State of Texas
Regional ITS Architectures and Deployment Plans

Tyler Region

Regional ITS Deployment Plan

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LIST OF ACRONYMS

APC	Automatic Passenger Counter
ATIS	Advanced Travel Information System
ATMS	Advanced Traffic Management System
AVI	Automated Vehicle Identification
AVL	Automatic Vehicle Location
C2C	Center-to-Center
CAD	Computer-Aided Dispatch
CCTV	Closed-Circuit Television
CV	Commercial Vehicle
CVISN	Commercial Vehicle Information Systems and Network
CVO	Commercial Vehicle Operations
DMS	Dynamic Message Sign
DPS	Department of Public Safety
EMS	Emergency Medical Services
EOC	Emergency Operations Center
ETCOG	East Texas Council of Governments
FHWA	Federal Highway Administration
FMS	Freeway Management System
GPS	Global Positioning System
HAR	Highway Advisory Radio
HAZMAT	Hazardous Materials
HCRS	Highway Condition Reporting System
HRI	Highway-Rail Intersections
ISP	Information Service Provider
ITS	Intelligent Transportation System
LCS	Lane Control Signals

LIST OF ACRONYMS

LED	Light Emitting Diode
MDT	Mobile Data Terminal
MPO	Metropolitan Planning Organization
NTCIP	National Transportation Communications for ITS Protocol
PSAP	Public Safety Answering Point
PTZ	Pan/Tilt/Zoom
RWIS	Road Weather Information System
TEA-21	Transportation Equity Act for the 21st Century
TIP	Transportation Improvements Program
TMC	Traffic Management Center
TOC	Traffic Operations Center Transit Operations Center
TxDOT	Texas 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 the Texas Department of Transportation (TxDOT) initiated the development of regional ITS architectures and deployment plans throughout the State of Texas. Although not required by the FHWA final rule, TxDOT took the opportunity to also develop an ITS deployment plan for each Region. The Tyler Regional ITS Architecture and Regional ITS Deployment Plan was prepared as part of this initiative.

The Tyler Regional ITS Deployment Plan outlines a vision for ITS deployment, and identifies and prioritizes projects that are needed to implement the ITS architecture on a short, medium, and long-term basis. In doing so, this plan also helps the Region to prioritize funding decisions. As infrastructure is incrementally built-out over a 20-year horizon, integration among key foundation systems in the Region can occur as the system grows and expands.

Stakeholders from throughout the Region participated in the development of the Regional ITS Deployment Plan. Participants included representatives from TxDOT, cities, counties, transit agencies, police and fire.

Building on the dialogue, consensus and vision outlined in the Regional ITS Architecture, stakeholders in the Tyler Region prioritized market packages and potential ITS projects for deployment in the Region. Projects were identified to correspond to the needs and priorities identified by the regional stakeholders, and were categorized into 5-year, 10-year, and 20-year timeframes.

The majority of ITS projects recommended for the Tyler Region were identified in the following key areas:

- Travel and Traffic Management;
- Emergency Management;
- Maintenance and Construction Operations; and
- Public Transportation Management.

Recommended ITS projects in the 5-year, 10-year, and 20-year deployment timeframes were summarized in tables for each deployment horizon. This summary included the project name and a brief description, primary responsible agency, a planning level estimate of probable cost, an indication of whether or not funding had been identified for that project, as well as an estimated duration for implementation. For each recommended ITS project, more detailed project descriptions were developed which mapped each project back to applicable market packages and also identified any prerequisite project requirements.

With the substantial amount of effort invested by stakeholders in the Tyler Region to develop both the Regional ITS Architecture and the Deployment Plan, developing a plan for maintaining these important tools was a key component of the process. Stakeholders agreed that both the Regional ITS Architecture and Deployment Plan would need to be periodically reviewed and potentially updated in order to reflect current deployment status as well as to re-evaluate priorities. Stakeholders agreed that it would be appropriate to review the plan annually. Updated status information and changes discussed will be

gathered and recorded by TxDOT to be incorporated into the plan when it is updated on a two year cycle that corresponds to the TIP update cycle. The TxDOT Tyler District was identified as the agency that should take the lead in maintaining and updating the Region's ITS Architecture and Deployment Plan, with support from a multijurisidictional committee in the Region.

1. INTRODUCTION

1.1 Project Overview

FHWA's final rule to implement Section 5206(e) of the TEA-21 requires 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. Although not required by the FHWA final rule, TxDOT sought to have an ITS deployment plan developed for each Region. The ITS Deployment Plan outlines a vision for ITS deployment in the Region and identifies and prioritizes projects that are needed to implement the ITS architecture on a short, medium, and long-term basis. In doing so, this plan also helps the Region to prioritize funding decisions by having a comprehensive, phased approach to the regional ITS programs, so that the infrastructure can be incrementally built-out over a 20-year horizon, and integration among key foundation systems in the Region can occur as the system grows and expands.

The Tyler Regional ITS Deployment Plan was developed using the Regional ITS Architecture developed in 2002. Through the architecture development process, stakeholders reached consensus on the transportation needs in the Region that could be addressed with ITS, worked with the architecture team to customize and prioritize market packages that formed the basis for the ITS Deployment Plan, and identified the required interfaces to provide the desired level of integration of systems and agencies within the Tyler Region.

The Tyler Regional ITS Architecture provided the framework and prioritized the key functions and services desired by stakeholders in the Region. The ITS Deployment Plan builds on the architecture by outlining specific ITS project recommendations and strategies for the Region, and identifying deployment timeframes so that the recommended projects and strategies can be implemented over time. Agency responsibilities for implementing and operating the systems also are a key component of the ITS Deployment Plan.

1.2 Document Overview

The Tyler Regional ITS Deployment Plan is organized into four key sections:

Section 1 – Introduction

This section provides a brief overview of the Tyler Regional ITS Deployment Plan, as well as an overview of some of the key features and stakeholders in the Tyler Region.

Section 2 – Prioritization of Market Packages

Section 2 contains the prioritized market packages for the Tyler Region. Included in this section is an overview of the prioritization process and detailed descriptions of the high, medium and low priority market packages.

Section 3 – Prioritization of Projects

Project recommendations have been developed for the Tyler Region to provide an incremental, phased build-out of the Region's ITS. These projects are categorized into five, ten and twenty year deployment timeframes. Each project recommendation includes a brief description, responsible agency, associated market package, pre-requisite projects or systems, and an estimate of probable cost. These recommendations took into consideration existing as well as planned ITS deployments in the Tyler Region.

Section 4 – Procedure for Submitting ITS Projects

A procedure for maintaining the ITS Deployment Plan and submitting new projects to add to the plan is recommended in this section.

1.3 The Tyler Region

1.3.1 Geography and Regional Characteristics

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.

Counties included in the Tyler Region are as follows:

- 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 of less than 50,000, TxDOT is the responsible agency for on-system roadways. The Cities of Longview and Tyler, with populations greater than 75,000 each, are the only two cities in the Region with populations in excess of the 50,000 threshold.

1.3.2 Transportation Infrastructure

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 through the Tyler District. 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.

1.3.3 Existing ITS in the Tyler Region

Within the Tyler Region there are currently several ITS applications in place. TxDOT has a permanent dynamic message sign (DMS) as well as several portable DMS that are utilized primarily for displaying delay information.

Closed-circuit television (CCTV) cameras have also been installed at an interchange to monitor delay, and TxDOT and the City of Longview are using video detection at several intersections in the Region.

Highway advisory radio (HAR) along I-20 provides motorists with information on construction, lane closures, possible alternate routes and traffic conditions.

High-water detection technology has been implemented in flood prone areas of the City of Longview to provide early notification of dangerous conditions resulting from a flooded roadway.

1.3.4 Tyler 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 interfaces, integration needs, 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.

Stakeholder agencies that are participating in the development of the Tyler Regional ITS Deployment Plan are listed in **Table 1** along with contact information for agency representatives that have participated.

Table 1 – Tyler Stakeholder Agencies and Contacts

Stakeholder Agency	Contact	Address	Phone Number	E-Mail
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 11th Street Austin, Texas 78701-2486	(512) 416-3258	jlight@dot.state.tx.us
TxDOT – Traffic Operations Division	Alex Power	Attn: TRF-TM 125 East 11th 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. PRIORITIZATION OF MARKET PACKAGES

2.1 Prioritization Process

Of the 75 available market packages in the National ITS Architecture, 35 were selected and customized for deployment in the Tyler Region. Stakeholders were asked to prioritize the market packages into high, medium, and low priorities, based on regional needs, feasibility and likelihood of deployment, and overall contribution of the market package to the goals and vision for ITS functionality in the Region. A summary of these prioritized market packages is shown in **Table 2**.

The market package prioritization was a key factor in developing recommendations for ITS deployment and integration in the Tyler Region. These priorities identified the key needs and services that are desired in the Tyler Region, as well as the interfaces that need to be established to provide integrated functionality and establish communication between elements.

This section includes detailed descriptions of the prioritized market packages for the Tyler Region. The market packages are organized into high, medium and low priorities. It is important to note that the high, medium and low prioritization does not necessarily correspond to any specific time frame (such as five, ten or twenty year deployment horizon). For example, a market package can be a high priority, but because of funding or prerequisite project requirements, it might not be feasible for deployment for several years. Maturity and availability of technology were other factors for prioritizing the market packages. Other considerations included whether or not the market package was better suited for private deployment and operations rather than public. As an example, ISP-based Route Guidance might be viewed as a valuable traveler information service for motorists in the Region, but stakeholders felt this market package was best suited for deployment by a private service provider, and as such, deemed it a low priority for agencies in the Region.

Each market package in the following subsections includes:

- A brief definition of the market package (which have been modified from the National ITS Architecture definitions);
- Any existing infrastructure from that market package that is already existing in the Tyler Region;
- Agencies currently operating or maintaining systems that apply to that market package;
- Planned projects that will address some or all of the services that are contained in the market package; and
- Any additional needs to bring the market package to the desired level of deployment or functionality.

Table 2 – Summary of Prioritized Market Packages for the Tyler Region

High Priority	Medium Priority	Low Priority
▪ Network Surveillance ▪ Surface Street Control ▪ Traffic Information Dissemination ▪ Regional Traffic Control ▪ Incident Management System ▪ Road Weather Data Collection ▪ Weather Information Processing and Distribution ▪ Work Zone Management ▪ Transit Vehicle Tracking ▪ Transit Fixed-Route Operations ▪ Demand Response Transit Operations ▪ Transit Security ▪ Transit Traveler Information ▪ Broadcast Traveler Information Systems ▪ Weigh-in-Motion ▪ HAZMAT Management ▪ Emergency Response ▪ Emergency Routing ▪ ITS Data Mart	▪ Probe Surveillance ▪ Emissions Monitoring and Management ▪ Standard Railroad Grade Crossing ▪ Railroad Operations Coordination ▪ Roadway Automated Treatment ▪ Work Zone Safety Monitoring ▪ Transit Passenger and Fare Management	▪ Maintenance and Construction Vehicle Tracking ▪ Maintenance and Construction Vehicle Maintenance ▪ Roadway Maintenance and Construction ▪ Maintenance and Construction Activity Coordination ▪ ISP Based Route Guidance ▪ Fleet Administration ▪ CV Administrative Processes ▪ On-Board CVO Safety ▪ CVO Fleet Maintenance

2.2 High Priority Market Packages

Market packages that were selected as high priorities for the Tyler Region are listed and described in **Table 3**. These market packages typically represent systems or functions that serve as foundations on which to build regional ITS programs. Listed in this section are market packages that address baseline control, monitoring and coordination technologies for surface streets and freeways, road/weather conditions data gathering, transit, incident management and emergency response.

Many of these high priority market packages have components that are in various stages of deployment and operation in the Tyler Region; that is, there are already systems and technologies deployed to deliver some of these high priority services and functions. For example, the City of Tyler closed loop signal systems and video image vehicle detection systems (VIVDS) have already been deployed and these are key components of the Surface Street Control market package. Although these devices are in place, this market package is still listed as a high priority. There are additional capabilities and functionality contained in this market package that are planned for implementation in the near-term, thus building on the existing infrastructure and expanding the services of this particular market package in the Tyler Region.

Table 3 – High Priority Market Packages for the Tyler Region

Network Surveillance (ATMS01)	**High Priority**
This market package includes traffic detectors, other surveillance equipment, the supporting field equipment, and wireline communications to transmit the collected data back to the Traffic Management Subsystem. The derived data can be used locally or remotely. The data generated by this market package enables traffic managers to monitor traffic and road conditions, identify and verify incidents, detect equipment faults, and collect census data for traffic strategy development and long range planning. The collected data can also be analyzed and made available to users and the Information Service Provider Subsystem.	
Existing Infrastructure ▪ TxDOT Tyler District TMC ▪ TxDOT CCTV Cameras ▪ City of Tyler TMC ▪ City of Longview TMC ▪ City of Longview High Water Detection System	**Agency** ▪ TxDOT ▪ City of Tyler ▪ City of Longview
Planned Projects ▪ TxDOT Advanced Traffic Management System (ATMS) Implementation ▪ TxDOT Freeway Management System (FMS) Implementation Phase 1 ▪ City of Longview TMC Expansion	
Additional Needs ▪ City of Tyler TMC Expansion ▪ TxDOT US 69 Instrumentation ▪ City of Tyler CCTV Camera Implementation ▪ TxDOT Instrumentation of US 259 and Other Major Routes ▪ TxDOT Highway/Rail Intersection Warnings ▪ Tyler Regional Telecommunications Master Plan ▪ TxDOT Flood Detection Stations ▪ City of Tyler Flood Detection Stations ▪ City of Longview Flood Detection Stations ▪ Other Cities/Counties Flood Detection Stations ▪ City of Tyler Highway/Rail Intersection Warning ▪ Other Cities ITS Implementation	

Table 3 – High Priority Market Packages for the Tyler Region (continued)

Surface Street Control (ATMS03)	**High Priority**
This market package provides the central control and monitoring equipment, communication links, and the signal control equipment that support local surface street control and/or arterial traffic management. A range of traffic signal control systems are represented by this market package ranging from static pre-timed control systems to fully traffic responsive systems that dynamically adjust control plans and strategies based on current traffic conditions and priority requests. This market package is consistent with typical urban traffic signal control systems.	
Existing Infrastructure ▪ TxDOT Tyler District TMC ▪ TxDOT Closed Loop Signal System ▪ TxDOT VIVDS ▪ City of Tyler TMC ▪ City of Tyler Closed Loop Signal System ▪ City of Tyler VIVDS ▪ City of Longview TMC ▪ City of Longview Closed Loop Signal System ▪ City of Longview VIVDS ▪ School Zone Flashers	**Agency** ▪ TxDOT ▪ City of Tyler ▪ City of Longview
Planned Projects ▪ TxDOT ATMS Implementation ▪ City of Longview TMC Expansion	
Additional Needs ▪ TxDOT Closed Loop Signal System Expansion Phases 1-3 ▪ City of Tyler Closed Loop Signal System Expansion Phases 1-3 ▪ City of Tyler VIVDS Expansion Phases 1-3 ▪ City of Tyler TMC Expansion ▪ City of Longview Closed Loop Signal System Expansion Phases 1-3 ▪ City of Longview Emergency Vehicle Signal Preemption ▪ City of Tyler Emergency Vehicle Signal Preemption ▪ City of Tyler CCTV Camera Implementation ▪ City of Longview VIVDS Expansion Phases 1-3 ▪ TxDOT Highway/Rail Intersection Warnings ▪ Tyler Regional Telecommunications Master Plan ▪ City of Tyler Highway/Rail Intersection Warnings ▪ Other Cities ITS Implementation	

Table 3 – High Priority Market Packages for the Tyler Region (continued)

Traffic Information Dissemination (ATMS06)	**High Priority**
This market package allows traffic information and road/bridge closures due to construction, maintenance, and weather, to be disseminated to drivers and vehicles using roadway equipment such as dynamic message signs or highway advisory radio. This package also covers the equipment and interfaces that provide traffic information from a traffic management center to the media (for instance via a direct tie-in between a traffic management center and radio or television station computer systems), Transit Management, Emergency Management, and Information Service Providers.	
Existing Infrastructure ▪ TxDOT Tyler District TMC ▪ TxDOT DMS ▪ TxDOT Portable DMS ▪ TxDOT HAR ▪ City of Tyler TMC ▪ City of Longview TMC	**Agency** ▪ TxDOT ▪ City of Tyler ▪ City of Longview
Planned Projects ▪ TxDOT ATMS Implementation ▪ TxDOT Center-to-Center Communication (statewide) ▪ TxDOT FMS Implementation Phase 1 ▪ TxDOT HCRS Enhancement	
Additional Needs ▪ Media Liaison and Coordination ▪ TxDOT Travel Information Kiosks at Rest Areas ▪ Regional 511 Advanced Traveler Information System Server ▪ ISP Based Route Guidance ▪ TxDOT Highway/Rail Intersection Warnings ▪ Tyler Regional Telecommunications Master Plan ▪ TxDOT US 69 Instrumentation ▪ City of Tyler Highway/Rail Intersection Warnings ▪ TxDOT Instrumentation of US 259 and Other Major Routes ▪ Other Cities ITS Implementation	

Table 3 – High Priority Market Packages for the Tyler Region (continued)

Regional Traffic Control (ATMS07)	High Priority
This market package provides for the sharing of traffic information and control among traffic management centers to support a regional control strategy. This package relies on roadside instrumentation supported by the Surface Street Control and Freeway Control Market Packages and adds hardware, software, and communications capabilities to implement traffic management strategies that are coordinated between allied traffic management centers. The extent of information and control sharing is determined through working arrangements between jurisdictions. At the request of stakeholders in the Tyler Region, this market package was expanded to include coordination and information sharing with TxDOT Districts and neighboring cities impacted by evacuations inland from coastal areas of Texas and Louisiana.	
Existing Infrastructure ▪ TxDOT Tyler District TMC ▪ City of Tyler TMC ▪ City of Longview TMC ▪ Other Texas Region TMCs ▪ Other States TMCs	**Agency** ▪ TxDOT ▪ City of Tyler ▪ City of Longview
Planned Projects ▪ TxDOT Center-to-Center Communication (Statewide) ▪ City of Longview TMC Expansion	
Additional Needs ▪ City of Tyler TMC/TxDOT Tyler District TMC Fiber Connection ▪ City of Longview TMC/TxDOT Tyler District TMC Connection ▪ Tyler Regional Telecommunications Master Plan ▪ City of Tyler EOC/TxDOT Tyler District TMC Connection ▪ City of Longview EOC/TxDOT Tyler District TMC Connection ▪ East Texas 911 Center/TxDOT Tyler District TMC Connection ▪ City of Longview Public Safety/TxDOT Tyler District TMC Connection ▪ DPS/TxDOT Tyler District TMC Connection ▪ City of Tyler TMC Expansion ▪ Tyler Regional Telecommunications Master Plan ▪ Other Cities ITS Implementation	

Table 3 – High Priority Market Packages for the Tyler Region (continued)

Incident Management System (ATMS08)	**High Priority**
This market package manages both unexpected incidents and planned events so that the impact to the transportation network and traveler safety is minimized. The market package includes incident detection capabilities through roadside surveillance devices (e.g. CCTV) and through regional coordination with other traffic management, maintenance and construction management, and emergency management centers as well as weather service entities and event promoters. Information from these diverse sources is collected and correlated by this market package to detect and verify incidents and implement an appropriate response. The response may include traffic control strategy modifications or resource coordination between center subsystems. The coordination with emergency management might be through a CAD system or through other communication with emergency field personnel. The coordination can also extend to tow trucks and other allied response agencies and field service personnel. Incident response also includes presentation of information to affected travelers using the Traffic Information Dissemination, Broadcast Traveler Information or Interactive Traveler Information market packages.	
Existing Infrastructure ▪ TxDOT Tyler District TMC ▪ TxDOT CCTV Cameras ▪ City of Tyler TMC ▪ City of Longview TMC ▪ County EOCs ▪ Municipal Government EOCs ▪ East Texas 911 Communication Center ▪ DPS Dispatch ▪ City of Longview High Water Detection System	**Agency** ▪ TxDOT ▪ City of Tyler ▪ City of Longview ▪ County Governments ▪ Municipal Governments ▪ ETCOG ▪ DPS
Planned Projects ▪ TxDOT ATMS Implementation ▪ TxDOT Center-to-Center Communication (statewide) ▪ TxDOT FMS Implementation Phase 1 ▪ TxDOT HCRS Enhancement ▪ City of Longview TMC Expansion	
Additional Needs ▪ City of Tyler TMC Expansion ▪ Incident Detour Plans ▪ Canton Parking and Event Management System ▪ Tyler Regional Telecommunications Master Plan ▪ City of Tyler EOC/TxDOT Tyler District TMC Connection ▪ East Texas 911 Center/TxDOT Tyler District TMC Connection ▪ City of Longview Public Safety/TxDOT Tyler District TMC Connection ▪ DPS/TxDOT Tyler District TMC Connection ▪ TxDOT US 69 Instrumentation ▪ TxDOT Instrumentation of US 259 and Other Major Routes ▪ Other Cities ITS Implementation	

Table 3 – High Priority Market Packages for the Tyler Region (continued)

Road Weather Data Collection (MC03)	**High Priority**
This market package collects current road and weather conditions using data collected from environmental sensors deployed on and about the roadway. In addition to fixed road weather information system (RWIS) stations at the roadside, sensing of the roadway environment can also occur from sensor systems located on Maintenance and Construction Vehicles. The collected environmental data is used by the Weather Information Processing and Distribution Market Package to process the information and help operators make decisions on operations.	
Existing Infrastructure	**Agency**
▪ City of Longview High Water Detection System	▪ City of Longview
Planned Projects None Identified	
Additional Needs ▪ TxDOT Flood Detection Stations ▪ City of Tyler Flood Detection Stations ▪ City of Longview Flood Detection Stations ▪ Other Cities/Counties Flood Detection Stations ▪ TxDOT Ice Detection and Anti-Icing Equipment on Bridges	

Table 3 – High Priority Market Packages for the Tyler Region (continued)

Weather Information Processing and Distribution (MC04)	**High Priority**
This market package processes and distributes the environmental information collected from the Road Weather Data Collection market package. This market package uses the environmental data to detect environmental hazards such as icy road conditions, high winds, and dense fog, so system operators and decision support systems can make decisions on corrective actions to take. The continuing updates of road condition information and current temperatures can be used by system operators to more effectively deploy road maintenance resources, issue general traveler advisories, issue location specific warnings to drivers using the Traffic Information Dissemination market package, and aid operators in scheduling work activity.	
Existing Infrastructure ▪ TxDOT Tyler District TMC ▪ TxDOT HCRS	**Agency** ▪ TxDOT
Planned Projects ▪ TxDOT ATMS Implementation ▪ TxDOT Center to Center Communication (statewide) ▪ TxDOT FMS Implementation Phase 1 ▪ TxDOT HCRS Enhancement ▪ City of Longview TMC Expansion	
Additional Needs ▪ City of Tyler TMC Expansion ▪ Media Liaison and Coordination ▪ TxDOT Travel Information Kiosks at Rest Areas ▪ TxDOT Flood Detection Stations ▪ City of Tyler Flood Detection Stations ▪ City of Longview Flood Detection Stations ▪ Other Cities/Counties Flood Detection Stations ▪ TxDOT Ice Detection and Anti-Icing Equipment on Bridges ▪ Other Cities ITS Implementation	

Table 3 – High Priority Market Packages for the Tyler Region (continued)

Work Zone Management (MC08)	**High Priority**
This market package directs activity in work zones, controlling traffic through portable DMS and informing other groups of activity (e.g., ISP, TM, other maintenance and construction centers) for better coordination management. Work zone speeds and delays are provided to the motorist prior to the work zones.	
Existing Infrastructure ▪ TxDOT Portable DMS ▪ TxDOT Workzone Speed Trailers ▪ TxDOT HCRS	**Agency** ▪ TxDOT
Planned Projects ▪ TxDOT Center-to-Center Communications (statewide) ▪ City of Tyler TMC/TxDOT Tyler District TMC Fiber Connection ▪ TxDOT FMS Implementation Phase 1	
Additional Needs ▪ Media Liaison and Coordination ▪ TxDOT Travel Information Kiosks at Rest Areas ▪ Web-based Route Guidance ▪ TxDOT Work Zone Speed Trailers ▪ Other Cities ITS Implementation	

Transit Vehicle Tracking (APTS01)	**High Priority**
This market package monitors current transit vehicle location using an Automated Vehicle Location System. The location data may be used to determine real time schedule adherence and update the transit system's schedule in real-time.	
Existing Infrastructure ▪ City of Tyler Transit Dispatch ▪ Longview Transit Dispatch ▪ ETCOG Rural Transit Dispatch	**Agency** ▪ City of Tyler ▪ City of Longview ▪ ETCOG
Planned Projects None identified at this time	
Additional Needs ▪ City of Tyler Transit AVL ▪ Longview Transit AVL ▪ ETCOG TOC with CAD System ▪ ETCOG AVL and Mobile Data Terminals	

Table 3 – High Priority Market Packages for the Tyler Region (continued)

Transit Fixed-Route Operations (APTS02)	**High Priority**
This market package performs vehicle routing and scheduling, as well as automatic driver assignment and system monitoring for fixed-route transit services. This service determines current schedule performance using AVL data and provides information displays for the Transit Management Subsystem. Static and real time transit data is exchanged with Information Service Providers where it is integrated with that from other transportation modes (e.g. rail, ferry, air) to provide the public with integrated and personalized dynamic schedules.	
Existing Infrastructure	**Agency**
▪ City of Tyler Transit Dispatch ▪ Longview Transit Dispatch ▪ ETCOG Rural Transit Dispatch ▪ Independent School Districts Dispatch	▪ City of Tyler ▪ City of Longview ▪ ETCOG ▪ Independent School Districts
Planned Projects	
▪ City of Tyler Transit Web-based Ride Scheduling and Travel Data	
Additional Needs	
▪ City of Tyler Transit AVL ▪ Longview Transit AVL ▪ Real-time Bus Information Travel Kiosks ▪ Longview Transit Web-based Ride Scheduling and Travel Data ▪ ETCOG Web-based Travel Data and Route Guidance ▪ City of Tyler Transit/ETCOG TOC Communication	

Table 3 – High Priority Market Packages for the Tyler Region (continued)

Demand Response Transit Operations (APTS03)	**High Priority**
This market package performs vehicle routing and scheduling as well as automatic driver assignment and monitoring for demand responsive transit services. This package monitors the current status of the transit fleet and supports allocation of these fleet resources to service incoming requests for transit service while also considering traffic conditions. The Transit Management Subsystem provides the necessary data processing and information display to assist the transit operator in making optimal use of the transit fleet. This service includes the capability for a traveler request for personalized transit services to be made through the Information Service Provider (ISP) Subsystem.	
Existing Infrastructure ▪ City of Tyler Transit Dispatch ▪ City of Tyler Transit Web Site ▪ Longview Transit Dispatch ▪ Longview Transit Web Site ▪ ETCOG Rural Transit Dispatch ▪ ETCOG Web Site	**Agency** ▪ City of Tyler ▪ City of Longview ▪ ETCOG
Planned Projects ▪ City of Tyler Transit Web-based Ride Scheduling and Travel Data	
Additional Needs ▪ City of Tyler Transit AVL ▪ Longview Transit Web-based Ride Scheduling and Travel Data ▪ Longview Transit AVL ▪ ETCOG TOC with CAD System ▪ ETCOG AVL and Mobile Data Terminals ▪ Real-time Bus Information Travel Kiosks ▪ ETCOG Web-based Travel Data and Route Guidance ▪ City of Tyler Transit/ETCOG TOC Connection	

Table 3 – High Priority Market Packages for the Tyler Region (continued)

Transit Security (APTS05)	**High Priority**
This market package provides for the physical security of transit passengers. An on-board security system is deployed to perform surveillance and warn of potentially hazardous situations. Public areas (e.g. stops, park and ride lots, stations) are also monitored. Information is communicated to the Transit Management Subsystem using wireless or wireline infrastructure. Security related information is also transmitted to the Emergency Management Subsystem when an emergency is identified that requires an external response. Incident information is communicated to the Information Service Provider.	
Existing Infrastructure ▪ City of Tyler Transit Dispatch ▪ Longview Transit Dispatch ▪ ETCOG Rural Transit Dispatch	**Agency** ▪ City of Tyler ▪ City of Longview ▪ ETCOG
Planned Projects None identified at this time	
Additional Needs ▪ ETCOG On-Board Security Cameras ▪ ETCOG Transfer Station Security Stations ▪ City of Tyler Transit On-Board Security Cameras ▪ Longview Transit On-Board Security Cameras ▪ ETCOG On-Board Video Security System	

Table 3 – High Priority Market Packages for the Tyler Region (continued)

Transit Traveler Information (APTS08)	**High Priority**
This market package provides transit users at transit stops and on-board transit vehicles with ready access to transit information. The information services include transit stop annunciation, imminent arrival signs, and real-time transit schedule displays that are of general interest to transit users. Systems that provide custom transit trip itineraries and other tailored transit information services are also represented by this market package.	
Existing Infrastructure ▪ City of Tyler Transit Dispatch ▪ City of Tyler Transit Web Site ▪ Longview Transit Dispatch ▪ Longview Transit Web Site ▪ ETCOG Rural Transit Dispatch ▪ ETCOG Web Site	**Agency** ▪ City of Tyler ▪ City of Longview ▪ ETCOG
Planned Projects ▪ City of Tyler Transit Web-based Ride Scheduling and Travel Data	
Additional Needs ▪ City of Tyler Transit AVL ▪ Longview Transit AVL ▪ ETCOG AVL and Mobile Data Terminals ▪ Real-time Bus Information Travel Kiosks ▪ Longview Transit Web-based Ride Scheduling and Travel Data ▪ ETCOG Web-based Travel Data and Route Guidance ▪ Transit/City of Tyler TMC Communication ▪ City of Tyler Transit/ETCOG TOC Connection	

Table 3 – High Priority Market Packages for the Tyler Region (continued)

Broadcast Traveler Information (ATIS01)	**High Priority**
This market package collects traffic conditions, advisories, general public transportation information, toll and parking information, incident information, air quality and weather information, and broadly disseminates this information through existing infrastructure and low cost user equipment (e.g., FM subcarrier, cellular data broadcast). This market package differs from the Traffic Information Dissemination market package, which provides localized HAR and DMS information capabilities. The information may be provided directly to travelers by an information service provider (ISP) or other traveler service providers so that they can better inform travelers of conditions. Successful deployment of this market package relies on availability of real-time traveler information from roadway instrumentation, probe vehicles or other sources.	
Existing Infrastructure ▪ TxDOT Tyler District TMC ▪ TxDOT HCRS ▪ TxDOT Tyler District Web Page ▪ City of Tyler TMC ▪ City of Longview TMC ▪ Local Access Cable TV Station	**Agency** ▪ TxDOT ▪ City of Tyler ▪ City of Longview
Planned Projects None identified at this time	
Additional Needs ▪ Media Liaison and Coordination ▪ TxDOT Travel Information Kiosks at Rest Areas ▪ Regional 511 Advanced Traveler Information System Server ▪ ISP Based Route Guidance ▪ Tyler Regional Telecommunications Master Plan	

Weigh-In-Motion (CVO06)	**High Priority**
This market package provides for high speed weigh-in-motion with or without Automated Vehicle Identification (AVI) capabilities. This market package provides the roadside equipment.	
Existing Infrastructure None identified	**Agency**
Planned Projects None identified at this time	
Additional Needs ▪ TxDOT Weigh-in-Motion Site Implementation	

Table 3 – High Priority Market Packages for the Tyler Region (continued)

HAZMAT Management (CVO10)	High Priority
This market package integrates incident management capabilities with commercial vehicle tracking to assure effective treatment of HAZMAT materials and incidents. HAZMAT tracking is performed by the Fleet and Freight Management Subsystem. The Emergency Management Subsystem is notified by the Commercial Vehicle if an incident occurs and coordinates the response. The response is tailored based on information that is provided as part of the original incident notification or derived from supplemental information provided prior to the beginning of the trip or gathered following the incident depending on the selected policy and implementation.	
Existing Infrastructure ▪ DPS Dispatch ▪ City of Longview Public Safety Dispatch	**Agency** ▪ DPS ▪ City of Longview
Planned Projects None identified at this time	
Additional Needs ▪ HAZMAT Incident Notification System	

Emergency Response (EM1)	High Priority
This market package includes emergency vehicle equipment, equipment used to receive and route emergency calls, and wireless communications that enable safe and rapid deployment of appropriate resources to an emergency. Coordination between Emergency Management Subsystems supports emergency notification and coordinated response between agencies.	
Existing Infrastructure ▪ Municipal Public Safety Dispatch ▪ County Public Safety Dispatch ▪ Regional Medical Center Dispatch ▪ DPS Dispatch ▪ Private Tow/Wrecker Dispatch	**Agency** ▪ Municipal Government ▪ County Government ▪ Regional Medical Centers ▪ DPS ▪ Private Tow/Wreckers
Planned Projects None identified at this time	
Additional Needs ▪ City of Tyler EOC/TxDOT Tyler District TMC Connection ▪ City of Longview EOC/TxDOT Tyler District TMC Connection ▪ East Texas 911 Center/TxDOT Tyler District TMC Connection ▪ City of Longview Public Safety/TxDOT Tyler District TMC Connection ▪ DPS/TxDOT Tyler District TMC Connection ▪ Mayday Support ▪ DPS CAD System	

Table 3 – High Priority Market Packages for the Tyler Region (continued)

Emergency Routing (EM2)	**High Priority**
This market package supports automated vehicle location and dynamic routing of emergency vehicles. The service also supports coordination with the Traffic Management Subsystem, collecting detailed road network conditions and requesting special priority or other specific emergency traffic control strategies on the selected route(s). The service provides for information exchange between care facilities and both the Emergency Management Subsystem and emergency vehicles.	
Existing Infrastructure None identified	**Agency**
Planned Projects ▪ TxDOT ATMS Implementation	
Additional Needs ▪ City of Tyler EOC/TxDOT Tyler District TMC Connection ▪ City of Longview EOC/TxDOT Tyler District TMC Connection ▪ East Texas 911 Center/TxDOT Tyler District TMC Connection ▪ City of Longview Public Safety/TxDOT Tyler District TMC Connection ▪ DPS/TxDOT Tyler District TMC Connection ▪ DPS CAD System ▪ City of Longview Emergency Vehicle Signal Preemption ▪ City of Tyler Emergency Vehicle Traffic Signal Preemption ▪ Incident Detour Plans ▪ Other Cities ITS Implementation	

Table 3 – High Priority Market Packages for the Tyler Region (continued)

ITS Data Mart (AD01)	High Priority
This market package provides a focused archive that houses data collected and owned by a single agency, district, private sector provider, research institution, or other organization. This focused archive typically includes data covering a single transportation mode and one jurisdiction that is collected from an operational data store and archived for future use. It provides general query and report access to archive data users.	
Existing Infrastructure ▪ TxDOT Tyler District Public Transportation Management System ▪ TxDOT Tyler District Pavement Management System ▪ Statewide Crash Records Information System	**Agency** ▪ TxDOT ▪ DPS
Planned Projects ▪ TxDOT ATMS Implementation ▪ TxDOT Center-to-Center Communications ▪ City of Longview TMC Expansion	
Additional Needs ▪ City of Tyler TMC Expansion ▪ Longview MPO ITS Data Warehouse ▪ Tyler MPO ITS Data Warehouse ▪ Other Cities ITS Implementation	

2.3 Medium Priority Market Packages

Table 4 outlines market packages that were deemed medium priority by stakeholders in the Tyler Region. These market packages were identified as useful and desirable services and functions for the Region, although very few of these market packages have existing infrastructure in place or planned over the next few years (through 2007). The feasibility of funding for these market packages was a factor in the prioritization. Availability and maturity of technology also was a consideration, particularly for the maintenance and construction operations market packages. Many of these market packages were recently developed and added to the National ITS Architecture, and are not yet widely deployed.

Table 4 – Medium Priority Market Packages for the Tyler Region

Probe Surveillance (ATMS02)	**Medium Priority**
This market package provides an alternative approach for surveillance of the roadway network. Two general implementation paths are supported by this market package: 1) wide-area wireless communications between the vehicle and Information Service Provider is used to communicate current vehicle location and status and 2) dedicated short range communications between the vehicle and roadside is used to provide equivalent information directly to the Traffic Management Subsystem. It requires either wide area or short-range communications equipment, roadside beacons and wireline communications for the short-range communications option, data reduction software, and utilizes wireline links between the Traffic Management Subsystem and Information Service Provider Subsystem to share the collected information. Both “Opt out” and “Opt in” strategies are available to ensure that the user has the ability to turn off the probe functions to ensure individual privacy.	
Existing Infrastructure ▪ TxDOT Tyler District TMC	**Agency** ▪ TxDOT
Planned Projects None identified at this time	
Additional Needs None identified at this time	

Table 4 – Medium Priority Market Packages for the Tyler Region (continued)

Emissions Monitoring and Management (ATMS11)	**Medium Priority**
This market package monitors individual vehicle emissions and provides general air quality monitoring using distributed sensors to collect the data. The collected information is transmitted to the emissions management subsystem for processing. Both area wide air quality monitoring and point emissions monitoring are supported by this market package. For area wide monitoring, this market package measures air quality, identifies sectors that are non-compliant with air quality standards, and collects, stores and reports supporting statistical data. For point emissions monitoring, this market package measures tail pipe emissions and identifies vehicles that exceed emissions standards. The gathered information can be used to implement environmentally sensitive travel demand management programs, policies, and regulations.	
Existing Infrastructure None identified at this time	**Agency**
Planned Projects None identified at this time	
Additional Needs ▪ Regional Emissions Monitoring	

Table 4 – Medium Priority Market Packages for the Tyler Region (continued)

Standard Railroad Grade Crossing/ Railroad Operations Coordination (ATMS13/ATMS15)	**Medium Priority**
This market package manages highway traffic at highway-rail intersections (HRIs) where rail operational speeds are less than 80 miles per hour. Both passive (e.g., the crossbuck sign) and active warning systems (e.g., flashing lights and gates) are supported. These traditional HRI warning systems may also be augmented with other standard traffic management devices. The warning systems are activated on notification by interfaced wayside equipment of an approaching train. The equipment at the HRI may also be interconnected with adjacent signalized intersections so that local control can be adapted to highway-rail intersection activities. Health monitoring of the HRI equipment and interfaces is performed; detected abnormalities are reported to both highway and railroad officials through wayside interfaces and interfaces to the traffic management subsystem. The Railroad Operations Coordination component provides an additional level of strategic coordination between rail operations and traffic management centers. Rail operations provides train schedules, maintenance schedules, and any other forecast events that will result in HRI closures. This information is used to develop forecast HRI closure times and durations that may be used in advanced traffic control strategies or to enhance the quality of traveler information.	
Existing Infrastructure ▪ TxDOT Tyler District TMC ▪ City of Tyler TMC ▪ City of Longview TMC	**Agency** ▪ TxDOT ▪ City of Tyler ▪ City of Longview
Planned Projects None identified at this time	
Additional Needs ▪ TxDOT Highway/Rail Intersection Warnings ▪ City of Tyler Highway/Rail Intersection Warnings	

Roadway Automated Treatment (MC05)	**Medium Priority**
This market package automatically treats a roadway section based on environmental or atmospheric conditions. Treatments include fog dispersion, anti-icing chemicals, etc. The market package includes the environmental sensors that detect adverse conditions, the automated treatment system itself, and driver information systems (e.g. dynamic message signs) that warn drivers when the treatment system is activated.	
Existing Infrastructure ▪ TxDOT Tyler District TMC	**Agency** ▪ TxDOT
Planned Projects None Identified	
Additional Needs ▪ TxDOT Ice Detection and Anti-Icing Equipment on Bridges	

Table 4 – Medium Priority Market Packages for the Tyler Region (continued)

Work Zone Safety Monitoring (MC09)	**Medium Priority**
This market package includes systems that improve work crew safety and reduce collisions between the motoring public and maintenance and construction vehicles. This market package detects vehicle intrusions in work zones and warns crew workers and drivers of imminent encroachment or other potential safety hazards. The market package supports both stationary and mobile work zones. The intrusion detection and alarm systems may be collocated or distributed, allowing systems that detect safety issues far upstream from a work zone (e.g., detection of over-dimension vehicles before they enter the work zone).	
Existing Infrastructure None identified at this time	**Agency**
Planned Projects None identified at this time	
Additional Needs ▪ TxDOT Work Zone Speed Trailers ▪ Work Zone Safety Monitoring	

Transit Passenger and Fare Management (APTS04)	**Medium Priority**
This market package manages passenger loading and fare payments on-board vehicles using electronic means. It allows transit users to use a traveler card or other electronic payment device. Sensors mounted on the vehicle permit the driver and central operations to determine vehicle loads, and readers located either in the infrastructure or on-board the transit vehicle allow electronic fare payment. Data is processed, stored, and displayed on the transit vehicle and communicated as needed to the Transit Management Subsystem.	
Existing Infrastructure ▪ City of Tyler Transit Dispatch ▪ Longview Transit Dispatch ▪ ETCOG Rural Transit Dispatch	**Agency** ▪ City of Tyler ▪ City of Longview ▪ ETCOG
Planned Projects ▪ City of Tyler Transit Automatic Passenger Counters	
Additional Needs ▪ Longview Transit Electronic Fare Payment System ▪ ETCOG Electronic Fare Payment System ▪ ETCOG Automatic Passenger Counters ▪ City of Tyler Transit Electronic Fare Payment System	

2.4 Low Priority Market Packages

Nine of the market packages that were identified and customized for the Tyler Region were ranked as low priority by stakeholders. These market packages are listed in **Table 5**. The services contained in these lower priority market packages were deemed useful and desirable for the Region, but stakeholders did not feel that public agencies should put a strong focus on these market packages in the near-term. These market packages were included as part of the Regional ITS Architecture so as not to preclude them from future deployment in the Region.

Some of these market packages were identified as candidates for private sector deployment and operations, such as ISP-Based Route Guidance and Fleet Administration. Others, such as Maintenance and Construction Vehicle Maintenance, are just more feasible for future implementation.

Table 5 – Low Priority Market Packages for the Tyler Region

Market Package Name	Description	Comments
Maintenance and Construction Vehicle Tracking (MC01)	This market package will track the location of maintenance and construction vehicles and other equipment to ascertain the progress of their activities. These activities can include ensuring the correct roads are being plowed and work activity is being performed at the correct locations.	This market package was not identified as needed in the Tyler Region at this time. However it was expected that the information from this market package may be useful to the Region some time in the future if maintenance activities were to become more automated. Included in this market package would be instrumentation of maintenance and construction vehicles with AVL.
Maintenance and Construction Vehicle Maintenance (MC02)	This market package performs vehicle maintenance scheduling and manages both routine and corrective maintenance activities on vehicles and other maintenance and construction equipment. It includes on board sensors capable of automatically performing diagnostics for maintenance and construction vehicles, and the systems that collect this diagnostic information and use it to schedule and manage vehicle maintenance.	Based on the current state of technology, this market package was not identified as needed in the Tyler Region at this time. As technology evolves, the Region may consider implementation of this market package in the future.
Roadway Maintenance and Construction (MC07)	This market package supports numerous services for scheduled and unscheduled maintenance and construction on a roadway system or right-of-way. Maintenance services would include landscape maintenance, hazard removal, routine maintenance activities, and repair and maintenance of both ITS and non-ITS equipment on the roadway. Environmental conditions information is also received from various weather sources to aid in scheduling maintenance and construction activities.	Similar to MC02, this market package was not identified as needed at this time based on the current state of technology. As technology evolves, the Region may consider implementation of this market package in the future.

Table 5 – Low Priority Market Packages for the Tyler Region (continued)

Market Package Name	Description	Comments
Maintenance and Construction Activity Coordination (MC10)	This market package supports the dissemination of maintenance and construction activity to centers which can utilize it as part of their operations, or to the Information Service Providers who can provide the information to travelers.	While the Region recognized the importance of this market package, at this time the HCRS system is providing this information.
ISP-Based Route Guidance (ATIS05)	This market package offers the user pre-trip route planning and turn-by-turn route guidance services, which are generated by an Information Service Provider (ISP). Routes may be based on static information or reflect real time network conditions. This approach simplifies the user equipment requirements and can provide the infrastructure better information on which to predict future traffic. The package includes two way data communications and optionally also equips the vehicle with the databases, location determination capability, and display technology to support turn by turn route guidance.	This market package is best suited for deployment and ongoing operations by a private sector ISP. Fee-based subscription services are typically required for delivery of this service. Stakeholders recognized a need to support this market package but will not take an active role in its implementation.
Fleet Administration (CVO01)	This market package provides the capabilities to manage a fleet of commercial vehicles. The Fleet and Freight Management subsystem would provide the route for a commercial vehicle by either utilizing an in-house routing software package or an Information Service Provider. A route would be electronically sent to the commercial vehicle with any appropriate dispatch instructions. The location of the commercial vehicle can be monitored by the Fleet and Freight Management subsystem and routing changes can be made depending on current road network conditions. The Fleet and Freight Management subsystem can process and respond to requests for assistance and general information from the commercial vehicle. The market package also provides the Fleet and Freight Management subsystem with the capability of monitoring on-board vehicle data.	This market package would be implemented primarily by the private sector. Routing information would be coordinated with TxDOT.

Table 5 – Low Priority Market Packages for the Tyler Region (continued)

Market Package Name	Description	Comments
CV Administrative Processes (CVO04)	This market package provides for electronic application, processing, fee collection, issuance, and distribution of CVO credential and tax filing. Through this process, carriers, drivers, and vehicles may be enrolled in the electronic clearance program provided by a separate market package which allows commercial vehicles to be screened at mainline speeds at roadside check facilities. Through this enrollment process, current profile databases are maintained in the Commercial Vehicle Administration subsystem and snapshots of this database are made available to the roadside check facilities to support the electronic clearance process.	This market package will be implemented primarily through the statewide CVISN program. On a Regional level, it will include permitting for oversize, overweight, and other special vehicles from municipal or county governments.
On-board CVO Safety (CVO08)	This market package provides for on-board commercial vehicle safety monitoring and reporting. It is an enhancement of the Roadside CVO Safety (CVO08) Market Package and includes roadside support for reading on-board safety data via tags. Safety warnings are provided to the driver as a priority with secondary requirements to notify the Commercial Vehicle Check roadside elements. This market package allows for the Fleet and Freight Management subsystem to have access to the on-board safety data.	This market package would be implemented by the private sector. Information from on-board systems could be sent to roadside DPS inspection stations.
Fleet Maintenance (CVO09)	This market package supports maintenance of CVO fleet vehicles with on-board monitoring equipment and Automated Vehicle Location (AVL) capabilities with in the Fleet and Freight Maintenance Subsystem. Records of vehicle mileage, repairs, and safety violations are maintained to assure safe vehicles on the highway.	This market package would be implemented by the private sector.

3. PRIORITIZATION OF PROJECTS

In order to achieve the vision of the Regional ITS Architecture, a Region must deploy carefully developed projects that provide the functionality and interoperability identified in the architecture. A key step toward that vision is the development of an ITS Deployment Plan that identifies specific projects, timeframes, and responsible agencies.

Input from all stakeholders is required in order for the stakeholders to have ownership of the ITS Deployment Plan and also to be sure that the plan has realistically identified projects and timeframes for the Region. Cost is another important factor. Cost can vary a great deal for many ITS elements, depending on the level of deployment, maturity of the technology, type of communications, etc. For example, freeway network surveillance could be adequately achieved for one Region by the deployment of still frame CCTV cameras only at freeway interchanges. In another Region, there may be a desire for full motion cameras deployed at one mile intervals to provide complete coverage of the freeway. The infrastructure and telecommunications costs for these two projects would vary a great deal, yet either one could be suitable for a particular Region.

In order to achieve input from stakeholders, a workshop was held in the Tyler Region on January 23, 2003 to present the draft Regional ITS Deployment Plan and discuss potential projects. Each project recommended for the Regional ITS Deployment Plan was discussed, and consensus was reached by the stakeholders on the project description and the timeframe for implementation.

In the following sections, projects are categorized into short-term projects (5-year deployment timeframe), mid-term projects (10-year deployment timeframe), and long-term projects (20-year deployment timeframe). For each timeframe, a summary table has been included that provides a brief project description, responsible agency, probable cost, an indication as to whether funding has been identified, and an estimated duration for the project to be designed and implemented. The agency identified as the responsible agency will be responsible for implementation, operations and maintenance unless otherwise noted. For example, the City of Tyler Fire Department may provide funding for arterial signal preemption within the City of Tyler, but the City of Tyler Street Services will operate and maintain the signals.

Following each table, a more detailed description of individual projects is included. This section also lists the market packages associated with each project and any pre-requisite projects that are required.

3.1 Short-Term Projects (5-Year)

Table 6 provides a description of projects for the Tyler Region in the 5-year timeframe. These projects represent the highest priority for the Region and should be strongly considered for implementation in the short-term. Immediately following **Table 6** are project descriptions for each of the short-term recommendations.

3.2 Mid-Term Projects (10-Year)

Table 7 provides a description of projects in the 10-year timeframe. Several of these projects are continuations of projects that will begin in the 5-year timeframe. These projects are important to the Region, but will need further review at the time of their deployment to ensure they are still a

priority for the Region. Immediately following **Table 7** are project descriptions for each of the mid-term recommendations.

3.3 Long-Term Projects (20-Year)

Table 8 provides a description of projects in the 20-year timeframe. While these projects represent market packages and anticipated future needs identified for the Region, they will need to be closely reviewed prior to implementation. It is expected that a major update to the Region's ITS Deployment Plan will occur prior to year 10 which would allow stakeholders to reassess these long-term projects to be sure that they are still feasible for the Region. Immediately following **Table 8** are project descriptions for each of the long-term recommendations.

Table 6 – Short-Term Projects (5-Year)

Program Area/Project	Description	Responsible Agency*	Probable Cost**	Funding Identified	Estimated Project Duration
Travel and Traffic Management					
TxDOT Advanced Traffic Management System (ATMS) Implementation	Implement TxDOT ATMS in TxDOT Tyler Traffic Management Center (TMC)	TxDOT	N/A	Yes	2 years
TxDOT Freeway Management System Implementation Phase 1	Implement 4 closed-circuit television (CCTV) cameras, 2 dynamic message signs (DMS) and highway advisory radio (HAR) in the Tyler Region along the I-20 corridor	TxDOT	$600,000	Partial	2 years
TxDOT Center-to-Center Communication (Statewide)	Enhance coordination with other TxDOT Districts through implementation of center-to-center communications between TxDOT TMCs	TxDOT	N/A	Yes	1 year
TxDOT Closed Loop Signal System Expansion Phase 1	Expand TxDOT closed loop signal system at signalized intersections throughout the Region	TxDOT	$200,000	No	2 years
TxDOT Travel Information Kiosks at Rest Areas	Install kiosks at rest areas to provide roadway information to motorists	TxDOT	$300,000	No	1 Year
City of Tyler TMC Expansion	Implement end equipment to allow video feed and control for VIVDS and CCTV camera pan/tilt/zoom (PTZ) at the TMC	City of Tyler	$50,000	No	6 months
City of Tyler TMC/TxDOT Tyler District TMC Fiber Connection	Implement a fiber connection between the City of Tyler TMC and the TxDOT Tyler District TMC to allow video sharing and control, traffic data sharing, and other joint functions	TxDOT/City of Tyler	$50,000	No	1 year
City of Tyler Closed Loop Signal System Expansion Phase 1	Expand City of Tyler closed loop signal system at 12 additional signalized intersections in the City of Tyler	City of Tyler	$200,000	No	2 years
City of Tyler VIVDS Expansion Phase 1	Implement video image vehicle detection systems (VIVDS) on an additional 12 signalized intersections in Tyler	City of Tyler	$240,000	No	6 months
City of Longview TMC Expansion	Implement end equipment to allow video feed and control for VIVDS and other field equipment at the TMC	City of Longview	$50,000	Yes	1 year

Table 6 – Short-Term Projects (5-Year) (continued)

Program Area/Project	Description	Responsible Agency*	Probable Cost**	Funding Identified	Estimated Project Duration
Travel and Traffic Management (continued)					
City of Longview Closed Loop Signal System Expansion Phase 1	Expand City of Longview closed loop signal system at 12 additional signalized intersections in the City of Longview	City of Longview	$200,000	No	2 years
City of Longview VIVDS Expansion Phase 1	Implement VIVDS at an additional 12 signalized intersections in Longview	City of Longview	$240,000	No	6 months
Media Liaison and Coordination	Develop agreements/enhanced coordination with local media to improve information sharing and dissemination. Provide CCTV camera feeds to media.	TxDOT/City of Tyler /City of Longview	N/A	N/A	6 months
Tyler Regional Telecommunications Master Plan	Develop Regional Telecommunications Master Plan including needs analysis and recommendations	TxDOT/City of Tyler/City of Longview	$100,000	No	6 months
Emergency Management					
East Texas 911 Center/TxDOT Tyler District TMC Connection	Install connection between East Texas 911 Center and TxDOT Tyler District TMC for CCTV camera shared monitoring and control and data sharing. This connection may be implemented through the City of Tyler TMC/TxDOT Tyler District TMC Fiber Connection project.	TxDOT/East Texas 911 Center/ Smith County	To Be Determined	No	3 months
City of Tyler EOC/TxDOT Tyler District TMC Connection	Install connection between City of Tyler Emergency Operations Center (EOC) and TxDOT Tyler District TMC to allow for DMS and CCTV camera shared monitoring and control, data sharing. This connection may be implemented through the City of Tyler TMC/TxDOT Tyler District TMC Fiber Connection project.	TxDOT/City of Tyler EOC	To Be Determined	No	6 months
City of Longview EOC/TxDOT Tyler District TMC Connection	Install connection between City of Longview EOC and TxDOT Tyler District TMC to allow for DMS and CCTV camera shared monitoring and control, data sharing.	TxDOT/City of Longview EOC	To Be Determined	No	6 months

Table 6 – Short-Term Projects (5-Year) (continued)

Program Area/Project	Description	Responsible Agency*	Probable Cost**	Funding Identified	Estimated Project Duration
Emergency Management (continued)					
City of Longview Public Safety/TxDOT Tyler District TMC Connection	Install connection between City of Longview Public Safety and TxDOT Tyler District TMC for CCTV camera shared monitoring and control and data sharing	TxDOT/City of Longview Public Safety	To Be Determined	No	3 months
DPS/TxDOT Tyler District TMC Connection	Install connection between DPS and TxDOT Tyler District TMC for CCTV camera shared monitoring and control and data sharing	TxDOT/DPS	$200,000	No	3 months
Incident Detour Plans	Develop incident detour plans for roads that would be used as detour routes during incidents along I-20	TxDOT/DPS/City of Longview/ City of Tyler/Other Cities and Counties	$100,000	No	1 year
DPS CAD System	Implement computer aided dispatch (CAD) system for DPS	DPS	$500,000	No	6 months
City of Tyler Emergency Vehicle Signal Preemption	Implement signal pre-emption at City of Tyler intersections for emergency vehicles	Implementation: City of Tyler Fire Operations and Maintenance: City of Tyler Traffic Engineering Department	$500,000	No	1 year
Maintenance and Construction Operations					
TxDOT Ice Detection and Anti-icing Equipment on Bridges	Install ice detection and anti-icing equipment at key locations in the Region prone to early icing	TxDOT	To Be Determined	No	1 year
TxDOT HCRS Enhancement	Implement enhancements to the Highway Conditions Reporting System (HCRS)	TxDOT	N/A	Yes (statewide initiative)	1 year
TxDOT Flood Detection Stations	Implement flood detection systems on state routes in the Tyler Region	TxDOT	$100,000	No	6 Months
TxDOT RWIS Station	Install a RWIS station to collect road weather information	TxDOT	$25,000	Yes	6 months

Table 6 – Short-Term Projects (5-Year) (continued)

Program Area/Project	Description	Responsible Agency*	Probable Cost**	Funding Identified	Estimated Project Duration
Maintenance and Construction Operations (continued)					
TxDOT Work Zone Speed Trailers	Procure 3 work zone speed trailers for use by TxDOT maintenance crews	TxDOT	$54,000	No	3 months
City of Tyler Flood Detection Stations	Implement flood detection stations at arterial street locations prone to flooding in the City of Tyler	City of Tyler	$100,000	No	6 months
City of Longview Flood Detection Stations	Implement flood detection stations at arterial street locations prone to flooding in the City of Longview	City of Longview	$100,000	No	6 months
Other Cities/Counties Flood Detections Stations	Implement flood detection stations at street locations prone to flooding in other cities and counties in the Tyler Region	Other Cities/Counties	$150,000	No	6 months
Public Transportation Management					
City of Tyler Transit Web-based Ride Scheduling and Travel Data	Provide web-based ride scheduling and real-time travel data via the internet	City of Tyler Transit	$140,000	Yes (partially funded)	3 months
City of Tyler Transit AVL	Install automatic vehicle location (AVL) on fixed route buses and paratransit vehicles	City of Tyler Transit	$150,000	Yes	6 months
City of Tyler Transit Automatic Passenger Counters	Passive system to accurately count ridership	City of Tyler Transit	$100,000	Yes	6 months
City of Tyler Transit/ETCOG TOC Communication	Implement a link between Tyler Transit and ETCOG to provide Tyler Transit the ability to share schedules and real time information between agencies	City of Tyler Transit/ETCOG	$20,000	No	1 year
Longview Transit Web-based Ride Scheduling and Travel Data	Provide web-based ride scheduling and real-time travel data via the internet	Longview Transit	$100,000	No	3 months
Longview Transit AVL	Install AVL on fixed route buses and paratransit vehicles. Cost will be estimated at $10,000 per vehicle.	Longview Transit	To Be Determined	No	6 months
Real-time Bus Information Travel Kiosks	Provide real-time bus information at transfer stations including time to next bus arrival	ETCOG/Longview Transit/City of Tyler	$100,000	No	9 months

Table 6 – Short-Term Projects (5-Year) (continued)

Program Area/Project	Description	Responsible Agency*	Probable Cost**	Funding Identified	Estimated Project Duration
Public Transportation Management (continued)					
ETCOG AVL and Mobile Data Terminals	Implement AVL and mobile data terminals to provide location information of buses and enable communication. Probable cost estimate is based on 63 vehicles.	ETCOG	$630,000	No	6 months
ETCOG TOC with CAD System	Implement hardware and software applications to optimize route and schedule planning used in a TOC for routine and emergency operations	ETCOG	$200,000	No	6 months
ETCOG On-board Transit Security Cameras	Install security cameras on buses and paratransit vehicles	ETCOG	$500,000	No	6 months
ETCOG Transfer Station Security Cameras	Install security cameras at transfer stations	ETCOG	$50,000	No	9 months
ETCOG Web-based Travel Data and Route Guidance	Provide real-time travel data and route guidance via the Internet	ETCOG	$100,000	No	3 months
Commercial Vehicle Operations					
HAZMAT Incident Notification System	Implement incident notification system for vehicles carrying hazardous materials	DPS/Municipal Public Safety Dispatch/County Public Safety Dispatch	To Be Determined	No	1 year
Archived Data					
Longview MPO ITS Data Warehouse	Expand data warehouse to include automated archival of data from City of Longview TMC, Gregg County, Longview Transit, and TxDOT Tyler District TMC	Longview MPO/ETCOG	$200,000	No	3 years
Tyler MPO ITS Data Warehouse	Expand data warehouse to include automated archival of data from City of Tyler TMC, Smith County, City of Tyler Transit, and TxDOT Tyler District TMC	Tyler MPO/ETCOG	$200,000	No	3 years

*Agency listed is responsible for implementation, operations and maintenance unless otherwise noted.

**The design has not been undertaken and thus this is only an opinion of probable cost for planning purposes.

Tyler Region
Short-Term Projects (5-Year)

Travel and Traffic Management

TxDOT Advanced Traffic Management System (ATMS) Implementation

Associated Market Packages:
- Network Surveillance (ATMS01)
- Surface Street Control (ATMS03)
- Traffic Information Dissemination (ATMS06)
- Incident Management System (ATMS08)
- Weather Information Processing and Distribution (MC04)
- Emergency Routing (EM2)
- ITS Data Mart (AD01)

Prerequisite Projects: None

Description: The TxDOT ATMS is a software- and hardware-based platform developed by TxDOT staff in the Traffic Operations Division in Austin. The function of this software is to provide a platform for the integration of various subsystems. The high level functions of the TxDOT ATMS include:

- Collection of traffic information (e.g., speed, incidents, lane closures) through a variety of collection methods such a loops, video detection, user entry, etc.;
- Data archiving;
- Graphical map with traffic information;
- Status information, command, and control for DMS, LCS, ramp metering and CCTV;
- Video switching; and
- User ID/password provided with each transaction for tracking use and establishing device control authority.

Future development efforts include software modules to provide status information and command/control of HAR and environmental sensors (i.e., RWIS). An integrated maintenance database management module is also under development. Lastly, several modules are currently being upgraded to support recently approved NTCIP standards for CCTV, center to center communications, and data collection devices.

TxDOT Freeway Management System (FMS) Implementation Phase 1

Associated Market Packages:
- Network Surveillance (ATMS01)
- Traffic Information Dissemination (ATMS06)
- Incident Management System (ATMS08)
- Weather Information Processing and Distribution (MC04)
- Work Zone Management (MC08)

Prerequisite Projects: TxDOT ATMS Implementation, Tyler Regional Telecommunications Master Plan

Description: Phase 1 of the Tyler FMS Implementation will include the implementation of four closed-circuit-television (CCTV) cameras and two dynamic message sign (DMS) communicating using a wireless or ISDN connection. The project also includes highway advisory radio (HAR). The estimated cost for this project is $600,000. The project has been partially funded; $300,000 has been identified for three CCTV cameras and their communications.

TxDOT Center-to-Center Communication (statewide)

Associated Market Packages:
- Traffic Information Dissemination (ATMS06)
- Regional Traffic Control (ATMS07)
- Incident Management System (ATMS08)
- Weather Information Processing and Distribution (MC04)
- Work Zone Management (MC08)
- ITS Data Mart (AD1)

Prerequisite Projects: TxDOT ATMS Implementation

Description: The center to center communications (C2C) project is a logical extension of the TxDOT ATMS and field equipment deployments. The project will enhance coordination with TxDOT Districts and other agencies through connection to the statewide C2C core infrastructure (already in place). A communication backbone must be developed with sufficient capacity between the TxDOT Tyler TMC and existing C2C infrastructure. Determination of whether the backbone should be TxDOT owned, leased, or combination thereof, should be coordinated significantly with the Tyler Regional Communications Master Plan development. The software required to support C2C communications is integral with the TxDOT developed ATMS; therefore, significant software development efforts are not anticipated. However, resources are required to oversee installation of the communications backbone and integration of existing software between the Tyler TMC and statewide C2C facilities. As part of connecting to the statewide C2C infrastructure, the Tyler District will provide data to the statewide webserver and statewide data archiving database. In return, access to information from other districts and agencies will be available to enhance operations throughout the Region.

TxDOT Closed Loop Signal System Expansion Phase 1

Associated Market Packages:
- Surface Street Control (ATMS03)

Prerequisite Projects: None

Description: Expand the closed loop signal system by integrating additional signals and implementing VIVDS at select signalized intersections in the TxDOT Tyler District. The ultimate goal of the expansion efforts is to implement closed loop signal systems throughout the Region.

TxDOT Travel Information Kiosks at Rest Areas

Associated Market Packages:
- Traffic Information Dissemination (ATMS06)
- Weather Information Processing and Distribution (MC04)
- Work Zone Management (MC08)
- Broadcast Traveler Information (ATIS01)

Prerequisite Projects: TxDOT Phase 1 FMS Implementation, TxDOT ATMS Implementation

Description: Implement kiosks at rest areas to provide motorists with roadway information including incident and/or delay notification, construction information, and weather conditions.

The estimated cost for this project is $300,000.

City of Tyler TMC/TxDOT Tyler District TMC Fiber Connection

Associated Market Packages:
- Regional Traffic Control (ATMS07)

Prerequisite Projects: City of Tyler TMC Expansion, Tyler Regional Telecommunications Master Plan

Description: Install a fiber connection between the City of Tyler TMC and the TxDOT Tyler District TMC to allow video sharing and control, traffic data sharing and other joint functions. A connection to the Tyler TMC will allow the TxDOT Tyler TMC to connect to the City of Tyler fiber ring and therefore other City of Tyler agencies such as 911 Dispatch and Smith County. The Existing fiber run reaches Harvey Hall (Fire Department facility). TxDOT could tie in at this point which is fairly close to the District office.

City of Tyler Closed Loop Signal System Expansion Phase 1

Associated Market Packages:
- Surface Street Control (ATMS03)

Prerequisite Projects: None

Description: Expand the closed loop signal system by converting existing signalized intersections to the closed-loop signal system. New signals that are installed as part of other projects will become part of the closed-loop signal system.

The estimated cost for this expansion is $200,000.

City of Tyler VIVDS Expansion Phase 1

Associated Market Packages:
- Surface Street Control (ATMS03)

Prerequisite Projects: None

Description: Implement VIVDS at signalized intersections in Tyler. By installing cameras and processors that can determine change in gray scale over a predetermined detection zone within the field of vision, VIVDS will provide Tyler with increased flexibility to determine traffic detector placement at signalized intersections. Typically a camera is mounted approximately 20 to 30 feet above the roadway and is positioned to look at oncoming vehicles. A processor is then connected to the traffic signal controller and as detection zones are activated, the controller recognizes the inputs as traditional induction loops. Many agencies operating closed loop signal systems install VIVDS and do not transport that data or video to a central location. As sufficient communications bandwidth becomes available at VIVDS field locations, both raw (without detection zones) and processed (with detection zones) video could be sent to the City of Tyler TMC to provide information to support better operational decisions, enhanced traveler information, and improved signal maintenance. Another capability of VIVDS includes various alarm features. In addition to drawing vehicle detection zones in the camera field of vision, additional zones can be created and tied to alarms. For example, if a VIVDS was located near a high vandalism area, an alarm zone could be created to assist public safety officials in protecting public property.

The City of Tyler has VIVDS at some of its signalized intersections. This project includes the implementation of VIVDS at twelve additional existing signalized intersections. The estimated cost per intersection is $20,000, therefore project costs are estimated to be $240,000.

City of Tyler TMC Expansion

Associated Market Packages:
- Network Surveillance (ATMS01)
- Surface Street Control (ATMS03)
- Regional Traffic Control (ATMS07)
- Incident Management System (ATMS08)
- Weather Information Processing and Distribution (MC04)
- ITS Data Mart (AD01)

Prerequisite Projects: None

Description: This project includes the expansion of the capabilities of the Tyler TMC. Currently, the City of Tyler TMC is used primarily to monitor the operations of the controllers and detectors at signalized intersections. VIVDS video images are not currently being transmitted to the TMC. The planned expansion of the TMC would include the implementation of end equipment to allow the transmission of the video feed from the VIVDS in the field back to the TMC. This project would also include the capabilities to control the VIVDS remotely from the TMC as well as those needed to control the pan/tilt/zoom of the planned CCTV cameras.

The estimated cost associated with this expansion is $50,000.

City of Longview TMC Expansion

Associated Market Packages:
- Network Surveillance (ATMS01)
- Surface Street Control (ATMS03)
- Regional Traffic Control (ATMS07)
- Incident Management System (ATMS08)
- Weather Information Processing and Distribution (MC04)
- ITS Data Mart (AD01)

Prerequisite Projects: None

Description: This project includes the expansion of the capabilities of the Longview TMC. Currently, the City of Longview TMC is used primarily to monitor the operations of the controllers and detectors at signalized intersections. VIVDS video images are not currently being transmitted to the TMC. The expansion of the TMC would include the implementation of end equipment to allow the transmission of the video feed from the VIVDS in the field back to the TMC. This project would also include the capabilities to control the VIVDS remotely from the TMC. This project is currently under design.

City of Longview Closed Loop Signal System Expansion Phase 1

Associated Market Packages:
- Surface Street Control (ATMS03)

Prerequisite Projects: None

Description: Expand the closed-loop signal system by converting existing signalized intersections to the closed-loop signal system. New signals that are installed as part of other projects will become part of the closed-loop signal system.

The estimated cost of this project is $200,000.

City of Longview VIVDS Expansion Phase 1

Associated Market Packages:
- Surface Street Control (ATMS03)

Prerequisite Projects: None

Description: Implement VIVDS at signalized intersections in Longview. By installing cameras and processors that can determine change in gray scale over a predetermined detection zone within the field of vision, VIVDS will provide Longview with increased flexibility to determine traffic detector placement at signalized intersections. Typically a camera is mounted approximately 20 to 30 feet above the roadway and is positioned to look at oncoming vehicles. A processor is then connected to the traffic signal controller and as detection zones are activated, the controller recognizes the inputs as traditional induction loops. Many agencies operating closed loop signal systems install VIVDS and do not transport that data or video to a central location. The City of Longview does not have plans at this time to bring the video back to their TMC. Another capability of VIVDS includes various alarm features. In addition to drawing vehicle detection zones in the camera field of vision, additional zones can be created and tied to alarms. For example, if a VIVDS was located near a high vandalism area, an alarm zone could be created to assist public safety officials in protecting public property.

The City of Longview has VIVDS at some of its signalized intersections. This project includes the implementation of VIVDS at twelve additional existing signalized intersections at an estimated cost of $20,000 per intersection for a total estimated project cost of $240,000.

Media Liaison and Coordination

Associated Market Packages:
- Traffic Information Dissemination (ATMS06)
- Weather Information Processing and Distribution (MC04)
- Work Zone Management (MC08)
- Broadcast Traveler Information (ATIS01)

Prerequisite Projects: TxDOT ATMS Implementation, TxDOT Phase 1 FMS Implementation

Description: Develop stronger liaison and coordination with local media to disseminate traveler information. Develop a link for local media to tap into CCTV camera images for dissemination of

traffic and weather advisories to the public via television and radio news broadcasts. Most TV and radio stations typically already have microwave licenses and infrastructure in place to support wireless transmission of video; therefore, TxDOT should provide a connection point at the TMC for media providers (e.g., video switch for video images and traffic conditions map), but not design and install the entire connection between the TMC and the media. An initial task in the project will be to meet with interested news providers to determine information needs to support media interface design activities. Each agency that will be sharing information directly with the media will likely need an agreement or policy in place to determine what type of information will be shared. A subgroup of the stakeholders will need to work on the process of sharing data with the media and what broadcasts will be allowed , in an attempt to provide similar data to the media from each individual stakeholder.

Tyler Regional Telecommunications Master Plan

Associated Market Packages:

- Network Surveillance (ATMS01)
- Surface Street Control (ATMS03)
- Traffic Information Dissemination (ATMS06)
- Regional Traffic Control (ATMS07)
- Incident Management System (ATMS08)
- Broadcast Traveler Information (ATIS1)

Prerequisite Projects: None

Description: Develop a Telecommunications Master Plan for the Tyler Region. The plan would include needs identification, technology alternatives analysis, and ultimately will develop recommendations for region-wide ITS and traffic-related communications. A network to serve center-to-center needs (among traffic management centers, emergency management centers, 911 centers, both within the Region and inter-state) and field-to-center links (from the TMCs out to the ATMS field devices, RWIS, traffic signals, etc.) will be defined. The report will investigate technology and transmission media options, comparing technologies, bandwidths, life cycle costs, and other requirements against the Region's needs and goals.

The outcome of these efforts will be a phased plan for transportation and ITS communications throughout the Region over a 20-year period. Strong coordination with public safety agencies is encouraged since there may be significant benefits in combining capital improvement funds to install telecommunications infrastructure that will support interagency coordination needs. The estimated cost to develop this plan is $100,000.

Emergency Management

East Texas 911 Center/TxDOT Tyler District TMC Connection

Associated Market Packages:
- Regional Traffic Control (ATMS07)
- Incident Management System (ATMS08)
- Emergency Response (EM1)
- Emergency Routing (EM2)

Prerequisite Projects: Tyler Regional Telecommunications Master Plan, City of Tyler TMC/TxDOT Tyler District TMC Fiber Connection

Description: Establish telecommunications connection between the East Texas 911 Dispatch Center and TxDOT Tyler District TMC to allow for CCTV camera shared monitoring and control and data sharing. There is a possibility that one connection from the TxDOT Tyler District TMC to the City of Tyler will allow a connection to the East Texas 911 Center through the existing City of Tyler Fiber Ring. The East Texas 911 Center is collocated with the City of Tyler EOC.

City of Tyler EOC/TxDOT Tyler District TMC Connection

Associated Market Packages:
- Regional Traffic Control (ATMS07)
- Incident Management System (ATMS08)
- Emergency Response (EM1)
- Emergency Routing (EM2)

Prerequisite Projects: Tyler Regional Telecommunications Master Plan, City of Tyler TMC/TxDOT Tyler District TMC Fiber Connection

Description: The City of Tyler EOC is collocated with the East Texas 911 Center. The connection that establishes communications between the TxDOT Tyler TMC and the East Texas 911 Center will accomplish the connection for the City of Tyler EOC.

City of Longview EOC/TxDOT Tyler District TMC Connection

Associated Market Packages:
- Regional Traffic Control (ATMS07)
- Incident Management System (ATMS08)
- Emergency Response (EM1)
- Emergency Routing (EM2)

Prerequisite Projects: Tyler Regional Telecommunications Master Plan

Description: Establish telecommunications connection between the City of Longview Emergency Operations Center (EOC) and TxDOT Tyler District TMC to allow for CCTV camera shared monitoring and control and data sharing. The cost of this connection will depend on the communications medium that is chosen.

City of Longview Public Safety/TxDOT Tyler District TMC Connection

Associated Market Packages:
- Regional Traffic Control (ATMS07)
- Incident Management System (ATMS08)
- Emergency Response (EM1)
- Emergency Routing (EM2)

Prerequisite Projects: Tyler Regional Telecommunications Master Plan

Description: Install telecommunications connection between the City of Longview Public Safety Dispatch and TxDOT Tyler District TMC to allow for CCTV camera shared monitoring and control and data sharing. The cost of this connection will depend on the communications method chosen.

DPS/TxDOT Tyler District TMC Connection

Associated Market Packages:
- Regional Traffic Control (ATMS07)
- Incident Management System (ATMS08)
- Emergency Response (EM1)
- Emergency Routing (EM2)

Prerequisite Projects: Tyler Regional Telecommunications Master Plan

Description: Install telecommunications connection between the DPS Dispatch and TxDOT Tyler District TMC to allow for CCTV camera shared monitoring and control and data sharing. This project is estimated to cost $200,000, but cost will be dependent on the type of communications medium chosen.

Incident Detour Plans

Associated Market Packages:
- Incident Management System (ATMS08)
- Emergency Routing (EM2)

Prerequisite Projects: None

Description: This project will identify detour routes for interstate, state, and local arterials to be used during times of major incidents on the respective roadways. Once an incident has been detected and verified along an instrumented roadway, the City of Tyler TMC or TxDOT Tyler TMC can post a message to a DMS along the subject roadway providing information not only on the incident (expected duration and delay) but also provide potential alternate routes. Additionally, if the detour routes are designated, the owning agency can provide alternate signal timing plans that will help move detoured traffic efficiently along the detour route.

DPS Computer Aided Dispatch (CAD) System

Associated Market Packages:
- Emergency Response (EM1)
- Emergency Routing (EM2)

Prerequisite Projects: None

Description: Implement a CAD system for dispatch of DPS vehicles in the Tyler Region. Because DPS is a state agency, a CAD system would need to be a statewide initiative. A CAD system for DPS would be most effective in conjunction with AVL units on-board each of the DPS vehicles, to allow for vehicles in the field and their locations to be displayed on a map of the Region. When emergency calls come in through 911 or another agency, dispatchers would create an incident entry in the CAD system, including the incident location and type/nature of the incident. The CAD system would identify the nearest officer based on location information from AVL units and generate an appropriate dispatch. The CAD system would be able to maintain records of all communications and responses between the dispatch center and the responding officer(s), and in effect, 'track' the incident from beginning to end.

Based on specifications created by DPS, there can be functions built in to the CAD to prioritize incidents (or assign priority) based on the type, severity, and other factors. A centralized, automated CAD system will allow DPS to manage multiple incidents, and could potentially interface with other agencies that would need to be contacted with incident details. During a major event that requires a multi-agency response, all involved agencies in the Tyler Region would be able to work from the same incident data and immediately know what resources have been committed. The records management function of a CAD system allows for all of the incident details to be stored in a consistent format, clearly identifies the dispatcher, responding officer(s), other agencies involved, duration of the incident, actions taken, and other pertinent details.

City of Tyler Emergency Vehicle Traffic Signal Preemption

Associated Market Packages:
- Surface Street Control (ATMS03)
- Emergency Routing (EM2)

Prerequisite Projects: None

Description: Equip intersections and City of Tyler Fire and Emergency Medical Services (EMS) vehicles with traffic signal preemption equipment. Typical installations include mounting hardware at the intersection and on each vehicle authorized to preempt the signal. The intersection equipment includes a detector(s) positioned at the intersection approach(es) that is connected to the traffic signal controller. As a vehicle equipped with a preemption emitter approaches an intersection, the detector activates a change in signal timing to allow fast and safe passage. Preemption systems have proven to improve safety of emergency personnel and vehicles en-route to an incident. The estimated implementation cost for this project is $500,000.

Maintenance and Construction Operations

TxDOT Ice Detection and Anti-Icing Equipment

Associated Market Packages:
- Road Weather Data Collection (MC03)
- Weather Information Processing and Distribution (MC04)
- Roadway Automated Treatment (MC05)

Prerequisite Projects: None

Description: Implement ice detection and anti-icing equipment at key locations within the Tyler Region prone to early icing. Anti-icing is a snow and ice control practice that attempts to prevent the formation or development of snow and ice that becomes bonded to the roadway by utilizing timely applications of a freezing point depressant.

Anti-icing devices apply a liquid chemical de-icing agent directly onto the surface before the temperature and humidity levels permit an ice bond to occur. This technique requires the chemical de-icing agents be applied in a timely and accurate manner. Permanent auto anti-icing systems must be activated by some means, and the level of service is directly impacted by the method that is used to activate the system. To achieve full autonomous operation (non-human intervention), the anti-icing system must be controlled by input from a road weather information system that measures atmospheric and pavement surface conditions, accurately measures the freeze point of the moisture/chemical solution on the road surface and in turn activates the permanent automated anti-icing system when icing conditions are imminent.

TxDOT Highway Condition Reporting System (HCRS) Enhancement

Associated Market Packages:
- Traffic Information Dissemination (ATMS06)
- Incident Management System (ATMS08)
- Weather Information Processing and Distribution (MC04)
- Maintenance and Construction Activity Coordination (MC010)

Prerequisite Projects: None

Description: TxDOT's HCRS will be enhanced on a statewide basis. The HCRS will use data from the Tyler TMC, both automated (ATMS) and manually entered. It is envisioned that the ATMS software will enhance the data collection and consolidation processes for automated information. This is a statewide effort; the Tyler Region will be affected by this project, and will contribute information to the HCRS, but will not be responsible for funding the enhancements or for the implementation schedule.

TxDOT Flood Detection Stations

Associated Market Packages:
- Network Surveillance (ATMS01)
- Road Weather Data Collection (MC03)
- Weather Information Processing and Distribution (MC04)

Prerequisite Projects: None

Description: Implement flood detection systems on flood-prone segments of Interstates and state routes in the Tyler Region. This will enable faster response times by maintenance crews to close flooded or near flooded roadway segments as necessary. The typical flood detection station is composed of a stream gauge, a rain gauge, a temperature sensor, a wind speed sensor, and a wind direction sensor and remote communications support. Other upgrades that may support operational decision making include sensors to measure relative humidity, soil moisture content, solar radiation, and air and water quality. The flood detection systems will be monitored from the TxDOT Tyler District TMC. Communications between the flood detection stations and the TMC can be achieved through a variety of wireline and wireless telemetry methods. TxDOT has identified one location, and other potential priority locations include SH 135 south of Gladewater and US 69 north of Rusk. There is a future module of the ATMS software planned to support environmental sensors (i.e., RWIS), and development of this module could be extended to include the needs of flood detection stations.

Costs for this project will vary based on the number of locations and detection stations installed, as well as communications. For planning purposes, three to four flood detection stations at $25,000 each (including communications) was used.

TxDOT RWIS Station

Associated Market Packages:
- Network Surveillance (ATMS01)
- Road Weather Data Collection (MC03)
- Weather Information Processing and Distribution (MC04)

Prerequisite Projects: None

Description: Install RWIS stations in the Tyler Region. The RWIS will be remotely monitored from the TxDOT Tyler District TMC. Real time weather information improves response time, increases winter maintenance efficiency and minimizes the traveling public's exposure to hazardous weather related roadway conditions. Archived RWIS information also provides valuable historic information for planning purposes. Data including temperature (atmospheric and pavement), precipitation, wind, humidity, visibility (white out/heavy fog) and even pavement surface conditions (i.e., snow, chemical) are collected by sensors placed at the roadside (typically on a 30 foot tower) and embedded in the roadway. Remote processing units placed along the roadway communicate with various types of road and weather sensors. Data from the units are transmitted to the central ATMS server, via dial-up modem or other low bandwidth telecommunications methods, which will be located at the TxDOT Tyler District TMC. A future module for the ATMS software will support environmental sensor data and provides collection, archiving, and distribution of the data.

In most installations, RWIS devices are installed at problem areas where rapidly changing weather has a direct, negative impact on travel conditions, such as bridges. Pavement sensors are installed in the bridge deck and approach. The variation in pavement temperatures can allow maintenance engineers to better determine appropriate pavement treatments (e.g., salt, bridge deck pre-wetting, other chemicals, etc.) and more effectively schedule personnel/equipment based on current and forecast weather conditions. More sophisticated RWIS stations are equipped with integrated cameras to transmit snapshots or streaming video to a central control facility. In the event that streaming video is a functional requirement, a telecommunications solution supporting higher bandwidth than standard telephone dial-up is required. RWIS data also can be included as part of web or phone-based travel information systems, as well as broadcast to motorists via HAR or commercial radio broadcasts (through an information service provider). The estimated cost for one RWIS station is $25,000.

TxDOT Work Zone Speed Trailers

Associated Market Packages:
- Workzone Management (MC08)

Prerequisite Projects: None

Description: Procure work zone speed trailers for use by TxDOT maintenance crews. Speed trailers are portable traffic control devices that are relatively easy to implement, operate, and dismantle. With a large LED speed display run by radar sitting atop a trailer, speed trailers are routinely used in work zones, residential neighborhoods, and urban settings to slow drivers. Recent studies have shown speed trailers particularly suited to temporary work zones and are more effective than radar drones. They help reduce speeds throughout work zones of both large trucks and passenger vehicles.

Costs will very depending on the number of speed zone trailers purchased. For planning purposes, three speed zone trailers at $18,000 each was used to arrive at the estimate.

City of Tyler Flood Detection Stations

Associated Market Packages:
- Network Surveillance (ATMS01)
- Road Weather Data Collection (MC03)
- Weather Information Processing and Distribution (MC04)

Prerequisite Projects: None

Description: Implement flood detection systems on flood-prone segments of city streets in the City of Tyler. This will enable faster response times by maintenance crews to close flooded or near flooded roadway segments as necessary. The typical flood detection station is composed of a stream gauge, a rain gauge, a temperature sensor, a wind speed sensor, and a wind direction sensor and remote communications support. Other upgrades that may support operational decision making include sensors to measure relative humidity, soil moisture content, solar radiation, and air and water quality. The flood detection systems will be monitored from the City of Tyler TMC. Communications between the flood detection stations and the TMC can be achieved through a variety of wireline and wireless telemetry methods. There is a future module of the ATMS software planned to support environmental sensors

(i.e., RWIS), and development of this module could be extended to include the needs of flood detection stations.

Costs for this project will vary based on the number of locations and detection stations installed, as well as communications. For planning purposes, three to four flood detection stations at $25,000 each (including communications) was used.

City of Longview Flood Detection Stations

Associated Market Packages:
- Network Surveillance (ATMS01)
- Road Weather Data Collection (MC03)
- Weather Information Processing and Distribution (MC04)

Prerequisite Projects: None

Description: Implement flood detection systems on flood-prone segments of city streets in the City of Longview. This will enable faster response times by maintenance crews to close flooded or near flooded roadway segments as necessary. The typical flood detection station is composed of a stream gauge, a rain gauge, a temperature sensor, a wind speed sensor, and a wind direction sensor and remote communications support. Other upgrades that may support operational decision making include sensors to measure relative humidity, soil moisture content, solar radiation, and air and water quality. The flood detection systems will be monitored from the City of Longview TMC. Communications between the flood detection stations and the TMC can be achieved through a variety of wireline and wireless telemetry methods. There is a future module of the ATMS software planned to support environmental sensors (i.e., RWIS), and development of this module could be extended to include the needs of flood detection stations.

Costs for this project will vary based on the number of locations and detection stations installed, as well as communications. For planning purposes, three to four flood detection stations at $25,000 each (including communications) was used.

Other Cities/Counties Flood Detection Stations

Associated Market Packages:
- Network Surveillance (ATMS01)
- Road Weather Data Collection (MC03)
- Weather Information Processing and Distribution (MC04)

Prerequisite Projects: None

Description: Implement flood detection systems on flood-prone roadway segments in the cities and counties of the Tyler Region. This will enable faster response times by maintenance crews to close flooded or near flooded roadway segments as necessary. The typical flood detection station is composed of a stream gauge, a rain gauge, a temperature sensor, a wind speed sensor, and a wind direction sensor and remote communications support. Other upgrades that may support operational decision making include sensors to measure relative humidity, soil moisture content, solar radiation, and air and water quality. The flood detection systems will be monitored by County Maintenance or

Municipal Public Works Department. Communications between the flood detection stations and the TMC can be achieved through a variety of wireline and wireless telemetry methods. There is a future module of the ATMS software planned to support environmental sensors (i.e., RWIS), and development of this module could be extended to include the needs of flood detection stations.

Costs for this project will vary based on the number of locations and detection stations installed, as well as communications. For planning purposes, five to six flood detection stations at $25,000 each (including communications) was used.

Public Transportation Management

City of Tyler Transit Web-based Ride Scheduling and Travel Data

Associated Market Packages:
- Transit Fixed-Route Operations (APTS02)
- Demand Response Transit Operations (APTS03)
- Transit Traveler Information (APTS08)

Prerequisite Projects: City of Tyler Transit AVL

Description: This project will include the publishing of real-time transit data on the City of Tyler Transit website. Patrons of Tyler Transit fixed-route and demand responsive transit operations will benefit from real-time as well as static information presented on this website. Users of the system will be able to enter their origination and destination addresses and the system will identify the best routes and estimated arrival times. Web-based ride scheduling for demand-response transit is included in this project. Funding for Phase I (web based scheduling software) has been identified. The estimated cost is $140,000 and then a monthly fee. Funding has not yet been identified for the rest of the project.

City of Tyler Transit Automatic Vehicle Location (AVL)

Associated Market Packages:
- Transit Vehicle Tracking (APTS01)
- Transit Fixed Route Operations (APTS02)
- Demand Response Transit Operations (APTS03)
- Transit Traveler Information (APTS08)

Prerequisite Projects: None

Description: Install AVL on City of Tyler Transit fixed routes buses and para-transit vehicles. The AVL system will convey information regarding real-time vehicle location to the Tyler Transit Dispatch Center, which will allow for enhanced system monitoring, scheduling, routing (or re-routing), as well as provide for precise bus location information in the event of a breakdown or emergency situation. AVL systems measure actual, real-time position of transit vehicles, and relay that information back to a transit operations center, usually via global positioning system. Used with a geographic information system map, bus locations can be displayed for any vehicles in the fleet equipped with the on-board AVL unit. AVL, in conjunction with CAD, allows for improved bus tracking capability, as well as archiving and managing historical data. AVL systems also can be equipped with additional features, including tie-ins to alarm/security systems, vehicle component monitoring, and automatic passenger counter and fare

payment systems. Transit managers for real-time operations and management as well as for transit traveler information can use information from the AVL/CAD system. In areas where AVL technology has been installed on buses, agencies report a 5-25 percent increase in on-time performance, which translates directly to improved efficiency and operations.

Costs will vary depending on the number of vehicles equipped with the on-board AVL unit. Funding has been secured through an FTA grant of $150,000. The systems are planned to be installed on four fixed routes and seven paratransit vehicles. At this time the City of Tyler Transit is exploring using satellite communications for communications to the buses because their current communications provider is going out of business.

City of Tyler Transit Automatic Passenger Counters

Associated Market Packages:
- Transit Passenger and Fare Management (APTS04)

Prerequisite Projects: City of Tyler Transit AVL

Description: Install Automatic Passenger Counter (APC) systems on transit vehicles to accurately count ridership. APC systems collect ridership information and can determine total boardings and alightings at each stop through the use of AVL to determine where those boardings and alightings take place.

This project is estimated to cost $100,000.

City of Tyler Transit/ETCOG TOC Communication

Associated Market Packages:
- Transit Fixed-Route Operations (APTS02)
- Demand-Response Transit Operations (APTS03)
- Transit Traveler Information (APTS08)

Prerequisite Projects: City of Tyler Transit AVL, ETCOG AVL and Mobile Data Terminals

Description: Implement a link between Tyler Transit and ETCOG to provide the transit agencies with the ability to share schedules and real time information.

Longview Transit Web-based Ride Scheduling and Travel Data

Associated Market Packages:
- Transit Fixed-Route Operations (APTS02)
- Demand Response Transit Operations (APTS03)
- Transit Traveler Information (APTS08)

Prerequisite Projects: Longview Transit AVL

Description: This project will include the publishing of real-time transit data on the Longview Transit website. Patrons of Longview Transit fixed-route and demand responsive transit operations will benefit from real-time as well as static information presented on this website. Users of the system will be able

to enter their origination and destination addresses and the system will identify the best routes and estimated arrival times. Web-based ride scheduling for demand responsive transit could be included in this project. The City of Longview could purchase a license to use the same system as the City of Tyler Transit and realize a cost savings as well as increased interoperability.

Longview Transit Automatic Vehicle Location (AVL)

Associated Market Packages:
- Transit Vehicle Tracking (APTS01)
- Transit Fixed Route Operations (APTS02)
- Demand Response Transit Operations (APTS03)
- Transit Traveler Information (APTS08)

Prerequisite Projects: None

Description: Install AVL on Longview Transit fixed routes buses and para-transit vehicles. The AVL system will convey information regarding real-time vehicle location to the Longview Transit Dispatch Center, which will allow for enhanced system monitoring, scheduling, routing (or re-routing), as well as provide for precise bus location information in the event of a breakdown or emergency situation. AVL systems measure actual, real-time position of transit vehicles, and relay that information back to a transit operations center, usually via global positioning system. Used with a geographic information system map, bus locations can be displayed for any vehicles in the fleet equipped with the on-board AVL unit. AVL, in conjunction with CAD, allows for improved bus tracking capability, as well as archiving and managing historical data. AVL systems also can be equipped with additional features, including tie-ins to alarm/security systems, vehicle component monitoring, and automatic passenger counter and fare payment systems. Transit managers for real-time operations and management as well as for transit traveler information can use information from the AVL/CAD system. In areas where AVL technology has been installed on buses, agencies report a 5-25 percent increase in on-time performance, which translates directly to improved efficiency and operations.

Costs will vary depending on the number of vehicles equipped with the on-board AVL unit. For planning purposes, it is estimated that the cost per vehicle is approximately $10,000.

Real-time Bus Information Travel Kiosks

Associated Market Packages:
- Transit Traveler Information (APTS08)

Prerequisite Projects: City of Tyler Transit AVL, Longview Transit AVL, ETCOG AVL and Mobile Data Terminals

Description: Install static and real-time transit traveler information devices at transit transfer stations in the Tyler Region. This project will be a joint effort of ETCOG, Longview Transit and City of Tyler Transit. The project will build on information available from the transit AVL project. Kiosks, monitors, or dynamic signs will relay information on current bus operating conditions (e.g., Next bus – 5 minutes, on schedule, delayed 10 minutes, etc.).

ETCOG AVL and Mobile Data Terminals

Associated Market Packages:
- Transit Vehicle Tracking (APTS01)
- Demand-Response Transit Operations (APTS03)
- Transit Traveler Information (APTS08)

Prerequisite Projects: ETCOG TOC with CAD System

Description: Install AVL and MDT units on 63 ETCOG transit vehicles. The AVL system will convey information regarding real-time vehicle location to the ETCOG Transit Operations Center, which will allow for enhanced system monitoring, scheduling, routing (or re-routing), as well as provide for precise bus location information in the event of a breakdown or emergency situation. AVL systems measure actual, real-time position of transit vehicles, and relay that information back to a transit operations center, usually via global positioning system. Used with a geographic information system map, bus locations can be displayed for any vehicles in the fleet equipped with the on-board AVL unit. AVL, in conjunction with CAD, allows for improved bus tracking capability, as well as archiving and managing historical data. AVL systems also can be equipped with additional features, including tie-ins to alarm/security systems, vehicle component monitoring, and automatic passenger counter and fare payment systems. Information from the AVL/CAD system can be used by transit managers for real-time operations and management as well as for transit traveler information. In areas where AVL technology has been installed on buses, agencies report a 5-25 percent increase in on-time performance, which translates directly to improved efficiency and operations.

Mobile data terminals allow bus operators to send and receive digital messages. Mobile data terminals can be used by dispatchers to notify drivers of adverse conditions, route changes, or other impacts to the route. MDTs can also transmit information from the driver to the dispatch center, including status, disruptions, or silent alarms. An additional feature that can be built-in to the MDT is the ability for vehicle-to-vehicle digital communications, in addition to the vehicle-to-center communications.

Cost will vary depending on the number of vehicles equipped with AVL/MDT systems, as well as the functions and features designed into the systems (above the basic location and digital communication functions). For planning purposes, 63 vehicles were used at $10,000 per vehicle.

ETCOG TOC with CAD System

Associated Market Packages:
- Transit Vehicle Tracking (APTS01)
- Demand-Response Transit Operations (APTS03)

Prerequisite Projects: None

Description: Implement a centralized transit management and operations center for the 14 counties that ETCOG services. These counties cover areas in the TxDOT Atlanta, Paris and Tyler Districts. A centralized transit management center will serve as the hub for transit operations, dispatch, transit travel information (including customer call center) and other functions. Upgrading to CAD will streamline communications between dispatchers and drivers. Used in conjunction with automatic vehicle location and mobile data terminals, dispatchers can assess vehicle locations, status, route adherence, as well as communicate with one or several vehicles that are in the field. A CAD system also improves the system

reporting functions by automatically logging all communications between the dispatch center and the driver, including time, vehicle/driver, nature of the communication, and response.

ETCOG On-board Transit Security Cameras

Associated Market Packages:
- Transit Security (APTS05)

Prerequisite Projects: None

Description: This project will include the installation of security cameras on ETCOG buses and paratransit vehicles. Cameras will be for on-board recording only, and are not envisioned to be monitored remotely from the ETCOG Transit Dispatch. Video will be stored for a pre-determined amount of time via video tape or emerging digital video recording technology. While the main objective of on-board surveillance projects has been to identify individuals committing criminal acts or creating disturbances on buses, there have been noticeable maintenance benefits such as a reduction of litter and debris.

ETCOG Transfer Station Security Cameras

Associated Market Packages:
- Transit Security (APTS05)

Prerequisite Projects: None

Description: This project will include the installation of security cameras at ETCOG transfer stations. Cameras will record, but will also likely be monitored at the Transit Dispatch. Video will be stored for a pre-determined amount of time via video tape or emerging digital video recording technology. The main objective of this project will be to provide increased security for transit patrons waiting at a transfer station.

ETCOG Transit Web-based Travel Data and Route Guidance

Associated Market Packages:
- Demand Response Transit Operations (APTS03)
- Transit Traveler Information (APTS08)

Prerequisite Projects: ETCOG AVL and Mobile Data Terminals

Description: This project will include the publishing of real-time transit data on the ETCOG website. ETCOG patrons of demand responsive transit operations will benefit from real-time as well as static information presented on this website. Users of the system will be able to enter their origination and destination addresses and the system will identify the best routes and estimated arrival times for the trip as well as allow them to schedule a ride.

Commercial Vehicle Operations

HAZMAT Incident Notification System

Associated Market Packages:
- HAZMAT Management (CVO10)

Prerequisite Projects: None

Description: Implement incident notification system for vehicles carrying hazardous materials. When an incident occurs in which a vehicle carrying hazardous materials was involved, a notice is sent to the local public safety office that monitors the area in which the incident occurred. The message contains information regarding the materials being transported by the commercial vehicle to the emergency response agency so that emergency personnel can understand what types of material they will be encountering and the best and safest method to use in the clean-up.

Information Management

Longview MPO ITS Data Warehouse

Associated Market Packages:
- ITS Data Mart (AD1)

Prerequisite Projects: None

Description: Implement a system to collect, store and process transportation data from selected locations. This project will design the frequency, quantity, and quality of data to be collected and stored. User interfaces will be required at each local agency to be able to access, search, and upload archived data as needed. The interface will likely be web-based.

Tyler MPO ITS Data Warehouse

Associated Market Packages:
- ITS Data Mart (AD1)

Prerequisite Projects: None

Description: Implement a system to collect, store and process transportation data from selected locations. This project will design the frequency, quantity, and quality of data to be collected and stored. User interfaces will be required at each local agency to be able to access, search, and upload archived data as needed. The interface will likely be web-based.

Table 7 – Mid-Term Projects (10-Year)

Program Area/Project	Description	Responsible Agency*	Probable Cost**	Funding Identified	Estimated Project Duration
Travel and Traffic Management					
TxDOT US 69 instrumentation	Implement CCTV cameras, DMS, detectors, and HAR along US 69 in the Tyler Region to help provide information during evacuations	TxDOT	$1,000,000	No	2 years
TxDOT Closed Loop Signal System Expansion Phase 2	Continue expansion of closed loop signal system at TxDOT intersections throughout the Region	TxDOT	$300,000	No	1 year
City of Tyler Closed Loop Signal System Expansion Phase 2	Continue implementation of closed loop signal systems in the City of Tyler	City of Tyler	$500,000	No	2 years
City of Tyler VIVDS Expansion Phase 2	Continue implementation of VIVDS at signalized intersections in City of Tyler	City of Tyler	$200,000	No	2 years
City of Tyler CCTV Camera Implementation	Implement CCTV cameras at major intersections such as those along Loop 323	City of Tyler	$150,000	No	1 years
City of Longview Closed Loop Signal System Expansion Phase 2	Continue implementation of closed loop signal systems in the City of Longview	City of Longview	$500,000	No	2 years
City of Longview VIVDS Expansion Phase 2	Continue implementation of VIVDS at signalized intersections in City of Longview	City of Longview	$200,000	No	2 years
Canton Parking and Event Management System	Implement parking and event management system at Canton First Monday Trade Days	City of Canton/TxDOT/ Private Sector	$500,000	No	2 years
TxDOT Highway/ Rail Intersection Warnings	Implement warning system to alert drivers of approaching trains and expected wait times	TxDOT/Railroad operators	$500,000	No	1 year
City of Tyler Highway/Rail Intersection Warnings	Add highway/rail intersection warning systems that are integrated with TxDOT Tyler District TMC and City of Tyler TMC as needed	TxDOT Tyler District TMC/City of Tyler TMC	$500,000	No	2 years

Table 7 – Mid-Term Projects (10-Year) (continued)

Program Area/Project	Description	Responsible Agency*	Probable Cost**	Funding Identified	Estimated Project Duration
Travel and Traffic Management (continued)					
Regional 511 Advanced Traveler Information System Server	Implement advanced traveler information system (ATIS) server in the TxDOT Tyler District TMC that will collect, consolidate, and distribute traveler information to a 511 based phone system, web, and private Information Service Providers (ISPs)	TxDOT	To Be Determined	No	1 year
Maintenance and Construction Operations					
Work Zone Safety Monitoring	Implement portable work zone safety monitoring equipment in work zones	TxDOT	To Be Determined	No	1 year
Public Transportation Management					
City of Tyler Transit On-board Security Cameras	Install on-board security cameras on buses	City of Tyler Transit	$100,000	No	1 year
City of Tyler Transit Electronic Fare Payment System	Install electronic fare payment system on fixed route buses	City of Tyler Transit	$150,000	No	1 year
Longview Transit On-board Security Cameras	Install on-board security cameras on buses	Longview Transit	$100,000	No	1 year
Longview Transit Electronic Fare Payment System	Install electronic fare payment system on fixed route buses	Longview Transit	$150,000	No	1 year
ETCOG Electronic Fare Payment System	Implement a system to allow the use of smart card and electronic swipe technology for fare collection	ETCOG	$150,000	No	3 months
Commercial Vehicle Operations					
TxDOT Weigh-in-Motion Site Implementation	Implement weigh-in-motion (WIM) sites on routes throughout the Region. For planning purposes, 2 sites were used at approximately $50,000 per site.	TxDOT	$100,000	No	1 year

*Agency listed is responsible for implementation, operations and maintenance unless otherwise noted.

**The design has not been undertaken and thus this is only an opinion of probable cost for planning purposes.

Tyler Region
Mid-Term Projects (10-Year)

Travel and Traffic Management

TxDOT US 69 Instrumentation

Associated Market Packages:
- Network Surveillance (ATMS01)
- Traffic Information Dissemination (ATMS06)
- Incident Management System (ATMS08)

Prerequisite Projects: TxDOT ATMS Implementation, TxDOT Freeway Management System Phase 1, Tyler Regional Telecommunications Master Plan

Description: Implement CCTV Cameras, DMS, detectors, and HAR along US 69 in the Tyler Region to help provide information during evacuations. The Tyler Region has been identified in State Emergency Management plans to receive 350,000 hurricane evacuees from southeast Texas coastal areas during an evacuation. Instrumentation along US 69 would allow more effective management of that traffic as well as provide a means to alert drivers of delays, incidents or other factors affecting the flow of traffic through use of the DMS signs.

TxDOT Closed Loop Signal System Expansion Phase 2

Associated Market Packages:
- Surface Street Control (ATMS03)

Prerequisite Projects: TxDOT Closed Loop Signal System Expansion Phase 1

Description: Expand the closed loop signal system by integrating additional signals and implementing VIVDS at select signalized intersections throughout the TxDOT Tyler District. The ultimate goal of the expansion efforts is to implement closed loop signal systems in all cities in the Region. This is a continuation of the project presented in the short-term project listings. This project is estimated to cost $300,000.

City of Tyler Closed Loop Signal System Expansion Phase 2

Associated Market Packages:
- Surface Street Control (ATMS03)

Prerequisite Projects: City of Tyler Closed Loop Signal System Expansion Phase 1

Description: Expand the closed loop signal system by converting existing signalized intersections to the closed-loop signal system. New signals that are installed as part of other projects will become part of the closed loop signal system. This is a continuation of the project presented in the short-term project listings and is estimated to cost $500,000.

City of Tyler VIVDS Expansion Phase 2

Associated Market Packages:
- Surface Street Control (ATMS03)

Prerequisite Projects: VIVDS to be installed in conjunction with traffic signals, City of Tyler VIVDS Expansion Phase 1

Description: Implement VIVDS at signalized intersections in Tyler. VIVDS will provide Tyler flexibility to determine traffic detector placement at signalized intersections by installing cameras and processors that can determine change in gray scale over a predetermined detection zone within the field of vision.

The City of Tyler has VIVDS at some of its signalized intersections as well as those completed as part of Phase 1 of this project. This project is to include the implementation of VIVDS at ten additional existing signalized intersections at an estimated cost of $200,000.

City of Tyler CCTV Camera Implementation

Associated Market Packages:
- Network Surveillance (ATMS01)
- Surface Street Control (ATMS03)

Prerequisite Projects: City of Tyler TMC Expansion

Description: This project includes the deployment of CCTV cameras at major City of Tyler intersections that will be impacted by detoured or re-routed traffic during times of incidents. The CCTV cameras can also be used to monitor congestion associated with recurring events and allow signal control adjustments according to the vehicular demand. The information gathered by the CCTV cameras (video feed) can be shared with the TxDOT Tyler District TMC.

Costs associated with this project will vary with the number of cameras installed. For planning purposes, at this time costs are estimated to be $150,000.

City of Longview Closed Loop Signal System Expansion Phase 2

Associated Market Packages:
- Surface Street Control (ATMS03)

Prerequisite Projects: City of Longview Closed Loop Signal System Phase 1

Description: Expand the closed loop signal system by converting existing signalized intersections to the closed-loop signal system. New signals that are installed as part of other projects will become part of the closed loop signal system. This is a continuation of the project described in the short-term project descriptions.

The costs associated with this expansion are estimated to be $500,000.

City of Longview VIVDS Expansion Phase 2

Associated Market Packages:
- Surface Street Control (ATMS03)

Prerequisite Projects: VIVDS to be installed in conjunction with traffic signals, City of Longview VIVDS Expansion Phase 1

Description: Implement VIVDS at signalized intersections in Longview. VIVDS will provide Longview flexibility to determine traffic detector placement at signalized intersections by installing cameras and processors that can determine change in gray scale over a predetermined detection zone within the field of vision.

The City of Longview has VIVDS at some of its signalized intersections as well as those implemented as part of Phase 1 of this project from the short term project listings. This project includes the implementation of VIVDS at ten additional existing signalized intersections at an estimated cost of $200,000.

Canton Parking and Event Management System

Associated Market Packages:
- Parking Facility Management (ATMS16)

Prerequisite Projects: None

Description: Install a parking and event management system that directs motorists to available spaces in Canton for the Canton First Monday Trade Days. Parking management systems have proven to reduce delays/congestion and improve air quality around areas where motorists may "circle" a venue in search of an available parking space. Parking and event management systems are composed of two subsystems. The first subsystem monitors the availability of parking spaces at a facility based on gate counts of vehicles entering and exiting the facility based on gate counts. More sophisticated subsystems count how many spaces are available based on individual parking stall presence detectors. The second major subsystem provides motorists with dynamic parking information on the major streets approaching the venue(s). The information is routinely disseminated using a combination of static and dynamic signing. At this time, it is assumed that this project will be operated by a private entity as a public/private partnership.

TxDOT Highway/Rail Intersection Warnings

Associated Market Packages:
- Network Surveillance (ATMS01)
- Surface Street Control (ATMS03)
- Traffic Information Dissemination (ATMS06)
- Standard Railroad Grade Crossing (AtMS13)
- Railroad Operations Coordination (ATMS15)

Prerequisite Projects: TxDOT ATMS Implementation

Description: This project will include highway/rail intersection warning systems that will alert motorists of arriving trains, amount of time the train will occupy the crossing, and the length of time a motorist can expect to be delayed. The deployment of instrumentation will be along TxDOT roadways at railroad grade crossings. Information will be gathered either directly from the railroad operators or from sensors placed along the railroad right-of-way that monitor train length and speed. Data will be transferred from the field sensors to the TxDOT Tyler District TMC where operators can make decisions regarding changes in signal operations to facilitate flow around the closed crossing or to clear traffic once the train has passed the crossing.

The estimated cost for this project is $500,000.

City of Tyler Highway/Rail Intersection Warnings

Associated Market Packages:
- Network Surveillance (ATMS01)
- Surface Street Control (ATMS03)
- Traffic Information Dissemination (ATMS06)
- Standard Railroad Grade Crossing (ATMS13)
- Railroad Operations (ATMS15)

Prerequisite Projects: City of Tyler TMC Expansion

Description: This project will include highway/rail intersection warning systems that will alert motorists of arriving trains, amount of time the train will occupy the crossing, and length of time a motorist can expect to be delayed. The deployment of instrumentation will be along City of Tyler roadways at railroad grade crossings. Information will be gathered either directly from the railroad operators or from sensors placed along the railroad right-of-way that monitor train length and speed. Data will be transferred from the field sensors to the Tyler TMC where operators can make decisions regarding changes in signal operations to facilitate flow around the closed crossing or to clear traffic once the train has passed the crossing.

Regional 511 Advanced Traveler Information System Server

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Broadcast Traveler Information (ATIS01)

Prerequisite Projects: TxDOT ATMS Implementation, TxDOT Center-to-Center Communications, TxDOT HCRS Enhancement, Media Liaison and Coordination

Description: Install a server dedicated to traveler information in the TxDOT Tyler TMC. This server would be installed as part of a 511 rollout in Texas and would provide a gateway for public and private entities to access current conditions, closures, restrictions, weather, and other valuable travel information. Relevant data from the ATMS and HCRS would be sent to the ATIS server where it would be consolidated and 'packaged' for distribution via phone (511) and web as well as to private partners who desire access to information in the Tyler Region. These private partners could include local media and information service providers, which would link to the ATIS server to download information, or obtain real-time feeds, depending on the link provided by the private partner. Appropriate security measures and firewalls could be designed into the server to allow or restrict access to registered, authorized users. By fusing various types of data from a variety of sources (traffic management, incident management, and others), this data can be converted to usable information for travelers as well as other agencies.

Maintenance and Construction Operations

Work Zone Safety Monitoring

Associated Market Packages:

- Work Zone Safety Monitoring (MC09)

Prerequisite Projects: None

Description: This project will include the use of advanced warning systems to detect unauthorized vehicles that have entered the perimeter of the work zone. The intent of such systems is to help decrease the number of accidents in work zones due to motorists getting too close to workers or their equipment. Intrusion detection devices can alert construction workers and the motorist that the motorist has entered the safe zone and should take evasive action. It is anticipated that this project will be conducted on, and possibly required by TxDOT on, a per-project basis.

Public Transportation Management

City of Tyler Transit On-Board Video Security Cameras

Associated Market Packages:
- Transit Security (APTS05)

Prerequisite Projects: None

Description: Install CCTV cameras on board City of Tyler transit vehicles. These cameras will allow for on-board recording only, and are not envisioned to be monitored remotely from the TOC. Video will be stored for a pre-determined amount of time on video tape or emerging digital video recording technology. While the main objective of on-board surveillance projects has been to identify individuals committing criminal acts or creating disturbances on buses, there have been noticeable maintenance benefits such as a reduction of litter and debris.

Costs will vary depending on number of on-board cameras installed. For planning purposes a cost of $100,000 was used. The cost per vehicle is estimated to be $15,000.

City of Tyler Transit Electronic Fare Payment System

Associated Market Packages:
- Transit Passenger and Fare Management (APTS04)

Prerequisite Projects: None

Description: Add automated fare payment capabilities to City of Tyler Transit buses. There are several benefits of electronic fare collection systems. They are enhanced revenue collection ability, increased security by not having large amounts of cash or tokens on the vehicle, and increased convenience and security for the transit patron. Specifically, fare boxes will be upgraded to accept smart cards (i.e., cards with passive radio frequency identification technology or a magnetic information strip, such as a credit card) with rider and account information. Electronic fare payment technology is rapidly advancing, and there will be several technological considerations that will need to be examined, such as standards for smart cards and interoperability issues. The City of Tyler should use the ETCOG Electronic Fare Payment System as a guide to ensure a seamless system where users of one system can use the same technology when traveling on another system in the Region. The estimated cost for this project is $150,000 to equip 30 City of Tyler Transit buses with electronic fare payment systems.

Longview Transit On-Board Video Security Cameras

Associated Market Packages:
- Transit Security (APTS05)

Prerequisite Projects: None

Description: Install CCTV cameras on board City of Longview Transit vehicles. These cameras will allow for on-board recording only, and are not envisioned to be monitored remotely from the TOC. Video will be stored for a pre-determined amount of time on video tape or emerging digital video recording technology. While the main objective of on-board surveillance projects has been to identify

individuals committing criminal acts or creating disturbances on buses, there have been noticeable maintenance benefits such as a reduction of litter and debris.

Costs will vary depending on number of on-board cameras installed. For planning purposes, the project cost was estimated to be $100,000. The cost per vehicle is estimated to be $15,000.

Longview Transit Electronic Fare Payment System

Associated Market Packages:

- Transit Passenger and Fare Management (APTS04)

Prerequisite Projects: None

Description: Add automated fare payment capabilities to Longview Transit buses. There are several benefits of electronic fare collection systems. They are enhanced revenue collection ability, increased security by not having large amounts of cash or tokens on the vehicle, and increased convenience and security for the transit patron. Specifically, fare boxes will be upgraded to accept smart cards (i.e., cards with passive radio frequency identification technology or a magnetic information strip, such as a credit card) with rider and account information. Electronic fare payment technology is rapidly advancing, and there will be several technological considerations that will need to be examined, such as standards for smart cards and interoperability issues. Longview Transit should use the ETCOG Electronic Fare Payment System as a guide to ensure a seamless system where users of one system can use the same technology when traveling on another system in the Region. The estimated cost for this project is $150,000 to equip 30 Longview Transit buses with electronic fare payment systems.

ETCOG Electronic Fare Payment System

Associated Market Packages:

- Transit Passenger and Fare Management (APTS04)

Prerequisite Projects: ETCOG AVL and Mobile Data Terminals

Description: Install electronic fare payment capabilities on ETCOG buses. There are three primary benefits of electronic fare collection systems. They are enhanced revenue collection ability, increased security by not having large amounts of cash or tokens on the vehicle, and increased convenience and security for the transit patron. Specifically, fare boxes will be upgraded to accept smart cards (i.e., cards with passive radio frequency identification technology or a magnetic information strip, such as a credit card) with rider and account information. Electronic fare payment technology is rapidly advancing, and there will be several technological considerations that will need to be examined, such as standards for smart cards and interoperability issues. The electronic fare payment system developed for ETCOG will likely serve as a model for other agencies in the Region to ensure seamless use of the system. The cost per bus is approximately $5,000. For planning purposes it was estimated that 30 ETCOG buses would be equipped with electronic fare collection systems as part of this project.

Commercial Vehicle Operations

TxDOT Weigh-in-Motion Site Implementation

Associated Market Packages:

- Weigh-in-Motion (CVO6)

Prerequisite Projects: None

Description: Implement at least one weigh-in-motion (WIM) site within the Region. WIM sites can be located on the mainline for high speed WIM, or at pull out locations for low speed WIM. There are several types of WIM systems, including bending plate, piezo electric, and load cell. These systems typically cost between $10,000-$20,000; however, a majority of the cost in deploying a WIM system is for the installation.

For mainline WIM, a smooth, straight approach prior to the scale is required to eliminate vehicle vibrations, which can greatly reduce the accuracy. In order to achieve the smooth surface, a new concrete pad is often installed prior to the WIM site. Pull out sites typically weigh trucks at slower speeds and do not require as significant construction as the main-line sites for installation, providing a pull out site is available. For estimation purposes, a cost of $50,000 per WIM site was used to account for equipment and installation costs.

Table 8 – Long-Term Projects (20-Year)

Program Area/Project	Description	Responsible Agency*	Probable Cost**	Funding Identified	Estimated Project Duration
Travel and Traffic Management					
TxDOT Instrumentation of US 259 and Other Major Corridors	Implement additional CCTV cameras, DMS, detectors, and HARs in the Tyler Region along US 259 as well as other major corridors as needs are identified.	TxDOT	$2,000,000	No	5 years
TxDOT Closed Loop Signal System Expansion Phase 3	Continue expansion of closed loop signal system at TxDOT intersections throughout the Region	TxDOT	$300,000	No	1 year
City of Tyler Closed Loop Signal System Expansion Phase 3	Continue expansion of the closed loop system in the City of Tyler	City of Tyler	$500,000	No	5 years
City of Tyler VIVDS Expansion Phase 3	Continue implementation of VIVDS at signalized intersections in City of Tyler	City of Tyler	$200,000	No	2 years
City of Longview TMC/TxDOT Tyler District TMC Connection	Implement fiber connection between the City of Longview TMC and the TxDOT Tyler District TMC to allow video sharing and control, traffic data sharing, and other joint functions. Cost will be dependent on the type of communication medium selected.	TxDOT/City of Longview	To Be Determined	No	1 Year
City of Longview Closed Loop Signal System Expansion Phase 3	Continue expansion of the closed loop system in the City of Longview	City of Longview	$500,000	No	5 years
City of Longview VIVDS Expansion Phase 3	Continue implementation of VIVDS at signalized intersections in the City of Longview	City of Longview	$200,000	No	2 years
ISP-based Route Guidance	Provided direct support to ISP-based route guidance systems through sharing of traveler information	Public Agencies/Private Sector	Public: $100,000	No	1 year
Regional Emissions Monitoring	Implement systems to allow emissions monitoring of vehicles and areas of concern	TxDOT/City of Tyler/ City of Longview	$250,000	No	2 years
Other Cities ITS Implementation	This project involves the establishment of TMCs and installation of DMS, CCTV, closed loop signal systems, VIVDS and other ITS technologies in other cities in the Region	Other Cities	To Be Determined	No	2 years

Table 8 – Long-Term Projects (20-Year) (continued)

Program Area/Project	Description	Responsible Agency*	Probable Cost**	Funding Identified	Estimated Project Duration
Emergency Management					
City of Longview Emergency Vehicle Traffic Signal Preemption	Implement signal pre-emption at City of Longview intersections for emergency vehicles	Implementation: City of Longview Fire Operations and Maintenance: City of Longview PWD	$500,000	No	1 year
Mayday Support	Provide support to Mayday Service providers through sharing of traffic information, emergency dispatch information, etc.	Transportation and Emergency Services Agencies/Private Sector	$100,000	No	1 year
Maintenance and Construction Operations					
Maintenance and Construction Vehicle AVL	Installation of AVL System on maintenance and construction vehicles	TxDOT/Other maintenance Agencies	To Be Determined	No	1 year
Public Transportation Management					
ETCOG Automatic Passenger Counters	Passive system to accurately count ridership. This project is estimated for implementation on 30 buses.	ETCOG	$60,000	No	6 months

*Agency listed is responsible for implementation, operations and maintenance unless otherwise noted.

**The design has not been undertaken and thus this is only an opinion of probable cost for planning purposes.

Tyler Region
Long-Term Projects (20-Year)

Travel and Traffic Management

TxDOT Instrumentation of US 259 and Other Major Corridors

Associated Market Packages:
- Network Surveillance (ATMS01)
- Traffic Information Dissemination (ATMS06)
- Incident Management System (ATMS08)

Prerequisite Projects: TxDOT ATMS Implementation, TxDOT Freeway Management System Implementation, Tyler Regional Telecommunications Master Plan

Description: Implement CCTV Cameras, DMS, detectors, and HAR along US 259 and other major routes identified in the future in the Tyler Region. Potential additional routes include US 271, the Green Carpet Route (East Texas Gulf Highway Association), Highway 31 and US 79. Potential uses for these devices would be to help provide information during evacuations. The Tyler Region has been identified in State Emergency Management plans to receive 350,000 hurricane evacuees from southeast Texas coastal areas during an evacuation. Instrumentation along major routes used for evacuations would allow more effective management of that traffic as well as provide a means to alert drivers of delays, incidents or other factors affecting the flow of traffic through use of the DMS signs.

TxDOT Closed Loop Signal System Expansion Phase 3

Associated Market Packages:
- Surface Street Control (ATMS03)

Prerequisite Projects: TxDOT Closed Loop Signal System Expansion Phase 1, TxDOT Closed Loop Signal System Expansion Phase 2

Description: Continue to expand the closed loop signal system by integrating additional signals and implementing VIVDS at select signalized intersections throughout the TxDOT Tyler District. The ultimate goal of the expansion efforts is to implement closed loop signal systems throughout the Region.

City of Tyler Closed Loop Signal System Expansion Phase 3

Associated Market Packages:
- Surface Street Control (ATMS03)

Prerequisite Projects: City of Tyler Closed Loop Signal System Expansion Phase 1, City of Tyler Closed Loop Signal System Expansion Phase 2

Description: Continue to expand the closed loop signal system by converting existing signalized intersections to the closed-loop signal system. New signals that are installed as part of other projects will become part of the closed loop signal system.

City of Tyler VIVDS Expansion Phase 3

Associated Market Packages:
- Surface Street Control (ATMS03)

Prerequisite Projects: VIVDS to be installed in conjunction with traffic signals, City of Tyler VIVDS Expansion Phase 1, City of Tyler VIVDS Expansion Phase 2

Description: Implement VIVDS at signalized intersections in Tyler. VIVDS will provide Tyler with increased flexibility to determine traffic detector placement at signalized intersections by installing cameras and processors that can determine change in gray scale over a predetermined detection zone within the field of vision.

The City of Tyler has VIVDS at some of its signalized intersections as well as those completed as part of Phase 1 and Phase 2 of this project. This project is to include the implementation of VIVDS at ten additional existing signalized intersections.

City of Longview TMC/TxDOT Tyler District TMC Connection

Associated Market Packages:
- Regional Traffic Control (ATMS07)

Prerequisite Projects: City of Longview TMC Expansion

Description: Install connection between the City of Longview TMC and the TxDOT Tyler District TMC to allow video sharing and control, traffic data sharing and other joint functions. The type of connection (fiber, wireless, leased line) will need to be determined prior to implementation of this project based on desired band width and cost of technologies available.

City of Longview Closed Loop Signal System Expansion Phase 3

Associated Market Packages:
- Surface Street Control (ATMS03)

Prerequisite Projects: City of Longview Closed Loop Signal System Phase 1, City of Longview Closed Loop Signal System Phase 2

Description: Continue to expand the closed loop signal system by converting existing signalized intersections to the closed-loop signal system. New signals that are installed as part of other projects will become part of the closed loop signal system.

City of Longview VIVDS Expansion Phase 3

Associated Market Packages:
- Surface Street Control (ATMS03)

Prerequisite Projects: VIVDS to be installed in conjunction with traffic signals, City of Longview VIVDS Expansion Phase 1, City of Longview VIVDS Expansion Phase 2

Description: Implement VIVDS at signalized intersections in Longview. VIVDS will provide Longview with increased flexibility to determine traffic detector placement at signalized intersections by installing cameras and processors that can determine change in gray scale over a predetermined detection zone within the field of vision.

The City of Longview has VIVDS at some of its signalized intersections as well as those implemented as part of Phase 1 and Phase 2 of this project. This project includes the implementation of VIVDS at ten additional existing signalized intersections.

ISP-based Route Guidance

Associated Market Packages:
- Traffic Information Dissemination (ATMS06)
- Broadcast Traveler Information (ATIS01)
- ISP Based Route Guidance (ATIS05)

Prerequisite Projects: None

Description: Provide direct support to private ISP-based route guidance systems through sharing of traveler information. These systems offer users pre-trip route planning and turn-by-turn route guidance services. Routes may be based on static information or reflect real time network conditions. The route determination functions are performed in the ISP system. This approach simplifies the user equipment requirements and can provide the infrastructure better information on which to predict future traffic. The system includes two way data communications and optionally also equips the vehicle with the databases, location determination capability, and display technology to support turn by turn route guidance.

Regional Emissions Monitoring

Associated Market Packages:
- Emissions Monitoring and Management (ATMS11)

Prerequisite Projects: None

Description: This project will monitor regional emissions levels. Although the Tyler Region is currently in compliance with air quality regulations there is a strong likelihood that in the next few years the Region will reach non-attainment status; therefore it is important to monitor emissions levels. At this time point source emissions (industry, etc) are the primary issue for the area, but automobile emissions do play an important role. The estimated cost for this project is $250,000.

Other Cities ITS Implementation

Associated Market Packages:
- Network Surveillance (ATMS01)
- Surface Street Control (ATMS03)
- Traffic Information Dissemination (ATMS06)
- Regional Traffic Control (ATMS07)
- Incident Management System (ATMS08)
- Weather Information Processing and Distribution (MC04)
- Work Zone Management (MC08)
- Emergency Routing (EM2)
- ITS Data Mart (AD01)

Prerequisite Projects: None

Description: This project will establish TMCs and/or implement DMS, CCTV, closed loop signal systems, VIVDS or other technology in cities that may identify a need in the future. This project accommodates the growth occurring in the Region by recognizing that it is likely that in the next 20 years another city in the Region will have a need for ITS technology.

Emergency Management

City of Longview Emergency Vehicle Traffic Signal Preemption

Associated Market Packages:
- Surface Street Control (ATMS03)
- Emergency Routing (EM2)

Prerequisite Projects: None

Description: Equip intersections and City of Longview Fire and EMS vehicles with traffic signal preemption equipment. Typical installations include mounting hardware at the intersection and on each vehicle authorized to preempt the signal. The intersection equipment includes a detector(s) positioned at the intersection approach(es) that is connected to the traffic signal controller. As a vehicle equipped with a preemption emitter approaches an intersection, the detector activates a change in signal timing to allow fast and safe passage. Preemption systems have proven to improve safety of emergency personnel and vehicles en-route to an incident. The cost of implementing this equipment is estimated to be approximately $500,000, dependent on the number of intersections and vehicles to be equipped.

Mayday Support

Associated Market Packages:

- Emergency Response (EM1)

Prerequisite Projects: TxDOT ATMS Implementation

Description: Provide real-time travel data to Mayday Service Providers. One of the features inherent to the emerging in-vehicle navigation systems is the use of Mayday Systems. Mayday systems send automated signals for help when sensors are activated (e.g., flat tire, collision, etc.). Alternatively, a driver can request assistance manually. Mayday calls typically are not routed to the nearest Public Safety Answering Point (PSAP), rather they are sent to private dispatch centers that coordinate requests for help. By providing real-time data from the TxDOT ATMS to the private dispatch centers, Mayday Support services will be enhanced. For example, a dispatcher will be able to provide the best route to an incident based on current travel conditions to a responding towing service.

Maintenance and Construction Operations

Maintenance and Construction Vehicle AVL

Associated Market Packages:

- Maintenance and Construction Vehicle Tracking (MC01)
- Maintenance and Construction Activity Coordination (MC10)

Prerequisite Projects: None

Description: Similar to the transit AVL project, the maintenance and construction AVL project includes equipping TxDOT, and potentially other agencies, maintenance or construction related vehicles with GPS based vehicle locators. It is envisioned that the location of the vehicle would be overlaid on a basemap showing real-time positions of each equipped vehicle. The main purpose of the system is to assist dispatchers and supervisors to better manage the fleet of vehicles. For example, if a report of a spill occurred on a major roadway, a supervisor could quickly determine what vehicle is closest and best equipped to clean up the spill. This project has been included in the deployment plan as a project that may be considered in the future; however, no serious consideration is being given to this project at this time.

Public Transportation Management

ETCOG Automatic Passenger Counters

Associated Market Packages:

- Transit Passenger and Fare Management (APTS04)

Prerequisite Projects: ETCOG AVL

Description: Install Automatic Passenger Counter (APC) systems on transit vehicles to accurately count ridership. APC systems collect ridership information and can determine total boardings and alightings at each stop through the use of AVL to determine where those boardings and alightings take place.

This project is estimated to cost $60,000.

4. MAINTAINING THE REGIONAL ITS ARCHITECTURE AND DEPLOYMENT PLAN

The Tyler Regional ITS Deployment Plan is a living document. The recommended projects and their timeframes for implementation reflect the needs of the Region at the time the plan was developed. It is expected that the needs of the Region will change as ITS deployments are put into place, population and travel patterns change, and as new technology is developed. In order for the ITS Deployment Plan to remain a useful document for Regional stakeholders, the plan must be updated over time.

TxDOT will serve as the lead agency for maintaining both the Tyler Regional ITS Architecture and the ITS Deployment Plan. These plans will continue to be driven by stakeholder consensus rather than a single stakeholder. In order for changes to occur in the plan, it is recommended that all stakeholders be invited to a consensus building meeting to discuss any proposed changes to the Regional ITS Architecture or ITS Deployment Plan.

It is recommended that stakeholders meet on an annual basis to review the existing Regional ITS Architecture and ITS Deployment Plan. At these annual meetings, stakeholders should identify which projects in the ITS Deployment Plan have been deployed. Project status (existing, planned, or future) may have to be updated for many of the projects as they move from the future to planned to existing status. New projects that are recommended by a stakeholder for inclusion in the ITS Deployment Plan should also be discussed to ensure that the Region as a whole feels that the project agrees with regional needs and priorities. This same type of consensus building should also be used should the geographic scope of the Region need to change or should additional stakeholders need to be added to the Regional ITS Architecture and ITS Deployment Plan.

Projects that are added to the ITS Deployment Plan should also be reviewed closely to determine if they fit into the current ITS Architecture for the Tyler Region. If a new project does not fit into the ITS Architecture, then the ITS Architecture will need to be revised to include the necessary links and data flows for the project.

The Tyler Regional ITS Architecture and ITS Deployment Plan should be updated every two years to correspond with the TIP update. At that time, input and changes agreed upon at the annual review meeting will be incorporated into the document.

Both the Tyler Regional ITS Architecture and the ITS Deployment Plan were developed with a consensus approach from the stakeholders. In order for these documents to continue to reflect the needs of the Region, changes in the documents will need to be driven by consensus of all of the stakeholders.