Commercial Vehicle Operations (CVO)
Advanced Traveler Information Systems (ATIS)

Summary of National Practice

Final Report

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Prepared for:

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Office of Freight and Commercial Vehicle Operations

Submitted by

TranSmart Technologies, Inc.

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EXECUTIVE SUMMARY

The Minnesota Department of Transportation (Mn/DOT) has implemented new and improved Advanced Traveler Information Systems (ATIS) to the general public, most notably 511 phone and web services. . These services are intended to provide real-time information about traffic congestion, construction activity and road/weather conditions primarily to "general" road users such as commuters and longer-distance travelers. As part of an overall policy of facilitating freight movement in Minnesota, Mn/DOT is considering customizing traveler information content or the method of delivery used to better meet the needs of Commercial Vehicle Operators (CVO), in particular, motor carrier operators. As a first step, Mn/DOT is interested in learning from the national experience with CVO ATIS. This report is intended to provide Mn/DOT with a baseline of information to make better decisions about investments in traveler information systems

Methodology

There were two main tasks involved in gathering information for the Summary of National Practice, a literature search and a survey of key organizations and private companies.

Information about current and planned CVO ATIS services was gathered through the literature search and also through phone interviews with individuals at public sector agencies. The literature search included a review of Mn/DOT ATIS and CVO initiatives (available from various Mn/DOT web sites) to provide a baseline for national comparison. Literature on national initiatives was obtained for review from various sources, including the ITS Joint Program Office electronic documents library, the ITS Operations Resource Guide (2002), the ITS Cooperative Deployment Network (ICDN). In certain cases, involved individuals transmitted additional documents, and provided insight or clarification on the reports from past studies. A list of the references reviewed is provided in Appendix A.

Eighteen representatives from the following public sector agencies were interviewed for the phone survey effort:

- ITS America - CVO Committee
- USDOT - Office of Freight Management
- AASHTO - 511 Committee
- TravInfo
- Gary-Chicago-Milwaukee Corridor
- I-95 Corridor Coalition
- USDOT Model Deployment Cities (Phoenix & Seattle)
- Condition Acquisition Reporting System (CARS) Group
- American Trucking Research Institute (formerly ATA Foundation)
- American Association of Motor Vehicle Administrators (AAMVA)
- Federal Motor Carrier Safety Administration (FMCSA)
- Commercial Vehicle Safety Alliance (CVSA)
- Iowa Department of Transportation

Information about the traveler information needs and requirements of CVOs was also gathered through phone surveys of a limited number of trucking companies as well as one vendor that offers routing and navigation solutions to CVOs. The companies selected represent a small sample of national carriers. Each company was contacted and asked to provide the name of the individual who would be most familiar with the company's traveler information services and requirements. The following is a list of the six companies contacted, the primary types of trucking services provided by the company and the position of the individual interviewed.

- Schneider Trucking (Truckload, Specialized and Bulk) – Fleet Services Manager
- Roadway Express (Truckload and LTL) – Director of Corporate Safety
- Yellow Transportation (LTL) – Minnesota Line Haul Operations Manager
- SYSCO Corporation (Local Delivery) – Fleet Manager, SYSCO Food Services of Minnesota
- Andersen Windows (Truckload, LTL, Local Delivery, Specialized, HAZMAT) – Transportation Manager
- ALK Technologies (Vendor) – Senior Vice President

Each of these individuals was asked questions about their familiarity with CVO ATIS, the traveler information services that their company currently offers and their beliefs about the types of services that would be most useful to their dispatchers and drivers.

Results – Existing and Planned CVO ATIS Projects

Based on the information gathered from both the interviews of individuals at the key organizations and the literature it is clear that CVO ATIS is still in its infancy. When contacted, Douglas McKelvey, Director of the Federal Motor Carrier Safety Administration (FMSCA) stated that he was unaware of any new national CVO ATIS initiatives. National ATIS initiatives, such as 511 and the Condition Acquisition and Reporting System (CARS), also remain focused on providing information to general travelers such as commuters and tourists. A review of the state and regional 511 web sites showed that the information provided specifically for CVOs was limited to vehicle load and speed restriction information provided on only a small number of sites. Of the ten states in the CARS consortium only Alaska is currently developing a module customized to provide CVO related services. The module planned will track commercial vehicles carrying hazardous materials with an interface to the oversize and overweight vehicle system planned by the Division of Measurement Standards and Commercial Vehicle Enforcement.

Only three CVO ATIS operational test projects and initiatives have been undertaken. The information gathered about these projects including they key conclusions and lessons learned from each project are summarized as follows:

- *FleetForward* – The FleetForward operational test was conducted during 1999-2000 as a public-private partnership involving members of the I-95 Corridor Coalition, the American Trucking Association Foundation and participating carriers. The project made customized, exception-based traffic information available to truck dispatchers as a data stream that could be used by their routing and dispatching software applications ("push delivery"). Alternately, the participating carriers could log onto a customized web page that had route maps that could be queried for their status, including congestion levels, incidents, and construction detours or restrictions ("pull delivery"). The following are some of the key conclusions from the FleetForward Operational Test:

- Carriers using the FleetForward application judged it to be a sound, useful product.
- FleetForward was heavily used by participants during emergency situations including Hurricane Floyd
- Additional desired features identified for future versions included integrated road weather (with forecast information), historical traffic reports, parking and rest stop information with real-time space availability.

Mary Grace Parker, director of operations management for the I-95 Corridor Coalition, was contacted on the potential future of a new generation of CVO ATIS initiatives such as FleetForward. While she stated that there are currently no plans or available funding for a new initiative tailored for the motor carrier industry's interests, she offered the following points of insight:

- There is an unmet demand by motor carriers for CVO ATIS services, however, no business or agency has developed a viable business plan to package and deliver these services. Also, motor carriers are limited in what they are willing to pay for such a service.

- There is a definitive demand for information on real-time truck parking location and availability in the motor carrier industry. The electronic tags and readers being deployed as part of ITS/CVO systems could potentially be used for gated parking areas for trucks.

- At the time the FleetForward test was conducted, and to this day, we are still on the early part of the learning curve for viable public-private business models for a CVO ATIS application.

- *FleetOnline* - FleetOnline was a web-based application that made traffic and real-time routing information available for pre-trip planning and en-route guidance to participating carriers ("pull delivery") An independent pilot study of FleetOnline was conducted in the Gary-Chicago-Milwaukee (GCM) corridor. The GCM Coalition, Wisconsin DOT, Illinois DOT, Indiana DOT, TranSmart Technologies, Inc., and American Trucking Research Institute (ATRI, formerly the ATA Foundation) were the primary partners involved in this study. FleetOnline was also implemented in Phoenix as a USDOT Model Deployment. According to post-operational test surveys of FleetOnline participants:

  - Expanding the service geographically will expand the usefulness of the application to more long-haul carriers, versus the limited areas tested.
  - An automatic information push for non-integrated operations (notification by a signaling device-pager, fax, phone, etc.) is desired to reduce a carrier's need to seek out information (for example, from websites)
  - Exception-based reporting, for non-recurring events and conditions, for example roadway accidents and special events, is preferred over standard non-exception based information
  - It is important to provide information about the reasons for delays and to provide truck-legal alternate routes.
  - A multi-jurisdictional corridor approach for delivering CVO ATIS has the potential to serve the most carriers.
  - A "custom subscription service" is desired for the diverse range of information of interest to carriers, that would only deliver parameters related to their day-to- day operation

- A custom subscription service might be feasible if the content provided gains industry credibility. Carriers must gain a sense of the timeliness, accuracy, detail, and relevance of the information provided in order for them to use it for their operations. Reliability is also important – knowing the information will be available when needed.

- *Virginia DOT I-81 Truck Fleet Support Program* – This program by the Virginia Department of Transportation (VDOT) grew from a larger VDOT I-81 Corridor ITS initiative that sought to optimize operations during a major planned construction program. A pilot test of this program ran from June to September of 2002. A final evaluation that included surveys of participating fleet operators and truck stop operators took place in December 2002. The Truck Fleet Support Program had two components the Truck Fleet Support Web site, and the Truck Fleet Alert activity. The Truck Fleet Alert component used a continuously updated central database of information on traffic accidents, congestion and other road conditions to convey information to users. Information was provided through E-mail alerts, a web site (www.truckfleetsupport.com), and voice-activated wireless and landline telephone (511 or 800 578-411). E-mail alerts covered not only all of I-81, but portions of connecting highways as well, including I-77 I-64, and I-66. At the time participants enrolled in the program, they were given an option of indicating which segments they wished to have included in alerts. The Truck Fleet Support Web Site component included information on traffic and road conditions as well as information on: truck stop and travel plaza locations and services, a truck parking site inventory, fuel and service locations, oversize and overweight permitting information, and access to a broad range of related sites. The major findings and conclusions from the pilot test and final evaluation are described as follows:

  - Information on additional routes, outside of the I-81 corridor, was desired in order to plan and implement diversions on other routes. It was suggested that the 511 information clearinghouse be utilized for this purpose.
  - Fax delivery is the means of communication common for many carrier dispatchers, and enables those with limited technical capability to still receive alerts.
  - Increased advertising and expanded Marketing of website was needed
  - Enhanced information on diversionary routes was needed. Through close coordination with affected jurisdictions, alternate route information could be developed and made available to the system users.
  - Use of Variable Message Signs should be increased.
  - E-mail alerts were an available option for nearly all operators surveyed and a fax machine was available to all operators.
  - For those fleets that had wireless communication technology – satellite and cellular – this means was used to alert drivers regarding incident and weather information. A number of operators used, or could use, cell phones. Many expressed interest in ultimately being able to have designated information go directly to drivers rather than through dispatchers, although the technology infrastructure to enable this is not currently available.
  - Virtually all participants expressed support for continuation of the program, even if current use was minimal to moderate. Only one of the fleet participants indicated a specific level of willingness to pay - $30 per month, and another indicated the fee might be negotiable. All others were not willing to pay for continued service. The limited geographic coverage, and lack of alternative routing were cited as the principal reasons that the value did not warrant a fee.

Based on the findings of the study during and after the operational test, the following options for a business model were proposed for a continued program:

- Public Funding, in whole or in part
- Integration of e-mail or other alerts in 511 Services (Estimated Cost: $25,000 per year)
- Sponsored Service (value-added, from trucking equipment or service providers)

The most notable recommendation from the initiative was to explore the integration of the CVO ATIS service into VDOT's 511 system.

The limited number of CVO ATIS operational tests found from a literature search is attributed to the following factors:

- There is a general sense that many State CVO administrators have yet to achieve the CVISN program goals of Level 1 Services. An investment in an ATIS system customized for commercial vehicle operators is thought of as a service beyond the scope of the CVISN program.
- There appears to be an institution barrier among those responsible for CVO and ATIS in the States, and the private sector: Who should champion, "own", or have primary responsibility for a CVO ATIS program?
- A business model for a CVO ATIS system is complicated by many factors, such as:
  - Varying truck operational characteristics (short haul, long haul, HAZMAT)
  - Who is the targeted decision-maker (owner, dispatcher, driver)?
  - What is the preferred delivery method (manual, paper/fax, cell phone, automatic)?
  - What classification of service (subscription, value added, free)?
- There is limited interest by the private sector in focusing on a smaller CVO segment of the ATIS market, versus the broader traveling public. This has constrained a new model for a public-private partnership for CVO ATIS.

Private Sector Survey Results - CVO Traveler Information Needs and Requirements

The following is a summary of the results of the private sector interviews. It should be noted that the results are based on a small sampling and are not statistically representative.

- *How familiar are they with CVO ATIS services* – The individuals interviewed were asked to rate how familiar they are with CVO Advanced Traveler Information Systems which were described as systems that deliver information, such as traffic or weather conditions, directly to drivers. The majority of those interviewed described themselves as moderately to very familiar with these types of services. In general, the respondents were familiar with and felt positively about the traveler information provided by Minnesota DOT on its web site. However, it should be noted that the two companies based in Minnesota that were interviewed both indicated that they were not at all familiar with CVO ATIS.

- *How they currently provide traveler information to drivers* – Almost all of those interviewed indicated that information is provided informally by "word-of-mouth", either by drivers requesting information when they talked to dispatch, or by dispatchers providing information verbally before the start of the route, or calling to driver's cell phones.

- *What they want from CVO ATIS* – In general they want information that is easily accessible, reliable, and up-to-the-minute. In particular they are most interested in receiving information about truck size and weight restrictions . The majority of those surveyed felt this type of

information was very to moderately useful. Other content that was considered useful was information about traffic conditions, safety and security alerts, and routing information based on driving conditions and restrictions. Opinions about the usefulness of other types of content including information about public rest stops, ATMs and other services, delays at ports/borders, and pavement conditions differed considerably between the carriers. Companies that provided primarily local delivery services, such as SYSCO Food Services of Minnesota, were less interested in these types of information perhaps because they are already familiar with the services and conditions in Minnesota.

- *Additional information that they would like to see provided* –
  - Personalized information such as where the consignee is located, directions to the consignee and the distance and estimated travel time to consignee
  - Information provided when route restrictions change

- *How they would prefer to receive information* – The commercial vehicle operators interviewed prefer to have information provided directly to drivers or dispatchers through a push type system. They do not want to have to work to obtain the information. Electronic roadside signs are the preferred method to receive traveler information by drivers. This method requires no effort from the driver to receive the information and it is directed at the drivers in the impacted region. Those interviewed also felt that having information sent directly to cell phones and CB radios or integrated with their dispatch systems would be effective, though one respondent commented that CB radios are often turned off or ignored due to the high amount of "chatter". Delivery methods that required dispatchers or drivers to pull information from the system, such as 511 phone services or web based services, were not considered to be as effective. One of those interviewed expressed that dispatchers "don't have time" to use these services, another commented that cell phone usage is discouraged, and that cell phone charges are not reimbursed.

- *Additional methods for information delivery that were suggested*:
  - It was suggested that the DOT or other agencies keep a list of companies that run their trucks in certain areas, so that a mass email or notice could be sent out to the companies affected in these areas prior to an event.
  - Pamphlets that drivers can stop to pick up that provide information on detours, construction and weather conditions

- *Key benefits from using CVO ATIS* - Improved reliability of trips, lower operating costs, and safer deliveries are the key benefits to users.

- *How the frequency of use of ATIS information can be increased* –In general increasing the ease of access and the value of the information is needed to increase usage. Specifically, it was suggested that more marketing information, such as pamphlets, be made available that the drivers can take with them to show what is available to them and help them understand how to use the information.

- *Would they be willing to pay for CVO ATIS services* – In general, those interviewed indicated it would be worth paying a fee if the services offered contained valuable information that would allow drivers to make their trips safer, more efficient and more effective. Several respondents indicated that they currently pay a fee for weather information. At one company the weather service they subscribe to faxes weather updates to the company headquarters five

times per day during the winter months. These updates provide detailed information about trouble areas nationally as well as in each state.

Conclusions and Recommendations

The following are the conclusions and recommendations of this study, relevant to Mn/DOT's interest to develop a CVO ATIS system:

1. Minnesota is at a technical advantage over most other states. Minnesota is one of the earliest states to implement 511 and a founding Condition Acquisition And Reporting System (CARS) state. Mn/DOT also currently provides some CVO content on their 511 web site and is in the planning stages of a CVO web portal that will provide real-time and static ATIS, as well as electronic transactions.

2. It is important to build strong relationships between public and private agencies to gain trust in projects, recognizing that different agencies have different goals. One way to accomplish this is to create a team that can meet regularly to overcome institutional and technical issues. For example, a coalition undertaking a CVO ATIS initiative in Minnesota would be likely to include operators and managers of the state's 511 ATIS system, staff from Mn/DOT's Office of Freight and Commercial Vehicle Operations, and the Trucking Industry, represented by an organization such as the American Trucking Association. It is also vital to keep key players involved to provide input from the user perspective. Motor carriers must be convinced that their time invested in participating in a public-private coalition will result in an initiative that will directly benefit their everyday operations.

3. There is an unmet demand for delivery of traveler information customized for commercial vehicle operators. The concept of a CVO ATIS market niche is viable, however, operational tests and market research has been very limited in recent years. Minnesota will have to take a strong leadership stance to move this initiative forward.

4. Mn/DOT should actively promote the development of a CARS module and operational test that will serve as a next-generation CVO ATIS system. The system should be promoted as benefiting all states with current and planned 511/CARS systems. Partner agencies should be sought at the Regional, State, and Federal level.

5. Customized information that includes overweight/overheight restrictions, delivered directly to drivers in their vehicles or directly integrated with the dispatch system would have the most value for commercial vehicle operators. The findings from the interviews show that trucking companies tend not to use ATIS due to accessibility issues. As a result, a push design method is needed so companies will feel more comfortable using traveler information

6. Additional market research with the CVO community is needed in order to get more of a feel for what ATIS methods other trucking companies are using and what other services they would like to see available. By interviewing six private companies, an idea of what traveler information is being used and what is needed was found, but more widespread participation is necessary

1.0 INTRODUCTION

The Minnesota Department of Transportation is in the process of introducing new and improved Advanced Traveler Information services (ATIS) for the traveling public. These services include, among others, a 511 abbreviated dialing phone information service (part of a national deployment of 511 service, a newly designed web site (Minnesota Road Traveler Information Service) and the continued deployment of electronic changeable message signs on major state roadways. These services provide a variety of real-time information including traffic congestion, construction activity, and road/weather conditions. Most of this content is targeted towards "general" road users, including commuters and longer-distance travelers.

As part of an overall policy of facilitating freight movement in Minnesota, Mn/DOT is examining these traveler information services with respect to commercial vehicle operators (CVO). CVOs consist of local, regional and national commercial fleets as well as independent carriers. While CVOs undoubtedly are using existing traveler information made available to them, there is little current data on satisfaction or utility of this information for the CVO community. It may be possible to better customize aspects of the traveler information for CVOs or improve the delivery of the information (delivery may be directly to the driver or via a dispatcher).

This report investigates the recent, planned and current initiatives in Minnesota and Nationwide related to leveraging the development of Advanced Traveler Information Systems for the benefit of Commercial Vehicle Operations. This CVO ATIS Review of National Practice will provide a baseline of information to Mn/DOT from which to make better traveler information investment decisions. Information for this report was gathered using two methods: a literature search and a survey of key organizations and private companies. This report will summarize the results of each of these tasks and provide recommendations to Mn/DOT regarding the CVO ATIS services that may warrant further consideration. In the report Section 2.0 summarizes the results of the literature search, Section 3.0 summarizes the results of the surveys of key organizations and private companies and Section 4.0 describes the conclusions and recommendations.

2.0 LITERATURE SEARCH

This section of the report provides a summary of the results of the literature search. Section 2.1 provides an overview of CVO and ATIS initiatives in Minnesota, Section 2.2 describes national CVO initiatives, Section 2.3 describes CVO ATIS operational test projects and initiatives, and Section 2.4 describes the national ATIS initiatives.

2.1 Overview of CVO and ATIS Initiatives in Minnesota

To provide a baseline for comparison of initiatives for CVO-related Travel Information dissemination in other regions of the country, Minnesota's program initiatives are summarized in this section. The Minnesota Program is a collaboration effort among those agencies involved with Commercial Vehicle Operations, and the agencies involved with Minnesota's Intelligent Transportation System (ITS) program, which includes a significant component dedicated to advanced traveler information services. A list of the references cited in the literature search can be found in Appendix A.

2.1.1 Commercial Vehicle Program

The Office of Freight and Commercial Vehicle Operations (OFCVO) within the Minnesota Department of Transportation administers functions related to Commercial Vehicle Operations in Minnesota. The agency's primary purpose is to promote and enforce Federal safety and economic regulations that govern for-hire and private motor carriers operating in Minnesota. The areas of service within the Office of Motor Carrier Services are communications and training, credentialing, oversize permits, safety and security operations, and commercial vehicle operations support.

The commercial vehicle operations support section within OFCVO, together with Mn/DOT's Department of Public Safety and industry representatives, were responsible for the development of Mn/DOT's initial CVO Business Plan in 1995 (1). This plan identified the need to reengineer CVO regulatory processes concurrently with the deployment of Intelligent Transportation System (ITS) initiatives that were part of the Minnesota Guidestar Program. This committee determined that while ITS technologies are essential in achieving the goals of improved safety performance, credential compliance, revenue collection, and customer service, these technologies should not be implemented to support outdated and inefficient processes (where they exist), but rather, process reengineering and technological change should proceed concurrently. Following a key action item of Mn/DOT's multi-modal strategic objective - implement a revised commercial vehicle operations (CVO) plan - the committee decided to revise its Business Plan. The first plan included only projects related to roadside enforcement and desk side credentialing activities. This new *CVO Action Plan* (2) includes a variety of other CVO business activities.

The *CVO Action Plan* identifies four main components vital to the success of CVO initiatives:

1. CVO Commercial Vehicle Operations includes all the operations associated with moving goods and passengers via commercial vehicles over the North American highway system and the activities necessary to regulate the operations.

2. ITS Intelligent Transportation Systems integrates advanced computer information processing, communications, sensor, and electronics technologies and management strategies to increase the safety and efficiency of the surface transportation system.

3. CVO/ITS This is a voluntary effort involving public and private partnerships focused on improving highway safety and motor carrier productivity through the use of technology. The Federal Motor Carriers Safety Administration (FMCSA) is the lead federal agency for the program and the Office of Motor Carriers' (OMC) CVO/ITS division is directly responsible for oversight of the program.

4. CVISN - Commercial Vehicle Information Systems and Networks, which is a subset of CVO/ITS, contains the information systems and networks necessary to link the various information sources between motor carrier, roadside, and desk side regulatory and enforcement activities.

While much of the plan relates to commercial vehicle operations regulatory and administrative activities, the new business plan also has a dedicated customer-positive focus that aims to deliver travel information services customized for the commercial vehicle industry, as if from a single entity, versus multiple efforts from diverse functional areas. One of the four focus areas of the *CVO Action Plan* is Mobility. Under this category, a project has been identified to "package" the Condition Acquisition and Reporting System (CARS) traveler information system for commercial vehicle operators.

The purpose of this project and report is to assess past, current, and planned initiatives, and survey industry officials and representatives, to determine the means to deliver CVO traveler information that will best meet industry needs and expectations.

2.1.2 ATIS Component of Minnesota's ITS Program – Relation to CVO Initiatives

Minnesota's initial plan for a Statewide Advanced Traveler Information System was published in 1998 (3). This plan identified several outcomes and information items applicable to the CVO service area, such as weather-related weight restrictions, location of truck stops, and in-vehicle road guidance. The report also acknowledged that a market segment such as CVO operators might emerge as the services were deployed and developed over time.

During the next two years following the release of Mn/DOT's ATIS plan, a nationwide initiative to develop a 3-digit telephone travel information service, the 511 service, was launched. The 511 travel information service number was officially designated by the Federal Communications Commission in July 2000. Minnesota became one of a handful of States to achieve early deployment of the 511 service, with the first pilot program for cell phone users announced in December, 2001 (4). The 511 telephone service complemented, and was integrated with the ATIS Internet Traveler Information Service (63), also sponsored by the Minnesota Department of Transportation. The 511 telephone/Internet service was enhanced in July, 2002, with abbreviated 511 dialing, voice recognition, increased calling capacity and easier-to-navigate web pages.

The Condition Acquisition and Reporting System (CARS) is the primary repository of travel information data for 511 services. Mn/DOT operations staff and State Patrol staff from dispatch centers, the field, and the Traffic Management Centers channel information to this system to maintain real-time information about travel conditions throughout the state.

The current Internet - ATIS menu for Minnesota traveler information starts with the selection of geographic area of the state by the user. The choices are nine geographic regions, the Twin Cities Metropolitan Region, and a Statewide Map. From the map display for each geographic region, a commercial vehicle user can select a tabbed section that will provide a map with the status of overweight / over-dimension permits for major state routes, with icons marking roadways with a "closed", "call-in", or "open" permit status.

Mn/DOT's 511 travel information caller service (can also be reached by any phone by dialing 800-542-0220) is also menu-based, with voice activation. The caller states the travel region of interest or "Menu" to hear a list of choices: Highway Traffic; Road Weather; State Summary; Regional Summary (followed by stating the nearest city); Transit Information (states the Hotline number for a separate service for the Twin Cities); and a provision to leave comments. It is noted that regional reports provide information on overweight permit status on state routes, a useful feature for motor carriers in this special situations.

At this time, the 511 telephone and Internet travel information service are the primary means to provide travel information to commercial vehicle users in Minnesota. As previously stated, there is limited information on the broad-based acceptance and use of this available information by motor carriers. Surveying past, current, and planned initiatives across the country related to ATIS – CVO, together with one-to-one surveys of officials and business owners (Project Task 2), will provide insight on the direction that the Mn/DOT ATIS initiative and the Office of Motor Carrier Services should take, perhaps to deliver the desired information more directly to the driver.

2.2 CVO National Initiatives

This section provides an overview of the national program of initiatives for applying ITS technology for the benefit of commercial vehicle operations.

2.2.1 National ITS CVO Program Architecture – CVO User Services and Market Packages

In order to investigate the feasibility of providing a customized advanced traveler information service for commercial vehicle operators, it is sensible to investigate how such a service would be compliant with the National ITS Architecture, so that Mn/DOT would be eligible to use Federal funds for deployment. Two key concepts of the National ITS Architecture are User Services and Market Packages (5). The User Service concept was developed to allow a high-level discussion of what processes or projects are required to address stakeholder needs and problems. The National ITS Architecture User Services were determined by a collaborative process involving USDOT and ITS America, with significant stakeholder input. There are currently 32 user services grouped into eight categories. The user services identified for the commercial vehicle category are:

Commercial Vehicle Electronic Clearance
Automated Roadside Safety Inspection
On-Board Safety Monitoring
Commercial Vehicle Administrative Processes
Hazardous Material Incident Response
Commercial Fleet Management

As can be seen from this list, none of the above broad user services identify a traveler information-type service specific for commercial vehicles. For this reason, a more detailed set of deployment-oriented ITS service building blocks were defined from the original user services. These are called *"market packages"* in the documentation. Market packages are defined by sets of equipment systems that work together to deliver a given transportation service and the major information flows between them and other equipment systems. *In other words, they identify the pieces of the National ITS Architecture required to implement a service.*

For considering a market package to serve an Mn/DOT CVO ATIS function, it is useful to consider the applicable National ITS architecture market packages for both commercial vehicle operations and traveler information:

Traveler Information Market Packages

- Broadcast Traveler Information
- Interactive Traveler Information
- Autonomous Route Guidance
- Dynamic Route Guidance
- Information Service Provider (ISP) Based Route Guidance
- Integrated Transportation Management/Route Guidance
- Yellow Pages and Reservation
- Dynamic Ridesharing
- In-Vehicle Signing

Commercial Vehicle Market Packages

- Fleet Administration
- Freight Administration
- Electronic Clearance
- Commercial Vehicle Administrative Processes
- International Border Electronic Clearance
- Weigh-In-Motion
- Roadside CVO Safety
- On-board CVO Safety
- CVO Fleet Maintenance
- HAZMAT Management

It is observed that architecture market packages on the commercial vehicle side are mainly concerned with safety, administration, and regulation, not with providing add-on service benefits to motor carriers. This suggests that any CVO ATIS service should originate from the traveler information set of market packages. However, opportunities to share the communications infrastructure being developed for commercial vehicles should be sought. In this way, a customized, hybrid market package could be developed for CVO ATIS.

One example of a customized market package might be Information Service Provider (ISP) Based Route Guidance, customized for motor carriers' routing and dispatch systems. An information flow diagram for such a market package is shown in Figure 2-1.

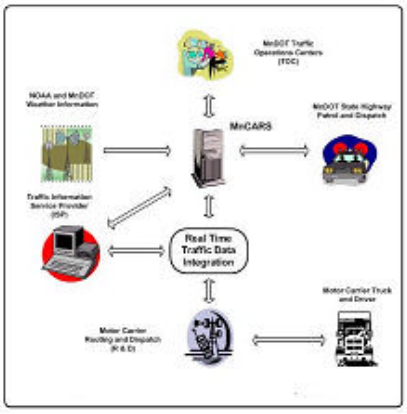


Figure 2-1: Conceptual CVO ATIS Architecture

2.2.2 FMCSA Programs Overview

The Federal Motor Carrier Safety Administration (FMCSA) was established within the Department of Transportation on January 1, 2000, pursuant to the Motor Carrier Safety Improvement Act of 1999 [Public Law No. 106-159, 113 Stat. 1748 (December 9, 1999)]. Formerly a part of the Federal Highway Administration, the Federal Motor Carrier Safety Administration's primary mission is to prevent commercial motor vehicle-related fatalities and injuries. Administration activities contribute to ensuring safety in motor carrier operations through strong enforcement of safety regulations, targeting high-risk carriers and commercial motor vehicle drivers; improving safety information systems and commercial motor vehicle technologies; strengthening commercial motor vehicle equipment and operating standards; and increasing safety awareness. To accomplish these activities, the Administration works with Federal, state, and local enforcement agencies, the motor carrier industry, labor safety interest groups, and others.

In addition to the standard regulatory, administrative, and safety functions of the FMCSA, their headquarters office also has a Research and Technology Program (7). The Administration identifies, coordinates, and administers research and development to enhance the safety of motor carrier operations, commercial motor vehicles, and commercial motor vehicle drivers. The Administration promotes the use of information systems and advanced technologies to improve commercial vehicle safety, simplify government administrative systems, and provide savings to states and the motor carrier industry. This group within the FMSCA would be the ideal point of contact for Mn/DOT to promote and gain consensus for a new CVO ATIS initiative. When contacted, Mr. Douglas McKelvey, Director of the FMSCA Research and Technology Division, advised that he was not aware of any new national CVO ATIS initiatives, however his office would be a point of contact and technical support for any such initiative that Mn/DOT selected to pursue. It is also noted that the FMSCA Research and Technology Program office coordinates national CVO-ITS efforts with the CVO point of contact at the FHWA-ITS joint program office (8).

2.2.3 CVISN Program Overview

An excellent overview of the CVISN program status can be found from the 2003 ITS Projects Book (9) published online by FHWA. This section summarizes the key elements of the CVISN program, and findings from review of CVO projects in the ITS Projects Book.

The Commercial Vehicle ITS Infrastructure component of the Federal ITS Deployment Program is defined in Section 5209 of the Transportation Equity Act for the 21st Century (TEA-21). It provides Federal ITS funding to deploy Commercial Vehicle Operations (CVO) ITS systems that improve the safety and productivity of commercial vehicles and drivers, and reduce CVO costs and regulatory requirements. A major element of this component is the Commercial Vehicle Information Systems and Networks (CVISN) deployment program. In TEA-21, Congress established a goal to complete CVISN deployment in a majority of states by September 30, 2003.

The Federal Motor Carrier Safety Administration (FMCSA) has adopted a safety goal of reducing the number of deaths and injuries resulting from truck and bus crashes 50 percent by 2010. The CVISN deployment program, managed by the FMCSA, supports the safety goal by providing: (1) State and Federal enforcement officials with electronic access to timely and accurate motor carrier safety and other information to target high-risk carriers for enforcement, and compliance actions and to identify high-risk and/or out-of-service commercial vehicles for further inspection;

and (2) the architecture and standards for electronically collecting and exchanging data on motor carrier safety and commercial vehicle operations needed to identify high-risk carriers and vehicles for inspections.

A specific set of organizational and technical capabilities associated with CVO-related information systems and communications networks has been identified as CVISN Level 1 capabilities. Level 1 deployment supports:

- Safety information exchange,
- Interstate credentials administration
- Roadside electronic screening,

The three-step process to deploy CVISN Level 1 capabilities is based on lessons learned from CVISN Prototype and Pilot State Model Deployments includes Step 1 – Planning; Step 2 Design; Step 3 – Deployment.

The goal of the CVISN program from the TEA-21 legislation was to achieve deployment of Level 1 services in a majority of states, and with a majority of carriers by 2005. The vision called on participation by the industry on a voluntary basis. At this time (2003) the state and industry progress in CVISN varies. All states are participating in one of the three steps—Deployment, Design, or Planning—of CVISN deployment. The states in the most advanced stages of deployment are Kentucky, Maryland, Virginia, Washington, California, and Minnesota. Other states have developed CVISN program plans, and are in lesser stages of completing deployment.

Available State CVO plans prepared under the CVISN program were reviewed in the following section for any visions, plans, or initiatives beyond basic Level 1 services that would leverage efforts from state and national ATIS traveler information deployments to achieve enhanced services for motor carriers. No such ATIS/CVO initiatives were found from a review of current or completed projects documented in Section 5 – Commercial Vehicle Operations, in the 2003 ITS Projects Book (9).

2.2.4 State CVO Business Plans

Federal funds were provided to State transportation agencies to develop CVO business plans. The plans for all states are in various stages of development and refinement. The ITS Joint Program Office began tracking the deployment of state CVO initiatives in 1996 (10). FHWA's goal was to have between 22 and 35 states deploy the initial, Level 1 operating systems and capabilities (credentials administration, safety administration exchange, and roadside electronic screening) of CVISN by the year 2005.

This section summarizes planned initiatives related to CVO ATIS that were noted in the published and available State CVO Business Plans. Kentucky (11) was one of the earlier states to begin its CVO plan before available guidelines were published by FHWA. Examples of initiatives planned for CVISN Level 1 services in Kentucky included:

- Advantage CVO, the original electronic clearance project with the states along the I-75 Corridor
- Cooperative weigh station operation on the Tennessee border

- MAPS-Advantage CVO Electronic Screening Interoperability Agreement
- Regional ITS-CVO Business planning guidance for 13 other states (Mainstreaming)

The Kentucky ITS-CVO plan stated that it was developed with the policy of being verified against the overall ITS plan to ensure that opportunities for capitalizing on joint deployments are were not lost, and that duplicative or redundant systems were combined and jointly deployed to be of benefit to multiple systems. The Kentucky Statewide ITS Plan was referenced in the CVO plan with the comment that, " Traffic information systems, tunnel monitoring, CVO regulatory processes, and weather monitoring systems all fall under the umbrella category of ITS, yet currently operate independently of each other" and "This strategic/business plan in a somewhat modified form will constitute the CVO section of the statewide ITS plan. Opportunities for synergy among the ITS areas will be closely examined. This examination may result in some modification to this plan." There was no explicit initiative related to providing traveler information, tailored to commercial vehicle operators in Kentucky's initial CVO plan.

The Connecticut ITS/CVO Business Plan (12) made specific reference to mobility for commercial vehicles as a goal, stating, "Support development of Advanced Traveler Information Systems (ATIS/CVO) to reduce the impact of traffic congestion on motor carrier operations." The following summarizes three areas of initiatives proposed by the Connecticut plan for CVO Traveler Information:

ACTION	CURRENT PROCESS	POTENTIAL ITS/CVO PROCESS
Method of Collecting Information	Motorist cellular phone calls, police radio, DOT issued highway construction advisories	Motorist cellular phone calls, police radio, DOT issued highway construction advisories. Additionally: loop detection, CCTV, traffic probe vehicles.
Method of Distributing Information to Highway Operations Groups, emergency responders	Telephone, radio, I-95 Corridor Coalition Information Exchange Network (IEN).	Telephone, radio, IEN.
Method of Disseminating Traveler Information to CVO	Governor's Telephone Hotline, commercial radio/TV stations, via Internet--Road Construction Advisory by DOT.	*FleetForward* program to deliver real-time traffic information to motor carriers' computer routing and dispatch systems.

The objectives of the Connecticut plan were:

1. Expand the current knowledge base of the information needs of motor carriers operating in the I-95 Corridor Coalition states.

2. Access existing information sources and sources being developed, to test the manipulation of data to formats most useful to the motor carriers.

3. Test the dissemination of information to motor carriers via several communications media.

4. Evaluate the effectiveness of the information and delivery modes for improving motor carrier routing and dispatching.

5. Assess overall potential motor carrier usage of real-time travel information for fully deployed ATIS-CVO.

6. Outreach to the motor carrier industry.

It is noted that Connecticut's plan included a survey of motor carrier preferences for ITS/CVO services. In this survey, real-time access to travel and road conditions ranked as a second choice to electronic applications for oversize/overweight permits, but ahead of nine other services in the CVISN program.

The Rhode Island CVO plan (13) was another early CVO Business plan with mobility as a specific goal, stating:

> Goal: Improve highway operations and motor carrier mobility
>
> Objectives:
>
> 1. Support development of Advanced Traveler Information Systems (ATIS/CVO) to reduce traffic congestion impacts on motor carrier operations.
> 2. Support public/private coordination efforts for the management of roadway incidents.

Similar to the Connecticut plan, the Rhode Island plan involved interviews of motor carriers on their preferences for CVO related ITS services, and in this case, access to real-time traffic information rated as the highest priority.

Rhode Island's CVO plan also acknowledged opportunities to leverage the State's other initiatives for the benefit of motor carriers. These initiatives included the Rhode Island Traffic Operations Center, variable message signs, CCTV for incident detection and confirmation, and highway advisory radio stations. Rhode Island's plan also referenced the FleetForward plan as an initiative of the I-95 Corridor Coalition.

The FleetForward initiative that grew from Connecticut and Rhode Island's CVO business plan is discussed in the section that follows.

The West Virginia CVO Business Plan (14) referenced as a related initiative the traffic management system operated by the Parkway and Economic Development and Tourism Authority, which used CCTV for incident detection, and Variable Message Signs to advise motorists of traffic and weather conditions. The West Virginia plan also referenced a downgrade dynamic speed warning initiative that was unique among the plans reviewed.

The Kansas ITS/CVO plan (15) referenced a project involving neighboring states and a Road Weather Information System (RWIS):

> Initiative: Participate in Road and Weather Information Systems (RWIS) Kansas is part of a consortium including the states of Colorado, Nebraska, Wyoming and Utah that has requested federal funding.
>
> *Project Objective:* The purpose of the project is to design, develop, operate and evaluate an integrated system that meets highway operators' and users' needs for clear and accurate weather and road information, particularly in rural areas.

> *Outcome:* Current road conditions would be available to motor carriers via kiosks at truck plazas and rest areas.
>
> *Scope:* Federal funding was not granted for this project. A group will be established to pursue this initiative.

Montana's ITS/CVO Plan (16) also referenced a Road Weather Information System (RWIS):

> 3.4.5. REMOTE WEATHER INFORMATION SYSTEM (RWIS):
>
> RWIS is a network of fifty-nine (59) strategically located weather information sites that provide air and ground temperature, road surface condition, humidity level and wind information to MDT maintenance forces on a real time basis. This information is used by maintenance managers to monitor changing conditions at remote sites like mountain passes, to help decide when to call snowplow crews out, and to determine what kind of equipment to deploy. These sites also provide geographically specific weather and road condition information to the trucking industry and the traveling public through MDT's 800-number Winter Road Report program. All 59 RWIS sites will be fully operational by December 1,1997.

Wisconsin's CVO Plan (17), considered an ATIS/CVO initiative as an add-on service, in addition to the Level 1 services:

> Other Projects Considered: The work group also considered the following ITS/CVO related project:
>
> *CVO Traveler Information:* The objective of this project is to enhance efficiency of motor carrier operations and reduce traffic congestion by providing information that will improve motor carrier routing and dispatching. The project will develop specific strategies for packaging and delivering CVO traveler information in forms that will permit commercial vehicle operators to make the optimum use of this information in a relatively seamless manner.

Indiana's CVO/ITS business plan (18) referenced ITS initiatives related to Borman Expressway operations and the role in the Gary-Chicago-Milwaukee (GCM) Corridor. The Borman Expressway was cited as a corridor with some of the heaviest truck traffic in the country. Services referenced that would benefit truck operators along the Borman Expressway included the *Hoosier Helpers* traffic patrol, with on-board laptop computers and an expert system that would send information from the field to the planned Borman Expressway Management system, and then have the information relayed in the form of alerts on Changeable Message Signs and Highway Advisory Radio stations. Closed Circuit TV cameras would also aid in detection and confirmation of incidents involving trucks. The Indiana plan also referenced a CVO Traveler information project:

> CVO Traveler Information (INDOT) **.** The objectives of this project are to enhance the efficiency of motor carrier operations and to reduce traffic congestion by providing information that will improve carrier routing and dispatching, particularly as it is associated with intermodal cargo movement.

The following State CVO Plans did not reference an explicit objective for mobility related to CVO ATIS initiatives, or cross-reference parallel efforts with Statewide ITS programs:

Georgia (19)	Idaho (23)	Missouri (27)
Louisiana (20)	New York (24)	Nebraska (28)
Ohio (21)	North Carolina (25)	Utah (29)
Wyoming (22)	South Dakota (26)	

2.3 CVO ATIS Operational Test Projects and Initiatives

2.3.1 FleetForward

The most extensive operational test conducted in North America for an Advanced Traveler Information System benefiting Commercial Vehicle Operations was the FleetForward Initiative (30, 31, 32). The FleetForward operational test was conducted during 1999-2000 as a public-private partnership involving members of the I-95 Corridor Coalition, the American Trucking Association Foundation and participating carriers, and SmartRoute Systems deployed in Boston, Philadelphia, and Washington D.C. The FleetForward concept comprised traffic data collection, fusion, and distribution to participating carriers using *PC Miler*, a software application for routing and dispatching commercial vehicles. Traffic data for the test was obtained from two sources: 1) The I-95 Corridor Coalition's Information Exchange Network (IEN), which serves as a warehouses for traffic data from member agencies such as the State DOT's and other agency coalitions such as TRANSCOM; 2) The SmartRoute Systems daily traffic information for the above three cities in the corridor.

The conclusions and recommendations of the FleetForward operational test are summarized here, with relevance to possible future, similar initiatives involving Mn/DOT.

FleetForward Operational Test Conclusions:

- The FleetForward test was a success. The public-private partnership stimulated an interest in the use of ATIS for Commercial Vehicle Operators. Information was gained on the needs and preferences of motor carriers using real-time traffic information to influence their routing and dispatch decisions.
- Carriers using the FleetForward application judged it to be a sound, useful product. While the application wasn't used by all carriers on a daily basis, the majority of those that did use it (mainly at the management level), felt that the system was easy to learn, and provided useful information for their operations.
- Post-test surveys of carriers identified additional desired features. Carriers surveyed after the operational test indicated additional information that would be more useful, including integrated road weather (with forecast information), historical traffic reports, parking and rest stop information with real-time space availability (to better plan for available hours of service).
- The operational test was a limited deployment, realizing limited, quantifiable benefits. A larger scale deployment, with a higher percentage of carrier involvement, would be required to realize benefits that were more quantifiable.
- FleetForward was heavily used by participants during emergency situations. This conclusion was verified by the increase in web page use during Hurricane Floyd and severe winter storms.

FleetForward Operational Test Recommendations:

- Use the experience from the FleetForward operational test to develop a business model for ATIS and CVO in the I-95 corridor.
- Conduct market research to identify additional service features and a pricing policy for a FleetForward type service.
- Improve the data quality with better uniformity, and a means for timely updates of the conditions (new incidents, plus clearing existing incidents)
- Expand the service with additional features, wider geographic coverage, and a 24 hour/day, 7 day/week broadcast
- Intensify initial outreach to achieve higher carrier commitment and participation
- A revised data collection plan should provide a more quantitative measure of effectiveness

What is the significance of the extensive FleetForward test for the Mn/DOT CVO ATIS initiative? The following points should be considered:

1. The initiative grew from consensus building by a large multi-state coalition of stakeholders and the early recognition of carrier interests in ATIS/CVO in Connecticut's State CVO plan. There was also a Federal financial commitment of $500,000 and state/local commitment of $250,000 for the test, yet the concept has not been revived or sustained to date. Mn/DOT should balance its interest in timely deployment of an ATIS/CVO plan with the need for a system that is sustainable, accepted by the industry, and achieves integration and interoperability in the broadest possible framework.
2. Since the FleetForward test, additional, nation-wide investments have been made in the 511 initiative and the Condition Acquisition and Reporting System (CARS) initiative (discussed elsewhere in this report). Mn/DOT and the I-95 Corridor Coalition need to explore and promote the leveraging and integration of these initiatives with the advancement of any new FleetForward-type initiative.
3. Since the FleetForward test, there has been intensified focus on the safety and security of the nation's transportation system. To gain support for an ATIS/CVO plan, it's usefulness in an emergency situation, as noted in the FleetForward test, should be promoted.

Finally, Mary Grace Parker (33), director of operations management for the I-95 Corridor Coalition, was contacted on the potential future of a new generation of CVO ATIS initiatives such as FleetForward. Ms. Parker stated that there are currently no plans or available funding for a new initiative tailored for the motor carrier industry's interests. However, she offered the following points of insight:

– There is an unmet demand by motor carriers for CVO ATIS services, however, no business or agency has developed a viable business plan to package and deliver these services. Also, motor carriers are limited in what they are willing to pay for such a service.

– There is a definitive demand for information on real-time truck parking location and availability in the motor carrier industry. The electronic tags and readers being deployed as part of ITS/CVO systems could potentially be used for gated parking areas for trucks.

– At the time the FleetForward test was conducted, and to this day, we are still on the early part of the learning curve for viable public-private business models for a CVO ATIS application.

2.3.2 FleetOnline

Two independent pilot studies of an ATIS system developed for commercial vehicle operators, FleetOnline, were conducted in Arizona and in the Gary-Chicago-Milwaukee (GCM) Corridor (34, 35). Prior to test periods of using the FleetOnline application, recruited participant carriers were surveyed to better understand their operating characteristics, technology systems, and ATIS/CVO information needs. A total of 38 carriers were surveyed in the GCM study, while an initial 36 carriers were given a screening survey and 10 carriers were given a more comprehensive pre-test survey in the Arizona study. For both studies, initial, general pre-test survey responses on the needs and perceptions of motor carriers were consistent with previous ATA Foundation investigations:

- The value of a CVO ATIS service is directly related to how complete it covers the carrier's operation – geographically, the time of day, and the details of the trip.
- Exception-based reporting for non-recurring events and conditions, for example roadway accidents and special events, is preferred over standard, non-exception based information.
- An automatic information push for non-integrated operations (notification by a signaling device-pager, fax, phone, etc.) is desired to reduce a carrier's need to seek out information (for example, from websites).
- A "custom subscription service" is desired for the diverse range of information of interest to carriers, that would only deliver parameters related to their day-to- day operation, with "manual polling" available on-demand for special conditions and information.
- Carriers must gain a sense of the timeliness, accuracy, detail, and relevance of the information provided in order for them to use it for their operations. Reliability is also important – knowing the information will be available when needed.
- For conditions involving delays, the carriers expect to know the cause for the delay, the impact on the planned route, and if an alternate route is proposed, it needs to be truck-legal.

The FleetOnline pilot test involved recruiting and training motor carriers for use of the software, a test period of six (6) months, and interim recruiting and training of carriers by ATA and TranSmart Technologies to make up for carriers lost to attrition. The Arizona pilot test started with fifteen initial participants and ended with eight participants, while the GCM study started with ten initial participants and ended with nine participants.

The FleetOnline pilot tests represented a significantly smaller and less comprehensive initiative than the FleetForward test. The significant differences included a lack of integration with dedicated route dispatching software (versus all FleetForward participants using *PC Miler*), integration of data from a private sector service (SmartRoutes), and the limited geographic coverage of the FleetOnline tests. For the small sample of participants on the FleetOnline tests, only qualitative and anecdotal results and feedback were obtained. The comments, for the most part positive, are highlighted as follows:

- The application addressed an operational need
- The training was adequate
- The user manual was easy to use
- FOL increased the percent of on-time deliveries

- FOL increased customer satisfaction through improved on-time performance or more predictable arrival times
- FOL allowed increased number of pickups or deliveries
- The application was the most useful in the winter
- Liked how it identified where permits are required, escorts needed, road restriction information, and routing

The areas recommended for enhancement by the participant carriers involved:

- Broader geographic coverage
- Provide greater route detail in the map presentation/Incorporate street-level traffic information
- Provide greater detail in door-to-door text-reports accompanied with detailed direction maps
- Improve timeliness of traffic and construction information
- Provide greater zoom-in/zoom-out capabilities for maps
- Provide capability to integrate real-time traffic information with carriers' existing routing and dispatch (R&D) systems
- Provide greater detail on the cause of the traffic congestion
- Enhance the "user-friendliness" of the system
    - Provide route-specific restriction information (especially on arterial routes)

No follow-up CVO ATIS initiatives have been made for either of the areas where the FleetOnline tests were conducted, according to a conversation with Dan Murray of the American Transportation Research Institute (formerly ATA Foundation, 36).

2.3.3 Kansas DOT Truck Routing Information System (TRIS)

The Kansas Department of Transportation (KDOT) initiated a web-based application, the Truck Routing Information System (TRIS) as an aid for routing and permitting oversize and overweight trucks (37). At this time, the application has only been used as an internal tool by the KDOT traffic engineering division (for routing OS/OW vehicles), the Kansas Department of Revenue (for permit issuance), and the bridge engineering division of KDOT for evaluating "superload" permit route requests. The main component of the TRIS application is an interactive map that provides quick access to information required for OS/OW truck routing permits, including bridge load rating and underpass clearances, interchange geometry, sign truss information, and construction /detour data. It also offers the ability to select from a dropdown list of routes to determine if a user-defined truck can pass selected route segments. The application addressed the major business problem associated with the permitting and routing of OS/OW vehicles - the need to review multiple sources of information much of which was paper-based. Features of the program include the ability to build a route from a highway ID list, from single or multiple segments, or from beginning and ending segments. The basic philosophy behind the use of the program is that OS/OW permit and route determination should not be an automated process, however, that Information and GIS technology can greatly assist in the professional decision-making process for selecting the best route. This should be considered for any web-based CVO ATIS system developed for use by the public.

2.3.4 Virginia DOT I-81 Truck Fleet Support Program

Another major CVO ATIS initiative was the Truck Fleet Support Program (1, 2), an ongoing program by the Virginia Department of Transportation (VDOT). The Truck Fleet Support program grew from a larger VDOT I-81 Corridor ITS initiative that sought to optimize operations during a major planned construction program. VDOT sought to bring CVO operations into high consideration for corridor improvements, because truck traffic made up a critical 40% of all traffic on I-81. A pilot "Travel Shenandoah" ATIS demonstration service was a principal part of the initial I-81 Program. It was developed under a cooperative relationship between VDOT and the Virginia Tech Transportation Institute (VTTI). Early in 2000, VTTI conducted a feasibility analysis, and a preliminary design of "Truck Fleet Alert and CVO Travel Service". In December 2000, the I-81 program leadership approved implementation, testing and evaluation of the service based on VTTI findings. The Truck Fleet Alert Service was linked to an expanded Travel Shenandoah service, supported by VTTI. Following final design of the service, trucking companies were recruited to participate in the prototype project.

The Truck Fleet Support Program has two components – the Truck Fleet Support Web site, and the Truck Fleet Alert activity.

- **Truck Fleet Alert**. This component uses the central database that is part of the I-81 Travel Information Clearinghouse maintained by VTTI. It includes information on traffic accidents, congestion, and other road conditions that is updated continuously using data provided by VDOT and the State Police. Weather information is drawn from the National Weather Service. This information is available 24 hours a day, 7 days a week, and is conveyed to users through
    - E-mail alerts
    - The Internet Web Site (www.truckfleetsupport.com)
    - Voice Activated Wireless and Landline Telephone (511 or 800 578-411)

E-mail alerts covered not only all of I-81, but portions of connecting highways as well, including I-77 I-64, and I-66. At the time participants enrolled in the program, they were given an option of indicating which segments they wished to have included in alerts.

- **Truck Fleet Support Web Site.** This site was designed specifically for the CVO user. It includes access to information on over 18,000 establishments along the corridor. In addition to the traffic, and road conditions information, the site includes –
    - truck stop and travel plaza locations and services
    - a truck parking site inventory
    - fuel and service locations
    - oversize and overweight permitting information
    - access to a broad range of related sites
    - access to the 511 Virginia Web Site (former Travel Shenandoah site)

The focus of potential fleet participants for the Pilot test was those CVO operations that had significant traffic throughout the I-81 corridor. Some 30 fleet operators were contacted, and 11 operators agreed to participate in the test. The test period of participating fleet users of the Truck Fleet Alert and Support Web Site services ran from June to September of 2002. During the test period, participants were requested to complete weekly, interim evaluation reports. The following summarizes interim feedback on the program's limitations and potential enhancements, obtained from the program participants during the test period:

- **Expanded geographical coverage**. Information on additional routes in Virginia, outside the I-81 corridor, is desired in order to plan and implement diversions on other routes. It was suggested that the statewide 511 information clearinghouse be utilized for this purpose.
- **Fax delivery**. This means of communication is common for many carrier dispatchers, and enables those with limited technical capability to still receive alerts.
- **Advertising and Expanded Marketing of Website.** Wider communication of the service might lead fleets to take advantage of the parking, truck stop and other services information available on the web site.
- **Enhanced information on diversionary routes**. Through close coordination with affected jurisdictions, alternate route information could be developed and made available to the system users.
- **Increased use of Variable Message Signs**. Close coordination between local VDOT officials and the data clearinghouse might yield a basis for increased use of VMS at strategic locations along I-81.

The Truck Fleet Support Program final evaluation stage involved a survey of participating fleet operators that was sent in November 2002. Shortly afterward, the survey was modified for truck stop operators. The survey for this group was sent out in December 2002. Fleet Users and Truck Stop Operators were asked about availability of information, communications technology, how information was shared with drivers, and for suggestions on other means to convey incident, weather and related information. Also, the users were polled on whether the service should be continued, and on their willingness to pay for future services. Findings and conclusions from the final evaluation stage of the Truck Fleet Support Program test were:

- **Technology availability.** E-mail alerts are an available option for nearly all operators. A fax machine is available to all operators.
- **Dispatcher/Driver Communication**. For those fleets that had wireless communication technology – satellite and cellular – this means was used to alert drivers regarding incident and weather information. A number of operators used, or could use, cell phones. Many expressed interest in ultimately being able to have designated information go directly to drivers rather than through dispatchers, although the technology infrastructure to enable this is not currently available.
- **Interest in Continuing Service/Willingness to Pay**. Virtually all participants expressed support for continuation of the program, even if current use was minimal to moderate. As set out in the interim evaluation report, participants expressed interest in wider geographic coverage beyond the I-81 corridor. Only one of the current fleet participants indicated a specific level of willingness to pay - $30 per month, and another indicated the fee might be negotiable. All others were not willing to pay for continued service. The limited geographic coverage, and lack of alternative routing were cited as the principal reasons that the value did not warrant a fee.

Based on the findings of the study during and after the operational test, the following options for a business model were proposed for a continued program:

- Public Funding, in whole or in part
- Integration of e-mail or other alerts in 511 Services (Estimated Cost: $25,000 per year)
- Sponsored Service (value-added, from trucking equipment or service providers)

The most notable recommendation from the initiative was to explore the integration of the CVO ATIS service into VDOT's 511 system.

2.3.5 Separate, related study: 511 Focus Group for I-81 Corridor, that included motor carrier operators (3).

A separate set of focus group sessions were conducted by the Virginia DOT for development of 511 travel information services along the I-81 corridor. Two focus group sessions involving a total of 41 people, that included the Commercial Vehicle Operations market participants, were held. The findings of these focus group sessions relevant to CVO operators are summarized below:

- **Pre-trip information**. CVO focus group participants had some unique types of pre-trip information they look for including: HAZMAT routes, special load routes, and low underpass information. They can find this information on special maps and by calling the Department of Transportation (DOT).

- **En-route information.** Participants in all but one CVO group said that they look for information about gas and rest stops while traveling. Other common types of en-route information included the distance to a particular destination, road conditions, and food locations.

- **Cell phone use.** Most of the participants, 84% said that they travel with cell phones. The breakdown by market segment was 80% of residents, 91% of truckers, and 75% of tourists. Several of the truckers said that their companies supply them with cell phones when they travel.

- **Desired CVO features on 511.** When CVO participants were asked what would need to be on a traveler information service for them to call, they said that they want a channel specifically tailored to the trucking community. CVO participants do not want to wait through menus of information unrelated to their business travel (i.e. tourism). The CVO participants also identified some information (i.e. low underpass bridges) they would like that is probably not of interest to residents or tourists.

The most significant recommendation that resulted from these focus group studies was to develop a channel on Virginia's 511 system that is tailored specifically to motor carriers. This feature would be more effective for directing the CVO users to trip information that they had a specific interest in.

2.3.6 Border Crossing Projects

The best recent reference for the use of ITS to enhance commercial vehicle and goods movement across United States Borders is the Cross-Cutting summary by USDOT, *Intelligent Transportation Systems at International Borders* (38). This publication was reviewed to investigate initiatives for combining ATIS with the planned CVISN Level 1 services for commercial vehicles.

The crosscutting study provided background on the International Border Clearance (IBC) provision of the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991. The program was originally conceived as a means to test the feasibility of utilizing Intelligent transportation safety, and expedite the processing of commercial vehicles through ports of entry in states along international borders. At all of the sites profiled in the cross-cutting study, the

primary objective was mitigating congestion at border crossing through development of a Freight and Trade Processing System (FTPS) which sought joint integration with national customs and trade systems (U.S. Treasury, U.S. Customs, Immigration and Naturalization Service) more than with surrounding regional travel information systems. It is noted that the architecture documented for the IBC system interconnectivity has a provision for sharing the vehicle traffic data through the system with other agencies, for the benefit of the general traveling pubic at border crossings.

The cross-cutting study gathered findings from field operational test (FOT) evaluation reports, and during interviews with Federal, State, and industry officials at six border crossing sites: Blaine, WA; Buffalo, NY; Detroit, MI; Laredo, TX; Nogales, AZ; and Otay Mesa, CA. Several instances of integration of IBC operations with conventional ITS systems were noted: 1) TRANSCOM'S System for Managing Incidents and Traffic (TRANSMIT) will be extended to the Buffalo area Peace Bridge crossing to allow bridge traffic conditions to be more closely monitored for incidents; 2) At the Nogales, AZ crossing, a proprietary Management Information System for Transportation (MIST™, by P B Farradyne), along with variable message signs (VMS), closed-circuit television (CCTV) cameras, and Weigh – in - Motion (WIM) scales were used to facilitate commercial vehicle movement through the port. Additional information on the use of MIST for border traffic management is documented in the EPIC report (39).

The report findings concluded that CVO/ITS technologies have the proven potential to mitigate commercial vehicle congestion at border crossings, however barriers remaining in the areas of institutional (e.g. uniform Dedicated Short Range Communication, DSRC, protocol between countries), infrastructure (space limitations at the crossing areas for new and expanding inspection and processing), increasing freight volumes (without associated increase in resources), sustainability (convincing potential private users of the benefits of financial commitment to a system), and uniform safety assurance (targeted inspections are illegal in some states). The opportunities for using the CVO/ITS infrastructure for enhancing traffic management and providing better information (ATIS) on delays to commercial vehicle operators exist as a secondary benefit, as the number of vehicles with transponders grows.

2.3.7 Free and Secure Trade (FAST) ProgramTransportation Systems (ITS) technologies at border crossings to facilitate trade and

A recent initiative agreed upon between the United States and Canadian governments, the Free and Secure Trade (FAST) program (40, 41), is worth noting. The communications infrastructure for this program might provide an opportunity for delivering information on wait times at northern borders for U.S and Canadian motor carriers with import/export shipments. The initial phase of FAST for U.S. Bound commercial shipments, which began in December 2002, will be available for qualifying commercial shipments at the following U.S./Canadian ports:

1. Blaine - Douglas
2. Detroit - Windsor
3. Port Huron - Sarnia
4. Buffalo - Fort Erie
5. Lewiston - Queenston
6. Champlain – Lacolle

There are seven U.S – Canadian crossings along the Minnesota border that might be future candidates for the FAST program (42).

FAST is a harmonized clearance process for known low-risk shipments. Thus, any truck using FAST lane processing must be a C-TPAT approved carrier, carrying qualifying goods from a U.S. Customs-Trade Partnership Against Terrorism (C-TPAT) approved importer, and the driver in the possession of a valid FAST-Commercial Driver Card. FAST processing is based upon advanced electronic transmission of information. The following are the key components:

1. Importer Registration: Importers will complete separate applications to the Customs administrations in the United States and Canada. Importers authorized to use the *FAST* program for clearance into the United States will have a demonstrated history of complying with all relevant legislative and regulatory requirements, and will have made a commitment to security enhancing business practices as required by C-TPAT.

2. Carrier Registration: Carriers will complete the FAST Highway Carrier Application Process requirements that include corporate information, a security profile, and a written Highway Carrier Agreement. In order to qualify for FAST Highway Carrier membership into the U.S. and Canada, two separate applications must be submitted to each country's respective FAST Processing Centers. Each country will perform an independent risk assessment and each country will issue independent approvals for participation. For the United States, a FAST approved carrier will have met all aspects of C-TPAT through the FAST registration process.

3. Commercial Driver Application: Drivers will complete a single FAST Commercial Driver Application for the U.S. and Canada. The application will be risk assessed by the customs and immigration services of both countries. Applicants identified as low risk will report to an enrollment center where they will be interviewed, have their original identification and citizenship documents reviewed, fingerprinted and have a digital photo taken. Low-risk applicants will then be issued a FAST – Commercial Driver Card.

4. Cargo Release Method(s). The two cargo release methods for FAST shipments are the National Customs Automated Prototype (NCAP) and the Pre-Arrival Processing System (PAPS). NCAP/FAST processing for FAST began in December 2002. The *FAST* processing of PAPS shipments is expected to start in 2003.

    1. *FAST***:** *FAST* is the first completely paperless cargo release mechanism put into place by U.S. Customs. This paperless processing is achieved through electronic data transmissions and transponder technology. *FAST* is highly automated and allows for the expedited release of highly compliant cargo from major importers, reducing congestion at our land borders.

    2. Pre Arrival Processing System (PAPS**):** The Pre-Arrival Processing System (PAPS) is a U.S. Customs ACS (Automated Commercial System) border cargo release mechanism that utilizes barcode technology to expedite the release of commercial shipments while still processing each shipment through Border Cargo Selectivity (BCS) and the Automated Targeting System (ATS).

Each PAPS shipment requires a unique barcode label, which the carrier attaches to the invoice and the truck manifest while the merchandise is still in Canada. The barcode consists of the Standard Carrier Alpha Code (SCAC) and Pro-Bill number. This information is then faxed ahead to the Customs broker in the U.S., who prepares a BCS entry in ACS. Upon the truck's arrival at the border, the Customs Inspector scans the barcode, which automatically retrieves the entry

information from ACS. If no examination is required, the Inspector then releases the truck from the primary booth, reducing the carrier's wait time and easing congestion at the U.S. border.

The use of the FAST program is bringing noticeable benefits in commercial vehicle throughput at the six initial crossing sites.

2.3.8 Research on Human Factors Related to ATIS - CVO

A major research initiative on Human Factors Development for ATIS/CVO systems, sponsored by the Federal Highway Administration, was completed in the mid-1990's, resulting in a series of reports (43-47). These reports represented a significant effort in the combined areas of ATIS/CVO that has not been equaled as of this date. The reports concluded that proven, viable concepts of ATIS/CVO applications would only emerge from actual operational tests. Since the reports were produced, only a limited number of operational tests involving real-time traffic information use for decision-making by motor carrier dispatchers have been conducted (the FleetForward and FleetOnline tests discussed above).

2.4 National ATIS Initiatives

The National ITS Architecture documents User Services and Market Packages for Advanced Traveler information systems. These were presented earlier in the discussion of both CVO and ATIS with respect to the National Architecture. States in the most advanced level of deployment of traveler information systems are mapped on a document, *511 – America's Traveler Information Number (with active hyperlink deployment map),* by the Federal Highway Administration, http://www.fhwa.dot.gov/trafficinfo/511.htm (48).

The evolution of the National 511 travel information program was described earlier, under Minnesota's traveler information initiatives. Other state and regional 511 web sites were reviewed to assess the extent that they provide services for commercial vehicle operators, with a summary of those services provided below:

Montana (49) – has a navigation tab for commercial vehicle load and speed limit restrictions. Statewide RWIS map provides weather information for both air and pavement/bridge sensors.

North Dakota (50) – can navigate to color-coded load restriction maps; shows a statewide rest area map, with one truck parking only location.

South Dakota (51) – has a tab linking to text-based load limit information; has link to section dedicated entirely for trucking in South Dakota; has a link to Statewide RWIS map providing weather information for both air and pavement/ bridge sensors.

Nebraska (52) – has several different links for traveler information, including Safe Travel USA, a privately maintained system by Meridian Technologies that includes the states NE, ND, SD, MT, and MN; has a link to an extensive listing and other web –based resources for motor carriers, including fuel permit station locations, scale locations, rules and regulations, a national private truck stop directory, interstate carrier forms, rest area locations, commercial drivers license information, and a new interactive web map using the ArcIMS application.

Iowa (53) – has a link to dotweatherview.com page with interactive map showing air and pavement / bridge surface conditions. No specific travel information for CVOs.

Kentucky (54) – state map design is similar to Minnesota's design, but doesn't have a tab for commercial vehicle permits.

Arizona 511 (55) – No customized information or references. No hyperlink for commercial vehicle division.

Utah (56) – no information or links for CVO

Bay Area (57) – Traffic website is under development

Alaska (58) – no information or links for CVO

Northern Kentucky/Cincinnati area system, ARTIMIS (59) – no information or links for CVO

Virginia (60) – this 511 travel information web page is oriented more towards tourism than commuter travelers; has a trip mapping that uses the private application by Navigation Technologies.

Orlando, Florida (61) – an auto-refreshing text table of travel times. No CVO information

Miami-Dade-Broward-Palm Beach counties, Florida (62) – has a road reporter registration service to recruit observers and reporters of incidents; links tab does not direct to any choices for CVO

2.4.1 Condition Acquisition and Reporting System (CARS)

The Condition Acquisition and Reporting System. (CARS) is a software application for traffic incident reporting developed by Castle Rock Consultants. (64). CARS is a web-based database that records both current and planned conditions affecting the surface transportation system. Trusted users with password control (e.g., DOT, troopers, local officials, others), can enter over 900 types of event or incident information. The database is geographically displayed and can store active incidents (e.g., floods, accidents, lane closures) or planned activities (e.g., construction activity, utility permit work, extraordinary oversize/ overweight movements, parades). The information is then portrayed on an Internet map, using traffic symbol icons to represent incidents on the highway network. You can also print out a detailed list of current incidents with all the supporting information. CARS was originally developed by a four-state consortium under the Federal Highway Administration 'pooled fund' rules. Since then additional states have opted to join CARS, bringing the consortium to 10 states. This aspect of CARS is significant. Not only do state DOTs benefit from the shared costs, but gain access to a system that has been tested in real world circumstances by agencies. The states using CARS are:

- Washington*
- Minnesota*
- Iowa*
- Missouri*
- Alaska
- New Mexico

- Kentucky
- Maine
- New Hampshire
- Vermont

* Denotes the original four states who started CARS.

The means of implementation of ATIS systems using CARS varies, but the web-based server is typically isolated from the public or tailored end-users to prevent overload of the data entry system during severe events or travel conditions. Most of the above states, including Minnesota, plan to integrate, or have already integrated their 511 traveler information systems with the CARS system (CARS-511). The voice-activated version of CARS-511 applications use an open standard called "voice-xml" (65).

Alaska's report on the CARS system (60) mentions that custom modules are planned for development, and the states can continue to leverage funds for jointly funded initiatives. Alaska is planning a module to track commercial vehicles carrying hazardous materials with an interface to the oversize and overweight vehicle system planned by the Division of Measurement Standards and Commercial Vehicle Enforcement. The demonstration project on the Dalton Highway leading to the North Slope oil fields in Alaska intends to use CARS as both an input and display mechanism for this information.

The Washington State DOT and others, including Minnesota, have implemented the CARS system as a standard for displaying road weather information
(http://www.wsdot.wa.gov/rweather/).

3.0 SURVEY OF KEY ORGANIZATIONS & PRIVATE COMPANIES

This task involved conducting in-depth telephone interviews with individuals from key organizations and associations that have conducted CVO ATIS projects or are planning such projects. Information was collected regarding project scope, services, technology description, customer response, status, lessons learned, future directions, etc. There were eighteen representatives interviewed from these public agencies. In addition, interviews were conducted with representatives from a small sample of private companies that are potential users of CVO ATIS services. Representatives from four motor carriers and one provider of navigation and routing products were interviewed. The surveys conducted with these private companies were intended to provide a general understanding of the needs and requirements of users of CVO ATIS systems. Since this is a small sample it is not intended to be statistically representative.

The key organizations, associations and private companies surveyed were:

Public Agencies

- ITS America – CVO Committee
- USDOT – Office of Freight Management
- AASHTO – 511 Committee
- TravInfo
- Gary-Chicago-Milwaukee Corridor

- I-95 Corridor Coalition
- USDOT Model Deployment Cities (Phoenix and Seattle)
- Condition Acquisition Reporting System (CARS) Group
- American Trucking Research Institute (formerly known as American Trucking Association Foundation)
- American Association of Motor Vehicle Administrators (AAMVA)
- Federal Motor Carrier Safety Administration (FMCSA)
- Commercial Vehicle Safety Alliance (CVSA)
- Iowa Department of Transportation

Private Companies

- Schneider Trucking
- Roadway Express
- Yellow Transportation
- SYSCO Corporation
- Andersen Windows
- ALK Technologies

Representatives from ITS America – Information Programs and USDOT – ITS Joint Programs Office were contacted but were unable to comment on any CVO ATIS projects.

Section 3.1 summarizes the results of the public sector interviews and Section 3.2 describes the private sector results.

3.1 Public Sector Results

3.1.1 Summary of Public Sector Interviews

FleetForward and FleetOnline are two ATIS projects discussed during the phone interviews that are designed specifically for commercial vehicle operators. The North American International Trade Corridor (NAITC) and 511 America's Travel Information Number are ATIS projects that were also discussed but are not CVO specific. Other interviewees discussed Commercial Vehicle Information Systems and Networks (CVISN), PrePass, Roadside Enforcement and various CVSA programs. Although these projects are CVO/ITS related they are not strictly ATIS projects, but information on coordination of agencies and the needs of the CVO industry are included in all of these projects which could, in turn, aid future CVO ATIS projects. Input about these projects came from representatives from the national level, state level, and private organizations. Interviewees were asked about certain details of the project they are involved with and the benefits, difficulties and lessons learned from the implementation of the project. The complete set of public sector interview questions are located in Appendix B.

FleetForward

As was described previously in section 2.3.1 of this report, FleetForward was a deployment project in seven states along the I-95 Corridor from Massachusetts to Virginia. Trucking companies and truck drivers were provided with real-time traveler information from the traffic management center that consisted of detours and construction routes, dispatch information regarding congestion, and some weather information through a web-based system and fax used by dispatch, and messages forwarded to cell phones and pagers. Since this was an operational test,

the service was promoted through proactive and targeted recruitment of companies. The I-95 Corridor Coalition, American Trucking Association Foundation, ALK Technologies, Federal Highway Administration (FHWA), Smart Routes, Transcom, and various motor carrier companies were the public and private sector partners involved in the FleetFoward project. Transcom collected information from New York, New Jersey, and Connecticut DOTs and ALK Technologies provided PC*Miler, the computer system for the project. The project was funded as an operational test through the I-95 Corridor Coalition and other public sectors with a fourth of the funding by private sectors.

The goals of the FleetForward deployment project were to improve operational efficiency of motor carriers, increase the efficiency of highway systems, gain motor carrier acceptance of ATIS, develop motor carrier usage of ATIS, and make better use of traffic information. According to the three representatives interviewed for the FleetForward project, the project was an overall success in accomplishing the goals with one representative rating the project a '3' and the others rating it a '4' on a scale of 1 to 4. There were five major tasks conducted for this project of which are listed below:

- Conduct a market analysis of what companies want in traveler information in ATIS and scan what ATIS services are already provided.
- Design and build a system using existing data.
- Recruiting companies to be involved in the testing stages of the project.
- Implementing and testing of the service.
- Data collecting, evaluating and analyzing the entire project.

The first task was considered easy to complete since one of the agencies working on the project represented the trucking agency. The last four tasks were more difficult because this type of project was the first of its kind to be implemented. A lack of standards and compatible systems among the many jurisdictions involved added to the difficulty of collecting and constructing the necessary data.

The overall operational safety of the corridor improved by helping FleetFoward users to make routing decisions when congestion was identified. The main objective of this operational test was to identify the flaws of the system, fix the flaws, and discover why an area was or was not successful. This project created public private partnerships to make driver information useful and effective.

Users of FleetForward knew that this was an operational test, so there weren't any problems with the overall coordinating and funding for participants. However, being an operational test, the agencies running this project were unable to standardize the data and information collected from the multiple jurisdictions involved. Some technical issues not resolved during this project were trying to create a support system to have potential customers connect into and providing dispatchers with Internet access.

This project produced an overall technically sound product and was highly acclaimed from the customer perspective. However, this system was based on a pull design where the user has to "reach" for the information (via web), instead of the much preferred push design where the information is given to the users without them having to search for it (i.e., messages on changeable message signs and wireless devices). Additional elements that would be helpful are weather, parking availability information, rest area information, and historic traffic data in order to design routes based on recurring congestion times. Also, an increase in road capacity by creating dedicated truck lanes would be helpful in decreasing overall traffic congestion. Two

important outcomes created by this project were the I-95 Corridor Coalition and the CVO decision-making wheel to help decipher the decision-making process for different types of motor carriers.

Benefits:
- Improve operational efficiency of freight movement to lower costs and save time.
- Improve safety.
- Identify and reduce congestion.
- Use FleetForward to influence routing decisions.
- Create public-private partnerships to make driver information useful.

Difficulties:
- Trying to get participants involved since this was a new ATIS concept.
- Multiple jurisdictions, agencies, and systems that were brought together had different goals and types of data.
- Did not have a backroom support system for potential customers to connect into.
- Some private companies do not allow dispatchers to have Internet/computer access.

Lack of infrastructure:
- Need dedicated truck lanes to increase road capacity.

Lessons Learned:
- Need to create standards for ATIS for agencies to follow, so systems are compatible with each other.
- Need to create a push design for users to receive information instead of a pull design.
- Need backroom support system for potential customers to connect into.
- Users would like additional elements like weather, parking availability information, rest area information, historic traffic data in order to design routes based on recurring congestion times.
- Need for better data and delivery mechanisms.

FleetOnline

As was described previously in section 2.3.2 of this report, the FleetOnline system provided commercial vehicle dispatchers and drivers with the information on congestion, incidents, weather, and routing that is necessary for safe, effective routing and dispatching. The objectives of this project were to enhance the safety and efficiency of motor carrier operations and to reduce traffic congestion by providing information that will improve carrier routing and dispatching.

During its demonstration-testing phase only a handful of firms were able to access the information during the testing period. The GCM Coalition, Wisconsin DOT, Illinois DOT, Indiana DOT, TranSmart Technologies, Inc., and American Trucking Research Institute (ATRI, formerly the ATA Foundation) are the primary partners involved in this project. FleetOnline was also being implemented in Phoenix as a USDOT Model Deployment.

By providing this information, FleetOnline will promote efficient use of transportation systems by heavy vehicle operators and provide information on when to use and when not to use certain routes. By following the tasks listed below, the goals of the project were accomplished.

- Develop concepts.
- Develop and design system.
- Code and use software.

- Test product.
- Evaluate product.

Better routing of commercial vehicles through the system and CVO specific driving restriction information provision were the major outcomes of the project; however, it did not have a strong impact on improving all vehicle conditions. Finding a way to get new data into the system, and verify, validate, and update the information so it will be useful and timely is a challenge to the continued system options. Other challenges encountered during the demonstration project were trying to find trucking firms willing to take part in this demonstration and trying to assemble private partnerships with multiple jurisdictions. To solve these problems, the GCM Coalition, who had already formed relationships with various agencies to help out with the GCM Corridor project, helped FleetOnline overcome these problems. The operational test was funded with GCM Priority Corridor funds and matching funds by TranSmart Technologies, Inc. and ATRI for a total of $200,000. Continued operation may be funded by public private partnerships.

Benefits:
- Traveler Information System specifically designed for CVO industry.
- Good information may help avoid delays and accidents.
- Provides good information to traveler to keep them informed so they can make travel decisions and have a piece of mind.
- Increases institutional cooperation.
- Takes a joint approach on freeway management issues, people like to know what's happening on the freeways even if they can't do anything about it.

Difficulties:
- Getting new data into the system, verifying, validating, and updating the information so it will be useful.

Lack of infrastructure:
- Wireless infrastructure for transferring information.

Lessons Learned:
- For the implementation of regional commercial vehicle operations, enhancements on geographic coverage and greater detail in terms of richness and precision of information in text and map formats are needed.
- Preferably, the information should allow for integration into carriers' legacy Routing and Dispatching Systems.

North American International Trade Corridor (NAITC)

The Iowa Department of Transportation is taking the leadership role on the implementation of the NAITC. This project will integrate low powered FM radio stations with the Condition Acquisition Reporting System (CARS) Internet based system and supply travelers with localized information on delays, accidents, weather and road conditions, local facilities information, special events, and other information that may have an affect on traffic. The FM programming, which is not completely implemented yet, will be the basis for Iowa and Minnesota 511 service information. It will have the same technology as the 511 service with prerecorded text, which will automatically be converted to voice, so there is no need for manual work. At this time, most sites are in Iowa for demonstration purposes, but Iowa DOT has received 73 licenses from the

Federal Communications Commission (FCC) for FM broadcasting along the corridor in case there will be more interest in implementation.

The five major tasks for implementing the NAITC project are as follows:

- Establish upfront stakeholders.
- Develop general architecture and software.
- Create interactions between groups.
- Install and test equipment.
- Set up stations and proceed to live radio broadcasts after FCC gives final approval.

This program is intended to reach commercial vehicle operators and general travelers who have access to FM radio on the NAFTA corridor (I-35, I-29, I-80 and I-94). The coalition states are Texas, Oklahoma, Missouri, Kansas, Iowa, South Dakota, North Dakota, Minnesota, the Province of Manitoba, and the Ambassador Bridge Coalition in Michigan. In order to get full participation from the coalition states, the NAITC is trying to get the states to sign an agreement and have them contribute $15,000 per state. So far, the only contributors have been Iowa DOT, Iowa State Patrol, Minnesota DOT, Minnesota State Patrol, and the Transportation Cabinet of the Province of Manitoba in providing information to CARS. Castle Rock Consultants, who developed CARS, will develop the ATIS program for this project. Since this is currently a pilot project, no long-term funding has been determined. Other possible financial resources may come from the fees charged for local communities to advertise tourist and event information.

According to Iowa DOT, two stations will be completely running by July of 2003, and with customer feedback, hopefully more will be constructed shortly after.

Benefits:
- Promotes safety and efficiency on highways by informing drivers.
- Provides localized traveler information to CVOs and general travelers.
- Mostly everyone has access to FM radio, low cost for users.
- Radio is very low tech but effective.

Difficulties:
- Working with FCC since there is no control over their decisions and processes.
- People leave or change positions in agencies during the long period of time that the program is being developed.
- Trying to get the voice technology integrated with CARS system.
- Refining the programming so the information has value to the customer.

Lack of infrastructure:
- Lack of high speed Internet connections in rural areas.

Lessons Learned:
- Coordinate with agencies so there is no duplicate information provided.

511 America's Travel Information Number

The 511 Travel Information Service is implemented in seventeen states around the country providing travelers with traffic updates, weather and road conditions, road closures and delays, and public transit services information via the telephone. The AASHTO 511 Committee and the USDOT Office of Freight Management are the involved federal agencies that were interviewed,

along with the Arizona Department of Transportation and TravInfo in California. Tell Me, Be Vocal and Westwood One are some of the private agencies that provide voicing interaction and general information management for the 511 service.

Providing travel information that is easily accessible for travelers can avoid delays and accidents, and provide a better feeling about travel by improving mobility and transportation choices. The following tasks were assigned for the project to ensure users were receiving a quality product:

- Develop guidelines for providing information.
- Learn from the experience of other projects.
- Create outreach and marketing methods.

A lack of detection systems for travel time, a common standard for exchanging information and difficulties with call transferability are some of the problems encountered with the implementation of this project. A committee has been created to deal with customer satisfaction, and hopefully with more funding and increasing comments and recommendations on usage, these problems can be solved to create an ideal product.

Initially, the government made 511 a national travel information number and offered a start up grant of $100,000 to get started. The FHWA has been willing to provide additional funding to assist participating states in upgrading their existing phone systems. Virginia has also created a partnership with businesses along I-81 to provide hotel and tourism information as another way to fund the service.

On a state level, Arizona DOT provides road condition information to the traveling public including both planned and unplanned incidents such as road construction, maintenance, weather, collisions, and special events via telephone and Internet (www.az511.com). This travel information is stored in the ADOT HCRS (Highway Conditions Reporting System) and is furnished to the public through both the Internet using the HCRS web-based program and telephones using VRAS. AzTech, which is the private partner in this project, has been instrumental in pulling together and providing information to the travelers. Data on customer satisfaction has yet to be evaluated, but with a rising average of 30,000 calls and 3 million web hits per month, customer usage is a useful way to determine that the users are satisfied with the product.

On a smaller scale, TravInfo provides travel information via telephone and the Internet (www.511.org) for commuters in the Bay Area in California. TravInfo is included in the suite of customer service projects funded through the Congestion Mitigation & Air Quality Improvement Program (CMAQ) and matched state funds, that focus on Bay Area traveler needs in the realm of improving transportation systems. CalTrans, California State Patrol, NTC, local transit agencies, and some private consultants and contractors have teamed together to provide information in a way that is useful and easy for users to access. Having to work with different agencies that have different goals and systems posed to be a difficult task, but coordination was the key to making this project have a 70 percent customer satisfaction rating. Covering nine counties in the Bay Area, TravInfo receive approximately 90,000 calls per month. Currently, TravInfo is conducting a voice activated user survey, in which users can receive an incentive for participating (i.e., mug or shirt).

Benefits:
- Helps avoid delays and accidents.

- Provides good information to traveler to keep them informed so they can make travel decisions and have a piece of mind.
- Increased institutional cooperation.
- Takes a joint approach on freeway management issues, people like to know what's happening on the freeways even if they can't do anything about it.

Difficulties:
- Realizing that existing detector systems did not provide enough information and having to build own systems.
- Creating a common standard for exchanging information over the system.
- Call transferability, customers get routed to wrong place due to where they are located.

Lack of infrastructure:
- Had to build own detector systems because existing systems did not have enough inventory to collect data and provide travel time.

Lessons Learned:
- Keeping in mind that different agencies have different goals.

Commercial Vehicle Information Systems & Networks (CVISN)

Commercial Vehicle Information Systems and Networks (CVISN) is a subset of CVO/ITS, which contains the information systems and networks necessary to link the various information sources between motor carrier, roadside, and desk side regulatory and enforcement activities. Seattle, Washington is among the USDOT Model Deployment Cities to deploy the CVISN program on its highways. The Department of Licensing, Department of Transportation, and Washington State Patrol are the regulatory agencies providing services to members of the Washington Trucking Association. Commercial vehicle operators can purchase licenses and permits via the Internet and can operate instantly without a temporary permit; and electronic bypasses can be purchased to allow safe and legal motor carriers to be weighed at freeway speeds. The measured freeway speeds are then compared to a national database that is provided by the International Registration Plan (IRP) and the International Fuel Tax Agreement (IFTA) which approves or disapproves drivers to skip scale house stops throughout the state. Twenty percent of motor carriers use CVISN to receive electronic information on an event basis, and ten to fifteen percent of motor carriers use the credential services offered by CVISN. The service is advertised through newsletters, billboards, and 800 numbers statewide. Additionally, permits can be purchased in Nevada.

Information for the program is continuously received and updated from all of the northwestern states, British Columbia, and the Federal Motor Carrier Safety Administration. The major goals for the CVISN program are to save time and money for motor carriers and regulatory agencies during the licensing and permitting process as well as while traveling on the highways and promoting safer trips. According to the representatives interviewed, CVISN has been very successful in accomplishing these goals, and can be justified by the increase in transponder purchases and the addition of weigh-in stations. This project has been difficult to implement since this type of project has never been done before in the United States. Agencies and states use different database standards and it has been difficult to implement them all into one system. Getting regulatory agencies and the motor carrier industry to accept the technology used for CVISN was the most challenging task according to representatives of the CVISN team. To ensure the agencies' trust, demonstrations were done to prove that the equipment is reliable.

Strong pubic-private partnerships were created to eliminate the distrust towards the accuracy of the electronic equipment. Currently, the project is ahead of schedule at the deployment phase and $15 million has been put into constructing six CVISN weigh-in sites for a total of fourteen in the next four to six years.

Benefits:
- Reduces delay for drivers and regulatory agencies.
- Drivers can obtain credentials instantly without using a temporary permit.
- It is an incentive for safe and legal trucks to bypass weigh stations.
- Gives regulatory agencies more time to concentrate on unsafe or illegal trucks.

Difficulties:
- Lack of trust in weigh-in stations electronic equipment and technology.

Lack of infrastructure:
- Smooth pavement is needed where weigh-in motion sensors were placed.
- All readers and equipment had to be installed as new.

Lessons Learned:
- Build strong relationship with public and private agencies to gain trust in projects.

Programs Affiliated with CVISN

PrePass is a national CVO/ITS program coordinated with CVISN. The Florida Department of Transportation was interviewed to determine their experiences with this program. PrePass is utilized on Florida's mainline interstates. This program gives commercial vehicle operators the ability to bypass weigh stations on the basis of their good safety and weight history in Florida. With the assistance of Heavy Vehicle Electronic Licensing Plate, Inc. (HELP, Inc.) for providing the licensing and Applied Computer Systems (ASC) for providing the computer systems, the information is provided via transponder on the truck and sent electronically to the weigh stations, and notifies the truck to stop at the upcoming weigh station or continue on route. The main goal of the PrePass program is to keep vehicles on the mainline to increase safety so the trucks will not have to merge and create weaving patterns on the highways. This program will also eliminate or delay the need to create more weigh stations in the future since commercial vehicles on the highways is said to double by 2004. By allowing drivers to bypass weigh stations, they can save approximately $4-6 per minute.

In 1998 and 1999, there was virtually no activity with the PrePass program, and in 2000, weigh stations looked at 17,210 trucks and bypassed 8,594 trucks. In April 2004, weigh stations looked at 320,000 trucks and bypassed 237,000 trucks. Currently, PrePass has seventeen weigh stations and will be adding two more by October of 2003 once I-10 in Pensacola is constructed. Representatives go to each of the carrier companies to promote the service and surveys at the weigh stations, along with standing counts and vocal captures, say that 80 percent of the users are satisfied with the PrePass program.

Other CVO ATIS programs being implemented or considered in Florida are the Agriculture Pass, 511 Travel Information Number, FleetForward, and the CV Help Desk.

Benefits:
-Eliminates accidents by reducing motor carriers from merging with traffic.

- Saves driver's time and money by not sitting at weigh station.
- Regulatory agencies can concentrate on unsafe or illegal motor carriers.

Difficulties:
- Getting agencies to accept one another to better the service of the CVO industry.
- Problem with Agriculture bypass signals being too close to the weigh in station signals accidentally confusing the driver into thinking they can bypass both stations.

Lack of infrastructure:
N/A

Lessons Learned:
- The creation of the CVISN team helps solve current coordination and technical problems monthly.
- Move Agriculture bypass signals farther from weigh station signals so drivers won't get confused.

Roadside Enforcement is a part of Connecticut's CVO/ITS Business Plan to support development of ATIS to reduce the impact of traffic congestion on motor carrier operations. This safety assistance program will reduce the number of high risk motor carrier drivers and eliminate hazardous incidents through the use of CVISN and Prism programs, roadside enforcement, compliance reviews, and roadside inspections. This program is used in Connecticut and is advertised through the Federal Motor Carrier Safety Administration, I-95 Corridor Coalition, and the Motor Transportation Association of Connecticut. The final deployment stage of Roadside Enforcement has been successful in promoting safety on highways by improving the regulatory process and keeping unsafe motor carriers off highways. CVISN has done a tremendous job in pulling together the state agencies and having them work together which has assisted in the success of Roadside Enforcement.

In order to meet the goals of the program, the Motor Carrier Advisory Council, a state mandated agency, meets twice a year to resolve institutional issues.

Benefits:
- Promotes safety by improving regulatory process and keeping unsafe motor carriers off highways.

Difficulties:
- Trying to implement a project that has not been done before.
- Coordinating four state agencies that all govern motor carrier regulations and safety operations.

Lack of infrastructure:
- Lack of concrete direction on what infrastructure is needed.

Lessons Learned:
- Create a team that can meet regularly to overcome institutional issues. CVISN has done a tremendous job in pulling together the state agencies and having them work together.

Other CVO Projects

The Maine Bureau of Motor Vehicles implements a variety of programs for the motor carrier industry but no ATIS projects specifically targeted at CVOs. The state provides motor carrier manuals, pamphlets, and a website explaining programs and regulations, such as the International Registration Plan (IRP), The International Fuel Tax Agreement (IFTA), oversize/overweight limits, safety, etc. Maine511 is the State's travel information number providing web and telephone based information regarding highway conditions. Information on the website is updated as needed, the commercial vehicle pamphlets are updated every year, and the motor carrier manuals are updated every other year to ensure correct information is being provided. These services are advertised in regular mailings, newsletters, and information printed within the IRP renewal package.

For most major projects, Maine uses vendor applications. ITS working agencies are in control of the message boards and short-range radio on the Maine Turnpike, and the State has a standing contract for all internet-related projects. Maine hopes to have a better motor carrier compliance, increasing highway safety and efficiency, while ultimately cutting down on overhead. Right now a lot of the projects in Maine are incomplete, but the web has helped, the manuals are useful, and the credential applications, IRP applications, and the IFTA tax forms all have been put online making it very convenient for users to access. Maine has also spent approximately $500,000 on a study to integrate hardware into the IRP system, this will provide better and more information to the law enforcement making it easier to screen motor carriers more efficiently and create a better safety compliance. Leftover funds from the I-95 Corridor Project and CVISN are used to pay for existing expenses in the hopes of diverting the service fee for users.

Among the challenges that were encountered during the implementation of these projects were keeping high level management support and funding, and problems with transferring files and using communication protocols. The American Association of Motor Vehicle Administrators (AAMVA) has sent out surveys in which they found that users are interested in oversize/overweight permit information and also collected some additional feedback from the web applications. AAMVA also includes some questions in surveys put out by Maine DOT Office of Freight Management and motor carrier companies to get feedback from the public and key customers.

Benefits:
- Better and more information supplied to law enforcement.
- Better safety compliance
- More efficient

Difficulties:
- Difficult to coordinate agencies, because high level officials don't talk to each other.
- Keeping high level support and funding.

Lack of infrastructure:
- Funding for infrastructure

Lessons Learned:
N/A

The Commercial Vehicle Safety Alliance (CVSA) also has a number of programs for commercial vehicle operators. Road Check and Operation Air Brake are among the many programs provided by CVSA to enhance commercial vehicle safety. Newsletter, pamphlets, information cards, CD-ROM, and online guides are some of the promotional items provided at roadside stops, scalehouses, trooper's vehicles, mailers sent to the industry, and on the website (www.cvsa.org) which are targeted towards commercial vehicle drivers.

Getting the information to the roadside officer is a difficult task, but CVSA tries to provide the information to a key contact officer a month in advance in order to distribute properly. Every year key players in the industry give their input on the operation of CVSA's programs before the guides are updated and distributed again. The travel restrictions placed on Minnesota State employees have made it difficult for CVSA to collect their feedback. Overall, the users have given positive feedback towards CVSA's programs.

Benefits:
- Reduce commercial vehicle related crashes.
- Inform drivers on how to operate safely.

Difficulties:
- The travel restrictions placed on Minnesota State employees has made it difficult for them to give their input on the operation of these programs.
- Distributing information to the roadside officer.

Lack of infrastructure:
N/A

Lessons Learned:
- Key players give input on guides on a yearly basis before they are updated.
- Distribute information to key contact officer in advance in order to distribute to roadside officers.

3.1.2 Key Lessons Learned from CVO ATIS Projects Conducted by Public Sector Agencies

The key lessons learned from previous CVO ATIS Projects that the public agencies were involved with are listed below:

- Create standards for ATIS so it will be easier to coordinate with agencies and utilize the information provided.
- Build strong relationships with public and private agencies to gain trust in projects, recognizing that different agencies have different goals.
- Create a team that can meet regularly to overcome institutional and technical issues. For example, CVISN has done a tremendous job in pulling together the state agencies and having them work together.
- Keep key players involved to provide input from the user perspective.
- Create a push design for receiving information instead of a pull design to ease accessibility.
- Users would like additional elements like weather, parking availability information, rest area information, and historic traffic data to design routes based on recurring congestion times.

- Create incentives to increase the participation in user surveys.

These lessons learned should be followed in any future CVO ATIS project in order to ensure successful implementation.

3.2 Private Sector Results

3.2.1 Summary of Private Sector Interviews

Phone interviews were conducted with representatives from five motor carriers and from one vendor that provides routing and navigation solutions to carriers. The motor carriers selected represent a small sample of national carriers. Each company was contacted and asked to provide the name of the individual who would be most familiar with the company's traveler information services and requirements. The following is a list of the six companies contacted, the primary types of trucking services provided by the company and the position of the individual interviewed.

- Schneider Trucking (Truckload, Specialized and Bulk) – Fleet Services Manager
- Roadway Express (Truckload and LTL)– Director of Corporate Safety
- Yellow Transportation (LTL) – Minnesota Line Haul Operations Manager
- SYSCO Corporation (Local Delivery) – Fleet Manager, SYSCO Food Services of Minnesota
- Anderson Windows (Truckload, LTL, Local Delivery, Specialized, HAZMAT) - Transportation Manager

- ALK Technologies (Vendor) – Senior Vice President

Each of these individuals was asked questions about their familiarity with CVO ATIS, the traveler information services that their company currently offers and their beliefs about the types of services that would be most useful to their dispatchers and drivers.

Upon interviewing these companies, different ATIS needs were found depending on the type of services the company provides. Questions about the different types of traveler information systems available, methods of delivery, how the company uses traveler information and the benefits of informing drivers and dispatchers of conditions on the roads were asked during the phone interviews. The complete set of private sector interview questions is located in Appendix B. The following graph shows what types of services the companies interviewed provide for. There did not seem to be many differences found in the interviews that distinguished the types of services that are best suited for various CVO market segments. One distinct difference was with local delivery companies who tended to be more concerned with notifying their customers if there would be any delays; drivers and dispatchers very infrequently used any traveler information services. In order to distinguish between different companies' needs, more interviews would need to be conducted with private companies.

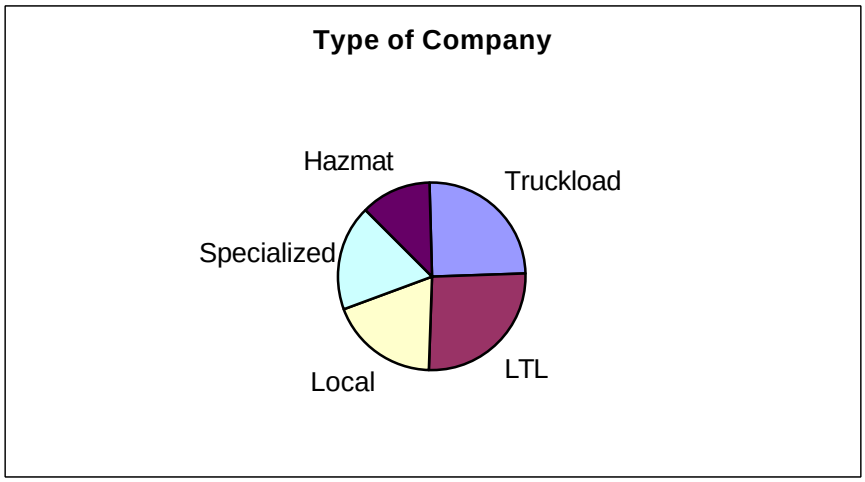


Figure 3-1: Type of Company

According to Figure 3-2 below, the majority of the private companies interviewed seemed to be familiar with CVO ATIS.

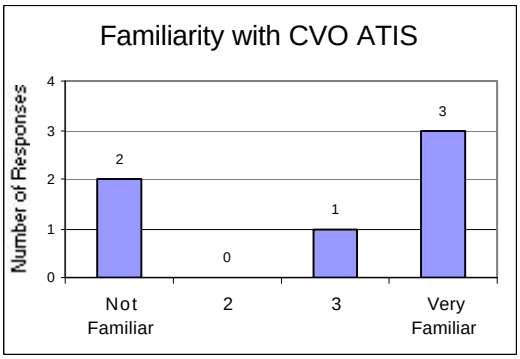
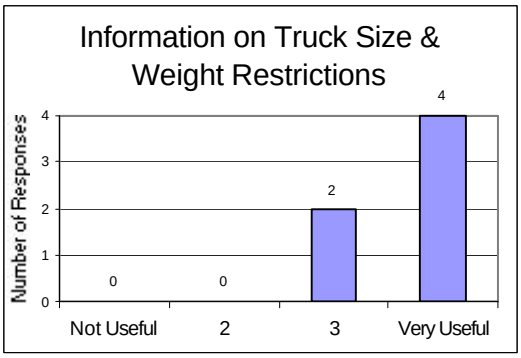
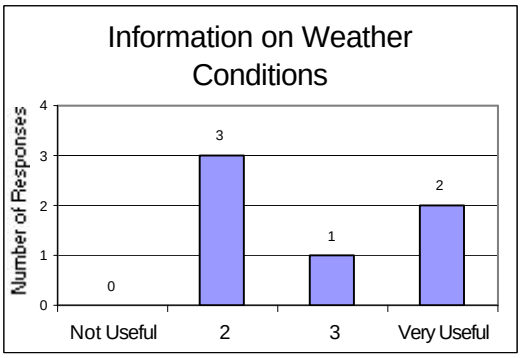
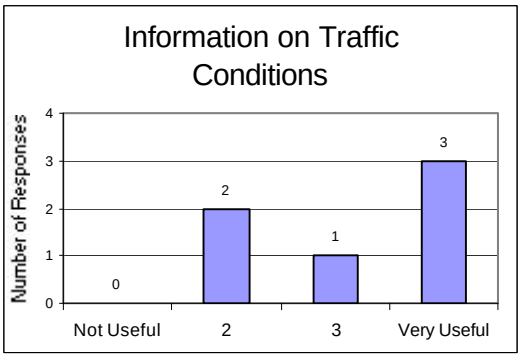


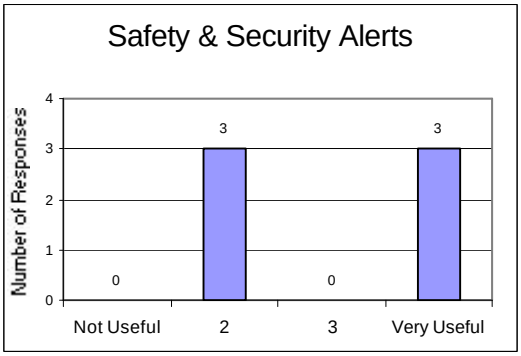
Figure 3-2: Familiarity with CVO ATIS

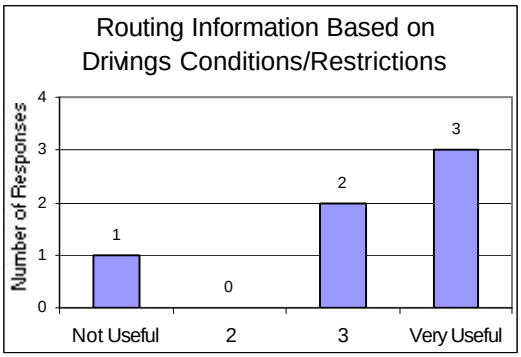
A series of questions were then asked about how useful private companies believe certain types of traveler information are, or would be, to their drivers or dispatchers. According to the interviewees, the most important types of traveler information are knowing truck size and weight restrictions, weather conditions, traffic conditions, and routing information based on driving conditions and restrictions. There were mixed feelings about safety and security alerts, information about travel services at truck stops, information about public rest stops, ATMs, restaurants and other services, delays at port/border approaches, and information about pavement conditions.

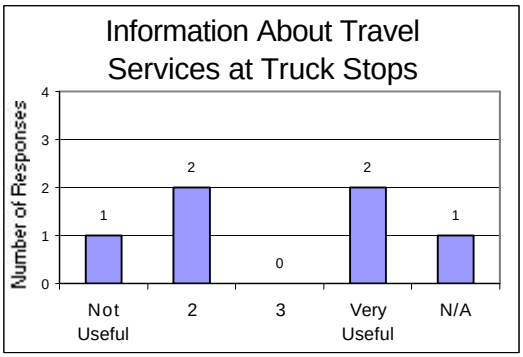


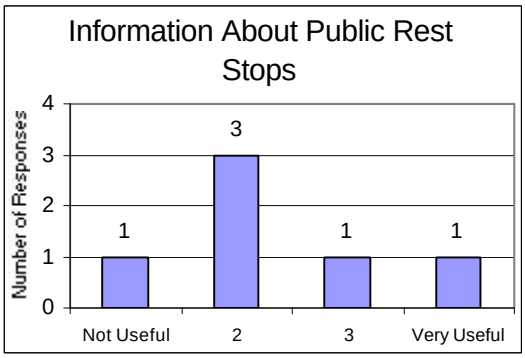


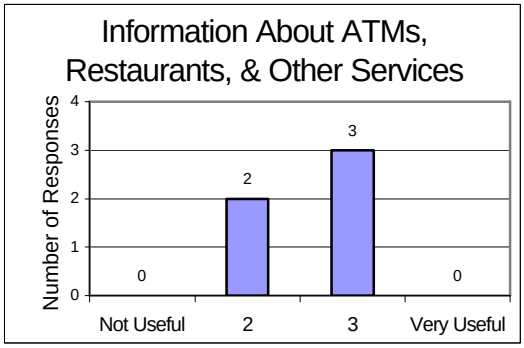


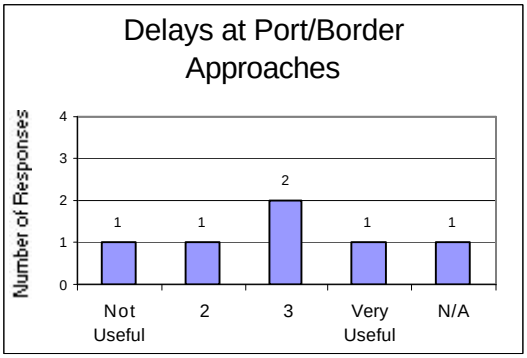












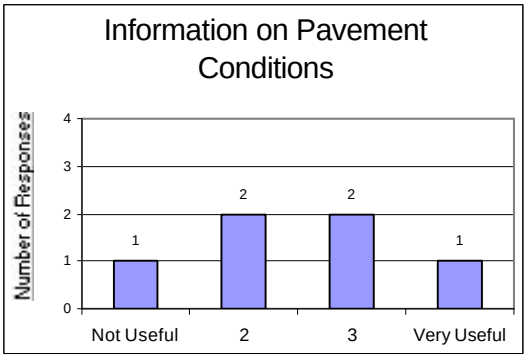
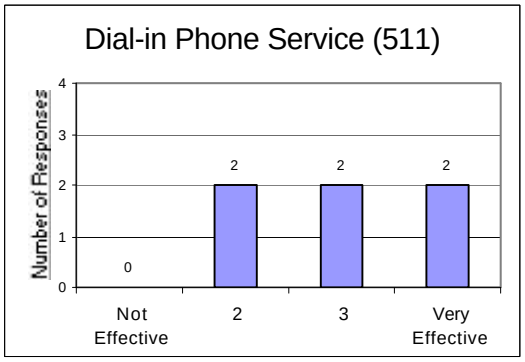
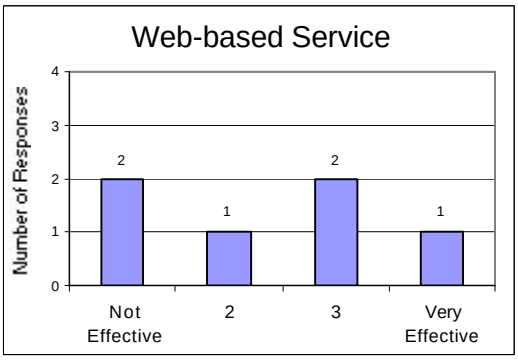


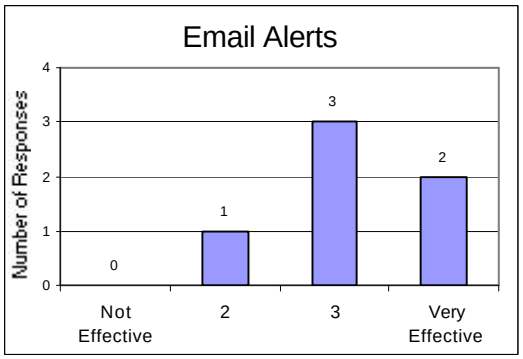
Figure 3-3: Types of Traveler Information

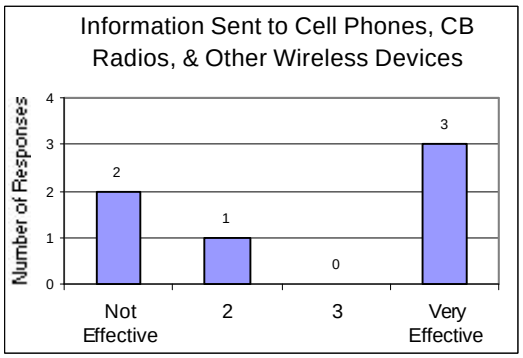
Other useful information that private companies would like to see are location, direction and estimated travel time to consignee, a way to receive more information on detours, construction and weather conditions, and information from the state when route restrictions have changed. It was also suggested to provide directions for locations that travelers could stop and receive information and pamphlets on tourist and traveler information. Any preventative information helps avoid dangerous scenarios and decreases the drivers' stress levels and increases safety on the roads. Positive comments were made about the helpfulness of Minnesota DOT's website that shows real-time traffic conditions for commercial vehicles in the Twin Cities area.

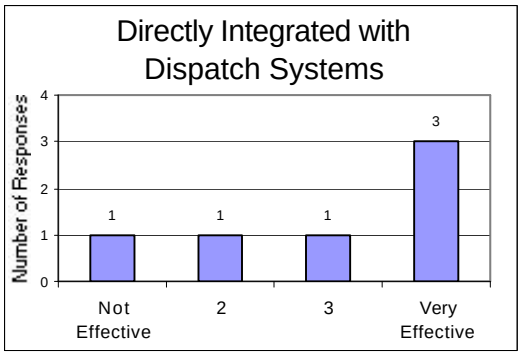
Another set of questions was asked on the effectiveness of a variety of methods that provide traveler information to drivers and dispatchers. The results are shown below in the graphs.

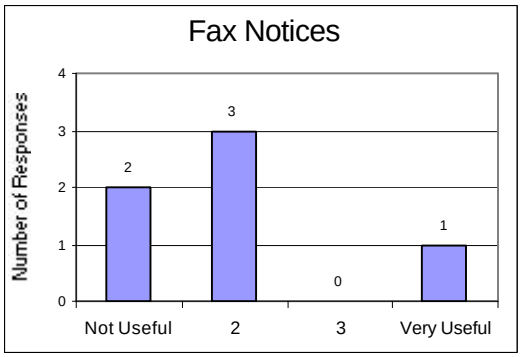












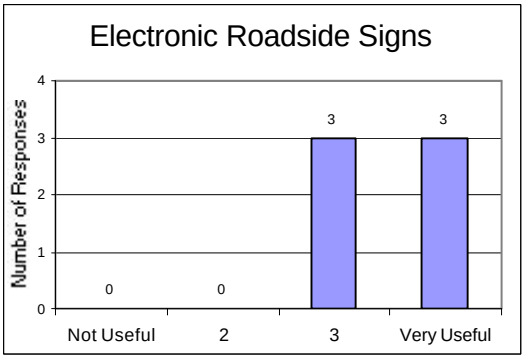


Figure 3-4: Methods for Delivering Traveler Information

Electronic roadside signs seemed to be the preferred method to receive traveler information by drivers. This method requires no effort from the driver to receive the information and it is directed at the drivers in the impacted region. Web-based services, email alerts, and fax notices can only be received by dispatchers and typically, according to the interviewees, dispatchers don't check frequently enough to contact the drivers in order to prevent delays or other impacts. In regards to information sent to cell phones, CB radios and other wireless devices, some drivers turn off CBs due to the "useless chatter" and the company does not encourage the use of cell phones or reimburse the drivers for cell phone usage.

In order for certain companies to receive traveler information, the methods of collecting would need to be very beneficial and easily accessible. An in-truck navigation system with messaging such as CoPilot Live | Pocket PC 4 would be a useful way for drivers to get real-time information sent to the trucks, and CCTV with information on conditions, detours, incidents for city dispatchers in the Twin Cities could be used constantly to avoid delays. The companies interviewed primarily used the dispatch as a central point to collect and deliver information, and the drivers could use any other ways to get information, but is not offered by the company. Some companies gives information to drivers about holidays, construction, and when school is in session to make the drivers more aware that there are more people on the road and to be vigilant when driving.

ALK Technologies offers the CoPilot program for drivers and the PC*Miler program for the dispatch which includes routing information, mileage, directions, navigation, and messaging that is directly integrated with the dispatch system. The benefits of providing traveler information according to trucking companies are improved reliability, lower operating costs, and safer delivery. Most companies are committed to the safety and welfare of drivers and good information can aid them in their goals.

Currently, companies use traveler information that is available to them, like weather conditions in the winter months and detours and construction in the summer months, very frequently. To increase the frequency of use more marketing information should be available, like booklets or pamphlets, that the drivers can take with them that shows what is available to them and helps them understand how to use the information. Also, it was recommended that the DOT or other agencies have a list of companies that run their trucks in a certain area and the area would be effected by an event, a mass email or notice could be sent out to the companies effected in that area prior to the event. Information that is easily accessible, reliable, and up-to-the-minute is the most important aspect of traveler information, and companies would be willing to pay for a service with these qualities. None of the private companies interviewed have conducted surveys or other market research to determine whether their drivers or dispatchers are interested in using traveler information or what types of services they need.

3.2.2 Private Sector Major Findings

Upon interviewing the six private trucking companies, the major findings of the interviews are listed below:

- Information from the Minnesota DOT website on traffic conditions proved to be helpful for certain trucking companies in order to have their trucks avoid certain congested areas in the Twin Cities.
- Information that is easily accessible, reliable, and up-to-the-minute is the most important aspect of traveler information.
- Improved reliability of the roads, lower operating costs, and safer deliveries are the key benefits of providing traveler information according to trucking companies.
- Truck size and weight restrictions, weather conditions, safety and security alerts, traffic conditions, and routing information based on driving conditions and restrictions are the most important types of traveler information needed from motor carrier companies interviewed.
- Location, direction and estimated travel time to consignee, information from the state when route restrictions have changed, a way to receive more information on detours, construction and weather conditions, and directions for locations that travelers could stop and receive information and pamphlets on tourist and traveler information are other useful types of information that private companies would like to have offered.
- Electronic roadside signs are the preferred method to receive traveler information by drivers. This method requires no effort from the driver to receive the information and it is directed at the drivers in the impacted region.
- To increase the frequency of use, more marketing information should be available, like booklets or pamphlets, that the drivers can take with them that shows what is available to them and help them understand how to use the information.
- DOT or other agencies should have a list of companies that run their trucks in certain areas and when the area is or will be effected by an event, a mass email or notice could be sent out to the companies effected in that area prior to the event.

Figure 3-5 below shows a graph summary of what types of traveler information private commercial vehicle companies feel are most important. Figure 3-6 is similar to Figure 3-5, but graphs the number of interviewees who rated the usefulness of the content of traveler information with a moderately useful (3) and very useful (4) ranking.

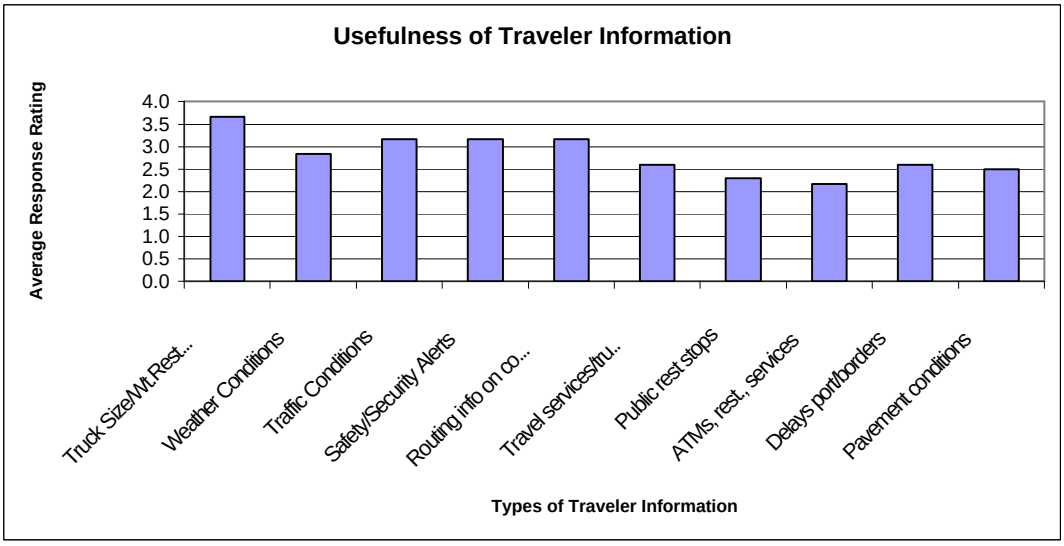


Figure 3-5: Usefulness of Traveler Information.

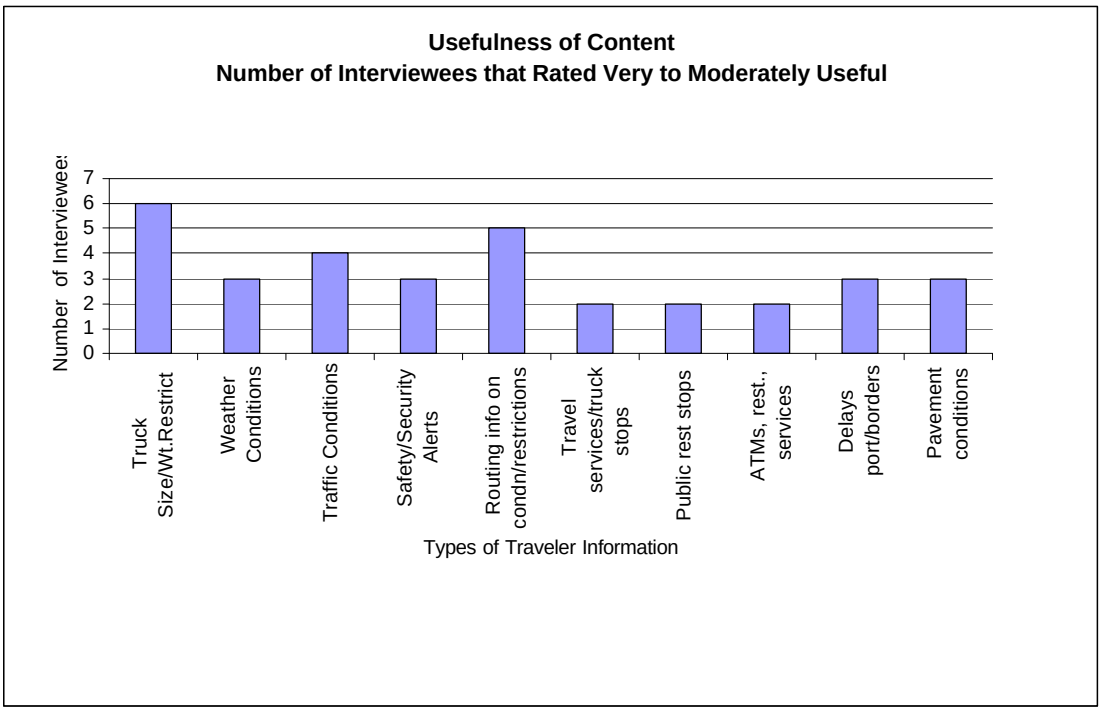


Figure 3-6: Usefulness of Content with Ratings from Very to Moderately Useful.

A graph summary of the effectiveness of traveler information delivery methods is shown in Figure3-7. Figure 3-8 shows the number of interviewees who ranked the delivery methods moderately to very effective.

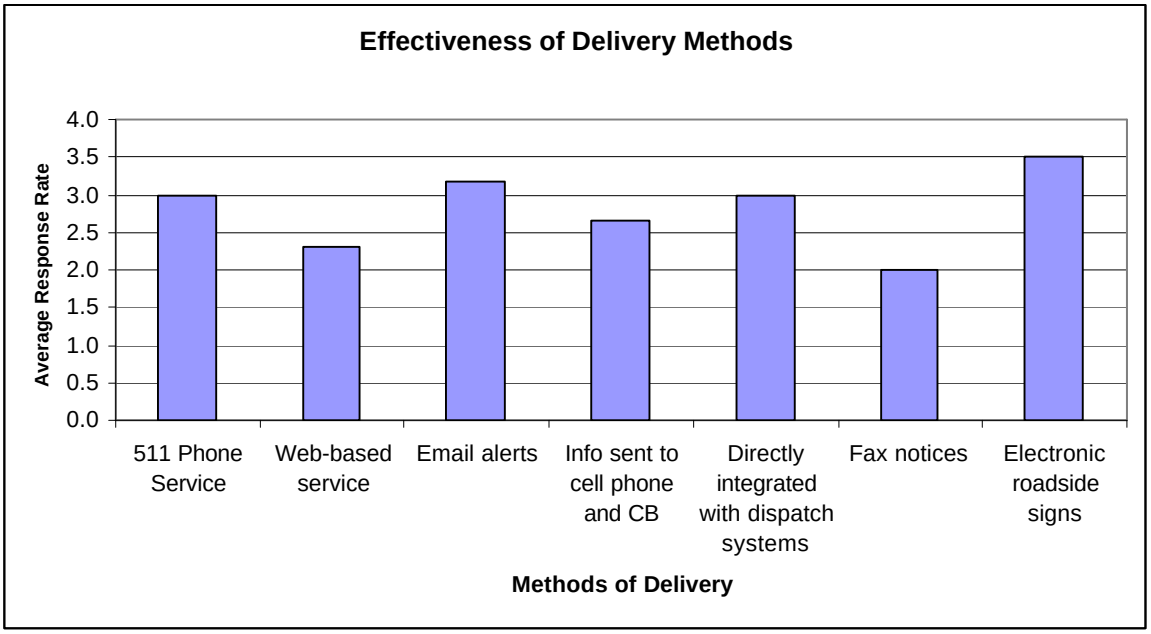


Figure 3-7: Effectiveness of Delivery Methods

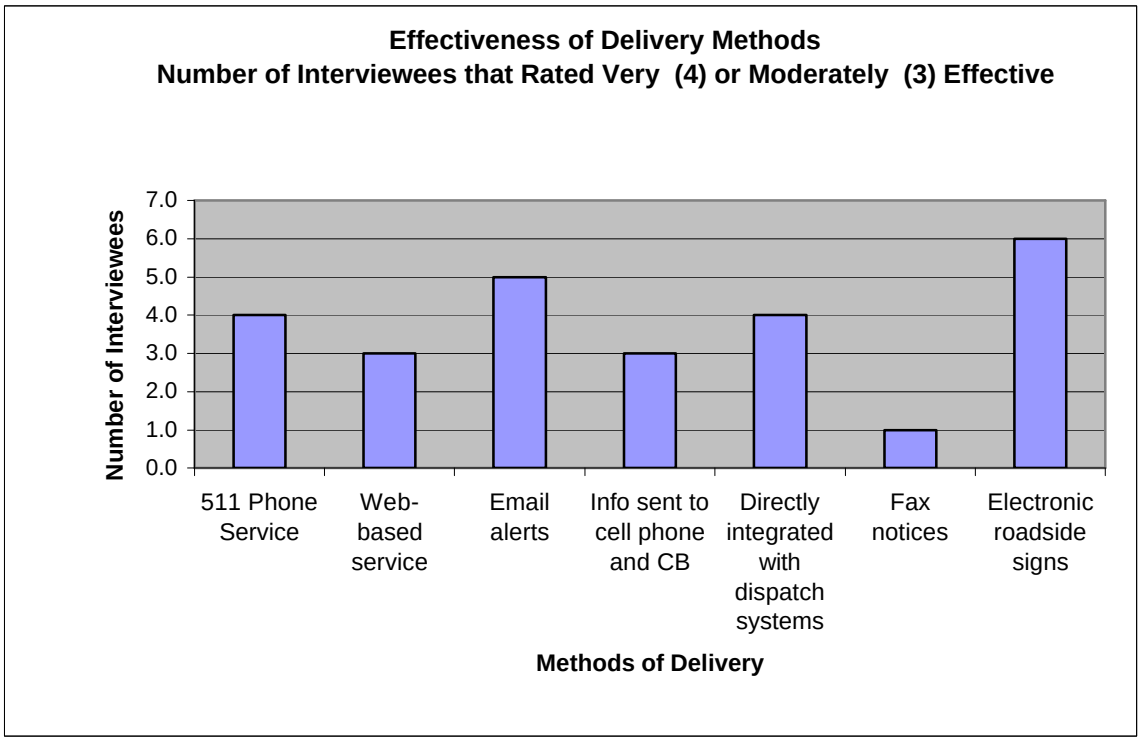


Figure 3-8: Effectiveness of Delivery Methods with Ratings Moderately to Very Effective.

4.0 CONCLUSIONS AND RECOMMENDATIONS

This report examined the background and current status of Minnesota and National programs for the use of ITS Technology to provide customized traveler information to better serve the motor carrier industry. It also examined the experiences of commercial vehicle operators with CVO ATIS as well as their needs and requirements for traveler information. It is clear from both the literature search and the surveys of organizations and private companies that very little is currently being offered in the way of ATIS designed primarily for the use of commercial vehicle operators. Mn/DOT therefore has the opportunity to be a leader in this area. The conclusions and recommendations of this study, relevant to Mn/DOT's interest to develop a CVO ATIS system are:

1. Surveys of motor carriers that were part of CVO Business Plans and operational tests elsewhere in the country confirm that there is an unmet demand for delivery of customized real-time road condition and related information to aid dispatch operations and drivers. The concept of a CVO ATIS market niche is viable, however, operational tests and follow-up market research has been very limited in recent years. Minnesota will have to take a strong leadership stance to move this initiative forward.

2. Mn/DOT should take action in several areas that have been keys to success and progress in related projects nationwide:

    a. Pursue a broad-based private industry consensus on the benefits of CVO ATIS. Actions taken to help accomplish this might include:

        - Establish the CVO ATIS concept as an on-going agenda item for the National 511 Deployment Coalition
        - On the CVISN side, pursue Federal seed funding for a CVO ATIS initiative as coalition-based organization of states that have accomplished the highest achievement of Level 1 Services, that seeks additional services. Prioritize the intended use of the seed funding for items such as public awareness of CVO ATIS and additional market research.
        - Consider market research to identify a "brand" for CVO ATIS, as was done for the National 511 logo.
        - Promote ATIS technology as an initiative that will benefit the overall safety and efficiency of daily commercial vehicle operations.

    b. From a leadership stance, gain financial and technical support in the largest possible framework. Examples identified in this report include:

        - Leveraging multi-state resources for technology investments (the 511 program and CARS-511)

        - Form route-based and geographic coalitions across jurisdictions (for example, the 5-state Safe Travel network, and the I-95 Corridor Coalition)

        - Closely follow the technology developments for both CVO and ATIS, and look for opportunities to share the telecommunications infrastructure, the largest investment in any ITS project.

- Acknowledge that government resources are limited. After investments in market research to prove a viable business plan, seek appropriate private sector partners (for example, the private information service provider participant in the FleetForward operational test, the American Trucking Association, and the American Transportation Research Institute).

3. Advances in technology for both CVO and ATIS systems have brought about a readiness for a next-generation operational test. Mn/DOT should identify and actively promote an operational test or CARS module development that capitalizes on investments such as the voice-activated 511 call-in system. Partner agencies should be sought at the Regional, State, and Federal level.

4. Customized information that includes overweight/overheight restrictions, delivered directly to drivers in their vehicles or directly integrated with the dispatch system would have the most value for commercial vehicle operators. The findings from the interviews show that trucking companies tend not to use ATIS due to accessibility issues. As a result, a push design method is needed so companies will feel more comfortable using traveler information

5. Additional market research with the CVO community is needed in order to get more of a feel for what ATIS methods other trucking companies are using and what other services they would like to see available. By interviewing six private companies, an idea of what traveler information is being used and what is needed was found, but more widespread participation is necessary.

6. One recommendation, made by William Honan of the Federal Motor Carrier Safety Administration, is that Mn/DOT and other state DOTs partner with motor carrier companies who already use a satellite communication system, such as Qualcomm's OmniTRACS or other GPS systems, as a normal part of their operation for dispatch and other communications. This will give the project an existing foundation as a way that the truck drivers can receive the information, which could be easy for the truck driver to access and receive the needed information in a timely manner by eliminating the communication with the dispatcher.

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Appendix B: Interview Questions

Private Trucking Company Interview Questions

Person Interviewed: _____

Company: _____

Position: _____

1. What type of services does your company primarily provide?

   a. Truckload
   b. LTL
   c. Local Delivery
   d. Specialized
   e. Hazmat

2. Commercial Vehicle Operations (CVO) Advanced Traveler Information Systems (ATIS) deliver information, such as traffic or weather conditions, directly to drivers. How familiar are you with these services?

   Not Familiar ——————————→ Very Familiar
   1 *2* *3* *4*

3. How useful do you believe the following types of traveler information are, or would be, to your drivers/dispatchers:

	Not Useful ←→ Very Useful			
a. Information on truck size and weight restrictions	1	2	3	4
b. Information on weather conditions	1	2	3	4
c. Information on traffic conditions	1	2	3	4
d. Safety and security alerts	1	2	3	4
e. Routing information based on driving conditions/ restrictions	1	2	3	4
f. Information about travel services at truck stops	1	2	3	4
g. Information about public rest stops	1	2	3	4
h. Information about ATMs , restaurants, and other services	1	2	3	4
i. Delays at port/border approaches	1	2	3	4
j. Information on pavement conditions	1	2	3	4

4. Are there other types of traveler information, that were not listed, that you think would be useful to your drivers/dispatchers?

a. Yes
b. No

If yes please describe them:

5. How effective do you think the following methods are, or would be, for providing traveler information to your drivers/dispatchers:

`

	Not Effective			Very Effective
a. Dial in phone service (511)	1	2	3	4
b. Web-based service	1	2	3	4
c. Email Alerts	1	2	3	4
d. Information sent to cell phones, CB radios and other wireless devices	1	2	3	4
e. Directly integrated with routing/dispatching systems	1	2	3	4
f. Fax notices	1	2	3	4
g. Electronic roadside signs	1	2	3	4

If you think that any of these methods would not be effective, please explain why and what you think could be done to make them effective:

6. Are there any methods of providing traveler information to drivers/dispatchers that were not listed that you think would be useful?

a. Yes
b. No

If yes, please describe them:

7. Does your company provide any traveler information directly to your drivers or dispatchers?

   a. Yes
   b. No

   If yes, what information do you provide and how is it delivered?

   Are you or would you be willing to pay a fee for traveler information services?

   What are the primary benefits to your company by providing this information?

8. If your company has worked with private companies or public sector agencies to provide traveler information could you describe this experience including any difficulties that your company encountered:

9. How frequently do your drivers/dispatchers use the traveler information that is currently available to them:

   Never ——————————→ *Very Frequently*

   1 2 3 4

10. What do you think could be done to increase how frequently they use this type of information?

11. Has your company done any surveys or other market research to determine whether your drivers/dispatchers are interested in using traveler information and what types of information or services they need?

    a. Yes
    b. No

    If yes please describe any results that you are aware of:

Private Sector Interview Questions

Person Interviewed: _____

Company: _____

Position: _____

2. What type of services does your company primarily provide?

   f. Truckload
   g. LTL
   h. Local Delivery
   i. Specialized
   j. Hazmat

3. Commercial Vehicle Operations (CVO) Advanced Traveler Information Systems (ATIS) deliver information, such as traffic or weather conditions, directly to drivers. How familiar are you with these services?

Not Familiar ——————————→ Very Familiar
1 *2* *3* *4*

4. How useful do you believe the following types of traveler information are, or would be, to your drivers/dispatchers:

	Not Useful ←→ Very Useful			
k. Information on truck size and weight restrictions	1	2	3	4
l. Information on weather conditions	1	2	3	4
m. Information on traffic conditions	1	2	3	4
n. Safety and security alerts	1	2	3	4
o. Routing information based on driving conditions/ restrictions	1	2	3	4
p. Information about travel services at truck stops	1	2	3	4
q. Information about public rest stops	1	2	3	4
r. Information about ATMs , restaurants, and other services	1	2	3	4
s. Delays at port/border approaches	1	2	3	4
t. Information on pavement conditions	1	2	3	4

5. Are there other types of traveler information, that were not listed, that you think would be useful to your drivers/dispatchers?

   c. Yes
   d. No

   If yes please describe them:

6. How effective do you think the following methods are, or would be, for providing traveler information to your drivers/dispatchers:

	Not Effective ◄			► Very Effective
h. Dial in phone service (511)	1	2	3	4
i. Web-based service	1	2	3	4
j. Email Alerts	1	2	3	4
k. Information sent to cell phones, CB radios and other wireless devices	1	2	3	4
l. Directly integrated with routing/dispatching systems	1	2	3	4
m. Fax notices	1	2	3	4
n. Electronic roadside signs	1	2	3	4

If you think that any of these methods would not be effective, please explain why and what you think could be done to make them effective:

7. Are there any methods of providing traveler information to drivers/dispatchers that were not listed that you think would be useful?

   c. Yes
   d. No

   If yes, please describe them:

9. Does your company provide any traveler information directly to your drivers or dispatchers?

   c. Yes
   d. No

   If yes, what information do you provide and how is it delivered?

   Are you or would you be willing to pay a fee for traveler information services?

   What are the primary benefits to your company by providing this information?

10. If your company has worked with private companies or public sector agencies to provide traveler information could you describe this experience including any difficulties that your company encountered:

12. How frequently do your drivers/dispatchers use the traveler information that is currently available to them:

Never → *Very Frequently*

1 *2* *3* *4*

13. What do you think could be done to increase how frequently they use this type of information?

14. Has your company done any surveys or other market research to determine whether your drivers/dispatchers are interested in using traveler information and what types of information or services they need?

c. Yes
d. No

If yes please describe any results that you are aware of: