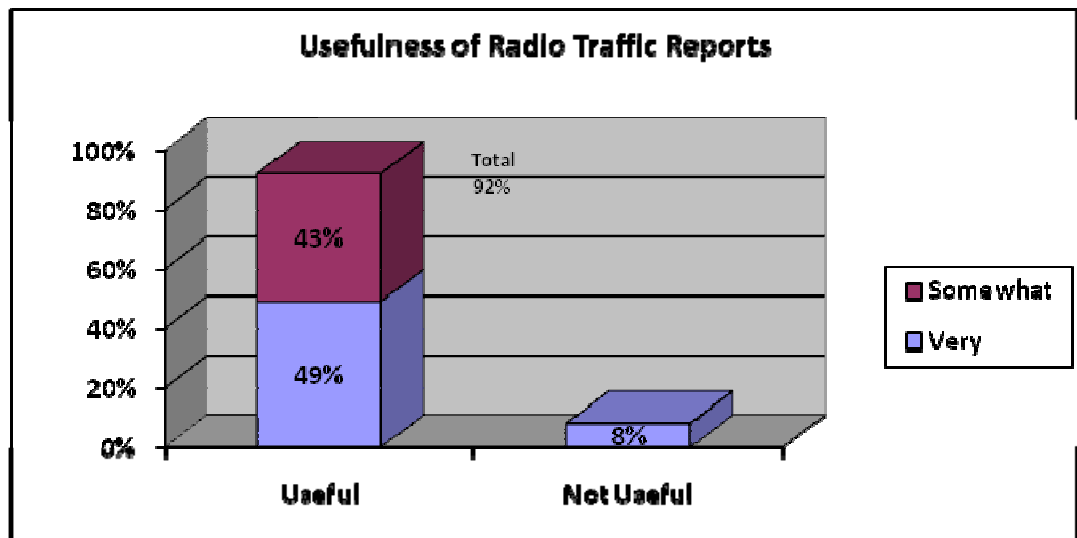
46% *Watch TV reports*

45% *Age 41-49*

43% *Changed plans based on other web sites*
“Seldom/Never” visit social networks

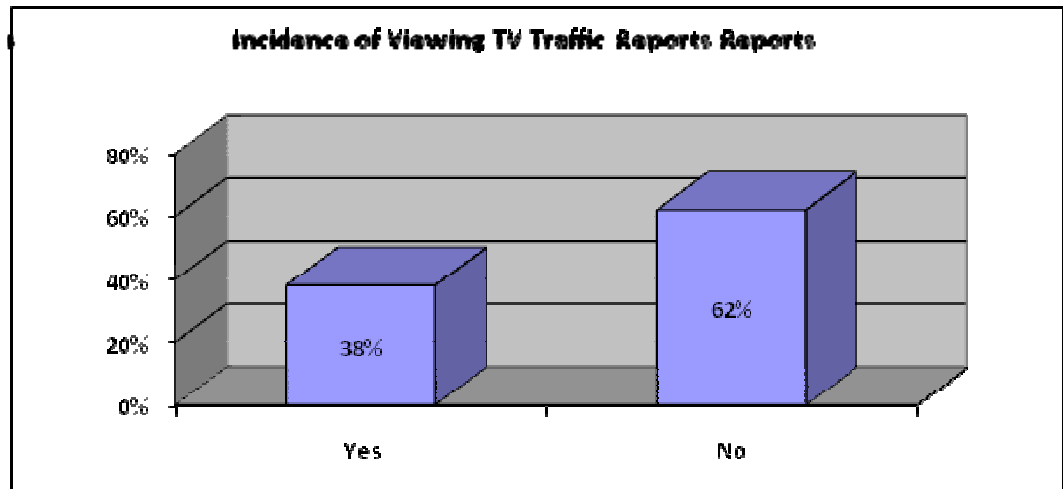
- African Americans
- 41% Older no college
- Older college educated
- 40% Commuters
- Portable signs “Somewhat” useful
- Age 50-55
- Women under 50

Among the 47 percent of travelers who listen to radio traffic reports, nearly all of them – 92 percent – indicated that they found them either “Very” (49 percent) or, “Somewhat” (43 percent) useful, and among those who found the reports useful, 84 percent reported altering their driving plans based on the traffic reports heard on the radio.



Nearly Two-Thirds Never Watch Traffic Reports on Television

When asked if they watch traffic reports on television, 62 percent of travelers reported that they do not – a result nearly 10 points higher than in the case of non-listenership to radio traffic reports.



Subgroups reporting viewership of television traffic reports in proportions greater than the norm included:

Q 14. N=686 "Yes", higher than 37%:

57% *Changed plans based on other web sites*

56% *Radio reports "Very" useful*

O.H. message - air quality

53% *Other web sites "Very" useful*

52% *GPS info "Very" useful*

African Americans

50% *O.H. message "Very" useful*

49% *Listens to radio reports weekly*

Changed plans based on radio report

O.H. message - special events

Changed plans based on GPS

46% *Wayne, Oakland, Macomb residents*

MDOT Detroit-Metro Region

45% *O.H. message - amber alert*

Portable signs "Very" useful

44% *Seen portable signs*

Age 41-49

43% *Know "A lot/Some" about MiDrive*

High School or less

Age 50-55

42% O.H. message – alternate routes

Changed plans based on o.h. message

Changed plans based on portable signs

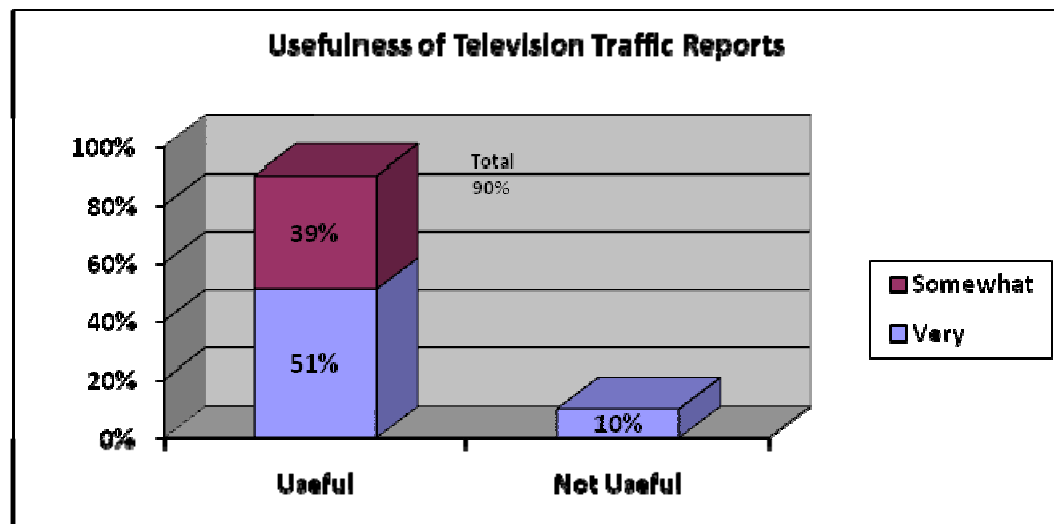
Age 65 and older

41% O.H. message – travel times

O.H. message – accidents

For those who do watch traffic reports on television, 82 percent do so, “a few times a week” with another 12 percent watching, “a few times a month”, and the balance reported less frequent viewership of television traffic reports.

As was the case with radio reports, nearly all of the respondents who reported watching televised traffic reports found them to be useful, and among those who found the reports useful, 80 percent reported altering their driving plans based on the traffic reports viewed on TV.



In a follow-up question, travelers who reported watching televised traffic reports were asked if the reports included a live feed of current traffic conditions. Eighty percent of this segment of the sample reported that the reports they watched included a live feed, 84 percent of this group found them useful and of these, 70 percent reported altering their driving plans based on the information obtained from live feeds.

Info Pertinent to Travel Most Recalled Message Type on Overhead Electronic Signs

A brief description of permanent overhead electronic message signs was read to drivers in the sample, who were then asked if they had seen any of six different

types of messages commonly displayed on them. As is illustrated by the table below, recall of messages was most prominent for information pertaining to traveling, as opposed to information not directly related to the respondents' movement.

	Yes	No	Undec
Information on alternate routes	69%	31%	-
Travel time information indicating estimated travel times to a particular location along the highway	67%	33%	-
Information about crashes and other traffic incidents	57%	42%	1%
Missing child alerts, also known as "Amber" alerts	57%	43%	-
Information on special events in the area	26%	73%	1%
Air quality alerts	13%	87%	-

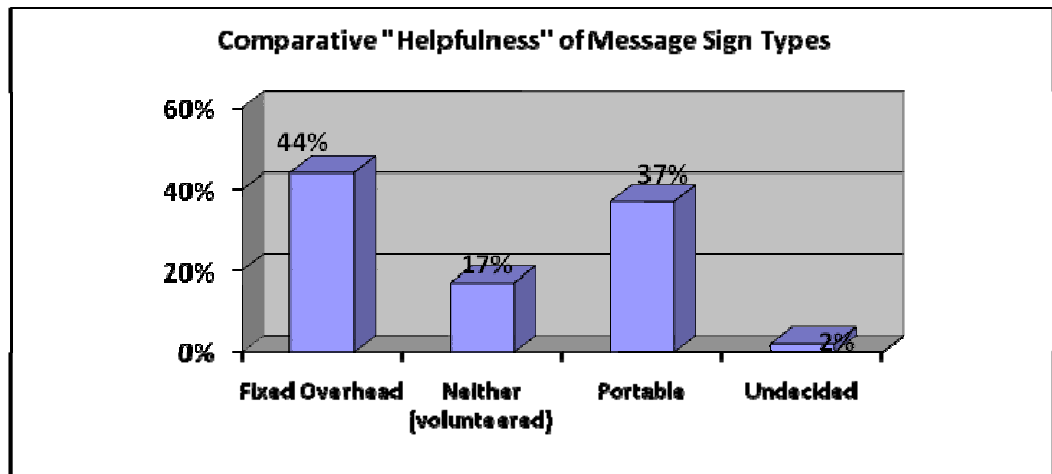
As part of a series of follow-up questions, drivers were asked if they recalled seeing any other type of message on the overhead signs. Among the 10 percent who said they had seen other messages, "Weather information" and the Department of State Police - Office of Highway Safety Planning's seat belt and drunk driving slogans were the most mentioned.

The practical effect of the overhead sign messages had slightly less apparent impact with respondents than either radio or television traffic reports, in that opinion regarding their usefulness - at 75 percent - was at least 15 points lower than the latter mentioned sources. Likewise, fewer than six in 10 (59 percent) offered that they changed their driving plans based on messages seen on overhead signs.

Mixed Results Regarding Portable Signs Versus Fixed Overhead Electronic Signs

When asked if they had ever seen a portable electronic message sign, 83 percent of drivers indicated that they had. Of these, 94 percent indicated they found them to be at least "Somewhat" useful (57 percent "Very"), and 68 percent reported changing their driving plans based on a message read on a portable sign. However, based on the comparison of results regarding usefulness and altered driving plans, the inference of a preference for portable signs over fixed overhead signs is not borne out in a direct question on the matter.

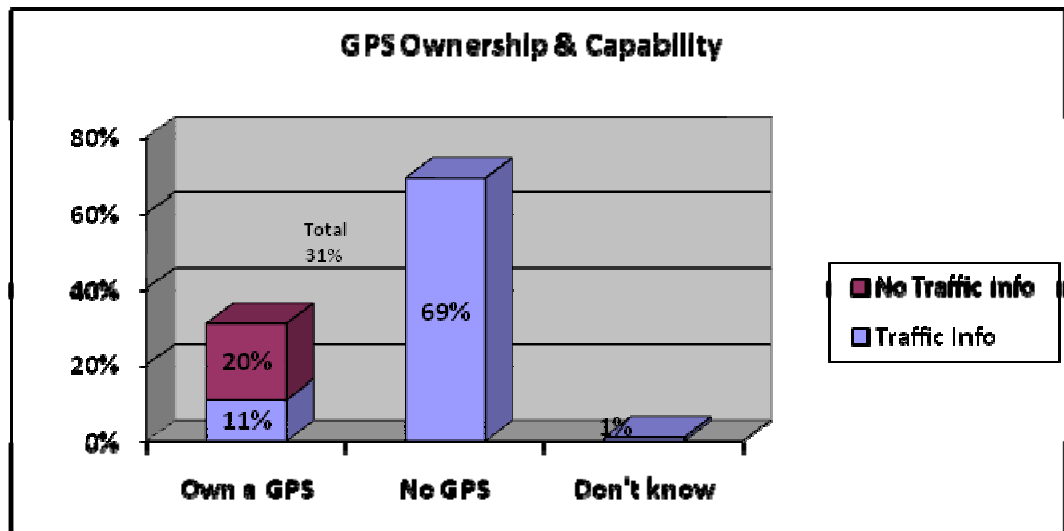
When asked which of the two message signs they found to be more helpful in dispensing information pertinent to driving plans, a plurality of 44 percent opted for the fixed overhead message signs versus 37 percent for portable signs. The following graph illustrates the distribution:



Satellite Sources of Travel Information

Nearly One-Third Have GPS, But Few Have Real-Time Traffic Info Displays

Thirty-one percent of travelers reported owning a GPS device for use in their vehicle, with 11 percent indicating that their device also displays traffic information.



Subgroups reporting ownership of a GPS which also displays traffic information in proportions greater than the norm included:

Q 30 - Do you have a GPS device - N=686.

- "Yes - also displays traffic information" higher than 11%:

20% Age 18-29

18% Visits social web media, "Every day"

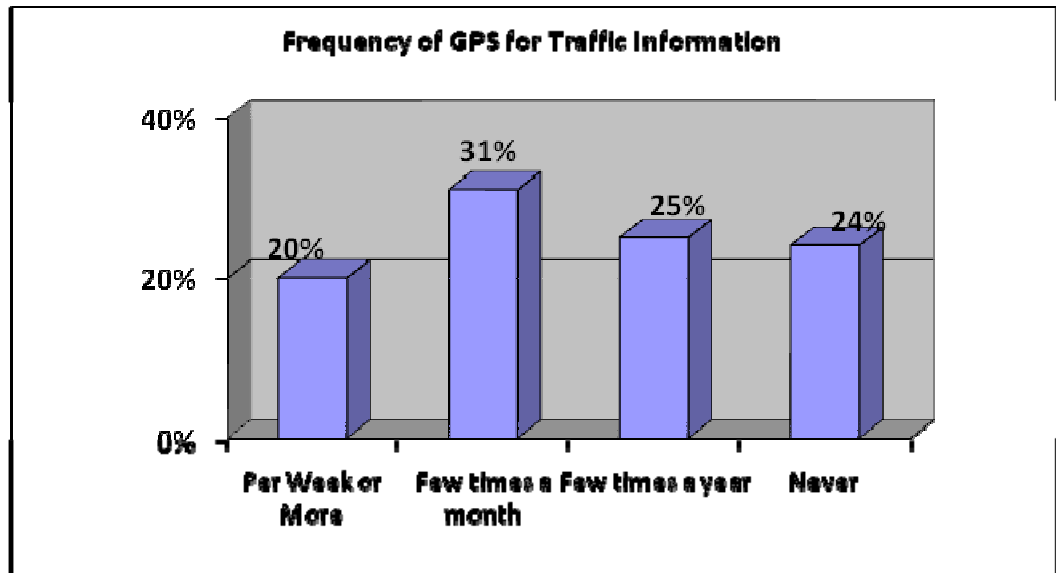
17% Has a web-enabled phone

16% EPIC • MRA North region

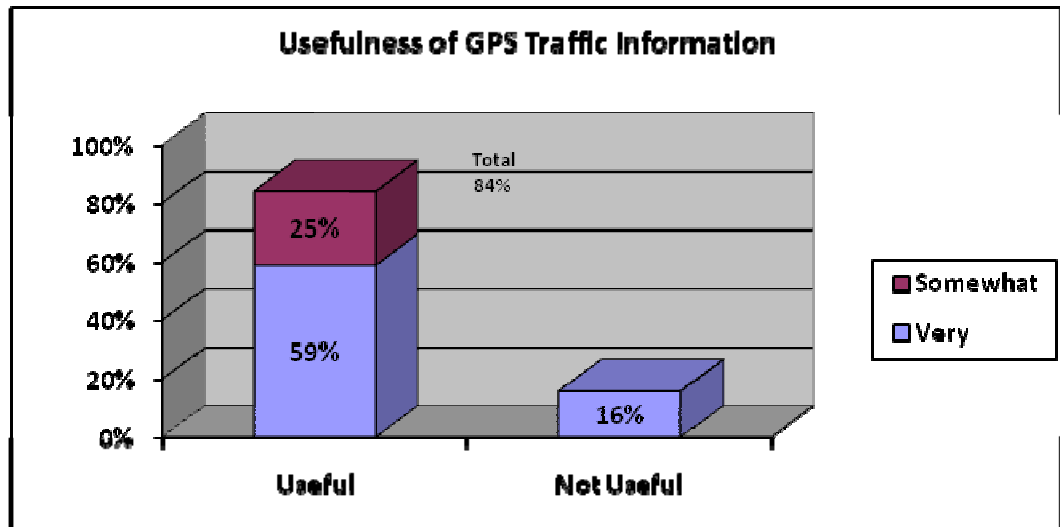
Age 18-35

15% Know "A lot/Some" about MiDrive

The resulting 74 respondents who reported having traffic information available on their GPS were then asked how frequently they have used that feature, how useful they found it, and whether or not they have altered their driving plans based on the information they retrieved.



As can be seen, nearly one in four respondents with traffic information-enabled GPS devices "Never" use the device for traffic information updates. However, for those who do, they generally find them to be "Very" useful:

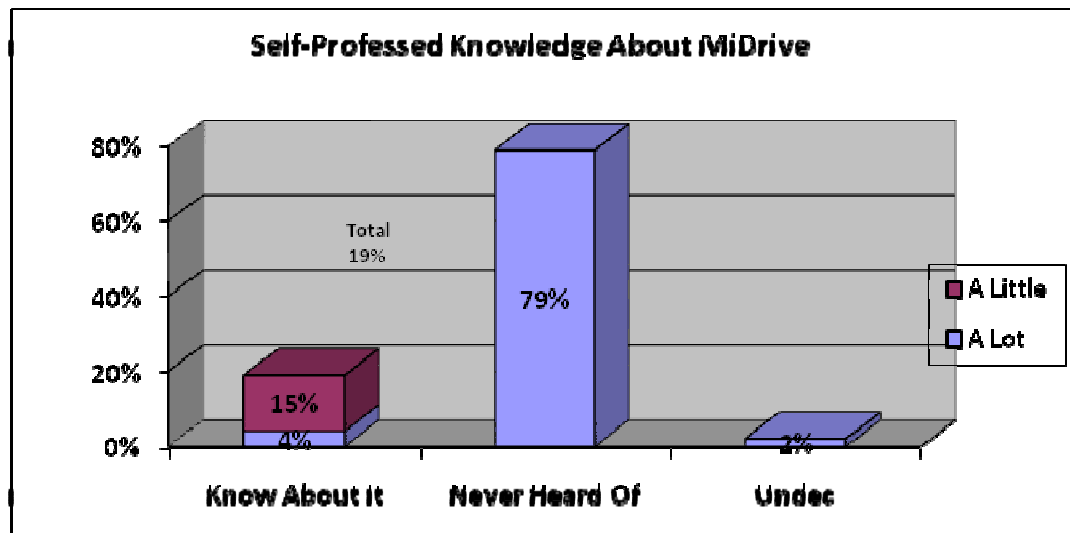


For the travelers who found the GPS traffic information “Useful”, 75 percent of them reported altering their driving plans based on the information.

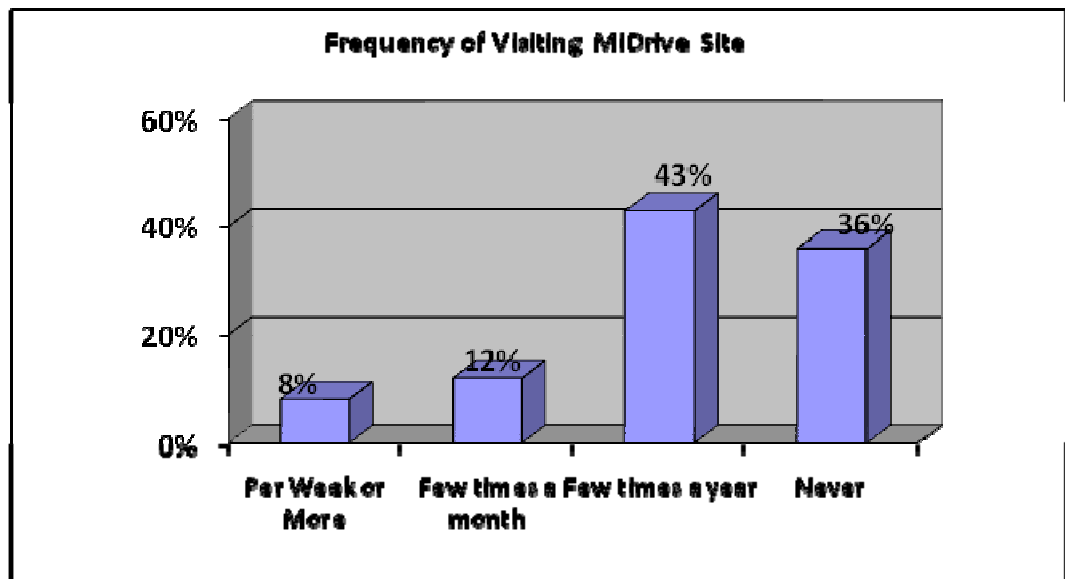
Web-based Sources of Travel Information

MiDrive Relatively Unknown, But Appreciated By Those Who Use It

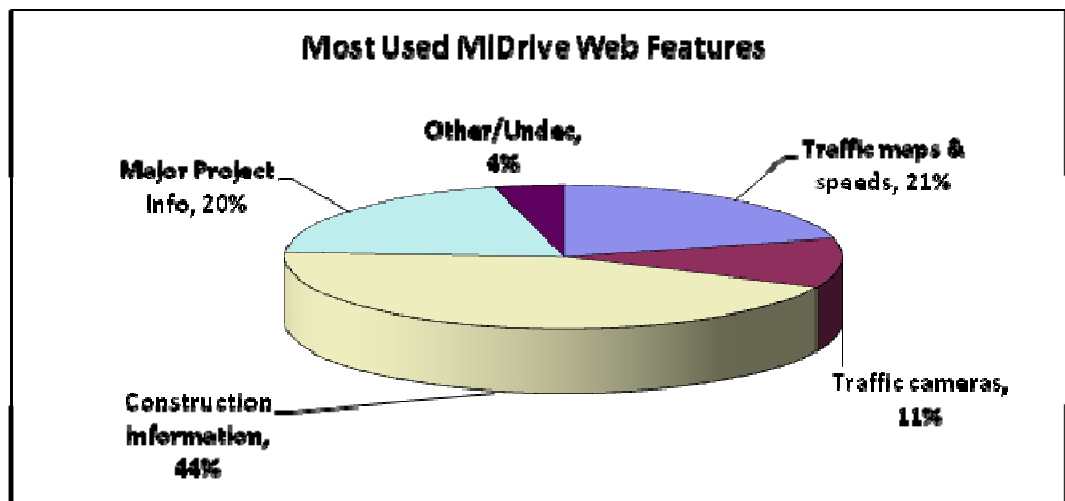
All respondents were asked to assess how much they know about the Michigan Department of Transportation’s “MiDrive” web site.



Those who expressed knowing at least “A little” about MiDrive were then asked how frequently they visited the web site.



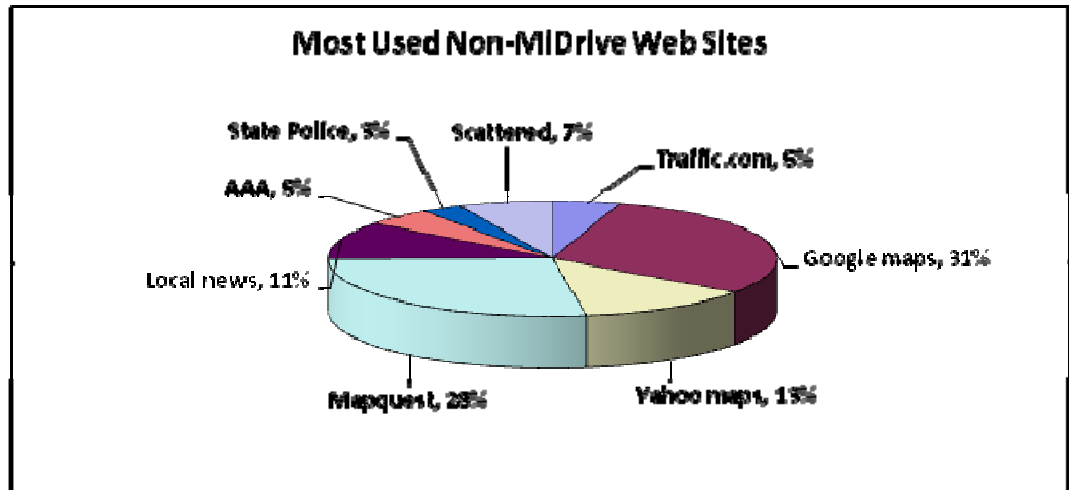
A list of five different MiDrive site features were read to those respondents reporting that they had visited the site in question. They were then asked which of the features they had used. The most popular MiDrive feature used dealt with “Construction information”, followed by “Traffic maps and speeds” and, “Major project information.” The following chart illustrates the distribution:



Those who reported visiting the MiDrive site were then asked to rate the usefulness of the information found there. Ninety-seven percent reported they found MiDrive to be “useful” – 72 percent “Very” useful. Of those reporting the site to be either “very” or “somewhat” useful, 84 percent indicated they had changed their travel plans because of the information on MiDrive.

Other Web Sites Also Sparsely Utilized for Traffic Info

All respondents were asked if they consulted web sites other than MiDrive to obtain traffic information. Again, the vast majority – 86 percent – reported that they did not. The 13 percent who indicated that they did go to other web sites for traffic information, cited a variety of locations to visit. Most frequently used the better known mapping sources, such as Google maps, Yahoo maps, and Mapquest. The following chart illustrates the distribution:



Subgroups reporting visiting non-MiDrive web sites displays traffic information in proportions greater than the norm included:

Q 50 – Do you use any other (non MiDrive) web sites for traffic info – N=709.

“Yes” – higher than 13%

- 37% MiDrive – changed plans
- 31% MiDrive “Very” useful
- 25% Uses MiDrive, “A lot/Some”
- 22% Social web sites “Every day”
- 21% Age 41-49
- 20% TV reports “Very” useful
 - Changed plans based on TV reports
 - O.H. message – Air quality
- 19% Radio reports “Very” useful
 - Changed plans based on radio report
 - Watches TV traffic reports
 - Macomb County residents

- 18% EPIC ▪ MRA Outer Metro Region
 - O.H. message – “Useful”
 - O.H. message – changed plans
 - Portable signs “Useful”
 - Men under 50
- 17% O.H. message – Events
 - Younger college educated

As might be expected from self-selected sources of information, nearly all respondents (99 percent) reported finding the site(s) they mentioned as “Useful”, although only two-thirds indicated they changed their travel plans based on the information they found.

Nearly One-Third Own Web-Enabled Cell Phones

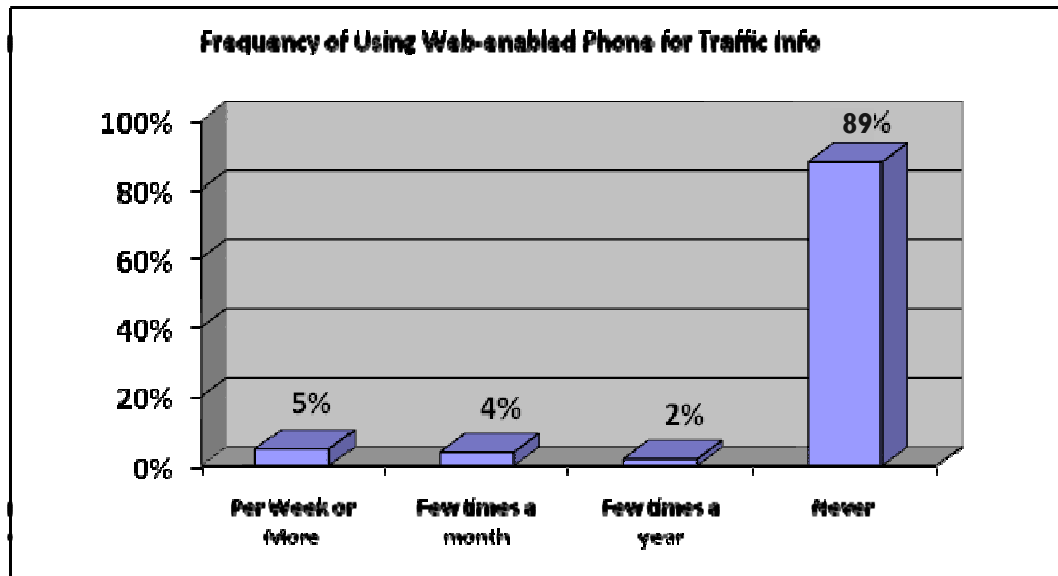
Thirty percent of all respondents reported ownership of a web-enabled cell phone. Subgroups of respondents reporting ownership of a web-enabled phone in proportions greater than the norm included:

Q. 54 – *Do you own a web-enabled cell phone* – N=709.

– “Yes” higher than 30%:

- 56% TV reports “Not” useful
- 47% Have GPS w/traffic info
- 45% Younger college
- 44% Age 18-29
- 41% Radio reports “Not” useful
 - Age 18-35
- 40% Age 30-40
- 38% African Americans
 - Under age 50
- 37% Commuters
- 35% Have basic GPS
 - Visit “Other” web sites for info
 - College women
- 34% Portable signs “Somewhat” Useful
 - MDOT Detroit-Metro Region
 - MDOT Southwest Region

However, only 11 percent of those with web-enabled phones use the device as a source of traffic information.



It is notable that every respondent that reported using the device for traffic information found it to be “Useful”, with 70 percent of them changing their driving plans based on reports obtained from their cell phone.

Types of Travel Information

Getting Quickly from “A” to “B” Most Important

Eleven different types of travel information were read to all respondents who were then asked to assess how useful they would find each of them. The types of travel information were randomly presented so as not to bias the responses by virtue of their order of presentation. As can be seen in the table below, which ranks the types of information by their “Total Usefulness” to all respondents, the statements sort out into three major tiers. The top tier – with “Total Usefulness” rankings of 80 percent or more – are the five statements most directly related to efficient conveyance. The second tier describes information types which require the active participation of the traveler, and the third tier speak either to non-private vehicle information or require ownership of a technology not yet pervasive in the general public.

	Very Useful	Somewhat Useful	Total Useful	Not at All	Undec/Ref
Roadway construction information	71%	24%	95%	5%	–
Information on alternate routes	57%	33%	90%	10%	–
Information on delays caused by crashes	65%	24%	89%	11%	–
Estimated driving times based on current conditions	44%	38%	82%	17%	1%
Information on the quickest travel time to a destination	45%	36%	81%	19%	–
Color-coded maps showing traffic conditions – such as you might find on a web site or mobile phone application.	25%	37%	62%	37%	1%
Live images of traffic conditions	20%	39%	59%	40%	1%
A mobile application for cell phones that provided real-time traffic information	16%	23%	39%	60%	1%
The location of bicycle routes	10%	20%	30%	69%	1%
Public transit information, such as transit routes, transfer options, schedules, and system delays	9%	19%	28%	71%	1%
Comparisons of different modes of transportation, like travel time by car versus by public transportation	8%	17%	25%	74%	1%

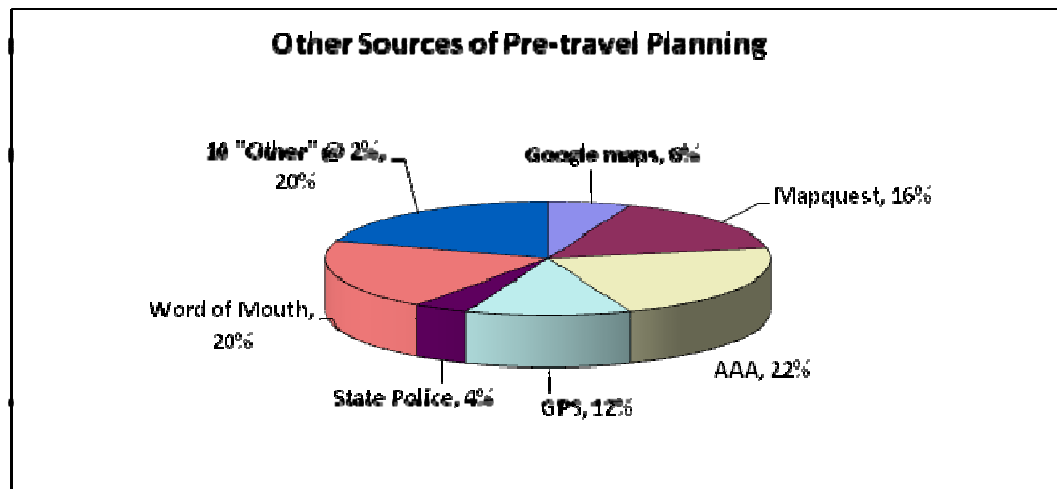
Recreational Travel

Most Travel for Weekend Recreation or Vacations

Seventy-one percent of all respondents reported that they travel 50 miles or more on Michigan roads for weekend recreation or vacation trips, “at least a few times”, per year. This group was asked if they used any one of four recited resources for predeparture planning. The following table illustrates the frequency – from most to least used – with which these travelers accessed the respective named resources:

	Yes	No	Unsure
Radio traffic reports	33%	66%	1%
TV traffic reports	29%	70%	1%
Transit web sites	17%	83%	-
MiDrive web site	9%	90%	1%

Respondents also had the option to name a pre-trip planning resource that was not presented to them. Fifty respondents, approximately 10 percent of the sample who were asked the main question, offered a variety of responses, as illustrated in the chart below.



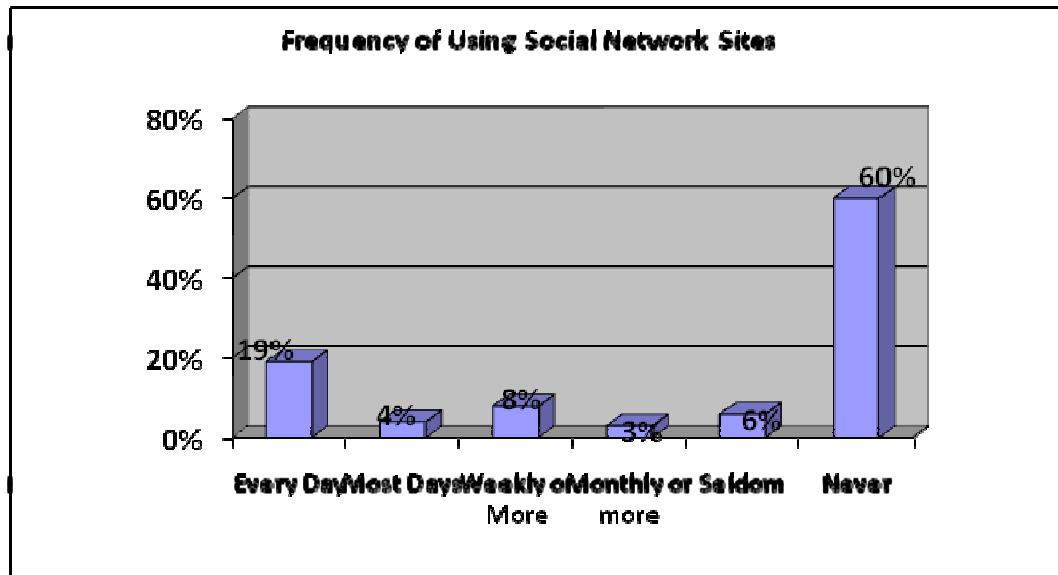
Self-Named Travel Info Sources Consistent With Reported Behavior

In keeping with their reported practice as demonstrated by the results above, all recreational travelers most often cited, “Radio” (22 percent), “Television” (21 percent) and “Web sites” (20 percent), when asked to name the sources most convenient to them for travel information.

Social Media

Over One-Third Regularly Use Social Media

All respondents were asked how often they use social media web sites, such as Twitter, Facebook, and MySpace. Thirty-four percent reported viewing these sites at least, “Several times a month”, with 60 percent indicating that they never use social media sites. The chart below illustrates the distribution.



Subgroups reporting visiting a social web site “Daily/Most days” in proportions greater than the norm included:

Q 72 – How often do you visit social web sites – N=709.

– “Daily/Most day” – higher than a combined 23%

- 47% Younger no college
- 45% Age 18-29
- 40% Changed plans based on other site info
- 39% Women under 50
- 38% Age 30-40
- 37% Visit other web sites for traffic info
- 36% Have real-time GPS
- Under 50
- 31% Radio reports “Few times a month/year”
- 30% MiDrive “Very” useful
- Men under 50
- College educated women
- 29% Radio reports “Somewhat” useful
- Changed plans based on MiDrive

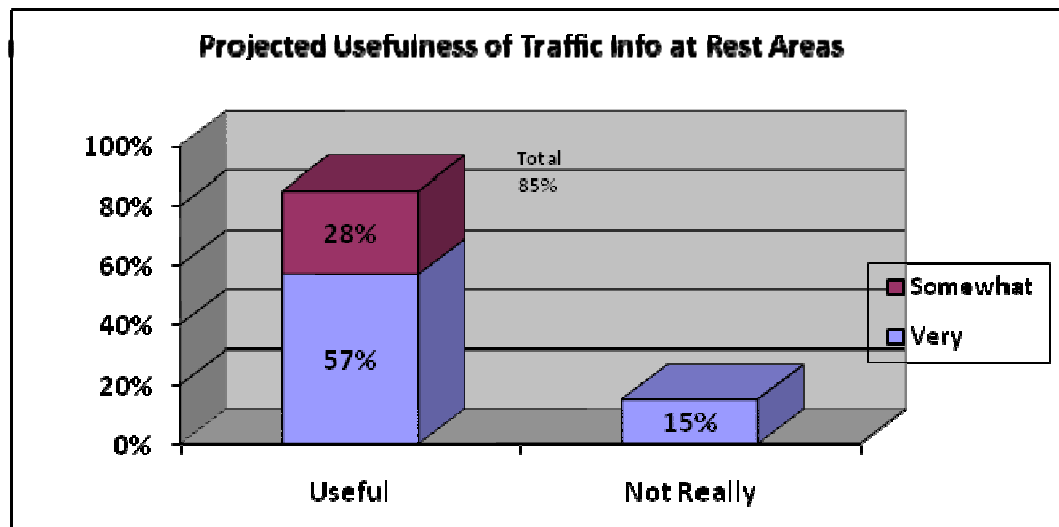
Few Are Aware of MDOT’s Presence on the Sites

Only six percent of respondents who ever logged onto social web sites were aware that MDOT maintains a presence on Facebook and Twitter through which the agency provides traveler information. Among the 17 respondents who were aware of the MDOT social network sites, seven reported having used it, and five of those seven found it to be “Useful”.

Travel Information at Rest Areas

Nearly Eight in 10 Have Used a Rest Area in the Past Two Years

When all respondents were asked if they had stopped at a rest area within the past two years, 78 percent reported that they had. A question was then posed to this group asking if they would find it useful to have real-time traffic information available to them at a rest stop. The vast majority indicated that they would, indeed find such information useful at that locale. The chart below illustrates the responses:

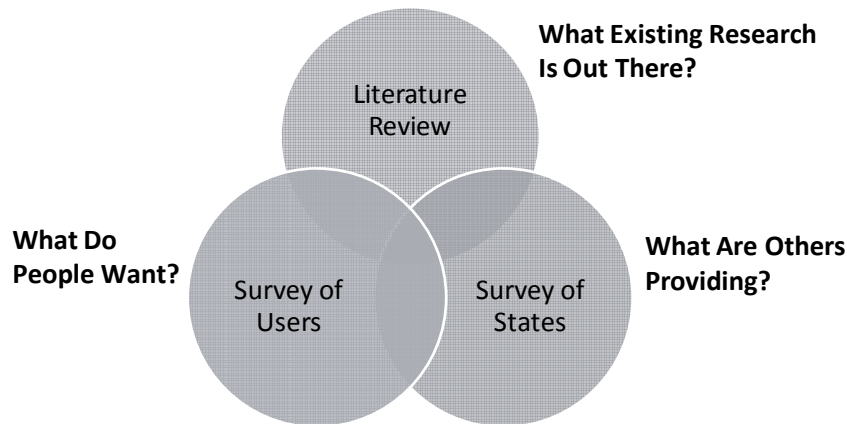


4.0 Survey of States Review

4.1 INTRODUCTION

Purpose

The Michigan Department of Transportation (MDOT) Survey of States report is part of a three-pronged approach being used by MDOT to provide input and serve as the basis for guiding the next phase of MDOT’s advanced traveler information system (ATIS) program. The results from the survey of states will answer the question “What are others providing?” Concurrent efforts performed as part of the overall research effort include a literature review documenting “What Existing Research is Out There?” and a survey of users targeting answers to “What do People Want?” The answers to these questions will allow MDOT to move forward with a traveler information plan that addresses the needs of the transportation system users in Michigan while using the full collective of research and best practices from around the country.



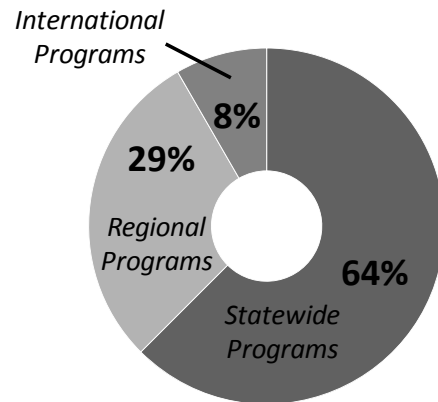
The purpose of this report is to provide an overview, based on the survey, of 25 traveler information programs throughout the country. Section 4.2 provides an overview of the type of data that was collected. Summaries of the survey result are presented in Section 4.3. Section 4.4 provides general observations regarding the implementation of traveler information and the current status of MDOT’s program in relation to other states.

This report provides documentation to support concepts and strategies that are presented in the recommendations document. Recommendations will be made using the collective information gathered from not only the survey of states, but also the literature review and the survey of users. This report does include a

broad summary of the information that was learned through the survey of states and an Appendix with the detailed results of that survey.

Overview of Programs Surveyed

The MDOT Survey of States report focuses primarily on statewide traveler information programs; however, several regional and international programs were included in the survey. Of the 25 programs reviewed, seven were regional in coverage (Bay Area, Houston, Kansas City, Los Angeles, San Diego, Chicago, and the I-95 Corridor) and two were international (Germany and United Kingdom). Programs were selected to provide a broad base of experience. Consideration was given to states that were similar to Michigan, states with some urban centers but large portions of rural areas, states where tourism was prevalent, and states with established traveler information programs.



The programs reviewed are identified below.

- Michigan (Mi Drive);
- Georgia (Navigator);
- Minnesota;
- Bay Area, California;
- North Carolina (TIMS);
- Houston (TranStar);
- New York State (511NY);
- Germany (Bayern Info);
- United Kingdom (Transport Direct);
- I-95 Corridor Coalition;
- Washington State;
- Arizona;
- Kansas City (Scout);
- Alaska;
- Los Angeles/Southern California;
- San Diego;
- Massachusetts;
- Delaware;
- Maryland (CHART);
- New Hampshire;
- Virginia;
- Wisconsin;
- Colorado (COTrip);
- Utah (CommuterLink); and
- Chicago Regional (Getting Around Illinois)

4.2 DATA COLLECTION FORMAT

Data collected from the 25 programs was assembled into two documents included as Appendices to this report. The *Summary from the Survey of States* summarizes key functions of each program. *System Maturity and Coverage* provides numerical-based scoring for the maturity and extent of coverage of all 25 programs reviewed.

The *Summary from the Survey States* assembles the following information:

- **Types of Traveler Information Collected** – This included 17 different types of traveler information, including those related to traffic conditions, weather, special events, transit and bicycle routes
- **Traveler Information Dissemination Methods** – Four general categories were used with more detail broken out in each category. The categories included: *Roadside Devices*, such as dynamic message signs (DMS) and highway advisory radio (HAR); *Web Sites* with the type of information provided (such as camera images); *Social Networking*, such as Facebook and Twitter; and *Other*, which includes kiosks and the 511 phone system.
- **Driver Distraction Laws** – Current and planned laws regarding the use of cellular telephones with hands free devices and texting while driving were reviewed. For both categories, the laws were identified as written; the summary documents which driver type is prohibited within the legislation: all drivers, young drivers, or bus drivers.
- **Private and Public Partnerships** – Existing and planned private and public partnerships were identified.

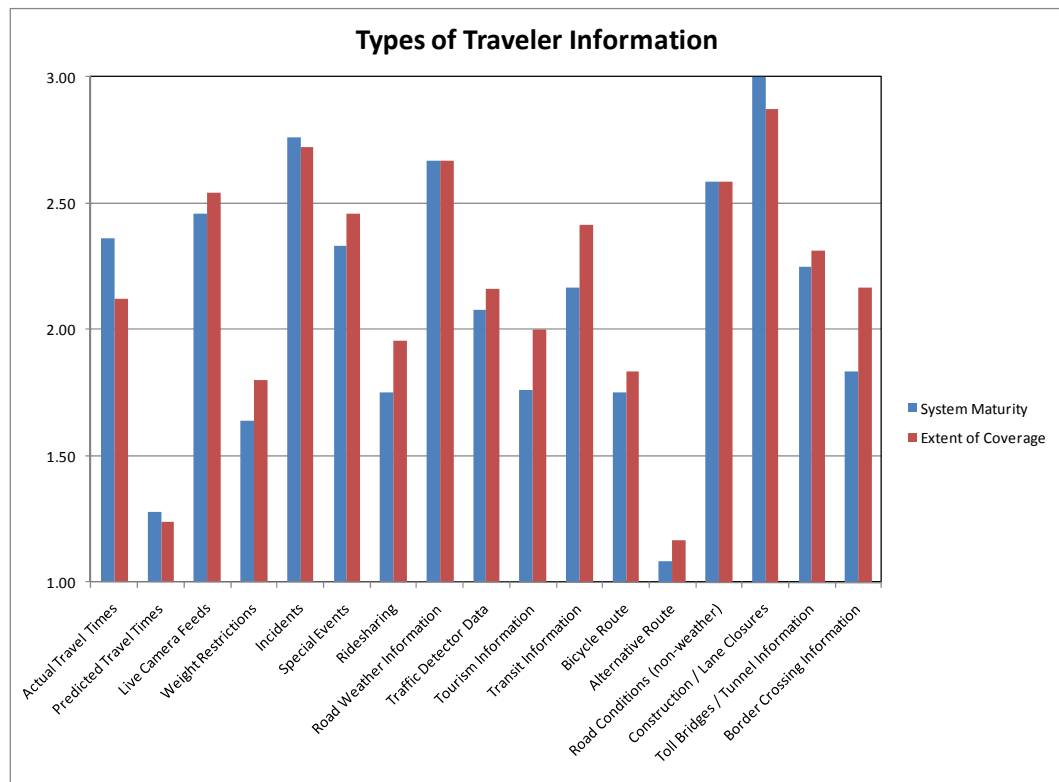
In addition to the *Summary from the Survey of States*, the *System Maturity and Coverage* appendix includes assigned values for system maturity of each program category, the extent of coverage, and the level of public-private partnership that supports specific functions of the ATIS program. System maturity is rated on a scale of 1 to 3, with 3 indicating a robust system, 2 indicating limited capabilities, and 1 indicating no capability. The extent of coverage is rated in a similar manner for each category, with 3 indicating systemwide coverage (whether the program is regional or statewide), 2 indicating only partial coverage in and around major population areas, and 1 indicating no coverage. The level of public private partnership is rated with a blank if the service is not provided, 1 if the service is handled by resources internal to the organization, 2 for programs that have a true partnership between the private and public sector partners, and 3 for services that are purchased through a contract with a specific vendor.

4.3 KEY FINDINGS

Types of Traveler Information

A wide variety of traveler information types were evaluated to determine the system maturity and extent of coverage of each. A total of 17 different types of traveler information data are currently being collected by at least one of the agencies reviewed. The results of the evaluation are presented in Figure 4.1.

Figure 4.1 Types of Traveler Information



Overall, it was found that the system maturity and the extent of coverage, rated on a scale of 1 to 3, were very similar within each individual agency. This is logical, as the more robust, mature systems have been around the longest; those systems often have the greatest extent of coverage. The types of traveler information that have the greatest maturity and level of coverage include:

- Construction and Lane Closures;
- Incidents;
- Road Weather Information;
- Road Conditions; and
- Live Camera Feeds

The types of traveler information with the least maturity and the most limited extent of coverage include:

- Alternate Routes;
- Predicted Travel Times;
- Weight Restrictions;
- Bicycle Routes;
- Ridesharing; and
- Tourism Information.

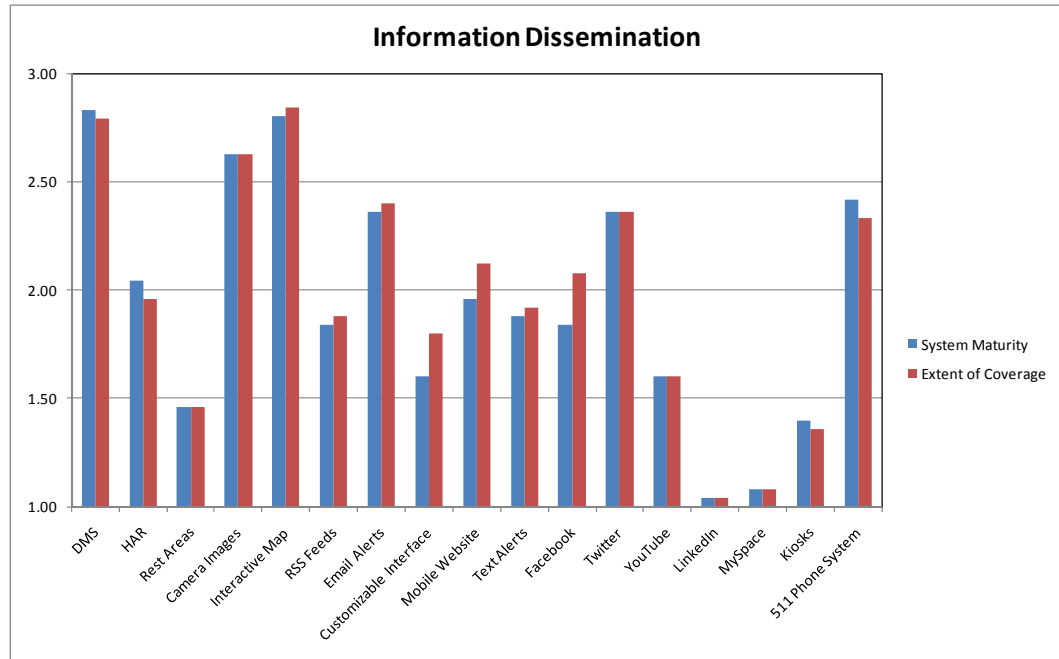
Of the four listed above, alternate routes and predicted travel times clearly rate the lowest for system maturity and extent of coverage. Alternate routes on arterial roadways most often are not provided because of the lack of information available to a system operator. When the alternate route is another freeway, this level of detail is often more accessible and more reliable information can be provided to the traveler. Since most alternatives to freeway routes occur on an arterial network, many agencies are hesitant to provide specific alternatives if the roadway conditions are unknown.

Predicted travel times also rated very low. Predicted travel times typically are used in locations where variable tolling is available. Predicted travel times allow system operators to set an appropriate toll rate to keep travel times on the variable toll rate to a predefined level of service. Because travel times can be severely impacted by random and unpredictable events, such as a vehicular crashes, many agencies may see limited value in providing predicted traveler information to the public.

Data Dissemination

A total of 17 types of devices or systems that can be used to disseminate traveler information to the public were evaluated. The results of the information dissemination evaluation are presented in Figure 4.2.

Figure 4.2 Information Dissemination



Traditionally, traveler information dissemination has focused on DMS and agency sponsored web sites. These continue to be among the most common methods to deliver traveler information. However, new methods, involving more customized options, are growing in popularity. These customizations include push options and location and time specific data. Examples include 511 traveler information systems, customizable interfaces on web sites, Twitter feeds, and e-mail alerts. These types of systems can be set up so that users predefine the type of information they want to receive. In some cases, that information is pushed to the user only when an unexpected delay or incident has occurred on their route.

The most common types of devices or systems used include:

- DMS;
- Interactive Maps (on Web site);
- Camera Images (on Web site);
- 511 Traveler Information Phone System;
- E-mail Alerts; and
- Twitter Accounts.

The least common types of data dissemination included:

- Linked In;
- My Space;

- Kiosks; and
- Rest Areas.

Generally, Linked In and My Space are not well suited for distribution of real-time information. Kiosks have been used less in the past few years because of the higher level of maintenance required and the lower level of accessibility by the traveler. Kiosks can provide specialized information for an individual traveler, but the number of people able to access the information can be limited.

Web Site Base Mapping

Traveler information web sites are increasingly improving into well-integrated, map-based sources of data. In order to accomplish this, agencies must select the most appropriate avenue for base mapping. They can use either a commercial product or internal resources to develop the base maps. Of the 25 programs evaluated, a large majority were using a commercial product to develop their base maps, with Google identified as the provider of mapping data for 13 of the 25 programs. Only 8 of the programs researched are using in-house resources to provide their traveler information base mapping.

Benefits of using a private provider, such as Google or Bing, for base maps include a familiar look and navigational approach for the user. Additionally, using a private data source alleviates the public agency's responsibility for updating the maps. However, the lack of responsibility also means a lack of control, and public agencies that use private provider base maps may not be able to get key roads added to existing maps. This can become problematic when a new freeway that includes ITS devices begins providing traveler information to the agency, but the freeway does not appear on a map.

Social Networking

The number of users of networking applications such as Twitter, Facebook, MySpace, and others has grown tremendously over the past decade. These sites offer a powerful medium not only for reaching travelers, but also for allowing the travelers themselves to share information with their own network of friends and contacts. Applications such as Twitter provide an agency with the ability to track not only the number of people that receive a tweet, but also the number of times that message is re-tweeted and the number of total people that receive the information.

Twitter is the most common social networking application for providing real-time traveler information and is consistently used by nearly every agency that provides traveler information through social networking. Many agencies have set up Twitter accounts for corridors or regions, so that users can follow information that is specific to their commute or the area where they commonly travel. Tweets can either be manually input or set up to be automatically generated when an incident or other event is entered into an incident or traffic management system.

Other social networking applications and tools, such as Facebook and YouTube, are more predominately used by Public Information Offices for press releases, notices of public meetings, and other information that is more detailed in nature but not quite as time sensitive as real-time traveler information.

Mobile Applications

Of the 25 programs evaluated, 15 currently have some type of capability for providing mobile applications for traveler information. Information includes speed maps, traffic camera images, and navigational assistance. A number of private sector companies also are developing mobile applications, many with national coverage. Google Traffic, which is available through Google Maps, and INRIX are two examples of free private sector applications that provide speed maps and incident information. BeatTheTraffic.com provides a mobile app that provides speed maps and CCTV camera images in certain areas. Both of these mobile apps allow users to submit incident information that can be confirmed and integrated into the available traveler information.

Driver Distraction

There are existing and planned driver distraction laws in almost every state where programs were evaluated. Out of 25 states, laws banning the use of handheld devices existed in 11 states for *all drivers* and 11 states for *young drivers only* for a total of 22 out of 25 states with some type of handheld device law. Arizona did not have any laws banning the use of handheld devices for drivers; however, they do ban the use of handheld devices by bus drivers.

Texting while driving was banned by 24 out of the 25 states, with 21 of those states banning texting while driving for *all drivers* and 3 states banning texting while driving only for *younger drivers*. Arizona also was the only state without laws banning texting while driving, with the exception of bus drivers, who are banned from texting.

It is interesting to note that while texting is banned in almost every state, more than half the states provide traveler information through text alerts and Twitter. These states advocate that drivers not use these services while operating a vehicle and that text alerts and Twitter messages should be checked before starting a trip or by a passenger in the vehicle.

4.4 OBSERVATIONS

Marketing and Outreach

Traveler information is not solely dependent on the deployment of technology. Successful programs have found that it is just as important to fund marketing initiatives to support the education and outreach of the program. Traveler information programs need to be advertised, performance metrics need to be

tracked, and surveys need to be conducted to ensure the information that is delivered meets the needs of the traveling public and achieves the goals identified by the regional stakeholders.

The Alaska Department of Transportation and Public Facilities (ADTPF) implemented its second generation of 511 after the first deployment was unsuccessful in attracting and capturing users. The first version was poorly rolled out and the public and ADTPF stakeholders never fully adopted the system. The public reverted back to calling the ADTPF Regional Offices and the program was not successful. A second rollout of the 511 system involved more interaction with the public and a marketing plan aimed at gaining interest. The better-received second iteration has been successful in transitioning users from calling the ADTPF Regional Offices to using 511.

Some programs have placed the responsibility of marketing traveler information systems on contractors that are operating the system. San Diego, for example, places responsibility for marketing their traveler information system on their contractor. In Georgia, the 511 contract is set up such that the contractor only receives revenue from ads placed on the Georgia Navigator web site and sponsorship of 511 highway signs. It is therefore in the contractor's best interest to market the web site to get as many hits as possible.

In addition to marketing, user outreach should evaluate whether the systems in place are meeting stakeholder and user needs. Performance measurements should be established to objectively track the performance of the system. The Metropolitan Transportation Commission (MTC) in the Bay Area of Northern California proactively seeks user input on functionality and new information that is needed from the system. This information is gathered through surveys and focus groups with users of the transportation system.

Partnerships

In addition to marketing, partnerships are a key area that should be considered when an agency is developing a traveler information program. Many examples are identified within the surveyed programs that involve partnerships between states and cities, states and other countries, partnerships with the media, and partnerships with the private sector. These relationships can allow the participating agencies to provide traveler information at little or no cost, depending on the arrangement. Examples of various partnerships are described below.

- Colorado has developed partnerships with cities in resort areas to broadcast travel conditions on local public access channels.
- Arizona 511 has developed a partnership with the Mexican State of Sonora to provide 511 and travel conditions in both Arizona and the state of Sonora.
- San Diego's traveler information system has successfully partnered with agencies at the United States/Mexican Border crossing so that border

crossing conditions at multiple bridge crossings can be provided to commercial vehicle operators and travelers.

- Both Arizona and Kansas City conduct an annual media summit to look at how they can improve relations with the media.
- The Bay Area MTC invited private sector representatives to their 511 strategic planning process in 2005 and 2006 so they could begin discussing future business models and roles.
- Georgia Navigator contracts with a provider to maintain their web site and 511 systems. The contractor receives no payment from the Georgia Department of Transportation (GDOT); rather, the contractor relies on Georgia Navigator site advertising and sponsorship of freeway 511 informational signs to generate income.

As partnerships are sought, it is important to realize that there are certain functions in which the public sector tends to have a stronger role and certain functions that may be more appropriately suited for the private sector. Construction information, incident alerts, special events, and CCTV camera video streams all represent information that many public sector agencies have and can provide to partners. Advanced interfaces for disseminating traveler information often are a strong point of the private sector.

Private sector providers are more likely to participate in the development of future traveler information methods, provided they have access to data. Some examples of the types of data that other agencies have made available to the private sector include:

- Real-time information on incidents, construction, special events, and weather;
- Real-time information on traffic cameras;
- Static transit routes; and
- Geographical Information System (GIS) map layers.

Offering transportation data as open source offers many advantages to agencies; however, there are concerns that should be considered. Open source data allows private sector companies with advanced software tools and large human resource capabilities, such as Google, NAVTEQ, and INRIX, the opportunity to develop traveler information delivery methods using existing data from agencies. There often is little or no maintenance of these technologies needed by the public sector, which frees up valuable staff time. Private sector involvement also provides more outlets for the information, such as phone applications or desktop widgets.

Concerns with open source data include accuracy and liability issues. Private sector companies often use a mix of public sector data as well as data from private sources for providing traffic information to public. Public agencies have little or no control over the overall quality and timeliness of what the private

sector companies eventually provide to the public. This can lead to the private sector providing information that is inaccurate and possibly even in conflict with what a public agency is providing on its own web site, 511 traveler information number, DMS, or other medium.

Liability issues can arise on several fronts. Public sector agencies need to maintain some control when providing video from CCTV camera feeds to private sector companies, such as the media, so they can stop a video feed if inappropriate images are being broadcast. This primarily is a concern during incident management, when a public sector agency must be cautious that sensitive video images are not broadcast to the public. Liability concerns also may arise if the private sector provides inaccurate or incomplete data to the public. One scenario is the potential for a private sector navigation tool using real-time information from the public sector to route a traveler onto a road that is flooded. If an injury occurs as a result of that car using the flooded road, it is possible that the traveler could fault the public sector agency that provided the data.

Michigan DOT Status

Michigan DOT currently provides a successful suite of traveler information tools. The Department has established partnerships with private sector data providers and the media. The Mi Drive web site includes camera images, speed maps, construction data, incident information, and DMS messages. Travel times are provided on some routes in urban areas, with current initiatives looking to expand this functionality to additional routes and within and in advance of construction zones. Social media options, including Twitter and Facebook, are being used as outreach tools to the public. In the field, DMS are used to provide real-time traveler information.

Michigan currently does not have a 511 traveler information number but a mobile web site and text alert function is currently in development. Alternate routes are not provided and transit information is not available through Mi Drive. A range of data currently is available in urban areas, but expanding consistent and reliable traveler information in more rural areas remains a challenge. Information from the road weather information stations (RWIS) is not publicly available. Although MDOT is collecting a wide range of traveler information, campaigns to increase public awareness have been very limited. Finally, MDOT currently does not have a complete system for reporting on performance measures of the traveler information system.

As noted in the first section of this report, recommendations on next steps for MDOT are not included in this report. The combination of the MDOT Survey of States Review, along with the Literature Review and the Survey of Users, will be used to make recommendations on how MDOT should consider expanding their current traveler information system.

5.0 Recommendations

Recommendations were developed based on the three previous tasks. They include recommendations specific to technology solutions, but also consideration to potential organizational changes. All of the recommendations were developed with an eye toward maximizing the effectiveness of the existing infrastructure in order to recognize opportunities for cost savings. Each recommendation includes a highlight of the supporting research, a brief discussion of the potential operations and maintenance costs, and the preliminary steps necessary for implementation.

Continue investments into DMS.

Based on the survey of the traveling public, DMS are very popular and continue to influence driver behavior. Seventy-five percent of Michigan drivers found the DMS somewhat or totally useful. Fifty-nine percent of the traveling public changed their driving plans based on information they saw on a DMS. For comparison, in Ohio and Indiana the public responded with 94 percent and 83 percent, respectively, that they found DMS signs somewhat or totally useful.

➔ ***MDOT should continue to focus on implementing the DMS that are currently planned across the state.*** Additionally, MDOT should continue to commit the necessary resources to ensure all of the existing and proposed DMS receive proper maintenance. Consistent operational procedures should be implemented and followed across the state to ensure that the most timely, relevant, and accurate information is posted.

Costs associated with this recommendation may vary, but historical information can provide some guidance for planning purposes. Typical overhead mounted DMS have shown construction costs of approximately \$225,000, whereas pedestal mounted shoulder DMS have a lower cost in the neighborhood of \$175,000. Some of the more rural locations could warrant higher costs associated with the difficulty of accessing limited communications and power sources in those areas.

➔ ***MDOT should continue looking at regional and statewide concepts of operations for managing traveler information.*** These concepts of operations should integrate the effective use of the DMS deployment to provide the largest impact possible to the traveling public. Similar to the I-75, U.S. 127, I-94 Triangle of corridors, MDOT should look at regional and statewide applications for DMS and not rely solely on this technology for local traffic management. These concepts of operations should be integrated into the STOC, MITSC, and West Michigan TOC's operations manuals.

Costs associated with concepts of operations are dependent on the size and characteristics of the study area. Plans that are focused in or include urban

areas typically involve a higher quantity of devices and also require a larger coordination effort amongst stakeholder agencies. Additionally, the level of effort required to develop a concept of operations depends on whether it is an extension of a current plan or if it covers a new geographical area and therefore may include an educational component for participants new to ITS. Concepts of operations for specific design projects typically require an effort in the \$35,000 to \$45,000 range, where larger regional efforts such as the I-75, U.S. 127, I-94 Triangle ATIS plan require a much larger effort in the range of \$300,000. Regardless of the size and scope of the plan, it is important that each new concept of operations reference and integrate any existing plans that have been completed.

Continue to watch the evolution of social media, but do not expand for real-time usage.

- ➔ ***MDOT should maintain its focus on using social media tools for Public Information Office (PIO) information dissemination.*** Although this is a growing area that provides instant communication, social media's current delivery mechanism is not suited for location-based information.

There are no additional costs associated with maintaining the Department's current level of effort associated with social media, but it is important that the existing resources are maintained to support the PIO initiatives.

- ➔ ***MDOT's ITS program should continue to monitor this arena and adjust its involvement accordingly.*** Up and coming focus areas of social media are centered on spatial awareness. The use of specific location and destination information that social media tools may be able to capture could certainly improve the ability to provide more specific user focused traveler information in the future.

There are minimal costs associated with a continued monitoring of the social media market. This includes some staff time and existing equipment to access the Internet. It is important however, to provide staff with the ability to access these alternative information sharing sources so they can continue to evaluate and monitor the progress.

Concentrate on the quality and dissemination of information that is of the highest priority to the public: construction and incident data.

The survey of the Michigan traveling public clearly indicated that construction and incident information is seen as the most valued information; ranking above travel times and congestion information.

- ➔ ***MDOT should build upon the existing lane-closure system to enhance access to real time construction and incident data.*** Collecting this information is not the primary focus of any third-party or private information disseminator, but it is seen as a great value within their business model. Third-party entities look to public agencies to assemble and provide these data sets.

Costs to MDOT would largely be internal and include more coordination and outreach efforts to field forces. Modifications to the database could be warranted based on feedback, but buy-in and support from the field forces is the most important aspect of this initiative. It is important for those responsible for overseeing the daily operations within construction and maintenance activities to acknowledge the benefit of maintaining information that is more representative of actual conditions. This acknowledgement and support is best accomplished through a focused outreach effort that listens to the staff and modifies the tools and protocol based on feedback.

- *MDOT should approach Google about forming a partnership for the development of an incident management data standard.* This relationship would be similar to TriMet, who partnered with Google to develop their transit trip planner. Michigan has strong ties with Google and this partnership could be both technically and politically beneficial. The standard for transit trip planning Google and TriMet developed has become the universal standard for transit authorities wanting to share their schedules with Google and other information providers. From a technical perspective, MDOT could set the standard for how construction and incident information is displayed via desktop and mobile platforms. Obviously, transit schedule information is static, while construction and incident information is dynamic, making this more difficult than the transit environment.

The potential benefit to the traveling public in Michigan, by creating a more robust and accurate way to convey construction and incident information, is significant and would come at relatively little cost to MDOT. Some modification of the lane closure or construction information database would be required, but it is anticipated that Google could shoulder a larger portion of the required cost. Additionally, MDOT would only be required to provide the data through a stream and the details of packaging and displaying that data would solely be the responsibility of Google.

Commit resources to marketing MDOT ATIS efforts.

The survey of the traveling public demonstrated a lack of awareness of Mi Drive. However, those who were aware of Mi Drive liked it a great deal. Only 19 percent knew a lot or a little about the web site, but 97 percent of those who used it found it useful. These statistics demonstrate the worth of the Mi Drive web site, but also the challenge of spreading the word about it. For reference, a similar study was done in Ohio in 2009 and at that time showed 28 percent of the traveling public knew a lot or a little about the Ohio traveler information web site “Buckeye Traffic.”

Most agencies with established and successful ATIS around the country pointed to the promotion and marketing of these systems as being a key factor to their success. The Bay Area’s 511.org consistently states that their system would not be successful if they had not allocated resources to promote the system from the beginning. The Los Angeles area has adopted this advice and is currently

conducting a significant outreach and promotion effort that includes billboards, print ads, and online ads as it rolls out its new 511 system.

The literature search also pointed to marketing and public awareness as being key to a successful ATIS program. Reports from MTC, FHWA, TRB, KYDOT, and MORPC all pointed toward the value of a marketing program.

MDOT should focus on marketing and increasing public awareness of the Mi Drive web site. This could be achieved through a variety of approaches.

- ➔ **Traditional – MDOT could partner with a public information firm to develop a publicity campaign.** MDOT conducts these types of campaigns frequently for large-scale construction projects, which makes this recommendation a familiar approach with little risk. There is, however, a cost associated with this approach that would need to be accommodated by MDOT and the cost could vary widely depending on the scope and size of the campaign.
- ➔ **Intergovernmental partnerships –** The cost of marketing Mi Drive could be offset by partnering with other Michigan departments, including tourism and agriculture – weights and measures. For example, *Pure Michigan should include the Mi Drive logo and information on their tourism information.* They could start small by having a prominent link added to the official Michigan tourism web site (www.michigan.gov). There is a good location currently available next to the jump buttons for this month’s events and the Pure Michigan blog. *Mi Drive information should be included in all of the printed Michigan Travel Guide publications.* Finally, another intergovernmental partnership recommends for *the Department of Agriculture’s weights and measures inspectors to place a sticker promoting Mi Drive on gas pumps around the state during the annual inspections.* This program was successfully implemented by KYDOT.
- ➔ **Media Partnerships –** Promotion of the system also could be achieved through creative agreements with current traditional media partners. *MDOT should update their video sharing agreements with television stations and integrate requirements regarding the promotion of Mi Drive.* Furthermore, *MDOT should partner with online versions of the state’s prominent newspapers.* For example, a link could be negotiated to appear below the weather section of the *Detroit Free Press’* web site. The *Los Angeles Times* currently has such a link. This would be of little cost, but would reach a vast number of people.

Put real-time traveler information at MDOT rest areas.

The survey of the traveling public demonstrated a strong interest in having some type of traveler information at rest areas. Seventy-eight percent of the public use rest areas on a regular basis and 85 percent of all Michigan drivers thought some form of real-time traveler information would be somewhat or very useful.

- ➔ **MDOT should install flat screens in key rest areas across the state.** This recommendation does not include *kiosks* of any kind. MDOT and other DOTs

have a checkered history of deploying kiosks at rest areas. These experiences have involved kiosks that were sponsored by vendors who did not maintain the equipment. This tended to become a major eye sore as well as tarnish the DOTs efforts to gain the public's trust in traveler information. The display should be installed so that it is protected against vandalism.

The information displayed must be customized for the format and viewing distance. Simply showing a current view of Mi Drive will not suffice. Specific localized status speed maps mixed with tabular construction or special event data is a potential example. The display device must be able to be controlled remotely from the STOC, West Michigan TOC, or the MITSC. MDOT's incorporation of welcome centers creates a perfect opportunity to test such a system at key sites.

Cost estimates have been derived for the Phase I of the Triangle ATIS Plan and are approximately \$15,000 per location. This is the capital costs for the implementation and it is important to identify resources to support operations and maintenance of the display. Typical O&M costs for ITS implementations are 10% of the capital, which provides an estimate of \$1,500 per year to maintain the flat screens. Regularly scheduled cleaning of the screen and other intermittent check-ups for vandalism will be required. Current plans are to install these screens in a manner that existing security cameras can provide coverage, but necessary preventative measures also should be included in the installation.

Create mechanisms for third-party developers to create content based on MDOT data.

One of the emerging areas within traveler information is third-party application development. These applications, developed by private entities outside of MDOT, use MDOT's sensor, construction, weather, and incident information to provide traveler information. These applications are primarily small, low-cost applications targeted at mobile devices. It should be noted that this is perhaps the most open-ended recommendation simply because there are so many directions MDOT could decide to pursue. Additionally, the wide range of possibilities is driven by the uncertainty of what third-party developers could create. MDOT should foster relationships with these developers to support the development of effective traveler information tools.

➔ ***MDOT should implement a Developer's Data Portal.*** This portal should make MDOT's traveler information data (construction, weather, incident, and traffic) available for others to use. Other DOTs and transportation agencies currently provide data in this format. Many agencies have implemented this solution to alleviate performance issues that result from outside vendors, such as Google and Yahoo!, scraping their site for data on a recurring basis. However, a growing number of agencies are doing it to foster collaboration and new content that the limited resources of a DOT cannot provide.

- ***MDOT and DTMB should dedicate staff and IT resources to provide a moderated discussion forum within the developer's portal.*** The focus of the forum should be to promote MDOT's data and assist outside entities with technical support surrounding the traffic, incident, weather, and construction data. This forum also can provide feedback to MDOT on the traveler information market and what data the public is most interested in accessing.
- ***MDOT should offer an Innovation Challenge leading up to the summer of 2011 construction season.*** The challenge should involve an MDOT sponsored contest for the best ideas for informing travelers about construction delays. A cash prize should be offered for the best solution that MDOT chooses to implement. This should be primarily targeted at mobile application developers. Although staff time would be required to initiate, evaluate, and oversee the execution of the winner of the Challenge, it would be at a significant savings compared with internal development. There also is a potentially significant public relations benefit and increased awareness of MDOT's goal to provide real time traveler information.

Develop a mechanism to actively manage and evaluate MDOT's ATIS efforts.

The study team recommends that the results and recommendations of this study should be used as a foundation for developing a statewide strategy for ATIS in Michigan. This plan would include the elements outlined in the preceding recommendations as well as these additional elements.

- ***MDOT should designate a staff member within the current ITS program staff to monitor and oversee ATIS efforts.*** This ownership is important to champion initiatives and also capture the progress of ATIS within the larger ITS program.
- ***MDOT should conduct a survey of the public on a biannual basis and compare how user needs are evolving and MDOT's efforts are being perceived.*** This tool will not only help guide future modifications to the plan, but provide support for where MDOT is allocating funds with respect to traveler information. Costs for a survey could vary depending on scope. Just to provide some context, the survey for this effort was approximately \$50,000, all inclusive.
- ***MDOT should develop a detailed concept of operations and operations plan for ATIS in Michigan.*** The plan should include all aspects of communication with the traveling public including the Mi Drive web site, media partnerships, mobile applications, etc. This plan should specify where MDOT will apply its limited resources, while also documenting where they will not. The plan will provide a focus for ATIS initiatives that have been vetted by stakeholders and not allow extraneous ideas and efforts to drain resources. This plan also should identify preliminary performance measures to evaluate the success of the ATIS program specific to each initiative.

Development of the plan could be a relatively modest effort conducted with MDOT staff through a series of one or two workshops. Most of the information needed to support and guide the development of the plan has already been generated through this research effort.

- ➔ ***MDOT should coordinate with DTMB to implement improvements to the Mi Drive site based on recommendations identified within the ATIS plan.*** These improvements are dependent on the outcome of the pending Mi Drive funding sources. Additionally, changes to the current funding source for Mi Drive could warrant that MDOT look to secure alternative resources in an effort to maintain the current level of operations provided by Mi Drive.