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16. Abstract Project

In this report, researchers present a review of the practices and technologies being used in Texas for incident management and traveler information exchange and sharing. Through interviews and site visits, researchers assimilated data from the Dallas, Fort Worth, Houston, and San Antonio Texas Department of Transportation (TxDOT) districts to determine what information is being shared, with whom, and how that information is being disseminated within existing operating philosophies of the various agencies and private entities involved. Currently, all of the districts contacted share video (real-time continuous and snapshots), speed information, real-time incident information, and scheduled lane/road closure information with other public and private entities. The most common method utilized by TxDOT for disseminating information is the internet. TxDOT also extensively operates dynamic message signs to provide information to travelers en route. Other methods employed include direct connections (e.g., fiber), email, telephone, fax, low power television, in-vehicle navigation units, lane control signals, and kiosks.

In addition, researchers conducted a survey on a sample group of agencies receiving information from TxDOT in order to quantify how frequently agencies utilize the different types of information, to explore how that information influences the types of decisions being made and actions being taken, and to identify the influence of local and regional issues upon information usage. Incident information is the most widely used by the agencies surveyed, closely followed by notification of scheduled lane closures. In addition, agencies utilize video to verify incident conditions and coordinate response efforts. Agencies such as city and county traffic departments, police, fire departments, transit, information service providers, and media continuously use the information provided by TxDOT to improve their daily operations. These agencies apply the information received from TxDOT to: 1) reroute traffic around roadways that are flooded; 2) adjust signal timings near construction or an incident to better accommodate increased traffic flow; 3) visually identify an incident; 4) determine the severity of an incident; 5) determine the appropriate incident response (e.g., fire, EMS, etc.); 6) improve emergency response time by better routing emergency units to avoid areas of congestion or other incidents; 7) provide incident information to responding personnel en route; 8) reroute buses and alleviate unnecessary schedule delays caused by an incident; 9) improve efficiency of agency personnel in their work-related travels by avoiding areas of congestion; and 10) improve roadway reports to the public.

Based on the results of this project, researchers assimilated guidelines regarding effective information exchange techniques and practices. Researchers believe that the information documented herein will be valuable to the other districts who are not as far along in their traffic management system development.

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PRACTICES, TECHNOLOGIES, AND USAGE OF INCIDENT MANAGEMENT AND TRAVELER INFORMATION EXCHANGE AND SHARING IN TEXAS

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DISCLAIMER

The contents of this report reflect the views of the authors, who are responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the Texas Department of Transportation (TxDOT). This report is not intended to constitute a standard, specification, or regulation, nor is it intended for construction, bidding, or permit purposes. The engineer in charge of the project was Dr. Gerald L. Ullman, P.E. #66876.

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1. INTRODUCTION

This report presents a review of the practices and technologies being used in Texas for incident management and traveler information exchange and sharing. Specifically, researchers compared and contrasted the current and planned information exchange processes and techniques being used by the following Texas Department of Transportation (TxDOT) districts: Dallas, Fort Worth, Houston, and San Antonio.

In addition, this report documents the results of a survey conducted on a sample group of public and private agencies receiving information from TxDOT. Researchers administered this survey in order to determine the data actually being used by the "customer," as well as how the recipient utilizes the data. It should be noted that the information documented herein is dynamic in nature, as the districts are continually implementing new strategies to disseminate information.

BACKGROUND

To address the nation's continuing surface transportation needs, Intelligent Transportation Systems (ITS) have evolved to increase the efficiency and safety of national, regional, and local transportation systems. The application of ITS management strategies and technologies on existing facilities allows for alternative solutions when solving transportation challenges instead of relying solely on building additional roadway capacity (*1*).

Information sharing and exchange is a core concept of ITS implementation throughout the state and nation. Indeed, the vision of ITS is for the right information to be available at the right place and time, so as to positively affect transportation decisions and actions. This report focuses on the sharing of incident management and traveler information between agencies and with the public.

Incident management is the multi-agency coordinated and planned approach to address nonrecurring congestion problems on freeways typically caused by incidents (*1*). An incident can be any transportation-related event, including planned roadway closures and special events (*2*). However, in this report researchers define an incident as any unscheduled transportation-related event, such as crashes and weather (scheduled events are addressed separately). An emergency management system receives information concerning incidents and then disseminates this information so that the appropriate response activities can be initiated. Other operating agencies and the public who use the facilities can then make informed decisions as to how to best react to the incidents and the travel difficulties those incidents create (*1*).

Traveler information systems apply many technologies that allow consumers to receive multi-modal information important to their trip. The information collected and distributed by these technologies can be dynamic (i.e., real time) or static in nature. Advanced traveler information systems (ATIS) usually provide trip planning, route guidance services and information, and advisory information. These systems interface with traffic management systems in the region to obtain traffic, incident, and roadway information. Travelers can request, receive, and interact

with all of this information through various avenues (e.g., internet, pagers, in-vehicle, kiosks, etc.) (*3*).

In April 1999, the ITS America's Advanced Traveler Information Systems Committee formed a Steering Committee to create guidelines that can assist public agencies and private firms in generating and using data to support the expansion of ATIS. One of the reasons for developing these guidelines was to increase recognition of the value of data sharing. The availability of data to other agencies for use in creating ATIS products and services was identified as an important issue to the deployment of ITS (*4*). To assess the incident management and traveler information exchange processes and techniques being used in Texas, researchers surveyed the following TxDOT districts: Dallas, Fort Worth, Houston, and San Antonio.

Dallas (DalTrans)

The Dallas urban area consists of multiple public agencies providing traffic, transportation, and emergency services to the traveling public. This area, compared to other urban locations in Texas, incorporates more major agencies in one urbanized region. Agencies in the Dallas area include (*5*):

- TxDOT Dallas District,
- Dallas and Collin Counties,
- thirty-one cities,
- Dallas Area Rapid Transit (DART),
- North Texas Tollway Authority (NTTA), and
- twenty separate 911 emergency services (public safety answering points [PSAPs]).

The Dallas District of TxDOT currently operates a transportation management center (TMC), called DalTrans, from a satellite control building that will serve as the freeway control center until a region-wide control facility is built. Housed in this facility are two TxDOT system operators, a Courtesy Patrol dispatcher, and an operator from DART. These operators monitor the freeway conditions, dispatch assistance to stranded motorists on the freeways, and share information about the freeway conditions with motorists and other transportation agencies, as well as the media. The current center is capable of operating and managing up to 100 freeway miles. The principal limiting factor for further expansion in the existing facility is physical room for additional equipment, particularly for the communications and computing equipment required to interface to other public agencies and news media (*5*).

The permanent region-wide center is currently under preliminary design and expected to be in operation around the year 2003. This new TxDOT Dallas TMC will serve as the regional data server and clearinghouse for communication among local agencies and private companies providing traffic services. TxDOT has executed interlocal agreements with the Cities of Dallas and Richardson specifying the manner in which video, other data, and control functions will be exchanged. Similar agreements have been developed for exchange of data with private companies such as commercial television and information service providers (ISPs) (*5*).

TxDOT Dallas has developed a prototype software package to control closed circuit television (CCTV) cameras, dynamic message signs (DMSs), and post incident locations and traffic conditions on a dynamic computer-based area map. The prototype software package also automatically sends the information from the dynamic area map to interested entities, including the general public. The system design is client-based with individual system users being "user clients." The current software package is termed the Incident Management Client (IMC). This software is internet compatible and can be readily adapted to be accessible to travelers, interested local agencies, and private ISPs (*5*).

Fort Worth (TransVision™)

Since its construction in the mid 1980s, TxDOT Fort Worth's Satellite Operations Center (SOC) served as the district's interim TMC. It housed TxDOT operators and provided a base for the many traffic-related activities of the Fort Worth District. Since the completion of the district's TransVision TMC in June 2000, the SOC has been unmanned, but can serve as a backup to the new TMC should the need arise (*6*).

System operators in TransVision monitor freeway conditions, manage traffic, and share up-to the-minute information with motorists. Currently, TransVision manages enhanced monitoring and system operating capabilities over approximately 50 miles of roadway, principally freeways. The TMC also interfaces with existing field equipment such as DMSs, CCTV cameras, and lane control signals (LCSs). Data from this equipment are available throughout TransVision via video and computer graphics displays (*6*).

Houston (TranStar©)

The Houston transportation and emergency management center, better known as Houston TranStar, was established in December 1995 and officially opened in April 1996. Currently, 160 miles are incorporated into the freeway management system out of a projected 300 miles. This center integrates the personnel and responsibilities of four partner agencies: TxDOT, the Metropolitan Transit Authority of Harris County (METRO), the City of Houston, and Harris County. Each of these agencies has representatives within the TMC building to facilitate communication between the agencies.

Houston TranStar personnel are responsible for managing freeway and arterial street systems in the greater Houston area. This responsibility includes the following components (*7*):

- freeway management system,
- freeway and arterial street incident management,
- flow signals (also called ramp meters),
- CCTV freeway cameras,
- dynamic message signs,
- high occupancy vehicle (HOV) lane system,
- Regional Traffic Signal System,
- ITS programs,

- bus dispatch,
- emergency management operations, and
- flood alert system.

All of the partners have access to an operations local area network (LAN) in Houston TranStar which contains an incident database that contains pertinent information regarding incidents in the Houston area. Access to the operations LAN and the incident database can be gained either through computer terminals on the control room floor or terminals in the Houston TranStar briefing room.

San Antonio (TransGuide®)

The Transportation Guidance System or TransGuide is the advanced traffic management system (ATMS) for San Antonio. Phase I was built between February 1993 and June 1995. This phase included the initial 26 miles out of the planned 191 miles, the complete operations center, mainframe computer system, application software, communication switching equipment, and all supporting hardware. To date, the TransGuide system covers approximately 64 miles. The partners in the TransGuide project include TxDOT, the City of San Antonio (traffic, police, fire, emergency medical services [EMS]), and VIA Metropolitan Transit. Representatives from these partners are located in the TransGuide Operations Center and have access to the information generated by the advanced traffic management system through workstations in the operations room (*8*, *9*).

Because of the established ITS infrastructure in San Antonio, the United States Department of Transportation (U.S. DOT) selected TransGuide (ATMS) for the Model Deployment Initiative (MDI) program. The implementation phase of the MDI project began in July 1998. The initial task in this initiative was to establish a data server to provide a central data repository that collects, stores, and distributes data for the ATMS and MDI projects. The data server design goals and objectives are as follows (*10*):

- provide a central access point for the storage and distribution of TransGuide ATMS and MDI subsystems data,
- treat traffic management data in a homogeneous fashion so that seamless access to data can occur,
- store data so that it can be geographically filtered when accessed,
- provide rapid response to data requests,
- easily incorporate new data sources in the future, and
- integrate into existing TransGuide environment with minimal impact.

This data server was developed with two users in mind: data generators (who supply data) and data consumers (who utilize data). Table 1 shows the data generators and consumers in the TransGuide data server system.

The TransGuide data server stores data in shared memory and in files. The data stored in shared memory are of limited and known size (e.g., speed data), while data of varying size (e.g., ATMS

incidents and lane closures) are stored in files. In addition to traffic data, status messages from each MDI subsystem are received and stored by the data server in shared memory. These messages and other status information can be accessed and displayed on the MDI System Status Graphical User Interface (GUI). The data server maintains only the most current version of data, updating the data when new data is received. However, the server is capable of storing files for later retrieval (*10*, *12*).

Table 1. TransGuide Data Generators and Consumers (*10*, *11*).

Data Generators	Data Consumers
TransGuide® ATMS	TransGuide® ATMS
Automatic Vehicle Identification (AVI)	Emergency Response
911 Dispatch System	In-Vehicle Navigation (IVN)
State Roadway Closed Database	Kiosks
VIA Metropolitan Transit	VIA Metropolitan Transit
Weather System	World Wide Web (WWW)
Advanced Warning to Avoid Railroad Delays (AWARD)	Low-Power Television Station (LPTV)

REPORT ORGANIZATION AND SCOPE

Chapter 2 contains a review of the practices and technologies being used for incident management and traveler information exchange and sharing in the Dallas, Fort Worth, Houston, and San Antonio Districts. This review examines the types of information the districts are sharing and with whom, and how they are disseminating the information within the existing operating philosophies of the various public and private entities involved.

Chapter 3 documents the results of a survey researchers conducted on a sample group of agencies receiving information from TxDOT. Researchers administered this survey in an effort to quantify how frequently agencies utilize the different types of information, to explore how that information influences the types of decisions the agencies make and actions they take, and to identify the influence of local and regional issues upon information usage.

Chapter 4 summarizes the results from the review of practices and telephone survey. In addition, conclusions and recommendations regarding the sharing of incident management and traveler information are discussed.

2. REVIEW OF PRACTICES AND TECHNOLOGIES IN TEXAS

Through interviews and site visits, researchers assimilated data from the Dallas, Fort Worth, Houston, and San Antonio Districts to determine what information the districts are sharing and with whom, and how they are disseminating the information within existing operating philosophies of the various agencies and private entities involved. The following sections summarize these findings by the types of information being shared: video, travel time and speed, incident, scheduled lane/road closure, and other traffic statistics.

VIDEO INFORMATION

The surveillance cameras that TxDOT traffic management centers use provide real-time continuous images of current roadway conditions. Researchers believe sharing of these data between TxDOT and other entities, as well as the public, enhances the consumers' ability to make informed decisions regarding transportation-related events.

Within the Dallas-Fort Worth (DFW) area, individual TMCs are operated by several of the surrounding cities. The need to exchange continuous live video data between these multiple centers, as well as other local agencies, has necessitated the establishment of a shared data server and a regional network instead of using one-to-one direct lines for each connection. This network would use existing agency communication assets such as owned fiber-optic cables and leased bandwidth on cables owned by cable television companies. To ensure that the network reaches all interested entities, other types of media such as leased circuits, wireless links, and the internet could be used as well (*13*).

The foundation for the regional network in Dallas has been established through the installation of hardware and communications links that will allow exchange of real-time live video, voice, traffic data, and control commands. Currently, DalTrans and TransVision are connected by a direct fiber line. Using asynchronous transfer mode (ATM), they have the capability to select and view each other's cameras. Additionally, DalTrans shares a video feed with the Cities of Dallas and Richardson, and TransVision exchanges full motion video with the City of Fort Worth. These connections allow the entities to view any TxDOT camera.

Expansion of the regional network project will tie in four additional cities. These local agencies choose the type of communication medium depending on data speed requirements. Funding for this hardware to local cities is provided through the Transportation Equity Act for the 21st Century (TEA-21).

In contrast, the TMCs located in Houston and San Antonio incorporate partnering local agencies. As mentioned in the background section, the partners in the TransGuide project include TxDOT, the City of San Antonio, and VIA Metropolitan Transit, while the partners in the Houston TranStar project include TxDOT, Harris County, City of Houston, and METRO. Representatives from these partners have access to the surveillance camera images, as well as other traffic data generated by the advanced traffic management system, through workstations in the operations room of their respective TMCs. This allows for the sharing of information between the TMC

partners via internal communications. This internal sharing of data reduces the need for a regional network in these regions; however, in some instances additional methods are also used to further distribute information.

In January of 1996, the San Antonio District began broadcasting video information over a low-power television station. Currently, the LPTV is used to transmit four video images that are continuously rotated on a switch. These images can be viewed by anyone within a range of 18 to 20 miles since they are transmitted on an unscrambled UHF channel; however, the main consumers of the LPTV signal are the local television stations. The TransGuide floor manager on shift selects the cameras to be broadcast; however, when an incident occurs it is usually displayed (i.e., one image can be continuously displayed). The cameras are labeled such that a description of the location of the camera is displayed with the image (e.g., 410 E at Cherry Ridge). However, the direction the camera is aimed can be deceiving, since the cameras are capable of rotating 350 degrees.

At that time, San Antonio TxDOT chose to use a LPTV instead of other technologies (e.g., microwave communications, leased fiber-optic services, connections to the existing TransGuide fiber-optic network, and high speed transmission over modem) because of the amount and type of data to be transmitted and the low-cost, one-time investment in hardware. Originally, the LPTV broadcast live video, as well as graphical maps, the current state of DMSs and LCSs, scheduled lane/road closure data, and detailed information about traffic incidents. However, only live video is currently transmitted since the other information is now available on the internet.

Currently, the San Antonio District transmits the LPTV signal over the TxDOT/City of San Antonio fiber connections to the City of San Antonio. The City has the ability to route the video to its office downtown (police, fire, etc.). During local emergencies, TransGuide video can be broadcast on the City of San Antonio's City Hall Information Channel on cable television. For similar reasons, the City of Fort Worth is interested in broadcasting TransVision's video on the City TV channel.

The San Antonio District also provides direct line video access to the San Antonio Police Department (SAPD); however, the video signal does not come from the LPTV. Instead, the police officer located in the TransGuide operations room has the ability to send one image from any camera to the SAPD Traffic Captain (located outside of TransGuide at police headquarters). SAPD requested a direct connection to obtain "secure" images of potentially serious situations. Similarly, the METRO Police Department in the Houston District requested a direct video feed of camera images around the Astrodome to observe conditions during the Houston Livestock Show and Rodeo.

Currently, the Houston District provides television stations, who install their own hardware, direct line access to all of Houston TranStar's cameras. The stations use controls similar to the ones used by Houston TranStar personnel to select camera views, except that the direct camera control (e.g., pan, tilt, zoom) has been removed. This setup gives the stations flexibility in choosing camera images without having to contact Houston TranStar personnel. The Houston District foresees providing video images to other public and private entities through this method.

Similarly, in the future the San Antonio District plans to provide external selectable video access for a limited number of camera images (the 16 views on the video wall in TransGuide) to the local television stations who install their own hardware. DalTrans will also allow media and ISPs to receive camera images over direct lines that the private entities install. It should be noted that the use of video by television stations is based on information sharing agreements. Appendix A contains a discussion of the agreements being used by the four districts surveyed.

Besides real-time continuous images, the districts are also distributing video snapshots. The Fort Worth District uses email to notify some 300 subscribers (other agencies and the public) of incidents. These emails include a video snapshot when available. In the future, Fort Worth plans to include video snapshots on its kiosks. All four districts surveyed currently provide video snapshots with the freeway name, cross street name, date of snapshot, and time of snapshot on their internet sites:

- Dallas-Fort Worth – http://www.dfwtraffic.dot.state.tx.us;
- Houston – http://traffic.tamu.edu; and
- San Antonio – http://www.transguide.dot.state.tx.us.

In addition, the DFW and Houston sites include two directional (e.g., north and south) pictures of the selected camera image so users can determine which way the camera is aimed. In the future, the Fort Worth District will additionally allow viewing of short video clips.

Overall, the four districts surveyed currently utilize one-to-one direct connections to disseminate continuous live video information to certain entities within their respective regions. The Dallas and Fort Worth Districts are also planning to establish a regional network to better facilitate the sharing of video, as well as other traffic data, in their area. Other methods currently used include the internet, LPTV in San Antonio, and email in Fort Worth. Table 2 summarizes the various methods used by consumers to obtain video information from TxDOT.

TRAVEL TIME AND/OR SPEED INFORMATION

Each of the TxDOT districts surveyed provide travel time and/or speed information to data consumers in multiple ways. Table 3 documents the methods used to disseminate this information to the consumers.

At present, all four of the districts surveyed have established current conditions maps of their areas that provide speed information to the consumer. The notable difference between the maps is the basis for which the maps are color-coded. The Houston map color-codes the roadway segments based on five speed classifications, while the other three districts' color-code is based on congestion levels (e.g., normal, heavily congested, no data, etc.). However, when a roadway segment is selected on the San Antonio map, the average speed is provided. The major reason for the difference (speed versus congestion level) is the type of technology used to collect traffic conditions. In Houston the average link speeds are measured directly by AVI technology, whereas San Antonio and Fort Worth utilize point or link measures of traffic conditions using

inductive loops installed in the pavement. Dallas will use a combination of inductive loops and video image detection.

Table 2. Summary of Video Information Provided by TxDOT.

Methods	Consumers									
	Cities	**Counties**	**Fire/ EMS**	**Police**	**ISP**	**Media**	**CVO**	**Airports**	**Transit**	**Travelers**
Direct Line	D F S			 H S	D*	D* H S*				
Regional Network [a]	D* F*	D*	D* F*	D* F*	 F*	 F*		F*	F*	
Internet	D F H S	D F H S	D F H S	D F H S	D F H S	D F H S	D F H S	D F H S	D F H S	D F H S
Email	F	F	F	F	F	F	F	F	F	F
LPTV	S					S				S
Kiosk							F*			F*

EMS-emergency medical services; CVO–commercial vehicle operations
D-Dallas District; F-Fort Worth District; H-Houston District; and S-San Antonio District
[a] In conjunction with a shared data server
* District is considering the use of the method or planning to provide information via the method in the future

In the Houston District, this map is provided to the consumer using several different methods. The primary means is through the Houston TranStar website. The current conditions map is also provided as a direct line feed to the City of Houston, Harris County, ISPs, and local television and radio stations. The direct line to the media is based upon a signed agreement with TxDOT (see Appendix A for more information). Finally, besides the TxDOT district office, there are kiosks located in the lobbies of the main offices of the City of Houston, Harris County, and METRO that display the current conditions map. These kiosks are intended for use by the general public.

As a precursor to the internet version of the TransGuide current conditions map, TxDOT San Antonio used LPTV to display speed conditions in terms of congestion. However, since travel time and speed information are now available on the internet, speed information is no longer provided via LPTV. The San Antonio District also provides travel time and speed information to ISPs through direct lines, to SAPD and VIA paratransit through in-vehicle navigation units, and to the fire department and emergency medical services directly through a data server. Each ISP in the region (at least five) has a unique account that was established through information sharing agreements. Per these agreements, the ISPs are responsible for providing and maintaining any hardware, software, or infrastructure that is necessary for them to connect to TransGuide's communication lines in order to receive data (see Appendix A for more information). The IVN units utilized by SAPD and paratransit were implemented as part of the MDI project. Currently there are 590 units installed in state municipal vehicles. The units receive real-time information

from the data server and then display the information along with map data to the vehicle operator.

Table 3. Summary of Travel Time and Speed Information Provided by TxDOT.

Methods	Consumers									
	Cities	**Counties**	**Fire/ EMS**	**Police**	**ISP**	**Media**	**CVO**	**Airports**	**Transit**	**Travelers**
Direct Line	H	H			H S	H				
Regional Network [a]	D* F*	D*	D* F*	D* F*	F*	F*		F*	F*	
Data Server			S							
IVN				S					S	
Internet	D F H S	D F H S	D F H S	D F H S	D F H S	D F H S	D F H S	D F H S	D F H S	D F H S
LPTV	S**					S**				
Kiosk							F*			F* H
DMS										D* F H S

D-Dallas District; F-Fort Worth District; H-Houston District; and S-San Antonio District

[a] In conjunction with a shared data server

* District is considering the use of the method or planning to provide information via the method in the future

** District is no longer using the method

The Dallas and Fort Worth Districts worked together to develop the DFW current conditions map that is displayed on their joint website. In the near future, travel time and speed information will also be exchanged between the Dallas and Fort Worth Districts and between the Fort Worth District and the City of Fort Worth via the data server. Both the Dallas and Fort Worth Districts foresee the use of the shared data server and regional network to disseminate travel time and speed information to various public and private agencies. TxDOT Fort Worth also plans to install kiosks at the Fort Worth Transit Authority (The "T") intermodal facility, the car rental facility at DFW airport, and possibly a few major truck stops along interstate routes in the region. These kiosks would provide flow conditions of certain roadways in the Fort Worth region.
The internet sites for both the San Antonio and Houston Districts also allow for a user to receive travel time and speed information about a particular segment of roadway. On both websites, users can access the following information:

- roadway,
- start and end points,
- distance,
- travel time, and
- speed.

Additionally, both internet sites have a feature that allows for the creation of user-selected routes. In both cases, the route builder allows the user to select predetermined segments of roadway, which are combined to provide a cumulative distance, travel time, and speed for the route.

Recently, the Houston District developed real-time speed charts to be displayed on its internet site. These charts plot speed versus time (5:00 a.m. to 8:00 p.m.) and show the current speed compared to the historical average speed. The current speed (live) charts are dynamically generated using speed data from the Houston TranStar AVI Traffic Monitoring System. In contrast, the historical average speeds are calculated using archived data from the system and are updated frequently. Gaps in the plots indicate a lack of speed data for the freeway segment being viewed. In addition to the real-time speed charts, historical average peak period speeds and travel times (6:00 a.m. to 9:00 a.m. and 4:00 p.m. to 7:00 p.m.) are available graphically or in table format.

DMSs are used extensively in the San Antonio District as a method for disseminating travel time information to travelers. The travel times for the San Antonio District are estimated based on average spot speed data collected by inductive loop and acoustic sensors, extrapolated over the distances between detectors, and then automatically posted on DMSs, which are generally five miles apart (primarily located at interchanges and other major roads). These DMS displays are posted on the TransGuide internet site along with the DMS location. TxDOT San Antonio is also considering posting travel speed information on DMSs; however, this would require the development of a new automated process.

The Houston District also uses DMSs to display travel time information, but on a much more limited basis. In the Houston District, the travel times must be computed by a floor operator and then manually entered into the DMS operation system. The information used in the computation of these travel times comes from the AVI system data. The manual effort required to display travel time information in the Houston District contributes to the limited use of DMSs as a method to provide travel times. Automation of this process is being investigated as part of an on-going traveler information dissemination project. The Houston District is also working to provide its DMS displays via the internet and is awaiting approval to complete this process.

Currently, the Dallas District is in the process of installing and integrating detectors into portions of the Dallas system. Once the detectors are installed, the DalTrans software has the capability to compute travel times and speeds from detector data. Thus, in the future the Dallas District may display travel times on DMSs.

In addition, both the San Antonio and Fort Worth Districts display congestion messages on DMSs. These messages indicate that there is congestion ahead, and that the driver should use caution. Originally, in San Antonio these messages included an approximate distance ahead where the driver could expect to slow down, but this practice was discontinued due to the dynamic nature of the congestion and the fact that both ends of the congestion queue rarely fell within the area covered by TransGuide. The expansion of the TransGuide network has eliminated this problem, in most cases, and has made it possible to again provide location information. An example of this type of message would be “CONGESTION AHEAD: FROM

WURZBACH TO CROSSROADS" and "USE CAUTION." The use of this type of message requires that the operations staff closely monitor the limits of the queue and modify the congestion messages as needed. The San Antonio District is also considering using the yellow downward arrow on LCSs in advance of non-incident-related congestion.

Overall, the most common method for disseminating travel time and/or speed information is the internet. This is also true for the other types of data, such as incident and scheduled lane/road closure information which will be discussed in a subsequent section. In addition to the internet, DMSs are used extensively for disseminating travel time information to travelers in the San Antonio District. This method is also utilized by the Houston District, but on a more limited basis. As mentioned earlier, the regional network concept and one-to-one direct lines are employed to distribute both traffic data and video.

INCIDENT INFORMATION

Table 4 shows the methods by which TxDOT provides incident information to consumers. As noted earlier, in this report researchers define "incident" as any unscheduled transportation-related event (e.g., crashes, weather, etc.).

All of the districts surveyed are currently using the internet as a means to disseminate incident information to public and private sector agencies, as well as travelers. On the current conditions maps, clickable icons denote the location of incidents. Table 5 contains the information provided by each district when the incident icons are chosen. Similar information is available for all current incidents on a separate text-based page.

Weather-related incident information, such as flooding, is a growing concern in the Houston and San Antonio areas. Recently, a group of environmental sensors were installed on the area interstates in Houston. These sensors monitor a variety of weather conditions including water level on the roadways, wind speed, and ice conditions. The data gathered from the sensors are available through the Harris County Office of Emergency Management (OEM) website, which can be accessed from the Houston TranStar internet site. San Antonio TxDOT also plans to report the pump station water levels for roadway flooding information via the internet. These pump stations are located on lower-level freeways in the region.

In addition to the internet, the Dallas and Fort Worth Districts are also using a direct connection between the two TMCs, email, and the telephone to disseminate incident information. As discussed previously, the direct fiber connection between TransVision and DalTrans is part of the regional network being established in the region. DalTrans also receives a direct feed of the City of Dallas 911 dispatches which have been filtered to remove non-traffic-related events. It should be noted that when using the internet, direct lines, or a regional network, the receiving agency must actively review the data on a regular basis to determine if any of the information provided is relevant to the agency.

Table 4. Summary of Incident Information Provided by TxDOT.

Methods	Consumers									
	Cities	**Counties**	**Fire/ EMS**	**Police**	**ISP**	**Media**	**CVO**	**Airports**	**Transit**	**Travelers**
Direct Line					S					
Regional Network [a]	D* F*		D* F*	D* F*	F*	F*	D* F*	D* F*	D* F*	
Data Server			S							
IVN				S					S	
Internet	D F H S	D F H S	D F H S	D F H S	D F H S	D F H S	D F H S	D F H S	D F H S	D F H S
Phone	H	H	H	F H	F H				H	
Email	D F	F	F	D F	D F	D F	F	F	F	F
Paging		H*								
Kiosk							F*			F* S
HAR							H* S*			H*
DMS										D F H S
LCS										F H S

HAR-highway advisory radio
D-Dallas District; F-Fort Worth District; H-Houston District; and S-San Antonio District
[a] In conjunction with a shared data server
* District is considering the use of the method or planning to provide information via the method in the future

Table 5. Incident Information Provided on the Internet by Each District.

Incident Information	Dallas-Fort Worth	Houston	San Antonio
Type	✓	✓	✓
Location or Roadway(s)	✓	✓	✓
Direction	✓	✓	✓
Time	✓	✓	✓
Date	✓	✓	✓
Status	✓	✓	
Number of Lanes Blocked or Affected Lanes	✓	✓	
Number of Vehicles	✓		
Reported By	✓		

In contrast, the use of email and the telephone by the Dallas and Fort Worth Districts allows for the consumer to receive direct notification when incidents occur. (It should be noted that the consumer still has to access email to receive the information.) Currently, both districts are distributing incident information via email to cities (including City of Dallas 911), the police, media, ISPs, and each other. In addition, TxDOT Fort Worth uses email to send incident information to counties, fire/EMS, commercial vehicle operations, DFW airport, transit, and the public.

The Fort Worth District's emails contain a detailed description of the incident including:

- the location of the incident (main street and cross street),
- number of lanes open or closed,
- date,
- time of the incident,
- a real-time video snapshot of the incident,
- travel times,
- speeds, and
- suggested alternate routes when available.

The information for the speeds and travel times comes primarily from surveillance loop detection or from observations of actual speed/flow conditions during an incident.

The Dallas District has recently upgraded its email incident notification service to allow users to select preferences and formatting. More specifically, each user can personalize the incident information received by choosing specific roadways, status of the incident (i.e., detected, verified, cleared, and disregarded), type of incident, day(s) of the week to be notified, and time of the day to be notified. In addition, users may choose the format of the email. All users default to a plain text template; however, three hypertext mark-up language (HTML) templates are also available. Users may change their password, unsubscribe, or edit their preferences at any time. The incident notification service includes the following basic information in all emails:

- description,
- main street,
- cross street,
- number of lanes closed, and
- time closed/opened.

Both districts send out follow-up emails when the incident is cleared and the road returns to normal service. The Dallas and Fort Worth Districts also call each other by telephone in the event of an incident that may affect roadways in their respective areas. Additionally, the Fort Worth District calls the police and ISPs with incident information.

The Houston District also uses the telephone to provide pertinent local agencies (e.g., county, city, etc.) with incident information, such as:

- the type of incident,
- start time,
- direction,
- status,
- time reported, and
- traffic impact.

A telephone call is also made directly to the fire department/EMS main dispatch when there is a need for emergency assistance at the accident location. In the Houston District, incident information is provided to METRO police and METRO transit by simple contact between the TxDOT floor operators at Houston TranStar and the representatives from METRO, who are also located on the floor at Houston TranStar. Additionally, representatives from the Houston Police Department (HPD) and ISPs are located on the Houston TranStar control room floor; however, they are not always present. Thus, HPD and ISPs are also contacted by telephone when they are not on the TMC control room floor and provided details regarding an incident, such as location and direction, type of incident, status, and number of lanes blocked. It should be noted that in the Houston District telephone calls are the primary method of directly contacting local organizations.

In several of the districts surveyed, pagers are currently used to communicate incident information to relevant TxDOT employees (e.g., maintenance engineer in the area, area engineer, etc.), but they are not being used to share information with other agencies. However, in the Houston area the Harris County OEM has instituted a new paging system, which in the future will be used by TxDOT to contact other agencies with relevant incident information.

Other methods for disseminating incident information include data servers, direct lines, and IVN units. As discussed previously, San Antonio TxDOT provides incident information to the fire department and EMS directly from the data server, to SAPD and VIA paratransit through IVN units (which receive incident information from the data server), and to ISPs via direct lines.

DMSs are the most common medium employed by the TxDOT districts surveyed to notify travelers about incidents en route. In all four of the districts surveyed, these messages inform motorists about the type of incident, direction and location of the incident, and impact of the incident (e.g., number of lanes blocked or open). Currently the Dallas, Fort Worth, and San Antonio Districts are posting DMS messages, along with sign location, on their respective websites. In the near future, the Houston District also plans to post DMS messages on the internet.

In the San Antonio District, grade-crossing information is also being provided to travelers via DMSs. This system is called Advance Warning for Railroad Delay and is operated independently of railroad signals or communications. Railroad crossings that are located on freeway access frontage roads are monitored to detect the presence of trains and predict the time

and duration of the blockage of grade-crossings. DMSs alert motorists of potential delays, thus allowing the motorist the opportunity to take alternate routes and avoid waiting at the crossings.

In addition to the DMSs, the Fort Worth, Houston, and San Antonio Districts use LCSs, where available, to indicate which lanes are blocked. Travelers in the San Antonio region can also receive incident information from kiosks provided by TxDOT. These kiosks are located at areas such as shopping malls, tourist attractions, and businesses. In the near future, the Fort Worth District also plans to utilize kiosks to provide travelers with incident information.

In Houston, TxDOT is currently in the process of implementing highway advisory radio on IH-610, IH-10, IH-45, US 59, and SH 146. The HAR system will utilize a low power AM radio station and text-to-voice technology. The system should be completed by the end of 2001. The San Antonio District is also investigating implementing HAR on interstate highways outside of the metropolitan area, which would target CVO.

To keep records of reported incidents, the Houston District manages an incident database that can be accessed through the operations LAN at Houston TranStar. This database contains current and historical information regarding incidents on area freeways. The information provided includes the type of incident, date and time, location and direction, and which lanes are blocked or if the incident is on the shoulder. This database can be accessed by the personnel who are located in the control room of the Houston TranStar building, which includes TxDOT, the City of Houston, Harris County, METRO, and HPD.

One problem noted in several of the districts is the use of different definitions for terms used by multiple agencies to describe incidents. In San Antonio, both TxDOT and SAPD report incident information that is input into the data server (which disseminates information to other applications). However, the terminology concerning incidents (i.e., major and minor) differs between the two agencies. TxDOT bases its designation of major and minor accidents on whether lanes are closed and the delay time, while SAPD bases its designation on whether an ambulance is dispatched. For example, a truck overturn that may last several hours is considered a major accident by TxDOT, but not necessarily by SAPD. TxDOT noted that there have been difficulties communicating with SAPD about accidents in the past because of this difference in designations.

As another example of potential confusion in terminology, in the Dallas and Fort Worth Districts follow-up emails are sent to subscribers when the incident is cleared. However, the term “clear” is defined differently between agencies. For example, one agency may consider “clear” to be when everyone at the incident is gone, while another agency may define “clear” as all lanes of traffic being open, but the emergency response organizations are still at the location. “Clear” can also mean all lanes of traffic are open, but the roadway is still congested.

SCHEDULED LANE/ROAD CLOSURE INFORMATION

Information concerning scheduled construction or maintenance activities that require specific lanes or entire roads to be closed is disseminated to various data consumers throughout the districts. Similar to the previous types of information, the most common method of providing this information to consumers is through the internet.

For the Dallas, Fort Worth, and Houston Districts, text-based lane/road closure information is available through the main TxDOT homepage (http://www.dot.state.tx.us/txdot.htm) as a list of current events for each district. This site can be accessed by any public or private agency and travelers that have an internet connection. The information provided includes the location and direction of the roadway, scheduled number of lanes to be closed and associated ramp closures, and the anticipated duration of the closure. It should be noted that similar information for the San Antonio District is not documented on the main TxDOT homepage, instead a link to the TransGuide internet site is provided.

In addition, the Dallas, Fort Worth, and San Antonio Districts provide scheduled lane/road closure information on their local internet sites. Similar to incident information, lane/road closure information is presented in the form of icons on the current conditions maps, as well as in a text-based format. The text-based information can be accessed either through a separate internet link, or by clicking on the icons presented on the map. Table 6 contains the scheduled lane/road closure information provided by each district. It should be noted that the Houston District does not display scheduled lane/road closure information on its current conditions map. Instead, a link to the Houston District daily construction schedule on the main TxDOT homepage is provided.

Table 6. Scheduled Lane/Road Closure Information Provided on the Internet by Each District.

Scheduled Lane/Road Closure Information	Dallas-Fort Worth	San Antonio
Nature or Description	✓	✓
Location or Roadway(s)	✓	✓
Direction	✓	✓
Beginning and End Time	✓	✓
Beginning and End Date or Days Closed	✓	✓
Status	✓	✓
Limit	✓	✓
Number of Existing Lanes		✓
Number of Closed Lanes	✓	✓
Associated Ramp Closures		✓
Detour Description		✓
Additional Notes		✓
Reported By	✓	

An activity that has been discontinued in the San Antonio District is the use of LPTV to provide scheduled lane/road closure information. This information was previously transmitted in a summary format and included the status of DMS and LCS equipment. This method is no longer being employed due to the fact that all of this information is now available over the internet.

Another common method for disseminating scheduled lane/road closure information is to distribute either emails or faxes to a designated list in the area. For the Dallas, Fort Worth, and Houston Districts this includes representatives of a variety of public and private sector agencies. These emails (in Fort Worth and Houston) and faxes (in Dallas, Fort Worth, and Houston) are sent daily to the subscribers list. The Fort Worth District sends out several hundred emails and faxes to various local agencies, private companies, and the public with information concerning scheduled maintenance and construction activities. In Dallas, the Dallas TxDOT Public Information Office (PIO) faxes planned lane/road closure information based on reports from TxDOT area engineers to similar entities. In Houston, the Houston TxDOT PIO also disseminates the faxes and emails containing scheduled lane/road closure information.

Currently, DMSs in all locations surveyed are providing lane/road closure information to travelers. These messages include such components as when the closure is active and the number of lanes that will be closed. Depending on the nature of the closure, the messages may be displayed for several days prior to the closure as a warning to the public to divert from the route during the closure. As noted earlier, the Dallas, Fort Worth, and San Antonio Districts' DMS messages are accessible through their respective internet sites. This service is also planned for the Houston District in the near future.

Other information regarding lane/road closures is available to the traveler through telephone-based systems, LCSs, and kiosks. Local road construction telephone numbers are available in Dallas, Fort Worth, and Houston. LCS displays are located in the Fort Worth, San Antonio, and Houston Districts and are used to indicate lane closures to the driver. Kiosks will be utilized in the Fort Worth District at specific locations such as DFW airport, transit facilities, and the Dallas District office to provide real-time lane/road closure information to travelers; however, currently this information is only available at the Fort Worth District office. As discussed in the previous sections, the San Antonio District also uses direct line, a data server, and IVN to disseminate lane/road closure information to other agencies, such as ISPs, fire departments, EMS, SAPD, and VIA paratransit. Table 7 summarizes all of the methods used by TxDOT to provide scheduled lane/road closure information to consumers.

OTHER TRAFFIC STATISTICS

In addition to information previously discussed, the San Antonio District currently provides access to historical traffic volume, speed, and occupancy data gathered from the initial 26 miles of instrumented highways within the TransGuide project through the TransGuide website. Two data sets are offered: 1) data collected for all expressway lanes at 20-second intervals and 2) data collected for all expressway lanes at 15-minute intervals. The second data set is derived from the 20-second data and calculated on two-minute running averages. In addition to the data previously mentioned, the second data set includes local control unit (LCU) poll data,

alarm/incident assignments and manager/operator changes, as well as scenario execution, commands, and cancellations. Data for the most recent periods are stored at a link address, while limited historical data from prior years may be available by special arrangement. In the future, as detector systems are implemented in the Dallas District, traffic data such as volumes, speeds, and occupancy will be made available to agencies and private entities through the data server or internet. Table 8 summarizes the current and planned methods utilized by TxDOT.

Table 7. Summary of Scheduled Lane/Road Closure Information Provided by TxDOT.

Methods	Consumers									
	Cities	**Counties**	**Fire/ EMS**	**Police**	**ISP**	**Media**	**CVO**	**Airports**	**Transit**	**Travelers**
Direct Line					S					
Data Server			S							
IVN				S					S	
Internet	D F H S	D F H S	D F H S	D F H S	D F H S	D F H S	D F H S	D F H S	D F H S	D F H S
Email	F H	F H	F H	F H	F H	F H	F H	F H	F H	F H
Fax	D F H	D F H	D F H	D F H	D F H	D F H	F H	F H	D F H	
LPTV	S**					S**				
Phone										D F H
Kiosk							F*			F*
DMS										D F H S
LCS										F H S

D-Dallas District; F-Fort Worth District; H-Houston District; and S-San Antonio District
* District is considering the use of the method or planning to provide information via the method in the future
** District is no longer using the method

Table 8. Summary of Other Traffic Statistics Provided by TxDOT.

Methods	Consumers									
	Cities	**Counties**	**Fire/ EMS**	**Police**	**ISP**	**Media**	**CVO**	**Airports**	**Transit**	**Travelers**
Data Server	D*	D*			D*	D*				
Internet	D* S	D* S	D* S	D* S	D* S	D* S	S	D* S	D* S	D* S

D-Dallas District; S-San Antonio District

* District is considering the use of the method or planning to provide information via the method in the future

CONCLUSIONS

A review of the practices and technologies being used for incident management and traveler information exchange and sharing in the Dallas, Fort Worth, Houston, and San Antonio TxDOT Districts was the focus of this chapter. The establishment of TMCs in these districts has facilitated the information sharing processes in their respective areas. Currently, all of the TMCs share the following types of data with other public and private entities:

- video (real-time continuous or snapshots),
- speed information,
- incident information, and
- scheduled lane/road closure information.

However, the methods by which the "customer" receives this information differs among the districts for several reasons. The two most prominent reasons for these differences are 1) the development stage of the TMC and 2) the physical location of the agencies with respect to each other. The Houston and San Antonio TMCs have been in operation the longest and therefore have well established avenues for the sharing of information. In addition, the Houston and San Antonio TMCs incorporate the offices of partnering local agencies (e.g., TxDOT, city, county, police, and transit), thus allowing these agencies direct access to the information generated by the traffic management systems. However, in some instances additional methods are used to distribute information to partnering agencies, as well as external entities (e.g., the media).

In contrast, the recently opened Fort Worth TMC and the interim Dallas TMC are still working to establish the components necessary to implement their entire information sharing plan. Also, in the DFW region multiple TMCs exist (TxDOT and cities) such that the local agencies are not housed together in one location. The need to exchange data between these multiple TMCs and other public and private entities has necessitated the establishment of a regional network.

Currently, the most common method utilized by TxDOT for disseminating information is the internet. The popularity of the use of the internet as a tool to share data can be attributed to its ability to distribute a wide variety of information to multiple consumers (public and private entities, as well as the general public). TxDOT also extensively utilizes DMSs to provide

information to travelers en route. Other methods employed include direct lines, email, telephone, fax, LPTV, IVN units, LCSs, and kiosks.

In some cases, TxDOT shares the same type of information (e.g., incident) with an agency through multiple mechanisms (e.g., direct line, internet, and email). This sharing facilitates the dissemination of data within an agency, as well as between agencies. For example, some applications are more applicable for en route information (IVN units), while others are more suited for receiving information in an office (internet or telephone call). In addition, when using some methods (direct lines, internet, regional network) the receiving agency must actively review the data to determine if any of the information provided is relevant to the agency. In contrast, other methods (email and telephone) allow the consumer to receive direct notification, and in some cases, format the information received based on user preferences.

To facilitate the sharing of information between multiple entities, data input into the traffic management system must be defined in a common manner. However, some terms in the arena of incident management (e.g., major, minor, clear) are used differently by the various agencies involved. Thus, miscommunication can occur between the incident management team members. In addition, the use of a term in a variety of applications can potentially confuse or misguide the end user (i.e., the public).

3. AGENCY SURVEYS

The focus of the review of practices and technologies in Chapter 2 was to identify what is being exchanged or shared by TxDOT, and how that sharing/exchange is occurring. However, the best assessment of TxDOT's commitment to information sharing/exchange is to determine the data actually being used by the "customer," as well as how the recipient utilizes the data. With such knowledge, practitioners (TxDOT and others) will be able to better estimate the benefits of information sharing efforts.

Thus, upon completion of the initial project effort to gather information from TxDOT regarding information sharing, researchers contacted a sample group of agencies in each district receiving information from TxDOT. The researchers created and administered agency surveys in an effort to quantify how frequently agencies utilize the different types of information, to explore how that information influences the types of decisions being made and actions being taken, and to identify the influence of local and regional issues upon information usage. A copy of the agency survey and a list of the agencies contacted can be found in Appendix B.

DALLAS

The Dallas District is providing information to outside agencies in the form of faxes for lane closures, email for reporting incidents, and video. The cities surrounding the Dallas area (e.g., Richardson, Garland, Irving, etc.) find the TxDOT lane closure information the most useful for the traffic department. These cities utilize the lane closure information as an indication to adjust signal timings in affected areas between two and five times a week. Video use in these areas is minimal due to the limited number of TxDOT cameras available within the surrounding cities.

In contrast, the City of Dallas indicated that the most useful information to its signal timing efforts is email warning of an incident. Furthermore, the police and fire departments within the City of Dallas stated that access to video provided by TxDOT was useful to them in responding to incidents in an efficient manner. For the police, the video helped with routing of response vehicles, thus decreasing the response time. Fire department personnel indicated that the video TxDOT provided to them gave a visual identification of the type of fire to which they were responding. All of these city agencies utilize the information received from TxDOT on a nearly daily basis.

Other agencies contacted in the Dallas area included DART and the area ISP (Traffic.com). DART indicated that it uses the information provided by TxDOT to identify lane closures that may affect the HOV lanes. However, this use is very infrequent. In contrast, the ISP indicated that it continuously uses the information provided by TxDOT to improve its current roadway condition reports, which are disseminated to the public. The information the ISP finds most useful is the 911 information screens for the Dallas area, although it also uses the incident emails and lane closure faxes as part of its information gathering. One additional item that the ISP indicated it would like to receive is information regarding courtesy patrol activities.

FORT WORTH

The contacted agencies in the Fort Worth area indicated that they use the information provided by the Fort Worth TxDOT District as a crucial part of their daily operations. The City of Fort Worth stated that the most useful information in its activities is video images. Emergency responders use this information as a means of identifying the severity of an incident and determining the appropriate response to an incident (fire, EMS, etc.), thus increasing the efficiency of the response.

The ISP (Traffic.com) indicated that video is also its most useful information source. For this entity, the video is acquired through a representative who is located within the TransVision center. Based on the information gained through this representative, the ISP provides real-time information to the public through web-based and radio formats. The ISP indicated that it would like to have a connection within the center-to-center network to promote continued information sharing efforts.

The Dallas Morning News also provides the public with DFW traffic-related information received from TxDOT. Respondents indicated that real-time video is of the greatest use to them, and that video snapshots are currently provided to the public via their newspaper website. Other information that could be of use to the media, but was not available at the time of the survey, is continuous live video, accident information, and road construction information. (Incident and road construction information is now available on the DFW TxDOT internet site.)

The final agency contacted in the Fort Worth District was the North Central Texas Council of Governments (NCTCOG). This agency receives the incident emails. These emails are primarily used as a means to assess available routes when it is necessary for personnel to travel in the area. The NCTCOG does not manage incidents, instead it is concerned with the planning and development of the area. For this reason, the NCTCOG would like to receive archived information concerning the roadway volume and speed data (probably weekly) which it could use for planning purposes.

HOUSTON

Information sharing within the Houston District is dependent upon the partnering of local agencies within one TMC building (i.e., Houston TranStar). The agency personnel who are continually on the control floor (other than TxDOT personnel) are transit dispatch, police, and an ISP. For these agencies the availability of information relies on the interaction with the TxDOT control room operators. For the transit dispatch, freeway incidents are the most important information available because it is used to reroute buses and alleviate unnecessary delays to their schedules. The police use the incident information gained from TxDOT as a means to better route responding units. Finally, the ISP found the road work and incident information to be of the greatest use in the reporting of traffic conditions to the driving public.

Other agencies that were contacted included the city and county, who also have representatives within the TMC building. For these agencies, telephone communication with the TxDOT floor

operators is considered to be the best means for acquiring information, although it was indicated that an automated notification system may be helpful in alleviating operator workload and thereby improving information sharing within the system. Both agencies indicated that incident information is the most useful to them. For the county, incident information is utilized to determine how many personnel will be needed to direct traffic around the incident. The city utilizes weather-related incident information, such as water level on roadways, to reroute traffic around the affected areas. In addition, through closely working with the other agencies located in Houston TranStar, the county and city know more readily when their assistance is needed. It should be noted that the representatives contacted at the different agencies indicated that they were satisfied with the working relationship that exists within the Houston District and the Houston TranStar building.

The final contact made within this district was to the TV media. One agency indicated that it uses TxDOT video, as well as ISP traffic conditions information, in its traffic reports. The representative for the TV media indicated that the information obtained from these sources increases the efficiency of their work during rush hour and major incident conditions, thereby allowing them to provide better information to the public.

SAN ANTONIO

As with the Houston District, the information sharing for the San Antonio District is promoted by the interaction between local agencies within one TMC building (i.e., TransGuide). For the City of San Antonio, the most useful information was the automatically generated alarms that are sent to representatives within the TransGuide building when city streets are being used for diversion around incidents. These alarms make it possible for the city to implement traffic signal timings to better accommodate the increased traffic flow. However, it was indicated that this type of operation change is infrequently implemented at the present time.

The police department representative indicated that the most useful information source for the police is the presence of their dispatch personnel on the TransGuide control floor. The dispatch officer is utilized daily to help in the coordination of incident response activities. The co-location of the police dispatch, TxDOT, and transit (VIA) eases this coordination, especially when major incidents occur (e.g., overturned truck). The police dispatch officers also use video to determine the appropriate incident response (e.g., dispatch a wrecker, EMS, etc.) and provide officers en route with pertinent incident information. In addition, the Police Captain utilizes video received over the LPTV signal approximately once every two to three weeks to assess a major incident. Through the coordination of incident response and the use of video to assess the situation, the police (and other entities) can better facilitate an incident and keep the public informed, thus potentially reducing the number of secondary accidents. A further source of information sharing that was considered of great use to the police representative was the monthly meetings that are held to update participating agencies on scheduled road work. The officer indicated that there is a good working relationship in the San Antonio District that has been generated through these cooperative efforts.

In contacting Bexar County, it was found that the county only uses the internet to acquire information from TxDOT. Respondents indicated that the internet is accessed for information a few times a week in an effort to locate road construction, congestion, or incident information. This information is then primarily used to increase the efficiency of personnel movement to projects within the area.

The final two contacts in the San Antonio District were to the media (KSAT and KENS). Both of the media contacts indicated that information regarding major accidents or road closures is the most useful for them. The agencies also stated that they use TxDOT video in their broadcasts to the public; however, they expressed that having the ability to select a camera themselves would be beneficial. KSAT also indicated that they use the internet to determine further information regarding incidents.

CONCLUSIONS

According to the agencies surveyed, incident information is the most widely used, closely followed by notification of scheduled lane closures. In addition, video is utilized to verify incident conditions and coordinate response efforts. Agencies such as city and county traffic departments, police, fire departments, transit, ISPs, and media continuously use the information provided by TxDOT to improve their daily operations. Other agencies (NCTCOG, Bexar County, and DART) only utilize the information TxDOT provides on a limited basis.

More specifically, the receiving agencies apply the incident or scheduled lane/road closure information received from TxDOT to:

- reroute traffic around roadways that are flooded;
- adjust signal timings near construction or an incident to better accommodate increased traffic flow;
- visually identify an incident;
- determine the severity of an incident;
- determine the appropriate incident response (e.g., fire, EMS, etc.);
- improve emergency response time by better routing emergency units to avoid areas of congestion or other incidents;
- provide incident information to responding personnel en route;
- reroute buses and alleviate unnecessary schedule delays caused by an incident;
- improve efficiency of agency personnel in their work-related travels by avoiding areas of congestion or potential congestion; and
- improve roadway reports to the public.

In all of the cases where information exchange is enhanced by a shared location between agencies (i.e., one TMC), the contacts had positive opinions of how this proximity was able to encourage cooperative efforts and improve efficiency of incident response.

Several of the agencies receiving TxDOT data also stated that they would like to receive the following additional information from TxDOT in the future:

- courtesy patrol activity information – ISP in Dallas;
- connection to center-to-center network – ISP in Fort Worth;
- continuous live video – media in Fort Worth;
- ability to select cameras – media in San Antonio;
- roadway volume and speed data for planning – NCTCOG; and
- automatic notification system when agency is affected – City of Houston and Harris County.

4. GUIDELINES FOR EFFECTIVE INCIDENT INFORMATION EXCHANGE BETWEEN AGENCIES

The results presented in this report illustrate the breadth and depth of current incident and traveler information sharing and exchange efforts by the Dallas, Fort Worth, Houston, and San Antonio TxDOT Districts. Based on these results, researchers have assimilated guidelines regarding effective information exchange techniques and practices. It is believed that the information documented previously, as well as these guidelines, will be valuable to the other districts who are not as far along in their traffic management system development.

The following guidelines should be considered during the development of a traffic management system:

- *Focus on the types of information to be disseminated, not on the method by which the information will be provided.* Based on the survey results from the agencies who receive and utilize TxDOT data, the priority of data dissemination should be as follows:
  1) incident information,
  2) scheduled lane/road closure information,
  3) travel time and speed information, and
  4) any additional traffic statistics.

- *Focus on staged implementation.* It is important to implement practices and technologies that encourage the exchange of priority information first and then expand to accommodate more consumers and additional needs. For example, when the Dallas and Fort Worth Districts began work on their respective TMCs, they focused on sharing incident information (including video) and scheduled lane/road closure information with other entities mainly through the use of faxes, the telephone, and email. Only within the last year have these districts expanded their system to provide speed information and make all of the above information available on the internet. TxDOT Dallas and Fort Worth are also participating in the development of a shared data server and a regional network to facilitate the exchange of information between multiple agencies (private and public) in the DFW region.

- *ITS sharing can have both direct and indirect benefits to all agencies in the region.* Based on the results of the surveys administered to the "consumers" of TxDOT data, when considering the potential benefits of information sharing the following items should be included:
  1) improvements to traffic flow on affected city streets when incidents or scheduled construction occur on the TxDOT roadway system;
  2) increase in the efficiency of emergency personnel response (police, fire, etc.);
  3) decrease in the number of secondary accidents;
  4) decrease in the unnecessary delays encountered by transit as a result of an incident;

5) improvements in the efficiency of agency personnel in their work-related travels; and
6) improvements in the traffic information available to the public.

- *The sharing of information with the private sector (e.g., media sources and ISPs) needs to be addressed early in the development of a TMC.* How many media sources and ISPs will potentially want TxDOT information? Will the entities be allowed to work in the TMC? Will the entities pay for the hardware and/or software needed to access the TxDOT system? How many cameras will be accessible to these entities? Will these entities have pan/tilt/zoom control of cameras? What will be the cost recovery mechanism for TxDOT (e.g., public service announcements, credit TxDOT when use TxDOT data, a fee)? The policy set forth by such questions will need to be formulated so that all media sources and ISPs can be addressed in a consistent manner. In addition, the policy can be administered through the use of information sharing agreements.

5. REFERENCES

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4. *Closing the Data Gap: Guidelines for Quality ATIS Data*. Draft Report. ITS America, U.S. Department of Transportation, April 2000.

5. Carvell. J., E. Seymour, C. Walters, and T. Starr. *Dallas Area-Wide Intelligent Transportation Systems Plan*. Report No. FHWA-96/591-1F. Texas Transportation Institute, Federal Highway Administration, U.S. Department of Transportation, July 1996.

6. Wiles, Poonam B., Scott Cooner, and Carol Walters. *Fort Worth Regional Intelligent Transportation System Plan.* FHWA Early Deployment Planning Study, January 1999.

7. Houston TranStar-About TranStar Website. http://traffic.tamu.edu/central2.html. Accessed May 22, 2000.

8. *TransGuide® Technical Brochure*. Texas Department of Transportation.

9. TransGuide Project Updates. http://www.transguide.dot.state.tx.us/PublicInfo/projects.php. Accessed May 15, 2000.

10. Data Server System Design Document. http://www.transguide.dot.state.tx.us/mdi/DataServer.html. Accessed February 28, 2000.

11. Dellenback, Steven W. and Brian F. Fariello. TransGuide® Model Deployment Initiative. http://www.transguide.dot.state.tx.us/docs/transtec.html. Accessed February 28, 2000.

12. Data Server Acceptance Test Plan. http://www.transguide.dot.state.tx.us/mdi/DataServer.html. Accessed February 28, 2000.

13. Communications Analysis and Recommendations. Prepared by HNTB Corporation and the Texas Transportation Institute for the Regional Comprehensive Intelligent Transportation Systems Program (RCIP) Executive Committee, April 2000.

APPENDIX A: INTERAGENCY AGREEMENTS

As of October 2001, there were three types of information sharing agreements used by the TxDOT District Transportation Management Centers for the sharing of data and information with other entities:

- License Agreement for the Use of TxDOT Software (Dallas District),
- License Agreement for the Use of Data (Houston and San Antonio Districts), and
- License Agreement for the Use of Video Signals (Dallas, Fort Worth, and Houston Districts).

Table 9 provides an overview of the provisions of these agreements. In general, all agreements are non-exclusive (i.e., TxDOT may enter into similar agreements with any other party they deem appropriate); any software required beyond the basic system provided by TxDOT is the responsibility of the licensee; and the agreements provide typical legal provisions such as indemnification of parties to the agreements.

LICENSE AGREEMENTS FOR THE USE OF DATA (HOUSTON AND SAN ANTONIO DISTRICTS)

The Houston District agreement, which can be used for private, as well as public entities, specifically provides for the licensee's use of speed data. When the licensee is a private company, the agreement requests some form of compensation. An annual fee of $5000 dollars is the minimum fee for the use of this information; however, all cases so far have been for exchange of services (e.g., public service announcements). In contrast, when the licensee is a public agency, any type of fee or service exchange is waived. This agreement also states that the licensee must provide to TxDOT the intended use of the data in writing.

The San Antonio District agreement does not specify the type of "data" provided. However, presumably "data" may include traffic and incident information, as well as video signals. The San Antonio District agreement states that monetary fees are waived the first year but may be employed in subsequent years upon proper notice. This agreement is intended for television media but could be applied to other entities such as local governments.

Both agreements state that the application software is the responsibility of the licensee and that TxDOT is to be credited for data used by the licensee.

LICENSE AGREEMENTS FOR THE USE OF VIDEO SIGNALS (DALLAS, FORT WORTH, AND HOUSTON DISTRICTS)

Since the Dallas and Fort Worth Districts are directly adjacent, media outlets will use data from each district. Thus, a considerable amount of coordination between the two districts is needed. As such, the districts plan to use the same agreement format and provisions. The specific type of information to be shared is designated "video signals," and the agreement specifies that the licensee will share its video signals with TxDOT, as well as vice versa. In addition, the body of the agreement provides for TxDOT to share traffic flow data, as it is available. A license fee is waived, but the licensee is required to provide tapes of stories aired that involve TxDOT and to air public service announcements as provided by TxDOT.

Table 9. Overview of Current TxDOT Information Sharing Agreements.

Provision	License to Use Data or Video				License to Use Software
	Houston District Speed Data	**Houston District Video**	**Dallas and Fort Worth Districts Video**	**San Antonio District Data and Video**	**Dallas District with City of Dallas**
Non-Exclusive	Yes	Yes	Yes	Yes	Yes
Graphic Displays	Responsibility of Licensee	Responsibility of Licensee	Responsibility of Licensee	---	---
Application Software	Responsibility of Licensee	Responsibility of Licensee	Responsibility of Licensee	Responsibility of Licensee	Provided by TxDOT
Software Updates	NA	NA	NA	NA	TxDOT Not Responsible
Describe Use of Received Information	Submit in Writing to TxDOT	---	---	---	City Provides in Contract
Use of Licensee's Video	NA	---	Yes	---	---
Use of Licensee's Data	---	NA	NA	---	---
Guaranty of Signal	No	No	No	No	NA
Licensee Provides Taped Stories	NA	---	Yes	---	NA
Public Service Announcements	Yes [a]	---	Yes	---	NA
Credits/Logo	Yes	Yes	Yes	Yes	NA
Fee	Yes [a]	Waived [b]	Waived	Waived	No
Indemnification	Yes	Yes	Yes	Yes	Yes

NA Not Applicable
--- Not Addressed
[a] Compensation is either a fee or service exchange
[b] A monetary compensation of $5000 is assessed to cover the cost of software modifications to limit pan, tilt, and zoom capabilities

The Houston District agreement also specifies that the type of information to be shared is designated "video signals." A monetary license fee is also waived but only for the first year. In subsequent years fees may be assessed upon proper notice. However, the agreement does provide for the assessment of a monetary compensation of $5000 to cover the cost of software modifications to limit pan, tilt, and zoom capabilities.

Both license formats are intended for the use of television media but could be applied to other entities. As such, the licensee is responsible for all hardware and software required to convert TxDOT's signals/data for the licensee's use. (In the Dallas and Fort Worth regions, funding for the hardware to public agencies is provided through TEA-21). Also, both agreements state that TxDOT is to be credited for providing video images when they are used in broadcasts.

LICENSE AGREEMENT FOR USE OF TXDOT SOFTWARE (DALLAS DISTRICT)

Because there are at least seven cities in the Dallas urban area that will be sharing data and video signals with and through TxDOT, it is conducive that common software be used. TxDOT has developed a prototype software package for camera control and other features, and will license it to each participating city or other local agency by way of a formal agreement. The software license is provided without fee, and the agreement specifically absolves TxDOT from being required to make adjustments or software updates.

COPIES OF THE LICENSE AGREEMENTS

The following sections contain the license agreements reviewed by researchers.

LICENSE AGREEMENT FOR THE USE OF DATA – HOUSTON DISTRICT

COPYRIGHT LICENSE AGREEMENT FOR THE USE OF THE TEXAS DEPARTMENT OF TRANSPORTATION'S TRANSTAR SPEED DATA AND HOUSTON TRANSTAR LOGO

STATE OF TEXAS *
*
COUNTY OF TRAVIS *

THIS AGREEMENT is made by and between the State of Texas, acting by and through the Texas Department of Transportation, hereinafter called "State," and *******, hereinafter called "Licensee," and Texas Transportation Institute, hereinafter called "TTI."

W I T N E S S E T H

WHEREAS, the State, in accordance with Transportation Code, §201.205, may:

1. apply for, register, secure, hold, and protect patents, copyrights, trademarks, or other evidence of protection or exclusivity;
2. enter into nonexclusive license agreements with any third party for the receipt of fees, royalties, or other things of monetary or nonmonetary value;
3. waive or reduce the amount of fees if it determines that such waiver will further the goals and missions of the department and result in a net benefit to the State; and

WHEREAS, the State has authored, produced, or participated in the production of a work and its data, known generally as the "TranStar Speed data" and is the owner of certain rights including copyrights; and

WHEREAS, Houston TranStar has trademark registrations on marks (Registration Nos. 2288372 and 2270129), hereinafter identified as the "Houston TranStar logo," in accordance with the requirements of Title 15 U.S.C. Section 1051 et seq., as amended; and

WHEREAS, TTI has a contract with TxDOT to operate and maintain the Speed Data system and the Houston TranStar Internet Server; and

WHEREAS, the Licensee desires to obtain a non-exclusive license from the State to use, modify, and distribute the TranStar Speed data and use the Houston TranStar logo; and

WHEREAS, the State is agreeable to provide a non-exclusive, non-transferable license to the Licensee to use the TranStar Speed data and Houston TranStar logo.

A G R E E M E N T

NOW, THEREFORE, in consideration of the premises and of the mutual covenants and agreements of the parties hereto, to be by them respectively kept and performed as hereinafter set forth, it is agreed as follows:

1. CONTRACT PERIOD. This agreement becomes effective upon the date of final execution by the parties and shall be in effect for one year.

2. RIGHTS GRANTED. The State hereby grants to the Licensee a non-exclusive right, license, and privilege worldwide to use, modify and distribute the TranStar Speed data. The Licensee agrees to give the State credit (visual Houston TranStar logo or verbal acknowledgement of Houston TranStar) for contributing the data. Rights granted to the Licensee to use the Houston TranStar Logo are limited to giving the State credit for contributed data. The State may transmit the TranStar Speed data with an imbedded logo. The Licensee shall not block, modify, or remove the Houston TranStar logo. TranStar Speed data that has been combined, modified, or enhanced, in whole or in part, by the Licensee may be sublicensed through the Licensee's provision to third parties of products and services that incorporate or otherwise use the data. Any such sublicense shall be subject to the terms and conditions of this agreement.

Licensee is authorized to access real-time travel time and speed information for the Houston freeway, HOV lane, and arterial system as available from the TranStar Speed data. The Licensee agrees to provide in writing to TTI a description of the intended use and audience of the data for TxDOT to approve before the data is used.

The Licensee also agrees to provide TxDOT and TTI with monthly summaries of accesses of the data disseminated. These summaries will be transmitted in a manner and format to be agreed upon by TxDOT and TTI.

TTI will provide the Licensee specifications for real-time accessing the specified data from the TranStar server. If the data is to be provided in any other manner other than real-time, then TTI will provide the Licensee with similar specifications as TTI determines is warranted. TTI will inform the Licensee of any changes in software that will affect the accessibility of the data. Licensee will address any technical issues regarding the data to TTI.

The Licensee agrees that this License does not transfer or convey any ownership or any other rights other than those rights expressly granted by this agreement. Licensee agrees that the State and TTI do not guarantee the availability of TranStar Speed data or a minimum response time to reestablish the broadcast of TranStar Speed data due to network or system failures.

3. LICENSE FEE. The license fee is $5000.

4. PROVISION OF INFRASTRUCTURE. The Licensee is responsible for providing and maintaining any hardware, software, or infrastructure that are necessary for the Licensee to

connect to State communication lines in order for Licensee to receive the TranStar Speed data. Licensee will establish a connection from TTI. Licensee may not place any equipment on State property.

5. TAXES AND FEES. Licensee agrees to report to the appropriate taxation authority and pay all federal, state, and local taxes or fees that may be imposed by any governmental entity for the use of the license.

6. ASSIGNMENT PROHIBITION. The Licensee is prohibited from assigning the license or licensing any of the rights conferred by this agreement, to any third party. Licensee may not allow others to use the web addresses, user names, or password to access the data.

7. COPYRIGHT INFRINGEMENT. The Licensee shall notify the State of any infringement or potential infringement by a third party of the copyright or any other rights owned by the State relating to the TranStar Speed data, or of any breach of this agreement by any third party. Each party shall assist and cooperate in resolving any and all breaches or infringements.

8. TERMINATION. Including the provisions established herein, this agreement may be terminated by mutual agreement and consent of the parties hereto or by any party for reasons of its own and not subject to the approval of the other parties upon not less than thirty (30) days written notice to the other parties. Termination of the agreement shall extinguish all rights, duties, obligations and liabilities of the State, TTI, and the Licensee under this agreement. All rights granted to the Licensee shall revert to the State as owner of the data. Upon notice of termination of this agreement, the Licensee will cease collecting and distributing the data within ten (10) business days. Access to TranStar Speed data will be immediately denied if its use has been found to be improper or associated with an illegal act. Termination or expiration of this agreement shall not extinguish any of the Licensee's, TTI's, or the State's obligations under this agreement which by their terms continue after the date of termination or expiration.

9. INDEMNIFICATION. The Licensee shall indemnify and save harmless the State and TTI from any and all claims, damages, and attorneys' fees arising out of or in any way connected with any claim that the TranStar Speed data infringes any intellectual property rights or other rights of any third party, except to the extent such claim arises out of an act of the State and TTI, or its officers and employees, and shall indemnify and save harmless the State from any and all losses, liabilities, damages, claims, demands, costs, expenses, or other liabilities arising out of or connected with the Licensee's possession or use of the data during the term of this agreement including, but not limited to, any illegal or improper use of the data or any violation of right to privacy. The Licensee's indemnification of the State and TTI shall extend for a period of three (3) years beyond the date of termination of this agreement.

10. REMEDIES. Violation or breach of contract by the Licensee shall be grounds for termination of the agreement and any increased costs arising from the Licensee's default, breach of contract or violation of contract terms shall be paid by the Licensee.

11. SUPPLEMENTAL AGREEMENTS. Any changes in the contract period, character, or agreement terms shall be enacted by a written supplemental agreement executed by both parties. Supplemental agreements must be executed during the contract period established in Article 1.

12. VENUE. This agreement is governed by the laws of the State of Texas.

13. NOTICES. All notices to either party by the other party required under this agreement shall be delivered personally or sent by certified or U.S. Mail, postage prepaid, addressed to such party at the following respective address:

STATE: Texas Department of Transportation
Houston District Transportation Operations
ATTN: Director of Transportation Operations
P.O. Box 1386
Houston, TX 77251-1386

TTI: Texas Transportation Institute
ATTN: Mr. Darrell W. Borchardt, P.E.
The Texas A & M University System
701 N. Post Oak, Suite 430
Houston, Texas 77024-3827

Licensee: *********

Copy to: Texas Department of Transportation
Director, General Service Division
125 E. 11th Street
Austin, Texas 78701

and shall be deemed to be received by the addressee on the date so delivered or so deposited in the mail, unless otherwise provided herein. Either party hereto may change the above address by sending written notice of such change to the other.

IN TESTIMONY WHEREOF, the State, TTI, and Licensee have executed triplicate counterparts of this agreement.

STATE OF TEXAS

Executed by and approved for the Texas Transportation Commission for the purpose and effect of activating and/or carrying out the orders, established policies or work programs heretofore approved and authorized by the Texas Transportation Commission.

By:

Gary K. Trietsch, P.E.
District Engineer
Houston

Date:

TEXAS TRANSPORTATION INSTITUTE

By:

Darrell Borchardt, P.E.
Research Engineer

Date:

****

By:

Name
Title

Date:

EXHIBIT “A”

Provision of Infrastructure	
By State	By Licensee
1. May provide facilities to house and support infrastructure equipment provided by Licensee.	1. Provide any and all infrastructure modifications needed to acquire the rights granted by State including 3rd party software and hardware. All costs to be assumed by licensee for these modifications.

Consideration Provided	
By State	By Licensee
1.	1. $5000.

LICENSE AGREEMENT FOR THE USE OF DATA – SAN ANTONIO DISTRICT

STATE OF TEXAS *
*
COUNTY OF TRAVIS *

COPYRIGHT LICENSE AGREEMENT FOR THE USE OF THE TEXAS DEPARTMENT OF TRANSPORTATION'S TRANSGUIDE DATA

THIS AGREEMENT is made by and between the State of Texas, acting by and through the Texas Department of Transportation, hereinafter called the "State," and E-Context, located at 612 Highland Avenue, San Mateo, California, 94401, hereinafter called the "Licensee."

W I T N E S S E T H

WHEREAS, the State, in accordance with Transportation Code, §201.205, may:

1. apply for, register, secure, hold, and protect patents, copyrights, trademarks, or other evidence of protection or exclusivity;
2. enter into nonexclusive license agreements with any third party for the receipt of fees, royalties, or other thing of monetary or nonmonetary value;
3. waive or reduce the amount of fees if it determines that such waiver will further the goals and missions of the department and result in a net benefit to the State; and

WHEREAS, the State has authored, produced, or participated in the production of a work and its data known generally as the "TRANSGUIDE data" and is the owner of certain rights including copyrights, and

WHEREAS, the Licensee desires to obtain a non-exclusive license from the State to receive the TRANSGUIDE data;

WHEREAS, the State is agreeable to provide a non-exclusive, non-transferable license to the Licensee to use the TRANSGUIDE data; and

A G R E E M E N T

NOW, THEREFORE, in consideration of the premises and of the mutual covenants and agreements of the parties hereto, to be by them respectively kept and performed as hereinafter set forth, it is agreed as follows:

1. CONTRACT PERIOD. This agreement becomes effective upon the date of final execution by the State and shall be renewed annually, unless terminated or modified as hereinafter provided.

2. RIGHTS GRANTED. The State hereby grants to the Licensee a non-exclusive right, license, and privilege worldwide to use the TRANSGUIDE data. The Licensee agrees to give the

state credit (visual TxDOT logo, if possible) for contributing the data. The Licensee agrees that this License does not transfer or convey any ownership or any other rights other than those rights expressly granted by this agreement. Licensee agrees that the State does not guarantee the availability of TRANSGUIDE data or a minimum response time to reestablish the broadcast of TRANSGUIDE data due to network or system failures.

3. LICENSE FEE. The State agrees to waive the fee associated with the use of the license. After the initial year, the state reserves the right to employ a fee for the use of the license by providing not less than thirty (30) days written notice to the Licensee defining the terms of the fee.

4. COPYRIGHT INFRINGEMENT. The Licensee shall notify the State of any infringement or potential infringement by a third party of the copyright or any other rights owned by the State relating to the TRANSGUIDE data, or of any breach of this agreement by any third party. Each party shall assist and cooperate in resolving any and all breaches or infringements.

5. PROVISION OF INFRASTRUCTURE. The Licensee is responsible for providing and maintaining any hardware, software, or infrastructure that is necessary for the Licensee to connect to State communication lines in order for the Licensee to receive the data. Licensee may not place any equipment on State property.

6. ASSIGNMENT PROHIBITION. The Licensee is prohibited from assigning the licensed rights to the data, or licensing any of the rights conferred by this agreement, to any third party.

7. TERMINATION. Including the provisions established herein, this agreement may be terminated by mutual agreement and consent of the parties hereto or by the State for reasons of its own and not subject to the approval of the Licensee upon not less than thirty (30) days written notice to the Licensee. Termination of the agreement shall extinguish all rights, duties, obligations, and liabilities of the State and the Licensee under this agreement. All rights granted to the Licensee shall revert to the State as owner of the data. Upon termination of this agreement, the Licensee will immediately cease distributing the data. Termination or expiration of this agreement shall not extinguish any of the Licensee's or the State's obligations under this agreement which by their terms continue after the date of termination or expiration.

8. INDEMNIFICATION. The Licensee shall indemnify and save harmless the State from any and all claims, damages, and attorneys' fees arising out of or in any way connected with any claim that the TRANSGUIDE data infringes any intellectual property rights or other rights of any third party, except to the extent such claim arises out of an act of the State or its officers and employees, and shall indemnify and save harmless the State from any and all losses, liabilities, damages, claims, demands, costs, expenses, or other liabilities arising out of or connected with the Licensee's possession or use of the data during the term of this agreement including, but not limited to, any illegal or improper use of the data or any violation of right to privacy. The Licensee's indemnification of the State shall extend for a period of three (3) years beyond the date of termination of this agreement.

9. REMEDIES. Violation or breach of contract by the Licensee shall be grounds for termination of the agreement and any increased costs arising from the Licensee's default, breach of contract, or violation of contract terms shall be paid by the Licensee.

10. SUPPLEMENTAL AGREEMENTS. Any changes in the contract period, character, or agreement terms shall be enacted by a written supplemental agreement executed by both parties. Supplemental agreements must be executed during the contract period established in Article 1.

11. NOTICES. All notices to either party by the other party required under this agreement shall be delivered personally or sent by certified or U.S. Mail, postage prepaid, addressed to such party at the following respective address:

State: Texas Department of Transportation
ATTN: _____
125 E. 11th Street
Austin, Texas 78701

Licensee:

and shall be deemed to be received by the addressee on the date so delivered or so deposited in the mail, unless otherwise provided herein. Either party hereto may change the above address by sending written notice of such change to the other.

IN TESTIMONY WHEREOF, the State and the Licensee have executed duplicate counterparts of this agreement.

The Licensee

By:

_____
Typed Name and Title

Date:

STATE OF TEXAS

Executed for the Executive Director and approved for the Texas Transportation Commission for the purpose and effect of activating and/or carrying out the orders, established policies or work programs heretofore approved and authorized by the Texas Transportation Commission.

By: Lawrence J. Zatopek
Director, General Services Division

Date:

LICENSE AGREEMENT FOR THE USE OF VIDEO SIGNALS –
DALLAS AND FORT WORTH DISTRICTS

LICENSE AGREEMENT FOR THE USE OF THE DALLAS TRANSPORTATION MANAGEMENT CENTER (DalTrans) AND FORT WORTH TRANSPORTATION MANAGEMENT CENTER (TransVISION) VIDEO SIGNALS, AND THE USE OF KTVT'S VIDEO SIGNALS

STATE OF TEXAS *
*
COUNTY OF TRAVIS *

THIS AGREEMENT is made by and between the State of Texas, acting by and through the Texas Department of Transportation, hereinafter called the "State," or "TxDOT," and the Gaylord Entertainment Company, d/b/a KTVT Television hereinafter called "The Licensee."

W I T N E S S E T H

WHEREAS, the State, in accordance with Transportation Code, §201.205, may:

1. Apply for, register, secure, hold, and protect under the laws of the United States, any state, or any nation a patent, copyright, trademark, or other evidence of protection or exclusivity issued in or for an idea, publication, or other original innovation fixed in a tangible medium, including, but not limited to:
    (a) a literary work, (b) a logo, (c) a service mark, (d) a study, (e) a map or planning document, (f) an engineering, architectural, or graphic design, (g) a manual, (h) automated systems software, (i) an audiovisual work, (j) a sound recording, or (k) travel literature [including but not limited to pamphlets, bulletins, books, maps, periodicals, and electronic information published or produced under Section 3, Chapter 193, Acts of the 56th Legislature, Regular Session, 1959 (Article 6144e, Vernon's Texas Civil Statutes)]; and
2. Enter into nonexclusive license agreements with any third party for the receipt of fees, royalties, or other thing of monetary or nonmonetary value; and
3. Waive or reduce the amount of fees, royalties, or other monetary or nonmonetary value to be assessed if it determines that such waiver will further the goals and missions of the department and result in a net benefit to the State; and

WHEREAS, the State is the owner of a transportation management facility in Dallas County, Texas, located at 8015 Churchill Way, Dallas, Texas ("DalTrans"), and the owner of a transportation management facility in Tarrant County, Texas, located at 2501 Southwest Loop 820, Fort Worth, Texas ("TransVISION"); and

WHEREAS, the State is also the owner of or operates from these facilities a network of closed circuit television (CCTV) cameras stationed along segments of the state highway system in Dallas, Collin, Denton, and Tarrant Counties, Texas, and has produced, and produces video output from these cameras which is used for the purpose of transportation management and in

which the State owns or has certain rights (including copyrights, copyright extensions, or a license to further distribute), and interests related thereto; and

WHEREAS, the Licensee desires to obtain a license from the State to use this video output, and electronic signals contained in this output, in accordance with the provisions set forth below; and

WHEREAS, the Licensee is the owner of a television station which provides video signals to various sources, and is the owner of various facilities located at _____, used for the purpose of broadcasting and transmitting electronic signals to various locations, and has produced, and produces video output which is transmitted from these facilities for the purpose of providing electronic news gathering (ENG) live video feeds, related to coverage of freeway incidents for use by travelers and other individuals and entities for the purpose of traffic management, and in which the Licensee owns certain rights (including copyrights and copyright extensions) and interests related thereto; and

WHEREAS, the State desires to obtain a communication link from one or more of those locations, and to obtain a license from the Licensee to use this video output, and electronic signals contained in this output, in accordance with the provisions set forth below; and

WHEREAS, each party is agreeable to provide the other a nonexclusive, non-transferable license to use the other party's intellectual property as stated herein, provided the other party agrees to the terms and conditions established in this agreement.

A G R E E M E N T

NOW, THEREFORE, in consideration of the premises and of the mutual covenants and agreements of the parties hereto, to be by them respectively kept and performed as hereinafter set forth, it is agreed as follows:

I. CONTRACT PERIOD

This agreement becomes effective upon the date of final execution by the State and shall terminate four (4) years from that date, unless terminated or modified as hereinafter provided. At the end of the contract period, both parties may enter into a written supplemental agreement, in the manner defined herein, to extend the period of this agreement.

II. RIGHTS GRANTED

A. The State hereby grants to the Licensee a nonexclusive right of access to video output available from the DalTrans and TransVISION transportation management centers, a nonexclusive right to receive electronic signals from all CCTV cameras owned and controlled by the State in its Dallas and Fort Worth Districts, and a nonexclusive license and privilege worldwide to use the electronic signals for the purpose of providing traffic and other broadcast services. The Licensee shall provide in Attachment A, attached and incorporated hereto for all purposes, a description of how the Licensee intends to transmit, use, distribute, and modify the

State's electronic signals. Any additions or deletions to this attachment shall have the advance written approval of the State. The State retains the sole right to adjust, at any time and without notice to the Licensee, the direction, including but not limited to any pan, tilt and zoom, focus, and location of the State's CCTV cameras. The State is currently using an Asynchronous Transfer Mode ("ATM") signal, and the Licensee will be responsible for providing any equipment needed to receive to the ATM signals. The State retains the right to modify the method of delivering the signals upon thirty (30) days written notice, provided that such modification does not increase the Licensee's costs associated with receiving the signals.

B. The State agrees to provide the Licensee, if such information becomes available to the State during the term of this agreement, graphic displays of traffic flow, and/or links to such information over the Internet. These displays and links will be provided at the Licensee's sole cost and expense.

C. The Licensee hereby grants to the State a nonexclusive right of access to all ENG live video feeds, related to freeway incident coverage available to the Licensee at their facility that originates from or affects its Dallas and Fort Worth market areas, along with a communication link to provide the video output to the State at its DalTrans and TransVISION facilities, and a nonexclusive license and privilege worldwide to use the electronic signals for the purpose of transportation management. The Licensee shall provide such right to access through either a microwave transmission link, dial-up modem access, or ATM signal. If dial-up modem access is chosen, the Licensee shall install at its facility whatever software is necessary to provide the State such access. If an ATM signal is the chosen method of access, the Licensee shall provide whatever switches or encoders/decoders are necessary to enable the State to pick up this signal. The Licensee shall notify the State of the chosen method of receiving the Licensee's electronic signals concurrently with the execution of this agreement. The Licensee's video output shall not be made available to any third party, other than other governmental entities that are a part of the State's network of traffic management centers, without the Licensee's prior consent, and shall not be used for commercial purposes, except as otherwise provided herein. The State shall provide in Attachment B, attached and incorporated hereto for all purposes, a description of how the State intends to transmit, use, and modify the Licensee's electronic signals. Any additions or deletions to this attachment shall have the advance written approval of the Licensee.

D. The parties hereby agree that this License Agreement does not transfer or convey any ownership or any other rights other than those rights expressly granted by this agreement. Title to and all rights of ownership in the parties' respective electronic signals are and remain with the party that produced them. Neither party has, nor shall it attempt to obtain, any title to the other party's signals. The video output and electronic signals are proprietary information of the party that produced them. Neither party shall transmit, use, distribute and/or modify this proprietary information except as expressly authorized in this agreement.

III. LICENSE FEE

A. Each party agrees to waive any monetary fee associated with the use of the license. Each party shall be provided nonmonetary compensation (in kind contribution) associated with the use of the license as described in this agreement.

B. The Licensee shall provide TxDOT a tape of any TxDOT related aired stories or any stories that involved any input from TxDOT's employees. TxDOT will be provided one copy of the tape within two weeks of the time the story was aired.

C. The Licensee agrees to broadcast public service announcements (PSAs) provided by the State. The total number of broadcasts should equal an average of five (5) minutes per month, including one (1) early evening newscast and one (1) early morning newscast.

IV. BROADCASTING OF VIDEO

A. The Licensee agrees to use reasonable discretion in airing and/or distributing video signals or images that may contain offensive material inappropriate for broadcasting.

B. The Licensee shall superimpose a visual credit over any electronic signals obtained from the State under this agreement. The form of the visual credit shall be approved by the State. The Licensee shall also use reasonable efforts to ensure that either the color logo of TxDOT, DalTrans, or TransVISION, as determined by the State, is superimposed over all video output of the State. It is understood that any failure on the part of the Licensee to superimpose such logo shall not be grounds for terminating or voiding this agreement.

C. The State shall provide the Licensee with the camera number and location of all CCTV cameras subject to this agreement to assist the Licensee in providing, if feasible, a text or graphical screen showing the location of the camera image being broadcast.

D. When airing an audio or text broadcast of traffic information obtained from viewing the State's video images, the Licensee shall credit TxDOT for providing the video.

V. INTERFERENCE WITH OTHER LICENSES

The Licensee acknowledges and agrees that its license is of a nonexclusive nature and the State has the right to grant other licenses, or rights of use, of any kind or nature, of and to its video output and electronic signals to other parties. The Licensee's use of the State's electronic signals under this agreement shall be in such a manner as not to cause measurable interference with any other licensee's use of the State's signals. The State shall use reasonable efforts to ensure that the use of its signals by any other licensee shall not result in measurable interference with the Licensee's use of the signals, and shall use reasonable diligence to prevent or stop such interference upon receiving notice thereof from the Licensee.

VI. COPYRIGHT INFRINGEMENT

Each party to this agreement shall notify the other of any infringement or potential infringement by a third party of the copyright or any other rights owned by each party in their respective intellectual property, or of any breach of this agreement by any third party. Each party shall assist and cooperate in resolving any and all breaches or infringements. Each party agrees to execute any instruments necessary for the other party's prosecution of any action for infringement.

VII. ASSIGNMENT PROHIBITION

Each party is prohibited from assigning the licensed rights to the other party's intellectual property, or licensing any of the rights conferred by this agreement to any third party, except as provided in this agreement, without the advance written approval of the other party. Notwithstanding the foregoing, the Licensee may assign its licensed rights to an affiliated corporate entity or to a purchaser of substantially all of its assets without the State's consent, provided that the State's licensed rights under this agreement remain unaffected. Any other attempted sublicense, assignment, or other transfer of the other party's electronic signals or of the rights or obligations of this agreement without the consent of the other party shall be void and may be grounds for termination of this agreement.

VIII. COVENANT AGAINST CHALLENGE

By entering into this agreement, each party is prohibited from challenging or contesting in any manner the validity of the other party's copyright in or ownership of its video output and electronic signals.

IX. TERMINATION

A. Including the provisions established herein, this agreement may be terminated by any of the following conditions:

(1) Mutual agreement and consent of the parties hereto.

(2) By each party as a consequence of the other party's failure to comply with the requirements of this agreement, unless the other party's failure to comply with the agreement is due to no fault of its own.

(3) By the State due to the Licensee's use of the State's electronic signals in a manner inconsistent with Article IV, upon not less than thirty (30) days written notice to the Licensee.

B. If the termination is due to the failure of a party to fulfill its contractual obligations, the other party will notify the breaching party that a possible breach of contract has occurred. The breaching party must remedy the breach as outlined by the other party to that party's satisfaction within thirty (30) days from receipt of notification. The nonbreaching party may declare this

agreement terminated upon the breaching party's failure to remedy the breach within the 30-day period.

C. Termination of the agreement shall extinguish all rights, duties, obligations, and liabilities of the State and the Licensee under this agreement. All rights granted to a party to this agreement shall revert to the other party as owner of its respective electronic signals. Upon termination of this agreement, each party will immediately cease transmitting, using, distributing, and/or modifying the other party's electronic signals as soon as is commercially feasible.

D. Termination or expiration of this agreement shall not extinguish any of the Licensee's or the State's obligations under this agreement which by their terms continue after the date of termination or expiration.

X. INDEMNIFICATION

The Licensee shall indemnify and save harmless the State from any and all claims, damages, and attorneys' fees arising out of any claim that the State's electronic signals infringe upon any intellectual property rights or other rights of any third party, except to the extent such claim arises out of an act of the State or its officers, employees, or agents, and shall indemnify and save harmless the State from any and all losses, liabilities, damages, claims, demands, costs, expenses, or other liabilities arising out of or connected with the Licensee's use of the State's electronic signals during the term of this agreement including, but not limited to, any illegal or improper use of the signals, or any use deemed offensive to the public. The Licensee's indemnification of the State shall extend for a period of three (3) years beyond the date of termination of this agreement.

XI. REMEDIES

Violation or breach of contract by either party to this agreement shall be grounds for termination of the agreement. Any increased costs to the State arising from the Licensee's default, breach of contract, or violation of contract terms shall be paid by the Licensee. This agreement shall not be considered as specifying the exclusive remedy for any default, but all remedies at law and in equity may be availed by either party and shall be cumulative.

XII. COMPLIANCE WITH LAWS

Each party shall comply with all federal, state and local laws, statutes, ordinances, rules and regulations, and the orders and decrees of any court or administrative body in any manner affecting the performance of this agreement.

XIII. SUPPLEMENTAL AGREEMENTS

Any changes in the contract period, character, or agreement terms shall be enacted by a written supplemental agreement executed by both parties. Any supplemental agreements must be executed during the contract period established in Article I.

XIV. LEGAL CONSTRUCTION

In case one or more of the provisions contained in this agreement shall for any reason be held invalid, illegal or unenforceable in any respect, such invalidity, illegality, or unenforceability shall not affect any other provision thereof and this agreement shall be construed as if such invalid, illegal, or unenforceable provision had never been contained herein.

XV. PRIOR AGREEMENTS SUPERSEDED

This agreement constitutes the sole and only agreement between the parties and supersedes any prior understandings and/or written or oral agreements between the State and the Licensee respecting the within subject matter.

XVI. SIGNATORY AUTHORITY

The undersigned for the Licensee represents and warrants that he or she is an officer of the organization for which he or she has executed this agreement and that he or she has the full and complete authority to enter into this agreement on behalf of the Licensee.

XVII. NOTICES

All notices to either party by the other party required under this agreement shall be delivered personally, by facsimile, or sent by U.S. mail, postage prepaid, addressed to such party at the following respective addresses:

For the State:
Texas Department of Transportation
Attention: General Services Division
125 E. 11th Street
Austin, Texas 78701-2483

The Licensee:
KTVT Television
Attention:
5233 Bridge Street
Fort Worth, TX 76103

With a copy to:
Texas Department of Transportation
Dallas District
4777 East Hwy 80
Dallas, Texas 75150-6643

Texas Department of Transportation
Fort Worth District
2501 SW Loop 820
Fort Worth, Texas 76133

and shall be deemed to be received by the addressee on the date so delivered or so deposited in the mail, unless otherwise provided herein. Either party hereto may change the above address by sending written notice of such change to the other in the manner provided herein.

IN TESTIMONY WHEREOF, the State and the Licensee have executed quadruplicate counterparts of this agreement.

GAYLORD ENTERTAINMENT COMPANY

By: _____

_____
Typed Name and Title

_____
Date

THE STATE OF TEXAS

Executed for the purpose and effect of activating and/or carrying out the orders, and established policies or work programs heretofore approved and authorized by the Texas Transportation Commission.

By: _____
Charles W. Heald, P.E.
Executive Director
Texas Department of Transportation

_____
Date

LICENSE AGREEMENT FOR THE USE OF VIDEO SIGNALS – HOUSTON DISTRICT

LICENSE AGREEMENT FOR THE USE OF
THE TEXAS DEPARTMENT OF TRANSPORTATION HOUSTON DISTRICT
INTELLIGENT TRANSPORTATION SYSTEM
CLOSED CIRCUIT TELEVISION VIDEO IMAGES AND TRANSTAR LOGO

STATE OF TEXAS *
*
COUNTY OF TRAVIS *

THIS AGREEMENT is made by and between the State of Texas, acting by and through the Texas Department of Transportation, hereinafter called the "State" and *******, located in Houston, Texas, hereinafter called the "Licensee."

W I T N E S S E T H

WHEREAS, the State, in accordance with Transportation Code, §201.205, may:

1. Apply for, register, secure, hold and protect patents, copyrights, trademarks, or other evidence of protection of exclusivity;
2. Enter into nonexclusive license agreements with any third party for the receipt of fees, royalties, or other things of monetary and non-monetary value; and
3. Waive or reduce the amount of fees if it determines that such waiver will further the goal and missions of the department and result in a net benefit to the State; and

WHEREAS, Transportation Code, §202.052 authorizes the State to lease highway assets if the area to be leased is not needed for highway purposes during the term of the lease and the State charges fair market value for the leased asset, and authorizes the State to waive such fees for social, economic, and environmental mitigation purposes; and

WHEREAS, the State is the owner of Intelligent Transportation (IT) Infrastructure constructed along segments of the State highway system in Brazoria, Fort Bend, Harris, Galveston, Montgomery, and Waller Counties, Texas, and has produced and produces transportation related information that is used for the purpose of Intelligent Transportation System (ITS), generally known as "Houston TranStar", and in which the State owns certain rights, title, and interests related thereto, including copyrights; and

WHEREAS, Houston TranStar has trademark registrations on marks (Registration Nos. 2288372 and 2270129), hereinafter identified as the "Houston TranStar logo," in accordance with the requirements of Title 15 U.S.C. Section 1051 et seq., as amended; and

WHEREAS, the Licensee desires to obtain a non-exclusive license from the State to receive and use Houston TranStar ITS Closed Circuit Television (CCTV) video, to use Houston TranStar IT Infrastructure, and to use the TranStar Logo; and

WHEREAS, the State is agreeable to provide a non-exclusive license to the Licensee to use the Houston TranStar ITS CCTV video, IT infrastructure, and TranStar Logo provided the Licensee agrees to the terms and conditions established in this agreement.

A G R E E M E N T

NOW, THEREFORE, in consideration of the premises and of the mutual covenants and agreements of the parties hereto, to be by them respectively kept and performed as hereinafter set forth, it is agreed as follows:

ARTICLE I. CONTRACT PERIOD

This agreement becomes effective upon the date of final execution by the State and shall be in effect for one year, unless terminated or modified as hereinafter provided.

ARTICLE II. RIGHTS GRANTED

The State hereby grants the Licensee a non-exclusive right, license, and privilege worldwide to use Houston TranStar ITS CCTV video and Houston IT Infrastructure for the purpose of obtaining and sharing Transportation related information. The Licensee agrees to give the State voice and visual credit (Houston TranStar Logo) for sharing the information. The State may transmit Houston TranStar ITS video information to the Licensee with an imbedded logo. The Licensee shall not block, modify, or remove the Houston TranStar Logo. The Licensee agrees that this License does not transfer or convey any ownership or any other rights other that those rights expressly granted by the agreement. A more detailed description of rights granted shall be provided in Exhibit "A" to this agreement, which is attached hereto and incorporated herein for all purposes.

ARTICLE III. PROVISION OF INFRASTRUCTURE

The Licensee is responsible for providing and maintaining any hardware, software, and additional infrastructure that are necessary to obtain Houston TranStar ITS CCTV video. The State may provide unused IT infrastructure and State facilities to support the additional infrastructure when possible, and when deemed to be in the best interest of the State and the Licensee. Licensee agrees that the State does not guarantee the availability of Houston TranStar ITS CCTV video or a minimum response time to reestablish the broadcast of Houston TranStar ITS CCTV video due to network or system failures. As the use of the Houston TranStar ITS CCTV video will result in social, economic, and environmental mitigation, by increasing mobility and reducing congestion on public highways, the State agrees to waive any fees associated with the use of State property. A more detailed description of infrastructure to be provided by each party is shown in Exhibit "A."

ARTICLE IV. INTERFERENCE WITH OTHER LICENSES

The Licensee's equipment and configuration shall be of such type and frequencies, and shall be operated in such a manner as not to cause measurable interference with any other Licensee's or the State's use of the Houston TranStar's Computerized Transportation Management Systems (CTMS) output. The State shall use reasonable efforts to ensure that any rights to use the Houston TranStar facility, granted to third parties hereafter, or the use of its CTMS output by any other Licensee, shall not result in measurable interference with the Licensee's use of the CTMS output. The State shall use reasonable diligence to prevent or stop such interference upon receiving notice thereof from the Licensee. If, in the State's sole opinion, the Licensee's use of the Houston TranStar facility interferes with or disrupts the State's use of its facility, the State may disconnect the Licensee's equipment until the cause of the interference is corrected by the Licensee.

ARTICLE V. LICENSE FEE

The State agrees to waive any monetary fee associated with the use of the license. After the initial year, the state reserves the right to employ a fee for the use of the license by providing not less than thirty (30) days written notice to the Licensee defining the terms of the fee.

ARTICLE VI. COPYRIGHT INFRINGEMENT

The Licensee shall notify the State of any infringement or potential infringement by a third party, of which it becomes aware, of the copyright or any other rights owned by the State relating to the Houston TranStar ITS CCTV video or any breach of this agreement by any third party. The Licensee shall provide the State, if feasible, any information or other assistance requested by the State to assist in the State's prosecution of any breaches or infringements.

ARTICLE VII. TAXES AND FEES

Licensee agrees to report to the appropriate taxation authority and pay all federal, state, and local taxes or fees that may be imposed by any governmental entity for the use of the license.

ARTICLE VIII. ASSIGNMENT PROHIBITION

The Licensee is prohibited from assigning the license or licensing any of the rights conferred by this agreement, to any third party. Notwithstanding the foregoing, the Licensee may assign its licensed rights to an affiliated corporate entity or to a purchaser of substantially all its assets without the State's consent, provided that the State's rights under this agreement remain unaffected. Any assignments shall be subject to the terms and conditions of this agreement.

ARTICLE IX. TERMINATION

a) Including the provisions established herein, this agreement may be terminated by any of the following conditions.

i) Mutual agreement and consent of the parties hereto.
ii) By the State for reason of its own and not subject to the approval of the Licensee upon not less than thirty (30) days written notice to the Licensee.
iii) By the Licensee for reason of its own and not subject to the approval of the State upon not less than thirty (30) days written notice to the State.

b) Termination of the agreement shall extinguish all rights, duties, obligations and liabilities of the State and Licensee of this agreement. All rights granted to the Licensee shall revert to the State as owner of the information. Upon termination of this agreement, the Licensee will immediately cease transmitting, using, distributing and/or modifying the electronic signals.

c) Termination or expiration of this agreement shall not extinguish any of the Licensee's or the State's obligation under this agreement which by their terms continue after the date of termination or expiration.

ARTICLE X. INDEMNIFICATION

The Licensee shall indemnify and save harmless the State from any and all losses, liabilities, damages, claims, demands, costs, expenses, or other liabilities arising out of or connected with Licensee's possession or use of the information during the agreement including, but not limited to, any illegal or improper use of the information or any violation of right to privacy. The Licensee's indemnification of the State shall extend for a period of three (3) years beyond the termination of this agreement.

ARTICLE XI. REMEDIES

Violation or breach of contract by the Licensee shall be grounds for termination of the agreement Any increased costs arising from the Licensee's default, breach of contract or violation of contract terms shall be paid by the Licensee.

ARTICLE XII. AMENDMENTS

Any changes in the contract period, character, or agreement terms shall be enacted by a written amendment executed by both parties. Amendments must be executed during the contract period established in Article I.

ARTICLE XIII. VENUE

This agreement is governed by the laws of the State of Texas.

ARTICLE XIV. NOTICES

All notices to either party by the other party required under this agreement shall be delivered personally or sent by certified or U.S. Mail, postage prepaid, addressed to such party at the following respective physical addresses:

STATE: Texas Department of Transportation
Houston District Transportation Operations
ATTN: Director of Transportation Operations
P.O. Box 1386
Houston, TX 77251-1386

LICENSEE: *********

Copy to: Texas Department of Transportation
Director, General Service Division
125 E. 11th Street
Austin, Texas 78701

and shall be deemed to be received by the addressee on the date so delivered or so deposited in the mail, unless otherwise provided within. Either party hereto may change the above address by sending written notice of such change to the other.

IN TESTIMONY WHEREOF, the State and the Licensee have executed triplicate counterparts of this agreement.

****

By: _____

_____
Name Title

Date: _____

STATE OF TEXAS

Executed by and approved for the Texas Transportation Commission for the purpose and effect of activating and/or carrying out the orders, established policies or work programs heretofore approved and authorized by the Texas Transportation Commission.

By: _____
Gary K. Trietsch, P.E.
Houston District Engineer

Date: _____

EXHIBIT “A”

Rights Granted	
By State	By Licensee
1. Right to configure a client workstation on the Houston TranStar CCTV Camera control system for camera selection only.	1. None

Provision of Infrastructure	
By State	By Licensee
1. May provide facilities to house and support infrastructure equipment provided by Licensee.	1. Provide any and all infrastructure modifications needed to acquire the rights granted by State including 3rd party software and hardware. 2. Hardware installations must be performed using the TranStar's Principal Integrator at the sole cost to the Licensee. 3. $5,000 to cover the cost of Software modifications to limit Pan, Tilt, and Zoom capabilities.

LICENSE AGREEMENT FOR THE USE OF TXDOT SOFTWARE – DALLAS DISTRICT

STATE OF TEXAS *
*
COUNTY OF TRAVIS *

COPYRIGHT LICENSE AGREEMENT FOR THE USE OF THE TEXAS DEPARTMENT OF TRANSPORTATION'S TRANSPORTATION MANAGEMENT SATELLITE (TMS) SOFTWARE

THIS AGREEMENT is made by and between the State of Texas, acting by and through the Texas Department of Transportation, hereinafter called the State, and the City of Dallas, located at 1500 Marilla Ave, Dallas, Tx , hereinafter called the Licensee.

W I T N E S S E T H

WHEREAS, the State, in accordance with Article 6673a-4, V.T.C.S., may:

1. Apply for, register, secure, hold, and protect patents, copyrights, trademarks, or other evidence of protection or exclusivity issued under the laws of the United States, any state, or any nation, including ideas, publications, and other original innovations fixed in a tangible medium, including but not limited to:

(a) literary works, (b) logos, (c) service marks, (d) studies, (e) maps and planning documents, (f) engineering, architectural, and graphic designs, (g) manuals, (h) automated systems software, (i) audiovisual works, (j) sound recordings, and (k) travel literature [including but not limited to pamphlets, bulletins, books, maps, periodicals, and electronic information published or produced under Section 3, Chapter 193, Acts of the 56th Legislature, Regular Session, 1959 (Article 6144e, Vernon's Texas Civil Statutes)]; and

2. Enter into nonexclusive license agreements with any third party for the receipt of fees, royalties, or other thing of monetary or nonmonetary value; and
3. Waive or reduce the amount of fees, royalties, or other monetary or nonmonetary value to be assessed if it determines that such waiver will further the goals and missions of the department and result in a net benefit to the State; and

WHEREAS, the State has authored, produced, or participated in the production of a work, or works, of the Dallas District Transportation Management Satellite System Software , known generally as the TMS Software and is the owner of certain rights including copyrights, title, and interests related thereto; and

WHEREAS, the State has copyrighted the TMS Software; and

WHEREAS, the Licensee desires to obtain a license from the State to use the TMS Software for Transportation Management ; and

WHEREAS, the State is agreeable to provide a nonexclusive, non-transferable license to the Licensee to use the TMS Software as stated herein, provided the Licensee agrees to the terms and conditions established in this agreement.

A G R E E M E N T

NOW, THEREFORE, in consideration of the premises and of the mutual covenants and agreements of the parties hereto, to be by them respectively kept and performed as hereinafter set forth, it is agreed as follows:

1. CONTRACT PERIOD

This agreement becomes effective upon the date of final execution by the State and shall terminate four (4) years from the date the agreement is signed by the State unless terminated or modified as hereinafter provided. At the end of the contract period, the State and the Licensee may enter into a written supplemental agreement, in a manner defined herein, to extend the period of the license agreement.

2. RIGHTS GRANTED

A. The State hereby grants to the Licensee a nonexclusive right, license, and privilege worldwide to use the TMS Software for the purpose of traffic management in the Dallas/Fort Worth Metroplex. The Licensee shall establish in Attachment B, attached and incorporated hereto for all purposes, a list describing how the Licensee intends to use the TMS Software. Any additions or deletions to this list shall have the advance written approval of the State.

B. The Licensee agrees that this License does not transfer or convey any ownership or any other rights other than those rights expressly granted by this agreement. Title to and all rights of ownership in the TMS Software, are and remain with the State. The Licensee does not have, nor shall it attempt to obtain, any title to the TMS Software. The TMS Software consists of the State's trade secrets and other proprietary and confidential information. The Licensee shall not disclose, publish, or disseminate any of the State's proprietary information to any third party who is not bound by a written confidentiality agreement with the State expressly covering this information. The Licensee will not use, reproduce, distribute, and/or sell the TMS Software, except as expressly authorized in this agreement.

3. LICENSE FEE

The State agrees to waive the fee associated with the use of the license. The State at all times under this agreement reserves the right to employ a fee for the use of the license by providing not less than thirty (30) days written notice to the Licensee defining the terms of the fee.

4. COPYRIGHT INFRINGEMENT

Each party to this agreement shall notify the other of any infringement or potential infringement by a third party of the copyright or any other rights owned by the State relating to the TMS Software, or of any breach of this agreement by any third party. Each party shall assist and cooperate in resolving any and all breaches or infringements. The Licensee agrees to execute any instruments necessary for the State's prosecution of any action for infringement.

5. RESPONSIBILITY FOR MAINTENANCE OF THE WORK

The State is not responsible for providing the Licensee any upgrades or modifications to the TMS Software , nor is the State responsible for any maintenance to, or correct any defects in, the TMS Software after the work has been provided to the Licensee under this agreement. Should the Licensee make any modifications to or upgrade the TMS Software , pursuant to rights granted to the Licensee under this agreement, the Licensee shall provide the State a copy of such upgraded or modified version of the work.

6. ASSIGNMENT PROHIBITION

The Licensee is prohibited from assigning the licensed rights to the TMS Software , or licensing any of the rights conferred by this agreement, to any third party without the advance written approval of the State. Any attempted sublicense, assignment, or other transfer of the TMS Software or of the rights or obligations of this agreement without the State's consent shall be void and may be grounds for termination of this agreement.

7. COVENANT AGAINST CHALLENGE

By entering into this agreement, the Licensee is prohibited from challenging or contesting in any manner the validity of the TMS Software's copyright, its registration, or its ownership by the State.

8. TERMINATION

A. Including the provisions established herein, this agreement may be terminated by any of the following conditions:

(1) Mutual agreement and consent of the parties hereto.

(2) By the State, upon written notice to the Licensee as consequence of the Licensee's failure to comply with the requirements of this agreement, unless the Licensee's failure to comply with the agreement is due to no fault of its own.

(3) By the State for reasons of its own and not subject to the approval of the Licensee upon not less than thirty (30) days written notice to the Licensee.

B. If the termination is due to the failure of the Licensee to fulfill its contractual obligations, the State will notify the Licensee a possible breach of contract has occurred. The Licensee must remedy the breach as outlined by the State to the State's satisfaction within thirty (30) days from

receipt of the State's written notification. The State will declare this agreement terminated upon the Licensee's failure to remedy the breach within the thirty (30) day period.

C. Termination of the agreement shall extinguish all rights, duties, obligations, and liabilities of the State and the Licensee under this agreement. All rights granted to the Licensee shall revert to the State as owner of the TMS Software. Upon termination of this agreement, the Licensee will immediately cease using the TMS Software as soon as feasible.

D. Termination or expiration of this agreement shall not extinguish any of the Licensee's or the State's obligations under this agreement which by their terms continue after the date of termination or expiration.

9. INDEMNIFICATION

The Licensee shall indemnify and save harmless the State from any and all claims, damages, and attorneys' fees arising out of or in any way connected with any claim that the TMS Software infringes any intellectual property rights or other rights of any third party, except to the extent such claim arises out of an act of the State or its officers and employees, and shall indemnify and save harmless the State from any and all losses, liabilities, damages, claims, demands, costs, expenses, or other liabilities arising out of or connected with the Licensee's possession or use of the TMS Software during the term of this agreement including, but not limited to, any illegal or improper use of the TMS Software. The Licensee's indemnification of the State shall extend for a period of three (3) years beyond the date of termination of this agreement.

10. REMEDIES

Violation or breach of contract by the Licensee shall be grounds for termination of the agreement and any increased costs arising from the Licensee's default, breach of contract, or violation of contract terms shall be paid by the Licensee. This agreement shall not be considered as specifying the exclusive remedy for any default, but all remedies at law and in equity may be availed by either party and shall be cumulative.

11. COMPLIANCE WITH LAWS

The licensee shall comply with all federal, state and local laws, statutes, ordinances, rules, and regulations, and the orders and decrees of any court or administrative body in any manner affecting the performance of this agreement.

12. SUPPLEMENTAL AGREEMENTS

Any changes in the contract period, character, or agreement terms shall be enacted by a written supplemental agreement executed by both parties. Any supplemental agreements must be executed during the contract period established in Article 1, Contract Period.

13. LEGAL CONSTRUCTION

In case one or more of the provisions contained in this agreement shall for any reason be held invalid, illegal or unenforceable in any respect, such invalidity, illegality, or unenforceability shall not affect any other provision thereof and this agreement shall be construed as if such invalid, illegal, or unenforceable provision had never been contained herein.

14. PRIOR AGREEMENTS SUPERSEDED

This agreement constitutes the sole and only agreement between the parties and supersedes any prior understandings and/or written or oral agreements between the State and the Licensee respecting the within subject matter.

15. SIGNATORY AUTHORITY

The undersigned for the Licensee represents and warrants that he/she is an officer of the organization for which he/she has executed this agreement and that he/she has the full and complete authority to enter into this agreement on behalf of the Licensee.

16. NOTICES

All notices to either party by the other party required under this agreement shall be delivered personally or sent by certified or U.S. Mail, postage prepaid, addressed to such party at the following respective address:

State: Texas Department of Transportation
ATTN: Director of Transportation Operations
P.O. Box 3067
Dallas, Texas 75221-3067

Licensee: City of Dallas, Public Works and Transportation
ATTN: Assistant Director
1500 Marilla, Room LIB North
Dallas, TX 75201

and shall be deemed to be received by the addressee on the date so delivered or so deposited in the mail, unless otherwise provided herein. Either party hereto may change the above address by sending written notice of such change to the other in the manner provided herein.

IN TESTIMONY WHEREOF, the State and the Licensee have executed duplicate counterparts of this agreement.

THE CITY OF DALLAS

APPROVED AS TO FORM:
SAM LINDSAY
City Attorney

BY:_____

CITY OF DALLAS
JOHN WARE
City Manager

BY:_____ Date:
Assistant City Manager

APPROVED BY:

_____ Date:
Director, General Services Division

THE STATE OF TEXAS

Executed for the Executive Director and approved for the Texas Transportation Commission for the purpose and effect of Assistant City Attorney activating and/or carrying out the orders, establishing policies or work programs by, the Texas Transportation Commission.

APPENDIX B: AGENCY SURVEY

CALL GUIDE FOR AGENCY SURVEY

Background Information

During the first year of Project 7-4951, researchers reviewed the practices and technologies being used in Texas for incident management and traveler information sharing. Through interviews and site visits, researchers assimilated data from the Dallas, Fort Worth, Houston, and San Antonio Districts to determine what incident and traveler information is being shared and with whom, and how it is being disseminated. However, they did not look at whether or not the information exchanged and shared is actually being used, nor what effect that use is having upon the recipients' operations or activities. The following phone survey will be used to identify what information the recipients use, how frequently they utilize the different types of information, and how the information influences decisions and actions being made by the receiving agency.

Phone Survey Guide

Hello, my name is _____ and I am calling from the Texas Transportation Institute which is part of the Texas A&M University System. We are currently conducting a research project for the Texas Department of Transportation concerning the sharing of incident management and traveler information. We are contacting several entities that receive incident and traveler information from TxDOT to determine how the shared information is utilized. Do you have a few minutes to answer a few questions about the information you are receiving from TxDOT? *(If no, thank them and ask them if you can call back at another time or fax them the survey.)*

First, I will need to get some general information from you:

Name:
_____

Title:
_____

Employer:
_____

Phone:
_____

Address:
_____
_____
_____

Email:
_____

Now, we can begin the survey.

Question 1: What incident and/or traveler information are you currently receiving from TxDOT? *(See Tech Memo 7-4951-1 to determine what they should be receiving)* _____
_____
_____
_____
_____

Question 2: Of the information you just mentioned, what do you find most useful and why? ___
_____
_____
_____

Question 3: How often or under what circumstances do you use the information? _____
_____
_____
_____

Question 4: Do you use this information for other purposes? _____
_____
_____
_____

Question 5: How does this information facilitate your handling of incidents? _____
_____
_____
_____

Question 6: What other information would you like to receive from TxDOT? *Be sure to document reasons.* _____
_____
_____
_____

Question 7: By what other means or modes would you like to receive information from TxDOT? *Be sure to document reasons.* _____
_____
_____
_____

That is all of the questions I have at this time. Do you have any further comments?_____
_____
_____

If I have any further questions, do you mind if I call you again? Yes _____ No _____
Thank you and have a nice day!
Please sign and date the survey when completed.

_____ _____
Researcher Date

Table 10. Contact Information for the Agencies Surveyed.

TxDOT District	Agency Contacted	Contact Person	Phone Number
Dallas	City of Dallas	Beth Ramirez	214-670-3122
	City of Garland	Dave Timbrell	972-205-2433
	City of Richardson	Robert Taylor	972-238-4230
	City of Irving	Kathleen Mullins-Jost	972-721-2646
	Dallas Fire Department	Beth Ramirez	214-670-3122
	Dallas Police Department	Beth Ramirez	214-670-3122
	DART	Mahesh Kuimil	214-749-2822
	Traffic.com (ISP)	Tom Corbett	214-631-7605
Fort Worth	City of Fort Worth	Russell Wiles	817-871-7978
	Dallas Morning News	Gerry Barker	214-977-5606
	NCTCOG	Natalie Bettger	817-695-9280
	Traffic.com (ISP)	Tom Corbett	214-631-7605
Houston	City of Houston	Bob White	713-881-3050
	Harris County	Frank Gutierrez	713-881-3083
	Houston Police Department	Sgt. Gil Mauricio	713-881-3026
	METRO Transit	Aurther Watkins	713-881-3235
	METRO Traffic (ISP)	Ted Wallace	713-881-3101
	Channel 11 News	traffic reporter	713-526-1111
San Antonio	Bexar County	Michael Martin	210-335-6700
	City of San Antonio	John Friebole	210-207-8291
	KENS – Channel 5 News	Dave Davies	210-366-5000
	KSAT	Preston Jones	210-351-1200
	San Antonio Police Department	Captain Tom Polanis	210-207-7400