



State of Texas
Regional ITS Architectures and Deployment Plans

Yoakum Region

Regional ITS Architecture Report

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LIST OF ACRONYMS

AASHTO	American Association of State Highway and Transportation Officials
AD	Archived Data
APTS	Advanced Public Transportation Systems
ASTM	American Society for Testing and Materials
ATIS	Advanced Travel Information System
ATMS	Advanced Traffic Management System
AVL	Automated Vehicle Location
BRINSAP	Bridge Inventory Inspection System
CAD	Computer Aided Dispatch
CC	Control Center
CCTV	Closed-Circuit Television
CPT	Common Public Transportation
CV	Commercial Vehicle
CVO	Commercial Vehicle Operations
DEM	Department of Emergency Management
DMS	Dynamic Message Sign
DPS	Department of Public Safety
EM	Emergency Management
EMS	Emergency Medical Services
EOC	Emergency Operations Center
ETMCC	External TMC Communication
EV	Emergency Vehicle
FC	Fare Collection
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FTA	Federal Transit Authority
HAR	Highway Advisory Radio
HAZMAT	Hazardous Materials
HCRS	Highway Condition Reporting System

LIST OF ACRONYMS

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

LIST OF ACRONYMS

TMC	Traffic Management Center
TMDD	Traffic Management Data Directory
TxDOT	Texas Department of Transportation
USDOT	United States Department of Transportation
USGS	United States Geological Survey
VIVDS	Video Image Vehicle Detection Systems

SUMMARY

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

To meet these requirements, in 2001 the Texas Department of Transportation (TxDOT) initiated the development of Regional ITS Architectures and Deployment Plans throughout the State of Texas. The Yoakum Region was the twentieth in the series of Regional ITS Architectures to be prepared as part of this initiative.

The Yoakum Region is located in southeast Texas. The 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.

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

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

An inventory of existing and planned ITS infrastructure in the Region provided the basis for the architecture development. Stakeholder needs that could be addressed by ITS technologies guided the selection of market packages, data flows, and integration requirements. A diverse range of needs were identified by stakeholders in the Region. High priority needs focused on traffic management, traffic information dissemination, and maintenance and construction management.

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

An interconnect, or “Sausage Diagram” was developed for the Yoakum Region which provided a top-level overview of system functions and primary interconnects. More detailed interfaces were then developed which identified the connectivity between the systems and elements. Each element identified in the ITS architecture for the Yoakum Region was mapped to the other elements that it must interface with. These interfaces were further defined by architecture data flows between individual elements that specify the information to be exchanged. These data flows could include requests for information, alerts and messages, status requests, confirmations, and other information requirements.

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

An Operational Concept for the Yoakum Region was developed to illustrate how systems, components, and agencies will be integrated and function as a result of the framework provided by the Regional ITS Architecture. The purpose of the Operational Concept is to demonstrate the roles and responsibilities of the various stakeholders in the Yoakum Region. Potential agreements that could be required for maintenance and operations, data sharing (among agencies and with the private sector), or joint operations are listed.

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

1. INTRODUCTION

1.1 Project Overview

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

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

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

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

1.2 Document Overview

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

Section 1 – Introduction

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

Section 2 – Integration Strategy

This section discusses Yoakum Region stakeholder needs and issues, regional ITS initiatives and potential regional ITS programs, and opportunities for integration to achieve regional goals and contribute to regional and national ITS interoperability. Stakeholders and their contact information are also included.

Section 3 – Regional ITS Architecture Development Process

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

Section 4 – Conceptual Design

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

Section 5 – Operational Concept

An Operational Concept has been prepared that discusses the key functions and services of the envisioned ITS for the Yoakum Region. As part of this concept, operational scenarios are described and roles and responsibilities of stakeholders are discussed. Potential public-public and public-private agreements also have been identified.

The Yoakum Regional ITS Architecture also contains two appendices:

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

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

1.3 The Yoakum Region

1.3.1 Geographic Overview

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 geographic boundaries of the Yoakum Region are highlighted in **Figure 1**.

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

As illustrated in **Figure 1**, 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. The effective operation of the roadway 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.

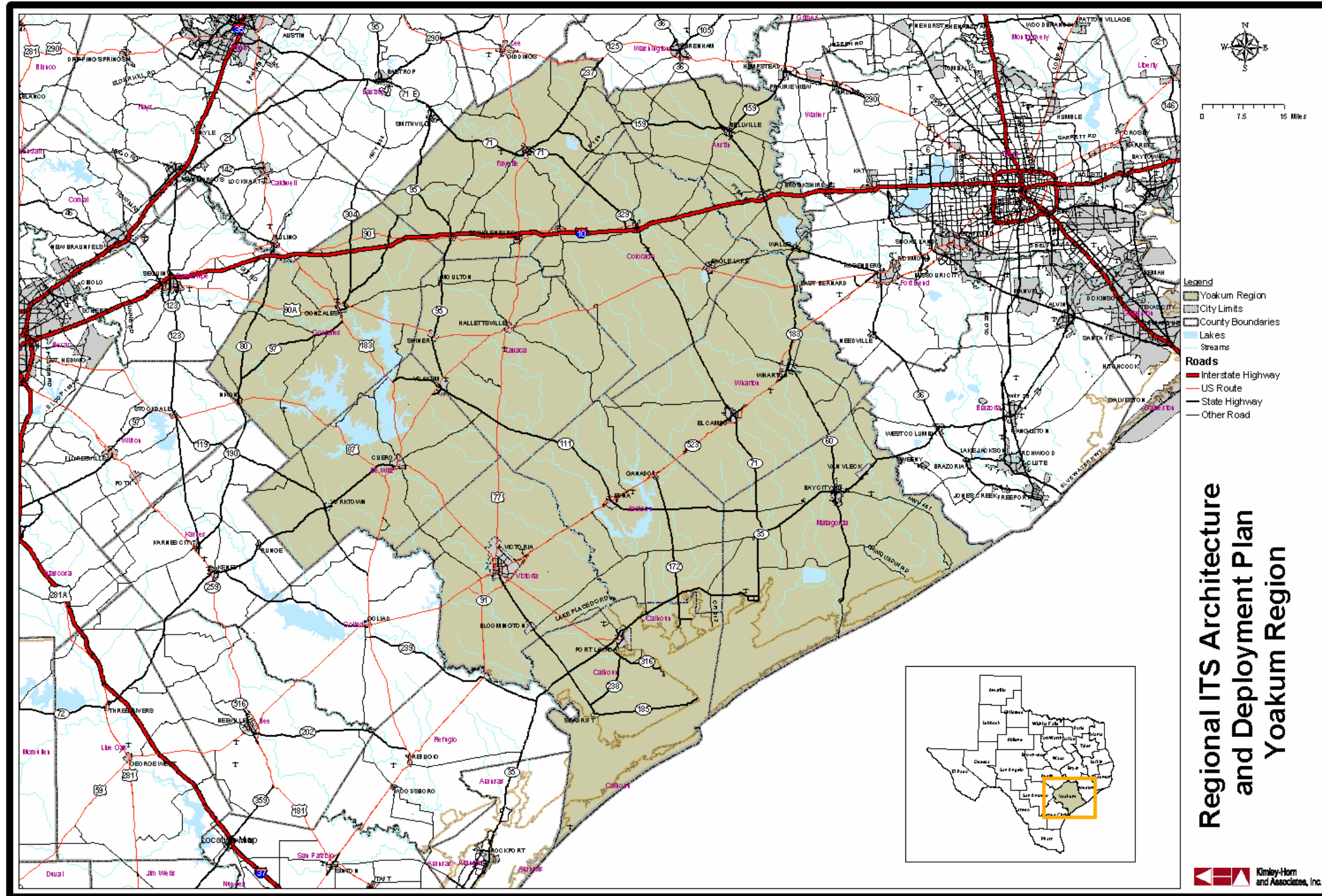


Figure 1 – Yoakum Region Map

1.3.3 Yoakum Region ITS Plans

There are several agencies in the Yoakum Region that have already deployed ITS components. It is important to recognize the initial deployment of ITS infrastructure in a Region because in order for that Region to receive federal funding for ITS projects, the United States Department of Transportation (USDOT) requires that the Region have an ITS architecture by April 2005. This requirement is only for Regions with existing ITS infrastructure deployed. For Regions that do not have any ITS infrastructure deployed, the USDOT requires that they have an ITS architecture within four years of their first ITS project entering final design. As the Yoakum Region pursues funding opportunities for proposed projects, it will be necessary to show that the proposed project fits within the architecture developed for the Region as part of this project.

Currently, the Yoakum Region has several ITS components deployed in the field including closed loop signal systems with video image vehicle detection systems (VIVDS), signal preemption for emergency vehicles, and computer aided dispatch (CAD). The following sections discuss these deployments.

Video Detection

TxDOT and the City of Victoria are using VIVDS at several intersections within the Region. Unlike loop detection, VIVDS will not be affected by paving operations, and the detection zone of a VIVDS can be quickly changed to accommodate lane shifts during construction. VIVDS can detect vehicles approaching or stopping at a signalized intersection, and, under actuated conditions, place a call for the service of the appropriate phase for that vehicle.

Signal Preemption for Emergency Vehicles

Currently, the City of Victoria has signal preemption installed at intersections within the city limits for emergency vehicles. Emergency vehicle preemption works when a vehicle equipped with a preemption emitter approaches an intersection and the detector activates a change in signal timing to allow fast and safe passage.

Computer Aided Dispatch

The Texas Department of Public Safety has CAD systems to enhance dispatch capabilities and allow dispatch records and any incident information entered by the dispatcher to be saved for future reference in a dispatch log. Several area transit agencies also utilize CAD systems to route demand response transit vehicles.

1.3.4 Stakeholders

Stakeholder coordination and involvement is one of the key elements to the development of a Regional ITS Architecture and Deployment Plan. Because ITS often transcends traditional transportation infrastructure, it is important to involve non-traditional stakeholders in the architecture development and visioning process. Input from these stakeholders, both public and private, is a critical part of defining the 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;
- Port of Victoria;
- Texas Department of Public Safety;
- TxDOT Corpus Christi District;
- TxDOT Houston District;
- TxDOT San Antonio District;
- TxDOT Traffic Operations Division (Austin); and
- TxDOT Yoakum District.

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.

2. INTEGRATION STRATEGY

2.1 Integration Purpose

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

For each operating agency or stakeholder entity identified through the development of the Regional ITS Architecture, there are operations that currently exist as a normal practice in order to accomplish the primary business goals and objectives for each stakeholder. As an example, a primary operation of the City of Victoria Police Department dispatch is to dispatch emergency personnel to the appropriate locations when a call for help is placed within the city. The integration of the dispatch with any of the other stakeholders will not change this primary function of the dispatch or disrupt typical business practices. The integration of the Victoria 911 Public Safety Answering Point (PSAP) with another agency, such as the TxDOT Yoakum District or City of Victoria Traffic Operations Center (TOC), will require that the data that will be exchanged between the two entities (such as the blockage of a lane of traffic due to a crash) meet certain requirements for that particular data type. Identifying the need for this connection between agencies and the opportunities for integration and interoperability in the Region are key purposes of this section.

This section will provide an overview of the major issues and stakeholder needs within the Yoakum Region and the primary areas of concern that were uncovered in the preparation of the Yoakum Regional ITS Architecture. This section will also discuss the need for interregional integration with agencies external to the Yoakum Region, such as the need for integration with other TxDOT Districts.

A key step in developing any regional ITS architecture is the identification of major stakeholders in the Region. Key stakeholder agencies that participated in the development of the Yoakum Regional ITS Architecture are listed in **Table 1**. A number of other stakeholders were identified and invited to participate. In many cases, these stakeholders were not able to attend due to time constraints. Minutes of meetings, copies of reports, and access to the project web site were provided to these stakeholders to encourage their participation as much as possible.

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 Lavaca, 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 Hallettsville, 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
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

Table 1 – Yoakum Stakeholder Agencies and Contacts (continued)

Stakeholder Agency	Contact	Address	Phone Number	E-Mail
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

2.2 Regional Needs

Needs from the Region were identified in the project kick-off meeting held on June 9, 2004. Stakeholders participating in that meeting identified the needs in the Region according to the eight user service areas defined in the National ITS Architecture. The needs identified in the project kick-off meeting are documented in **Table 2**.

Table 2 – Yoakum Region: Summary of ITS Needs

Yoakum Region Summary of ITS Needs Yoakum Regional ITS Architecture and Deployment Plan Kick-Off Meeting June 9, 2004
<p>Travel and Traffic Management Needs</p> <ul style="list-style-type: none"> ■ Need coordination with San Antonio and Houston to maximize dynamic message sign (DMS) placement effectiveness ■ Need SH 59 DMS for incident early warnings ■ Need I-10 DMS ■ Need DMS for Causeway ■ Need Causeway Management System (wind detection/advisories, lane closures, other) ■ Need portable DMS with closed-circuit television (CCTV) and radio communications at stations ■ Need coordination with Corpus Christi for evacuations ■ Need hurricane evacuation plan and coordination with nearby Districts ■ Need US 77, US 87, and US 183 evacuation routes ■ Need evacuation signal timing plans ■ Need improved traveler information for Lavaca County ■ Need vehicle detection on I-10 (speed data) ■ Need highway advisory radio (HAR) ■ Need City of Victoria TOC
<p>Public Transportation Management Needs</p> <ul style="list-style-type: none"> ■ Need automated vehicle location (AVL) for Colorado Valley Transit ■ Need computer aided dispatch (CAD) upgrades for Colorado Valley Transit ■ Need Smart Card fare payment for Colorado Valley Transit ■ Need kiosks for Colorado Valley Transit information ■ Need communications between emergency management and Colorado Valley Transit ■ Need AVL for Golden Crescent Transit ■ Need CAD upgrade for Golden Crescent Transit ■ Need Smart Card fare payment for Golden Crescent Transit ■ Need on-board surveillance cameras on Golden Crescent Transit ■ Need CCTV at Golden Crescent Transit transfer stations ■ Need kiosks for Golden Crescent Transit information ■ Need communications between emergency management and Golden Crescent Transit ■ Need coordination between transit agencies
<p>Electronic Payment Needs</p> <p>None Identified</p>
<p>Commercial Vehicle Operations Needs</p> <p>None Identified</p>
<p>Emergency Management Needs</p> <ul style="list-style-type: none"> ■ Need emergency vehicle signal preemption for the City of Victoria ■ Need emergency vehicle signal preemption for other cities on TxDOT signals ■ Need fire station emergency vehicle warning flasher on US 183 ■ Need TxDOT/DPS coordination ■ Need Emergency Call Out System/Reverse 911 ■ Need cell phone emergency priority ■ Need satellite communication

Table 2 – Yoakum Region: Summary of ITS Needs (continued)

<p>Advanced Vehicle Safety Systems Needs None Identified</p> <p>Information Management Needs (Data Archiving) None Identified</p> <p>Maintenance and Construction Management Needs</p> <ul style="list-style-type: none"> ▪ Need additional portable DMS for TxDOT ▪ Need portable DMS for counties ▪ Need flood warning systems on US 59, US 87, and US 183 ▪ Need improved coordination with LCRA and USGS to get accurate weather data ▪ Need standardized flood data information ▪ Need flood information dissemination for Lavaca County ▪ Need flood detection for Lavaca County ▪ Need road weather information system (RWIS) wind speed information
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2.3 Regional Integration and Interoperability

A vision for the Yoakum Region is to integrate systems on both an intra-regional and an inter-regional basis. Within the Yoakum Region, nearly every stakeholder identified is involved in emergency management. Incidents that occur on major roadways either in the Yoakum Region or on roadways that could impact the movement of people and goods in the Yoakum Region should be shared. The integration of the State Emergency Operations Center (EOC) and the local EOCs can facilitate the clearing of such an incident more efficiently. As an example, a chemical spill along I-10 between San Antonio and Houston in the Yoakum District would require a major clean-up in addition to other emergency personnel on site. Coordination between the EOCs could identify the closest clean-up crew that could respond to the spill and dispatch them to the scene. Similarly, once on scene, the response team could provide the State EOC and the local EOCs with status reports on the clean-up and time estimates for a return to normal operations.

The Yoakum Region is bordered by five other TxDOT Districts. Improved coordination with these surrounding Districts for incident management and roadway closures is a very important need in the Yoakum Region.

Road closures due to maintenance or incidents also lead to a number of opportunities for improved operations through integration. TxDOT and other transportation agencies would like to be able to share this information throughout the Region so that as soon as one agency is aware of a closure, whether planned or unplanned, other agencies can also be made aware of the closure and make an appropriate response.

Operators of the transportation system have many opportunities to improve performance through integration. Golden Crescent Transit and Colorado Valley Transit can improve performance and schedule adherence of their transit agencies by integrating closure information from operators of the transportation network.

Systems such as TxDOT's Highway Condition Reporting System (HCRS) provide an integrated method to gather consistent traveler information on a statewide basis. This type of system could

eventually feed into a 511 traveler information number that would provide consistent traveler information throughout the state.

The headquarters of TxDOT maintains a database of traffic counts and accident records for roadways throughout the State of Texas. On occasion, agencies within the Yoakum Region will need access to these databases either to retrieve data or supply data to the database. These data exchanges also will require integrating the agencies' data flows such that neither of the agencies' normal business operations is disturbed to share these data.

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

3. REGIONAL ITS ARCHITECTURE DEVELOPMENT PROCESS

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

3.1 Yoakum Process

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

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

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

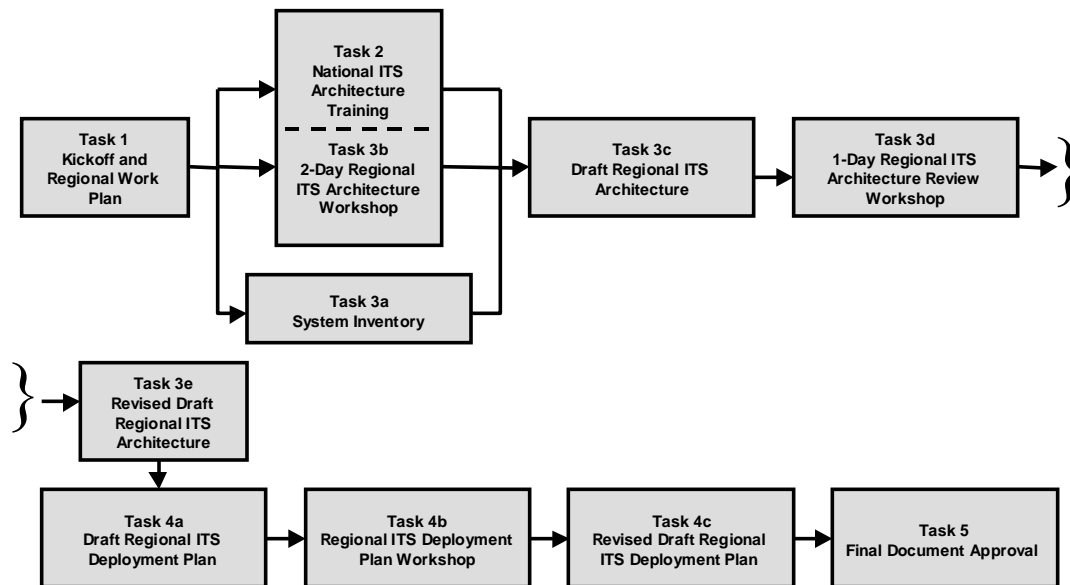


Figure 2 – Yoakum Regional ITS Architecture and Deployment Plan Development Process

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

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

Key components of the process are described below:

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

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

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

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

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

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

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

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

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

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

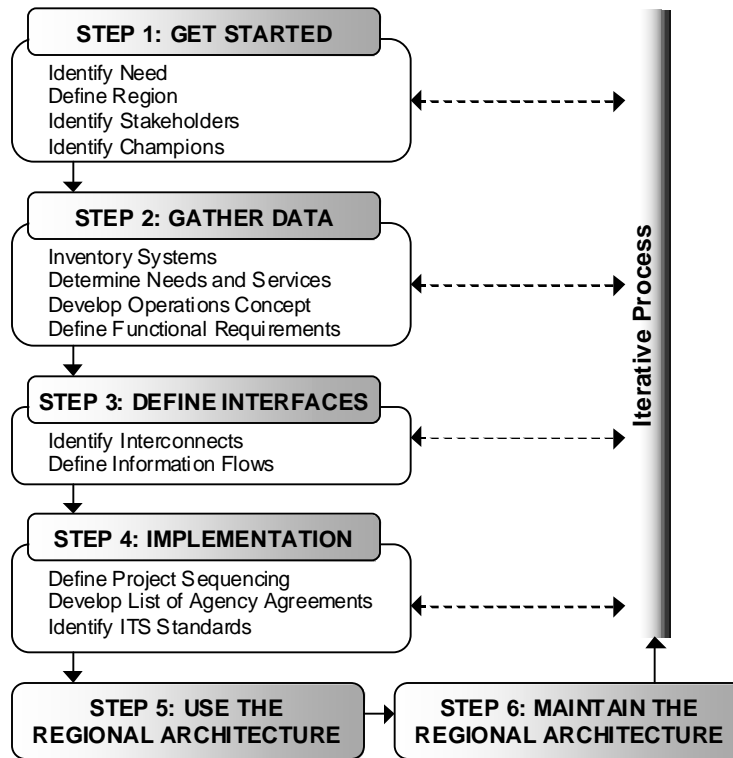
Task 4B – Regional ITS Deployment Plan Workshop: The Draft Regional ITS Deployment Plan was presented to stakeholders at the Regional ITS Deployment Plan Workshop. Stakeholders were asked to provide input on the recommended projects, priority, and deployment timeframe.

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

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

3.2 USDOT Regional ITS Architecture Guidance

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



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

Figure 3 – USDOT Guidance on Regional ITS Architecture Development

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

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

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

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

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

4. CONCEPTUAL DESIGN

4.1 Systems Inventory

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

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

- ***Travel and Traffic Management*** – includes the TxDOT Yoakum Traffic Management Center (TMC), center-to-center links, detection systems, CCTV, fixed and portable dynamic message signs, broadcast traveler information, and other related technologies.
- ***Public Transportation Management*** – includes transit and paratransit automated vehicle location, and transit travel information systems.
- ***Commercial Vehicle Operations*** – includes coordination with TexView (CVISN) efforts.
- ***Emergency Management*** – includes emergency operations/management centers and improved information sharing among traffic and emergency services.
- ***Information Management*** – includes electronic data management and archiving systems.
- ***Maintenance and Construction Management*** – includes maintenance and construction vehicle tracking, roadway maintenance and construction information, and work zone management.

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

4.1.1 Subsystems and Terminators

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

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

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

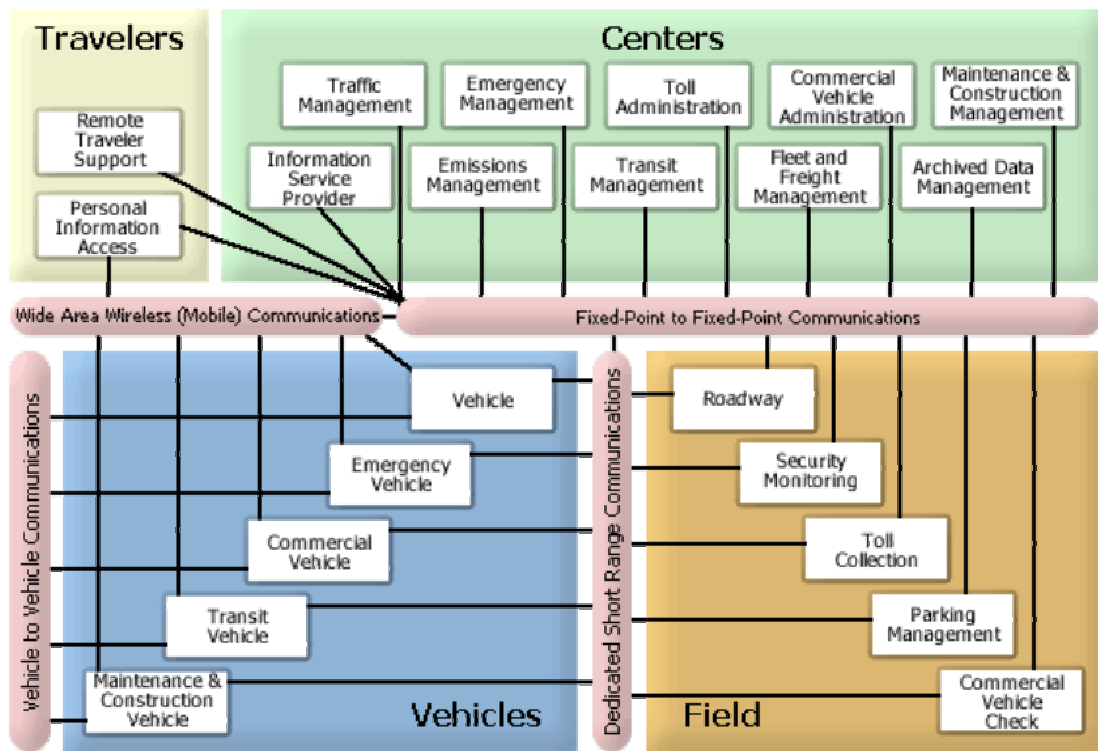


Figure 4 – Physical Subsystem Interconnect Diagram

4.1.2 Yoakum ITS Inventory by Stakeholder

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

The information in **Table 3** also is included on the Yoakum ITS Architecture web site, which is accessible by selecting the link to the Texas Regional ITS Architecture, the Yoakum Region, and then selecting the “Inventory by Stakeholder” button which will open the stakeholder list. Each element in the list contains a hyperlink to more detailed information, including status, description, stakeholder, and other elements within the

inventory with which it interfaces. (At the time this report was published, the Yoakum Regional ITS Architecture web site was being hosted at www.consystem.com. TxDOT plans to permanently host the site in the future at www.dot.state.tx.us/trf/its.)

4.1.3 *Yoakum ITS Inventory by Entity*

The Yoakum Regional ITS Architecture inventory is made up of the transportation and communications centers, the field equipment, the vehicles, and other systems in the regional transportation system. These components have been assigned to an entity (subsystem or terminator) as defined by the National ITS Architecture. **Table 4** presents the Yoakum Region inventory using the associated National ITS Architecture subsystem or terminator. This sorts elements that perform similar functions together, so elements of a particular type can be easily identified. This inventory also can be accessed from the Yoakum Regional ITS Architecture web site by selecting the “Inventory by Entity” button.

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

Stakeholder	Element	Entity	Status
Army Corp of Engineers	Army Corps of Engineers Field Office	Emergency Management Subsystem	Existing
	Army Corps of Engineers Flood Monitoring System	Roadway Subsystem	Existing
Bay City	Bay City Police/Fire/EMS Dispatch and PSAP	Emergency Management Subsystem	Existing
City of Victoria	City of Victoria Crash Records Database	Archived Data Management Subsystem	Existing
	City of Victoria EOC	Emergency Management Subsystem	Existing
	City of Victoria MPO Archive	Archived Data Management Subsystem	Existing
	City of Victoria Public Information Office	Information Service Provider Subsystem	Existing
	City of Victoria Traffic Database	Archived Data Management Subsystem	Planned
	City of Victoria Traffic Database Users	Archived Data User Systems	Planned
	City of Victoria Traffic Operations Center	Emergency Management Subsystem	Existing
	City of Victoria Traffic Operations Center	Traffic Management Subsystem	Existing
	City of Victoria Website	Information Service Provider Subsystem	Existing
City of Victoria Fire Department	City of Victoria Fire/EMS Vehicles	Emergency Vehicle Subsystem	Existing
City of Victoria MPO	City of Victoria MPO Archive Users	Archived Data User Systems	Existing
	City of Victoria MPO Field Devices	Roadway Subsystem	Existing
City of Victoria Police Department	City of Victoria Fire/Police/EMS Dispatch and PSAP	Emergency Management Subsystem	Existing
	City of Victoria First Call (Reverse 911)	Emergency Telecommunications System	Existing
	City of Victoria Police Vehicles	Emergency Vehicle Subsystem	Existing
City of Victoria Public Works Division	City of Victoria Air Quality Division	Emissions Management Subsystem	Existing
	City of Victoria Emissions Monitoring Equipment	Roadway Subsystem	Existing
	City of Victoria Maintenance and Construction Vehicles	Maintenance and Construction Vehicle Subsystem	Existing
	City of Victoria Sign Inventory Database	Archived Data Management Subsystem	Existing
	City of Victoria Sign Inventory Database Users	Archived Data User Systems	Existing
	City of Victoria Traffic Signal Shop	Equipment Repair Facility	Existing

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

Stakeholder	Element	Entity	Status
City of Victoria Street Department	City of Victoria Maintenance Dispatch	Maintenance and Construction Management Subsystem	Existing
	City of Victoria Pavement Management System	Archived Data Management Subsystem	Existing
	City of Victoria Pavement Management System Users	Archived Data User Systems	Existing
City of Victoria Traffic Control Division	City of Victoria ITS Field Equipment	Roadway Subsystem	Existing
Colorado Valley Transit	Colorado Valley Transit Information Display/Point of Sale	Remote Traveler Support Subsystem	Planned
	Colorado Valley Transit Dispatch	Emergency Management Subsystem	Existing
	Colorado Valley Transit Dispatch	Transit Management Subsystem	Existing
	Colorado Valley Transit Vehicles	Transit Vehicle Subsystem	Existing
	Colorado Valley Transit Website	Information Service Provider Subsystem	Existing
Commercial Vehicle Operators	Commercial Vehicles	Commercial Vehicle Subsystem	Existing
	Commercial Vehicles	Vehicle Subsystem	Existing
	Private Fleet Management Systems	Fleet and Freight Management Subsystem	Planned
Correctional Facilities	Correctional Facilities Operations	Emergency Management Subsystem	Existing
County Emergency Management Agencies	County EOC	Emergency Management Subsystem	Existing
	County EOC Public Information Office	Information Service Provider Subsystem	Existing
	Other County EOC	Emergency Management Subsystem	Existing
County Road and Bridge	County Road and Bridge	Maintenance and Construction Management Subsystem	Existing
	County Road and Bridge Field Equipment	Roadway Subsystem	Planned
	County Road and Bridge Vehicles	Maintenance and Construction Vehicle Subsystem	Existing
County Sheriff	County Public Safety Dispatch and PSAP	Emergency Management Subsystem	Existing
DPS	DPS Administration	Emergency Management Subsystem	Existing
	DPS Communications	Emergency Management Subsystem	Existing
	DPS Emergency Vehicles	Emergency Vehicle Subsystem	Existing

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

Stakeholder	Element	Entity	Status
DPS (continued)	Statewide Crash Records Information System	Archived Data Management Subsystem	Existing
	Statewide Crash Records Information System	Information Service Provider Subsystem	Existing
	Statewide Crash Records Information System Users	Archived Data User Systems	Existing
DPS Division of Emergency Management	State EOC	Emergency Management Subsystem	Existing
Federal Emergency Management Agency (FEMA)	Federal Emergency Management Agency (FEMA)	Emergency Management Subsystem	Existing
Financial Institution	Financial Institution	Financial Institution	Existing
Golden Crescent Regional Planning Commission	Golden Crescent Regional Planning Commission Archive Users	Archived Data User Systems	Existing
	Golden Crescent Regional Planning Commission ITS Database	Archived Data Management Subsystem	Planned
Golden Crescent Transit	Golden Crescent Transit Dispatch	Emergency Management Subsystem	Existing
	Golden Crescent Transit Dispatch	Transit Management Subsystem	Existing
	Golden Crescent Transit Information Display at Shelters	Remote Traveler Support Subsystem	Existing
	Golden Crescent Transit Information Display/Point of Sale	Remote Traveler Support Subsystem	Existing
	Golden Crescent Transit Vehicles	Transit Vehicle Subsystem	Existing
	Golden Crescent Transit Website	Information Service Provider Subsystem	Planned
Guadalupe-Blanco River Authority	Guadalupe-Blanco River Authority Control Center	Emergency Management Subsystem	Existing
	Guadalupe-Blanco River Authority Flood Warning Devices	Roadway Subsystem	Existing
Independent School Districts	Independent School District Buses	Transit Vehicle Subsystem	Existing
	Independent School District Dispatch	Emergency Management Subsystem	Existing
	Independent School District Dispatch	Transit Management Subsystem	Existing
Lavaca-Navidad River Authority	Lavaca Navidad River Authority Flood Monitoring Devices	Roadway Subsystem	Existing
	Lavaca Navidad River Authority Headquarters	Emergency Management Subsystem	Existing

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

Stakeholder	Element	Entity	Status
Local Media	Local Print and Broadcast Media	Media	Existing
Local Transit Operators	Local Transit Operations	Emergency Management Subsystem	Existing
	Local Transit Operations	Transit Management Subsystem	Existing
	Yoakum Region Intermodal Transit Terminal	Multimodal Transportation Service Provider	Planned
Lower Colorado River Authority	Lower Colorado River Authority Flood Detectors	Roadway Subsystem	Existing
	Lower Colorado River Authority Headquarters	Emergency Management Subsystem	Existing
Municipal Convention and Visitors Bureau	Municipal Convention and Visitors Bureau	Event Promoters	Existing
Municipal or County Government	Municipal ITS Field Equipment	Roadway Subsystem	Existing
	Municipal or County Permitting System	Commercial Vehicle Administration Subsystem	Existing
	Municipal Public Information Office	Information Service Provider Subsystem	Existing
	Municipal Traffic Operations Center	Emergency Management Subsystem	Planned
	Municipal Traffic Operations Center	Traffic Management Subsystem	Planned
	Municipal Website	Information Service Provider Subsystem	Existing
	Municipal/County Crash Records Database	Archived Data Management Subsystem	Existing
Municipal or County Public Safety	Municipal EOC	Emergency Management Subsystem	Existing
	Municipal or County Public Safety Vehicles	Emergency Vehicle Subsystem	Existing
	Municipal Public Safety Dispatch	Emergency Management Subsystem	Existing
	Other Municipal EOC	Emergency Management Subsystem	Existing
Municipal Public Works Department	Municipal Equipment Repair Facility	Equipment Repair Facility	Existing
	Municipal PWD	Maintenance and Construction Management Subsystem	Existing
	Municipal PWD Vehicles	Maintenance and Construction Vehicle Subsystem	Existing
	TexMAP Archive Database	Archived Data Management Subsystem	Existing
	TexMAP Archive Database Users	Archived Data User Systems	Existing

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

Stakeholder	Element	Entity	Status
Municipal Public Works Department (continued)	TexTAP Archive Database	Archived Data Management Subsystem	Existing
	TexTAP Archive Database Users	Archived Data User Systems	Existing
National Forest Service	Forest Service Dispatch	Emergency Management Subsystem	Planned
NOAA	National Weather Service	Weather Service	Existing
Non-Profit LLC	Emergency Alert System (Reverse 911)	Emergency Telecommunications System	Existing
	Emergency Response Information Center	Alerting and Advisory Systems	Existing
Private Equipment Repair Providers	Private Equipment Repair Facility	Equipment Repair Facility	Existing
	Private Sector Traveler Information Services	Information Service Provider Subsystem	Planned
Private Taxi Providers	Private Taxi Provider Dispatch	Transit Management Subsystem	Existing
Private Tow/Wrecker Providers	Private Tow/Wrecker Dispatch	Emergency Management Subsystem	Existing
	Private Tow/Wrecker Vehicles	Emergency Vehicle Subsystem	Existing
Private Transportation Providers	Intercity Bus Company Dispatch	Transit Management Subsystem	Existing
Private Travelers	Private Traveler	Traveler	Existing
	Private Travelers Personal Computing Devices	Personal Information Access Subsystem	Existing
	Private Vehicle Operators	Driver	Existing
	Private Vehicles	Vehicle Subsystem	Existing
Private/Public Ambulance Providers	Private/Public Ambulance Dispatch	Emergency Management Subsystem	Existing
	Private/Public Ambulance Vehicle	Emergency Vehicle Subsystem	Existing
Public Health Providers	County/Municipal Public Health Office	Emergency Management Subsystem	Existing
Rail Operators	Rail Operations Centers	Fleet and Freight Management Subsystem	Existing
	Rail Operations Centers	Rail Operations	Existing
	Rail Operators Rail Cars	Commercial Vehicle Subsystem	Planned
	Rail Operators Wayside Equipment	Wayside Equipment	Existing
Regional Airports	Victoria Regional Airport	Multimodal Transportation Service Provider	Existing
Regional Medical Center	Regional Medical Centers	Care Facility	Existing

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

Stakeholder	Element	Entity	Status
Regional Mobility Toll Road Authority	Other Regional Mobility Authority Toll Road Center	Toll Administration Subsystem	Existing
	Regional Mobility Authority Toll Collection Website	Information Service Provider Subsystem	Planned
	Regional Mobility Authority Toll Plazas	Toll Collection Subsystem	Planned
	Regional Mobility Authority Toll Road Customer Service Center	Toll Administration Subsystem	Planned
	TxTAG	Traveler Card	Planned
Regional Transit Agencies	Regional Smart Card	Traveler Card	Planned
Service Agencies	Service Agencies	Financial Institution	Existing
South Texas Nuclear Power Providers	South Texas Nuclear Power Plant Operations	Emergency Management Subsystem	Existing
Texas Commission on Environmental Quality (TCEQ)	TCEQ Field Emissions Monitors	Roadway Subsystem	Existing
	TCEQ Monitor Operations Section	Emissions Management Subsystem	Existing
	TCEQ State Headquarters	Emissions Management Subsystem	Existing
	Texas Commission on Environmental Quality (TCEQ)	Emergency Management Subsystem	Existing
Texas DEM	Texas DEM Disaster District Information System	Emergency Management Subsystem	Planned
Texas Department of Health	Texas Department of Health	Emergency Management Subsystem	Existing
TxDOT	Other TxDOT District Maintenance Sections	Maintenance and Construction Management Subsystem	Existing
	Other TxDOT District TMCs	Traffic Management Subsystem	Existing
	Other TxDOT Permitting Systems	Commercial Vehicle Administration Subsystem	Existing
	Regional Swing Bridges	Multimodal Crossings	Existing
	Regional Swing Bridges	Roadway Subsystem	Existing
	TxDOT 511 System	Information Service Provider Subsystem	Planned
	TxDOT BRINSAP	Asset Management	Existing
	TxDOT Central Permit Office	Commercial Vehicle Administration Subsystem	Existing
	TxDOT Fort Worth TMC (TransVision)	Traffic Management Subsystem	Existing

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

Stakeholder	Element	Entity	Status
TxDOT (continued)	TxDOT Headquarters (Austin) Maintenance Division	Traffic Management Subsystem	Existing
	TxDOT Highway Conditions Reporting System	Information Service Provider Subsystem	Existing
	TxDOT Highway Conditions Reporting System	Maintenance and Construction Management Subsystem	Existing
	TxDOT Houston TMC (TranStar)	Traffic Management Subsystem	Existing
	TxDOT Motor Carrier Routing Information	Information Service Provider Subsystem	Existing
	TxDOT Public Transportation Division (Austin)	Archived Data Management Subsystem	Existing
	TxDOT Rest Areas/Visitor Centers/Truck Stops/Service Plaza Kiosks	Remote Traveler Support Subsystem	Planned
	TxDOT San Antonio TMC (TransGuide)	Traffic Management Subsystem	Existing
	TxDOT Statewide Emergency Management Coordinator	Emergency Management Subsystem	Existing
	TxDOT Statewide Highway Conditions Reporting System	Traffic Management Subsystem	Existing
	TxDOT Statewide Pavement Management System	Archived Data Management Subsystem	Existing
	TxDOT Statewide Roadway Data Collection System	Archived Data Management Subsystem	Existing
	TxDOT Yoakum District Area Engineers Offices	Maintenance and Construction Administrative Systems	Existing
	TxDOT Yoakum District Area Engineers Offices	Maintenance and Construction Management Subsystem	Existing
	TxDOT Yoakum District CCTV	Roadway Subsystem	Planned
	TxDOT Yoakum District DMS	Roadway Subsystem	Existing
	TxDOT Yoakum District Field Sensors	Roadway Subsystem	Existing
	TxDOT Yoakum District Flood Sensors	Roadway Subsystem	Existing
	TxDOT Yoakum District HAR	Roadway Subsystem	Existing
	TxDOT Yoakum District Maintenance and Construction Vehicles	Maintenance and Construction Vehicle Subsystem	Existing

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

Stakeholder	Element	Entity	Status
TxDOT (continued)	TxDOT Yoakum District Maintenance Sections	Maintenance and Construction Management Subsystem	Existing
	TxDOT Yoakum District Office – Maintenance	Maintenance and Construction Management Subsystem	Existing
	TxDOT Yoakum District Office -Traffic	Emergency Management Subsystem	Existing
	TxDOT Yoakum District Office -Traffic	Traffic Management Subsystem	Existing
	TxDOT Yoakum District Pavement Management System	Archived Data Management Subsystem	Existing
	TxDOT Yoakum District Pavement Management System	Asset Management	Existing
	TxDOT Yoakum District Pavement Management System Archive Users	Archived Data User Systems	Existing
	TxDOT Yoakum District Public Information Office	Information Service Provider Subsystem	Planned
	TxDOT Yoakum District Public Transportation Management System (PTMS)	Archived Data Management Subsystem	Existing
	TxDOT Yoakum District Public Transportation Management System Archive Users	Archived Data User Systems	Existing
	TxDOT Yoakum District Roadway Data Collection System	Archived Data Management Subsystem	Existing
	TxDOT Yoakum District Roadway Data Collection System Users	Archived Data User Systems	Existing
	TxDOT Yoakum District RWIS	Roadway Subsystem	Existing
	TxDOT Yoakum District School Pager System	Roadway Subsystem	Existing
	TxDOT Yoakum District Security Equipment	Roadway Subsystem	Planned
	TxDOT Yoakum District Security Equipment	Security Monitoring Subsystem	Planned
	TxDOT Yoakum District Shop	Equipment Repair Facility	Existing
	TxDOT Yoakum District Swing Bridge Equipment	Roadway Subsystem	Existing
TxDOT Yoakum District Traffic Signal Shop	Equipment Repair Facility	Existing	

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

Stakeholder	Element	Entity	Status
TxDOT (continued)	TxDOT Yoakum District Traffic Signals	Roadway Subsystem	Existing
	TxDOT Yoakum District Web Page	Information Service Provider Subsystem	Existing
	TxDOT Yoakum District Work Zone Equipment	Roadway Subsystem	Planned
U.S. Coast Guard	U.S. Coast Guard Office	Emergency Management Subsystem	Existing
USGS	USGS Field Office	Emergency Management Subsystem	Existing
	USGS Flood Monitoring System	Roadway Subsystem	Existing
	USGS Website	Information Service Provider Subsystem	Existing
Victoria Transit	Victoria Transit Dispatch	Emergency Management Subsystem	Existing
	Victoria Transit Dispatch	Transit Management Subsystem	Existing
	Victoria Transit Vehicles	Transit Vehicle Subsystem	Existing
	Victoria Transit Website	Information Service Provider Subsystem	Existing
Volunteer Fire Departments	Volunteer Fire Departments	Emergency Management Subsystem	Existing
DPS	State Office of Emergency Management	Other Emergency Management	Existing
Regional Transit Agencies	State Centralized Transit Dispatch	Other Transit Management	Existing
FTA – Federal Transit Agency	FTA National Database	Other Archives	Existing

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

Entity	Element	Stakeholder	Status
Alerting and Advisory Systems	Emergency Response Information Center	Non-Profit LLC	Existing
Archived Data Management Subsystem	City of Victoria Crash Records Database	City of Victoria	Existing
	City of Victoria MPO Archive	City of Victoria	Existing
	City of Victoria Pavement Management System	City of Victoria Street Department	Existing
	City of Victoria Sign Inventory Database	City of Victoria Public Works Division	Existing
	City of Victoria Traffic Database	City of Victoria	Planned
	Golden Crescent Regional Planning Commission ITS Database	Golden Crescent Regional Planning Commission	Planned
	Municipal/County Crash Records Database	Municipal or County Government	Existing
	Statewide Crash Records Information System	DPS	Existing
	TexMAP Archive Database	Municipal Public Works Department	Existing
	TexTAP Archive Database	Municipal Public Works Department	Existing
	TxDOT Public Transportation Division (Austin)	TxDOT	Existing
	TxDOT Statewide Pavement Management System	TxDOT	Existing
	TxDOT Statewide Roadway Data Collection System	TxDOT	Existing
	TxDOT Yoakum District Pavement Management System	TxDOT	Existing
	TxDOT Yoakum District Public Transportation Management System (PTMS)	TxDOT	Existing
TxDOT Yoakum District Roadway Data Collection System	TxDOT	Existing	
Archived Data User Systems	City of Victoria MPO Archive Users	City of Victoria MPO	Existing
	City of Victoria Pavement Management System Users	City of Victoria Street Department	Existing
	City of Victoria Sign Inventory Database Users	City of Victoria Public Works Division	Existing
	City of Victoria Traffic Database Users	City of Victoria	Planned
	Golden Crescent Regional Planning Commission Archive Users	Golden Crescent Regional Planning Commission	Existing
	Statewide Crash Records Information System Users	DPS	Existing

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

Entity	Element	Stakeholder	Status
Archived Data User Systems (continued)	TexMAP Archive Database Users	Municipal Public Works Department	Existing
	TexTAP Archive Database Users	Municipal Public Works Department	Existing
	TxDOT Yoakum District Pavement Management System Archive Users	TxDOT	Existing
	TxDOT Yoakum District Public Transportation Management System Archive Users	TxDOT	Existing
	TxDOT Yoakum District Roadway Data Collection System Users	TxDOT	Existing
Asset Management	TxDOT BRINSAP	TxDOT	Existing
	TxDOT Yoakum District Pavement Management System	TxDOT	Existing
Care Facility	Regional Medical Centers	Regional Medical Center	Existing
Commercial Vehicle Administration Subsystem	Municipal or County Permitting System	Municipal or County Government	Existing
	Other TxDOT Permitting Systems	TxDOT	Existing
	TxDOT Central Permit Office	TxDOT	Existing
Commercial Vehicle Subsystem	Commercial Vehicles	Commercial Vehicle Operators	Existing
	Rail Operators Rail Cars	Rail Operators	Planned
Driver	Private Vehicle Operators	Private Travelers	Existing
Emergency Management Subsystem	Army Corps of Engineers Field Office	Army Corp of Engineers	Existing
	Bay City Police/Fire/EMS Dispatch and PSAP	Bay City	Existing
	City of Victoria EOC	City of Victoria	Existing
	City of Victoria Fire/Police/EMS Dispatch and PSAP	City of Victoria Police Department	Existing
	City of Victoria Traffic Operations Center	City of Victoria	Existing
	Colorado Valley Transit Dispatch	Colorado Valley Transit	Existing
	Correctional Facilities Operations	Correctional Facilities	Existing
	County EOC	County Emergency Management Agencies	Existing
	County Public Safety Dispatch and PSAP	County Sheriff	Existing

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

Entity	Element	Stakeholder	Status
Emergency Management Subsystem (continued)	County/Municipal Public Health Office	Public Health Providers	Existing
	DPS Administration	DPS	Existing
	DPS Communications	DPS	Existing
	Federal Emergency Management Agency (FEMA)	Federal Emergency Management Agency (FEMA)	Existing
	Forest Service Dispatch	National Forest Service	Planned
	Golden Crescent Transit Dispatch	Golden Crescent Transit	Existing
	Guadalupe-Blanco River Authority Control Center	Guadalupe-Blanco River Authority	Existing
	Independent School District Dispatch	Independent School Districts	Existing
	Lavaca Navidad River Authority Headquarters	Lavaca-Navidad River Authority	Existing
	Local Transit Operations	Local Transit Operators	Existing
	Lower Colorado River Authority Headquarters	Lower Colorado River Authority	Existing
	Municipal EOC	Municipal or County Public Safety	Existing
	Municipal Public Safety Dispatch	Municipal or County Public Safety	Existing
	Municipal Traffic Operations Center	Municipal or County Government	Planned
	Other County EOC	County Emergency Management Agencies	Existing
	Other Municipal EOC	Municipal or County Public Safety	Existing
	Private Tow/Wrecker Dispatch	Private Tow/Wrecker Providers	Existing
	Private/Public Ambulance Dispatch	Private/Public Ambulance Providers	Existing
	South Texas Nuclear Power Plant Operations	South Texas Nuclear Power Providers	Existing
	State EOC	DPS Division of Emergency Management	Existing
Texas Commission on Environmental Quality (TCEQ)	Texas Commission on Environmental Quality (TCEQ)	Existing	
Texas DEM Disaster District Information System	Texas DEM	Planned	
Texas Department of Health	Texas Department of Health	Existing	
TxDOT Statewide Emergency Management Coordinator	TxDOT	Existing	

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

Entity	Element	Stakeholder	Status
Emergency Management (continued)	TxDOT Yoakum District Office -Traffic	TxDOT	Existing
	U.S. Coast Guard Office	U.S. Coast Guard	Existing
	USGS Field Office	USGS	Existing
	Victoria Transit Dispatch	Victoria Transit	Existing
	Volunteer Fire Departments	Volunteer Fire Departments	Existing
Emergency Telecommunications System	City of Victoria First Call (Reverse 911)	City of Victoria Police Department	Existing
	Emergency Alert System (Reverse 911)	Non-Profit LLC	Existing
Emergency Vehicle Subsystem	City of Victoria Fire/EMS Vehicles	City of Victoria Fire Department	Existing
	City of Victoria Police Vehicles	City of Victoria Police Department	Existing
	DPS Emergency Vehicles	DPS	Existing
	Municipal or County Public Safety Vehicles	Municipal or County Public Safety	Existing
	Private Tow/Wrecker Vehicles	Private Tow/Wrecker Providers	Existing
	Private/Public Ambulance Vehicle	Private/Public Ambulance Providers	Existing
Emissions Management Subsystem	City of Victoria Air Quality Division	City of Victoria Public Works Division	Existing
	TCEQ Monitor Operations Section	Texas Commission on Environmental Quality (TCEQ)	Existing
	TCEQ State Headquarters	TCEQ	Existing
Equipment Repair Facility	City of Victoria Traffic Signal Shop	City of Victoria Public Works Division	Existing
	Municipal Equipment Repair Facility	Municipal Public Works Department	Existing
	Private Equipment Repair Facility	Private Equipment Repair Providers	Existing
	TxDOT Yoakum District Shop	TxDOT	Existing
	TxDOT Yoakum District Traffic Signal Shop	TxDOT	Existing
Event Promoters	Municipal Convention and Visitors Bureau	Municipal Convention and Visitors Bureau	Existing
Financial Institution	Financial Institution	Financial Institution	Existing
	Service Agencies	Service Agencies	Existing

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

Entity	Element	Stakeholder	Status
Fleet and Freight Management Subsystem	Private Fleet Management Systems	Commercial Vehicle Operators	Planned
	Rail Operations Centers	Rail Operators	Existing
Information Service Provider Subsystem	City of Victoria Public Information Office	City of Victoria	Existing
	City of Victoria Website	City of Victoria	Existing
	Colorado Valley Transit Website	Colorado Valley Transit	Existing
	County EOC Public Information Office	County Emergency Management Agencies	Existing
	Golden Crescent Transit Website	Golden Crescent Transit	Planned
	Municipal Public Information Office	Municipal or County Government	Existing
	Municipal Website	Municipal or County Government	Existing
	Private Sector Traveler Information Services	Private Information Service Providers	Planned
	Regional Mobility Authority Toll Collection Website	Regional Mobility Toll Road Authority	Planned
	Statewide Crash Records Information System	DPS	Existing
	TxDOT 511 System	TxDOT	Planned
	TxDOT Highway Conditions Reporting System	TxDOT	Existing
	TxDOT Motor Carrier Routing Information	TxDOT	Existing
	TxDOT Yoakum District Public Information Office	TxDOT	Planned
	TxDOT Yoakum District Web Page	TxDOT	Existing
	USGS Website	USGS	Existing
Victoria Transit Website	Victoria Transit	Existing	
Maintenance and Construction Administrative Systems	TxDOT Yoakum District Area Engineers Offices	TxDOT	Existing
Maintenance and Construction Management Subsystem	City of Victoria Maintenance Dispatch	City of Victoria Street Department	Existing
	County Road and Bridge	County Road and Bridge	Existing
	Municipal PWD	Municipal Public Works Department	Existing
	Other TxDOT District Maintenance Sections	TxDOT	Existing

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

Entity	Element	Stakeholder	Status
Maintenance and Construction Management Subsystem (continued)	TxDOT Highway Conditions Reporting System	TxDOT	Existing
	TxDOT Yoakum District Area Engineers Offices	TxDOT	Existing
	TxDOT Yoakum District Maintenance Sections	TxDOT	Existing
	TxDOT Yoakum District Office –Maintenance	TxDOT	Existing
Maintenance and Construction Vehicle Subsystem	City of Victoria Maintenance and Construction Vehicles	City of Victoria Public Works Division	Existing
	County Road and Bridge Vehicles	County Road and Bridge	Existing
	Municipal PWD Vehicles	Municipal Public Works Department	Existing
	TxDOT Yoakum District Maintenance and Construction Vehicles	TxDOT	Existing
Media	Local Print and Broadcast Media	Local Media	Existing
Multimodal Crossings	Regional Swing Bridges	TxDOT	Existing
Multimodal Transportation Service Provider	Victoria Regional Airport	Regional Airports	Existing
	Yoakum Region Intermodal Transit Terminal	Local Transit Operators	Planned
Other Archives	FTA National Database	FTA –Federal Transit Agency	Existing
Other Emergency Management	State Office of Emergency Management	DPS	Existing
Other Transit Management	State Centralized Transit Dispatch	Regional Transit Agencies	Existing
Personal Information Access Subsystem	Private Travelers Personal Computing Devices	Private Travelers	Existing
Rail Operations	Rail Operations Centers	Rail Operators	Existing
Remote Traveler Support Subsystem	Colorado Valley Transit Information Display/Point of Sale	Colorado Valley Transit	Planned
	Golden Crescent Transit Information Display at Shelters	Golden Crescent Transit	Existing
	Golden Crescent Transit Information Display/Point of Sale	Golden Crescent Transit	Existing
	TxDOT Rest Areas/Visitor Centers/Truck Stops/Service Plaza Kiosks	TxDOT	Planned

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

Entity	Element	Stakeholder	Status
Roadway Subsystem	Army Corps of Engineers Flood Monitoring System	Army Corp of Engineers	Existing
	City of Victoria Emissions Monitoring Equipment	City of Victoria Public Works Division	Existing
	City of Victoria ITS Field Equipment	City of Victoria Traffic Control Division	Existing
	City of Victoria MPO Field Devices	City of Victoria MPO	Existing
	County Road and Bridge Field Equipment	County Road and Bridge	Planned
	Guadalupe-Blanco River Authority Flood Warning Devices	Guadalupe-Blanco River Authority	Existing
	Lavaca Navidad River Authority Flood Monitoring Devices	Lavaca-Navidad River Authority	Existing
	Lower Colorado River Authority Flood Detectors	Lower Colorado River Authority	Existing
	Municipal ITS Field Equipment	Municipal or County Government	Existing
	Regional Swing Bridges	TxDOT	Existing
	TCEQ Field Emissions Monitors	Texas Commission on Environmental Quality (TCEQ)	Existing
	TxDOT Yoakum District CCTV	TxDOT	Planned
	TxDOT Yoakum District DMS	TxDOT	Existing
	TxDOT Yoakum District Field Sensors	TxDOT	Existing
	TxDOT Yoakum District Flood Sensors	TxDOT	Existing
	TxDOT Yoakum District HAR	TxDOT	Existing
	TxDOT Yoakum District RWIS	TxDOT	Existing
	TxDOT Yoakum District School Pager System	TxDOT	Existing
	TxDOT Yoakum District Security Equipment	TxDOT	Planned
	TxDOT Yoakum District Swing Bridge Equipment	TxDOT	Existing
TxDOT Yoakum District Traffic Signals	TxDOT	Existing	
TxDOT Yoakum District Work Zone Equipment	TxDOT	Planned	
USGS Flood Monitoring System	USGS	Existing	
Security Monitoring Subsystem	TxDOT Yoakum District Security Equipment	TxDOT	Planned

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

Entity	Element	Stakeholder	Status
Toll Administration Subsystem	Other Regional Mobility Authority Toll Road Center	Regional Mobility Toll Road Authority	Existing
	Regional Mobility Authority Toll Road Customer Service Center	Regional Mobility Toll Road Authority	Planned
Toll Collection Subsystem	Regional Mobility Authority Toll Plazas	Regional Mobility Toll Road Authority	Planned
Traffic Management Subsystem	City of Victoria Traffic Operations Center	City of Victoria	Existing
	Municipal Traffic Operations Center	Municipal or County Government	Planned
	Other TxDOT District TMCs	TxDOT	Existing
	TxDOT Fort Worth TMC (TransVision)	TxDOT	Existing
	TxDOT Headquarters (Austin) Maintenance Division	TxDOT	Existing
	TxDOT Houston TMC (TranStar)	TxDOT	Existing
	TxDOT San Antonio TMC (TransGuide)	TxDOT	Existing
	TxDOT Statewide Highway Conditions Reporting System	TxDOT	Existing
	TxDOT Yoakum District Office -Traffic	TxDOT	Existing
Transit Management Subsystem	Colorado Valley Transit Dispatch	Colorado Valley Transit	Existing
	Golden Crescent Transit Dispatch	Golden Crescent Transit	Existing
	Independent School District Dispatch	Independent School Districts	Existing
	Intercity Bus Company Dispatch	Private Transportation Providers	Existing
	Local Transit Operations	Local Transit Operators	Existing
	Private Taxi Provider Dispatch	Private Taxi Providers	Existing
	Victoria Transit Dispatch	Victoria Transit	Existing
Transit Vehicle Subsystem	Colorado Valley Transit Vehicles	Colorado Valley Transit	Existing
	Golden Crescent Transit Vehicles	Golden Crescent Transit	Existing
	Independent School District Buses	Independent School Districts	Existing
	Victoria Transit Vehicles	Victoria Transit	Existing
Traveler	Private Traveler	Private Travelers	Existing

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

Entity	Element	Stakeholder	Status
Traveler Card	Regional Smart Card	Regional Transit Agencies	Planned
	TxTAG	Regional Mobility Toll Road Authority	Planned
Vehicle Subsystem	Commercial Vehicles	Commercial Vehicle Operators	Existing
	Private Vehicles	Private Travelers	Existing
Wayside Equipment	Rail Operators Wayside Equipment	Rail Operators	Existing
Weather Service	National Weather Service	NOAA	Existing

4.2 Regional Market Packages

Upon completion of the system inventory, the next step in the development of the architecture was to identify the transportation services that are important to the Yoakum Region. In the National ITS Architecture, services are referred to as market packages. Market packages could include several stakeholders and elements that work together to provide a service in the Region. Examples of market packages from the National ITS Architecture include Network Surveillance, Traffic Information Dissemination, and Transit Vehicle Tracking. There are currently a total of 85 market packages identified in the National ITS Architecture Version 5.0.

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

In several cases, there are multiple stakeholders in the Region that provide the same service at different levels. For example, Surface Street Control (ATMS03) could be provided on arterials by the City of Victoria and by TxDOT on highways throughout the Yoakum District. The market package status is identified as existing, planned, or future for each of the primary stakeholders in the Region. In many cases market packages classified as existing might still need to be enhanced to increase the service that the market package provides and establish all of the elements associated with it.

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

Table 5 – Yoakum Region Selected Market Packages

Market Package	Market Package Name	Elements Associated with Market Package	Primary Stakeholders Responsible for Implementation	Market Package Status
ATMS01	Network Surveillance	City of Victoria ITS Field Equipment City of Victoria Traffic Operations Center City of Victoria Website Municipal ITS Field Equipment Municipal Traffic Operations Center Municipal Website Private Sector Traveler Information Services TxDOT Highway Conditions Reporting System TxDOT Yoakum District CCTV TxDOT Yoakum District Field Sensors TxDOT Yoakum District Office – Traffic TxDOT Yoakum District Web Page	City of Victoria	Existing
			Municipalities	Future
			TxDOT Yoakum	Future

Table 5 – Yoakum Region Selected Market Packages (continued)

Market Package	Market Package Name	Elements Associated with Market Package	Primary Stakeholders Responsible for Implementation	Market Package Status
ATMS02	Probe Surveillance	Commercial Vehicles Private Vehicles TxDOT Yoakum District DMS TxDOT Yoakum District Field Sensors TxDOT Yoakum District Office – Traffic TxDOT Yoakum District Web Page	TxDOT Yoakum	Future
ATMS03	Surface Street Control	City of Victoria ITS Field Equipment City of Victoria Traffic Operations Center Municipal ITS Field Equipment Municipal Traffic Operations Center TxDOT Yoakum District Field Sensors TxDOT Yoakum District Office – Traffic TxDOT Yoakum District School Pager System TxDOT Yoakum District Traffic Signals	City of Victoria	Existing
			Municipalities	Future
			TxDOT Yoakum	Future
ATMS06	Traffic Information Dissemination	City of Victoria Fire/Police/EMS Dispatch and PSAP City of Victoria ITS Field Equipment City of Victoria Maintenance Dispatch City of Victoria Public Information Office City of Victoria Traffic Operations Center City of Victoria Website Colorado Valley Transit Dispatch County Public Safety Dispatch and PSAP County Road and Bridge DPS Communications Golden Crescent Transit Dispatch Independent School District Dispatch Intercity Bus Company Dispatch Local Print and Broadcast Media Local Transit Operations Municipal ITS Field Equipment Municipal Public Information Office Municipal Public Safety Dispatch Municipal PWD Municipal Traffic Operations Center Municipal Website Private Sector Traveler Information Services Private Tow/Wrecker Dispatch	City of Victoria	Future
			Municipalities	Future
			TxDOT Yoakum	Future

Table 5 – Yoakum Region Selected Market Packages (continued)

Market Package	Market Package Name	Elements Associated with Market Package	Primary Stakeholders Responsible for Implementation	Market Package Status
ATMS06 (continued)	Traffic Information Dissemination (continued)	<p>TxDOT 511 System</p> <p>TxDOT Highway Conditions Reporting System</p> <p>TxDOT Houston TMC (TranStar)</p> <p>TxDOT San Antonio TMC (TransGuide)</p> <p>TxDOT Statewide Highway Conditions Reporting System</p> <p>TxDOT Yoakum District DMS</p> <p>TxDOT Yoakum District HAR</p> <p>TxDOT Yoakum District Maintenance Sections</p> <p>TxDOT Yoakum District Office – Maintenance</p> <p>TxDOT Yoakum District Office – Traffic</p> <p>TxDOT Yoakum District Public Information Office</p> <p>Victoria Transit Dispatch</p>		
ATMS07	Regional Traffic Control	<p>City of Victoria Traffic Operations Center</p> <p>Municipal Traffic Operations Center</p> <p>Other TxDOT District TMCs</p> <p>TxDOT Houston TMC (TranStar)</p> <p>TxDOT San Antonio TMC (TransGuide)</p> <p>TxDOT Yoakum District Office – Traffic</p>	TxDOT Yoakum	Future
ATMS08	Traffic Incident Management System	<p>Army Corps of Engineers Field Office</p> <p>Army Corps of Engineers Flood Monitoring System</p> <p>City of Victoria EOC</p> <p>City of Victoria Fire/EMS Vehicles</p> <p>City of Victoria Fire/Police/EMS Dispatch and PSAP</p> <p>City of Victoria Maintenance Dispatch</p> <p>City of Victoria Police Vehicles</p> <p>City of Victoria Public Information Office</p> <p>City of Victoria Traffic Operations Center</p> <p>Colorado Valley Transit Dispatch</p> <p>Colorado Valley Transit Vehicles</p> <p>Colorado Valley Transit Website</p> <p>County EOC</p> <p>County Public Safety Dispatch and PSAP</p> <p>County Road and Bridge</p>	<p>Transportation and Emergency Management Agencies</p>	Future

Table 5 – Yoakum Region Selected Market Packages (continued)

Market Package	Market Package Name	Elements Associated with Market Package	Primary Stakeholders Responsible for Implementation	Market Package Status
ATMS08 (continued)	Traffic Incident Management System (continued)	DPS Communications DPS Emergency Vehicles Golden Crescent Transit Dispatch Golden Crescent Transit Website Guadalupe-Blanco River Authority Control Center Guadalupe-Blanco River Authority Flood Warning Devices Lavaca Navidad River Authority Flood Monitoring Devices Lavaca Navidad River Authority Headquarters Local Print and Broadcast Media Local Transit Operations Lower Colorado River Authority Flood Detectors Lower Colorado River Authority Headquarters Municipal Convention and Visitors Bureau Municipal EOC Municipal or County Public Safety Vehicles Municipal Public Safety Dispatch Municipal PWD Municipal Traffic Operations Center National Weather Service Other County EOC Other Municipal EOC Other TxDOT District TMCs Other TxDOT District Maintenance Sections Private Tow/Wrecker Dispatch Private Tow/Wrecker Vehicles Private/Public Ambulance Dispatch Private/Public Ambulance Vehicle Rail Operations Centers State Centralized Transit Dispatch TxDOT Yoakum District Flood Sensors TxDOT Yoakum District Maintenance Sections TxDOT Yoakum District Office – Maintenance TxDOT Yoakum District Office – Traffic		

Table 5 – Yoakum Region Selected Market Packages (continued)

Market Package	Market Package Name	Elements Associated with Market Package	Primary Stakeholders Responsible for Implementation	Market Package Status
ATMS08 (continued)	Traffic Incident Management System (continued)	USGS Field Office USGS Flood Monitoring System USGS Website Victoria Transit Dispatch Victoria Transit Website Volunteer Fire Departments		
ATMS10	Electronic Toll Collection	Commercial Vehicles Financial Institution Other Regional Mobility Authority Toll Road Center Private Fleet Management Systems Private Vehicle Operators Private Vehicles Regional Mobility Authority Toll Collection Website Regional Mobility Authority Toll Plazas Regional Mobility Authority Toll Road Customer Service Center TxTAG	Regional Mobility Authority	Future
ATMS11	Emissions Monitoring and Management	City of Victoria Air Quality Division City of Victoria Emissions Monitoring Equipment City of Victoria Traffic Operations Center Local Print and Broadcast Media TCEQ Field Emissions Monitors TCEQ Monitor Operations Section TCEQ State Headquarters TxDOT Yoakum District Office – Traffic	City of Victoria	Future
			TCEQ	Future
ATMS13	Standard Railroad Grade Crossing	City of Victoria ITS Field Equipment City of Victoria Traffic Operations Center Rail Operations Centers Rail Operators Wayside Equipment TxDOT Yoakum District Office – Traffic TxDOT Yoakum District Traffic Signals	City of Victoria	Existing
			TxDOT Yoakum	Future
ATMS15	Railroad Operations Coordination	City of Victoria Traffic Operations Center Municipal Traffic Operations Center Rail Operations Centers TxDOT Yoakum District Office – Traffic	City of Victoria	Future
			TxDOT Yoakum	Future
			Municipalities	Future

Table 5 – Yoakum Region Selected Market Packages (continued)

Market Package	Market Package Name	Elements Associated with Market Package	Primary Stakeholders Responsible for Implementation	Market Package Status
ATMS19	Speed Monitoring	City of Victoria ITS Field Equipment City of Victoria Traffic Operations Center	City of Victoria	Future
ATMS20	Drawbridge Management	Regional Swing Bridges TxDOT Highway Conditions Reporting System TxDOT Yoakum District Office – Traffic TxDOT Yoakum District Swing Bridge Equipment US Coast Guard Office	TxDOT Yoakum	Future
EM01	Emergency Call-Taking and Dispatch	Bay City Police/Fire/EMS Dispatch and PSAP City of Victoria EOC City of Victoria Fire/Police/EMS Dispatch and PSAP City of Victoria Traffic Operations Center Colorado Valley Transit Dispatch Correctional Facilities Operations County EOC County Public Safety Dispatch and PSAP County/Municipal Public Health Office DPS Communications Forest Service Dispatch Golden Crescent Transit Dispatch Guadalupe-Blanco River Authority Control Center Independent School District Dispatch Lavaca-Navidad River Authority Headquarters Local Transit Operations Lower Colorado River Authority Headquarters Municipal EOC Municipal Public Safety Dispatch Municipal Traffic Operations Center Other County EOC Other TxDOT District TMCs Private Tow/Wrecker Dispatch Private/Public Ambulance Dispatch Private/Public Ambulance Vehicle State EOC	Emergency Management Agencies	Future

Table 5 – Yoakum Region Selected Market Packages (continued)

Market Package	Market Package Name	Elements Associated with Market Package	Primary Stakeholders Responsible for Implementation	Market Package Status
EM01 (continued)	Emergency Call-Taking and Dispatch (continued)	Texas DEM Disaster District Information System TxDOT Houston TMC (TranStar) TxDOT San Antonio TMC (TransGuide) TxDOT Yoakum District Office – Traffic Victoria Transit Dispatch		
EM02	Emergency Routing	City of Victoria Fire/EMS Vehicles City of Victoria Fire/Police/EMS Dispatch and PSAP City of Victoria ITS Field Equipment City of Victoria Traffic Operations Center County Public Safety Dispatch and PSAP DPS Communications DPS Emergency Vehicles Municipal ITS Field Equipment Municipal or County Public Safety Vehicles Municipal Public Safety Dispatch Municipal Traffic Operations Center Private/Public Ambulance Dispatch Private/Public Ambulance Vehicle Regional Medical Centers TxDOT Yoakum District Office – Traffic TxDOT Yoakum District Traffic Signals	City of Victoria	Existing
			Counties	Future
			DPS	Future
			Municipalities	Future
			Private EMS	Future
			TxDOT Yoakum	Future
EM05	Transportation Infrastructure Protection	City of Victoria Traffic Operations Center County Public Safety Dispatch and PSAP DPS Communications Emergency Response Information Center Municipal Traffic Operations Center Other TxDOT District TMCs State Office of Emergency Management TxDOT Headquarters (Austin) Maintenance Division TxDOT Houston TMC (TranStar) TxDOT San Antonio TMC (TransGuide) TxDOT Yoakum District Maintenance Sections TxDOT Yoakum District Office – Traffic TxDOT Yoakum District Public Information Office	TxDOT Yoakum	Future

Table 5 – Yoakum Region Selected Market Packages (continued)

Market Package	Market Package Name	Elements Associated with Market Package	Primary Stakeholders Responsible for Implementation	Market Package Status
EM05 (continued)	Transportation Infrastructure Protection (continued)	TxDOT Yoakum District Security Equipment U.S. Coast Guard Office		
EM06	Wide-Area Alert	City of Victoria EOC City of Victoria Fire/Police/EMS Dispatch and PSAP City of Victoria First Call (Reverse 911) City of Victoria Maintenance Dispatch City of Victoria Traffic Operations Center County EOC County Public Safety Dispatch and PSAP County/Municipal Public Health Office County Road and Bridge DPS Communications Emergency Alert System (Reverse 911) Municipal EOC Municipal Public Safety Dispatch Municipal PWD Municipal Traffic Operations Center National Weather Service Other County EOC Private Traveler South Texas Nuclear Power Plant Operations TxDOT Fort Worth TMC (TransVision) TxDOT Yoakum District Office – Maintenance TxDOT Yoakum District Office – Traffic	City of Victoria	Future
			Counties	Future
			DPS	Future
			TxDOT Yoakum	Future
EM08	Disaster Response and Recovery	Bay City Police/Fire/EMS Dispatch and PSAP City of Victoria EOC City of Victoria Fire/Police/EMS Dispatch and PSAP City of Victoria Maintenance Dispatch City of Victoria Traffic Operations Center Colorado Valley Transit Dispatch County EOC County Public Safety Dispatch and PSAP County Road and Bridge DPS Communications	Counties	Future

Table 5 – Yoakum Region Selected Market Packages (continued)

Market Package	Market Package Name	Elements Associated with Market Package	Primary Stakeholders Responsible for Implementation	Market Package Status
EM08 (continued)	Disaster Response and Recovery (continued)	Federal Emergency Management Agency (FEMA) Golden Crescent Transit Dispatch Independent School District Dispatch Local Transit Operations Municipal EOC Municipal Public Safety Dispatch Municipal PWD Municipal Traffic Operations Center Other County EOC Private/Public Ambulance Dispatch State EOC TxDOT Yoakum District Office – Maintenance TxDOT Yoakum District Office – Traffic U.S. Coast Guard Office Victoria Transit Dispatch		
EM09	Evacuation and Reentry Management	Bay City Police/Fire/EMS Dispatch and PSAP	City of Victoria	Future
		City of Victoria EOC	Counties	Future
		City of Victoria Fire/Police/EMS Dispatch and PSAP	Municipalities	Future
		City of Victoria Maintenance Dispatch City of Victoria Traffic Operations Center	State of Texas Emergency Management	Future
Colorado Valley Transit Dispatch County EOC County Public Safety Dispatch and PSAP County Road and Bridge DPS Communications Golden Crescent Transit Dispatch Independent School District Dispatch Local Transit Operations Municipal EOC Municipal Public Safety Dispatch Municipal PWD Municipal Traffic Operations Center State EOC Texas DEM Disaster District Information System				

Table 5 – Yoakum Region Selected Market Packages (continued)

Market Package	Market Package Name	Elements Associated with Market Package	Primary Stakeholders Responsible for Implementation	Market Package Status
EM09 (continued)	Evacuation and Reentry Management (continued)	TxDOT Statewide Emergency Management Coordinator TxDOT Yoakum District Office – Maintenance TxDOT Yoakum District Office – Traffic Victoria Transit Dispatch		
EM10	Disaster Traveler Information	City of Victoria EOC City of Victoria Fire/Police/EMS Dispatch and PSAP City of Victoria Public Information Office City of Victoria Traffic Operations Center Colorado Valley Transit Dispatch County EOC County EOC Public Information Office County Public Safety Dispatch and PSAP Golden Crescent Transit Dispatch Independent School District Dispatch Local Print and Broadcast Media Local Transit Operations Municipal EOC Municipal Public Information Office Municipal Public Safety Dispatch Municipal Traffic Operations Center Other County EOC Private Travelers Personal Computing Devices State EOC TxDOT Yoakum District Office – Traffic TxDOT Yoakum District Public Information Office Victoria Transit Dispatch	City of Victoria	Future
			Counties	Future
			Municipalities	Future
			TxDOT Yoakum	Future
MC01	Maintenance and Construction Vehicle and Equipment Tracking	County Road and Bridge County Road and Bridge Vehicles TxDOT Yoakum District Area Engineers Offices TxDOT Yoakum District Maintenance and Construction Vehicles TxDOT Yoakum District Maintenance Sections	Counties	Future
			TxDOT Yoakum	Future

Table 5 – Yoakum Region Selected Market Packages (continued)

Market Package	Market Package Name	Elements Associated with Market Package	Primary Stakeholders Responsible for Implementation	Market Package Status
MC02	Maintenance and Construction Vehicle Maintenance	City of Victoria Maintenance and Construction Vehicles City of Victoria Maintenance Dispatch Private Equipment Repair Facility TxDOT Yoakum District Maintenance and Construction Vehicles TxDOT Yoakum District Maintenance Sections TxDOT Yoakum District Shop	City of Victoria	Future
			TxDOT Yoakum	Future
MC03	Road Weather Data Collection	City of Victoria ITS Field Equipment City of Victoria Maintenance Dispatch City of Victoria Traffic Operations Center City of Victoria Website National Weather Service TxDOT Yoakum District Flood Sensors TxDOT Yoakum District Maintenance Sections TxDOT Yoakum District Office – Traffic TxDOT Yoakum District RWIS	City of Victoria	Future
			TxDOT Yoakum	Future
MC04	Weather Information Processing and Distribution	City of Victoria EOC City of Victoria Fire/Police/EMS Dispatch and PSAP City of Victoria Maintenance and Construction Vehicles City of Victoria Maintenance Dispatch Colorado Valley Transit Dispatch County EOC County Public Safety Dispatch and PSAP County Road and Bridge DPS Communications Golden Crescent Transit Dispatch Independent School District Dispatch Local Transit Operations Municipal EOC Municipal Public Safety Dispatch Municipal PWD National Weather Service Other TxDOT District Maintenance Sections State EOC	City of Victoria	Future
			TxDOT Yoakum	Future

Table 5 – Yoakum Region Selected Market Packages (continued)

Market Package	Market Package Name	Elements Associated with Market Package	Primary Stakeholders Responsible for Implementation	Market Package Status
MC04 (continued)	Weather Information Processing and Distribution (continued)	TxDOT Yoakum District Maintenance and Construction Vehicles TxDOT Yoakum District Maintenance Sections TxDOT Yoakum District Office – Maintenance Victoria Transit Dispatch		
MC07	Roadway Maintenance and Construction	City of Victoria Maintenance and Construction Vehicles City of Victoria Maintenance Dispatch City of Victoria Traffic Operations Center City of Victoria Traffic Signal Shop Municipal Equipment Repair Facility Municipal PWD Municipal PWD Vehicles Municipal Traffic Operations Center National Weather Service TxDOT BRINSAP TxDOT Yoakum District Area Engineers Offices TxDOT Yoakum District Maintenance and Construction Vehicles TxDOT Yoakum District Maintenance Sections TxDOT Yoakum District Office – Maintenance TxDOT Yoakum District Office – Traffic TxDOT Yoakum District Pavement Management System TxDOT Yoakum Traffic Signal Shop	City of Victoria	Future
			Municipalities	Future
			TxDOT Yoakum	Future
MC08	Work Zone Management	City of Victoria Fire/Police/EMS Dispatch and PSAP City of Victoria ITS Field Equipment City of Victoria Maintenance Dispatch City of Victoria Traffic Operations Center Colorado Valley Transit Dispatch County EOC County Public Safety Dispatch and PSAP County Road and Bridge County Road and Bridge Field Equipment County Road and Bridge Vehicles	City of Victoria	Future
			Counties	Future
			Municipalities	Future
			TxDOT Yoakum	Future

Table 5 – Yoakum Region Selected Market Packages (continued)

Market Package	Market Package Name	Elements Associated with Market Package	Primary Stakeholders Responsible for Implementation	Market Package Status
MC08 (continued)	Work Zone Management (continued)	DPS Communications Golden Crescent Transit Dispatch Independent School District Dispatch Local Transit Operations Municipal ITS Field Equipment Municipal Public Safety Dispatch Municipal PWD Municipal PWD Vehicles Municipal Traffic Operations Center Other TxDOT District Maintenance Sections Private Tow/Wrecker Dispatch TxDOT 511 System TxDOT Highway Conditions Reporting System TxDOT Yoakum District Area Engineers Offices TxDOT Yoakum District Maintenance and Construction Vehicles TxDOT Yoakum District Maintenance Sections TxDOT Yoakum District Office – Traffic TxDOT Yoakum District Web Page TxDOT Yoakum District Work Zone Equipment Victoria Transit Dispatch		
MC09	Work Zone Safety Monitoring	City of Victoria ITS Field Equipment	City of Victoria	Future
		City of Victoria Maintenance and Construction Vehicles	TxDOT Yoakum	Future
		City of Victoria Maintenance Dispatch TxDOT Yoakum District Maintenance and Construction Vehicles TxDOT Yoakum District Maintenance Sections TxDOT Yoakum District Work Zone Equipment		

Table 5 – Yoakum Region Selected Market Packages (continued)

Market Package	Market Package Name	Elements Associated with Market Package	Primary Stakeholders Responsible for Implementation	Market Package Status
MC10	Maintenance and Construction Activity Coordination	City of Victoria EOC City of Victoria Fire/Police/EMS Dispatch and PSAP City of Victoria Maintenance Dispatch City of Victoria Public Information Office City of Victoria Traffic Operations Center Colorado Valley Transit Dispatch County EOC County Public Safety Dispatch and PSAP County Road and Bridge DPS Communications Golden Crescent Transit Dispatch Independent School District Dispatch Local Transit Operations Municipal EOC Municipal Public Information Office Municipal Public Safety Dispatch Municipal PWD Municipal Traffic Operations Center Other TxDOT District Maintenance Sections Private Tow/Wrecker Dispatch TxDOT 511 System TxDOT Highway Conditions Reporting System TxDOT Yoakum District Area Engineers Offices TxDOT Yoakum District Maintenance Sections TxDOT Yoakum District Office – Traffic TxDOT Yoakum District Public Information Office Victoria Transit Dispatch Volunteer Fire Departments	City of Victoria	Future
			Municipalities	Future
			TxDOT Yoakum	Future
APTS1	Transit Vehicle Tracking	Colorado Valley Transit Dispatch Colorado Valley Transit Vehicles Golden Crescent Transit Dispatch Golden Crescent Transit Vehicles Independent School District Buses Independent School District Dispatch	Colorado Valley Transit	Future
			Golden Crescent Transit	Future
			Independent School Districts	Future
			Victoria Transit	Future

Table 5 – Yoakum Region Selected Market Packages (continued)

Market Package	Market Package Name	Elements Associated with Market Package	Primary Stakeholders Responsible for Implementation	Market Package Status
APTS1 (continued)	Transit Vehicle Tracking (continued)	Victoria Transit Dispatch Victoria Transit Vehicles		
APTS2	Transit Fixed-Route Operations	City of Victoria Maintenance Dispatch City of Victoria Public Information Office City of Victoria Traffic Operations Center Colorado Valley Transit Dispatch Colorado Valley Transit Vehicles Colorado Valley Transit Website County Road and Bridge Golden Crescent Transit Website Independent School District Buses Independent School District Dispatch Municipal PWD Municipal Traffic Operations Center Private Sector Traveler Information Services TxDOT 511 System TxDOT Yoakum District Area Engineers Offices TxDOT Yoakum District Office – Maintenance TxDOT Yoakum District Office – Traffic Victoria Transit Dispatch Victoria Transit Vehicles	Colorado Valley Transit	Future
			Victoria Transit	Future
			Independent School Districts	Future
APTS3	Demand Response Transit Operations	City of Victoria Maintenance Dispatch City of Victoria Traffic Operations Center Colorado Valley Transit Dispatch Colorado Valley Transit Vehicles Colorado Valley Transit Website County Road and Bridge Golden Crescent Transit Dispatch Golden Crescent Transit Vehicles Golden Crescent Transit Website Municipal PWD Municipal Traffic Operations Center Other TxDOT District Maintenance Sections Other TxDOT District TMCs Private Sector Traveler Information Services TxDOT 511 System	Colorado Valley Transit	Future
			Golden Crescent Transit	Future
			Victoria Transit	Future

Table 5 – Yoakum Region Selected Market Packages (continued)

Market Package	Market Package Name	Elements Associated with Market Package	Primary Stakeholders Responsible for Implementation	Market Package Status
APTS3 (continued)	Demand Response Transit Operations (continued)	TxDOT Yoakum District Office – Maintenance TxDOT Yoakum District Office – Traffic Victoria Transit Dispatch Victoria Transit Vehicles Victoria Transit Website		
APTS4	Transit Passenger and Fare Management	Colorado Valley Transit Information Display/Point of Sale Colorado Valley Transit Dispatch Colorado Valley Transit Vehicles Financial Institution Golden Crescent Transit Dispatch Golden Crescent Transit Information Display/Point of Sale Golden Crescent Transit Vehicles Regional Smart Card Service Agencies TxDOT Rest Areas/Visitor Centers/Truck Stops/Service Plaza Kiosks Victoria Transit Dispatch Victoria Transit Vehicles	Colorado Valley Transit	Future
			Golden Crescent Transit	Future
			Victoria Transit	
APTS5	Transit Security	Bay City Police/Fire/EMS Dispatch and PSAP City of Victoria Fire/Police/EMS Dispatch and PSAP Colorado Valley Transit Dispatch Colorado Valley Transit Vehicles County Public Safety Dispatch and PSAP DPS Communications Golden Crescent Transit Dispatch Golden Crescent Transit Vehicles Independent School District Buses Independent School District Dispatch Municipal Public Safety Dispatch Victoria Transit Dispatch Victoria Transit Vehicles	Colorado Valley Transit	Future
			Golden Crescent Transit	Future
			Independent School Districts	Future
			Victoria Transit	Future
APTS6	Transit Maintenance	Colorado Valley Transit Dispatch Colorado Valley Transit Vehicles Golden Crescent Transit Dispatch Golden Crescent Transit Vehicles	Colorado Valley Transit	Future
			Golden Crescent Transit	Future
			Victoria Transit	Future

Table 5 – Yoakum Region Selected Market Packages (continued)

Market Package	Market Package Name	Elements Associated with Market Package	Primary Stakeholders Responsible for Implementation	Market Package Status
APTS6 (continued)	Transit Maintenance (continued)	Victoria Transit Dispatch Victoria Transit Vehicles		
APTS7	Multi-modal Coordination	Colorado Valley Transit Dispatch	Golden Crescent Transit	Future
		Colorado Valley Transit Vehicles	Colorado Valley Transit	Future
		Golden Crescent Transit Dispatch Golden Crescent Transit Vehicles Intercity Bus Company Dispatch Local Transit Operations Private Taxi Provider Dispatch Victoria Regional Airport Victoria Transit Dispatch Victoria Transit Vehicles Yoakum Region Intermodal Transit Terminal	Victoria Transit	Future
APTS8	Transit Traveler Information	Colorado Valley Transit Information Display/Point of Sale	Colorado Valley Transit	Future
		Colorado Valley Transit Dispatch	Golden Crescent Transit	Future
		Colorado Valley Transit Website Golden Crescent Transit Dispatch Golden Crescent Transit Information Display at Shelters Golden Crescent Transit Information Display/Point of Sale Golden Crescent Transit Website Private Travelers Personal Computing Devices TxDOT 511 System TxDOT Rest Areas/Visitor Centers/Truck Stops/Service Plaza Kiosks Victoria Transit Dispatch Victoria Transit Website	Victoria Transit	Future
CVO04	CV Administrative Processes	City of Victoria Fire/Police/EMS Dispatch and PSAP	Municipalities	Future
		City of Victoria Traffic Operations Center County Public Safety Dispatch and PSAP DPS Communications Municipal or County Permitting System Municipal Public Safety Dispatch Municipal Traffic Operations Center Other TxDOT Permitting Systems Private Fleet Management Systems	TxDOT (Statewide)	Future

Table 5 – Yoakum Region Selected Market Packages (continued)

Market Package	Market Package Name	Elements Associated with Market Package	Primary Stakeholders Responsible for Implementation	Market Package Status
CVO04 (continued)	CV Administrative Processes (continued)	TxDOT Central Permit Office TxDOT Yoakum District Office – Maintenance TxDOT Yoakum District Office – Traffic		
CVO10	HAZMAT Management	Bay City Police/Fire/EMS Dispatch and PSAP City of Victoria Fire/Police/EMS Dispatch and PSAP Commercial Vehicles County Public Safety Dispatch and PSAP DPS Communications Guadalupe-Blanco River Authority Control Center Lavaca Navidad River Authority Headquarters Lower Colorado River Authority Headquarters Municipal Public Safety Dispatch Private Fleet Management Systems Rail Operations Centers Rail Operators Rail Cars Texas Commission on Environmental Quality (TCEQ) Texas Department of Health U.S. Coast Guard Office	Emergency Management Agencies	Future
ATIS1	Broadcast Traveler Information	City of Victoria Traffic Operations Center Colorado Valley Transit Dispatch Golden Crescent Transit Dispatch Independent School District Dispatch Local Print and Broadcast Media Local Transit Operations Municipal Traffic Operations Center Private Travelers Personal Computing Devices TxDOT 511 System TxDOT Highway Conditions Reporting System TxDOT Rest Areas/Visitor Centers/Truck Stops/Service Plaza Kiosks TxDOT Yoakum District Area Engineers Offices	TxDOT (Statewide)	Future

Table 5 – Yoakum Region Selected Market Packages (continued)

Market Package	Market Package Name	Elements Associated with Market Package	Primary Stakeholders Responsible for Implementation	Market Package Status
ATIS1 (continued)	Broadcast Traveler Information (continued)	TxDOT Yoakum District Maintenance Sections TxDOT Yoakum District Office – Maintenance TxDOT Yoakum District Office – Traffic TxDOT Yoakum District Public Information Office Victoria Transit Dispatch		
ATIS2	Interactive Traveler Information	City of Victoria Traffic Operations Center Colorado Valley Transit Dispatch Golden Crescent Transit Dispatch Independent School District Dispatch Local Transit Operations Municipal Traffic Operations Center Private Travelers Personal Computing Devices TxDOT 511 System TxDOT Highway Conditions Reporting System TxDOT Rest Areas/Visitor Centers/Truck Stops/Service Plaza Kiosks TxDOT Yoakum District Office - Traffic Victoria Transit Dispatch	TxDOT (Statewide)	Future
ATIS5	ISP Based Route Guidance	Private Fleet Management Systems TxDOT Motor Carrier Routing Information TxDOT Rest Areas/Visitor Centers/Truck Stops/Service Plaza Kiosks TxDOT Statewide Highway Conditions Reporting System	TxDOT Motor Carrier Division	Future
AD1	ITS Data Mart	City of Victoria Crash Records Database City of Victoria ITS Field Equipment City of Victoria Maintenance Dispatch City of Victoria MPO Archive City of Victoria MPO Archive Users City of Victoria MPO Field Devices City of Victoria Pavement Management System City of Victoria Pavement Management System Users City of Victoria Police Vehicles City of Victoria Sign Inventory Database	City of Victoria City of Victoria MPO Counties DPS Golden Crescent Regional Planning Commission Municipalities TxDOT (Statewide) TxDOT Yoakum	Future Future Future Future Future Future Future Future

Table 5 – Yoakum Region Selected Market Packages (continued)

Market Package	Market Package Name	Elements Associated with Market Package	Primary Stakeholders Responsible for Implementation	Market Package Status
AD1 (continued)	ITS Data Mart (continued)	City of Victoria Sign Inventory Database Users City of Victoria Traffic Database City of Victoria Traffic Database Users City of Victoria Traffic Operations Center Colorado Valley Transit Dispatch DPS Administration FTA National Database Golden Crescent Regional Planning Commission Archive Users Golden Crescent Regional Planning Commission ITS Database Golden Crescent Transit Dispatch Independent School District Dispatch Intercity Bus Company Dispatch Local Transit Operations Municipal or County Public Safety Vehicles Municipal/County Crash Records Database Statewide Crash Records Information System Statewide Crash Records Information System Users TexMAP Archive Database TexMAP Archive Database Users TexTAP Archive Database TexTAP Archive Database Users TxDOT Public Transportation Division (Austin) TxDOT Statewide Pavement Management System TxDOT Statewide Roadway Data Collection System TxDOT Yoakum District Office – Maintenance TxDOT Yoakum District Pavement Management System TxDOT Yoakum District Pavement Management System Archive Users TxDOT Yoakum District Public Transportation Management System (PTMS)		

Table 5 – Yoakum Region Selected Market Packages (continued)

Market Package	Market Package Name	Elements Associated with Market Package	Primary Stakeholders Responsible for Implementation	Market Package Status
AD1 (continued)	ITS Data Mart (continued)	TxDOT Yoakum District Public Transportation Management System Archive Users TxDOT Yoakum District Roadway Data Collection System TxDOT Yoakum District Roadway Data Collection System Users Victoria Transit Dispatch		

4.3 Interconnections

4.3.1 Top Level Regional System Interconnect Diagram

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

4.3.2 Customized Market Packages

The market packages in the National ITS Architecture were customized to reflect the unique systems, subsystems, and terminators in the Yoakum Region. Each market package is shown graphically, with the market package name, Yoakum-specific element, and with the unique agency and system identifiers within the subsystems and terminators. Market packages represent a service that will be deployed as an integrated capability. Market packages often are comprised of one or more equipment packages, which are functional capabilities that could be deployed at a specific time. Equipment packages are the most basic functions that will be developed or bought by implementers.

Figure 6 is an example of an ATMS market package for Surface Street Control that has been customized for the Yoakum Region. This market package shows the two subsystems, Traffic Management and Roadway, and the associated entities (TxDOT Yoakum District Traffic Signals, TxDOT Yoakum District Field Sensors, etc.) for the TxDOT Yoakum District signal system. Data flows between the subsystems indicate what information is being shared.

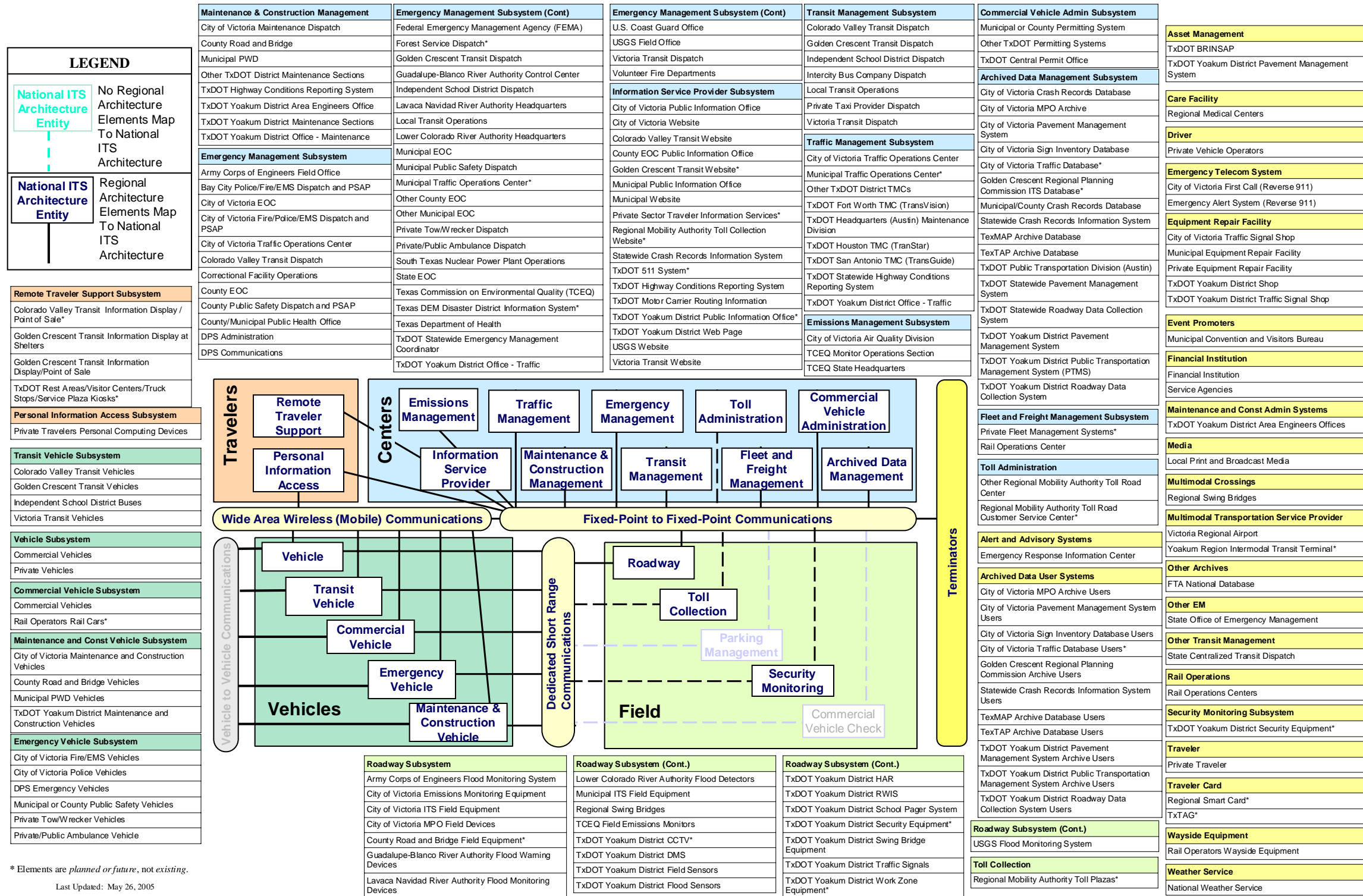


Figure 5 – Yoakum Regional System Interconnect Diagram

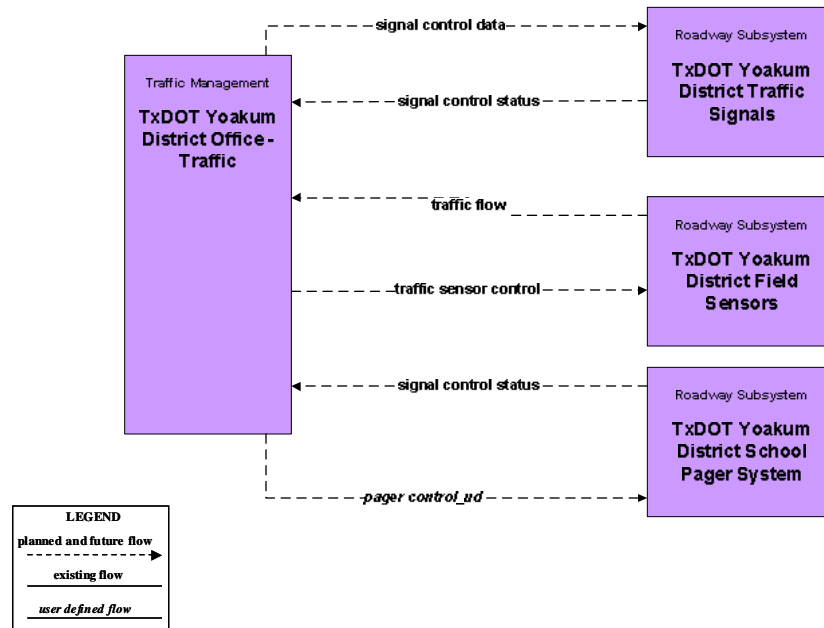


Figure 6 – Custom Market Package for Surface Street Control

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

4.3.3 Yoakum Architecture Interfaces

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

There are 177 different elements identified as part of the Yoakum Regional ITS Architecture. These elements include traffic management centers, transit vehicles, dispatch systems, emergency management agencies, media outlets, and others – essentially, all of the existing and planned physical components that contribute to the regional intelligent transportation system. Interfaces have been identified for each element in the Yoakum

Regional ITS Architecture, and each element has been mapped to those other elements with which it must interface. For example, the TxDOT Yoakum District Office – Traffic has existing or planned interfaces with 54 other elements in the Yoakum Region, ranging from field equipment and dispatch centers, to other TxDOT District TMCs. Other interfaces are far less complex, such as the interface between the DPS vehicles and the DPS Communications Dispatch.

An example of one of the system interfaces is shown in **Figure 7**. This graphic shows the TxDOT Yoakum District Traffic Signals and the existing and planned interfaces with other elements throughout the Region. These interfaces are shown as existing, planned, or future.

Interfaces defined as planned have funding identified, while future interfaces are desired by stakeholders but funding has not yet been identified.

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

4.3.4 *Physical Subsystem Architecture Flows*

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

An example of the architecture flows between two elements is shown in **Figure 8**. In this interface, the flows between the TxDOT Yoakum District Office – Traffic and Other TxDOT District TMCs show information that must go from the Yoakum District Office to other Texas TMCs, as well as information that the District Office needs from devices. Similar to the interfaces, architecture flows also are defined as existing, planned, or future.

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

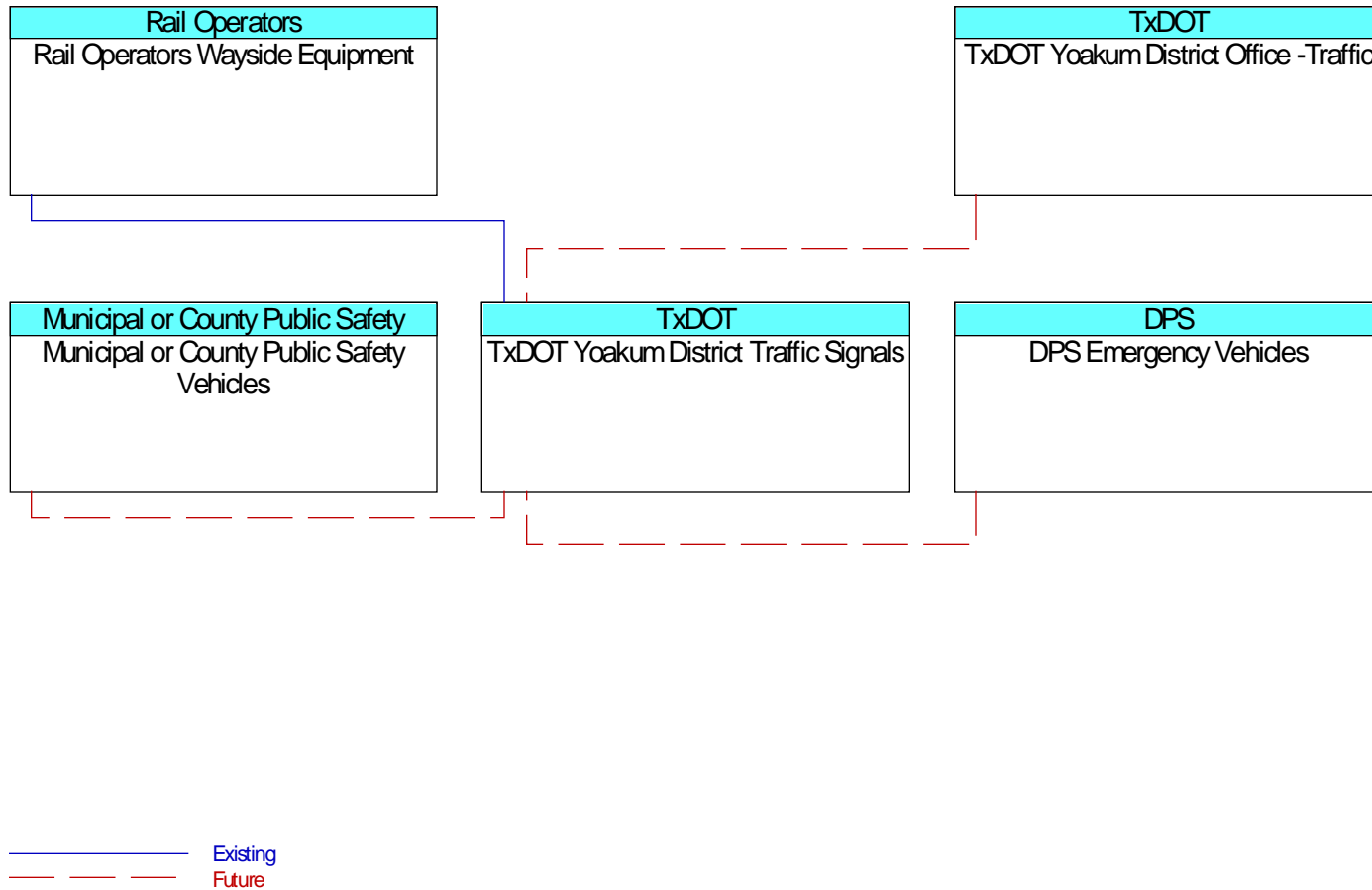


Figure 7 – TxDOT Yoakum District Traffic Signals Interfaces

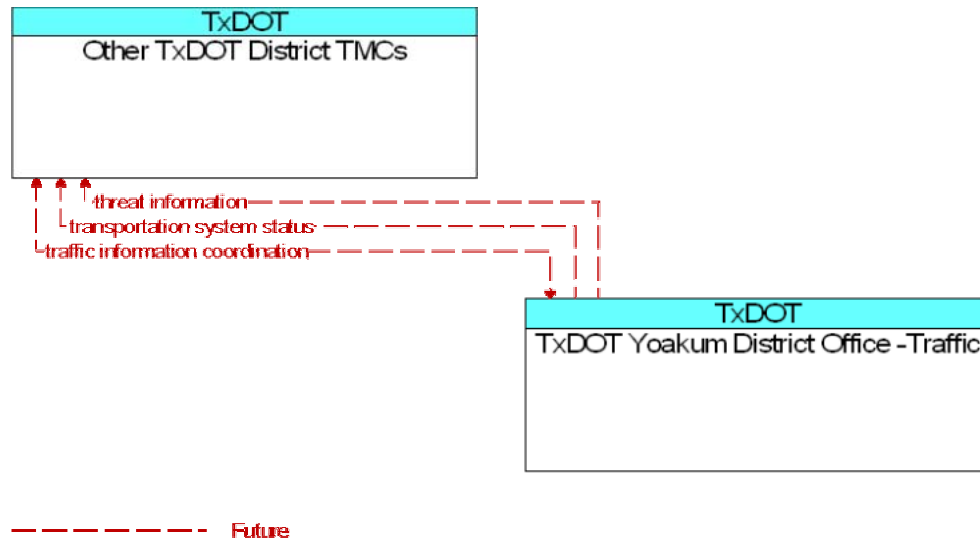


Figure 8 – TxDOT Yoakum District Office – Traffic to Other TxDOT District TMCs Architecture Flows

4.4 Functional Requirements

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

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

At a more detailed level, functional requirements for the Yoakum Region also are described in terms of equipment packages that are associated with one or more subsystems in the Yoakum Regional ITS Architecture as shown in **Table 6**. An equipment package is a functional capability that could be deployed at a specific time. Each equipment package can be linked in the National ITS Architecture to the Process Specifications that might be applicable. It is recommended that during the design concept stage of a project, the applicable equipment package, and associated Process Specifications from the National ITS Architecture be reviewed by the implementer to determine the appropriate functional requirements for the project. A link for each equipment package is available on the Yoakum Regional ITS Architecture web site by clicking on the “Functions” button.

Table 6 – Yoakum Region Equipment Packages

Subsystem	Equipment Package
Archived Data Management Subsystem	Government Reporting Systems Support
	ITS Data Repository
	Traffic and Roadside Data Archival
Commercial Vehicle Administration Subsystem	Credentials and Taxes Administration
	CV Data Collection
	CV Information Exchange
Commercial Vehicle Subsystem	On-board Cargo Monitoring
Emergency Management Subsystem	Emergency Call-Taking
	Emergency Data Collection
	Emergency Dispatch
	Emergency Environmental Monitoring
	Emergency Response Management
	Emergency Secure Area Surveillance
	Mayday Support
Emergency Vehicle Subsystem	On-board EV En Route Support
	On-board EV Environmental Monitoring
	On-board EV Incident Management Communication
Emissions Management Subsystem	Emissions Data Collection
	Emissions Data Management
Fleet and Freight Management Subsystem	Fleet Administration
	Fleet Credentials and Taxes Management and Reporting
	Fleet HAZMAT Management
Information Service Provider Subsystem	Basic Information Broadcast
	Infrastructure Provided Route Selection
	Interactive Infrastructure Information
	ISP Data Collection
	ISP Probe Information Collection
Maintenance and Construction Management Subsystem	MCM Data Collection
	MCM Environmental Information Collection
	MCM Environmental Information Processing
	MCM Incident Management
	MCM Maintenance Decision Support
	MCM Roadway Maintenance and Construction
	MCM Speed Monitoring
	MCM Vehicle and Equipment Maintenance Management
	MCM Vehicle Tracking
	MCM Work Activity Coordination
	MCM Work Zone Management
	MCM Work Zone Safety Management

Table 6 – Yoakum Region Equipment Packages (continued)

Subsystem	Equipment Package
Maintenance and Construction Vehicle Subsystem	MCV Environmental Monitoring
	MCV Infrastructure Monitoring
	MCV Roadway Maintenance and Construction
	MCV Vehicle Location Tracking
	MCV Vehicle Safety Monitoring
	MCV Vehicle System Monitoring and Diagnostics
	MCV Work Zone Support
Parking Management Subsystem	Parking Data Collection
Personal Information Access Subsystem	Personal Basic Information Reception
	Personal Interactive Information Reception
	Personal Location Determination
	Personal Provider-Based Route Guidance
Remote Traveler Support Subsystem	Remote Basic Information Reception
	Remote Interactive Information Reception
	Remote Mayday I/F
	Remote Transit Fare Management
	Remote Transit Information Services
	Secure Area Monitoring
Roadway Subsystem	Multimodal Crossing Control
	Roadside Data Collection
	Roadside Signal Priority
	Roadway Basic Surveillance
	Roadway Emissions Monitoring
	Roadway Environmental Monitoring
	Roadway Equipment Coordination
	Roadway Incident Detection
	Roadway Infrastructure Monitoring
	Roadway Probe Beacons
	Roadway Signal Controls
	Roadway Speed Monitoring
	Roadway Traffic Information Dissemination
	Roadway Work Zone Safety
	Roadway Work Zone Traffic Control
Toll Administration Subsystem	Toll Administration
	Toll Data Collection
Toll Collection Subsystem	Toll Plaza Toll Collection

Table 6 – Yoakum Region Equipment Packages (continued)

Subsystem	Equipment Package
Traffic Management Subsystem	Collect Traffic Surveillance
	HRI Traffic Management
	Rail Operations Coordination
	TMC Environmental Monitoring
	TMC Freeway Management
	TMC Incident Detection
	TMC Incident Dispatch Coordination/Communication
	TMC Multimodal Coordination
	TMC Multimodal Crossing Management
	TMC Probe Information Collection
	TMC Regional Traffic Control
	TMC Signal Control
	TMC Speed Monitoring
	TMC Traffic Information Dissemination
	TMC Work Zone Traffic Management
	Traffic Data Collection
Traffic Maintenance	
Transit Management Subsystem	Transit Center Fare and Load Management
	Transit Center Fixed-Route Operations
	Transit Center Information Services
	Transit Center Multi-Modal Coordination
	Transit Center Paratransit Operations
	Transit Center Security
	Transit Center Tracking and Dispatch
	Transit Data Collection
	Transit Environmental Monitoring
	Transit Garage Maintenance
	Transit Garage Operations
Transit Vehicle Subsystem	On-board Environmental Monitoring
	On-board Fixed Route Schedule Management
	On-board Maintenance
	On-board Paratransit Operations
	On-board Transit Fare and Load Management
	On-board Transit Information Services
	On-board Transit Security
	On-board Transit Signal Priority
On-board Transit Trip Monitoring	

Table 6 – Yoakum Region Equipment Packages (continued)

Subsystem	Equipment Package
Vehicle Subsystem	Basic Vehicle Reception
	Interactive Vehicle Reception
	Smart Probe
	Vehicle Location Determination
	Vehicle Mayday I/F
	Vehicle Probe Support
	Vehicle Provider-Based Route Guidance
	Vehicle Safety Monitoring System
	Vehicle Toll/Parking Interface

4.5 Standards

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

Table 7 – Applicable ITS Standards for the Yoakum Region

SDO	Document ID	Title	Type
AASHTO/ITE/NEMA	NTCIP 1201	Global Object Definitions	Message/Data
	NTCIP 1202	Object Definitions for Actuated Traffic Signal Controller Units	Message/Data
	NTCIP 1203	Object Definitions for Dynamic Message Signs	Message/Data
	NTCIP 1204	Object Definitions for Environmental Sensor Stations and Roadside Weather Information System	Message/Data
	NTCIP 1205	Data Dictionary for CCTV	Message/Data
	NTCIP 1206	Data Collection and Monitoring Devices	Message/Data
	NTCIP 1208	Object Definitions for Video Switches	Message/Data
	NTCIP 1209	Transportation System Sensor Objects	Message/Data
	NTCIP 1210	Objects for Signal Systems Master	Message/Data
	NTCIP 1211	Objects for Signal Control Priority	Message/Data
	NTCIP 1401	TCIP –Common Public Transportation (CPT) Business Area Standard	Message/Data
	NTCIP 1402	TCIP –Incident Management (IM) Business Area Standard	Message/Data

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

SDO	Document ID	Title	Type
AASHTO/ITE/NEMA (continued)	NTCIP 1403	TCIP –Passenger Information (PI) Business Area Standard	Message/Data
	NTCIP 1404	TCIP –Scheduling/Runcutting (SCH) Business Area Standard	Message/Data
	NTCIP 1405	TCIP –Spatial Representation (SP) Business Area Standard	Message/Data
	NTCIP 1406	TCIP –Onboard (OB) Business Area Standard	Message/Data
	NTCIP 1407	TCIP –Control Center (CC) Business Area Standard	Message/Data
	NTCIP 1408	TCIP –Fare Collection (FC) Business Area Standard	Message/Data
	Various	NTCIP Center-to-Center Standards Group	Group
	Various	NTCIP Center-to-Field Standards Group	Group
ASTM	ASTM E2259-xx	Standard Specification for Archiving ITS Generated Traffic Monitoring Data	Message/Data
	Various	Dedicated Short Range Communication at 915 MHz Standards Group	Group
IEEE	IEEE 1570-2002	Standard for Interface Between the Rail Subsystem and the Highway Subsystem at a Highway Rail Intersection	Message/Data
	IEEE Std 1455-1999	Standard for Message Sets for Vehicle/Roadside Communications	Message/Data
	Various	Incident Management Standards Group	Group
ITE	ITE TM 1.03	Standard for Functional Level Traffic Management Data Dictionary (TMDD)	Message/Data
	ITE TM 2.01	Message Sets for External TMC Communication (MS/ETMCC)	Message/Data
SAE	Various	Advanced Traveler Information Systems (ATIS) General Use Standards Group	Group
	Various	ATIS Bandwidth Limited Standards Group	Group
	Various	On-board Vehicle Mayday Standards Group	Group
SAE/IEEE	Various	Dedicated Short Range Communication at 5.9 GHz Standards Group	Group

4.6 Phases of Implementation

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

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

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

- Network Surveillance;
- Surface Street Control;
- Traffic Information Dissemination; and
- Transit Vehicle Tracking.

5. OPERATIONAL CONCEPT

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

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

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

5.1 Operational Scenarios

Scenario 1

The first operational scenario describes how ITS technologies may be used during a multi-vehicle crash on US 59 within the Victoria city limits. Motorists call 911 from cellular telephones and the City of Victoria Public Safety Dispatch is quickly informed of the crash. An alert is automatically sent from the City of Victoria Public Safety Dispatch to the City of Victoria TOC which in turn notifies the TxDOT Yoakum District TMC. TxDOT activates dynamic message signs on US 59 and monitors the situation with a CCTV camera that is near the crash. The City of Victoria Fire Department uses the video feed from the City of Victoria and TxDOT CCTV cameras to determine the severity of the accident and the number and type of fire and rescue vehicles to dispatch.

Southbound US 59 is completely closed and the City of Victoria Police and County Sheriff's Department, in coordination with the TxDOT Yoakum District and DPS, begin setting up a closure and detour. The City of Victoria uses their closed-loop signal system to implement a modified timing plan from their TOC on alternate routes to accommodate the large increases in traffic volume. The TxDOT Yoakum District does the same for their signals. The TxDOT Yoakum District TMC also contacts Houston TranStar (the TMC in Houston), so that motorists on US 59 approaching the area can be forewarned of the impending delay along southbound US 59 as a result of the accident.

TxDOT enters the closure on the Highway Condition Reporting System, which also feeds the statewide 511 traveler information number. Dynamic message signs continue to warn motorists that southbound US 59 is closed. The CCTV camera feed, which has been turned away from the crash to focus on the traffic condition on the freeway, is shared with the media which broadcasts the live shots of US 59 on the evening news to warn motorists that US 59 remains closed.

Scenario 2

Road construction along I-10 between Houston and San Antonio is expected to result in long-term nightly lane closures of one lane of traffic as I-10 is resurfaced. The TxDOT Yoakum District TMC reports the closure schedule to Houston TranStar and San Antonio TransGuide as well as the local media. The TxDOT Yoakum District TMC posts messages on permanent and portable dynamic message signs along I-10 alerting motorists of the construction and potential delay.

The TxDOT Yoakum District TMC also sends a message to the Texas Department of Public Safety and the appropriate county public safety dispatches so that when emergency vehicles are dispatched the drivers are cognizant of the closures and can take the appropriate detours.

Once the construction is complete, the TxDOT Yoakum District TMC sends out a message to all affected agencies that nightly lane closures have come to an end.

5.2 Roles and Responsibilities

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

Travel and Traffic Management

- City of Victoria
- County Road and Bridge
- Texas Department of Transportation Yoakum District
- Other Texas Department of Transportation Districts
- Texas Department of Public Safety

Public Transportation Management

- Colorado Valley Transit
- Golden Crescent Transit
- Independent School Districts
- Victoria Transit

Electronic Payment

- Colorado Valley Transit
- Golden Crescent Transit
- Victoria Transit

Commercial Vehicle Operations

- Texas Department of Public Safety
- Texas Department of Transportation

Emergency Management

- City of Victoria (Police, Fire, Traffic)
- County Public Safety (Sheriff's Office, Emergency Operations Center)
- Regional Hospitals
- Texas Department of Public Safety
- Texas Department of Transportation

Advanced Vehicle Safety System Needs

- Not Applicable

Information Management

- City of Victoria Metropolitan Planning Organization
- Department of Public Safety
- Golden Crescent Regional Planning Commission
- Texas Department of Transportation

Maintenance and Construction Management

- City of Victoria
- County Road and Bridge
- Texas Department of Transportation

5.3 Yoakum Agreements

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

With the implementation of ITS technologies, integrating systems from one or more agencies, and the anticipated level of information exchange identified in the architecture, it is likely that formal agreements between agencies will be needed in the future. These agreements, while perhaps not requiring a financial commitment from agencies in the Region, should outline specific roles, responsibilities, data exchanges, levels of authority, and other facets of regional operations. Some agreements will also outline specific funding responsibilities, where appropriate and applicable.

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

Table 8 – Potential Agreements for the Yoakum Region

Agreement and Agencies	Status	Agreement Description	Considerations
<p>Data Sharing and Usage (Public) TxDOT Yoakum District and Public Agencies within the Region</p>	<p>Future</p>	<p>This agreement would define the parameters, guidelines, and policies for inter- and intra-agency ITS data sharing. This data sharing would support regional activities related to traffic management, incident management, and traveler information, and other functions. The terms of this agreement should generally address such items as:</p> <ul style="list-style-type: none"> ▪ Types of data and information to be shared ▪ Repository for information (i.e., TxDOT Yoakum District TMC as central hub) ▪ How the information will be used (traffic incident management, displayed on web site for travel information, distributed to private media, etc.) ▪ Parameters for data format, quality, security 	<p>These agreements are typically zero-dollar agreements, in that there is no charge among agencies for the actual data, although there might be some cost incurred for infrastructure, systems or fiber to enable communications between agencies.</p>
<p>Data Sharing and Usage (Public-Private) TxDOT Yoakum District and Private Media/Information Service Providers</p>	<p>Future</p>	<p>This agreement would define the parameters, guidelines, and policies for private media use of regional ITS-related information from the TxDOT Yoakum District. This type of agreement is recommended between TxDOT (data provider) and the media (data user) to define terms of use for broadcasting public-agency information regarding traffic conditions, closures, restrictions, as well as video images. Agreements can also include requirements for the media to 'source' the information (i.e., using the TxDOT logo on all video images broadcast).</p>	<p>These agreements can be zero-dollar agreements, although some agencies have stipulated identifying the information, public service announcements by the media, or other requirements as a term of use. The private media entity is typically responsible for paying any necessary costs for access (i.e., communications infrastructure to link to the TxDOT database or video switch). These agreements also typically include a sunset clause to allow the agency to periodically review the agreement and make any modifications prior to renewal.</p>

Table 8 – Potential Agreements for the Yoakum Region (continued)

Agreement and Agencies	Status	Agreement Description	Considerations
<p>Shared Video Monitoring (Public) TxDOT Yoakum District, City of Victoria, DPS</p>	<p>Future</p>	<p>This agreement would enable shared video monitoring of TxDOT CCTV cameras by public safety and emergency services agencies in the Yoakum Region for incident management purposes. This agreement would define the parameters and policies for public safety agencies to access video images via the TxDOT video switch. It is recommended that the agreement include any TxDOT policies relating to video images (including archiving, privacy, disclaimers, use of video and redistribution) as well as processes for agency requests for specific views. Shared video monitoring does not address shared use or shared control of video equipment functions.</p>	<p>These agreements are typically zero-dollar agreements, in that there is no charge among agencies for the actual data, although there might be some cost incurred for infrastructure, systems or fiber to enable communications between agencies, particularly with the high bandwidth required for transmitting live video images.</p>
<p>Mutual Aid Agreements (Public) DPS, TxDOT Yoakum District, City of Victoria Police, City of Victoria Fire/EMS, County Sheriffs, Rural Volunteer Fire</p>	<p>Existing</p>	<p>Mutual aid agreements currently exist as informal arrangements in many Regions around the state, although they are a routine practice among public safety and emergency services agencies. Formal mutual aid agreements will become more important as agencies integrate systems and capabilities, particularly automated dispatch and notification.</p>	<p>These agreements are typically zero-dollar agreements, although there might be some funding required to support regional incident management activities. The agreement also would outline resource commitments that would be part of any mutual aid arrangement (personnel, equipment, facilities, etc.).</p>
<p>Joint Operations/Shared Control Agreements (Public) TxDOT Yoakum District, City of Victoria, DPS (potential)</p>	<p>Future</p>	<p>These agreements are formal arrangements to allow joint operations or control of certain systems and equipment. The agreement would need to define the terms of this arrangement, such as hours of operation and time of day/day of week where shared control would take effect, circumstances or incidents where shared control would take effect, notification procedures between the agencies agreeing to shared control arrangements, etc. Additional agencies (such as DPS) could be part of a joint operations/shared control agreement for certain types of devices.</p>	<p>Joint operations/shared control agreements could consider some form of mutual funding for certain system elements, primarily communication links.</p>