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Texas Department of Transportation  
Regional ITS Architectures and Deployment Plans



# Austin Region

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## Regional ITS Architecture Report

*Prepared by:*



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## LIST OF ACRONYMS

AASHTO	American Association of State Highway and Transportation Officials
ABIA	Austin Bergstrom International Airport
AMBER	America's Missing: Broadcast Emergency Response
APCO	Association of Public Safety Communications Officials
ASTM	American Society for Testing and Materials
ATIS	Advanced Travel Information System
ATMS	Advanced Traffic Management System
AVL	Automated Vehicle Location
CAD	Computer Aided Dispatch
CAMPO	Capital Area Metropolitan Planning Organization
CARTS	Capital Area Rural Transportation System
CCTV	Closed-Circuit Television
CTECC	Combined Transportation and Emergency Communications Center
CTRMA	Central Texas Regional Mobility Authority
CVISN	Commercial Vehicle Information Systems and Networks
DEM	Department of Emergency Management
DMS	Dynamic Message Sign
DOT	Department of Transportation
DPS	Department of Public Safety
DSRC	Dedicated Short Range Communication
EMC	Emergency Management Center
EMS	Emergency Medical Services
EOC	Emergency Operations Center
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
FTP	File Transfer Protocol
HAR	Highway Advisory Radio
HAZMAT	Hazardous Materials
HCRS	Highway Conditions Reporting System
HRI	Highway Rail Intersection

## LIST OF ACRONYMS

IEEE	Institute of Electrical and Electronics Engineers
IMMS	Incident Management Message Sets
ITE	Institute of Transportation Engineers
ITIS	International Traveler Information Systems
ITS	Intelligent Transportation System
ISD	Independent School District
ISO	International Standards Organization
LCRA	Lower Colorado River Authority
LED	Light Emitting Diode
LRMS	Location Referencing Message Specification
L RTP	Long Range Transportation Plan
MAC	Medium Access Control
MDT	Mobile Data Terminal
MPO	Metropolitan Planning Organization
NEMA	National Electrical Manufacturers Association
NOAA	National Oceanic and Atmospheric Administration
NTCIP	National Transportation Communications for ITS Protocol
OER	Octet Encoding Rules
PIO	Public Information Office
PSAP	Public Safety Answering Point
PTMS	Public Transportation Management System
PTZ	Pan/Tilt/Zoom
PWD	Public Works Department
RDMT	Radio, Dispatch, Mobile Data, Transportation
RDS	Radio Data Systems
SAE	Society of Automotive Engineers
SAFETEA-LU	Safe, Accountable, Flexible and Efficient Transportation Equity Act – A Legacy for Users
SDO	Standards Development Organization
STMF	Simple Transportation Management Framework

## LIST OF ACRONYMS

STS	Special Transit Service
TCEQ	Texas Commission on Environmental Quality
TEA-21	Transportation Equity Act for the 21st Century
TIP	Transportation Involvement Plan
TMC	Traffic Management Center
TMDD	Traffic Management Data Directory
TOC	Traffic Operations Center
TTA	Texas Turnpike Authority
TxDOT	Texas Department of Transportation
USDOT	United States Department of Transportation
USGS	United States Geological Survey
UT	University of Texas
VIVDS	Video Imaging Vehicle Detection System

# 1. INTRODUCTION

## 1.1 Project Overview

Development of a regional intelligent transportation system (ITS) architecture is one of the most important steps in planning for and implementing ITS in a region. 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. The ITS architecture allows stakeholders to plan for what they want their system to look like in the long-term and then break out the system into smaller pieces that can be implemented as funding permits.

ITS architectures satisfy the conformity requirements first established in the Transportation Equity Act for the 21<sup>st</sup> Century (TEA-21) highway bill and continued in the Safe, Accountable, Flexible and Efficient Transportation Equity Act – A Legacy for Users (SAFETEA-LU) bill passed in 2005. In response to Section 5206(e) of TEA-21, the Federal Highway Administration (FHWA) issued a final rule and the Federal Transit Administration (FTA) issued a final policy that required regions implementing any ITS project to have an ITS architecture in place by April 2005. After this date, any ITS projects must show conformance with their regional ITS architecture in order to be eligible for funding from FHWA or FTA.

In an effort led by the Texas Department of Transportation (TxDOT) Austin District, the Austin Region completed an ITS architecture in March of 2003 using Version 3.0 of the National ITS Architecture. The geographic boundaries of the original architecture for the Region were those of the Capital Area Metropolitan Planning Organization (CAMPO) area and included Travis, Williamson, and Hays Counties. Since that time, the Austin Region has grown and the National ITS Architecture has been revised.

In January of 2006, the TxDOT Austin District began a project to update the Austin Regional ITS Architecture using Version 5.1 of the National ITS Architecture. As part of this project, the geographic boundaries have been expanded to cover the entire TxDOT Austin District. The project focuses on a 20-year vision of ITS for the Region. A project website was developed which contains additional information that was not feasible to include in the report. In addition, a separate ITS Deployment Plan was developed to identify and prioritize specific ITS projects recommended for the Region in order to implement the ITS architecture.

The ITS Architecture and the ITS Deployment Plan were both developed with significant input from local, state, and federal officials. A series of workshops were held to solicit input from stakeholders and ensure that the plans reflected the unique needs of the Region. Copies of the draft reports were made available 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 an accurate snapshot of existing ITS deployment 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 Austin Regional ITS Architecture report is organized into five key sections:

### Section 1 – Introduction

This section provides an overview of the National ITS Architecture requirements, the Austin Regional ITS Architecture, and the key features and stakeholders in the Austin Region.

### Section 2 – Regional ITS Architecture Development Process

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

### Section 3 – Customization of the National ITS Architecture for the Austin Region

This section contains a summary of regional needs and details the customization of the National ITS Architecture to meet the ITS vision for the Region. The market packages that were selected for the Region are included in this section and interconnects are presented, including the “Sausage Diagram” showing the relationships of the key subsystems and elements in the Region, system interfaces, and the physical subsystem architecture flows.

### Section 4 – Application of the Regional ITS Architecture

Functional requirements and standards that apply to the Region, as indicated by the Regional ITS Architecture, are presented in Section 4. Operational concepts identifying stakeholder roles and responsibilities have been prepared, and potential agreements to support the sharing of data and resources have been identified. The section also includes information on how the Region anticipates deploying ITS to achieve their vision.

### Section 5 – Maintaining the Regional ITS Architecture

A maintenance plan has been developed for the Austin Regional ITS Architecture, and is included in this section. The plan outlines the procedure for updating the ITS architecture over time.

The Austin Regional ITS Architecture also contains six appendices:

- Appendix A – Stakeholder Interviews;
- Appendix B – Market Package Definitions;
- Appendix C – Customized Market Packages;
- Appendix D – Context Diagrams;
- Appendix E – Element Functions; and
- Appendix F – Architecture Maintenance Documentation Form.

During the development of the Austin Regional ITS Architecture a web site was established that contains the architecture documentation, element inventories, market packages, interconnects, interfaces, and functional requirements. This web site was temporarily housed at [www.consystem.com](http://www.consystem.com) under the Texas Regional link and may be hosted at a later date by the Texas Department of Transportation. The web site provides hyperlinks to more detailed information about the Austin Regional ITS Architecture than what could feasibly be included in the printed document. In certain sections of the document, readers are referred to the web site for additional information and details. All of the files contained on the website are also available on a project CD.

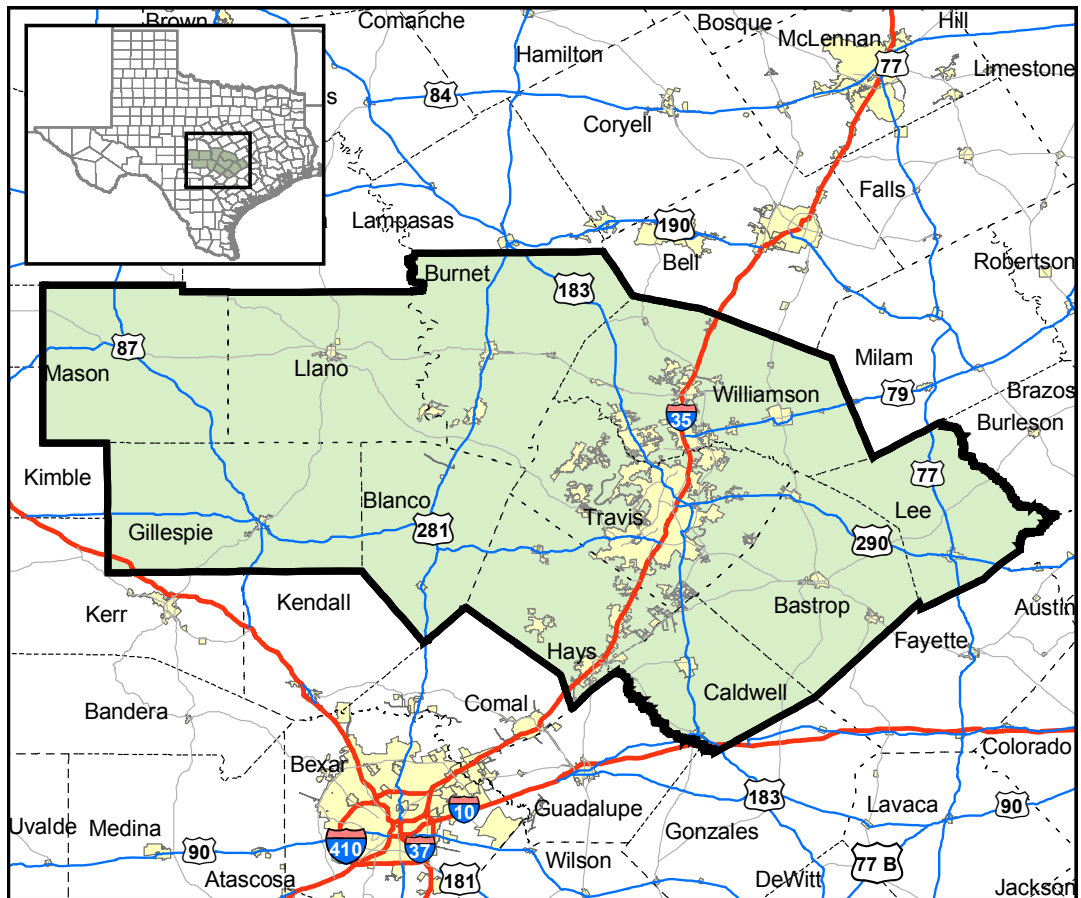


### 1.3 The Austin Region

#### 1.3.1 Austin Region Scope of Regional ITS Architecture

The Austin Region is defined by the boundaries of the 11 county TxDOT Austin District as shown in **Figure 1**.

The Region encompasses 9,489 square miles in central Texas. It includes Bastrop, Blanco, Burnet, Caldwell, Gillespie, Hays, Lee, Llano, Mason, Travis, and Williamson Counties. The largest city in the Region is Austin, which is situated in the center of Travis County. The Austin Region population is approximately 1.5 million.



**Figure 1 – Austin Regional Boundaries**

While Austin is the largest city in the Region, there are many other communities within the geographic boundaries of the Region. When developing the stakeholder group, invitations were sent to cities with a population greater than 5,000, counties, state and federal agencies, and area transit providers. **Table 1** in Section 1.3.4 identifies the stakeholders that participated in the process.

When developing the architecture, a 20-year vision for ITS in the Region was documented. In the ITS Deployment Plan, the 20-year time frame was broken down into smaller time periods to prioritize and sequence the projects. The naming convention used for elements in the Austin Regional ITS Architecture is consistent with the naming convention used in

other regional ITS architectures in Texas, including those in the adjacent Brazos Valley, Waco, West Central Texas, San Angelo, and Yoakum Regions. This consistency provides seamless connections to those other architectures without requiring that they be specifically called out. The Other TxDOT TMCs and Other TxDOT District Maintenance Sections Dispatch elements allow connections to all of the adjacent Regions. As in other Regions, statewide commercial vehicle operations were not included in the regional ITS architecture because they are documented in the statewide Commercial Vehicle Information Systems and Networks (CVISN) plan.

### *1.3.2 Transportation Infrastructure*

As illustrated in **Figure 1**, the Region is served by numerous State and Federal highways. The primary roadway facilities include I-35, US 183, US 281, US 290, and SH 71. Several toll facilities are planned or under construction for the Region including US 183A, portions of US 183 and US 290, SH 45, portions of SH 71, and SH 130.

I-35 is the primary highway in the Region; I-35 and US 183 run north-south and SH 71 and US 290 run east-west. The effective operation of I-35 is critical to the movement of goods and people through the State of Texas as well as the United States. I-35 extends from Laredo, Texas on the U.S.-Mexico border to Duluth, Minnesota. Construction and incidents along I-35 can have a severe impact on commercial vehicle traffic and motorists traveling through the Region on this significant cross-country facility.

US 183, US 290, and SH 71 serve several rapidly growing communities north and east of the City of Austin. Most of the traffic along the roadways is daily commuter traffic and this travel pattern is anticipated to continue growing in coming years.

When complete, SH 130 will provide an alternate route for trucks to avoid I-35 through the Austin metropolitan area. The other toll facilities will improve access to suburbs of Austin and serve primarily daily commuter traffic.

### *1.3.3 Austin Region ITS Plans*

A Regional ITS Architecture for the Austin Region was first completed in 2003 using Version 3.0 of the National ITS Architecture. In 2005, the Region determined that an update to the architecture was needed to incorporate additional stakeholder agencies and address new market packages included in Version 5.1 of the National ITS Architecture. TxDOT contracted with a team of consultants to lead the update effort.

The Austin Region has many ITS components deployed. The Combined Transportation and Emergency Communications Center (CTECC) is a joint operations center from which TxDOT manages their ITS field components and the City of Austin and Travis County dispatch emergency responders. TxDOT field equipment includes dynamic message signs (DMS), closed-circuit television cameras (CCTV), vehicle detection equipment, highway advisory radio (HAR), and lane control signals. Many of the cities in the Region have transportation operations centers in place and are deploying ITS on arterial streets such as closed loop signal systems with video imaging vehicle detection system (VIVDS) and signal preemption for emergency vehicles. Both Capital Metro and Capital Area Rural Transportation System have plans to add to their existing ITS deployments. As the Austin Region pursues funding opportunities for additional ITS projects, it will be necessary to show that a project fits within the ITS architecture developed for the Region.

### 1.3.4 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.

**Table 1** contains a listing of stakeholders in the Austin Region who have participated in the project workshops or provided input to the study team as to the needs and issues that should be considered as part of the Austin Regional ITS Architecture. Other stakeholders that were invited to participate but were not able to attend were provided minutes of workshops, copies of reports, and access to the project web site to encourage their participation as much as possible.

**Table 1 – Austin Stakeholder Agencies and Contacts**

Stakeholder Agency	Address	Contact
Austin – Travis County EMS	CTECC 5010 Old Manor Road Austin, Texas 78723	Clayton Smith
Burnet County	511 Hwy 281 Marble Falls, Texas 78654	Jon Don Dockery
Burnet County	220 South Pierce Burnet, Texas 78611	Ronny Hibler
Burnet County	220 South Pierce Burnet, Texas 78611	Donna Klaeger
Caldwell County	110 South Main Street, Room 201 Lockhart, Texas 78644	Tom Bonn
Caldwell County	1400 FM 20 East Lockhart, Texas 78644	Jim Parker
Capital Area Metropolitan Planning Organization	P.O. Box 1088 Austin, Texas 78767-1088	Michelle Meaux
Capital Area Metropolitan Planning Organization	P.O. Box 1088 Austin, Texas 78767-1088	Cathy Stephens
Capital Area Rural Transportation System	2010 East 6 <sup>th</sup> Street Austin, Texas 78702	Adrian Elliot
Capital Area Rural Transportation System	2010 East 6 <sup>th</sup> Street Austin, Texas 78702	Rene Guajardo
Capital Area Rural Transportation System	2010 East 6 <sup>th</sup> Street Austin, Texas 78702	Dave Marsh
Capital Metropolitan Transportation Authority	2910 East 5 <sup>th</sup> Street Austin, Texas 78702	Nancy Brown
Capital Metropolitan Transportation Authority	2910 East 5 <sup>th</sup> Street Austin, Texas 78702	Mark Clendennen
Capital Metropolitan Transportation Authority	2910 East 5 <sup>th</sup> Street Austin, Texas 78702	Jane Schroter
Central Texas Regional Mobility Authority	301 Congress Avenue, Suite 650 Austin, Texas 78701	Ron Fagan
City of Austin	P.O. Box 1088 Austin, Texas 78767	Jasper Brown

**Table 1 – Austin Stakeholder Agencies and Contacts (continued)**

<b>Stakeholder Agency</b>	<b>Address</b>	<b>Contact</b>
City of Austin	1501 Toomey Road Austin, Texas 78704	Ali Mozdbar
City of Austin	1501 Toomey Road Austin, Texas 78704	Teresa Reel
City of Austin Fire Department	CTECC 5010 Old Manor Road Austin, Texas 78723	Palmer Buck
City of Austin Police Department	P.O. Box 689001 Austin, Texas 78768-9001	Stephen Baker
City of Cedar Park	600 North Bell Boulevard Cedar Park, Texas 78613	Alan Green
City of Cedar Park	911 Quest Pkwy Cedar Park, Texas 78613	James Mallinger
City of Cedar Park	880 Brushy Creek Road Cedar Park, Texas 78613	Eric Rauschber
City of Cedar Park	600 North Bell Boulevard Cedar Park, Texas 78613	Duane Smith
City of Georgetown	City Hall 113 East 8th Street Georgetown, Texas 78627	Paul Brandenburg
City of Georgetown	103 West 7th Street Georgetown, Texas 78627	Dennis Schoenborn
City of Georgetown Police Department	809 Martin Luther King, Jr. Georgetown, Texas 78626	David Morgan
City of Georgetown Utility Services	300 Industrial Avenue Georgetown, Texas 78626	Mark Miller
City of Marble Falls	800 Third Street Marble Falls, Texas 78654	Tim Dolan
City of Marble Falls	800 Third Street Marble Falls, Texas 78654	Perry Malkemus
City of Marble Falls	800 Third Street Marble Falls, Texas 78654	Judy Miller
City of Marble Falls	800 Third Street Marble Falls, Texas 78654	George Russell
City of Marble Falls Fire Department	700 Avenue North Marble Falls, Texas 78654	Ralph Hendricks
City of Marble Falls Police Department	209 Main Street Marble Falls, Texas 78654	Mark Whitacre
City of Round Rock	212 Commerce Cove Round Rock, Texas 78664	David Bartels
City of Round Rock	212 Commerce Cove Round Rock, Texas 78664	Thomas Martin
City of Round Rock Fire Department / EOC	203 Commerce Round Rock, Texas 78664	Mark Selby
City of Round Rock Police Department	615 East Palm Valley Round Rock, Texas 78664	Chris Bratton

**Table 1 – Austin Stakeholder Agencies and Contacts (continued)**

<b>Stakeholder Agency</b>	<b>Address</b>	<b>Contact</b>
City of Round Rock Police Department	615 East Palm Valley Round Rock, Texas 78664	Maureen Ganner
City of Round Rock Police Department	615 E. Palm Valley Round Rock, Texas 78664	Richard Johnson
City of San Marcos	630 East Hopkins San Marcos, Texas 78666	Sabas Avila
City of San Marcos Fire and Rescue	630 East Hopkins San Marcos, Texas 78666	Mike Baker
City of San Marcos Police Department	2300 IH 35 South San Marcos, Texas 78666	Johnny James
FHWA Texas Division	300 East 8th Street, Room 826 Austin, Texas 78701	Scott Bowles
FHWA Texas Division	300 East 8th Street, Room 826 Austin, Texas 78701	Mark Olson
Hays County	111 E. San Antonio Street Suite 303 San Marcos, Texas 78666	Richard Salmon
Hays County Emergency Management	102 N. LBJ, Room 303 San Marcos, Texas 78666	Jeff Turner
NOAA – National Weather Service	2090 Airport Road New Braunfels, Texas 78130	Joe Arellano, Jr.
NOAA – National Weather Service	2090 Airport Road New Braunfels, Texas 78130	Larry Eblen
NOAA – National Weather Service	2090 Airport Road New Braunfels, Texas 78130	Jon Zeitler
Texas Department of Public Safety District 6B	9000 IH 35 North Austin, Texas 78753	John Reney Jr.
Texas Department of Public Safety District 6B	9000 IH 35 North Austin, Texas 78753	Casey Goetz
Texas State University Transportation Department	601 University Drive San Marcos, Texas 78666	Paul Hamilton
Travis County	P.O. Box 1748 Austin, Texas 78767	David Greear
Travis County	P.O. Box 1748 Austin, Texas 78767	Joe Hall
TxDOT Austin District	7901 North IH 35 Austin, Texas 78753-6602	Brian Burk
TxDOT Austin District	7901 North IH-5 Building 3A, 2 <sup>nd</sup> Floor Austin, Texas 78753	Keith Dunmire
TxDOT Austin District	7901 North IH 35 Austin, Texas 78753-6602	Joe Holland
TxDOT Austin District	7901 North IH35 Building 3A, 2nd Floor Austin, Texas 78753	Wayne Rehnberg

**Table 1 – Austin Stakeholder Agencies and Contacts (continued)**

<b>Stakeholder Agency</b>	<b>Address</b>	<b>Contact</b>
TxDOT Austin District	7901 North IH 35 Austin, Texas 78753	Darcie Schipull
TxDOT Austin District Courtesy Patrol	PO Box 15426 NEAS Austin, Texas 78761-5426	Russell Davenport
TxDOT Burnet Area Office	3029 E. SH 29 Burnet, Texas 78611	Howard Lyons
TxDOT – Public Transportation Division	125 East 11th Street Austin, Texas 78701	Kris Dudley
TxDOT – Public Transportation Division	123 East 11th Street Austin, Texas 78737	Susan Hausmann
TxDOT –Texas Turnpike Authority Division	11801 Stonehollow Drive Building C, Suite 100 Austin, Texas 78758	Julie Dillard
TxDOT – Texas Turnpike Authority Division	11801 Stonehollow Drive Building C, Suite 100 Austin, Texas 78758	Linda Sexton
TxDOT – Texas Turnpike Authority Division / PBS&J	6504 Bridge Point Parkway Suite 200 Austin, Texas 78730	Rene Garza
TxDOT – Texas Turnpike Authority Division / PBS&J	11801 Stonehollow Drive Building C, Suite 100 Austin, Texas 78758	Gloria Stoppenhagen
TxDOT – Traffic Operations Division	Attn:TRF-Cedar Park #51, Wing E 125 East 11th Street Austin, Texas 78701-2483	Alesia Gamboa
University of Texas Center for Transportation Research	3208 Red River Austin, Texas 78705	Ron White
Village of Bee Cave	13333-A HWY 71 W Bee Cave, Texas 78738	Travis Askey
Williamson County	301 SE Inner Loop, Suite 105 Georgetown, Texas 78626	Jay Schade
Williamson County 9-1-1 Communications	508 South Rock Street Georgetown, Texas 78626	Sara Floyd
Williamson County EMS	303 MLK Street Georgetown, Texas 78627	Thomas Bradford
Williamson County EMS	P.O. Box 873 Georgetown, Texas 78627	Jeff Hayes
Williamson County Sheriff's Office	508 South Rock Street Georgetown, Texas 78626	M Gleason
Williamson County Sheriff's Office	508 South Rock Street Georgetown, Texas 78626	Shawn Newson

## 2. REGIONAL ITS ARCHITECTURE DEVELOPMENT PROCESS

Development of the Regional ITS Architecture and Deployment Plan for the Austin Region relied heavily on stakeholder input to ensure that the architecture reflected local needs. Six workshops were held with stakeholders to gather input, and a web site with the components of the Regional ITS Architecture as well as hard copies of documents were made available to stakeholders for review and comment. Many individual interviews were also conducted with representatives of stakeholder agencies.

The process followed for the Austin Region was designed to ensure that stakeholders could provide input and review for the development of the Region’s ITS Architecture and Deployment Plan. **Figure 2** illustrates the stakeholder involvement process utilized.

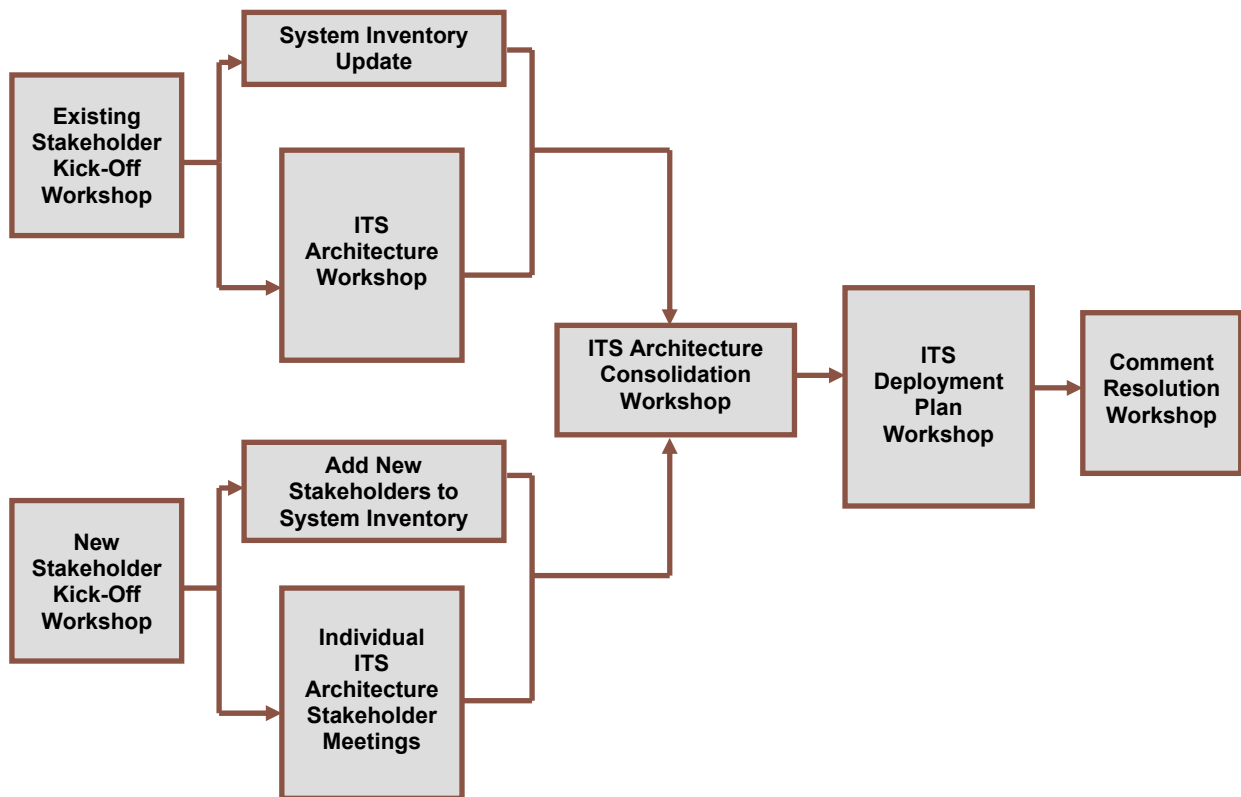


Figure 2 – Austin Regional ITS Architecture and Deployment Plan Development Process

A total of six workshops with stakeholders over a period of eight months were used to develop the Austin Regional ITS Architecture and Deployment Plan. These workshops included:

- Kick-Off Workshop (one for existing stakeholders and another for new stakeholders);
- ITS Architecture Workshop;
- ITS Architecture Consolidation Workshop;
- ITS Deployment Plan Workshop; and
- Comment Resolution Workshop.

In addition to the workshops listed above, the project team met individually with stakeholders, especially the new stakeholders, to document their ITS equipment and future needs. Key components of the process are described below:

**Existing Stakeholder Kick-Off Workshop:** Stakeholder agencies that were involved in the initial development of the Austin Regional ITS Architecture were invited to a project Kick-Off Workshop. At this workshop stakeholders reviewed the ITS services included in the 2003 architecture and identified additional ITS needs for the Region.

**System Inventory Update:** Collecting information to update the system inventory began at the Kick-Off Workshop through stakeholder discussions. After the Kick-Off Workshop, the team followed up with a number of stakeholders to gather additional input. To complete the inventory, stakeholders were presented with a draft inventory at the ITS Architecture Workshop for modification.

**ITS Architecture Workshop and ITS Architecture Development:** The purpose of the ITS Architecture Workshop was to review the system inventory with existing stakeholders and update the Austin Regional ITS Architecture to address market packages added to the National ITS Architecture in Version 5.1 and additional regional needs. Training on the National ITS Architecture was integrated into the workshop so that key elements of the architecture, such as market packages, could be explained prior to the selection and editing of these elements. The result of the ITS Architecture Workshop was an updated ITS Architecture for the Austin Region. Following the workshop, a Draft Regional ITS Architecture was prepared and placed on the project website for stakeholder review and comment.

**New Stakeholder Kick-Off Workshop:** A group of additional stakeholders who had not been involved in the original architecture development effort was identified and invited to the New Stakeholder Kick-Off Workshop. At this workshop stakeholders identified ITS needs for the Region.

**Addition of New Stakeholders to System Inventory:** Collecting information to add the new stakeholder agencies to the system inventory began at the New Stakeholder Kick-Off Workshop through discussions with stakeholders to determine existing and planned ITS elements in the Region. After the Kick-Off Workshop, the team followed up with a number of stakeholders to gather additional input.

**Individual ITS Architecture Stakeholder Meetings:** The project team scheduled a series of individual agency meetings with new stakeholders to finalize the system inventory and customize market packages to document existing ITS elements as well as ITS needs. The information from these meetings was compiled and used to update the architecture. A Draft Austin Regional ITS Architecture document was prepared and sent to stakeholders for review. In addition, the project website was updated for stakeholder review and comment.

**ITS Architecture Consolidation Workshop:** Both existing and new stakeholder groups were invited to a workshop to address regional coordination of ITS services. The workshop focused on market packages that involve multiple agencies. Following the workshop, the architecture was revised and a Revised Draft Austin Regional ITS Architecture document was prepared and sent to stakeholders for review. In addition, the project website was updated for stakeholder review and comment.



**ITS Deployment Plan Workshop:** A draft project listing for the Region was presented to stakeholders at the Regional ITS Deployment Plan Workshop. Stakeholders were asked to provide input on the recommended projects, responsible agencies, associated costs, and deployment timeframe. Following the workshop, a Draft Regional ITS Deployment Plan document was prepared and sent to stakeholders for review and comment.

**Comment Resolution Workshop:** A Comment Resolution Workshop was held with stakeholders to review the Revised Draft Regional ITS Architecture and the Draft Regional ITS Deployment Plan. The next steps for the Region were also discussed. Comments were incorporated, and a final Regional ITS Architecture and Regional ITS Deployment Plan were developed.

### 3. CUSTOMIZATION OF THE NATIONAL ITS ARCHITECTURE FOR THE AUSTIN REGION

#### 3.1 Systems Inventory

An important initial step in the architecture development process is to establish an inventory of existing ITS elements. At the Kick-Off Workshops and through subsequent discussions with agency representatives throughout the Region, Austin stakeholders provided the team with information about existing and planned systems that would play a role in the Region's ITS architecture.

The National ITS Architecture has eight groups of ITS service areas. Existing, planned, and future systems in the Austin Region were identified in the following service areas:

- **Traffic Management** – includes the CTECC as well as other existing and future traffic management centers (TMCs), detection systems, CCTV, fixed and portable DMS, electronic toll collection, and other related technologies.
- **Emergency Management** – includes emergency operations/management centers (including CTECC), improved information sharing among traffic and emergency services, automated vehicle location (AVL) on emergency vehicles, traffic signal preemption for emergency vehicles, and wide-area alerts.
- **Maintenance and Construction Management** – includes work zone management, roadway maintenance and construction information, and road weather detection systems.
- **Public Transportation Management** – includes transit and paratransit AVL, transit travel information systems, transit signal priority, electronic fare collection, and transit security.
- **Commercial Vehicle Operations** – includes coordination with CVISN efforts, and hazardous materials (HAZMAT) management.
- **Traveler Information** – includes broadcast traveler information, traveler information kiosks and HAR.
- **Archived Data Management** – includes electronic data management and archiving systems.
- **Vehicle Safety** – these systems were discussed; however, at this time, this service group is primarily a private sector initiative to incorporate technologies such as intersection collision avoidance and automated vehicle operation systems into vehicles.

#### 3.2 Regional Needs

Needs from the Region were identified by Stakeholders at the Kick-Off Workshops held in January and February of 2006 as well as through the individual stakeholder meetings. **Appendix A** contains the stakeholder interview information sheets that document the discussions held at the individual meetings.

The needs identified provided guidance for determining which market packages should be included in the architecture. Stakeholders identified ITS needs for the Austin Region in the following areas:

- Traffic management;
- Emergency management;
- Maintenance and construction management;
- Transit operations;

- Traveler information; and
- Archive data management.

Section 3.4.3 contains additional information about the specific needs identified and relates those needs to the market packages that document the corresponding ITS service.

### 3.3 Element Customization

The inventory and needs documented at the Kick-Off Workshop are the starting point for developing an ITS architecture for the Austin Region. These ITS systems and components are used to customize the National ITS Architecture and create the architecture for the Austin Region.

#### 3.3.1 Subsystems and Terminators

Each identified system or component in the Austin Regional ITS inventory was mapped to a subsystem or terminator in the National ITS Architecture. Subsystems and terminators are the ‘entities’ that represent systems in ITS. Subsystems are the highest level building blocks of the physical architecture, and the National ITS Architecture groups them into four major classes: Centers, Field, Vehicles, and Travelers. Each of these major classes includes various subsystems that represent a set of transportation functions (or processes) that are likely to be collected together under one agency, jurisdiction, or location, and correspond to physical elements, such as traffic operations centers, traffic signals, or vehicles. **Figure 3** shows the National ITS Architecture subsystems. This figure, also known as the “sausage diagram,” is a standard interconnect diagram showing the relationships of the various subsystems within the architecture; a customized interconnect diagram for the Austin Region is shown later in **Figure 4**. Communication functions between the subsystems are represented in the ovals. It should be noted that fixed-point to fixed-point communications include not only twisted pair and fiber optic technologies, but also such wireless technologies as microwave and spread spectrum.

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

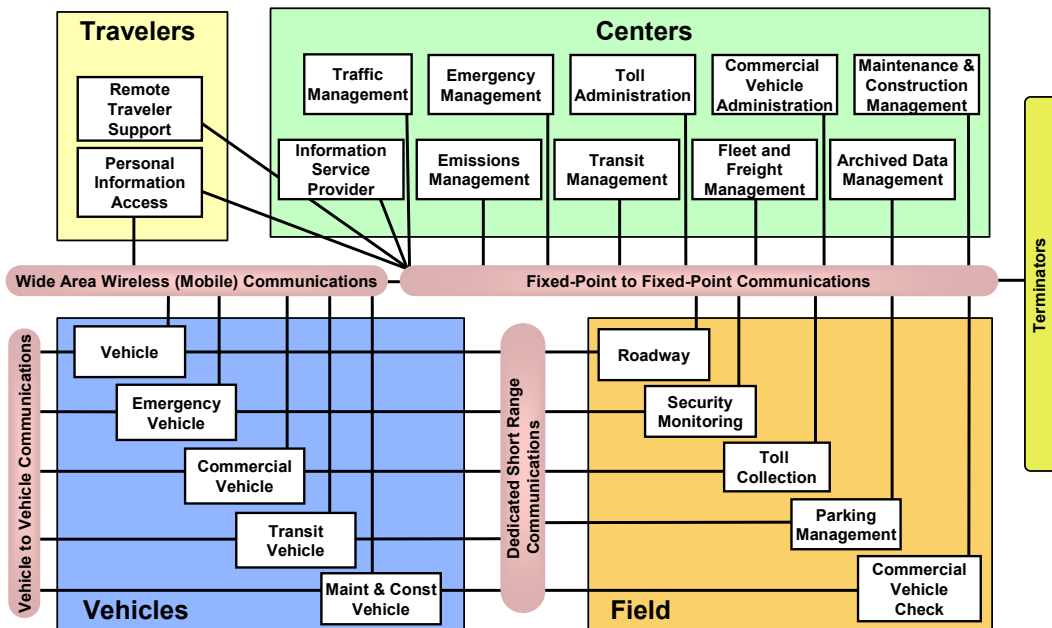


Figure 3 – National ITS Architecture Physical Subsystem Interconnect Diagram

### 3.3.2 ITS Inventory by Stakeholder

Each stakeholder is associated with one or more systems or elements (subsystems and terminators) that make up the transportation system in the Austin Region. A listing of stakeholders, as identified in the architecture, can be found in **Table 2** along with a description of the stakeholder. For example, rather than individually documenting each of the smaller municipalities in the Region, a single stakeholder was created for municipal agencies which represents the cities and towns not specifically called out in the architecture. **Table 3** sorts the inventory by stakeholder so that each stakeholder can easily identify and review all of the architecture elements associated with their agency. The table includes the status of the element. In many cases an element classified as existing might still need to be enhanced to attain the service level desired by the Region.

The information in **Table 3** is included on the Austin ITS Architecture web site, which was accessible at the time this report was developed at [www.consystec.com](http://www.consystec.com) by selecting the link to Texas Regional, then the link to the Austin Region, and then the “Inventory by Stakeholder” button which will open the stakeholder list. Each element in the list contains a hyperlink to more detailed information that includes element status, a description, the responsible stakeholder, and other elements within the inventory with which it interfaces.

**Table 2 – Austin Stakeholder Descriptions**

Stakeholder	Stakeholder Description
Amtrak	Passenger rail services provider with stations in San Marcos, Austin, and Taylor.
Archive Data Users	Users (and their systems) of general archive data within the Region.
Army Corps of Engineers	The US Army Corps of Engineers is the regulatory agency responsible for reservoirs and waterways including Lake Georgetown and Lake Granger.
Austin/Travis County Office of Emergency Management	City of Austin/Travis County joint department that coordinates the citywide and countywide response to large-scale emergencies and disasters. This includes planning and activities for preparedness, response, and recovery phases of a disaster. The Austin/Travis County Emergency Operations Center (EOC) is part of the Office of Emergency Management.
Capital Area MPO	Metropolitan planning organization (MPO) for the Austin metropolitan area that currently includes Travis, Williamson, and Hays Counties.
CapMetro	Capital Metropolitan Transportation Authority provides fixed route and paratransit service in the City of Austin and several surrounding jurisdictions.
CARTS	Capital Area Rural Transportation System provides fixed route, commuter route, and demand response transit in portions of Bastrop, Blanco, Burnet, Caldwell, Fayette, Hays, Lee, Travis, and Williamson Counties.
Cellular Providers	Represents cellular service providers in the Austin Region.
City of Austin	Municipal government for the City of Austin. Includes both traffic and maintenance sections for the City as well as the Watershed department.
City of Austin and Travis County	Emergency medical services provider for Travis County, including the City of Austin.
City of Austin Aviation Department	City of Austin department responsible for the operation of Austin-Bergstrom International Airport.
City of Austin Fire Department	City of Austin department responsible for fire dispatch and response. Dispatched out of CTECC.
City of Austin Police Department	City of Austin department responsible for police dispatch. Dispatched out of CTECC.
City of Cedar Park	Municipal government for the City of Cedar Park. Includes both traffic and maintenance sections for the City.
City of Georgetown	Municipal government for the City of Georgetown. Includes both traffic and maintenance sections for the City.
City of Round Rock	Municipal government for the City of Round Rock. Includes both traffic and maintenance sections for the City.
City of Round Rock Public Safety	City of Round Rock department responsible for police and fire dispatch as well as operating the Round Rock EOC.
City of San Marcos	Municipal government for the City of San Marcos. Includes both traffic and maintenance sections for the City.
Commercial Information Provider	Private provider of regional transportation information, usually on a subscription basis.
Commercial Vehicle Fleet Operations	Private commercial vehicle operations that operate within the Region.
County Departments	County government departments such as road and bridge.

**Table 2 – Austin Stakeholder Descriptions (continued)**

Stakeholder	Stakeholder Description
County Emergency Management Agencies	Agencies that coordinate their county's response to large-scale emergencies and disasters. This includes planning and activities for preparedness, response, and recovery phases of a disaster.
County Public Safety	County public safety dispatch and emergency response. Dispatch includes County Sheriff and any other county public safety services such as emergency medical services (EMS). In many counties responsibilities also include dispatch of Department of Public Safety troopers.
CTRMA	The Central Texas Regional Mobility Authority is responsible for the construction, maintenance and operation of several toll roads in the Region (i.e. US 183A).
Department of Public Safety	State public safety agency whose responsibilities include issuing AMBER Alerts.
Financial Institution	Banks involved in the transfer of funds for fare collection as well as for other fee based transportation services.
Hays County	Represents the county offices and stakeholders of Hays County.
Independent School Districts	Public school districts within the Region. The districts have been included primarily for their role in emergency evacuations where school buses are utilized.
Intercity Carriers	Private bus carriers that carry passengers to/from intercity terminals (e.g. Greyhound).
Local Media	Includes both print (newspaper) and broadcast (TV, radio) news media.
Lower Colorado River Authority	Manages the water supply of the lower Colorado River basin. LCRA generates electricity, operates the Mansfield Dam, the dam on Lake Buchanan as well as several smaller dams in the Region.
Municipalities	Municipalities located within the Region that are not specifically called out by the ITS architecture (i.e. Leander, Marble Falls, and Burnet).
NOAA	National Oceanic and Atmospheric Administration (includes the National Weather Service).
Other Regional Communications Providers	Intended to be a placeholder for other regional communications providers that operate on either 800 MHz or 900 MHz.
Private Concierge Service Provider	Private company who provides mayday support to vehicles through a subscription service.
Private Rail Operations	Companies that operate freight rail within the Region.
Private Taxi Providers	Private companies that provide taxi services within the Region.
Private Tow/Wrecker Providers	Private companies that provide tow or wrecker services for the Region.
Private Transportation Providers	Private transportation service providers such as taxis, shuttle services, and the Texas State University bus system that operates within the Region.
Private Travelers	Traveling public accessing various modes of transportation, including surface street, air, rail/transit, and non-motorized.
Public/Private Ambulance Providers	EMS providers located within the Region.
Radio Network Users	All current and future users of the radio network. This includes TMCs, maintenance dispatch and vehicles, emergency dispatches and vehicles, transit management/dispatch and vehicles, toll facilities, and multi-modal transportation service providers. The vision for the radio system is that in the future all members of these service groups will have interoperable voice and data radio systems to facilitate a coordinated response during an incident.

**Table 2 – Austin Stakeholder Descriptions (continued)**

Stakeholder	Stakeholder Description
Regional Event Promoter	Group that promotes events within the Region, such as a Chamber of Commerce or Visitor's Bureau.
Regional Medical Centers	Hospital/trauma centers in the Region.
Regional Utility Companies	Utility companies that operate in the Region.
Rural Fire Departments	Rural fire departments that operate using paid, volunteer, or a combination of paid and volunteer staff. These departments are usually dispatched by the County Sheriff or other area public safety answering point (PSAP).
Service Agencies	State and Federal agencies who subsidize the funding of paratransit and other demand response transit providers.
Statewide Toll Authorities	Own and operate the statewide HUB system for toll collection and reconciliation.
TCEQ – Texas Commission on Environmental Quality	The Texas Commission on Environmental Quality that is responsible for measuring and evaluating the emissions data for cities within the state of Texas.
Texas DEM	The Texas Department of Emergency Management is a division of the Texas Department of Public Safety responsible for the response to large-scale emergencies and disasters.
Travis County Public Safety	Public safety and emergency response agencies for Travis County. Includes the Travis County Sheriff and Austin/Travis County EMS.
Travis County Road Department	Department responsible for the construction and maintenance of county roads in Travis County.
TxDOT	Texas Department of Transportation. Responsible for the maintenance and construction of interstates, state routes, and other state roadway facilities in Texas. This general TxDOT stakeholder includes all elements not part of the TxDOT Austin District.
TxDOT Austin District	Austin District of TxDOT. Includes traffic, maintenance, and planning and programming. The District includes Mason, Gillespie, Llano, Burnet, Blanco, Hays, Travis, Williamson, Caldwell, Bastrop, and Lee Counties.
TxDOT Travel Division	Represents the Travel Division for TxDOT.
TxDOT TTA Division	The Texas Turnpike Authority is the division of TxDOT responsible for the construction, maintenance and operations of toll facilities in the region not managed by CTRMA.
University of Texas	The University of Texas (UT) at Austin. Includes all departments of the University, including the UT events department and the UT Police Department.
USGS	The US Geological Survey collects and analyzes environmental data in the region including water level data.
Williamson County Public Safety	Public safety and emergency response agencies for Williamson County. Includes the Williamson County Sheriff and Williamson County EMS.
Williamson County Road Department	Department responsible for the construction and maintenance of county roads in Williamson County.

**Table 3 – Austin Inventory of ITS Elements**

<b>Stakeholder</b>	<b>Element Name</b>	<b>Element Description</b>	<b>Status</b>
Amtrak	Amtrak Dispatch	The dispatch function for Amtrak.	Existing
Archive Data Users	Archive Data Users	Any user of archive data products from any Regional archive management system. This may include individual users, computer applications, or modeling systems utilizing the archived data.	Existing
Army Corps of Engineers	Army Corps of Engineers Flood Detectors	Flood monitoring equipment owned and operated by the Army Corps of Engineers. Used to determine water elevations of rivers, causeways, etc. and report it back to local agencies (traffic, transit, emergency management, maintenance, etc.).	Existing
	Army Corps of Engineers Flood Monitoring Center	Represents the control center for the Army Corps of Engineers where flood monitoring equipment sends data.	Existing
Austin/Travis County Office of Emergency Management	Austin/Travis County EOC (CTECC)	The emergency operations center (EOC) for the City of Austin and Travis County that is located in the CTECC building in Austin.	Existing
Capital Area MPO	Capital Area MPO Archive	Archive management system for the MPO for the City of Austin and surrounding areas.	Planned
CapMetro	CapMetro Barrier System	Barrier system used to close parking lots when at capacity, as well as at exit points for payment collection.	Existing
	CapMetro Commuter Rail Operations Center	The operations center for freight rail track owned and managed by CapMetro.	Existing
	CapMetro Commuter Rail Vehicles	Commuter rail vehicles owned and operated by CapMetro. May have light emitting diode (LED) displays and closed-circuit television (CCTV) cameras installed on rail cars.	Existing
	CapMetro DMS	Dynamic message signs (DMS) owned and operated by CapMetro. May be at transit stops or on buses.	Planned
	CapMetro Fixed Route Operations Center	Dispatches all fixed route transit vehicles for CapMetro. Includes fixed route service to the University of Texas.	Existing
	CapMetro Fixed Route Vehicles	Fixed route vehicles owned and operated by CapMetro. Vehicles may have automated vehicle location (AVL), security field equipment, and mobile data terminals (MDTs) for drivers. At some point in the future it is possible that they will also have automated fare payment and preemption devices.	Existing
	CapMetro Lessee Freight Cars	Freight rail vehicles operating on CapMetro track.	Existing
	CapMetro Multimodal Center	The multimodal center for CapMetro.	Planned



**Table 3 – Austin Inventory of ITS Elements (continued)**

<b>Stakeholder</b>	<b>Element Name</b>	<b>Element Description</b>	<b>Status</b>
CapMetro (continued)	CapMetro Parking Facility Equipment	Parking equipment owned by CapMetro that monitors parking lots, determines the availability of parking spaces, closes a barrier system when the lot is full, and opens a barrier system after a customer has paid for their parking fee.	Planned
	CapMetro RAPID Vehicles	Rapid transit vehicles owned and operated by CapMetro.	Existing
	CapMetro Security Monitoring Field Equipment	Secure area monitoring devices owned and operated by CapMetro. May includes monitoring systems on buses, at bus stops, or at transit terminals (including commuter rail).	Existing
	CapMetro STS Operations Center	Dispatch function for Special Transit Service (STS) vehicles. This is CapMetro's demand response paratransit service.	Existing
	CapMetro STS Vehicles	Demand response vehicles owned and operated by CapMetro. Vehicles may have AVL, security field equipment, and MDTs for drivers. Possibly have automated fare payment. May include private taxi services as part of demand response.	Existing
	CapMetro Transit Kiosks	Transit kiosks owned and operated by CapMetro. May include an opportunity to purchase a transit card, request trip information, or display notices on LED displays.	Planned
	CapMetro Transit Police	A private police force that patrols and responds to incidents involving transit vehicles.	Existing
	CapMetro Vehicle Maintenance Garage	The maintenance and equipment repair facility for CapMetro.	Existing
	CapMetro Wayside Equipment	Wayside equipment owned and operated by CapMetro to support their freight rail operations.	Existing
	CapMetro Website	The website for CapMetro where fare and schedule information may be found. In the future you may be able to request and pay for a demand response transit trip. Includes interactive voice response services.	Existing
Regional Smart Card	Smart Card used for Transit and other electronic systems.	Existing	
CARTS	CARTS Barrier System	Barrier system used to close parking lots when at capacity, as well as at exit points for payment collection.	Existing
	CARTS Demand Response Vehicles	Demand response vehicles owned and operated by the Capital Area Rural Transportation System (CARTS). Vehicles may have AVL, security field equipment, and MDTs for drivers. Possibly have automated fare payment.	Existing

**Table 3 – Austin Inventory of ITS Elements (continued)**

<b>Stakeholder</b>	<b>Element Name</b>	<b>Element Description</b>	<b>Status</b>
CARTS (continued)	CARTS DMS	DMS owned and operated by CARTS. May be at transit stops or on buses.	Planned
	CARTS Fixed Route Vehicles	Fixed route vehicles owned and operated by CARTS. Vehicles may have AVL, security field equipment, and MDTs for drivers. Possibly have automated fare payment and preemption devices.	Existing
	CARTS Maintenance Garage	The equipment maintenance garage for CARTS that performs the maintenance of all CART vehicles.	Existing
	CARTS Parking Facility Equipment	Parking equipment owned by CARTS that monitors parking lots, determines the availability of parking spaces, and closes a barrier system when the lot is full (and prior to paying for an exit).	Planned
	CARTS Security Monitoring Field Equipment	Secure area monitoring devices owned and operated by CARTS. May include monitoring systems on buses, at bus stops, and at bus terminals.	Planned
	CARTS Transit Kiosks	Transit kiosks owned and operated by CARTS. May include an opportunity to purchase a transit card, request trip information, or display notices on LED displays.	Planned
	CARTS Transit Operations Center	The transit dispatch function for CARTS. Dispatches all fixed route vehicles and demand response vehicles.	Existing
	CARTS Transit Police	A private police force that patrols and responds to incidents on CARTS transit vehicles.	Existing
	CARTS Website	The website for CARTS where fare and schedule information may be found. In the future you may be able to request and pay for a demand response transit trip. Includes interactive voice response services.	Existing
Cellular Providers	Cellular Communications Device Systems	The radio or voice communications network that is owned and operated by Cellular companies. Radio and voice networks used to transfer voice and data communications between agencies.	Existing
City of Austin	City of Austin Air Quality Division	The emissions management division for the City of Austin.	Existing
	City of Austin Asset Management System	This element represents a place-holder element for an asset management system for the City of Austin (e.g. bridge restrictions, pavement management, etc.).	Planned

**Table 3 – Austin Inventory of ITS Elements (continued)**

<b>Stakeholder</b>	<b>Element Name</b>	<b>Element Description</b>	<b>Status</b>
City of Austin (continued)	City of Austin CCTV	CCTV cameras owned and operated by the City of Austin.	Existing
	City of Austin Convention and Visitors Bureau	The City of Austin department of tourism responsible for attracting various travelers, conventions, etc. to the City of Austin.	Existing
	City of Austin DMS	DMS owned and operated by the City of Austin.	Planned
	City of Austin Emissions Monitoring Field Equipment	Emissions monitoring field equipment owned and operated by the City of Austin.	Existing
	City of Austin Fleet Services	The maintenance shop for all roadside equipment owned and operated by the City of Austin. Also provides maintenance to City of Austin vehicles.	Existing
	City of Austin Flood Closure Gates	Modified railroad closure gates operated by the City of Austin that are intended to keep traffic from flooded areas/roadways.	Existing
	City of Austin Flood Detectors	Flood warning systems for the City of Austin that detect flood events at low water crossings (dips) throughout the city. System includes monitoring and alerting functions and may be interconnected with other roadway equipment such as DMS to alert motorists.	Existing
	City of Austin ITS Field Equipment	Field equipment owned and operated by the City of Austin that is not expressly identified. May include video imaging vehicle detection system (VIVDS), sensors, etc.	Existing
	City of Austin Maintenance and Construction Vehicles	Maintenance and construction vehicles for the City of Austin.	Existing
	City of Austin Pavement Management System	The City of Austin's Pavement Management System that assists in storing, retrieving, analyzing and reporting information to help with pavement-related decision-making processes.	Existing
	City of Austin Permit Issuing Department	Issues permits for parades, demonstrations, marathons, etc.	Planned
	City of Austin Permitting System	The City of Austin's commercial vehicle permitting system for hazardous materials (HAZMAT) and oversize/overweight permits.	Existing
	City of Austin Public Information Office	The office provides the official interface between the City of Austin traffic and maintenance departments and interests outside the departments such as the media.	Existing

**Table 3 – Austin Inventory of ITS Elements (continued)**

<b>Stakeholder</b>	<b>Element Name</b>	<b>Element Description</b>	<b>Status</b>
City of Austin (continued)	City of Austin Public Works Dispatch	The maintenance and construction division for the City of Austin. Operates as the dispatch function for the City of Austin maintenance and construction vehicles.	Existing
	City of Austin School Programmable Flasher System	School zone warning system installed in the City of Austin school zones to warn drivers. System includes pagers, flashers and DMS installed at flasher locations. Pagers are used to download/upload messages to the DMS and to activate/deactivate the flashers.	Existing
	City of Austin TMC	The traffic management center (TMC) located in Austin that controls the traffic signal systems and other field equipment owned by the City of Austin.	Existing
	City of Austin Traffic Database	The archive data management system for traffic operations and traffic information for the City of Austin.	Planned
	City of Austin Traffic Signals	Traffic signal systems owned and operated by the City of Austin.	Existing
	City of Austin Website	Transportation information web page for the City of Austin. In the future will include real-time construction, work zone, special event, incident, and traffic information.	Existing
	City of Austin Watershed Protection	Department within the City of Austin that is responsible for monitoring floods within the City and getting the information out to other agencies as well as the traveling public.	Existing
City of Austin and Travis County	City of Austin/Travis County 911 Dispatch Center (CTECC)	The 911 public safety answering point (PSAP) for the City of Austin. Also dispatches emergency medical services (EMS) and County Sheriff for all of Travis County. Collocated with the TxDOT Austin District TMC – Combined Transportation and Emergency Communications Center (CTECC).	Existing
	City of Austin/Travis County Radio Systems	The radio communications network that is owned and operated by Travis County. Radio networks used to transfer voice and data communications between agencies.	Existing
City of Austin Aviation Department	ABIA (Airport) Police Dispatch	Police dispatch for the airport grounds at Austin Bergstrom International Airport (ABIA).	Existing
	ABIA (Airport) Police Vehicles	Police vehicles owned and operated by ABIA. Includes MDTs in police cruisers.	Existing
	Austin Bergstrom International Airport	The international airport that serves the Austin area.	Existing

**Table 3 – Austin Inventory of ITS Elements (continued)**

<b>Stakeholder</b>	<b>Element Name</b>	<b>Element Description</b>	<b>Status</b>
City of Austin Fire Department	City of Austin Fire Vehicles	Fire vehicles owned and operated by the City of Austin. ITS technologies on-board fire vehicles may include MDTs, AVL, signal pre-emption devices, etc. Also includes HAZMAT vehicles dispatched within the City limits.	Existing
City of Austin Police Department	City of Austin Crash Records Database	Crash or incident records database collected by the City of Austin.	Existing
	City of Austin Police Vehicles	Police vehicles owned and operated by the City of Austin. ITS technologies on-board cruisers may include MDTs, AVL, etc.	Existing
City of Cedar Park	City of Cedar Park CCTV	CCTV cameras owned and operated by the City of Cedar Park.	Planned
	City of Cedar Park DMS	DMS owned and operated by the City of Cedar Park.	Planned
	City of Cedar Park ITS Field Equipment	Field equipment owned and operated by the City of Cedar Park that is not expressly identified. May include VIVDS, sensors, etc.	Planned
	City of Cedar Park Public Information Office	The office provides the official interface between the City of Cedar Park traffic and maintenance departments and interests outside the departments such as the media.	Existing
	City of Cedar Park School Programmable Flasher Systems	School zone warning system installed in the City of Cedar Park school zones to warn drivers. System includes pagers, flashers and DMS installed at flasher locations. Pagers are used to download/upload messages to the DMS and to activate/deactivate the flashers	Existing
	City of Cedar Park TOC	The Traffic Operations Center (TOC) located in Cedar Park that controls the traffic signal systems and other field equipment owned by the City of Cedar Park.	Planned
	City of Cedar Park Traffic Signals	Traffic signal systems owned and operated by the City of Cedar Park.	Existing
City of Georgetown	City of Georgetown CCTV	CCTV cameras owned and operated by the City of Georgetown.	Planned
	City of Georgetown DMS	DMS owned and operated by the City of Georgetown.	Planned

**Table 3 – Austin Inventory of ITS Elements (continued)**

<b>Stakeholder</b>	<b>Element Name</b>	<b>Element Description</b>	<b>Status</b>
City of Georgetown (continued)	City of Georgetown Flood Closure Gates	Modified railroad closure gates operated by the City of Georgetown that are intended to keep traffic from flooded areas/roadways.	Planned
	City of Georgetown Flood Detectors	Flood warning systems for the City of Georgetown that detect flood events at low water crossings throughout the city. System includes monitoring and alerting functions, and may be interconnected with other roadway equipment such as DMS to alert motorists that the roadway is flooded ahead.	Existing
	City of Georgetown ITS Field Equipment	Field equipment owned and operated by the City of Georgetown that is not expressly identified. May include VIVDS, sensors, etc.	Existing
	City of Georgetown Public Information Office	The office provides the official interface between the City of Georgetown traffic and maintenance departments and interests outside the departments such as the media.	Existing
	City of Georgetown School Programmable Flasher Systems	School Zone warning system installed in the City of Georgetown school zones to warn drivers. System includes pagers, flashers and DMS installed at flasher locations. Pagers are used to download/upload messages to the DMS and to activate/deactivate the flashers.	Existing
	City of Georgetown TOC	The TOC located in Georgetown that controls the traffic signal systems and other field equipment owned by the City of Georgetown.	Planned
	City of Georgetown Traffic Signals	Traffic signal systems owned and operated by the City of Georgetown.	Existing
City of Round Rock	City of Round Rock CCTV	CCTV cameras that are owned and operated by the City of Round Rock.	Existing
	City of Round Rock Convention and Visitors Bureau	The City of Round Rock department of tourism responsible for attracting various travelers, conventions, etc. to the City of Round Rock.	Existing
	City of Round Rock DMS	DMS owned and operated by the City of Round Rock.	Existing
	City of Round Rock Equipment Repair Facility	The maintenance shop for all roadside equipment owned and operated by the City of Round Rock. Also provides maintenance to City of Round Rock vehicles.	Existing

**Table 3 – Austin Inventory of ITS Elements (continued)**

Stakeholder	Element Name	Element Description	Status
City of Round Rock (continued)	City of Round Rock Flood Closure Gates	Modified railroad closure gates operated by the City of Round Rock that are intended to keep traffic from flooded areas/roadways.	Existing
	City of Round Rock Flood Detectors	Flood warning systems for the City of Round Rock that detect flood events at low water crossings throughout the city. System includes monitoring and alerting functions, and may be interconnected with other roadway equipment such as DMS to alert motorists that the roadway is flooded ahead.	Existing
	City of Round Rock ITS Field Equipment	Represents ITS field equipment owned and operated by the City of Round Rock. May include traffic sensors, VIVDS, etc.	Planned
	City of Round Rock Pavement Management System	The City of Round Rock's Pavement Management System that assists in storing, retrieving, analyzing and reporting information to help with pavement-related decision-making processes.	Existing
	City of Round Rock Permitting System	The City of Round Rock's commercial vehicle permitting system for HAZMAT and oversize/overweight permits.	Existing
	City of Round Rock Public Information Office	The office provides the official interface between the City of Round Rock traffic and maintenance departments and interests outside the departments such as the media.	Existing
	City of Round Rock Public Works Dispatch	The maintenance and construction division for the City of Round Rock. Operates as the dispatch function for the City of Round Rock's maintenance and construction vehicles.	Existing
	City of Round Rock Public Works Vehicles	Maintenance and construction vehicles for the City of Round Rock.	Existing
	City of Round Rock School Programmable Flasher Systems	School Zone warning system installed in the City of Round Rock school zones to warn drivers. System includes pagers, flashers and DMS installed at flasher locations. Pagers are used to download/upload messages to the DMS and to activate/deactivate the flashers.	Planned
	City of Round Rock TMC	The TMC located in Round Rock that controls the traffic signal systems and other field equipment owned by the City of Round Rock.	Existing
City of Round Rock Traffic Signals	Traffic signal systems owned and operated by the City of Round Rock.	Existing	

**Table 3 – Austin Inventory of ITS Elements (continued)**

<b>Stakeholder</b>	<b>Element Name</b>	<b>Element Description</b>	<b>Status</b>
City of Round Rock (continued)	City of Round Rock Website	Transportation information website for the City of Round Rock. In the future will include real-time construction, work zone, special event, incident, and traffic information.	Existing
City of Round Rock Public Safety	City of Round Rock Communications Center	Local PSAP for the City of Round Rock.	Existing
	City of Round Rock Crash Records Database	Crash or incident records database collected by the City of Round Rock.	Existing
	City of Round Rock EOC	The emergency operations center for the City of Round Rock that is activated in the event of a natural or man-made disaster, or anytime a major threat is determined to exist.	Planned
	City of Round Rock Fire Vehicles	Fire vehicles owned and operated by the City of Round Rock. ITS technologies on-board fire vehicles may include MDTs, AVL, signal preemption devices, etc.	Existing
	City of Round Rock Police Vehicles	Police vehicles owned and operated by the City of Round Rock. ITS technologies on-board cruisers may include MDTs, AVL, etc.	Existing
City of San Marcos	City of San Marcos CCTV	CCTV cameras owned and operated by the City of San Marcos.	Planned
	City of San Marcos DMS	DMS owned and operated by the City of San Marcos.	Planned
	City of San Marcos Flood Detectors	Flood warning systems for the City of San Marcos that detect flood events at low water crossings throughout the city. System includes monitoring and alerting functions, and may be interconnected with other roadway equipment such as DMS to alert motorists.	Planned
	City of San Marcos ITS Field Equipment	Field equipment owned and operated by the City of San Marcos that is not expressly identified. May include VIVDS, sensors, etc.	Existing
	City of San Marcos Public Information Office	The office provides the official interface between the City of San Marcos traffic and maintenance departments and interests outside the departments such as the media.	Existing



**Table 3 – Austin Inventory of ITS Elements (continued)**

<b>Stakeholder</b>	<b>Element Name</b>	<b>Element Description</b>	<b>Status</b>
City of San Marcos (continued)	City of San Marcos School Programmable Flasher Systems	School Zone warning system installed in the City of San Marcos school zones to warn drivers. System includes pagers, flashers and DMS installed at flasher locations. Pagers are used to download/upload messages to the DMS and to activate/deactivate the flashers.	Existing
	City of San Marcos TOC	The traffic management center located in San Marcos that controls the traffic signal systems and other field equipment owned by the City of San Marcos.	Planned
	City of San Marcos Traffic Signals	Traffic signal systems owned and operated by the City of San Marcos.	Existing
Commercial Information Provider	Private Sector Traveler Information Services	Private traveler information providers serving the region. This element could, in the future, provide support to the National Traveler Information 511 number because it collects information from a broad array of operating centers. Could also include a website.	Existing
Commercial Vehicle Fleet Operations	Commercial Vehicles	Privately owned commercial vehicles that travel throughout the Region. Included in the architecture to cover HAZMAT incident reporting.	Existing
Commercial Vehicle Fleet Operations	Private Fleet Management Systems	Includes private commercial fleet management operations in the Region.	Existing
County Departments	County Asset Management System	This element represents a place-holder element for an asset management system for the counties within the Region (e.g. bridge restrictions, pavement management, etc.).	Planned
	County Equipment Repair Garage	The maintenance shop for all roadside equipment owned and operated by the counties within the Region.	Existing
	County ITS Field Equipment	Portable DMS and CCTV used by the counties within the Region at times when construction information needs to be passed to travelers.	Existing
	County Maintenance and Construction Operations Dispatch	The maintenance and construction division for the unnamed Counties within the Region. Operates as the dispatch function for and County's maintenance and construction vehicles.	Existing
	County Maintenance and Construction Vehicles	Maintenance and construction vehicles for the unnamed Counties within the Region.	Planned

**Table 3 – Austin Inventory of ITS Elements (continued)**

<b>Stakeholder</b>	<b>Element Name</b>	<b>Element Description</b>	<b>Status</b>
County Emergency Management Agencies	Austin Region Incident and Mutual Aid Network	The regional incident and mutual aid network where all emergency management providers can share or gather information regarding an incident.	Planned
	County EOC	County EOCs, which represents the EOCs in each of the counties in the Region.	Planned
County Public Safety	County Public Safety Dispatch and PSAP	Dispatch center for sheriff, fire and EMS at the county level in the TxDOT Austin Region.	Existing
	County Public Safety Vehicles	County emergency vehicles including sheriff and EMS. Some preemption for EMS vehicles.	Existing
CTRMA	CTRMA CCTV	CCTV cameras owned and operated by the Central Texas Regional Mobility Authority (CTRMA).	Planned
	CTRMA DMS	DMS owned and operated by CTRMA.	Planned
	CTRMA Field Sensors	Field sensors owned and operated by CTRMA.	Planned
	CTRMA Operations Center	The customer service center for the CTRMA. This represents the backend systems of the Toll Authority.	Planned
	CTRMA Toll Collection SmartHUB	A HUB device owned and operated by CTRMA that relays toll collection information to toll authorities throughout the Region.	Planned
	CTRMA Toll Plazas	Toll plazas owned and operated by CTRMA.	Existing
	CTRMA Toll Reconciliation Office	The CTRMA office that reconciles toll payments with Texas Turnpike Authority (TTA). It is intended that TTA does the toll collection for the CTRMA. This office coordinates that collection through CTRMA toll plazas.	Existing
	CTRMA Website	Website owned and operated by CTRMA. Contains toll information and vehicle tag information posted in the website.	Existing
Department of Public Safety	DPS and Other Public Safety Spectrum Systems	The radio communications network that is owned and operated by the Department of Public Safety (DPS) and other public safety providers. Spectrum system is used to transfer voice and data communications between agencies.	Existing
	DPS Communications	Dispatches Highway Patrol Vehicles using two-way radio communication. Responsible for regional evacuation coordination.	Existing
	DPS Emergency Vehicles	Highway Patrol vehicles that provide public safety services on state owned roads and highways.	Existing

**Table 3 – Austin Inventory of ITS Elements (continued)**

<b>Stakeholder</b>	<b>Element Name</b>	<b>Element Description</b>	<b>Status</b>
Department of Public Safety (continued)	State Office of Emergency Management	State office that coordinates threat activities for the Texas DPS.	Existing
	Statewide Crash Records Information System	Statewide database of vehicle crash records. Input to system provided by elements in the Region.	Existing
	Statewide EOC	The statewide EOC.	Existing
Financial Institution	Financial Institution	Represents the financial institutions the regional transit agencies will use as part of electronic fare payment systems. Includes Health Services through TxDOT.	Existing
Hays County	Hays County Radio Systems	The radio communications network that is owned and operated by Hays County. Radio networks used to transfer voice and data communications between agencies.	Existing
Independent School Districts	Independent School District Buses	Buses owned and operated by the independent school districts. May come equipped with security measures.	Existing
	Independent School District Dispatch	Dispatch function for each of the independent school districts in the Region. Includes radio communication with school buses.	Existing
	Independent School District Police	A private police force that patrols and responds to incidents on independent school district buses.	Existing
Intercity Carriers	Intercity Buses	The buses owned and operated by the intercity bus companies.	Existing
	Intercity Carrier Dispatch	The dispatch function for intercity bus systems (e.g. Greyhound).	Planned
Local Media	Local Print and Broadcast Media	Local TV (including cable TV), radio, and newspapers.	Existing
Lower Colorado River Authority	LCRA Flood Monitoring Center	The regional office/control center that monitors flood detection devices and provides real-time flood information to regional transportation providers.	Existing
	LCRA Flood Monitoring Field Equipment	Flood monitoring field equipment owed and operated by the Lower Colorado River Authority (LCRA) at the dams in the Region.	Existing
	LCRA Radio Systems	The radio communications network that is owned and operated by the LCRA. Radio networks used to transfer voice and data communications between agencies.	Existing

**Table 3 – Austin Inventory of ITS Elements (continued)**

<b>Stakeholder</b>	<b>Element Name</b>	<b>Element Description</b>	<b>Status</b>
Municipalities	Municipal Asset Management System	This element represents a place-holder element for an asset management system for the municipalities within the Region (e.g. bridge restrictions, pavement management, etc.).	Planned
	Municipal Convention and Visitors Bureau	The municipal department of tourism that is responsible for attracting various travelers, conventions, etc. to the municipality.	Existing
	Municipal EOCs	The emergency operations centers owned and operated by the municipalities throughout the Region.	Existing
	Municipal Equipment Repair Garage	The maintenance shop for all roadside equipment owned and operated by the municipalities not specifically called out in this architecture. Also provides maintenance to the same municipality's vehicles.	Existing
	Municipal Fire Vehicles	Municipal fire vehicles, including preemption capabilities through the cities and the municipalities within the Region.	Existing
	Municipal ITS Field Equipment	Represents ITS field equipment owned and operated by the municipalities not expressly called out in this Architecture, but that are within the Region. May include CCTV, traffic sensors, traffic signals, etc.	Planned
	Municipal or County Permitting System	Every city (including Austin) that has a commercial vehicle HAZMAT and oversize/overweight permitting process.	Existing
	Municipal Pavement Management System	The Pavement Management System for all municipalities within the region (including Cedar Park, Georgetown, and San Marcos) that assists in storing, retrieving, analyzing, and reporting information to help with pavement-related decision-making processes.	Existing
	Municipal Public Information Office	The office provides the official interface between municipal traffic and maintenance departments and interests outside the departments such as the media.	Existing
	Municipal Public Safety Dispatch and PSAP	This is a general element that is meant to represent the 911 dispatch centers (dispatching police, fire and EMS) for the cities or municipalities within the Region that are not specifically called out in the architecture.	Existing

**Table 3 – Austin Inventory of ITS Elements (continued)**

<b>Stakeholder</b>	<b>Element Name</b>	<b>Element Description</b>	<b>Status</b>
Municipalities (continued)	Municipal Public Safety Vehicles	Municipal emergency vehicles including police, fire, and EMS. Some preemption for fire and EMS vehicles.	Existing
	Municipal PWD	The maintenance and construction division for the municipalities within the Region. Operates as the dispatch function for the municipal maintenance and construction vehicles.	Existing
	Municipal PWD Vehicles	Maintenance and construction vehicles for the unnamed municipalities within the Region.	Existing
	Municipal School Pager System	School Zone warning system installed in the municipalities within the Region at school zones to warn drivers. System includes pagers, flashers and DMS installed at flasher locations. Pagers are used to download/upload messages to the DMS and to activate/deactivate the flashers.	Planned
	Municipal Traffic Database	The archive data management system for traffic operations and traffic information for the municipalities within the Region.	Existing
	Municipal Traffic Operations Center	Municipal centers that operate traffic signal systems within the municipalities not specifically called out within the Region.	Planned
	Municipal Website	Transportation information website for each municipality. In the future will include real-time construction, work zone, special event, incident, and traffic information.	Planned
	Municipal/County Crash Records Database	Crash records database collected by the municipalities or counties within the Region.	Existing
NOAA	National Weather Service	Service for national, regional, and local weather information.	Existing
Other Regional Communications Providers	Other 800 MHz Communications Systems	Intended to represent the other 800 MHz communications systems that are not specifically identified in the architecture.	Planned
	Other 900 MHz Communications Systems	Intended to represent the other 900 MHz communications systems that are not specifically identified in the architecture.	Planned
Private Concierge Service Provider	Private Concierge Service Provider	This element represents the private concierge (mayday) service providers in some private and commercial vehicles (e.g. OnStar).	Existing
Private Rail Operations	Rail Operations Centers	The dispatch centers for major railroads in the region (e.g. Union Pacific in Omaha, NE).	Existing
	Rail Operators Rail Cars	Rail-based commercial vehicles.	Existing

**Table 3 – Austin Inventory of ITS Elements (continued)**

<b>Stakeholder</b>	<b>Element Name</b>	<b>Element Description</b>	<b>Status</b>
Private Rail Operations (continued)	Rail Operators Wayside Equipment	The rail operated equipment at highway rail intersections. Interconnect with traffic control.	Existing
Private Tow/Wrecker Providers	Private Tow/Wrecker Dispatch	Dispatch function for privately owned tow or wrecker service. Based on a rotation list.	Existing
	Private Tow/Wrecker Vehicles	The tow or wrecker vehicles in the Region.	Existing
Private Transportation Providers	Private Transportation Provider Demand Response Vehicles	Demand response vehicles owned and operated by private transportation providers.	Existing
	Private Transportation Provider Fixed Route Vehicles	Fixed route vehicles that are owned and operated by private transportation providers.	Existing
	Private Transportation Provider Kiosks	Kiosks that are owned and operated by private transportation providers. May include LED displays at bus stops, fare card purchasing, etc.	Planned
	Private Transportation Provider Operations	Private transportation providers that dispatch private taxis, shuttles, and Texas State University transportation services in the Region.	Existing
	Private Transportation Provider Operations Website	Local website for private transportation providers. May be able to request a demand response service from the agency website.	Planned
Private Travelers	Private Travelers Personal Computing Devices	Includes personal and office computers, pagers, and handheld devices used by travelers to receive ITS information.	Existing
	Private Vehicles	Vehicles owned by private individuals in the area.	Existing
Public/Private Ambulance Providers	Public/Private Ambulance Dispatch	Dispatch functions for public/private ambulance services within the Region.	Existing
	Public/Private Ambulance Vehicles	The vehicles dispatched by public or private ambulance companies.	Existing
Radio Network Users	Radio Network Users	This element represents the radio system for the Austin Region. The ultimate goal of this system is to provide interoperable voice and data radio communications to agencies in the Region.	Existing
Regional Event Promoter	Special Event Sponsors and Promoters	Promoters and sponsors of special events. They coordinate with traffic and emergency providers.	Existing
Regional Medical Centers	Regional Medical Centers	Medical facilities (public and private) found in the Region.	Existing

**Table 3 – Austin Inventory of ITS Elements (continued)**

<b>Stakeholder</b>	<b>Element Name</b>	<b>Element Description</b>	<b>Status</b>
Regional Utility Companies	Regional Utility Companies	Utility companies that operate in the region and coordinate with maintenance activities of the local jurisdictions for right of way issues or service issues. Could also be contacted in the event of an incident where a certain utility could be threatened.	Existing
Rural Fire Departments	Rural Fire Department Dispatch	Volunteer fire departments dispatch. Frequently this is done by the County Sheriff's office.	Existing
	Rural Fire Department Vehicles	Fire vehicles owned and operated by volunteer fire departments.	Existing
Service Agencies	Service Agencies	Agencies that help subsidize the funding for paratransit operations for special case citizens to ensure that these citizens have transportation to and from where they need to go (generally to medical appointments).	Existing
Statewide Toll Authorities	Statewide Toll Collection SmarHUB	HUB system operated by toll authorities around the state for the reconciliation of tolls between toll authorities.	Existing
TCEQ – Texas Commission of Environmental Quality	TCEQ Field Emissions Monitors	Emissions monitoring field equipment owned and operated by the Texas Commission of Environmental Quality (TCEQ).	Existing
	TCEQ Monitoring Operations Section	The section that is responsible for regional field equipment monitoring and testing.	Existing
	TCEQ State Headquarters	State headquarters for TCEQ that collects all emissions data from around the state and prepares a report for the federal government.	Existing
Texas DEM	Texas DEM Disaster District Information System	The disaster information system run by the Division of Emergency Management in the event of a natural or man-made disaster.	Planned
Travis County Public Safety	Travis County Public Safety Vehicles	Sheriff, fire, or EMS vehicles owned and operated by Travis County. Onboard ITS systems include MDTs, AVL, cameras, etc.	Existing
Travis County Road Department	Travis County Equipment Repair Garage	The maintenance shop for all roadside equipment owned and operated by Travis County. Also provides maintenance to Travis County vehicles.	Existing
	Travis County Maintenance and Construction Operations Dispatch	The maintenance and construction division for Travis County. Operates as the dispatch function for Travis County's maintenance and construction vehicles.	Existing

**Table 3 – Austin Inventory of ITS Elements (continued)**

<b>Stakeholder</b>	<b>Element Name</b>	<b>Element Description</b>	<b>Status</b>
Travis County Road Department (continued)	Travis County Maintenance and Construction Vehicles	Maintenance and construction vehicles for Travis County.	Existing
TxDOT	TxDOT 511 System	Planned statewide phone based traveler information system.	Planned
	TxDOT BRINSAP	TxDOT Bridge Inspection and Inventory System. Statewide system holding information regarding the inventory and inspection status of all bridges.	Existing
	TxDOT Central Permitting Office	The central permit office for TxDOT. Coordinates permits with other states and acts as a data repository for regional permits.	Existing
	TxDOT Demand Response Transit Intake Center	The center owned and operated by TxDOT where residents can either call in or go online and request and pay for a demand responsive transit plan.	Existing
	TxDOT Motor Carrier Routing Information	This on-line system allows motor carriers to view routing and roadway information, including load restricted bridges, low vertical clearance locations, metro lane closures, and permit restrictions. Bridge restriction information includes TxDOT as well as local agency bridges. Low vertical clearance, permit restriction, and metro lane closure information is available by TxDOT District.	Existing
	TxDOT Other District Maintenance Sections Dispatch	Municipal, county, and TxDOT Maintenance sections in neighboring regions.	Existing
	TxDOT Other District TMCs	Traffic Management Centers in other TxDOT Districts (i.e. TranStar, Stratus, DalTrans, TransVision, TransVista and Pegasus).	Existing
	TxDOT Other Permitting Systems	Localized permitting systems in other TxDOT regions.	Existing
	TxDOT Rest Areas/Visitor Centers/Truck Stops/Service Plaza Kiosks	This represents the rest areas and visitor centers with varied amenities that are existing or planned by TxDOT. Tourist information, emergency evacuation information, and general traffic information could be provided in the future.	Planned
	TxDOT San Antonio District TMC (TransGuide)	TransGuide serves as the TMC for the San Antonio District and also initiates AMBER Alert procedures in the other TxDOT Districts at the direction of the DPS.	Existing



**Table 3 – Austin Inventory of ITS Elements (continued)**

<b>Stakeholder</b>	<b>Element Name</b>	<b>Element Description</b>	<b>Status</b>
TxDOT (continued)	TxDOT Statewide Emergency Management Coordinator	TxDOT representative at State EOC who communicates information to the TxDOT maintenance sections and TxDOT traffic sections.	Existing
	TxDOT Statewide Pavement Management System	Statewide Pavement Management System that has an interface to the district Pavement Management System. This information is made available on the Internet.	Existing
	TxDOT Statewide Roadway Data Collection System	Collects roadway data across the state for TxDOT.	Existing
TxDOT Austin District	TxDOT Austin District Area Engineers Office	Construction design and supervision (schedules and plans) for the Austin District. Provide content to TMC's for maintenance and construction road status.	Existing
	TxDOT Austin District CCTV	CCTV owned and operated by TxDOT Austin.	Existing
	TxDOT Austin District DMS	DMS owned and operated by TxDOT Austin.	Existing
	TxDOT Austin District Field Sensors	Traffic and vehicle sensors owned and operated by TxDOT Austin.	Existing
	TxDOT Austin District Flood Detectors	Flood warning systems owned and operated by TxDOT that detect flood events at low water crossings on TxDOT roads. System includes monitoring and alerting functions, and may be interconnected with other roadway equipment such as DMS to alert motorists that a roadway is flooded ahead.	Planned
	TxDOT Austin District HAR	Highway Advisory Radio (HAR) owned and operated by TxDOT Austin.	Existing
	TxDOT Austin District HERO Vehicles	Roadway service patrol vehicles operated by TxDOT. May include MDTs, AVL, etc.	Existing
	TxDOT Austin District Historical Traffic Database	The archive data management system for traffic operations and traffic information for the TxDOT Austin District.	Existing
	TxDOT Austin District ITS Field Equipment	ITS field equipment not specifically called out in the architecture. May include speed monitoring equipment, barrier system equipment, etc.	Existing
	TxDOT Austin District Lane Control Signals	Lane control signals owned and operated by TxDOT Austin.	Existing

**Table 3 – Austin Inventory of ITS Elements (continued)**

<b>Stakeholder</b>	<b>Element Name</b>	<b>Element Description</b>	<b>Status</b>
TxDOT Austin District (continued)	TxDOT Austin District Maintenance and Construction Vehicles	Maintenance and construction vehicles for the TxDOT Austin District.	Existing
	TxDOT Austin District Maintenance Office	Office in charge of construction and maintenance operations for the TxDOT Austin district.	Existing
	TxDOT Austin District Maintenance Sections Dispatch	TxDOT maintenance sections for Austin Region. Dispatches maintenance vehicles and equipment for maintaining road and ITS equipment owned by TxDOT.	Existing
	TxDOT Austin District Mechanic Shop	This facility provides repair and maintenance services for TxDOT maintenance vehicles and equipment (e.g. portable DMS).	Existing
	TxDOT Austin District Pavement Management System	District Pavement Management System that assists in storing, retrieving, analyzing and reporting information to help with pavement-related decision-making processes.	Existing
	TxDOT Austin District Public Information Office	The office provides the official interface between the TxDOT traffic and maintenance departments and interests outside the departments such as the media.	Existing
	TxDOT Austin District Security Monitoring Field Equipment	Security equipment owned and operated by the TxDOT Austin District.	Planned
	TxDOT Austin District Public Transportation Management System (PTMS)	Maintains a Transit Vehicle Inventory for public transit vehicles that receive federal and state funds. Also able to generate ridership information such as cost per mile, revenues per mile, total revenues, etc.	Existing
	TxDOT Austin District Roadway Data Collection System	The roadway data collection system (including loop detectors and counters) archive management system owned and operated by the TxDOT Austin district.	Existing
	TxDOT Austin District RWIS	Road weather information systems (RWIS) that are owned and operated by TxDOT Austin.	Planned
	TxDOT Austin District Security Monitoring Field Equipment	Security equipment owned and operated by the TxDOT Austin District.	Planned
	TxDOT Austin District Signal Server	The traffic management center (server) that controls the traffic signal systems owned and operated by TxDOT Austin.	Existing
TxDOT Austin District Signals	Traffic signals owned and operated by TxDOT Austin.	Existing	

**Table 3 – Austin Inventory of ITS Elements (continued)**

<b>Stakeholder</b>	<b>Element Name</b>	<b>Element Description</b>	<b>Status</b>
TxDOT Austin District (continued)	TxDOT Austin District TMC (CTECC)	The traffic management center for the TxDOT Austin District. Controls all TxDOT ITS field equipment except signal systems. Located in CTECC, the Combined Transportation Emergency Communications Center.	Existing
	TxDOT Austin District Website	Transportation information website for the Austin district. In the future it will include real-time construction, work zone, special event, incident, and traffic information. (Handled by the Information Resource Office.)	Existing
	TxDOT Austin District Work Zone Equipment	Work zone monitoring and alerting equipment owned by TxDOT Austin.	Existing
TxDOT Travel Division	TxDOT Highway Conditions Reporting System	Provides detailed construction closures, detours, restrictions, permit and weather information. Compiled by District Public Information staff and area maintenance personnel. Accessible to the public on the internet at <a href="http://www.dot.state.tx.us/hcr/main.htm">www.dot.state.tx.us/hcr/main.htm</a> . The system provides access to information by route, county, or roadway condition. Includes contact information, Phone (800-452-9292) for construction, closures, hazards and detour information.	Existing
TxDOT TTA Division	Toll Payment Device	A device by which travelers can pay a toll – a Regional Smartcard system.	Existing
	TxDOT TTA CCTV	CCTV cameras owned and operated by Texas Turnpike Authority.	Planned
	TxDOT TTA Customer Service Center	The customer service center for the Texas Turnpike Authority. This represents the backend systems of the Turnpike.	Existing
	TxDOT TTA DMS	DMS owned and operated by Texas Turnpike Authority.	Planned
	TxDOT TTA Field Sensors	Field sensors (for traffic) owned and operated by Texas Turnpike Authority.	Planned
	TxDOT TTA Toll Collection SmartHUB	A HUB device owned and operated by Texas Turnpike Authority that relays toll collection information to toll authorities throughout the region for reconciliation of tolls.	Planned
	TxDOT TTA Toll Collection Website	Website for future Texas Turnpike Authority toll road.	Existing

**Table 3 – Austin Inventory of ITS Elements (continued)**

<b>Stakeholder</b>	<b>Element Name</b>	<b>Element Description</b>	<b>Status</b>
TxDOT TTA Division (continued)	TxDOT TTA Toll Plazas	The toll plazas on the Texas Turnpike. The plazas may have automated toll collection systems, tag readers, or other ITS devices.	Existing
University of Texas	UT Events Office	The event office at the University of Texas that coordinates with regional traffic systems for large events (football games, etc.).	Existing
	UT Police Dispatch	The police dispatch for the University Police Department.	Existing
	UT Police Vehicles	Police vehicles owned and operated by the University of Texas at Austin. Includes the ITS equipment installed on the cruisers (AVL, MDTs, etc.).	Existing
USGS	USGS Flood Monitoring Center	Flood warning devices owned and operated by the USGS in waterways in the Region including the Colorado River, Bull Creek, Barton Creek, and Onion Creek among numerous others.	Existing
	USGS Flood Monitoring Devices	Flood warning devices owned and operated by the USGS.	Existing
Williamson County Public Safety	Williamson County Emergency Communications Center	The local 911 dispatch center (rural) for Williamson County that dispatched Williamson County Sheriff, fire, EMS, rural fire department, and all municipal public safety vehicles). Has coordinated computer-aided dispatch (CAD) system with City of Round Rock.	Existing
	Williamson County EOC	The Williamson County EOC.	Planned
	Williamson County Public Safety Vehicles	Sheriff, fire, or EMS vehicles owned and operated by Williamson County. Onboard ITS systems include MDTs, AVL, cameras, etc.	Existing
	Williamson County Radio Systems	The radio communications network that is owned and operated by Williamson County. Radio networks used to transfer voice and data communications between agencies.	Existing

**Table 3 – Austin Inventory of ITS Elements (continued)**

<b>Stakeholder</b>	<b>Element Name</b>	<b>Element Description</b>	<b>Status</b>
Williamson County Road Department	Williamson County Emergency Communications Center	The local 911 dispatch center (rural) for Williamson County that dispatched Williamson County Sheriff, fire, EMS, rural fire department, and all municipal public safety vehicles). Has coordinated CAD system with City of Round Rock.	Existing
	Williamson County EOC	The Williamson County EOC.	Planned
	Williamson County Public Safety Vehicles	Sheriff, fire, or EMS vehicles owned and operated by Williamson County. Onboard ITS systems include MDTs, AVL, cameras, etc.	Existing
	Williamson County Radio Systems	The radio communications network that is owned and operated by Williamson County. Radio networks used to transfer voice and data communications between agencies.	Existing
	Williamson County Equipment Repair Facility	The maintenance shop for all roadside equipment owned and operated by Williamson County. Also provides maintenance to Williamson County vehicles.	Existing
	Williamson County Maintenance and Construction Operations	The maintenance and construction division for Williamson County. Operates as the dispatch function for Williamson County maintenance and construction vehicles.	Existing
	Williamson County Maintenance and Construction Vehicles	Maintenance and construction vehicles for Williamson County.	Existing

### 3.3.3 Top Level Regional System Interconnect Diagram

A system interconnect diagram, or “sausage diagram” (shown previously in **Figure 3**), shows the systems and primary interconnects in the Region. The National ITS Architecture interconnect diagram has been customized for the Austin Region based on the system inventory and information gathered from the stakeholders. **Figure 4** summarizes the existing, planned, and future ITS elements for the Austin Region in the context of a physical interconnect. Subsystems and elements specific to the Region are called out in the boxes surrounding the main interconnect diagram, and these are color-coded to the subsystem to which they are associated.

## 3.4 Market Packages

Upon completion of the system inventory, the next step in the development of the architecture was to identify the transportation services that are important to the Austin Region. In the National ITS Architecture, services are referred to as market packages. Market packages can include several stakeholders and elements that work together to provide a service in the Region. Examples of market packages from the National ITS Architecture include Network Surveillance, Traffic Information Dissemination, and Transit Vehicle Tracking. There are currently a total of 85 market packages identified in the National ITS Architecture Version 5.1

The market packages are grouped together into eight ITS service areas: Traffic Management, Emergency Management, Maintenance and Construction Management, Public Transportation Management, Commercial Vehicle Operations, Traveler Information, Archived Data Management, and Vehicle Safety. As mentioned earlier in Section 3.1, Vehicle Safety was not included in the Austin Regional ITS Architecture because implementation of those market packages would be by private sector automobile and information service providers.

### 3.4.1 Selection and Prioritization of Market Packages

In the Austin 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 4**. Stakeholders prioritized the selected market packages during the workshop and the table organizes the market packages into service areas and priority groupings.

In addition to the market packages selected from the National ITS Architecture, stakeholders in Austin also developed a customized market package that centers the voice and data transfer through the radio network. This market package is presented in greater detail in section 3.4.4.

TxDOT is leading a separate effort to develop and implement the CVISN program. CVISN addresses commercial vehicle operations, including ITS, on a statewide level and includes such applications as electronic clearance, safety enforcement, and registration. Unless a specific need was identified in the Austin Region that could be addressed locally, the commercial vehicle operations market packages were not selected and instead will be covered in the CVISN effort to ensure consistency.

In several cases, there are multiple stakeholders in the Region that provide the same service at different levels. For example, Traffic Information Dissemination (ATMS06) is provided on interstates and controlled access state facilities by TxDOT using DMS. In the future the City of Austin could also deploy DMS on arterials. The market package status is identified



as existing, planned, or future for each of the primary stakeholders in the Region. In many cases market packages classified as existing might still need to be enhanced to increase the service that the market package provides and establish all of the elements associated with it.

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

LEGEND	
	No Regional Architecture Elements Map To National ITS Architecture
	Regional Architecture Elements Map To National ITS Architecture
	Existing Connection
	Future Connection
	No Connection Planned

Maintenance & Const Management Subsystem
City of Austin Public Works Dispatch
City of Round Rock Public Works Dispatch
County Maintenance and Construction Operations Dispatch
Municipal PWD
Radio Network User Systems
Regional Utility Companies
Travis County Maintenance and Construction Operations Dispatch
TxDOT Austin District Area Engineers Office
TxDOT Austin District Maintenance Office
TxDOT Austin District Maintenance Sections Dispatch
Williamson County Maintenance and Construction Operations Dispatch
Emergency Management Subsystem
ABIA Police Dispatch
Army Corps of Engineers Flood Monitoring Center
Austin/Travis County EOC (CTECC)
CapMetro Fixed Route Operations Center
CapMetro Transit Police
CARTS Transit Operations Center
CARTS Transit Police
City of Austin TMC
Rural Fire Department Protection
City of Austin/Travis County 911 Dispatch Center (CTECC)

Emergency Management Subsystem (Cont)
City of Cedar Park TOC*
City of Georgetown TOC*
City of Round Rock Communications Center
City of Round Rock EOC*
City of Round Rock TMC
City of San Marcos TOC*
County EOC
County Public Safety Dispatch and PSAP
DPS Communications
Independent School District Dispatch
Independent School District Police
LCRA Flood Monitoring Center
Local Transit Operations
Municipal EOCs
Municipal Public Safety Dispatch and PSAP
Municipal Traffic Operations Center*
Private Concierge Service Provider
Private Tow/Wrecker Dispatch
Private Transportation Provider Operations
Public/Private Ambulance Dispatch
Rural Fire Department Dispatch
State Office of Emergency Management

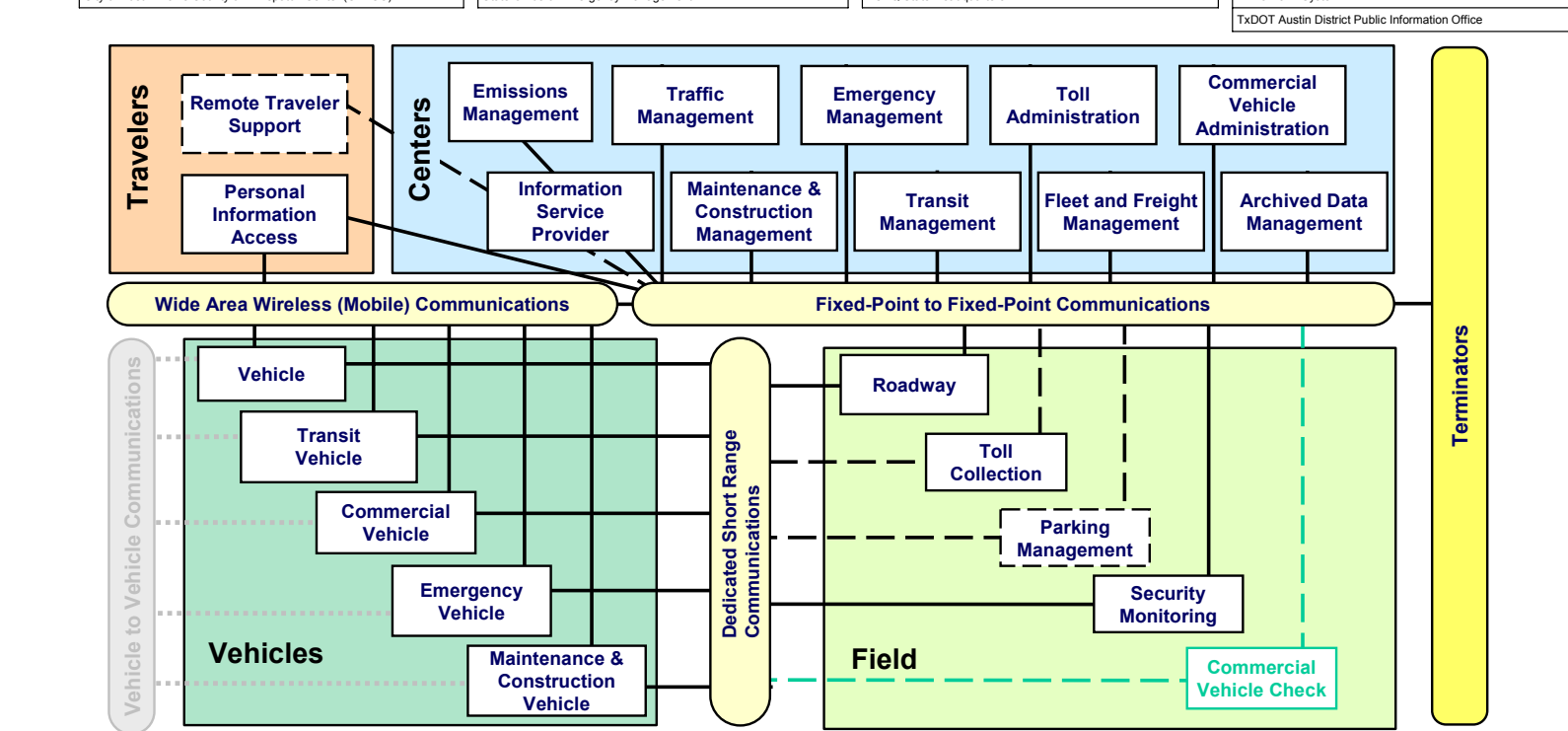
Emergency Management Subsystem (Cont)
Statewide EOC
Texas DEM Disaster District Information System*
TxDOT Austin District TMC (CTECC)
TxDOT Statewide Emergency Management Coordinator
USGS Flood Monitoring Center
UT Police Dispatch
Williamson County Emergency Communications Center
Williamson County EOC*
Traffic Management Subsystem
City of Austin TMC
City of Cedar Park TOC*
City of Georgetown TOC*
City of Round Rock TMC
City of San Marcos TOC*
CTRMA Operations Center*
Municipal Traffic Operations Center*
TxDOT Austin District Signal Server
TxDOT Austin District TMC (CTECC)
Emissions Management Subsystem
City of Austin Air Quality Division
TCEQ Monitoring Operations Section
TCEQ State Headquarters

Information Service Provider Subsystem
CapMetro Website
CARTS Website
Cellular Communications Device Systems
City of Austin Public Information Office
City of Austin Website*
City of Austin/Travis County Radio Systems
City of Cedar Park Public Information Office
City of Georgetown Public Information Office
City of Round Rock Public Information Office
City of Round Rock Website
City of San Marcos Public Information Office
CTRMA Website*
DPS and Other Public Safety Spectrum Systems
Hays County Radio Systems
LCRA Radio Systems
Municipal Public Information Office
Municipal Website*
Other 800 MHz Communications Systems*
Other 900 MHz Communications Systems*
Private Sector Traveler Information Services
Private Transportation Provider Operations Website*
TxDOT 511 System*
TxDOT Austin District Public Information Office

Information Service Provider Subsystem (cont)
TxDOT Austin District Website
TxDOT Demand Response Transit Intake Center
TxDOT Highway Conditions Reporting System*
TxDOT Motor Carrier Routing Information
TxDOT TTA Toll Collection Website
Williamson County Radio Systems
Transit Management Subsystem
CapMetro Commuter Rail Operations Center
CapMetro Fixed Route Operations Center
CapMetro STS Operations Center
CARTS Transit Operations Center
Independent School District Dispatch
Private Transportation Provider Operations
Toll Administration Subsystem
CTRMA Operations Center*
CTRMA Toll Collection SmartHUB*
CTRMA Toll Reconciliation Office
Statewide Toll Collection SmartHUB
TxDOT TTA Customer Service Center
TxDOT TTA Toll Collection SmartHUB*
Commercial Vehicle Admin Subsystem
City of Austin Permitting System
City of Round Rock Permitting System
Municipal or County Permitting System
TxDOT Central Permitting Office
TxDOT Other Permitting Systems

Archived Data Management Subsystem
Capital Area MPO Archive*
City of Austin Crash Records Database
City of Austin Pavement Management System
City of Austin Traffic Database*
City of Round Rock Crash Records Database
City of Round Rock Pavement Management System
Municipal Pavement Management System
Municipal Traffic Database
Municipal/County Crash Records Database
Statewide Crash Records Information System
TxDOT Austin District Historical Traffic Database
TxDOT Austin District Pavement Management System
TxDOT Austin District Public Transportation Management System (PTMS)
TxDOT Austin District Roadway Data Collection System
TxDOT Statewide Pavement Management System
TxDOT Statewide Roadway Data Collection System
Fleet and Freight Management Subsystem
Private Fleet Management Systems

Remote Traveler Support Subsystem
CapMetro Transit Kiosks*
CARTS Transit Kiosks*
Private Transit Provider Kiosks*
TxDOT Rest Area/Visitor Center/Truck Stop/Service Plaza Kiosks*
Personal Information Access Subsystem
Private Travelers Personal Computing Devices
Vehicle Subsystem
CapMetro Lessee Freight Cars
Commercial Vehicles
Private Vehicles
Transit Vehicle Subsystem
CapMetro Commuter Rail Vehicles
CapMetro Fixed Route Vehicles
CapMetro RAPID Vehicles
CapMetro STS Vehicles
CARTS Demand Response Vehicles
CARTS Fixed Route Vehicles
Independent School District Buses
Intercity Buses*
Private Transportation Provider Demand Response Vehicles
Private Transportation Provider Fixed Route Vehicles
Commercial Vehicle Subsystem
CapMetro Lessee Freight Cars
Commercial Vehicles
Rail Operators Rail Cars
Emergency Vehicle Subsystem
ABIA Police Vehicles*
City of Austin Fire Vehicles
City of Austin Police Vehicles
City of Round Rock Fire Vehicles
City of Round Rock Police Vehicles
County Public Safety Vehicles
DPS Emergency Vehicles
Municipal Fire Vehicles
Municipal Public Safety Vehicles
Private Tow/Wrecker Vehicles
Public/Private Ambulance Vehicles
Rural Fire Department Vehicles
Travis County Public Safety Vehicles
TxDOT Austin District HERO Vehicles
UT Police Vehicles
Williamson County Public Safety Vehicles



Maintenance & Const Vehicle Subsystem
City of Austin Maintenance and Construction Vehicles
City of Round Rock Public Works Vehicles
County Maintenance and Construction Vehicles
Municipal Fire Vehicles
Municipal PWD Vehicles
Travis County Maintenance and Construction Vehicles
TxDOT Austin District Maintenance and Construction Vehicles
Rural Fire Department Vehicles
Williamson County Maintenance and Construction Vehicles

Roadway Subsystem
Army Corps of Engineers Flood Detectors
CapMetro Barrier System
CapMetro DMS*
CapMetro Wayside Equipment
CARTS Barrier System
CARTS DMS*
City of Austin CCTV
City of Austin DMS*
City of Austin Emissions Monitoring Field Equipment
City of Austin Flood Closure Gates
City of Austin Flood Detectors
City of Austin ITS Field Equipment
City of Austin School Programmable Flasher System

Roadway Subsystem
City of Austin Traffic Signals
City of Cedar Park CCTV*
City of Cedar Park DMS*
City of Cedar Park ITS Field Equipment*
City of Cedar Park School Programmable Flasher System
City of Cedar Park Traffic Signals*
City of Georgetown CCTV*
City of Georgetown DMS*
City of Georgetown Flood Closure Gates*
City of Georgetown Flood Detectors
City of Georgetown ITS Field Equipment
City of Georgetown School Programmable Flasher System
City of Georgetown Traffic Signals*

Roadway Subsystem
City of Round Rock CCTV
City of Round Rock DMS
City of Round Rock Flood Closure Gates
City of Round Rock Flood Detectors
City of Round Rock ITS Field Equipment
City of Round Rock School Programmable Flasher System*
City of Round Rock Traffic Signals
City of San Marcos CCTV*
City of San Marcos DMS*
City of San Marcos Flood Detectors*
City of San Marcos ITS Field Equipment
City of San Marcos School Programmable Flasher System

Roadway Subsystem
City of San Marcos Traffic Signals*
County ITS Field Equipment
CTRMA CCTV*
CTRMA DMS*
CTRMA Field Sensors*
CTRMA Toll Plazas
LCRA Flood Monitoring Field Equipment
Municipal ITS Field Equipment*
Municipal School Programmable Flasher Systems*
TCEQ Field Emissions Monitors
TxDOT Austin District CCTV
TxDOT Austin District DMS
TxDOT Austin District Field Sensors

Archived Data User Systems
Archive Data Users
Asset Management
City of Austin Asset Management System*
County Asset Management System*
Municipal Asset Management System*
TxDOT Austin District Pavement Management System
TxDOT BRINSAP
Care Facility
Regional Medical Centers
Enforcement Agency
City of Austin/Travis County 911 Dispatch Center (CTECC)
Equipment Repair Facility
CapMetro Vehicle Maintenance Garage
CARTS Maintenance Garage
City of Austin Fleet Services
City of Round Rock Equipment Repair Facility
County Equipment Repair Garage
Municipal Equipment Repair Garage
Travis County Equipment Repair Garage
TxDOT Austin District Mechanic Shop
Williamson County Equipment Repair Facility
Event Promoters
City of Austin Convention and Visitors Bureau
City of Austin Permit Issuing Department*
City of Round Rock Convention and Visitors Bureau
Municipal Convention and Visitors Bureau
Special Event Sponsors and Promoters
UT Events Office
Roadway Subsystem (Cont)
TxDOT Austin District Flood Detectors*
TxDOT Austin District HAR
TxDOT Austin District ITS Field Equipment
TxDOT Austin District Lane Control Signals
TxDOT Austin District RWIS*
TxDOT Austin District Signals
TxDOT Austin District Work Zone Equipment
TxDOT TTA CCTV*
TxDOT TTA DMS*
TxDOT TTA Field Sensors*
TxDOT TTA Toll Collection SmartHUB*
USGS Flood Monitoring Devices

Financial Institution
Financial Institution
Service Agencies
Maintenance and Const Admin Systems
TxDOT Austin District Area Engineers Office
Media
Local Print and Broadcast Media
Asset Management
Amtrak Dispatch
Austin Bergstrom International Airport
CapMetro Multimodal Center*
Intercity Carrier Dispatch*
Other Emergency Management
Austin Region Incident, Mutual Aid and Communications Network*
Other Maintenance & Construction
TxDOT Other District Maintenance Sections Dispatch
Other Traffic Management
TxDOT Other District TMCs
TxDOT San Antonio District TMC (TransGuide)
Rail Operations
CapMetro Commuter Rail Operations Center
Rail Operations Centers
Telecommunications System for Traveler Information
Radio System Subscribers
Traveler Card
Regional Smart Card
Toll Payment Device
Wayside Equipment
CapMetro Wayside Equipment
Rail Operators Wayside Equipment
Weather Service
National Weather Service
Security Monitoring Subsystem
CapMetro Security Monitoring Field Equipment
CARTS Security Monitoring Field Equipment*
TxDOT Austin District Security Monitoring Field Equipment*
Parking Management Subsystem
CapMetro Parking Facility Equipment*
CARTS Parking Facility Equipment*
Toll Collection Subsystem
CTRMA Toll Plazas
TxDOT TTA Toll Plazas

\* Elements are planned or future, not existing.

Figure 4 – Austin Regional System Interconnect Diagram



**Table 4 – Austin Market Package Prioritization by Functional Area**

High Priority Market Packages	Medium Priority Market Packages	Low Priority Market Packages
<b>Traffic Management</b>		
ATMS01 Network 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 ATMS15 Railroad Operations Coordination ATMS16 Parking Facility Management	ATMS02 Probe Surveillance ATMS13 Standard Railroad Grade Crossing ATMS18 Reversible Lane Management ATMS19 Speed Monitoring ATMS21 Roadway Closure Management	ATMS05 HOV Lane Management ATMS11 Emissions Monitoring and Management
<b>Emergency Management</b>		
EM01 Emergency Call Taking and Dispatch EM02 Emergency Routing EM04 Roadway Service Patrols EM06 Wide-Area Alert	EM03 Mayday Support EM08 Disaster Response and Recovery EM09 Evacuation and Reentry Management EM10 Disaster Traveler Information	EM05 Transportation Infrastructure Protection EM07 Early Warning System
<b>Maintenance and Construction Management</b>		
MC03 Road Weather Data Collection MC04 Weather Information Processing and Distribution MC08 Work Zone Management MC10 Maintenance and Construction Activity Coordination	MC07 Roadway Maintenance and Construction	MC01 Maintenance and Construction Vehicle and Equipment Tracking MC02 Maintenance and Construction Vehicle Maintenance MC09 Work Zone Safety Monitoring
<b>Public Transportation Management</b>		
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	APTS6 Transit Vehicle Maintenance APTS8 Transit Traveler Information	

**Table 4 – Austin Market Package Prioritization by Functional Area (continued)**

High Priority Market Packages	Medium Priority Market Packages	Low Priority Market Packages
<b>Commercial Vehicle Operations</b>		
	CVO10 HAZMAT Management	CVO04 CV Administrative Processes
<b>Traveler Information</b>		
ATIS1 Broadcast Traveler Information ATIS2 Interactive Traveler Information		ATIS5 ISP Based Route Coordination
<b>Archived Data Management</b>		
	AD1 ITS Data Mart AD2 ITS Data Warehouse AD3 Virtual ITS Data Warehouse	
<b>User Defined Market Package</b>		
RCN01 Radio Communications Network		

### 3.4.2 Customized Market Packages

The market packages in the National ITS Architecture were customized to reflect the unique systems, subsystems, and terminators in the Austin Region. Each market package is shown graphically, with the market package name, local agencies involved, and desired data flows included. Market packages represent a service that will be deployed as an integrated capability.

**Figure 5** is an example of an advanced traffic management system (ATMS) market package for Surface Street Control that has been customized for the Region. This market package shows the two subsystems, Traffic Management and Roadway, and the associated entities (City of Austin TMC and City of Austin Traffic Signals, School Programmable Flasher System, CCTV and ITS Field Equipment) for surface street control in the City of Austin. Data flows between the subsystems indicate what information is being shared.

Market packages that were customized for the Austin Region are shown in **Appendix C**. These market packages are also included on the Austin Regional ITS Architecture web site by selecting the “Market Packages by Functional Area” button. On this section of the site, market packages are grouped by functional area (Traffic Management, Maintenance and Construction, Public Transportation, etc.), and each of the customized market packages can be viewed by clicking on the market package number under each area heading. It is important to note that while the market package table on the web site shows all of the available market packages from the National ITS Architecture, only those selected for the Austin Region include diagrams. On the web site these selected market packages are highlighted in the table.

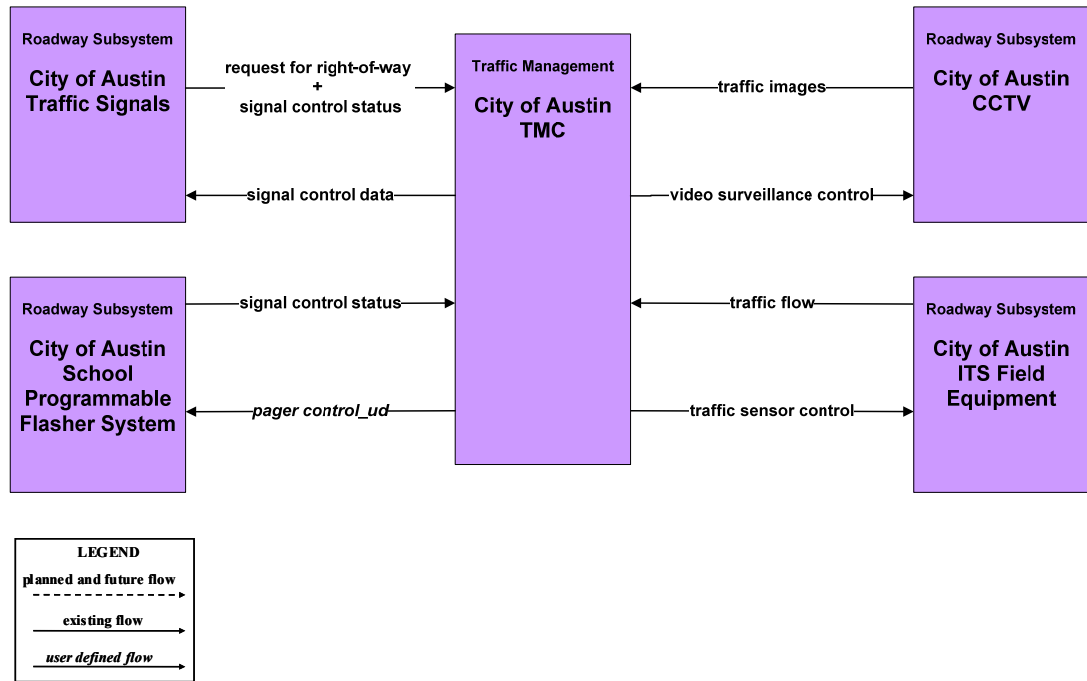


Figure 5 – Example Market Package Diagram: Surface Street Control

3.4.3 Regional ITS Needs and Customized Market Packages

Input received from stakeholders at the Kickoff Workshops and through individual stakeholder meetings provided valuable input for the market package customization process. The specific needs identified are included in Table 5. The table also identifies which market package documents the ITS need.

Table 5 – Regional ITS Needs and Corresponding Market Packages

ITS Need	Identifying Agency	Implementing Agency	Market Package
<b>Traffic Management</b>			
Need improved signal timing and coordination	Burnet County, City of Marble Falls, City of Burnet	TxDOT	ATMS03
Need vehicle detection at key locations	Caldwell County	TxDOT	ATMS01
Need improved signal timing and coordination	Caldwell County	TxDOT	ATMS03
Need to share TxDOT detector data with the City of Austin	City of Austin	City of Austin, TxDOT	ATMS07
Need to expand video sharing between TxDOT and the City of Austin	City of Austin	City of Austin, TxDOT	ATMS07
Need real time information from public safety answering points regarding incidents	City of Austin	City of Austin, City of Austin/Travis County 911 Dispatch	ATMS08

**Table 5 – Regional Needs and Corresponding Market Packages (continued)**

ITS Need	Identifying Agency	Implementing Agency	Market Package
<b>Traffic Management (continued)</b>			
Need Cedar Park Traffic Operations Center to control signal system and other future ITS devices	City of Cedar Park	City of Cedar Park	ATMS01 ATMS03 ATMS06
Need CCTV for incident detection	City of Cedar Park	City of Cedar Park, TxDOT	ATMS01
Need improved signal timing coordination	City of Georgetown	City of Georgetown, TxDOT	ATMS03
Need real-time information about railroad crossing blockages (especially at RR 620) and the ability to inform motorists on I-35	City of Round Rock	City of Round Rock, TxDOT	ATMS13
Need improved traffic signal system coordination in railroad crossing corridors and improved re-synchronization after railroad crossing preemptions	City of Round Rock	City of Round Rock	ATMS13
Need video images from TxDOT	City of Round Rock	City of Round Rock, TxDOT	ATMS07
Need real-time information about SH 45 from surrounding cities	City of Round Rock	City of Round Rock, City of Austin, TxDOT TTA, TxDOT	ATMS07
Need improved signal coordination	City of San Marcos	City of San Marcos, TxDOT	ATMS03
Need to implement center-to-center communications between TxDOT TMCs	TxDOT	TxDOT	ATMS07
Need speed detection and DMS at Village Entrance on Hwy 71	Village of Bee Cave	Village of Bee Cave, TxDOT	ATMS19
Need video and detector data from CTECC	Williamson County	Williamson County, TxDOT	ATMS08
Need additional CCTV on I-35, SH 45, SH 79, SH 130, US 183, US 183A and RR 620	Williamson County	TxDOT	ATMS01
<b>Emergency Management</b>			
Need to coordinate evacuation efforts with CapMetro and CARTS	CapMetro, CARTS	Emergency Management Agencies, CARTS, CapMetro	EM08 EM09
Need emergency vehicle signal preemption	City of Burnet	City of Burnet	EM02
Need emergency vehicle signal preemption for the Cedar Park Fire Department, Williamson County EMS and Travis County EMS in the City of Cedar Park	City of Cedar Park	City of Cedar Park, Williamson County, Travis County	EM02
Need to integrate CAD system with TxDOT ATMS	City of Georgetown	City of Georgetown, TxDOT	ATMS08
Need emergency vehicle signal preemption	City of Georgetown	City of Georgetown	EM02

**Table 5 – Regional Needs and Corresponding Market Packages (continued)**

ITS Need	Identifying Agency	Implementing Agency	Market Package
<b>Emergency Management (continued)</b>			
Need emergency vehicle signal preemption	City of Marble Falls	City of Marble Falls	EM02
Need to integrate road closure information into the CAD system	City of Round Rock	City of Round Rock, Williamson County, TxDOT	ATMS08
Need advanced information that a railroad crossing is blocked to facilitate emergency services dispatch	City of San Marcos	City of San Marcos	ATMS13
Need to integrate CAD System with TxDOT ATMS	City of San Marcos	City of San Marcos, TxDOT	ATMS08
Need MDTs for Fire and EMS	City of San Marcos	City of San Marcos, Hays County EMS	EM01 EM02
Need real time traffic information	DPS District 6B	Municipalities, TxDOT	ATMS08
Need shared control of CCTV pan-tilt-zoom (PTZ)	DPS District 6B	Municipalities, TxDOT	ATMS08
Need advance information that a railroad crossing is blocked to facilitate emergency services dispatch	Hays County	Hays County	ATMS13
Need to integrate CAD System with TxDOT ATMS	Hays County	Hays County, TxDOT	ATMS08
Need to upgrade AVL and CAD system for EMS	Williamson County	Williamson County	EM01 EM02
Need to incorporate roadway information on closures and incidents in to the CAD system	Williamson County	Williamson County	EM02
Need AVL and MDTs for emergency management vehicles	Williamson County	Williamson County	EM01 EM02
Need advance information that a railroad crossing is blocked to facilitate emergency services dispatch	Williamson County	Williamson County	ATMS13
Need an agreement with the City of Austin to allow Williamson County EMS to have preemption rights on City of Austin traffic signals	Williamson County	Williamson County, City of Austin	EM02
<b>Maintenance and Construction Management</b>			
Need flood detection and automatic road closure gates on county and state roads	Burnet County	Burnet County, TxDOT	ATMS21 EM07
Need flood detection on county roads	Caldwell County	Caldwell County	EM07
Need flood detection and automated road closure gates	City of Georgetown	City of Georgetown	ATMS21 EM07
Need flood detection and automated road closure gates	City of Round Rock	City of Round Rock	ATMS21 EM07
Need flood detection and CCTV cameras to monitor low water crossings along the Blanco River	City of San Marcos	City of San Marcos	EM07 ATMS01

**Table 5 – Regional Needs and Corresponding Market Packages (continued)**

ITS Need	Identifying Agency	Implementing Agency	Market Package
<b><i>Maintenance and Construction Management (continued)</i></b>			
Need flood detection	Hays County	Hays County TxDOT	EM07
Need flood detection on US 183 and SH 80	Caldwell County	TxDOT	EM07
Need additional flood detection and closure gates on Spicewood Springs Road	Travis County	Travis County, City of Austin	EM07
Need flood detection	Williamson County	Williamson County, TxDOT	EM07
<b><i>Transit Operations</i></b>			
Need to expand use of AVL, passenger counters and vehicle monitoring	CapMetro	CapMetro	APTS1 APTS4 APTS5
Need to implement rapid bus project on selected routes	CapMetro	CapMetro	APTS1 APTS2 APTS7
Need to add surveillance cameras to buses as well as at buses and future light rail stops	CapMetro	CapMetro	APTS5
Need to add smart card payment system	CapMetro	CapMetro	APTS4
Need to provide web based reservations for demand response transit	CapMetro	CapMetro	APTS8
Need to provide real time information on vehicle arrival times at bus stops and future light rail	CapMetro	CapMetro	APTS8
Need to provide web based reservations for demand response transit	CARTS	CARTS	APTS8
Need to provide real time information on vehicle arrival times at transfer points	CARTS	CARTS	APTS8
Need to implement AVL, passenger counters and vehicle monitoring	CARTS	CARTS	APTS1 APTS4 APTS5
Need to add surveillance cameras to transit vehicles and at transit transfer stations	CARTS	CARTS	APTS5
Need to add smart card payment system	CARTS	CARTS	APTS4
Need to implement MDTs so that route changes can be communicated to the driver	CARTS	CARTS	APTS3
Need passenger count information from Capital Metro to determine bus rapid transit signal priority needs	City of Austin	City of Austin, Capital Metro	APTS7
Need to improve coordination between providers	Texas State University Transportation Department	Texas State University Transportation Department, CARTS, CapMetro	APTS7
Need advance information that a railroad crossing is blocked	Texas State University Transportation Department	City of San Marcos	ATMS13

**Table 5 – Regional Needs and Corresponding Market Packages (continued)**

Need	Identifying Agency	Implementing Agency	Market Package
<b><i>Transit Operations (continued)</i></b>			
Need passenger counters	Texas State University Transportation Department	Texas State University Transportation Department	APTS4
Need real-time bus arrival information to post on the internet and at transit stations and stops	Texas State University Transportation Department	Texas State University Transportation Department	APTS1 APTS2
<b><i>Traveler Information</i></b>			
Need DMS on US 281 (potentially as far away as the US 281/SH 71 intersection) for information on the segment between Marble Falls and Burnet. Accidents on this stretch have a significant impact on traffic and there is also an upcoming project to replace the bridge over the Colorado River. Also consider HAR.	Burnet County	TxDOT	ATMS06
Need to provide advance notice of flooded roadways to facilitate detouring	Burnet County	Burnet County, TxDOT	ATMS06
Need advance traveler information for FM 1431 heading east to Austin in the event of flooding or an accident.	Burnet County	TxDOT	ATMS06
Need DMS on I-10 for traveler information, especially in case of an evacuation	Caldwell County	TxDOT	ATMS06
Need to add DMS to arterials	City of Austin	City of Austin	ATMS06
Need DMS on FM 1431 near US 183 and on US 183 southbound north of New Hope so that vehicles can be detoured to US 183A if there is an incident on US 183	City of Cedar Park	City of Cedar Park, TxDOT	ATMS06
Need CCTV and vehicle detection on the Southwest Bypass and Inner Loop	City of Georgetown	City of Georgetown	ATMS01
Need DMS on I-35 for travel time and potential detour information	City of Georgetown	TxDOT	ATMS06
Need DMS on Southwest Bypass	City of Georgetown	City of Georgetown	ATMS06
Need portable DMS	City of Georgetown	City of Georgetown	ATMS06
Need DMS at several locations within the city including near the Dell Diamond.	City of Round Rock	TxDOT	ATMS06
Need DMS on I-35 in the vicinity of Exit 200 (outlet malls)	City of San Marcos Hays County	TxDOT	ATMS06
Need to coordinate with the TXDOT Austin District and TxDOT San Antonio Districts to provide improved traveler information	City of San Marcos Hays County	City of San Marcos, TxDOT Austin, TxDOT San Antonio	ATMS07
Need improved traveler information about conditions on RR 12 for Wimberley Trade Days	Hays County	TxDOT Austin	ATMS07

**Table 5 – Regional Needs and Corresponding Market Packages (continued)**

Need	Identifying Agency	Implementing Agency	Market Package
<b>Traveler Information (continued)</b>			
Need DMS on Brodie Lane, Anderson Mill Road, and Southwest Parkway to provide travel time and incident information	Travis County	Travis County	ATMS06
Need DMS on state routes throughout the County for traveler information	Travis County	TxDOT	ATMS06
Need to expand freeway management system through the implementation of additional DMS	TxDOT	TxDOT	ATMS06
Need to expand freeway management system through the implementation of additional CCTV cameras and vehicle detection	TxDOT	TxDOT	ATMS01
Need to add DMS for traveler information	TxDOT TTA	TxDOT	ATMS06
Need to add vehicle detection to toll roads	TxDOT TTA	TxDOT	ATMS01
Need to consider adding CCTV cameras for surveillance	TxDOT TTA	TxDOT	ATMS01
Need DMS on SH 71 prior to Bee Caves Road	Village of Bee Cave	TxDOT	ATMS06
<b>Archive Data Management</b>			
Need to bring data from ITS deployments together to allow it to be used for planning purposes	TxDOT, CAMPO	TxDOT, City of Austin, CAMPO	AD1 AD2 AD3

#### 3.4.4 Radio Communications Market Package

In addition to the 85 market packages covered in the National ITS Architecture, a user defined market package was also developed for the Austin Regional ITS Architecture to address the need for improved radio communications. Radio communications are essential to many of the incident management, emergency management, maintenance, and transit operations in the Region. In addition to voice, stakeholders envisioned the use of radio for data transmittal throughout the Region. Although the technology used to transmit data, such as fiber or microwave, is not generally shown in a regional ITS architecture, due to the importance of radio and the need for interoperability stakeholders felt it was important to clearly demonstrate the desired interoperability in the Region by creating a market package specific to radio communications.

In Texas, a Statewide Interagency Radio Work Group has worked together to identify solutions to the radio interoperability challenge. The group adopted the Association of Public Safety Communications Officials (APCO) International Project 25 standards. Project 25 is not a single standard but rather a number of individual protocols that can be mixed and matched to meet the individual needs of an agency. The key is that any radios using the Project 25 standards should be able communicate with any other Project 25 radio regardless of the manufacturer. The Texas legislature has required that future radio equipment purchased by the state use Project 25 radios.

Local governments are not required to use the Project 25 radios; however, all of the local agencies that participated in interviews as part of the Regional ITS Architecture process expressed a desire for interoperability between their radio systems and other systems in the



Region. Cost of upgrading their system as well as the increased cost of the digital radio that are Project 25 compliant will be the greatest obstacles in achieving interoperability between all agencies.

In order to reflect the desire for interoperability of radio systems between all agencies in the Region, the Radio Communications market package was developed for the Austin Regional ITS Architecture. This market package is represented in **Figure 6** and **Figure 7**. The Radio Communications market package includes the primary radio systems currently operating in the Region, those belonging to the City of Austin/Travis County, Hays County, LCRA, and Williamson County. The interface between these systems and other systems could be the Project 25 standards that allow compatibility between all agencies. Stakeholders throughout the Region have not agreed that this is the standard they will follow, only that they wish to have an interoperable radio system. The Radio Network market package also shows the need for radio systems to support both voice and data transfer on the radio system.

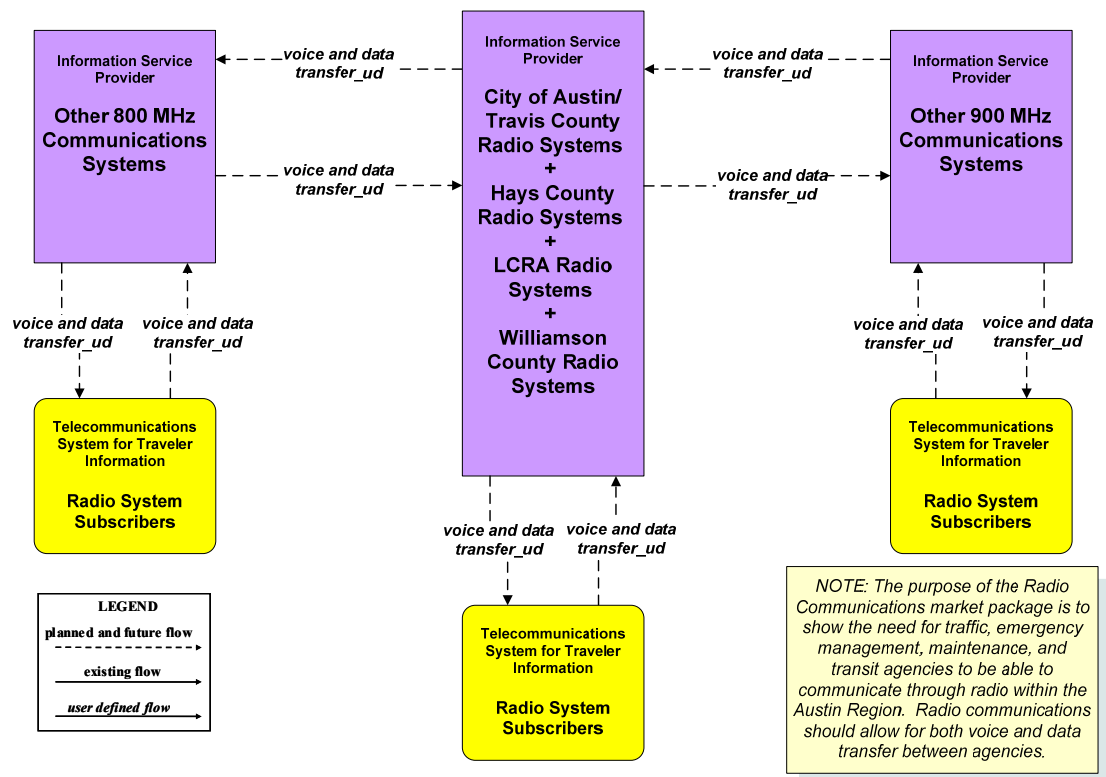


Figure 6 – Radio Communications Market Package (Part 1 of 2)

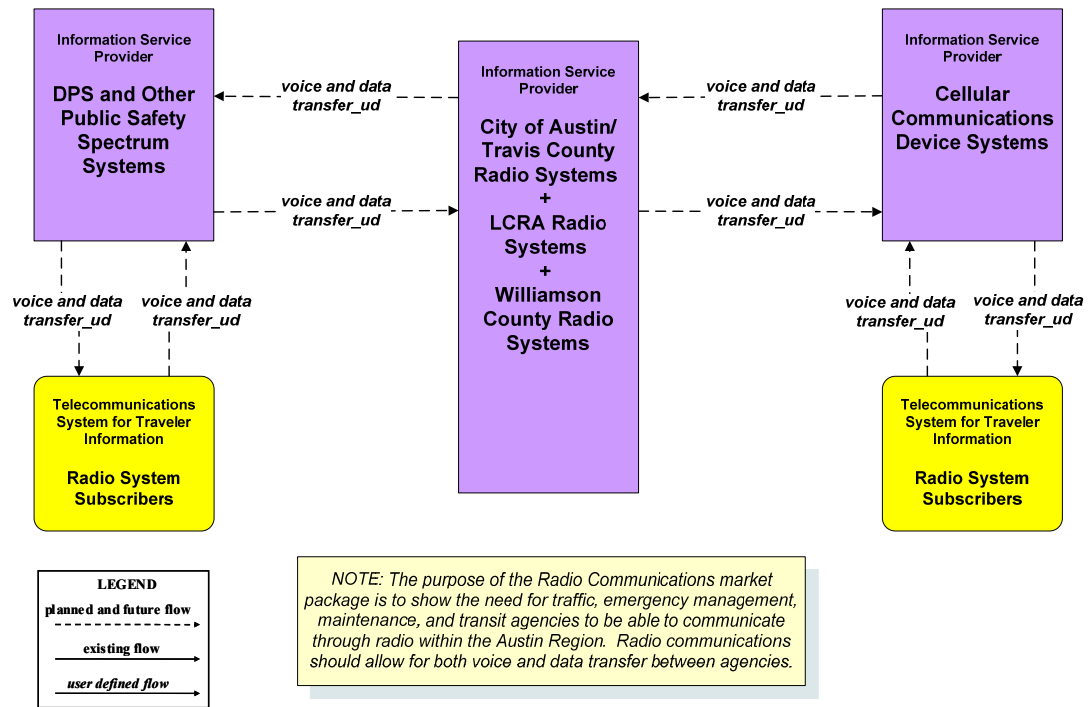


Figure 7 – Radio Communications Market Package (Part 2 of 2)

### 3.5 Architecture Interfaces

While it is important to identify the various systems and stakeholders as part of a regional ITS, a primary purpose of the architecture is to identify the connectivity between transportation systems in the Austin Region. The interconnect diagram shown previously in **Figure 4** showed the high-level relationships of the subsystems and terminators in the Austin Region and the associated local projects and systems. The customized market packages represent services that can be deployed as an integrated capability, and the market package diagrams show the information flows between the subsystems and terminators that are most important to the operation of the market packages. How these systems interface with each other is an integral part of the overall ITS architecture.

#### 3.5.1 Element Connections

There are a large number of different elements identified as part of the Austin Regional ITS Architecture. These elements include TMCs, transit vehicles, dispatch systems, emergency management agencies, media outlets, and others—essentially, all of the existing and planned physical components that contribute to the regional ITS. Interfaces have been identified for each element in the Austin Regional ITS Architecture, and each element has been mapped to those other elements with which it must interface.

An example of one of the context diagrams is shown in **Figure 8**. This graphic shows the TxDOT Austin District CCTV and the existing and planned interfaces with other elements throughout the Region. These interfaces are shown as existing or planned. The context diagrams are included on the Regional ITS Architecture web site and can be accessed from either the “Inventory by Stakeholder” section or the “Inventory by Entity” section. When an element is selected from either of these areas you can choose to view the context

diagram from the element description page that is displayed. The context diagrams are included in **Appendix D**.

### 3.5.2 Data Flows Between Elements

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

An example of the architecture flows between two elements is shown in **Table 6**. In this summary, the flows between the TxDOT Austin District TMC and the City of Austin/Travis County 911 Dispatch Center show the information that could go between the elements. Similar to the interfaces, architecture flows are also defined as existing or planned.

Each of these individual element data flow summaries can be accessed on the project web site at [www.consysfec.com](http://www.consysfec.com) by selecting the link to Texas Regional, then the link to the Austin Region, and then either the “ITS Inventory”, “Inventory by Stakeholder”, or “Inventory by Entity” button. Click on one of the inventory buttons and select any of the elements from the column on the right. This will display an element description page. On this page the interface list contains each element in the architecture that the chosen element shares information with. Selecting the desired element will display a table of data flows similar to that in **Table 6**. Selecting the Context Diagram button will display a context diagram similar to **Figure 8**. A complete set of context diagrams for all elements is included in **Appendix D**. For those elements with numerous interfaces, such as the City of Austin TMC, the context diagram is difficult to read so a table with a listing of all of the flows selected for use in the architecture is also included.

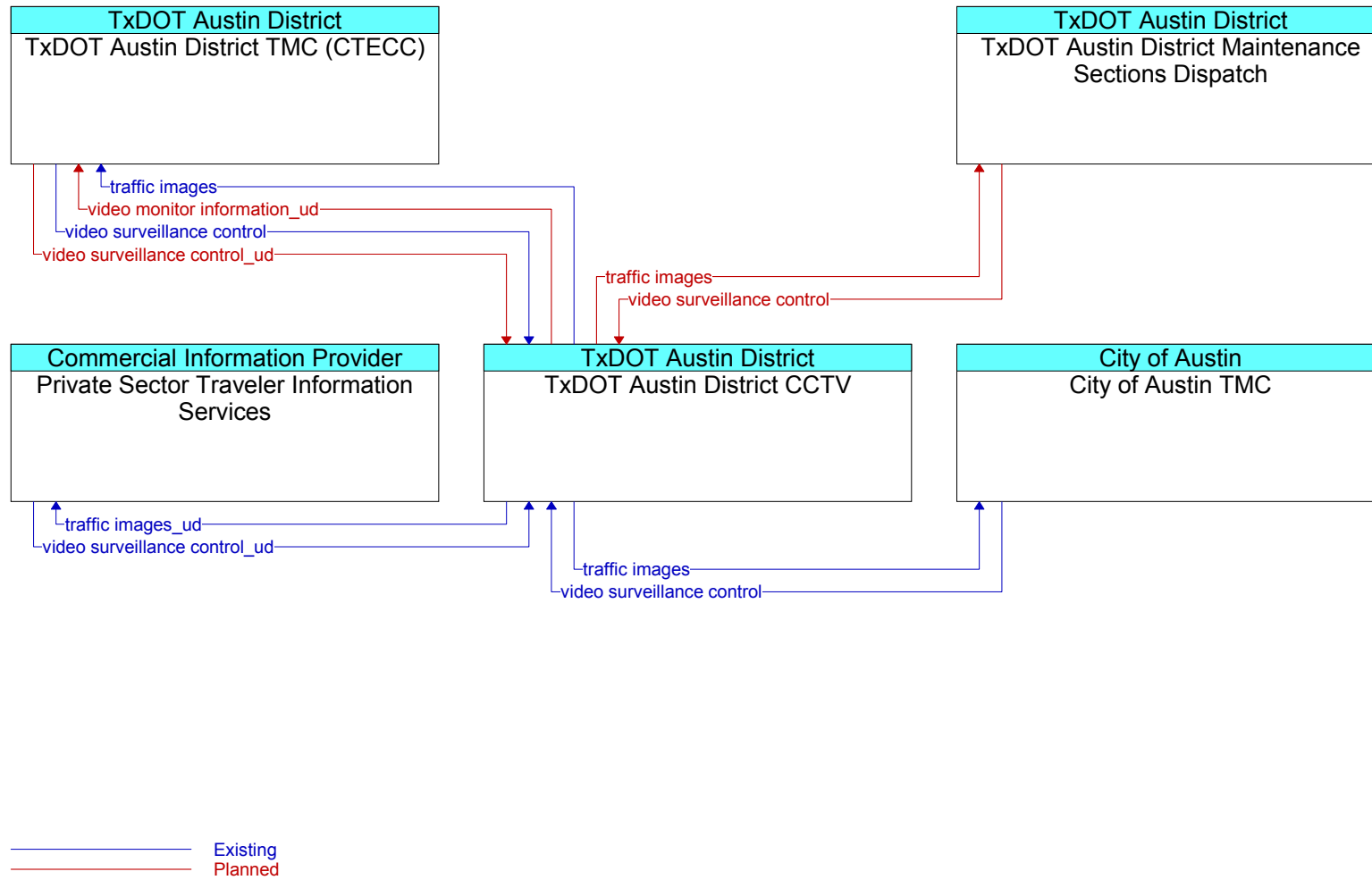


Figure 8 – Example Context Diagram: TxDOT Austin District CCTV

**Table 6 – Example Data Flow Table**

Source	Architecture Flows	Destination
City of Austin/Travis County 911 Dispatch Center (CTECC)	Threat information coordination (P)	TxDOT Austin District TMC (CTECC)
	Incident report (P)	
	Resource request (E)	
	Remote surveillance control (E)	
	Incident response status (E)	
	Incident information (E)	
TxDOT Austin District TMC (CTECC)	Flood warning_ud (P)	City of Austin/Travis County 911 Dispatch Center (CTECC)
	Threat information coordination (P)	
	Incident report (P)	
	Incident information (E)	
	Traffic images (E)	
	Resource deployment status (E)	
	Road network conditions (E)	
	Traffic violation notification (P)	

## 4. APPLICATION OF THE REGIONAL ITS ARCHITECTURE

Once a region has identified the desired components of ITS for their area and established which agencies and systems need to be connected, the structure of the National ITS Architecture assists with the region's planning and implementation. This section addresses the application of the Regional ITS Architecture in the Austin Region. The National ITS Architecture provides recommendations for standards and functional requirements that should be considered when implementing ITS elements. In addition, an operational concept has been developed for the Region and documents the roles and responsibilities of stakeholders in the operation of the regional ITS. The implementation of ITS in the Austin Region will likely require interagency agreements. Potential agreements have been identified based on the desired data flows identified in the Austin Region. The ITS Architecture and ITS Deployment Plan developed as part of this process will be incorporated in to the existing planning process for the Region to ensure that the maximum benefit is realized from the development effort.

### 4.1 Functional Requirements

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

For the Austin Regional ITS Architecture, functional requirements have been identified at two levels. The customized market packages, discussed previously in Section 3.4.2, describe the services that ITS needs to provide in the Region and the architecture flows between the elements. These market packages and data flows describe what the ITS system in the Austin Region has to do and the data that needs to be shared among elements.

At a more detailed level, functional requirements for the Austin Region are described in terms of functions that each element in the architecture performs or will perform in the future. **Appendix E** contains a table that summarizes the functions by element.

### 4.2 Standards

Standards are an important tool that will allow efficient implementation of the elements in the Austin Regional ITS Architecture over time. Standards facilitate deployment of interoperable systems at local, regional, and national levels without impeding innovation as technology advances, vendors change, and as new approaches evolve. The USDOT's ITS Joint Program Office is supporting Standards Development Organizations (SDOs) with an extensive, multi-year program of accelerated, consensus-based standards development to facilitate successful ITS deployment in the United States. Standards have been developed to support many of the physical subsystem architecture flows identified in the National ITS Architecture. **Table 7** identifies each of the ITS standards that could apply to the Austin Regional ITS Architecture. These standards are based on the physical subsystem architecture flows previously identified in Section 3.5.2.

Three additional standards that are not based on the National ITS Architecture physical subsystems architecture flows have also been included.

- TxDOT Center-to-Center: This standard has been developed by TxDOT to support center-to-center communications for traffic information.
- APCO Project 25 (P25): This standard has been developed by the Association of Public Safety Communications Officials International to support interoperability of radio systems.
- Department of Justice Global Justice Data Dictionary (Global JXDD): This standard has been developed by the Department of Justice and is used for interoperability between CAD systems. This data dictionary differs from the data dictionary developed by the Institute of Traffic Engineers for sharing incident information but is required by the Department of Justice if they are funding a project.

**Table 7 – Austin Applicable ITS Standards**

SDO	Document ID	Title
AASHTO/ITE/NEMA	NTCIP 1102	Octet Encoding Rules (OER) Base Protocol
	NTCIP 1104	Center-to-Center Naming Convention Specification
	NTCIP 1105	CORBA Security Service Specification
	NTCIP 1106	CORBA Near-Real Time Data Service Specification
	NTCIP 2104	Ethernet Subnetwork Profile
	NTCIP 2202	Internet (TCP/IP and UDP/IP) Transport Profile
	NTCIP 2303	File Transfer Protocol (FTP) Application Profile
	NTCIP 2304	Application Profile for DATEX-ASN (AP-DATEX)
	NTCIP 2305	Application Profile for CORBA (AP-CORBA)
	NTCIP 2306	Application Profile for XML Message Encoding and Transport in ITS C2C Communications
	NTCIP 2501	Information Profile for DATEX
	NTCIP 2502	Information Profile for CORBA
	NTCIP 1101	Simple Transportation Management Framework (STMF)
	NTCIP 1102	OER Base Protocol
	NTCIP 1103	Transportation Management Protocols
	NTCIP 2101	Point to Multi-Point Protocol Using RS-232 Subnetwork Profile
	NTCIP 2102	Point to Multi-Point Protocol Using FSK Modem Subnetwork Profile
	NTCIP 2103	Point-to-Point Protocol Over RS-232 Subnetwork Profile
	NTCIP 2104	Ethernet Subnetwork Profile
	NTCIP 2201	Transportation Transport Profile
	NTCIP 2202	Internet (TCP/IP and UDP/IP) Transport Profile
	NTCIP 2301	STMF Application Profile
	NTCIP 2302	Trivial File Transfer Protocol Application Profile
NTCIP 2303	FTP Application Profile	
ASTM	ASTM E2158-01	Standard Specification for Dedicated Short Range Communication (DSRC) Physical Layer using Microwave in the 902-928 MHz Band
	ASTM PS 105-99	Standard Provisional Specification for DSRC Data Link Layer

**Table 7 – Austin Applicable ITS Standards (continued)**

<b>SDO</b>	<b>Document ID</b>	<b>Title</b>
IEEE	IEEE 1609.1	Resource Manager for DSRC 5.9 GHz
	IEEE 1609.2	Application Services (Layers 6,7) for DSRC 5.9 GHz
	IEEE 1609.3	Communications Services (Layers 4,5) for DSRC 5.9 GHz (Future Standard)
	IEEE 1609.4	Medium Access Control (MAC) Extension & the MAC Extension Management Entity for DSRC 5.9 GHz
	IEEE 802.11	Standard Specification for Telecommunications and Information Exchange Between Roadside and Vehicle Systems – 5 GHz Band DSRC MAC and Physical Layer Specifications
	IEEE 802.2	Logical Link (Layer 2) for DSRC 5.9 GHz
	IEEE 1512.1-2003	Standard for Traffic Incident Management Message Sets (IMMS) for Use by Emergency Management Centers (EMCs)
	IEEE 1512.2-2004	Standard for Public Safety IMMS for use by EMCs
	IEEE 1512.3-2002	Standard for Hazardous Material IMMS
	IEEE 1512-2000	Standard for Common IMMS for use by EMCs
	IEEE P1512.4	Standard for Common Traffic Incident Management Message Sets for Use in Entities External to Centers
ISO	ISO 21210	Networking Services (Layer 3) for DSRC 5.9 GHz
SAE	SAE J2266	Location Referencing Message Specification (LRMS)
	SAE J2354	Message Set for Advanced Traveler Information System (ATIS)
	SAE J2369	Standard for ATIS Message Sets Delivered Over Reduced Bandwidth Media
	SAE J2540	Messages for Handling Strings and Look-Up Tables in ATIS Standards
	SAE J2540-1	Radio Data System (RDS) Phrase Lists
	SAE J2540-2	International Traveler Information Systems (IT IS) Phrase Lists
	SAE J2540-3	National Names Phrase List
	SAE J2266	LRMS
	SAE J2354	Message Set for Advanced Travel Information System (ATIS)
	SAE J2540	Messages for Handling Strings and Look-Up Tables in ATIS Standards
	SAE J2540-1	RDS Phrase Lists
	SAE J2540-2	ITIS Phrase Lists
	SAE J2540-3	National Names Phrase List
	SAE J2313	On-Board Land Vehicle Mayday Reporting Interface



### 4.3 Operational Concepts

An Operational Concept documents each stakeholder's current and future roles and responsibilities in the operation of the regional ITS. The Operational Concept documents these roles and responsibilities across a range of transportation services as grouped in the Operational Concepts section of Turbo Architecture. The services covered are:

- **Arterial Management** – The development of signal systems that react to changing traffic conditions and provide coordinated intersection timing over a corridor, an area, or multiple jurisdictions.
- **Highway Management** – The development of systems to monitor freeway (or tollway) traffic flow and roadway conditions, and provide strategies such as ramp metering or lane access control to improve the flow of traffic on the freeway. Includes systems to provide information to travelers on the roadway.
- **Incident Management** – The development of systems to provide rapid and effective response to incidents. Includes systems to detect and verify incidents, along with coordinated agency response to the incidents.
- **Emergency Management** – The development of systems to provide emergency call taking, public safety dispatch, and emergency operations center operations.
- **Maintenance and Construction Management** – The development of systems to manage the maintenance of roadways in the Region, including winter snow and ice clearance. Includes the managing of construction operations.
- **Transit Management** – The development of systems to more efficiently manage fleets of transit vehicles or transit rail. Includes systems to provide transit traveler information both pre-trip and during the trip.
- **Electronic Payment** – The development of electronic fare payment systems for use by transit and other agencies (e.g., parking).
- **Commercial Vehicle Operations** – The development of systems to facilitate the management of commercial vehicles (e.g. electronic clearance).
- **Traveler Information** – The development of systems to provide static and real time transportation information to travelers.
- **Archive Data Management** – The development of systems to collect transportation data for use in non-operational purposes (e.g., planning and research).

**Table 8** identifies the roles and responsibilities of key stakeholders for a range of transportation services.

**Table 8 – Austin Stakeholder Roles and Responsibilities**

Transportation Service	Stakeholder	Roles/Responsibilities
Traffic Signal Control	TxDOT	Operate network surveillance equipment (CCTV cameras, field sensors, etc.) on state owned arterials and City streets.
		Provide traffic images and video surveillance control to private sector traveler information systems.
		Perform speed monitoring on state owned arterials.
		Operate traffic signal systems on state owned arterials, including traffic signals, sensor systems, and pedestrian crossing signals.
		Provide traffic information reports to regional and private information service providers as well as the Texas 511 System (through the highway conditions reporting system [HCRS]).
		Provide traffic information to regional agencies including transit, emergency management, maintenance and construction, and the media. Provide traffic information to travelers through state owned DMS.
		Coordinate traffic information with the state's other Regional TMCs and the local city and municipality TMCs/TOCs.
		Coordinate highway rail intersection (HRI) signal adjustments with regional and private Rail Operators.
		Operate and control reversible lanes on state arterials or toll roads.
		Provide speed monitoring on state owned arterials or toll roads.
	Provide automated flood detection and road closures (as well as alerting the traveling public through DMS) on state owned arterials.	
	Provide security monitoring of critical infrastructure for the State, and relay threat information to regional emergency management providers as well as other regional and municipal/local TMCs/TOCs.	
	Provide emergency signal preemption for the City and County public safety vehicles as well as DPS vehicles.	
	City of Austin	Operate network surveillance equipment (CCTV cameras, field sensors, etc.) on City streets.
		Provide traffic images and video surveillance control to private sector traveler information systems.
Operate traffic signal systems on City owned streets, including traffic signals, sensor systems, and CCTV detection devices.		
Operate programmable flasher systems for City schools.		
Provide traffic information reports to regional information service providers, private information service providers, and the Texas 511 System.		

**Table 8 – Austin Stakeholder Roles and Responsibilities (continued)**

Transportation Service	Stakeholder	Roles/Responsibilities
Traffic Signal Control (continued)	City of Austin (continued)	Provide traffic information to regional agencies including transit, emergency management, maintenance and construction, and the media (through the City's Public Information Office [PIO]). Provide traffic information to travelers through City's DMS.
	Coordinate traffic information with the state's Regional TMC and the local city and municipality TMCs/TOCs.	
	Coordinate HRI signal adjustments with regional and private Rail Operators.	
	Operate and control reversible lanes on City owned streets.	
	Provide speed monitoring on City owned streets.	
	Provide automated flood detection and road closures on City owned streets.	
	Provide security monitoring of critical infrastructure for the City, and relay threat information to regional emergency management providers as well as regional and municipal/local TMCs/TOCs.	
	Provide transit signal priority for regional fixed route transit vehicles.	
	Provide emergency signal preemption for the City's Fire and EMS vehicles, the county's public safety vehicles, and public/private ambulances.	
	City of Cedar Park	Operate network surveillance equipment (CCTV cameras, field sensors, etc.) on City streets.
		Operate traffic signal systems on City owned streets, including traffic signals, sensor systems, and pedestrian crossing systems.
		Operate programmable flasher systems for City schools.
		Provide traffic information reports to regional information service providers, private information service providers, and the Texas 511 System.
		Provide traffic information to regional agencies including transit, emergency management, maintenance and construction, and the media (through the City's PIO). Provide traffic information to travelers through City's DMS.
		Coordinate traffic information with the state's Regional TMC and the local city and municipality TMCs/TOCs.
		Coordinate HRI signal adjustments with regional and private Rail Operators.
Provide emergency signal preemption for the City's Fire and EMS vehicles, the county's public safety vehicles, and public/private ambulances.		

**Table 8 – Austin Stakeholder Roles and Responsibilities (continued)**

Transportation Service	Stakeholder	Roles/Responsibilities
Traffic Signal Control (continued)	City of Georgetown	Operate network surveillance equipment (CCTV cameras, field sensors, etc.) on City streets.
		Operate traffic signal systems on City owned streets, including traffic signals, sensor systems, and pedestrian crossing systems.
		Operate programmable flasher systems for City schools.
		Provide traffic information reports to regional information service providers, private information service providers, and the Texas 511 System.
		Provide traffic information to regional agencies including transit, emergency management, maintenance and construction, and the media (through the City's PIO). Provide traffic information to travelers through City's DMS.
		Coordinate traffic information with the state's Regional TMC and the local city and municipality TMCs/TOCs.
		Coordinate HRI signal adjustments with regional and private Rail Operators.
		Provide automated flood detection and road closures on City owned streets.
		Provide emergency signal preemption for the City's Fire and EMS vehicles, the county's public safety vehicles, and public/private ambulances.
	City of Round Rock	Operate network surveillance equipment (CCTV cameras, field sensors, etc.) on City streets.
		Provide traffic images to the regional DOT office.
		Operate traffic signal systems on City owned streets, including traffic signals, sensor systems, and pedestrian crossing systems.
		Operate programmable flasher systems for City schools.
		Provide traffic information reports to regional information service providers, private information service providers, and the Texas 511 System.
		Provide traffic information to regional agencies including transit, emergency management, maintenance and construction, and the media (through the City's PIO). Provide traffic information to travelers through City's DMS.
		Coordinate traffic information with the state's Regional TMC and the local city and municipality TMCs/TOCs.
		Coordinate HRI signal adjustments with regional and private Rail Operators.
		Provide emergency signal preemption for the City's Fire and EMS vehicles, the county's public safety vehicles, and public/private ambulances.

**Table 8 – Austin Stakeholder Roles and Responsibilities (continued)**

Transportation Service	Stakeholder	Roles/Responsibilities
Traffic Signal Control (continued)	City of San Marcos	Operate network surveillance equipment (CCTV cameras, field sensors, etc.) on City streets.
		Provide traffic images to the regional DOT office.
		Operate traffic signal systems on City owned streets, including traffic signals, sensor systems, and pedestrian crossing systems.
		Operate programmable flasher systems for City schools.
		Provide traffic information reports to regional information service providers, private information service providers, and the Texas 511 System.
		Provide traffic information to regional agencies including transit, emergency management, maintenance and construction, and the media (through the City's PIO). Provide traffic information to travelers through City's DMS.
		Coordinate traffic information with the state's Regional TMC and the local city and municipality TMCs/TOCs.
		Coordinate HRI signal adjustments with regional and private Rail Operators.
	Municipalities	Provide emergency signal preemption for the City's Fire and EMS vehicles, the county's public safety vehicles, and public/private ambulances.
		Operate network surveillance equipment (CCTV cameras, field sensors, etc.) on municipality streets.
		Operate traffic signal systems on City owned streets, including traffic signals, sensor systems, and pedestrian crossing systems.
		Operate programmable flasher systems for City schools.
		Provide traffic information reports to regional information service providers, private information service providers, and the Texas 511 System.
		Provide traffic information to regional agencies including transit, emergency management, maintenance and construction, and the media. Provide traffic information to travelers through City's DMS.
		Coordinate traffic information with the state's Regional TMC and the local city and municipality TMCs/TOCs.
		Coordinate HRI signal adjustments with regional and private Rail Operators.
Provide emergency signal preemption for the municipality's Fire and EMS vehicles, the county's public safety vehicles, and public/private ambulances.		

**Table 8 – Austin Stakeholder Roles and Responsibilities (continued)**

Transportation Service	Stakeholder	Roles/Responsibilities
Highway Management	TxDOT	Operate network surveillance equipment (CCTV cameras, field sensors, etc.) on State owned highways.
		Operate lane controls on state owned highways.
		Provide traffic information to regional transportation agencies and the general public through traffic information devices (DMS, Highway Advisory Radio, HCRS, Texas 511, etc.).
		Provide HOV lane management for state owned highways. Provide travelers with real-time pricing information for HOV lanes via agency DMS.
		Provide security monitoring of critical infrastructure for the State.
		Coordinate traffic information and traffic control with other regional TMCs and the statewide TMC.
Incident Management (Traffic)	Texas Department of Public Safety (DPS)	Dispatch DPS Police vehicles for incidents on highways and the parkway.
		Coordinate incident response with other public safety agencies (police, fire, EMS, sheriff, etc.) as well as with TxDOT.
		Perform incident detection and verification for the highways within the region, and provide this information to traffic and other public safety agencies.
		Coordinate maintenance resources in response to incidents on state highways with regional maintenance providers.
		Coordinate an incident response with regional rail operations for incidents involving rail.
	City of Austin and Travis County (911 Dispatch)	Receive emergency calls for incidents within the City or the County.
		Coordinate public safety resources for incident response with the City's traffic operations center (TOC).
		Coordinate incident response with other public safety agencies (fire and EMS).
		Dispatch the City's police vehicles, fire vehicles and EMS vehicles and dispatch county public safety vehicles, as well as coordinate with all other public safety agencies within the region.
		Perform incident detection and verification for the streets within the City and County, and provide this information to the City's TOC.
		Coordinate an incident response with regional rail operations for incidents involving rail.
		Coordinate maintenance resources in response to incidents within the City and within the County.

**Table 8 – Austin Stakeholder Roles and Responsibilities (continued)**

Transportation Service	Stakeholder	Roles/Responsibilities
Incident Management (Traffic) (continued)	City of Round Rock Public Safety	Coordinate incident response with the County public safety departments.
		Dispatch the City's public safety vehicles (police, fire and EMS) as well as coordinate with all other public safety agencies within the region.
		Coordinate public safety resources for incident response with regional traffic agencies, including the City's TOC and regional TMCs.
		Coordinate with ambulance services in response to incidents within the City.
		Coordinate an incident response with regional rail operations for incidents involving rail.
	County Sheriff	Receive emergency calls for incidents within the counties.
		Dispatch the County's sheriff vehicles (and track their location) as well as coordinate with all other public safety agencies within the region.
		Coordinate incident response with the county's public safety agencies (fire and EMS).
		Perform incident detection and verification for the streets within the county, and provide this information to the regional TMCs.
		Coordinate an incident response with regional rail operations for incidents involving rail.
		Coordinate maintenance resources in response to incidents within the county of an adjacent municipality.
	Municipalities	Receive emergency calls for incidents within the municipalities.
		Coordinate public safety resources for incident response with the municipality's TOC or TMC.
		Dispatch the municipality's police vehicles, fire vehicles and EMS vehicles as well as coordinate with all other public safety agencies within the region.
		Perform incident detection and verification for the streets within the municipalities, and provide this information to the municipality TOCs.
		Coordinate an incident response with regional rail operations for incidents involving rail.
		Coordinate with ambulance services in response to incidents within the City.
		Coordinate maintenance resources in response to incident with the municipality.

**Table 8 – Austin Stakeholder Roles and Responsibilities (continued)**

Transportation Service	Stakeholder	Roles/Responsibilities
Incident Management (Traffic) (continued)	University of Texas	Receive emergency calls for incidents within the University.
		Dispatch the University Police vehicles as well as coordinate with all other public safety agencies within the region (City and County level).
		Coordinate incident response with the City Police.
		Perform incident detection and verification for the streets within the University, and provide this information to the regional and City TMC.
		Coordinate maintenance resources in response to incident within the University.
Transit Management	CapMetro	Track vehicle location on all agency fixed route transit vehicles, demand response vehicles, and commuter rail.
		Provide transit schedule and fare information to the agency's website, the TxDOT 511 system, regional traveler information providers, and private sector traveler information service providers.
		Provide fixed route bus service for the agency defined service area through fixed route transit vehicles and commuter rail.
		Provide demand response bus service (STS) for the agency defined service area, with the ability to provide a demand response transit plan from the agency website.
		Provide transit passenger electronic fare payment on all agency fixed route, demand response, STS, and commuter rail transit vehicles.
		Provide transit security on all agency transit vehicles through silent alarms, sensors, AVL, and surveillance systems.
		Provide automated transit maintenance scheduling through automated vehicle condition reports on all agency fixed route, demand response, STS, and commuter transit vehicles.
		Obtain traffic signal priority from the municipalities in the agency's service area through the municipality's field equipment for all fixed route transit vehicles.
		Coordinate transit service with all other agency transit vehicles.
		Coordinate transit service with other regional transit providers, as well as regional intermodal terminals, AMTRAK stations, and regional airports.
		Provide transit traveler information to the agency website (thus accessible from the Internet) as well as making it available on all transit information kiosks and transit vehicles.



**Table 8 – Austin Stakeholder Roles and Responsibilities (continued)**

Transportation Service	Stakeholder	Roles/Responsibilities
Transit Management (continued)	CapMetro (continued)	Coordinate emergency plans with Municipal, County, and Statewide EOCs and provide emergency transit services for evacuations, fires, and disasters (including re-entry).
	CARTS	Track vehicle location and evaluate schedule performance on all agency fixed route transit vehicles and demand response transit vehicles.
		Provide transit schedule and fare information to the agency's website, the TxDOT 511 system, regional traveler information providers, and private sector traveler information service providers.
		Provide fixed route bus service for the agency defined service area.
		Provide demand response bus service for the agency defined service area, with the ability to provide a demand response transit plan from the agency website.
		Provide transit passenger electronic fare payment on all agency fixed route and demand response transit vehicles.
		Provide transit security on all agency transit vehicles through silent alarms and surveillance systems.
		Provide automated transit maintenance scheduling through automated vehicle condition reports on all agency fixed route and demand response transit vehicles.
		Coordinate transit service with other regional transit providers, as well as regional intermodal terminals, AMTRAK stations, and regional airports.
		Provide transit traveler information to the agency website (thus accessible from the Internet) as well as making it available on all transit information kiosks and transit vehicles.
		Coordinate emergency plans with Municipal, County, and Statewide EOCs and provide emergency transit services for evacuations, fires, and disasters (including re-entry).
	Independent School Districts	Track vehicle location and evaluate schedule performance on all school district vehicles.
		Provide school bus schedule and route information to the school district website.
		Provide fixed route school bus service for the cities, municipalities, and counties within the State of Texas.
		Provide transit security on all transit vehicles through silent alarms and surveillance systems.
		Provide automated transit maintenance scheduling through automated vehicle conditions reports on all Independent School District buses.
		Coordinate emergency plans with Municipal, County, and Statewide EOCs and provide emergency transit services for evacuations, fires, and disasters (including re-entry).

**Table 8 – Austin Stakeholder Roles and Responsibilities (continued)**

Transportation Service	Stakeholder	Roles/Responsibilities
Transit Management (continued)	TxDOT	Provide a demand-response intake center to aid the traveling public in coordinating with demand response transit vehicles.
		Provide the ability to determine a demand response transit plan.
Traveler Information	TxDOT	Operate the state 511 system.
		Collect traffic, incident, transit schedule, road maintenance and weather information and provide it to the media and private travelers.
		Provide broadcast information to travelers.
		Coordinate and share traveler information with all other traveler information providers within the region.
		Provide traveler information to private travelers (in vehicle, personal computing device, or kiosk) upon request.
		Provide traveler information to the media.
		Provide a route guidance system for private commercial fleets based on information gathered from HCRS.
Emergency Management	Department of Public Safety	Dispatch State Police vehicles (and track their location) as well as coordinate with all other public safety agencies within the region.
		Participates in the incident response, coordination, and reporting of the Statewide Mutual Aid and Incident Management Network in a coordination effort only (no dispatch function).
		Operates a PSAP for statewide services, but has the ability to dispatch regional and statewide emergency services.
		Coordinates with regional medical centers regarding the status of the care facility as well as the patient status en route to the medical center.
		Receive signal preemption from regional traffic signals.
		Receive and respond to threat information from the City's TMC regarding critical infrastructure.
		Receive AMBER Alert and other Wide-Area Alert information from the State Office of Emergency Management.
		Generate AMBER Alerts and distribute them to regional emergency management agencies, transit agencies, traffic agencies, and the media.
		Aide in the coordination of region wide emergency plans, evacuation and reentry plans, and disaster management plans.
		Receive Wide-Area Alert information from the Regional EOCs.

**Table 8 – Austin Stakeholder Roles and Responsibilities (continued)**

Transportation Service	Stakeholder	Roles/Responsibilities
Emergency Management (continued)	City of Austin Police Department	Participates in the incident response, coordination, and reporting of the Statewide Mutual Aid and Incident Management Network in a coordination effort only (no dispatch function).
		Dispatch the City's police vehicles (and track their location) as well as coordinate with all other public safety agencies within the City and region.
		Perform incident detection and verification for streets within the City.
		Receive AMBER Alert and other Wide-Area Alert information from the Department of Public Safety (DPS).
		Receive Wide-Area Alert information from the Regional EOCs.
		Aide in the coordination of region wide emergency plans, evacuation and reentry plans, and disaster management plans.
	City of Austin Fire Department	Participates in the incident response, coordination, and reporting of the Statewide Mutual Aid and Incident Management Network in a coordination effort only (no dispatch function).
		Dispatch the City's police vehicles (and track their location) as well as coordinate with all other public safety agencies within the City and region.
		Perform incident detection and verification for streets within the City.
		Receive AMBER Alert and other Wide-Area Alert information from DPS.
		Receive Wide-Area Alert information from the Regional EOCs.
		Aide in the coordination of region wide emergency plans, evacuation and reentry plans, and disaster management plans.
	City of Round Rock Public Safety	Participates in the incident response, coordination, and reporting of the Statewide Mutual Aid and Incident Management Network in a coordination effort only (no dispatch function).
		Operates 9-1-1 center for the City and County, with the ability to dispatch regional and statewide emergency services.
		Dispatch the City's police vehicles (and track their location) as well as coordinate with all other public safety agencies within the City and region.
		Coordinates with regional medical centers regarding the status of the care facility as well as the patient status en route to the medical center.
		Receive signal preemption from City's traffic signals, and regional traffic signals.

**Table 8 – Austin Stakeholder Roles and Responsibilities (continued)**

Transportation Service	Stakeholder	Roles/Responsibilities
Emergency Management (continued)	City of Round Rock Public Safety (continued)	Perform incident detection and verification for streets within the City.
		Receive AMBER Alert and other Wide-Area Alert information from DPS.
		Receive Wide-Area Alert information from the Regional EOCs.
		Aide in the coordination of region wide emergency plans, evacuation and reentry plans, and disaster management plans.
	Municipalities	Participates in the incident response, coordination, and reporting of the Statewide Mutual Aid and Incident Management Network in a coordination effort only (no dispatch function).
		Operates PSAP for the municipalities, with the ability to dispatch regional and statewide emergency services.
		Dispatch the municipality's public safety vehicles (and track their location) as well as coordinate with all other public safety agencies within the municipality and the region.
		Coordinates with regional medical centers regarding the status of the care facility as well as the patient status en route to the medical center.
		Receive signal preemption from municipality and City traffic signals, as well as regional traffic signals.
		Perform incident detection and verification for streets within the municipalities of the region.
		Receive AMBER Alert and other Wide-Area Alert information from DPS.
		Receive Wide-Area Alert information from the Regional EOCs.
		Aide in the coordination of region wide emergency plans, evacuation and reentry plans, and disaster management plans.
		Participates in the incident response, coordination, and reporting of the Statewide Mutual Aid and Incident Management Network in a coordination effort only (no dispatch function).
	County Sheriff	Participates in the incident response, coordination, and reporting of the Statewide Mutual Aid and Incident Management Network in a coordination effort only (no dispatch function).
		Operate 9-1-1 center for the County, with the ability to dispatch regional and statewide emergency services.
		Dispatch the County sheriff's vehicles (and track their location) and county public safety vehicles and coordinate with all other public safety agencies within the county and region.

**Table 8 – Austin Stakeholder Roles and Responsibilities (continued)**

Transportation Service	Stakeholder	Roles/Responsibilities
Emergency Management (continued)	County Sheriff (continued)	Receive signal preemption for county public safety vehicles from regional traffic signals.
		Perform incident detection and verification for streets within the counties of the state as well as on county roads.
		Receive AMBER Alert and other Wide-Area Alert information from DPS.
		Receive Wide-Area Alert information from the Regional EOCs.
		Aide in the coordination of region wide emergency plans, evacuation and reentry plans, and disaster management plans.
	Travis County Public Safety	Participates in the incident response, coordination, and reporting of the Statewide Mutual Aid and Incident Management Network in a coordination effort only (no dispatch function).
		Dispatch the County's public safety vehicles (and track their location) as well as coordinate with all other public safety agencies within the county and region.
		Coordinates with regional medical centers regarding the status of the care facility as well as the patient status en route to the medical center.
		Receive signal preemption from regional traffic signals.
		Perform incident detection and verification for county roads.
		Receive AMBER Alert and other Wide-Area Alert information from DPS.
		Receive Wide-Area Alert information from the Regional EOCs.
		Aide in the coordination of region wide emergency plans, evacuation and reentry plans, and disaster management plans.
	Williamson County EMS/EOC	Participates in the incident response, coordination, and reporting of the Statewide Mutual Aid and Incident Management Network in a coordination effort only (no dispatch function).
		Operate a PSAP for the County, with the ability to dispatch regional and statewide emergency services.
		Dispatch the County's public safety vehicles (and track their location) as well as coordinate with all other public safety agencies within the county and region.
		Coordinates with regional medical centers regarding the status of the care facility as well as the patient status en route to the medical center.
		Receive signal preemption from municipal traffic signals as well as regional traffic signals.

**Table 8 – Austin Stakeholder Roles and Responsibilities (continued)**

Transportation Service	Stakeholder	Roles/Responsibilities
Emergency Management (continued)	Williamson County EMS/EOC (continued)	Perform incident detection and verification on county roads.
		Receive AMBER Alert and other Wide-Area Alert information from DPS.
		Generate and coordinate wide-area alerts and distribute them to regional emergency management agencies, transit agencies, traffic agencies, regional information service providers, and the media.
		Plan and coordinate region wide emergency plans, evacuation and reentry plans, and disaster management plans dealing with HAZMAT incidents.
		Provide regional traffic, transit, emergency management, and maintenance operations with disaster information to disseminate to the traveling public.
	County Emergency Management Agencies	Responsible for the Statewide Mutual Aid and Incident Management Network in a coordination effort only (no dispatch function).
		Coordinates with regional medical centers regarding the status of the care facility as well as the patient status en route to the medical center.
		Receive AMBER Alert and other Wide-Area Alert information from DPS.
		Generate and coordinate wide-area alerts and distribute them to regional emergency management agencies, transit agencies, traffic agencies, regional information service providers, and the media.
		Plan and coordinate region wide emergency plans, evacuation and reentry plans, and disaster management plans dealing with HAZMAT incidents.
		Provide regional traffic, transit, emergency management, and maintenance operations with disaster information to disseminate to the traveling public.
	City of Austin and Travis County (911 Dispatch)	Operate 9-1-1 center for the City and County, with the ability to dispatch regional and statewide emergency services.
		Participates in the incident response, coordination, and reporting of the Statewide Mutual Aid and Incident Management Network in a coordination effort only (no dispatch function).
		Dispatch City fire vehicles with suggested route information and track the vehicles to the incident.
		Receive and respond to threat information from regional transportation infrastructure protection equipment.
		Dispatch all city, county, municipality, and DPS vehicles to incidents within the region.
		Receive AMBER Alert and other Wide-Area Alert information from DPS.

**Table 8 – Austin Stakeholder Roles and Responsibilities (continued)**

Transportation Service	Stakeholder	Roles/Responsibilities
Emergency Management (continued)	City of Austin and Travis County (911 Dispatch) (continued)	Receive Wide-Area Alert information from the Regional EOCs.
		Aide in the coordination of region wide emergency plans, evacuation and reentry plans, and disaster management plans.
		Operate 9-1-1 center for the City and County, with the ability to dispatch regional and statewide emergency services.
	Austin/Travis County Office of Emergency Management (EOC)	Participates in the incident response, coordination, and reporting of the Statewide Mutual Aid and Incident Management Network in a coordination effort only (no dispatch function).
		Operates PSAP for the City and the County, with the ability to dispatch regional and statewide emergency services.
		Receive AMBER Alert and other Wide-Area Alert information from DPS.
		Generate and coordinate wide-area alerts and distribute them to regional emergency management agencies, transit agencies, traffic agencies, regional information service providers, and the media.
		Plan and coordinate region wide emergency plans, evacuation and reentry plans, and disaster management plans dealing with HAZMAT incidents.
		Provide regional traffic, transit, emergency management, and maintenance operations with disaster information to disseminate to the traveling public.
	City of Austin Aviation Department	Participates in the incident response, coordination, and reporting of the Statewide Mutual Aid and Incident Management Network in a coordination effort only (no dispatch function).
		Receive AMBER Alert and other Wide-Area Alert information from DPS.
		Receive Wide-Area Alert information from the Regional EOCs.
		Aide in the coordination of region wide emergency plans, evacuation and reentry plans, and disaster management plans.
	Public/Private Ambulance Providers	Participates in the incident response, coordination, and reporting of the Statewide Mutual Aid and Incident Management Network in a coordination effort only (no dispatch function).
		Coordinates with regional and statewide emergency services to dispatch and track their own vehicles.
Coordinates with regional medical centers regarding the status of the care facility as well as the patient status en route to the medical center.		

**Table 8 – Austin Stakeholder Roles and Responsibilities (continued)**

Transportation Service	Stakeholder	Roles/Responsibilities
Emergency Management (continued)	Public/Private Ambulance Providers (continued)	Dispatch ambulance vehicles with suggested route information and track the vehicles to the incident.
		Receive signal preemption from municipal and City traffic signals as well as regional traffic signals.
		Receive AMBER Alert and other Wide-Area Alert information from DPS.
		Receive Wide-Area Alert information from the Regional EOCs.
		Aide in the coordination of region wide emergency plans, evacuation and reentry plans, and disaster management plans.
	University of Texas	Participates in the incident response, coordination, and reporting of the Statewide Mutual Aid and Incident Management Network in a coordination effort only (no dispatch function).
		Dispatch Special Police vehicles (and track their location) as well as coordinate with all other public safety agencies within the City.
		Perform incident detection and verification for streets within the specified area of responsibility.
		Receive AMBER Alert and other Wide-Area Alert information from DPS.
		Receive Wide-Area Alert information from the Regional EOCs.
		Aide in the coordination of region wide emergency plans, evacuation and reentry plans, and disaster management plans.
	Lower Colorado River Authority	Receive flood monitoring information from its own field equipment.
		Provide flood warning information to regional TMCs/TOCs and regional transit agencies.
	TxDOT	Receive flood monitoring information from its own field equipment.
		Provide flood warning information to regional TMCs/TOCs, regional transit agencies, regional maintenance agencies, and the media.
		Provide flood warning information to the traveling public through DMS and with flood gates.
		Provide disaster traveler information to regional emergency management agencies, regional traffic agencies, and regional transit agencies.
	City of Austin	Receive flood monitoring information from its own field equipment (water level monitors and CCTV cameras).
Provide flood warning information to regional TMCs/TOCs, regional transit agencies, regional maintenance agencies, and the media.		



**Table 8 – Austin Stakeholder Roles and Responsibilities (continued)**

Transportation Service	Stakeholder	Roles/Responsibilities	
Emergency Management (continued)	City of Austin (continued)	Provide flood warning information to the traveling public through DMS and with flood gates.	
		Provide disaster traveler information to regional emergency management agencies, regional traffic agencies, and regional transit agencies.	
	City of Georgetown	Receive flood monitoring information from its own field equipment (water level monitors and CCTV cameras).	
		Provide flood warning information to regional TMCs/TOCs, regional transit agencies, regional maintenance agencies, and the media.	
		Provide flood warning information to the traveling public through DMS and with flood gates.	
		Provide disaster traveler information to regional emergency management agencies, regional traffic agencies, and regional transit agencies.	
	City of Round Rock	Receive flood monitoring information from its own field equipment (water level monitors and CCTV cameras).	
		Provide flood warning information to regional TMCs/TOCs, regional transit agencies, regional maintenance agencies, and the media.	
		Provide flood warning information to the traveling public through DMS and with flood gates.	
		Provide disaster traveler information to regional emergency management agencies, regional traffic agencies, and regional transit agencies.	
	City of San Marcos	Receive flood monitoring information from its own field equipment (water level monitors and CCTV cameras).	
		Provide flood warning information to regional TMCs/TOCs, regional transit agencies, regional maintenance agencies, and the media.	
		Provide flood warning information to the traveling public through DMS.	
		Provide disaster traveler information to regional emergency management agencies, regional traffic agencies, and regional transit agencies.	
	Maintenance and Construction Management	TxDOT	Receive a request for maintenance resources for incident response from regional emergency management agencies.
			Coordinate maintenance resources for incidents with other regional maintenance providers.
Receive vehicle location information from agency maintenance and construction vehicles.			
Receive vehicle maintenance conditions from agency maintenance and construction vehicles and coordinate fleet maintenance with the agency's district mechanic shop.			

**Table 8 – Austin Stakeholder Roles and Responsibilities (continued)**

Transportation Service	Stakeholder	Roles/Responsibilities
Maintenance and Construction Management (continued)	TxDOT (continued)	Collect road weather information with agency field equipment and distribute it to regional traffic, maintenance and transit agencies as well as the national weather service and the media.
		Provide maintenance of state highways within the region, including pavement maintenance and all construction activities.
		Coordinate maintenance activities with the agency's district engineer and with the agency's asset management system.
		Dispatch agency maintenance vehicles and get operations status from these vehicles.
		Provide maintenance to all field equipment owned and operated by the agency.
		Manage work zones on all agency maintenance and construction activities, as well as monitors work zone safety with agency field devices and vehicles.
		Provide maintenance status and notification information to the traveling public through agency owned DMS.
		Monitor the safety of maintenance and construction activities through early warning systems and sensors on maintenance and construction field equipment.
		Coordinates maintenance and construction activities with other regional maintenance and construction agencies.
		Distributes maintenance and construction plans and work zone information to regional information service providers, regional traffic operations, emergency operations, transit providers, rail operations, and the media.
	City of Austin	Receive a request for maintenance resources for incident response from regional emergency management agencies.
		Coordinate maintenance resources for incidents with other regional maintenance providers.
		Receive vehicle location information from agency maintenance and construction vehicles.
		Receive vehicle maintenance conditions from agency maintenance and construction vehicles and coordinate fleet maintenance with agency's fleet services.
		Provide maintenance of streets within the city, including pavement maintenance and all construction activities.
		Coordinate maintenance activities with the agency's TMC and with the agency's asset management system.
		Dispatch agency maintenance vehicles and get operations status from these vehicles.
		Provide maintenance to all field equipment owned and operated by the City.

**Table 8 – Austin Stakeholder Roles and Responsibilities (continued)**

Transportation Service	Stakeholder	Roles/Responsibilities
Maintenance and Construction Management (continued)	City of Austin (continued)	Manage work zones on City streets, and monitors the safety of work zones status with City owned vehicles and field equipment.
		Coordinates maintenance and construction activities with other regional maintenance and construction agencies.
		Distributes maintenance and construction plans and work zone information to regional information service providers, regional traffic operations, emergency operations, rail operations, and the media.
	City of Round Rock	Receive a request for maintenance resources for incident response from regional emergency management agencies.
		Coordinate maintenance resources for incidents with other regional maintenance providers.
		Receive vehicle location information from agency maintenance and construction vehicles.
		Receive vehicle maintenance conditions from agency maintenance and construction vehicles and coordinate fleet maintenance with agency's equipment repair facility.
		Provide maintenance of streets within the city, including pavement maintenance and all construction activities.
		Coordinate maintenance activities with the agency's TMC and with the agency's asset management system.
		Dispatch agency maintenance vehicles and get operations status from these vehicles.
		Provide maintenance to all field equipment owned and operated by the City.
		Manage work zones on City streets, and monitors the safety of work zones status with City owned vehicles and field equipment.
		Coordinates maintenance and construction activities with other regional maintenance and construction agencies.
	Municipalities	Receive a request for maintenance resources for incident response from regional emergency management agencies.
		Coordinate maintenance resources for incidents with other regional maintenance providers.
		Receive vehicle location information from agency maintenance and construction vehicles.
Receive vehicle maintenance conditions from agency maintenance and construction vehicles and coordinate fleet maintenance with agency's equipment repair garage.		

**Table 8 – Austin Stakeholder Roles and Responsibilities (continued)**

Transportation Service	Stakeholder	Roles/Responsibilities
Maintenance and Construction Management (continued)	Municipalities (continued)	Provide maintenance of streets within the municipalities, including pavement maintenance and all construction activities.
		Coordinate maintenance activities with the municipal TOC and with the agency's asset management system.
		Dispatch agency maintenance vehicles and get operations status from these vehicles.
		Provide maintenance to all field equipment owned and operated by the municipality.
		Manage work zones on municipal streets.
		Coordinates maintenance and construction activities with other regional maintenance and construction agencies.
		Distributes maintenance and construction plans and work zone information to regional information service providers, regional traffic operations, emergency operations, rail operations, and the media.
	Travis County Road Department	Receive a request for maintenance resources for incident response from regional emergency management agencies.
		Coordinate maintenance resources for incidents with other regional maintenance providers.
		Receive vehicle location information from agency maintenance and construction vehicles.
		Receive vehicle maintenance conditions from agency maintenance and construction vehicles and coordinate fleet maintenance with agency's equipment repair garage.
		Provide maintenance of streets within the county, including pavement maintenance and all construction activities.
		Coordinate maintenance activities with regional traffic operations and with the agency's asset management system.
		Dispatch agency maintenance vehicles and get operations status from these vehicles.
		Provide maintenance to all field equipment owned and operated by the county.
		Manage work zones on county streets.
		Coordinates maintenance and construction activities with other regional maintenance and construction agencies.
		Distributes maintenance and construction plans and work zone information to regional information service providers, regional traffic operations, emergency operations, rail operations, and the media.

**Table 8 – Austin Stakeholder Roles and Responsibilities (continued)**

Transportation Service	Stakeholder	Roles/Responsibilities		
Maintenance and Construction Management (continued)	Williamson County Road Department	Receive a request for maintenance resources for incident response from regional emergency management agencies.		
		Coordinate maintenance resources for incidents with other regional maintenance providers.		
		Receive vehicle location information from agency maintenance and construction vehicles.		
		Receive vehicle maintenance conditions from agency maintenance and construction vehicles and coordinate fleet maintenance with agency's equipment repair facility.		
		Provide maintenance of streets within the county, including pavement maintenance and all construction activities.		
		Coordinate maintenance activities with regional traffic operations and with the agency's asset management system.		
		Dispatch agency maintenance vehicles and get operations status from these vehicles.		
		Provide maintenance to all field equipment owned and operated by the county.		
		Manage work zones on county streets.		
		Coordinates maintenance and construction activities with other regional maintenance and construction agencies.		
		Distributes maintenance and construction plans and work zone information to regional information service providers, regional traffic operations, emergency operations, rail operations, and the media.		
			County Departments	Receive a request for maintenance resources for incident response from regional emergency management agencies.
				Coordinate maintenance resources for incidents with other regional maintenance providers.
Receive vehicle location information from agency maintenance and construction vehicles.				
Receive vehicle maintenance conditions from agency maintenance and construction vehicles and coordinate fleet maintenance with agency's equipment repair garage.				
Provide maintenance of streets within the county, including pavement maintenance and all construction activities.				
Coordinate maintenance activities with regional traffic operations and with the agency's asset management system.				
Dispatch agency maintenance vehicles and get operations status from these vehicles.				

**Table 8 – Austin Stakeholder Roles and Responsibilities (continued)**

Transportation Service	Stakeholder	Roles/Responsibilities
Maintenance and Construction Management (continued)	County Departments (continued)	Provide maintenance to all field equipment owned and operated by the county.
		Manage work zones on county streets.
		Coordinates maintenance and construction activities with other regional maintenance and construction agencies.
		Distributes maintenance and construction plans and work zone information to regional information service providers, regional traffic operations, emergency operations, rail operations, and the media.
Archived Data Management	TxDOT	Collect and archive transit and ridership information for the region's transit agencies.
		Collect and archive pavement management/maintenance information from regional maintenance sections and provide the information to the statewide system.
		Collect and archive emergency and crash information from regional emergency management agencies and DPS.
		Collect and archive emergency and crash information from regional archives.
		Collect and archive traffic information from the agency's regional TMC and traffic signal system.
	City of Austin	Collect and archive pavement management/maintenance information from its own field equipment and maintenance section and provide the information to regional and statewide systems.
		Collect and archive emergency and crash information from regional emergency management agencies and regional public safety agencies and provide this information to the statewide system.
		Collect and archive traffic information from the agency's maintenance section.
	City of Round Rock	Collect and archive pavement management/maintenance information from its own field equipment and maintenance section and provide the information to regional and statewide systems.
		Collect and archive emergency and crash information from regional emergency management agencies and regional public safety agencies and provide this information to the statewide system.
	Municipalities	Collect and archive pavement management/maintenance information from its own field equipment and maintenance section and provide the information to regional and statewide systems.
		Collect and archive emergency and crash information from regional emergency management agencies and regional public safety agencies and provide this information to the statewide system.

**Table 8 – Austin Stakeholder Roles and Responsibilities (continued)**

Transportation Service	Stakeholder	Roles/Responsibilities
Archived Data Management (continued)	Capital Area MPO	Collect and archive traffic information from regional traffic management providers, emergency information from regional public safety providers, transit information from regional transit agencies, toll information from regional toll authorities, and parking information from regional parking providers for planning purposes.
		Serve as a data warehouse for regional traffic, emergency, transit, toll, and parking management agencies.
		Serve as a virtual data warehouse for all archive systems in the region.
Commercial Vehicle Operations	City of Austin	Provide for commercial vehicle permits (oversize/overweight) through the agency website and through coordination with other regional permitting systems.
		Provide credential verification and route restrictions for regional commercial vehicles.
		Coordinate fee and credential information and payment with regional and municipal permitting systems.
	City of Round Rock	Provide for commercial vehicle permits (oversize/overweight) through the agency website and through coordination with other regional permitting systems.
		Provide credential verification and route restrictions for regional commercial vehicles.
		Coordinate fee and credential information and payment with regional and municipal permitting systems.
	Municipalities	Provide for commercial vehicle permits (oversize/overweight) through the agency website and through coordination with other regional permitting systems.
		Provide credential verification and route restrictions for regional commercial vehicles.
		Coordinate fee and credential information and payment with regional and municipal permitting systems.
	TxDOT	Provides an electronic (web based) credentials interface for commercial vehicle credentials applications.
		Coordinate fee and credential information and payment with regional and municipal permitting systems.
		Provide route information to regional and statewide information service providers, including 511 and HCRS.
	Private Commercial Carriers	Provide emergency notification and HAZMAT information to regional emergency management providers through a concierge service provider.
		Provide HAZMAT information to regional emergency management providers.

**Table 8 – Austin Stakeholder Roles and Responsibilities (continued)**

Transportation Service	Stakeholder	Roles/Responsibilities
Commercial Vehicle Operations (continued)	Rail Operations	Provide emergency notification and HAZMAT information to regional emergency management providers through a concierge service provider.
		Provide HAZMAT information to regional emergency management providers.
	Texas DEM	Coordinate and provide alert or evacuation information for commercial vehicle incidents (accidents or HAZMAT spills).

#### 4.4 Potential Agreements

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

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

**Table 9** provides a list of existing and potential agreements for the Austin Region based on the interfaces identified in the Regional ITS Architecture. It is important to note that as ITS services and systems are implemented in the Region, part of the planning and review process for those projects should include a review of potential agreements that would be needed for implementation or operations.

**Table 9 – Austin Potential Agreements**

Status	Agreement and Agencies	Agreement Description
Existing	<b>Joint Operations/Shared Control Agreement</b> (911 RDMT Project) – TxDOT Austin District, Travis County, City of Austin, CapMetro, Austin ISD, ABIA	Provides for the development of a unified public safety communication system that could include 911 operations, CAD, mobile data information transfer, public safety and public service radio communications, and ITS management, all of which might be operated from a fully integrated combined center.
Existing	<b>Data Sharing and Usage</b> – TxDOT Austin District, KEYE, KVUE, KXAN and News 8	License agreements to access and broadcast TxDOT CCTV camera video feeds.



**Table 9 – Austin Potential Agreements (continued)**

Status	Agreement and Agencies	Agreement Description
Existing	<b>Standard Operating Procedures – CTECC Partners</b>	<p>CTECC partner agencies have developed standard operating procedures to cover the many different aspects of operating the center. Agreements are categorized into function codes that cover the following areas:</p> <p>Function Code 00 – SOP Process            Function Code 01 – General Office            Function Code 02 – Facility Maintenance            Function Code 03 – Building Security/Building Emergency            Function Code 05 – System Security/Application Administration            Function Code 07 – Radio            Function Code 08 – CTECC Administration</p>
In Progress	<b>Electronic Toll Interoperability Agreements – TxDOT TTA, CTRMA, Other Texas Regional Tolling Authorities</b>	<p>Agreements to define electronic toll collection interoperability between TxDOT TTA, CTRMA, and other Texas regional tolling authorities such as the North Texas Tollway Authority and Harris County Toll Road Authority. An Interoperability Taskforce is currently in place and developing such agreements.</p>
Future	<b>ITS and Traffic Signal Timing Data Sharing and Usage – TxDOT Austin District, City of Austin, City of Cedar Park, City of Georgetown, City of Round Rock, and City of San Marcos</b>	<p>Agreement would define the parameters, guidelines, and policies for inter-agency ITS and traffic signal timing sharing between the TxDOT TMC at CTECC and cities that are at or near 50,000 in population and maintaining their own traffic signal systems.</p>
Future	<b>Incident Data Sharing and Usage – TxDOT Austin District and Emergency Management Agencies</b>	<p>Agreement would define the parameters, guidelines, and policies for inter-agency sharing of incident data between TxDOT and emergency management agencies in the Region. Incident information could be sent directly to CAD systems and include information on lane closures, travel delays, and weather.</p>
Future	<b>Data Sharing and Usage – TxDOT Austin District and Williamson County</b>	<p>Agreement would define the parameters, guidelines, and policies for inter-agency ITS data sharing between the TxDOT TMC at CTECC and Williamson County operations center that is currently in the planning phase.</p>
Future	<b>Data Sharing and Usage – TxDOT Austin District and Private Information Service Provider</b>	<p>Agreements would define the parameters, guidelines, and policies for private sector (such as the media or other information service providers) use of ITS data. This type of agreement is recommended to define terms of use for broadcasting public-agency information regarding traffic conditions, closures, restrictions, as well as video images. Agreements can also include requirements for the media to 'source' the information (i.e., using the providing agencies logo on all video images broadcast).</p>
Future	<b>Operations and Maintenance Agreement – TxDOT Austin District, TxDOT TTA Division, and CTRMA</b>	<p>Agreement to operate ITS equipment on TTA and CTRMA facilities as well as dispatch courtesy patrol vehicles. The agreement will need to address funding of these services.</p>

#### **4.5 Phases of Implementation**

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

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

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

- Network Surveillance;
- Surface Street Control;
- Traffic Information Dissemination;
- Regional Traffic Control;
- Wide-Area Alerts; and
- Transit Vehicle Tracking.

## 5. USE AND MAINTENANCE OF THE REGIONAL ITS ARCHITECTURE

The ITS Architecture developed for the Austin Region addresses the Region's vision for ITS implementation at the time the plan was developed. Stakeholders invested a considerable amount of effort in the development of the Regional ITS Architecture and Regional ITS Deployment Plan. The plan needs to be incorporated into the regional planning process so that the ITS vision for the Region is considered when implementing ITS projects and to ensure that the Region remains eligible for federal funding for implementation of the projects.

As the Region grows, needs will change, and, as technology progresses, new ITS opportunities will arise. Shifts in regional needs and focus as well as changes in the National ITS Architecture will necessitate that the Austin Regional ITS Architecture be updated to remain a useful resource for the Region.

### 5.1 Use of the Regional ITS Architecture in the Regional Planning Process

The Regional ITS Architecture can serve as a valuable resource in the development of the Long Range Transportation Plan (LRTP). **Figure 9** illustrates the CAMPO planning process and the involvement of the ITS Architecture in that process. The CAMPO Congestion Management Process and ITS Working Group provides input into the LRTP on ITS needs for the Region. The needs identified in the ITS Architecture should be considered by the Working Group when providing this input. During the project selection process the market package prioritization developed by stakeholders during the ITS architecture development process should be utilized to facilitate the selection of projects for inclusion in the LRTP.

As projects transition from the LRTP to the Transportation Improvement Program (TIP), each project should be evaluated to determine if the project includes any ITS elements. If the project contains an ITS element, then the Regional ITS Architecture needs to be reviewed to ensure that the project is in conformance. CAMPO will assist agencies as they perform this examination as part of the project application process using the procedure outlined in Section 5.1.1.

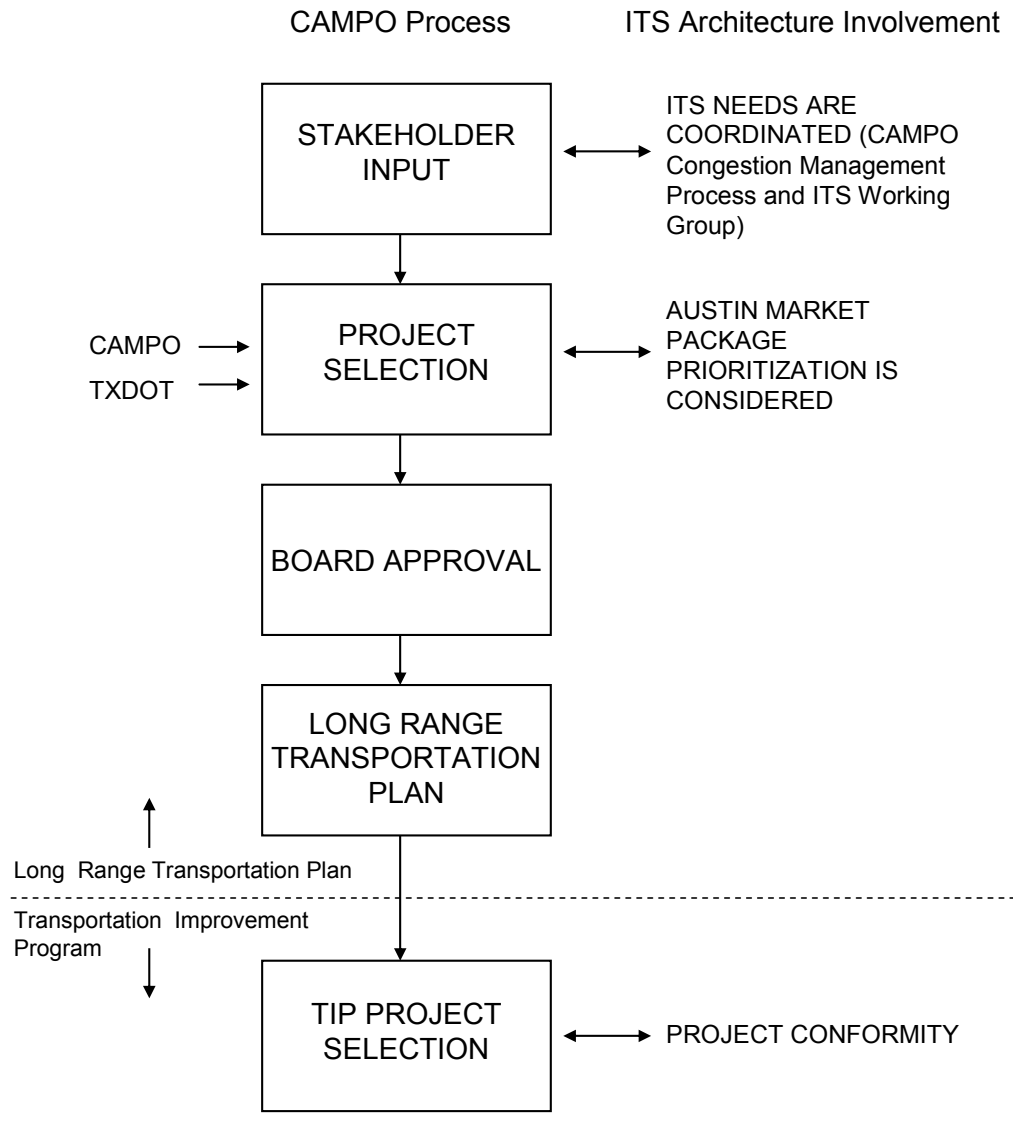


Figure 9 – CAMPO Regional Planning Process and ITS Architecture Involvement

### 5.1.1 Process for Determining Architecture Conformity

The Austin Regional ITS Architecture documents the customized market packages that were developed as part of the ITS architecture process. To satisfy federal requirements and remain eligible to use federal funds, a project must be accurately documented. A section will be added to the CAMPO project proposal form to guide applicants through the process of determining conformance with the architecture. Applicants will be asked to attach a copy of the applicable market package(s) to their application. The steps of the process are as follows:

- Identify the ITS components in the project;
- Identify the corresponding market packages(s) from the Regional ITS Architecture;
- Locate the component within the market package;
- Compare the connections to other agencies or elements documented in the ITS architecture as well as the information flows between them to the connections that will be part of the project ; and
- Document any changes necessary to the ITS Architecture or the project to ensure there is conformance.

#### Identifying the ITS Components

ITS components can be fairly apparent in an ITS focused project such as CCTV or DMS deployments, but could also be included in other types of projects. For example, an arterial widening project could include the installation of signal system interconnect, signal upgrades, and the incorporation of the signals in the project limits into the City's closed loop signal system. These are all ITS deployments and should be part of the ITS architecture.

#### Identifying the Corresponding Market Packages

If a project was included in the ITS Deployment Plan **Table 10** through **Table 15**, then the applicable market package(s) for that project are identified in a column. ITS projects are not required to be included in the ITS Deployment Plan in order to be eligible for federal funding; therefore, market packages might need to be identified without the assistance of an ITS Deployment Plan. In that case, the market packages selected and customized for the Austin Region are identified in **Table 4** of this document, detailed market package definitions are located in **Appendix B**, and customized market packages for the Region are included in **Appendix C**.

#### Identifying the Component within the Market Package

The customized market packages for the Austin Region are located in **Appendix C**. Once the element is located on the market package the evaluator may determine that the element name should be modified. For example, an element called the City of Cedar Park TOC was included in the architecture, but at the time of deployment, the City might decide to call the center by a new name. This name change should be documented using the process outlined in Section 5.3.

#### Evaluating the Connections and Flows

The connections and architecture flows documented in the market package diagrams were selected based on the information available at the time the plan was developed. As the projects are designed, decisions will be made on the system layout that might differ from what is shown in the market package. These changes in the project should be documented in the ITS market packages using the process outlined in Section 5.3.

### Documenting Required Changes

If any changes are needed to accommodate the project under review, Section 5.3 describes how those changes should be documented. Any changes will be incorporated during the next architecture update. Conformance will be accomplished by documenting how the market package(s) should be modified so that the connections and data flows are consistent with the project.

## 5.2 Maintenance Process

TxDOT will be responsible for leading the maintenance of the Austin Regional ITS Architecture and Deployment Plan in coordination with CAMPO. Maintenance includes both modifications to the plan as well as complete updates. **Table 10** summarizes the maintenance process agreed upon by stakeholders in the Region.

**Table 10 – Regional ITS Architecture and Deployment Plan Maintenance Summary**

Maintenance Details	Regional ITS Architecture		Regional ITS Deployment Plan	
	Modification	Complete Update	Modification	Complete Update
<b>Timeframe for Updates</b>	As needed	Every 4 years	Annually	Every 4 years
<b>Scope of Update</b>	Update market packages to satisfy architecture compliance requirements of projects or to document other changes that impact the ITS Architecture	Entire ITS Architecture	Update project status and add or remove projects as needed	Entire ITS Deployment Plan
<b>Lead Agency</b>	CAMPO	TxDOT	TxDOT/CAMPO	TxDOT
<b>Participants</b>	Stakeholders impacted by market package modifications	Entire stakeholder group	Entire stakeholder group	
<b>Results</b>	Market package or other change(s) documented for next complete update	Updated Austin Regional ITS Architecture document, Appendices, and Turbo Architecture database	Updated project tables	Updated Austin Regional ITS Deployment Plan document

Modifications to the Regional ITS Architecture will often be necessitated by ITS projects that are receiving federal funding but do not conform to the Regional ITS Architecture. CAMPO will take the lead in working with agencies that receive federal funding for ITS projects and will keep a record of any changes that are needed to the Regional ITS Architecture. Complete updates to the Regional ITS Architecture will occur approximately every four years in the year preceding the TIP update and will be led by the TxDOT Austin District. The next TIP will cover 2011 to 2014 and be due in May 2010; therefore, the next update of the Regional ITS Architecture will need to

be completed by 2010. Section 4 of the ITS Deployment Plan contains additional detail on the annual project review process.

The Regional ITS Deployment Plan should be modified annually. The annual modifications should consist primarily of updates to the recommended projects, including identification of any projects in the plan that have been deployed and any new project that should be added to the plan. This effort could be led by the TxDOT Austin District or the CAMPO Congestion Management Process and ITS Working Group. A complete update of the ITS Deployment Plan should occur every four years as part of the ITS Architecture update. The TxDOT Austin District will lead this effort.

### **5.3 Procedure for Submitting ITS Architecture Changes Between Scheduled Updates**

Updates to the Austin Regional ITS Architecture will occur on a regular basis as described in Section 5.2 to maintain the architecture as a useful planning tool. Between complete plan updates, smaller modifications will likely be required to accommodate ITS projects in the Region. Section 5.1.1 contains step by step guidance for determining whether or not a project requires architecture modifications.

For situations where a change is required, an ITS Architecture Maintenance Documentation Form was developed and is included in **Appendix F**. This form should be completed and submitted to CAMPO whenever a change to the Regional ITS Architecture is proposed.

The Maintenance Documentation form identifies three levels of modifications. They include:

- Level 1 – Basic changes that do not affect the structure of the architecture  
Examples include: Changes to stakeholder or element name, element status, or data flow status.
- Level 2 – Structural changes that impact only one agency  
Examples include: Addition of a new market package or modifications to an existing market package that affects only one agency.
- Level 3 – Structural changes that have the potential to impact multiple agencies  
Examples include: Addition of a new market package or modifications to an existing market package that involves multiple agencies or incorporation of a new stakeholder into the architecture.

In the process of documenting the change, the stakeholder proposing the change should contact any other agency that will be impacted by the modification to obtain feedback. This communication between agencies will simplify the process of performing a complete plan update. CAMPO will review and accept the proposed changes. When a complete update is performed by TxDOT, all of the documented changes will be incorporated into the architecture. This documentation will most likely be performed in conjunction with project conformance documentation as part of the TIP project application process; however, changes could be documented at other times as agencies are planning for future projects using the same form.