State of Texas
ITS Architectures and Deployment Plans

Wichita Falls Region

Executive Summary

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January 14, 2005
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PROJECT APPROACH

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) in January of 2001. This final rule requires that Intelligent Transportation System (ITS) projects funded through the Highway Trust Fund conform to the National ITS Architecture and applicable standards. FHWA has further established a deadline of April 2005 for regions to have an ITS architecture in place.

To meet these requirements and ensure future federal funding eligibility for ITS, the Texas Department of Transportation (TxDOT) initiated the development of regional ITS architectures and deployment plans throughout the State of Texas. There are several metropolitan areas in the state that already have ITS architectures in place or under development. The focus of the State of Texas Regional ITS Architectures and Deployment Plans program is to develop architectures in those areas outside of the Austin, Houston, Dallas, Fort Worth, and San Antonio Regions. TxDOT expanded upon the ITS architecture requirements outlined in the FHWA Final Rule, and included an ITS deployment plan as part of the regional efforts. The regional ITS architecture provides a framework for ITS systems, services, integration, and interoperability, and the regional ITS deployment plan identifies specific projects and timeframes for ITS implementation to support the vision developed by stakeholders in the architecture.

TxDOT's process for developing the regional ITS architectures and deployment plans followed a consensus-based approach to meeting the requirements in the FHWA Final Rule and supporting guidelines. This process was further tailored to meet the specific multi-agency needs of these regional plans, and was structured around stakeholder input and involvement. The addition of an ITS deployment plan provides a tangible road map for regional ITS deployment and integration. **Figure 1** shows the development process for each of the State of Texas Regional ITS Architectures and Deployment Plans.

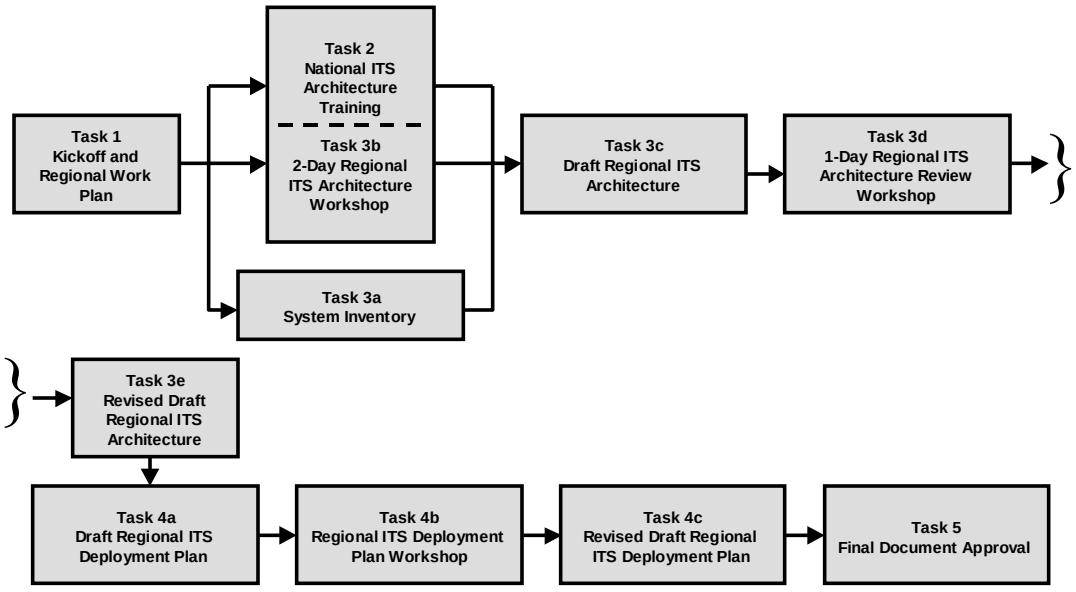


Figure 1 – Wichita Falls Regional ITS Architecture and Deployment Plan Development Process

OVERVIEW OF THE WICHITA FALLS REGION

The Wichita Falls Region is located in north central Texas and shares a border with the State of Oklahoma. 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. For the Wichita Falls Regional ITS Architecture and Deployment Plan, the study area included all nine counties that comprise the TxDOT Wichita Falls District. **Figure 2** illustrates the Regional boundaries.

The Wichita Falls Region has an extensive transportation infrastructure. The primary roadway facilities include I-35 in the eastern part of the Region, I-44 from the Wichita Falls metro area 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 routes. Alternate routes are limited once outside of the metro areas. Additionally, in the event of a major incident on one of the Region's primary corridors, there are limited traveler service facilities outside of the Gainesville, Muenster, Bowie, Wichita Falls, and Vernon areas.

US 287 carries a significant amount of commercial vehicle traffic through the Wichita Falls Region. The facility runs from the Dallas/Ft Worth area through the Region, connects to I-40 in Amarillo, and continues north into Colorado. Lockheed Martin will have a jet fighter 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.

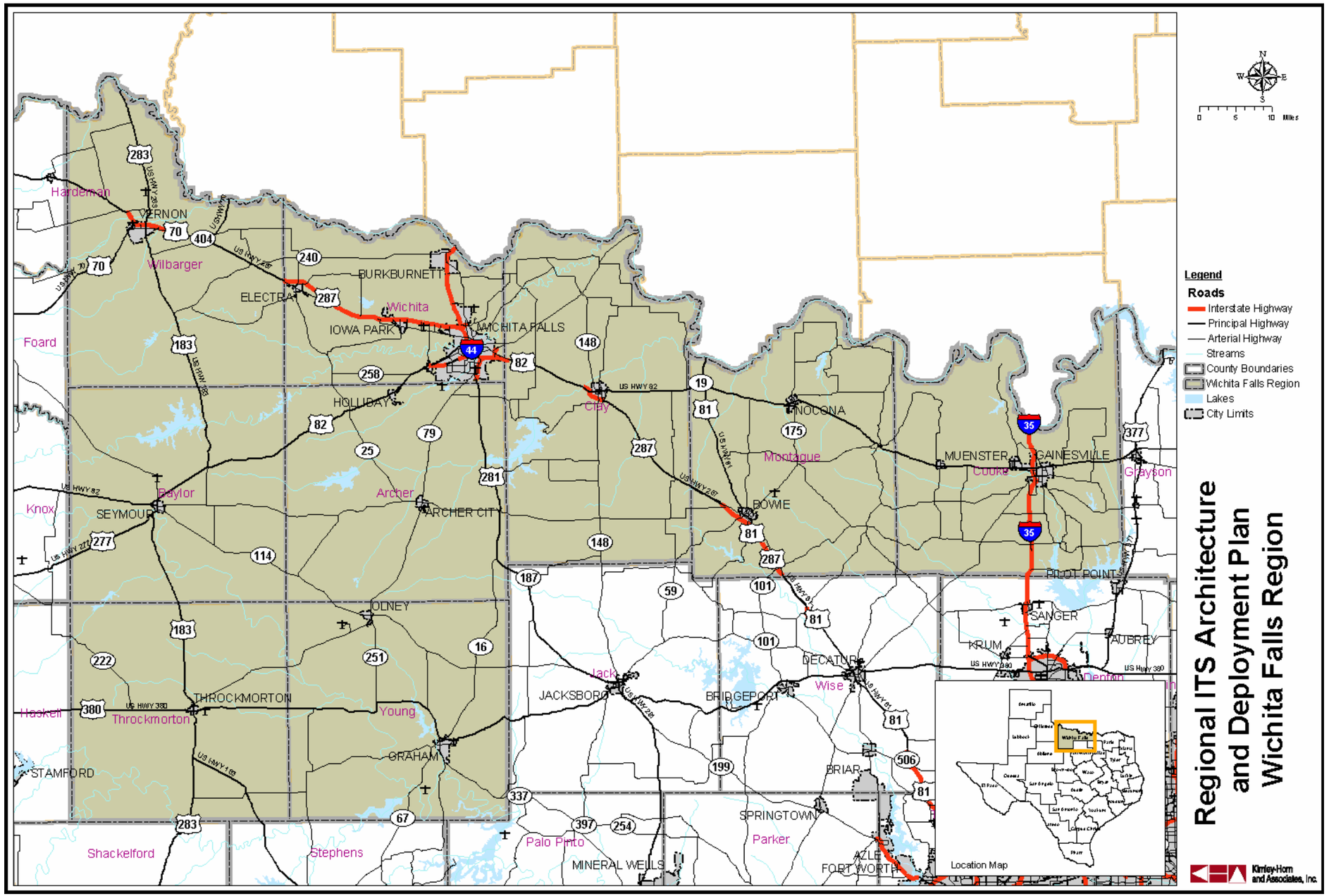


Figure 2 – Wichita Falls Region Map

WICHITA FALLS REGION STAKEHOLDERS

Involving a range of perspectives in the development of a regional ITS architecture and deployment plan, and obtaining consensus on the vision and recommendations are key components to the process. Stakeholders from throughout the Wichita Falls Region participated in the development of the Wichita Falls Regional ITS Architecture and Deployment Plan. Key participants included representatives from TxDOT, cities, counties, emergency management, transit management, Oklahoma DOT, Sheppard AFB, and the USGS. These stakeholders provided input and review at key steps in the development process, including a project kick-off meeting, architecture development and review workshops, a deployment plan workshop, and review of the final project documentation.

The following is a list of 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 and Deployment Plan:

- 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 Service (ARES);
- Wichita Falls Air Evac Lifeteam; and
- Young County.

WICHITA FALLS REGIONAL ITS ARCHITECTURE

The process for developing the Regional ITS Architecture for the Wichita Falls Region included several key steps:

- Preparing an inventory of planned and existing systems in the Region;
- Identifying needs in the Region that could be addressed by ITS deployment or integration;
- Customizing and prioritizing market packages to address the specific needs and services identified by stakeholders;
- Developing interconnects and interfaces for system elements to map out data flows and agency links;
- Preparing an operational concept to illustrate how the systems, components, and agencies will be integrated and function as a result of the architecture framework;
- Identifying high-level functional requirements;
- Identifying standards that could be applicable to the Wichita Falls Region; and
- Outlining potential agreements that would be needed to facilitate information or resource sharing as a result of ITS implementation.

Inventory and Needs in the Region

The Wichita Falls Regional ITS Architecture began with a project kick-off meeting in September 2003. At that meeting, stakeholders provided information about existing and planned ITS elements in the Region. A diverse range of needs were identified by stakeholders who attended. The inventory of planned and existing ITS infrastructure provided the basis for the architecture development. Needs that could be addressed by ITS technologies guided the selection of market packages, data flows, and integration requirements.

The needs identified by the Wichita Falls Region stakeholders were categorized into functional areas and are shown in **Table 1**.

Table 1 – 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

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

Market Packages

A 2-Day ITS Architecture Workshop was held in Wichita Falls in November 2003. At this workshop, stakeholders were provided with architecture training that included background information about the National ITS Architecture and the process that would be used to develop the Wichita Falls Regional ITS Architecture.

The next step in developing the Wichita Falls Regional ITS Architecture was to identify the services that would be needed to address the stakeholder needs. In the National ITS Architecture, services are referred to as market packages. Market packages can 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 Version 4.0 of the National ITS Architecture.

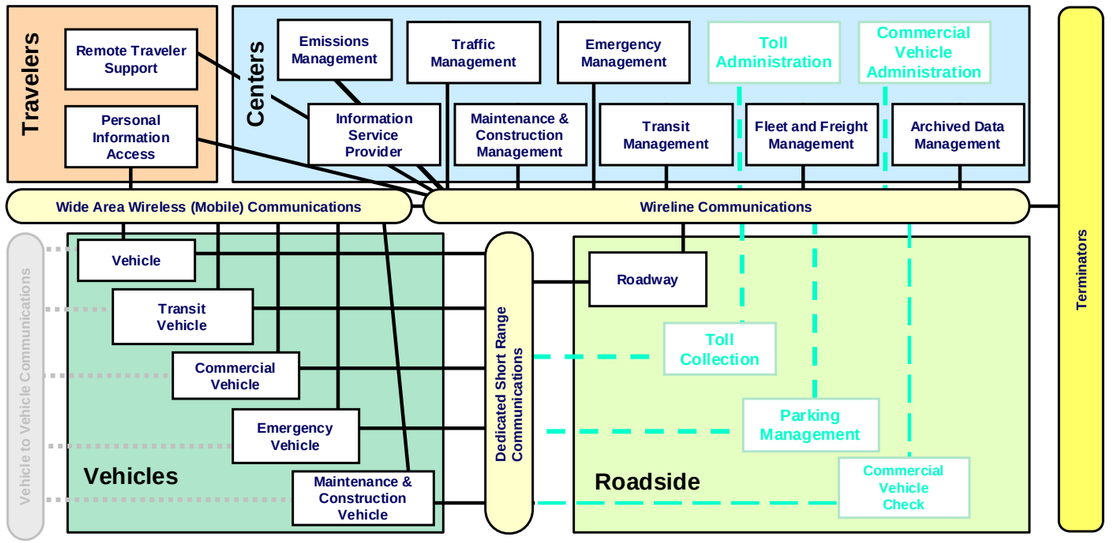
At the 2-Day ITS Architecture Workshop, stakeholders selected the market packages that corresponded to the desired services and functions identified for the Region, and then customized these market packages. They included services and functions such as Network Surveillance, Traffic Information Dissemination, and Emergency Response as well as market packages to address coordination needs, including an Incident Management System and Regional Traffic Control and Coordination. Because market packages are groups of services and functions, they can be deployed incrementally and over time. Of the 75 market packages in the National ITS Architecture Version 4.0, stakeholders identified 35 as being applicable to the Wichita Falls Region.

Interconnects, Interfaces, and Standards

Stakeholders also began the process of mapping existing and planned ITS elements in the Wichita Falls Region to the subsystems in the National ITS Architecture. These elements included agencies, systems, and essentially all of the ITS components in the Region. 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. This mapping resulted in an interconnect diagram for the Wichita Falls Region that is shown in **Figure 3** on the following page. This architecture diagram, also referred to as the "sausage diagram" shows the relationship of existing, planned, and future systems in the Wichita Falls Region.

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 was shown graphically, with the market package name, Wichita Falls Region specific element, and the unique agency and system identifiers within the subsystems and terminators.

Figure 4 is an example of an advanced traffic management system (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. The solid data flow lines in this market package indicate existing information flows. If there were any planned or future floqs they would be shown with dashed lines. All of the Wichita Falls Region market package diagrams are included in the Regional ITS Architecture report.



LEGEND

National ITS Architecture Entity — No Regional Architecture Elements Map To National ITS Architecture

National ITS Architecture Entity — Regional Architecture Elements Map To National ITS Architecture

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 3 – Wichita Falls Regional System Interconnect Diagram

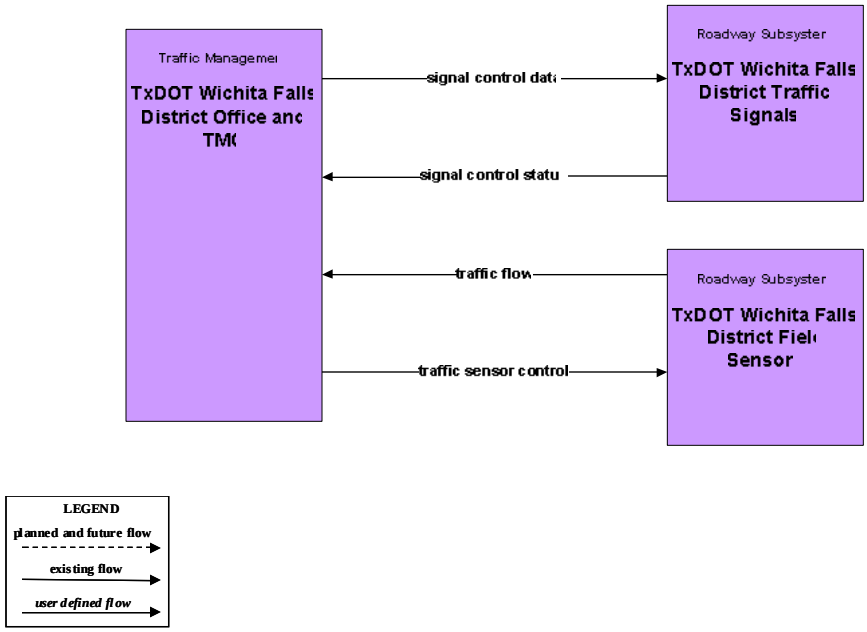


Figure 4 – Wichita Falls Surface Street Control Customized Market Package

More detailed interfaces were 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. The data flows include requests for information, alerts and messages, status requests, confirmations, and other information requirements.

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. There are 110 different elements identified as part of the Wichita Falls Regional ITS Architecture. These elements include local and state traffic management/operations centers, transit vehicles, dispatch systems, emergency management agencies, and others – essentially all of the existing and planned physical components that contribute to a Regional ITS. 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.

An example of one of the system interfaces is included as **Figure 5**. 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.

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.

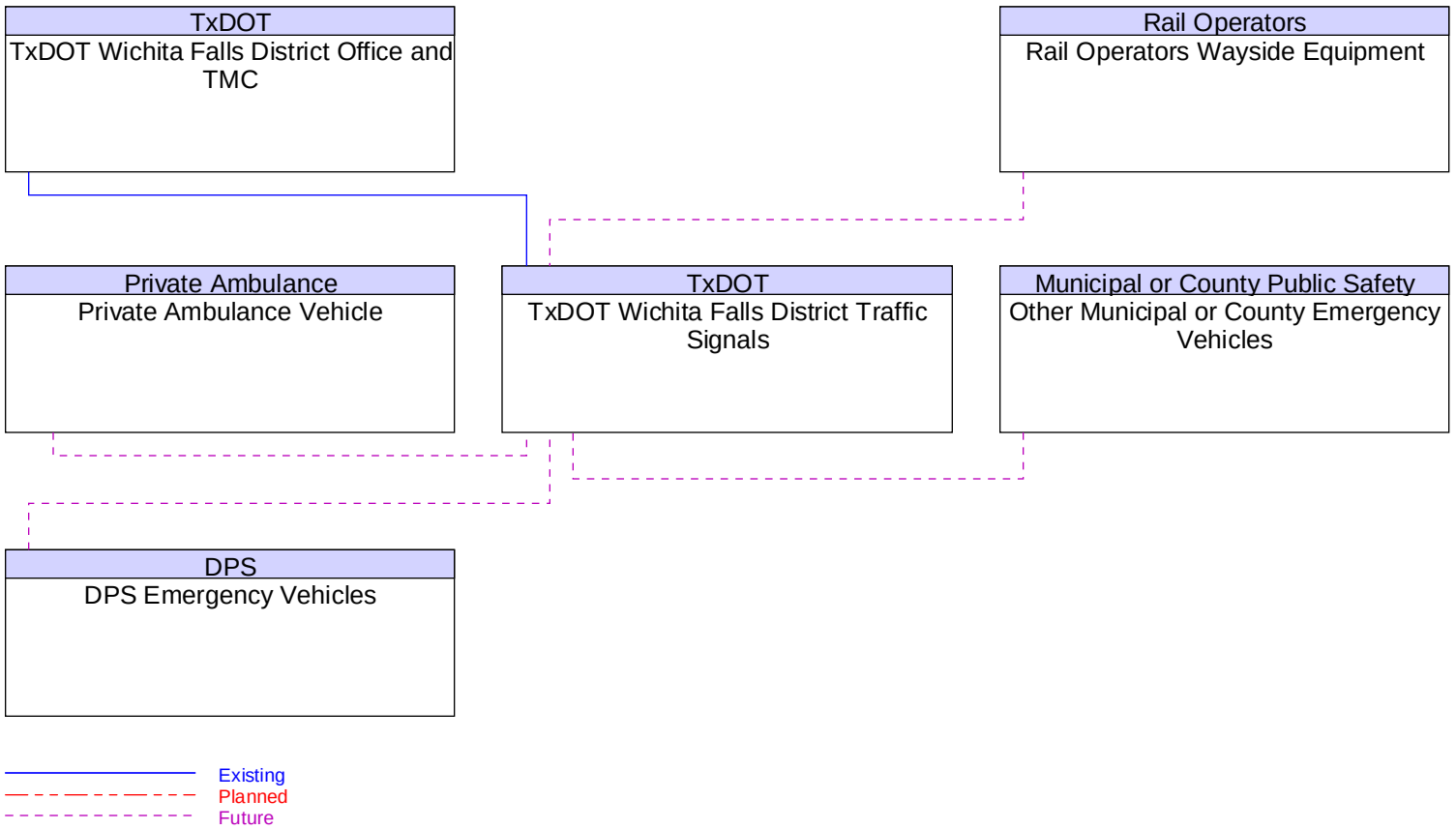


Figure 5 – TxDOT Wichita Falls Traffic Signals Interfaces

An example of the architecture flows between two elements is shown in **Figure 6**. 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 other TxDOT TMCs. Similar to the interfaces, architecture flows also are defined as existing, planned, or future. Diagrams of all of the architecture flows between elements have been included on the project website.

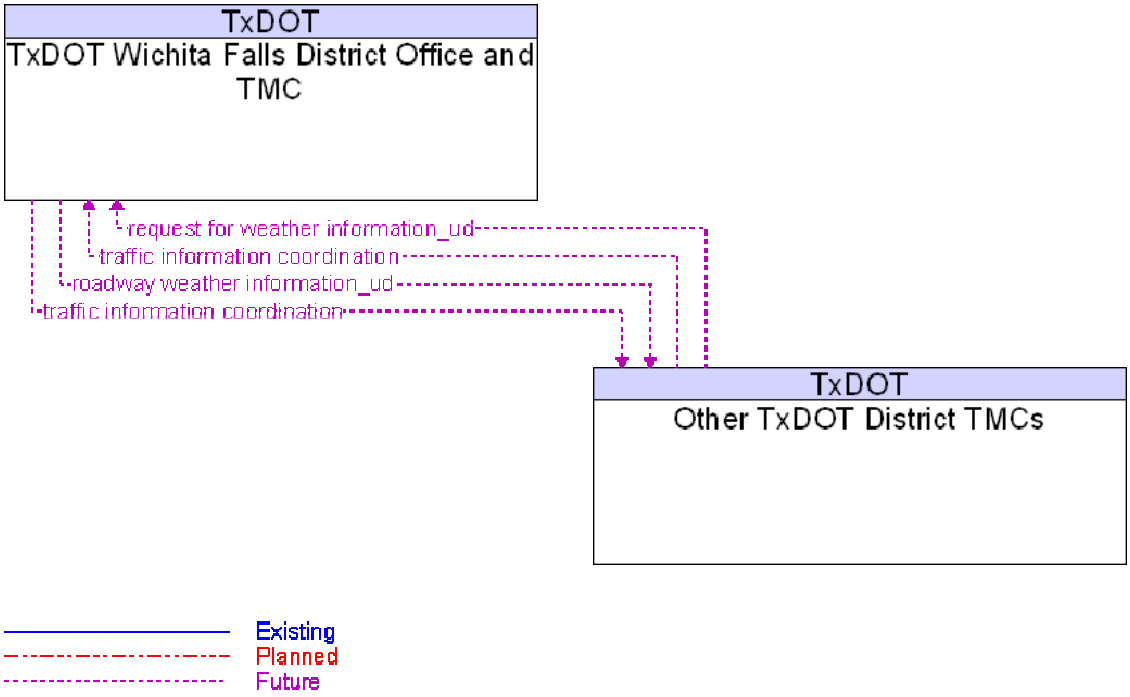


Figure 6 – TxDOT Wichita Falls District Office and TMC to Other TxDOT District TMCs Architecture Flows

With the required interfaces and interconnections identified, standards that could potentially be applied to the Wichita Falls Region were identified. Standards are an important tool that will allow efficient implementation of the elements in the Wichita Falls Regional ITS Architecture over time. They facilitate deployment of interoperable systems at local, regional, and national levels without impeding innovation as technology advances, vendors change, and as new approaches evolve.

Operational Concept and Scenarios

An operational concept for the Wichita Falls Region was developed as part of the architecture process to illustrate how systems, components, and agencies will be integrated and function as a result of the framework provided by the Regional ITS Architecture. For the Wichita Falls Region, two concepts were illustrated. The first describes how ITS technologies could be used to manage a multi-vehicle crash on I-44 within the City of Wichita Falls city limits on Labor Day weekend. The operational concept shows how ITS technologies are used to detect an accident on the road, and assist in implementing strategies to divert traffic, inform motorists, and dispatch

emergency vehicles. The second scenario describes the impacts of an ice storm moving in to the Region, and how deployed systems and communication links help multiple agencies better coordinate.

Agreements

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 and incident management, provide traveler information, and perform other functions identified in the Regional ITS Architecture. Recommended projects will result in systems and interfaces that will require inter-agency agreements, both public and private, to facilitate the exchange of information.

Currently, there is one formal agreement in place in the Wichita Falls Region between TxDOT and the City of Wichita Falls. The agreement is for shared viewing and limited pan/tilt/zoom control of TxDOT CCTV cameras by the City of Wichita Falls (the City Police will serve as a back-up for the TxDOT TMC after hours). With the implementation of ITS technologies, integration of systems from one or more agencies, and the anticipated level of information exchange identified in the architecture, it is likely that additional formal agreements will be needed in the future.

The following is a list of potential agreements for the Wichita Falls Region based on the interfaces identified in the Regional ITS Architecture and recommended ITS projects in the Deployment Plan:

- Data sharing and usage agreements among public agencies;
- Data sharing and usage agreements among public agencies and private media and information service providers;
- Shared video monitoring agreements between TxDOT and public safety agencies;
- Mutual aid agreements among public sector agencies, primarily fire, police, emergency services, DPS, and TxDOT; and
- Joint operations/shared control agreements between TxDOT and the City of Wichita Falls (to potentially include additional components in addition to the existing CCTV agreement).

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.

ITS Architecture Documentation

The Regional ITS Architecture for the Wichita Falls Region is documented in a final report. Stakeholders were brought together to review the Regional ITS Architecture and provide feedback. The final architecture report was not prepared until after completion of the Wichita Falls Regional ITS Deployment Plan to allow for modifications based on information and input received for the ITS Deployment Plan recommendations.

A website with all of the Regional ITS Architectures also was maintained. The website allowed stakeholders to review the architecture and provide comments directly to the project team through the website. At the time this report was published, the Wichita Falls Regional ITS Architecture website was being hosted at www.consystec.com. The site can be accessed by selecting the link

to Texas Regional, and then the link to Wichita Falls. TxDOT plans to permanently host the site in the future at www.dot.state.tx.us/trf/its.

WICHITA FALLS REGIONAL ITS DEPLOYMENT PLAN

Although development of an ITS deployment plan was not required by the FHWA Final Rule for the architecture, the Final Rule does request a sequence of projects required for implementation. Capitalizing on the momentum and interagency dialogue established during the development of the Wichita Falls Regional ITS Architecture, TxDOT chose to expand on the project sequence requirement to develop a formal ITS deployment plan for the Region.

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

Prioritized Market Packages

Market packages for the Wichita Falls Region previously identified as part of the architecture were categorized into high, medium, and low priorities by stakeholders. The market package prioritization was a key factor in developing recommendations for ITS deployment and integration in the Wichita Falls Region. These priorities identified the key needs and services that are desired in the Region, as well as the interfaces that need to be established to provide integrated functionality and establish communication between elements.

It is important to note that the high, medium, and low priorities were not directly related to anticipated deployment timeframes (such as 5, 10, or 20 year deployment horizon). For example, a market package can be a high priority, but because of funding or prerequisite project requirements, it might not be feasible for deployment for several years. Maturity and availability of technology was another factor for prioritizing the market packages. Because market packages often represent groups of technologies or services to deliver a particular functionality, certain components of the market package could be identified as a high priority or existing capability, while other components would have a lower priority. Other considerations included whether or not the market package was better suited for deployment and operations by the private sector rather than public agencies in the Region.

Table 2 shows the prioritization of the selected market packages for the Wichita Falls Region. The majority of these market packages fall into the high priority category. This category also includes market packages (or portions of market packages) that are already deployed in the Wichita Falls Region, such as surface street control and traffic information dissemination.

Table 2 – Summary of Prioritized Market Packages for the Wichita Falls Region

High Priority	Medium Priority	Low Priority
▪ Network Surveillance ▪ Surface Street Control ▪ Traffic Information Dissemination ▪ Regional Traffic Control ▪ Incident Management System ▪ Emergency Response ▪ Road Weather Data Collection ▪ Weather Information Processing and Distribution ▪ Work Zone Management ▪ Work Zone Safety Monitoring ▪ Maintenance and Construction Activity Coordination ▪ Transit Fixed-Route Operations ▪ Demand Response Transit Operations ▪ Transit Security ▪ Transit Traveler Information ▪ Broadcast Traveler Information ▪ ITS Data Mart	▪ Standard Railroad Grade Crossing ▪ Railroad Operations Coordination ▪ Emergency Routing ▪ Roadway Automated Treatment ▪ Winter Maintenance ▪ Roadway Maintenance and Construction ▪ Transit Vehicle Tracking ▪ Transit Passenger and Fare Management ▪ Multi-modal Coordination ▪ Weigh-in-Motion ▪ HAZMAT Management ▪ Interactive Traveler Information ▪ ITS Data Warehouse	▪ Freeway Control ▪ Maintenance and Construction Vehicle Tracking ▪ Maintenance and Construction Vehicle Maintenance ▪ ISP-based Route Guidance ▪ In Vehicle Signing

Each of the prioritized market packages was assessed from the perspective of deployment status (which components, if any, were already existing in the Region), as well as any planned projects or additional new projects needed to fully implement the market package in the Wichita Falls Region. Each market package analysis included:

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

ITS Project Recommendations for the Wichita Falls Region

Using the needs, market package priorities, and any planned projects identified by the stakeholders during the architecture process, a list of recommended ITS projects for the Wichita Falls Region was developed. These projects were refined and additions and deletions were made by the Regional stakeholders at the ITS Deployment Plan Workshop in March 2004.

Recommended ITS projects for the Wichita Falls Region were categorized into short-, medium-, and long-term timeframes for programming in the 5, 10, and 20 year horizons. This was done based on current status if the project had previously been identified and planned by the Region, market package priority, and dependency on other project completions. The majority of the short term or 5-year recommendations serve as "foundation" projects to implement basic functionality, infrastructure, and interfaces, with the intent of continuing to build out those foundation projects over the 10 and 20 year timeframes. Most projects for the Wichita Falls Region are infrastructure based; however, there are some recommendations that focus more on institutional practices and interconnectivity to enhance coordination and communications.

Each recommended project for the Wichita Falls Region was included in a short-, medium-, or long-term table. These tables provided the name of the project, primary operating/implementing agency, a planning level estimate of probable cost, an indication of whether or not funding had been identified for that specific project, and an estimated project duration. Following each table, detailed descriptions of each project were developed, which also included associated market packages and any pre-requisite project requirements.

Table 3 summarizes the ITS projects recommended for the Wichita Falls Region. This summary is divided into the major program areas and subdivided by timeframe. As can be seen from this summary, the majority of the project recommendations focus on the Travel and Traffic Management category which would implement surface street traffic management, traveler information, and inter-agency coordination elements.

Table 3 – Recommended ITS Projects for the Wichita Falls Region

Project Time Frame	Project Name	Funding Identified (Funding Agency if Applicable)
Travel and Traffic Management		
Short Term Projects 5-year Horizon	TxDOT Wichita Falls DMS Phase 2 (I-35)	Partial (TxDOT)
	TxDOT Wichita Falls CCTV Phase 2	Partial (TxDOT)
	TxDOT Center-to-Center Communications	Yes (TxDOT Statewide Initiative)
	TxDOT Wichita Falls TMC/City of Wichita Falls TOC Connection	No
	TxDOT Traffic Signal System Upgrades Phase 1	Yes (TxDOT)
	TxDOT Wichita Falls Web Page Enhancements	No
	Media Access to TxDOT CCTV Feeds	No
	City of Wichita Falls Traffic Signal System Expansion Phase 1	Yes (City of Wichita Falls)
Mid Term Projects 10-year Horizon	TxDOT Wichita Falls TMC Expansion	No
	TxDOT Wichita Falls DMS Phase 3	No
	TxDOT Wichita Falls CCTV Phase 3	No
	Interstate Coordination	No
	TxDOT Wichita Falls Highway Advisory Radio	No
	Kiosks at Travel Information Centers (TxDOT TexBox)	No
	TxDOT Wichita Falls Traffic Signal System Upgrades Phase 2	No
	TxDOT School Zone Flashers Paging System	No
	Regional 511 Advanced Traveler Information System Server	No
	Sheppard AFB/City of Wichita Falls TOC Connection	No
	City of Wichita Falls CCTV	No
	Media Access to City of Wichita Falls CCTV	No
	City of Wichita Falls Traffic Signal System Expansion Phase 2	No

Table 3 – Recommended ITS Projects for the Wichita Falls Region (continued)

Project Time Frame	Project Name	Funding Identified (Funding Agency if Applicable)
Travel and Traffic Management (continued)		
Long Term Projects 20-year Horizon	TxDOT Wichita Falls ITS Expansion and Upgrade	No
	TxDOT Wichita Falls Traffic Signal System Upgrades and Expansion	No
	City and County/TxDOT TMC Connection	No
	City of Wichita Falls Arterial Management System	No
	City of Wichita Falls Traffic Operations Center Enhancements	No
	City of Wichita Falls Traffic Signal System Expansion Phase 3	No
Emergency Management		
Short Term Projects 5-year Horizon	DPS/TxDOT Wichita Falls TMC Connection	No
	City of Wichita Falls Police Dispatch Center Enhancements	Yes (City of Wichita Falls)
	Sheppard AFB/TxDOT TMC Connection	No
Mid Term Projects 10-year Horizon	TxDOT Wichita Falls Emergency Vehicle Traffic Signal Preemption	No
	City of Wichita Falls Police Automated Vehicle Location and Mobile Data Terminals	No
	City of Wichita Falls Emergency Vehicle Traffic Signal Preemption Expansion	No
	Sheppard AFB Emergency Services/City of Wichita Falls PSAP Communications Connection	No
Long Term Projects 20-year Horizon	911 Call Centers/TxDOT Wichita Falls TMC Connection	No
	TDCJ /TxDOT TMC Connection	No
	Prison Vehicle AVL	No
Maintenance and Construction Management		
Short Term Projects 5-year Horizon	City of Wichita Falls Work Zone Safety Monitoring	No
	TxDOT Highway Condition Reporting System (HCRS) Enhancements	Yes (TxDOT Statewide Initiative)
	TxDOT Wichita Falls Area Office Maintenance Workstations	No
	TxDOT Wichita Falls Flood Monitoring System Phase 2	No
	TxDOT Wichita Falls RWIS Phase 2	Yes (TxDOT)
	TxDOT Wichita Falls Portable Smart Work Zones Phase 1	No
	TxDOT Wichita Falls Work Zone Safety Monitoring	No

Table 3 – Recommended ITS Projects for the Wichita Falls Region (continued)

Project Time Frame	Project Name	Funding Identified (Funding Agency if Applicable)
Maintenance and Construction Management (continued)		
Mid Term Projects 10-year Horizon	TxDOT Wichita Falls Anti-icing Program Phase 1	No
	TxDOT Wichita Falls RWIS Phase 3	No
	TxDOT Wichita Falls Portable Smart Work Zones Phase 2	No
Long Term Projects 20-year Horizon	TxDOT Wichita Falls Anti-icing Program Phase 2	No
	TxDOT Wichita Falls Maintenance Vehicle AVL	No
	TxDOT Wichita Falls Vehicle Maintenance Management System	No
	County Maintenance Vehicle AVL	No
	County Vehicle Maintenance Management System	No
	City of Wichita Falls Maintenance Vehicle AVL	No
	City of Wichita Falls Winter Maintenance System	No
	Other City/County Winter Maintenance Systems	No
Public Transportation Management		
Short Term Projects 5-year Horizon	Texoma Transit Operations Center and Computer Aided Dispatch	No
	Texoma Transit Security Alarms and Cameras	No
	SHARP Lines Transit Operations Center and Computer Aided Dispatch	No
	SHARP Lines Transit Security Alarms and Cameras	No
	City of Wichita Falls Transit Operations Center Enhancements and Computer Aided Dispatch	No
	City of Wichita Falls Transit Security System	No
	City of Wichita Falls Transit Web Page Enhancements	No
	City of Wichita Falls Transit/City of Wichita Falls TOC Connection	No
	SHARP Lines Transit Operations Center/City of Wichita Falls TOC Connection	No

Table 3 – Recommended ITS Projects for the Wichita Falls Region (continued)

Project Time Frame	Project Name	Funding Identified (Funding Agency if Applicable)
Public Transportation Management (continued)		
Mid Term Projects 10-year Horizon	Multi-modal Coordination	No
	Texoma AVL	No
	Texoma Web Site	No
	SHARP Lines AVL	No
	SHARP Lines Web Site	No
	City of Wichita Falls Transit AVL and MDTs	No
	City of Wichita Falls Transit Kiosks	No
Long Term Projects 20-year Horizon	Regional Transit Smart Card	No
	City of Wichita Falls Transit Electronic Fare Collection System	No
	City of Wichita Falls Transit Passenger Counters	No
Commercial Vehicle Operations		
Short Term Projects 5-year Horizon	Wichita Falls Weigh-in-Motion Expansion	Yes (TxDOT Statewide Initiative)
Mid Term Projects 10-year Horizon	None planned at this time	N/A
Long Term Projects 20-year Horizon	CVO Warning System	No
Archived Data		
Short Term Projects 5-year Horizon	None planned at this time	N/A
Mid Term Projects 10-year Horizon	Nortex Regional Data Archive	No
Long Term Projects 20-year Horizon	None planned at this time	N/A

MAINTAINING THE REGIONAL ITS ARCHITECTURE AND DEPLOYMENT PLAN

The Wichita Falls Regional ITS Deployment Plan is a living document. The recommended projects and timeframes for their implementation reflect the needs of the Region at the time the plan was developed. Wichita Falls is in the early stages of implementing its first phase of ITS technologies, and it is expected that the needs of the Region will change as ITS deployments are put into place, as population and travel patterns change, and as new technology is developed. This first phase, which included dynamic message signs, a TMC at the TxDOT District Office, TxDOT's ATMS software, surveillance equipment (including CCTV cameras and detectors), and weather detection (road pavement conditions and flood detection) was implemented in late 2004. Deployments in neighboring Regions, such as Amarillo, Childress, and Fort Worth as well as in Oklahoma also could have an impact on needs and priorities in the Wichita Falls Region. In order for the ITS Deployment Plan to remain a useful document for Regional stakeholders, the plan must be reviewed and updated over time.

It was agreed that as new programs and initiatives come on line, such as with security and emergency services, new stakeholders are welcome to participate in future discussions, formal updates, and revisions to both the architecture and the deployment plan for the Wichita Falls Region. These could include stakeholders who were invited but unable to consistently participate in the architecture and deployment plan process, new agencies or entities that have a role in the Region's ITS, as well as neighboring TxDOT Districts and states.

TxDOT Traffic Operations Division was identified as the lead to maintain and update the Wichita Falls Regional ITS Architecture and Deployment Plan, with input and guidance from TxDOT Wichita Falls and other stakeholders in the Region. These plans will continue to be driven by stakeholder consensus rather than a single stakeholder. In order for changes to occur in the plan, it is recommended that all stakeholders be invited to a consensus building meeting to discuss any proposed changes to the Regional ITS Architecture or ITS Deployment Plan.

Wichita Falls stakeholders noted that there was a stronger need to periodically review the projects in the Regional ITS Deployment Plan, but recognized it will be important to review new market packages to the National ITS Architecture as well as updated guidance and directives from the United States Department of Transportation to determine their applicability to the Wichita Falls Plans. The Regional ITS Deployment Plan will be reviewed for potential updates every two years, prior to the update of the regional transportation improvement program (TIP). At these review meetings, stakeholders should identify which projects in the ITS Deployment Plan have been deployed. Project status (existing, planned, or future) may have to be updated for many of the projects as they move from the future to planned to existing status. New projects that are recommended by a stakeholder for inclusion in the ITS Deployment Plan should also be discussed to ensure that the Region as a whole feels that the project is consistent with regional needs and priorities. Projects that are added to the ITS Deployment Plan should also be reviewed closely to determine if they fit into the current Wichita Falls Regional ITS Architecture; if a new project does not fit into the ITS Architecture, then the ITS Architecture will need to be revised to include the necessary links and data flows for the project.

This same type of consensus building should also be used should the geographic scope need to change or should additional stakeholders need to be added to the Wichita Falls Regional ITS Architecture and ITS Deployment Plan.

MEMORANDUM OF UNDERSTANDING

As a final step in the development of the Wichita Falls Regional ITS Architecture and Deployment Plan, a Memorandum of Understanding (MOU) was prepared for the participating stakeholder agencies. The MOU was developed for stakeholders to acknowledge their participation and approval of the plan, and pledge their support in the implementation and operation of ITS in the Wichita Falls Region. Also included in the MOU was a pledge to provide TxDOT with the information necessary to maintain the Regional ITS Architecture and ITS Deployment Plan.

Those stakeholders that were asked to sign the MOU represented agencies that participated in the planning process. In most cases these agencies will have the greatest impact in the Region in terms of ITS deployments and system operations. Stakeholder agencies that were asked to sign the MOU for the Wichita Falls Regional ITS Architecture and Deployment Plan included the following:

- City of Bowie;
- City of Gainesville;
- City of Vernon;
- City of Wichita Falls;
- City of Windthorst;
- Nortex Regional Planning Commission;
- Oklahoma Department of Transportation;
- Oklahoma Highway Patrol;
- Rolling Plains Management Corporation (SHARP Lines);
- Sheppard Air Force Base;
- Texas Department of Criminal Justice;
- Texas Department of Public Safety;
- Texas Department of Transportation;
- Texoma Area Paratransit System;
- US Geological Survey; and
- Wichita County.