Texas Department of Transportation
Regional ITS Architectures and Deployment Plans

San Antonio Region

Regional ITS Deployment Plan

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Texas Department of Transportation

TABLE OF CONTENTS

REGIONAL ITS DEPLOYMENT PLAN

TABLE OF CONTENTS

REGIONAL ITS DEPLOYMENT PLAN

LIST OF TABLES

LIST OF ACRONYMS

AD	Archived Data
APTS	Advanced Public Transportation Systems
ART	Alamo Regional Transit
ATIS	Advanced Travel Information System
ATMS	Advanced Traffic Management System
AVL	Automated Vehicle Location
AWARD	Advanced Warning to Avoid Railroad Delay
BRT	Bus Rapid Transit
CAD	Computer Aided Dispatch
CCSWT	Community Council of Southwest Texas
CCTV	Closed-circuit Television
COSA	City of San Antonio
CTECC	Combined Transportation, Emergency and Communications Center
CVISN	Commercial Vehicle Information Systems and Networks
CVO	Commercial Vehicle Operations
DMS	Dynamic Message Sign
DOT	Department of Transportation
DPS	Department of Public Safety
EM	Emergency Management
EMS	Emergency Medical Services
EOC	Emergency Operations Center
FD	Fire Department
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
HAR	Highway Advisory Radio
HAZMAT	Hazardous Materials
HCRS	Highway Conditions Reporting System
HRI	Highway Rail Intersection
ITS	Intelligent Transportation System
KBC	Kerrville Bus Company

LIST OF ACRONYMS

LCS	Lane Control Signals
MC	Maintenance and Construction
MDT	Mobile Data Terminal
MPO	Metropolitan Planning Organization
PD	Police Department
PIO	Public Information Office
RMA	Regional Mobility Authority
SAFETEA-LU	Safe, Accountable, Flexible and Efficient Transportation Equity Act – A Legacy for Users
TCEQ	Texas Commission on Environmental Quality
TEA-21	Transportation Equity Act for the 21st Century
TMC	Traffic Management Center
TOC	Traffic Operations Center
TxDOT	Texas Department of Transportation
USDOT	United States Department of Transportation
VIVDS	Video Imaging Vehicle Detection System

1. INTRODUCTION

1.1 Project Overview

The San Antonio Region completed an update of its Regional Intelligent Transportation System (ITS) Architecture in 2007 under the direction of the Texas Department of Transportation (TxDOT) San Antonio District. ITS architectures provide a framework for implementing ITS projects, encourage interoperability and resource sharing among agencies, identify applicable standards to apply to projects, and allow for cohesive long-range planning among regional stakeholders. A regional ITS architecture focuses on the functionality that ITS could provide in the Region as well as how those functions could be operated by agencies in and around the Region. A regional ITS architecture also satisfies an important requirement from the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) regarding transportation and funding. An FHWA Final Rule and an FTA Final Policy issued in 2001 requires that regions develop an ITS architecture and show how ITS projects conform to that regional ITS architecture in order to use federal funding on ITS projects.

An ITS deployment plan, while not required by FHWA and FTA, is a useful tool for regions to identify specific projects that are recommended for deployment in order to implement the architecture. An ITS deployment plan builds on the architecture by outlining specific ITS project recommendations and strategies for a region and identifying deployment timeframes so that the recommended projects and strategies can be implemented over time. An ITS deployment plan also links each project to the ITS architecture by identifying the applicable market packages that correspond to each project. The resulting ITS deployment projects from this effort should be clearly supported by the ITS architecture.

The San Antonio Regional ITS Architecture and ITS Deployment Plan were both developed with significant input from local, state, and federal officials. Numerous interviews with stakeholders were held to solicit input in order to ensure that the plans reflected the unique needs of the Region. The project team also reported the project progress and solicited input from the San Antonio ITS Technical Committee, which meets on a quarterly basis at TransGuide. Copies of the draft reports were sent to all stakeholders and the project website allowed stakeholders to submit comments directly to the project team. The Regional ITS Architecture and Deployment Plan developed reflects a snapshot of existing ITS deployments and future ITS plans in the Region. Needs and priorities of the Region will change over time, and, in order to remain effective, this plan should be periodically reviewed and updated.

1.2 Document Overview

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

Section 1 – Introduction

This section provides an overview of the San Antonio Regional ITS Deployment Plan and the key features and stakeholders in the San Antonio Region.

Section 2 – Regional ITS Architecture Market Package Implementation

A summary of the selected and prioritized market packages for the Region is provided in this section. Each market package is described and a listing of projects identified for the San Antonio Region that support implementation of the services contained in the market package is provided.

Section 3 – Project Recommendations

This section contains project recommendations to address stakeholder needs and goals for ITS implementation in the Region. Each project includes a description of the project, stakeholders including the lead agency responsible for implementation, whether or not funding has been identified, and a listing of market packages that are associated with the project. Projects are categorized into service areas and recommended for deployment in the short-, mid-, and long-term timeframes.

Section 4 – Maintaining the Regional ITS Deployment Plan

This section contains a description of the maintenance procedure for the Regional ITS Deployment Plan.

1.3 San Antonio Region Overview

1.3.1 Geographic Region

The San Antonio Region encompasses 12,251 square miles in South-Central Texas. The Region includes Atascosa, Bandera, Bexar, Comal, Frio, Guadalupe, Kendall, Kerr, McMullen, Medina, Uvalde, and Wilson Counties. The largest city in the Region is San Antonio, with a population of 1.2 million people according to the 2005 US Census estimate. The metropolitan area of San Antonio occupies much of Bexar County. The total San Antonio Region population is approximately 2 million people.

The Region is served by numerous State and Federal highways. The primary roadway facilities include the Interstates (I-10, I-35, and I-37), U.S. Highways (US 59, US 81, US 83, US 87, US 90, US 181, and US 281), and State Highways (SH 16, SH 151, and SH 1604). Several toll facilities are planned or under construction in the Region by the Alamo Regional Mobility Authority. Current and potential toll projects include Bandera Road, Wurzbach Parkway, I-35, and US 281/SH 1604.

1.3.2 Stakeholders

Due to the fact that ITS often transcends traditional transportation infrastructure, it is important to involve non-traditional stakeholders in the architecture development and visioning process. Input from these stakeholders, both public and private, is a critical part of defining the interfaces, integration needs, and overall vision for ITS in a region.

The following stakeholder agencies have participated in the San Antonio Region project workshops or provided input to the stakeholders:

- Alamo Area Council of Governments (Homeland Security);
- Alamo Regional Mobility Authority;
- Alamo Regional Transit;
- Bexar County (Emergency Management, Infrastructure Services Department, Public Works);
- City of San Antonio Elderly and Disabled Services - Community Initiatives;
- City of San Antonio Public Works Department (Parking Division, Street Maintenance, Transportation);
- Coach America - Kerrville Bus Company;
- Comal County (Commissioner's Court, Emergency Management, Engineering);
- Community Council of Southwest Texas;

- Department of Public Safety;
- Federal Highway Administration;
- Guadalupe County (Emergency Management);
- Presa Community Center;
- Texas Department of Transportation San Antonio District;
- Texas Department of Transportation Traffic Operations Division;
- VIA Metropolitan Transit; and
- Warm Springs Resource Center.

A more detailed list of stakeholders, including the individuals representing each agency, is provided in the ITS Architecture report.

2. REGIONAL ITS ARCHITECTURE MARKET PACKAGE IMPLEMENTATION

2.1 Market Package Prioritization

In the San Antonio Region, the National ITS Architecture market packages were reviewed by the stakeholders and selected based on the relevance of the service that the market package could provide to the Region. Fifty-one market packages were selected from the National ITS Architecture for implementation in the Region. They are identified in **Table 1**. Kimley-Horn prioritized the selected market packages and stakeholders reviewed the market package priorities. The table organizes the market packages into service areas and priority groupings

Table 1 – San Antonio Market Package Prioritization by Functional Area

High Priority Market Packages	Medium Priority Market Packages	Low Priority Market Packages
Traffic Management		
ATMS01 Network Surveillance ATMS02 Probe Surveillance ATMS03 Surface Street Control ATMS04 Freeway Control ATMS06 Traffic Information Dissemination ATMS07 Regional Traffic Control ATMS08 Traffic Incident Management System ATMS10 Electronic Toll Collection ATMS18 Reversible Lane Management	ATMS13 Standard Railroad Grade Crossing ATMS14 Advanced Railroad Grade Crossing ATMS15 Railroad Operations Coordination ATMS19 Speed Monitoring ATMS21 Roadway Closure Management	ATMS09 Traffic Forecast and Demand Management ATMS11 Emissions Monitoring and Management ATMS16 Parking Facility Management ATMS17 Regional Parking Management
Emergency Management		
EM01 Emergency Call Taking and Dispatch EM02 Emergency Routing EM06 Wide-Area Alert EM08 Disaster Response and Recovery EM09 Evacuation and Reentry Management EM10 Disaster Traveler Information	EM04 Roadway Service Patrols EM07 Early Warning System	EM03 Mayday Support EM05 Transportation Infrastructure Protection

Table 1 – San Antonio Market Package Prioritization by Functional Area (continued)

High Priority Market Packages	Medium Priority Market Packages	Low Priority Market Packages
Maintenance and Construction Management		
MC01 Maintenance and Construction Vehicle and Equipment Tracking MC03 Road Weather Data Collection MC04 Weather Information Processing and Distribution MC08 Work Zone Management MC10 Maintenance and Construction Activity Coordination	MC09 Work Zone Safety Monitoring	
Public Transportation Management		
APTS1 Transit Vehicle Tracking APTS2 Transit Fixed Route Operations APTS3 Demand Response Transit Operations APTS4 Transit Passenger and Fare Management APTS5 Transit Security APTS7 Multi-modal Coordination APTS8 Transit Traveler Information	APTS6 Transit Vehicle Maintenance	
Commercial Vehicle Operations		
	CVO10 HAZMAT Management CVO11 Roadside HAZMAT Security Detection and Mitigation	
Traveler Information		
ATIS1 Broadcast Traveler Information ATIS2 Interactive Traveler Information	ATIS5 ISP Based Route Guidance ATIS8 Dynamic Ridesharing	
Archived Data Management		
AD1 ITS Data Mart AD2 ITS Data Warehouse		AD3 Virtual ITS Data Warehouse

The market package prioritization was a primary factor in developing recommendations for ITS deployment and integration in the San Antonio Region. These priorities identified the key ITS services that are desired by stakeholders in the San Antonio Region, as well as the interfaces that need to be established to provide integrated functionality and establish communication between elements. It is important to note that the high, medium, and low prioritization does not necessarily correspond to any specific time frame (such as five, ten, or twenty year deployment horizon). For example, a market package can be a high priority, but because of funding or prerequisite project requirements, it might not be feasible for deployment for several years. Maturity and availability of technology were also considered in prioritizing the market packages. Another consideration included whether or not the market package was better suited for private deployment and operations or public sector deployment.

2.2 Market Packages and Supporting Projects

To implement the ITS services contained in the ITS market packages selected for the San Antonio Region, each market package was reviewed to determine which projects should be deployed. When identifying projects in the ITS Deployment Plan, stakeholders generally focused on shorter term projects that were more likely to be funded as opposed to projects that extended to the twenty-year timeframe.

Several market packages were identified as being important to the Region, however, stakeholders did not identify any specific projects to implement these market packages at this time. In the future, it is likely that additional projects will be added to the ITS Deployment Plan to implement these market packages.

The market packages in the following subsections are organized by service areas in the order they appear in the National ITS Architecture. The service areas that contain market packages selected by stakeholders were the traffic management, emergency management, maintenance and construction management, public transportation management, commercial vehicle operations, traveler information, and archived data management service areas. Each market package includes:

- A brief definition of the market package (which have been modified from the National ITS Architecture definitions);
- Stakeholder priority for the market package (high, medium, or low); and
- Recommended projects that will address some or all of the services that are contained in the market package.

Additional detail regarding each project is provided in Section 3 of this document.

2.2.1 Traffic Management Service Area

The following market packages and related projects, shown in **Table 2**, implement the traffic management service area functions. These traffic management service areas represent some of the most commonly deployed projects, such as closed-circuit television (CCTV) cameras, dynamic message signs (DMS), traffic operations centers (TOCs), and traffic signal systems. It is expected that many of the market packages in this area will be deployed prior to market packages in other areas.

Table 2 – Traffic Management Market Packages and Projects

Network Surveillance (ATMS01)	**High Priority**
Includes traffic detectors, CCTV cameras, other surveillance equipment, supporting field equipment, and fixed point to fixed point communications to transmit the collected data back to a traffic management center (TMC).	
Recommended Projects ▪ City of San Antonio CCTV Camera Deployment ▪ City of San Antonio Signal System Upgrades and Expansion (Short-Term, Mid-Term) ▪ City of San Antonio Traveler Information System ▪ City of San Antonio/TransGuide Operator Cross-Training Program ▪ City of San Antonio Web-based Information Sharing of Video Feeds ▪ TxDOT CCTV Camera Deployment ▪ TxDOT CTM Deployments (Short-Term, Mid-Term, Long-Term) ▪ TxDOT CTM Maintenance and Upgrades (Short-Term, Mid-Term, Long-Term)	

Probe Surveillance (ATMS02)	**High Priority**
Provides an alternative approach for surveillance of the roadway network. Probe vehicles are tracked and position and speed information utilized to determine road network conditions such as average speed and congestion conditions.	
Recommended Projects No projects have been identified at this time	

Table 2 – Traffic Management Market Packages and Projects (continued)

Surface Street Control (ATMS03)	**High Priority**
Provides the central control, monitoring equipment, communication links, and signal control equipment that support local street and/or arterial traffic management. This market package is consistent with typical urban traffic signal control systems.	
Recommended Projects ▪ City of San Antonio CCTV Camera Deployment ▪ City of San Antonio Signal System Upgrades and Expansion (Short-Term, Mid-Term) ▪ City of San Antonio Bus Priority ▪ City of San Antonio Emergency Vehicle Signal Preemption (Short-Term) ▪ City of San Antonio Operations and Maintenance of TxDOT Traffic Signals (Short-Term, Mid-Term) ▪ City of San Antonio/TransGuide Operator Cross-Training Program ▪ County/Municipal Emergency Vehicle Signal Preemption	

Freeway Control (ATMS04)	**High Priority**
Provides the communications and roadside equipment to support ramp control, lane controls, and interchange control for freeways. This market package is consistent with typical urban traffic freeway control systems. Also includes the capability to utilize surveillance information for detection of incidents.	
Recommended Projects ▪ TxDOT CTM Deployments (Short-Term, Mid-Term, Long-Term) ▪ TxDOT CTM Maintenance and Upgrades (Short-Term, Mid-Term, Long-Term) ▪ TxDOT Ramp Meters	

Traffic Information Dissemination (ATMS06)	**High Priority**
Provides information to drivers using roadway equipment such as DMS or highway advisory radio (HAR). Information can include traffic and road conditions, closure and detour information, incident information, emergency alerts and driver advisories.	
Recommended Projects ▪ City of San Antonio DMS Deployment ▪ City of San Antonio Traveler Information System ▪ City of San Antonio/TransGuide Operator Cross-Training Program ▪ TxDOT CTM Deployments (Short-Term, Mid-Term, Long-Term) ▪ TxDOT CTM Maintenance and Upgrades (Short-Term, Mid-Term, Long-Term) ▪ TxDOT DMS Deployment ▪ TxDOT Highway Advisory Radio Expansion ▪ TxDOT Portable DMS Deployment ▪ TxDOT Portable DMS Upgrades for Remote Communications	

Table 2 – Traffic Management Market Packages and Projects (continued)

Regional Traffic Control (ATMS07)	**High Priority**
Facilitates the sharing of traffic information and control among TMCs to support a regional control strategy. The nature of optimization and extent of information and control sharing is determined through working arrangements between jurisdictions.	
Recommended Projects ▪ City of San Antonio/TransGuide Information Sharing Expansion ▪ TxDOT Center-to-Center Communications	

Traffic Incident Management System (ATMS08)	**High Priority**
Manages both unexpected incidents and planned events so that the impact to the transportation network and traveler safety is minimized. This market package includes incident detection capabilities and coordination with other agencies. It supports traffic operations personnel in developing an appropriate response in coordination with emergency management, maintenance and construction management, and other incident response personnel.	
Recommended Projects ▪ City of San Antonio CCTV Camera Deployment ▪ City of San Antonio DMS Deployment ▪ City of San Antonio Portable DMS Deployment ▪ City of San Antonio Traveler Information System ▪ City of San Antonio/TransGuide Information Sharing Expansion ▪ City of San Antonio/TransGuide Operator Cross-Training Program ▪ County EOC TransGuide Workstation Implementation ▪ San Antonio/Bexar County EOC TransGuide Workstation Implementation ▪ TxDOT ATMS Software Integration with Municipal and County Public Safety CAD (Short-Term, Mid-Term) ▪ TxDOT CCTV Camera Deployment ▪ TxDOT Center-to-Center Communications ▪ TxDOT CTM Deployments (Short-Term, Mid-Term, Long-Term) ▪ TxDOT CTM Maintenance and Upgrades (Short-Term, Mid-Term, Long-Term) ▪ TxDOT DMS Deployment ▪ TxDOT Highway Advisory Radio Expansion ▪ TxDOT National Weather Service Connection ▪ TxDOT Real-Time HCRS (Statewide)	

Traffic Forecast and Demand Management (ATMS09)	**Low Priority**
Includes advanced algorithms, processing, and mass storage capabilities that support historical evaluation, real-time assessment, and forecasts of the roadway network performance.	
Recommended Projects No projects have been identified at this time	

Table 2 – Traffic Management Market Packages and Projects (continued)

Electronic Toll Collection (ATMS10)	**High Priority**
Provides toll operators with the ability to collect tolls electronically and detect and process violations.	
Recommended Projects ▪ Alamo RMA Toll Collection	

Emissions Monitoring and Management (ATMS11)	**Low Priority**
Monitors individual vehicle emissions and provides general air quality monitoring using distributed sensors to collect the data.	
Recommended Projects No projects have been identified at this time. However, AACOG has indicated interest in sharing data from other emissions monitoring sensors such as those used for HAZMAT detection. The disadvantage faced in sharing such sensor data is that HAZMAT sensors are typically located at 'hot-spots' which do not provide an accurate reading for ozone precursors which is the pollutant AACOG is primarily interested in monitoring. Additionally if EPA lowers certain pollutant standards San Antonio is likely to fall into non-attainment which may result in new emissions monitoring requirements.	

Standard Railroad Grade Crossing (ATMS13)	**Medium Priority**
Manages highway traffic at highway-rail intersections (HRIs) where rail speeds are less than 80 mph.	
Recommended Projects No projects have been identified at this time	

Advanced Railroad Grade Crossing (ATMS14)	**Medium Priority**
Manages highway traffic at highway-rail intersections (HRIs) where operational speeds are greater than 80 mph. Augments Standard Railroad Grade Crossing market package with additional safety features to mitigate the risk associated with higher rail speeds.	
Recommended Projects ▪ TxDOT AWARD System Expansion	

Railroad Operations Coordination (ATMS15)	**Medium Priority**
Provides an additional level of strategic coordination between freight rail operations and traffic management centers. Could include train schedules, maintenance schedules or any other anticipated HRI closures.	
Recommended Projects No projects have been identified at this time	

Table 2 – Traffic Management Market Packages and Projects (continued)

Parking Facility Management (ATMS16)	Low Priority
Provides enhanced monitoring and management of parking facilities. Market package assists in the management of parking operations, coordinates with transportation authorities, and supports electronic collection of parking fees.	
Recommended Projects No projects have been identified at this time	

Regional Parking Management (ATMS17)	Low Priority
Supports coordination between parking facilities to enable regional parking management strategies.	
Recommended Projects No projects have been identified at this time	

Reversible Lane Management (ATMS18)	High Priority
Provides for the management of reversible lane facilities and includes the field equipment, physical lane access controls, and associated control electronics.	
Recommended Projects No projects have been identified at this time	

Speed Monitoring (ATMS19)	Medium Priority
Monitors the speed of vehicles traveling through a roadway system. If the speed is determined to be excessive, roadside equipment can suggest a safe driving speed. Environmental conditions may be monitored and factored into the safe speed advisories that are provided to the motorist. This service can also support notifications to an enforcement agency to enforce the speed limit on a roadway system.	
Recommended Projects ▪ TxDOT Truck Rollover Warning System	

Roadway Closure Management (ATMS21)	Medium Priority
Closes roadways to vehicular traffic when driving conditions are unsafe, maintenance must be performed, or during other situations. Market package covers general road closures applications; specific closure systems that are used at railroad grade crossings, drawbridges, reversible lanes, etc. are covered by other market packages.	
Recommended Projects ▪ Bexar County Flood Detection and Closure System ▪ City of San Antonio Flood Detection and Closure System (Short-Term, Mid-Term) ▪ Comal County Flood Detection and Closure System ▪ County/Municipal Flood Detection and Closure System ▪ TxDOT District Wide Flood Detection System (Short-Term, Mid-Term)	

2.2.2 *Emergency Management Service Area*

The following market packages and related projects in **Table 3** implement ITS functions that support emergency management activities. Emergency management market packages involve a large variety of different communications that support 911 call-taking and dispatching to wireless and fiber optic communications between emergency management and traffic and transit management centers. Emergency management in the Region also comprises of ITS services that include and support traffic signal preemption for emergency vehicles, dissemination of emergency alerts through DMS, and support services such as a roadway service patrol.

Table 3 – Emergency Management Market Packages and Projects

Emergency Call-Taking and Dispatch (EM01)	**High Priority**
Provides basic public safety call-taking and dispatch services. Includes emergency vehicle equipment, equipment used to receive and route emergency calls, wireless communications, and coordination between emergency management agencies.	
Recommended Projects ▪ TxDOT ATMS Software Integration with Municipal and County Public Safety CAD (Short-Term, Mid-Term)	

Emergency Routing (EM02)	**High Priority**
Supports automated vehicle location (AVL) and dynamic routing of emergency vehicles. Traffic information, road conditions and suggested routing information are provided to enhance emergency vehicle routing. Includes signal preemption and priority applications.	
Recommended Projects ▪ City of San Antonio Emergency Vehicle Signal Preemption ▪ County/Municipal Emergency Vehicle Signal Preemption	

Mayday Support (EM03)	**Low Priority**
Allows the user to initiate a request for emergency assistance and enables the emergency management subsystem to locate the user, gather information about the incident and determine the appropriate response.	
Recommended Projects No projects have been identified at this time	

Roadway Service Patrols (EM04)	**Medium Priority**
Supports the roadway service patrol vehicles that aid motorists, offering rapid response to minor incidents (flat tire, accidents, out of gas) to minimize disruption to the traffic stream. This market package monitors service patrol vehicle locations and supports vehicle dispatch.	
Recommended Projects ▪ Alamo RMA Roadway Service Patrol	

Table 3 – Emergency Management Market Packages and Projects (continued)

Transportation Infrastructure Protection (EM05)	**Low Priority**
Includes the monitoring of transportation infrastructure (e.g. bridges, tunnels and management centers) for potential threats using sensors, surveillance equipment, and barriers and safeguard systems to preclude an incident, control access during and after an incident, or to mitigate the impact of an incident. Threats can be acts of nature, terrorist attacks, or other incidents causing damage to the infrastructure.	
Recommended Projects No projects have been identified at this time that are specifically for transportation infrastructure protection. However, CCTV camera deployments in other projects could serve a secondary role for transportation infrastructure protection.	

Wide-Area Alert (EM06)	**High Priority**
Uses ITS driver and traveler information systems to alert the public in emergency situations such as child abductions, severe weather, civil emergencies, or other situations that pose a threat to life and property.	
Recommended Projects ▪ AACOG Portable DMS Deployment ▪ County EOC TransGuide Workstation Implementation ▪ TxDOT Center-to-Center Communications ▪ TxDOT CTM Deployments (Short-Term, Mid-Term, Long-Term) ▪ TxDOT CTM Maintenance and Upgrades (Short-Term, Mid-Term, Long-Term)	

Early Warning System (EM07)	**Medium Priority**
Monitors and detects potential, looming, and actual disasters including natural disasters (hurricanes, earthquakes, floods, winter storms, tsunamis, etc.) and technological and man-made disasters (hazardous materials incidents, nuclear power plant accidents, and acts of terrorism including nuclear, chemical, biological, and radiological weapons attacks).	
Recommended Projects ▪ Bexar County Early Warning System Study ▪ TxDOT District Wide Flood Detection System (Short-Term, Mid-Term) ▪ TxDOT National Weather Service Connection	

Disaster Response and Recovery (EM08)	**High Priority**
Enhances the ability of the surface transportation system to respond to and recover from disasters. It addresses the most severe incidents that require an extraordinary response from outside the local community.	
Recommended Projects ▪ AACOG Portable DMS Deployment ▪ County EOC TransGuide Workstation Implementation ▪ San Antonio/Bexar County EOC TransGuide Workstation Implementation	

Table 3 – Emergency Management Market Packages and Projects (continued)

Evacuation and Reentry Management (EM09)	**High Priority**
Supports evacuation of the general public from a disaster area and manages subsequent reentry to the disaster area. This market package supports both anticipated, well-planned, and orderly evacuations such as for a hurricane, as well as sudden evacuations with little or no time for preparation or public warning such as a terrorist act. Employs a number of strategies to maximize capacity along an evacuation route including coordination with transit.	
Recommended Projects ▪ AACOG Portable DMS Deployment ▪ County EOC TransGuide Workstation Implementation ▪ TxDOT CTM Deployments (Short-Term, Mid-Term, Long-Term) ▪ TxDOT CTM Maintenance and Upgrades (Short-Term, Mid-Term, Long-Term) ▪ TxDOT Highway Advisory Radio Expansion	

Disaster Traveler Information (EM10)	**High Priority**
Uses ITS to provide disaster-related traveler information to the general public, including evacuation and reentry information and other information concerning the operation of the transportation system during a disaster.	
Recommended Projects ▪ AACOG Portable DMS Deployment ▪ County EOC TransGuide Workstation Implementation	

2.2.3 Maintenance and Construction Management Service Area

Table 4 implements maintenance and construction management ITS functions for the following market packages and related projects. The stakeholders in the Region have indicated that several of the maintenance and construction management market packages are of high priority. The Region has been vulnerable to inclement weather that jeopardizes road conditions, especially at low-water crossings. Flood detection and road closure systems are of strong interest to stakeholders in the Region. Other services such as work zone management, vehicle tracking, and maintenance and construction activity coordination have also been identified as high priorities to the Region.

Table 4 – Maintenance and Construction Management Market Packages and Projects

Maintenance and Construction Vehicle and Equipment Tracking (MC01)	**High Priority**
Tracks the location of maintenance and construction vehicles and other equipment to ascertain the progress of their activities.	
Recommended Projects No projects have been identified at this time	

Road Weather Data Collection (MC03)	**High Priority**
Collects current road weather conditions data from environmental sensors deployed on and about the roadway.	
Recommended Projects ▪ Bexar County Flood Detection and Closure System ▪ City of San Antonio Flood Detection and Closure System (Short-Term, Mid-Term) ▪ Comal County Flood Detection and Closure System ▪ County/Municipal Flood Detection and Closure System ▪ TxDOT District Wide Flood Detection System (Short-Term, Mid-Term) ▪ TxDOT Storm Water Pump Station Installation and Upgrades	

Weather Information Processing and Distribution (MC04)	**High Priority**
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, dense fog, etc. so system operators can make decisions on corrective actions to take.	
Recommended Projects ▪ Bexar County Flood Detection and Closure System ▪ City of San Antonio Flood Detection and Closure System (Short-Term, Mid-Term) ▪ Comal County Flood Detection and Closure System ▪ County/Municipal Flood Detection and Closure System ▪ TxDOT District Wide Flood Detection System (Short-Term, Mid-Term) ▪ TxDOT National Weather Service Connection	

Table 4 – Maintenance and Construction Management Market Packages and Projects (continued)

Work Zone Management (MC08)	**High Priority**
Directs activity in work zones, controlling traffic through portable DMS and informing other groups of activity for better coordination management. Also provides speed and delay information to motorists prior to the work zone.	
Recommended Projects ▪ TxDOT Portable DMS Deployment ▪ TxDOT Portable DMS Upgrades for Remote Communications	

Work Zone Safety Monitoring (MC09)	**Medium Priority**
Includes systems that improve work crew safety and reduce collisions between the motoring public and maintenance and construction vehicles. Detects vehicle intrusions in work zones and warns workers and drivers of safety hazards when encroachment occurs.	
Recommended Projects No projects have been identified at this time. It was noted by stakeholders that many of the work zone safety monitoring programs would be implemented by contractors as part of project construction rather than as a separate project.	

Maintenance and Construction Activity Coordination (MC10)	**High Priority**
Supports the dissemination of maintenance and construction activity information to centers that can utilize it as part of their operations. (i.e., traffic management, transit, emergency management)	
Recommended Projects ▪ TxDOT Real-Time HCRS (Statewide)	

2.2.4 Public Transportation Management Service Area

The following ITS market packages and related projects, as detailed in **Table 5**, implement public transportation management ITS functions. Most of these market packages were considered high priority and will likely be implemented or expanded in the near future. The primary transit agency, VIA Metropolitan, is planning to implement projects in almost all of the different public transportation market packages.

Table 5 – Public Transportation Management Market Packages and Projects

Transit Vehicle Tracking (APTS1)	**High Priority**
Monitors current transit vehicle location using an AVL system. Location data may be used to determine real time schedule adherence and update the transit system's schedule in real time.	
Recommended Projects ▪ Alamo Regional Transit MDC Deployments ▪ Alamo Regional Transit New/Upgrade Dispatch Software ▪ CCSWT AVL Pilot Study ▪ VIA Metropolitan On-board Vehicle Communications Upgrade	

Transit Fixed-Route Operations (APTS2)	**High Priority**
Performs vehicle routing and scheduling, as well as operator assignment and system monitoring for fixed-route and flexible-route transit services.	
Recommended Projects ▪ Alamo Regional Transit Fixed Route and/or Deviated Routes in the AACOG Area ▪ Alamo Regional Transit MDC Deployments ▪ Alamo Regional Transit New/Upgrade Dispatch Software ▪ VIA Metropolitan Bus Rapid Transit Program ▪ VIA Metropolitan On-board Vehicle Communications Upgrade ▪ VIA Metropolitan Super Stop Deployment (Short-Term, Mid-Term)	

Demand Response Transit Operations (APTS3)	**High Priority**
Performs vehicle routing and scheduling, as well as operator assignment and system monitoring for demand responsive transit services.	
Recommended Projects ▪ Alamo Regional Transit New/Upgrade Dispatch Software ▪ Alamo Regional Transit Fixed Route and/or Deviated Routes in the AACOG Area ▪ CCSWT AVL Pilot Study ▪ VIA Metropolitan Closure and Traffic Information Access ▪ VIA Metropolitan IVR Reservation System for Demand Response Transit ▪ VIA Metropolitan On-board Vehicle Communications Upgrade	

Table 5 – Public Transportation Management Market Packages and Projects (continued)

Transit Passenger and Fare Management (APTS4)	**High Priority**
Manages passenger loading and fare payments on transit vehicles using electronic means.	
Recommended Projects ▪ Alamo Regional Transit Fare Box Management Systems ▪ Coach America KBC Integrated Website Management ▪ VIA Metropolitan IVR Reservation System for Demand Response Transit ▪ VIA Metropolitan Smart Card Payment System ▪ VIA Metropolitan Super Stop Deployment (Short-Term, Mid-Term)	

Transit Security (APTS5)	**High Priority**
Provides for the physical security of transit passengers and transit vehicle operators. Includes on-board security cameras and panic buttons.	
Recommended Projects ▪ Alamo Regional Transit Security at the Kerrville Intermodal Facility ▪ VIA Metropolitan Super Stop Deployment (Short-Term, Mid-Term)	

Transit Maintenance Management (APTS6)	**Medium Priority**
Supports automatic transit maintenance scheduling and monitoring for both routine and corrective maintenance.	
Recommended Projects No projects have been identified at this time	

Multi-Modal Coordination (APTS7)	**High Priority**
Establishes two way communications between multiple transit and traffic agencies to improve service coordination.	
Recommended Projects ▪ City of San Antonio Bus Priority ▪ Coach America KBC Integrated Website Management ▪ VIA Metropolitan Closure and Traffic Information Access ▪ VIA Metropolitan Bus Rapid Transit Program	

Table 5 – Public Transportation Management Market Packages and Projects (continued)

Transit Traveler Information (APTS8)	**High Priority**
Provides transit users at transit stops and on board transit vehicles with ready access to transit information. Services include stop annunciation, imminent arrival signs, and real-time transit schedule displays. Systems that provide custom transit trip itineraries and other tailored transit information services are also represented by this market package.	
Recommended Projects ▪ Coach America KBC Integrated Website Management ▪ Coach America KBC Passenger Information Signs ▪ VIA Metropolitan IVR Reservation System for Demand Response Transit ▪ VIA Metropolitan Personalized Real Time Information Applications ▪ VIA Metropolitan Super Stop Deployment (Short-Term, Mid-Term)	

2.2.5 Commercial Vehicle Operations Service Area

HAZMAT Management and Roadside HAZMAT Security Detection and Mitigation were identified as necessary market packages that related to commercial vehicle operations in the Region. Planning for commercial vehicle operations is being performed on a statewide level as part of the Commercial Vehicle Information Systems and Networks (CVISN) program. As part of this program projects are being developed on a statewide basis rather than a regional basis. **Table 6** shows that although two market packages were identified by stakeholders for local deployment, no projects were currently identified for implementation of these market packages.

Table 6 – Commercial Vehicle Operations Market Packages and Projects

HAZMAT Management (CVO10)	**Medium Priority**
Integrates incident management capabilities with commercial vehicle tracking to assure effective treatment of hazardous materials (HAZMAT) material and incidents.	
Recommended Projects No projects have been identified at this time	

Roadside HAZMAT Security Detection and Mitigation (CVO11)	**Medium Priority**
Provides the capability to detect and classify security sensitive HAZMAT on commercial vehicles using roadside sensing and imaging technology. Credentials information can be accessed to verify if the commercial driver, vehicle and carrier are permitted to transport the identified HAZMAT.	
Recommended Projects No projects have been identified at this time	

2.2.6 Traveler Information Service Area

The following market packages and related projects implement traveler information ITS functions, as seen in **Table 7**. Traveler information service area projects address market packages that broadcast traveler information over a wide area. The future 511 traveler information phone number, updates to add real time information to TxDOT's Highway Condition Reporting System (HCRS), and expansion to the TxDOT Advanced Warning to Avoid Railroad Delays (AWARD) system were identified as projects to facilitate broadcast traveler information. Traveler information provided at a specific location on the roadway, such as DMS, is addressed in the ATMS06 – Traffic Information Dissemination market package in Section 2.2.1.

Table 7 – Traveler Information Market Packages and Projects

Broadcast Traveler Information (ATIS1)	**High Priority**
Collects traffic conditions, advisories, general public transportation, toll and parking information, incident information, roadway maintenance and construction information, air quality and weather information, and broadly disseminates this information through existing infrastructures (radio, cell phones, etc.).	
Recommended Projects ▪ City of San Antonio Web-based Information Sharing of Video Feeds ▪ TxDOT 511 Traveler Information ▪ TxDOT AMBER Alerts ▪ TxDOT AWARD System Expansion ▪ TxDOT Real-Time HCRS (Statewide)	

Interactive Traveler Information (ATIS2)	**High Priority**
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, roadway maintenance and construction, transit services, ride share/ride match, parking management, detours and pricing information.	
Recommended Projects ▪ TxDOT 511 Traveler Information ▪ TxDOT Personal Emergency Transportation Plan	

ISP Based Route Guidance (ATIS5)	**Medium Priority**
Offers the user pre-trip route planning and turn-by-turn route guidance services. Routes may be based on static or real time network conditions.	
Recommended Projects ▪ TxDOT Personal Emergency Transportation Plan	

Table 7 – Traveler Information Market Packages and Projects (continued)

Dynamic Ridesharing (ATIS8)	**Medium Priority**
Provides dynamic ridesharing/ride matching services to the user.	
Recommended Projects No projects have been identified at this time	

2.2.7 *Archived Data Management Service Area*

The archived data management service area market packages and related projects implement archived data management ITS functions. Data collected through ITS deployments can be housed in several different formats such as a data mart, a data warehouse (stores one agency's archive data), or a virtual data warehouse (an electronic method of maintaining numerous agencies' archive data). The market packages selected by stakeholders will allow data for a specific agency to be housed by that agency in a data mart. Data from throughout the Region can be sent to either a data warehouse or a virtual data warehouse to be housed together with other agencies' data.

Table 8 – Archived Data Management Market Packages and Projects

ITS Data Mart (AD1)	**High Priority**
Provides a focused archive that houses data collected and owned by a single agency or other organization. Focused archive typically covers a single transportation mode and one jurisdiction.	
Recommended Projects ▪ TransGuide Data Archive Upgrades	

ITS Data Warehouse (AD2)	**High Priority**
Includes all the data collection and management capabilities of the ITS Data Mart. Adds the functionality to allow collection of data from multiple agencies and data sources across modal and jurisdictional boundaries.	
Recommended Projects ▪ TransGuide Data Archive Upgrades	

Virtual ITS Data Warehouse (AD3)	**Low Priority**
Provides the same broad access to multimodal, multidimensional data from varied sources as in the ITS Data Warehouse Market Package, but provides this access using enhanced interoperability between physically distributed ITS archives that are each locally managed.	
Recommended Projects No projects have been identified at this time	

3. PROJECT RECOMMENDATIONS

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

The purpose of Section 3 – Project Recommendations is to identify potential future projects that the San Antonio Region may want to deploy and match those projects to the Regional ITS Architecture so that architecture conformity can be verified. The key benefit for the Region is that by including projects in this section architecture conformity can be verified concurrently with the ITS architecture update. If potential projects do not conform it is relatively easy to modify the Regional ITS Architecture while still in the development process. It is likely that there will be additional projects developed and deployed in the Region that are not included in this section but are important for the Region. Although there is no requirement that those projects be included in this ITS Deployment Plan, those projects must conform to the Regional ITS Architecture in order to receive federal funding. If those projects do not conform, the Regional ITS Architecture or the project itself will need to be modified to show conformance.

In the following section, projects are categorized into functional areas: Traffic Management, Emergency Management, Maintenance and Construction Management, Public Transportation Management, Traveler Information, and Archived Data Management. For each functional area, projects were grouped into timeframes for deployment based on priority, dependence on other projects, technology, and feasibility. The timeframes have been categorized as follows:

- Short-term deployments – Deployments in the next 5 years;
- Mid-term deployments – Deployments in the next 10 years; and
- Long-term deployments – Deployments in the next 20 years.

Actual deployment timeframes for the projects will be dependent on inclusion in the Regional Transportation Improvement Plan (TIP) and identification of funding sources. It should also be noted that many of the projects identified for mid-term and long-term deployments are extensions, upgrades or continuations of projects that will be deployed in the short-term.

For each project, the tables include a project description, stakeholders, and the applicable market packages in the San Antonio Regional ITS Architecture.

- Project Description – The project description provides a brief overview of the project. The level of detail of the project is dependent on the stakeholder agency. In some cases projects were in the planning or design stage and the level of detail of the project description can be increased. In other cases projects have been identified as a result of the ITS Architecture process and no real detail beyond a very basic project concept is available.
- Stakeholders – A lead agency for the project has been identified where appropriate and other agencies that will have a role in some or all of the planning, implementation, operations, and maintenance of the projects have also been included.
- Applicable Market Packages – Each project identified will assist stakeholders in implementing one or more of the ITS market packages identified for the Region. Projects often just implement one piece of a market package, and, to fully implement a market package, multiple projects will need to be implemented. Due to funding constraints, it is unlikely that all market packages will ever be fully implemented in the Region. Rather, stakeholders will need to focus on implementing the most important pieces of each market package so that ITS investments in the Region are maximized.

3.1 Regional Projects

Regional projects are identified in **Table 9** through **Table 14**. The tables are broken out as follows:

- **Table 9** – Traffic Management Project Recommendations;
- **Table 10** – Emergency Management Project Recommendations;
- **Table 11** – Maintenance and Construction Management Project Recommendations;
- **Table 12** – Public Transportation Project Recommendations;
- **Table 13** – Traveler Information Project Recommendations; and
- **Table 14** – Archive Data Management Project Recommendations.

3.1.1 *Traffic Management Project Recommendations*

Table 9 – Traffic Management Project Recommendations

Program Area/Project	Description	Stakeholders[1]	Applicable Market Packages[2]
Short-Term Traffic Management Projects:			
TxDOT CTM Deployments (Short-Term)	Implement Corridor Traffic Management (CTM) projects, including CCTV cameras and vehicle detection for traffic management and incident detection, DMS for traveler information, and lane control signals for lane closure and restriction information. CTM projects that are planned for deployment in 2007 include I-35 between Loop 1604 in San Antonio and Ben White Boulevard in Austin.	Lead: TxDOT	ATMS01 ATMS04 ATMS06 ATMS08 EM06 EM09
TxDOT CTM Maintenance and Upgrades (Short-Term)	Maintain and upgrade existing CTM deployments in the San Antonio District. Technologies deployed include CCTV, vehicle detection, LCS, and DMS. Cost will vary based on the types of upgrades and maintenance that are needed.	Lead: TxDOT	ATMS01 ATMS04 ATMS06 ATMS08 EM06 EM09
TxDOT CCTV Camera Deployment	Deploy additional CCTV cameras to monitor traffic conditions and aid in incident detection and emergency response. The deployment of these cameras is in addition to CTM deployments and locations for deployment will be chosen due to their unique criteria.	Lead: TxDOT	ATMS01 ATMS08
TxDOT Center-to-Center Communications	Develop communications between TxDOT traffic management centers (TMCs). TransGuide is the TxDOT point of contact for DPS in the event of an AMBER Alert and is responsible for disseminating the information to the other TxDOT Districts. In the Corpus Christi and Laredo Districts TransGuide places the AMBER Alert messages on the DMS after hours. Center-to-center communication will facilitate these arrangements with other Districts for AMBER Alerts as well as coordination for traffic and incident management. Communication between CTECC, based in Austin, and TransGuide is an especially important connection that needs to be made.	Lead: TxDOT	ATMS07 ATMS08 EM06
TxDOT DMS Deployment	Deploy additional DMS to disseminate information on traffic conditions and incidents to travelers. The deployment of these DMS is in addition to CTM deployments and locations for deployment will be chosen due to their unique criteria.	Lead: TxDOT	ATMS06 ATMS08

Table 9 – Traffic Management Project Recommendations (continued)

Program Area/Project	Description	Stakeholders[1]	Applicable Market Packages[2]
TxDOT Highway Advisory Radio Expansion	Expand highway advisory radio (HAR) coverage on I-35 to provide coverage of the corridor primarily through Bexar, Comal and Guadalupe Counties.	Lead: TxDOT Others: TxDOT Austin District, Bexar County, Comal County, Guadalupe County	ATMS06 ATMS08 EM09
TxDOT Fiber Optic Deployment	Deploy fiber optic communication and implement fiber sharing agreements as developed in the San Antonio Regional Fiber/Communications Sharing Plan.	Lead: TxDOT	The project is not explicitly classified by any one market package, but will affect most of the market packages.
TxDOT National Weather Service Connection	Implement communications between TransGuide and the National Weather Service (NWS) to get weather and flood gauge information. Cost will vary based on communications method selected.	Lead: TxDOT Others: National Weather Service	ATMS08 EM07 MC04
TxDOT Truck Rollover Warning System	Deploy truck rollover warning systems as needed throughout the Region. The system would include the height and speed detection for trucks as well as active warning devices such as flashing beacons and real time speed displays.	Lead: TxDOT	ATMS19
City of San Antonio Signal System Upgrades and Expansion (Short-Term)	Upgrade the signal system including replacement of existing 170 controllers with 2070 controllers and improve communications equipment. Optimize and coordinate signals through data collection, analysis, and optimized timing.	Lead: City of San Antonio	ATMS01 ATMS03
City of San Antonio CCTV Camera Deployment	Deploy additional CCTV cameras to monitor traffic conditions and aid in incident detection and emergency response, and special management.	Lead: City of San Antonio Others: TxDOT	ATMS01 ATMS03 ATMS08
City of San Antonio DMS Deployment	Deploy DMS on major arterials for dissemination of traveler information including detour and special event information.	Lead: City of San Antonio Others: TxDOT	ATMS06 ATMS08

Table 9 – Traffic Management Project Recommendations (continued)

Program Area/Project	Description	Stakeholders[1]	Applicable Market Packages[2]
City of San Antonio Bus Priority	Provide bus priority capability for VIA at City of San Antonio traffic signals.	Lead: City of San Antonio Others: VIA	ATMS03 APTS7
City of San Antonio Operations and Maintenance of TxDOT Traffic Signals (Short-Term)	The City of San Antonio will take over operations and maintenance of approximately 140 TxDOT traffic signals located primarily along freeway frontage roads.	Lead: City of San Antonio, TxDOT	ATMS03
City of San Antonio/TransGuide Information Sharing Expansion	Expand information sharing between the City of San Antonio and TransGuide to add the capability to share video images and detector data. Cost will depend on whether additional communications capacity must be added and whether any software modifications are required.	Lead: City of San Antonio, TxDOT	ATMS07 ATMS08
City of San Antonio/TransGuide Operator Cross-Training Program	TransGuide is staffed 24-7 by TxDOT operators. In order to keep City of San Antonio traffic management components operational after hours, cross-training of personnel that would be responsible for both TxDOT and City of San Antonio traffic management components was recommended by the City of San Antonio.	Lead: City of San Antonio, TxDOT	ATMS01 ATMS03 ATMS06 ATMS08
Alamo RMA Toll Collection	Alamo RMA is in the process of developing and evaluating several toll road projects in the Region including Bandera Road, Wurzbach Parkway, and US 281/SH 1604. Once constructed, the roads will implement ITS technology to support toll collection including toll tag readers, cameras, and vehicle detectors.	Lead: Alamo RMA	ATMS10
County EOC TransGuide Workstation Implementation	Implement TransGuide workstations in County EOCs to allow EOCs the capability to monitor and possibly control TransGuide field devices such as CCTV cameras, flood detection stations, and DMS. Comal County and Guadalupe County specifically expressed interest in having access to TransGuide data for use during major incidents and evacuations.	Lead: County EOCs, TxDOT (Comal and Guadalupe have indicated their interest)	ATMS08 EM06 EM08 EM09 EM10

Table 9 – Traffic Management Project Recommendations (continued)

Program Area/Project	Description	Stakeholders[1]	Applicable Market Packages[2]
Mid-Term Traffic Management Projects:			
TxDOT CTM Deployments (Mid-Term)	Continue implementation of Corridor Traffic Management (CTM) projects, including CCTV cameras and vehicle detection for traffic management and incident detection, DMS for traveler information, and lane control signals for lane closure and restriction information.	Lead: TxDOT	ATMS01 ATMS04 ATMS06 ATMS08 EM06 EM09
TxDOT CTM Maintenance and Upgrades (Mid-Term)	City of San Antonio will continue take over of operations and maintenance of TxDOT traffic signals located primarily along freeway frontage roads.	Lead: TxDOT	ATMS01 ATMS04 ATMS06 ATMS08 EM06 EM09
TxDOT Ramp Meters	TxDOT has not determined if ramp metering will be implemented. However, if determined appropriate for the District, ramp metering on freeway facilities will be implemented.	Lead: TxDOT Others: City of San Antonio	ATMS04
City of San Antonio Signal System Upgrades and Expansion (Mid-Term)	Continue to upgrade the signal system through controller replacements, communications upgrades, and optimized timings.	Lead: City of San Antonio	ATMS01 ATMS03
City of San Antonio Operations and Maintenance of TxDOT Traffic Signals (Mid-Term)	TxDOT will continue the process of transferring operations and maintenance of the remaining traffic signals at expressway intersections with major arterials from TxDOT to the City of San Antonio to facilitate area wide traffic signal coordination.	Lead: TxDOT, City of San Antonio	ATMS03
Long-Term Traffic Management Projects:			
TxDOT CTM Deployments (Long-Term)	Continue implementation of Corridor Traffic Management (CTM) projects, including CCTV cameras and vehicle detection for traffic management and incident detection, DMS for traveler information, and lane control signals for lane closure and restriction information.	Lead: TxDOT	ATMS01 ATMS04 ATMS06 ATMS08 EM06 EM09

Table 9 – Traffic Management Project Recommendations (continued)

Program Area/Project	Description	Stakeholders[1]	Applicable Market Packages[2]
TxDOT CTM Maintenance and Upgrades (Long-Term)	Continue maintenance and upgrade of existing CTM deployments on TxDOT roadways in the San Antonio District. Technologies deployed include CCTV, vehicle detection, LCS, and DMS. Cost will vary based on the types of upgrades and maintenance that are needed.	Lead: TxDOT	ATMS01 ATMS04 ATMS06 ATMS08 EM06 EM09

[1]Stakeholders listed will play a role the planning, implementation, operations, and/or maintenance of the project. The lead agency and any other agencies that have a role in the project are identified.

[2]Applicable market packages indicate the market packages that could be partially or fully implemented by the deployment of the listed project.

3.1.2 *Emergency Management Project Recommendations*

Table 10 – Emergency Management Project Recommendations

Program Area/Project	Description	Stakeholders[1]	Applicable Market Packages[2]
Short-Term Emergency Management Projects:			
TxDOT ATMS Software Integration with Municipal and County Public Safety CAD (Short-Term)	Integrate municipal and county emergency services computer aided dispatch (CAD) system with the TransGuide ATMS software. The integration will allow TransGuide to access real-time information about the incidents on the roadway and allow emergency dispatchers to access real-time information on traffic conditions. TxDOT would like to integrate software systems with as many municipalities and counties as possible.	Lead: TxDOT Others: Municipal Public Safety Departments	ATMS08 EM01
City of San Antonio Emergency Vehicle Signal Preemption	Implement emergency vehicle signal preemption on City of San Antonio traffic signals for City of San Antonio Fire Department and Bexar County EMS.	Lead: City of San Antonio Others: Bexar County	ATMS03 EM02
San Antonio/Bexar County EOC TransGuide Workstation Implementation	Implement a TransGuide workstation in the San Antonio/Bexar County EOC. The workstation will allow the San Antonio/Bexar County emergency operations coordinator to access data and video from TransGuide and also serve as a backup TMC for the San Antonio Region.	Lead: San Antonio/Bexar County EOC, TxDOT	ATMS08 EM08
AACOG Portable DMS Deployment	AACOG would like to purchase two portable DMS that could be used anywhere in the AACOG Region by any of the County/Municipal EOCs. The primary use of the DMS would be for evacuation but they could also be used for other needs in the Region. Portable DMS will have cellular communications capability.	Lead: AACOG	EM06 EM08 EM09 EM10
Bexar County Early Warning System Study	Bexar County may conduct an initial study into developing an early warning system. The study will provide the County with realistic solutions which could involve numerous ITS technologies such as DMS, remote sensing, emergency routing, lights and beacons, barrier gates, and HAR. The cost is anticipated to be in the magnitude of $160,000.	Lead: Bexar County	EM07

Table 10 – Emergency Management Project Recommendations (continued)

Program Area/Project	Description	Stakeholders[1]	Applicable Market Packages[2]
Mid-Term Emergency Management Projects:			
County/Municipal Emergency Vehicle Signal Preemption	Implement emergency vehicle signal preemption on traffic signals throughout the Region for county and municipal fire and EMS vehicles.	Lead: Counties and Municipalities	ATMS03 EM02
TxDOT ATMS Software Integration with Municipal Public Safety CAD (Mid-Term)	Continue to integrate municipal and county emergency services computer aided dispatch (CAD) system with the TransGuide ATMS software. The integration will allow TransGuide to access real-time information about the incidents on the roadway and allow emergency dispatchers to access real-time information on traffic conditions. TxDOT would like to integrate software systems with as many municipalities and counties as possible.	Lead: TxDOT Others: Municipal Public Safety Departments	ATMS08 EM01
Alamo RMA Roadway Service Patrol	In order to maintain an efficient and effective roadway network, the Alamo RMA is interested in establishing a roadway service patrol which will respond to incidents and situations on the roadway such as vehicle breakdowns, flat tires, or debris on the roadway.	Lead: Alamo RMA	EM04

[1]Stakeholders listed will play a role the planning, implementation, operations, and/or maintenance of the project. The lead agency and any other agencies that have a role in the project are identified.

[2]Applicable market packages indicate the market packages that could be partially or fully implemented by the deployment of the listed project.

3.1.3 *Maintenance and Construction Management Project Recommendations*

Table 11 – Maintenance and Construction Management Project Recommendations

Program Area/Project	Description	Stakeholders[1]	Applicable Market Packages[2]
Short-Term Maintenance and Construction Management Projects:			
TxDOT District Wide Flood Detection System (Short-Term)	Implement flood detection equipment and possibly automated road closure gates at low water crossings on state routes within the TxDOT San Antonio Region.	Lead: TxDOT	ATMS21 EM07 MC03 MC04
TxDOT Portable DMS Deployment	Procure additional portable DMS with cellular communications capability for use in the TxDOT San Antonio District for maintenance and construction management as well as evacuation and emergency management purposes.	Lead: TxDOT	ATMS06 MC08
TxDOT Portable DMS Upgrades for Remote Communications	Upgrade existing portable DMS signs with cellular modems to allow remote communications.	Lead: TxDOT	ATMS06 MC08
TxDOT Real-Time HCRS (Statewide)	Integrate the Highway Condition Reporting System (HCRS) with District TMCs to get real-time incident information from ATMS into HCRS. This information would include incidents and lane closures.	Lead: TxDOT Travel Division	ATMS08 MC10 ATIS1
TxDOT Storm Water Pump Station Installation and Upgrades	Upgrading three existing storm water pump stations and add an additional pump station at SH151/LP 410.	Lead: TxDOT	MC03
City of San Antonio Flood Detection and Closure System (Short-Term)	Implement flood detection equipment at low water crossings on roadways within the City of San Antonio. In addition to the flood detection equipment, automated road closure gates could also be deployed at some locations.	Lead: City of San Antonio	ATMS21 MC03 MC04
City of San Antonio Portable DMS Deployment	Deploy portable DMS for use by the City of San Antonio to provide traveler information during special events, incidents, and construction.	Lead: City of San Antonio	ATMS08

Table 11 – Maintenance and Construction Management Project Recommendations (continued)

Program Area/Project	Description	Stakeholders[1]	Applicable Market Packages[2]
Bexar County Flood Detection and Closure System	Implement flood detection equipment at low water crossings within the limits of Bexar County. May also include automated road closure gates.	Lead: Bexar County	ATMS21 MC03 MC04
Comal County Flood Detection and Closure System	Implement flood detection equipment at low water crossings within the limits of Comal County. May also include automated road closure gates.	Lead: Comal County	ATMS21 MC03 MC04
Mid-Term Maintenance and Construction Management Projects:			
TxDOT District Wide Flood Detection System (Mid-Term)	Implement additional flood detection equipment and possibly automated road closure gates at low water crossings on state routes within the TxDOT San Antonio Region.	Lead: TxDOT	ATMS21 EM07 MC03 MC04
City of San Antonio Flood Detection and Closure System (Mid-Term)	Continue to implement additional flood detection equipment at low water crossings on roadways within the City of San Antonio. In addition to the flood detection equipment, automated road closure gates could also be deployed at some locations.	Lead: City of San Antonio	ATMS21 MC03 MC04
County/Municipal Flood Detection and Closure System	Implement additional flood detection equipment at low water crossings on roadways in counties and municipalities as needed in the Region. The project may also include automated road closure gates.	Lead: Counties and Municipalities	ATMS21 MC03 MC04

[1]Stakeholders listed will play a role the planning, implementation, operations, and/or maintenance of the project. The lead agency and any other agencies that have a role in the project are identified.

[2]Applicable market packages indicate the market packages that could be partially or fully implemented by the deployment of the listed project.

3.1.4 Public Transportation Management Project Recommendations

Table 12 – Public Transportation Management Project Recommendations

Program Area/Project	Description	Stakeholders[1]	Applicable Market Packages[2]
Short-Term Public Transportation Management Projects:			
VIA Metropolitan Bus Rapid Transit Program	Implement bus rapid transit on Fredericksburg Road as well as transit signal priority at signalized intersections in the City of San Antonio. The bus rapid transit project is currently underway. Transit signal priority will be added after the City of San Antonio has upgraded the current signal controllers throughout the Region.	Lead: VIA Metropolitan Other: City of San Antonio	APTS2 APTS7
VIA Metropolitan Closure and Traffic Information Access	Integrate real time traffic information from TransGuide system into VIA Demand Response dispatching system. Integration would allow VIA Demand Response access to real time information. VIA Fixed Route dispatchers are currently located in the TransGuide Operations room and have access to real time closure and traffic information.	Lead: VIA Metropolitan Other: TxDOT	APTS3 APTS7
VIA Metropolitan On-board Vehicle Communications Upgrade	Upgrade AVL and MDT system on VIA buses in the next 3-5 years. All new buses purchased have AVL and MDT systems installed. The upgrade would only impact older buses.	Lead: VIA Metropolitan	APTS1 APTS2 APTS3
VIA Metropolitan Smart Card Payment System	Implement Smart Card electronic fare collection system on VIA buses. The system should be coordinated with other transit agencies where possible to ensure future interoperability opportunities. VIA plans to have an RFP out by the end of 2007 and expects to implement the system in the next 3-5 years.	Lead: VIA Metropolitan Others: All transit agencies in the Region	APTS4
VIA Metropolitan Super Stop Deployment (Short-Term)	Implement super stops at existing transit stops throughout the Region. Super stops could include real-time bus arrival information signs, fare vending machines, and possibly CCTV cameras where communications exist. VIA has a 10-year plan for the deployment of super stops.	Lead: VIA Metropolitan	APTS2 APTS4 APTS5 APTS8

Table 12 – Public Transportation Management Project Recommendations (continued)

Program Area/Project	Description	Stakeholders[1]	Applicable Market Packages[2]
Alamo Regional Transit Fare Box Management Systems	AACOG Regional Transit is interested in the installation of fare boxes aboard buses for the collection of fares through the use of swipe cards, tokens, or cash. The cost is anticipated to be in the magnitude of $400,000.	Lead: Alamo Regional Transit	APTS4
Alamo Regional Transit Fixed and/or Deviated Routes in the AACOG Area	Conduct focus group meetings to involve the general public on their transportation needs. Upon reviewing the gathered information, create fixed or deviated routes. The cost is anticipated to be in the magnitude of $107,500. Funding has been identified through a Regional Coordination Planning Grant and TxDOT funds.	Lead: Alamo Regional Transit	APTS2 APTS3
Alamo Regional Transit New/Upgrade Dispatch Software	Complete an RFP for dispatch software to meet the growing needs of the AACOG rural transportation service area. This project may include upgrades and installation of AVL and GIS components on vehicles. The cost is anticipated to be in the magnitude of $180,000.	Lead: Alamo Regional Transit	APTS1 APTS2 APTS3
Alamo Regional Transit MDC Deployments	Implement mobile data computers (MDC) for the Alamo Regional Transit vehicles. The fleet size is 70 vehicles. The cost is anticipated to be in the magnitude of $560,000, and includes the cost of computers as well as three new vans. Funding for this project has been applied for by AACOG.	Lead: Alamo Regional Transit	APTS1 APTS2
Alamo Regional Transit Security at the Kerrville Intermodal Facility	Create and implement a security plan for the Kerrville Intermodal Facility in Kerrville Texas. The cost is anticipated to be in the magnitude of $80,000.	Lead: Alamo Regional Transit	APTS5
CCSWT AVL Pilot Study	Purchase, install and manage an AVL system on test vehicles in a pilot study in order to determine whether adopting such a system would be beneficial to the CCSWT transit program.	Lead: CCSWT	APTS1 APTS3
Coach America KBC Passenger Information Signs	Implement passenger information signs that could display real-time information on bus schedule and location. Other information that could be displayed includes fare prices, routes and special announcements.	Lead: Coach America KBC	APTS8

Table 12 – Public Transportation Management Project Recommendations (continued)

Program Area/Project	Description	Stakeholders[1]	Applicable Market Packages[2]
Coach America KBC Integrated Website Management	Coach America KBC is interested in integrating and coordinating with rural transit providers to better serve the local populace and share a common ticketing system.	Lead: Coach America KBC Other: Other Regional Transit Providers	APTS4 APTS7 APTS8
Mid-Term Public Transportation Management Projects:			
VIA Metropolitan IVR Reservation System for Demand Response Transit	Implement an Interactive Voice Response (IVR) system to allow demand response reservations to be made by phone.	Lead: VIA Metropolitan	APTS3 APTS4 APTS8
VIA Metropolitan Personalized Real Time Information Applications	Implement system to allow information to be disseminated through various communication modes to subscribers such as automated telephone calls, text messaging, e-mails, or paging. Information could include real-time information on bus arrival and delays.	Lead: VIA Metropolitan	APTS8
VIA Metropolitan Super Stop Deployment (Mid-Term)	Continue to deploy super stops as part of the 10-year deployment program. Super stops could include real-time bus arrival information signs, fare vending machines, and possibly CCTV cameras where communications exist.	Lead: VIA Metropolitan	APTS2 APTS4 APTS5 APTS8

[1]Stakeholders listed will play a role the planning, implementation, operations, and/or maintenance of the project. The lead agency and any other agencies that have a role in the project are identified.

[2]Applicable market packages indicate the market packages that could be partially or fully implemented by the deployment of the listed project.

3.1.5 *Traveler Information Project Recommendations*

Table 13 – Traveler Information Project Recommendations

Program Area/Project	Description	Stakeholders[1]	Applicable Market Packages[2]
Short-Term Traveler Information Projects:			
TxDOT 511 Traveler Information	Implement traveler information 511 phone service to make real-time transportation information available to the public both pre-trip and en-route. The TxDOT Traffic Operations Division is leading this effort statewide. Real-time information will be needed from the TxDOT San Antonio District in order to provide 511 users information on travel conditions in the San Antonio Region. The San Antonio Region could also serve as a possible test site for the initial deployment of 511.	Lead: TxDOT Operations Division	ATIS1 ATIS2
TxDOT AMBER Alerts	Complete statewide center-to-center communications system to allow TransGuide the ability to place AMBER Alerts on DMS throughout the state. TransGuide is currently serving as the TxDOT point of contact of AMBER Alert notification from DPS and the distribution point for TxDOT.	Lead: TxDOT Other: DPS	ATIS1
TxDOT AWARD System Expansion	The Advanced Warning to Avoid Railroad Delay (AWARD) system is designed to help motorists avoid delays due to railroad operations that cross freeway access roads. The system utilizes Doppler radar sensors placed along railroad tracks which detect the presence, length, and speed of trains before they reach intersections. Delays and information would be disseminated to travelers through DMS and on the TransGuide Website.	Lead: TxDOT Others: City of San Antonio	ATIS1 ATMS14
TxDOT Personal Emergency Transportation Plan	This project is based on a website that allows travelers to develop a personalized plan for use on their daily commutes. The website will generate alternate route options for travelers in the event that their typical route was closed or congested.	Lead: TxDOT Others: City of San Antonio	ATIS2 ATIS5
City of San Antonio Traveler Information System	Develop a traveler information system for the City of San Antonio. The system could include real time traffic information provided through the City of San Antonio website as well as roadside traveler information provided on DMS.	Lead: City of San Antonio	ATMS01 ATMS06 ATMS08

Table 13 – Traveler Information Project Recommendations (continued)

Program Area/Project	Description	Stakeholders[1]	Applicable Market Packages[2]
Mid-Term Traveler Information Projects:			
City of San Antonio Web-based Information Sharing of Video Feeds	Provide real-time video feeds to the City of San Antonio website for access by the general public and other agencies.	Lead: City of San Antonio	ATIS1 ATMS01

[1]Stakeholders listed will play a role the planning, implementation, operations, and/or maintenance of the project. The lead agency and any other agencies that have a role in the project are identified.

[2]Applicable market packages indicate the market packages that could be partially or fully implemented by the deployment of the listed project.

3.1.6 *Archived Data Management Project Recommendations*

Table 14 – Archive Data Management Project Recommendations

Program Area/Project	Description	Stakeholders[1]	Applicable Market Packages[2]
Short-Term Archive Data Management Projects:			
TransGuide Data Archive Upgrades	TransGuide currently has a data archive that serves both as an ITS Data Mart for TxDOT and as an ITS Data Warehouse for multiple TransGuide partners. The data archive will need to be enhanced and upgraded over time as its functionality expands for such projects as the Integrated Corridor Management deployment.	Lead: TxDOT Others: City of San Antonio, VIA Metropolitan	AD1 AD2

[1]Stakeholders listed will play a role the planning, implementation, operations, and/or maintenance of the project. The lead agency and any other agencies that have a role in the project are identified.

[2]Applicable market packages indicate the market packages that could be partially or fully implemented by the deployment of the listed project.

4. MAINTAINING THE ITS REGIONAL DEPLOYMENT PLAN

Just as the ITS Architecture developed for the San Antonio Region documents the Region's goals for ITS implementation at the time it was prepared, the ITS Deployment Plan addresses the projects that stakeholders agreed were necessary to implement at the time the plan was developed in order to reach their ITS deployment goals. As the Region grows, needs will change, and, as technology progresses new ITS opportunities will arise. Shifts in regional focus as well as changes in the National ITS Architecture will necessitate the San Antonio Regional ITS Architecture be updated to remain a useful resource for the Region. These same changes will create new project opportunities and revisions to the projects in this ITS Deployment Plan.

Stakeholders agreed upon a procedure for updating the Regional ITS Architecture and Deployment Plan. The procedure, documented in the San Antonio Regional ITS Architecture, outlines how to document architecture changes for inclusion in the next plan update. While complete plan updates are scheduled for once every four years, stakeholders agreed that it would be beneficial to review the projects identified in the ITS Deployment Plan once a year. TxDOT San Antonio District will lead the annual project reviews. The purpose of the discussion would be to update the project status, remove projects that were completed, add project detail when available, and add new projects as needed. Any corresponding architecture changes would be documented and retained by TxDOT for inclusion during the next complete update of the Regional ITS Architecture.