



# Bristol Regional ITS Architecture Stakeholder Review Workshop

January 24, 2017



# Presentation Overview

## Review of the Regional ITS Architecture Document

- Key Changes to the Document
- ITS Service Package Prioritization
- Review Stakeholder Comments

## Discussion of Existing and Planned ITS Projects

- Existing and Planned ITS Projects in the Region

## Discussion on Use and Maintenance of the Regional ITS Architecture

- Planning for Operations
- Architecture Conformance for Federal Funding
- Maintenance of the Regional ITS Architecture

# What is ITS?

## ***ITS:***

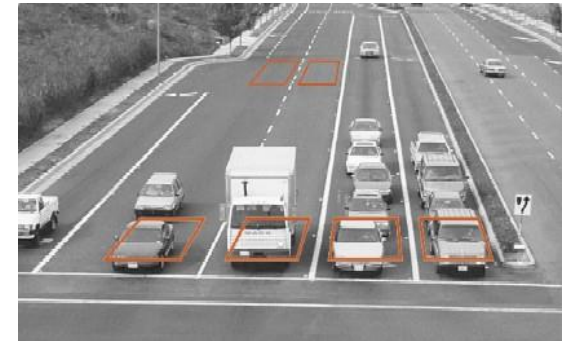
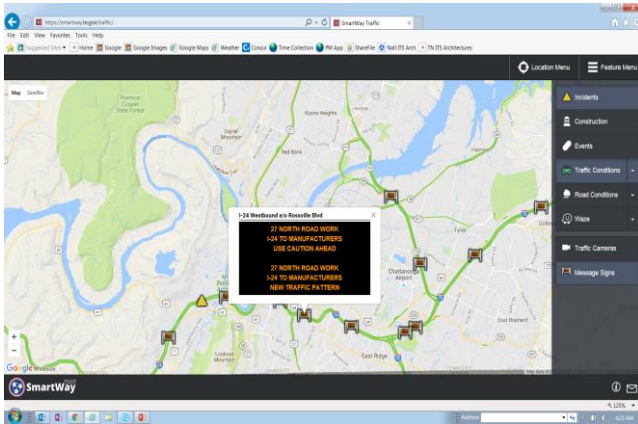
An acronym that stands for Intelligent Transportation Systems.

## ***One definition of ITS:***

The application of data processing and data communications to surface transportation to increase safety and efficiency.



# What is ITS?



# ITS Applications

Traffic Management

Traveler Information

Emergency Management

Maintenance & Construction Management

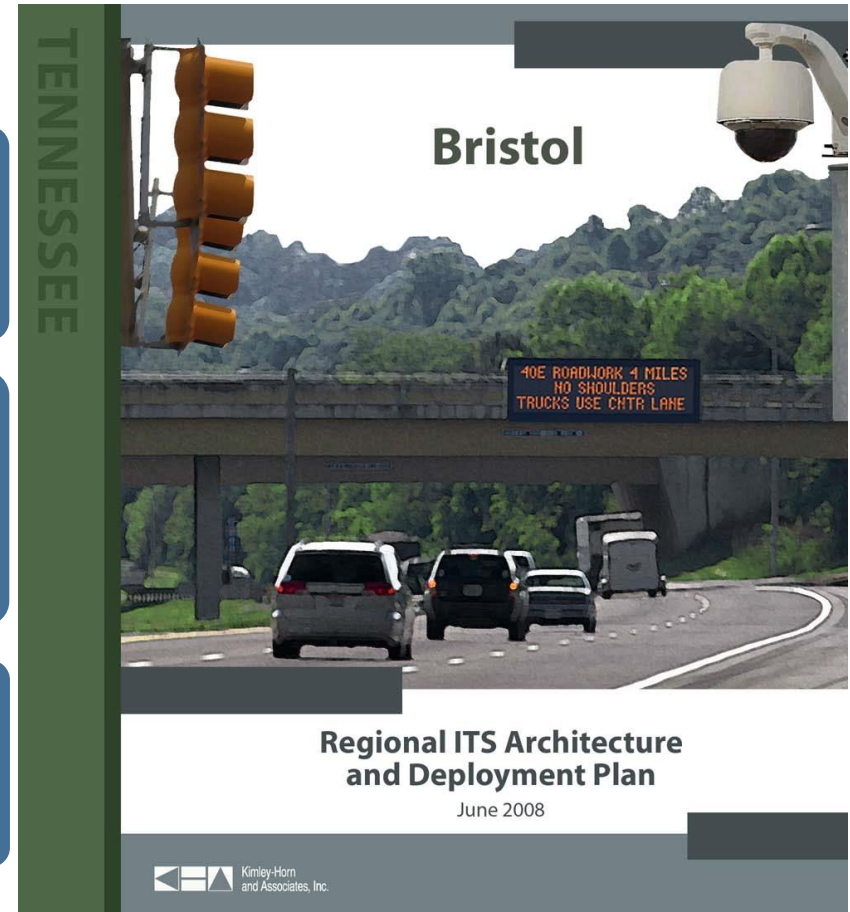
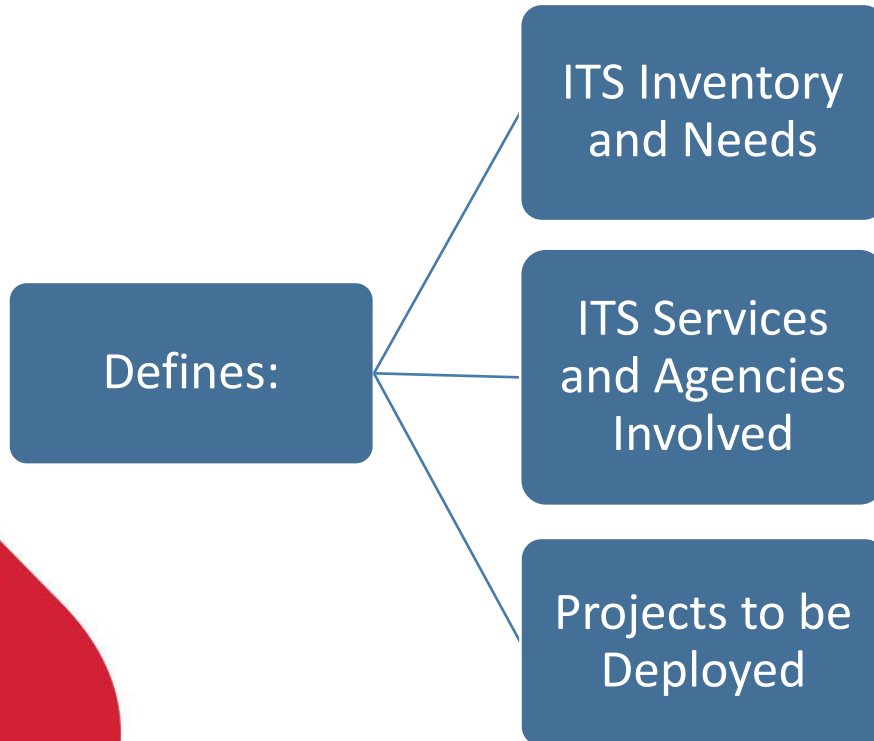
Public Transportation

Commercial Vehicle Operations

Archived Data Management

Vehicle Safety (Connected & Autonomous Vehicles)

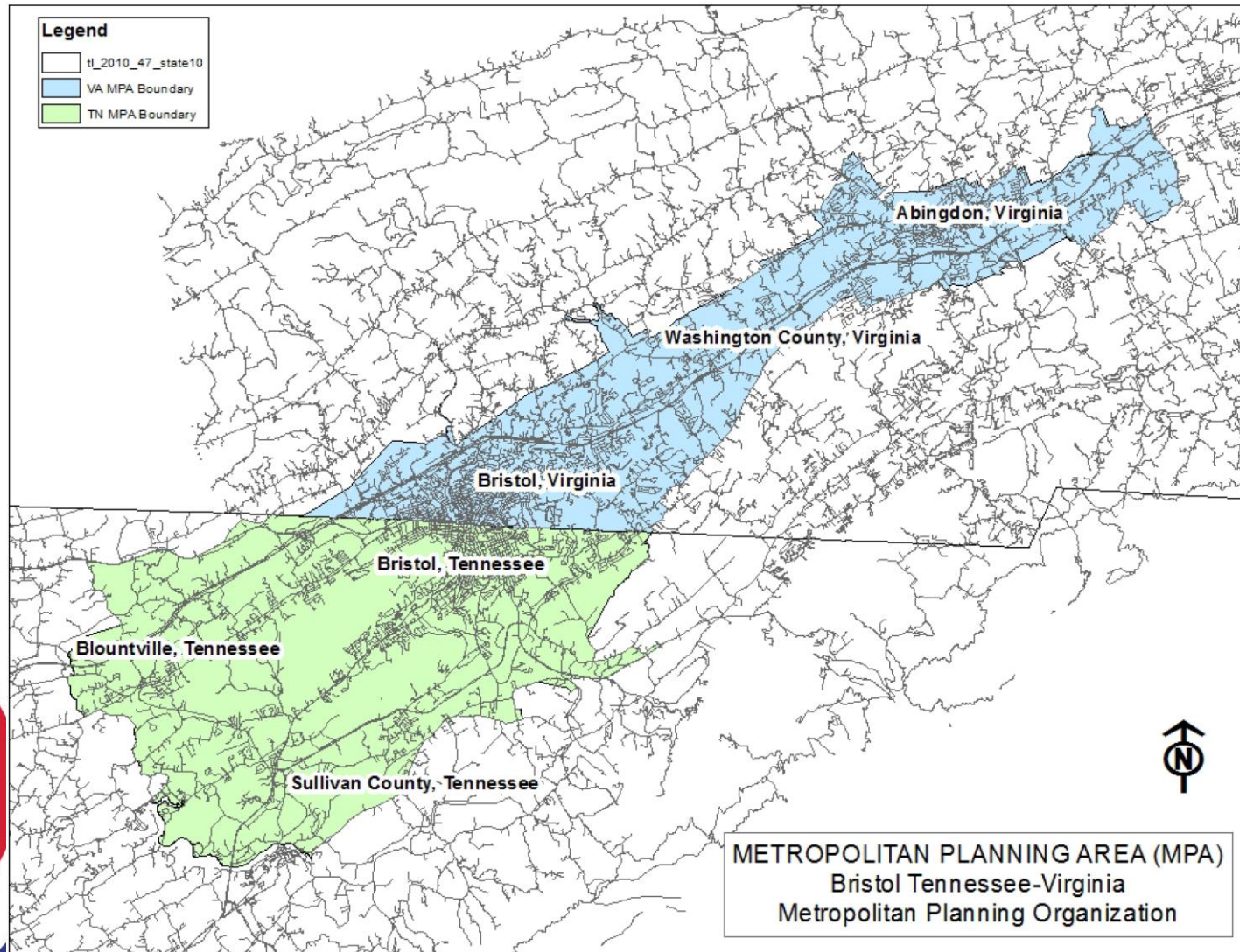
# Bristol Regional ITS Architecture



Created in 2008

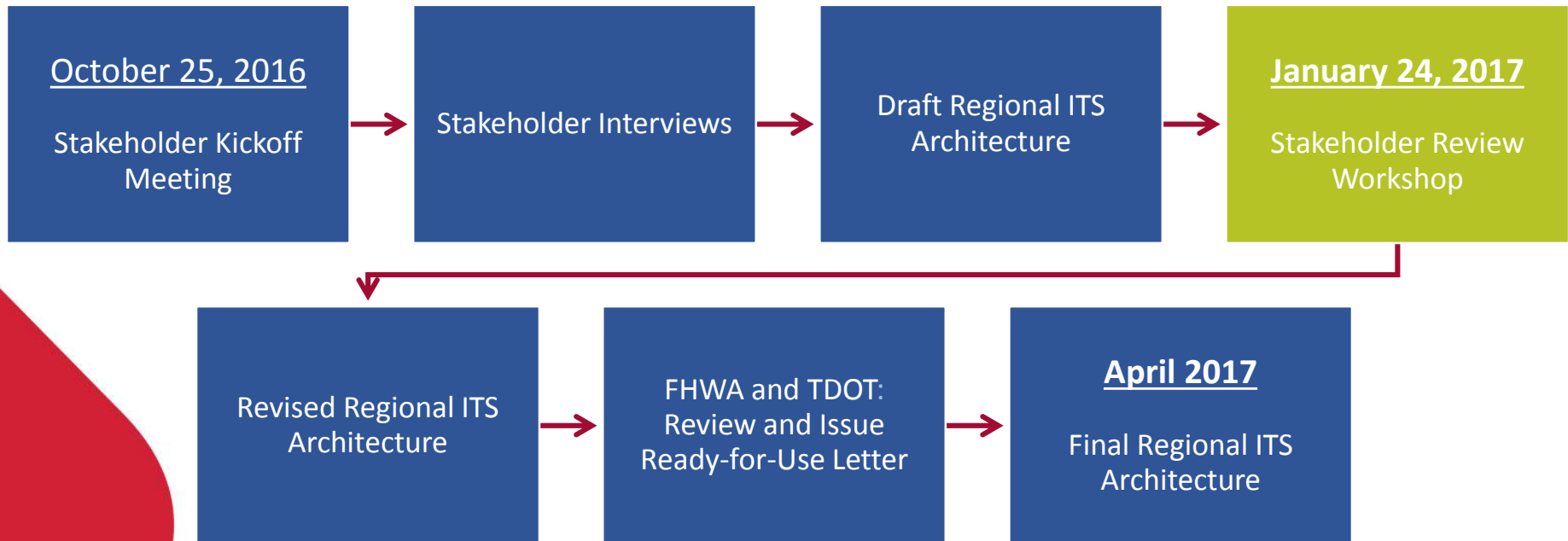


# Bristol MPO Planning Area



# Update Process

## Schedule



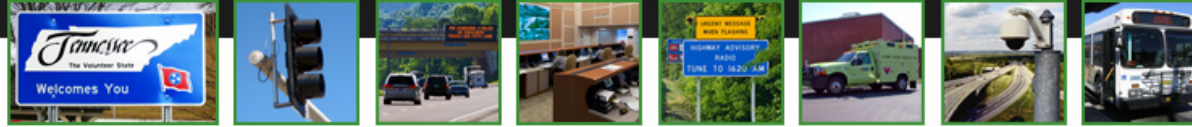


# Project Website

Project Website Located at the Follow Link:

[www.kimley-horn.com/Projects/TennesseeITSArchitecture/bristol.html](http://www.kimley-horn.com/Projects/TennesseeITSArchitecture/bristol.html)

**Or Just Google  
Bristol Regional ITS Architecture**



Kimley-Horn and Associates, Inc.

## Kimley»Horn TENNESSEE REGIONAL ITS ARCHITECTURES AND DEPLOYMENT PLANS

### OVERVIEW

### STATEWIDE

### BRISTOL

### CHATTANOOGA

### CLARKSVILLE

### CLEVELAND

### JACKSON

### JOHNSON CITY

### KINGSPORT

### KNOXVILLE

### LAKEWAY

### MEMPHIS

### NASHVILLE

## Bristol Regional ITS Architecture

The Bristol Regional ITS Architecture and Deployment Plan provides a long-range plan for the deployment, integration, and operation of ITS in the Bristol Region. An update to the plan is being led by the Tennessee Department of Transportation (TDOT) in coordination with the Bristol Metropolitan Planning Organization (MPO). The update is expected to be completed in the Spring of 2017.

The Bristol Regional ITS Architecture regional boundaries are comprised of the much of the eastern half of Sullivan County, TN, the independent city of Bristol, VA, and portions of central Washington County, VA. Stakeholders included representatives from traffic, transit, emergency management, and public safety agencies at the local, state, and federal level. Two stakeholder workshops and several interviews with stakeholder agencies are being conducted to gather input for the plan.

### Project Documents (2017 Version)

#### Regional ITS Architecture and Deployment Plan

- [Draft Bristol Regional ITS Architecture and Deployment Plan](#)
- [Draft Bristol Turbo Architecture Database](#)
- Draft Bristol Interactive ITS Architecture (In Development)

#### Workshop Materials

- [Kickoff Workshop Agenda – October 2016](#)
- [Kickoff Workshop Minutes – October 2016](#)
- [Kickoff Workshop Presentation – October 2016](#)
- [Review Workshop Agenda – January 2017](#)
- Review Workshop Minutes – January 2017 (To be Added Later)
- Review Workshop Presentation – January 2017 (To be Added Later)

#### Other Documents and Presentations

- [ITS Overview Sheet – October 2016](#)

### Project Documents (2008 Version)

#### Executive Summary

- [Bristol Executive Summary](#)

#### Regional ITS Architecture

- [Bristol Regional ITS Architecture](#)
- [Bristol Regional ITS Architecture Appendices](#)
- [Bristol Turbo Architecture Database \(download\)](#)



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# Workshop Outline

## Review of the Regional ITS Architecture Document

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# Regional ITS Architecture Update

**Comments Requested by  
February 8, 2017**

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**Bristol**  
Regional Intelligent  
Transportation System  
Architecture and  
Deployment Plan

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*Prepared by:*  
**Kimley»Horn**

**January 2017**  
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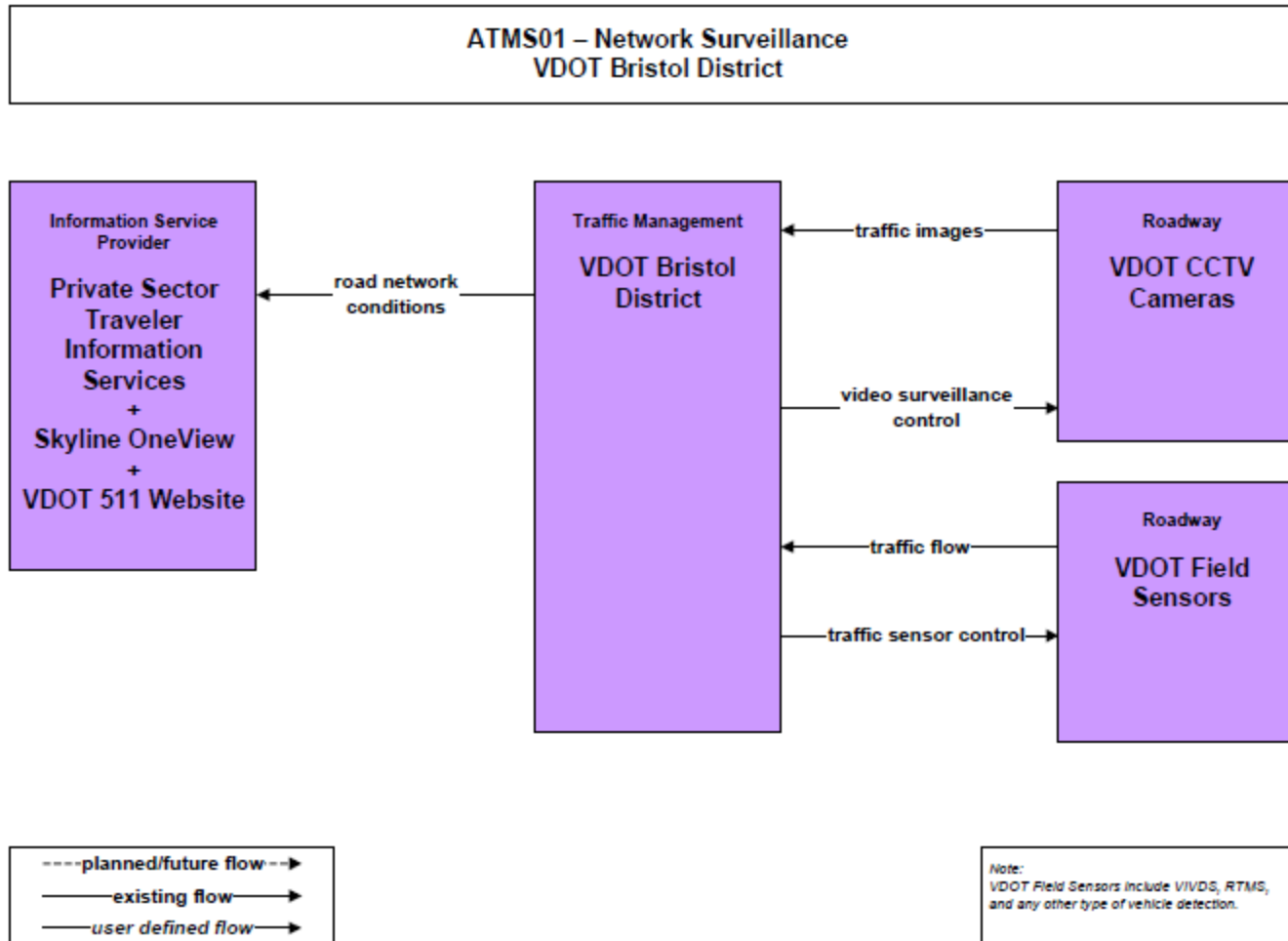
# Regional ITS Architecture Update

- Updated the following areas:
  - ITS Needs
  - Status of ITS Elements (Several Planned Elements are now Existing)
  - ITS Service Packages (Updated Data Flows, Added New ITS Service Packages)
  - ITS Deployment Plan Projects
  - Use and Maintenance Guidance Including Systems Engineering Guidance
- Comments requested by February 8, 2017

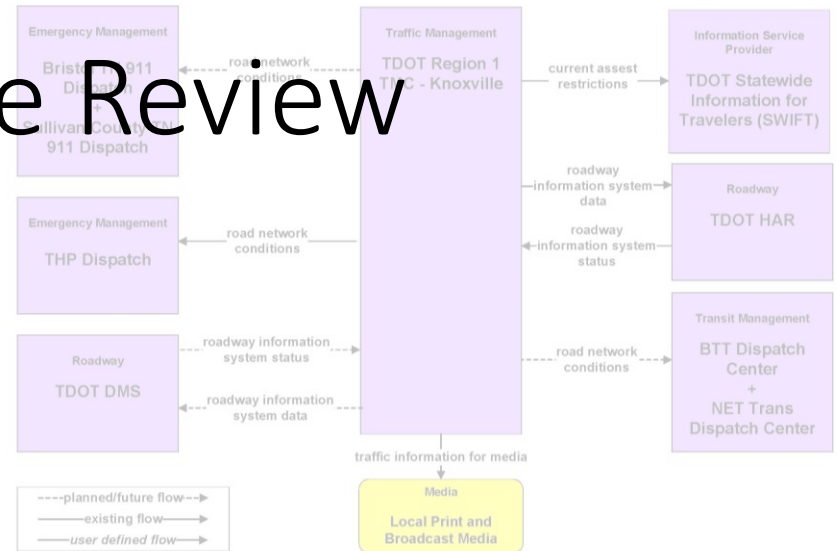
# Regional ITS Architecture Service Package Changes

Bristol Regional ITS Architecture Service Package Updates			
Service Packages Added or Removed	Service Packages with Added, Removed, or Edited Elements	Service Packages with Changes to Data Flows Only	
<p><b>ADDED:</b></p> <p>ATMS18 – Reversible Lane Management (TDOT)</p> <p>ATMS22 – Variable Speed Limits (TDOT Region 1 TMC – Knoxville)</p> <p>ATMS24 – Dynamic Roadway Warning (TDOT Overheight Vehicle Detection, VDOT Overheight Vehicle Detection, VDOT Ramp Queue Warning System)</p> <p>EM02 – Emergency Routing (VDOT)</p> <p>EM09 – Evacuation and Reentry Management (Virginia Statewide EOC)</p> <p>MC08 – Work Zone Management (TDOT Region 1 Construction Office)</p> <p>APTS03 – Demand Response Transit Operations (NET Trans)</p> <p>APTS07 – Multimodal Coordination (NET Trans)</p> <p>AD1 – ITS Data Mart (TITAN)</p>	<p>ATMS01 – Network Surveillance (TDOT Region 1 TMC - Knoxville, VDOT TOC – Salem, VDOT Bristol District)</p> <p>ATMS06 – Traffic Information Dissemination (TDOT Region 1 TMC- Knoxville, VDOT Bristol District)</p> <p>ATMS07 – Regional Traffic Management (TDOT Region 1 TMC – Knoxville, City of Bristol TN, City of Bristol VA)</p> <p>ATMS08 – Traffic Incident Management System (TDOT Region 1 TMC – Knoxville, VDOT TOC Salem, VDOT TMC Bristol District, City of Bristol TN, Bristol Motor Speedway Operations – Virginia)</p> <p>EM01 – Emergency Call-Taking and Dispatch (Tennessee Highway Patrol, Virginia State Police, Sullivan County TN 911 Dispatch)</p> <p>EM02 – Emergency Routing (VDOT Bristol District, City of Bristol VA, Town of Abingdon VA)</p> <p>EM06 – Wide-Area Alert (Tennessee AMBER Alert, Virginia AMBER Alert)</p> <p>EM08 – Disaster Response and Recovery (Sullivan County TN EMA)</p> <p>EM09 – Evacuation and Reentry Management (TEMA, Virginia Statewide EOC, Sullivan County EMA)</p>	<p>EM10 – Disaster Traveler Information (Tennessee 511, Virginia 511)</p> <p>MC01 – Maintenance and Construction Vehicle and Equipment Tracking (TDOT Region 1 District Operations)</p> <p>MC03 – Road Weather Data Collection (TDOT RWIS, VDOT RWIS)</p> <p>MC04 – Weather Information Processing and Distribution (TDOT Region 1 District Operations, VDOT Bristol District Maintenance)</p> <p>MC06 – Winter Maintenance (TDOT, VDOT)</p> <p>MC10 – Maintenance and Construction Activity Coordination (TDOT, VDOT, City of Bristol TN, Municipal/County)</p> <p>APTS03 – Demand Response Transit Operations (Bristol TN Transit, Bristol VA Transit)</p> <p>ATIS01 – Broadcast Traveler Information (SWIFT, Virginia 511, City of Bristol TN)</p> <p>ATOS02 – Interactive Traveler Information (TDOT SmartWay, Tennessee 511, Virginia 511)</p> <p>AD1 – ITS Data Mart (TDOT, TITAN)</p>	<p>ATMS01 – Network Surveillance (VDOT Bristol District)</p> <p>ATMS03 – Traffic Signal Control (VDOT Bristol District)</p> <p>ATMS06 – Traffic Information Dissemination (TDOT Region 1 TMC – Knoxville, City of Bristol TN))</p> <p>ATMS07 – Regional Traffic Management (VDOT Bristol District)</p> <p>EM04 – Roadway Service Patrols (VDOT SSP Dispatch)</p> <p>EM10 – Disaster Traveler Information (SWIFT)</p> <p>MC01 – Maintenance and Construction Vehicle and Equipment Tracking (VDOT Maintenance Vehicles)</p> <p>MC03 – Road Weather Data Collection (TDOT Maintenance Headquarters and TDOT Region 1 District Operations)</p> <p>ATIS01 – Broadcast Traveler Information (SWIFT)</p> <p>ATIS02 – Interactive Traveler Information (Tennessee 511 System)</p> <p>AD1 – ITS Data Mart (VDOT Archive)</p> <p>AD2 – ITS Data Warehouse (Bristol MPO Data Archive)</p>

# Example ITS Service Package



# ITS Service Package Review





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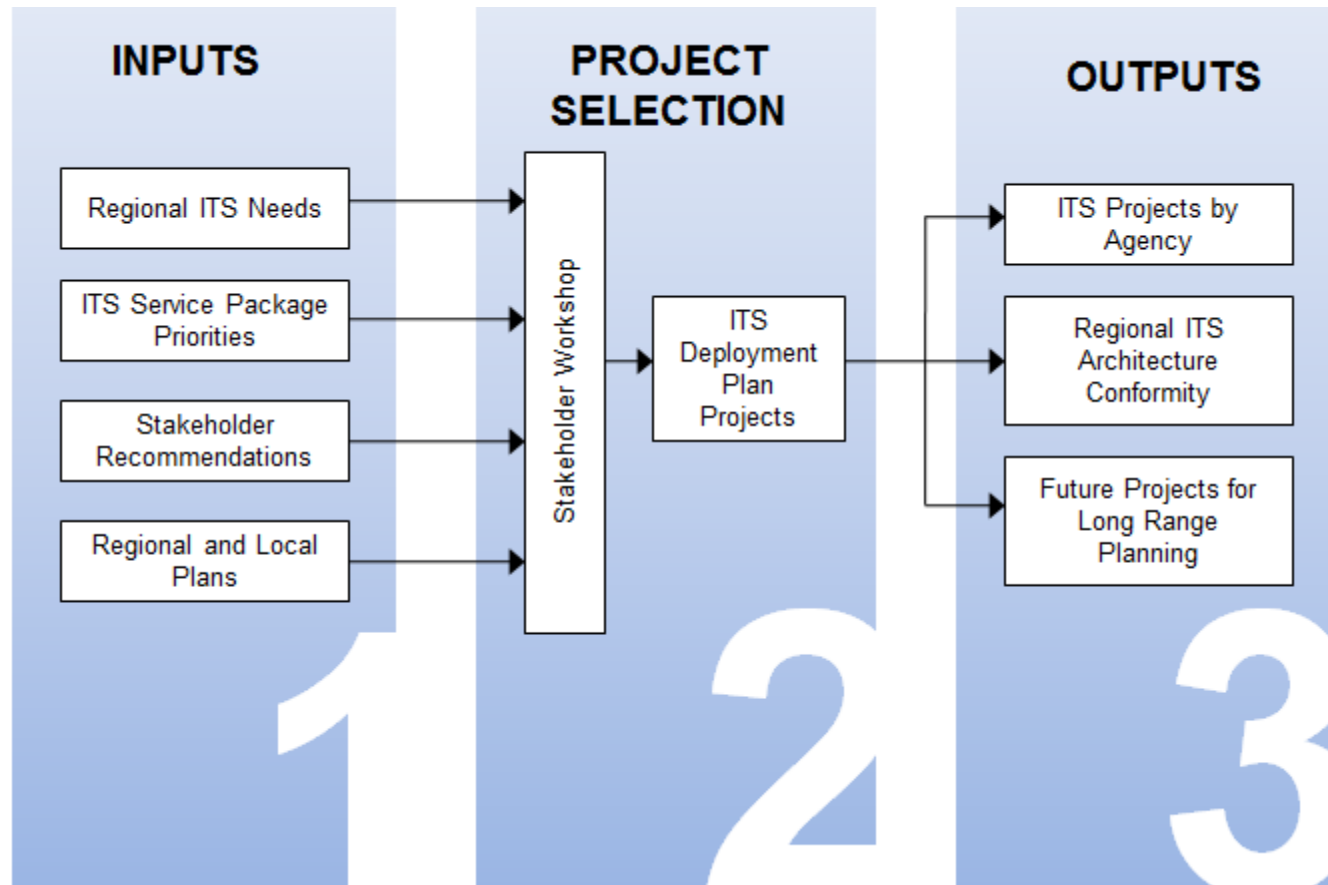
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# Regional ITS Deployment Plan



# Regional ITS Project Review



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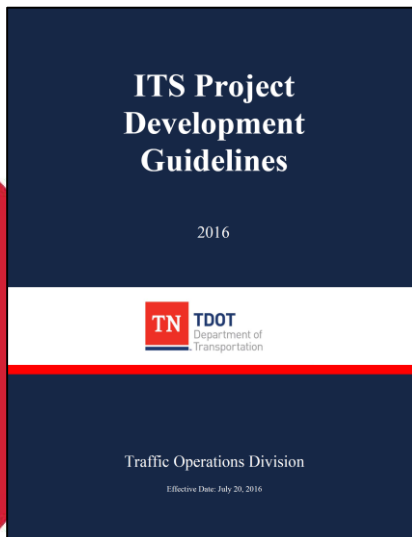
# Systems Engineering

## Definition

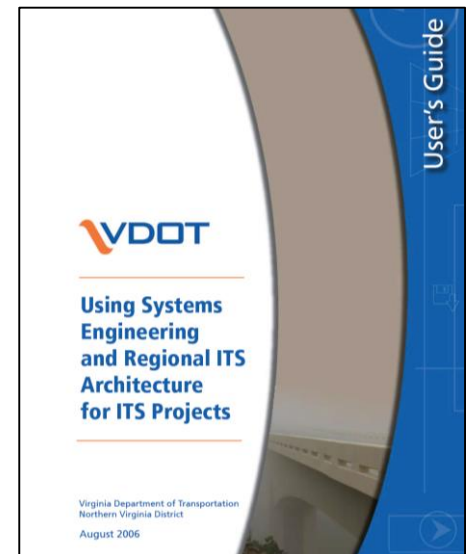
Systems engineering is an interdisciplinary approach to enable the realization of successful systems. It **focuses on defining customer needs and required functionality early** in the development cycle, documenting requirements, then proceeding with design synthesis and system validation while considering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

## Requirements

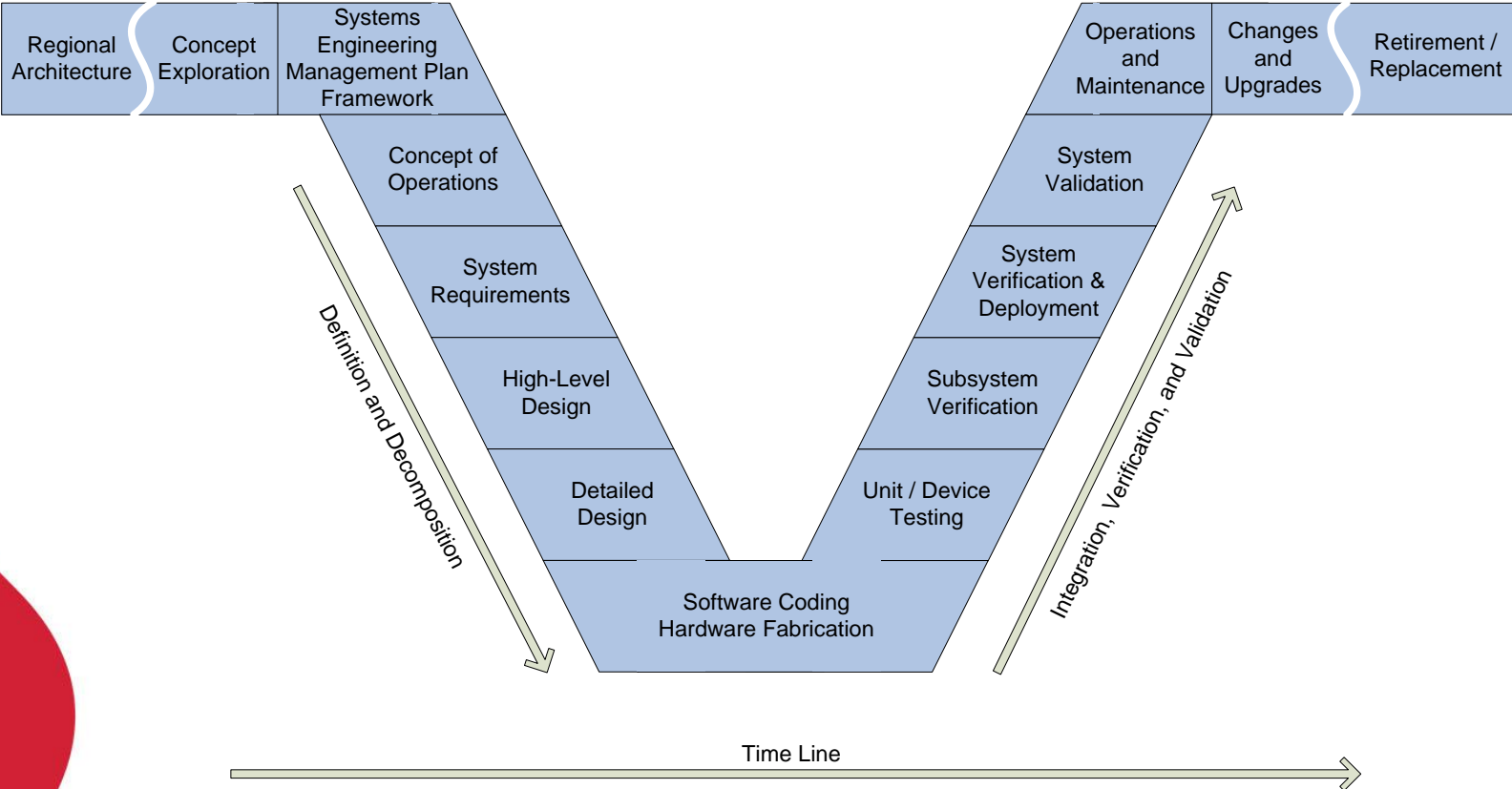
Using a systems engineering approach is required by the USDOT for ITS projects. The process includes demonstrating conformance to the Regional ITS Architecture.



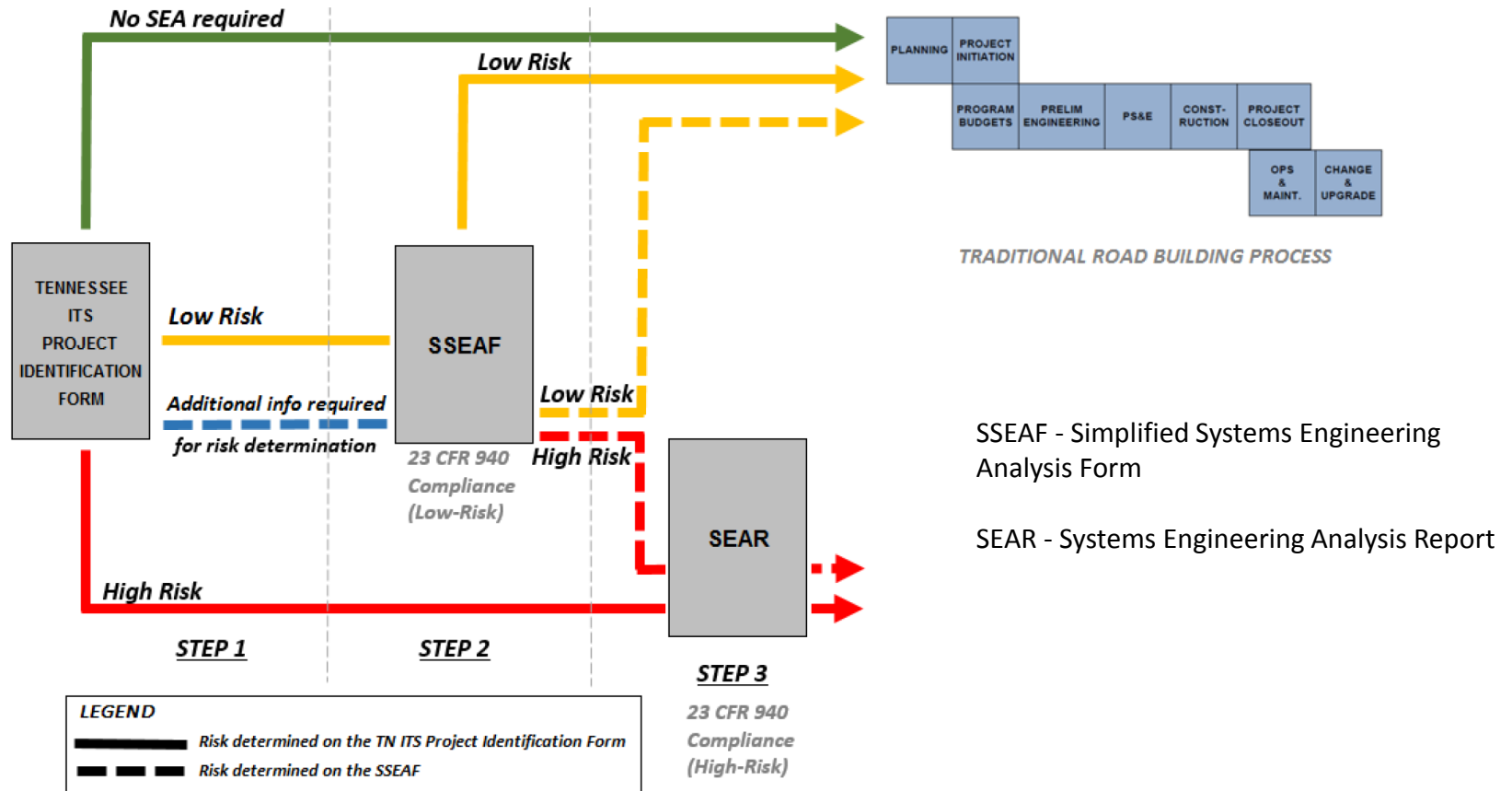
Guidance can be found in the *TDOT ITS Project Development Guidelines* and *VDOT Using Systems Engineering and Regional ITS Architecture for ITS Projects*



# Systems Engineering Vee Diagram



# TDOT SEA Decision Process



## TDOT's Process for ITS Systems Engineering Documentation

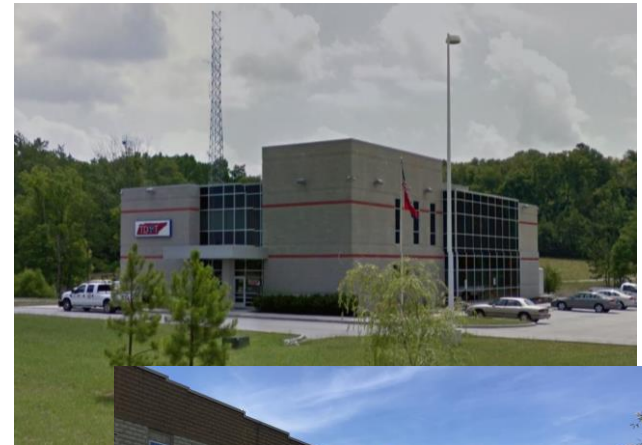
Source: TDOT ITS Project Development Guidelines (2016)

# Regional ITS Architecture Maintenance

## Bristol Regional ITS Architecture Maintenance Summary

Maintenance Details	Regional ITS Architecture and Deployment Plan	
	Minor Update	Full Update
Timeframe for Updates	As needed	Review every 4 years in the year preceding the Metropolitan Transportation Plan update to determine if a full update is required
Scope of Update	Review and update service packages to satisfy architecture compliance requirements of projects or to document other changes that impact the Regional ITS Architecture.	Entire Regional ITS Architecture and Deployment Plan
Lead Agency	Bristol MPO in Coordination with TDOT	
Participants	Stakeholders impacted by service package modifications	Entire stakeholder group
Results	ITS service package or other change(s) documented for next complete update	Updated Regional ITS Architecture and Deployment Plan document, Appendices, and Turbo Architecture database

# Comments and Questions





# Next Steps

- Stakeholders provide comments on the Draft Regional ITS Architecture and Deployment Plan Document by February 8, 2017
- Kimley-Horn incorporates comments and submits to FHWA and TDOT for “Ready for Use” review
- Obtain FHWA and TDOT “Ready for Use” letter and finalize documents

# Thank You!

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