State of Texas
Regional ITS Architectures and Deployment Plans

Wichita Falls Region

Regional ITS Architecture Report

Prepared by:

Kimley-Horn and Associates, Inc.

ConSysTec Corp

January 14, 2005
068510013

TABLE OF CONTENTS

REGIONAL ITS ARCHITECTURE REPORT

TABLE OF CONTENTS

REGIONAL ITS ARCHITECTURE REPORT

LIST OF FIGURES

LIST OF TABLES

LIST OF ACRONYMS

AASHTO	American Association of State Highway and Transportation Officials
ARES	Amateur Radio Emergency Services
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
CC	Control Center
CCTV	Closed-Circuit Television
CEA	Consumer Electronics Association
CPT	Common Public Transportation
CV	Commercial Vehicle
DARC	Data Radio Channel
DMS	Dynamic Message Sign
DPS	Department of Public Safety
DSRC	Dedicated Short Range Communications
EIA	Electronic Industries Association
EOC	Emergency Operations Center
ETMCC	External TMC Communication
EV	Emergency Vehicle
FC	Fare Collection
FHWA	Federal Highway Administration
HAR	Highway Advisory Radio
HAZMAT	Hazardous Materials
HCRS	Highway Condition Reporting System
HRI	Highway-Rail Intersections
I/F	Interface
IEEE	Institute of Electrical and Electronics Engineers
IM	Incident Management

LIST OF ACRONYMS

IMMS	Incident Management Message Sets
ISP	Information Service Provider
ITE	Institute of Transportation Engineers
ITS	Intelligent Transportation System
MCM	Maintenance and Construction Management
MCV	Maintenance and Construction Vehicle
MOU	Memorandum of Understanding
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
RPC	Regional Planning Commission
RWIS	Road Weather Information System
SAE	Society of Automotive Engineers
SAFB	Sheppard Air Force Base
SDO	Standards Development Organization
SP	Spatial Representation
STIC	Subcarrier Traffic Information Channel
TAPS	Texoma Area Paratransit Services
TCIP	Transit Communication Interface Protocol
TDCJ-ID	Texas Department of Criminal Justice – Institutional Division
TEA-21	Transportation Equity Act for the 21st Century
TM	Traffic Management
TMC	Traffic Management Center

LIST OF ACRONYMS

TMDD	Traffic Management Data Directory
TOC	Traffic Operations Center
TxDOT	Texas Department of Transportation
USDOT	United States Department of Transportation
USGS	United States Geological Survey
VIVDS	Video Image Vehicle Detection Systems
WIM	Weigh in Motion

SUMMARY

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

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

The Wichita Falls Region is located in north-central Texas. The Region is primarily rural, with Wichita Falls being the largest population center in the Region. Other cities and towns include Gainesville, Bowie, Olney, and Iowa Park. The Wichita Falls Region is bordered by several other TxDOT Districts, including Childress, Abilene, Brownwood, Fort Worth, Dallas, and Paris. The majority of the Wichita Falls Region also shares a border with the State of Oklahoma.

The Architecture for the Wichita Falls Region followed a comprehensive process focused on stakeholder outreach and education, identifying market packages and interfaces tailored to the needs of the Wichita Falls 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 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, transit management, Oklahoma DOT, Sheppard Air Force Base (AFB) and the United States Geological Survey (USGS). These stakeholders provided input and review at key steps in the architecture development process, including a project kick-off meeting, architecture development and review workshops, and final review of the architecture documentation.

An inventory of existing and planned ITS infrastructure in the Region provided the basis for the architecture development. Stakeholder needs that could be addressed by ITS technologies guided the selection of market packages, data flows, and integration requirements. A diverse range of needs were identified by stakeholders in the Region. The highest priority needs focused on improving emergency coordination and response, providing accurate, timely, advisories about road and weather conditions to travelers, and communications among TxDOT, the City of Wichita Falls and other cities throughout the Region. Coordination with Oklahoma also was a priority for stakeholders.

Market packages were selected that corresponded to the desired services and functions identified for the Region, and were customized for Wichita Falls Region agencies and equipment. These market packages included high priority 'foundation' services and functions, such as network surveillance and road/weather information systems, as well as market packages to address coordination needs, including incident management system and regional traffic control and coordination. Stakeholders then prioritized these market packages as high, medium, and low. These priorities were used in the second phase of the project to develop the ITS Deployment Plan for the Wichita Falls Region.

An interconnect, or "Sausage Diagram" was developed for the Wichita Falls 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 Wichita Falls 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 Wichita Falls 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 Wichita Falls Region also were identified as part of the architecture development process.

An Operational Concept for the Wichita Falls 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 Region.

The Regional ITS Architecture for the Wichita Falls 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 Wichita Falls Region. Stakeholders included representatives from TxDOT, cities, counties, emergency management, transit management, Oklahoma DOT, Sheppard AFB and the USGS. A series of five meetings were held with the ITS stakeholders to discuss the development and gather input into the Wichita Falls Regional ITS Architecture and Deployment Plan. In addition, a project web site was developed which contains all of the information on the Wichita Falls 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 Wichita Falls 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 Wichita Falls Region have been identified. An operational concept has been developed that focuses on the roles and responsibilities of the various agencies involved in the Wichita Falls Region. A separate ITS Deployment Plan was developed that identifies projects in the Wichita Falls Region that are required to implement the architecture.

1.2 Document Overview

The Wichita Falls 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 Wichita Falls Region, as well as an overview of some of the key features and stakeholders in the Wichita Falls Region.

Section 2 – Integration Strategy

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

Section 3 – Regional ITS Architecture Development Process

An overview of the key steps involved in developing the ITS architecture for the Wichita Falls 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 Wichita Falls 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 Wichita Falls Region also are included in this section, as are the system functional requirements. The Wichita Falls 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 Wichita Falls 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 Wichita Falls Region. As part of this concept, several operational scenarios are described and roles and responsibilities of stakeholders are discussed. Potential agreements that could be required to support integration and information sharing are described.

The Wichita Falls Regional ITS Architecture also contains three appendices:

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

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.consystec.com, and by selecting the link to the Texas Regional ITS Architecture Home Page, and then Wichita Falls Region. The web site provides hyperlinks to more detailed information about the Wichita Falls 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 Wichita Falls Regional ITS Architecture web site was being hosted at www.consystec.com. TxDOT plans to permanently host the site in the future at www.dot.state.tx.us/trf/its.

1.3 The Wichita Falls Region

1.3.1 Geographic Overview

The Wichita Falls Region is located in north central Texas and shares a border with the State of Oklahoma. The boundaries of the Wichita Falls Region were defined by stakeholders to correspond with the TxDOT Wichita Falls District, although it was recognized by stakeholders that including other cities and communities along US 287 in the Fort Worth District would be beneficial. The Wichita Falls Region is bordered by six other TxDOT Districts, including: the Childress District to the west; Abilene, Brownwood, Forth Worth and Dallas Districts to the south; and the Paris District on the east. **Figure 1** shows a geographic overview of the Wichita Falls Region.

There are nine counties in the Wichita Falls Region:

- Archer;
- Baylor;
- Clay;
- Cooke;
- Montague;
- Throckmorton;
- Wichita;
- Wilbarger; and
- Young.

With an estimated population of 242,500 in the Region and a square mile area of 8,117, Wichita Falls is primarily a rural region. Key cities and towns in the Region include Wichita Falls, Bowie, Gainesville, Graham, Olney, and Iowa Park. TxDOT serves as the primary agency for on-system roadways in these and other cities. Although city and county agencies provide maintenance for facilities in their jurisdictions, most of these cities and towns are located on or near Interstate, US or State Route highways and TxDOT serves as the lead agency for any improvements and maintenance activities.

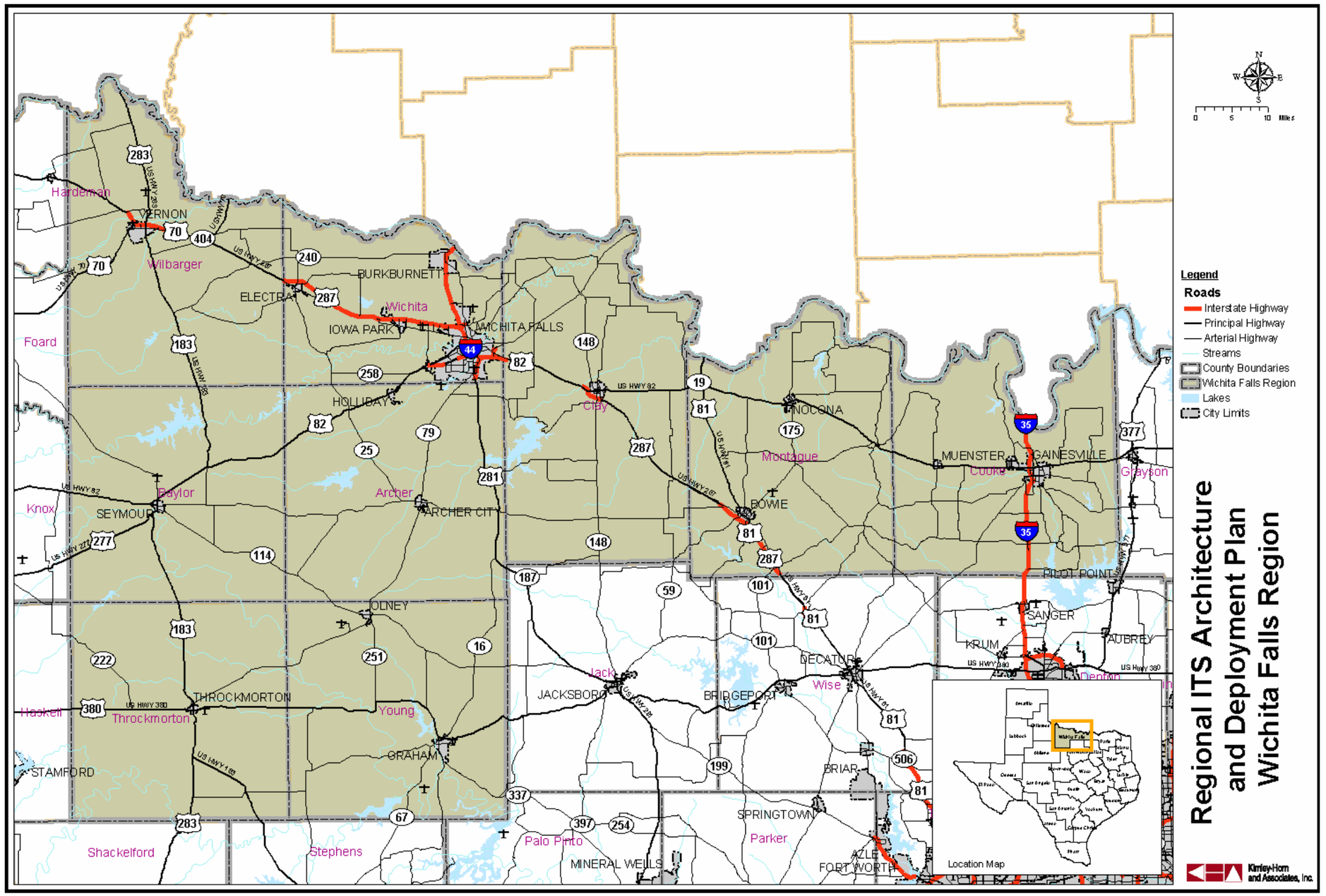


Figure 1 – Wichita Falls Region Map

1.3.2 Roadway Infrastructure

Several key corridors traverse the Wichita Falls Region, making it an important gateway to the Texas Panhandle, Oklahoma, and neighboring TxDOT Districts, particularly Fort Worth and Dallas. Major roadway facilities within the Region include I-35 in the eastern part of the Region, I-44 in the Wichita Falls metro area through to Oklahoma, and US Highways 81, 277/82, 281, and 287.

I-35 and US 287 are important routes from the Dallas/Fort Worth metro area, and as such, there is a significant amount of commercial vehicle traffic that uses these corridors. Any restrictions on these corridors will likely affect nearby or alternate routes, which are limited once outside of the metro areas. In the event of a major incident on one of the Region's primary corridors, there are limited traveler services on facilities outside of Gainesville, Muenster, Bowie, Wichita Falls, and Vernon areas.

US Highway 287 is a significant link between Colorado and Dallas/Fort Worth, which creates a major truck route through the Wichita Falls Region and on through the Panhandle. The amount of truck traffic is expected to increase along US 287 in the near future. Lockheed Martin will have a fighter jet manufacturing plant in Forth Worth, and this route will be the primary corridor for trucks hauling goods from the plant that need to head north to connect with I-40.

1.3.3 Wichita Falls Region ITS Plans

Currently, there is limited deployment of ITS in the Wichita Falls Region. Existing and planned near-term ITS technologies focus on detection, traveler information, and coordination with neighboring TxDOT Districts.

Traffic Management

TxDOT Wichita Falls is implementing a traffic management center (TMC) at its District Office. This TMC will serve as the 'hub' for ITS operations in the Region, as well as serve as a vital link with other TxDOT District TMCs to support center-to-center communications and coordination. The TMC will include TxDOT's Advanced Traffic Management System (ATMS) software, which will provide for monitoring and control of several of the devices that are to be implemented. The City of Wichita Falls Police will serve as a back-up to the TMC operations during evenings and weekends, so a connection with this agency is a high priority.

Video image vehicle detection system (VIVDS) cameras exist on Broad Street and Holliday Street in Wichita Falls which are tied into the City of Wichita Falls Traffic Office. Intersection controllers are communicated with via spread spectrum radio and signal timing plans vary for special events or incidents. VIVDS cameras are also installed at various locations across the region for signal control. Future plans include installation of VIVDS cameras at three or four intersections per year across the Region. A traffic signal detection control system is in place in Cooke County on US 82 at Weber Drive. Dynamic speed display signs are located on US 277 in Seymour. Downtown Gainesville is scheduled for a signal upgrade with newer technology for more efficient traffic flow.

Traveler Information

There are two dynamic message signs (DMS) that are used on the I-44/US 287 corridor through Wichita Falls to notify travelers of upcoming construction, detours, closures or other hazards. The Wichita Falls Region plans to implement additional traveler information tools to better inform motorists and truckers about adverse conditions along roadways in the Region (or in nearby Regions). With few alternate routes in this rural Region, it is important to provide travelers with ample advance warning of hazards or impacts on their routes. Permanent DMS are planned for I-35 northbound and southbound near Gainesville, on SH 325 ahead of the entrance to Sheppard AFB, and on US 82. Highway advisory radio and kiosks, particularly at and near rest areas, are not currently in use in the Region, but are being considered as potential future projects. They are envisioned to be able to provide travelers with road conditions, weather, and other valuable information. There are also plans to develop a District web site that can be used for pre-trip information. TxDOT already maintains web and phone-based travel information tools that travelers can call to find out about planned closures and restrictions on major routes throughout the Region. This information is static (not real-time) and is updated by TxDOT as needed.

The Public Information Officer at TxDOT Wichita Falls is responsible for sending media in the Wichita Falls Region (as well as neighboring Regions) notifications or updates about construction, closures, restrictions and other hazards. Information is sent to radio, television and print media. Emergency radio broadcast systems are in place to provide warnings and advisories of weather hazards such as winter storms or tornadoes. As closed-circuit television (CCTV) cameras come on-line, TxDOT and local media could form a partnership whereby television media could access camera images to provide real-time visual information during its news broadcasts.

Incident and Emergency Management

TxDOT, Texas DPS, County Sheriffs, and local police have established excellent working relationships and routinely combine resources for incident and emergency management within the Wichita Falls Region. Coordination with Oklahoma Department of Public Safety and Department of Transportation is also required for major incidents that impact routes such as I-35, I-44, and SH 81 near the Texas/Oklahoma border. State-to-state communications was cited as a high priority need. Coordination with Sheppard Air Force Base for incident and emergency management, closures, and special events is also a key component of regional operations. There also is a network of volunteer radio operators that provide emergency communications support during major incidents.

The North Texas Regional Planning Commission is responsible for planning and implementing 911 for the Region, as well as providing planning support for other regional emergency communications. There are several 911 Public Safety Answering Points (PSAP) in the Region, including Wichita Falls and Sheppard Air Force Base.

Texas DPS and City of Wichita Falls Police have Computer Aided Dispatch systems; radio is the primary communications between other city/county dispatch centers and law enforcement vehicles. TxDOT also currently uses radio communications to communicate with maintenance vehicles.

The City of Wichita Falls currently has emergency vehicle preemption at some signals, and presently it is just for fire vehicles. TxDOT does not have preemption on any of its traffic signals, but this could be a future consideration for fire and potentially DPS.

Maintenance and Construction Management

Weather detection and winter maintenance strategies are a key issue in the Wichita Falls Region. TxDOT has plans to implement road weather information system (RWIS) sensors to be able to obtain real-time information about roadway/pavement surface conditions, including temperature, precipitation, presence of ice or snow, and other factors. These RWIS will send information to the TMC so that operators are apprised of current conditions and can implement appropriate strategies or dispatch maintenance crews. TxDOT also plans to install anti-icing systems at key locations to proactively handle icy conditions, particularly on bridges.

USGS has several flood sensors and stream gauges throughout the Region to detect water levels. TxDOT and the USGS are exploring opportunities for TxDOT to be able to access USGS data in the District. TxDOT also is looking to implement flood detection sensors at key locations.

Public Transportation

Because of the rural nature of the Wichita Falls Region, transit services are predominantly on-demand, although there are regular transit service routes within the City of Wichita Falls. There are three primary transit providers in the Region:

- Wichita Falls Transit;
- Rolling Plains Management Corporation (SHARP Lines); and
- Texoma Rural Transit.

The City of Wichita Falls Transit operates a route deviation fixed route system in conjunction with demand response. City Transit runs along five regular routes, and there is express service between Sheppard Air Force Base and the Sikes Senter Shopping Mall. Service in the rural areas is provided by Rolling Plains Management Corporation, which operators SHARP Lines. Texoma Rural Transit also provides demand-response transport service in addition to a few fixed routes.

1.3.4 Wichita Falls 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 several non-traditional stakeholders in the architecture development and visioning process. Input from these stakeholders, is a critical part of defining the interfaces, integration needs, and overall vision for ITS in the Wichita Falls Region.

The following is a list of public and private stakeholders in the Wichita Falls 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 Wichita Falls Regional ITS Architecture:

- American Red Cross;
- City of Bowie;
- City of Gainesville;
- City of Iowa Park;

- City of Olney;
- City of Vernon;
- City of Wichita Falls;
- City of Windthorst;
- Clay County;
- James Allred Prison;
- Nortex Regional Planning Commission;
- Oklahoma Department of Transportation;
- Oklahoma Highway Patrol;
- Red River Authority;
- Rolling Plains Management Corporation (SHARP Lines);
- Senate District 30;
- Sheppard Air Force Base;
- Texas Department of Health;
- Texas Department of Public Safety;
- Texas Traveler Information Center;
- Texoma Area Paratransit System;
- TxDOT Traffic Operations Division (Austin);
- TxDOT Wichita Falls District;
- United Regional Healthcare System;
- US Geological Survey;
- Wichita County;
- Wichita County Amateur Radio Emergency Services (ARES);
- Wichita Falls Air Evac Lifeteam; and
- Young County.

2. INTEGRATION STRATEGY

2.1 Integration Purpose

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

For each operating agency or stakeholder entity identified through the development of the Regional ITS Architecture, there are operations that currently exist as normal practice in order to accomplish the primary business goals and objectives for each stakeholder. The integration of each agency with any of the other stakeholders will not change the agency's primary function or disrupt its typical business practices. The integration process will require that the data that is exchanged between the two entities 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. Although there are several state, county and local agencies that could potentially be involved in current and future ITS activities in the Region, the primary integration focus is likely to be among Wichita Falls and other TxDOT centers (Districts) in North Texas, TxDOT, and the City of Wichita Falls, coordination with Oklahoma, and enhanced coordination and integration among transit providers.

This section will provide an overview of the major issues and stakeholders' needs within the Wichita Falls Region and the primary areas of concern that were identified in the preparation of the Wichita Falls Regional ITS Architecture.

The first step in developing any regional ITS architecture is identifying major stakeholders in the Region. Key stakeholders that participated in the development of the Wichita Falls 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 was provided to these stakeholders to encourage their participation as much as possible.

Table 1 – Wichita Falls Stakeholder Agencies and Contacts

Stakeholder Agency	Contact	Address	Phone Number	E-Mail
American Red Cross	Steve Ayer	1809 5th Street Wichita Falls, Texas 76301	940-322-8686 (ext 11)	sayer@cst.net
American Red Cross	Bev Shumann	1809 5th Street Wichita Falls, Texas 76301	940-322-8686 (ext 20)	bevs@cst.net
City of Bowie	James Cantwell	304 Lindsey Street Bowie, Texas 76230	940-872-2251	N/A
City of Bowie	Jesse Gutierres	304 Lindsey Street Bowie, Texas 76230	940-872-1114 (ext 30)	N/A
City of Gainesville	Allan Stanley	200 S. Rush Gainesville, Texas	940-668-4551	N/A
City of Iowa Park	Mike Price	103 East Cash Iowa Park, Texas 76367	940-592-2131	N/A

Table 1 – Wichita Falls Stakeholder Agencies and Contacts (continued)

Stakeholder Agency	Contact	Address	Phone Number	E-Mail
City of Olney	Joe Gamble	PO Box 546 Olney, Texas 76374	940-564-2102	gambill@mail.com
City of Vernon	Jim Murray	1725 Wilbarger Vernon, Texas 76384	940-552-2581	jmurray@chipshot.net
City of Wichita Falls	Lin Barnett	2100 Seymour Hwy Wichita Falls, Texas 76301	940-761-7450	lin.barnett@cwftx.net
City of Wichita Falls	Mark Beauchamp	2100 Seymour Highway Wichita Falls, Texas 76307	N/A	mark.beauchamp@cwftx.net
City of Wichita Falls	Larry Blowers	2100 Seymour Highway Wichita Falls, Texas 76301	940-761-7642	N/A
City of Wichita Falls	John Henderson	1300 7th Street Wichita Falls, Texas 76307	940-761-7619	N/A
City of Wichita Falls PD	Glenn Barham	610 Holliday Wichita Falls, Texas 76301	940-761-7797	glenn.barham@wfpd.net
City of Wichita Falls PD	Karl Lillie	610 Holliday Wichita Falls, Texas 76301	940-761-6897	karl.lillie@wfpd.net
City of Wichita Falls PD	R.W. Smith	610 Holliday Wichita Falls, Texas 76301	940-761-6897	richard.smith@wfpd.net
City of Windthorst	Ervin Campbell	PO Box 128 Windthorst, Texas 76389	940-423-6682	N/A
City of Windthorst	Sue Steinberger	PO Box 128 Windthorst, Texas 76389	940-423-6288	N/A
Clay County	Kenneth Liggett	100 N Bridge Henrietta, TX 76365	940-538-5597	N/A
Department of Public Safety	William Sellers	5505 North Central Freeway Wichita Falls, Texas 76305	940-851-5500	william.sellers@txdps.state.tx.us
James Allred Prison	Danny Horton	2101 FM 369 North Iowa Park, Texas 76367	940-855-7492	N/A
Nortex Regional Planning Commission	Mary Kilgo	4309 Old Jacksboro Hwy. Wichita Falls, Texas 76302	940-322-5281	mkilgo@texasconnection.org
Oklahoma Department of Transportation	Bob Rose, P.E.	2205 N. Highway 81 Duncan, Oklahoma 73533	580-255-7586	N/A
Oklahoma Highway Patrol	Mike McClelland	705 East Gore Lawton, Oklahoma 73501	580-353-0783	mmcclell@dps.state.ok.us
Radio Hamm Operator Wichita County Area	David Gaines	4215 Seabury Dr Wichita Falls, Texas 76319	940-692-7338	n5dhg@earthlink.net
Red River Authority	Curtis Campbell	900 8th Street, Suite 502 Wichita Falls, Texas 76301	940-723-8697	N/A
Red River Authority	Sharon Faver	900 8th Street, Suite 502 Wichita Falls, Texas 76301	940-723-8697	N/A

Table 1 – Wichita Falls Stakeholder Agencies and Contacts (continued)

Stakeholder Agency	Contact	Address	Phone Number	E-Mail
Rolling Plains Mgmt Corporation	Lezlie Carroll	300 E. California Crowell, Texas 79227	940-684-1571	sharplines@yahoo.com
Senate District 30	Craig Estes	4245 Kemp, Suite 306 Wichita Falls, Texas 76308	512-463-0130	craig.estes@senate.state.tx.us
Sheppard Air Force Base 82nd TRW Command Post	Michael Chapman	419 Avenue G, Suite 4 Sheppard Air Force Base, Texas 76311	940-676-6266	michael.chapman@sheppard.af.mil
Texas Department of Health	Jerry Bradshaw	4309 Jacksboro Hwy, Suite 101 Wichita Falls, Texas 76302	940-767-8593 (ext 52)	jerry.bradshaw@tdh.state.tx.us
Texas Traveler Information Center	Becki Boyd	900 Central Frwy Wichita Falls, Texas 76306	940-723-7931	N/A
Texas Traveler Information Center	Lisa Vian	900 Central Frwy Wichita Falls, Texas 76306	940-723-7931	N/A
Texoma Area Paratransit System	Ven Hammonds	6104 Texoma Parkway Sherman, Texas 75090	903-893-4601	tapsinc1@airmail.net
TxDOT Austin Traffic Operations	Alex Power	Attn: TRF-Cedar Park #51, Wing E 125 East 11th Street Austin, Texas 78701-2483	512-506-5153	apower@dot.state.tx.us
TxDOT Wichita Falls	Carolyn Askins	1601 Southwest Parkway Wichita Falls, Texas 76301	N/A	caskins@dot.state.tx.us
TxDOT Wichita Falls	Molli Choate	1601 Southwest Parkway Wichita Falls, Texas 76302	940-720-7757	mchoate@dot.state.tx.us
TxDOT Wichita Falls	Tim Hertel	1601 SW Parkway Wichita Falls, Texas 76302	940-720-7721	thertel@dot.state.tx.us
TxDOT Wichita Falls	Adele Lewis	1601 SW Parkway Wichita Falls, Texas 76302	940-720-7728	alewis@dot.state.tx.us
TxDOT Wichita Falls	Davis Powell	1601 Southwest Parkway Wichita Falls, Texas 76302	940-720-7717	dpowel2@dot.state.tx.us
TxDOT Wichita Falls Area Office	Glenn Albritton	2844 East Central Freeway Wichita Falls, Texas 76301	940-322-1634	gallbri@dot.state.tx.us
United Regional Health Care System	Kim Brownlee	1600 10th Street Wichita Falls, TX 76301	940-764-3093	N/A
US Geological Survey	Mick Baldys	3010 Buchanan Wichita Falls, Texas	940-692-4283	N/A
US Geological Survey	Mike Dorsey	3010 Buchanan Wichita Falls, Texas	940-692-4283	N/A
US Geological Survey	Dave Holmes	3010 Buchanan Wichita Falls, Texas 76308	940-692-4283	dholmes@usgs.gov
Wichita County Emergency Management	Lee Bourgoin	506 Holiday Street Wichita Falls, Texas 76301	940-763-0820	N/A

Table 1 – Wichita Falls Stakeholder Agencies and Contacts (continued)

Stakeholder Agency	Contact	Address	Phone Number	E-Mail
Wichita County Precinct 3	Gordon Griffith	610 East Jefferson Iowa Park, Texas 76367	940-766-8260	gordon.griffith@co.wichita.tx.us
Wichita Falls Air Evac Lifeteam	Shelly Dove	1610 10th Street Wichita Falls, Texas 76301	940-764-3990	AE34@air-evac.com
Wichita Falls Air Evac Lifeteam	Jim Whitman	1610 10th Street Wichita Falls, Texas 76301	940-764-3990	AE34@air-evac.com
Wichita Falls Air Evac Lifeteam	Pete Wolf	1610 10th Street Wichita Falls, Texas 76301	940-764-3990	AE34@air-evac.com
Young County	John Bullock	Young County Courthouse 516 4th Street, Room 103 Graham, Texas 76450	940-362-4301	j.bullock@youngcounty.org

2.2 Regional Needs

Needs from the Wichita Falls Region were identified in the project kick-off meeting held on September 24, 2003. 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 – Wichita Falls Region: Summary of ITS Needs

Wichita Falls Region

Summary of ITS Needs
Wichita Falls Regional ITS Architecture and Deployment Plan Kick-Off Meeting
September 24, 2003

Travel and Traffic Management Needs

- Need road weather information
- Need increased coordination/information sharing with media, both local and outside Region
- Need TMC at District complex
- Need Center to Center Communications
- Need improved communications with local agencies
- Need ice detection on Red River bridge
- Need communication between smaller cities and TxDOT Wichita Falls District and City of Wichita Falls
- Need increased coordination between City of Wichita Falls and Sheppard Air Force Base to coordinate closures and special events
- Need local coordinated traffic signal system for Bowie
- Need improved traveler information along US 287 in conjunction with ice detection capabilities
- Need ice detection
- Need real time traveler information
- Need CCTV, especially near Sheppard AFB
- Need more DMS

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

Public Transportation Management Needs

- Need real time information of traffic and road conditions
- Need to re-evaluate automated vehicle location/mobile data terminals for demand-response transit
- Need a common benefits card for electronic fare collection, smart fare boxes
- Need on-board guidance systems

Electronic Payment Needs

None Identified

Commercial Vehicle Operations Needs

None identified

Emergency Management Needs

- Need interagency communication
- Need increased interoperability
- Need state to state communications
- Need emergency notification system in the City of Olney

Advanced Vehicle Safety Systems Needs

None Identified

Information Management Needs (Data Archiving)

- Need accident data archive
- Need traffic count archive in Young County
- Need GIS mapping for the City of Wichita Falls

Maintenance and Construction Management Needs

None identified

2.3 Regional Integration and Interoperability

The Wichita Falls Region is bordered by the Childress, Abilene, Brownwood, Fort Worth, Dallas and Paris TxDOT Districts as well as the State of Oklahoma, and planning for integration and coordination with these neighboring areas is a critical part of the ITS architecture development. These regions share common major corridors, including I-35, I-44, US Highways 81, 277/82, 281/187, 283/183, and 287. A major incident on any of these corridors impacts several TxDOT Regions and potentially another state. Coordination and information sharing among state and local jurisdictions, including transportation, public safety, emergency services, is paramount to ensuring that any hazards, closures, and other impacts on these shared corridors is communicated to the appropriate agencies.

Communicating accurate and current information about road conditions was identified as a high priority in the Wichita Falls Region, and this includes communication among agencies as well as with travelers. Many of the planned ITS projects in the Region are aimed at providing additional detection of real time conditions (including weather) and providing accurate, timely travel information. 511, which would provide road condition information via the telephone, was identified as an important tool. Equally important to the dissemination of information to motorists and truck drivers is the data coming in to the system. Data that could be obtained from road

weather information systems would be relayed back to the Wichita Falls District which could then be broadcast over a range of public and private systems as well as shared with other TxDOT Districts and Oklahoma.

Center-to-center links among TxDOT District Offices have been identified as key needs. For Wichita Falls, this would provide a direct line of communication among the TxDOT District Offices in the Panhandle, central and northeast Texas. Another key link is from the Fort Worth District Office to Wichita Falls; TxDOT Fort Worth is the originating point for AMBER Alert messages to be broadcast to the other TxDOT District Offices. Sharing information in common data formats on similar platforms, which will be accomplished with ATMS and center-to-center communications in each of the TxDOT Districts, will help to standardize and streamline communications among these management centers.

TxDOT in the Wichita Falls Region responds to more than transportation incidents. Residents in the Region often look to TxDOT for information about weather and storm warnings, particularly in the winter months. With limited detection for traffic or weather, the majority of information about current conditions, hazards, incidents, and weather impacts come from visual observations from TxDOT, DPS, and local sheriffs and police who are out in the field. These agencies routinely coordinate for incident management as a matter of common practice. DPS functions as an Emergency Operations Center during major incidents, and there are Emergency Operations Centers (EOCs) in each County and in Wichita Falls. Providing communication, information sharing links, and resource coordination among these key agencies will improve an already successful working relationship.

Public transportation and non-emergency transport is provided by several different entities in the Wichita Falls Region. These are primarily on-demand services, although the City of Wichita Falls Transit operates on five regular routes with route deviation and an express service between Sheppard Air Force Base and downtown. Rolling Plains Management Corporation (which operates SHARP Lines) and TAPS, provide the majority of on-demand transit in the Region. There is currently some coordination between TAPS and Dallas Area Rapid Transit. Enhanced coordination among the two key demand-response providers would result in more centralized information for transit patrons (phone, web and customer service call centers), and could be extended to include ‘one-stop’ services such as point of sale for regional transit fare cards. Providing transit agencies with advanced notice of closures or restrictions will allow them to make the necessary route changes to ensure that passengers and drivers can get to their destinations in a safe, timely manner.

3. REGIONAL ITS ARCHITECTURE DEVELOPMENT PROCESS

Development of the Regional ITS Architecture and Deployment Plan for the Wichita Falls 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 Wichita Falls Process

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

Prior to the first project kick-off meeting with the contractor and stakeholders, TxDOT identified relevant stakeholders in the Region to begin discussions on the development of a Regional ITS Architecture and Deployment Plan. 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.

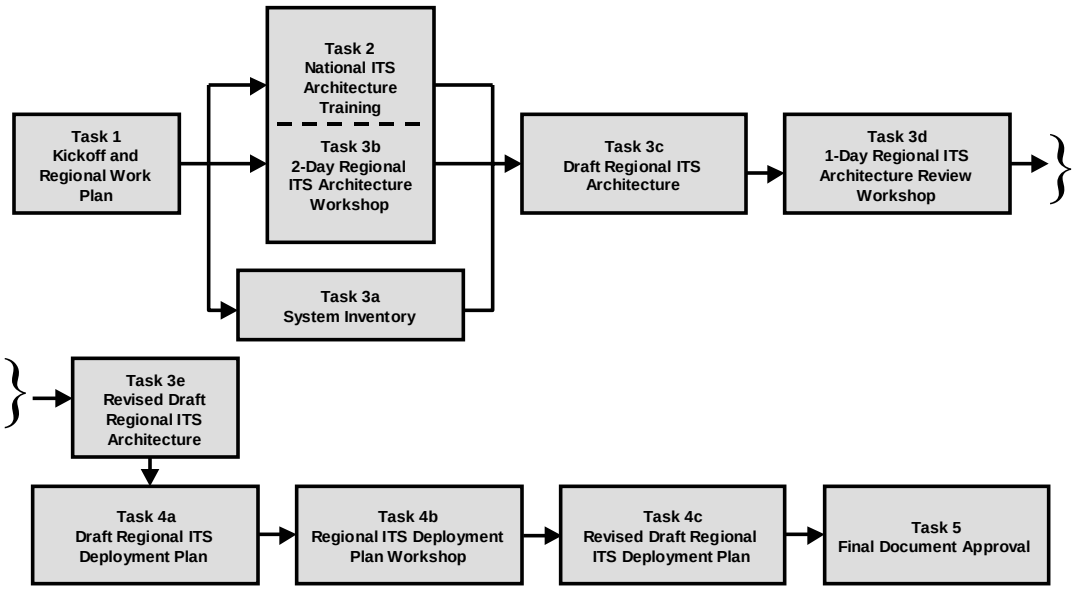


Figure 2 – Wichita Falls Regional ITS Architecture and Deployment Plan Development Process

A total of five meetings and workshops with stakeholders over a period of eleven months were used to develop the Wichita Falls 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
- Final 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 Wichita Falls 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 Wichita Falls 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 Wichita Falls, 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 Wichita Falls Region was sent to stakeholders prior to the 1-Day Regional ITS Architecture Review Workshop.

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

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

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

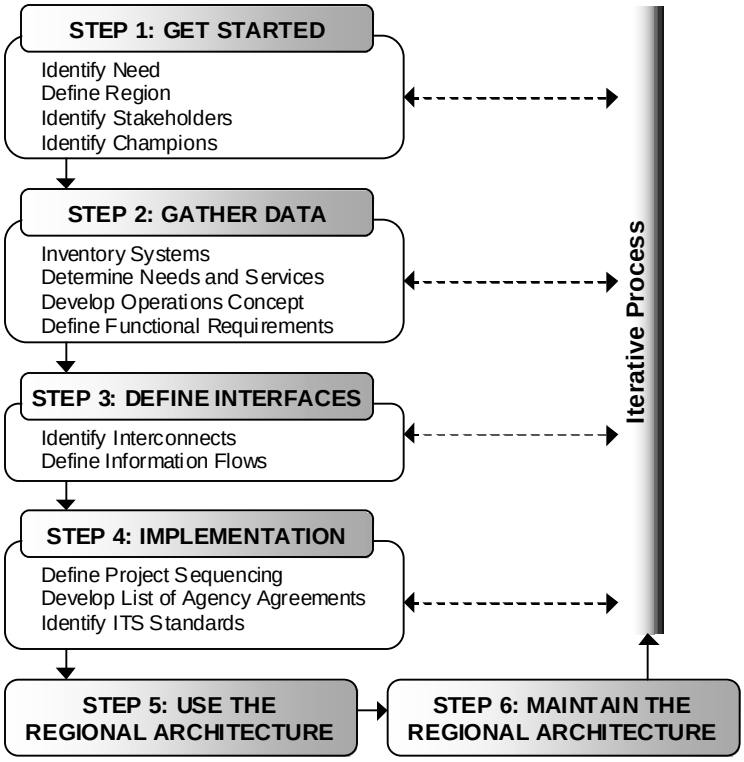
Task 4B – Regional ITS Deployment Plan Workshop: The Draft Regional ITS Deployment Plan was presented to stakeholders at the Regional ITS Deployment Plan Workshop. Stakeholders were asked to provide input on the recommended projects, priority, and deployment timeframe.

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



(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 Wichita Falls 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 Wichita Falls 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 Wichita Falls 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, Wichita Falls 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 Wichita Falls Region were identified in the following categories:

- ***Travel and Traffic Management*** – includes the TxDOT Wichita Falls 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 HAZMAT permitting and weigh-in-motion.
- ***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, weather detection, winter maintenance strategies, 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 Wichita Falls 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 Wichita Falls 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.

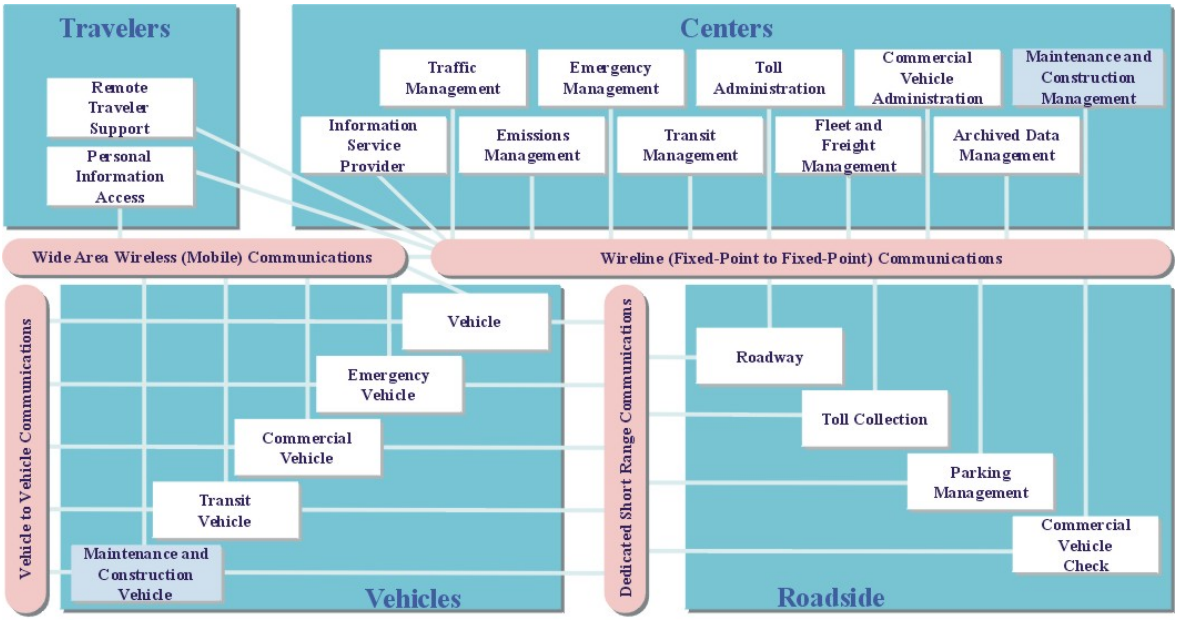


Figure 4 – Physical Subsystem Interconnect Diagram

4.1.2 Wichita Falls 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 Wichita Falls 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 Wichita Falls Regional ITS Architecture.

The information in **Table 3** also is included on the Wichita Falls ITS Architecture web site, which is accessible by selecting the link to the Texas Regional ITS Architecture, the Wichita Falls 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 Wichita Falls Regional ITS Architecture web site was being hosted at www.consystec.com. TxDOT plans to permanently host the site in the future at www.dot.state.tx.us/trf/its.)

4.1.3 Wichita Falls ITS Inventory by Entity

The Wichita Falls 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 Wichita Falls 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 Wichita Falls Regional ITS Architecture web site by selecting the "Inventory by Entity" button.

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

Stakeholder	Element	Entity	Status
Air-Evac Lifeteam	Air-Evac Lifeteam Dispatch	Emergency Management Subsystem	Existing
City of Wichita Falls	City of Wichita Falls Central Services Garage	Equipment Repair Facility	Existing
	City of Wichita Falls Public Information Office	Information Service Provider Subsystem	Existing
	City of Wichita Falls Public Works Department	Maintenance and Construction Management Subsystem	Existing
	City of Wichita Falls PWD Vehicles	Maintenance and Construction Vehicle Subsystem	Future
	City of Wichita Falls Website	Information Service Provider Subsystem	Existing
City of Wichita Falls Public Safety Departments	City of Wichita Falls Emergency Vehicles	Emergency Vehicle Subsystem	Existing
	City of Wichita Falls EOC	Emergency Management Subsystem	Future
	City of Wichita Falls Fire/EMS Dispatch	Emergency Management Subsystem	Existing
	City of Wichita Falls Police Dispatch	Emergency Management Subsystem	Existing
	City of Wichita Falls Police Dispatch	Traffic Management Subsystem	Existing
City of Wichita Falls Public Works Transportation	City of Wichita Falls Field Equipment	Roadway Subsystem	Existing
City of Wichita Falls Traffic, Transportation and Aviation	City of Wichita Falls Traffic Operations Center	Maintenance and Construction Management Subsystem	Existing
	City of Wichita Falls Traffic Operations Center	Traffic Management 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	Future
County Emergency Management Agencies	County EOC	Emergency Management Subsystem	Existing
County Road and Bridge	County Road and Bridge	Maintenance and Construction Management Subsystem	Existing
	County Road and Bridge Equipment Repair	Equipment Repair Facility	Existing
	County Road and Bridge Field Equipment	Roadway Subsystem	Future

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

Stakeholder	Element	Entity	Status
County Road and Bridge (continued)	County Road and Bridge Vehicles	Maintenance and Construction Vehicle Subsystem	Existing
County Volunteer Fire Departments	County Volunteer Fire Departments Dispatch	Emergency Management Subsystem	Existing
DPS	DPS Administration	Emergency Management Subsystem	Existing
	DPS Communications Service	Emergency Management Subsystem	Existing
	DPS Emergency Vehicles	Emergency Vehicle Subsystem	Existing
	Statewide Crash Records Information System	Archived Data Management Subsystem	Existing
	Statewide Crash Records Information System Users	Archived Data User Systems	Existing
DPS Division of Emergency Management	State EOC	Emergency Management Subsystem	Existing
Financial Institution	Financial Institution	Financial Institution	Future
Independent School Districts	Independent School District Buses	Transit Vehicle Subsystem	Existing
	Independent School District Dispatch	Transit Management Subsystem	Existing
Local Media	Local Print and Broadcast Media	Media	Existing
Municipal Convention and Visitors Bureau	Municipal Convention and Visitors Bureau	Event Promoters	Existing
Municipal Government	Other Municipal TOCs	Traffic Management Subsystem	Existing
Municipal or County Public Safety	Other Municipal or County Emergency Vehicles	Emergency Vehicle Subsystem	Existing
	Other Municipal or County Public Safety Dispatch and PSAP	Emergency Management Subsystem	Existing
Municipal Public Works Department	Municipal Field Equipment	Roadway Subsystem	Future
	Other Municipal PWD	Maintenance and Construction Management Subsystem	Existing
	Other Municipal PWD Field Equipment	Roadway Subsystem	Existing
	Other Municipal PWD Garage	Equipment Repair Facility	Future
	Other Municipal PWD Vehicles	Maintenance and Construction Vehicle Subsystem	Existing
NOAA	National Weather Service	Weather Service	Existing

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

Stakeholder	Element	Entity	Status
Nortex Regional Planning Commission	Nortex Regional Planning Commission Archive	Archived Data Management Subsystem	Future
	Nortex RPC Archive Data User Systems	Archived Data User Systems	Future
Oklahoma DOT	ODOT Maintenance Sections	Maintenance and Construction Management Subsystem	Existing
	Oklahoma DOT TMC	Traffic Management Subsystem	Future
Oklahoma DPS	Oklahoma DPS Dispatch	Emergency Management Subsystem	Existing
Private Ambulance	Private Ambulance Dispatch	Emergency Management Subsystem	Existing
	Private Ambulance Vehicle	Emergency Vehicle Subsystem	Existing
Private Information Service Providers	Private Sector Traveler Information Services	Information Service Provider Subsystem	Future
Private Taxi Providers	Private Taxi Provider Dispatch	Transit Management Subsystem	Future
Private Tow/Wrecker Providers	Private Tow/Wrecker Dispatch	Emergency Management Subsystem	Future
Private Travelers	Private Travelers Personal Computing Devices	Personal Information Access Subsystem	Future
Rail Operators	Rail Operations Centers	Fleet and Freight Management Subsystem	Existing
	Rail Operations Centers	Rail Operations	Existing
	Rail Operators Rail Cars	Commercial Vehicle Subsystem	Future
	Rail Operators Wayside Equipment	Wayside Equipment	Existing
Regional Airports	Regional Airports	Multimodal Transportation Service Provider	Existing
Regional Medical Center	Regional Medical Center	Care Facility	Existing
	Regional Medical Center	Emergency Management Subsystem	Existing
Regional Emergency and Public Safety Agencies	Wichita Falls Region Incident and Mutual Aid Network	Other EM	Future
Regions Chamber of Commerce	Regional Chamber of Commerce Traveler Information Systems	Remote Traveler Support Subsystem	Future
Rolling Plains Management Corp.	SHARP Line Transit Information Display/Point of Sale	Remote Traveler Support Subsystem	Future
	SHARP Lines Transit Dispatch	Transit Management Subsystem	Existing

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

Stakeholder	Element	Entity	Status
Rolling Plains Management Corp. (continued)	SHARP Lines Transit Vehicles	Transit Vehicle Subsystem	Existing
	SHARP Lines Transit Website	Information Service Provider Subsystem	Future
Sheppard AFB	Sheppard AFB EOC	Emergency Management Subsystem	Future
Texas Department of Criminal Justice Institutional Division	TDCJ-ID Regional Dispatch	Emergency Management Subsystem	Existing
Texoma Area Paratransit Systems	TAPS Transit Dispatch	Transit Management Subsystem	Existing
	TAPS Transit Information Display/Point of Sale	Remote Traveler Support Subsystem	Future
	TAPS Transit Vehicles	Transit Vehicle Subsystem	Existing
	TAPS Transit Website	Information Service Provider Subsystem	Future
TxDOT	Other TxDOT District Maintenance Sections	Maintenance and Construction Management Subsystem	Existing
	Other TxDOT District TMCs	Traffic Management Subsystem	Future
	TxDOT 511 System	Information Service Provider Subsystem	Planned
	TxDOT BRINSAP	Asset Management	Existing
	TxDOT Flood Detection	Roadway Subsystem	Future
	TxDOT Fort Worth TMC (TransVision)	Traffic Management Subsystem	Existing
	TxDOT Highway Conditions Reporting System	Information Service Provider Subsystem	Existing
	TxDOT Highway Conditions Reporting System	Maintenance and Construction Management Subsystem	Existing
	TxDOT Motor Carrier Routing Information	Information Service Provider Subsystem	Existing
	TxDOT PTMS Archive Data Users Systems	Archived Data User Systems	Existing
	TxDOT Rest Areas/Visitor Centers/Truck Stops/Service Plaza Kiosks	Remote Traveler Support Subsystem	Future
	TxDOT Statewide Pavement Management System	Archived Data Management Subsystem	Existing
	TxDOT Weigh in Motion	Commercial Vehicle Check Subsystem	Existing
	TxDOT Weigh in Motion	Roadway Subsystem	Existing
	TxDOT Wichita Falls District Anti-Icing Equipment	Roadway Subsystem	Future

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

Stakeholder	Element	Entity	Status
TxDOT (continued)	TxDOT Wichita Falls District Area Engineers Office	Maintenance and Construction Administrative Systems	Existing
	TxDOT Wichita Falls District Area Engineers Office	Maintenance and Construction Management Subsystem	Existing
	TxDOT Wichita Falls District CCTV	Roadway Subsystem	Existing
	TxDOT Wichita Falls District Design Pavement Section	Maintenance and Construction Management Subsystem	Existing
	TxDOT Wichita Falls District DMS	Roadway Subsystem	Existing
	TxDOT Wichita Falls District Equipment Repair Garage	Equipment Repair Facility	Future
	TxDOT Wichita Falls District Field Sensors	Commercial Vehicle Check Subsystem	Existing
	TxDOT Wichita Falls District Field Sensors	Roadway Subsystem	Existing
	TxDOT Wichita Falls District HAR	Roadway Subsystem	Existing
	TxDOT Wichita Falls District In-Vehicle Information Field Equipment	Roadway Subsystem	Future
	TxDOT Wichita Falls District Maintenance Sections	Maintenance and Construction Management Subsystem	Existing
	TxDOT Wichita Falls District Maintenance Vehicles	Maintenance and Construction Vehicle Subsystem	Existing
	TxDOT Wichita Falls District Office and TMC	Emergency Management Subsystem	Existing
	TxDOT Wichita Falls District Office and TMC	Information Service Provider Subsystem	Existing
	TxDOT Wichita Falls District Office and TMC	Maintenance and Construction Management Subsystem	Existing
	TxDOT Wichita Falls District Office and TMC	Traffic Management Subsystem	Existing
	TxDOT Wichita Falls District Pavement Management System	Archived Data Management Subsystem	Existing
	TxDOT Wichita Falls District Pavement Management System	Archived Data User Systems	Existing
	TxDOT Wichita Falls District Pavement Management System	Asset Management	Existing

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

Stakeholder	Element	Entity	Status
TxDOT (continued)	TxDOT Wichita Falls District Pavement Management System Users	Archived Data User Systems	Future
	TxDOT Wichita Falls District Public Information Office	Information Service Provider Subsystem	Future
	TxDOT Wichita Falls District Public Transportation Management System (PTMS)	Archived Data Management Subsystem	Existing
	TxDOT Wichita Falls District Traffic Signals	Roadway Subsystem	Existing
	TxDOT Wichita Falls District VIVDS Sensors	Roadway Subsystem	Existing
	TxDOT Wichita Falls District Website	Information Service Provider Subsystem	Existing
	TxDOT Wichita Falls District Work Zone Equipment	Roadway Subsystem	Future
USGS	Central USGS Flood Monitoring System	Emergency Management Subsystem	Existing
	USGS Archive	Archived Data Management Subsystem	Existing
	USGS Archive Data User Systems	Archived Data User Systems	Future
	USGS Field Equipment	Roadway Subsystem	Existing
Wichita Falls Transit	Wichita Falls Regional Smart Card	Traveler Card	Future
	Wichita Falls Transit Dispatch	Transit Management Subsystem	Existing
	Wichita Falls Transit Information Display/Point of Sale	Remote Traveler Support Subsystem	Future
	Wichita Falls Transit Vehicles	Transit Vehicle Subsystem	Existing
	Wichita Falls Transit Website	Information Service Provider Subsystem	Existing
Wichita Region Reconciliation Network Owners	Wichita Falls Region Transit Reconciliation Network	Transit Management Subsystem	Future

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

Entity	Element	Stakeholder	Status
Archived Data Management Subsystem	Nortex Regional Planning Commission Archive	Nortex Regional Planning Commission	Future
	Statewide Crash Records Information System	DPS	Existing
	TxDOT Statewide Pavement Management System	TxDOT	Existing
	TxDOT Wichita Falls District Pavement Management System	TxDOT	Existing
	TxDOT Wichita Falls District Public Transportation Management System (PTMS)	TxDOT	Existing
	USGS Archive	USGS	Existing
Archived Data User Systems	Nortex RPC Archive Data User Systems	Nortex Regional Planning Commission	Future
	Statewide Crash Records Information System Users	DPS	Existing
	TxDOT PTMS Archive Data Users Systems	TxDOT	Existing
	TxDOT Wichita Falls District Pavement Management System	TxDOT	Existing
	TxDOT Wichita Falls District Pavement Management System Users	TxDOT	Future
	USGS Archive Data User Systems	USGS	Future
Asset Management	TxDOT BRINSAP	TxDOT	Existing
	TxDOT Wichita Falls District Pavement Management System	TxDOT	Existing
Care Facility	Regional Medical Center	Regional Medical Center	Existing
Commercial Vehicle Check Subsystem	TxDOT Weigh in Motion	TxDOT	Existing
	TxDOT Wichita Falls District Field Sensors	TxDOT	Existing
Commercial Vehicle Subsystem	Commercial Vehicles	Commercial Vehicle Operators	Existing
	Rail Operators Rail Cars	Rail Operators	Future
Emergency Management Subsystem	Air-Evac Lifeteam Dispatch	Air-Evac Lifeteam	Existing
	Central USGS Flood Monitoring System	USGS	Existing

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

Entity	Element	Stakeholder	Status
Emergency Management Subsystem (continued)	City of Wichita Falls EOC	City of Wichita Falls Public Safety Departments	Future
	City of Wichita Falls Fire/EMS Dispatch	City of Wichita Falls Public Safety Departments	Existing
	City of Wichita Falls Police Dispatch	City of Wichita Falls Public Safety Departments	Existing
	County EOC	County Emergency Management Agencies	Existing
	County Volunteer Fire Departments Dispatch	County Volunteer Fire Departments	Existing
	DPS Administration	DPS	Existing
	DPS Communications Service	DPS	Existing
	Oklahoma DPS Dispatch	Oklahoma DPS	Existing
	Other Municipal or County Public Safety Dispatch and PSAP	Municipal or County Public Safety	Existing
	Private Ambulance Dispatch	Private Ambulance	Existing
	Private Tow/Wrecker Dispatch	Private Tow/Wrecker Providers	Future
	Regional Medical Center	Regional Medical Center	Existing
	Sheppard AFB EOC	Sheppard AFB	Future
	State EOC	DPS Division of Emergency Management	Existing
	TDCJ-ID Regional Dispatch	Texas Department of Criminal Justice Institutional Division	Existing
	TxDOT Wichita Falls District Office and TMC	TxDOT	Existing
Emergency Vehicle Subsystem	City of Wichita Falls Emergency Vehicles	City of Wichita Falls Public Safety Departments	Existing
	DPS Emergency Vehicles	DPS	Existing
	Other Municipal or County Emergency Vehicles	Municipal or County Public Safety	Existing
	Private Ambulance Vehicle	Private Ambulance	Existing

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

Entity	Element	Stakeholder	Status
Equipment Repair Facility	City of Wichita Falls Central Services Garage	City of Wichita Falls	Existing
	County Road and Bridge Equipment Repair	County Road and Bridge	Existing
	Other Municipal PWD Garage	Municipal Public Works Department	Future
	TxDOT Wichita Falls District Equipment Repair Garage	TxDOT	Future
Event Promoters	Municipal Convention and Visitors Bureau	Municipal Convention and Visitors Bureau	Existing
Financial Institution	Financial Institution	Financial Institution	Future
Fleet and Freight Management Subsystem	Private Fleet Management Systems	Commercial Vehicle Operators	Future
	Rail Operations Centers	Rail Operators	Existing
Information Service Provider Subsystem	City of Wichita Falls Public Information Office	City of Wichita Falls	Existing
	City of Wichita Falls Website	City of Wichita Falls	Existing
	Private Sector Traveler Information Services	Private Information Service Providers	Future
	SHARP Lines Transit Website	Rolling Plains Management Corp.	Future
	TAPS Transit Website	Texoma Area Paratransit Systems	Future
	TxDOT 511 System	TxDOT	Planned
	TxDOT Highway Conditions Reporting System	TxDOT	Existing
	TxDOT Motor Carrier Routing Information	TxDOT	Existing
	TxDOT Wichita Falls District Office and TMC	TxDOT	Existing
	TxDOT Wichita Falls District Public Information Office	TxDOT	Future
	TxDOT Wichita Falls District Website	TxDOT	Existing
	Wichita Falls Transit Website	Wichita Falls Transit	Existing
Maintenance and Construction Administrative Systems	TxDOT Wichita Falls District Area Engineers Office	TxDOT	Existing
Maintenance and Construction Management Subsystem	City of Wichita Falls Public Works Department	City of Wichita Falls	Existing
	City of Wichita Falls Traffic Operations Center	City of Wichita Falls Traffic, Transportation and Aviation	Existing
	County Road and Bridge	County Road and Bridge	Existing

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

Entity	Element	Stakeholder	Status
Maintenance and Construction Management Subsystem (continued)	ODOT Maintenance Sections	Oklahoma DOT	Existing
	Other Municipal PWD	Municipal Public Works Department	Existing
	Other TxDOT District Maintenance Sections	TxDOT	Existing
	TxDOT Highway Conditions Reporting System	TxDOT	Existing
	TxDOT Wichita Falls District Area Engineers Office	TxDOT	Existing
	TxDOT Wichita Falls District Design Pavement Section	TxDOT	Existing
	TxDOT Wichita Falls District Maintenance Sections	TxDOT	Existing
	TxDOT Wichita Falls District Office and TMC	TxDOT	Existing
Maintenance and Construction Vehicle Subsystem	City of Wichita Falls PWD Vehicles	City of Wichita Falls	Future
	County Road and Bridge Vehicles	County Road and Bridge	Existing
	Other Municipal PWD Vehicles	Municipal Public Works Department	Existing
	TxDOT Wichita Falls District Maintenance Vehicles	TxDOT	Existing
Media	Local Print and Broadcast Media	Local Media	Existing
Multimodal Transportation Service Provider	Regional Airports	Regional Airports	Existing
Other EM	Wichita Falls Region Incident and Mutual Aid Network	Regional Emergency and Public Safety Agencies	Future
Personal Information Access Subsystem	Private Travelers Personal Computing Devices	Private Travelers	Future
Rail Operations	Rail Operations Centers	Rail Operators	Existing
Remote Traveler Support Subsystem	Regional Chamber of Commerce Traveler Information Systems	Regions Chamber of Commerce	Future
	SHARP Line Transit Information Display/Point of Sale	Rolling Plains Management Corp.	Future
	TAPS Transit Information Display/Point of Sale	Texoma Area Paratransit Systems	Future
	TxDOT Rest Areas/Visitor Centers/Truck Stops/Service Plaza Kiosks	TxDOT	Future
	Wichita Falls Transit Information Display/Point of Sale	Wichita Falls Transit	Future

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

Entity	Element	Stakeholder	Status
Roadway Subsystem	City of Wichita Falls Field Equipment	City of Wichita Falls Public Works Transportation	Existing
	County Road and Bridge Field Equipment	County Road and Bridge	Future
	Municipal Field Equipment	Municipal Public Works Department	Future
	Other Municipal PWD Field Equipment	Municipal Public Works Department	Existing
	TxDOT Flood Detection	TxDOT	Future
	TxDOT Weigh in Motion	TxDOT	Existing
	TxDOT Wichita Falls District Anti-Icing Equipment	TxDOT	Future
	TxDOT Wichita Falls District CCTV	TxDOT	Existing
	TxDOT Wichita Falls District DMS	TxDOT	Existing
	TxDOT Wichita Falls District Field Sensors	TxDOT	Existing
	TxDOT Wichita Falls District HAR	TxDOT	Existing
	TxDOT Wichita Falls District In-Vehicle Information Field Equipment	TxDOT	Future
	TxDOT Wichita Falls District Traffic Signals	TxDOT	Existing
	TxDOT Wichita Falls District VIVDS Sensors	TxDOT	Existing
	TxDOT Wichita Falls District Work Zone Equipment	TxDOT	Future
	USGS Field Equipment	USGS	Existing
Traffic Management Subsystem	City of Wichita Falls Police Dispatch	City of Wichita Falls Public Safety Departments	Existing
	City of Wichita Falls Traffic Operations Center	City of Wichita Falls Traffic, Transportation and Aviation	Existing
	Oklahoma DOT TMC	Oklahoma DOT	Future
	Other Municipal TOCs	Municipal Government	Existing
	Other TxDOT District TMCs	TxDOT	Future

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

Entity	Element	Stakeholder	Status
Traffic Management Subsystem (continued)	TxDOT Fort Worth TMC (TransVision)	TxDOT	Existing
	TxDOT Wichita Falls District Office and TMC	TxDOT	Existing
Transit Management Subsystem	Independent School District Dispatch	Independent School Districts	Existing
	Private Taxi Provider Dispatch	Private Taxi Providers	Future
	SHARP Lines Transit Dispatch	Rolling Plains Management Corp.	Existing
	TAPS Transit Dispatch	Texoma Area Paratransit Systems	Existing
	Wichita Falls Region Transit Reconciliation Network	Wichita Region Reconciliation Network Owners	Future
	Wichita Falls Transit Dispatch	Wichita Falls Transit	Existing
Transit Vehicle Subsystem	Independent School District Buses	Independent School Districts	Existing
	SHARP Lines Transit Vehicles	Rolling Plains Management Corp.	Existing
	TAPS Transit Vehicles	Texoma Area Paratransit Systems	Existing
	Wichita Falls Transit Vehicles	Wichita Falls Transit	Existing
Traveler Card	Wichita Falls Regional Smart Card	Wichita Falls Transit	Future
Vehicle Subsystem	Commercial Vehicles	Commercial Vehicle Operators	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 Wichita Falls 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 a total of 75 market packages identified in the National ITS Architecture Version 4.0.

In the Wichita Falls 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 Wichita Falls 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 Wichita Falls and on state routes through the TxDOT Wichita Falls District. The market packages 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 – Wichita Falls 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 Wichita Falls Field Equipment	City of Wichita Falls	Existing
		City of Wichita Falls Traffic Operations Center	Municipalities	Future
		Municipal Field Equipment	TxDOT Wichita Falls District	Existing
		Other Municipal TOCs		
		Private Sector Traveler Information Services		
		TxDOT Wichita Falls District CCTV		
		TxDOT Wichita Falls District Field Sensors		
		TxDOT Wichita Falls District Office and TMC		
		TxDOT Wichita Falls District VIVDS Sensors		
		TxDOT Wichita Falls District Website		
ATMS03	Surface Street Control	City of Wichita Falls Field Equipment	City of Wichita Falls	Existing
		City of Wichita Falls Traffic Operations Center	Municipalities	Future
			TxDOT Wichita Falls District	Existing

Table 5 – Wichita Falls Region Selected Market Packages (continued)

Market Package	Market Package Name	Elements Associated with Market Package	Primary Stakeholders Responsible for Implementation	Market Package Status
ATMS03 (continued)	Surface Street Control (continued)	Municipal Field Equipment Other Municipal TOCs TxDOT Wichita Falls District Field Sensors TxDOT Wichita Falls District Office and TMC TxDOT Wichita Falls District Traffic Signals		
ATMS04	Freeway Control	TxDOT Wichita Falls District CCTV TxDOT Wichita Falls District Field Sensors TxDOT Wichita Falls District Office and TMC	TxDOT Wichita Falls District	Existing
ATMS06	Traffic Information Dissemination	City of Wichita Falls Fire/EMS Dispatch City of Wichita Falls Police Dispatch City of Wichita Falls Public Information Office City of Wichita Falls Public Works Department City of Wichita Falls Traffic Operations Center City of Wichita Falls Website County Road and Bridge DPS Communications Service Independent School District Dispatch Local Print and Broadcast Media Other Municipal or County Public Safety Dispatch and PSAP Other Municipal PWD Private Sector Traveler Information Services SHARP Lines Transit Dispatch TAPS Transit Dispatch TxDOT 511 System TxDOT Wichita Falls District Design Pavement Section TxDOT Wichita Falls District Maintenance Sections TxDOT Wichita Falls District DMS TxDOT Wichita Falls District HAR TxDOT Wichita Falls District Maintenance Sections TxDOT Wichita Falls District Office and TMC TxDOT Wichita Falls District Public Information Office TxDOT Wichita Falls District Website Wichita Falls Transit Dispatch	City of Wichita Falls TxDOT Wichita Falls District	Future Future

Table 5 – Wichita Falls Region Selected Market Packages (continued)

Market Package	Market Package Name	Elements Associated with Market Package	Primary Stakeholders Responsible for Implementation	Market Package Status
ATMS07	Regional Traffic Control	City of Wichita Falls Police Dispatch City of Wichita Falls Traffic Operations Center DPS Communications Service Oklahoma DPS Dispatch Oklahoma DOT TMC Other TxDOT District TMCs TxDOT Fort Worth TMC (TransVision) TxDOT Wichita Falls District Office and TMC	TxDOT Wichita Falls District	Future
ATMS08	Incident Management System	Central USGS Flood Monitoring System City of Wichita Falls Emergency Vehicles City of Wichita Falls EOC City of Wichita Falls Fire/EMS Dispatch City of Wichita Falls Police Dispatch City of Wichita Falls Public Works Department City of Wichita Falls Traffic Operations Center County EOC County Road and Bridge DPS Communications Service DPS Emergency Vehicles Local Print and Broadcast Media Municipal Convention and Visitors Bureau Oklahoma DOT TMC Oklahoma DPS Dispatch Other Municipal or County Emergency Vehicles Other Municipal or County Public Safety Dispatch and PSAP Other Municipal PWD Other Municipal TOCs Other TxDOT District Maintenance Sections Private Ambulance Dispatch Private Ambulance Vehicle Rail Operations Centers Sheppard AFB EOC TxDOT Flood Detection TxDOT Highway Conditions Reporting System	Transportation and Emergency Management Agencies	Future

Table 5 – Wichita Falls 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)	Incident Management System (continued)	TxDOT Wichita Falls District Area Engineers Office TxDOT Wichita Falls District Maintenance Sections TxDOT Wichita Falls District Office and TMC USGS Field Equipment		
ATMS13	Standard Railroad Grade Crossing	City of Wichita Falls Field Equipment City of Wichita Falls Traffic Operations Center Rail Operations Centers Rail Operators Wayside Equipment TxDOT Wichita Falls District Office and TMC TxDOT Wichita Falls District Traffic Signals	City of Wichita Falls TxDOT Wichita Falls District	Existing Future
ATMS15	Railroad Operations Coordination	City of Wichita Falls Traffic Operations Center Rail Operations Centers TxDOT Wichita Falls District Office and TMC	City of Wichita Falls TxDOT Wichita Falls District	Future Future
EM01	Emergency Response	Air-Evac Lifeteam Dispatch City of Wichita Falls EOC City of Wichita Falls Fire/EMS Dispatch City of Wichita Falls Police Dispatch County EOC County Volunteer Fire Departments Dispatch DPS Communications Service Oklahoma DPS Dispatch Other Municipal or County Public Safety Dispatch and PSAP Private Ambulance Dispatch Private Tow/Wrecker Dispatch Regional Medical Center Sheppard AFB EOC State EOC TDCJ-ID Regional Dispatch Wichita Falls Region Incident and Mutual Aid Network	Transportation and Emergency Management Agencies	Future

Table 5 – Wichita Falls Region Selected Market Packages (continued)

Market Package	Market Package Name	Elements Associated with Market Package	Primary Stakeholders Responsible for Implementation	Market Package Status
EM02	Emergency Routing	City of Wichita Falls Emergency Vehicles City of Wichita Falls Field Equipment City of Wichita Falls Fire/EMS Dispatch City of Wichita Falls Traffic Operations Center DPS Communications Service DPS Emergency Vehicles Other Municipal or County Emergency Vehicles Other Municipal or County Public Safety Dispatch and PSAP Private Ambulance Dispatch Private Ambulance Vehicle Regional Medical Center TxDOT Wichita Falls District Office and TMC TxDOT Wichita Falls District Traffic Signals	City of Wichita Falls TxDOT Wichita Falls District	Existing Future
MC01	Maintenance and Construction Vehicle Tracking	City of Wichita Falls Public Works Department City of Wichita Falls PWD Vehicles County Road and Bridge County Road and Bridge Vehicles Other Municipal PWD Vehicles Other Municipal PWD TxDOT Wichita Falls District Maintenance Sections TxDOT Wichita Falls District Maintenance Vehicles TxDOT Wichita Falls District Office and TMC	City of Wichita Falls Counties Municipalities TxDOT Wichita Falls District	Future Future Future Future
MC02	Maintenance and Construction Vehicle Maintenance	City of Wichita Falls Central Services Garage City of Wichita Falls Public Works Department City of Wichita Falls PWD Vehicles County Road and Bridge County Road and Bridge Equipment Repair County Road and Bridge Vehicles Other Municipal PWD Garage Other Municipal PWD Vehicles Other Municipal PWD	City of Wichita Falls Counties Municipalities TxDOT Wichita Falls District	Future Future Future Future

Table 5 – Wichita Falls Region Selected Market Packages (continued)

Market Package	Market Package Name	Elements Associated with Market Package	Primary Stakeholders Responsible for Implementation	Market Package Status
MC02 (continued)	Maintenance and Construction Vehicle Maintenance (continued)	TxDOT Wichita Falls District Equipment Repair Garage TxDOT Wichita Falls District Maintenance Sections TxDOT Wichita Falls District Maintenance Vehicles TxDOT Wichita Falls District Office and TMC		
MC03	Road Weather Data Collection	Central USGS Flood Monitoring System	TxDOT Wichita Falls District	Existing
		TxDOT Wichita Falls District Anti-Icing Equipment TxDOT Wichita Falls District Maintenance Sections TxDOT Wichita Falls District DMS TxDOT Wichita Falls District Field Sensors TxDOT Wichita Falls District Office and TMC		
MC04	Weather Information Processing and Distribution	City of Wichita Falls Fire/EMS Dispatch	National Weather Service	Future
		City of Wichita Falls Police Dispatch	TxDOT Wichita Falls District	Future
		City of Wichita Falls Traffic Operations Center County EOC County Volunteer Fire Departments Dispatch DPS Communications Service Independent School District Dispatch Local Print and Broadcast Media National Weather Service Oklahoma DOT TMC Oklahoma DPS Dispatch Other Municipal or County Public Safety Dispatch and PSAP Other Municipal TOCs Other TxDOT District TMCs Private Ambulance Dispatch Private Travelers Personal Computing Devices SHARP Lines Transit Dispatch TAPS Transit Dispatch TDCJ-ID Regional Dispatch TxDOT Wichita Falls District Office and TMC TxDOT Wichita Falls District Website Wichita Falls Transit Dispatch		

Table 5 – Wichita Falls Region Selected Market Packages (continued)

Market Package	Market Package Name	Elements Associated with Market Package	Primary Stakeholders Responsible for Implementation	Market Package Status
MC05	Roadway Automated Treatment	TxDOT Wichita Falls District Anti-Icing Equipment	TxDOT Wichita Falls District	Future
		TxDOT Wichita Falls District Office and TMC		
MC06	Winter Maintenance	City of Wichita Falls Fire/EMS Dispatch	City of Wichita Falls	Future
		City of Wichita Falls Police Dispatch	Counties	Future
		City of Wichita Falls Public Information Office	Municipalities	Future
		City of Wichita Falls Public Works Department	TxDOT Wichita Falls District	Future
		City of Wichita Falls PWD Vehicles		
		City of Wichita Falls Traffic Operations Center		
		County EOC		
		County Road and Bridge		
		County Road and Bridge Vehicles		
		DPS Communications Service		
		Independent School District Dispatch		
		Local Print and Broadcast Media		
		National Weather Service		
		Other Municipal or County Public Safety Dispatch and PSAP		
		Other Municipal PWD Vehicles		
		Other Municipal PWD		
		Other Municipal TOCs		
		SHARP Lines Transit Dispatch		
		TAPS Transit Dispatch		
		TxDOT Wichita Falls District Maintenance Sections		
		TxDOT Wichita Falls District Maintenance Vehicles		
		TxDOT Wichita Falls District Office and TMC		
		TxDOT Wichita Falls District Public Information Office		
		TxDOT Wichita Falls District Website		
		Wichita Falls Transit Dispatch		
MC07	Roadway Maintenance and Construction	City of Wichita Falls Public Works Department	City of Wichita Falls	Future
		City of Wichita Falls PWD Vehicles	Counties	Future
		City of Wichita Falls Traffic Operations Center	Municipalities	Future
		County Road and Bridge	TxDOT Wichita Falls District	Future

Table 5 – Wichita Falls Region Selected Market Packages (continued)

Market Package	Market Package Name	Elements Associated with Market Package	Primary Stakeholders Responsible for Implementation	Market Package Status
MC07 (continued)	Roadway Maintenance and Construction (continued)	County Road and Bridge Field Equipment County Road and Bridge Vehicles National Weather Service Other Municipal PWD Vehicles Other Municipal PWD TxDOT BRINSAP TxDOT Wichita Falls District Area Engineers Office TxDOT Wichita Falls District Maintenance Sections TxDOT Wichita Falls District Maintenance Vehicles TxDOT Wichita Falls District Office and TMC TxDOT Wichita Falls District Design Pavement Section TxDOT Wichita Falls District Pavement Management System		
MC08	Work Zone Management	City of Wichita Falls Field Equipment City of Wichita Falls Fire/EMS Dispatch City of Wichita Falls Police Dispatch City of Wichita Falls Public Works Department City of Wichita Falls PWD Vehicles City of Wichita Falls Traffic Operations Center County EOC County Road and Bridge DPS Communications Service Independent School District Dispatch Other Municipal or County Public Safety Dispatch and PSAP Other Municipal PWD Other Municipal PWD Field Equipment Other Municipal PWD Vehicles Other TxDOT District Maintenance Sections Private Tow/Wrecker Dispatch SHARP Lines Transit Dispatch State EOC TAPS Transit Dispatch TxDOT Highway Conditions Reporting System	City of Wichita Falls Municipalities TxDOT Wichita Falls District	Future Future Future

Table 5 – Wichita Falls 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)	TxDOT Wichita Falls District Area Engineers Office TxDOT Wichita Falls District Maintenance Sections TxDOT Wichita Falls District Maintenance Vehicles TxDOT Wichita Falls District Office and TMC TxDOT Wichita Falls District Public Information Office TxDOT Wichita Falls District Website TxDOT Wichita Falls District Work Zone Equipment Wichita Falls Transit Dispatch		
MC09	Work Zone Safety Monitoring	City of Wichita Falls Field Equipment City of Wichita Falls Public Works Department City of Wichita Falls PWD Vehicles County Road and Bridge County Road and Bridge Field Equipment County Road and Bridge Vehicles Other Municipal PWD Other Municipal PWD Field Equipment Other Municipal PWD Vehicles TxDOT Wichita Falls District Maintenance Sections TxDOT Wichita Falls District Maintenance Vehicles TxDOT Wichita Falls District Work Zone Equipment	City of Wichita Falls Counties Municipalities TxDOT Wichita Falls District	Future Future Future Future
MC10	Maintenance and Construction Activity Coordination	City of Wichita Falls EOC City of Wichita Falls Fire/EMS Dispatch City of Wichita Falls Police Dispatch City of Wichita Falls Public Information Office City of Wichita Falls Public Works Department City of Wichita Falls Traffic Operations Center County EOC County Road and Bridge DPS Communications Service Independent School District Dispatch	City of Wichita Falls Counties Municipalities TxDOT Wichita Falls District	Future Future Future Future

Table 5 – Wichita Falls Region Selected Market Packages (continued)

Market Package	Market Package Name	Elements Associated with Market Package	Primary Stakeholders Responsible for Implementation	Market Package Status
MC10 (continued)	Maintenance and Construction Activity Coordination (continued)	Local Print and Broadcast Media Other Municipal or County Public Safety Dispatch and PSAP ODOT Maintenance Sections Oklahoma DOT TMC Other Municipal PWD Other TxDOT District Maintenance Sections Rail Operations Centers SHARP Lines Transit Dispatch Sheppard AFB EOC TAPS Transit Dispatch TxDOT Highway Conditions Reporting System TxDOT Wichita Falls District Area Engineers Office TxDOT Wichita Falls District Maintenance Sections TxDOT Wichita Falls District Office and TMC TxDOT Wichita Falls District Public Information Office TxDOT Wichita Falls District Website Wichita Falls Transit Dispatch		
APTS1	Transit Vehicle Tracking	SHARP Lines Transit Dispatch SHARP Lines Transit Vehicles TAPS Transit Dispatch TAPS Transit Vehicles Wichita Falls Transit Dispatch Wichita Falls Transit Vehicles	Wichita Falls Transit SHARP Lines Transit TAPS Transit	Future Future Future
APTS2	Transit Fixed-Route Operations	City of Wichita Falls Public Works Department City of Wichita Falls Traffic Operations Center Independent School District Buses Independent School District Dispatch Other Municipal TOCs Private Sector Traveler Information Services TxDOT 511 System TxDOT Wichita Falls District Office and TMC Wichita Falls Transit Dispatch Wichita Falls Transit Vehicles Wichita Falls Transit Website	Wichita Falls Transit Independent School Districts	Future Future

Table 5 – Wichita Falls Region Selected Market Packages (continued)

Market Package	Market Package Name	Elements Associated with Market Package	Primary Stakeholders Responsible for Implementation	Market Package Status
APTS3	Demand Response Transit Operations	City of Wichita Falls Traffic Operations Center Other Municipal TOCs Private Sector Traveler Information Services SHARP Lines Transit Dispatch SHARP Lines Transit Vehicles TAPS Transit Dispatch TAPS Transit Vehicles TAPS Transit Website TxDOT 511 System TxDOT Wichita Falls District Office and TMC Wichita Falls Transit Dispatch Wichita Falls Transit Vehicles Wichita Falls Transit Website	SHARP Lines Transit TAPS Transit Wichita Falls Transit	Future Future Future
APTS4	Transit Passenger and Fare Management	Financial Institution SHARP Line Transit Information Display/Point of Sale SHARP Lines Transit Dispatch SHARP Lines Transit Vehicles TAPS Transit Dispatch TAPS Transit Information Display/Point of Sale TAPS Transit Vehicles TAPS Transit Website Wichita Falls Regional Smart Card Wichita Falls Transit Dispatch Wichita Falls Transit Information Display/Point of Sale Wichita Falls Transit Vehicles Wichita Falls Region Transit Reconciliation Network	SHARP Lines Transit TAPS Transit Wichita Falls Transit	Future Future Future
APTS5	Transit Security	City of Wichita Falls Police Dispatch DPS Communications Service Other Municipal or County Public Safety Dispatch and PSAP SHARP Lines Transit Dispatch SHARP Lines Transit Vehicles TAPS Transit Dispatch TAPS Transit Vehicles Wichita Falls Transit Dispatch	SHARP Lines Transit TAPS Transit Wichita Falls Transit	Future Future Future

Table 5 – Wichita Falls Region Selected Market Packages (continued)

Market Package	Market Package Name	Elements Associated with Market Package	Primary Stakeholders Responsible for Implementation	Market Package Status
APTS5 (continued)	Transit Security (continued)	Wichita Falls Transit Information Display/Point of Sale		
		Wichita Falls Transit Vehicles		
APTS7	Multi-modal Coordination	Private Taxi Provider Dispatch	SHARP Lines Transit	Future
		Regional Airports	TAPS Transit	Future
		SHARP Lines Transit Dispatch	Wichita Falls Transit	Future
		SHARP Lines Transit Vehicles		
		TAPS Transit Dispatch		
		TAPS Transit Vehicles		
		Wichita Falls Transit Dispatch		
		Wichita Falls Transit Vehicles		
APTS8	Transit Traveler Information	Private Travelers Personal Computing Devices	SHARP Lines Transit	Future
		Regional Chamber of Commerce Traveler Information Systems	TAPS Transit	Future
		SHARP Lines Transit Dispatch	Wichita Falls Transit	Future
		SHARP Lines Transit Website		
		TAPS Transit Dispatch		
		TAPS Transit Website		
		TxDOT Rest Areas/Visitor Centers/Service/Truck Stops/ Plaza Kiosks		
		Wichita Falls Transit Dispatch		
		Wichita Falls Transit Information Display/Point of Sale		
		Wichita Falls Transit Website		
CVO06	Weigh-In-Motion	City of Wichita Falls Fire/EMS Dispatch	TxDOT Wichita Falls District	Future
		City of Wichita Falls Police Dispatch		
		Commercial Vehicles		
		County Volunteer Fire Departments Dispatch		
		DPS Communications Service		
		Other Municipal or County Public Safety Dispatch and PSAP		
		TxDOT Weigh in Motion		
		TxDOT Wichita Falls District Office and TMC		
CVO10	HAZMAT Management	City of Wichita Falls Fire/EMS Dispatch	City of Wichita Falls	Future
		City of Wichita Falls Police Dispatch		
		Commercial Vehicles		
		Other Municipal or County Public Safety Dispatch and PSAP		
		Private Fleet Management Systems		

Table 5 – Wichita Falls Region Selected Market Packages (continued)

Market Package	Market Package Name	Elements Associated with Market Package	Primary Stakeholders Responsible for Implementation	Market Package Status
CVO10 (continued)	HAZMAT Management (continued)	Rail Operations Centers Rail Operators Rail Cars		
ATIS1	Broadcast Traveler Information	City of Wichita Falls Traffic Operations Center Local Print and Broadcast Media Other TxDOT District Maintenance Sections Private Travelers Personal Computing Devices TxDOT 511 System TxDOT Highway Conditions Reporting System TxDOT Rest Areas/Visitor Centers/Service/Truck Stops/ Plaza Kiosks TxDOT Wichita Falls District Maintenance Sections TxDOT Wichita Falls District Office and TMC TxDOT Wichita Falls District Public Information Office TxDOT Wichita Falls District Website	TxDOT Wichita Falls District	Future
ATIS2	Broadcast Traveler Information	Commercial Vehicles Local Print and Broadcast Media Private Travelers Personal Computing Devices TxDOT Rest Areas/Visitor Centers/Service/Truck Stops/ Plaza Kiosks TxDOT Wichita Falls District Public Information Office	TxDOT Wichita Falls District	Future
ATIS5	ISP Based Route Guidance	City of Wichita Falls Traffic Operations Center Private Fleet Management Systems TxDOT Motor Carrier Routing Information TxDOT Rest Areas/Visitor Centers/Service/Truck Stops/Plaza Kiosks TxDOT Wichita Falls District Maintenance Sections TxDOT Wichita Falls District Office and TMC	TxDOT Motor Carrier	Future
ATIS9	In-Vehicle Signing	Commercial Vehicles TxDOT Wichita Falls District In-Vehicle Information Field Equipment TxDOT Wichita Falls District Office and TMC	TxDOT Wichita Falls District	Future

Table 5 – Wichita Falls Region Selected Market Packages (continued)

Market Package	Market Package Name	Elements Associated with Market Package	Primary Stakeholders Responsible for Implementation	Market Package Status
AD1	ITS Data Mart	Central USGS Flood Monitoring System	DPS	Future
		DPS Administration	TxDOT Wichita Falls District	Future
		SHARP Lines Transit Dispatch	USGS	Future
		Statewide Crash Records Information System		
		Statewide Crash Records Information System Users		
		TAPS Transit Dispatch		
		TxDOT Public Transportation Management System (PTMS) Archive Data Users Systems		
		TxDOT Statewide Pavement Management System		
		TxDOT Wichita Falls District Maintenance Sections		
		TxDOT Wichita Falls District Pavement Management System		
		TxDOT Wichita Falls District Pavement Management System Users		
		TxDOT Wichita Falls District PTMS		
		USGS Archive		
		USGS Archive Data User System		
		Wichita Falls Transit Dispatch		
AD2	ITS Data Warehouse	City of Wichita Falls Traffic Operations Center	Nortex	Future
		Nortex Regional Planning Commission Archive	TxDOT Wichita Falls District	Future
		Nortex RPC Archive Data User Systems		
		Rail Operations Centers		
		Regional Airports		
		SHARP Lines Transit Dispatch		
		TAPS Transit Dispatch		
		TxDOT PTMS Archive Data Users Systems		
		TxDOT Statewide Pavement Management System		
		TxDOT Wichita Falls District Maintenance Sections		
		TxDOT Wichita Falls District Office and TMC		
		TxDOT Wichita Falls District Pavement Management System		
		Wichita Falls Transit Dispatch		

4.3 Interconnections

4.3.1 Top Level Regional System Interconnect Diagram

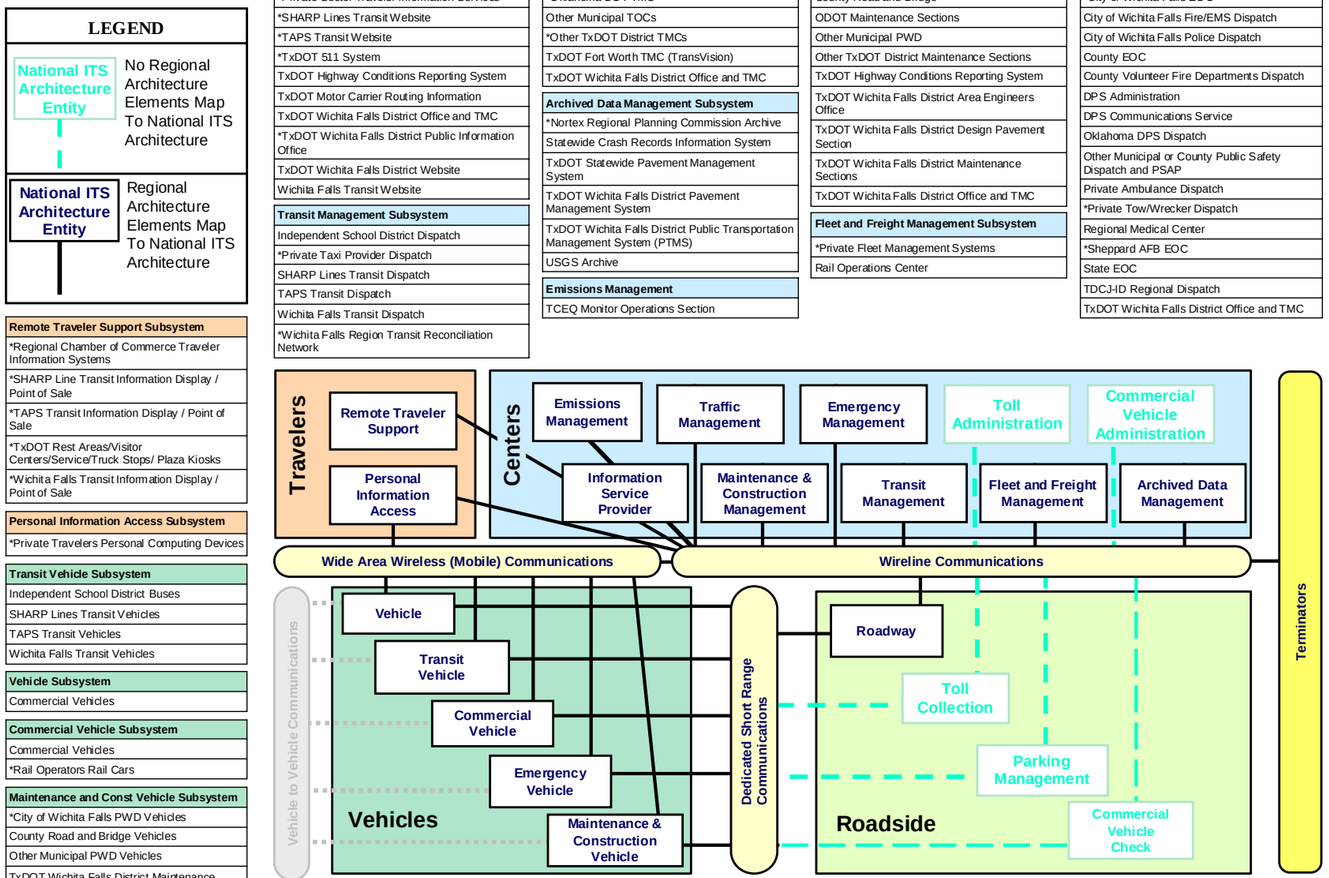
A system interconnect diagram, or sausage diagram (shown previously in **Figure 4**), shows the systems and primary interconnects in the Region. The National ITS Architecture interconnect diagram has been customized for the Wichita Falls Region based on the information gathered from the stakeholders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

4.3.2 Customized Market Packages

The market packages in the National ITS Architecture were customized to reflect the unique systems, subsystems, and terminators in the Wichita Falls Region. Each market package is shown graphically, with the market package name, Wichita Falls-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 Wichita Falls Region. This market package shows the two subsystems, Traffic Management and Roadway, and the associated entities (TxDOT Wichita Falls District Traffic Signals, TxDOT Wichita Falls District Field Sensors, etc.) for the TxDOT Wichita Falls District signal system. Data flows between the subsystems indicate what information is being shared.

Market packages that were customized for the Wichita Falls Region are shown in **Appendix A**. These market packages also are included on the Wichita Falls 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 Wichita Falls 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.



Remote Traveler Support Subsystem
*Regional Chamber of Commerce Traveler Information Systems
*SHARP Line Transit Information Display / Point of Sale
*TAPS Transit Information Display / Point of Sale
*TxDOT Rest Areas/Visitor Centers/Service/Truck Stops/ Plaza Kiosks
*Wichita Falls Transit Information Display / Point of Sale

Personal Information Access Subsystem
*Private Travelers Personal Computing Devices

Transit Vehicle Subsystem
Independent School District Buses
SHARP Lines Transit Vehicles
TAPS Transit Vehicles
Wichita Falls Transit Vehicles

Vehicle Subsystem
Commercial Vehicles

Commercial Vehicle Subsystem
Commercial Vehicles
*Rail Operators Rail Cars

Maintenance and Const Vehicle Subsystem
*City of Wichita Falls PWD Vehicles
County Road and Bridge Vehicles
Other Municipal PWD Vehicles
TxDOT Wichita Falls District Maintenance Vehicles

Emergency Vehicle Subsystem
City of Wichita Falls Emergency Vehicles
DPS Emergency Vehicles
Other Municipal or County Emergency Vehicles
Private Ambulance Vehicle

Information Service Provider Subsystem*
City of Wichita Falls Public Information Office
City of Wichita Falls Website
*Private Sector Traveler Information Services
*SHARP Lines Transit Website
*TAPS Transit Website
*TxDOT 511 System
TxDOT Highway Conditions Reporting System
TxDOT Motor Carrier Routing Information
TxDOT Wichita Falls District Office and TMC
*TxDOT Wichita Falls District Public Information Office
TxDOT Wichita Falls District Website
Wichita Falls Transit Website

Transit Management Subsystem
Independent School District Dispatch
*Private Taxi Provider Dispatch
SHARP Lines Transit Dispatch
TAPS Transit Dispatch
Wichita Falls Transit Dispatch
*Wichita Falls Region Transit Reconciliation Network

Traffic Management Subsystem
City of Wichita Falls Police Dispatch
City of Wichita Falls Traffic Operations Center
*Oklahoma DOT TMC
Other Municipal TOCs
*Other TxDOT District TMCs
TxDOT Fort Worth TMC (TransVision)
TxDOT Wichita Falls District Office and TMC

Archived Data Management Subsystem
*Nortex Regional Planning Commission Archive
Statewide Crash Records Information System
TxDOT Statewide Pavement Management System
TxDOT Wichita Falls District Pavement Management System
TxDOT Wichita Falls District Public Transportation Management System (PTMS)
USGS Archive

Emissions Management
TCEQ Monitor Operations Section

Maintenance & Construction Management
City of Wichita Falls Public Works Department
City of Wichita Falls Traffic Operations Center
County Road and Bridge
ODOT Maintenance Sections
Other Municipal PWD
Other TxDOT District Maintenance Sections
TxDOT Highway Conditions Reporting System
TxDOT Wichita Falls District Area Engineers Office
TxDOT Wichita Falls District Design Pavement Section
TxDOT Wichita Falls District Maintenance Sections
TxDOT Wichita Falls District Office and TMC

Fleet and Freight Management Subsystem
*Private Fleet Management Systems
Rail Operations Center

Emergency Management Subsystem
Air-Evac Lifeteam Dispatch
Central USGS Flood Monitoring System
*City of Wichita Falls EOC
City of Wichita Falls Fire/EMS Dispatch
City of Wichita Falls Police Dispatch
County EOC
County Volunteer Fire Departments Dispatch
DPS Administration
DPS Communications Service
Oklahoma DPS Dispatch
Other Municipal or County Public Safety Dispatch and PSAP
Private Ambulance Dispatch
*Private Tow/Wrecker Dispatch
Regional Medical Center
*Sheppard AFB EOC
State EOC
TDCJ-ID Regional Dispatch
TxDOT Wichita Falls District Office and TMC

Roadway Subsystem
City of Wichita Falls Field Equipment
*County Road and Bridge Field Equipment
*Municipal Field Equipment
Other Municipal PWD Field Equipment
*TxDOT Flood Detection
TxDOT Weigh in Motion
*TxDOT Wichita Falls District Anti-Icing Equipment
TxDOT Wichita Falls District CCTV

Roadway Subsystem
TxDOT Wichita Falls District DMS
TxDOT Wichita Falls District Field Sensors
TxDOT Wichita Falls District HAR
*TxDOT Wichita Falls District In-Vehicle Information Field Equipment
TxDOT Wichita Falls District Traffic Signals
TxDOT Wichita Falls District VIVDS sensors
*TxDOT Wichita Falls District Work Zone Equip.
USGS Field Equipment

Archived Data User Systems
*Nortex RPC Archive Data User Systems
Statewide Crash Records Information System Users
TxDOT PTMS Archive Data Users Systems
TxDOT Wichita Falls District Pavement Management System
*TxDOT Wichita Falls District Pavement Management System Users
*USGS Archive Data User Systems

Asset Management
TxDOT BRINSAP
TxDOT Wichita Falls District Pavement Management System

Commercial Vehicle Check
TxDOT Weigh In Motion
*TxDOT Wichita Falls District Field Sensors

Care Facility
Regional Medical Center

Equipment Repair Facility
City of Wichita Falls Central Services Garage
County Road and Bridge Equipment Repair
*Other Municipal PWD Garage
*TxDOT Wichita Falls District Equipment Repair Garage

Event Promoters
Municipal Convention and Visitors Bureau

Financial Institution
*Financial Institution

Maintenance & Construction Admin
TxDOT Wichita Falls District Area Engineers Office

Media
Local Print and Broadcast Media

Multimodal Transportation Service Provider
Regional Airports

Other EM
Wichita Falls Region Incident and Mutual Aid Network

Rail Operations
Rail Operations Centers

Traveler Card
*Wichita Falls Regional Smart Card

Wayside Equipment
Rail Operators Wayside Equipment

Weather Service
National Weather Service

* Elements are *planned or future*, not *existing*.

Last Updated: September 22, 2004

Figure 5 – Wichita Falls Regional System Interconnect Diagram

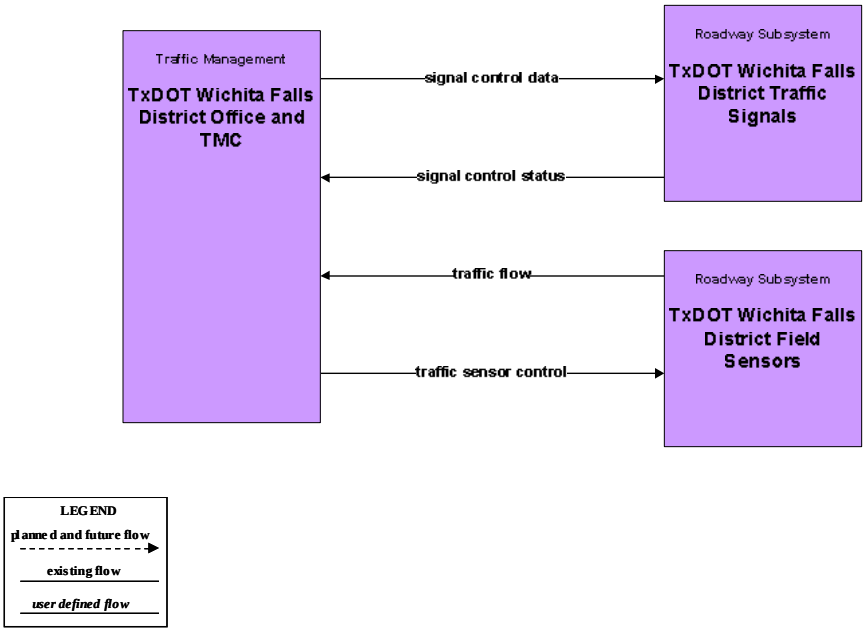


Figure 6 – Custom Market Package for Surface Street Control

4.3.3 Wichita Falls 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 Wichita Falls Region. The interconnect diagram shown previously in **Figure 5** showed the high-level relationships of the subsystems and terminators in the Wichita Falls 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 110 different elements identified as part of the Wichita Falls 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 Wichita Falls Regional ITS Architecture, and each element has been mapped to those other elements with which it must interface. For example, the TxDOT Wichita Falls District Office and TMC has existing or planned interfaces with 52 other elements in the Wichita Falls 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 Wichita Falls 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 Wichita Falls 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 Wichita Falls 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 Wichita Falls District Office and TMC and Other Texas Region TMCs show information that must go from the Wichita Falls District Office and TMC to other Texas TMCs, as well as information that the District Office and TMC needs from devices. Similar to the interfaces, architecture flows also are defined as existing, planned, or future.

Each of the individual element interfaces can be accessed on the Wichita Falls 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 Wichita Falls Region are discussed in more detail in Section 4.5.

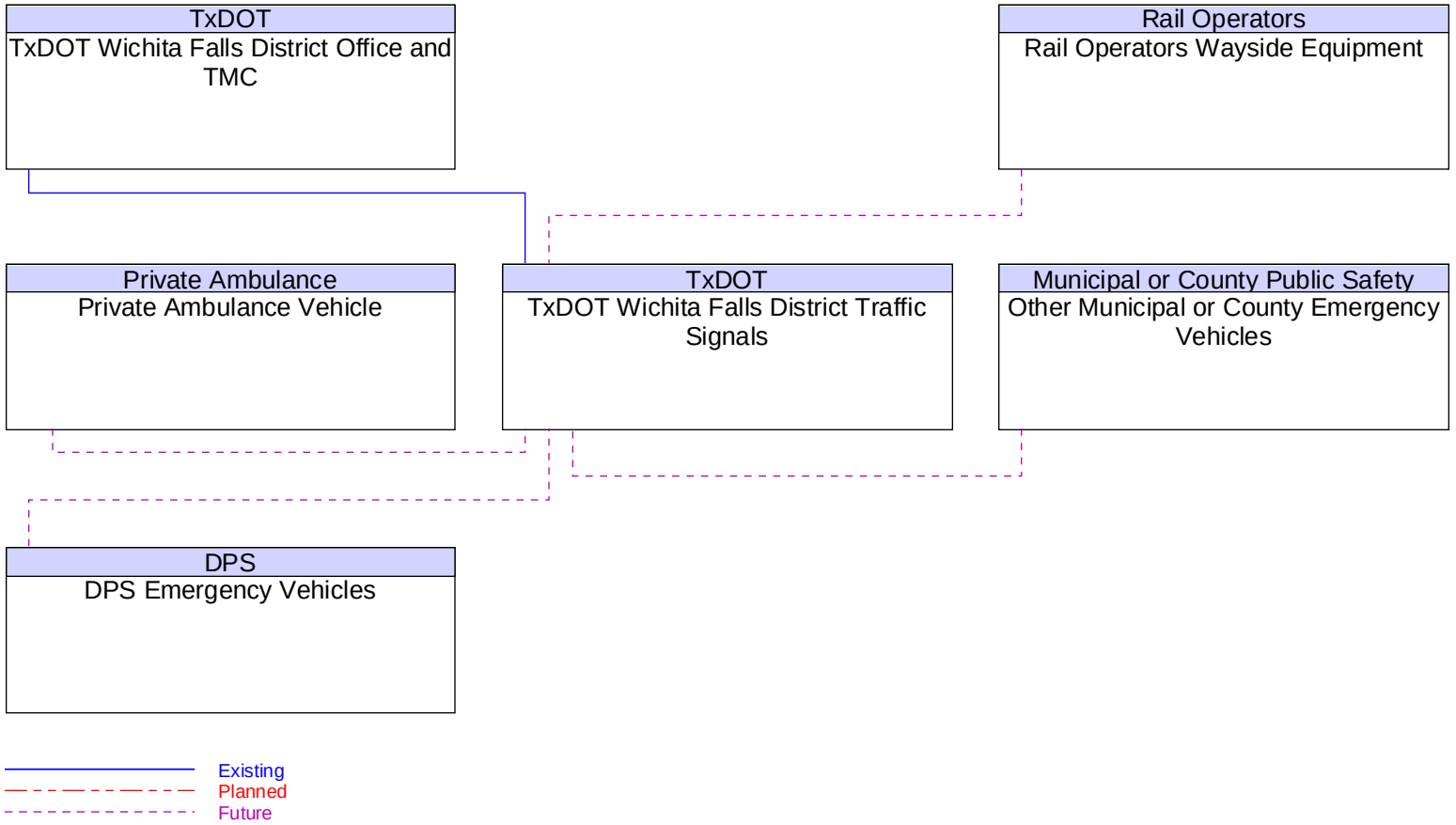


Figure 7 – TxDOT Wichita Falls District Traffic Signals Interfaces

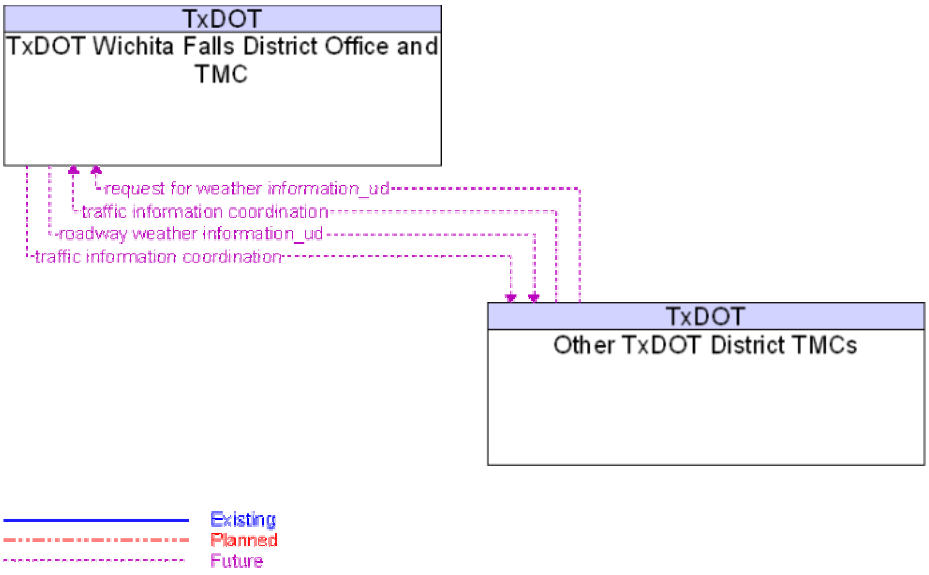


Figure 8 – TxDOT Wichita Falls District Office and TMC to Other TxDOT District TMCs Architecture Flows

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 Wichita Falls 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 Wichita Falls 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 Wichita Falls has to do and the data that needs to be shared among elements.

At a more detailed level, functional requirements for the Wichita Falls Region also are described in terms of equipment packages that are associated with one or more subsystems in the Wichita Falls 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 Wichita Falls Regional ITS Architecture web site by clicking on the "Functions" button.

Table 6 – Wichita Falls Region Equipment Packages

Subsystem	Equipment Package
Archived Data Management Subsystem	Government Reporting Systems Support
	ITS Data Repository
	On-Line Analysis and Mining
	Traffic and Roadside Data Archival
Commercial Vehicle Administration Subsystem	CV Data Collection
Commercial Vehicle Check Subsystem	Roadside WIM
Commercial Vehicle Subsystem	On-Board Cargo Monitoring
	On-board CV Electronic Data
Emergency Management Subsystem	Emergency Call-Taking
	Emergency Data Collection
	Emergency Dispatch
	Emergency Environmental Monitoring
	Emergency Response Management
	Mayday Support
Emergency Vehicle Subsystem	On-board EV En Route Support
	On-Board EV Environmental Monitoring
	On-board EV Incident Management Communication
Emissions Management Subsystem	Emissions Data Collection
Fleet and Freight Management Subsystem	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 Automated Treatment System Control
	MCM Data Collection
	MCM Environmental Information Collection
	MCM Environmental Information Processing
	MCM Incident Management
	MCM Maintenance Decision Support
	MCM Roadway Maintenance and Construction
	MCM Vehicle and Equipment Maintenance Management
	MCM Vehicle Tracking
	MCM Winter Maintenance Management
	MCM Work Activity Coordination
	MCM Work Zone Management
	MCM Work Zone Safety Management

Table 6 – Wichita Falls 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 Winter Maintenance
	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	Roadside Data Collection
	Roadside Signal Priority
	Roadway Automated Treatment
	Roadway Basic Surveillance
	Roadway Environmental Monitoring
	Roadway Equipment Coordination
	Roadway Freeway Control
	Roadway Incident Detection
	Roadway Infrastructure Monitoring
	Roadway Probe Beacons
	Roadway Signal Controls
	Roadway Traffic Information Dissemination
	Roadway Work Zone Safety
	Roadway Work Zone Traffic Control
	Standard Rail Crossing
Toll Administration Subsystem	Toll Data Collection
Traffic Management Subsystem	Collect Traffic Surveillance
	HRI Traffic Management
	Rail Operations Coordination

Table 6 – Wichita Falls Region Equipment Packages (continued)

Subsystem	Equipment Package
Traffic Management Subsystem (continued)	TMC Environmental Monitoring
	TMC Freeway Management
	TMC Incident Detection
	TMC Incident Dispatch Coordination/Communication
	TMC Multimodal Coordination
	TMC Probe Information Collection
	TMC Regional Traffic Control
	TMC Signal Control
	TMC Traffic Information Dissemination
	TMC Work Zone Traffic Management
	Traffic Data Collection
	Traffic Maintenance
Transit Management Subsystem	Transit Center Fare and Load Management
	Transit Center Fixed-Route Operations
	Transit Center Information Services
	Transit Center Multi-Modal Coordination
	Transit Center Paratransit Operations
	Transit Center Security
	Transit Center Tracking and Dispatch
	Transit Data Collection
	Transit Environmental Monitoring
	Transit Garage Operations
Transit Vehicle Subsystem	On-board Environmental Monitoring
	On-board Fixed Route Schedule Management
	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
Vehicle Subsystem	Basic Vehicle Reception
	Interactive Vehicle Reception
	Smart Probe
	Vehicle Location Determination
	Vehicle Mayday I/F
	Vehicle Provider-Based Route Guidance
	Vehicle Safety Monitoring System

4.5 Standards

Standards are an important tool that will allow efficient implementation of the elements in the Wichita Falls 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 Wichita Falls 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 Wichita Falls Regional ITS Architecture web site by clicking on the "Interfaces" or "Standards" buttons.

Table 7 – Applicable ITS Standards for the Wichita Falls Region

SDO	Document ID	Title	Type
AASHTO/ITE/NEMA	NTCIP 1201	Global Object Definitions	Message
	NTCIP 1202	Object Definitions for Actuated Traffic Signal Controller Units	Message
	NTCIP 1203	Object Definitions for Dynamic Message Signs	Message
	NTCIP 1204	Object Definitions for Environmental Sensor Stations and Roadside Weather Information System	Message
	NTCIP 1205	Data Dictionary for Closed Circuit Television (CCTV)	Message
	NTCIP 1208	Object Definitions for Video Switches	Message
	NTCIP 1209	Transportation System Sensor Objects	Message
	NTCIP 1210	Objects for Signal Systems Master	Message
	NTCIP 1211	Objects for Signal Control Priority	Message
	NTCIP 1301	Message Set for Weather Reports	Message
	NTCIP 1401	TCIP – Common Public Transportation (CPT) Business Area Standard	Message
	NTCIP 1402	TCIP – Incident Management (IM) Business Area Standard	Message
	NTCIP 1403	TCIP – Passenger Information (PI) Business Area Standard	Message
	NTCIP 1404	TCIP – Scheduling/Runcutting (SCH) Business Area Standard	Message
	NTCIP 1405	TCIP – Spatial Representation (SP) Business Area Standard	Message
	NTCIP 1406	TCIP – Onboard (OB) Business Area Standard	Message
	NTCIP 1407	TCIP – Control Center (CC) Business Area Standard	Message
	NTCIP 1408	TCIP – Fare Collection (FC) Business Area Standard	Message
	Various	NTCIP Center-to-Center Standards Group	Communication
	Various	NTCIP Center-to-Field Standards Group	Communication

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

SDO	Document ID	Title	Type
ASTM	ASTM 5 GHz Data Link	Standard Specification for 5.9 GHz Data Link Layer	Communication
	ASTM 5 GHz Phys	Standard Specification for 5.9 GHz Physical Layer	Communication
	ASTM DD 17.54.00.2	ADMS Data Dictionary Specifications	Data
	ASTM PS 105-99	Specification for Dedicated Short Range Communication (DSRC) Data Link Layer: Medium Access and Logical Link Control	Communication
	ASTM PS 111-98	Specification for DSRC Physical Layer using Microwave in the 902-928 MHz	Communication
EIA/CEA	CEA/EIA-794	Data Radio Channel (DARC) System	Communication
	CEA/EIA-795	Subcarrier Traffic Information Channel (STIC) System	Communication
IEEE	IEEE P1512.1	Standard for Traffic Incident Management Message Sets for Use by EMCs	Message
	IEEE P1512.2	Standard for Public Safety IMMS for use by EMCs	Message
	IEEE P1512.3	Standard for Hazardous Material IMMS for use by EMCs	Message
	IEEE P1512.a	Standard for Emergency Management Data Dictionary	Data
	IEEE P1512-2000	Standard for Common Incident Management Message Sets (IMMS) for use by EMCs	Message
	IEEE P1556	Security/Privacy of Vehicle/RS Communications including Smart Card Communications	Communication
	IEEE P1570	Standard for Interface Between the Rail Subsystem and the Highway Subsystem at a Highway Rail Intersection	Message
	IEEE Std 1455-1999	Standard for Message Sets for Vehicle/Roadside Communications	Message
ITE	ITE TM 1.03	Standard for Functional Level Traffic Management Data Dictionary (TMDD)	Data
	ITE TM 2.01	Message Sets for External TMC Communication (MS/ETMCC)	Message
SAE	SAE J1746	ISP-Vehicle Location Referencing Standard	Data
	SAE J2313	On-Board Land Vehicle Mayday Reporting Interface	Message
	SAE J2353	Data Dictionary for Advanced Traveler Information System (ATIS)	Data
	SAE J2354	Message Set for ATIS	Message
	SAE J2369	Standard for ATIS Message Sets Delivered Over Bandwidth Restricted Media	Message
	SAE J2529	Rules for Standardizing Street Names and Route IDs	Message
	SAE J2540	Messages for Handling Strings and Look-Up Tables in ATIS Standards	Message

4.6 Phases of Implementation

The Wichita Falls 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 be incremental and will occur over the next several years.

A sequence of projects and recommended time frames has been identified in the Wichita Falls Regional ITS Deployment Plan. These projects have been sequenced over a 20-year period, with projects identified for deployment in a 5-, 10-, and 20-year timeframe. These timeframes correspond with priorities and needs identified by stakeholders in the Wichita Falls Region.

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

- Network Surveillance;
- Road Weather Data Collection;
- Traffic Information Dissemination;
- Incident Management System; and
- Winter Maintenance.

In addition to the above market packages, the implementation of an appropriate communications system in the Wichita Falls Region to support ITS – including operation of devices as well as information sharing among agencies – is critical for continued deployment and integration of systems.

5. OPERATIONAL CONCEPT

The operational concept for the Wichita Falls Region provides a description of the stakeholders' roles and responsibilities in the operation of the systems that are being proposed. This operational concept provides an "executive summary" view of the way the Wichita Falls Region's systems will work together, and it documents the roles and responsibilities for the each of the services that the intelligent transportation system will provide. The approach to describing the operational concept is to present specific operational scenarios that describe and define the stakeholders' general role 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 information sharing needs, operational requirements, and in some cases shared or joint operations of systems, agreements may be required to better define roles and responsibilities. A list of potential agreements has been included in Section 5.3. As projects are implemented and agencies move toward integration on a regional level, these potential agreements should be reviewed for their applicability.

5.1 Operational Scenarios

Scenario 1

The first operational scenario describes how ITS technologies may be used during a multi-vehicle crash on I-44 within the City of Wichita Falls city limits on Labor Day weekend. Motorists call 911 from mobile telephones and the City of Wichita Falls Police is quickly informed of the crash. Because the Police serve as the back-up TMC after hours and on weekends, the Police are able to quickly zoom in to the incident scene using CCTV cameras along I-44. With the incident verified, an alert also is automatically sent from the City of Wichita Falls Police to the Texas Department of Public Safety, the City of Wichita Falls Fire Department, and to the TxDOT Wichita Falls District Office after-hours contact notifying them of the incident, the severity, and traffic conditions which are backing up along southbound I-44. The Wichita Falls Police Department monitors the situation with the CCTV camera that is near the crash. The City's Fire Department uses the video feed from the TxDOT camera to determine the severity of the accident and the number and type of fire and rescue vehicles to dispatch. Using AVL on the fire vehicles, those vehicles that are closest to the scene with the appropriate equipment are dispatched.

DPS closes southbound I-44 at the US 287 merge point and officers on-scene begin detouring southbound traffic off of the freeway. The Wichita Falls Police are notified of the closure, detour route impacts and expected duration through a message sent from mobile data terminals in the DPS vehicles. An incident notification also is provided to the City of Wichita Falls Traffic Operations Center which uses their closed-loop signal system to implement a modified timing plan on alternate routes to accommodate the large increases in traffic volumes. The TxDOT Wichita Falls on-call contact remotely activates the DMS and places a message on them to warn motorists of the incident and the closure. TxDOT maintenance, which received notification from the TxDOT TMC on-call operator, arrives on-scene and assists DPS with setting up the detour

devices. The City of Wichita Falls dispatches police and maintenance staff with portable DMS to the primary detour routes to assist with routing motorists. Sheppard Air Force Base also is notified, as the closure impacts incoming and outgoing traffic from the Base.

The TxDOT Wichita Falls TMC staff arrives at the TMC and implements a series of strategies to warn travelers, neighboring TxDOT Districts, and the Oklahoma DOT about the incident and closure on I-44. The TxDOT TMC operator enters the closure on the Highway Condition Reporting System (HCRS), which also feeds the statewide 511 traveler information number. DMSs on US 287 and I-44 north of the incident continue to warn motorists that southbound I-44 is closed; a message about the closure also is placed on highway advisory radio, and beacons are activated alerting motorists that there is an active message. The CCTV camera feed, which has been turned away from the crash to focus on the traffic condition on the interstate, is shared with the media which broadcasts the live shots of I-44 on the evening news to warn motorist that I-44 remains closed.

Scenario 2

An ice storm is approaching the Wichita Falls Region from the southeast. Staff at the TxDOT Wichita Falls TMC have been receiving weather updates throughout the day from the National Weather Service and have also been in contact with TxDOT Amarillo and Childress Districts, which were hit with the storm in the late afternoon. Temperatures begin to drop below freezing in the Region as the roadside weather data collection centers monitor the deteriorating weather conditions and send reports to the TxDOT Wichita Falls TMC. Ice formation is detected on several bridges on US 287 between Childress and Wichita Falls and the automated treatment of one of the bridges is activated, including a dynamic message sign warning motorists approaching the bridge that anti-icing chemicals are in use. A second bridge begins to ice, as detected by the field sensors, but this bridge does not have automated treatment and a message is sent from the ice-detection system to the Wichita Falls TMC. The TMC routes the message to District Maintenance Offices in Henrietta and Bowie, and the Henrietta Maintenance Office dispatches sand trucks and a maintenance crew to the scene.

TxDOT Wichita Falls TMC operators activate DMSs on southbound US 287 near the City of Wichita Falls alerting motorists that icy conditions are present on the highway; a similar message from TxDOT Fort Worth is activated on DMSs so that motorists leaving the Fort Worth Area heading north on US 287 will be alerted. Emergency Operations Centers and Sheriffs in Wichita, Clay, and Montague Counties are notified of the conditions along the corridor, and to be prepared for potential emergencies. A link to demand-response transit operators, including SHARP Lines and Texoma, alert them of the conditions on the US 287 corridor. TxDOT Childress and Oklahoma DOT are notified of the conditions in the Wichita Falls Region, and in particular the US 287 corridor. DPS also is warned of conditions along the corridor, and informs TxDOT Wichita Falls that it has received several 911 calls from motorists that are stranded or have crashed.

As the storm continues, several bridges and steep inclines become impassable. Updates from weather sensors, pavement sensors, and incident information are passed along to the local TMCs, emergency dispatch centers, and is entered into HCRS by the TxDOT Wichita Falls TMC. A highway advisory radio message is activated and flashing beacons alert motorists to tune in. 511 also includes a warning about hazardous conditions on US 287. Notice is given to the media, including television and radio, to alert the public of the dangers of trying to travel during current

winter weather conditions. Once roadways are cleared, the public is once again notified that traveling conditions are safe and they can resume their normal activities.

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 Wichita Falls 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 Wichita Falls (Traffic and Police)
- County Road/Public Works
- Oklahoma State Department of Transportation
- Texas Department of Public Safety
- Texas Department of Transportation (Wichita Falls and Other Districts)

Public Transportation Management

- City of Wichita Falls Transit
- SHARP Lines (Rolling Plains Management Corp.)
- Texoma Area Paratransit Services (TAPS)
- Independent School Districts

Electronic Payment

- Not Applicable

Commercial Vehicle Operations

- Texas Department of Public Safety
- Texas Department of Transportation

Emergency Management

- City of Wichita Falls (Traffic and Police)
- Local City/County EOCs
- Local County Sheriffs
- Local Law Enforcement
- Oklahoma Department of Public Safety
- Texas Department of Public Safety
- Texas Department of Transportation

Information Management

- Texas Department of Transportation
- Nortex Regional Planning Commission

Maintenance and Construction Management

- City of Wichita Falls
- County Road and Bridge
- Oklahoma Department of Transportation
- Texas Department of Transportation

5.3 Wichita Falls Agreements

The Regional ITS Architecture for the Wichita Falls 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 Wichita Falls Region will require agreements among agencies that establish parameters for sharing agency information to support traffic management, incident management, provide traveler information, and other functions identified in the Regional ITS Architecture.

Currently, there are few formal agreements in place in the Wichita Falls Region, with the exception of a shared CCTV viewing/control agreement between TxDOT Wichita Falls District and the City of Wichita Falls. This agreement provides provision for the City to access TxDOT CCTV camera feeds and images, as well as provides parameters for the City's use of the CCTV camera images. This agreement is particularly important as the City of Wichita Falls Police will be serving as a back-up to TxDOT's TMC on an after-hours basis. A copy of this agreement is included as **Appendix C** of this document.

Stakeholders indicated that while there is a high degree of cooperation among agencies, there has not been a need for formal agreements to facilitate multi-jurisdictional resource sharing, cooperation, or mutual aid. 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 more formal agreements will be needed similar to the current CCTV usage agreement between TxDOT and the City of Wichita Falls. Furthermore, if information from public agency ITS systems is to be shared with the private sector, such as local television media wanting to broadcast video feeds from the freeway CCTV cameras, then agreements would be needed to govern use of video images and any restrictions or conditions.

These agreements, while perhaps not requiring a financial commitment from agencies in the Region, should outline specific roles, responsibilities, data exchanges, levels of authority, and other facets of regional operations. Some agreements also will outline specific funding responsibilities, where appropriate and applicable.

Table 8 provides a list of potential agreements for the Wichita Falls 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 Wichita Falls Region

Agreement and Agencies	Status	Agreement Description	Considerations
Data Sharing and Usage (Public) TxDOT Wichita Falls District and Public Agencies within the Region (cities, counties, transit), outside of the Region (including Oklahoma), as well as federal agencies, such as USGS.	Future	This agreement would define the parameters, guidelines and policies for inter- and intra-agency ITS data sharing. This data sharing would support regional activities related to traffic management, incident management, and traveler information, and other functions. 'Data' also would include video images from CCTV cameras (live video feeds should be addressed in a separate agreement). The terms of this agreement should generally address such items as: ▪ Agency as information source ▪ Types of data and information to be shared ▪ Repository for information (i.e., TxDOT Wichita Falls 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	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.
Data Sharing and Usage (Public-Private) TxDOT Wichita Falls District and Private Media/Information Service Providers	Future	This agreement would define the parameters, guidelines and policies for private media use of regional ITS-related information from TxDOT Wichita Falls. 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 CCTV video images broadcast).	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.

Table 8 – Potential Agreements for the Wichita Falls Region (continued)

Agreement and Agencies	Status	Agreement Description	Considerations
Shared Video Monitoring (Public) TxDOT, Texas DPS, Local Sheriff and Police	Existing and Future	This agreement would enable shared video monitoring of TxDOT CCTV cameras by public safety and emergency services agencies in the Wichita Falls 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. An agreement is already in place between TxDOT and the City of Wichita Falls to allow shared video monitoring.	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.
Joint Operations/Shared Control Agreements (Public) TxDOT and City of Wichita Falls Police	Existing	These agreements are formal arrangements to allow joint operations or control of certain systems and equipment. TxDOT Wichita Falls has stated that the City of Wichita Falls Police will serve in an after-hours TMC capacity, and be able to monitor and control certain field elements when the TxDOT TMC is not staffed (evenings and weekends). The current agreement allows for shared viewing of TxDOT CCTV cameras, and specifies parameters for when pan/tilt/zoom capability by entities other than TxDOT is allowed. The agreement would need to define the terms of this arrangement, such as hours of operation and time of day/time of week where shared control would take effect, circumstances or incidents where shared control would take effect, notification procedures between the agencies agreeing to shared control arrangements, etc.	Joint operations/shared control will require training for City of Wichita Falls Police on TxDOT procedures and processes, including equipment operation, operational parameters, and procedures for coordinating with other agencies. The current agreement also specifies cost responsibilities (TxDOT and City hardware, telecommunications accessibility).
Mutual Aid Agreements (Public) Texas DPS, Fire, Police, Sheriff, EOCs, TxDOT	Existing (Informal)	Mutual aid agreements currently exist as informal arrangements in the Wichita Falls Region, although they are a routine practice among public safety and emergency services agencies. Formal mutual aid agreements will become more important as agencies integrate systems and capabilities, particularly automated dispatch and notification.	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.).