



State of Texas
Regional ITS Architectures and Deployment Plans

Lufkin Region

Regional ITS Deployment Plan

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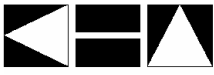
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LIST OF ACRONYMS

ANRA	Angelina and Neches River Authority
ATIS	Advanced Traveler Information System
ATMS	Advanced Traffic Management System
AVL	Automated Vehicle Location
BTD	Brazos Transit District
CAD	Computer Aided Dispatch
CCTV	Closed-Circuit Television
DETCOG	Deep East Texas Council of Governments
DMS	Dynamic Message Signs
DPS	Department of Public Safety
EAS	Emergency Alert System
EMS	Emergency Medical Services
FHWA	Federal Highway Administration
GPS	Global Positioning Satellite
HAR	Highway Advisory Radio
HAZMAT	Hazardous Materials
HCRS	Highway Conditions Reporting System
HRI	Highway-Rail Intersections
ISP	Information Service Provider
ITS	Intelligent Transportation System
LADOTD	Louisiana Department of Transportation and Development
LED	Light Emitting Diode
MDT	Mobile Data Terminal
NTCIP	National Transportation Communications for ITS Protocol
PSAP	Public Safety Answering Point
PTZ	Pan/Tilt/Zoom



LIST OF ACRONYMS

RWIS	Road Weather Information System
TEA-21	Transportation Equity Act for the 21st Century
TMC	Transportation Management Center
TOC	Traffic Operations Center Transit Operations Center
TxDOT	Texas Department of Transportation
VIVDS	Video Image Vehicle Detection System

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 Lufkin Regional ITS Architecture and Regional ITS Deployment Plan was prepared as part of this initiative.

The Lufkin 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, public safety, transit and planning organizations.

Building on the dialogue, consensus, and vision outlined in the Regional ITS Architecture, stakeholders in the Lufkin 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 Lufkin Region were identified in the following key areas:

- Travel and Traffic Management;
- Emergency Management; and
- Maintenance and Construction 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 Lufkin 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.

1. INTRODUCTION

1.1 Project Overview

The FHWA 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 Lufkin Regional ITS Deployment Plan was developed using the Regional ITS Architecture developed in 2004. 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 Lufkin Region.

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

Section 1 – Introduction

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

Section 2 – Prioritization of Market Packages

Section 2 contains the prioritized market packages for the Lufkin 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 Lufkin Region to provide an incremental, phased build-out of the Region’s ITS. These projects are categorized into 5-year, 10-year, and 20-year deployment timeframes. Each project recommendation includes a brief description, responsible agency, associated market packages, pre-requisite projects or systems, and an estimate of probable cost.

Section 4 – Maintaining the Regional ITS Architecture and Deployment Plan

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

1.3 The Lufkin Region

1.3.1 Geography and Regional Characteristics

The Lufkin Region is bordered by the TxDOT Tyler and Atlanta Districts to the north, the State of Louisiana to the east, the TxDOT Beaumont and Houston Districts to the south, and the TxDOT Bryan District to the west. For the Lufkin Regional ITS Architecture and Deployment Plan, the study area included all nine counties that comprise the TxDOT Lufkin District.

The counties included in the Lufkin Region are:

- Angelina;
- Houston;
- Nacogdoches;
- Polk;
- Sabine;
- San Augustine;
- San Jacinto;
- Shelby; and
- Trinity.

TxDOT partners with local governments for roadway construction, maintenance, and traffic operations support, and serves as the responsible agency for on-system roadways in cities with populations less than 50,000. Major cities in the Region include Lufkin, Nacogdoches, Crockett, and Livingston, but none of the cities in the Lufkin Region have a population greater than 50,000.

1.3.2 Transportation Infrastructure

The Lufkin Region’s transportation infrastructure is primarily US and State Highway Routes. The primary roadway facilities include US 59, US 69, US 96, US 259, and State Highways 7, 21, and 103. The majority of these US routes are north/south corridors; east/west corridors are primarily state, county, and farm-to-market roads. The Sabine River separates the Lufkin Region and Louisiana, and there are several bridge crossings connecting the two areas.



US 59 is the most heavily traveled corridor in the Region, and provides a vital link between Houston and Lufkin, as well as between Lufkin and Nacogdoches. North of Nacogdoches, this highway ultimately connects with I-20. Its effective operation is critical to the movement of people and good throughout the Region. Blockages along US 59 can have serious implications on drive-time for commercial vehicles and motorists alike due to the lack of obvious alternate routes. Knowing the road and travel conditions within this corridor and having the ability to disseminate this information to motorists are important elements for this project. For example, if US 59 has been closed due to a major incident or weather (such as the HAZMAT truck incident in June 2004 that shut down a substantial portion of US 59 between Lufkin and Nacogdoches) 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.

Public transportation in the Lufkin Region is provided primarily by the Brazos Transit District which operates fixed-route services in Lufkin and Nacogdoches, and demand-response services throughout the Region. Smaller transit operators also provide non-emergency medical and social services transportation. An intermodal terminal is planned for the City of Lufkin that will serve as an access point for local transit services and intercity coaches, and will include a parking facility.

1.3.3 Existing ITS in the Lufkin Region

To date, there has been limited deployment of ITS in the Lufkin Region. TxDOT has deployed traffic signals with video image vehicle detection systems (VIVDS), portable dynamic message signs (DMS), and signal preemption for emergency vehicles at a few intersections. The City of Nacogdoches also has portable DMS for work zones or to notify travelers of closures or restrictions. Computer aided dispatch (CAD) is used by the City of Lufkin Police Department, City of Nacogdoches Police and the Texas Department of Public Safety. The City of Nacogdoches also has mobile data terminals (MDTs) on-board police vehicles which allows for automated communications and incident updates between dispatches and officers in the field.

1.3.4 Lufkin 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 Lufkin Region.

The following is a list of stakeholders in the Lufkin 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 Lufkin Regional ITS Architecture:

- Angelina and Neches River Authority;
- Brazos Transit District;
- City of Crockett;
- City of Livingston;
- City of Lufkin;
- City of Nacogdoches;
- City of San Augustine;
- Crockett Economic Development Corporation;
- Deep East Texas Council of Governments;
- Polk County;
- San Augustine County;
- Trinity County;
- Texas Department of Public Safety;
- TxDOT Lufkin District; and
- TxDOT Traffic Operations Division (Austin).

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

Table 1 – Lufkin Stakeholder Agencies and Contacts

Stakeholder Agency	Contact	Address	Phone Number	E-Mail
Angelina and Neches River Authority	Kelley Holcomb	210 East Lufkin Avenue Lufkin, Texas 75901	(936) 632-7795	kholcomb@anra.org
Brazos Transit District	Jennifer Montgomery	1759 North Earl Rudder Fwy Bryan, Texas 77803	(979) 778-4489	jennifer_transit@tca.net
City of Crockett	Ron Duncan	200 North 5th Street Crockett, Texas 75835	(936) 544-5156	duncanr@cityofcrockett.org
City of Crockett	Bill Holcomb	1001 East Goliad Avenue Crockett, Texas 75835	(936) 544-7127	bholcomb@valornet.com
City of Groveton	Ralph Jester	115 East Front Street Groveton, Texas 75845	(936) 642-1255	N/A
City of Livingston	Sam Gordon	208 West Church Street Livingston, Texas 77351	(936) 327-4311	manager@livingston.net
City of Livingston	Hec Long	200 West Church Street Livingston, Texas 77351	(936) 327-8391	N/A
City of Livingston	Ben Ogletree, Jr.	200 West Church Street Livingston, Texas 77351	N/A	benroyden@livingston.net
City of Livingston	Marilyn Sutton	200 West Church Street Livingston, Texas 77351	(936) 327-4311	citysecretary@livingston.net



Table 1 – Lufkin Stakeholder Agencies and Contacts (continued)

Stakeholder Agency	Contact	Address	Phone Number	E-Mail
City of Livingston	Mark Taylor	200 West Church Street Livingston, Texas 77351	(936) 327-8655	livfire@livingston.net
City of Livingston Police Department	Dennis Clifton	208 West Church Street Livingston, Texas 77351	(936) 327-3117	livpd@livingston.net
City of Lufkin	Louis Bronaugh	P.O. Box 190 Lufkin, Texas 75902	N/A	mayor@cityoflufkin.com
City of Lufkin	Kris Greene	300 East Shepherd Lufkin, Texas 75902	(936) 633-0268	kgreene@cityoflufkin.com
City of Lufkin	Scott Marcotte	300 East Shepherd Street Lufkin, Texas 75902	(936) 633-0322	smarcotte@lufkinpolice.com
City of Lufkin	Paul Parker	P.O. Box 190 Lufkin, Texas 75902-0190	(936) 633-0211	pparker@cityoflufkin.com
City of Lufkin	Steve Poskey	P.O. Box 190 Lufkin, Texas 75902-0190	(936) 633-0235	sposkey@cityoflufkin.com
City of Lufkin Fire Department	Murry Brown	111 South 3rd Street Lufkin, Texas	(936) 633-0369	mbrown@cityoflufkin.com
City of Nacogdoches	Victoria LaFollett	P.O. Box 635030 Nacogdoches, Texas 75963	(936) 559-2503	vlafollett@ci.nacogdoches.tx.us
City of Nacogdoches	Wayne Shepherd	P.O. Box 635030 Nacogdoches, Texas 75963	(936) 559-2582	shepherdw@ci.nacogdoches.tx.us
City of Nacogdoches	David Smith	P.O. Box 635030 Nacogdoches, Texas 75963	(936) 559-2516	dsmith@ci.nacogdoches.tx.us
City of Nacogdoches Fire Department	Ronnie Kimbrough	P.O. Box 635030 Nacogdoches, Texas 75963	(936) 559-2541	kimbroug@ci.nacogdoches.tx.us
City of Nacogdoches Fire Department	Stanley Whitaker	P.O. Box 635030 Nacogdoches, Texas 75963	(936) 559-2591	whitaker@ci.nacogdoches.tx.us
City of Nacogdoches Police Department	William Lujan	P.O. Box 635030 Nacogdoches, Texas 75963	(936) 559-2601	lujanw@ci.nacogdoches.tx.us
City of San Augustine Police Department	Ken Delacerda	615 East Main San Augustine, Texas 75972	N/A	keagled@qzip.net
Crockett Economic and Industrial Development Corporation	Tim Culp	P.O. Box 307 Crockett, Texas 75835	(936) 546-5363	tculp@crockett.org
DETCOG	Gary Hanlon	274 East Lamar Street Jasper, Texas 75951	(409) 384-5704	ghanlon@detcog.org
DETCOG	John McDowell	602 E. Church Street, Ste 504 Livingston, Texas 77351	(936) 327-6825	jmcdowell@detcog.org
DETCOG	Don Morris	602 E. Church Street, Ste 504 Livingston, Texas 77351	(936) 634-0120	dmorris@detcog.org
Polk County Sheriff's Office	Randy Bridges	1733 North Washington Livingston, Texas 77351	(936) 327-6810	N/A
San Augustine County	Wayne Holt	106 Courthouse Square San Augustine, Texas 75972	(936) 275-2762	wayne.holt@co.san-augustine.tx.us
Texas Department of Public Safety	Randall Noe	2809 South John Redditt Lufkin, Texas 75904	(936) 634-5553	randall.no@txdps.state.tx.us



Table 1 – Lufkin Stakeholder Agencies and Contacts (continued)

Stakeholder Agency	Contact	Address	Phone Number	E-Mail
Trinity County	Brent Phillips	P.O. Box 95 Groveton, Texas 75845	(936) 642-1424	trinitycoso@hotmail.com
TxDOT – Lufkin District	Herbert Bickley	1805 North Timberland Drive Lufkin, Texas 75901	(936) 634-4433	hbickle@dot.state.tx.us
TxDOT – Lufkin District	Dennis Cooley	1805 North Timberland Drive Lufkin, Texas 75901	(936) 634-4433	dcooley@dot.state.tx.us
TxDOT – Lufkin District	Cheryl Flood	1805 North Timberland Drive Lufkin, Texas 75901	N/A	cflood@dot.state.tx.us
TxDOT – Lufkin District	Margie Gandy	1805 North Timberland Drive Lufkin, Texas 75901	(936) 634-4433	mgandy@dot.state.tx.us
TxDOT – Lufkin District	Tom Hunter	1805 North Timberland Drive Lufkin, Texas 75901	(936) 633-4454	thunter@dot.state.tx.us
TxDOT – Lufkin District	Richard Ivy	1805 North Timberland Drive Lufkin, Texas 75901	(936) 633-4384	rivy@dot.state.tx.us
TxDOT – Lufkin District	John Miller	1805 North Timberland Drive Lufkin, Texas 75901	(936) 633-4302	jmiller@dot.state.tx.us
TxDOT – Lufkin District	Paul Montgomery	1805 North Timberland Drive Lufkin, Texas 75901	(936) 634-4433	pmontg@dot.state.tx.us
TxDOT – Lufkin District	David Selman	914 Industrial Boulevard Nacogdoches, Texas 75961	(936) 564-7782	dselman@dot.state.tx.us
TxDOT – Lufkin District	Brad Tiemann	Route 1, P.O. Box 724H San Augustine, Texas 75972	(939) 275-9671	btieman@dot.state.tx.us
TxDOT – Lufkin District	Kathi White	1805 North Timberland Drive Lufkin, Texas 75901	(936) 633-4395	kwhite1@dot.state.tx.us
TxDOT Traffic Operations Division	Roland Merz	125 East 11th Street Austin, Texas 78701	(512) 416-3269	rmerz@dot.state.tx.us
TxDOT Traffic Operations Division	Alex Power	Attn: TRF-Cedar Park #51 125 E. 11th Street Austin, Texas 78701-2483	(512) 506-5153	apower@dot.state.tx.us

2. PRIORITIZATION OF MARKET PACKAGES

2.1 Prioritization Process

Of the 85 market packages currently available in the National ITS Architecture Version 5.0, 37 were selected and customized for deployment in the Lufkin 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 Lufkin Region. These priorities identified the key needs and services that are desired in the Lufkin 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 Lufkin 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 Lufkin 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 Lufkin Region

High Priority	Medium Priority	Low Priority
<ul style="list-style-type: none"> ▪ Network Surveillance ▪ Surface Street Control ▪ Traffic Information Dissemination ▪ Traffic Incident Management System ▪ Speed Monitoring ▪ Emergency Call-Taking and Dispatch ▪ Emergency Vehicle Routing ▪ Wide-Area Alert ▪ Evacuation and Reentry Management ▪ Disaster Traveler Information ▪ Road Weather Data Collection ▪ Weather Information Processing and Distribution ▪ Work Zone Management ▪ Work Zone Safety Monitoring ▪ Transit Vehicle Tracking ▪ Demand Response Transit Operations ▪ Multi-modal Coordination ▪ Transit Traveler Information ▪ CV Administrative Processes ▪ HAZMAT Management ▪ Broadcast Traveler Information 	<ul style="list-style-type: none"> ▪ Regional Traffic Control ▪ Maintenance and Construction Vehicle and Equipment Tracking ▪ Roadway Maintenance and Construction ▪ Maintenance and Construction Activity Coordination ▪ Transit Fixed-Route Operations ▪ Interactive Traveler Information 	<ul style="list-style-type: none"> ▪ Probe Surveillance ▪ Emissions Monitoring and Management ▪ Standard Railroad Grade Crossing ▪ Railroad Operations Coordination ▪ Parking Facility Management ▪ Maintenance and Construction Vehicle Maintenance ▪ Transit Passenger and Fare Management ▪ Transit Security ▪ ISP Based Route Guidance ▪ ITS Data Mart



2.2 High Priority Market Packages

Market packages that were selected as high priorities for the Lufkin 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 Lufkin Region; that is, there are already systems and technologies deployed to deliver some of these high priority services and functions. For example, the TxDOT Lufkin District traffic signals and 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 Lufkin Region.

Table 3 – High Priority Market Packages for the Lufkin Region

Network Surveillance (ATMS01)	High Priority
<p>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 (ISP) Subsystem.</p>	
<p>Existing Infrastructure</p> <ul style="list-style-type: none"> ▪ VIVDS ▪ Overheight Vehicle Detection 	<p>Agency</p> <ul style="list-style-type: none"> ▪ TxDOT
<p>Planned Projects</p> <ul style="list-style-type: none"> ▪ TxDOT Lufkin ATMS Implementation 	
<p>Additional Needs</p> <ul style="list-style-type: none"> ▪ City of Lufkin Flood Detection ▪ City of Lufkin TOC ▪ City of Lufkin Traffic Signal System ▪ City of Nacogdoches Flood Detection ▪ City of Nacogdoches TOC ▪ City of Nacogdoches Traffic Signal System ▪ Communications Master Plan ▪ TxDOT Advanced Work Zone Equipment ▪ TxDOT CCTV Phase 1 ▪ TxDOT CCTV Phase 2 ▪ TxDOT Evacuation Route Implementation 	



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

Network Surveillance (ATMS01) (continued)	High Priority
<p>Additional Needs (continued)</p> <ul style="list-style-type: none"> ▪ TxDOT Flood Detection Phase 1 ▪ TxDOT Flood Detection Phase 2 ▪ TxDOT Lufkin TMC ▪ TxDOT Traffic Signal System Expansion Phase 1 ▪ TxDOT Traffic Signal System Expansion Phase 2 	
Surface Street Control (ATMS03)	High Priority
<p>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.</p>	
<p>Existing Infrastructure</p> <ul style="list-style-type: none"> ▪ Traffic Signal System ▪ Traffic Signal Preemption (manual) 	<p>Agency</p> <ul style="list-style-type: none"> ▪ TxDOT ▪ City of Lufkin ▪ City of Diboll
<p>Planned Projects None identified at this time</p>	
<p>Additional Needs</p> <ul style="list-style-type: none"> ▪ City of Lufkin TOC ▪ City of Lufkin Traffic Signal System ▪ City of Nacogdoches TOC ▪ City of Nacogdoches Traffic Signal System ▪ Communications Master Plan ▪ TxDOT Emergency Vehicle Traffic Signal Preemption ▪ TxDOT Evacuation Route Implementation ▪ TxDOT Lufkin TMC ▪ TxDOT School Zone Pager System ▪ TxDOT Traffic Signal System Expansion Phase 1 ▪ TxDOT Traffic Signal System Expansion Phase 2 	

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

Traffic Information Dissemination (ATMS06)	High Priority
<p>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.</p> <p>This package also covers the equipment and interfaces that provide traffic information from a transportation management center (TMC) to the media (for instance via a direct tie-in between a TMC and radio or television station computer systems), Transit Management, Emergency Management, and ISPs.</p>	
Existing Infrastructure <ul style="list-style-type: none"> ▪ TxDOT HCRS ▪ TxDOT Portable DMS ▪ TxDOT Arrowboards ▪ City of Nacogdoches Portable DMS 	Agency <ul style="list-style-type: none"> ▪ TxDOT ▪ City of Nacogdoches
Planned Projects <ul style="list-style-type: none"> ▪ TxDOT Center-to-Center Communications ▪ TxDOT Lufkin ATMS Implementation ▪ TxDOT HCRS Enhancements 	
Additional Needs <ul style="list-style-type: none"> ▪ City of Lufkin Portable DMS ▪ City of Lufkin TOC ▪ City of Nacogdoches Portable DMS ▪ City of Nacogdoches TOC ▪ Communications Master Plan ▪ TxDOT Advanced Work Zone Equipment ▪ TxDOT DMS Phase 1 ▪ TxDOT DMS Phase 2 ▪ TxDOT Evacuation Route Implementation ▪ TxDOT Highway Advisory Radio ▪ TxDOT Lufkin TMC ▪ TxDOT Lufkin TMC/City of Livingston Fire/Police/EMS Dispatch Communications Connection ▪ TxDOT Lufkin TMC/City of Lufkin EMS Dispatch Communications Connection ▪ TxDOT Lufkin TMC/City of Nacogdoches Police/Fire Dispatch Communications Connection ▪ TXDOT Lufkin TMC/County Public Safety Dispatch Communications Connection ▪ TxDOT Lufkin TMC/DPS Communications Connection ▪ TxDOT Media Liaison and Coordination ▪ TxDOT Portable DMS Phase 1 ▪ TxDOT Portable DMS Phase 2 ▪ TxDOT/City of Lufkin Communications Connection ▪ TxDOT/City of Nacogdoches Communications Connection 	

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

<p>Traffic Incident Management System (ATMS08)</p>	<p>High Priority</p>
<p>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. closed-circuit television [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.</p> <p>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.</p> <p>Incident response also includes presentation of information to affected travelers using the Traffic Information Dissemination, Broadcast Traveler Information, or Interactive Traveler Information market packages.</p>	
<p>Existing Infrastructure</p> <ul style="list-style-type: none"> ▪ Portable DMS ▪ Computer Aided Dispatch ▪ Mobile Data Terminals (Police) ▪ Evacuation Route Law Enforcement Preemption at Select Signals (Manually) 	<p>Agency</p> <ul style="list-style-type: none"> ▪ TxDOT ▪ City of Nacogdoches ▪ City of Lufkin ▪ Texas DPS ▪ Polk County Sheriff
<p>Planned Projects</p> <ul style="list-style-type: none"> ▪ TxDOT Center-to-Center Communications ▪ TxDOT HCRS Enhancements ▪ TxDOT Lufkin ATMS Implementation 	
<p>Additional Needs</p> <ul style="list-style-type: none"> ▪ City of Lufkin Portable DMS ▪ City of Lufkin TOC ▪ City of Nacogdoches Portable DMS ▪ City of Nacogdoches TOC ▪ Communications Master Plan ▪ TxDOT Advanced Work Zone Equipment ▪ TxDOT Regional 511 Advanced Traveler Information System Server ▪ TxDOT CCTV Phase 1 ▪ TxDOT CCTV Phase 2 ▪ TxDOT DMS Phase 1 ▪ TxDOT DMS Phase 2 ▪ TxDOT Emergency Vehicle Traffic Signal Preemption ▪ TxDOT Evacuation Route Implementation 	



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

Traffic Incident Management System (ATMS08) (continued)	High Priority
<p>Additional Needs (continued)</p> <ul style="list-style-type: none"> ▪ TxDOT Highway Advisory Radio ▪ TxDOT Lufkin TMC ▪ TxDOT Lufkin TMC/Angelina and Neches River Authority Dispatch Communications Connection ▪ TxDOT Lufkin TMC/City of Livingston Fire/Police/EMS Dispatch Communications Connection ▪ TxDOT Lufkin TMC/City of Lufkin EMS Dispatch Communications Connection ▪ TxDOT Lufkin TMC/City of Nacogdoches Police/Fire Dispatch Communications Connection ▪ TxDOT Lufkin TMC/County Public Safety Dispatch Communications Connection ▪ TxDOT Lufkin TMC/DPS Communications Connection ▪ TxDOT Lufkin TMC/Lower Neches Valley Dispatch Communications Connection ▪ TxDOT Lufkin TMC/Sabine River Authority Gulf Coast Division Communications Connection ▪ TxDOT Lufkin TMC/Trinity River Authority Control Center Communications Connection ▪ TxDOT Media Liaison and Coordination ▪ TxDOT Portable DMS Phase 1 ▪ TxDOT Portable DMS Phase 2 ▪ TxDOT/City of Lufkin Communications Connection ▪ TxDOT/City of Nacogdoches Communications Connection 	

Speed Monitoring (ATMS19)	High Priority
<p>This market package monitors the speeds of vehicles traveling through a roadway system. If the speed is determined to be excessive, roadside equipment can suggest a safe driving speed. Environmental conditions may be monitored and factored in to the safe speed advisories that are provided to the motorist. This service can also support notifications to an enforcement agency to enforce the speed limit on a roadway system.</p>	
<p>Existing Infrastructure</p> <ul style="list-style-type: none"> ▪ Speed Trailers 	<p>Agency</p> <ul style="list-style-type: none"> ▪ City of Lufkin ▪ City of Nacogdoches
<p>Planned Projects None identified at this time</p>	
<p>Additional Needs</p> <ul style="list-style-type: none"> ▪ TxDOT Portable Speed Monitoring 	



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

Emergency Call-Taking and Dispatch (EM01)	High Priority
<p>This market package provides basic public safety call-taking and dispatch services. It 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 between agencies. Wide area wireless communications between the Emergency Management Subsystem and an Emergency Vehicle supports dispatch and provision of information to responding personnel.</p>	
<p>Existing Infrastructure</p> <ul style="list-style-type: none"> ▪ Computer Aided Dispatch ▪ Public Safety Answering Point ▪ Mobile Data Terminals 	<p>Agency</p> <ul style="list-style-type: none"> ▪ City of Lufkin ▪ City of Nacogdoches ▪ Texas DPS ▪ County Sheriffs
<p>Planned Projects None identified at this time</p>	
<p>Additional Needs</p> <ul style="list-style-type: none"> ▪ City of Lufkin Fire Vehicle AVL/MDT ▪ City of Nacogdoches Fire Vehicle AVL ▪ TxDOT Emergency Vehicle Traffic Signal Preemption 	



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

Emergency Vehicle Routing (EM02)	High Priority
<p>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.</p>	
<p>Existing Infrastructure</p> <ul style="list-style-type: none"> ▪ Mobile Data Terminals ▪ Traffic Signal Preemption 	<p>Agency</p> <ul style="list-style-type: none"> ▪ City of Nacogdoches ▪ City of Lufkin ▪ City of Diboll ▪ TxDOT
<p>Planned Projects</p> <p>None identified at this time</p>	
<p>Additional Needs</p> <ul style="list-style-type: none"> ▪ City of Lufkin Fire Vehicle AVL/MDT ▪ City of Nacogdoches Fire Vehicle AVL ▪ TxDOT Emergency Vehicle Traffic Signal Preemption ▪ TxDOT Lufkin TMC/City of Livingston Fire/Police/EMS Dispatch Communications Connection ▪ TxDOT Lufkin TMC/City of Lufkin EMS Dispatch Communications Connection ▪ TxDOT Lufkin TMC/City of Nacogdoches Police/Fire Dispatch Communications Connection ▪ TxDOT Lufkin TMC/County Public Safety Dispatch Communications Connection ▪ TxDOT Lufkin TMC/DPS Communications Connection 	



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

Wide-Area Alert (EM06)	High Priority
<p>This market package uses ITS driver and traveler information systems to alert the public in emergency situations such as child abductions, severe weather events, civil emergencies, and other situations that pose a threat to life and property. The alert includes information and instructions for transportation system operators and the traveling public, improving public safety and enlisting the public's help in some scenarios. The ITS technologies will supplement and support other emergency and homeland security alert systems such as the Emergency Alert System (EAS). When an emergency situation is reported and verified and the terms and conditions for system activation are satisfied, a designated agency broadcasts emergency information to traffic agencies, transit agencies, information service providers, toll operators, and others that operate ITS systems. The ITS systems, in turn, provide the alert information to transportation system operators and the traveling public using ITS technologies such as dynamic message signs, highway advisory radios, in-vehicle displays, transit displays, 511 traveler information systems, and traveler information web sites.</p>	
<p>Existing Infrastructure None identified</p>	<p>Agency</p>
<p>Planned Projects</p> <ul style="list-style-type: none"> ▪ TxDOT Center-to-Center Communications ▪ TxDOT Lufkin ATMS Implementation 	
<p>Additional Needs</p> <ul style="list-style-type: none"> ▪ TxDOT Regional 511 Advanced Traveler Information System Server ▪ TxDOT DMS Phase 1 ▪ TxDOT DMS Phase 2 ▪ TxDOT Highway Advisory Radio ▪ TxDOT Lufkin TMC ▪ TxDOT Lufkin Web Page 	



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

Evacuation and Reentry Management (EM09)	High Priority
<p>This market package supports evacuation of the general public from a disaster area and manages subsequent reentry to the disaster area. The market package addresses evacuations for all types of disasters, including disasters like hurricanes that are anticipated and occur slowly, allowing a well-planned orderly evacuation, as well as disasters like terrorist acts that occur rapidly, without warning, and allow little or no time for preparation or public warning.</p> <p>This market package supports coordination of evacuation plans among the federal, state, and local transportation, emergency, and law enforcement agencies that may be involved in a large-scale evacuation. All affected jurisdictions (e.g., states and counties) at the evacuation origin, evacuation destination, and along the evacuation route are informed of the plan. Information is shared with traffic management agencies to implement special traffic control strategies and to control evacuation traffic, including traffic on local streets and arterials as well as the major evacuation routes. Reversible lanes, shoulder use, closures, special signal control strategies, and other special strategies may be implemented to maximize capacity along the evacuation routes. Transit resources play an important role in an evacuation, removing many people from an evacuated area while making efficient use of limited capacity. Additional shared transit resources may be added and managed in evacuation scenarios. Resource requirements are forecast based on the evacuation plans, and the necessary resources are located, shared between agencies if necessary, and deployed at the right locations at the appropriate times.</p>	
Existing Infrastructure <ul style="list-style-type: none"> ▪ Emergency Operations Centers 	Agency <ul style="list-style-type: none"> ▪ City of Nacogdoches ▪ Polk County
Planned Projects <ul style="list-style-type: none"> ▪ TxDOT Center-to-Center Communications 	
Additional Needs <ul style="list-style-type: none"> ▪ Communications Master Plan ▪ Interstate Coordination ▪ TxDOT Evacuation Route Implementation ▪ TxDOT Lufkin TMC/City of Livingston Fire/Police/EMS Dispatch Communications Connection ▪ TxDOT Lufkin TMC/City of Lufkin EMS Dispatch Communications Connection ▪ TxDOT Lufkin TMC/City of Nacogdoches Police/Fire Dispatch Communications Connection ▪ TxDOT Lufkin TMC/County Public Safety Dispatch Communications Connection ▪ TxDOT Lufkin TMC/DPS Communications Connection ▪ TxDOT/City of Lufkin Communications Connection ▪ TxDOT/City of Nacogdoches Communications Connection 	



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

Disaster Traveler Information (EM10)	High Priority
<p>This market package uses ITS to provide disaster-related traveler information to the general public, including evacuation and reentry information and other information concerning the operation of the transportation system during a disaster. This market package collects information from multiple sources including traffic, transit, public safety, emergency management, shelter provider, and travel service provider organizations. The collected information is processed and the public is provided with real-time disaster and evacuation information using ITS traveler information systems.</p>	
Existing Infrastructure	Agency
None identified	
Planned Projects	
<ul style="list-style-type: none"> ▪ TxDOT Lufkin ATMS Implementation 	
Additional Needs	
<ul style="list-style-type: none"> ▪ BTD Web Site Enhancements ▪ Lufkin Intermodal Terminal Transit Travel Information System ▪ TxDOT Regional 511 Advanced Traveler Information System Server ▪ TxDOT DMS Phase 1 ▪ TxDOT DMS Phase 2 ▪ TxDOT Highway Advisory Radio ▪ TxDOT Lufkin TMC ▪ TxDOT Lufkin TMC/City of Livingston Fire/Police/EMS Dispatch Communications Connection ▪ TxDOT Lufkin TMC/City of Lufkin EMS Dispatch Communications Connection ▪ TxDOT Lufkin TMC/City of Nacogdoches Police/Fire Dispatch Communications Connection ▪ TxDOT Lufkin TMC/County Public Safety Dispatch Communications Connection ▪ TxDOT Lufkin TMC/DPS Communications Connection ▪ TxDOT Lufkin Web Page ▪ TxDOT Media Liaison and Coordination ▪ TxDOT/City of Lufkin Communications Connection ▪ TxDOT/City of Nacogdoches Communications Connection 	



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

Road Weather Data Collection (MC03)	High Priority
<p>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.</p>	
<p>Existing Infrastructure</p> <ul style="list-style-type: none"> ▪ Stream/Flood Gauges 	<p>Agency</p> <ul style="list-style-type: none"> ▪ Angelina and Neches River Authority
<p>Planned Projects</p> <p>None identified at this time</p>	
<p>Additional Needs</p> <ul style="list-style-type: none"> ▪ City of Lufkin Flood Detection ▪ City of Nacogdoches Flood Detection ▪ TxDOT Flood Detection Phase 1 ▪ TxDOT Flood Detection Phase 2 	



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

Weather Information Processing and Distribution (MC04)	High Priority
<p>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.</p>	
Existing Infrastructure <ul style="list-style-type: none"> ▪ TxDOT HCRS 	Agency <ul style="list-style-type: none"> ▪ TxDOT
Planned Projects <ul style="list-style-type: none"> ▪ TxDOT Center-to-Center Communications ▪ TxDOT HCRS Enhancements ▪ TxDOT Lufkin ATMS Implementation 	
Additional Needs <ul style="list-style-type: none"> ▪ Regional Roadway Maintenance/Work Zone Activity Clearinghouse ▪ TxDOT Lufkin TMC ▪ TxDOT Lufkin TMC/Angelina and Neches River Authority Dispatch Communications Connection ▪ TxDOT Lufkin TMC/Lower Neches Valley Dispatch Communications Connection ▪ TxDOT Lufkin TMC/Sabine River Authority Gulf Coast Division Communications Connection ▪ TxDOT Lufkin TMC/Trinity River Authority Control Center Communications Connection ▪ TxDOT Media Liaison and Coordination ▪ TxDOT Regional 511 Advanced Traveler Information System Server 	



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

Work Zone Management (MC08)	High Priority
<p>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.</p>	
<p>Existing Infrastructure</p> <ul style="list-style-type: none"> ▪ Speed Trailers ▪ Portable Dynamic Message Signs ▪ Arrowboards ▪ TxDOT HCRS 	<p>Agency</p> <ul style="list-style-type: none"> ▪ City of Lufkin ▪ City of Nacogdoches ▪ TxDOT
<p>Planned Projects</p> <ul style="list-style-type: none"> ▪ TxDOT HCRS Enhancements 	
<p>Additional Needs</p> <ul style="list-style-type: none"> ▪ City of Lufkin Portable DMS ▪ City of Nacogdoches Portable DMS ▪ Regional Roadway Maintenance/Work Zone Activity Clearinghouse ▪ TxDOT Regional 511 Advanced Traveler Information System Server ▪ TxDOT Advanced Work Zone Equipment ▪ TxDOT DMS Phase 1 ▪ TxDOT DMS Phase 2 ▪ TxDOT Media Liaison and Coordination ▪ TxDOT Portable DMS Phase 1 ▪ TxDOT Portable DMS Phase 2 ▪ TxDOT Portable Speed Monitoring 	



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

Work Zone Safety Monitoring (MC09)	High Priority
<p>This market package includes systems and strategies to improve work crew safety and reduce collisions between the motoring public and maintenance vehicles and activities. Included in this market package is detection for vehicle intrusions to the work zone and warning systems to alert workers and drivers of potential safety hazards. This market package support both stationary and mobile work zones.</p>	
Existing Infrastructure None identified	Agency
Planned Projects None identified at this time	
<p>Additional Needs</p> <ul style="list-style-type: none"> ▪ City of Lufkin Work Zone Safety Monitoring Equipment ▪ City of Nacogdoches Work Zone Safety Monitoring Equipment ▪ TxDOT Advanced Work Zone Equipment ▪ TxDOT Portable Speed Monitoring ▪ TxDOT Work Zone Safety Monitoring Equipment 	

Transit Vehicle Tracking (APTS1)	High Priority
<p>This market package monitors current transit vehicle location using an Automated Vehicle Location (AVL) System. The location data may be used to determine real time schedule adherence and update the transit system's schedule in real-time.</p>	
Existing Infrastructure <ul style="list-style-type: none"> ▪ Demand Response AVL 	Agency <ul style="list-style-type: none"> ▪ Brazos Transit District
Planned Projects None identified at this time	
<p>Additional Needs</p> <ul style="list-style-type: none"> ▪ BTD Fixed Route AVL/MDT ▪ BTD Transit Dispatch Center Enhancements 	



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

Demand Response Transit Operations (APTS3)	High Priority
<p>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 ISP Subsystem.</p>	
<p>Existing Infrastructure</p> <ul style="list-style-type: none"> ▪ Demand Response AVL ▪ BTD Web Page 	<p>Agency</p> <ul style="list-style-type: none"> ▪ Brazos Transit District
<p>Planned Projects</p> <ul style="list-style-type: none"> ▪ BTD Demand Response MDTs 	
<p>Additional Needs</p> <ul style="list-style-type: none"> ▪ BTD Transit Dispatch Center Enhancements ▪ BTD Web Site Enhancements ▪ Regional Paratransit Coordination System ▪ Regional Smart Card 	

Multi-modal Coordination (APTS7)	High Priority
<p>This market package establishes two way communications between multiple transit and traffic agencies to improve service coordination. Multimodal coordination between transit agencies can increase traveler convenience at transfer points and also improve operating efficiency. Coordination between traffic and transit management is intended to improve on-time performance of the transit system to the extent that this can be accommodated without degrading overall performance of the traffic network. More limited local coordination between the transit vehicle and the individual intersection for signal priority is also supported by this package.</p>	
<p>Existing Infrastructure</p> <p>None identified</p>	<p>Agency</p>
<p>Planned Projects</p> <p>None identified at this time</p>	
<p>Additional Needs</p> <ul style="list-style-type: none"> ▪ Lufkin Intermodal Terminal Parking Management System ▪ Lufkin Intermodal Terminal Transit Travel Information System ▪ Regional Transit Smart Card ▪ Regional Paratransit Coordination System 	



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

Transit Traveler Information (APTS8)	High Priority
<p>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.</p>	
Existing Infrastructure	Agency
<ul style="list-style-type: none"> ▪ BTD Web Page 	<ul style="list-style-type: none"> ▪ Brazos Transit District
Planned Projects	
None identified at this time	
Additional Needs	
<ul style="list-style-type: none"> ▪ BTD Web Site Enhancements ▪ Lufkin Intermodal Terminal Parking Management System ▪ Lufkin Intermodal Terminal Transit Travel Information System ▪ Regional Paratransit Coordination System 	

CV Administrative Processes (CVO04)	High Priority
<p>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 at the roadside to support the electronic clearance process.</p>	
Existing Infrastructure	Agency
None identified	
Planned Projects	
None identified at this time	
Additional Needs	
<ul style="list-style-type: none"> ▪ CVO Emergency Information Clearinghouse ▪ CVO/HAZMAT Permit Coordination and Notification System 	

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

HAZMAT Management (CVO10)	High Priority
<p>This market package integrates incident management capabilities with commercial vehicle tracking to assure effective treatment of Hazardous Materials (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.</p>	
<p>Existing Infrastructure None identified</p>	<p>Agency</p>
<p>Planned Projects None identified at this time</p>	
<p>Additional Needs</p> <ul style="list-style-type: none"> ▪ CVO Emergency Information Clearinghouse ▪ CVO/HAZMAT Permit Coordination and Notification System 	

Broadcast Traveler Information (ATIS1)	High Priority
<p>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 highway advisory radio (HAR) and DMS information capabilities.</p> <p>The information may be provided directly to travelers by an 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.</p>	
<p>Existing Infrastructure</p> <ul style="list-style-type: none"> ▪ TxDOT HCRS 	<p>Agency</p> <ul style="list-style-type: none"> ▪ TxDOT
<p>Planned Projects</p> <ul style="list-style-type: none"> ▪ TxDOT HCRS Enhancements 	
<p>Additional Needs</p> <ul style="list-style-type: none"> ▪ TxDOT Media Liaison and Coordination 	



2.3 Medium Priority Market Packages

Table 4 outlines market packages that were deemed medium priority by stakeholders in the Lufkin 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. 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 management 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 Lufkin Region

Regional Traffic Control (ATMS07)	Medium Priority
This market package provides for the sharing of traffic information and control among TMCs 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.	
Existing Infrastructure None identified	Agency
Planned Projects	
<ul style="list-style-type: none"> ▪ TxDOT Center-to-Center Communications ▪ TxDOT Lufkin ATMS Implementation 	
Additional Needs	
<ul style="list-style-type: none"> ▪ Communications Master Plan ▪ Interstate Coordination ▪ TxDOT/City of Lufkin Communications Connection ▪ TxDOT/City of Nacogdoches Communications Connection 	



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

Maintenance and Construction Vehicle and Equipment Tracking (MC01)	Medium Priority
This market package will track the location of maintenance 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.	
Existing Infrastructure None identified	Agency
Planned Projects None identified at this time	
Additional Needs <ul style="list-style-type: none"> ▪ County Maintenance Vehicle AVL ▪ TxDOT Maintenance Vehicle AVL 	

Roadway Maintenance and Construction (MC07)	Medium Priority
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 (roadway debris, dead animals), routine maintenance activities (roadway cleaning, grass cutting), and repair and maintenance of both ITS and non-ITS equipment on the roadway (e.g., signs, traffic controllers, traffic detectors, dynamic message signs, traffic signals, CCTV, etc.). Environmental conditions information is also received from various weather sources to aid in scheduling maintenance and construction activities.	
Existing Infrastructure <ul style="list-style-type: none"> ▪ TxDOT HCRS 	Agency <ul style="list-style-type: none"> ▪ TxDOT
Planned Projects <ul style="list-style-type: none"> ▪ TxDOT HCRS Enhancements 	
Additional Needs <ul style="list-style-type: none"> ▪ Regional Roadway Maintenance/Work Zone Activity Clearinghouse 	



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

Maintenance and Construction Activity Coordination (MC10)	Medium Priority
<p>This market package supports the dissemination of maintenance and construction activity information to centers which can utilize it as part of their operations, or to the ISPs who can provide the information to travelers.</p>	
<p>Existing Infrastructure</p> <ul style="list-style-type: none"> ▪ TxDOT HCRS 	<p>Agency</p> <ul style="list-style-type: none"> ▪ TxDOT
<p>Planned Projects</p> <ul style="list-style-type: none"> ▪ TxDOT Center-to-Center Communications ▪ TxDOT HCRS Enhancements 	
<p>Additional Needs</p> <ul style="list-style-type: none"> ▪ Interstate Coordination ▪ Regional Roadway Maintenance/Work Zone Activity Clearinghouse ▪ TxDOT Lufkin TMC ▪ TxDOT Lufkin Web Page ▪ TxDOT Media Liaison and Coordination ▪ TxDOT Regional 511 Advanced Traveler Information System Server ▪ TxDOT/City of Lufkin Communications Connection ▪ TxDOT/City of Nacogdoches Communications Connection 	

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

Transit Fixed-Route Operations (APTS2)	Medium Priority
<p>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 ISPs 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.</p>	
<p>Existing Infrastructure</p> <ul style="list-style-type: none"> ▪ BTD Web Page 	<p>Agency</p> <ul style="list-style-type: none"> ▪ Brazos Transit District
<p>Planned Projects</p> <p>None identified at this time</p>	
<p>Additional Needs</p> <ul style="list-style-type: none"> ▪ BTD Fixed Route AVL/MDT ▪ BTD Transit Dispatch Center Enhancements ▪ BTD Web Site Enhancements ▪ Regional Smart Card 	

Interactive Traveler Information (ATIS2)	Medium Priority
<p>This market package provides tailored information in response to a traveler request. Both real-time interactive request/response systems and information systems that "push" a tailored stream of information to the traveler based on a submitted profile are supported. The traveler can obtain current information regarding traffic conditions, transit services, ride share/ride match, parking management, and pricing information.</p> <p>Information can be accessed via phone, kiosk, Personal Digital Assistant, personal computer, and a variety of in-vehicle devices. Successful deployment of this market package relies on availability of real-time transportation data from roadway instrumentation, probe vehicles, or other means.</p>	
<p>Existing Infrastructure</p> <ul style="list-style-type: none"> ▪ BTD Website ▪ TxDOT Website 	<p>Agency</p> <ul style="list-style-type: none"> ▪ Brazos Transit District ▪ TxDOT
<p>Planned Projects</p> <p>None identified at this time</p>	
<p>Additional Needs</p> <ul style="list-style-type: none"> ▪ BTD Web Site Enhancements ▪ TxDOT HCRS Enhancements ▪ TxDOT Lufkin Web Page ▪ TxDOT Regional 511 Advanced Traveler Information System Server 	



2.4 Low Priority Market Packages

Nine of the market packages that were identified and customized for the Lufkin 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. Others, such as Maintenance and Construction Vehicle Maintenance, are just more feasible for future implementation.

Table 5 – Low Priority Market Packages for the Lufkin Region

Market Package Name	Description	Comments
Probe Surveillance (ATMS02)	<p>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.</p> <p>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.</p>	<p>Probe surveillance was not deemed a high priority market package at the time of the initial architecture development in the Lufkin Region. For probe data to be consistent and accurately reflect current conditions, there must be a quantifiable amount of vehicles equipped with probes on the roadways at any given time.</p> <p>The Lufkin Region might want to investigate the feasibility of using probe surveillance in the future to assist with determining near-real-time volume information on roads or freeways. Two potential probe vehicle candidates could be buses or commercial vehicles.</p>



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

Market Package Name	Description	Comments
Emissions Monitoring and Management (ATMS11)	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 TDM programs, policies, and regulations.	At present, the Lufkin Region is not part of a non-attainment area. Because of the Lufkin Region's proximity to Houston, there may be regulations that could impact the Region in the future.

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

Market Package Name	Description	Comments
<p>Standard Railroad Grade Crossing/Railroad Operations Coordination (ATMS13/ATMS15)</p>	<p>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.</p> <p>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.</p> <p>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.</p>	<p>Highway/rail crossings were not deemed a high priority for ITS in the Lufkin Region. Stakeholders agreed that as systems are implemented near major rail crossings, coordination with these systems in the future might be feasible.</p>
<p>Parking Facility Management (ATMS16)</p>	<p>This market package provides enhanced monitoring and management of parking facilities. It assists in the management of parking operations, coordinates with transportation authorities, and supports electronic collection of parking fees. This market package collects current parking status, shares this data with Information Service Providers and Traffic Management, and collects parking fees using the same in-vehicle equipment utilized for electronic toll collection or contact or proximity traveler cards used for electronic payment. Electronic payment for transit is addressed under a separate market package (APTS4).</p>	<p>The Lufkin Intermodal Terminal could benefit from parking management systems and technologies. Stakeholders in the Lufkin Region did not see these functions as a near-term priority, but agreed it should be considered in the future.</p>



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

Market Package Name	Description	Comments
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.	This market package is more appropriate for future applications. It relies on diagnostic systems on-board maintenance vehicles, and supporting systems and logistics at maintenance facilities. Stakeholders agreed that it was better suited for a longer-term consideration.
Transit Passenger and Fare Management (APTS4)	This market package manages passenger loading and fare payments on-board vehicles using electronic means. It allows transit patrons 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.	Brazos Transit District indicated that 'smart cards' for fare payment will likely be deployed throughout the agency's service area, but they are not envisioned for the near term.
Transit Security (APTS5)	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.	On-board transit security systems were not deemed a high priority for near-term implementation in the Lufkin Region. With the construction of the Lufkin Intermodal Terminal, parking lots, and associated infrastructure, security issues will need to be considered, and appropriate strategies assessed for potential implementation.



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

Market Package Name	Description	Comments
ISP Based Route Guidance (ATIS5)	<p>This market package offers the user pre-trip route planning and turn-by-turn route guidance services, which are generated by an 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.</p>	<p>The private sector will have primary responsibility for this market package, with minimal public sector support other than as a data provider.</p>
ITS Data Mart (AD1)	<p>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.</p> <p>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.</p>	<p>Data archiving was selected for future consideration by stakeholders in the Lufkin Region. As systems are implemented and begin generating data, uses of that data for planning purposes and other future uses should be assessed, and an approach to data archiving, storage and retrieval should be developed.</p>

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 Lufkin Region on December 15, 2004 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.

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 Lufkin 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 Lufkin TMC	Implement a Transportation Management Center (TMC) at the Lufkin District Office	TxDOT	\$200,000	No	2 years
TxDOT Lufkin ATMS Implementation	Implement TxDOT's Advanced Traffic Management System (ATMS) software at the Lufkin TMC. ATMS provides for control of Dynamic Message Signs (DMS), Closed Circuit Television (CCTV) cameras and other functions	TxDOT	N/A	N/A	1 year
TxDOT CCTV Phase 1	Implement CCTV cameras along US 59 to monitor traffic conditions on key portions of the corridor	TxDOT	\$25,000- \$30,000/site	No	1 year
TxDOT School Zone Pager System	Upgrade the pager-based system that will activate school zone flashing lights during school hours throughout the Region	TxDOT	To Be Determined	No	1 year
TxDOT DMS Phase 1	Install permanent DMS at key locations and decision points on major corridors in the Region	TxDOT	\$150,000/sign	No	2 years
TxDOT Center-to-Center Communications	Statewide project to enhance coordination with other TxDOT Districts through implementation of center-to-center communications among TxDOT TMCs. The software to facilitate this connection is included in the ATMS Implementation. Some hardware may be required at the District level.	TxDOT	N/A	N/A	1 year
Communications Master Plan	Develop a regional master plan for telecommunications infrastructure, including communication needs (center-to-center, center-to-field), types, phasing and cost requirements	TxDOT	\$100,000	No	6 months
TxDOT Highway Advisory Radio	Implement Highway Advisory Radio to provide en-route information about closures, hazards, incidents, weather advisories and other impacts in the Region	TxDOT	\$20,000/ transmitter	No	6 months



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)					
TxDOT Traffic Signal System Expansion Phase 1	Expand TxDOT traffic signal system at signalized intersections throughout the Region. Also includes the implementation of Video Image Vehicle Detection Systems (VIVDS).	TxDOT	To Be Determined	No	5 years
TxDOT Portable Speed Monitoring	Procure portable speed monitoring/warning systems that can be used at key locations in the Region	TxDOT	\$17,000/each	No	6 months
TxDOT Lufkin Web Page	Enhance existing TxDOT Expressway website for the Lufkin District to provide travel information, real-time traffic conditions, closures, etc. The site will include TxDOT and local agency information.	TxDOT	\$50,000 plus cost of periodic updates	No	1 year
Emergency Management					
TxDOT Evacuation Route Implementation	Implement strategies and technologies to assist with evacuation route traffic management, including fixed FMS components (DMS, CCTV, lane control signals) and portable equipment	TxDOT	To Be Determined	No	2 years
TxDOT Lufkin TMC/DPS Communications Connection	Install connection from DPS to TxDOT TMC for CCTV shared video monitoring, data sharing, and incident information coordination	TxDOT/DPS	To Be Determined	No	3 months
City of Lufkin Fire Vehicle AVL/MDT	Install Automated Vehicle Location (AVL) and Mobile Data Terminal (MDT) devices on City of Lufkin Fire vehicles to provide real-time location information and enable automated communications between the vehicles and dispatch center	City of Lufkin	\$10,000/vehicle (Includes software)	No	6 months
City of Nacogdoches Fire Vehicle AVL	Install AVL devices on City of Nacogdoches Fire vehicles to provide real-time location information (MDTs are already installed)	City of Nacogdoches	\$8,000/vehicle (Includes software)	No	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 Management					
TxDOT HCRS Enhancements	Implement enhancements to the Highway Conditions Reporting System (HCRS)	TxDOT	N/A	Yes (statewide initiative)	1 year
TxDOT Portable DMS Phase 1	Procure additional portable DMS for use throughout the Lufkin Region	TxDOT	\$30,000/sign	No	6 months
TxDOT Flood Detection Phase 1	Implement flood monitoring and warning sensors at key locations/near key corridors in the Region that are prone to flooding.	TxDOT	\$10,000/sensor	No	1 year
City of Lufkin Flood Detection	Implement flood monitoring and warning sensors at key locations/near key corridors in Lufkin that are prone to flooding.	City of Lufkin	\$10,000/sensor	No	1 year
City of Lufkin Portable DMS	Procure portable DMS for use by the City of Lufkin	City of Lufkin	\$30,000/sign	No	6 months
City of Nacogdoches Flood Detection	Implement flood monitoring and warning sensors at key locations/near key corridors in Nacogdoches that are prone to flooding.	City of Nacogdoches	\$10,000/sensor	No	1 year
City of Nacogdoches Portable DMS	Procure additional portable DMS for use by the City of Nacogdoches	City of Nacogdoches	\$30,000/sign	No	6 months
Public Transportation Management					
Lufkin Intermodal Terminal Transit Travel Information System	Develop and implement a transit travel information system at the Lufkin Intermodal Terminal. Information could include available transit services and providers, schedules, fares, next-bus arrival times, and other types of information that could be beneficial to transit patrons. Potential technologies include touch-screen kiosks or plasma display screens.	Brazos Transit District	To Be Determined	No	2 years



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)					
BTD Demand Response MDTs	Install mobile data terminals on Brazos Transit demand response vehicles to facilitate automated communications, warnings, or advisories between drivers and the dispatch centers. (Demand response vehicles are already equipped with AVL)	Brazos Transit District	\$5,000/vehicle	Yes	6 months
BTD Fixed Route AVL/MDT	Install AVL and MDT devices on Brazos Transit fixed-route vehicles to provide real-time location information and enable automated communications between the drivers and dispatch center	Brazos Transit District	\$10,000/vehicle (including software)	No	6 months
BTD Transit Dispatch Center Enhancements	Expand the capabilities of the Brazos Transit District dispatch center to better support systems, automated information sharing and coordination with other transit providers in the Region	Brazos Transit District	\$150,000	No	2 years
Commercial Vehicle Operations					
CVO/HAZMAT Permit Coordination and Notification System	Implement a coordinated permitting system for TxDOT, DPS, Cities and Counties for HAZMAT permitting and HAZMAT notification	TxDOT/ DPS	To Be Determined	No	2 years
CVO Emergency Information Clearinghouse	Implement a database and information clearinghouse to better track HAZMAT transporters, permits, routes, contents, fleet manager, and other important pieces of information. The purpose of this clearinghouse would be to be able to quickly identify HAZMAT contents in the event of a crash or other emergency, and notify and coordinate with the fleet manager/owner during incident clearance and recovery.	Private CVO Entity	To Be Determined	N/A	2 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.

Lufkin Region Short-Term Projects (5-Year)

Travel and Traffic Management

TxDOT Lufkin TMC

Associated Market Packages:

- Network Surveillance (ATMS01)
- Surface Street Control (ATMS03)
- Traffic Information Dissemination (ATMS06)
- Traffic Incident Management System (ATMS08)
- Wide Area Alert (EM06)
- Disaster Traveler Information (EM10)
- Weather Information Processing and Distribution (MC04)
- Maintenance and Construction Activity Coordination (MC10)

Prerequisite Projects: None

Description: Establish a TMC for the TxDOT Lufkin District to monitor and manage traffic flow in the District. Control of traffic signal systems as well as operations of any future ITS deployments will occur from the TMC. The project will also include the implementation of end equipment to allow video feed and control for VIVDS and CCTV pan/tilt/zoom.

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

TxDOT Lufkin ATMS Implementation

Associated Market Packages:

- Network Surveillance (ATMS01)
- Traffic Information Dissemination (ATMS06)
- Regional Traffic Control (ATMS07)
- Traffic Incident Management System (ATMS08)
- Wide Area Alert (EM06)
- Disaster Traveler Information (EM10)
- Weather Information Processing and Distribution (MC04)

Prerequisite Projects: None

Description: This project involves the implementation of ATMS software to facilitate control of DMS, CCTV cameras and other TxDOT field equipment.

The TxDOT ATMS is a software platform developed by the TxDOT Traffic Operations Division whose function is to integrate the various subsystems. The high level functions of the TxDOT ATMS include:

- Collect traffic information (e.g., speed, incidents, lane closures) through a variety of collection methods such as loops, video image detection, etc.;
- Data archiving;
- Graphical map with traffic information;
- Status information, command and control for DMS, 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 (such as flood detection systems). An integrated maintenance database management module is also under development. Lastly, several modules are currently being upgraded to support recently approved National Transportation Communications for ITS Protocol (NTCIP) standards for CCTV, Center-to-Center Communications, and data collection devices.

This ATMS implementation project will include the software necessary to have an operational central system to routinely poll devices and support archiving of data.

TxDOT CCTV Phase 1

Associated Market Packages:

- Network Surveillance (ATMS01)
- Incident Management (ATMS08)

Prerequisite Projects: None

Description: This project includes the deployment of CCTV cameras at key locations along US 59. The CCTV cameras can be used for incident detection and verification, to monitor congestion and to aid in the dispatch of emergency vehicles. The information gathered by the CCTV cameras (video feed) can be shared with the area emergency management agencies.

The estimated cost of this project is \$25,000 to \$30,000 per camera.

TxDOT School Zone Pager System

Associated Market Packages:

- Surface Street Control (ATMS03)

Prerequisite Projects: None

Description: Update the current paging and central system(s) to allow remote control of flashers for schools. Two-way paging systems are available for programming and troubleshooting school zone time clocks (AC or solar powered). A two-way paging system will allow programming of times for the new school year, school holidays, and special events from a central location. Two-way paging also provides acknowledgement that the flasher received the message and provides routine diagnostic/operational status messages. The main benefit of a paging system is eliminating costly trips to the field to

reprogram units or manually operate flashers. Also, flashers can be quickly programmed to operate during unplanned events such as an early dismissal due to weather.

TxDOT DMS Phase 1

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Traffic Incident Management System (ATMS08)
- Wide Area Alert (EM06)
- Disaster Traveler Information (EM10)
- Work Zone Management (MC08)

Prerequisite Projects: None

Description: This project consists of the deployment of permanent DMS along roadway facilities in the Region for purposes of traffic information dissemination and incident management. DMS also will be utilized in conjunction with emergency evacuation coordination (i.e., HAZMAT, weather, etc.). The estimated cost per sign is approximately \$150,000.

TxDOT Center-to-Center Communications

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Regional Traffic Control and Coordination (ATMS07)
- Traffic Incident Management System (ATMS08)
- Wide Area Alert (EM06)
- Weather Information Processing and Distribution (MC04)
- Maintenance and Construction Activity Coordination (MC10)

Prerequisite Projects: TxDOT ATMS Implementation

Description: The Center-to-Center Communications project will enhance coordination with TxDOT Districts through connection to the statewide center-to-center core infrastructure. A communication backbone must be developed with sufficient capacity between the TxDOT Lufkin TMC and existing center-to-center infrastructure. Determination of whether the backbone should be TxDOT owned, leased, or a combination thereof will be determined at a later date. The software required to support center-to-center communications is integrated with the TxDOT developed ATMS, so significant software development efforts are not anticipated. Resources will be required to oversee installation of the communications backbone between the TxDOT Lufkin TMC and statewide center-to-center facilities. As part of connecting to the statewide center-to-center infrastructure, the Lufkin Region will provide data to the statewide web server and statewide data archiving database. In return, access to information from other TxDOT Districts (and potentially other agencies) will be available to enhance operations throughout the Region.

Communications Master Plan

Associated Market Packages:

- Network Surveillance (ATMS01)
- Surface Street Control (ATMS03)
- Traffic Information Dissemination (ATMS06)
- Regional Traffic Control (ATMS07)
- Traffic Incident Management System (ATMS08)
- Evacuation and Reentry Management (EM09)

Prerequisite Projects: None

Description: Develop a Regional Communications Master Plan for the Lufkin 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.

TxDOT Highway Advisory Radio

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Traffic Incident Management System (ATMS08)
- Wide Area Alert (EM06)
- Disaster Traveler Information (EM10)

Prerequisite Projects: None

Description: This project includes the implementation of HAR to provide en-route information about closures, hazards, incidents, evacuation route advisories and other impacts. HAR will allow operators at the Lufkin TMC to record travel advisory messages related to traffic, incidents, and weather emergencies for transmission at the roadside to vehicles traveling in the vicinity of the HAR transmitter(s). It also includes roadside signs with flashing beacons to alert motorists to tune in for a current message.

The estimated cost of this project is approximately \$20,000 per transmitter.

TxDOT Traffic Signal System Expansion Phase 1

Associated Market Packages:

- Network Surveillance (ATMS01)
- Surface Street Control (ATMS03)

Prerequisite Projects: None

Description: Expand the TxDOT traffic signal system at additional signalized intersections. This project also includes the installation of VIVDS when needed.

TxDOT Portable Speed Monitoring

Associated Market Packages:

- Speed Monitoring (ATMS19)
- Workzone Management (MC08)
- Workzone Safety Monitoring (MC09)

Prerequisite Projects: None

Description: Procure speed monitoring trailers for use by TxDOT crews. Speed trailers are portable traffic control devices with a large light emitting diode (LED) speed display run by radar sitting atop a trailer. Speed trailers are routinely used in work zones, residential neighborhoods, school zones, 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 and school zones of both large trucks and passenger vehicles.

The estimated cost per speed trailer is \$17,000.

TxDOT Lufkin Web Page

Associated Market Packages:

- Wide Area Alert (EM06)
- Disaster Traveler Information (EM10)
- Maintenance and Construction Activity Coordination (MC10)
- Interactive Traveler Information (ATIS2)

Prerequisite Projects: TxDOT ATMS Implementation

Description: Customize and enhance the Lufkin District webpage on the TxDOT Expressway website to provide information on traffic, current roadway conditions, construction and any weather advisories.

The estimated cost of this project is \$50,000 plus the cost of periodic updates.

Emergency Management

TxDOT Evacuation Route Implementation

Associated Market Packages:

- Network Surveillance (ATMS01)
- Traffic Information Dissemination (ATMS06)
- Regional Traffic Control (ATMS07)
- Traffic Incident Management System (ATMS08)
- Evacuation and Reentry Management (EM09)

Prerequisite Projects: None

Description: Develop evacuation plans for the Lufkin Region to be used in case of a natural or man-made disaster or incident. These plans will include the use of fixed ITS components such as DMS and CCTV as well as portable equipment and signal timing plan modifications in order to facilitate the timely and efficient evacuation of the Region.

TxDOT Lufkin TMC/DPS Communications Connection

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Traffic Incident Management System (ATMS08)
- Emergency Vehicle Routing (EM02)
- Evacuation and Reentry Management (EM09)
- Disaster Traveler Information (EM10)

Prerequisite Projects: TxDOT Lufkin TMC

Description: Install telecommunications connection between the DPS dispatch and TxDOT Lufkin TMC to allow for sharing of incident information and potential future video feeds. Cost of this connection will be determined based on the communications method chosen.

City of Lufkin Fire Vehicle AVL/MDT

Associated Market Packages:

- Emergency Call Taking and Dispatch (EM01)
- Emergency Vehicle Routing (EM02)

Prerequisite Projects: None

Description: Install AVL and MDTs on City of Lufkin Fire Department vehicles. The AVL system will convey information regarding real-time vehicle location to the dispatch center, which will allow for enhanced dispatch, routing (or re-routing), as well as provide for precise vehicle location information in the event of a breakdown or emergency situation. AVL systems measure actual, real-time position of vehicles, and relay that information back to a dispatch center, usually via global positioning system.

MDTs allow the Fire Department to send and receive digital messages. MDTs can be used by dispatchers to notify officers of adverse conditions and recommended routes. 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 dispatch communications.

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

City of Nacogdoches Fire Vehicle AVL

Associated Market Packages:

- Emergency Call Taking and Dispatch (EM01)
- Emergency Vehicle Routing (EM02)

Prerequisite Projects: None

Description: Install AVL on City of Nacogdoches Fire Department vehicles. The AVL system will convey information regarding real-time vehicle location to the dispatch center, which will allow for enhanced dispatch, routing (or re-routing), as well as provide for precise vehicle location information in the event of a breakdown or emergency situation. AVL systems measure actual, real-time position of vehicles, and relay that information back to a dispatch center, usually via global positioning system.

Costs will vary depending on the number of vehicles equipped with the units. For planning purposes, it is estimated that the cost per vehicle is approximately \$8,000.

Maintenance and Construction Management

TxDOT HCRS Enhancements

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Traffic Incident Management System (ATMS08)
- Weather Information Processing and Distribution (MC04)
- Roadway Maintenance and Construction (MC07)
- Work Zone Management (MC08)
- Maintenance and Construction Activity Coordination (MC10)
- Broadcast Traveler Information (ATIS1)
- Interactive Traveler Information (ATIS2)

Prerequisite Projects: None

Description: TxDOT's HCRS will be enhanced on a statewide basis. The HCRS will use data from the Lufkin District Office, both automated (ATMS) and manually entered. It is envisioned that the ATMS software will enhance the data collection and consolidation processes for automated information. The HCRS provides the centralized data foundation for a range of functions, including information displayed on TxDOT's website (current closures and restrictions) as well as a future 511 phone-based travel

information service. This is a statewide effort; the Lufkin District 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 Portable DMS Phase 1

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Traffic Incident Management System (ATMS08)
- Work Zone Management (MC08)

Prerequisite Projects: None

Description: Portable DMS are a valuable tool to communicate existing and future closures, restrictions, detours, alternate routes, and other important information to motorists while they are en-route. These signs can be used at or near work zones to notify motorists of activity and appropriate measures to take (i.e., detour, slow down), but also can be mobilized at specific locations as conditions warrant, such as flooding or other closures. Portable DMS can be stand-alone signs or mounted to the back of a maintenance vehicle. Programming is typically done manually at the sign. The estimated cost is \$30,000 per sign.

TxDOT Flood Detection Phase 1

Associated Market Packages:

- Network Surveillance (ATMS01)
- Road Weather Data Collection (MC03)

Prerequisite Projects: None

Description: Implement flood monitoring equipment on flood-prone segments of roadway in the Lufkin 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, 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 Lufkin District Office. Communications between the flood detection stations and the District Office can be achieved through a variety of wireless and wireline telemetry methods. There is a future module of the ATMS software planned to support environmental sensors, and development of this module could be extended to include the needs of flood detection stations. The estimated cost is \$10,000 per sensor.

City of Lufkin Flood Detection

Associated Market Packages:

- Network Surveillance (ATMS01)
- Road Weather Data Collection (MC03)

Prerequisite Projects: None

Description: Implement flood monitoring equipment on flood-prone segments of roadway in the City of Lufkin. 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, 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 the City of Lufkin Public Works. Communications between the flood detection stations and the Public Works Department can be achieved through a variety of wireless and wireline telemetry methods. The estimated cost is \$10,000 per sensor.

City of Lufkin Portable DMS

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Traffic Incident Management System (ATMS08)
- Work Zone Management (MC08)

Prerequisite Projects: None

Description: Portable DMS are a valuable tool to communicate existing and future closures, restrictions, detours, alternate routes, and other important information to motorists while they are en-route. These signs can be used at or near work zones to notify motorists of activity and appropriate measures to take (i.e., detour, slow down), but also can be mobilized at specific locations as conditions warrant, such as flooding or other closures. Portable DMS can be stand-alone signs or mounted to the back of a maintenance vehicle. Programming is typically done manually at the sign. The estimated cost is \$30,000 a sign.

City of Nacogdoches Flood Detection

Associated Market Packages:

- Network Surveillance (ATMS01)
- Road Weather Data Collection (MC03)

Prerequisite Projects: None

Description: Implement flood monitoring equipment on flood-prone segments of roadway in the City of Nacogdoches. 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, 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 the City of Nacogdoches Public Works. Communications between the flood detection stations and the Public Works Department can be achieved through a variety of wireless and wireline telemetry methods. The estimated cost is \$10,000 per sensor.

City of Nacogdoches Portable DMS

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Traffic Incident Management System (ATMS08)
- Work Zone Management (MC08)

Prerequisite Projects: None

Description: Portable DMS are a valuable tool to communicate existing and future closures, restrictions, detours, alternate routes, and other important information to motorists while they are en-route. These signs can be used at or near work zones to notify motorists of activity and appropriate measures to take (i.e., detour, slow down), but also can be mobilized at specific locations as conditions warrant, such as flooding or other closures. Portable DMS can be stand-alone signs or mounted to the back of a maintenance vehicle. Programming is typically done manually at the sign. The estimated cost is \$30,000 a sign.

Public Transportation Management

Lufkin Intermodal Terminal Transit Travel Information System

Associated Market Packages:

- Disaster Traveler Information (EM10)
- Multi-modal Coordination (APTS7)
- Transit Traveler Information (APTS8)

Prerequisite Projects: None

Description: Develop and implement a transit travel information system at the Lufkin Intermodal Terminal. Information could include available transit services and providers, schedules, fares, next bus arrival times, and other types of information that could be beneficial to transit patrons. Potential technologies for the system include touch screen kiosks or plasma display screens.

BTD Demand Response MDTs

Associated Market Packages:

- Demand Response Transit Operations (APTS3)

Prerequisite Projects: None

Description: Install MDT units on BTD demand response transit vehicles. 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 MDT systems, as well as the functions and features designed into the systems. The estimated cost is \$5,000 per vehicle.

BTD Fixed Route AVL/MDT

Associated Market Packages:

- Transit Vehicle Tracking (APTS1)
- Transit Fixed-Route Operations (APTS2)

Prerequisite Projects: None

Description: Install AVL and MDT units on BTD fixed route transit vehicles. The AVL system will convey information regarding real-time vehicle location to the 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 automated 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 to 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). The estimated cost is \$10,000 per vehicle.

BTD Transit Dispatch Center Enhancements

Associated Market Packages:

- Transit Vehicle Tracking (APTS1)
- Transit Fixed-Route Operations (APTS2)
- Demand Response Transit Operations (APTS3)

Prerequisite Projects: None

Description: Expand the capabilities of the Brazos Transit District dispatch center to better support systems, automated information sharing, and coordination with other transit providers in the Region. The center is location in Bryan, Texas, part of the TxDOT Bryan District and the Brazos Valley Regional ITS Architecture, but also serves the Lufkin area.

The estimated cost of this project is \$150,000.

Commercial Vehicle Operations

CVO/HAZMAT Permit Coordination and Notification System

Associated Market Packages:

- CV Administrative Processes (CVO04)
- HAZMAT Management (CVO10)

Prerequisite Projects: None

Description: Implement a coordinated permitting system for TxDOT, DPS, Cities, and Counties for HAZMAT permitting and HAZMAT content notification in case of an incident involving a hazardous material on one of the Region's corridors.

CVO Emergency Information Clearinghouse

Associated Market Packages:

- CV Administrative Processes (CVO04)
- HAZMAT Management (CVO10)

Prerequisite Projects: None

Description: Implement a database and information clearinghouse to better track HAZMAT transporters, permits, routes, contents, fleet manager, and other important pieces of information. The purpose of this clearinghouse would be to be able to quickly identify HAZMAT contents in the event of a crash or other emergency, and notify and coordinate with the fleet manager/owner during incident clearance and recovery.

It is likely that this clearinghouse function will be performed by a private company and that the stakeholders in the Lufkin Region will subscribe to their notification services.



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 CCTV Phase 2	Implement additional CCTV cameras along key routes to monitor traffic conditions on major corridors in the Region	TxDOT	\$25,000-\$30,000/site	No	1 year
TxDOT DMS Phase 2	Install permanent dynamic message signs at key locations and decision points on major corridors in the Region	TxDOT	\$150,000/sign	No	1 year
TxDOT Media Liaison and Coordination	Establish a connection between the TxDOT TMC and the media to be able to share information as well as CCTV video feeds (TxDOT would be responsible for video switch, media would be responsible for communications access to switch)	TxDOT/Local Media	\$40,000	No	1 year
TxDOT 511 Advanced Traveler Information System Server	Implement an advanced traveler information system (ATIS) server in the TxDOT Lufkin 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
Interstate Coordination	Establish communications connection and information sharing between TxDOT Lufkin TMC and Louisiana Department of Transportation and Development (LADOTD)	TxDOT/LADOTD	To Be Determined	No	6 months
TxDOT Traffic Signal System Expansion Phase 2	Expand TxDOT traffic signal system at signalized intersections throughout the Region. Also includes the implementation of VIVDS.	TxDOT	To Be Determined	No	3 years
Emergency Management					
TxDOT Lufkin TMC/City of Livingston Fire/Police/EMS Dispatch Communications Connection	Establish a connection between the City of Livingston PSAP/Emergency Dispatch and the TxDOT Lufkin TMC for emergency dispatch coordination, and sharing of incident and road condition information	TxDOT/City of Livingston	To Be Determined	No	3 months
TxDOT Lufkin TMC/City of Lufkin EMS Dispatch Communications Connection	Establish a connection between the City of Lufkin Public Safety Answering Point (PSAP)/Emergency Medical Services (EMS) Dispatch and the TxDOT Lufkin TMC for emergency dispatch coordination, and sharing of incident and road condition information	TxDOT/City of Lufkin	To Be Determined	No	3 months



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

Program Area/Project	Description	Responsible Agency*	Probable Cost**	Funding Identified	Estimated Project Duration
Emergency Management (continued)					
TxDOT Lufkin TMC/City of Nacogdoches Police/Fire Dispatch Communications Connection	Establish a connection between the City of Nacogdoches PSAP/Police/Fire Dispatch and the TxDOT Lufkin TMC for emergency dispatch coordination, and sharing of incident and road condition information	TxDOT/City of Nacogdoches	To Be Determined	No	3 months
TxDOT Lufkin TMC/County Public Safety Dispatch Communications Connection	Establish a connection between the County Public Safety Dispatch centers and the TxDOT Lufkin TMC for emergency dispatch coordination, and sharing of incident and road condition information	TxDOT/Counties	To Be Determined	No	3 months
TxDOT Lufkin TMC/Angelina and Neches River Authority Dispatch Communications Connection	Establish a connection between the TxDOT Lufkin TMC and Angelina and Neches River Authority (ANRA) Dispatch Center for emergency dispatch coordination, to share flood/stream gauge data, and incident information	TxDOT/ANRA	To Be Determined	No	3 months
TxDOT Emergency Vehicle Traffic Signal Preemption	Expand preemption to include additional TxDOT traffic signals in the Lufkin Region. This project includes controller upgrades, sensors, and transmitters.	TxDOT/Municipalities	\$6,000/ intersection \$1,500/vehicle	No	1 year
Maintenance and Construction Management					
TxDOT Portable DMS Phase 2	Procure additional portable DMS for use throughout the Lufkin Region	TxDOT	\$30,000/sign	No	6 months
TxDOT Advanced Work Zone Equipment	Procure smart work zone equipment for TxDOT, including speed warning trailers, DMS, CCTV, detection and other systems to enhance safety near work zones	TxDOT	\$400,000	No	1 year
TxDOT Flood Detection Phase 2	Implement additional flood monitoring and warning sensors at key locations/near key corridors in the Region that are prone to flooding.	TxDOT	\$10,000/sensor	No	1 year
TxDOT Work Zone Safety Monitoring Equipment	Procure systems and technologies that will detect intrusions to work zones, and notify work crews and drivers of intrusions. Includes portable sensors, surveillance, automated alarms and other equipment	TxDOT	To Be Determined	No	1 year



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

Program Area/Project	Description	Responsible Agency*	Probable Cost**	Funding Identified	Estimated Project Duration
Maintenance and Construction Management (continued)					
TxDOT Maintenance Vehicle AVL	Install automated vehicle location technologies on TxDOT maintenance vehicles for real-time location and status information	TxDOT	\$10,000/vehicle (Includes software)	No	1 year
Regional Roadway Maintenance/Work Zone Activity Clearinghouse	Implement a centralized clearinghouse for information about work zones, maintenance activity, and other planned impacts to the transportation system in the region. HCRS already collects this information for TxDOT, but this clearinghouse would also incorporate information from counties and cities in the Region.	TxDOT	\$350,000	No	3 years
Public Transportation Management					
Regional Paratransit Coordination System	Establish a centralized hub in the Lufkin Region for coordinated demand response transit scheduling and customer service	Brazos Transit District/Other Paratransit Providers	To Be Determined	No	3 years
BTD Web Site Enhancements	Update and expand the Brazos Transit District web page to incorporate enhancements such as real-time information, trip planner capabilities, and demand-response scheduling.	Brazos Transit District	\$150,000	No	2 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.



Lufkin Region Mid-Term Projects (10-Year)

Travel and Traffic Management

TxDOT CCTV Phase 2

Associated Market Packages:

- Network Surveillance (ATMS01)
- Incident Management (ATMS08)

Prerequisite Projects: TxDOT CCTV Phase 1

Description: This project continues the deployment of CCTV cameras at key locations in the Lufkin Region. The CCTV cameras can be used for incident detection and verification, to monitor congestion and to aid in the dispatch of emergency vehicles. The information gathered by the CCTV cameras (video feed) can be shared with the area emergency management agencies, and potentially the local media.

The estimated cost per camera is \$25,000 to \$30,000.

TxDOT DMS Phase 2

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Traffic Incident Management System (ATMS08)
- Wide Area Alert (EM06)
- Disaster Traveler Information (EM10)
- Work Zone Management (MC08)

Prerequisite Projects: TxDOT DMS Phase 1

Description: This project continues the deployment of permanent DMS at locations along roadways in the Region for purposes of traffic information dissemination and incident management. The estimated cost per sign is approximately \$150,000.

TxDOT Media Liaison and Coordination

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Traffic Incident Management System (ATMS08)
- Disaster Traveler Information (EM10)
- Weather Information Processing and Distribution (MC04)
- Work Zone Management (MC08)
- Maintenance and Construction Activity Coordination (MC10)
- Broadcast Traveler Information (ATIS1)

Prerequisite Projects: None

Description: Develop stronger liaison and coordination with local media to disseminate traveler information. Develop a link for local media to obtain CCTV camera images for dissemination of traffic and weather advisories to the public via television and radio news broadcasts. Most television 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 including 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. Sharing information directly with the media will likely necessitate that an agreement or policy be in place to determine what type of information will be shared.

The estimated cost of this project is \$40,000 for required TxDOT equipment.

TxDOT 511 Advanced Traveler Information System Server

Associated Market Packages:

- Traffic Incident Management System (ATMS08)
- Wide Area Alert (EM06)
- Disaster Traveler Information (EM10)
- Weather Information Processing and Distribution (MC04)
- Work Zone Management (MC08)
- Maintenance and Construction Activity Coordination (MC10)
- Interactive Traveler Information (ATIS2)

Prerequisite Projects: TxDOT ATMS Implementation, TxDOT Center-to-Center Communications, TxDOT HCRS Enhancements

Description: Install a server dedicated to ATIS in the TxDOT Lufkin District Office. 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), the internet, and to private partners who

desire access to information in the Lufkin 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), the data can be converted to usable information for travelers as well as other agencies.

Interstate Coordination

Associated Market Packages:

- Regional Traffic Control and Coordination (ATMS07)
- Evacuation and Reentry Management (EM09)
- Maintenance and Construction Activity Coordination (MC10)

Prerequisite Projects: None

Description: Implement communication links and information sharing between TxDOT and the Louisiana Department of Transportation and Development (LADOTD). Major incidents, weather hazards, or closures and restrictions along roadways in the Lufkin Region or in Louisiana could have significant impacts on travel between the states. Sharing planned and unplanned incident information is valuable due to the limited alternate routes and limited resources/facilities in smaller communities positioned along the corridors.

TxDOT Traffic Signal System Expansion Phase 2

Associated Market Packages:

- Network Surveillance (ATMS01)
- Surface Street Control (ATMS03)

Prerequisite Projects: TxDOT Traffic Signal System Expansion Phase 1

Description: Expand the TxDOT traffic signal system to include additional signalized intersections. This project also includes the installation of VIVDS when needed.



Emergency Management

TxDOT Lufkin TMC/City of Livingston Fire/Police/EMS Dispatch Communications Connection

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Traffic Incident Management System (ATMS08)
- Emergency Vehicle Routing (EM02)
- Evacuation and Reentry Management (EM09)
- Disaster Traveler Information (EM10)

Prerequisite Projects: TxDOT Lufkin TMC

Description: Install telecommunications connection between the City of Livingston Emergency Services Dispatch and TxDOT Lufkin TMC to allow for CCTV camera shared monitoring and control and data sharing. Cost of this connection will be determined based on the communications method chosen.

TxDOT Lufkin TMC/City of Lufkin EMS Dispatch Communications Connection

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Traffic Incident Management System (ATMS08)
- Emergency Vehicle Routing (EM02)
- Evacuation and Reentry Management (EM09)
- Disaster Traveler Information (EM10)

Prerequisite Projects: TxDOT Lufkin TMC

Description: Install telecommunications connection between the City of Lufkin EMS Dispatch and TxDOT Lufkin TMC to allow for CCTV camera shared monitoring and control and data sharing. Cost of this connection will be determined based on the communications method chosen.



TxDOT Lufkin TMC/City of Nacogdoches Police/Fire Dispatch Communications Connection

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Traffic Incident Management System (ATMS08)
- Emergency Vehicle Routing (EM02)
- Evacuation and Reentry Management (EM09)
- Disaster Traveler Information (EM10)

Prerequisite Projects: TxDOT Lufkin TMC

Description: Install telecommunications connection between the City of Nacogdoches Emergency Services Dispatch and TxDOT Lufkin TMC to allow for CCTV camera shared monitoring and control and data sharing. Cost of this connection will be determined based on the communications method chosen.

TxDOT Lufkin TMC/County Public Safety Dispatch Communications Connection

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Traffic Incident Management System (ATMS08)
- Emergency Vehicle Routing (EM02)
- Evacuation and Reentry Management (EM09)
- Disaster Traveler Information (EM10)

Prerequisite Projects: TxDOT Lufkin TMC

Description: Install telecommunications connection between the County Public Safety Dispatch and TxDOT Lufkin TMC to allow for CCTV camera shared monitoring and control and data sharing. Cost of this connection will be determined based on the communications method chosen.

TxDOT Lufkin TMC/Angelina and Neches River Authority Dispatch Communications Connection

Associated Market Packages:

- Traffic Incident Management System (ATMS08)
- Weather Information Processing and Distribution (MC04)

Prerequisite Projects: TxDOT Lufkin TMC

Description: Install telecommunications connection between the Angelina and Neches River Authority Dispatch and TxDOT Lufkin TMC to allow for incident information and data sharing including flood sensor and stream gauge data. Cost of this connection will be determined based on the communications method chosen.

TxDOT Emergency Vehicle Traffic Signal Preemption

Associated Market Packages:

- Surface Street Control (ATMS03)
- Emergency Call Taking and Dispatch (EM01)
- Emergency Vehicle Routing (EM02)

Prerequisite Projects: None

Description: This project implements preemption equipment at select traffic signals in the Lufkin District. This project includes required controller modifications, sensors, and transmitters. 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) 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 been shown to improve safety of emergency personnel and vehicles en-route to an incident. TxDOT will have responsibility for implementing and maintaining preemption sensors on traffic signals, and fire and emergency services will be responsible for installing the on-board units. Coordination of this project with the signal system upgrade projects identified under Travel and Traffic Management can reduce the overall cost of both projects.

The estimated cost is \$6,000 per intersection and \$1,500 per vehicle equipped.

Maintenance and Construction Management

TxDOT Portable DMS Phase 2

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Traffic Incident Management System (ATMS08)
- Work Zone Management (MC08)

Prerequisite Projects: TxDOT Portable DMS Phase 1

Description: This project would procure additional portable DMS to be used throughout the Region. Portable DMS are a valuable tool to communicate existing and future closures, restrictions, detours, alternate routes, and other important information to motorists while they are en-route. These signs can be used at or near work zones to notify motorists of activity and appropriate measures to take (i.e., detour, slow down), but also can be mobilized at specific locations as conditions warrant, such as flooding or other closures. Portable DMS can be stand-alone signs or mounted to the back of a maintenance vehicle. Programming is typically done manually at the sign. The estimated cost is \$30,000 a sign.

TxDOT Advanced Work Zone Equipment

Associated Market Packages:

- Network Surveillance (ATMS01)
- Traffic Information Dissemination (ATMS06)
- Traffic Incident Management System (ATMS08)
- Work Zone Management (MC08)
- Work Zone Safety Monitoring (MC09)

Prerequisite Projects: None

Description: Procure smart work zone equipment for TxDOT to deploy in work zones during a long term construction project. Equipment includes speed warning trailers, portable DMS, portable CCTV, and portable vehicle detection devices so that traffic conditions in the workzone can be monitored during construction. Agencies have also used this portable equipment for special event traffic management.

The estimated cost of this project is \$400,000.

TxDOT Flood Detection Phase 2

Associated Market Packages:

- Network Surveillance (ATMS01)
- Road Weather Data Collection (MC03)

Prerequisite Projects: TxDOT Flood Detection Phase 1

Description: Implement additional flood monitoring equipment on flood-prone segments of roadway in the Lufkin 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, 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 Lufkin District Office. Communications between the flood detection stations and the District Office can be achieved through a variety of wireless and wireline telemetry methods. There is a future module of the ATMS software planned to support environmental sensors, and development of this module could be extended to include the needs of flood detection stations. The estimated cost is \$10,000 per sensor.

TxDOT Work Zone Safety Monitoring Equipment

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.

TxDOT Maintenance Vehicle AVL

Associated Market Packages:

- Maintenance and Construction Vehicle Tracking (MC01)

Prerequisite Projects: None

Description: Similar to the transit AVL project, the maintenance and construction AVL project includes equipping TxDOT maintenance or construction related vehicles with global positioning system (GPS) based vehicle locators. It is envisioned that the location of the vehicle would be overlaid on a base map 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.

The estimated cost per vehicle is \$10,000.

Regional Roadway Maintenance/Work Zone Activity Clearinghouse

Associated Market Packages:

- Weather Information Processing and Distribution (MC04)
- Roadway Maintenance and Construction (MC07)
- Work Zone Management (MC08)
- Maintenance and Construction Activity Coordination (MC10)

Prerequisite Projects: TxDOT HCRS Enhancements

Description: Implement a centralized clearinghouse for information about work zones, maintenance activity, and other planned impacts to the transportation system in the region. HCRS already collects this information for TxDOT, but this clearinghouse would also incorporate information from counties and cities in the Region.

The estimated cost of this project is \$350,000.



Public Transportation Management

Regional Paratransit Coordination System

Associated Market Packages:

- Demand-Response Transit Operations (APTS3)
- Multi-modal Coordination (APTS7)
- Transit Traveler Information (APTS8)

Prerequisite Projects: None

Description: Establish a centralized hub in the Lufkin Region for coordinated demand response transit scheduling and customer service.

BTD Web Site Enhancements

Associated Market Packages:

- Disaster Traveler Information (EM10)
- Transit Fixed-Route Operations (APTS2)
- Demand-Response Transit Operations (APTS3)
- Transit Traveler Information (APTS8)
- Interactive Traveler Information (ATIS2)

Prerequisite Projects: None

Description: Update and expand the Brazos Transit District web page to incorporate enhancements such as real-time information, trip planner capabilities, and demand-response scheduling.

The estimated cost of this project is \$150,000.



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

Program Area/Project	Description	Responsible Agency*	Probable Cost**	Funding Identified	Estimated Project Duration
<i>Travel and Traffic Management</i>					
City of Lufkin TOC	Implement a traffic operations center (TOC) in the City of Lufkin to monitor and control traffic signals and other field equipment	City of Lufkin	\$100,000	No	2 years
City of Lufkin Traffic Signal System	Implement and upgrade traffic signals at key intersections in Lufkin, including VIVDS for detection	City of Lufkin	To Be Determined	No	5 years
City of Nacogdoches TOC	Implement a TOC in the City of Nacogdoches to monitor and control traffic signals and other field equipment	City of Nacogdoches	\$100,000	No	2 years
City of Nacogdoches Traffic Signal System	Implement and upgrade traffic signals at key intersections in Nacogdoches, including VIVDS for detection	City of Nacogdoches	To Be Determined	No	5 years
TxDOT/City of Lufkin Communications Connection	Implement communications connection between the TxDOT Lufkin TMC and the City of Lufkin TOC to share information about current conditions, closures, and CCTV images	TxDOT/City of Lufkin	To Be Determined	No	3 months
TxDOT/City of Nacogdoches Communications Connection	Implement communications connection between the TxDOT Lufkin TMC and the City of Nacogdoches TOC to share information about current conditions, closures, and CCTV images	TxDOT/City of Nacogdoches	To Be Determined	No	3 months
<i>Emergency Management</i>					
TxDOT Lufkin TMC/Trinity River Authority Control Center Communications Connection	Establish a connection between the TxDOT Lufkin TMC and Trinity River Authority Control Center for emergency dispatch coordination, to share flood/stream gauge data, and incident information	TxDOT/Trinity River Authority	To Be Determined	No	3 months
TxDOT Lufkin TMC/Sabine River Authority Gulf Coast Division Communications Connection	Establish a connection between the TxDOT Lufkin TMC and Sabine River Authority Gulf Coast Division for emergency dispatch coordination, to share flood/stream gauge data, and incident information	TxDOT/Sabine River Authority	To Be Determined	No	3 months
TxDOT Lufkin TMC/Lower Neches Valley Dispatch Communications Connection	Establish a connection between the TxDOT Lufkin TMC and the Lower Neches Valley Dispatch for emergency dispatch coordination, to share flood/stream gauge data, and incident information	TxDOT/Lower Neches Valley	To Be Determined	No	3 months



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

Program Area/Project	Description	Responsible Agency*	Probable Cost**	Funding Identified	Estimated Project Duration
<i>Maintenance and Construction Management</i>					
County Maintenance Vehicle AVL	Install AVL on County maintenance vehicles	Counties	\$10,000/vehicle (Includes software)	No	1 year
County Maintenance Vehicle Management System	Implement diagnostic equipment on-board County maintenance vehicles, includes supporting infrastructure at maintenance vehicle facilities	Counties	To Be Determined	No	3 years
TxDOT Lufkin Maintenance Vehicle Management System	Implement diagnostic equipment on-board TxDOT maintenance vehicles, includes supporting infrastructure at maintenance vehicle facilities	TxDOT	To Be Determined	No	3 years
City of Nacogdoches Work Zone Safety Monitoring Equipment	Procure systems and technologies that will detect intrusions to work zones, and notify work crews and drivers of intrusions. Includes portable sensors, surveillance, automated alarms and other equipment	City of Nacogdoches	To Be Determined	No	1 year
City of Lufkin Work Zone Safety Monitoring Equipment	Procure systems and technologies that will detect intrusions to work zones, and notify work crews and drivers of intrusions. Includes portable sensors, surveillance, automated alarms and other equipment	City of Lufkin	To Be Determined	No	1 year
<i>Public Transportation Management</i>					
Regional Transit Smart Card	Implement and coordinate a transit fare payment card for fixed-route and demand-response transit services.	Brazos Transit District/Other Transit Providers	To Be Determined	No	3 years
Lufkin Intermodal Terminal Parking Management System	Implement a parking management system at the Lufkin Intermodal Terminal that could include revenue control systems, security/surveillance, detection (for space availability), and other features.	Brazos Transit District	To Be Determined	No	4 years



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

Program Area/Project	Description	Responsible Agency*	Probable Cost**	Funding Identified	Estimated Project Duration
<i>Archived Data</i>					
DETCOG Regional ITS Database	Implement a regional data archive to store operational data from field sensors, weather/flood sensors, transit, and other information sources. Information stored in the database could assist with future planning efforts.	DETCOG	To Be Determined	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.

Lufkin Region Long-Term Projects (20-Year)

Travel and Traffic Management

City of Lufkin TOC

Associated Market Packages:

- Network Surveillance (ATMS01)
- Surface Street Control (ATMS03)
- Traffic Information Dissemination (ATMS06)
- Traffic Incident Management System (ATMS08)

Prerequisite Projects: None

Description: Installation of equipment needed to monitor and manage traffic flow in the City of Lufkin. Although TxDOT currently operates traffic signals within the city, future growth could warrant Lufkin implementing its own signals; signal operations as well as operations of any future ITS deployments within the city would occur from the TOC. The project will also include the implementation of end equipment to allow video feed and control for VIVDS and CCTV pan/tilt/zoom.

The estimated cost of this project is \$100,000.

City of Lufkin Traffic Signal System

Associated Market Packages:

- Network Surveillance (ATMS01)
- Surface Street Control (ATMS03)

Prerequisite Projects: None

Description: This long-term project includes implementing and operating traffic signals within the City of Lufkin. At present, TxDOT is responsible for signals within the city; future growth could warrant that the city take responsibility for their own signals. This project also includes the installation of VIVDS.

City of Nacogdoches TOC

Associated Market Packages:

- Network Surveillance (ATMS01)
- Surface Street Control (ATMS03)
- Traffic Information Dissemination (ATMS06)
- Traffic Incident Management System (ATMS08)

Prerequisite Projects: None

Description: This project would install facilities and equipment needed to monitor and manage traffic flow in the City of Nacogdoches. Future city traffic signals as well as operations of any future ITS deployments within the city would occur from the TOC. The project will also include the implementation of end equipment to allow video feed and control for VIVDS and CCTV PTZ.

The estimated cost of this project is \$100,000.

City of Nacogdoches Traffic Signal System

Associated Market Packages:

- Network Surveillance (ATMS01)
- Surface Street Control (ATMS03)

Prerequisite Projects: None

Description: This long-term project includes implementing and operating traffic signals within the City of Nacogdoches. At present, TxDOT is responsible for signals within the city; future growth could warrant that the city take responsibility for their own signals. This project also includes the installation of VIVDS.

TxDOT/City of Lufkin Communications Connection

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Regional Traffic Control (ATMS07)
- Traffic Incident Management System (ATMS08)
- Evacuation and Reentry Management (EM09)
- Disaster Traveler Information (EM10)
- Maintenance and Construction Activity Coordination (MC10)

Prerequisite Projects: TxDOT Lufkin TMC, City of Lufkin TOC

Description: Install a connection between the City of Lufkin TOC and the TxDOT Lufkin TMC to allow video sharing, 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 bandwidth and cost of technologies available.

TxDOT/City of Nacogdoches Communications Connection

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Regional Traffic Control (ATMS07)
- Traffic Incident Management System (ATMS08)
- Evacuation and Reentry Management (EM09)
- Disaster Traveler Information (EM10)
- Maintenance and Construction Activity Coordination (MC10)

Prerequisite Projects: TxDOT Lufkin TMC, City of Nacogdoches TOC

Description: Install a connection between the City of Nacogdoches TOC and the TxDOT Lufkin TMC to allow video sharing, 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.

Emergency Management

TxDOT Lufkin TMC/Trinity River Authority Control Center Communications Connection

Associated Market Packages:

- Traffic Incident Management System (ATMS08)
- Weather Information Processing and Distribution (MC04)

Prerequisite Projects: TxDOT Lufkin TMC

Description: Install telecommunications connection between the Trinity River Authority Control Center and TxDOT Lufkin TMC to allow for incident information and flood sensor/stream gauge data sharing. Cost of this connection will be determined based on the communications method chosen.

TxDOT Lufkin TMC/Sabine River Authority Gulf Coast Division Communications Connection

Associated Market Packages:

- Traffic Incident Management System (ATMS08)
- Weather Information Processing and Distribution (MC04)

Prerequisite Projects: TxDOT Lufkin TMC

Description: Install telecommunications connection between the Sabine River Authority Gulf Coast Division and TxDOT Lufkin TMC to allow for incident information and data sharing. Cost of this connection will be determined based on the communications method chosen.

TxDOT Lufkin TMC/Lower Neches Valley Dispatch Communications Connection

Associated Market Packages:

- Traffic Incident Management System (ATMS08)
- Weather Information Processing and Distribution (MC04)

Prerequisite Projects: TxDOT Lufkin TMC

Description: Install telecommunications connection between the Lower Neches Valley Dispatch and TxDOT Lufkin TMC to allow for incident information and data sharing. Cost of this connection will be determined based on the communications method chosen.

Maintenance and Construction Management

County Maintenance Vehicle AVL

Associated Market Packages:

- Maintenance and Construction Vehicle Tracking (MC01)

Prerequisite Projects: None

Description: Similar to the transit AVL project, the maintenance and construction AVL project includes equipping County maintenance or construction related vehicles with global positioning system (GPS) based vehicle locators. It is envisioned that the location of the vehicle would be overlaid on a base map 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.

The estimated cost per vehicle is \$10,000.

County Maintenance Vehicle Management System

Associated Market Packages:

- Maintenance and Construction Vehicle Maintenance (MC02)

Prerequisite Projects: None

Description: Implement system to support maintenance of maintenance and construction vehicle fleets with on-board monitoring equipment. This system combines the use of on-board equipment and software to provide maintenance agencies with capabilities to regulate maintenance, repairs, tires, fuel consumption, mileage, logs, licensing and tags, preventative maintenance scheduling, parts inventory with bar code support, employee and vehicle information, etc. This system will facilitate data input and storage, and will also include report generation capabilities to allow the maintenance agency to generate desired reports through an easy to use interface.

TxDOT Lufkin Maintenance Vehicle Management System

Associated Market Packages:

- Maintenance and Construction Vehicle Maintenance (MC02)

Prerequisite Projects: None

Description: Implement system to support maintenance of maintenance and construction vehicle fleets with on-board monitoring equipment. This system combines the use of on-board equipment and software to provide maintenance agencies with capabilities to regulate maintenance, repairs, tires, fuel consumption, mileage, logs, licensing and tags, preventative maintenance scheduling, parts inventory with bar code support, employee and vehicle information, etc. This system will facilitate data input and storage, and will also include report generation capabilities to allow the maintenance agency to generate desired reports through an easy to use interface.

City of Nacogdoches Work Zone Safety Monitoring Equipment

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 on a per-project basis.

City of Lufkin Work Zone Safety Monitoring Equipment

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 on a per-project basis.

Public Transportation Management

Regional Smart Card

Associated Market Packages

- Transit Fixed Route Operations (APTS2)
- Demand Response Transit Operations (APTS3)
- Transit Passenger and Fare Management (APTS4)
- Multi-modal Coordination (APTS7)

Prerequisite Projects: None

Description: Implement a regional smart card common fare payment system for transit agencies in the Region. A common payment card would facilitate transfers between transit agencies and simplify fare payment for patrons.

Lufkin Intermodal Terminal Parking Management System

Associated Market Packages:

- Parking Facility Management (ATMS16)
- Multi-modal Coordination (APTS7)
- Transit Traveler Information (APTS8)

Prerequisite Projects: None

Description: Implement a parking management system at the Lufkin Intermodal Terminal. Components of the system could include revenue control systems, security/surveillance, space availability detection, and other features.

Archived Data

DETCOG Regional ITS Database

Associated Market Packages:

- ITS Data Mart (AD1)

Prerequisite Projects: None

Description: Implement a regional data archive to store operational data from field sensors, weather/flood sensors, transit, and other information sources. Information stored in the database could assist with future planning efforts.



4. MAINTAINING THE REGIONAL ITS ARCHITECTURE AND DEPLOYMENT PLAN

The Lufkin 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 Lufkin Regional ITS Architecture and the ITS Deployment Plan, however, these plans will continue to be driven by stakeholder consensus rather than a single stakeholder.

At the ITS Deployment Plan Meeting in December 2004, stakeholders recommended that the group meet every two years to correspond with the Transportation Improvement Plan update process to review the Regional ITS Architecture and Deployment Plan and formally update both documents. The Regional ITS Architecture Update will include a review of any new market packages that have been added to the National Architecture to see if they are applicable to the Lufkin Region. Data flows in existing market packages will also be reviewed to determine if any planned/future flows have been implemented. The Deployment Plan will be updated at that time to reflect projects that have been deployed, new projects that are necessary, and to reprioritize projects currently shown in the plan. Projects that are added to the ITS Deployment Plan should also be reviewed closely to determine if they fit into the ITS Architecture for the Lufkin 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. Any changes to the geographic scope of the Region should be agreed upon by the stakeholders.

Both the Lufkin 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.