



State of Texas  
Regional ITS Architectures and Deployment Plans

# Tyler Region

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## Regional ITS Architecture Report

*Prepared by:*



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**July 16, 2003**

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## LIST OF ACRONYMS

AASHTO	American Association of State Highway and Transportation Officials
ASTM	American Society for Testing and Materials
ATIS	Advanced Travel Information System
ATMS	Advanced Traffic Management System
AVL	Automatic Vehicle Location
BRINSAP	Bridge Inventory Inspection System
CC	Control Center
CCTV	Closed-Circuit Television
COLT	City of Longview Transit
CPT	Common Public Transportation
CVO	Commercial Vehicle Operations
DARC	Data Radio Channel
DMS	Dynamic Message Sign
DOT	Department of Transportation
DPS	Department of Public Safety
DSRC	Dedicated Short Range Communications
EIA	Electronic Industries Association
EMS	Emergency Medical Services
EOC	Emergency Operations Center
ETCOG	East Texas Council of Governments
ETMCC	External TMC Communication
EV	Emergency Vehicle
FC	Fare Collection
FHWA	Federal Highway Administration
HAR	Highway Advisory Radio
HAZMAT	Hazardous Materials

## LIST OF ACRONYMS

HRI	Highway-Rail Intersections
I/F	Interface
IM	Incident Management
IMMS	Incident Management Message Sets
ISP	Information Service Provider
ITE	Institute of Transportation Engineers
ITS	Intelligent Transportation System
MCM	Maintenance and Construction Management
MCV	Maintenance and Construction Vehicle
MOU	Memorandum of Understanding
MPO	Metropolitan Planning Organization
MS	Message Sets
NEMA	National Electrical Manufacturers Association
NOAA	National Oceanic and Atmospheric Administration
NTCIP	National Transportation Communications for ITS Protocol
OB	Onboard
PI	Passenger Information
PSAP	Public Safety Answering Point
PTMS	Public Transportation Management System
SAE	Society of Automotive Engineers
SDO	Standards Development Organization
SP	Spatial Representation
STIC	Subcarrier Traffic Information Channel
TCEQ	Texas Commission on Environmental Quality
TCIP	Transit Communication Interface Protocol
TEA-21	Transportation Equity Act for the 21st Century

## LIST OF ACRONYMS

TM	Traffic Management
TMC	Traffic Management Center
TMDD	Traffic Management Data Directory
TOC	Traffic Operations Center
TxDOT	Texas Department of Transportation
USDOT	United States Department of Transportation
VIVDS	Video Image Vehicle Detector System
WIM	Weigh-in-Motion

## SUMMARY

In January 2001, the Federal Highway Administration (FHWA) issued a final rule to implement Section 5206(e) of the Transportation Equity Act for the 21st Century (TEA-21) requiring that Intelligent Transportation System (ITS) projects funded through the Highway Trust Fund conform to the National ITS Architecture and applicable standards.

To meet these requirements, in 2001 the Texas Department of Transportation (TxDOT) initiated the development of regional ITS architectures and deployment plans throughout the State of Texas. The Tyler Region was the fifth in the series of regional ITS architectures to be prepared as part of this initiative.

The Tyler Region is located in the north eastern part of Texas. The ITS stakeholders defined the regional boundaries to correspond to the eight county TxDOT Tyler District, which includes the Cities of Tyler, Longview, Canton, Athens, Palestine, Gladewater, and Henderson. Interstate 20, which crosses through the Tyler Region, is a major east west corridor connecting Texas to the eastern United States.

The Tyler Regional Architecture effort followed a comprehensive process focused on stakeholder outreach and education, identifying market packages and interfaces tailored to the needs of the Tyler Region, and developing a consensus-based architecture for the Region. This architecture provides a framework for ITS infrastructure to be deployed and integrated in the Tyler Region over the next 20 years.

Stakeholders from throughout the Region participated in the development of the Regional ITS Architecture, including representatives from TxDOT, cities, counties, municipal planning organizations (MPOs), and transit agencies. These stakeholders provided input and review at key steps in the architecture development process, including a project kick-off meeting, architecture development and review workshops, and final review of the architecture documentation.

An inventory of existing and planned ITS infrastructure in the Region provided the basis for the architecture development. Stakeholder needs that could be addressed by ITS technologies guided the selection of market packages, data flows, and integration requirements. A diverse range of needs were identified by stakeholders in the Region. The highest priority needs focused on improving freeway and arterial control, transit operations, emergency coordination and response, and detection of weather related incidents such as ice and flooding.

Market packages were selected that corresponded to the desired services and functions identified for the Region, and were customized for Tyler Region agencies and equipment. These market packages included high priority ‘foundation’ services and functions, such as network surveillance, surface street control, and transit vehicle tracking, as well as market packages to address coordination needs, including incident management system and regional traffic control and coordination. Stakeholders then prioritized these market packages as high, medium, and low. These priorities were used in the second phase of the project to develop the ITS Deployment Plan for the Tyler Region.

An interconnect, or “sausage diagram” was developed for the Tyler Region which provided a top-level overview of system functions and primary interconnects. More detailed interfaces were then developed which identified the connectivity between the systems and elements. Each element identified in the ITS architecture for the Tyler Region was mapped to the other elements that it must interface with. These interfaces were further defined by architecture data flows between individual elements that specify the

information to be exchanged. These data flows could include requests for information, alerts and messages, status requests, confirmations, and other information requirements.

Functional requirements for the Tyler Region were identified through customized market packages and data flows, and the equipment packages that deliver specific capabilities. The equipment packages that were identified provide more detailed descriptions of functionality and can be deployed incrementally. Standards that could apply to the Tyler Region also were identified as part of the architecture development process.

An Operational Concept for the Tyler Region was developed to illustrate how systems, components, and agencies will be integrated and function as a result of the framework provided by the Regional ITS Architecture. The purpose of the Operational Concept is to demonstrate the roles and responsibilities of the various stakeholders in the Tyler Region.

The Regional ITS Architecture for the Tyler Region is documented in the final report. In addition, a companion web site was developed that contains all of the architecture information, stakeholders, regional inventory, customized market packages, interfaces, and standards.



## 1. INTRODUCTION

### 1.1 Project Overview

In January 2001, FHWA issued a final rule to implement Section 5206(e) of the TEA-21. This rule required that ITS projects funded through the Highway Trust Fund conform to the National ITS Architecture and applicable standards. The rule requests that the National ITS Architecture be used to develop a local implementation of the National ITS Architecture, which is referred to as a “Regional ITS Architecture.”

In order to meet these requirements, TxDOT initiated the development of regional ITS architectures and deployment plans throughout the State of Texas. In addition to meeting the federal requirements for funding, the development of regional ITS architectures provides a framework for implementing ITS on a regional level, encourages interoperability and resource sharing, identifies applicable standards, and allows for cohesive long range planning among stakeholders in the Region. Although not required by the FHWA final rule, TxDOT also sought to have an ITS deployment plan developed for each Region. An ITS deployment plan identifies and prioritizes projects that are needed to implement the ITS architecture on a short-, medium-, and long-term basis.

A key goal in the development of the regional ITS architectures was to develop a consensus-based architecture with as many stakeholders as possible involved. Each stakeholder had an equal voice in determining the direction of the architecture for the Region. Stakeholders included representatives from TxDOT, cities, counties, MPOs, and transit agencies. A series of five meetings were held with the ITS stakeholders to discuss the development and gather input into the Tyler Regional ITS Architecture and Deployment Plan. In addition, a project web site was developed which contains all of the information on the Tyler Regional ITS Architecture and provides stakeholders with an opportunity to review and comment on the architecture directly from the web.

The result is an ITS architecture that establishes a vision and direction for the Region. ITS needs of the Tyler Region were established early in the project. Existing and planned elements of the architecture have been identified and the key agencies required to develop the ITS services, or market packages as they are referred to in the National ITS Architecture, for the Tyler Region have been identified. An operational concept has been developed that focuses on the roles and responsibilities of the various agencies involved in the Tyler Region. A separate ITS Deployment Plan was developed that identifies projects in the Tyler Region that would be needed to make the architecture functional.

### 1.2 Document Overview

The Tyler Regional ITS Architecture report is organized into five key sections:

#### Section 1 – Introduction

This section provides an overview of the State of Texas ITS Architectures and Deployment Plans Program, the ITS architecture for the Tyler Region, as well as an overview of some of the key features and stakeholders in the Tyler Region.

## **Section 2 – Integration Strategy**

This section discusses Tyler Region stakeholder needs and issues, regional ITS initiatives and potential regional ITS programs, and opportunities for integration to achieve regional goals and contribute to regional and national ITS interoperability.

## **Section 3 – Regional ITS Architecture Development Process**

An overview of the key steps involved in developing the ITS architecture for the Tyler Region is provided in this section. It includes a discussion of the methodology, stakeholder involvement, architecture workshops, and architecture development process.

## **Section 4 – Conceptual Design**

The conceptual design contains the key sections of the Tyler Regional ITS Architecture. The inventory of existing and planned systems is presented in Section 4, and is sorted by stakeholder as well as by entity for easy reference. The market packages that were selected for the Tyler Region also are included in this section, as are the system functional requirements. The Tyler Region interconnects are presented, including the “Sausage Diagram” showing the relationships of the key subsystems and elements in the Region, system interfaces, and the physical subsystem architecture flows. Standards that apply to the Tyler Regional ITS Architecture also are listed.

## **Section 5 – Operational Concept**

An Operational Concept has been prepared that discusses the key functions and services of the envisioned ITS for the Tyler Region. As part of this concept, several operational scenarios are described and roles and responsibilities of stakeholders are discussed. Potential agreements that could be required to support integration and information sharing are described.

The Tyler Regional ITS Architecture also contains three appendices:

- Appendix A – Customized Market Packages; and
- Appendix B – Interface Diagrams.

A project web site has been established that contains the architecture documentation, inventories, interconnects, market packages, interfaces, and functional requirements. The web site provides hyperlinks to more detailed information about the Tyler Regional ITS Architecture than what could feasibly be included in the printed document. In certain sections of the document, readers are referred to the project web site for additional information and details. At the time this report was published, the Tyler Regional ITS Architecture web site was being hosted at [www.consystem.com](http://www.consystem.com). The site can be accessed by selecting the link to Texas, and then the link to Tyler. TxDOT plans to permanently host the site in the future at [www.dot.state.tx.us/trf/its](http://www.dot.state.tx.us/trf/its).

## 1.3 The Tyler Region

### 1.3.1 Geographic Overview

The Tyler Region is bordered by the TxDOT Atlanta District to the northeast, the TxDOT Lufkin District to the southeast, the TxDOT Bryan and TxDOT Dallas Districts to the west and the TxDOT Paris District to the north. For the Tyler Regional ITS Architecture and Deployment Plan, the study area included all eight counties that comprise the TxDOT Tyler District. The geographic boundaries of the Tyler Region are highlighted in **Figure 1**.

The counties included in the Tyler Region area:

- Anderson;
- Cherokee;
- Gregg;
- Henderson;
- Rusk;
- Smith;
- Van Zandt; and
- Wood.

TxDOT partners with local governments for roadway construction, maintenance, and traffic operations support. For cities with a population less than 50,000, TxDOT is the responsible agency for on-system roadways. The cities of Longview and Tyler, each with populations greater than 75,000, are the only two cities in the Region with populations in excess of the 50,000 threshold.

### 1.3.2 Roadway Infrastructure

As illustrated in **Figure 1**, the Tyler Region has an extensive transportation infrastructure. The primary facilities include I-20, US 69, US 80, US 259, US 271, SH 31, SH 64, SH 110, SH 155, and Loop 323.

One of the most heavily traveled truck routes in the southern United States is the I-20 corridor. I-20 is an east-west, four-lane divided interstate highway. The effective operation of this highway is critical to the movement of goods and people across the United States. I-20 extends from South Carolina in the east to California in the west. Within the Tyler Region, the frontage roads are not continuous. Blockages along I-20 can have serious implications on drive-time for commercial vehicles and motorists alike due to the lack of obvious alternate routes. Knowing road and travel conditions within this transportation corridor and having the ability to disseminate this information to motorists are important elements for this project. For example, if I-20 has been closed due to a major incident or weather, and motorists are informed of the closure in advance, they can alter their travel plans with an alternate route or wait to begin their travels.

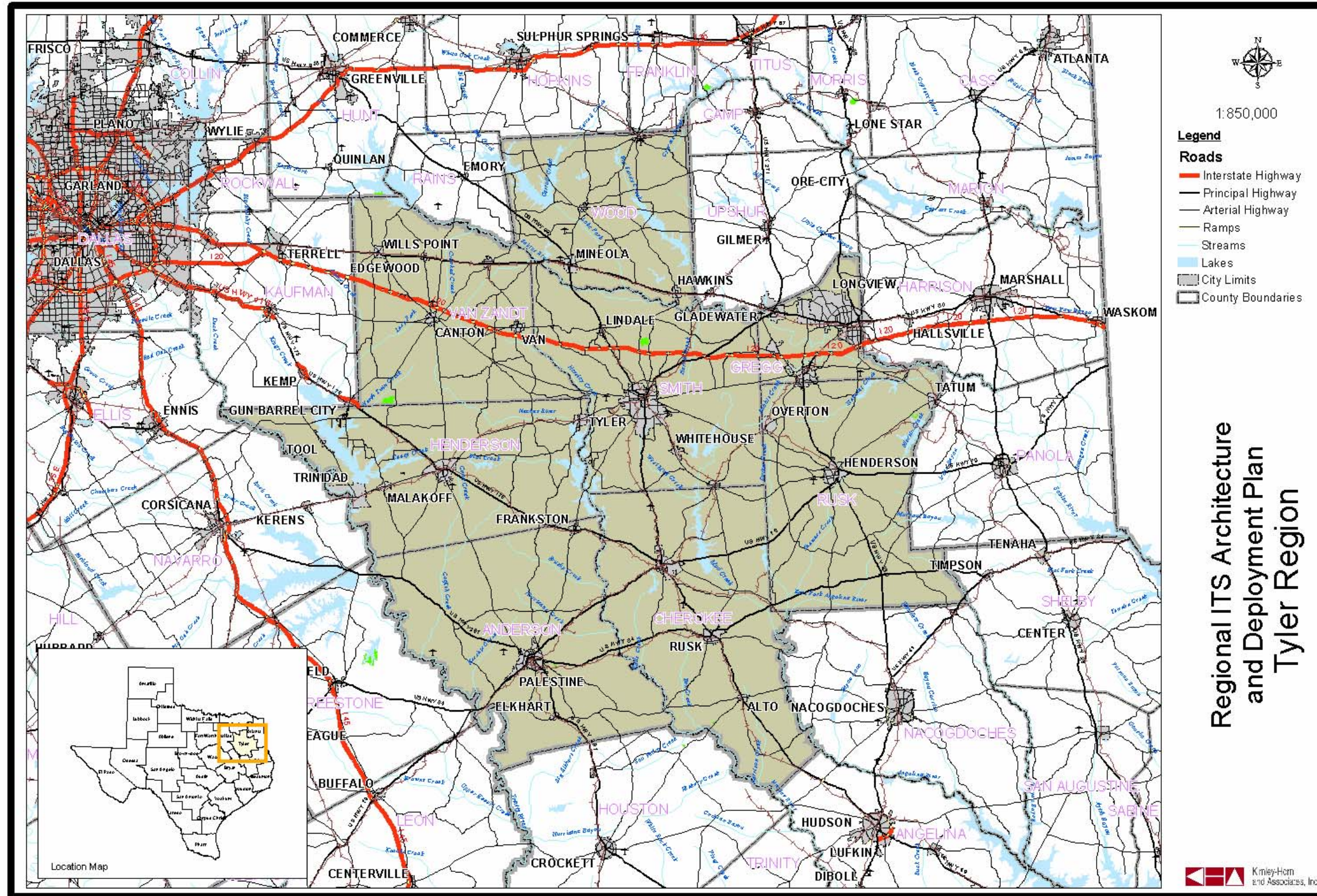


Figure 1 – Tyler Region Map

### 1.3.3 Tyler Region ITS Plans

Agencies in the Tyler Region have previously deployed ITS components. It is important to recognize the initial deployment of ITS in a region because federal requirements mandate that a region, in order to secure future funding for ITS projects, must have an ITS architecture in place within four years of the initial deployment of ITS strategies and components. As the Tyler Region pursues funding opportunities for proposed projects, it will be necessary to show that the proposed project fits within the architecture developed for the Region as part of this project.

Currently, the Tyler Region has several ITS components deployed in the field including dynamic message signs (DMS), video surveillance and detection, highway advisory radio (HAR), and high water detection. The following sections discuss these deployments.

#### ***Dynamic Message Signs***

The TxDOT Tyler District is currently the only agency in the Tyler Region that has deployed DMS, and the District has both permanent and portable signs. The existing permanent DMS is located on eastbound I-20. The District uses this sign primarily to alert motorists of delay that may be caused by the Canton First Monday Trade Days. This sign can also be used to alert motorists of severe weather (such as icing) or construction. In addition to conditions within the District's boundary, roadway conditions in Louisiana could be disseminated to the motorist via the DMS during times of necessary closures or extreme conditions.

#### ***Video Monitoring and Detection***

The second element of the Region's initial ITS is the deployment of closed-circuit television (CCTV) cameras. These cameras are strategically located at the interchange of I-20 and SH 19 so that the traffic queues at the interchange can be monitored from a remote location for the First Monday Canton Trade Days. These are currently the only CCTV cameras that have been deployed in the Region.

Cameras help ascertain traffic conditions, as well as identify low-lying roadways that may have been flooded or bridges that may have iced from remote locations. Then this information, along with possible alternate routes, can be provided to motorists.

In addition to the use of video for monitoring, TxDOT and the Cities of Longview and Tyler are using video image vehicle detection systems (VIVDS) at many intersections within the Region. Unlike loop detection, VIVDS will not be affected by paving operations, and the detection zone of a VIVDS can be quickly changed to accommodate lane shifts during construction. VIVDS can detect vehicles approaching or stopping at a signalized intersection, and, under actuated conditions, place a call for the service of the appropriate phase for that vehicle.

#### ***Highway Advisory Radio***

Currently, TxDOT has deployed highway advisory radio (HAR) along I-20. Motorists are advised via guide signs to tune their radios to a certain AM radio frequency to hear updates on road conditions. The current HAR system provides updates on roadway conditions based upon construction and lane closures, traffic conditions and possible alternate routes.

### ***High-Water Detection***

Due to the presence of flood-prone areas within the City of Longview, the city has deployed high-water detection devices that can alert the appropriate personnel that there are dangerous situations along roadways due to rising water. These high-water sensors can be used to automatically close a section of a street with a barrier arm should high water be present. The devices could also be used to alert emergency response vehicles of routes to avoid when trying to reach an accident location. These notifications could be automated as part of future projects.

#### ***1.3.4 Stakeholders***

Stakeholder coordination and involvement is one of the key elements to the development of a Regional ITS Architecture and Deployment Plan. Because ITS often transcends traditional transportation infrastructure, it is important to involve non-traditional stakeholders in the architecture development and visioning process. Input from these stakeholders, both public and private, is a critical part of defining the integration needs, interfaces and overall vision for ITS in the Tyler Region.

The following is a list of stakeholders in the Tyler Region who have participated in the project workshops or provided input to the study team as to the needs and issues that should be considered as part of the Tyler Regional ITS Architecture.

- City of Gladewater;
- City of Lindale;
- City of Longview;
- City of Rusk;
- City of Tyler;
- East Texas Council of Governments;
- Gregg County;
- Rusk County;
- Smith County;
- TxDOT Traffic Operations Division;
- TxDOT Tyler District; and
- Wood County.

## 2. INTEGRATION STRATEGY

### 2.1 Integration Purpose

The purpose of the integration strategy is to identify the needs, stakeholders, and strategy for regional integration in the Tyler Region.

For each operating agency or stakeholder entity identified through the development of the Regional ITS Architecture, there are operations that currently exist as a normal practice for each stakeholder in order to accomplish their primary business goals and objectives. As an example, a primary operation of the Smith County dispatch is to dispatch emergency personnel to the appropriate locations when a call for help is placed in Smith County. The integration of the Smith County PSAP with any of the other stakeholders will not change this primary function of the Smith County dispatch or disrupt typical business practices. The integration of the Smith County PSAP with another agency such as the TxDOT Tyler District will require that the data that will be exchanged between the two entities (such as the blockage of a lane of traffic due to a crash) meet certain requirements for that particular data type. Identifying the need for this connection between agencies and the opportunities for integration and interoperability in the Region are key purposes of this section.

This section will provide an overview of the major issues and stakeholders' needs within the Tyler Region and the primary areas of concern that were uncovered in the preparation of the Tyler Regional ITS Architecture. Additionally, this section will discuss the need for interregional integration with agencies external to the Tyler Region such as the need for integration with other TxDOT Districts and possibly the Louisiana DOT during major incidents along I-20.

A key step in developing any regional ITS architecture is the identification of major stakeholders in the Region. Stakeholder agencies that participated in the development of the Tyler Regional ITS Architecture are listed in **Table 1**. Minutes of meetings, copies of reports, and access to the project web site was provided to these stakeholders to facilitate their participation as much as possible.

**Table 1 – Tyler Stakeholder Agencies and Contacts**

<b>Stakeholder Agency</b>	<b>Contact</b>	<b>Address</b>	<b>Phone Number</b>	<b>E-Mail</b>
City of Gladewater	Sharon Johnson	519 East Broadway Gladewater, Texas 75647	(903) 845-2196	gladewatr@aol.com
City of Gladewater	Lon Welton	519 East Broadway Gladewater, Texas 75647	(903) 845-5753	gladewatermainst@cox-internet.com
City of Lindale	Owen Scott	201 North Main Street Lindale, Texas 75771	(903) 882-3422	cmoflindale@cox-internet.com
City of Longview	Walt Cooper	130 East Timpson Street Longview, Texas 75602	(903) 237-1007	waltcooper@hotmail.com
City of Longview	Stan Hobbs	130 East Timpson Street Longview, Texas 75602	(903) 237-1272	shobbs@ci.longview.tx.us
City of Longview	Rolin McPhee	130 East Timpson Street Longview, Texas 75602	(903) 237-1007	rmcphee@ci.longview.tx.us
City of Rusk	Kevin Bowden	408 North Main Street Rusk, Texas 75785	(903) 683-2213	citymgr@rusktx.com
City of Rusk	Martha Neeley	408 North Main Street Rusk, Texas 75785	(903) 683-6641	mainst@rusktx.com
City of Tyler	Steve Glass	423 West Ferguson Tyler, Texas 75702	(903) 531-1134	sglass@tylertexas.com
City of Tyler	William Morales	423 West Ferguson Tyler, Texas 75702	(903) 531-1175	bmorales@tylertexas.com
City of Tyler Fire Department	David Schlottach	1718 West Houston Tyler, Texas 75702	(903) 535-0005	firetraining@tylertexas.com
City of Tyler Transit	Norman Schenck	412 West Locust Street Tyler, Texas 75702	(903) 533-8057	nschenck@tylertexas.com
East Texas Council of Governments	Patty Scarborough	3800 Stone Road Kilgore, Texas 75662-6937	(903) 984-8641	patty.scarborough@twc.state.tx.us
East Texas Council of Governments	Roxanne Mackey	3800 Stone Road Kilgore, Texas 75662-6937	(903) 984-8641	roxanne.pitts@twc.state.tx.us
Gregg County	Charles Davis	1109 FM 449 Longview, Texas 75605	(903) 663-0400	charlesdavis@co.gregg.tx.us
Rusk County	Kimble Harris	4255 FM 13 West Henderson, Texas 75654	(903) 657-5914	N/A



**Table 1 – Tyler Stakeholder Agencies and Contacts (continued)**

Stakeholder Agency	Contact	Address	Phone Number	E-Mail
Smith County	Tom Flowers	1700 West Claude Street Tyler, Texas 75702	(903) 535-0880	tflowers@smith-county.com
Smith County	Jimmy Seaton	400 Smith County Office Bldg 106 East Elm Tyler, Texas 75702	(903) 535-0965	jseaton@smith-county.com
TxDOT – Traffic Operations Division	Janie Light	Attn: TRF-TM 125 East 11 <sup>th</sup> Street Austin, Texas 78701-2486	(512) 416-3258	jlight@dot.state.tx.us
TxDOT – Traffic Operations Division	Alex Power	Attn: TRF-TM 125 East 11 <sup>th</sup> Street Austin, Texas 78701-2486	(512) 416-3444	apower@dot.state.tx.us
TxDOT – Tyler District	Marty Allen	2709 West Front Street Tyler, Texas 75702	(903) 510-9114	mallen1@dot.state.tx.us
TxDOT – Tyler District	Juanita Daniels-West	2709 West Front Street Tyler, Texas 75702	(903) 510-9106	jdanie2@dot.state.tx.us
TxDOT – Tyler District	Peter Eng	2709 West Front Street Tyler, Texas 75702	(903) 510-9204	peng@dot.state.tx.us
TxDOT – Tyler District	Randy Redmond	15986 SH 155 South Tyler, Texas 75703	(903) 509-9066	rredmon@dot.state.tx.us
TxDOT – Tyler District	Dale Spitz	2709 West Front Street Tyler, Texas 75702	(903) 510-9100	dspitz@dot.state.tx.us
TxDOT – Tyler District	Vernon Webb	15986 SH 155 South Tyler, Texas 75703	(903) 509-9066	vwebb@dot.state.tx.us
Wood County	Jerry Galloway	3684 North FM 312 Winnsboro, TX 75494	(903) 629-7317	N/A

## 2.2 Regional Needs

Needs from the Region were identified in the project Kick-off Meeting held in July 2002. Stakeholders participating in that meeting identified the needs in the Region according to the eight user service areas defined in the National ITS Architecture. The needs identified in the project kick-off meeting are documented in **Table 2**.

Given the location of the I-20 corridor through the Tyler Region, and its designation as a hazardous cargo route, it is reasonable to expect the need for evacuations from time to time due to hazardous material spills. One of the driving forces for integrating the various stakeholders in the Tyler Region is the need to be able to provide motorists and residents real-time information as it relates to roadway conditions during these times of large scale evacuation. For this reason, traffic data collected by the City of Longview, the City of Tyler, and the TxDOT Tyler District will be very useful to the lead agency as it coordinates efficiently moving people away from danger and to a safe place during a time of crisis. Established standards will govern the exchange of these data.



Similarly, for non-major incidents such as traffic accidents along I-20, there is a need for the TxDOT Tyler District to provide the City of Longview Emergency Dispatch data related to the exact location of the accident as identified using TxDOT surveillance cameras. The primary function of the surveillance cameras will be to monitor traffic conditions on a daily basis and provide the video feed to a traffic management center (TMC) where a determination can be made to post a message on a DMS given certain conditions. However, when there is an incident, the video can be extremely useful for the City of Longview Emergency Dispatch as it dispatches emergency personnel and manages the accident scene. The integration of these agencies will certainly not have to be physical, but rather virtual, wherein the two agencies are willing to share data, whether that information is video feeds or site clearance information, with each other. The Regional ITS Architecture for the Tyler Region will provide a means to automate the exchange of this information.

**Table 2 – Tyler Region: Summary of ITS Needs**

<p style="text-align: center;"><b>Tyler Region</b> <b>Summary of ITS Needs</b> <b>Tyler Regional ITS Architecture and Deployment Plan Kick-Off Meeting</b> <b>July 16, 2002</b></p> <p><b>Institutional Issues/Needs</b></p> <ul style="list-style-type: none"><li>▪ Need agreements to use data from other agencies</li><li>▪ Need agreements on control of equipment</li><li>▪ Need agreements on protocol</li></ul> <p><b>Traffic Management Needs</b></p> <ul style="list-style-type: none"><li>▪ Need emergency vehicle pre-emption along arterials</li><li>▪ Need pan tilt zoom control on interchange cameras and feeds to city</li><li>▪ Need a joint TMC for Tyler and Longview</li><li>▪ Need red-light-running enforcement</li></ul> <p><b>Traveler Information Needs</b></p> <ul style="list-style-type: none"><li>▪ Need information on traffic flow and incidents</li><li>▪ Need additional DMS</li><li>▪ Need to provide more information (emergency and tourist)</li><li>▪ Need to move toward 511 implementation to increase information dissemination (especially for First Monday)</li><li>▪ Need special events traffic management</li></ul> <p><b>Data Needs (Collecting, Sharing)</b></p> <ul style="list-style-type: none"><li>▪ Need to have traffic flow data shared with dispatch to aid movement of emergency vehicles</li><li>▪ Need to integrate data sources</li><li>▪ Need system to share video</li><li>▪ Need weather conditions</li><li>▪ Need construction updates</li><li>▪ Need ice detection</li></ul> <p><b>Public Transportation Management Needs</b></p> <ul style="list-style-type: none"><li>▪ Need Automatic Vehicle Location (AVL) on buses</li></ul> <p><b>Electronic Payment Needs</b></p> <ul style="list-style-type: none"><li>▪ Need smart pay for public transportation</li></ul> <p><b>Commercial Vehicle Operations Needs</b></p> <p>None Identified</p>
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**Table 2 – Tyler: Summary of ITS Needs (continued)**

**Emergency Management Needs**

- Need emergency vehicle signal pre-emption

**Advanced Vehicle Safety Systems Needs**

None Identified

**Information Management Needs (Data Archiving)**

None identified – data needs covered in other categories

**Maintenance and Construction Management Needs**

- Need improved sharing of information relative to construction

### 2.3 Regional Integration and Interoperability

The TxDOT Tyler Region is bordered by the TxDOT Atlanta District to the northeast, the TxDOT Lufkin District to the southeast, the TxDOT Bryan and Dallas Districts to the west and the TxDOT Paris District to the north. During times of detours along I-20, it is imperative that the agency leading the detour is cognizant of road and weather conditions in the areas to which people are being directed. In the case of Tyler Region, the next TxDOT District along the I-20 corridor to the west is the Dallas District. As such the emergency operations centers (EOCs) in Tyler and/or Longview should have communications with the TxDOT Dallas District TMC.

Data collected by the TxDOT Tyler TMC should be supplied to the TxDOT Dallas District TMC so that the center will know if vehicles leaving the Dallas District should expect long delays or perhaps the Dallas District should be made aware of additional demand being places on alternate routes. This type of information could help the TxDOT Dallas District make decisions on the operations of roadways within their jurisdiction such as adjusting signal timing to accommodate the unusual traffic patterns or posting messages on DMS.

Also, during times of major crises, the Region’s EOCs will need to coordinate closures on I-20 with the Texas State EOC. For example, data that should be shared includes the estimated arrival time for a major ice storm hitting the Region and icing status information on roadways that are on the States trunk highway system and have an effect outside the Tyler Region. Additionally, incidents that occur on major roadways either in the Tyler Region or on roadways that could impact the movement of people and goods in the Tyler Region should be shared. The integration of the State EOC and the local EOC can facilitate the clearing of such an incident more efficiently as the State EOC can assist with identifying resources for resolving the situation.

As an example, a fuel spill along I-20 east of the Tyler Region would require a major clean-up in addition to other emergency personnel on site. Coordination between the Local EOCs and the State EOC could identify the closest clean-up crew that could respond to the spill and dispatch them to the scene. Similarly, once on the scene, the response team could provide the State EOC and the Tyler and Longview EOCs status reports on the clean-up and potential timing for return to normal operations.



The TxDOT headquarters in Austin maintains a database of traffic counts and accident records for roadways throughout the State of Texas. On occasion, agencies within the Tyler Region will need access to these databases either to retrieve data or supply data to the database. These data exchanges also will require integrating the agencies' data flows such that no agencies' normal business operations are disturbed to share the data.

One of the primary purposes of the development of an ITS architecture is to ensure that while various agencies are deploying ITS components, there are some commonalities between them that will allow and facilitate the exchange of data fairly seamlessly and automatically. This is not to say that all technologies or media that are used by the various agencies will be the same, but that there is an acknowledgement that the data that is being collected and disseminated is valuable to many different agencies, and that therefore, the integration strategy has to be implemented to ensure a consistent format so that data exchange is possible.

### 3. REGIONAL ITS ARCHITECTURE DEVELOPMENT PROCESS

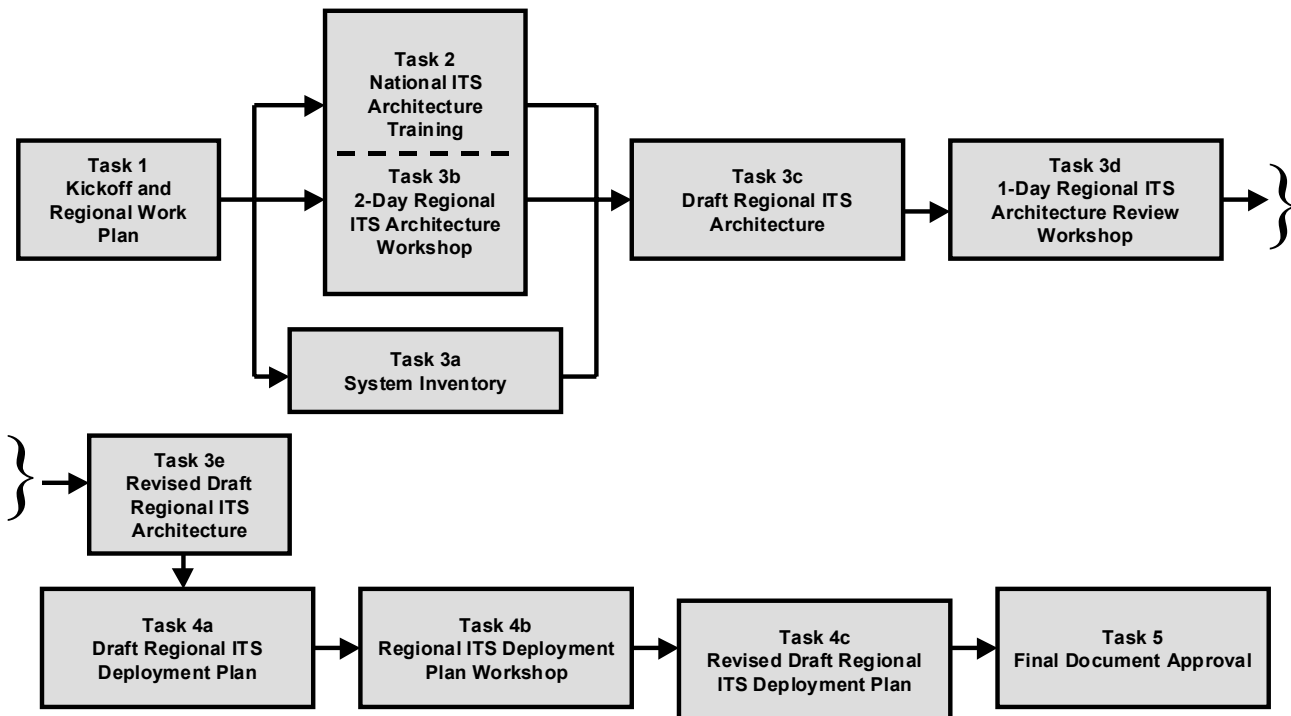
Development of the Regional ITS Architecture and Deployment Plan for the Tyler Region relied heavily on stakeholder input to ensure that the architecture reflected local needs. A series of five meetings was held with stakeholders to gather input, and a web site with the components of the regional architecture, as well as hard copies of documents, were made available to stakeholders for review and comment.

#### 3.1 Tyler Process

The process followed for the Tyler Region was designed to ensure that stakeholders could provide input and review to the development of the Region’s ITS Architecture.

Prior to the first project kick-off meeting with the contractor and stakeholders, TxDOT identified relevant stakeholders in the Region to begin discussions on the development of a Regional ITS Architecture and Deployment Plan. The TxDOT District Traffic Operations Engineer led this effort. Stakeholders signed a memorandum of understanding (MOU) stating that they would work together in the Region to develop the ITS architecture.

After selecting a contractor, the process shown in **Figure 2** was used to develop the Region’s ITS Architecture. In addition to the architecture, an ITS Deployment Plan for the Region also was developed to identify projects needed to implement the architecture.



**Figure 2 – Tyler Regional ITS Architecture and Deployment Plan Development Process**

A total of five meetings with stakeholders over a period of eleven months was used to develop the Tyler Regional ITS Architecture and Deployment Plan. These meetings included:

- 1-Day Kick-off and Regional Work Plan Meeting;
- 2-Day Regional ITS Architecture Workshop;
- 1-Day Regional ITS Architecture Review Workshop;
- ITS Deployment Plan Workshop; and
- Final Comment Resolution Review and Final Meeting.

Key components of the process are described below:

**Task 1 – Kick-Off and Regional Work Plan:** Based on the initial stakeholder meeting and MOU that was signed, a number of key stakeholders were identified. Additional stakeholders that did not sign the initial MOU also were identified and invited to the first project kick-off meeting. At this meeting, the regional work plan was presented to stakeholders for review and comment. Subsequent meeting dates were identified and agreed upon by the stakeholders.

As part of this meeting, a workshop was held with the stakeholders to identify three additional areas of information:

- Additional stakeholders to invite to participate in the process;
- Needs of the stakeholders in the Tyler Region; and
- Existing and planned ITS elements in the Region.

**Task 2 – National ITS Architecture Training:** Task 2 was the development and presentation of training on the National ITS Architecture. The purpose of the training was to familiarize stakeholders with the architecture terminology to the extent needed to allow them to provide input and review on the Tyler Region’s ITS Architecture. The National ITS Architecture training was presented in conjunction with the 2-Day Regional ITS Architecture Workshop described in Task 3B.

**Task 3A – System Inventory:** Collecting information for the system inventory began at the kick-off meeting during the workshop with stakeholders to determine existing and planned ITS elements in the Region. After the kick-off meeting, follow-up calls were conducted with a number of local stakeholders to gather additional input for the architecture inventory. To finalize the inventory, stakeholders were presented with the results in the 2-Day ITS Architecture Workshop described in Task 3B.

**Task 3B – 2-Day Regional ITS Architecture Workshop:** The purpose of the 2-Day Regional ITS Architecture Workshop was to review the inventory with stakeholders and begin the development of the Tyler Regional ITS Architecture. Training on the National ITS Architecture also was integrated into the workshop so that key elements of the architecture, such as market packages, could be explained prior to selecting and customizing these elements. The result of the 2-Day Regional ITS Architecture Workshop was a Regional ITS Architecture for the Tyler Region, which included a complete system inventory, interconnect diagram, customized market packages, identification of functional requirements through process specifications, system interfaces, and relevant ITS standards.

**Task 3C – Draft Regional ITS Architecture:** After the 2-Day Regional ITS Architecture Workshop was completed, a project web site ([www.consystem.com](http://www.consystem.com)) was developed with a dedicated link to the Texas Regional ITS Architecture program. Stakeholders were asked to review the web site and provide comments through an email link set up on the site. A hard copy of the Draft Regional ITS Architecture for the Tyler Region was sent to stakeholders prior to the 1-Day Regional ITS Architecture Review Workshop.

**Task 3D – 1-Day Regional ITS Architecture Review Workshop:** The 1-Day Regional ITS Architecture Review workshop was designed to allow stakeholders to review the draft architecture and provide comments. The primary focus of the workshop was to review the architecture flows between elements in the market packages. Training on architecture flows as well as ITS standards also was completed.

**Task 3E – Revised Draft Regional ITS Architecture:** Input from stakeholders in the 1-Day Regional ITS Architecture Review Workshop, as well as comments from stakeholders reviewing the web site and hard copy document, were used to revise the Draft Regional ITS Architecture. The revisions were incorporated into the web site as well as into the hard copy document. The Revised Draft Regional ITS Architecture was mailed to stakeholders for additional review.

**Task 4A – Draft Regional ITS Deployment Plan:** A Draft Regional ITS Deployment Plan was developed based on the prioritization of market packages and needs expressed by the stakeholders in the Region. The Draft Regional ITS Deployment Plan included a list of recommended projects in a 5-year, 10-year, and 20-year timeframe. Each project was linked to at least one market package from the Tyler Regional ITS Architecture.

**Task 4B – Regional ITS Deployment Plan Workshop:** The Draft Regional ITS Deployment Plan was presented to stakeholders at the Regional ITS Deployment Plan Workshop. Stakeholders were asked to provide input on the recommended projects, priority, and deployment timeframe.

**Task 4C – Revised Draft Regional ITS Deployment Plan:** Based on the review and input from stakeholders at the Regional ITS Deployment Plan Workshop, as well as review comments received from stakeholders outside of the workshop, a Revised Draft Regional ITS Deployment Plan was developed and sent to stakeholders.

**Task 5 – Final Document Approval:** A final comment resolution meeting was held with stakeholders to review the Revised Draft Regional ITS Architecture and the Revised Draft Regional ITS Deployment Plan. Next steps for the Region also were discussed. Comments were incorporated and a final Regional ITS Architecture and Regional ITS Deployment Plan were developed.

### 3.2 USDOT Regional ITS Architecture Guidance

On October 12, 2001, the U.S. Department of Transportation (USDOT) issued guidance on development of a regional ITS architecture through the document “Regional ITS Architecture Guidance: Developing, Using, and Maintaining an ITS Architecture for Your Region.” **Figure 3** summarizes the guidance provided by the USDOT.

The process used to develop the Tyler Regional ITS Architecture and Deployment Plan follows Steps 1 through 4 of the guidance. Steps 5 and 6 are designed to provide guidance upon the completion of the development of the Regional ITS Architecture.

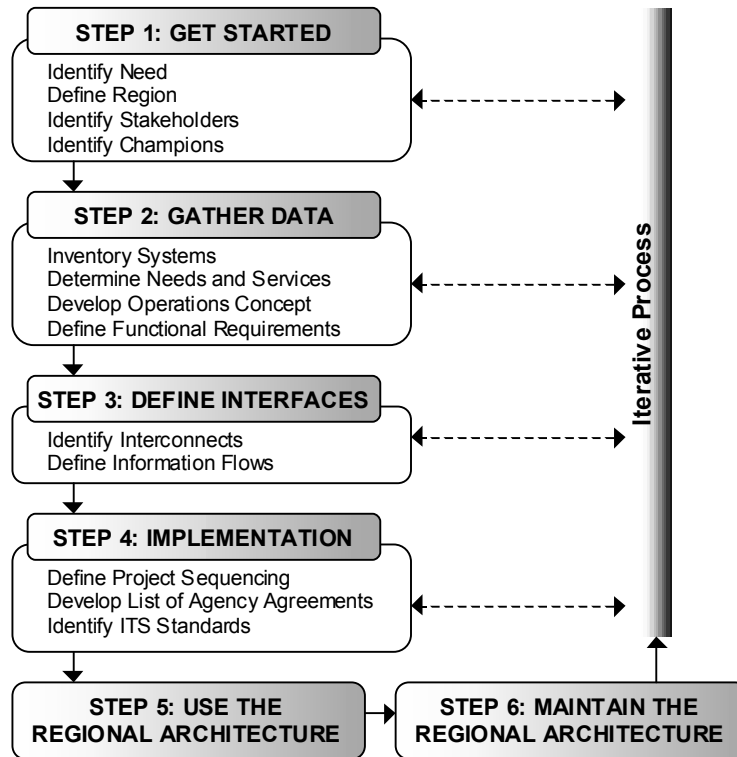


Step 1, Get Started, of the guidance was completed in Task 1 – Kick-off and Regional Work Plan, as well as preliminary work completed by TxDOT to identify initial stakeholders and the need to complete the architecture for the Tyler Region. Through these efforts, the need for an architecture, appropriate stakeholders, and the Region was defined.

Step 2, Gather Data, was completed through Task 1 – Kick-off and Regional Work Plan, Task 3A – System Inventory, and Task 3B – 2-Day Regional ITS Architecture Workshop. These efforts allowed the inventory for the Tyler Region to be completed, identified ITS needs in the Region, and led to the development of an operational concept and definition of functional requirements.

Step 3, Define Interfaces, was completed in Task 3B – 2-Day Regional ITS Architecture Workshop and Task 3D – 1-Day Regional ITS Architecture Review Workshop. These workshops engaged stakeholders in customizing Market Packages for the Region, which included identifying interconnects among elements in the architecture and reviewing and selecting data flows between elements.

Step 4, Implementation, was completed in Task 3D – 1-Day Regional ITS Architecture Review Workshop through the prioritization of market packages. Sequencing of projects began in this process and was completed in the ITS Deployment Plan. Applicable ITS standards to match the identified data flows also were identified through the 1-Day ITS Architecture Review Workshop.



(Source: Regional ITS Architecture Guidance: Developing, Using, and Maintaining an ITS Architecture for Your Region, USDOT)

**Figure 3 – USDOT Guidance on Regional ITS Architecture Development**

## 4. CONCEPTUAL DESIGN

### 4.1 Systems Inventory

One of the key initial steps in the architecture development process is to establish an inventory of existing ITS elements. At the project kick-off meeting and through subsequent discussions with agency representatives throughout the Region, Tyler stakeholders provided the team with a list of existing, planned, and future systems that would play a role in the Region's ITS architecture. "Planned" is defined as a system with funding identified while "future" is defined as a system that does not yet have funding identified.

Existing, planned, and future systems in the Tyler Region were identified in the following categories:

- ***Travel and Traffic Management*** – includes state and local traffic management centers, traffic signal systems, monitoring and detection systems, dynamic message signs, emissions monitoring, railroad grade crossing technologies, and other related technologies.
- ***Public Transportation Management*** – includes transit fixed route and demand response operations, fare management security, and travel information systems.
- ***Electronic Payment*** – none identified.
- ***Commercial Vehicle Operations*** – includes weigh-in-motion and HAZMAT management.
- ***Emergency Management*** – includes dispatch for police, fire/EMS, HAZMAT, and emergency operations/management centers.
- ***Information Management*** – includes electronic data management and archiving systems.
- ***Maintenance and Construction Management*** – includes road weather data collection systems and work zone management.

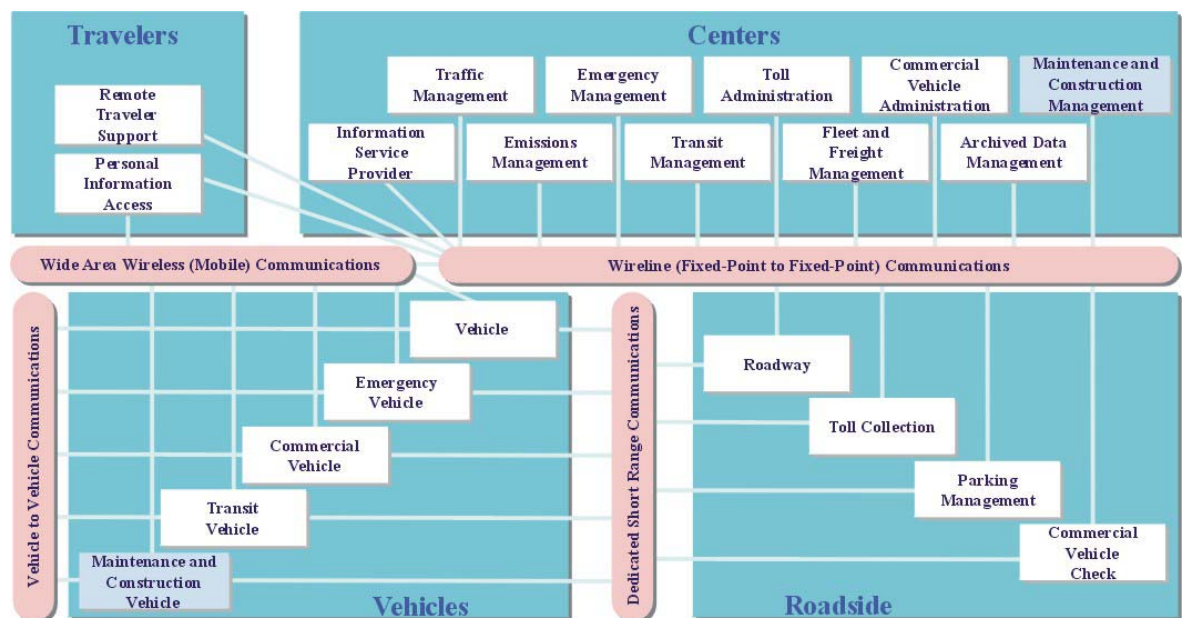
The System Inventory is a valuable task for several reasons. It provides a baseline of existing and planned ITS projects and systems in the Region, outlines which agencies are currently deploying and operating ITS, as well as those that are planning to implement ITS programs, and provides a foundation for identifying needed elements or agency participation for the regional ITS. This will be important for subsequent tasks including the market package identification and prioritization, system interface and integration requirements in the Region, and ultimately the ITS Deployment Plan.

#### 4.1.1 Subsystems and Terminators

Each identified system or component in the Tyler Regional ITS inventory was mapped to a subsystem or terminator in the National ITS Architecture. Subsystems and terminators are the 'entities' that represent systems in ITS. Subsystems are the highest level building blocks of the physical architecture, and the National ITS Architecture groups them into four major classes: Centers, Roadside, Vehicles, and Travelers. Each of these major classes includes various subsystems that represent a set of transportation functions (or processes) that are likely to be collected together under one agency, jurisdiction, or location, and correspond to physical elements, such as traffic operations centers, traffic signals, vehicles, and more. **Figure 4** shows the National ITS Architecture subsystems. This figure, also known as the "sausage diagram" is a standard interconnect diagram, showing the relationships of the various subsystems within the architecture; a customized interconnect diagram for the Tyler

Region is included in Section 4.3.1 of this report. Communication functions between the subsystems are represented in the ovals. It should be noted that “wireline” communication refers to fixed-point to fixed-point communications, which include not only twisted pair and fiber optic technologies, but also such wireless technologies such as microwave and spread spectrum.

Terminators are the people, systems, other facilities, and environmental conditions outside of ITS that need to communicate or interface with ITS subsystems. They help to define the boundaries of the National ITS Architecture as well as a regional system. Examples of terminators include drivers, traffic operations personnel, information service providers, weather effects (snow, rain, fog), telecommunications systems, and government reporting systems, among others.



**Figure 4 – Physical Subsystem Interconnect Diagram**

#### 4.1.2 Tyler ITS Inventory by Stakeholder

Each stakeholder is associated with one or more systems or elements (subsystems and terminators) that make up the transportation system in the Tyler Region. **Table 3** sorts the inventory by stakeholder, so each stakeholder can easily identify and review all their relevant assets that are identified in the Tyler Regional ITS Architecture.

The information in **Table 3** also is included on the Tyler ITS Architecture web site, which is accessible by selecting the link to the Texas Regional ITS Architecture, the Tyler Region, and then selecting the “Inventory by Stakeholder” button which will open the stakeholder list. Each element in the list contains a hyperlink to more detailed information, including status, description, stakeholder, and other elements within the inventory with which it interfaces. (At the time this report was published, the Tyler Regional ITS Architecture web site was being hosted at [www.consysfec.com](http://www.consysfec.com). TxDOT plans to permanently host the site in the future at [www.dot.state.tx.us/trf/its](http://www.dot.state.tx.us/trf/its).)

#### 4.1.3 *Tyler ITS Inventory by Entity*

The Tyler Regional ITS Architecture inventory is made up of the transportation and communications centers, the field equipment, the vehicles, and other systems in the regional transportation system. These components have been assigned to a subsystem or terminator as defined by the National ITS Architecture. **Table 4** presents the Tyler Region inventory using the associated National ITS Architecture subsystem or terminator. This sorts elements that perform similar functions together, so elements of a particular type can be easily identified.

This inventory also can be accessed from the Tyler Regional ITS Architecture web site by selecting the “Inventory by Entity” button.

**Table 3 – Tyler Inventory of Regional Subsystems/Terminators (sorted by Stakeholder)**

Stakeholder	Element	Entity	Status
City of Longview Fire Department	City of Longview Fire/EMS Vehicles	Emergency Vehicle Subsystem	Existing
City of Longview Police Department	City of Longview Police Vehicles	Emergency Vehicle Subsystem	Existing
	City of Longview Public Safety Dispatch	Emergency Management Subsystem	Existing
City of Longview PWD	City of Longview Field Equipment	Roadway Subsystem	Existing
	City of Longview TMC	Archived Data User Systems	Existing
	City of Longview TMC	Traffic Management Subsystem	Existing
City of Longview Transit System (COLT)	COLT Transit Dispatch	Archived Data User Systems	Existing
	COLT Transit Dispatch	Transit Management Subsystem	Existing
	COLT Transit Vehicles	Transit Vehicle Subsystem	Existing
	COLT Transit Web Site	Information Service Provider Subsystem	Existing
City of Tyler Fire Department	City of Tyler Fire Vehicles	Emergency Vehicle Subsystem	Existing
City of Tyler Police Department	City of Tyler Police Vehicles	Emergency Vehicle Subsystem	Existing
City of Tyler Traffic Engineering Department	City of Tyler Field Equipment	Roadway Subsystem	Existing
	City of Tyler TMC	Traffic Management Subsystem	Existing
City of Tyler Transit	City of Tyler Transit Dispatch	Archived Data User Systems	Existing
	City of Tyler Transit Dispatch	Transit Management Subsystem	Existing
	City of Tyler Transit Stop Information Displays	Remote Traveler Support Subsystem	Future
	City of Tyler Transit Vehicles	Transit Vehicle Subsystem	Existing
	City of Tyler Transit Web Site	Information Service Provider Subsystem	Existing
	Multimodal Transfer Center	Remote Traveler Support Subsystem	Future
Commercial Vehicle Operators	Commercial Vehicles	Commercial Vehicle Subsystem	Existing
	Commercial Vehicles	Vehicle Subsystem	Existing
	Private Fleet Management Systems	Fleet and Freight Management Subsystem	Future
Community Air Quality Public Information Office	Community Air Quality Information Office System	Media	Existing

**Table 3 – Tyler Inventory of Regional Subsystems/Terminators (sorted by Stakeholder) (continued)**

Stakeholder	Element	Entity	Status
Community Convention and Visitors Bureau	Community Convention and Visitors Bureau	Event Promoters	Existing
County Emergency Management Agencies	County EOC	Emergency Management Subsystem	Existing
County Road and Bridge	County Road and Bridge	Maintenance and Construction Management Subsystem	Existing
	County Road and Bridge Equipment Repair	Equipment Repair Facility	Existing
	County Road and Bridge Field Equipment	Roadway Subsystem	Future
	County Road and Bridge Maintenance Yard	Storage Facility	Future
	County Road and Bridge Vehicles	Maintenance and Construction Vehicle Subsystem	Existing
County Sheriff	County Public Safety Dispatch	Emergency Management Subsystem	Existing
DPS	DPS Administration	Emergency Management Subsystem	Existing
	DPS Communications Service	Emergency Management Subsystem	Existing
	DPS Emergency Vehicles	Emergency Vehicle Subsystem	Existing
	DPS Inspection Stations	Commercial Vehicle Check Subsystem	Existing
	Statewide Crash Records Information System	Archived Data Management Subsystem	Existing
	Statewide Crash Records Information System	Information Service Provider Subsystem	Existing
DPS Division of Emergency Management	State EOC	Emergency Management Subsystem	Existing
DPS Local Emergency Planning Committee	DPS Local Emergency Planning Committee	Archived Data User Systems	Existing
East Texas 911	East Texas 911 Communications Center	Emergency Management Subsystem	Future
East Texas Medical Center	East Texas Med Center EMS	Care Facility	Existing
	East Texas Med Center EMS	Emergency Management Subsystem	Existing
ETCOG	ETCOG Planning Systems and Operational Database	Archived Data Management Subsystem	Future
	ETCOG Rural Transit Dispatch	Archived Data User Systems	Existing
	ETCOG Rural Transit Dispatch	Transit Management Subsystem	Existing
	ETCOG Rural Transit Vehicles	Transit Vehicle Subsystem	Existing

**Table 3 – Tyler Inventory of Regional Subsystems/Terminators (sorted by Stakeholder) (continued)**

Stakeholder	Element	Entity	Status
ETCOG (continued)	ETCOG Web Site	Information Service Provider Subsystem	Existing
	GETTA-ride Regional Transit Card	Traveler Card	Future
	GETTA-ride Transit Kiosk and Information Displays	Remote Traveler Support Subsystem	Future
Financial Institution	Financial Institution	Financial Institution	Future
Independent School Districts	Independent School District Buses	Transit Vehicle Subsystem	Existing
	Independent School District Dispatch	Transit Management Subsystem	Existing
Local Media	Local Print and Broadcast Media	Media	Existing
Longview MPO	Longview MPO System	Archived Data Management Subsystem	Existing
	Longview MPO System Users	Archived Data User Systems	Future
Municipal or County Government	Municipal Government EOC	Emergency Management Subsystem	Existing
	Municipal or County Permitting System	Commercial Vehicle Administration Subsystem	Existing
Municipal or County Public Safety	Municipal or County Emergency Vehicles	Emergency Vehicle Subsystem	Existing
	Municipal Public Safety Dispatch	Emergency Management Subsystem	Existing
Municipal Public Works Department	Municipal PWD	Maintenance and Construction Management Subsystem	Existing
	Municipal PWD Equipment Repair	Equipment Repair Facility	Existing
	Municipal PWD Maintenance Yard	Storage Facility	Existing
	Municipal PWD Vehicles	Maintenance and Construction Vehicle Subsystem	Existing
Municipal Traffic Department	Municipal Traffic Signal Systems	Traffic Management Subsystem	Existing
NOAA	National Weather Service	Weather Service	Existing
Other States Departments of Transportation	Other States TMCs	Traffic Management Subsystem	Existing
Private Information Service Providers	Private Sector Traveler Information Services	Information Service Provider Subsystem	Future
Private Taxi Providers	Private Taxi Provider Dispatch	Transit Management Subsystem	Existing

**Table 3 – Tyler Inventory of Regional Subsystems/Terminators (sorted by Stakeholder) (continued)**

Stakeholder	Element	Entity	Status
Private Tow/Wrecker Providers	Private Tow/Wrecker Dispatch	Emergency Management Subsystem	Existing
	Private Tow/Wrecker Vehicles	Emergency Vehicle Subsystem	Existing
Private Travelers	Private Travelers Personal Computing Devices	Personal Information Access Subsystem	Future
	Private Vehicles	Vehicle Subsystem	Existing
Private Weather Service Provider	Private Weather Service	Surface Transportation Weather Service	Existing
Rail Operators	Rail Operators	Rail Operations	Existing
	Rail Operators Wayside Equipment	Wayside Equipment	Existing
Regional Airports	Regional Airports	Multimodal Transportation Service Provider	Existing
Regional Medical Center	Private EMS Vehicles	Emergency Vehicle Subsystem	Existing
	Regional Medical Center Dispatch	Care Facility	Existing
	Regional Medical Center Dispatch	Emergency Management Subsystem	Existing
State of Texas Parks and Wildlife	State of Texas Parks and Wildlife Texas State Railroad	Rail Operations	Existing
	State of Texas Parks and Wildlife Texas State Railroad	Wayside Equipment	Existing
Texas Commission on Environmental Quality (TCEQ)	TCEQ Field Emissions Monitors	Roadway Subsystem	Existing
	TCEQ Monitor Operations Section	Emissions Management Subsystem	Existing
TxDOT	Other Texas Region TMCs	Traffic Management Subsystem	Existing
	Other TxDOT District Maintenance Sections	Maintenance and Construction Management Subsystem	Existing
	TxDOT 511 System	Information Service Provider Subsystem	Future
	TxDOT Area Engineers Office	Maintenance and Construction Administrative Systems	Existing
	TxDOT Area Engineers Office	Maintenance and Construction Management Subsystem	Existing
	TxDOT BRINSAP	Asset Management	Existing
	TxDOT Crash Record Information System Users	Archived Data User Systems	Future



**Table 3 – Tyler Inventory of Regional Subsystems/Terminators (sorted by Stakeholder) (continued)**

Stakeholder	Element	Entity	Status
TxDOT (continued)	TxDOT District Shop	Equipment Repair Facility	Existing
	TxDOT Fort Worth TMC (TransVision)	Traffic Management Subsystem	Existing
	TxDOT Highway Conditions Reporting System	Information Service Provider Subsystem	Existing
	TxDOT Highway Conditions Reporting System	Maintenance and Construction Management Subsystem	Existing
	TxDOT Motor Carrier Routing Information	Information Service Provider Subsystem	Existing
	TxDOT Rest Areas/Visitor Centers/Service Plaza Kiosks	Remote Traveler Support Subsystem	Future
	TxDOT Statewide Pavement Management System	Archived Data Management Subsystem	Existing
	TxDOT Tyler District Anti-icing Equipment	Roadway Subsystem	Future
	TxDOT Tyler District CCTV	Roadway Subsystem	Existing
	TxDOT Tyler District CVO Corridor System	Roadway Subsystem	Future
	TxDOT Tyler District DMS	Roadway Subsystem	Existing
	TxDOT Tyler District Environmental Sensors	Roadway Subsystem	Future
	TxDOT Tyler District Field Sensors	Roadway Subsystem	Existing
	TxDOT Tyler District HAR	Roadway Subsystem	Existing
	TxDOT Tyler District Maintenance Section Yards	Storage Facility	Existing
	TxDOT Tyler District Maintenance Sections	Maintenance and Construction Management Subsystem	Existing
	TxDOT Tyler District Maintenance Vehicles	Maintenance and Construction Vehicle Subsystem	Existing
	TxDOT Tyler District Office	Archived Data User Systems	Existing
	TxDOT Tyler District Office	Information Service Provider Subsystem	Existing
	TxDOT Tyler District Office	Maintenance and Construction Administrative Systems	Existing
	TxDOT Tyler District Office	Maintenance and Construction Management Subsystem	Existing

**Table 3 – Tyler Inventory of Regional Subsystems/Terminators (sorted by Stakeholder) (continued)**

Stakeholder	Element	Entity	Status
TxDOT (continued)	TxDOT Tyler District Office	Traffic Management Subsystem	Existing
	TxDOT Tyler District Pavement Management System	Archived Data Management Subsystem	Existing
	TxDOT Tyler District Pavement Management System	Archived Data User Systems	Existing
	TxDOT Tyler District Pavement Management System	Asset Management	Existing
	TxDOT Tyler District Pavement Management System Users	Archived Data User Systems	Future
	TxDOT Tyler District PTMS Users	Archived Data User Systems	Future
	TxDOT Tyler District Public Information Office	Information Service Provider Subsystem	Future
	TxDOT Tyler District TMC	Maintenance and Construction Management Subsystem	Existing
	TxDOT Tyler District TMC	Traffic Management Subsystem	Existing
	TxDOT Tyler District Traffic Signals	Roadway Subsystem	Existing
	TxDOT Tyler District Transit Providers Archive System	Archived Data Management Subsystem	Future
	TxDOT Tyler District Web Page	Information Service Provider Subsystem	Existing
	TxDOT Tyler District Web Page	Maintenance and Construction Management Subsystem	Existing
	TxDOT Tyler District Work Zone Equipment	Roadway Subsystem	Future
TxDOT Tyler District	TxDOT Tyler District Public Transportation Management System (PTMS)	Archived Data Management Subsystem	Existing
Tyler MPO	Tyler MPO System	Archived Data Management Subsystem	Existing
	Tyler MPO System Users	Archived Data User Systems	Future

**Table 4 – Tyler Inventory of Regional Subsystems/Terminators (sorted by Entity)**

Entity	Element	Stakeholder	Status
Archived Data Management Subsystem	ETCOG Planning Systems and Operational Database	ETCOG	Future
	Longview MPO System	Longview MPO	Existing
	Statewide Crash Records Information System	DPS	Existing
	TxDOT Statewide Pavement Management System	TxDOT	Existing
	TxDOT Tyler District Pavement Management System	TxDOT	Existing
	TxDOT Tyler District Public Transportation Management System (PTMS)	TxDOT Tyler District	Existing
	TxDOT Tyler District Transit Providers Archive System	TxDOT	Future
	Tyler MPO System	Tyler MPO	Existing
Archived Data User Systems	City of Longview TMC	City of Longview PWD	Existing
	City of Tyler Transit Dispatch	City of Tyler Transit	Existing
	COLT Transit Dispatch	City of Longview Transit System (COLT)	Existing
	DPS Local Emergency Planning Committee	DPS Local Emergency Planning Committee	Existing
	ETCOG Rural Transit Dispatch	ETCOG	Existing
	Longview MPO System Users	Longview MPO	Future
	TxDOT Crash Record Information System Users	TxDOT	Future
	TxDOT Tyler District Office	TxDOT	Existing
	TxDOT Tyler District Pavement Management System	TxDOT	Existing
	TxDOT Tyler District Pavement Management System Users	TxDOT	Future
	TxDOT Tyler District PTMS Users	TxDOT	Future
	Tyler MPO System Users	Tyler MPO	Future
Asset Management	TxDOT BRINSAP	TxDOT	Existing
	TxDOT Tyler District Pavement Management System	TxDOT	Existing

**Table 4 – Tyler Inventory of Regional Subsystems/Terminators (sorted by Entity) (continued)**

<b>Entity</b>	<b>Element</b>	<b>Stakeholder</b>	<b>Status</b>
Care Facility	East Texas Med Center EMS	East Texas Medical Center	Existing
	Regional Medical Center Dispatch	Regional Medical Center	Existing
Commercial Vehicle Administration Subsystem	Municipal or County Permitting System	Municipal or County Government	Existing
Commercial Vehicle Check Subsystem	DPS Inspection Stations	DPS	Existing
Commercial Vehicle Subsystem	Commercial Vehicles	Commercial Vehicle Operators	Existing
Emergency Management Subsystem	City of Longview Public Safety Dispatch	City of Longview Police Department	Existing
	County EOC	County Emergency Management Agencies	Existing
	County Public Safety Dispatch	County Sheriff	Existing
	DPS Administration	DPS	Existing
	DPS Communications Service	DPS	Existing
	East Texas 911 Communications Center	East Texas 911	Future
	East Texas Med Center EMS	East Texas Medical Center	Existing
	Municipal Government EOC	Municipal or County Government	Existing
	Municipal Public Safety Dispatch	Municipal or County Public Safety	Existing
	Private Tow/Wrecker Dispatch	Private Tow/Wrecker Providers	Existing
	Regional Medical Center Dispatch	Regional Medical Center	Existing
	State EOC	DPS Division of Emergency Management	Existing
Emergency Vehicle Subsystem	City of Longview Fire/EMS Vehicles	City of Longview Fire Dept.	Existing
	City of Longview Police Vehicles	City of Longview Police Department	Existing
	City of Tyler Fire Vehicles	City of Tyler Fire Department	Existing
	City of Tyler Police Vehicles	City of Tyler Police Department	Existing
	DPS Emergency Vehicles	DPS	Existing
	Municipal or County Emergency Vehicles	Municipal or County Public Safety	Existing

**Table 4 – Tyler Inventory of Regional Subsystems/Terminators (sorted by Entity) (continued)**

Entity	Element	Stakeholder	Status
Emergency Vehicle Subsystem (continued)	Private EMS Vehicles	Regional Medical Center	Existing
	Private Tow/Wrecker Vehicles	Private Tow/Wrecker Providers	Existing
Emissions Management Subsystem	TCEQ Monitor Operations Section	Texas Commission on Environmental Quality (TCEQ)	Existing
Equipment Repair Facility	County Road and Bridge Equipment Repair	County Road and Bridge	Existing
	Municipal PWD Equipment Repair	Municipal Public Works Department	Existing
	TxDOT District Shop	TxDOT	Existing
Event Promoters	Community Convention and Visitors Bureau	Community Convention and Visitors Bureau	Existing
Financial Institution	Financial Institution	Financial Institution	Future
Fleet and Freight Management Subsystem	Private Fleet Management Systems	Commercial Vehicle Operators	Future
Information Service Provider Subsystem	City of Tyler Transit Web Site	City of Tyler Transit	Existing
	COLT Transit Web Site	City of Longview Transit System (COLT)	Existing
	ETCOG Web Site	ETCOG	Existing
	Private Sector Traveler Information Services	Private Information Service Providers	Future
	Statewide Crash Records Information System	DPS	Existing
	TxDOT 511 System	TxDOT	Future
	TxDOT Highway Conditions Reporting System	TxDOT	Existing
	TxDOT Motor Carrier Routing Information	TxDOT	Existing
	TxDOT Tyler District Office	TxDOT	Existing
	TxDOT Tyler District Public Information Office	TxDOT	Future
	TxDOT Tyler District Web Page	TxDOT	Existing
Maintenance and Construction Administrative Systems	TxDOT Area Engineers Office	TxDOT	Existing
	TxDOT Tyler District Office	TxDOT	Existing

**Table 4 – Tyler Inventory of Regional Subsystems/Terminators (sorted by Entity) (continued)**

<b>Entity</b>	<b>Element</b>	<b>Stakeholder</b>	<b>Status</b>
Maintenance and Construction Management Subsystem	County Road and Bridge	County Road and Bridge	Existing
	Municipal PWD	Municipal Public Works Department	Existing
	Other TxDOT District Maintenance Sections	TxDOT	Existing
	TxDOT Area Engineers Office	TxDOT	Existing
	TxDOT Highway Conditions Reporting System	TxDOT	Existing
	TxDOT Tyler District Maintenance Sections	TxDOT	Existing
	TxDOT Tyler District Office	TxDOT	Existing
	TxDOT Tyler District TMC	TxDOT	Existing
	TxDOT Tyler District Web Page	TxDOT	Existing
Maintenance and Construction Vehicle Subsystem	County Road and Bridge Vehicles	County Road and Bridge	Existing
	Municipal PWD Vehicles	Municipal Public Works Department	Existing
	TxDOT Tyler District Maintenance Vehicles	TxDOT	Existing
Media	Community Air Quality Information Office System	Community Air Quality Public Information Office	Existing
	Local Print and Broadcast Media	Local Media	Existing
Multimodal Transportation Service Provider	Regional Airports	Regional Airports	Existing
Personal Information Access Subsystem	Private Travelers Personal Computing Devices	Private Travelers	Future
Rail Operations	Rail Operators	Rail Operators	Existing
	State of Texas Parks and Wildlife Texas State Railroad	State of Texas Parks and Wildlife	Existing
Remote Traveler Support Subsystem	City of Tyler Transit Stop Information Displays	City of Tyler Transit	Future
	GETTA-ride Transit Kiosk and Information Displays	ETCOG	Future
	Multimodal Transfer Center	City of Tyler Transit	Future
	TxDOT Rest Areas/Visitor Centers/Service Plaza Kiosks	TxDOT	Future

**Table 4 – Tyler Inventory of Regional Subsystems/Terminators (sorted by Entity) (continued)**

Entity	Element	Stakeholder	Status
Roadway Subsystem	City of Longview Field Equipment	City of Longview PWD	Existing
	City of Tyler Field Equipment	City of Tyler Traffic Engineering Dept.	Existing
	County Road and Bridge Field Equipment	County Road and Bridge	Future
	TCEQ Field Emissions Monitors	Texas Commission on Environmental Quality (TCEQ)	Existing
	TxDOT Tyler District Anti-icing Equipment	TxDOT	Future
	TxDOT Tyler District CCTV	TxDOT	Existing
	TxDOT Tyler District CVO Corridor System	TxDOT	Future
	TxDOT Tyler District DMS	TxDOT	Existing
	TxDOT Tyler District Environmental Sensors	TxDOT	Future
	TxDOT Tyler District Field Sensors	TxDOT	Existing
	TxDOT Tyler District HAR	TxDOT	Existing
	TxDOT Tyler District Traffic Signals	TxDOT	Existing
	TxDOT Tyler District Work Zone Equipment	TxDOT	Future
Storage Facility	County Road and Bridge Maintenance Yard	County Road and Bridge	Future
	Municipal PWD Maintenance Yard	Municipal Public Works Department	Existing
	TxDOT Tyler District Maintenance Section Yards	TxDOT	Existing
Surface Transportation Weather Service	Private Weather Service	Private Weather Service Provider	Existing
Traffic Management Subsystem	City of Longview TMC	City of Longview PWD	Existing
	City of Tyler TMC	City of Tyler Traffic Engineering Dept.	Existing
	Municipal Traffic Signal Systems	Municipal Traffic Department	Existing
	Other States TMCs	Other States Departments of Transportation	Existing
	Other Texas Region TMCs	TxDOT	Existing
	TxDOT Fort Worth TMC (TransVision)	TxDOT	Existing

**Table 4 – Tyler Inventory of Regional Subsystems/Terminators (sorted by Entity) (continued)**

<b>Entity</b>	<b>Element</b>	<b>Stakeholder</b>	<b>Status</b>
Traffic Management Subsystem (continued)	TxDOT Tyler District Office	TxDOT	Existing
	TxDOT Tyler District TMC	TxDOT	Existing
Transit Management Subsystem	City of Tyler Transit Dispatch	City of Tyler Transit	Existing
	COLT Transit Dispatch	City of Longview Transit System (COLT)	Existing
	ETCOG Rural Transit Dispatch	ETCOG	Existing
	Independent School District Dispatch	Independent School Districts	Existing
	Private Taxi Provider Dispatch	Private Taxi Providers	Existing
Transit Vehicle Subsystem	City of Tyler Transit Vehicles	City of Tyler Transit	Existing
	COLT Transit Vehicles	City of Longview Transit System (COLT)	Existing
	ETCOG Rural Transit Vehicles	ETCOG	Existing
	Independent School District Buses	Independent School Districts	Existing
Traveler Card	GETTA-ride Regional Transit Card	ETCOG	Future
Vehicle Subsystem	Commercial Vehicles	Commercial Vehicle Operators	Existing
	Private Vehicles	Private Travelers	Existing
Wayside Equipment	Rail Operators Wayside Equipment	Rail Operators	Existing
	State of Texas Parks and Wildlife Texas State Railroad	State of Texas Parks and Wildlife	Existing
Weather Service	National Weather Service	NOAA	Existing



## 4.2 Regional Market Packages

Upon completion of the system inventory, the next step in the development of the architecture was to identify the transportation services that are important to the Tyler Region. In the National ITS Architecture, services are referred to as market packages. Market packages could include several stakeholders and elements that work together to provide a service in the Region. Examples of market packages from the National ITS Architecture include Network Surveillance, Traffic Information Dissemination, and Transit Vehicle Tracking. There are currently a total of 75 market packages identified in the National ITS Architecture.

In the Tyler Region, the National ITS Architecture market packages were reviewed by the stakeholders and selected based on the relevance of the service that the market package could provide to the Region. All of the market packages that stakeholders in the Tyler selected for implementation in the Region are identified in **Table 5**, as well as the primary stakeholders responsible for implementing the market packages and the elements in the Region that serve a role in providing the market package service.

In several cases, there are multiple stakeholders in the Region that provide the same service at different levels. For example, Surface Street Control (ATMS03) could be provided on highways through the TxDOT Tyler District and on arterials by the City of Longview and the City of Tyler. The market packages are identified as either existing, planned, or future for the Region. In many cases, existing market packages might still need to be enhanced to increase the service that the market package provides.

Upon selecting the market packages that were applicable for the Region, stakeholders then reviewed each market package and the elements that could be included to customize it for the Region. This customization is discussed further in the following section.

**Table 5 – Tyler Region Selected Market Packages**

Market Package	Market Package Name	Elements Associated with Market Package	Primary Stakeholders Responsible for Implementation	Status
ATMS01	Network Surveillance	City of Longview Field Equipment City of Longview TMC City of Tyler Field Equipment City of Tyler TMC Private Sector Traveler Information Services TxDOT Tyler District CCTV TxDOT Tyler District Field Sensors TxDOT Tyler District TMC TxDOT Tyler District Web Page	City of Longview	Existing
			City of Tyler	Existing
			TxDOT Tyler District	Existing
ATMS02	Probe Surveillance	Commercial Vehicles Private Vehicles TxDOT Tyler District CVO Corridor System TxDOT Tyler District TMC	TxDOT Tyler District	Future

**Table 5 – Tyler Region Selected Market Packages (continued)**

<b>Market Package</b>	<b>Market Package Name</b>	<b>Elements Associated with Market Package</b>	<b>Primary Stakeholders Responsible for Implementation</b>	<b>Status</b>
ATMS03	Surface Street Control	City of Longview Field Equipment City of Longview TMC City of Tyler Field Equipment City of Tyler TMC TxDOT Tyler District TMC TxDOT Tyler District Traffic Signals	City of Longview	Existing
			City of Tyler	Existing
			TxDOT Tyler District	Existing
ATMS06	Traffic Information Dissemination	City of Longview Public Safety Dispatch City of Longview TMC City of Tyler Field Equipment City of Tyler TMC City of Tyler Transit Dispatch COLT Transit Dispatch County EOC County Public Safety Dispatch County Road and Bridge DPS Communications Service East Texas 911 Communications Center ETCOG Rural Transit Dispatch Independent School District Dispatch Local Print and Broadcast Media Municipal Government EOC Municipal Public Safety Dispatch Municipal PWD Private Tow/Wrecker Dispatch Regional Medical Center Dispatch State EOC TxDOT Tyler District DMS TxDOT Tyler District HAR TxDOT Tyler District Office TxDOT Tyler District TMC	TxDOT Tyler District	Future
			City of Longview	Future
			City of Tyler	Future
ATMS07	Regional Traffic Control	City of Longview TMC City of Tyler TMC Other Texas Region TMCs TxDOT Fort Worth TMC (TransVision) TxDOT Tyler District TMC	TxDOT Tyler District	Future

**Table 5 – Tyler Region Selected Market Packages (continued)**

<b>Market Package</b>	<b>Market Package Name</b>	<b>Elements Associated with Market Package</b>	<b>Primary Stakeholders Responsible for Implementation</b>	<b>Status</b>
ATMS08	Incident Management System	City of Longview Fire/EMS Vehicles City of Longview Police Vehicles City of Longview Public Safety Dispatch City of Longview TMC City of Tyler Fire Vehicles City of Tyler Police Vehicles City of Tyler TMC Community Convention and Visitors Bureau County EOC County Public Safety Dispatch County Road and Bridge DPS Communications Service DPS Emergency Vehicles East Texas 911 Communications Center Municipal Government EOC Municipal or County Emergency Vehicles Municipal Public Safety Dispatch Municipal PWD Municipal Traffic Signal Systems Other States TMCs Other Texas Region TMCs Other TxDOT District Maintenance Sections Private EMS Vehicles Private Tow/Wrecker Dispatch Private Tow/Wrecker Vehicles Regional Medical Center Dispatch State EOC TxDOT Tyler District Environmental Sensors TxDOT Tyler District Office TxDOT Tyler District TMC	Emergency and Transportation Agencies	Future
ATMS11	Emissions Monitoring and Management	Community Air Quality Information Office System Local Print and Broadcast Media TCEQ Field Emissions Monitors TCEQ Monitor Operations Section TxDOT Tyler District TMC	Texas Commission on Environmental Quality	Future

**Table 5 – Tyler Region Selected Market Packages (continued)**

<b>Market Package</b>	<b>Market Package Name</b>	<b>Elements Associated with Market Package</b>	<b>Primary Stakeholders Responsible for Implementation</b>	<b>Status</b>
ATMS13	Standard Railroad Grade Crossing	City of Longview Field Equipment City of Longview TMC City of Tyler Field Equipment City of Tyler TMC Rail Operators Rail Operators Wayside Equipment State of Texas Parks and Wildlife Texas State Railroad TxDOT Tyler District TMC TxDOT Tyler District Traffic Signals	City of Longview	Existing
			City of Tyler	Existing
			TxDOT Tyler District	Existing
ATMS15	Railroad Operations Coordination	City of Longview TMC City of Tyler TMC Rail Operators State of Texas Parks and Wildlife Texas State Railroad TxDOT Tyler District TMC	City of Longview	Future
			City of Tyler	Future
			TxDOT Tyler District	Future
EM1	Emergency Response	City of Longview Fire/EMS Vehicles City of Longview Police Vehicles City of Longview Public Safety Dispatch City of Tyler Fire Vehicles City of Tyler Police Vehicles County Public Safety Dispatch DPS Communications Service DPS Emergency Vehicles East Texas 911 Communications Center East Texas Med Center EMS Municipal or County Emergency Vehicles Municipal Public Safety Dispatch Private EMS Vehicles Private Tow/Wrecker Dispatch Private Tow/Wrecker Vehicles Regional Medical Center Dispatch Tyler Regional Incident and Mutual Aid Network	Emergency and Transportation Agencies	Future

**Table 5 – Tyler Region Selected Market Packages (continued)**

<b>Market Package</b>	<b>Market Package Name</b>	<b>Elements Associated with Market Package</b>	<b>Primary Stakeholders Responsible for Implementation</b>	<b>Status</b>
EM2	Emergency Routing	City of Longview Field Equipment City of Longview Fire/EMS Vehicles City of Longview Public Safety Dispatch City of Longview TMC City of Tyler Field Equipment City of Tyler Fire Vehicles City of Tyler TMC East Texas 911 Communications Center Private EMS Vehicles Regional Medical Center Dispatch TxDOT Tyler District TMC TxDOT Tyler District Traffic Signals	City of Longview	Future
			City of Tyler	Future
			Private EMS	Future
MC01	Maintenance and Construction Vehicle Tracking	County Road and Bridge County Road and Bridge Vehicles Municipal PWD Municipal PWD Vehicles TxDOT Tyler District Maintenance Sections TxDOT Tyler District Maintenance Vehicles	TxDOT Tyler District	Future
			County Road and Bridge	Future
			Municipal PWD	Future
MC02	Maintenance and Construction Vehicle Maintenance	County Road and Bridge County Road and Bridge Equipment Repair County Road and Bridge Vehicles Municipal PWD Municipal PWD Equipment Repair Municipal PWD Vehicles TxDOT District Shop TxDOT Tyler District Maintenance Sections TxDOT Tyler District Maintenance Vehicles	TxDOT Tyler District	Future
			County Road and Bridge	Future
			Municipal PWD	Future
MC03	Road Weather Data Collection	National Weather Service Private Weather Service TxDOT Tyler District Environmental Sensors TxDOT Tyler District Office TxDOT Tyler District TMC	TxDOT Tyler District	Future

**Table 5 – Tyler Region Selected Market Packages (continued)**

Market Package	Market Package Name	Elements Associated with Market Package	Primary Stakeholders Responsible for Implementation	Status
MC04	Weather Information Processing and Distribution	City of Longview Public Safety Dispatch City of Longview TMC City of Tyler TMC City of Tyler Transit Dispatch COLT Transit Dispatch County EOC County Public Safety Dispatch County Road and Bridge DPS Communications Service East Texas 911 Communications Center ETCOG Rural Transit Dispatch Independent School District Dispatch Local Print and Broadcast Media Municipal Government EOC Municipal Public Safety Dispatch Municipal PWD National Weather Service Other Texas Region TMCs Private Tow/Wrecker Dispatch Private Weather Service Rail Operators Regional Medical Center Dispatch State EOC State of Texas Parks and Wildlife Texas State Railroad TxDOT Highway Conditions Reporting System TxDOT Tyler District Maintenance Sections TxDOT Tyler District Office TxDOT Tyler District TMC TxDOT Tyler District Web Page	TxDOT Tyler District	Future
MC05	Roadway Automated Treatment	City of Longview Field Equipment City of Tyler Field Equipment TxDOT Tyler District Anti-icing Equipment TxDOT Tyler District DMS	TxDOT Tyler District	Future

**Table 5 – Tyler Region Selected Market Packages (continued)**

Market Package	Market Package Name	Elements Associated with Market Package	Primary Stakeholders Responsible for Implementation	Status
MC07	Roadway Maintenance and Construction	City of Longview TMC	TxDOT Tyler District	Future
		City of Tyler TMC	County Road and Bridge	Future
		County Road and Bridge	Municipal PWD	Future
		County Road and Bridge Maintenance Yard		
		County Road and Bridge Vehicles		
		Municipal PWD		
		Municipal PWD Maintenance Yard		
		Municipal PWD Vehicles		
		Municipal Traffic Signal Systems		
		National Weather Service		
Other States TMCs				
Other Texas Region TMCs				
TxDOT BRINSAP				
TxDOT Tyler District Maintenance Section Yards				
TxDOT Tyler District Maintenance Sections				
TxDOT Tyler District Maintenance Vehicles				
TxDOT Tyler District Office				
TxDOT Tyler District TMC				
MC08	Work Zone Management	City of Longview Field Equipment	TxDOT Tyler District	Future
		City of Longview Public Safety Dispatch	County Road and Bridge	Future
		City of Longview TMC	Municipal PWD	Future
		City of Tyler Field Equipment	City of Tyler	Future
		City of Tyler TMC	City of Longview	Future
		City of Tyler Transit Dispatch		
		COLT Transit Dispatch		
		County EOC		
		County Public Safety Dispatch		
		County Road and Bridge		
		County Road and Bridge Field Equipment		
		County Road and Bridge Vehicles		
		DPS Communications Service		
		East Texas 911 Communications Center		
		ETCOG Rural Transit Dispatch		
		Independent School District Dispatch		
Municipal Government EOC				
Municipal Public Safety Dispatch				
Municipal PWD				
Municipal PWD Vehicles				

**Table 5 – Tyler Region Selected Market Packages (continued)**

<b>Market Package</b>	<b>Market Package Name</b>	<b>Elements Associated with Market Package</b>	<b>Primary Stakeholders Responsible for Implementation</b>	<b>Status</b>
MC08 (continued)	Work Zone Management (continued)	Municipal Traffic Signal Systems Other States TMCs Other Texas Region TMCs Private Tow/Wrecker Dispatch Regional Medical Center Dispatch State EOC TxDOT Highway Conditions Reporting System TxDOT Tyler District DMS TxDOT Tyler District HAR TxDOT Tyler District Maintenance Sections TxDOT Tyler District Maintenance Vehicles TxDOT Tyler District Office TxDOT Tyler District TMC TxDOT Tyler District Web Page		
MC09	Work Zone Safety Monitoring	County Road and Bridge County Road and Bridge Field Equipment County Road and Bridge Vehicles TxDOT Tyler District Maintenance Sections TxDOT Tyler District Maintenance Vehicles TxDOT Tyler District Work Zone Equipment	TxDOT Tyler District	Future
			County Road and Bridge	Future
MC10	Maintenance and Construction Activity Coordination	City of Longview Public Safety Dispatch City of Longview TMC City of Tyler TMC City of Tyler Transit Dispatch COLT Transit Dispatch County Public Safety Dispatch County Road and Bridge DPS Communications Service East Texas 911 Communications Center ETCOG Rural Transit Dispatch Municipal Public Safety Dispatch Municipal PWD Private Tow/Wrecker Dispatch Rail Operators Regional Medical Center Dispatch State of Texas Parks and Wildlife Texas State Railroad TxDOT Area Engineers Office	TxDOT Tyler District	Future
			County Road and Bridge	Future
			Municipal PWD	Future



**Table 5 – Tyler Region Selected Market Packages (continued)**

<b>Market Package</b>	<b>Market Package Name</b>	<b>Elements Associated with Market Package</b>	<b>Primary Stakeholders Responsible for Implementation</b>	<b>Status</b>
MC10 (continued)	Maintenance and Construction Activity Coordination (continued)	TxDOT Highway Conditions Reporting System TxDOT Tyler District Maintenance Sections TxDOT Tyler District Office TxDOT Tyler District TMC TxDOT Tyler District Web Page		
APTS1	Transit Vehicle Tracking	City of Tyler Transit Dispatch City of Tyler Transit Vehicles COLT Transit Dispatch COLT Transit Vehicles ETCOG Rural Transit Dispatch ETCOG Rural Transit Vehicles	City of Tyler Transit	Future
			Longview Transit	Future
			ETCOG Rural Transit	Future
APTS2	Transit Fixed-Route Operations	City of Longview TMC City of Tyler TMC City of Tyler Transit Dispatch City of Tyler Transit Vehicles City of Tyler Transit Web Site COLT Transit Dispatch COLT Transit Vehicles COLT Transit Web Site Independent School District Buses Independent School District Dispatch Private Sector Traveler Information Services TxDOT Tyler District TMC	City of Tyler Transit	Future
			Independent School Districts	Future
APTS3	Demand Response Transit Operations	City of Longview TMC City of Tyler TMC City of Tyler Transit Dispatch City of Tyler Transit Vehicles City of Tyler Transit Web Site COLT Transit Dispatch COLT Transit Vehicles COLT Transit Web Site ETCOG Rural Transit Dispatch ETCOG Rural Transit Vehicles ETCOG Web Site TxDOT Tyler District TMC	City of Tyler Transit	Future
			Longview Transit	Future
			ETCOG Rural Transit	Future

**Table 5 – Tyler Region Selected Market Packages (continued)**

<b>Market Package</b>	<b>Market Package Name</b>	<b>Elements Associated with Market Package</b>	<b>Primary Stakeholders Responsible for Implementation</b>	<b>Status</b>
APTS4	Transit Passenger and Fare Management	City of Tyler Transit Dispatch City of Tyler Transit Vehicles COLT Transit Dispatch COLT Transit Vehicles ETCOG Rural Transit Dispatch ETCOG Rural Transit Vehicles Financial Institution GETTA-ride Regional Transit Card GETTA-ride Transit Kiosk and Information Displays	City of Tyler Transit	Future
			Longview Transit	Future
			ETCOG Rural Transit	Future
APTS5	Transit Security	City of Longview Public Safety Dispatch City of Tyler Transit Dispatch City of Tyler Transit Vehicles COLT Transit Dispatch COLT Transit Vehicles County Public Safety Dispatch East Texas 911 Communications Center ETCOG Rural Transit Dispatch ETCOG Rural Transit Vehicles	City of Tyler Transit	Future
			Longview Transit	Future
			ETCOG Rural Transit	Future
APTS7	Multi-modal Coordination	City of Tyler Transit Dispatch COLT Transit Dispatch ETCOG Rural Transit Dispatch Private Taxi Provider Dispatch Regional Airports	City of Tyler Transit	Future
			Longview Transit	Future
			ETCOG Rural Transit	Future
APTS8	Transit Traveler Information	City of Tyler Transit Dispatch City of Tyler Transit Stop Information Displays City of Tyler Transit Web Site COLT Transit Dispatch COLT Transit Web Site ETCOG Rural Transit Dispatch ETCOG Web Site GETTA-ride Transit Kiosk and Information Displays Multimodal Transfer Center Private Travelers Personal Computing Devices	City of Tyler Transit	Future
			Longview Transit	Future
			ETCOG Rural Transit	Future

**Table 5 – Tyler Region Selected Market Packages (continued)**

<b>Market Package</b>	<b>Market Package Name</b>	<b>Elements Associated with Market Package</b>	<b>Primary Stakeholders Responsible for Implementation</b>	<b>Status</b>
CVO01	Fleet Administration	Commercial Vehicles Private Fleet Management Systems Private Sector Traveler Information Services TxDOT Motor Carrier Routing Information	Fleet and Freight Management	Future
CVO04	CV Administrative Processes	Municipal or County Permitting System Private Fleet Management Systems	Municipal or County Government	Existing
CVO06	Weigh-In-Motion	Commercial Vehicles DPS Inspection Stations	Department of Public Safety	Existing
CVO08	On-board CVO Safety	Commercial Vehicles DPS Inspection Stations Private Fleet Management Systems	Department of Public Safety	Future
CVO09	CVO Fleet Maintenance	Commercial Vehicles Private Fleet Management Systems	Fleet and Freight Management	Future
CVO10	HAZMAT Management	City of Longview Public Safety Dispatch Commercial Vehicles DPS Communications Service East Texas 911 Communications Center Private Fleet Management Systems	Emergency Management Agencies	Future
ATIS1	Broadcast Traveler Information	City of Longview TMC City of Tyler TMC Local Print and Broadcast Media Other Texas Region TMCs TxDOT 511 System TxDOT Rest Areas/Visitor Centers/Service Plaza Kiosks TxDOT Tyler District Office TxDOT Tyler District Public Information Office TxDOT Tyler District TMC TxDOT Tyler District Web Page	TxDOT Tyler District	Future
ATIS5	ISP Based Route Guidance	TxDOT Motor Carrier Routing Information TxDOT Tyler District Office TxDOT Tyler District TMC	TxDOT Tyler District	Future

**Table 5 – Tyler Region Selected Market Packages (continued)**

Market Package	Market Package Name	Elements Associated with Market Package	Primary Stakeholders Responsible for Implementation	Status
AD1	ITS Data Mart	City of Longview Public Safety Dispatch	TxDOT Tyler District	Future
		City of Longview TMC	Longview MPO	Future
		City of Tyler TMC	Tyler MPO	Future
City of Tyler Transit Dispatch COLT Transit Dispatch County EOC County Public Safety Dispatch DPS Administration DPS Communications Service DPS Local Emergency Planning Committee East Texas 911 Communications Center ETCOG Planning Systems and Operational Database ETCOG Rural Transit Dispatch Longview MPO System Longview MPO System Users Municipal Government EOC Municipal Public Safety Dispatch Private Tow/Wrecker Dispatch Regional Medical Center Dispatch State EOC Statewide Crash Records Information System TxDOT Crash Record Information System Users TxDOT Tyler District Pavement Management System TxDOT Tyler District Pavement Management System Users TxDOT Tyler District PTMS Users TxDOT Tyler District Public Transportation Management System (PTMS) TxDOT Tyler District TMC TxDOT Tyler District Transit Providers Archive System Tyler MPO System Tyler MPO System Users				

## 4.3 Interconnections

### 4.3.1 Top Level Regional System Interconnect Diagram

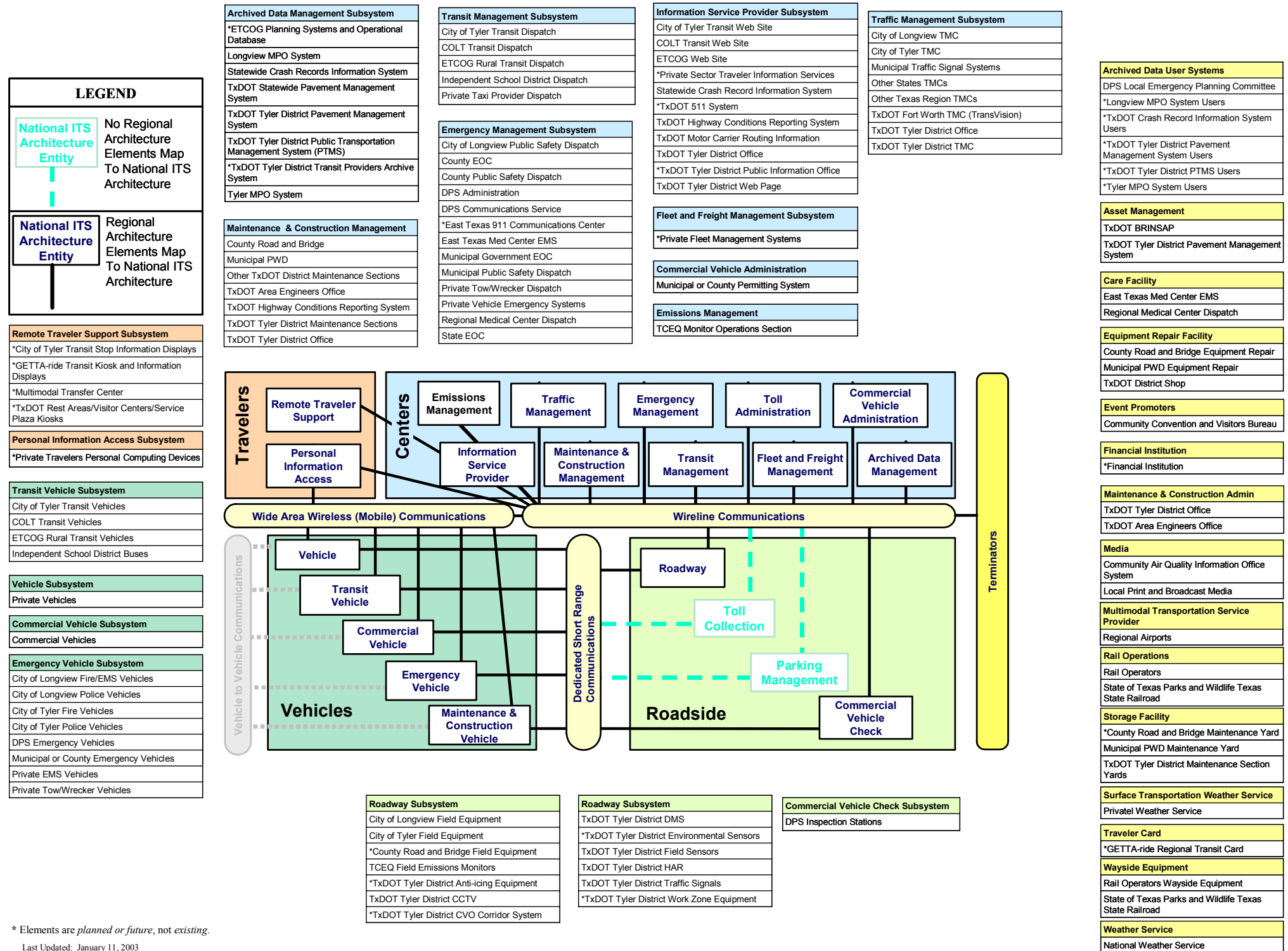
A system interconnect diagram, or sausage diagram (shown previously in **Figure 4**), shows the systems and primary interconnects in the Region. The National ITS Architecture interconnect diagram has been customized for the Tyler Region based on the information gathered from the stakeholders and system inventory. **Figure 5** summarizes the existing, planned, and future ITS elements for the Tyler Region in the context of a physical interconnect. Subsystems and elements specific to Tyler are called out in the boxes surrounding the main interconnect diagram, and these are color-coded to the subsystem to which they are associated. The rectangles represent the architecture subsystems, and the terminators are represented by the rounded rectangles. Elements with an asterisk (\*) are planned and future system elements.

### 4.3.2 Customized Market Packages

The market packages in the National ITS Architecture were customized to reflect the unique systems, subsystems, and terminators in the Tyler Region. Each market package is shown graphically, with the market package name, Tyler-specific element, and with the unique agency and system identifiers within the subsystems and terminators.

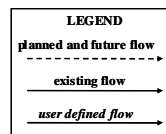
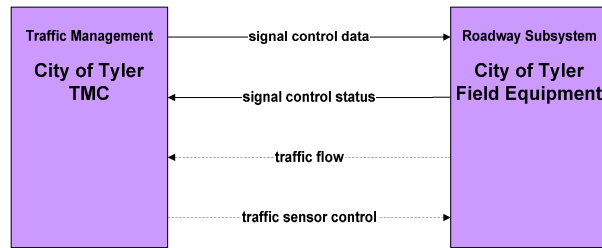
**Figure 6** is an example of an ATMS market package for Surface Street Control that has been customized for the Tyler Region. This market package shows the two subsystems, Traffic Management and Roadway, and the associated entities (City of Tyler TMC and City of Tyler Field Equipment). Data flows between the subsystems and/or terminators indicate what information is being shared.

Market packages that were customized for the Tyler Region are shown in **Appendix A**. These market packages also are included on the Tyler Regional ITS Architecture web site by selecting the “Market Package” button. Market packages are grouped by functional area (Traffic Management, Maintenance and Construction, Public Transportation, etc.), and each of the customized market packages can be viewed by clicking on the Market Package Diagram icon under each area heading. It is important to note that while the market package table on the web site shows all of the available market packages from the National ITS Architecture, only those selected for the Tyler Region are included in the diagrams. The selected market packages on the web site also are highlighted in the table with bold print, and are indicated as existing or planned.



\* Elements are *planned or future*, not existing.  
Last Updated: January 11, 2003

Figure 5 – Tyler Regional System Interconnect Diagram



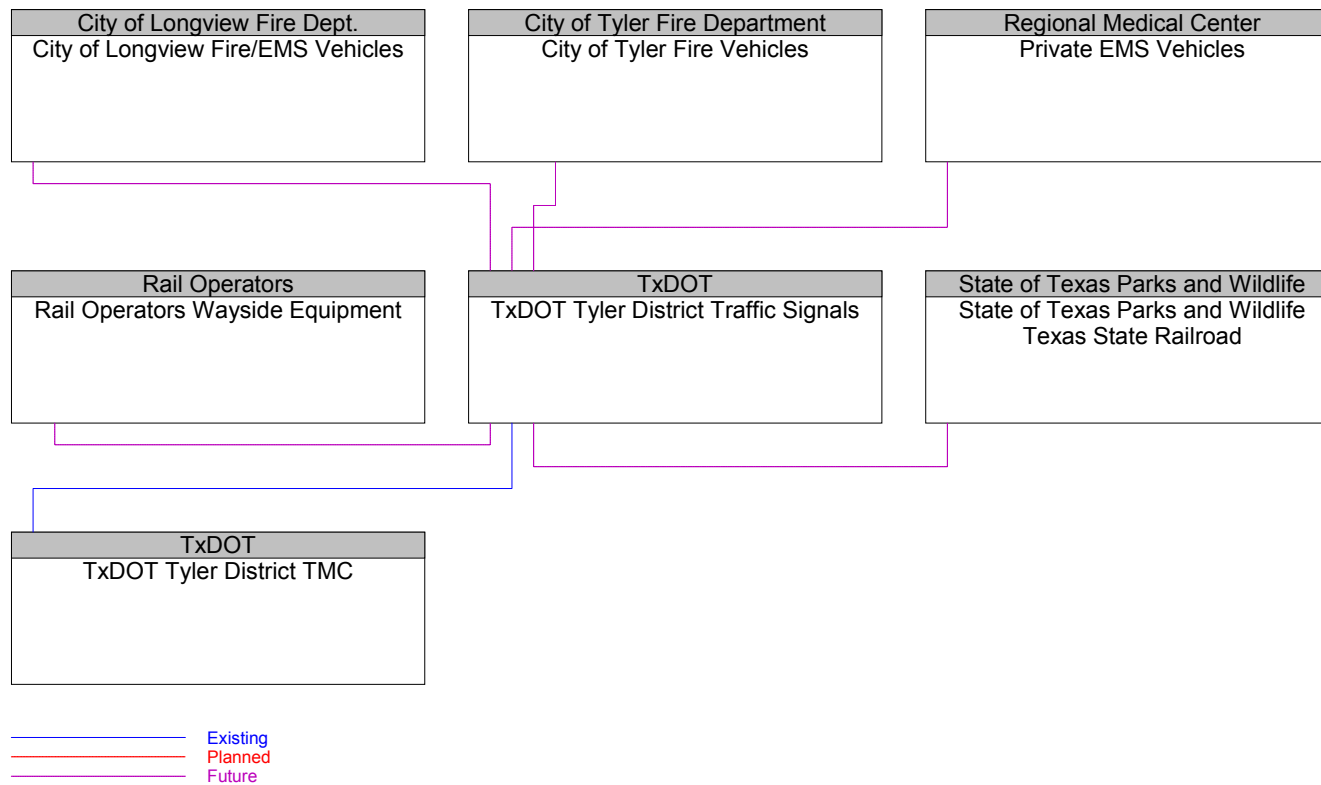
**Figure 6 – Custom Market Package for Tyler Surface Street Control**

#### 4.3.3 Tyler Architecture Interfaces

While it is important to identify the various systems and stakeholders as part of a regional ITS, a primary purpose of the architecture is to identify the *connectivity* between transportation systems in the Tyler Region. The interconnect diagram shown previously in **Figure 5** showed the high-level relationships of the subsystems and terminators in the Tyler Region and the associated local projects and systems. The customized market packages represent services that can be deployed as an integrated capability, and the market package diagrams show the information flows between the subsystems and terminators that are most important to the operation of the market packages. How these systems interface with each other is an integral part of the overall ITS architecture.

There are 111 different elements identified as part of the Tyler Regional ITS Architecture. These elements include local and state TOCs, transit vehicles, dispatch systems, emergency management agencies, media outlets, and others – essentially, all of the existing and planned physical components that contribute to the regional intelligent transportation system. Interfaces have been identified for each element in the Tyler Regional ITS Architecture, and each element has been mapped to those other elements with which it must interface. For example, the City of Tyler TMC has existing or planned interfaces with 26 other elements in the Tyler Region, ranging from field equipment and dispatch centers, to transit and emergency operations centers. Other interfaces are far less complex, such as the interface between the City of Tyler Police Vehicles and the City of Tyler Public Safety Dispatch.

An example of one of the system interfaces is shown in **Figure 7**. This graphic shows the TxDOT Tyler District Traffic Signals and the existing and planned interfaces with other elements throughout the Region. These interfaces are shown as existing, planned, or future. Interfaces defined as planned have funding identified, while future interfaces are desired by stakeholders but funding has not yet been identified.



**Figure 7 – TxDOT Tyler Traffic Signals Interfaces**



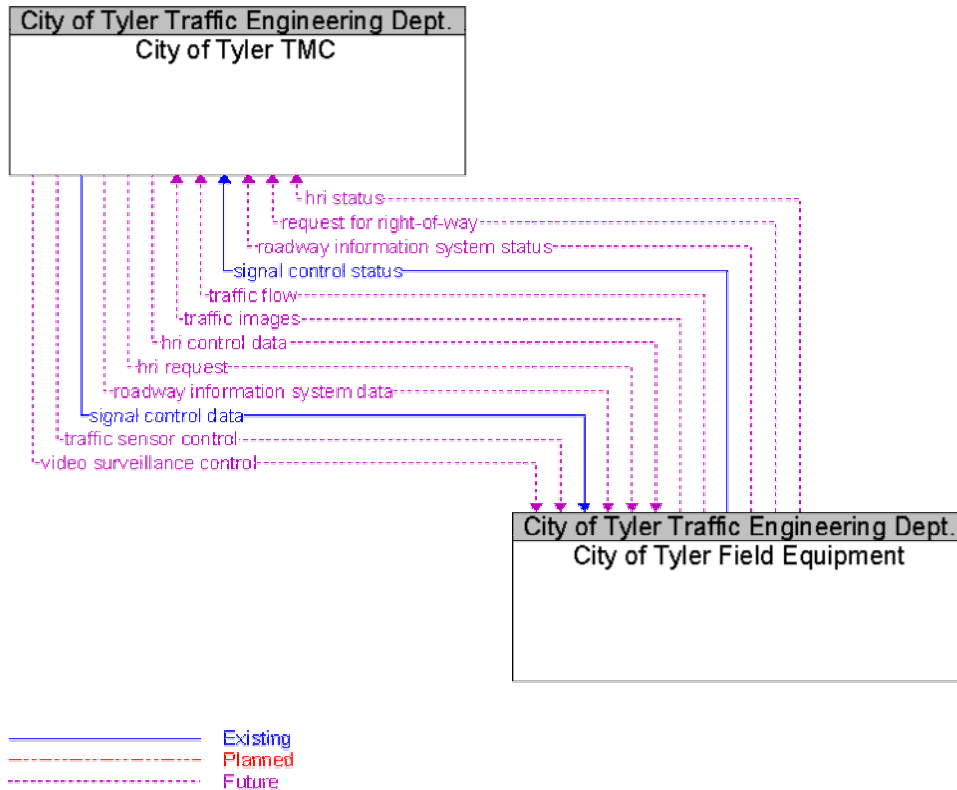
Each element and its defined interfaces are listed in **Appendix B**. Elements and their interfaces also are accessible via the Tyler Regional ITS Architecture web site by clicking on the “Interfaces” button. Elements are listed alphabetically in the column on the left, and each entry in the Interfacing Element column on the right is a link to more detailed information about the particular interface. The architecture flows between the individual element interfaces are described in more detail in the following section.

#### *4.3.4 Physical Subsystem Architecture Flows*

Architecture flows between the subsystems and terminators define the specific information (data) that is exchanged between subsystems and terminators. Each architecture flow has one or more data flows that specify what information is exchanged and the direction of the exchange. These data flows could be requests for information, alerts and messages, status requests, broadcast advisories, event messages, confirmations, and other key information requirements. These architecture flows define the interface requirements between the various elements in the Tyler Regional ITS Architecture.

An example of the architecture flows between two elements is shown in **Figure 8**. In this interface, the flows between the City of Tyler TMC and the City’s Field Equipment show information that must go from the TMC to the field equipment, as well as information that the TMC needs from devices. Similar to the interfaces, architecture flows also are defined as existing, planned, or future.

Each of the individual element interfaces can be accessed on the Tyler Regional ITS Architecture web site by clicking on the “Interfaces” button. Selecting any of the interfacing elements from the column on the right will display an interface diagram and architecture flows between two specific elements, similar to the diagram shown in **Figure 8**. Each data flow is defined, and any standards associated with that data flow are noted. Standards as they apply to the Tyler Region are discussed in more detail in Section 4.5.



**Figure 8 – Tyler TMC to Field Equipment Architecture Flows**

#### 4.4 Functional Requirements

Functions are a description of what the system has to do. In the National ITS Architecture, functions are defined at several different levels, ranging from general subsystem descriptions through somewhat more specific equipment package descriptions to Process Specifications that include substantial detail. Guidance from the USDOT on developing a Regional ITS Architecture recommends that each Region determine the level of detail of the functional requirements for their Region. In the Tyler Region, it is recommended that the development of detailed functional requirements such as the “shall” statements included in Process Specifications for a system be developed at the project level. These detailed “shall” statements identify all functions that a project or system needs to perform.

For the Tyler Regional ITS Architecture, functional requirements have been identified at two levels. The customized market packages, included in Section 4.3.2, describe the services that ITS needs to provide in the Region and the architecture flows between the elements. These market packages and data flows describe what the ITS system in Tyler has to do and the data that needs to be shared among elements.

At a more detailed level, functional requirements for the Tyler Region also are described in terms of equipment packages that are associated with one or more subsystems in the Tyler Regional ITS Architecture as shown in **Table 6**. An equipment package is a functional capability that could be deployed at a specific time. Each equipment package can be linked in the National ITS Architecture to the Process Specifications that might be applicable. It is recommended that during

the design concept stage of a project, the applicable equipment package and associated Process Specifications from the National ITS Architecture be reviewed by the implementer to determine the appropriate functional requirements for the project. A link for each equipment package is available on the Tyler Regional ITS Architecture web site by clicking on the “Functions” button.

**Table 6 – Tyler Region Equipment Packages**

<b>Subsystem</b>	<b>Equipment Package</b>
Archived Data Management Subsystem	Government Reporting Systems Support
	ITS Data Repository
	On-Line Analysis and Mining
	Traffic and Roadside Data Archival
Commercial Vehicle Administration Subsystem	Credentials and Taxes Administration
	CV Information Exchange
Commercial Vehicle Check Subsystem	Citation and Accident Electronic Recording
	Roadside Safety Inspection
	Roadside WIM
Commercial Vehicle Subsystem	On-board Cargo Monitoring
	On-board CV Electronic Data
	On-board CV Safety
	On-board Trip Monitoring
Emergency Management Subsystem	Emergency Call-Taking
	Emergency Data Collection
	Emergency Dispatch
	Emergency Environmental Monitoring
	Emergency Response Management
	Mayday Support
Emergency Vehicle Subsystem	On-board EV En Route Support
	On-board EV Incident Management Communication
Emissions Management Subsystem	Emissions Data Management
Fleet and Freight Management Subsystem	Fleet Administration
	Fleet Credentials and Taxes Management and Reporting
	Fleet HAZMAT Management
	Fleet Maintenance Management
Information Service Provider Subsystem	Basic Information Broadcast
	Infrastructure Provided Route Selection
	Interactive Infrastructure Information
	ISP Data Collection
	ISP Probe Information Collection

**Table 6 – Tyler Region Equipment Packages (continued)**

<b>Subsystem</b>	<b>Equipment Package</b>
Maintenance and Construction Management Subsystem	MCM Data Collection
	MCM Environmental Information Collection
	MCM Environmental Information Processing
	MCM Incident Management
	MCM Maintenance Decision Support
	MCM Roadway Maintenance and Construction
	MCM Vehicle and Equipment Maintenance Management
	MCM Vehicle Tracking
	MCM Work Activity Coordination
	MCM Work Zone Management
	MCM Work Zone Safety Management
Maintenance and Construction Vehicle Subsystem	MCV Infrastructure Monitoring
	MCV Roadway Maintenance and Construction
	MCV Vehicle Location Tracking
	MCV Vehicle Safety Monitoring
	MCV Vehicle System Monitoring and Diagnostics
	MCV Work Zone Support
Personal Information Access Subsystem	Personal Interactive Information Reception
Remote Traveler Support Subsystem	Remote Basic Information Reception
	Remote Transit Fare Management
	Remote Transit Information Services
Roadway Subsystem	Roadside Signal Priority
	Roadway Automated Treatment
	Roadway Basic Surveillance
	Roadway Emissions Monitoring
	Roadway Environmental Monitoring
	Roadway Equipment Coordination
	Roadway Incident Detection
	Roadway Probe Beacons
	Roadway Signal Controls
	Roadway Traffic Information Dissemination
	Roadway Work Zone Safety
	Roadway Work Zone Traffic Control
	Standard Rail Crossing
Traffic Management Subsystem	Collect Traffic Surveillance
	HRI Traffic Management
	Rail Operations Coordination
	TMC Environmental Monitoring

**Table 6 – Tyler Region Equipment Packages (continued)**

Subsystem	Equipment Package
Traffic Management Subsystem (continued)	TMC Incident Detection
	TMC Incident Dispatch Coordination/Communication
	TMC Probe Information Collection
	TMC Regional Traffic Control
	TMC Signal Control
	TMC Traffic Information Dissemination
	TMC Work Zone Traffic Management
	Traffic Data Collection
	Traffic Maintenance
Transit Management Subsystem	Transit Center Fare and Load Management
	Transit Center Fixed-Route Operations
	Transit Center Information Services
	Transit Center Multi-Modal Coordination
	Transit Center Paratransit Operations
	Transit Center Security
	Transit Center Tracking and Dispatch
	Transit Data Collection
	Transit Environmental Monitoring
Transit Vehicle Subsystem	On-board Fixed Route Schedule Management
	On-board Paratransit Operations
	On-board Transit Fare and Load Management
	On-board Transit Security
	On-board Transit Trip Monitoring
Vehicle Subsystem	Vehicle Location Determination
	Vehicle Mayday I/F
	Vehicle Probe Support

#### 4.5 Standards

Standards are an important tool that will allow efficient implementation of the elements in the Tyler Regional ITS Architecture over time. Standards facilitate deployment of interoperable systems at local, regional, and national levels without impeding innovation as technology advances, vendors change, and as new approaches evolve. The USDOT’s ITS Joint Program Office is supporting Standards Development Organizations (SDOs) with an extensive, multi-year program of accelerated, consensus-based standards development to facilitate successful ITS deployment in the United States. **Table 7** identifies each of the ITS standards that could apply to the Tyler Regional ITS Architecture. These standards are based on the physical subsystem architecture flows identified in Section 4.3.4. The connection of each standard to the applicable

architecture flows between elements can be viewed on the Tyler Regional ITS Architecture web site by clicking on the “Interfaces” or “Standards” buttons.

**Table 7 – Applicable ITS Standards for the Tyler Region**

SDO	Document ID	Title	Type
AASHTO/ITE/NEMA	NTCIP 1201	Global Object Definitions	Message
	NTCIP 1202	Object Definitions for Actuated Traffic Signal Controller Units	Message
	NTCIP 1203	Object Definitions for Dynamic Message Signs	Message
	NTCIP 1204	Object Definitions for Environmental Sensor Stations and Roadside Weather Information System	Message
	NTCIP 1205	Data Dictionary for Closed Circuit Television (CCTV)	Message
	NTCIP 1206	Data Collection and Monitoring Devices	Message
	NTCIP 1208	Object Definitions for Video Switches	Message
	NTCIP 1209	Transportation System Sensor Objects	Message
	NTCIP 1210	Objects for Signal Systems Master	Message
	NTCIP 1211	Objects for Signal Control Priority	Message
	NTCIP 1301	Message Set for Weather Reports	Message
	NTCIP 1401	TCIP – Common Public Transportation (CPT) Business Area Standard	Message
	NTCIP 1402	TCIP – Incident Management (IM) Business Area Standard	Message
	NTCIP 1403	TCIP – Passenger Information (PI) Business Area Standard	Message
	NTCIP 1404	TCIP – Scheduling/Runcutting (SCH) Business Area Standard	Message
	NTCIP 1405	TCIP – Spatial Representation (SP) Business Area Standard	Message
	NTCIP 1406	TCIP – Onboard (OB) Business Area Standard	Message
	NTCIP 1407	TCIP – Control Center (CC) Business Area Standard	Message
	NTCIP 1408	TCIP – Fare Collection (FC) Business Area Standard	Message
	Various	NTCIP Center-to-Center Standards Group	Communication
Various	NTCIP Center-to-Field Standards Group	Communication	
ANSI	ANSI TS286	Commercial Vehicle Credentials	Message
ASTM	ASTM 5 GHz Data Link	Standard Specification for 5.9 GHz Data Link Layer	Communication
	ASTM 5 GHz Phys	Standard Specification for 5.9 GHz Physical Layer	Communication
	ASTM DD 17.54.00.2	ADMS Data Dictionary Specifications	Data
	ASTM PS 105-99	Specification for Dedicated Short Range Communication (DSRC) Data Link Layer: Medium Access and Logical Link Control	Communication
	ASTM PS 111-98	Specification for Dedicated Short Range Communication (DSRC) Physical Layer using Microwave in the 902-928 MHz	Communication

**Table 7 – Applicable ITS Standards for the Tyler Region (continued)**

SDO	Document ID	Title	Type
EIA/CEA	CEA/EIA-794	Data Radio Channel (DARC) System	Communication
	CEA/EIA-795	Subcarrier Traffic Information Channel (STIC) System	Communication
IEEE	IEEE P1512.1	Standard for Traffic Incident Management Message Sets for Use by EMCs	Message
	IEEE P1512.2	Standard for Public Safety IMMS for use by EMCs	Message
	IEEE P1512.3	Standard for Hazardous Material IMMS for use by EMCs	Message
	IEEE P1512.a	Standard for Emergency Management Data Dictionary	Data
	IEEE P1512-2000	Standard for Common Incident Management Message Sets (IMMS) for use by EMCs	Message
	IEEE P1556	Security/Privacy of Vehicle/RS Communications including Smart Card Communications	Communication
	IEEE P1570	Standard for Interface Between the Rail Subsystem and the Highway Subsystem at a Highway Rail Intersection	Message
	IEEE Std 1455-1999	Standard for Message Sets for Vehicle/Roadside Communications	Message
ITE	ITE TM 1.03	Standard for Functional Level Traffic Management Data Dictionary (TMDD)	Data
	ITE TM 2.01	Message Sets for External TMC Communication (MS/ETMCC)	Message
SAE	SAE J1746	ISP-Vehicle Location Referencing Standard	Data
	SAE J2313	On-Board Land Vehicle Mayday Reporting Interface	Message
	SAE J2353	Data Dictionary for Advanced Traveler Information System (ATIS)	Data
	SAE J2354	Message Set for Advanced Traveler Information System (ATIS)	Message
	SAE J2369	Standard for ATIS Message Sets Delivered Over Bandwidth Restricted Media	Message
	SAE J2529	Rules for Standardizing Street Names and Route IDs	Message
	SAE J2540	Messages for Handling Strings and Look-Up Tables in ATIS Standards	Message

#### 4.6 Phases of Implementation

The Regional ITS Architecture will be implemented through a series of projects led by both public sector and private sector agencies. Key foundation systems will need to be implemented in order to support other systems that have been identified in the Regional ITS Architecture. The deployment of all of the systems required to achieve the final Regional ITS Architecture build out will occur over many years.

A sequence of projects and their respective time frames have been identified in the Tyler Regional ITS Deployment Plan. These projects have been sequenced over a 20-year period, with projects identified for deployment in 5-, 10- and 20-year timeframes.

Some of the key market packages that will provide the functions for the key foundation systems in the Tyler Region are listed below. Projects associated with these and other market packages identified for the Region have been included in the Tyler Regional ITS Deployment Plan.

- Network Surveillance;
- Surface Street Control;
- Road Weather Data Collection;
- Transit Vehicle Tracking;
- Broadcast Traveler Information; and
- ITS Data Mart.

In addition to the above market packages, the implementation of an appropriate communications system in the Region to support ITS is critical for continued deployment of projects.



## 5. OPERATIONAL CONCEPT

The operational concept for the Tyler Region provides a description of the stakeholders' roles and responsibilities in the operation of the systems that currently exist or that are being proposed. This operational concept provides an "executive summary" view of the way the Tyler Region's systems will work together, and it documents the roles and responsibilities for each of the services that ITS will provide. The approach to describing the operational concept is to present specific operational scenarios that describe and define the stakeholders' general roles in providing the services.

In addition to the operational scenarios that illustrate the roles and responsibilities of each agency, a list of the key agencies that are responsible for operations in the eight ITS areas is presented. This list will serve as a high level overview of the different roles and responsibilities in this operational concept. In addition, specific roles and coordination requirements for operations are illustrated through the customized market package diagrams presented in **Appendix A**.

With the integration, information sharing, and in some cases joint operations of systems, there will likely be a requirement for agency agreements. Descriptions of potential agreements that may be needed in the Tyler Region are included in Section 5.3.

### 5.1 Operational Scenarios

#### *Scenario 1*

The first operational scenario describes how ITS technologies may be used during a multi-vehicle crash on I-20 within the City of Longview city limits. Motorists call 911 from cellular telephones and the City of Longview Public Safety Dispatch is quickly informed of the crash. An alert is automatically sent from the City of Longview Public Safety Dispatch to City of Longview TMC and the TxDOT Tyler District TMC. TxDOT activates DMS and monitors the situation with a CCTV camera that is near the crash. The City of Longview Fire Department uses the video feed from TxDOT to determine the severity of the accident and the number and type of fire and rescue vehicles to dispatch. Using AVL on the fire vehicles, those vehicles that are closest to the scene with the appropriate equipment are dispatched.

Eastbound I-20 is completely closed and the City of Longview Police begin setting up a closure and detour. The City of Longview uses their closed-loop signal system to implement a modified timing plan from their TMC on alternate routes along the arterials to accommodate the large increases in traffic volume. The TxDOT Tyler District TMC also contacts the TxDOT Atlanta District TMC so that motorist on I-20 in the Atlanta Region can be forewarned of the impending delay along eastbound I-20.

TxDOT enters the closure on the Highway Condition Reporting System, which also feeds the statewide 511 traveler information number. DMS and HAR continue to warn motorist that eastbound I-20 is closed. The CCTV camera feed, which has been turned away from the crash to focus on the traffic condition on the interstate, is shared with the media which broadcasts the live shots of I-20 on the evening news to warn motorist that I-20 remains closed.

### *Scenario 2*

Road construction along Loop 323 within the City of Tyler is expected to result in the long-term closure of two lanes of traffic. The TxDOT Tyler District TMC reports the closure to the City of Tyler TMC. The City of Tyler TMC implements detour timing plans on its closed-loop signal system and resets signal detectors using their VIVDS to account for changes in approaches to the signalized intersections. The City of Tyler TMC posts messages on the city's DMS along the city arterials alerting motorists of the construction and potential detour routes.

The City of Tyler TMC also sends a message to the East Texas 911 Communications Center so that when emergency vehicles are dispatched the drivers are cognizant of the closures and can take the appropriate detours. Additionally, the City of Tyler Transit Dispatch is also notified in case the closure will have an impact on the fixed-route transit.

Once the construction is complete, the TxDOT Tyler District TMC sends out a message to the City of Tyler TMC that all lanes are once again open. The City of Tyler TMC then sends out a message to the East Texas 911 Center and the City of Tyler Transit Dispatch regarding the re-opening of the lanes.

## **5.2 Roles and Responsibilities**

The operational scenarios described in the previous section illustrate the interagency cooperation and coordination that is required in two situations that might occur in the Tyler Region. During any operational scenario, a number of agencies will be required to coordinate closely to perform their operational responsibilities. The key agencies that have a lead role or responsibility during operations are listed below for each ITS area. It is recognized that a number of other agencies will also need to be involved during a scenario in addition to the ones listed below, although it is not expected that these agencies will play as critical a role in operations.

### **Travel and Traffic Management**

- City of Tyler
- City of Longview
- County Road and Bridge
- Texas Department of Transportation Tyler District
- Other Texas Department of Transportation Districts
- Texas Department of Public Safety

### **Public Transportation Management**

- Independent School Districts
- City of Longview Transit
- City of Tyler Transit
- ETCOG Rural Transit

### **Electronic Payment**

- Not Applicable

### **Commercial Vehicle Operations**

- Texas Department of Public Safety
- Texas Department of Transportation

### **Emergency Management**

- City of Tyler (Police, Fire, Emergency Operations Center, Traffic)
- East Texas 911 Communications Center
- City of Longview (Police, Fire, Emergency Operations Center, Traffic)
- City/County Public Safety Agencies (Emergency Operations Center, Public Safety Dispatch)
- Regional Hospitals
- Texas Department of Public Safety
- Texas Department of Transportation

### **Advanced Vehicle Safety System Needs**

- Not Applicable

### **Information Management**

- Texas Department of Transportation
- Longview MPO
- Tyler MPO

### **Maintenance and Construction Management**

- City of Tyler
- City of Longview
- County Road and Bridge
- Municipal Public Works Division
- Texas Department of Transportation

### 5.3 Tyler Agreements

The Regional ITS Architecture for the Tyler Region has identified several agency interfaces, information exchanges, and integration strategies that would be needed to provide the ITS services and systems identified by the stakeholders in the Region. Interfaces and data flows among public and private entities in the Tyler Region will require agreements among agencies that establish parameters for sharing agency information to support traffic management, incident management, provide traveler information, and other functions identified in the Regional ITS Architecture.

Currently, there are no formal agreements in place in the Tyler Region with regards to ITS. Stakeholders indicated that while there is a high degree of cooperation among agencies, there hasn't been a need for formal agreements to facilitate multi-jurisdictional resource sharing and cooperation. With the implementation of ITS technologies, integrating systems from one or more agencies, the anticipated level of information exchange identified in the architecture, it is likely that more formal agreements will be needed. These agreements, while perhaps not requiring a financial commitment from agencies in the Region, should outline specific roles, responsibilities, data exchanges, levels of authority, and other facets of regional operations. Some agreements also will outline specific funding responsibilities, where appropriate and applicable.

**Table 8** provides a list of potential agreements for the Tyler Region based on the interfaces identified in the Regional Architecture. It is important to note that as ITS services and systems are implemented in the Region, part of the planning and review process for those projects should include a review of potential agreements that would be needed for implementation or operations.

**Table 8 – Potential Agreements for the Tyler Region**

Agreement and Agencies	Status	Agreement Description	Considerations
<p><b>Data Sharing and Usage (Public)</b> TxDOT Tyler District and Public Agencies within the Region</p>	Future	<p>This agreement would define the parameters, guidelines and policies for inter- and intra-agency ITS data sharing. This data sharing would support regional activities related to traffic management, incident management, and traveler information, and other functions. Data also would include video images from CCTV cameras. The terms of this agreement should generally address such items as:</p> <ul style="list-style-type: none"> <li>▪ Types of data and information to be shared</li> <li>▪ Repository for information (i.e., TxDOT Tyler TMC as central hub)</li> <li>▪ How the information will be used (traffic incident management, displayed on web site for travel information, distributed to private media, etc.)</li> <li>▪ Parameters for data format, quality, security</li> </ul>	<p>These agreements are typically zero-dollar agreements, in that there is no charge among agencies for the actual data, although there might be some cost incurred for infrastructure, systems or fiber to enable communications between agencies.</p>

**Table 8 – Potential Agreements for the Tyler Region (continued)**

Agreement and Agencies	Status	Agreement Description	Considerations
<p><b>Data Sharing and Usage (Public-Private)</b>            TxDOT Tyler District and Private Media/Information Service Providers</p>	<p>Future</p>	<p>This agreement would define the parameters, guidelines and policies for private media use of regional ITS-related information from TxDOT Tyler. This type of agreement is recommended between TxDOT (data provider) and the media (data user) to define terms of use for broadcasting public-agency information regarding traffic conditions, closures, restrictions, as well as video images. Agreements can also include requirements for the media to ‘source’ the information (i.e., using the TxDOT logo on all video images broadcast).</p>	<p>These agreements can be zero-dollar agreements, although some agencies have stipulated identifying the information, public service announcements by the media, or other requirements as a term of use. The private media entity is typically responsible for paying any necessary costs for access (i.e., communications infrastructure to link to the TxDOT database or video switch). These agreements also typically include a sunset clause to allow the agency to periodically review the agreement and make any modifications prior to renewal.</p>
<p><b>Shared Video Monitoring (Public)</b>            TxDOT Tyler District, City of Tyler, City of Longview, Tyler EOC, State EOC, DPS</p>	<p>Future</p>	<p>This agreement would enable shared video monitoring of TxDOT CCTV cameras by public safety and emergency services agencies in the Tyler Region for incident management purposes. This agreement would define the parameters and policies for public safety agencies to access video images via the TxDOT video switch. It is recommended that the agreement include any TxDOT policies relating to video images (including archiving, privacy, disclaimers, use of video and redistribution) as well as processes for agency requests for specific views. Shared video monitoring does not address shared use or shared control of video equipment functions.</p>	<p>These agreements are typically zero-dollar agreements, in that there is no charge among agencies for the actual data, although there might be some cost incurred for infrastructure, systems or fiber to enable communications between agencies, particularly with the high bandwidth required for transmitting live video images.</p>
<p><b>Mutual Aid Agreements (Public)</b>            DPS, TxDOT Tyler District, Tyler Police, Tyler, Longview Police, Longview Fire, Tyler EOC</p>	<p>Existing (Informal)</p>	<p>Mutual aid agreements currently exist as informal arrangements in the Tyler Region, although they are a routine practice among public safety and emergency services agencies. Formal mutual aid agreements will become more important as agencies integrate systems and capabilities, particularly automated dispatch and notification.</p>	<p>These agreements are typically zero-dollar agreements, although there might be some funding required to support regional incident management activities. The agreement also would outline resource commitments that would be part of any mutual aid arrangement (personnel, equipment, facilities, etc.).</p>

**Table 8 – Potential Agreements for the Tyler Region (continued)**

Agreement and Agencies	Status	Agreement Description	Considerations
<p><b>Joint Operations/Shared Control Agreements (Public)</b></p> <p>TxDOT Tyler District, City of Tyler, City of Longview, DPS (potential)</p>	<p>Future</p>	<p>These agreements are formal arrangements to allow joint operations or control of certain systems and equipment. The agreement would need to define the terms of this arrangement, such as hours of operation and time of day/time of week where shared control would take effect, circumstances or incidents where shared control would take effect, notification procedures between the agencies agreeing to shared control arrangements, etc. Additional agencies (such as DPS) could be part of a joint operations/shared control agreement for certain types of devices.</p>	<p>Joint operations/shared control agreements could consider some form of mutual funding for certain system elements, primarily communication links.</p>