Austin Regional ITS Architecture
and Deployment Plan Update

ITS Architecture Workshop

July 22, 2014



Kimley»Horn

Workshop Overview

- Welcome and Introductions
- Presentation and Discussion on the Regional ITS Architecture Components
  - Regional ITS Goals and Objectives
  - ITS Service Packages Selected for the Region
  - ITS Agreements
  - Use and Maintenance of the Regional ITS Architecture
- Presentation and Discussion on Operations Concepts and ITS Projects
  - Potential Regional ITS Operations Initiatives
  - Potential Regional ITS Projects
  - Future Technologies and Programs to Consider in the Regional ITS Architecture
- Concluding Comments and Adjourn




Project Overview

- Purpose: Update the 2007 Austin Regional ITS Architecture report and Deployment Plan
- Update goals:
  - Include participation from traffic, transit, and public safety stakeholders representing local, state, and federal agencies in the Austin Region
  - Provide a high level plan that documents the Region's vision for the deployment, integration, and operation of ITS in the Austin Region
  - Assist the Region in meeting the FHWA and FTA requirements for ITS architecture conformity

Kimley»Horn




Austin Regional Boundaries

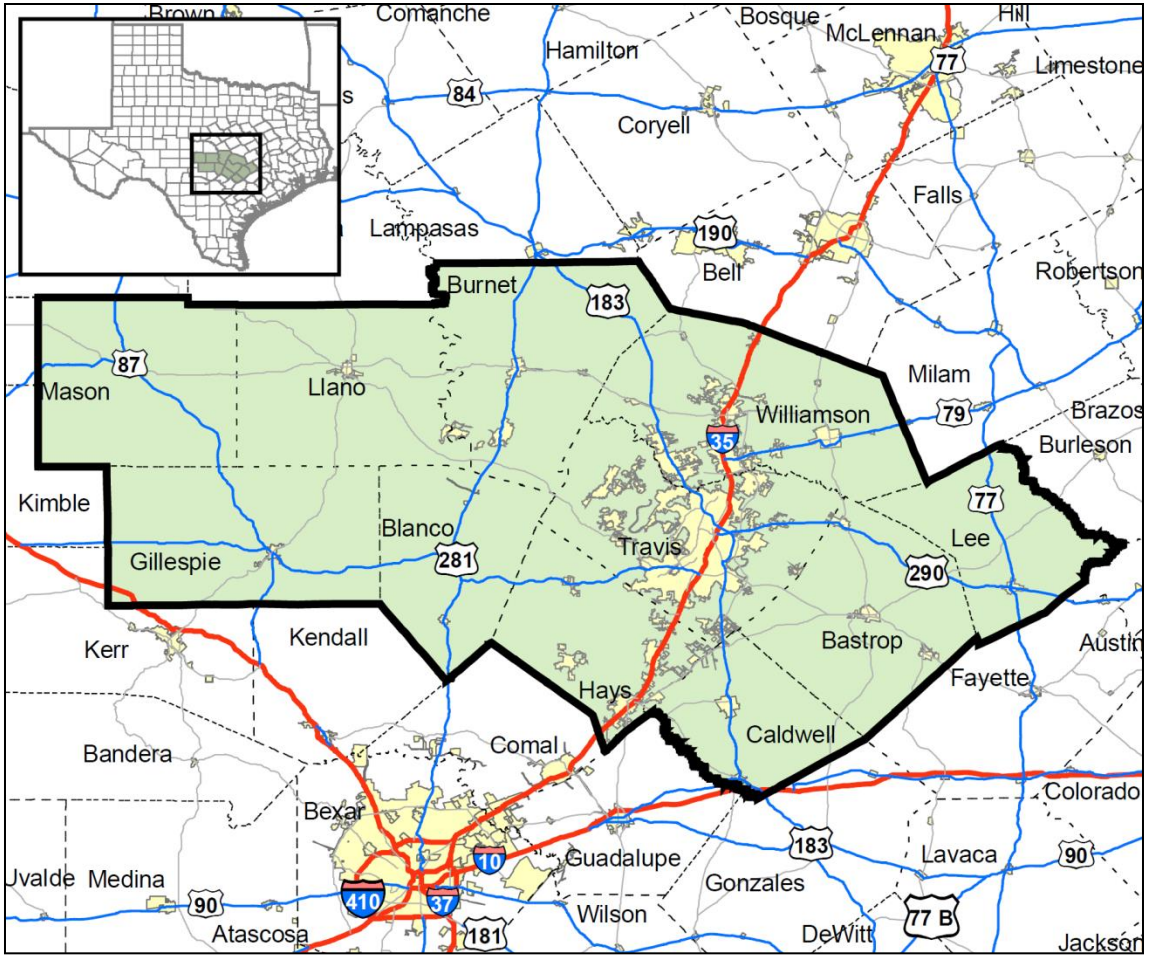
The regional boundaries have been defined as the boundaries of the TxDOT Austin District

Bastrop, Blanco, Burnet,
Caldwell, Gillespie, Hays,
Lee, Llano, Mason,
Travis and Williamson

Connections will be added to all agencies outside the regional boundaries as appropriate

Kimley»Horn

Austin Regional Boundaries



Kimley»Horn





Project Overview

Mar 2014 | Jul 2014 | Jan 2015

Kick-Off Workshop
March 24

Stakeholder Interviews
April - July

ITS Architecture Workshop
July 22

Draft Documents
August

Stakeholder Interviews
August/September

Deployment Plan Workshop
September

Revised Draft and Final Documents
October - January

Training on Use and Maintenance
December

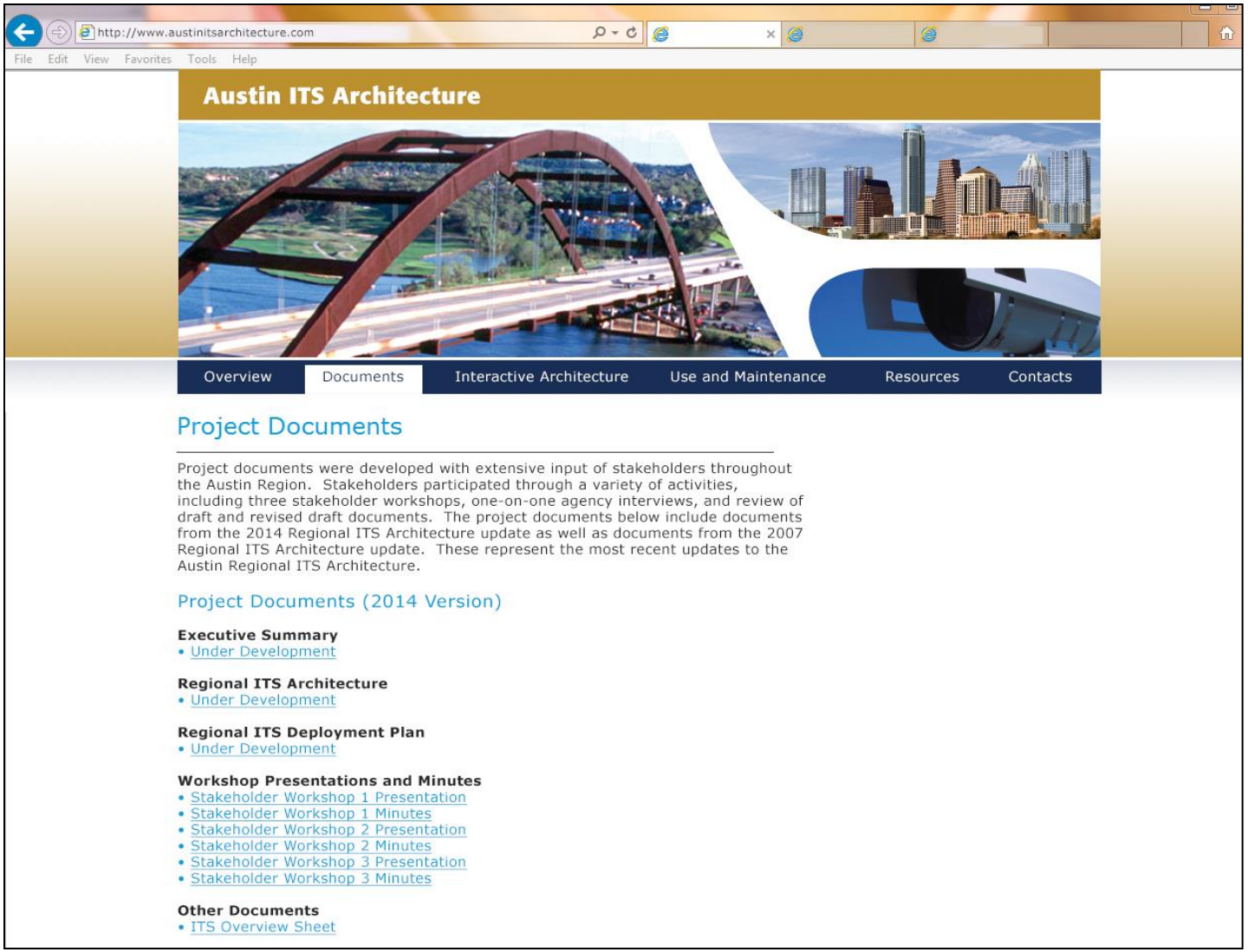
Agency Interview

Group Workshop or Training

Remaining Deliverables

- Regional ITS Architecture Update and Deployment Plan Report
  - Draft
  - Revised Draft
  - Final
- Executive Summary
- Turbo Architecture Database (Version 7.0 of Turbo Architecture)
- Project Website

Kimley»Horn



www.AustinITSArchitecture.com

Kimley»Horn

Regional ITS Goals and Objectives

Kimley»Horn




Regional Goals and Objectives

ITS Need	Service Packages
Improve communication and coordination between agencies (State-Local, Local-Local) for traffic operations and incident management	ATMS07 – Regional Traffic Management ATMS08 – Traffic Incident Management System
Collect and make available additional travel time information along controlled access facilities and arterials	ATMS01 – Network Surveillance ATMS06 – Traffic Information Dissemination ATIS01 – Broadcast Traveler Information ATIS02 – Interactive Traveler Information
Implement additional strategies for active traffic management	ATMS03 – Traffic Signal Control ATMS04 – Traffic Metering ATMS05 – HOV Lane Management ATMS18 – Reversible Lane Management ATMS22 – Variable Speed Limits ATMS23 – Dynamic Lane Management and Shoulder Use




Regional Goals and Objectives

ITS Need	Service Packages
Monitor roadway weather conditions to minimize the effects of adverse conditions on traffic	ATMS06 – Traffic Information Dissemination ATMS24 – Dynamic Roadway Warning MC03 – Road Weather Data Collection MC04 – Weather Information Processing and Distribution MC05 – Roadway Automated Treatment MC06 – Winter Maintenance
Improve emergency vehicle movements with signal preemption	ATMS03 – Traffic Signal Control EM01 – Emergency Call-Taking and Dispatch EM02 – Emergency Routing




Regional Goals and Objectives

ITS Need	Service Packages
Improve data sharing among agencies for both operational and planning initiatives	ADI – ITS Data Mart AD2 – ITS Data Warehouse AD3 – Virtual Data Warehouse
Plan for and adapt to changes in vehicle safety technologies such as connected vehicles	AVSS10 – Intersection Collision Avoidance AVSS11 – Automated Vehicle Operations AVSS12 – Cooperative Vehicle Safety Systems
Ensure that the Austin Region remains at the forefront of new technological advancements in transportation	ATMS02 – Traffic Probe Surveillance ATMS07 – Regional Traffic Management ATMS24 – Dynamic Roadway Warning ATIS04 – Dynamic Route Guidance ATIS09 – In-Vehicle Signing AVSS12 – Cooperative Vehicle Safety Systems




Regional Goals and Objectives

ITS Need	Service Packages
Implement a regional or statewide transit fare payment system that could accommodate the transfer of passengers between modes and agencies	APTS04 – Transit Fare Collection Management System APTS07 – Multi-modal Coordination
Optimize passenger travel times and establish coordination among transit agencies	APTS02 – Transit Fixed-Route Operations APTS03 – Demand Response Transit Operations APTS07 – Multi-modal Coordination APTS11 – Multi-modal Connection Protection
Expand traffic signal priority for transit vehicles	APTS09 – Transit Signal Priority ATMS03 – Traffic Signal Control

ITS Service Packages for the Region

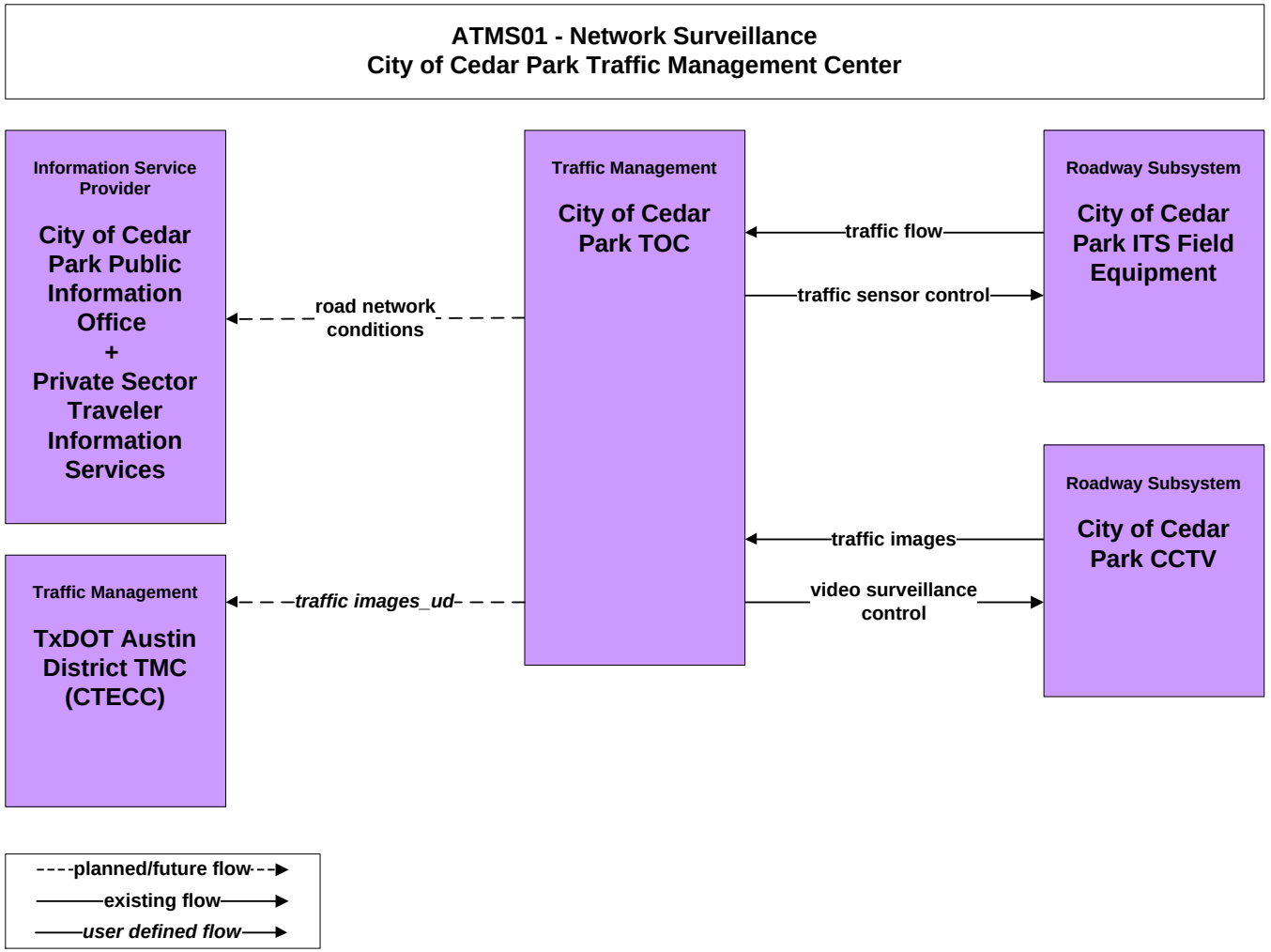
Kimley»Horn




ITS Service Packages

- Describe the services that ITS can provide
- National ITS Architecture identifies 97 different services in 8 difference areas:
  - Traffic Management
  - Emergency Management
  - Maintenance and Construction Management
  - Traveler Information
  - Public Transit
  - Commercial Vehicles Operations
  - Archived Data Management
  - Vehicle Safety
- Diagrams of each ITS service area selected are developed for individual stakeholder agencies
- Austin Regional ITS Architecture uses 55 ITS service packages from the National ITS Architecture

ITS Service Packages



Kimley»Horn





Selected ITS Service Packages

High Priority ITS Service Packages		Medium Priority ITS Service Packages		Low Priority ITS Service Packages	
Traffic Management					
ATMS01	Network Surveillance	ATMS02	Traffic Probe Surveillance	ATMS11	Emissions Monitoring and Management
ATMS03	Traffic Signal Control	ATMS13	Standard Railroad Grade Crossing		
ATMS04	Traffic Metering	ATMS18	Reversible Lane Management		
ATMS05	HOV Lane Management	ATMS19	Speed Warning and Enforcement		
ATMS06	Traffic Information Dissemination	ATMS21	Roadway Closure Management		
ATMS07	Regional Traffic Management	ATMS25	Mixed Use Warning Systems		
ATMS08	Traffic Incident Management System				
ATMS10	Electronic Toll Collection				
ATMS13	Railroad Operations Coordination				
ATMS16	Parking Facility Management				
ATMS23	Dynamic Lane Management and Shoulder Use				




Selected ITS Service Packages

High Priority ITS Service Packages	Medium Priority ITS Service Packages	Low Priority ITS Service Packages
Emergency Management		
EM01 Emergency Call-Taking and Dispatch	EM03 Mayday and Alarms Support	EM05 Transportation Infrastructure Protection
EM02 Emergency Routing	EM08 Disaster Response and Recovery	EM07 Early Warning System
EM04 Roadway Service Patrols	EM09 Evacuation and Reentry Management	
EM06 Wide-Area Alert	EM10 Disaster Traveler Information	

Kimley»Horn




Selected ITS Service Packages

High Priority ITS Service Packages	Medium Priority ITS Service Packages	Low Priority ITS Service Packages
Maintenance and Construction Management		
MC03 Road Weather Data Collection	MC07 Roadway Maintenance and Construction	MC02 Maintenance and Construction Vehicle Maintenance
MC04 Weather Information Processing and Distribution	MC01 Maintenance and Construction Vehicle and Equipment Tracking	MC09 Work Zone Safety Monitoring
MC08 Work Zone Management		
MC10 Maintenance and Construction Activity Coordination		

Kimley»Horn




Selected ITS Service Packages

High Priority ITS Service Packages		Medium Priority ITS Service Packages	Low Priority ITS Service Packages
Public Transportation			
APTS01	Transit Vehicle Tracking		
APTS02	Transit Fixed-Route Operations		
APTS03	Demand Response Transit Operations		
APTS04	Transit Fare Collection Management		
APTS05	Transit Security		
APTS06	Transit Fleet Management		
APTS07	Multi-modal Coordination		
APTS08	Transit Traveler Information		
APTS09	Transit Signal Priority		
APTS10	Transit Passenger Counting		
APTS11	Multimodal Connection Protection		

Kimley»Horn

Selected ITS Service Packages

High Priority ITS Service Packages	Medium Priority ITS Service Packages	Low Priority ITS Service Packages
Traffic Management		
	CVO10 HAZMAT Management	CVO04 CV Administrative Processes
Traveler Information		
ATIS1 Broadcast Traveler Information ATIS2 Interactive Traveler Information		ATIS5 ISP Based Route Coordination
Archived Data Management		
	AD1 ITS Data Mart AD2 ITS Data Warehouse AD3 Virtual ITS Data Warehouse	
User Defined Service Package		
RCN01 Radio Communications Network		

Kimley»Horn




ITS Agreements

Kimley»Horn




Regional Agreements

- Existing Agreements
  - TxDOT and Municipalities – Traffic signal maintenance and operations
  - TxDOT and Various Railroad Operators – Installation and maintenance of a fiber optic line within railroad right-of-way
  - TxDOT and Partner Agencies – Regional ITS Architecture maintenance and support
  - Austin Area Incident Management for Highways (AIMHIGH) – Memorandum for Regional Cooperation
  - City of Austin and Capital Metro – Transit signal priority
- Needed Agreements?




ITS Architecture Use and Maintenance Plan

Kimley»Horn




Systems Engineering

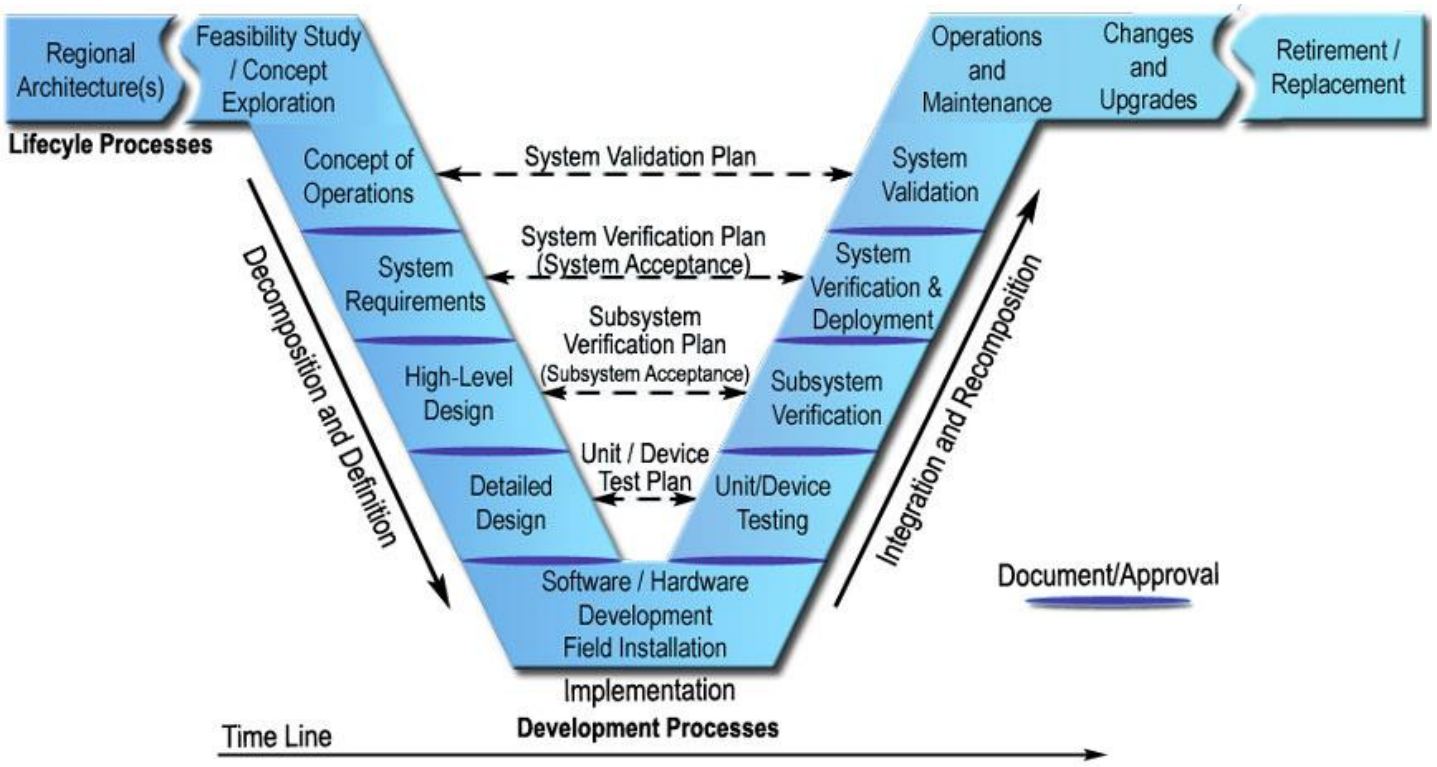
Definition

Systems engineering is an interdisciplinary approach to enable the realization of successful systems. It **focuses on defining customer needs and required functionality early** in the development cycle, documenting requirements, then proceeding with design synthesis and system validation while considering the complete problem.

Requirements

Using a systems engineering approach is required by the USDOT for ITS projects. The process includes demonstrating conformance to the Regional ITS Architecture.

Systems Engineering



Systems Engineering Analysis

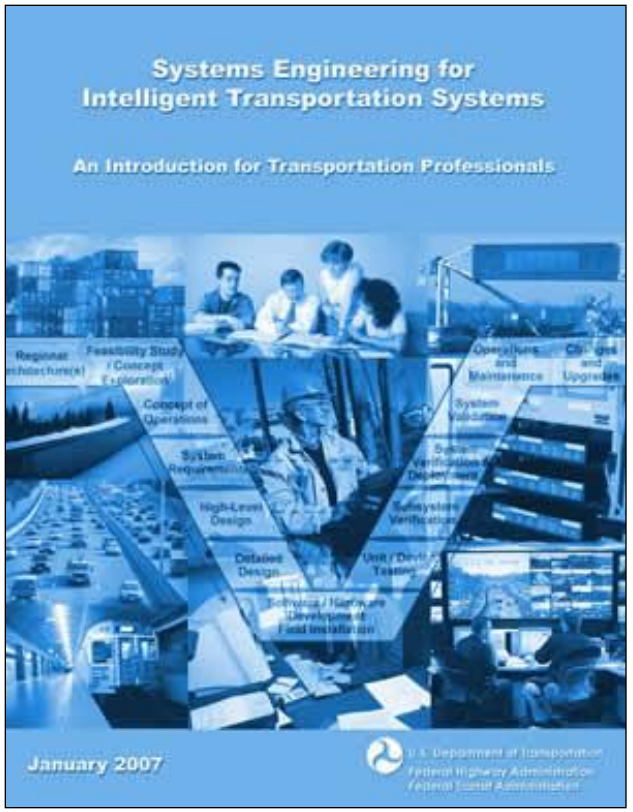
USDOT Systems Engineering Requirements

- Required for all ITS projects funded with highway trust funds
- Scale should be commensurate with the project scope
- Includes:
  - Identification of the part of the ITS architecture being implemented
  - Agencies roles and responsibilities
  - Alternatives analysis
  - Standards

Resources

FHWA Systems Engineering for Intelligent Transportation Systems

An Introduction for Transportation Professionals

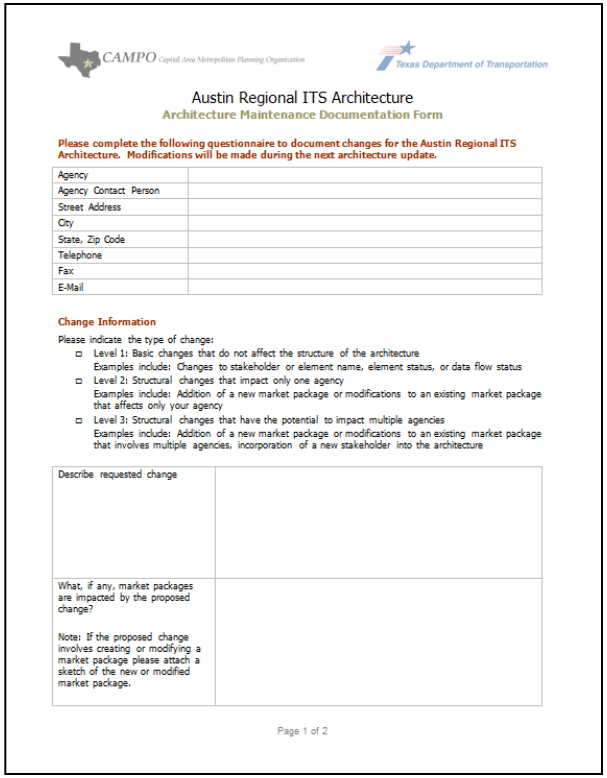


Kimley»Horn

Use and Maintenance Plan

ITS Architecture Maintenance Procedure Needs to Identify:

1. Lead Maintenance Agency
2. Maintenance Process (Documentation Form)
3. Timeframe for Updates



CAMPO Capital Area Metropolitan Planning Organization — Texas Department of Transportation

Austin Regional ITS Architecture

Architecture Maintenance Documentation Form

Please complete the following questionnaire to document changes for the Austin Regional ITS Architecture. Modifications will be made during the next architecture update.

Agency	
Agency Contact Person	
Street Address	
City	
State, Zip Code	
Telephone	
Fax	
E-Mail	

Change Information

Please indicate the type of change:

- ☐ 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 your 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, incorporation of a new stakeholder into the architecture

Describe requested change	
What, if any, market packages are impacted by the proposed change? Note: If the proposed change involves creating or modifying a market package please attach a sketch of the new or modified market package.	

Page 1 of 2

Kimley»Horn




Use and Maintenance Plan

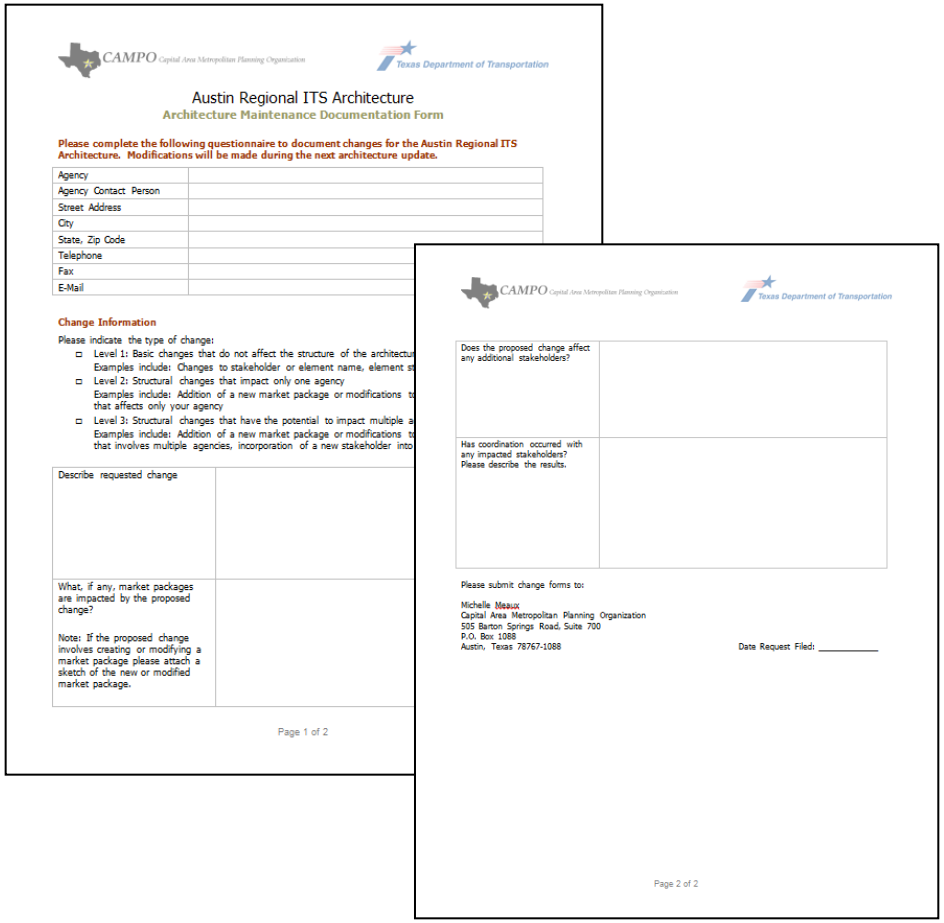
Project Manager Evaluates Conformance to Regional ITS Architecture

↓

Project Manager Completes ITS Architecture Maintenance Documentation Form and Submits to Maintainer

↓

Maintainer Confirms Receipt of Form and Files Form for Use During Next Update



CAMPO Capital Area Metropolitan Planning Organization — Texas Department of Transportation

Austin Regional ITS Architecture

Architecture Maintenance Documentation Form

Please complete the following questionnaire to document changes for the Austin Regional ITS Architecture. Modifications will be made during the next architecture update.

Agency	
Agency Contact Person	
Street Address	
City	
State, Zip Code	
Telephone	
Fax	
E-Mail	

Change Information

Please indicate the type of change:

- ☐ Level 1: Basic changes that do not affect the structure of the architectur
  Examples include: Changes to stakeholder or element name, element st
- ☐ Level 2: Structural changes that impact only one agency
  Examples include: Addition of a new market package or modifications t
  that affects only your agency
- ☐ Level 3: Structural changes that have the potential to impact multiple a
  Examples include: Addition of a new market package or modifications t
  that involves multiple agencies, incorporation of a new stakeholder into

Describe requested change	
What, if any, market packages are impacted by the proposed change? Note: If the proposed change involves creating or modifying a market package please attach a sketch of the new or modified market package.	

Page 1 of 2

CAMPO Capital Area Metropolitan Planning Organization — Texas Department of Transportation

Does the proposed change affect any additional stakeholders?	
Has coordination occurred with any impacted stakeholders? Please describe the results.	

Please submit change forms to:

Michelle Meaux
Capital Area Metropolitan Planning Organization
505 Barton Springs Road, Suite 700
P.O. Box 1088
Austin, Texas 78767-1088

Date Request Filed: _____

Page 2 of 2

Kimley»Horn




Regional ITS Architecture Maintenance Process

Maintenance Details	Regional ITS Architecture		Regional ITS Deployment Plan	
	Modification	**Complete Update**	**Modification**	**Complete Update**
Timeframe for Updates	As needed	Every 4 years	Annually	Every 4 years
Scope of Update	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
Lead Agency	CAMPO	TxDOT	TxDOT/CAMPO	TxDOT
Participants	Stakeholders impacted by market package modifications	Entire stakeholder group	Entire stakeholder group	
Results	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

Kimley»Horn

ITS Projects and Operational Concepts

- ITS Deployment Plan will be developed after Draft Regional ITS Architecture document
- Identifies potential ITS projects and operational concepts for the Austin Region
- Meets USDOT requirements to develop a sequence of projects to implement the Regional ITS Architecture
- Allows project team to ensure conformity of all projects with the Regional ITS Architecture
- Focus will be on **regional** ITS projects and operational concepts




ITS Deployment Plan

State and Local Deployments

Projects	State	Local
Traffic Management Centers	✓	✓
Vehicle Detection Systems	✓	✓
CCTV Cameras	✓	✓
Coordinated Traffic Signals	✓	✓
Traffic Signal Preemption for Emergency Vehicles	✓	✓
Transit Signal Priority	NA	✓




ITS Deployment Plan

State Deployments, Local Needs

Projects	State	Local
Real Time System Management Information	✓	Partial
Freeway Service Patrol	✓	
Travel Times	✓	Need
Road Weather Information	✓	Need
Traveler Information (Websites)	Partial	Need
Traveler Information (Social Media)	Partial	Need

ITS Deployment Plan

State and Local Needs

Projects	State	Local
Center-to-Center Communications (State-to-State)	Partial	
Center-to-Center Communications (State-to-Local)	Need	Need
Center-to-Center Communications (Local-to-Local)		Need
Traffic Incident Management (Training, Policies and Procedures, Alternate Routing)	Partial	Partial

Kimley»Horn




ITS Deployment Plan

State and Local Needs

Projects	State	Local
Archived Data Warehouse	Need	Need
Regional or Statewide Transit Payment System		Partial
Active Traffic Management (Managed Lanes, Variable Speed Limits, Lane Control Signals)	Partial	Need
Adaptive Signal Control	Need	Need
Integrated Corridor Management	Need	Need
Autonomous / Connected Vehicles		

Next Steps

- Develop Draft Regional ITS Architecture Document
- Post to project website and notify stakeholders when website and document is available
- Develop Regional ITS Deployment Plan
  - Additional input from stakeholders needed
- Upcoming Workshops
  - September – ITS Deployment Plan Workshop
  - December/January – ITS Architecture Use and Maintenance Training

Thank You!

TxDOT Project Manager

Brian Burk
brian.burk@txdot.gov

Consultant Team

Tom Fowler
thomas.fowler@kimley-horn.com

Terrance Hill
terrance.hill@kimley-horn.com

Vivek Deshpande
vivek.deshpande@kimley-horn.com

Kimley»Horn