State of Texas
Regional ITS Architectures and Deployment Plans

Childress Region

Regional ITS Deployment Plan

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August 22, 2003
068510006

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REGIONAL ITS DEPLOYMENT PLAN

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LIST OF ACRONYMS

ATIS	Advanced Travel Information System
ATMS	Advanced Traffic Management System
AVL	Automatic Vehicle Location
C2C	Center-to-Center
CAD	Computer-Aided Dispatch
CCTV	Closed-Circuit Television
DMS	Dynamic Message Sign
DPS	Department of Public Safety
EMS	Emergency Medical Services
EOC	Emergency Operations Center
FHWA	Federal Highway Administration
GIS	Geographic Information System
GPS	Global Positioning System
HAR	Highway Advisory Radio
HAZMAT	Hazardous Materials
HCRS	Highway Condition Reporting System
HRI	Highway-Rail Intersections
ISDN	Integrated Services Digital Network
ISP	Information Service Provider
ITS	Intelligent Transportation System
MCO	Maintenance and Construction Operations
NTCIP	National Transportation Communications for ITS Protocol
OBD	On-Board Diagnostic
PSAP	Public Safety Answering Point
RWIS	Road Weather Information System
TEA-21	Transportation Equity Act for the 21st Century

LIST OF ACRONYMS

TM	Traffic Management
TMC	Traffic Management Center
TxDOT	Texas Department of Transportation
USDOT	United States Department of Transportation
VIVDS	Video Image Vehicle Detector System
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 the Texas Department of Transportation (TxDOT) initiated the development of regional ITS architectures and deployment plans throughout the State of Texas. Although not required by the FHWA final rule, TxDOT took the opportunity to also develop an ITS deployment plan for each Region. The Childress Regional ITS Architecture and Regional ITS Deployment Plan was prepared as part of this initiative.

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

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

Building on the dialogue, consensus and vision outlined in the Regional ITS Architecture, stakeholders in the Childress Region prioritized market packages and potential ITS projects for deployment in the Region. Projects were identified to correspond to the needs and priorities identified by the regional stakeholders, and were categorized into 5-year, 10-year, and 20-year timeframes.

The majority of ITS projects recommended for the Childress Region were identified in the following key areas:

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

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

With the substantial amount of effort invested by stakeholders in the Childress Region to develop both the Regional ITS Architecture and the Deployment Plan, developing a plan for maintaining these important tools was a key component of the process. Stakeholders agreed that both the Regional ITS Architecture and Deployment Plan would need to be periodically reviewed and potentially updated in order to reflect current deployment status as well as to re-evaluate priorities. Childress stakeholders noted that there was a stronger need to periodically review 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 (USDOT) to determine their applicability to the Childress Plans. The Regional ITS Deployment Plan will be reviewed for potential updates every two years, prior to the budget process and Texas legislature meetings. TxDOT Traffic Operations Division was identified as the lead to maintain and update the Childress Regional ITS Architecture and Deployment Plan, with input and guidance from TxDOT Childress and other stakeholders in the Region.

1. INTRODUCTION

1.1 Project Overview

FHWA's final rule to implement Section 5206(e) of the TEA-21 requires that ITS projects funded through the Highway Trust Fund conform to the National ITS Architecture and applicable standards. The rule requests that the National ITS Architecture be used to develop a local implementation of the National ITS Architecture, which is referred to as a "Regional ITS Architecture."

In order to meet these requirements, the TxDOT initiated the development of Regional ITS Architectures and Deployment Plans throughout the State of Texas. Although not required by the FHWA final rule, TxDOT sought to expand on the project sequence requirement and have an ITS deployment plan developed for each Region. The ITS deployment plan outlines a vision for ITS deployment in the Region, and identifies and prioritizes projects that are needed to implement the ITS architecture on a short, medium, and long-term basis. In doing so, this plan also helps the Region to prioritize funding decisions by having a comprehensive, phased approach to the Regional ITS programs, so that the infrastructure can be incrementally built-out over a 20-year horizon, and integration among key foundation systems in the Region can occur as the system grows and expands.

The ITS Deployment Plan for the Childress Region was developed using the Regional ITS Architecture developed in 2002. Through the architecture development process, stakeholders reached consensus on the transportation needs in the Region that could be addressed with ITS, worked with the architecture team to customize and prioritize market packages that formed the basis for the deployment plan, and identified the required interfaces to provide the desired level of integration of systems and agencies within the Childress Region.

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

1.2 Document Overview

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

Section 1 – Introduction

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

Section 2 – Prioritization of Market Packages

Section 2 contains the prioritized market packages for the Childress Region. Included in this section is an overview of the prioritization process, and detailed descriptions of the high, medium and low priority market packages.

Section 3 – Prioritization of Projects

Project recommendations have been developed for the Childress Region to provide an incremental, phased build-out of the Region's ITS. These projects are categorized into five, ten and twenty year deployment timeframes. Each project recommendation includes a brief description, responsible agency, associated market package, pre-requisite projects or systems, and an estimate of probable cost. These recommendations took into consideration existing as well as planned ITS deployments in the Childress Region.

Section 4 – Procedure for Updating Regional ITS Architecture and Deployment Plan

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

1.3 The Childress Region

1.3.1 Geography and Regional Characteristics

The Childress Region is located in the eastern portion of the Texas Panhandle. The boundaries of the Childress Region were defined by stakeholders to correspond with the TxDOT Childress District, one of 25 Districts throughout the state. The Childress Region is bordered by the Amarillo District to the northwest, the Lubbock District to the southwest, and the Abilene District to the south. The Region shares its eastern borders with the state of Oklahoma and TxDOT's Wichita Falls District.

There are 13 counties in the Childress Region:

- Briscoe;
- Childress;
- Collingsworth;
- Cottle;
- Dickens;
- Donley;
- Foard;
- Hall;
- Hardeman;
- King;
- Knox;
- Motley; and
- Wheeler.

A rural Region without any major metropolitan areas, there are several key cities and towns in the Childress Region including Childress, Wellington, Shamrock, Quanah, Crowell, and Paducah. 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.

1.3.2 Transportation Infrastructure

The Childress Region is an important gateway to the Texas Panhandle, Oklahoma, and neighboring TxDOT Districts. Interstate 40, and US Highways 287, 83 and 70 are major corridors, and there also are several State Highways that serve as important links to US Highways and Interstates.

A portion of I-40 is located in the northern part of the Region. As a major east-west corridor for Texas and its neighboring states, any restrictions or impacts on I-40 will affect nearby routes. In the case of the Childress Region, these would include US Highways 287 and 83, as well as State Highways 207, 70, and 273.

US Highway 287 is a significant link between Colorado and Dallas/Fort Worth, which creates a major truck route through Childress and other communities along the corridor. It is also the primary route between Wichita Falls, Childress, and Amarillo, which makes coordination among these Regions extremely important. US Highway 83 is a north-south corridor in the eastern part of the Childress Region that connects to I-40 at Shamrock in Wheeler County. US 83 provides access via several State Highways and farm-to-market roads to western Oklahoma. Further south, US 83 extends through Abilene to Laredo on the Texas/Mexico border; this corridor is a direct route from Mexico to Canada.

Because of the rural nature of the Childress Region, transit services are predominantly on-demand, although there are a few fixed-route schedules. Transit services are provided by Panhandle Community Services, Rolling Plains Management Corporation (Sharp Lines), and Double Mountain Coach.

1.3.3 Existing ITS in the Childress Region

Currently, there is limited deployment of ITS in the Childress Region. Existing and planned near-term ITS technologies focus on detection, traveler information, and coordination with neighboring TxDOT Districts. US Highway 287 has Video Image Vehicle Detection (VIVD) and signal interconnect through Childress. The signal at US 287/SR256 also is equipped with emergency preemption. TxDOT operates and maintains all traffic signals within the Childress Region. TxDOT also has traffic counting stations at key points along I-40.

There are several portable dynamic message signs (DMS) that are used throughout the Childress Region, and permanent DMS are planned on I-40 westbound east of Shamrock and on US 287 westbound in advance of US 83. The Childress Region wants to implement additional traveler information tools to better inform motorists and truckers about adverse conditions along roadways in the Region (or in nearby Regions). Using a FaxNet system, the Public Information Officer at TxDOT Childress is responsible for sending media in the Childress Region (as well as neighboring Regions) notifications or updates about construction, closures, restrictions and other hazards.

Emergency radio broadcast systems are in place to provide warnings and advisories of weather hazards such as winter storms or tornadoes. TxDOT, TxDPS, the Forest Service, County Sheriffs, and local police routinely combine resources for incident and emergency management within the Childress Region. Radio is the primary communications between dispatch centers and vehicles, including TxDPS, local law enforcement, and TxDOT maintenance.

1.3.4 Childress Stakeholders

A diverse group of stakeholders provided ongoing input and guidance to the development of the ITS Architecture and Deployment Plan for the Childress Region. Although TxDOT operations and maintenance staff from throughout the Region comprised the majority of stakeholders, having input from several perspectives, including state, county, local, public safety and transit, the resulting deployment plan and vision is an accurate reflection of the needs and unique issues in the Childress Region.

Key stakeholders that are participating in the development of the Childress Regional ITS Deployment Plan are listed in **Table 1**.

Table 1 – Childress Stakeholder Agencies and Contacts

Stakeholder Agency	Contact	Address	Phone Number	E-Mail
City of Childress	Jerry Cummins	P.O. Box 1087 Childress, Texas 79201	(940) 937-3684	citymanager@childresstx.com
City of Shamrock	David Rushing	207 North Main Shamrock, Texas 79079	(806) 256-2516	irishedb@hotmail.com
Rolling Plans Management Group	Lezlie Carroll	Box 490 Crowell, Texas 79227	(940) 684-1571	sharplines@yahoo.com
TxDOT – Abilene District	Roy Wright	4250 North Clack Abilene, Texas 79604	(915) 616-6805	rwright@dot.state.tx.us
TxDOT – Amarillo District	Chris Freeman	P.O. Box 7368 Amarillo, Texas 79114	(806) 356-3290	cfreema@dot.state.tx.us
TxDOT – Amarillo District	Robin Frisk	P.O. Box 7368 Amarillo, Texas 79114	(806) 356-3292	rfrisk@dot.state.tx.us
TxDOT – Childress District	Danny Brown	7599 US 287 Childress, Texas 79201	(940) 937-7251	dbrown3@dot.state.tx.us
TxDOT – Childress District	Tracy Cain	16215 FM 338 Wellington, Texas 79095	(806) 447-5137	tcain@dot.state.tx.us
TxDOT – Childress District	Craig Clark	7599 US 287 Childress, Texas 79201	(940) 937-7145	cclark3@dot.state.tx.us
TxDOT – Childress District	Tonya Cummins	7599 US 287 Childress, Texas 79201	(940) 937-7164	tcummin@dot.state.tx.us
TxDOT – Childress District	Clyde Harper	7599 US 287 Childress, Texas 79201	(940) 937-7185	charper@dot.state.tx.us
TxDOT – Childress District	Darlene Harris	7599 US 287 Childress, Texas 79201	(940) 937-7138	dharri2@dot.state.tx.us
TxDOT – Childress District	Terry Keener	7599 US 287 Childress, Texas 79201	(940) 937-2571	tkeener@dot.state.tx.us
TxDOT – Childress District	Chris Medford	7599 US 287 Childress, Texas 79201	(940) 937-7132	cmedfor@dot.state.tx.us
TxDOT – Childress District	Barbara Seal	7599 US 287 Childress, Texas 79201	(940) 937-7145	bseal@dot.state.tx.us

Table 1 – Childress Stakeholder Agencies and Contacts (continued)

Stakeholder Agency	Contact	Address	Phone Number	E-Mail
TxDOT – Childress District	Kenneth Whitaker	16100 I-40 Shamrock, Texas 79079	(806) 256-3206	N/A
TxDOT – Wichita Falls District	Davis Powell	1601 Southwest Parkway Wichita Falls, Texas 76302	(940) 720-7717	dpowel2@dot.state.tx.us
TxDOT Traffic Operations Division	Bernie Walker	125 East 11th Street Austin, Texas 78701	(512) 416-3264	bwalker@dot.state.tx.us
TxDOT Traffic Operations Division	Janie Light	125 East 11th Street Austin, Texas 78701	(512) 416-3258	jlight@dot.state.tx.us

2. PRIORITIZATION OF MARKET PACKAGES

2.1 Prioritization Process

Of the 75 available market packages in the National ITS Architecture, 30 were selected and customized for deployment in the Childress Region. Stakeholders were asked to prioritize the market packages into high, medium, and low priorities, based on regional needs, feasibility and likelihood of deployment, and overall contribution of the market package to the goals and vision for ITS functionality in the Region. A summary of these prioritized market packages is shown in **Table 2**.

Table 2 – Summary of Prioritized Market Packages for the Childress Region

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

The market package prioritization was a key factor in developing recommendations for ITS deployment and integration in the Childress Region. These priorities identified the priority needs and services that are desired in the Childress Region, as well as the interfaces that need to be established to provide integrated functionality and establish communication between elements.

This section includes detailed descriptions of the prioritized market packages for the Childress Region. The market packages are organized into high, medium and low priorities. It is important to note that the high, medium and low prioritization does not necessarily correspond to any

specific time frame (such as five, ten or twenty year deployment horizon). For example, a market package can be a high priority, but because of funding or prerequisite project requirements, it might not be feasible for deployment for several years. Maturity and availability of technology was another factor for prioritizing the market packages. Other considerations included whether or not the market package was better suited for private deployment and operations rather than by a public agency.

Each market package in the following subsections includes:

- A brief definition of the market package (which has been modified from the National ITS Architecture definitions);
- Any infrastructure from that market package that is already existing in the Childress 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.

2.2 High Priority Market Packages

Market packages that were selected as high priorities for the Childress Region are listed and described in **Table 3**. These market packages typically represent systems or functions that serve as foundations for which to build regional ITS programs. Listed in this section are market packages that address basic control and monitoring technologies for roadways (such as CCTV cameras and detectors), road/weather conditions data gathering, traveler information, and incident management and emergency response coordination. Because there is limited deployment of ITS technologies in the Childress Region, these foundation systems will provide a practical and functional baseline for future ITS deployment.

Table 3 – High Priority Market Packages for the Childress Region

Network Surveillance (ATMS01)	High Priority
This market package includes traffic detectors, other surveillance equipment, the supporting field equipment, and wireline communications to transmit the collected data back to the Traffic Management Subsystem. The derived data can be used locally or remotely. The data generated by this market package enables traffic managers to monitor traffic and road conditions, identify and verify incidents, detect equipment faults, and collect census data for traffic strategy development and long range planning. The collected data can also be analyzed and made available to users and the Information Service Provider Subsystem.	

Existing Infrastructure	Agency
▪ TxDOT Video Cameras at Rest Areas ▪ TxDOT Video Image Vehicle Detection System (VIVDS)	▪ TxDOT

Planned Projects
None identified at this time

Additional Needs
▪ TxDOT Childress District TMC ▪ TxDOT ATMS Implementation ▪ TxDOT Childress ITS Implementation Phases 1 through 3 ▪ TxDOT Childress Flood Detection Stations ▪ TxDOT Childress Portable Traffic Detection ▪ TxDOT Childress RWIS Phases 1 and 2 ▪ Probe Surveillance

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

Traffic Information Dissemination (ATMS06)	High Priority

This market package allows traffic information and road/bridge closures due to construction, maintenance, and weather, to be disseminated to drivers and vehicles using roadway equipment such as dynamic message signs or highway advisory radio.

This package also covers the equipment and interfaces that provide traffic information from a traffic management center to the media (for instance via a direct tie-in between a traffic management center and radio or television station computer systems), Transit Management, Emergency Management, and Information Service Providers.

Existing Infrastructure	Agency
■ TxDOT Portable DMS	■ TxDOT
■ Rest Area Kiosks	■ Wheeler County
■ Wheeler County Portable DMS	
■ TxDOT FaxNet	

Planned Projects

■ TxDOT Childress Highway Condition Reporting System (HCRS) Enhancements

Additional Needs

■ TxDOT Childress District TMC

■ TxDOT ATMS Implementation

■ TxDOT Childress ITS Implementation Phases 1 through 3

■ TxDOT Portable DMS

■ Regional 511 Advanced Traveler Information System Server

■ TxDOT Childress Rest Area Traveler Information

■ TxDOT Childress TMC to Regional EOC Connection

■ Interstate TMC Coordination

■ Railroad Crossing Upgrades

■ TxDOT Childress TMC/City of Childress Police Department Connection

■ TxDOT Childress TMC/Municipal Public Works Connection

■ TxDOT Childress TMC/County EOC Connection

■ TxDOT Childress TMC/County Road and Bridge Connection

■ TxDOT Childress Portable Smart Workzones

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

Regional Traffic Control (ATMS07)	High Priority
This market package provides for the sharing of traffic information and control among traffic management centers to support a regional control strategy. This package relies on roadside instrumentation supported by the Surface Street Control and Freeway Control Market Packages and adds hardware, software, and communications capabilities to implement traffic management strategies that are coordinated between allied traffic management centers. The extent of information and control sharing is determined through working arrangements between jurisdictions.	
Existing Infrastructure	**Agency**
None Identified	
Planned Projects	
▪ TxDOT Center-to-Center Communications	
Additional Needs	
▪ TxDOT Childress District TMC ▪ TxDOT ATMS Implementation ▪ TxDOT Childress ITS Implementation Phases 1 through 3 ▪ TxDOT Childress Area Office Remote TMC Workstations ▪ Interstate TMC Coordination ▪ TxDOT Childress Closed Loop Signal System Upgrade	

Incident Management System (ATMS08)	High Priority

This market package manages both unexpected incidents and planned events so that the impact to the transportation network and traveler safety is minimized. The market package includes incident detection capabilities through roadside surveillance devices (e.g. CCTV) and through regional coordination with other traffic management, maintenance and construction management and emergency management centers as well as weather service entities and event promoters. Information from these diverse sources are collected and correlated by this market package to detect and verify incidents and implement an appropriate response.

The response may include traffic control strategy modifications or resource coordination between center subsystems. The coordination with emergency management might be through a CAD system or through other communication with emergency field personnel. The coordination can also extend to tow trucks and other allied response agencies and field service personnel.

Incident response also includes presentation of information to affected travelers using the Traffic Information Dissemination, Broadcast Traveler Information or Interactive Traveler Information market packages.

Existing Infrastructure	Agency
▪ DPS Emergency Operations Center	▪ Department of Public Safety
▪ County Emergency Operations Center	▪ Counties
▪ Forest Service Mobile Command Center	▪ Texas Forest Service

Planned Projects

- ▪ TxDOT Childress Highway Condition Reporting System (HCRS) Enhancements
- ▪ TxDOT Center-to-Center Communications

Additional Needs

- ▪ TxDOT Childress District TMC
- ▪ TxDOT ATMS Implementation
- ▪ TxDOT Childress ITS Implementation Phases 1 through 3
- ▪ Regional Emergency Operations Center (EOC) Enhancements
- ▪ TxDOT Childress TMC to Regional EOC Connection
- ▪ TxDOT Childress TMC/City of Childress Police Department Connection
- ▪ TxDOT Childress TMC/County EOC Connection
- ▪ DPS Childress Computer Aided Dispatch System
- ▪ Automatic Vehicle Location for Fire and EMS
- ▪ TxDOT Childress Portable Smart Work Zones

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

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

Additional Needs

- TxDOT Childress District TMC
- TxDOT ATMS Implementation
- TxDOT Childress RWIS Phases 1 and 2
- TxDOT Childress Flood Detection Stations
- TxDOT Childress Winter Maintenance Decision Support System
- TxDOT Childress Automated Anti-icing Treatment

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

Weather Information Processing and Distribution (MC04)	High Priority
This market package processes and distributes the environmental information collected from the Road Weather Data Collection market package. This market package uses the environmental data to detect environmental hazards such as icy road conditions, high winds, and dense fog, so system operators and decision support systems can make decision on corrective actions to take. The continuing updates of road condition information and current temperatures can be used by system operators to more effectively deploy road maintenance resources, issue general traveler advisories, issue location specific warnings to drivers using the Traffic Information Dissemination market package, and aid operators in scheduling work activity.	

Existing Infrastructure	Agency
▪ Rest Area Kiosks	▪ TxDOT

Planned Projects

- ▪ TxDOT Childress Highway Condition Reporting System (HCRS) Enhancements
- ▪ TxDOT Center-to-Center Communications

Additional Needs

- ▪ TxDOT Childress District TMC
- ▪ TxDOT Childress Flood Detection Stations
- ▪ TxDOT Childress RWIS Phases 1 and 2
- ▪ TxDOT Childress District Web Page
- ▪ TxDOT Childress Rest Area Traveler Information
- ▪ Regional 511 Advanced Traveler Information System Server
- ▪ TxDOT Childress Winter Maintenance Decision Support System
- ▪ TxDOT Childress Automated Anti-icing Treatment
- ▪ TxDOT Childress Area Office Remote TMC Workstations
- ▪ Interstate TMC Coordination
- ▪ TxDOT Childress TMC/County Road and Bridge Connection
- ▪ TxDOT Childress TMC/County EOC Connection

Transit Vehicle Tracking (APTS1)	High Priority
This market package monitors current transit vehicle location using an Automated Vehicle Location System. The location data may be used to determine real time schedule adherence and update the transit system's schedule in real-time.	
Existing Infrastructure	**Agency**
None identified	
Planned Projects	
None identified at this time	
Additional Needs	
- Panhandle Community Services Transit Automatic Vehicle Location System - Sharp Lines Automatic Vehicle Location System - Sharp Lines Transit Operations Center with Computer Aided Dispatch - Childress Region Independent School Districts Bus AVL	

Demand Response Transit Operations (APTS3)	High Priority
This market package performs vehicle routing and scheduling as well as automatic driver assignment and monitoring for demand responsive transit services. This package monitors the current status of the transit fleet and supports allocation of these fleet resources to service incoming requests for transit service while also considering traffic conditions. The Transit Management Subsystem provides the necessary data processing and information display to assist the transit operator in making optimal use of the transit fleet. This service includes the capability for a traveler request for personalized transit services to be made through the Information Service Provider (ISP) Subsystem.	
Existing Infrastructure	**Agency**
Transit Dispatch Centers	- Rolling Plains (Sharp Lines) - Panhandle Community Services
Planned Projects	
None identified at this time	
Additional Needs	
- Sharp Lines Transit Operations Center with Computer Aided Dispatch - Sharp Lines Automatic Vehicle Location System - Panhandle Community Services Transit Automatic Vehicle Location System - Rolling Plains Transit Traveler Information System	

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

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

Planned Projects

None identified at this time

Additional Needs

- Rolling Plains Transit Traveler Information System
- Sharp Lines Transit Operations Center with Computer Aided Dispatch
- Sharp Lines Automatic Vehicle Location System
- Panhandle Community Services Transit Automatic Vehicle Location System
- Regional 511 Advanced Traveler Information System Server

Broadcast Traveler Information (ATIS1)	High Priority
This market package collects traffic conditions, advisories, general public transportation, toll and parking information, incident information, air quality and weather information, and broadly disseminates this information through existing infrastructure and low cost user equipment (e.g., FM subcarrier, cellular data broadcast). This market package differs from the Traffic Information Dissemination market package, which provides localized HAR and DMS information capabilities. The information may be provided directly to travelers by an information service provider (ISP) or other traveler service providers so that they can better inform travelers of conditions. Successful deployment of this market package relies on availability of real-time traveler information from roadway instrumentation, probe vehicles or other sources.	
Existing Infrastructure	**Agency**
▪ TxDOT Web Page	▪ TxDOT

Planned Projects

- TxDOT Childress Highway Condition Reporting System (HCRS) Enhancements

Additional Needs

- TxDOT Childress District TMC
- TxDOT ATMS Implementation
- TxDOT Childress ITS Implementation Phases 1 through 3
- TxDOT Childress District Web Page
- Regional 511 Advanced Traveler Information System Server

Interactive Traveler Information (ATIS2)	High Priority
This market package provides tailored information in response to a traveler request. Both real-time interactive request/response systems and information systems that "push" a tailored stream of information to the traveler based on a submitted profile are supported. The traveler can obtain current information regarding traffic conditions, transit services, ride share/ride match, parking management, and pricing information. Information can be accessed via phone, kiosk, Personal Digital Assistant, personal computer, and a variety of in-vehicle devices. Successful deployment of this market package relies on availability of real-time transportation data from roadway instrumentation, probe vehicles or other means.	
Existing Infrastructure	**Agency**
▪ Rest Area Kiosks	▪ TxDOT
Planned Projects	
▪ TxDOT Childress Highway Condition Reporting System (HCRS) Enhancements	
Additional Needs	
▪ TxDOT Childress District Web Page ▪ Regional 511 Advanced Traveler Information System Server ▪ TxDOT Childress Rest Area Traveler Information ▪ Rolling Plains Transit Traveler Information System	

HAZMAT Management (CVO10)	High Priority
This market package integrates incident management capabilities with commercial vehicle tracking to assure effective treatment of HAZMAT material and incidents. HAZMAT tracking is performed by the Fleet and Freight Management Subsystem. The Emergency Management Subsystem is notified by the Commercial Vehicle if an incident occurs and coordinates the response. The response is tailored based on information that is provided as part of the original incident notification or derived from supplemental information provided prior to the beginning of the trip or gathered following the incident depending on the selected policy and implementation.	
Existing Infrastructure	**Agency**
None identified	
Planned Projects	
None identified at this time	
Additional Needs	
▪ Regional Emergency Operations Center (EOC) Enhancements ▪ HAZMAT Notification System	

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

Emergency Response (EM1)	High Priority
This market package includes emergency vehicle equipment, equipment used to receive and route emergency calls, and wireless communications that enable safe and rapid deployment of appropriate resources to an emergency. Coordination between Emergency Management Subsystems supports emergency notification and coordinated response between agencies.	

Existing Infrastructure	Agency
▪ Local 911 PSAP	▪ Local Police
▪ DPS Emergency Operations Center	▪ DPS
▪ County Emergency Operations Center	▪ Counties
▪ Forest Service Mobile Command Center	▪ Texas Forest Service

Planned Projects

None identified at this time

Additional Needs

- ▪ Regional Emergency Operations Center (EOC) Enhancements
- ▪ TxDOT TMC to Regional EOC Connection
- ▪ DPS Childress Computer Aided Dispatch System
- ▪ Automatic Vehicle Location for Fire and EMS
- ▪ TxDOT Childress TMC/County EOC Connection

Emergency Routing (EM2)	High Priority
This market package supports automated vehicle location and dynamic routing of emergency vehicles. The service also supports coordination with the Traffic Management Subsystem, collecting detailed road network conditions and requesting special priority or other specific emergency traffic control strategies on the selected route(s). The service provides for information exchange between care facilities and both the Emergency Management Subsystem and emergency vehicles.	

Existing Infrastructure	Agency
▪ Emergency Vehicle Traffic Signal Preemption at US 287/SR256	▪ TxDOT

Planned Projects

None identified

Additional Needs

- ▪ TxDOT Childress District TMC
- ▪ TxDOT ATMS Implementation
- ▪ DPS Childress Computer Aided Dispatch System
- ▪ Emergency Vehicle Traffic Signal Preemption
- ▪ TxDOT Childress TMC to Regional EOC Connection
- ▪ TxDOT Childress TMC/City of Childress Police Department Connection
- ▪ TxDOT Childress TMC/County EOC Connection
- ▪ Automatic Vehicle Location for Fire and EMS

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

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

Existing Infrastructure	Agency
▪ TxDOT/DPS Crash Record Information System ▪ TxDOT Public Transportation Management System ▪ Permanent Traffic Count Stations on I-40	▪ DPS ▪ TxDOT

Planned Projects
None identified

Additional Needs
▪ TxDOT ATMS Implementation ▪ TxDOT Childress Traffic Count Archive

2.3 Medium Priority Market Packages

Table 4 outlines market packages that were deemed medium priority by stakeholders in the Childress Region. These market packages were identified as useful and desirable services and functions for the Region, although very few of these market packages have existing infrastructure in place or planned over the next few years (through 2005). The feasibility of funding for these market packages also was a factor in the prioritization. Availability and maturity of technology also was a consideration, particularly for the Maintenance and Construction Management market packages. These market packages were recently developed and added to the National ITS Architecture, and are not yet widely deployed. It is recommended that stakeholders in the Childress Region review deployments of some of the maintenance and construction technologies in other areas over the next few years to assess how well they have performed, benefits, and cost-effectiveness.

Several of these medium priority market packages have components that are dependent on deployment and implementation of higher priority market packages, such as road weather data collection to support winter maintenance and roadway automated treatment functions.

Table 4 – Medium Priority Market Packages for the Childress Region

Surface Street Control (ATMS03)	Medium Priority
This market package provides the central control and monitoring equipment, communication links, and the signal control equipment that support local surface street control and/or arterial traffic management. A range of traffic signal control systems are represented by this market package ranging from static pre-timed control systems to fully traffic responsive systems that dynamically adjust control plans and strategies based on current traffic conditions and priority requests. This market package is consistent with typical urban traffic signal control systems.	
Existing Infrastructure	**Agency**
▪ TxDOT VIVDS ▪ TxDOT Traffic Signals ▪ Emergency Vehicle Traffic Signal Preemption at US287/SR256 ▪ Electronic Speed Warning Signs	▪ TxDOT
Planned Projects	
None identified	
Additional Needs	
▪ TxDOT Childress District TMC ▪ Emergency Vehicle Traffic Signal Preemption ▪ TxDOT Childress Portable Traffic Detection ▪ TxDOT Childress Closed Loop Signal System Upgrade	

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

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

Roadway Automated Treatment (MC05)	Medium Priority
This market package automatically treats a roadway section based on environmental or atmospheric conditions. Treatments include fog dispersion, anti-icing chemicals, etc. The market package includes the environmental sensors that detect adverse conditions, the automated treatment system itself, and driver information systems (e.g. dynamic message signs) that warn drivers when the treatment system is activated.	
Existing Infrastructure	**Agency**
None identified	
Planned Projects	
None identified at this time	
Additional Needs	
▪ TxDOT Childress Automated Anti-Icing Treatment ▪ TxDOT Childress RWIS Phases 1 and 2 ▪ TxDOT Childress Winter Maintenance Decision Support System	

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

Winter Maintenance (MC06)	Medium Priority
This market package supports winter road maintenance including snow plow operations, roadway treatments (e.g. salt spraying and other anti-icing material applications), and other snow and ice control activities. This package monitors environmental conditions and weather forecasts and uses the information to schedule winter maintenance activities, determine the appropriate snow and ice control response, and track and manage response operations.	
Existing Infrastructure None identified	**Agency**
Planned Projects None identified at this time	
Additional Needs - TxDOT Childress District TMC - TxDOT Childress RWIS Phases 1 and 2 - TxDOT Childress Automated Anti-Icing Treatment - TxDOT Childress Winter Maintenance Decision Support System - TxDOT Childress Area Office Remote TMC Workstations	

Work Zone Management (MC08)	Medium Priority
This market package directs activity in work zones, controlling traffic through portable DMS and informing other groups of activity (e.g., ISP, TM, other maintenance and construction centers) for better coordination management. Work zone speeds and delays are provided to the motorist prior to the work zones.	
Existing Infrastructure - TxDOT Portable DMS - Wheeler County Portable DMS - TxDOT Web Page - Toll Free Information Line	**Agency** - TxDOT - Wheeler County
Planned Projects - TxDOT Childress Highway Condition Reporting System (HCRS) Enhancements - TxDOT Center-to-Center Communications	
Additional Needs - TxDOT Childress District TMC - TxDOT ATMS Implementation - TxDOT Childress Area Office Remote Workstations - TxDOT Childress Portable DMS - TxDOT Childress Portable Smart Work Zones - TxDOT Childress Portable Traffic Detection - TxDOT Childress District Web Page	

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

Transit Fixed-Route Operations (APTS2)	Medium Priority
This market package performs vehicle routing and scheduling, as well as automatic driver assignment and system monitoring for fixed-route transit services. This service determines current schedule performance using AVL data and provides information displays at the Transit Management Subsystem. Static and real time transit data is exchanged with Information Service Providers where it is integrated with that from other transportation modes (e.g. rail, ferry, air) to provide the public with integrated and personalized dynamic schedules.	
Existing Infrastructure	**Agency**
School Districts Bus Fleet(s)	Childress Regional Independent School Districts
Planned Projects	
None identified at this time	
Additional Needs	
▪ Childress Region Independent School Districts Bus Operations Management Center ▪ Childress Region Independent School Districts Bus AVL	

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

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

Weigh-in-Motion (CVO06)	Medium Priority
This market package provides for high speed weigh-in-motion with or without automated vehicle identification capabilities. This market package provides the roadside equipment that could be used as a stand-alone system or to augment the electronic clearance market package.	
Existing Infrastructure	**Agency**
None identified	
Planned Projects	
None identified at this time	
Additional Needs	
▪ TxDOT Childress Weigh-in-Motion (WIM) Site Implementation	

2.4   Low Priority Market Packages

Six market packages were identified and customized for the Childress Region, but were ranked as low priority by stakeholders. These market packages are listed in **Table 5**. The services contained in these lower priority market packages were deemed useful and desirable for the Region, but stakeholders did not feel that public agencies should put a strong focus on these market packages in the near-term. Stakeholders also did not want to preclude these market packages from future deployment in the Region, so it was decided to keep these market packages as part of the Regional ITS Architecture.

Some of these market packages were identified as candidates for private sector deployment and operations, or will require a public-private partnership for implementation and ongoing operations. For example, ISP-Based Route Guidance will require a partnership between TxDOT and private information service providers. Similarly, probe surveillance using commercial vehicles was identified as a potential source of road and traffic condition data, and this will require participation of truck drivers for in-vehicle transponders as well as a substantial public investment in roadside infrastructure for data collection. While both of these are not high priority needs, Childress stakeholders did not want to preclude them from future consideration.

Table 5 – Low Priority Market Packages for the Childress Region

Market Package Name	Description	Comments
Probe Surveillance (ATMS02)	This market package provides an alternative approach for surveillance of the roadway network. Two general implementation paths are supported by this market package: 1) wide-area wireless communications between the vehicle and Information Service Provider is used to communicate current vehicle location and status and 2) dedicated short range communications between the vehicle and roadside is used to provide equivalent information directly to the Traffic Management Subsystem. It requires either wide area or short-range communications equipment, roadside beacons and wireline communications for the short-range communications option, data reduction software, and utilizes wireline links between the Traffic Management Subsystem and Information Service Provider Subsystem to share the collected information. Both "Opt out" and "Opt in" strategies are available so the user has the ability to turn off the probe functions to ensure individual privacy.	The use of vehicles as probes, particularly commercial vehicles with transponders, was discussed with stakeholders in the Childress Region. There were no plans to implement this market package in the near or mid-terms, but it was recognized by stakeholders that probe surveillance could be a beneficial service at some time in the future.

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

Market Package Name	Description	Comments
Maintenance and Construction Vehicle Tracking (MC01)	This market package will track the location of maintenance vehicles and other equipment to ascertain the progress of their activities. These activities can include ensuring the correct roads are being plowed and work activity is being performed at the correct locations.	This market package was not identified as needed in the Childress Region at this time. It was expected that the information from this market package may be useful to the Region some time in the future if maintenance activities were to become more automated. Included in this market package would be instrumentation of maintenance vehicles with AVL.
Maintenance and Construction Vehicle Maintenance (MC02)	This market package performs vehicle maintenance scheduling and manages both routine and corrective maintenance activities on vehicles and other maintenance equipment. It includes on board sensors capable of automatically performing diagnostics for maintenance vehicles, and the systems that collect this diagnostic information and use it to schedule and manage vehicle maintenance.	Based on the current state of technology, this market package was not identified as needed in the Childress Region at this time. As technology evolves, the Region may consider implementation of this market package in the future.
Work Zone Safety Monitoring (MC09)	This market package includes systems that improve work crew safety and reduce collisions between the motoring public and maintenance and construction vehicles by detecting vehicle intrusions in work zones and warning crews and drivers of imminent encroachment or other potential safety hazards. This could include systems that detect safety issues far upstream from a work zone – for example, detection of over-dimension vehicles before they enter the work zone.	This market package was identified as a future need for the Region. Higher priority MCO market packages focused on smart work zone equipment (including detection) to improve work zone safety.
Maintenance and Construction Activity Coordination (MC10)	This market package supports the dissemination of maintenance and construction activity to centers which can utilize it as part of their operations, or to the Information Service Providers who can provide the information to travelers.	While the Region recognized the importance of this market package, the current HCRS system is providing this information.

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

Market Package Name	Description	Comments
ISP-Based Route Guidance (ATIS06)	This market package offers the user pre-trip route planning and turn-by-turn route guidance services, which are generated by an ISP. Routes can be based on static information or reflect real time network conditions. This approach simplifies the user equipment requirements and can provide the infrastructure better information on which to predict future traffic. The package includes two way data communications and optionally also equips the vehicle with the databases, location determination capability, and display technology to support turn by turn route guidance.	This market package is best suited for deployment and ongoing operations by a private sector ISP. Fee-based subscription services are typically required for delivery of this service. Stakeholders recognized a need to provide information to support this market package (through deployed data collection systems) but will not take an active role in its implementation.

3. PRIORITIZATION OF PROJECTS

In order to achieve the vision of the Regional ITS Architecture, a Region must deploy carefully developed projects that provide the functionality and interoperability identified in the architecture. A key step in the deployment of those projects is the development of an ITS Deployment Plan that identifies specific projects, timeframes, and responsible agencies.

Input from all stakeholders is required in order for the stakeholders to have ownership of the ITS Deployment Plan, and also to be sure that the plan has realistically identified projects and timeframes for the Region. Cost is another important factor. Cost can vary a great deal for many ITS elements, depending on the level of deployment, maturity of the technology, type of communications, etc. For example, freeway network surveillance could be adequately achieved for one Region by deploying still-frame CCTV cameras only at freeway interchanges. In another Region, there may be a desire for full motion cameras deployed at every mile to provide complete coverage of the freeway. The infrastructure and telecommunications costs for these two projects would vary a great deal, yet either one could be suitable for a particular Region.

In order to achieve input from stakeholders, a workshop was held in the Childress Region on February 5, 2003 to present the draft Regional ITS Deployment Plan and discuss potential projects. Each project recommended for the Regional ITS Deployment Plan was discussed, and consensus was reached by the stakeholders on the project description and the timeframe for implementation.

In the following sections, projects are categorized into short-term projects (5-year deployment timeframe), mid-term projects (10-year deployment timeframe), and long-term projects (20-year deployment timeframe). For each timeframe, a summary table has been included that provides a brief project description, responsible agency, probable cost, an indication as to whether funding has been identified, and an estimated duration for the project to be designed and implemented. The agency identified as the responsible agency will be responsible for implementation, operations and maintenance unless otherwise noted. For example, TxDOT may provide funding for weigh-in-motion stations, but DPS will operate and maintain them.

Following each table, a more detailed description of individual projects is included. This section also includes the market packages associated with the project and any pre-requisite projects that are required.

3.1 Short-Term Projects (5-Year)

Table 6 provides a description of projects for the Childress Region in the 5-year timeframe. These projects represent the highest priority for the Region and should be strongly considered for implementation in the short-term. Immediately following **Table 6** are project descriptions for each of the short-term recommendations.

3.2 Mid-Term Projects (10-Year)

Table 7 provides a description of projects in the 10-year timeframe. Several of these projects are continuations of projects that will begin in the 5-year timeframe. These projects are important to the Region, but will need further review at the time of their deployment to ensure they are still a priority for the Region. Immediately following **Table 7** are project descriptions for each of the mid-term recommendations.

3.3 Long-Term Projects (20-Year)

Table 8 provides a description of projects in the 20-year timeframe. While these projects represent market packages and anticipated future needs identified for the Region, they will need to be closely reviewed prior to implementation. It is expected that a major update to the Region's ITS Deployment Plan will occur prior to year 10 which would allow stakeholders to reassess these long-term projects to be sure that they are still feasible for the Region. Immediately following **Table 8** are project descriptions for each of the long-term recommendations.

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

Program Area/Project	Description	Responsible Agency*	Probable Cost**	Funding Identified	Estimated Project Duration
Travel and Traffic Management					
TxDOT Childress District TMC	Implement a Transportation Management Center (TMC) at the Childress District Office	TxDOT	$100,000	No	1 year
TxDOT ATMS Implementation	Implement TxDOT's Advanced Traffic Management System (ATMS) at the TxDOT Childress District TMC	TxDOT	N/A	No (statewide initiative)	6 months
TxDOT Childress ITS Implementation Phase 1	Implement closed-circuit television (CCTV) cameras, Dynamic Message Signs (DMS), and Highway Advisory Radio (HAR) installations in the Childress Region	TxDOT	$1,800,000	No	2 years
TxDOT Childress Portable DMS	Procure additional portable DMS for use throughout the Childress District	TxDOT	$80,000	No	1 year
TxDOT Childress Rest Area Traveler Information	Integrate real-time weather and road condition information with traveler information at rest area kiosks; procure an additional kiosk for Childress Welcome Center	TxDOT	$100,000	No	6 months
TxDOT Center-to-Center Communications	Enhance coordination with other TxDOT Districts through implementation of center-to-center communications between TxDOT TMCs	TxDOT	N/A	Yes (statewide initiative)	1 year
TxDOT Childress Flood Detection Stations	Implement flood detection at various locations in the Childress Region	TxDOT	$100,000	No	1 year
TxDOT Childress District Web Page	Enhance current web-based information with Childress-specific traffic and travel condition information	TxDOT	$40,000	No	1 year
Emergency Management					
Regional Emergency Operations Center (EOC) Enhancements	Implement an enhanced Childress Region emergency operations center at DPS/Forest Service facility.	DPS/Forest Service	$100,000 (cost does not apply to ITS program)	No	2 years

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

Program Area/Project	Description	Responsible Agency*	Probable Cost**	Funding Identified	Estimated Project Duration
Emergency Management (continued)					
TxDOT Childress TMC to Regional EOC Connection	Install fiber connection from TxDOT TMC to Regional EOC to allow for weather sensor data sharing, CCTV and DMS shared monitoring (Approximately two miles of fiber and conduit)	Childress Region EOC and TxDOT	$200,000	No	6 months
DPS Childress Computer Aided Dispatch System	Implement a Computer-Aided Dispatch (CAD) system for DPS in the Childress Region	DPS	$500,000	Would need to be statewide	2 years
Emergency Vehicle Traffic Signal Preemption	Equip existing traffic signals with preemption capability, and equip fire and emergency vehicles with transponders.	TxDOT/EMS	$100,000	No	1 year
Maintenance and Construction Management					
TxDOT Childress Highway Condition Reporting System (HCRS) Enhancements	Statewide effort to enhance HCRS	TxDOT	N/A	Yes (statewide initiative)	1 year
TxDOT Childress RWIS Phase 1	Implement Road Weather Information System (RWIS) sensors at various locations in the Childress Region	TxDOT	$100,000	No	1 year
Public Transportation Management					
Sharp Lines Transit Operations Center with Computer Aided Dispatch	Expand on Sharp Lines brokerage project to implement a Transit Operations Center and CAD hardware and software to support demand-response transit services in the Region	Rolling Plains Management Corp.	$200,000	No	6 months
Sharp Lines Automatic Vehicle Location System	Implement AVL on Sharp Lines demand-response vehicles to provide vehicle location and status information to the Sharp Lines Transit Operations Center (33 vehicles)	Rolling Plains Management Corp.	$250,000	No	6 months
Panhandle Community Services Automatic Vehicle Location System	Install AVL on Panhandle transit vehicles in the Childress Region to provide vehicle location and status information	Panhandle Community Services	To be determined ($7,500/veh)	No	6 months

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

Program Area/Project	Description	Responsible Agency*	Probable Cost**	Funding Identified	Estimated Project Duration
Commercial Vehicle Operations					
HAZMAT Notification System	Implement an automated HAZMAT notification system for HAZMAT cargo carriers in the Childress Region	DPS/Commercial Vehicle Operators	To be determined	No	To be determined
Agency listed is responsible for implementation, operations, and maintenance unless otherwise noted. **Probable Cost is not an estimate because no design work has been done.					

Travel and Traffic Management

TxDOT Childress District TMC

Associated Market Packages:

- Network Surveillance (ATMS01)
- Surface Street Control (ATMS03)
- Traffic Information Dissemination (ATMS06)
- Regional Traffic Control and Coordination (ATMS07)
- Incident Management System (ATMS08)
- Road Weather Data Collection (MC03)
- Weather Information Processing and Distribution (MC04)
- Winter Maintenance (MC06)
- Work Zone Management (MC08)
- Maintenance and Construction Activity Coordination (MC10)
- Broadcast Traveler Information (ATIS1)
- Emergency Routing (EM2)

Prerequisite Projects: None

Description: Implement a Traffic Management Center at the TxDOT Childress District Office. This TMC will serve as the hub of regional traffic and weather management activities. The TMC will include a workstation, video monitors, and will house the central systems and ATMS software that manage and receive data from field devices. Video images from the CCTV cameras could be viewed by TMC operators, and a video switch at the TMC could enable video images to be linked to the Childress web site. Additional workstations could be added at the TMC to provide for additional operator stations, or to serve as 'command center' workstations during major incidents on highways in the Region.

Childress TxDOT staff indicated that there was sufficient space at the District Office to house the TMC, and with some retrofitting of existing office space, it would provide a suitable location for the Childress TMC. Costs were estimated based on minor retrofitting needs, and also accounts for TMC hardware that might not be included as part of the ATMS or Phase 1 ITS implementations in the Childress Region.

TxDOT ATMS Implementation

Associated Market Packages:

- Network Surveillance (ATMS01)
- Traffic Information Dissemination (ATMS06)
- Regional Traffic Control (ATMS07)
- Incident Management System (ATMS08)
- Road Weather Data Collection (MC03)
- Weather Information Processing and Distribution (MC04)
- Work Zone Management (MC08)
- Broadcast Traveler Information (ATIS1)
- Emergency Routing (EM2)
- ITS Data Mart (AD1)

Prerequisite Projects: TxDOT Childress District TMC

Description: The TxDOT ATMS is a software and hardware based platform developed by TxDOT staff in the Austin Headquarters. ATMS is being implemented in several TxDOT Districts, although Childress is not currently on the near-term implementation schedule.

The function of this software is to provide a platform for the operations and integration of various subsystems. The high level functions of the TxDOT ATMS include:

- Collect traffic information (e.g., speed, incidents, lane closures) through a variety of collection methods such a loops, video detection, user entry, etc.;
- Data archiving;
- Graphical map with traffic information;
- Status information, command and control for dynamic message signs, CCTV and other freeway management system components;
- Video switching; and
- User ID/password provided with each transaction for tracking use and establishing device control authority.

Future development efforts include software modules to provide status information and command/control of HAR and environmental sensors (i.e., RWIS). Of particular importance to the Childress Region are the ATMS capabilities for DMS, CCTV and future capability for RWIS. An integrated maintenance database management module is also under development. Lastly, several modules are currently being upgraded to support recently approved NTCIP standards for CCTV, Center to Center Communications, and data collection devices

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

TxDOT Childress ITS Implementation Phase 1

Associated Market Packages:

- Network Surveillance (ATMS01)
- Traffic Information Dissemination (ATMS06)
- Regional Traffic Control and Coordination (ATMS07)
- Incident Management System (ATMS08)
- Broadcast Traveler Information (ATIS1)

Prerequisite Projects: TxDOT Childress TMC

Description: Phase 1 of the TxDOT ITS program in Childress will build on the TMC implementation and ATMS software installation, although ATMS implementation is not critical to installing some of the components identified in Phase 1. This phase includes field elements to support enhanced traffic management, traveler information and incident management on highways in the Region. The project will also install the communication infrastructure necessary to integrate the field devices with the ATMS at the Childress TMC. It is important to note that Phase 1 infrastructure does not denote a collective deployment; that is, if TxDOT Childress has an opportunity to fund and install highway advisory radio prior to funding dynamic message signs, TxDOT should pursue the near-term opportunities.

This initial phase of the TxDOT Childress ITS will implement foundation technologies, including:

- CCTV cameras at key locations (such as bridges, major interchanges/intersections or junctions) to verify conditions, incidents, or DMS message displays. Each camera will also be equipped with pan/tilt and zoom capabilities (zoom lenses provide a viewing range of 1 to 1.5 miles). Full-duplex communications to all cameras will be accommodated through ISDN dial-up telephone lines.
- Permanent dynamic message signs that can be programmed via dial-up connection to display important advisory information to motorists about closures, restrictions, incidents, severe weather, detours, and other pertinent details affecting highways in the Childress Region or in an adjacent Region.
- Highway advisory radio transmitters to broadcast travel information to motorists via an AM or FM band.

TxDOT Childress Portable DMS

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Work Zone Management (MC08)

Prerequisite Projects: None

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

vehicle. Programming is typically done manually at the sign. The TxDOT Childress Region currently has six portable DMS that are used throughout the Region. Four additional portable DMS are recommended for use by TxDOT maintenance staff.

TxDOT Childress Rest Area Traveler Information

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Weather Information Processing and Distribution (MC04)
- Interactive Traveler Information (ATIS2)

Prerequisite Projects: TxDOT Childress Web Page

Description: There are limited travel information resources currently available in the Childress Region. Rest areas along key highways offer an opportunity to provide static as well as real-time information about travel conditions and weather in the Region. Two kiosk consoles have been installed at rest areas in the Childress Region (US287 near Quanah), and the kiosks currently provide access to traveler services and directional information. Wireless internet is used. There is a need to connect these kiosks to real-time conditions, closures, and weather information. This would include information about closures and restrictions in the Region, traveler advisories and other information. RWIS data (once detector stations are deployed and integrated) also could be made available. Additional weather data, such as from the National Weather Service, could be accessible via a link. The TexBox pilot kiosk project has installed two kiosks on I-40 in the Amarillo Region, and these kiosks provide more detailed information available from the TxDOT web page. This pilot kiosk project could be applicable to rest areas or welcome centers in Childress.

TxDOT Childress expressed a need to have an additional traveler information center in Childress which could include both static information as well as an additional kiosk with links to the web-based data. While this information center would not be considered ITS and costs for the center are not included as part of the deployment plan, the kiosk and interface to TxDOT information would be operated and maintained by TxDOT.

TxDOT Center-to-Center Communications

Associated Market Packages:

- Regional Traffic Control (ATMS07)
- Incident Management System (ATMS08)
- Weather Information Processing and Distribution (MC04)
- Work Zone Management (MC08)
- Maintenance and Construction Activity Coordination (MC10)

Prerequisite Projects: TxDOT Childress District TMC, TxDOT ATMS Implementation

Description: The Center-to-Center (C2C) Communications project will enhance coordination with TxDOT Districts (and potentially other agencies) through connection to the statewide C2C core infrastructure. A communication backbone must be developed with sufficient capacity between the

TxDOT Childress TMC and existing C2C infrastructure. Determination of whether the backbone should be TxDOT owned, leased, or a combination thereof will need to be determined. The software required to support C2C communications is integral with the TxDOT developed ATMS, so significant software development efforts are not anticipated. Resources will be required to oversee installation of the communications backbone and integration of existing software between the TxDOT Childress TMC and statewide C2C facilities. As part of connecting to the statewide C2C infrastructure, the Childress District will provide data to the statewide web server and statewide data archiving database. In return, access to information from other TxDOT Districts (and potentially other agencies) will be available to enhance operations throughout the Region.

TxDOT Childress Flood Detection Stations

Associated Market Packages:

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

Prerequisite Projects: None

Description: Implement flood detection systems on flood-prone segments of Interstates, state routes, and potentially other corridors in the Childress Region. This will enable faster response times by maintenance crews to close flooded or near flooded roadway segments as necessary. The typical flood detection station is composed of a stream gauge and a rain gauge, but also could include a temperature sensor, a wind speed sensor, and a wind direction sensor and remote communications support. Other upgrades that could support operational decision making include sensors to measure relative humidity, soil moisture content, solar radiation, and air and water quality. The flood detection systems can be stand-alone devices or can be configured to be monitored from the TxDOT Childress District TMC. Communications between the flood detection stations and the TMC can be achieved through a variety of wireless and wireline telemetry methods. Wireless communications will support portable detection stations so that TxDOT can locate flood detection stations based on need. There is a future module of the ATMS software planned to support environmental sensors (i.e., RWIS), and development of this module could be extended to include the needs of flood detection stations.

Costs for this project will vary based on the number of locations and detection stations installed, as well as communications. For planning purposes, four flood detection stations at $25,000 each (including communications) was used.

TxDOT Childress District Web Page

Associated Market Packages:

- Broadcast Traveler Information (ATIS1)
- Interactive Traveler Information (ATIS2)
- Incident Management System (AMTS08)
- Weather Information Processing and Distribution (MC04)
- Work Zone Management (MC08)

Prerequisite Projects: None

Description: TxDOT Childress plans to implement a web page that will serve as a traveler information tool for motorists in the Region. This web page will be an enhanced version of what Childress-area information is currently available via the statewide TxDOT web page (www.dot.state.tx.us/chs/), and is envisioned to include current closures and restrictions, maintenance activities, hazards, real-time weather and pavement conditions, weather emergencies impacting travel, and motorist alerts and advisories. Additional content and links could include information about traveler services in towns and cities in the District, or links to Chambers of Commerce. Information on major corridors in neighboring regions (Amarillo, Wichita Falls) as well as Oklahoma also could be included. The web page will be managed and updated by the Public Information Officer in the TxDOT Childress District Office.

Emergency Management

Regional Emergency Operations Center (EOC) Enhancements

Associated Market Packages:

- Incident Management System (ATMS08)
- HAZMAT Management (CVO10)
- Emergency Response (EM1)

Prerequisite Projects: None

Description: The Department of Public Safety serves as the EOC for the Childress Region; major incidents involving traffic and roadways, as well as major weather hazards, fall under command of DPS, which then coordinates the response of multiple agencies. Presently, the Forest Service is located in an adjacent facility; the Forest Service is an incident response agency in the Region, and coordinates with and through DPS for major fires, floods and other emergencies.

Enhancements to the current DPS facility should include communications, and monitors/workstations to enable viewing of TxDOT CCTV cameras. There are likely several enhancements, including technology-based and policy-based initiatives that will be implemented as a result of homeland security measures and new programs through the Texas Department of Emergency Management, which is a division of the Department of Public Safety. These improvements are anticipated to be funded through homeland security and emergency management funding programs.

TxDOT Childress TMC to Regional EOC Connection

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Incident Management System (ATMS08)
- Emergency Response (EM1)
- Emergency Routing (EM2)

Prerequisite Projects: TxDOT Childress District TMC, Regional Emergency Operations Center (EOC) Enhancements

Description: Implement a fiber connection between the TxDOT Childress TMC and the DPS/EOC to allow shared viewing of video, traffic information, and other mutually beneficial data. Shared monitoring and control capabilities provided through the connection could also allow for joint operations of equipment (i.e., traffic signals, DMS) by DPS staff. Data/video sharing and other joint operation policies need to be developed and agreed upon between TxDOT and DPS, preferably before final design of the systems begins, because some policies may have a direct impact on design strategies.

DPS Childress Computer Aided Dispatch System

Associated Market Packages:

- Incident Management System (ATMS08)
- Emergency Response (EM1)
- Emergency Routing (EM2)

Prerequisite Projects: None

Description: Implement a CAD system for dispatch of DPS vehicles in the Childress Region. Because DPS is a state agency, a CAD system would need to be a statewide initiative. When emergency calls come in through 911 or another agency, dispatchers would create an incident entry in the CAD system, including the incident location, type/nature of the incident, and generate an appropriate dispatch. The CAD system would be able to maintain records of all communications and responses between the dispatch center and the responding officer(s), and in effect, 'track' the incident from beginning to end.

Based on specifications that would need to be created by DPS, there can be functions built in to the CAD to prioritize incidents (or assign priority) based on the type, severity, and other factors. A centralized, automated CAD system will allow DPS to manage multiple incidents, and could potentially interface with other agencies that would need to be contacted with incident details. During a major event that requires a multi-agency response, all involved agencies in the Childress Region would be able to work from the same incident data and immediately know what resources have been committed. The records management function of a CAD system allows for all of the incident details to be stored in a consistent format, clearly identifies the dispatcher, responding officer(s), other agencies involved, duration of the incident, actions taken, and other pertinent details.

Emergency Vehicle Traffic Signal Preemption

Associated Market Packages:

- Surface Street Control (ATMS03)
- Emergency Routing (EM2)

Prerequisite Projects: None

Description: Equip 12 signals in the Childress Region with preemption capability. Typical installations include mounting hardware at the intersection and on each vehicle authorized to preempt the signal. The intersection equipment includes a detector(s) positioned at the intersection approach(es) connected to the traffic signal controller. As a vehicle equipped with a preemption emitter approaches an intersection, the detector activates a change in signal timing to allow fast and safe passage. Preemption systems have proven to improve safety of emergency personnel and vehicles en-route to an incident. Childress stakeholders agreed that fire and ambulance would be the only vehicles authorized for preemption. TxDOT will have responsibility for implementing and maintaining preemption sensors on traffic signals, and fire and emergency services will be responsible for installing the on-board units.

Maintenance and Construction Management

TxDOT Childress Highway Condition Reporting System (HCRS) Enhancements

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Incident Management System (ATMS08)
- Weather Information Processing and Distribution (MC04)
- Work Zone Management (MC08)
- Maintenance and Construction Activity Coordination (MC010)
- Broadcast Traveler Information (ATIS1)

Prerequisite Projects: None

Description: TxDOT's HCRS will be enhanced on a statewide basis. The HCRS will use data from the Childress TMC, including dynamic automated data (from the ATMS) as well as information that is manually entered. It is envisioned the ATMS software will enhance the data collection and consolidation processes for automated information. This is a statewide effort; Childress will be affected by this project, and will contribute information to the HCRS, but will not be responsible for funding the enhancements or for the implementation schedule.

TxDOT Childress RWIS Phase 1

Associated Market Packages:

- Network Surveillance (ATMS01)
- Road Weather Data Collection (MC03)
- Weather Information Processing and Distribution (MC04)
- Roadway Automated Treatment (MC05)
- Winter Maintenance (MC06)

Prerequisite Projects: None

Description: Road Weather Information Systems (RWIS) provide real-time weather and pavement condition information to improve response time, enhance winter maintenance functions and activities, and minimize the traveling public's exposure to hazardous weather related roadway conditions. Data including temperature (atmospheric and pavement), precipitation, wind, humidity, visibility (white out/heavy fog) and even pavement surface conditions (i.e., ice, snow, chemical) are collected by sensors placed at the roadside (typically on a 30 foot tower) and embedded in the roadway. Remote processing units placed along the roadway communicate with various types of road and weather sensors. Data from the RPU are transmitted to the central ATMS server, via dial-up modem or other low bandwidth telecommunication methods, which will be located at the TxDOT Childress TMC (Note: RWIS data can be gathered via a vendor-supplied program without having to implement ATMS, but a future module of ATMS will include RWIS capability). Archived RWIS information also provides valuable historic information for planning purposes.

In most installations, RWIS devices are installed at problem areas where rapidly changing weather has a direct, negative impact on travel conditions, such as bridges. Pavement sensors are installed in the bridge deck and approach. The variation in pavement temperatures can allow maintenance engineers to better determine appropriate pavement treatments (e.g., salt, bridge deck pre-wetting, other chemicals, etc.) and more efficiently schedule personnel/equipment based on current and forecast weather conditions. More sophisticated RWIS stations are equipped with integrated cameras to transmit snapshots or streaming video to a central control facility. In the event that streaming video is a functional requirement, a telecommunications solution supporting higher bandwidth than standard telephone dial-up is required. RWIS data also can be included as part of web or phone-based travel information systems, as well as broadcast to motorists via HAR or commercial radio broadcasts (through an Information Service Provider).

Costs will vary depending on the number of RWIS stations deployed. For planning purposes, four RWIS stations at $25,000 each (including communications) was used.

Public Transportation Management

Sharp Lines Transit Operations Center with Computer Aided Dispatch

Associated Market Packages:

- Transit Vehicle Tracking (APTS1)
- Demand-Response Transit Operations (APTS3)
- Transit Traveler Information System (APTS8)

Prerequisite Projects: None

Description: Implement a centralized transit management and operations center for Sharp Lines (Rolling Plains Management Corporation), which is a demand-response transit service in the Childress Region and neighboring Wichita Falls Region. A centralized transit management center will serve as the hub for transit operations, dispatch, transit travel information (including customer call center) and other functions. Upgrading to computer-aided dispatch (CAD) will streamline communications between dispatchers and drivers. Used in conjunction with automatic vehicle location (AVL), dispatchers can assess vehicle locations, status, route adherence, as well as communicate with one or several vehicles that are in the field. A CAD system also improves the system reporting functions, by automatically logging all communications between the dispatch center and the driver, including time, vehicle/driver, nature of the communication, and response.

Sharp Lines Automatic Vehicle Location System

Associated Market Packages:

- Transit Vehicle Tracking (APTS1)
- Demand-Response Transit Operations (APTS3)
- Transit Traveler Information System (APTS8)

Prerequisite Projects: None

Description: Install AVL units on 33 Sharp Lines (Rolling Plains Management Corporation) paratransit vehicles and implement AVL software at the Sharp Lines dispatch center or transit operations center. The AVL system will convey information regarding real-time vehicle location to the Transit Operations Center, which will allow for enhanced system monitoring, scheduling, routing (or re-routing), as well as provide for precise bus location information in the event of a breakdown or emergency situation. AVL systems relay information back to a transit operations center, usually via global positioning system. Used with a geographic information system (GIS) map, bus locations can be displayed for any vehicles in the fleet equipped with the on-board AVL unit. AVL, in conjunction with Computer Aided Dispatch, allows for improved bus tracking capability, as well as archiving and managing historical data. AVL systems also can be equipped with additional features, including tie-ins to alarm/security systems, vehicle component monitoring, and automatic passenger counter and fare payment systems. Information from the AVL/CAD system can be used by transit managers for real-time operations and management as well as for transit traveler information. These functions are particularly desirable for the Sharp Lines transit operations, due to the large, rural geographic area that is covered by Sharp Lines, as well as the demand-response nature of the transportation services provided. In areas where AVL technology has

been installed on buses, agencies report a 5-25 percent increase in on-time performance, which translates directly to improved efficiency and operations.

Cost will vary depending on the number of vehicles equipped with AVL systems, as well as the functions and features designed into the systems (above the basic location and digital communication functions). For planning purposes, 33 vehicles were used at $10,000 per vehicle. This cost estimate includes cost for on-board AVL units as well as for central system procurement and development. Central system costs will vary based on the amount of software development or customization required.

Panhandle Community Services Transit Automatic Vehicle Location System

Associated Market Packages:

- Transit Vehicle Tracking (APTS1)
- Demand-Response Transit Operations (APTS3)
- Transit Traveler Information (APTS8)

Prerequisite Projects: None

Description: Install AVL units on Panhandle Community Services vehicles. The AVL system will convey information regarding real-time vehicle location to the Panhandle Transit Operations Center, which will allow for enhanced system monitoring, scheduling, routing (or re-routing), as well as provide for precise bus location information in the event of a breakdown or emergency situation. AVL systems measure actual, real-time position of transit vehicles, and relay that information back to a transit operations center, usually via global positioning system. Used with a GIS map, bus locations can be displayed for any vehicles in the fleet equipped with the on-board AVL unit. AVL, in conjunction with Computer Aided Dispatch, allows for improved bus tracking capability, as well as archiving and managing historical data. AVL systems also can be equipped with additional features, including tie-ins to alarm/security systems, vehicle component monitoring, and automatic passenger counter and fare payment systems. Information from the AVL/CAD system can be used by transit managers for real-time operations and management as well as for transit traveler information. These functions are particularly desirable for the Panhandle Community Services transit operations, due to the large, rural geographic area that is covered by Panhandle, as well as the demand-response nature of the transportation services provided. In areas where AVL technology has been installed on buses, agencies report a 5-25 percent increase in on-time performance, which translates directly to improved efficiency and operations.

Cost will vary depending on the number of vehicles equipped with AVL systems, as well as the functions and features designed into the systems (above the basic location and digital communication functions).

Commercial Vehicle Operations

HAZMAT Notification System

Associated Market Packages:

▪ HAZMAT Management (CVO10)

Prerequisite Projects: None

Description: Implement an automated notification system for HAZMAT carriers. Permitting processes in Texas through the TxDOT Motor Carrier Division, and with the focus on HAZMAT cargo and transport as a result of heightened security measures, requires increased coordination for HAZMAT transport. This project would implement an automated system whereby HAZMAT motor carriers would be notified of any local permitting restrictions in the Childress Region. This would require collating information from TxDOT from the HCRS, as well as from DPS in Childress to provide carriers with approved routes, and notify them of any construction, closures or other restrictions. It is recommended that this be a two-way information exchange so that local authorities are made aware of HAZMAT cargo that will be routed through the Childress Region.

Table 7 – Mid-Term Projects (10-Year)

Program Area/Project	Description	Responsible Agency*	Probable Cost**	Funding Identified	Estimated Project Duration
Travel and Traffic Management					
TxDOT Childress ITS Implementation Phase 2	Implement additional CCTV cameras, DMS, vehicle detectors, and HARs in the Childress Region	TxDOT	$2,000,000	No	2 years
TxDOT Childress Area Office Remote TMC Workstations	Implement workstations at Childress District Area Offices for shared viewing of video and weather data	TxDOT	$30,000	No	1 year
Regional 511 Advanced Traveler Information System Server	Implement an ATIS Server in the TxDOT Childress TMC that will collect, consolidate and distribute travel information to 511 phone based system, and web	TxDOT (Austin)	N/A	No	1 year
TxDOT Childress Closed Loop Signal System Upgrade	Expand and upgrade closed-loop signal systems at select intersections in Childress Region, including VIVDS for traffic volume data. Upgrade controllers to include communication back to Childress TMC.	TxDOT	$200,000	No	2 years
TxDOT Childress TMC/Municipal Public Works Connection	Install connection from TxDOT TMC to City of Childress Public Works to allow for weather sensor data sharing, CCTV shared viewing, and incident information	TxDOT/City of Childress	$30,000	No	6 months
TxDOT Childress TMC/County Road and Bridge Connection	Install connection from TxDOT TMC to County Road and Bridge offices to allow for weather sensor data sharing, CCTV shared viewing, and incident information	TxDOT/Counties	$30,000	No	6 months
Interstate TMC Coordination	Implement communications link and information sharing between TxDOT Childress TMC and Oklahoma DOT	TxDOT/ODOT	$30,000	No	6 months
Railroad Crossing Upgrades	Upgrade of railroad crossings, including vehicle detection and advanced train arrival notification system	TxDOT	$150,000	No	1 year
TxDOT Childress Portable Traffic Detection	Procure portable traffic detectors to supplement VIVDs in Childress Region	TxDOT	$25,000	No	6 months

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

Program Area/Project	Description	Responsible Agency*	Probable Cost**	Funding Identified	Estimated Project Duration
Emergency Management					
Emergency Vehicle AVL	Procure and implement automatic vehicle location systems for fire and ambulance vehicles in the Childress Region	Local Fire and EMS	To be determined	No	6 months
TxDOT Childress TMC/City of Childress Police Department Connection	Provide link from TxDOT Childress TMC to Childress Police Department for shared viewing of video, road condition information, weather and incident information	TxDOT/City of Childress PD	$30,000	No	6 months
TxDOT Childress TMC/County EOC Connection	Provide link from TxDOT Childress TMC to County EOC for shared viewing of video, road condition information, weather and incident information	TxDOT/County EOC	$30,000	No	6 months
Maintenance and Construction Management					
TxDOT Childress Portable Smart Work Zones	Procure smart work zones for use by TxDOT maintenance crews, including speed zone trailers, portable CCTV, portable DMS	TxDOT	$200,000	No	1 year
TxDOT Childress Winter Maintenance Decision Support System	Implement a winter maintenance support system, including enhanced coordination among TxDOT and other agencies for winter weather and road conditions, links between TxDOT Childress TMC and Area Maintenance Offices	TxDOT	$200,000	No	2 years
TxDOT Childress Automated Anti-icing Treatment	Install automatic anti-icing systems at selected areas	TxDOT	$300,000	No	2 years
Public Transportation Management					
Sharp Lines Transit Security Cameras and Alarms	Install on-board cameras for surveillance and on-board alarms on all Sharp Lines transit vehicles (33 vehicles)	Rolling Plains Management Corp.	$330,000	No	6 months
Panhandle Community Transit Security Cameras and Alarms	Install on-board cameras for surveillance and on-board alarms on all Panhandle transit vehicles	Panhandle Community Services	To be determined	No	6 months
Rolling Plains Transit Traveler Information System	Develop a web page for transit information and expand Rolling Plains brokerage project call center capabilities	Rolling Plains Management Corp.	$50,000	No	1 year

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

Program Area/Project	Description	Responsible Agency*	Probable Cost**	Funding Identified	Estimated Project Duration
Information Management					
TxDOT Childress Traffic Count Archive	Implement an archived data system for traffic counts in the Childress District	TxDOT	$30,000	No	1 year
Commercial Vehicle Operations					
TxDOT Childress Weigh-in-Motion (WIM) Site Implementation	Install weigh-in-motion sites on key routes in the Region (project initiated through Transportation Planning and Programming)	Implementation: TxDOT Operations: DPS	To be determined ($30,000-$50,000 per site)	No	1 year
Agency listed is responsible for implementation, operations, and maintenance unless otherwise noted.					
**Probable Cost is not an estimate because no design work has been done.*					

Travel and Traffic Management

TxDOT Childress ITS Implementation Phase 2

Associated Market Packages:

- Network Surveillance (ATMS01)
- Traffic Information Dissemination (ATMS06)
- Regional Traffic Control and Coordination (ATMS07)
- Incident Management System (ATMS08)
- Broadcast Traveler Information (ATIS1)

Prerequisite Projects: TxDOT Childress ITS Implementation Phase 1

Description: Phase 2 of the TxDOT ITS will implement additional CCTV cameras and DMS, as well as vehicle detection and highway advisory radio (HAR) transmitters in the Childress Region. HAR will allow operators at the Childress TMC to record travel advisory messages related to traffic, incidents, and weather for transmission at the roadside to vehicles traveling in the vicinity of the HAR transmitter. The estimated cost for Phase 2 Implementation is $2,000,000.

TxDOT Childress Area Office Remote TMC Workstations

Associated Market Packages:

- Weather Information Processing and Distribution (MC04)
- Winter Maintenance (MC06)
- Work Zone Management (MC08)
- Maintenance and Construction Activity Coordination (MC10)

Prerequisite Projects: TxDOT Childress District TMC, TxDOT ATMS Implementation

Description: Implement workstations at Area Offices in the Childress District for shared viewing of video and weather data. This will allow Area Offices to better anticipate weather related roadway problems and monitor weather sensors and traffic operations in their area. Equipping these workstations with HCRS and links to the ATMS at the Childress District Office will facilitate information sharing among these Area Office and District Office. The estimated cost for this project to equip three area offices is $30,000.

Regional 511 Advanced Traveler Information System Server

Associated Market Packages:

- Broadcast Traveler Information (ATIS1)
- Interactive Traveler Information (ATIS2)

Prerequisite Projects: TxDOT Center-to-Center Communications, TxDOT Highway Condition Reporting System (HCRS) Enhancements

Description: Install a server dedicated to ATIS in the TxDOT Childress TMC. This server would be installed as part of a 511 rollout in Texas and would provide a gateway for public and private entities to access current conditions, closures, restrictions, weather, and other valuable travel information. Relevant data from the ATMS and HCRS would be sent to the ATIS server where it would be consolidated and 'packaged' for distribution via phone (511) and web and also to private partners who desire access to information in the Childress Region. These private partners could include local media and information service providers, which would link to the ATIS server to download information or obtain real-time feeds, depending on the link provided by the private partner. Appropriate security measures and firewalls could be designed into the server to allow or restrict access to registered, authorized users. By fusing various types of data from a variety of sources (traffic management, incident management, and others), this data can be converted to usable information for travelers as well as other agencies.

TxDOT Childress Closed Loop Signal System Upgrade

Associated Market Packages:

- Surface Street Control (ATMS03)
- Regional Traffic Control (ATMS07)

Prerequisite Projects: None.

Description: Upgrade and expand the closed loop signal system by converting existing signalized intersections to the closed-loop signal system. There are currently 12 traffic signals in the Childress Region, and there is a need to coordinate those in Childress, Donley County and in Clarendon. As part of this signal upgrade, it is recommended that the signals in Childress be interconnected. New signals that are installed as part of other projects will become part of the closed loop signal system. These signal upgrades also involve the installation of VIVDS for traffic volume data collection and an upgrade of the existing controllers.

TxDOT Childress TMC/Municipal Public Works Connection

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Weather Information Processing and Distribution (MC04)
- Maintenance and Construction Activity Coordination (MC10)

Prerequisite Projects: TxDOT Childress District TMC, TxDOT ATMS

Description: Establish a telecommunications connection from the Public Works Department to the TxDOT Childress District TMC to share weather sensor, CCTV data and images as well as to help coordinate maintenance or construction schedules. The connection will also provide information on current road conditions, and planned maintenance activities.

TxDOT Childress TMC/County Road and Bridge Connection

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Incident Management System (ATMS08)
- Weather Information Processing and Distribution (MC04)
- Maintenance and Construction Activity Coordination (MC10)

Prerequisite Projects: TxDOT Childress District TMC, TxDOT ATMS

Description: Establish a telecommunications connection from the County Road and Bridge offices to the TxDOT Childress District TMC to share weather sensor, CCTV data and images, as well as to help coordinate maintenance and construction schedules. The connection will also provide information on current road conditions, and planned maintenance activities.

Interstate TMC Coordination

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Regional Traffic Control (ATMS07)
- Incident Management System (ATMS08)
- Weather Information Processing and Distribution (MC04)

Prerequisite Projects: TxDOT Childress District TMC, TxDOT ATMS

Description: Establish a communications connection from the TxDOT Childress TMC to the Oklahoma DOT to share information. The connection could provide information including current road conditions, closures or restrictions in Texas that could assist with incident/emergency management or incident information. This information could be utilized to manage an incident near the state lines. Connections between the Childress TMC and Oklahoma TMC are recommended to be leased lines.

Railroad Crossing Upgrades

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Standard Railroad Grade Crossing (ATMS13)
- Railroad Operations Coordination (ATMS15)

Prerequisite Projects: None

Description: Upgrade select railroad crossings in the Childress Region to provide improved safety and traveler information. The proposed improvements include a variety of traffic signal coordination modifications (including possible installation of VIVDS), gate enhancements/trapped vehicle alarm systems, and dynamic estimated time of arrival/departure signs. It is anticipated that TxDOT and local law enforcement would receive a notice when the trapped vehicle alarm has been activated. The estimated cost for this project is $150,000.

TxDOT Childress Portable Traffic Detection

Associated Market Packages:

- Network Surveillance (ATMS01)
- Surface Street Control (ATMS03)
- Work Zone Management (MC08)

Prerequisite Projects: None

Description: Procure portable traffic detection devices for use in the Childress Region. These devices can be used to observe the flow of traffic during special events or to substitute for detection devices temporarily removed as part of a construction project or not installed yet. The estimated cost of this project is $25,000.

Emergency Management

Automatic Vehicle Location for Fire and EMS

Associated Market Packages:

- Incident Management System (ATMS08)
- Emergency Response (EM1)
- Emergency Routing (EM2)

Prerequisite Projects: None

Description: Install AVL on Fire and EMS vehicles. The AVL system will convey information regarding real-time vehicle location to an Emergency Dispatch Center, which will allow for enhanced system monitoring and routing (or re-routing), as well as provide for precise vehicle location information in the event of a breakdown or emergency situation. AVL systems measure actual, real-

time position of vehicles, and relay that information back to an emergency management center, usually via global positioning system. Used with a geographic information system (GIS) map, emergency vehicle locations can be displayed for any vehicles in the fleet equipped with an on-board AVL unit. AVL, in conjunction with Computer Aided Dispatch, allows for improved vehicle tracking capability, as well as archiving and managing historical data.

TxDOT Childress TMC/City of Childress Police Department Connection

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Incident Management System (ATMS08)
- Emergency Routing (EM2)

Prerequisite Projects: TxDOT Childress District TMC, TxDOT ATMS

Description: Establish a telecommunications connection from the Childress Police Department to the TxDOT Childress District TMC to share weather sensor and CCTV data and images. The connection will also provide information on current road conditions that could assist with incident/emergency management.

TxDOT Childress TMC/County EOC Connection

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Incident Management System (ATMS08)
- Weather Information Processing and Distribution (MC04)
- Emergency Response (EM1)
- Emergency Routing (EM2)

Prerequisite Projects: TxDOT Childress District TMC, TxDOT ATMS

Description: Establish a telecommunications connection from the County EOC to the TxDOT Childress District TMC to share weather sensor, CCTV and DMS data. The connection will also provide information on current road conditions that could assist with incident/emergency management and evacuation routing.

Maintenance and Construction Management

TxDOT Childress Portable Smart Work Zones

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Incident Management System (ATMS08)
- Work Zone Management (MC08)
- Work Zone Safety Monitoring (MC09)
- Maintenance and Construction Activity Coordination (MC10)

Prerequisite Projects: None

Description: Procure smart work zones for use by TxDOT maintenance crews. A smart work zone is comprised of portable speed trailers, portable CCTV and portable DMS to monitor work zones and provide related information to the traveling public. In addition to being useful for work zone management, the smart work zone components, such as DMS or CCTV, could also have valuable application to managing a large, unplanned incidents and emergencies.

TxDOT Childress Winter Maintenance Decision Support System

Associated Market Packages:

- Road Weather Data Collection (MC03)
- Weather Information Processing and Distribution (MC04)
- Roadway Automated Treatment (MC05)
- Winter Maintenance (MC06)

Prerequisite Projects: TxDOT ATMS Implementation, TxDOT Childress RWIS Phase 1, TxDOT Childress Area Office Remote TMC Workstations

Description: Implement decision support system which would allow TxDOT Childress District maintenance personnel access to predicted weather conditions and information on the potential for deteriorating road conditions, as well as provide tools to predict weather impacts on road conditions, plan treatment scenarios treatment recommendations. This system is meant to provide the appropriate information to the appropriate personnel so that they can make proactive winter maintenance decisions. The Federal Highway Administration has developed a prototype of such a system, but it must be implemented on a state and/or regional level. This system would need to have connections between the TMC and Area maintenance offices for collection and dissemination of weather related information. It would integrate weather related projects for the Region including RWIS stations and automated anti-icing treatment locations.

TxDOT Childress Automated Anti-icing Treatment

Associated Market Packages:

- Road Weather Data Collection (MC03)
- Weather Information Processing and Distribution (MC04)
- Roadway Automated Treatment (MC05)
- Winter Maintenance (MC06)

Prerequisite Projects: TxDOT RWIS Phase 1

Description: Implement anti-icing equipment at selected locations within the Childress Region. Anti-icing is a snow and ice control practice that attempts to prevent the formation or development of snow and ice that becomes bonded to the roadway by utilizing timely applications of a freezing point depressant.

Anti-icing involves applying a liquid chemical de-icing agent directly onto the surface before the temperature and humidity levels permit an ice bond to occur. This technique requires that chemical de-icing agents be applied in a timely and accurate manner. Permanent auto anti-icing systems must be activated by some means, and the level of service is directly impacted by the method that is used to activate the system. To achieve full autonomous operation (non-human intervention), the anti-icing system must be controlled by input from a road weather information system that measures atmospheric and pavement surface conditions, accurately measures the freeze point of the moisture/chemical solution on the road surface and in turn activates the permanent automated anti-icing system when icing conditions are imminent.

Automated anti-icing systems can be installed as part of a bridge re-decking project where equipment is integrated into overall construction. Alternatively, anti-icing systems can be retrofit to existing bridges. Other features that have been included in anti-icing systems are:

- Integration of DMS in advance of locations to warn motorists of operating spray nozzles;
- CCTV to verify anti-icing operations and to monitor critical infrastructure; and
- Bridge structure monitoring (on bridges that may be forming hairline cracks).

Public Transportation Management

Sharp Lines Transit Security Cameras and Alarms

Associated Market Packages:

- Transit Security (APTS5)

Prerequisite Projects: None

Description: This project will install security cameras on Sharp Lines Transit vehicles. Cameras will be for on-board recording only, and are not envisioned to be monitored remotely. Video will be stored for a pre-determined amount of time via video tape or emerging digital video recording technology. While the main objective of on-board surveillance projects has been to identify individuals committing criminal acts or creating disturbances on buses, there have been noticeable maintenance benefits such as

a reduction of litter and debris. This project will also install alarm buttons on the buses. If the driver feels there is a threat on the bus, the bus has been involved in an accident, or any other situation occurs where the driver may need assistance, he or she can activate the alarm. The alarm notifies the dispatch center of the potential problem so that help can be dispatched.

Panhandle Community Transit Security Cameras and Alarms

Associated Market Packages:

- Transit Security (APTS5)

Prerequisite Projects: None

Description: This project will include the installation of security cameras on Panhandle Community Transit vehicles. Cameras will be for on-board recording only, and are not envisioned to be monitored remotely. Video will be stored for a pre-determined amount of time via video tape or emerging digital video recording technology. While the main objective of on-board surveillance projects has been to identify individuals committing criminal acts or creating disturbances on buses, there have been noticeable maintenance benefits such as a reduction of litter and debris. This project will also install alarm buttons on the buses. If the driver feels there is a threat on the bus, the bus has been involved in an accident, or any other situation occurs where the driver may need assistance, he or she can activate the alarm. The alarm notifies the dispatch center of the potential problem so that help can be dispatched.

Rolling Plains Transit Traveler Information System

Associated Market Packages:

- Demand-Response Transit Operations (APTS3)
- Transit Traveler Information (APTS8)
- Interactive Traveler Information (ATIS2)

Prerequisite Projects: None

Description: Provide up-to-date transit information for Rolling Plains Transit on the Internet and by phone. This project will implement web-based transit traveler information that can be accessed by patrons pre-trip to identify routes, schedules, status (delays, bus arrival times, etc. from AVL data), make reservation, and other pertinent information. An integrated transit traveler information system will make this information accessible from the Internet and via phone. This project will upgrade the capabilities of the current customer service call center.

Information Management

TxDOT Childress Traffic Count Archive

Associated Market Packages:

▪ ITS Data Mart (AD1)

Prerequisite Projects: None

Description: Implement an archived data system for traffic counts in the Childress District. A central archived data server will be developed at the TxDOT Childress District Office that will collect, process, store and provide access to historical traffic count data from throughout the district. Communications links will be necessary between TxDOT and the other data sources. This project will design the frequency, quantity, and quality of data to be collected and stored. Price will be very dependent on the amount of information that is desired and the functionality of the archival system. For planning purposes, the estimated cost to implement this system is approximately $30,000.

Commercial Vehicle Operations

TxDOT Weigh-in-Motion Site Implementation

Associated Market Packages:

▪ Weigh-in-Motion (CVO06)

Prerequisite Projects: None

Description: Implement at least one weigh-in-motion (WIM) site on routes throughout the Region. WIM sites can be located on the mainline for high speed WIM, or at pull out locations for low speed WIM. There are several types of WIM systems, including bending plate, piezo electric, and load cell. These systems typically cost between $10,000-$20,000, however a majority of the cost in deploying a WIM system is for the installation.

For mainline WIM, a smooth, straight approach prior to the scale is required to eliminate vehicle vibrations, which can greatly reduce the accuracy. In order to achieve the smooth surface, a new concrete pad is often installed prior to the WIM site. Pull out sites typically weigh trucks at slower speeds and do not require as significant construction as the main-line sites for installation, providing a pull out site is available. For estimation purposes, a cost of $50,000 per WIM site was used to account for equipment and installation costs. This project is being led by Transportation Planning and Programming out of TxDOT headquarters in Austin. It would be beneficial to identify other needed ITS components that could potentially be located near the WIM sets.

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

Program Area/Project	Description	Responsible Agency*	Probable Cost**	Funding Identified	Estimated Project Duration
Travel and Traffic Management					
TxDOT Childress ITS Implementation Phase 3	Implement/upgrade CCTV cameras, DMS, vehicle detectors, and HARs in the Childress Region as needed	TxDOT	$4,000,000	No	5 years
ISP-based Route Guidance Support	Provide direct support to ISP-based route guidance systems through sharing of traveler information	Public Agencies/Private Sector	Public: $100,000	No	1 year
Probe Surveillance	Implement systems to allow probe surveillance of vehicles along major route (I-40, US 287, US 83). Could include commercial vehicles, transit or school buses	TxDOT/Commercial Vehicle Operators/Transit/School District	$1,000,000	No	2 years
Maintenance and Construction Management					
TxDOT Childress RWIS Phase 2	Implement additional RWIS stations in Childress Region	TxDOT	$100,000	No	1 year
TxDOT Childress Maintenance Vehicle AVL	Implement AVL technology on TxDOT Childress maintenance vehicles (12 maintenance sections, 84 vehicles)	TxDOT	$630,000	No	2 years
TxDOT Childress Maintenance Vehicle Diagnostics	Implement on-board vehicle diagnostic systems on TxDOT Childress maintenance vehicles	TxDOT	To be determined	No	2 years
Municipal and County Maintenance Vehicle AVL	Implement AVL technology on municipal and county maintenance vehicles (3 City of Childress vehicles)	City of Childress/County Road Departments	To be determined ($7,500/veh)	No	2 years
Municipal and County Maintenance Vehicle Diagnostics	Implement on-board vehicle diagnostic systems on City of Childress and County Road department maintenance vehicles	City of Childress/County Road Departments	To be determined	No	2 years

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

Program Area/Project	Description	Responsible Agency*	Probable Cost**	Funding Identified	Estimated Project Duration
Public Transportation Management					
Childress Region Independent School Districts Bus AVL	Install AVL on all school buses in the Childress Region	Childress Region Independent School Districts	To be determined ($7,500/veh)	No	1 year
Childress Region Independent School Districts Bus Operations Management Center	Implement a centralized transit operations, dispatch and management center for Childress Region schools	Childress Region Independent School Districts	$200,000	No	2 years
Agency listed is responsible for implementation, operations, and maintenance unless otherwise noted.					
**Probable Cost is not an estimate because no design work has been done.					

Travel and Traffic Management

TxDOT Childress ITS Implementation Phase 3

Associated Market Packages:

- Network Surveillance (ATMS01)
- Traffic Information Dissemination (ATMS06)
- Regional Traffic Control and Coordination (ATMS07)
- Incident Management System (ATMS08)
- Broadcast Traveler Information (ATIS1)

Prerequisite Projects: TxDOT Childress ITS Implementation Phases 1 and 2

Description: Phase 3 of the TxDOT ITS Implementation will upgrade or implement additional CCTV cameras and DMS, as well as vehicle detection and highway advisory radio (HAR) transmitters in the Childress Region. HAR will allow operators at the Childress TMC to record travel advisory messages related to traffic, incidents, and weather for transmission at the roadside to vehicles traveling in the vicinity of the HAR transmitter. The estimated cost for Phase 3 Implementation is $4,000,000.

ISP-Based Route Guidance Support

Associated Market Packages:

- ISP-Based Route Guidance (ATIS6)

Prerequisite Projects: TxDOT Childress District TMC, TxDOT ATMS, TxDOT Childress ITS Implementation Phases 1 and 2

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

Probe Surveillance

Associated Market Packages:

- Network Surveillance (ATMS01)
- Probe Surveillance (ATMS02)

Prerequisite Projects: None

Description: Obtain travel condition information from vehicles equipped with GPS devices. Many new vehicles are being equipped with GPS based in-vehicle route guidance systems, and a public/private partnership should be developed, possibly in conjunction with the ISP-based Route Guidance Support project, to provide location, and travel direction/speed data to TxDOT to integrate into the ATMS. Commercial vehicles are good candidate probe vehicles for this project. Other potential probe vehicles could be transit or school buses. Software, and potentially hardware, enhancements will be required to integrate the probe information into the existing platform and user interface.

Maintenance and Construction Management

TxDOT Childress RWIS Phase 2

Associated Market Packages:

- Network Surveillance (ATMS01)
- Road Weather Data Collection (MC03)
- Weather Information Processing and Distribution (MC04)
- Roadway Automated Treatment (MC05)
- Winter Maintenance (MC06)

Prerequisite Projects: TxDOT Childress District TMC, TxDOT Childress RWIS Phase 1

Description: This project will install additional RWIS stations in the Childress Region to provide broader coverage of weather detection capabilities. The RWIS will be remotely monitored from the TxDOT Childress District TMC. Data including temperature (atmospheric and pavement), precipitation, wind, humidity, visibility (white out/heavy fog) and even pavement surface conditions (i.e., ice, snow, chemical) are collected by sensors placed at the roadside (typically on a 30 foot tower) and embedded in the roadway. Remote processing units placed along the roadway communicate with various types of road and weather sensors. Data from the RPU are transmitted to a server, via dial-up modem or other low bandwidth telecommunication methods, which will be located at the TxDOT TMC. A future module for the ATMS software will support environmental sensor data and provides collection, archiving, and distribution of the data.

Costs will vary depending on the number of RWIS stations deployed. For planning purposes, four additional RWIS stations at $25,000 each (including communications) was used.

TxDOT Childress Maintenance Vehicle AVL

Associated Market Packages:

- Maintenance and Construction Vehicle Tracking (MC01)
- Maintenance and Construction Activity Coordination (MC10)

Prerequisite Projects: None

Description: Equip TxDOT Childress District maintenance vehicles with GPS based vehicle locators to track, in real-time, vehicle locations while in the field. It is envisioned that the location of the vehicle would be overlaid on a base map showing real-time positions of each equipped vehicle. The main purpose of the system is to assist dispatchers and supervisors in the 12 Maintenance Sections in the Region to better manage the fleet of vehicles (approximately 84 vehicles). For example, if a report of a spill occurred on a major roadway, a supervisor could quickly determine what vehicle is closest and best equipped to clean up the spill.

TxDOT Childress Maintenance Vehicle Diagnostics

Associated Market Packages:

- Maintenance and Construction Vehicle Maintenance (MC02)

Prerequisite Projects: None

Description: Install on-board diagnostic (OBD) systems on TxDOT maintenance vehicles to monitor vehicle performance, level of activity, etc. Most cars today have on board computers, which control engine performance and other important vehicle systems. These management systems considerably enhance the way in which cars can be maintained, tested and repaired.

OBD are computer-based systems that detect operational malfunctions or failures of the engine, emissions related components, and other variables as desired by the maintaining agency. For instance, using sensors and software to compare expected and actual signals from the engine, OBD can trace misfires or other faults that will lead to excessive vehicle emissions. Oxygen sensors upstream and downstream of the catalyst can be used to check the air/fuel ratios and detect any emission control failure. If such a failure is found the system automatically illuminates a malfunction indicator in the dashboard display to alert the driver of the problem and the need for repair.

To identify and repair any fault will require access to the engine control computer, the OBD command software and to fault codes, which record and store the status of the engine and emission control systems. To achieve this, maintenance personnel (or any would-be repairer) must have a standardized scan tool that can connect with the vehicle's OBD system, be able to read and erase the relevant fault codes, and have all other relevant repair information.

Municipal and County Maintenance Vehicle AVL

Associated Market Packages:

- Maintenance and Construction Vehicle Tracking (MC01)
- Maintenance and Construction Activity Coordination (MC10)

Prerequisite Projects: None

Description: Equip municipal and county maintenance vehicles in the Childress Region with GPS based vehicle locators. It is envisioned that the location of the vehicle would be overlaid on a base map showing real-time positions of each equipped vehicle. The main purpose of the system is to assist dispatchers and supervisors to better manage the fleet of vehicles. For example, if a report of a spill occurred on a major roadway, a supervisor could quickly determine what vehicle is closest and best equipped to clean up the spill.

Municipal and County Maintenance Vehicle Diagnostics

Associated Market Packages:

- Maintenance and Construction Vehicle Maintenance (MC02)

Prerequisite Projects: None

Description: Install OBD systems on City of Childress and County Road Departments maintenance vehicles to monitor vehicle performance, level of activity, etc. Most cars today have on board computers, which control engine performance and other important vehicle systems. These management systems considerably enhance the way in which cars can be maintained, tested and repaired.

OBD are computer-based systems that detect operational malfunctions or failures of the engine, emissions related components, and other variables as desired by the maintaining agency. For instance, using sensors and software to compare expected and actual signals from the engine, OBD can trace misfires or other faults that will lead to excessive vehicle emissions. Oxygen sensors upstream and downstream of the catalyst can be used to check the air/fuel ratios and detect any emission control failure. If such a failure is found the system automatically illuminates a malfunction indicator in the dashboard display to alert the driver of the problem and the need for repair.

To identify and repair any fault will require access to the engine control computer, the OBD command software and to fault codes, which record and store the status of the engine and emission control systems. To achieve this, maintenance personnel (or any would-be repairer) must have a standardized scan tool that can connect with the vehicle's OBD system, be able to read and erase the relevant fault codes, and have all other relevant repair information.

Public Transportation Management

Childress Region Independent School Districts Bus AVL

Associated Market Packages:

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

Prerequisite Projects: None

Description: Install AVL on school buses. The AVL system will convey information regarding real-time vehicle location to the Bus Operations Management Center, which will allow for enhanced system monitoring, scheduling, routing (or re-routing), as well as provide for precise bus location information in the event of a breakdown or emergency situation. AVL systems measure actual, real-time position of transit vehicles, and relay that information back to a transit operations center, usually via global positioning system. Used with a GIS map, bus locations can be displayed for any vehicles in the fleet equipped with the on-board AVL unit. AVL systems also can be equipped with additional features, including tie-ins to alarm/security systems, and vehicle component monitoring.

Costs will vary depending on the number of vehicles equipped with the on-board AVL unit. For planning purposes, it is estimated that the cost per vehicle is approximately $7,500.

Childress Region Independent School Districts Bus Operations Management Center

Associated Market Packages:

- Transit Fixed-Route Operations (APTS2)

Prerequisite Projects: None

Description: Implement a centralized dispatch and operations management center for Childress Region school buses. A centralized transit management center will serve as the hub for bus operations, dispatch, and other functions. Used in conjunction with AVL, dispatchers can assess vehicle locations, status, and route adherence, as well as communicate with one or several vehicles that are in the field.

4. MAINTAINING THE REGIONAL ITS ARCHITECTURE AND DEPLOYMENT PLAN

The Childress 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. 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. Deployments in neighboring Regions, such as Amarillo, Wichita Falls, Lubbock or Abilene also could have an impact on needs and priorities in the Childress 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 Childress 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 Childress Regional ITS Architecture and Deployment Plan, with input and guidance from TxDOT Childress 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.

Childress stakeholders noted that there was a stronger need to periodically review 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 USDOT to determine their applicability to the Childress Plans. The Regional ITS Deployment Plan will be reviewed for potential updates every two years, prior to the budget process and Texas legislature meetings. 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 agrees 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 Childress 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 Regional ITS Architecture and ITS Deployment Plan.