State of Texas
Regional ITS Architectures and Deployment Plans

Yoakum Region

Regional ITS Deployment Plan

Prepared by:

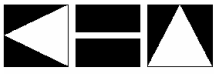Kimley-Horn
and Associates, Inc.

July 22, 2005
068510020

TABLE OF CONTENTS

REGIONAL ITS DEPLOYMENT PLAN

LIST OF TABLES

LIST OF ACRONYMS

AD	Archived Data
APTS	Advanced Public Transportation Systems
ATIS	Advanced Traveler Information System
ATMS	Advanced Traffic Management System
AVL	Automated Vehicle Location
CARTS	Capital Area Rural Transportation System
CAD	Computer Aided Dispatch
CARTS	Capital Area Rural Transportation System
CCTV	Closed-Circuit Television
CV	Commercial Vehicle
CVO	Commercial Vehicle Operations
DMS	Dynamic Message Sign
DPS	Department of Public Safety
EAS	Emergency Alert System
EM	Emergency Management
FHWA	Federal Highway Administration
HAR	Highway Advisory Radio
HAZMAT	Hazardous Materials
HCRS	Highway Conditions Reporting System
HRI	Highway-Rail Intersections
ISP	Information Service Provider
ITS	Intelligent Transportation System
LED	Light Emitting Diode
MC	Maintenance and Construction
NTCIP	National Transportation Communications for ITS Protocol
PTZ	Pan/Tilt/Zoom
RFID	Radio Frequency Identification
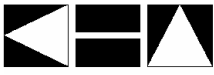
LIST OF ACRONYMS

RWIS	Road Weather Information System
TDM	Travel Demand Management
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
USGS	United States Geological Survey
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 Yoakum Regional ITS Architecture and Regional ITS Deployment Plan was prepared as part of this initiative.

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

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

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

- Travel and Traffic Management;
- Emergency Management; and
- Public Transportation Management.

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

With the substantial amount of effort invested by stakeholders in the Yoakum 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, the 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 Yoakum 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 Yoakum Region.

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

Section 1 – Introduction

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

Section 2 – Prioritization of Market Packages

Section 2 contains the prioritized market packages for the Yoakum 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 Yoakum 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 Yoakum Region

1.3.1 Geography and Regional Characteristics

The Yoakum Region is bordered by the TxDOT Austin District to the northwest, the TxDOT Bryan District to the northeast, the TxDOT Houston District to the east, the TxDOT Corpus Christi District to the southwest, and the TxDOT San Antonio District to the west. For the Yoakum Regional ITS Architecture and Deployment Plan, the study area included all 11 counties that comprise the TxDOT Yoakum District.

The counties included in the Yoakum Region are:

- Austin;
- Calhoun;
- Colorado;
- DeWitt;
- Fayette;
- Gonzales;
- Jackson;
- Lavaca;
- Matagorda;
- Victoria; and
- Wharton.

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. All of the cities in the Yoakum Region, except for the City of Victoria, have a population less than 50,000.

1.3.2 Transportation Infrastructure

The Yoakum Region has an extensive transportation infrastructure. The primary roadway facilities include I-10, US 59, US 77, US 87, and US 90.

I-10 is an east-west divided interstate highway. Its effective operation is critical to the movement of goods and people through the State of Texas and the United States. Blockages along I-10 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 transportation corridor and having the ability to disseminate this information to motorists are important elements for this project. For example, if I-10 has been closed due to a major incident or weather, and motorists are informed of the closure in advance, they can modify their travel plans with an alternate route or wait to begin their travels.

1.3.3   Existing ITS in the Yoakum Region

Within the Yoakum Region there are currently several ITS applications in place. Video Image Vehicle Detection Systems (VIVDS) have been installed at several intersections in the Region by TxDOT.

Signal preemption for emergency vehicles is in place within the City of Victoria for fire vehicles and several emergency management agencies are utilizing computer aided dispatch systems.

1.3.4   Yoakum 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 Yoakum Region.

The following is a list of stakeholders in the Yoakum 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 Yoakum Regional ITS Architecture.

- Capital Area Rural Transportation System (CARTS);
- City of Victoria;
- Colorado Valley Transit;
- Federal Highway Administration;
- Golden Crescent Regional Planning Commission;
- Gonzales County;
- I-10 Corridor Chamber of Commerce;
- Lavaca County;
- Lower Colorado River Authority (LCRA);
- Port of Victoria;
- Texas Department of Public Safety;
- TxDOT Corpus Christi District;
- TxDOT Houston District;
- TxDOT San Antonio District;
- TxDOT Traffic Operations Division (Austin);
- TxDOT Yoakum District; and
- Wharton County.

CARTS operates in Fayette County, which is included in the Yoakum District boundaries, as well as in eight additional counties in the Austin District. The CARTS operations center is located in the Austin District and since most of the transit agency's functions occur in the Austin District, CARTS will primarily be covered in the Austin Regional ITS Architecture. However, several projects will be included in the Deployment Plan for the Yoakum Region since they affect transit operations in the Region.

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

Table 1 – Yoakum Stakeholder Agencies and Contacts

Stakeholder Agency	Contact	Address	Phone Number	E-Mail
Capital Area Rural Transportation System	David Marsh	2010 East Sixth Street Austin, Texas 78702	(512) 708-5515	dave@ridecarts.com
City of Victoria	Brian Jahn	PO Box 1758 Victoria, Texas 77902	(361) 485-3340	bjahn@victoriatx.org
City of Victoria	John Johnston	PO Box 1758 Victoria, Texas 77902	(361) 485-3340	N/A
Colorado Valley Transit, Inc.	Claudia Wicks	PO Box 940 Columbus, Texas 78934	(800) 548-1068	cwicks@intertex.net
Colorado Valley Transit, Inc.	Vastene Olier	PO Box 940 Columbus, Texas 78934	(800) 548-1068	volier@intertex.net
Department of Public Safety	Jack Downs	PO Box 782 Gonzales, Texas 78629	(830) 672-2434	N/A
Department of Public Safety	John Bradley	2275 North Hwy 35 Port Lavaca, Texas 77979	N/A	N/A
Department of Public Safety	Juan Aguilera	2275 North Hwy 35 Port Lavcaca, Texas 77979	N/A	N/A
Federal Highway Administration, Texas Division	Alvin Krejci, Jr.	300 East 8th Street Room 826 Austin, Texas 78701	(512) 536-5965	joe.krejci@fhwa.dot.gov
Federal Highway Administration, Texas Division	Mark Olson	300 East 8th Street Room 826 Austin, Texas 78701	(512) 536-5972	mark.olson@fhwa.dot.gov
Golden Crescent Regional Planning Commission	Lisa Cortinas	PO Box 4085 Victoria, Texas 77903	(361) 578-1587	N/A
Gonzales County	David Bird	PO Box 80 Gonzales, Texas 78629	(830) 672-2327	countycourt@gvec.net
I-10 Corridor Chamber of Commerce	Barbara Hand	PO Box 134 Gonzales, Texas 78629	(830) 672-6532	N/A
Lavaca County	James Myrick	306 South La Grange Halletsville, Texas 77964	(361) 798-2101	james.myrick@co.lavaca.tx.us
Lavaca County	Ronald Leck	PO Box 243 Hallettsville, Texas 77964	(361) 798-2301	cojudge@co.lavaca.tx.us

Table 1 – Yoakum Stakeholder Agencies and Contacts (continued)

Stakeholder Agency	Contact	Address	Phone Number	E-Mail
Lower Colorado River Authority	Rick Arnic	PO Box 220 Austin, Texas 78720	N/A	rick.arnic@lcra.org
Port of Victoria	Howard Hawthorne	PO Box 2760 Victoria, Texas 77902	(361) 570-8855	ofc@portofvictoria.com
TxDOT Traffic Operations Division	Alex Power	Attn: TRF- Cedar Park #51 125 East 11th Street Austin, Texas 78701-2483	(512) 506-5153	apower@dot.state.tx.us
TxDOT – Corpus Christi District	Gabriel Garcia	PO Box 9907 Corpus Christi, Texas 78469	(361) 808-2266	ggarcia5@dot.state.tx.us
TxDOT – Houston District	David Munoz	7721 Washington Avenue Houston, Texas 88007	(713) 802-5836	dmunoz@dot.state.tx.us
TxDOT – Houston District	Magdy Kozman	6922 Old Katy Road Houston, Texas 77024	(713) 881-3317	mkozman@dot.state.tx.us
TxDOT – San Antonio District	Patrick Irwin	3500 NW Loop 410 San Antonio, Texas 78229	(210) 362-7830	N/A
TxDOT – San Antonio District	David Rodrigues	PO Box 29928 San Antonio, Texas 78229	(210) 731-5248	drodri@dot.state.tx.us
TxDOT – Yoakum District	Randy Bena	11401 US 59 N Victoria, Texas 77905	(361) 573-9251	rbena@dot.state.tx.us
TxDOT – Yoakum District	Wanda Carter-Dyer	403 Huck Street Yoakum, Texas 77995	(361) 293-4395	wdyer@dot.state.tx.us
TxDOT – Yoakum District	Paul Frerich	403 Huck Street Yoakum, Texas 77995	(361) 293-4347	pfreric@dot.state.tx.us
TxDOT – Yoakum District	James Ivy	2000 East SH 71 La Grange, Texas 78945	(979) 968-8333	jivy@dot.state.tx.us
TxDOT – Yoakum District	Marla Jasek	403 Huck Street Yoakum, Texas 77995	(361) 293-4356	mjasek@dot.state.tx.us
TxDOT – Yoakum District	Peggy Krejci	403 Huck Street Yoakum, Texas 77995	(361) 293-4331	pkrejci@dot.state.tx.us
TxDOT – Yoakum District	Carl O'Neill	403 Huck Street Yoakum, Texas 77995	(361) 293-4353	coneill@dot.state.tx.us
TxDOT – Yoakum District	Darryl Pesek	403 Huck Street Yoakum, Texas 77995	(361) 293-4304	dpesek@dot.state.tx.us
TxDOT – Yoakum District	Brian Schoenemann	403 Huck Street Yoakum, Texas 77995	(361) 293-4378	bschoene@dot.state.tx.us
TxDOT – Yoakum District	Randy Zimmerman	403 Huck Street Yoakum, Texas 77995	(361) 293-4370	rzimmer@dot.state.tx.us
Wharton County	John Wesley Murrile	309 East Milam, Suite 600 Wharton, Texas 77488	(979) 532-4612	cojudge@intertex.net

2. PRIORITIZATION OF MARKET PACKAGES

2.1 Prioritization Process

Of the 85 market packages currently available in the National ITS Architecture Version 5.0, 41 were selected and customized for deployment in the Yoakum Region. Stakeholders were asked to prioritize the market packages into high, medium, and low priorities, based on regional needs, feasibility, 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 Yoakum Region. These priorities identified the key needs and services that are desired in the Yoakum 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 Yoakum 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, Information Service Provider (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 Yoakum 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 Yoakum Region

High Priority	Medium Priority	Low Priority
▪ Network Surveillance	▪ Probe Surveillance	▪ Emissions Monitoring and Management
▪ Surface Street Control	▪ Electronic Toll Collection	▪ Speed Monitoring
▪ Traffic Information Dissemination	▪ Standard Railroad Grade Crossing	▪ Drawbridge Management
▪ Regional Traffic Control	▪ Railroad Operations Coordination	▪ Maintenance and Construction Vehicle and Equipment Tracking
▪ Traffic Incident Management System	▪ Work Zone Management	▪ Maintenance and Construction Vehicle Maintenance
▪ Emergency Call Taking and Dispatch	▪ Work Zone Safety Monitoring	▪ Roadway Maintenance and Construction
▪ Emergency Routing	▪ Transit Fixed-Route Operations	▪ Transit Maintenance
▪ Transportation Infrastructure Protection	▪ Interactive Traveler Information	▪ CV Administrative Processes
▪ Wide-Area Alert	▪ ITS Data Mart	▪ ISP Based Route Guidance
▪ Disaster Response and Recovery		
▪ Evacuation and Reentry Management		
▪ Disaster Traveler Information		
▪ Road Weather Data Collection		
▪ Weather Information Processing and Distribution		
▪ Maintenance and Construction Activity Coordination		
▪ Transit Vehicle Tracking		
▪ Demand Response Transit Operations		
▪ Transit Passenger and Fare Management		
▪ Transit Security		
▪ Multi-modal Coordination		
▪ Transit Traveler Information		
▪ HAZMAT Management		
▪ Broadcast Traveler Information		

2.2 High Priority Market Packages

Market packages that were selected as high priorities for the Yoakum 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 Yoakum Region; that is, there are already systems and technologies deployed to deliver some of these high priority services and functions. For example, the City of Victoria has already deployed several closed loop signal systems 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 Yoakum Region.

Table 3 – High Priority Market Packages for the Yoakum Region

Network Surveillance (ATMS01)	High Priority

This market package includes traffic detectors, other surveillance equipment, the supporting field equipment, and wireline communications to transmit the collected data back to the Traffic Management Subsystem. The derived data can be used locally or remotely. The data generated by this market package enables traffic managers to monitor traffic and road conditions, identify and verify incidents, detect equipment faults, and collect census data for traffic strategy development and long range planning. The collected data can also be analyzed and made available to users and the ISP Subsystem.

Existing Infrastructure	Agency
▪ City of Victoria TOC ▪ City of Victoria Closed Loop Signal System/Radio Signal Interconnect ▪ VIVDS	▪ City of Victoria ▪ TxDOT

Planned Projects

- City of Victoria Signal System Upgrades/Closed Loop Expansion Phase 1
- TxDOT ATMS Implementation

Additional Needs

- City of Victoria CCTV Camera Implementation
- City of Victoria Signal System Upgrades/Closed Loop Expansion Phase 2
- City of Victoria Signal System Upgrades/Closed Loop Expansion Phase 3
- City of Victoria TOC Capability Expansion
- Municipal Closed Loop Signal System Implementation Phase 1
- Municipal Closed Loop Signal System Implementation Phase 2
- Nuclear Power Plant Transportation System Security Monitoring
- TxDOT Flood Warning System Phase 1
- TxDOT Flood Warning System Phase 2
- TxDOT Port Lavaca Causeway Management System
- TxDOT Portable Smart Work Zone Equipment
- TxDOT RWIS Stations
- TxDOT Signal System Upgrades/Closed Loop Expansion Phase 1
- TxDOT Signal System Upgrades/Closed Loop Expansion Phase 2
- TxDOT Signal System Upgrades/Closed Loop Expansion Phase 3
- TxDOT Vehicle Detection on I-10
- TxDOT Yoakum District TMC

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

Surface Street Control (ATMS03)	High Priority
This market package provides the central control and monitoring equipment, communication links, and the signal control equipment that support local surface street control and/or arterial traffic management. A range of traffic signal control systems are represented by this market package ranging from static pre-timed control systems to fully traffic responsive systems that dynamically adjust control plans and strategies based on current traffic conditions and priority requests. This market package is consistent with typical urban traffic signal control systems.	

Existing Infrastructure	Agency
▪ City of Victoria TOC	▪ City of Victoria
▪ City of Victoria Closed Loop Signal System/Radio Signal Interconnect	▪ TxDOT
▪ VIVDS	
▪ Emergency Vehicle Traffic Signal Preemption	

Planned Projects

- City of Victoria Signal System Upgrades/Closed Loop Expansion Phase 1

Additional Needs

- City of Victoria Emergency Vehicle Traffic Signal Preemption Expansion
- City of Victoria Signal System Upgrades/Closed Loop Expansion Phase 2
- City of Victoria Signal System Upgrades/Closed Loop Expansion Phase 3
- City of Victoria TOC Capability Expansion
- Evacuation Route Planning and Signal Timing
- Municipal Closed Loop Signal System Implementation Phase 1
- Municipal Closed Loop Signal System Implementation Phase 2
- Municipal Emergency Vehicle Traffic Signal Preemption
- TxDOT Signal System Upgrades/Closed Loop Expansion Phase 1
- TxDOT Signal System Upgrades/Closed Loop Expansion Phase 2
- TxDOT Signal System Upgrades/Closed Loop Expansion Phase 3
- TxDOT Yoakum District TMC

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

Traffic Information Dissemination (ATMS06)	High Priority
This market package allows traffic information and road/bridge closures due to construction, maintenance, and weather, to be disseminated to drivers and vehicles using roadway equipment such as dynamic message signs or highway advisory radio. This package also covers the equipment and interfaces that provide traffic information from a traffic management center (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.	

Existing Infrastructure	Agency
■ Portable DMS	■ City of Victoria
	■ TxDOT

Planned Projects

- TxDOT ATMS Implementation
- TxDOT Center to Center Communications
- TxDOT DMS on I-10

Additional Needs

- City of Victoria 911 Dispatch/City of Victoria TOC Communications Connection
- City of Victoria Portable DMS
- City of Victoria TOC Capability Expansion
- City of Victoria TOC/TxDOT Yoakum District TMC Communications Connection
- County Portable DMS
- DPS/TxDOT Yoakum District TMC Communications Connection
- ISP Based Route Guidance
- Media Liaison and Coordination
- Regional 511 Advanced Traveler Information System Server
- TxDOT DMS on SH 35
- TxDOT DMS on US 59
- TxDOT HAR
- TxDOT Port Lavaca Causeway Management System
- TxDOT Portable DMS
- TxDOT Portable Smart Work Zone Equipment
- TxDOT Yoakum District TMC

Regional Traffic Control (ATMS07)	High 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	**Agency**
▪ City of Victoria TOC	▪ City of Victoria
Planned Projects	
▪ TxDOT ATMS Implementation ▪ TxDOT Center to Center Communications	
Additional Needs	
▪ City of Victoria TOC/TxDOT Yoakum District TMC Communications Connection	

Traffic Incident Management System (ATMS08)	High Priority
This market package manages both unexpected incidents and planned events so that the impact to the transportation network and traveler safety is minimized. The market package includes incident detection capabilities through roadside surveillance devices (e.g. 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.	
The response may include traffic control strategy modifications or resource coordination between center subsystems. The coordination with emergency management might be through a computer aided dispatch (CAD) system or through other communication with emergency field personnel. The coordination can also extend to tow trucks and other allied response agencies and field service personnel.	
Incident response also includes presentation of information to affected travelers using the Traffic Information Dissemination, Broadcast Traveler Information, or Interactive Traveler Information market packages.	
Existing Infrastructure	**Agency**
▪ City of Victoria TOC	▪ City of Victoria
Planned Projects	
▪ TxDOT AMTS Implementation ▪ TxDOT Center-to-Center Communications ▪ TxDOT DMS on I-10	
Additional Needs	
▪ City of Victoria 911 Dispatch/City of Victoria TOC Communications Connection ▪ City of Victoria CCTV Camera Implementation ▪ City of Victoria Emergency Vehicle Traffic Signal Preemption Expansion ▪ City of Victoria Portable DMS	

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

Traffic Incident Management System (ATMS08) (continued)	High Priority
Additional Needs (continued)	

- City of Victoria TOC Capability Expansion

- City of Victoria TOC/TxDOT Yoakum District TMC Communications Connection

- County Portable DMS

- DPS/TxDOT Yoakum District TMC Communications Connection

- Media Liaison and Coordination

- Municipal Emergency Vehicle Traffic Signal Preemption

- Regional 511 Advanced Traveler Information System Server

- TxDOT DMS on SH 35

- TxDOT DMS on US 59

- TxDOT HAR

- TxDOT Port Lavaca Causeway Management System

- TxDOT Portable DMS

- TxDOT Portable Smart Work Zone Equipment

- TxDOT Vehicle Detection on I-10

- TxDOT Yoakum District TMC

- TxDOT Yoakum District/LCRA Communications Connection

- TxDOT Yoakum District/USGS Communications Connection

Emergency Call-Taking and Dispatch (EM01)	High Priority
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.	
Existing Infrastructure	**Agency**
▪ CAD Dispatch	▪ DPS
Planned Projects	
None identified at this time	
Additional Needs	

- City of Victoria 911 Dispatch/City of Victoria TOC Communications Connection

- City of Victoria Emergency Vehicle Traffic Signal Preemption Expansion

- DPS/TxDOT Yoakum District Communications Connection

- Municipal Emergency Vehicle Traffic Signal Preemption

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

Emergency Routing (EM02)	High Priority
This market package supports automated vehicle location and dynamic routing of emergency vehicles. The service also supports coordination with the Traffic Management Subsystem, collecting detailed road network conditions and requesting special priority or other specific emergency traffic control strategies on the selected route(s). The service provides for information exchange between care facilities and both the Emergency Management Subsystem and emergency vehicles.	

Existing Infrastructure	Agency
▪ CAD Dispatch ▪ Emergency Vehicle Traffic Signal Preemption	▪ DPS ▪ TxDOT ▪ City of Victoria

Planned Projects
None identified at this time

Additional Needs
▪ City of Victoria 911 Dispatch/City of Victoria TOC Communications Connection ▪ City of Victoria Emergency Vehicle Traffic Signal Preemption Expansion ▪ DPS/TxDOT Yoakum District TMC Communications Connection ▪ Evacuation Route Planning and Signal Timing ▪ Municipal Emergency Vehicle Traffic Signal Preemption

Transportation Infrastructure Protection (EM05)	High Priority
This market package includes the monitoring of transportation infrastructure for potential threats using sensors and surveillance equipment and barrier and safeguard systems to preclude an incident, control access during and after an incident or mitigate impact of an incident. Threats can result from acts of nature, terrorist attacks, or other incidents causing damage to the infrastructure. Infrastructure may be monitored with acoustic, environmental threat, infrastructure condition and integrity, motion and object sensors, and video and audio surveillance equipment. When a threat is detected, agencies are notified. Detected threats or advisories received from other agencies result in an increased level of system preparedness. In response to threats, barrier and safeguard systems may be activated by Traffic Management Subsystems to deter an incident, control access to an area, or mitigate the impact of an incident.	

Existing Infrastructure	Agency
None identified	

Planned Projects
None identified at this time

Additional Needs
▪ Nuclear Power Plant Transportation System Security Monitoring

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

Wide-Area Alert (EM06)	High Priority
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.	
Existing Infrastructure	**Agency**
None identified	
Planned Projects	
▪ TxDOT DMS on I-10	
Additional Needs	
▪ Emergency Call-Out System	
▪ Regional 511 Advanced Traveler Information Systems Server	
▪ TxDOT DMS on SH 35	
▪ TxDOT DMS on US 59	
▪ TxDOT HAR	
▪ TxDOT Port Lavaca Causeway Management System	

Disaster Response and Recovery (EM08)	High Priority
This market package enhances the ability of the surface transportation system to respond to and recover from disasters. It addresses the most severe incidents that require an extraordinary response from outside the local community. All types of disasters are addressed including natural disasters (hurricanes, earthquakes, floods, winter storms, tsunamis, etc.) and technological and man-made disasters (hazardous materials incidents, nuclear power plant accidents, and national security emergencies such as nuclear, chemical, biological, and radiological weapons attacks). The market package supports coordination of emergency response plans, provides enhanced access to the scene and better information about the transportation system in the vicinity of the disaster, and maintains situation awareness.	
Existing Infrastructure	**Agency**
None identified	
Planned Projects	
▪ TxDOT Center-to-Center Communications	
Additional Needs	
▪ City of Victoria 911 Dispatch/City of Victoria TOC Communications Connection	
▪ City of Victoria TOC/TxDOT Yoakum District TMC Communications Connection	
▪ DPS/TxDOT Yoakum District TMC Communications Connection	

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

Evacuation and Reentry Management (EM09)	High Priority
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.	
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.	
Existing Infrastructure	**Agency**
None identified	
Planned Projects	
None identified at this time	
Additional Needs	
▪ Evacuation Route Planning and Signal Timing	

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

Disaster Traveler Information (EM10)	High Priority
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.	
Existing Infrastructure	**Agency**
None identified	

Planned Projects

- TxDOT DMS on I-10

Additional Needs

- City of Victoria Portable DMS
- County Portable DMS
- Regional 511 Advanced Traveler Information System Server
- TxDOT DMS on SH 35
- TxDOT DMS on US 59
- TxDOT HAR
- TxDOT Port Lavaca Causeway Management System
- TxDOT Portable DMS

Road Weather Data Collection (MC03)	High Priority
This market package collects current road and weather conditions using data collected from environmental sensors deployed on and about the roadway. In addition to fixed road weather information system (RWIS) stations at the roadside, sensing of the roadway environment can also occur from sensor systems located on Maintenance and Construction Vehicles. The collected environmental data is used by the Weather Information Processing and Distribution Market Package to process the information and help operators make decisions on operations.	
Existing Infrastructure	**Agency**
None identified	

Planned Projects

None identified at this time

Additional Needs

- TxDOT Flood Warning System Phase 1
- TxDOT Flood Warning System Phase 2
- TXDOT RWIS Stations

Weather Information Processing and Distribution (MC04)	High Priority
This market package processes and distributes the environmental information collected from the Road Weather Data Collection market package. This market package uses the environmental data to detect environmental hazards such as icy road conditions, high winds, and dense fog, so system operators and decision support systems can make decisions on corrective actions to take. The continuing updates of road condition information and current temperatures can be used by system operators to more effectively deploy road maintenance resources, issue general traveler advisories, issue location specific warnings to drivers using the Traffic Information Dissemination market package, and aid operators in scheduling work activity.	
Existing Infrastructure	**Agency**
None identified	

Planned Projects

- TxDOT ATMS Implementation
- TxDOT Center-to-Center Communications

Additional Needs

- Maintenance and Construction Information Clearinghouse
- Media Liaison and Coordination
- Regional 511 Advanced Traveler Information System Server
- TxDOT Flood Warning System Phase 1
- TxDOT Flood Warning System Phase 2
- TxDOT Port Lavaca Causeway Management System
- TxDOT Yoakum District TMC
- TxDOT Yoakum District/LCRA Communications Connection
- TxDOT Yoakum District/USGS Communications Connection

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

Maintenance and Construction Activity Coordination (MC10)	High Priority
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.	
Existing Infrastructure	**Agency**
None identified	
Planned Projects	
▪ TxDOT Center to Center Communications	
Additional Needs	
▪ City of Victoria TOC/TxDOT Yoakum District TMC Communications Connection	
▪ ISP-Based Route Guidance	
▪ Maintenance and Construction Information Clearinghouse	
▪ Media Liaison and Coordination	
▪ Regional 511 Advanced Traveler Information System Server	
▪ TxDOT Yoakum District TMC	

Transit Vehicle Tracking (APTS1)	High Priority
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.	
Existing Infrastructure	**Agency**
None identified	
Planned Projects	
None identified at this time	
Additional Needs	
▪ Colorado Valley Transit AVL and CAD Upgrade	
▪ Golden Crescent Transit AVL and CAD Upgrade	
▪ Victoria Transit AVL and CAD Upgrade	

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

Demand Response Transit Operations (APTS3)	High Priority
This market package performs vehicle routing and scheduling as well as automatic driver assignment and monitoring for demand responsive transit services. This package monitors the current status of the transit fleet and supports allocation of these fleet resources to service incoming requests for transit service while also considering traffic conditions. The Transit Management Subsystem provides the necessary data processing and information display to assist the transit operator in making optimal use of the transit fleet. This service includes the capability for a traveler request for personalized transit services to be made through the ISP Subsystem.	

Existing Infrastructure	Agency
▪ Central Dispatch with CAD	▪ Colorado Valley Transit ▪ Golden Crescent Transit

Planned Projects

- CARTS Electronic Fare Collection, Website Upgrade, and CAD Improvements

Additional Needs

- Colorado Valley Transit AVL and CAD Upgrade
- Colorado Valley Transit Information Kiosks
- Colorado Valley Transit Smart Card Electronic Fare Collection
- Golden Crescent Transit AVL and CAD Upgrade
- Golden Crescent Transit Information Kiosks
- Golden Crescent Transit Smart Card Electronic Fare Collection
- Multimodal Coordination
- Victoria Transit AVL and CAD Upgrade
- Victoria Transit Smart Card Electronic Fare Collection

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

Transit Passenger and Fare Management (APTS4)	High Priority
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.	
Existing Infrastructure None identified	**Agency**
Planned Projects ▪ CARTS Electronic Fare Collection, Website Upgrade, and CAD Improvements	
Additional Needs ▪ Colorado Valley Transit Smart Card Electronic Fare Collection ▪ Golden Crescent Transit Smart Card Electronic Fare Collection ▪ Victoria Transit Smart Card Electronic Fare Collection	

Transit Security (APTS5)	High Priority
This market package provides for the physical security of transit passengers. An on-board security system is deployed to perform surveillance and warn of potentially hazardous situations. Public areas (e.g. stops, park and ride lots, stations) are also monitored. Information is communicated to the Transit Management Subsystem using wireless or wireline infrastructure. Security related information is also transmitted to the Emergency Management Subsystem when an emergency is identified that requires an external response. Incident information is communicated to the Information Service Provider.	
Existing Infrastructure ▪ Emergency On-board Silent Alarms	**Agency** ▪ Colorado Valley Transit
Planned Projects None identified at this time	
Additional Needs None identified at this time	

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

Multi-modal Coordination (APTS7)	High Priority
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.	
Existing Infrastructure None identified	**Agency**
Planned Projects None identified at this time	
Additional Needs ▪ Multimodal Coordination	

Transit Traveler Information (APTS8)	High Priority
This market package provides transit users at transit stops and on-board transit vehicles with ready access to transit information. The information services include transit stop annunciation, imminent arrival signs, and real-time transit schedule displays that are of general interest to transit users. Systems that provide custom transit trip itineraries and other tailored transit information services are also represented by this market package.	
Existing Infrastructure None identified	**Agency**
Planned Projects None identified at this time	
Additional Needs ▪ Colorado Valley Transit Information Kiosks ▪ Golden Crescent Transit Information Kiosks ▪ Victoria Transit Information Kiosks	

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

HAZMAT Management (CVO10)	High Priority
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.	
Existing Infrastructure	**Agency**
None identified	
Planned Projects	
None identified at this time	
Additional Needs	
None identified at this time	

Broadcast Traveler Information (ATIS1)	High Priority
This market package collects traffic conditions, advisories, general public transportation information, toll and parking information, incident information, air quality and weather information, and broadly disseminates this information through existing infrastructure and low cost user equipment (e.g., FM subcarrier, cellular data broadcast). This market package differs from the Traffic Information Dissemination market package, which provides localized highway advisory radio (HAR) and dynamic message sign (DMS) information capabilities. 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.	
Existing Infrastructure	**Agency**
None identified	
Planned Projects	
None identified at this time	
Additional Needs	
▪ ISP Based Route Guidance ▪ Media Liaison and Coordination ▪ Regional 511 Advanced Traveler Information System Server	

2.3 Medium Priority Market Packages

Table 4 outlines market packages that were deemed medium priority by stakeholders in the Yoakum 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 Yoakum Region

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

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

Electronic Toll Collection (ATMS10)	Medium Priority
This market package provides toll operators with the ability to collect tolls electronically and detect and process violations. The fees that are collected may be adjusted to implement demand management strategies. Dedicated short-range communication between the roadway equipment and the vehicle is required as well as wireline interfaces between the toll collection equipment and transportation authorities and the financial infrastructure that supports fee collection. Vehicle tags of toll violators are read and electronically posted to vehicle owners. Standards, inter-agency coordination, and financial clearinghouse capabilities enable regional, and ultimately national interoperability for these services. The toll tags and roadside readers that these systems utilize also can be used to collect road use statistics for highway authorities. This data can be collected as a natural by-product of the toll collection process or collected by separate readers that are dedicated to probe data collection.	
Existing Infrastructure	**Agency**
None identified	
Planned Projects	
None identified at this time	
Additional Needs	
None identified at this time	

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

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

Work Zone Management (MC08)	Medium Priority
This market package directs activity in work zones, controlling traffic through portable DMS and informing other groups of activity (e.g., ISP, TM, other maintenance and construction centers) for better coordination management. Work zone speeds and delays are provided to the motorist prior to the work zones.	

Existing Infrastructure	Agency
▪ Portable DMS ▪ Portable Speed Trailers	▪ TxDOT ▪ City of Victoria

Planned Projects

- TxDOT Center-to-Center Communications
- TxDOT DMS on I-10

Additional Needs

- City of Victoria Portable DMS
- City of Victoria Portable Speed Trailers
- City of Victoria TOC/TxDOT Yoakum District TMC Communications Connection
- County Portable DMS
- Maintenance and Construction Information Clearinghouse
- Media Liaison and Coordination
- TxDOT DMS on US 59
- TxDOT Portable DMS
- TxDOT Portable Smart Work Zone Equipment

Work Zone Safety Monitoring (MC09)	Medium Priority
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.	

Existing Infrastructure	Agency
None identified	

Planned Projects

None identified at this time

Additional Needs

None identified at this time

Transit Fixed-Route Operations (APTS2)	Medium Priority
This market package performs vehicle routing and scheduling, as well as automatic driver assignment and system monitoring for fixed-route transit services. This service determines current schedule performance using AVL data and provides information displays for the Transit Management Subsystem. Static and real time transit data is exchanged with 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.	
Existing Infrastructure	**Agency**
None identified	
Planned Projects	
▪ CARTS Electronic Fare Collection, Website Upgrade, and CAD Improvements	
Additional Needs	
▪ Multi-modal Coordination ▪ Victoria Transit AVL and CAD Upgrade ▪ Victoria Transit Smart Card Electronic Fare Collection	

Interactive Traveler Information (ATIS2)	Medium Priority
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. 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.	
Existing Infrastructure	**Agency**
None identified	
Planned Projects	
None identified at this time	
Additional Needs	
▪ TxDOT Regional 511 Advanced Traveler Information System Server	

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

ITS Data Mart (AD1)	Medium Priority
This market package provides a focused archive that houses data collected and owned by a single agency, district, private sector provider, research institution, or other organization. This focused archive typically includes data covering a single transportation mode and one jurisdiction that is collected from an operational data store and archived for future use. It provides general query and report access to archive data users.	

Existing Infrastructure	Agency
▪ Statewide Crash Record Database ▪ BRINSAP ▪ Pavement Management System ▪ HCRS ▪ Transit Usage Database	▪ DPS ▪ TxDOT

Planned Projects
None identified at this time

Additional Needs
▪ Golden Crescent Regional Planning Commission Data Warehouse   ▪ TxDOT Transit Data Archive System

2.4 Low Priority Market Packages

Nine of the market packages that were identified and customized for the Yoakum 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 Yoakum Region

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.	The Yoakum Region might want to consider this market package for future deployment as air quality management becomes a higher priority.
Speed Monitoring (ATMS19)	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.	The Yoakum Region might want to consider this market package for future deployment, but it is not a high priority at this time.

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

Market Package Name	Description	Comments
Drawbridge Management (ATMS20)	This market package supports systems that manage drawbridges at rivers and canals and other multimodal crossings (other than railroad grade crossings which are specifically covered by other market packages). The equipment managed by this market package includes control devices (e.g., gates, warning lights, dynamic message signs) at the drawbridge as well as the information systems that are used to keep travelers apprised of current and forecasted drawbridge status.	There are several drawbridges in the Yoakum Region and functions of this market package may be appropriate for future implementation in the Region.
Maintenance and Construction Vehicle Tracking (MC01)	This market package will track the location of maintenance and construction vehicles and other equipment to ascertain the progress of their activities. These activities can include ensuring the correct roads are being plowed and work activity is being performed at the correct locations.	The Yoakum Region might want to consider this market package as a future deployment. There are likely institutional issues that will need to be worked out before this market package can be implemented.
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.	The Yoakum Region might want to consider this market package as a future deployment as the existing fleet is replaced with vehicles that have the capability to provide the diagnostic information.
Roadway Maintenance and Construction (MC07)	This market package supports numerous services for scheduled and unscheduled maintenance and construction on a roadway system or right-of-way. Maintenance services would include landscape maintenance, hazard removal, routine maintenance activities, and repair and maintenance of both ITS and non-ITS equipment on the roadway. Environmental conditions information is also received from various weather sources to aid in scheduling maintenance and construction activities.	The Yoakum Region might want to consider this market package as a future deployment. Several road weather data collection projects in the deployment plan support this market package.

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

Market Package Name	Description	Comments
Transit Maintenance (APTS6)	This market package supports automatic transit maintenance scheduling and monitoring. On-board condition sensors monitor system status and transmit critical status information to the Transit Management Subsystem. Hardware and software in the Transit Management Subsystem processes this data and schedules preventative and corrective maintenance.	The Yoakum Region might want to consider this market package as a future deployment as the existing fleet is replaced with vehicles that have the capability to provide the diagnostic information.
CV Administrative Processes (CVO04)	This market package provides for electronic application, processing, fee collection, issuance, and distribution of Commercial Vehicle Operations (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.	Individual agencies in the Yoakum Region have limited responsibility for Commercial Vehicle (CV) Administration at this time. Most of the functions are handled at the statewide level.
ISP Based Route Guidance (ATIS5)	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.	This market package is best suited for deployment and ongoing operations by a private sector ISP. Fee-based subscription services are typically required for delivery of this service. Because this market package is considered a private sector initiative, it is not recommended that the public sector play a significant role, other than as a data provider to private ISPs.

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 Yoakum Region on January 20, 2005 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 Yoakum 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 Yoakum District TMC	Establish a Traffic Management Center (TMC) for the TxDOT Yoakum District. Project includes the implementation of end equipment to allow video feed and control for video image vehicle detection systems (VIVDS) and closed circuit television (CCTV) camera pan/tilt/zoom (PTZ).	TxDOT Yoakum District	To Be Determined	No	2 years
TxDOT ATMS Implementation	Implement the TxDOT Advanced Traffic Management System (ATMS) software in the TxDOT Yoakum District TMC	TxDOT	N/A	N/A	2 years
TxDOT Center-to-Center Communications	Statewide project to enhance coordination with other TxDOT Districts through the implementation of center-to-center communications between TxDOT TMCs. The software to facilitate this connection is included in the ATMS Implementation. Some hardware may be required at the District level.	TxDOT	To Be Determined	N/A	1 year
TxDOT DMS on I-10	Implement 4 dynamic message signs (DMS) on I-10 for traffic information dissemination	TxDOT Yoakum District/ TxDOT Houston District/ TxDOT San Antonio District	$110,000/sign	Yes	2 years
TxDOT DMS on US 59	Implement 4 DMS on US 59 near Victoria for traffic information dissemination	TxDOT Yoakum District/ TxDOT Houston District/ TxDOT Corpus Christi District	$110,000/sign	No	2 years
TxDOT Vehicle Detection on I-10	Implement vehicle detection equipment on I-10 to monitor traffic flow	TxDOT Yoakum District	To Be Determined	No	1 year
TxDOT Port Lavaca Causeway Management System	Implement CCTV cameras for traffic monitoring and DMS for information dissemination in the area approaching the Port Lavaca Causeway. Project might also include the implementation of wind detection systems.	TxDOT Yoakum District	To Be Determined	No	2 years
TxDOT Signal System Upgrades/Closed Loop Expansion Phase 1	Upgrade traffic signal controllers in the TxDOT Yoakum District. May also include the implementation of VIVDS and addition of signals to a closed loop signal system.	TxDOT Yoakum District	$32,500/ intersection	Partial	5 years

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

Program Area/Project	Description	Responsible Agency*	Probable Cost**	Funding Identified	Estimated Project Duration
Travel and Traffic Management (continued)					
City of Victoria TOC Capability Expansion	Expand the capabilities of the City of Victoria Traffic Operations Center (TOC). Project includes the implementation of end equipment to allow video feed as well as control for CCTV camera PTZ.	City of Victoria	To Be Determined	No	2 years
City of Victoria TOC/TxDOT Yoakum District TMC Communications Connection	Implement a connection between the City of Victoria TOC and the TxDOT Yoakum District TMC to allow video sharing, traffic data sharing, and other joint functions.	City of Victoria/TxDOT Yoakum District	To Be Determined	No	1 year
City of Victoria CCTV Camera Implementation	Implement 6 CCTV cameras in the City of Victoria for traffic monitoring and incident detection. Could include Loop 463 and City of Victoria arterial streets.	City of Victoria	$150,000	No	1 year
City of Victoria Signal System Upgrades/Closed Loop Expansion Phase 1	Upgrade traffic signal controllers in the City of Victoria. May also include the implementation of VIVDS and addition of signals to a closed loop signal system.	City of Victoria	cost varies by intersection	Partial	5 years
Emergency Management					
City of Victoria Emergency Vehicle Traffic Signal Preemption Expansion	Install emergency Vehicle Traffic Signal Preemption at additional intersections in the City of Victoria	City of Victoria	$6,000/ intersection $1,500/vehicle	No	2 years
Evacuation Route Planning and Signal Timing	Plan evacuation routes and strategies for evacuating the Region in case of a hurricane or other disaster. Coordination with the TxDOT Corpus Christi District and other neighboring Districts is a key component of the planning effort. This project also includes the development of alternate signal timing plans for use during an evacuation situation to facilitate the evacuation or return to an evacuated area.	TxDOT Yoakum District	To Be Determined	No	6 months
Nuclear Power Plant Transportation System Security Monitoring	Implement CCTV cameras for monitoring of the transportation network at select locations including FM 521 and the intersection of FM 521 and FM 1468	South Texas Nuclear Power Providers	$20,000-$25,000/site	No	1 year

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 Portable DMS	Procure portable DMS for use in the Yoakum District	TxDOT Yoakum District	$30,000/sign	No	6 months
TxDOT Flood Warning System Phase 1	Implement flood detection stations at flood prone locations on roadways in the Yoakum District. Key corridors include US 59, US 77/90A, US 87, and US 183. Project also includes flashing beacon signs to warn motorists when water has encroached on the roadway.	TxDOT Yoakum District	$15,000/station	No	1 year
TxDOT RWIS Stations	Install 2-4 road weather information system (RWIS) stations to collect road weather information in the Yoakum District	TxDOT Yoakum District	$25,000/station	No	1 year
Maintenance and Construction Information Clearinghouse	Establish an information clearinghouse for maintenance and construction closures as well as information from TxDOT and City of Victoria RWIS stations. This consolidated information source would allow other agencies, especially transit and emergency management, to quickly gather data that might affect their operations.	TxDOT Yoakum District/ City of Victoria	To Be Determined	No	1 year
City of Victoria Portable DMS	Procure portable DMS for use in the City of Victoria	City of Victoria	$30,000/sign	No	6 months
City of Victoria Portable Speed Trailers	Procure portable speed trailers for use in the City of Victoria	City of Victoria	$17,000/trailer	No	6 months
Public Transportation Management					
Colorado Valley Transit AVL and CAD Upgrade	Install automated vehicle location (AVL) on Colorado Valley Transit vehicles. Project also includes the upgrade of the computer aided dispatch (CAD) system.	Colorado Valley Transit	$10,000/vehicle	No	6 months
Golden Crescent Transit AVL and CAD Upgrade	Install AVL on Golden Crescent Transit vehicles. Project also includes the upgrade of the CAD system.	Golden Crescent Transit	$10,000/vehicle	No	6 months
Victoria Transit AVL and CAD Upgrade	Install AVL on Victoria Transit vehicles. Project also includes the upgrade of the CAD system.	Victoria Transit	$10,000/vehicle	No	6 months

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

Program Area/Project	Description	Responsible Agency*	Probable Cost**	Funding Identified	Estimated Project Duration
Public Transportation Management (continued)					
CARTS Electronic Fare Collection, Website Upgrade, and CAD Improvements	Implement magnetic swipe card and smart card electronic fare collection, upgrade CARTS website, import 911 resources to the CARTS CAD system, and incorporate the CARTS fixed route fleet into mobile data computer data gateways.	CARTS	To Be Determined	Yes	1 year

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

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

Yoakum Region
Short-Term Projects (5-Year)

Travel and Traffic Management

TxDOT Yoakum District TMC

Associated Market Packages:

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

Prerequisite Projects: None

Description: Establish a TMC for the TxDOT Yoakum District to monitor and manage traffic flow in the District. Control of closed loop 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 PTZ.

TxDOT ATMS Implementation

Associated Market Packages:

- Network Surveillance (ATMS01)
- Traffic Information Dissemination (ATMS06)
- Regional Traffic Control (ATMS07)
- Traffic Incident Management System (ATMS08)
- 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 Center-to-Center Communication

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Regional Traffic Control and Coordination (ATMS07)
- Traffic Incident Management System (ATMS08)
- Disaster Response and Recovery (EM08)
- Weather Information Processing and Distribution (MC04)
- Work Zone Management (MC08)
- 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 Yoakum District 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 Yoakum District TMC and statewide center-to-center facilities. As part of connecting to the statewide center-to-center infrastructure, the Yoakum 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.

TxDOT DMS on I-10

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 four permanent DMS along I-10 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 $110,000.

TxDOT DMS on US 59

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 four permanent DMS along US 59 near Victoria 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 Vehicle Detection on I-10

Associated Market Packages:

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

Prerequisite Projects: None

Description: Implement vehicle detection along I-10 in the Yoakum District for the purpose of incident detection and travel time calculations. Probe surveillance using transponders that already exist on many trucks passing through the Region is a potential method of data collection. Other detection methods could include in pavement loop detectors, VIVDS, or microwave detection. The cost will vary based on the detection method chosen.

TxDOT Port Lavaca Causeway Management System

Associated Market Packages:

- Network Surveillance (ATMS01)
- Traffic Information Dissemination (ATMS06)
- Traffic Incident Management System (ATMS08)
- Wide-Area Alert (EM06)
- Disaster Traveler Information (EM10)
- Road Weather Data Collection (MC04)

Prerequisite Projects: None

Description: Implement CCTV cameras and DMS in the area of the Port Lavaca Causeway for purposes of traffic monitoring, traffic information dissemination, and incident management. DMS also will be utilized in conjunction with emergency evacuation coordination (i.e., HAZMAT, weather, etc.). Other potential components of the causeway management system include the implementation of wind detection systems.

TxDOT Signal System Upgrades/Closed Loop Expansion Phase 1

Associated Market Packages:

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

Prerequisite Projects: None

Description: Upgrade the traffic signal controllers at TxDOT signalized intersections in the Yoakum District. Signals that are not currently part of the closed loop signal system will be added to a closed loop. This project also includes the installation of VIVDS when needed.

The estimated cost is $32,500 per intersection.

City of Victoria TOC Capability Expansion

Associated Market Packages:

- Network Surveillance (ATMS01)
- Surface Street Control (ATMS03)
- Traffic Information Dissemination (ATMS06)
- Traffic Incident Management System (ATMS08)
- Maintenance and Construction Activity Coordination (MC10)

Prerequisite Projects: None

Description: Expand the capabilities of the City of Victoria TOC to improve capabilities to monitor and manage traffic flow in the City of Victoria. The project includes the implementation of end equipment to allow video feed and control for CCTV PTZ.

City of Victoria TOC/TxDOT Yoakum District TMC Communications Connection

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Regional Traffic Control (ATMS07)
- Traffic Incident Management System (ATMS08)
- Disaster Response and Recovery (EM08)
- Work Zone Management (MC08)
- Maintenance and Construction Activity Coordination (MC10)

Prerequisite Projects: TxDOT Yoakum District TMC, City of Victoria TOC Capability Expansion

Description: Install a connection between the City of Victoria TOC and the TxDOT Yoakum District 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.

City of Victoria CCTV Camera Implementation

Associated Market Packages:

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

Prerequisite Projects: None

Description: This project includes the deployment of 6 CCTV cameras in the City of Victoria. Potential locations include Loop 463 and City of Victoria arterial streets. 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 area emergency management agencies.

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

City of Victoria Signal System Upgrades/Closed Loop Expansion Phase 1

Associated Market Packages:

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

Prerequisite Projects: None

Description: Upgrade the traffic signal controllers at signalized intersections in the City of Victoria. Signals that are not currently part of the closed loop signal system will be added to a closed loop. This project also includes the installation of VIVDS. The cost will vary by intersection depending on whether the signal poles, heads, and/or cabinets need replacing, or if just a signal controller upgrade is needed.

Emergency Management

City of Victoria Emergency Vehicle Traffic Signal Preemption Expansion

Associated Market Packages:

- Surface Street Control (ATMS03)
- Traffic Incident Management System (ATMS08)
- Emergency Call Taking and Dispatch (EM01)
- Emergency Routing (EM02)

Prerequisite Projects: None

Description: Equip additional traffic signals in the City of Victoria with traffic signal preemption equipment. Typical installations include mounting hardware at the intersection and on each vehicle authorized to preempt the signal. The intersection equipment includes a detector(s) positioned at the intersection approach(es) connected to the traffic signal controller. As a vehicle equipped with a preemption emitter approaches an intersection, the detector activates a change in signal timing to allow fast and safe passage. Preemption systems have proven to improve safety of emergency personnel and vehicles en-route to an incident.

The approximate cost per intersection is $6,000. An emitter is needed for each emergency vehicle desiring preempt capabilities and costs approximately $1,500 per vehicle.

Evacuation Route Planning and Signal Timing

Associated Market Packages:

- Surface Street Control (ATMS03)
- Emergency Routing (EM02)
- Evacuation and Reentry Management (EM09)

Prerequisite Projects: None

Description: Plan evacuation routes and strategies for evacuating the Region in case of a hurricane or other disaster. Coordination with the TxDOT Corpus Christi District and other neighboring districts is a key component of the planning effort. This project also includes the development of alternate signal timing plans for use during an evacuation situation to facilitate the evacuation or return to an evacuated area.

Nuclear Power Plant Transportation System Security Monitoring

Associated Market Packages:

- Network Surveillance (ATMS01)
- Transportation Infrastructure Protection (EM05)

Prerequisite Projects: None

Description: Implement CCTV cameras for monitoring of the transportation network at select locations including FM 521 and the intersection of FM 521 and FM 1468. The estimated cost of this project is $20,000 - $25,000 per camera location.

Maintenance and Construction Management

TxDOT Portable DMS

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Traffic Incident Management System (ATMS08)
- Disaster Traveler Information (EM10)
- 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.

TxDOT Flood Warning System Phase 1

Associated Market Packages:

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

Prerequisite Projects: None

Description: Implement flood monitoring equipment on flood-prone segments of roadway in the Yoakum 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 Yoakum 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. This project also includes the implementation of low water crossing warning flasher signs that would be activated when water was detected to be obstructing the roadway to alert motorists. Potential locations include US 59, US 77/90A in Hallettsville, US 87, and US 183.

The estimated cost of this project is $15,000 per station.

TxDOT RWIS Stations

Associated Market Packages:

- Network Surveillance (ATMS01)
- Road Weather Data Collection (MC03)
- Roadway Maintenance and Construction (MC07)

Prerequisite Projects: None

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

The estimated cost for one site is $25,000. The District is interested in installing at two to four sites.

Maintenance and Construction Information Clearinghouse

Associated Market Packages:

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

Prerequisite Projects: None

Description: Establish an information clearinghouse for maintenance and construction closures as well as information from TxDOT and City of Victoria RWIS stations. This consolidated information source would allow other agencies, especially transit and emergency management, to quickly gather data that might affect their operations.

City of Victoria Portable DMS

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Traffic Incident Management System (ATMS08)
- Disaster Traveler Information (EM10)
- 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 Victoria Portable Speed Trailers

Associated Market Packages:

- Speed Monitoring (ATMS19)
- Work Zone Management (MC08)

Prerequisite Projects: None

Description: Procure speed monitoring trailers for use by City of Victoria 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, and urban settings to slow drivers. Recent studies have shown speed trailers particularly suited to temporary work zones and are more effective than radar drones. They help reduce speeds throughout work zones of both large trucks and passenger vehicles.

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

Public Transportation Management

Colorado Valley Transit AVL and CAD Upgrade

Associated Market Packages:

- Transit Vehicle Tracking (APTS1)
- Demand-Response Transit Operations (APTS3)

Prerequisite Projects: None

Description: Install AVL units on Colorado Valley Transit vehicles and upgrade the CAD system. 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.

Cost will vary depending on the number of vehicles equipped with AVL systems, as well as the functions and features designed into the systems. The estimated cost is $10,000 per vehicle.

Golden Crescent Transit AVL and CAD Upgrade

Associated Market Packages:

- Transit Vehicle Tracking (APTS1)
- Demand-Response Transit Operations (APTS3)

Prerequisite Projects: None

Description: Install AVL units on Golden Crescent Transit vehicles and upgrade the CAD system. 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.

Cost will vary depending on the number of vehicles equipped with AVL systems, as well as the functions and features designed into the systems. The estimated cost is $10,000 per vehicle.

Victoria Transit AVL and CAD Upgrade

Associated Market Packages:

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

Prerequisite Projects: None

Description: Install AVL units on Victoria Transit vehicles and upgrade the CAD system. 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.

Cost will vary depending on the number of vehicles equipped with AVL systems, as well as the functions and features designed into the systems. The estimated cost is $10,000 per vehicle.

CARTS Electronic Fare Collection, Website Upgrade, and CAD Improvements

Associated Market Packages

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

Prerequisite Projects: None

Description: CARTS is deploying additional technology through a demonstration project funded by the Federal Transit Administration's Office of Mobility Innovation that will initiate a RideCARTS card as fare media into the system using magnetic stripe and smart card technology, and incorporate the Texas Lone Star Card as a data collection device. This project will also upgrade the CARTS website, import 911 mapping resources from the Capital Area Council of Governments into the CARTS CAD system, and incorporate the CARTS fixed route fleet into the mobile data computer data gateways.

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 DMS on SH 35	Implement approximately 6 DMS on SH 35 for traffic information dissemination	TxDOT Yoakum District	$110,000/sign	No	2 years
TxDOT HAR	Implement highway advisory radio (HAR) in key locations along I-10 in the Yoakum District for traffic information dissemination	TxDOT Yoakum District	To Be Determined	No	1 year
TxDOT Signal System Upgrades/Closed Loop Expansion Phase 2	Upgrade additional traffic signal controllers in the TxDOT Yoakum District. May also include the implementation of VIVDS and addition of signals to a closed loop signal system.	TxDOT Yoakum District	$32,500/ intersection	No	5 years
City of Victoria Signal System Upgrades/Closed Loop Expansion Phase 2	Upgrade additional traffic signal controllers in the City of Victoria. May also include the implementation of VIVDS and addition of signals to a closed loop signal system.	City of Victoria	cost varies by intersection	No	5 years
Municipal Closed Loop Signal System Implementation Phase 1	Implement closed loop signal systems at signalized intersections in municipalities in the Region. May also include the implementation of VIVDS.	Municipalities	$32,500/ intersection	No	5 years
Regional 511 Advanced Traveler Information System Server	Implement an advanced traveler information system server in the TxDOT Yoakum District TMC that will collect, consolidate, and distribute traveler information to a 511 phone system, web, and private information service providers (ISPs)	TxDOT	To Be Determined	No	1 year
Media Liaison and Coordination	Develop agreements/enhanced coordination with local media to improve information sharing and dissemination	TxDOT/City of Victoria/Municipalities	N/A	N/A	6 months
Emergency Management					
Municipal Emergency Vehicle Traffic Signal Preemption	Install emergency Vehicle Traffic Signal Preemption in municipalities in the Region	Municipalities/TxDOT Yoakum District	$6,000/ intersection $1,500/vehicle	No	2 years
Emergency Call-Out System	Establish an emergency call-out system to notify the public of emergency events in the Region	LaVaca County, Other Municipalities/Counties	To Be Determined	No	6 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)					
DPS/TxDOT Yoakum District TMC Communications Connection	Establish a connection between the Department of Public Safety (DPS) dispatch center and the TxDOT Yoakum District TMC for coordination and sharing of incident and traffic information	DPS/TxDOT Yoakum District	To Be Determined	No	1 year
City of Victoria 911 Dispatch/City of Victoria TOC Communications Connection	Establish a connection between the 911 dispatch center and the City of Victoria TOC for coordination and sharing of incident and traffic information including video feed	City of Victoria	To Be Determined	No	1 year
Maintenance and Construction Management					
TxDOT Portable Smart Work Zone Equipment	Procure portable DMS and CCTV cameras for use in work zones to manage traffic during construction activities	TxDOT Yoakum District	To Be Determined	No	6 months
TxDOT Flood Warning System Phase 2	Implement flood detection stations at flood prone locations on roadways in the Yoakum District. Project also includes flashing beacon signs to warn motorists when water has encroached on the roadway. Potential locations include FM 530 and FM 957.	TxDOT Yoakum District	$15,000/station	No	1 year
TxDOT Yoakum District/LCRA Communications Connection	Implement a communications connection between the LCRA and TxDOT Yoakum District for sharing of weather and water level information	TxDOT Yoakum District/LCRA	To Be Determined	No	6 months
TxDOT Yoakum District/USGS Communications Connection	Implement a communications connection between the United States Geological Survey (USGS) and TxDOT Yoakum District for sharing of weather and water level information	TxDOT Yoakum District/USGS	To Be Determined	No	6 months
Public Transportation Management					
Colorado Valley Transit Smart Card Electronic Fare Collection	Implement Smart Card electronic fare collection	Colorado Valley Transit	To Be Determined	No	6 months
Colorado Valley Transit Information Kiosks	Implement transit information kiosks at transit transfer stations to disseminate transit information to patrons	Colorado Valley Transit	To Be Determined	No	6 months

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

Program Area/Project	Description	Responsible Agency*	Probable Cost**	Funding Identified	Estimated Project Duration
Public Transportation Management (continued)					
Golden Crescent Transit Smart Card Electronic Fare Collection	Implement Smart Card electronic fare collection	Golden Crescent Transit	To Be Determined	No	6 months
Golden Crescent Transit Information Kiosks	Implement transit information kiosks at transit transfer stations to disseminate transit information to patrons	Golden Crescent Transit	To Be Determined	No	6 months
Victoria Transit Smart Card Electronic Fare Collection	Implement Smart Card electronic fare collection	Victoria Transit	To Be Determined	No	6 months
Victoria Transit Information Kiosks	Implement transit information kiosks at transit transfer stations, and other locations such as City Hall or the mall, to disseminate transit information to patrons	Victoria Transit	To Be Determined	No	6 months
Archived Data					
Golden Crescent Regional Planning Commission Data Warehouse	Establish a data warehouse to archive data from cities and transit agencies in the planning commission service area	Golden Crescent Regional Planning Commission	$100,000	No	3 years
TxDOT Transit Data Archive System	Establish a data archive system for transit information such as ridership and maintenance statistics from different transit agencies in the TxDOT Yoakum District	TxDOT Yoakum District	$100,000	No	1 year

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

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

Yoakum Region
Mid-Term Projects (10-Year)

Travel and Traffic Management

TxDOT DMS on SH 35

Associated Market Packages:

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

Prerequisite Projects: None

Description: This project continues the deployment of permanent DMS at approximately six locations along SH 35 in the Region for purposes of traffic information dissemination and incident management. The estimated cost per sign is approximately $150,000.

TxDOT HAR

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, weather advisories and other impacts. HAR will allow operators at the Yoakum TMC to record travel advisory messages related to traffic, incidents, and weather 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.

TxDOT Signal System Upgrades/Closed Loop Expansion Phase 2

Associated Market Packages:

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

Prerequisite Projects: TxDOT Signal System Upgrades/Closed Loop Expansion Phase 1

Description: Upgrade the traffic signal controllers at additional TxDOT signalized intersections. Signals that are not currently part of the closed loop signal system will be added to a closed loop. This project also includes the installation of VIVDS when needed.

The estimated cost of this project is $32,500 per intersection.

City of Victoria Signal System Upgrades/Closed Loop Expansion Phase 2

Associated Market Packages:

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

Prerequisite Projects: City of Victoria Signal System Upgrades/Closed Loop Expansion Phase 1

Description: Upgrade the traffic signal controllers at additional signalized intersections in the City of Victoria. Signals that are not currently part of the closed loop signal system will be added to a closed loop. This project also includes the installation of VIVDS.

Municipal Closed Loop Signal System Implementation Phase 1

Associated Market Packages:

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

Prerequisite Projects: None

Description: Implement closed loop signal systems at signalized intersections in municipalities in the Yoakum Region. This project may also include the implementation of VIVDS.

The estimated cost of this project is $32,500 per intersection.

Regional 511 Advanced Traveler Information System Server

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- 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)
- Broadcast Traveler Information (ATIS1)
- Interactive Traveler Information (ATIS2)

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

Description: Install a server dedicated to advanced travel information systems (ATIS) in the TxDOT Yoakum 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 Highway Conditions

Reporting System (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 Yoakum 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.

Media Liaison and Coordination

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Traffic Incident Management System (ATMS08)
- 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 tap into 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. Each agency that will be sharing information directly with the media will likely need an agreement or policy in place to determine what type of information will be shared. A subgroup of the stakeholders will need to work on the process of sharing data with the media and what broadcasts will be allowed to attempt to provide similar data to the media from each individual stakeholder.

Emergency Management

Municipal Emergency Vehicle Traffic Signal Preemption

Associated Market Packages:

- Surface Street Control (ATMS03)
- Traffic Traffic Incident Management System (ATMS08)
- Emergency Call Taking and Dispatch (EM01)
- Emergency Routing (EM02)

Prerequisite Projects: None

Description: This project implements preemption equipment at select traffic signals in the Yoakum 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.

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

Emergency Call-Out System

Associated Market Packages:

- Wide-Area Alert (EM06)

Prerequisite Projects: None

Description: Establish an emergency call-out system in LaVaca County and other regional counties and cities to notify the public of emergency events in the Region. The system would call every household in an area and play a recorded message with details of action required on the part of the resident. This could be information regarding a prison escapee, hurricane evacuation, hazardous materials spill, or other incidents where a large segment of the community needs to be made aware of an emergency condition.

DPS/TxDOT Yoakum District TMC Communications Connection

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Traffic Incident Management System (ATMS08)
- Emergency Call Taking and Dispatch (EM01)
- Emergency Routing (EM02)
- Disaster Response and Recovery (EM08)

Prerequisite Projects: TxDOT Yoakum District TMC

Description: Install telecommunications connection between the DPS and TxDOT Yoakum District 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.

City of Victoria 911 Dispatch/City of Victoria TOC Communications Connection

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Traffic Incident Management System (ATMS08)
- Emergency Call Taking and Dispatch (EM01)
- Emergency Routing (EM02)
- Disaster Response and Recovery (EM08)

Prerequisite Projects: City of Victoria TOC Capability Expansion

Description: Install telecommunications connection between the City of Victoria 911 Dispatch and City of Victoria TOC 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.

Maintenance and Construction Management

TxDOT Portable Smart Work Zone Equipment

Associated Market Packages:

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

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 work zone can be monitored during construction.

TxDOT Flood Warning System Phase 2

Associated Market Packages:

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

Prerequisite Projects: TxDOT Flood Warning System Phase 1

Description: Implement additional flood monitoring equipment on flood-prone segments of roadway in the Yoakum 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 Yoakum 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. This project also includes the implementation of low water crossing warning flasher signs that would be activated when water was detected to be obstructing the roadway to alert motorists.

The estimated cost of this project is $15,000 per station.

TxDOT Yoakum District/LCRA Communications Connection

Associated Market Packages:

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

Prerequisite Projects: TxDOT Yoakum District TMC

Description: Install telecommunications connection between the LCRA and TxDOT Yoakum District to allow for incident information and data sharing. Cost of this connection will be determined based on the communications method chosen.

TxDOT Yoakum District/USGS Communications Connection

Associated Market Packages:

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

Prerequisite Projects: TxDOT Yoakum District TMC

Description: Install telecommunications connection between the USGS and TxDOT Yoakum District to allow for incident information and data sharing. Cost of this connection will be determined based on the communications method chosen.

Public Transportation Management

Colorado Valley Transit Smart Card Electronic Fare Collection

Associated Market Packages

- Demand Response Transit Operations (APTS3)
- Transit Passenger and Fare Management (APTS4)

Prerequisite Projects: None

Description: Implement electronic fare collection systems on Colorado Valley Transit vehicles. There are three primary benefits of these collection systems. The first is enhanced revenue collection ability. The second is increased security by not having large amounts of cash or tokens on the vehicle. The third is the increased convenience and security for the transit patron. These systems are often implemented in conjunction with AVL or mobile data terminals, or are implemented as an add-on to those systems. To enable automated fare collection, fare boxes would need to be upgraded to accept smart cards (i.e., cards with passive radio frequency identification (RFID) technology or a magnetic information strip, such as a credit card) with rider and account information. Electronic Fare Collection and passenger information technology is rapidly advancing, and there will be several technological considerations that will need to be examined, such as standards for smart cards and interoperability issues.

Colorado Valley Transit Information Kiosks

Associated Market Packages:

- Demand Response Transit Operations (APTS3)
- Transit Traveler Information (APTS8)

Prerequisite Projects: Colorado Valley Transit AVL and CAD Upgrade

Description: Install static and real-time transit and traveler information devices at transit transfer stations. The project will build on information available from the transit AVL project. Based on the patron's request, kiosks will provide information on current bus operating conditions (e.g., Next bus – 5 minutes, on schedule, delayed 10 minutes, etc.). Displays at transit transfer centers or hubs would also provide current schedule information.

Golden Crescent Transit Smart Card Electronic Fare Collection

Associated Market Packages:

▪ Demand Response Transit Operations (APTS3)
▪ Transit Passenger and Fare Management (APTS4)

Prerequisite Projects: None

Description: Implement electronic fare collection systems on Golden Crescent Transit vehicles. There are three primary benefits of these collection systems. The first is enhanced revenue collection ability. The second is increased security by not having large amounts of cash or tokens on the vehicle. The third is the increased convenience and security for the transit patron. These systems are often implemented in conjunction with AVL or mobile data terminals, or are implemented as an add-on to those systems. To enable automated fare collection, fare boxes would need to be upgraded to accept smart cards (i.e., cards with passive RFID technology or a magnetic information strip, such as a credit card) with rider and account information. Electronic Fare Collection and passenger information technology is rapidly advancing, and there will be several technological considerations that will need to be examined, such as standards for smart cards and interoperability issues.

Golden Crescent Transit Information Kiosks

Associated Market Packages:

▪ Demand Response Transit Operations (APTS3)
▪ Transit Traveler Information (APTS8)

Prerequisite Projects: Golden Crescent Transit AVL and CAD Upgrade

Description: Install static and real-time transit and traveler information devices at transit transfer stations. The project will build on information available from the transit AVL project. Based on the patron's request, kiosks will provide information on current bus operating conditions (e.g., Next bus – 5 minutes, on schedule, delayed 10 minutes, etc.). Displays at transit transfer centers or hubs would also provide current schedule information.

Victoria Transit Smart Card Electronic Fare Collection

Associated Market Packages:

▪ Transit Fixed Route Operations (APTS2)
▪ Transit Passenger and Fare Management (APTS4)

Prerequisite Projects: None

Description: Implement electronic fare collection systems on Victoria Transit vehicles. There are three primary benefits of these collection systems. The first is enhanced revenue collection ability. The second is increased security by not having large amounts of cash or tokens on the vehicle. The third is the increased convenience and security for the transit patron. These systems are often implemented in conjunction with AVL or mobile data terminals, or are implemented as an add-on to those systems. To enable automated fare collection, fare boxes would need to be upgraded to accept smart cards (i.e., cards

with passive RFID technology or a magnetic information strip, such as a credit card) with rider and account information. Electronic Fare Collection and passenger information technology is rapidly advancing, and there will be several technological considerations that will need to be examined, such as standards for smart cards and interoperability issues.

Victoria Transit Information Kiosks

Associated Market Packages:

- Transit Fixed Route Operations (APTS2)
- Transit Traveler Information (APTS8)

Prerequisite Projects: Victoria Transit AVL and CAD Upgrade

Description: Install static and real-time transit and traveler information devices at transit transfer stations and other locations such as City Hall or the mall. The project will build on information available from the transit AVL project. Based on the patron's request, kiosks will provide information on current bus operating conditions (e.g., Next bus – 5 minutes, on schedule, delayed 10 minutes, etc.). Displays at transit transfer centers or hubs would also provide current schedule information.

Archived Data Management

Golden Crescent Regional Planning Commission Data Warehouse

Associated Market Packages:

- ITS Data Mart (AD1)

Prerequisite Projects: None

Description: Implement a system to collect, store and process transportation data from cities and transit agencies in the planning commission area. This project will design the frequency, quantity, and quality of data to be collected and stored. User interfaces will be required at each local agency to be able to access, search, and upload archived data as needed.

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

TxDOT Transit Data Archive System

Associated Market Packages:

- ITS Data Mart (AD1)

Prerequisite Projects: None

Description: Implement a system to collect, store and process transit data from transit agencies in the TxDOT Yoakum District. This project will design the frequency, quantity, and quality of data to be collected and stored.

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

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

Program Area/Project	Description	Responsible Agency*	Probable Cost**	Funding Identified	Estimated Project Duration
Travel and Traffic Management					
TxDOT Signal System Upgrades/Closed Loop Expansion Phase 3	Upgrade additional traffic signal controllers in the TxDOT Yoakum District. May also include the implementation of VIVDS and addition of signals to a closed loop signal system.	TxDOT Yoakum District	$32,500/ intersection	No	5 years
City of Victoria Signal System Upgrades/Closed Loop Expansion Phase 3	Upgrade additional traffic signal controllers in the TxDOT Yoakum District. May also include the implementation of VIVDS and addition of signals to a closed loop signal system.	City of Victoria	cost varies by intersection	No	5 years
Municipal Closed Loop Signal System Implementation Phase 2	Implement closed loop signal systems at signalized intersections in municipalities in the Region. May also include the implementation of VIVDS.	Municipalities	$32,500/ intersection	No	5 years
ISP Based Route Guidance	Provide direct support to ISP-based route guidance systems through sharing of traveler information	Public Agencies/Private Sector	To Be Determined	No	1 year
Maintenance and Construction Management					
County Portable DMS	Procure portable DMS for use in the counties in the Region	Counties	$30,000/sign	No	6 months
Public Transportation Management					
Multi-modal Coordination	Implement connections necessary for transit agencies in the Region to coordinate with one another for regional schedule coordination for transfers	Victoria Transit/Golden Crescent Transit/Colorado Valley Transit	To Be Determined	No	6 months

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

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

Yoakum Region
Long-Term Projects (20-Year)

Travel and Traffic Management

TxDOT Signal System Upgrades/Closed Loop Expansion Phase 3

Associated Market Packages:

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

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

Description: Upgrade the traffic signal controllers at TxDOT signalized intersections. Signals that are not currently part of the closed loop signal system will be added to a closed loop. This project also includes the installation of VIVDS when needed.

The estimated cost is $32,500 per intersection.

City of Victoria Signal System Upgrades/Closed Loop Expansion Phase 3

Associated Market Packages:

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

Prerequisite Projects: City of Victoria Signal System Upgrades/Closed Loop Expansion Phase 1, City of Victoria Signal System Upgrades/Closed Loop Expansion Phase 2

Description: Upgrade the traffic signal controllers at signalized intersections in the City of Victoria. Signals that are not currently part of the closed loop signal system will be added to a closed loop. This project also includes the installation of VIVDS.

Municipal Closed Loop Signal System Implementation Phase 2

Associated Market Packages:

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

Prerequisite Projects: Municipal Signal System Implementation Phase 1

Description: Upgrade additional traffic signal controllers at signalized intersections in municipalities in the Region and add those signals to a closed loop signal system. This project also includes the installation of VIVDS.

The estimated cost is $32,500 per intersection.

ISP Based Route Guidance

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Maintenance and Construction Activity Coordination (MC10)
- Broadcast Traveler Information (ATIS1)
- ISP-Based Route Guidance (ATIS5)

Prerequisite Projects: TxDOT ATMS Implementation

Description: Provide ISPs with data relative to current travel conditions. The project extends current static capabilities of the OnStar, in-vehicle route guidance systems (or equivalent) currently being equipped in new vehicles (OnStar is equipped on some GM, Acura, Audi, Saab, and Subaru models). Currently, the OnStar system will help guide a motorist to a location based on static information. By providing real-time traveler information to ISPs, the guidance systems could modify the recommended route based on dynamic roadway conditions (e.g., variation on congestion levels, accidents, roadwork, etc.). The project will require a public/private sector partnership, because route guidance and navigation services are typically subscription services.

Maintenance and Construction Management

County Portable DMS

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Traffic Incident Management System (ATMS08)
- Disaster Traveler Information (EM10)
- 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

Multi-modal Coordination

Associated Market Packages:

- Transit Fixed Route Operations (APTS2)
- Demand Response Transit Operations (APTS3)
- Multi-modal Coordination (APTS7)

Prerequisite Projects: None

Description: Implement connections necessary for Yoakum Region transit agencies to coordinate with each other for regional schedule coordination, especially to facilitate passenger transfers. It is envisioned that by linking the CAD systems and electronic schedules, that a passenger traveling through the Region that needed to use multiple agencies to complete their trip could arrange those transfers by contacting one of the agencies who would be able to request the necessary transfers through the CAD system.

4. MAINTAINING THE REGIONAL ITS ARCHITECTURE AND DEPLOYMENT PLAN

The Yoakum 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 Yoakum 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 January 2005, stakeholders recommended that a meeting be held on an annual basis to review the existing Regional ITS Deployment Plan to update project status and include any new projects. These updates will be documented and included in the next formal revision of the plans. It was also recommended that the group meet every two years to correspond with the Transportation Improvement Plan update process to review the Regional ITS Architecture and formally update both the Regional ITS Architecture and the ITS Deployment Plan. Any new market packages that have been added to the National Architecture should be reviewed to see if they are applicable to the Yoakum Region. Data flows in existing market packages should also be reviewed to determine if any planned/future flows have been implemented. The Deployment Plan will also 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 Yoakum 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 Yoakum 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.