Johnson City MTPO

Regional ITS Architecture Update

Stakeholder Review Workshop

February 10, 2022

Johnson City MTPO
Metropolitan Transportation Planning Organization

TN TDOT Department of Transportation

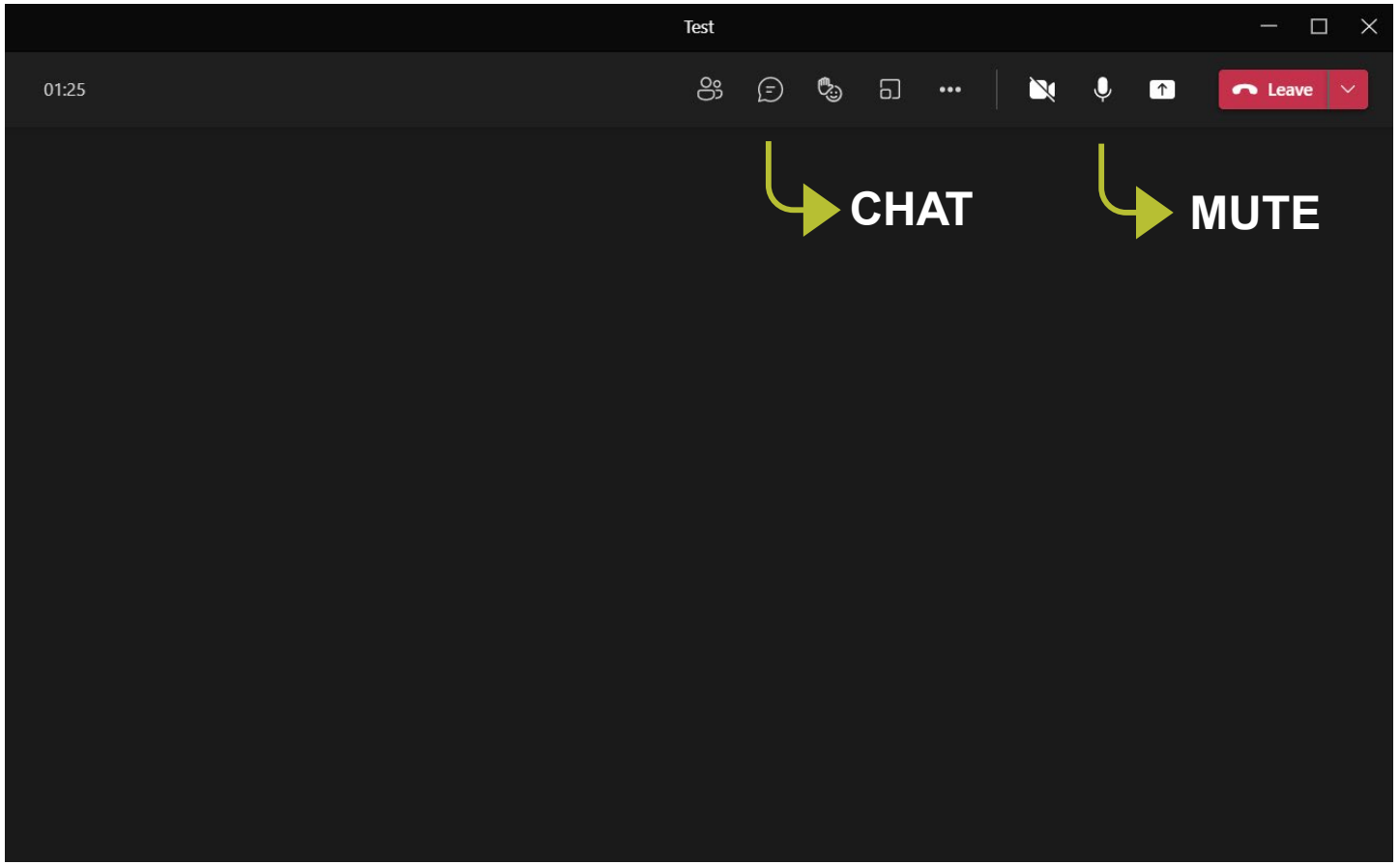
Housekeeping

Please add you name and agency in the CHAT box

Please stay on MUTE unless asking a question…but please come off MUTE during the discussion

Please come off MUTE or use the CHAT box to add information during the discussion

If you were not invited to the workshop but would like to be added to our contact list, please add your email to the CHAT box



Workshop Overview

- Welcome and Introductions
- Overview of the Regional ITS Architecture Update Project
- Review of Draft Regional ITS Needs
- Review of New ITS Service Packages for the Region
- Review of Draft ITS Projects
- ITS Project Conformity and ITS Architecture Maintenance
- Next Steps and Wrap-Up

Introductions

Overview of the Regional ITS Architecture Update Project

What is ITS?

ITS
Intelligent Transportation Systems

One Definition of ITS
The application of data processing and data communications to the surface transportation system to increase safety and efficiency

What is ITS?


© TheFunTimesGuide.com
HIGHWAY INCIDENT RESPONSE UNIT
HELP
TDOT
smartway


MASTERSON


ONE TEXT OR CALL
COULD
WRECK IT ALL
MILE
53


Spaces Available
Level 4 92
Level 3 184
Level 2 68
Level 1 185


WORK
CONVOY

Emerging ITS Technologies

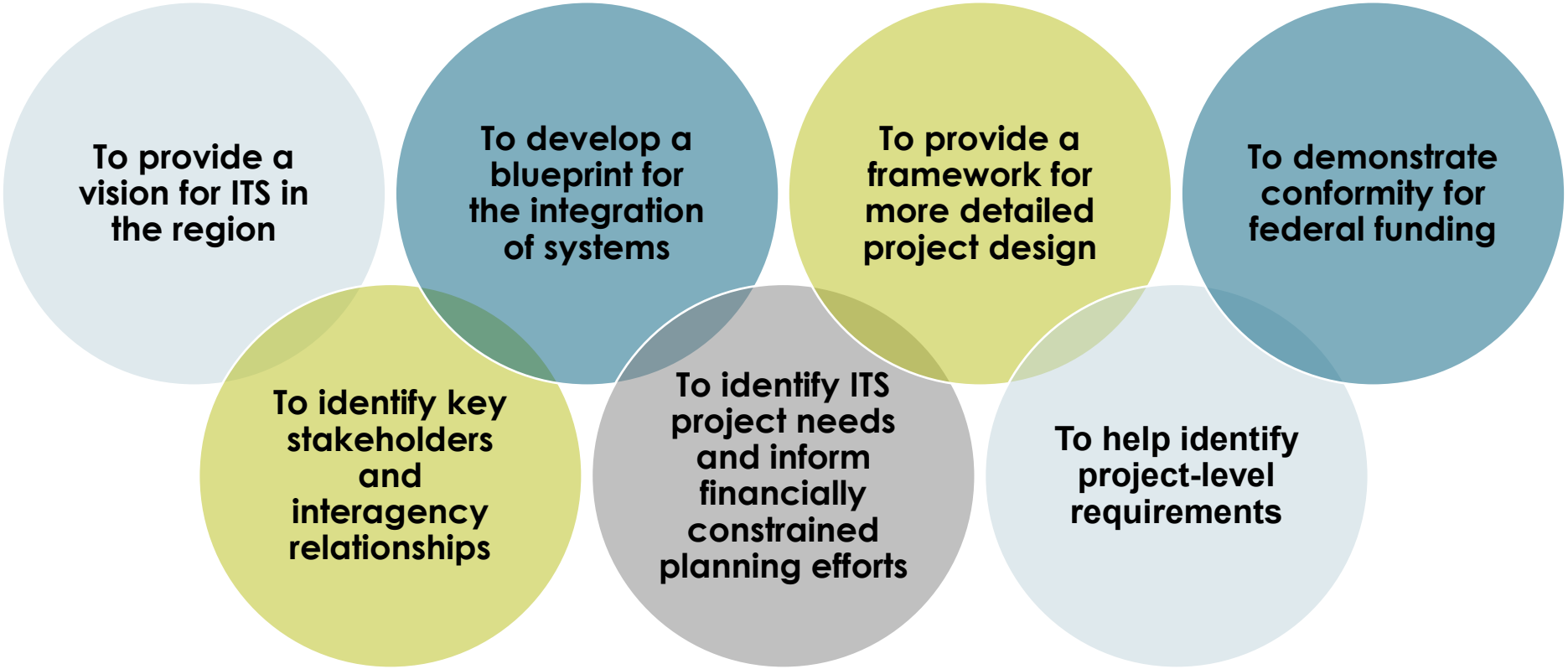
- Connected Vehicles
- Automated Vehicles
- Active Traffic Management
- Privatized Traffic Data

What is a Regional ITS Architecture

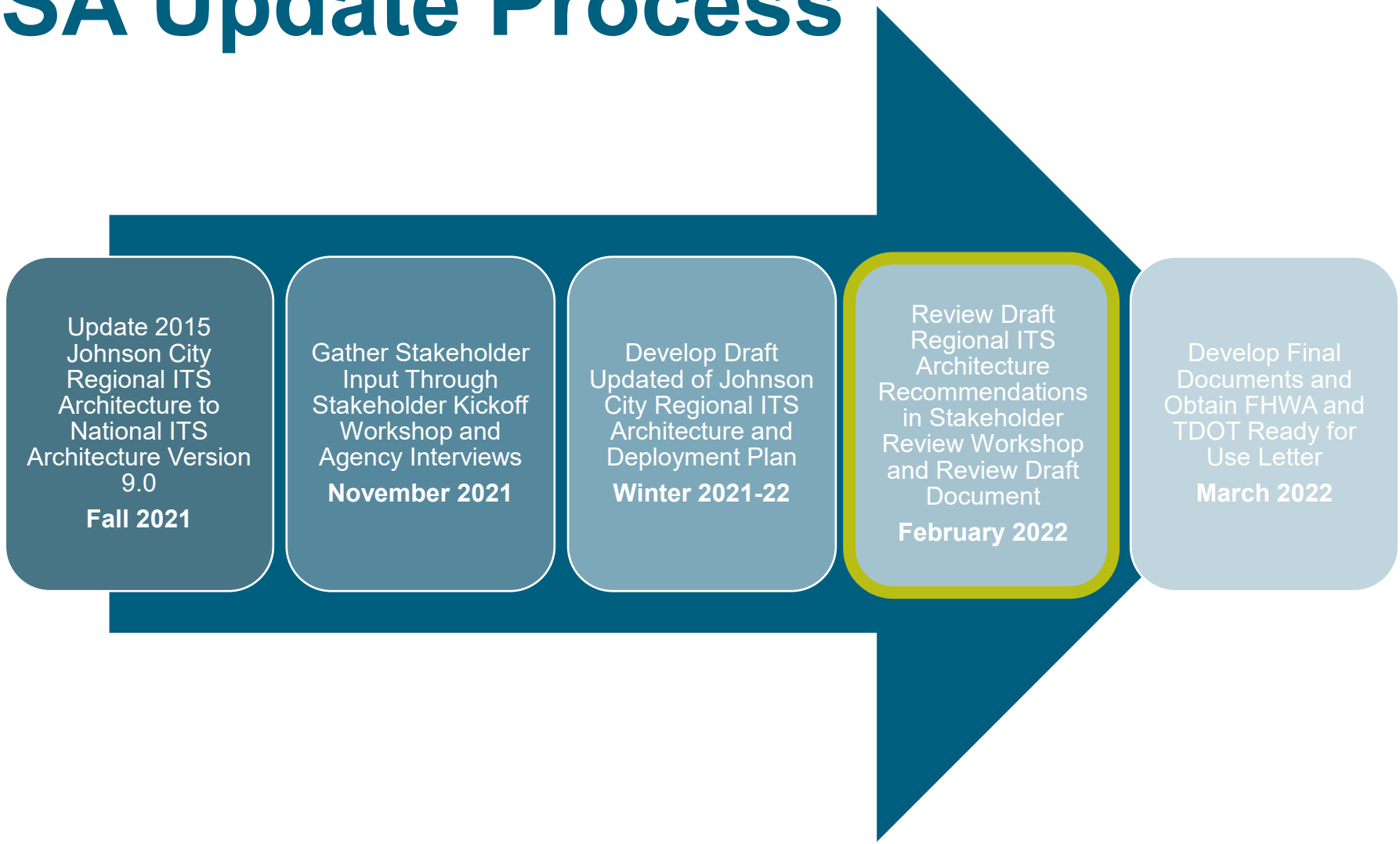
A plan for the deployment, integration, and operation of Intelligent Transportation Systems in a Region

Often referred to as a RITSA, the plan includes traffic, transit, and emergency services

Purpose of the Architecture



RITSA Update Process



Review of Draft Regional ITS Needs

Needs included in **Table 3** of the *Regional ITS Architecture and Deployment Plan*

Regional ITS Needs

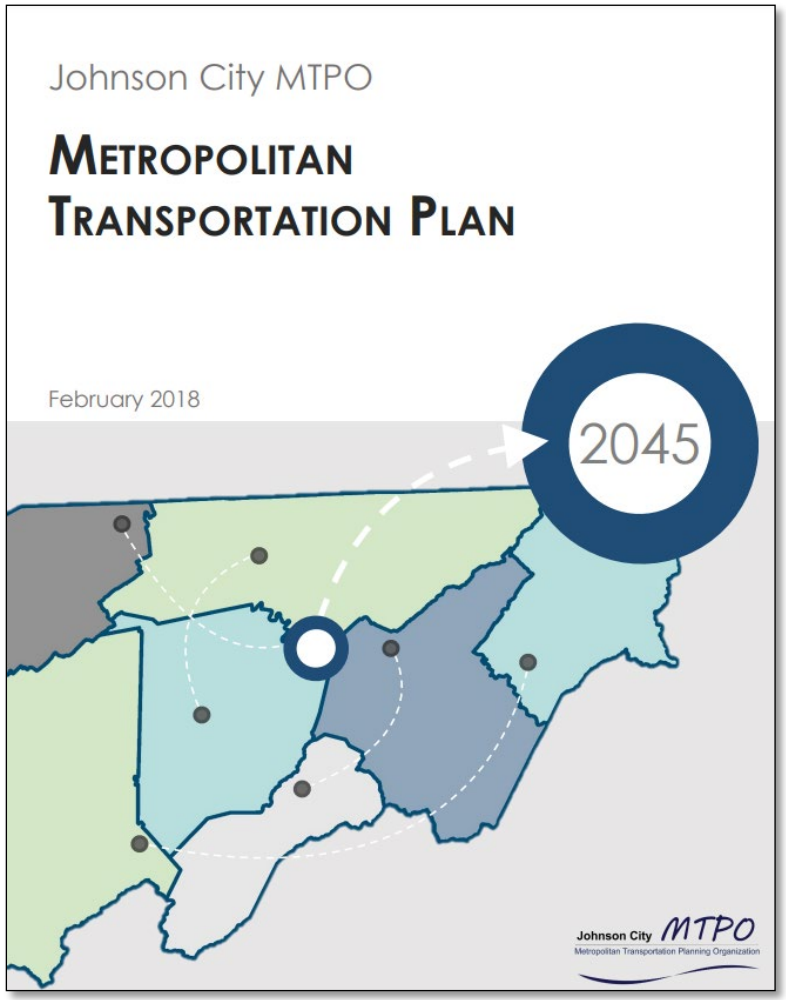
Johnson City MTPO's 2045 Metropolitan Transportation Plan (MTP) Goals:

Improve Safety and Security throughout the Transportation System

Reduce Traffic Congestion along major routes

Promote Economic Growth and Livability by Enhancing the Transportation System

Enhance Regional Access to and from the MTPO Area



Regional ITS Needs

Summary of Needs Identified in the Regional ITS Architecture (24)

Traffic Management Needs (7)

Traveler Information Needs (2)

Public Transportation Needs (4)

Public Safety Needs (4)

Maintenance and Construction Needs (2)

Weather Management Needs (1)

Parking Management Needs (1)

Data Management Needs (2)

Vehicle Safety Needs (1)

All ITS Service Packages Identified for the Region are Mapped to ITS Needs

Regional ITS Needs

Data Management Needs
Need to archive data gathered through ITS to make it more accessible to regional stakeholders
Need to store spatial data to allow for better analysis of crashes and other spatial transportation data
Maintenance and Construction Needs
Need for better coordination between TDOT and local agencies during maintenance and construction
Need to monitor and improve tracking for winter road maintenance activities and vehicles
Parking Management Needs
Need to monitor and display real-time parking availability information
Public Safety Needs
Need for better coordination among various agencies during large-scale events
Need to assist emergency vehicle movement with traffic signal preemption and monitoring
Need to implement a reverse 911 system that allows emergency management officials to reach a large group of people
Need to expand roadway service patrols for motorist assistance and incident management
Public Transportation Needs
Need to improve coordination among transit agencies
Need for Johnson City Transit to implement scheduling software for paratransit vehicle
Need to monitor bus passenger boarding and alighting
Need to implement smart card system for both fixed-route and demand response vehicles that is compatible with other transit agencies
Traffic Management Needs
Need to reduce traffic congestion along major routes within the MTPO area
Need to improve coordination and the sharing of information between TDOT and Johnson City
Need for Johnson City traffic to provide Johnson City emergency management agencies with roadway network conditions
Need to implement adaptive traffic signal control along congested corridors
Need to expand the interconnected traffic signal system network
Need to expand CCTV camera coverage areas throughout the Region
Need to monitor rail crossing and convey blockages to drivers
Traveler Information Needs
Need to convey information to drivers through DMS, social media, television, or other methods
Need to continue to improve the dissemination of real-time transit information for riders through mobile phone application, bus stop DMS, and website
Vehicle Safety Needs
Need to provide a transportation system that supports vulnerable road users
Weather Needs
Need to monitor roadway weather conditions and provide accurate dissemination to agencies and travelers

Review of ITS Service Packages for the Region

Service Packages included in **Table 7** of the *Regional ITS Architecture and Deployment Plan*

Regional ITS Service Packages

Summary of ITS Service Packages in the Regional ITS Architecture (48)

Traffic Management (14)

Traveler Information (3)

Public Transportation (11)

Public Safety (10)

Maintenance and Construction (4)

Weather Management (2)

Parking Management (1)

Data Management (1)

Vehicle Safety (2)

Regional ITS Service Packages

Summary of ITS Service Packages in the Regional ITS Architecture (48)

Traffic Management (14)

Traveler Information (3)

Public Transportation (11)

Public Safety (10)

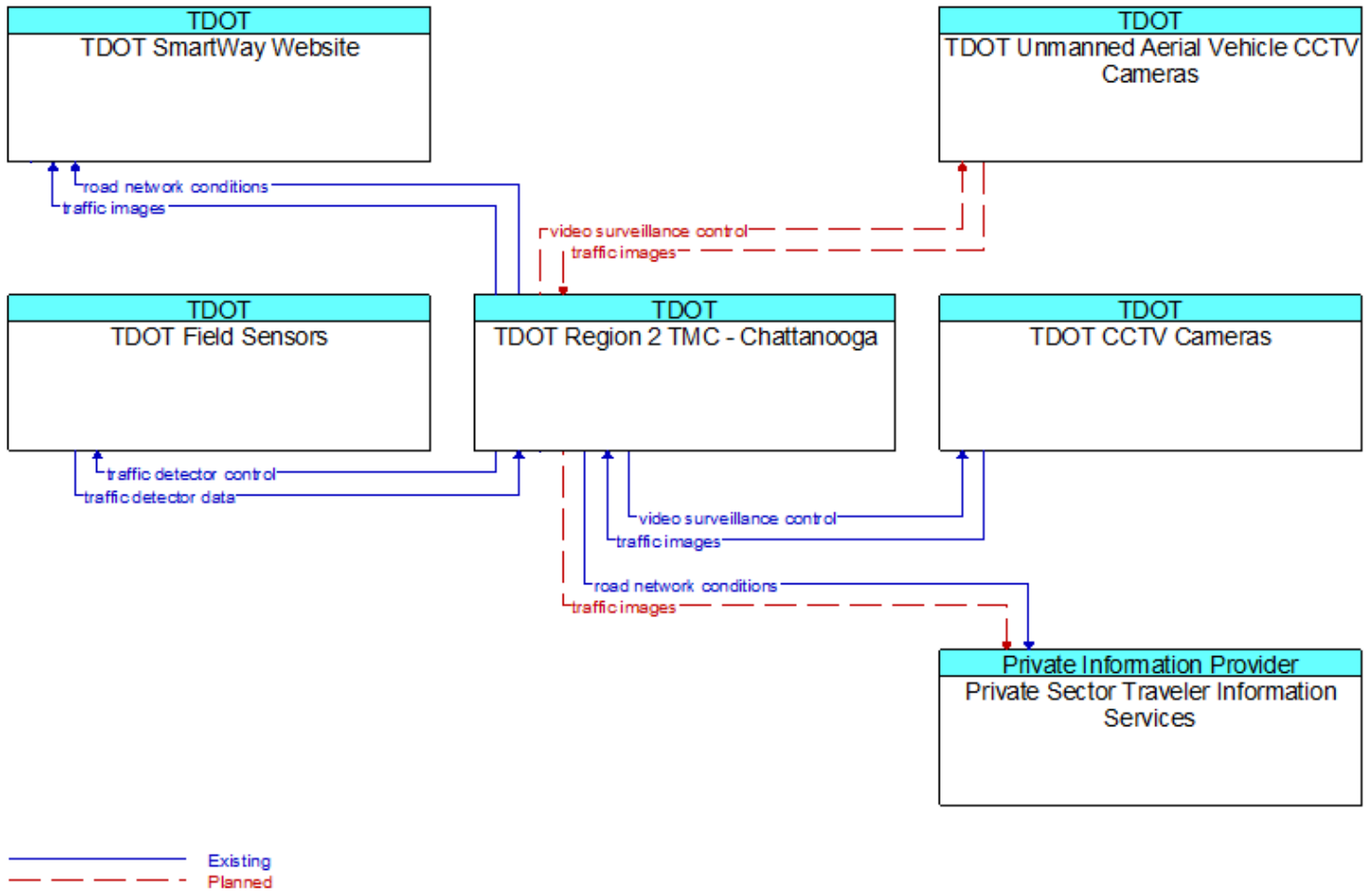
Maintenance and Construction (4)

Weather Management (2)

Parking Management (1)

Data Management (1)

Vehicle Safety (2)



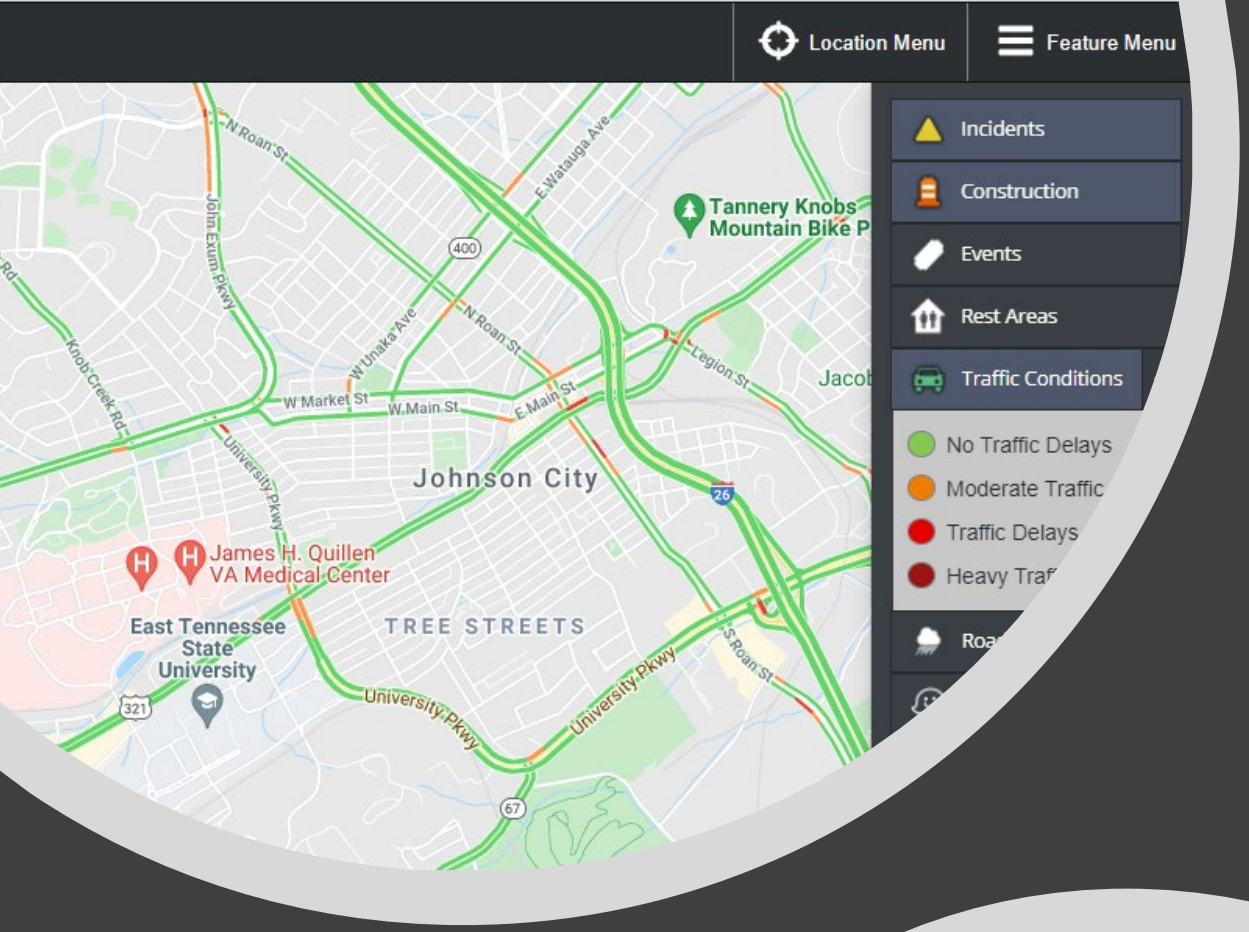
Traffic Management

High Priority Service Packages

- TM01 – Infrastructure-Based Traffic Surveillance
- TM03 – Traffic Signal Control
- TM06 – Traffic Information Dissemination
- TM07 – Regional Traffic Management
- TM08 – Traffic Incident Management System

Service Package Added in Update

- TM04 – Connected Vehicle Traffic Signal System (Low Priority)
- TM19 – Roadway Closure Management (Low Priority)
- TM25 – Wrong Way Vehicle Detection and Warning (Low Priority)



Traveler Information

High Priority Service Packages

- TI01 – Broadcast Traveler Information
- TI02 – Personalized Traveler Information

Service Package Added in Update

- TI07 – In-Vehicle Signage (Low Priority)

Public Transportation

High Priority Service Packages

- PT01 – Transit Vehicle Tracking
- PT02 – Transit Fixed-Route Operations
- PT03 – Dynamic Transit Operations
- PT05 – Transit Security
- PT08 – Transit Traveler Information
- PT17 – Transit Connection Protection

Service Package Added in Update

- PT09 – Transit Signal Priority (Low Priority)

Public Safety

High Priority Service Packages

- PS01 – Emergency Call-Taking and Dispatch
- PS02 – Emergency Response
- PS08 – Roadway Service Patrols
- PS10 – Wide-Area Alert
- PS14 – Disaster Traveler Information

Service Package Added in Update

- PS09 – Transportation Infrastructure Protection (Low Priority)

Maintenance and Construction

High Priority Service Packages

- MC06 – Work Zone Management
- MC08 – Maintenance and Construction Activity Coordination

Weather

High Priority Service Packages

- WX01 – Weather Data Collection
- WX02 – Weather Information Processing and Distribution

Parking Management

High Priority Service Packages

- No high priority service packages for parking management have been identified at this time

Service Package Added in Update

- PM01 – Parking Space Management (Low Priority)

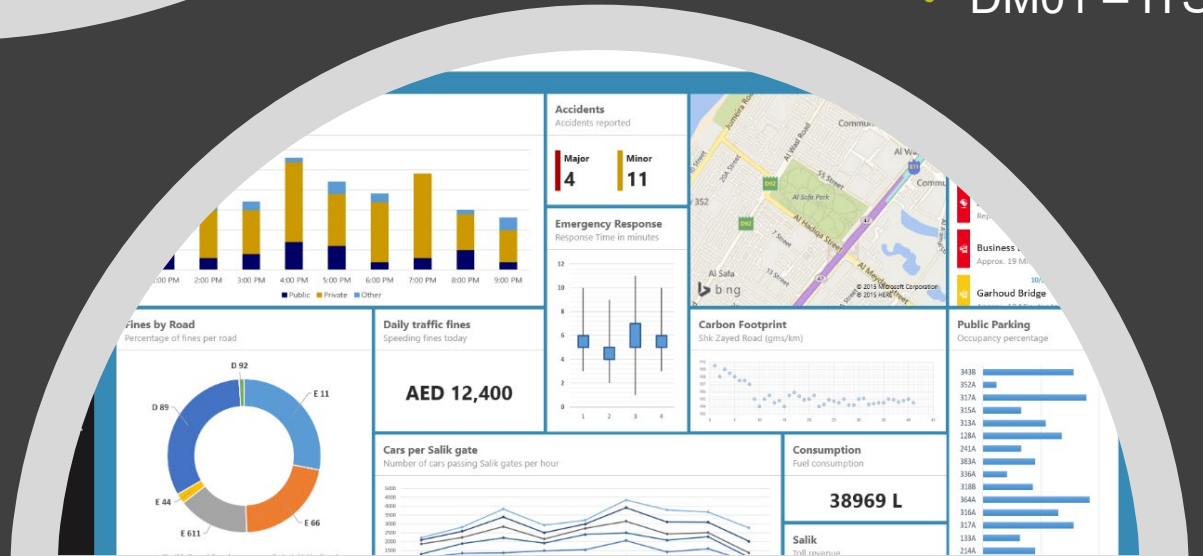
Data Management

High Priority Service Packages

- No high priority service packages for data management have been identified at this time

Medium Priority Service Packages

- DM01 – ITS Data Warehouse



Vehicle Safety

High Priority Service Packages

- VS12 – Pedestrian and Cyclist Safety

Service Package Added in Update

- VS08 – Queue Warning (Low Priority)

Potential Regional ITS Projects and Emerging Focus Areas

Projects included in **Tables 12 through 15** of the *Regional ITS Architecture and Deployment Plan*

ITS Deployment Plan Projects

State DOT Projects

Project	Project Description	Deployment Timeframe and Responsible Agency[1]	Funding Status	Applicable ITS Service Packages
TDOT/Johnson City Coordination	Improve coordination between TDOT and the City of Johnson City, including the exchange of future CCTV camera feeds and improved coordination during incidents. TDOT will need to establish a fiber connection with the City of Johnson City to access the City's CCTV camera feeds. TDOT's SmartWay software will have the ability to share full-motion video from their CCTV cameras with cities across the State once fully developed.	TDOT & City of Johnson City Short-Term	Funding Identified: No	TM01 – Infrastructure-Based Traffic Surveillance TM07 – Regional Traffic Management TM08 – Traffic Incident Management System
TDOT SmartWay Infrastructure Installation	Install CCTV camera and DMS along I-26 and expand the existing infrastructure along I-81 by adding CCTV cameras and DMS in the vicinity of the I-26/I-81 Interchange.	TDOT Short to Mid-Term	Funding Identified: No	TM01 – Infrastructure-Based Traffic Surveillance TM06 – Traffic Information Dissemination TM07 – Regional Traffic Management
TDOT HELP Lite	Establish deployment of TDOT HELP Lite Service Patrol along I-26 and I-81 to provide basic incident management support in rural areas. Patrol vehicles are equipped with a variety of tools, fuel, and water to assist with minor traffic incidents such as flat tires or stalled vehicles.	TDOT Short-Term	Funding Identified: No	PS08 – Roadway Service Patrols

[1]Deployment timeframes include short-term (0-5 years), mid-term (5-10 years), and long-term (10+ years).

ITS Deployment Plan Projects

Local Projects

Project	Project Description	Deployment Timeframe and Responsible Agency[1]	Funding Status	Applicable ITS Service Packages
City of Johnson City CCTV Camera Expansion	Install additional CCTV cameras along major arterials including along Boones Creek Road and in the Gray area in north Washington County.	City of Johnson City Short to Mid-Term	Funding Identified: Yes	TM01 – Infrastructure-Based Traffic Surveillance
City of Johnson City Fiber Optic Expansion	Install additional fiber optic cable for traffic signal communications and CCTV camera installation.	City of Johnson City Short to Mid-Term	Funding Identified: Yes	TM01 – Infrastructure-Based Traffic Surveillance TM03 – Traffic Signal Control
City of Johnson City Adaptive Traffic Signals	Install an adaptive traffic signal system to reduce congestion. This is a system wide improvement.	City of Johnson City Mid to Long-Term	Funding Identified: Yes	TM01 – Infrastructure-Based Traffic Surveillance TM02 – Vehicle-Based Traffic Surveillance TM03 – Traffic Signal Control
City of Johnson City Speed Monitoring System	Collect and disseminate travel time information along major corridors using Bluetooth technology.	City of Johnson City Mid to Long-Term	Funding Identified: No	TM02 – Vehicle-Based Traffic Surveillance TM03 – Traffic Signal Control
City of Johnson City Flood Detection and Warning System	Implement a system to provide automated flood detection, road closure, and advanced warning on roads with low water crossings that frequently flood.	City of Johnson City Mid to Long-Term	Funding Identified: No	PS11 – Early Warning System TM06 – Traffic Information Dissemination WX01 – Weather Data Collection WX02 – Weather Information Processing and Distribution

[1]Deployment timeframes include short-term (0-5 years), mid-term (5-10 years), and long-term (10+ years).

ITS Deployment Plan Projects

Local Projects (Continued)

Project	Project Description	Deployment Timeframe and Responsible Agency[1]	Funding Status	Applicable ITS Service Packages
City of Johnson City Automatic Vehicle Location (AVL)	Install AVL technology on snowplows to track them during winter weather events.	City of Johnson City Short-Term	Funding Identified: No	MC01 – Maintenance and Construction Vehicle and Equipment Tracking MC04 – Winter Maintenance
City of Johnson City DMS	Install permanent dynamic message signs along key corridors to provide motorists with roadway network conditions.	City of Johnson City Mid to Long-Term	Funding Identified: No	TM06 – Traffic Information Dissemination
City of Johnson City RWIS	Install road weather information systems that include field sensors to monitor road weather conditions including ice, snow, and rain.	City of Johnson City Long-Term	Funding Identified: Yes	WX01 – Weather Data Collection WX02 – Weather Information Processing and Distribution
City of Johnson City Smart Streetlights	Deploy smart streetlight system that will include parking space occupancy detection and provide information on parking space availability. Flood monitoring to detect water on roadway could be included as part of streetlight system.	City of Johnson City Short to Mid-Term	Funding Identified: No	PM01 – Parking Space Management WX01 – Weather Data Collection
City of Elizabethton TMC	Create a TMC and connect all traffic signals within the City of Elizabethton to a centralized TMC for operations.	City of Elizabethton Short to Mid-Term	Funding Identified: No	TM03 – Traffic Signal Control TM07 – Regional Traffic Management
City of Elizabethton Fiber Optic Installation	Install fiber optic cable to connect City Hall to the nearest interconnected signalized intersection to establish a line of communication for the future TMC	City of Elizabethton Short to Mid-Term	Funding Identified: No	TM01 – Infrastructure-Based Traffic Surveillance TM03 – Traffic Signal Control TM07 – Regional Traffic Management

[1]Deployment timeframes include short-term (0-5 years), mid-term (5-10 years), and long-term (10+ years).

ITS Deployment Plan Projects

Transit Projects

Project	Project Description	Deployment Timeframe and Responsible Agency[1]	Funding Status	Applicable ITS Service Packages
Johnson City Transit Mobile Phone Application	Develop a mobile phone application that allows users to view transit service information, real-time bus location, and create a transit trip plan. Johnson City Transit does have this service available through their website but not through a dedicated transit app.	Johnson City Transit Short to Mid-Term	Funding Identified: No	TM01 – Infrastructure-Based Traffic Surveillance TM07 – Regional Traffic Management WX01 – Weather Data Collection
Johnson City Transit Smart Card Implementation	Implement a Smart Card system to pay for Johnson City Transit. Deploy kiosks to allow passengers to renew or purchase passes for electronic fare collection on agency buses. Card could be expanded to coordinate with other City services, such as parking payment.	Johnson City Transit Short to Mid-Term	Funding Identified: No	PT04 – Transit Fare Collection Management PT14 – Multimodal Coordination
Johnson City Transit Northern Transfer Center	Construct a transfer center in Johnson City Transit's northern service area to serve an expanding population. Transit center could include additional ITS elements such as transit security cameras and bus stop DMS.	City of Johnson City Mid to Long-Term	Funding Identified: No	PT02 – Transit Fixed-Route Operations PT05 – Transit Security PT08 – Transit Traveler Information PT17 – Transit Connection Protection
Regional Transit Coordination	Improve coordination within and among transit agencies to optimize transit travel times.	Johnson City Transit & NET Trans Short to Mid-Term	Funding Identified: No	PT14 – Multimodal Coordination PT17 – Transit Connection Protection

[1]Deployment timeframes include short-term (0-5 years), mid-term (5-10 years), and long-term (10+ years).

ITS Deployment Plan Projects

Other Projects

Project	Project Description	Deployment Timeframe and Responsible Agency[1]	Funding Status	Applicable ITS Service Packages
Johnson City Metropolitan Transportation Planning Organization Data Warehouse Implementation	Develop a transportation data warehouse that includes region-wide transportation data gathered from the ITS network and various agencies.	Johnson City MTPO Long-Term	Funding Identified: No	DM01 – ITS Data Warehouse

[1]Deployment timeframes include short-term (0-5 years), mid-term (5-10 years), and long-term (10+ years).

Other Projects to Add to the Plan?

ITS Project Conformity and ITS Architecture Maintenance

Need for ITS Project Conformity

All transportation projects funded through the Highway Trust Fund must conform with a Regional ITS Architecture

Projects that demonstrate conformity are more likely to:

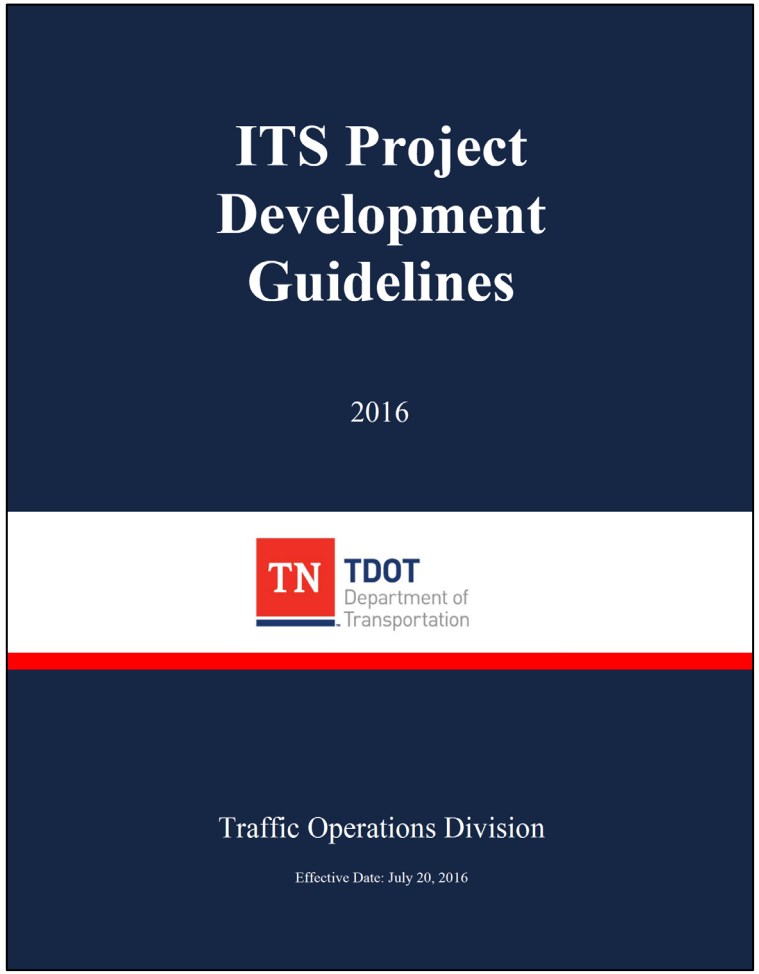
- Be designed so that they incorporate all desired functionality
- Maintain interoperability with other existing deployments
- Deploy with fewer cost overruns and less overall project risk

Systems Engineering

Systems engineering focuses on:

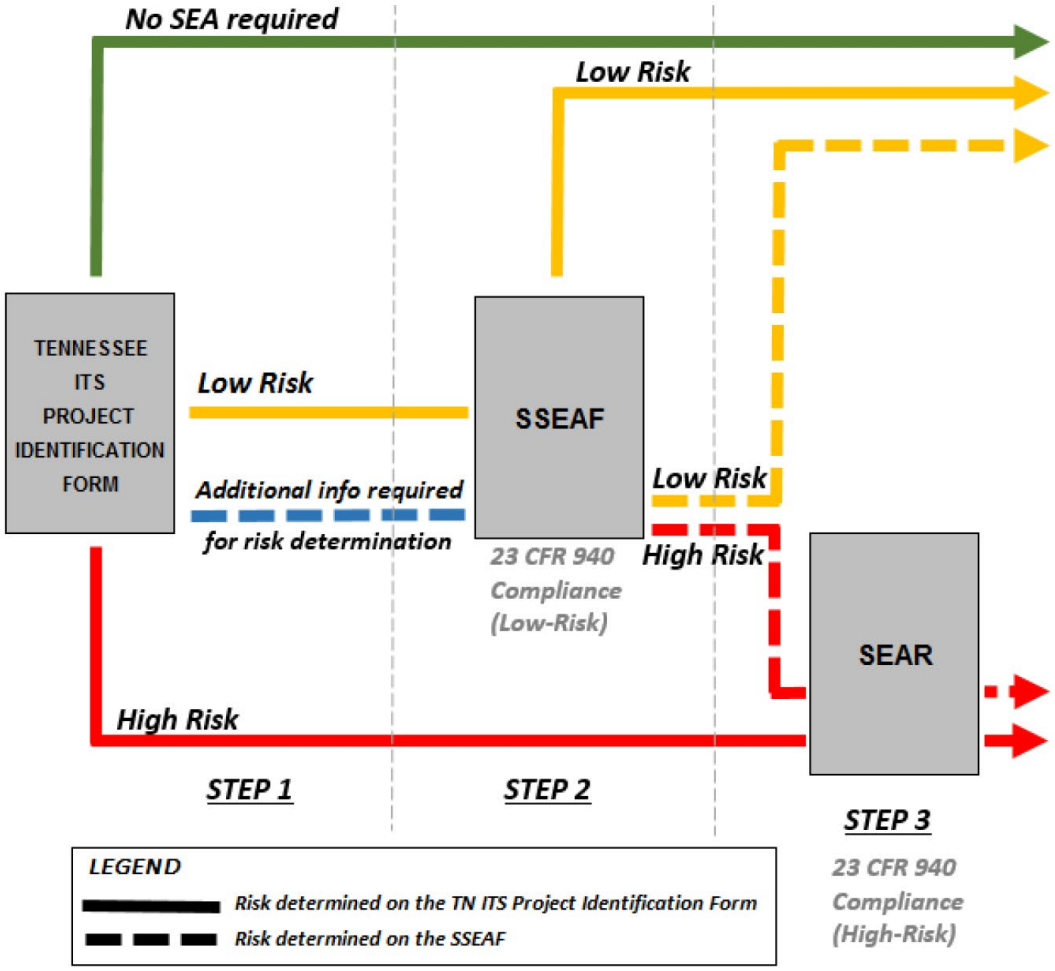
- Defining customer needs and required functionality early in the project development cycle,
- Documenting requirements, and then
- Proceeding with design synthesis and system validation.

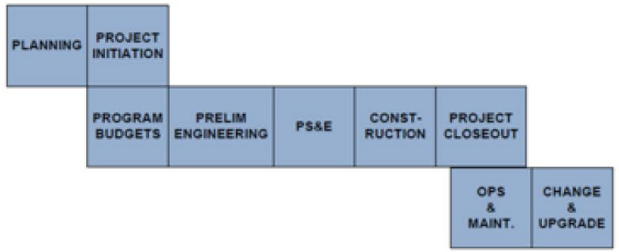
Using a systems engineering approach is required by USDOT and TDOT for ITS projects.



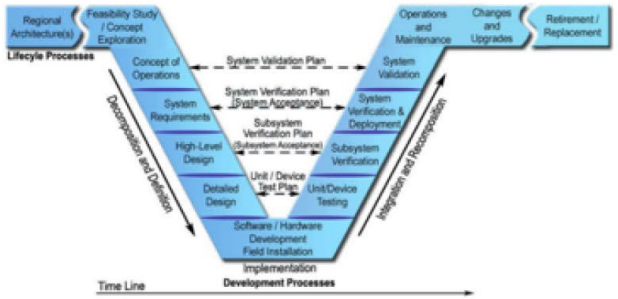
Detailed guidance can be found in the *TDOT ITS Project Development Guidelines (2016 edition is currently being updated)*

TDOT SEA Decision Process



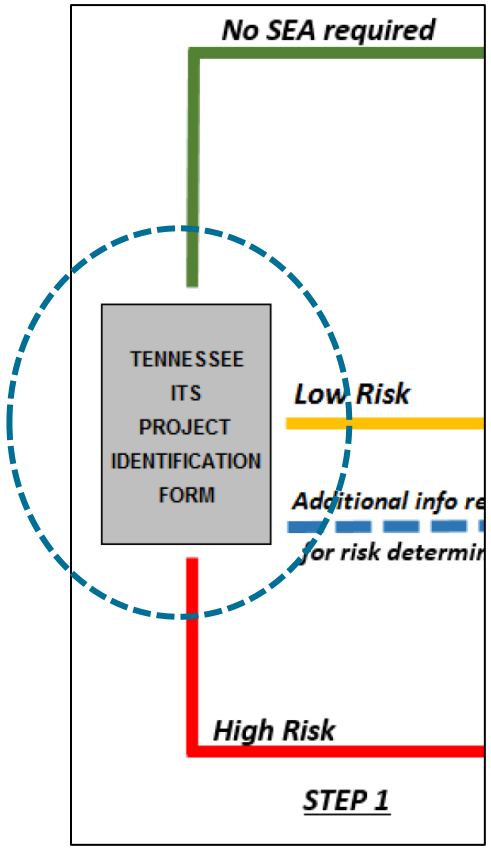


TRADITIONAL ROAD BUILDING PROCESS



SYSTEMS ENGINEERING PROCESS

TDOT SEA Decision Process



Tennessee ITS Project Identification Form

INSTRUCTIONS: Refer to Section 4.2 of the TDOT ITS Project Development Guidelines. Attach or make available any documents referenced in this form when submitting.

SECTION 1 – PROJECT INFORMATION

Agency: _____

Agency Information (Address, phone number, e-mail, etc):

_____

Project Name and Location:

_____

☐ New Project
☐ Modification Project
☐ Expansion Project

Nature of Work:

☐ Planning
☐ Design Software / Integration
☐ Operations
☐ Evaluation
☐ Scoping
☐ Construction
☐ Maintenance (Equipment Replacement)
☐ Other: _____

Please provide the following background information. In most cases, 1-3 sentences will be sufficient for each item.

Brief Description of ITS project objectives – (What is the purpose of the project? What needs are being addressed?):

_____

_____

Project Summary – (What solutions will address the needs? What major elements will be installed? What major function(s) will be performed?)

_____

_____

Work to Date: (Any preliminary planning, investigation of options, associated internal or external systems examined?)

_____

SECTION 2 – RISK ASSESSMENT

(For each question, answer Yes, No, Not Sure or N/A for not applicable):

1 – Will the project depend on **only your agency** to implement and operate?

_____

2 - Will the project use only software proven elsewhere, with **no** new software writing?

_____

3 - Will the project use only hardware and communications **proven** elsewhere?

_____

4 - Will the project use only **existing interfaces** (no new interfaces to other systems)?

_____ (If YES include reference)

5 - Will the project use only **existing system requirements** that are well documented?

_____ (If YES include reference)

6 - Will the project use only **existing operating procedures** that are well documented?

_____ (If YES include reference)

7 - Will the project use only technologies with service life **longer** than 2-4 years?

_____

SECTION 3 – FUNDING

Identify all that apply: ☐ Local Agency ☐ State ☐ Federal Funds

TIP/STIP Identification and Description:

_____

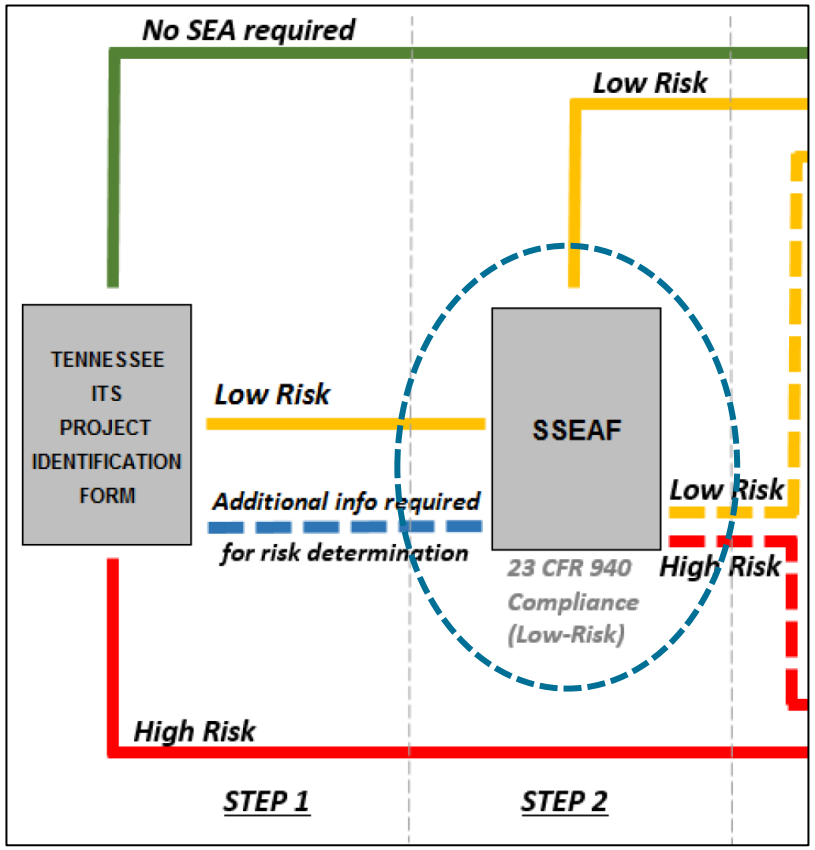
_____	_____	_____
Agency Representative	Signature	Date
_____	_____	_____
MPO/RPO Representative	Signature	Date

FOR TDOT USE ONLY:

☐ No additional documentation required ☐ Inconclusive risk level determination (SSEAF is required)
☐ Low Risk (SSEAF is required) ☐ High Risk (SEAR is required)

_____	_____	_____
TDOT Representative	Signature	Date

TDOT SEA Decision Process

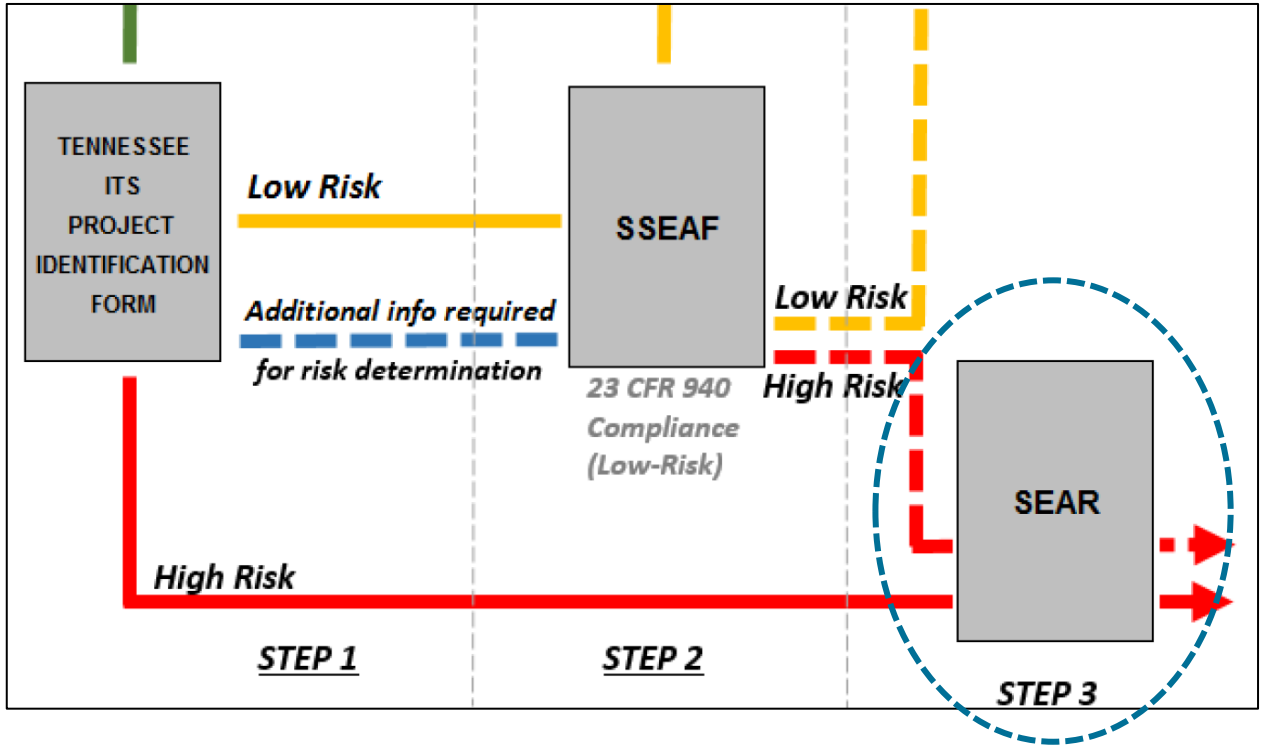


Simplified Systems Engineering Analysis Form (SSEAF)

1 - Identification of portions of the Regional ITS Architecture (RA) being implemented:

Instructions: Contact your MPO to get this information from your Regional ITS Architecture ("RA"). In the RA, the project might be identified specifically by name and agency, or by a more generic description (e.g. "Arterial Traffic Management"). If listed in the RA, document which inventory elements, market packages, subsystems, and/or information flows are being completed in this project. If there is ***no*** *information in your RA, arrange with your MPO to provide them this information when your project is designed; they will use it in the next update of the RA.*

TDOT SEA Decision Process



Systems Engineering Analysis Report (SEAR)

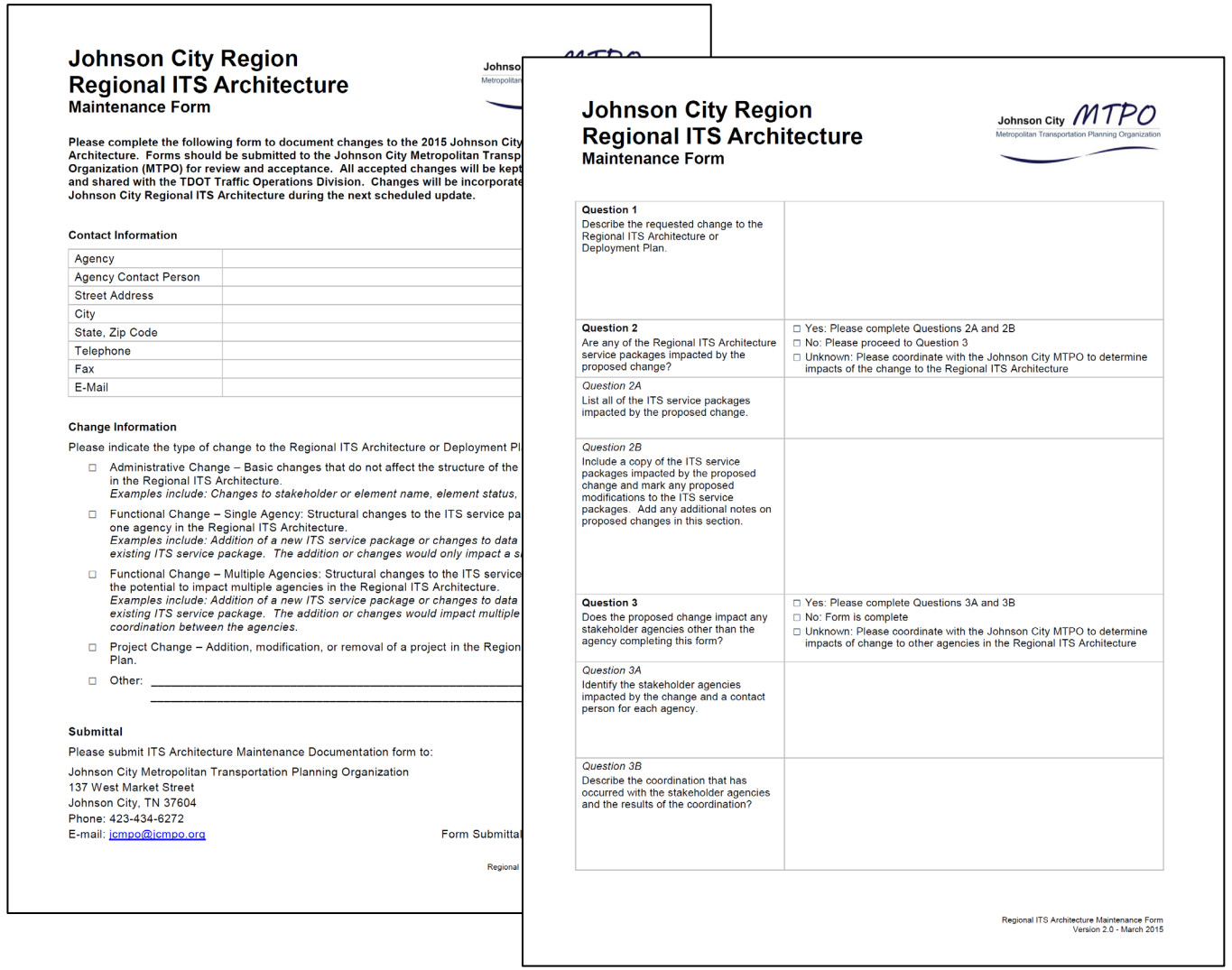
TDOT SEA Decision Process

Changes that are required to the Regional ITS Architecture to Establish Conformity can be:

Documented through TDOT ITS Project Development System

or

Documented using Regional ITS Architecture Maintenance Form



Johnson City Region
Regional ITS Architecture
Maintenance Form

Please complete the following form to document changes to the 2015 Johnson City Architecture. Forms should be submitted to the Johnson City Metropolitan Transp Organization (MTPO) for review and acceptance. All accepted changes will be kept and shared with the TDOT Traffic Operations Division. Changes will be incorporate Johnson City Regional ITS Architecture during the next scheduled update.

Contact Information

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

Change Information

Please indicate the type of change to the Regional ITS Architecture or Deployment Pl

- ☐ Administrative Change – Basic changes that do not affect the structure of the in the Regional ITS Architecture.
  Examples include: Changes to stakeholder or element name, element status,
- ☐ Functional Change – Single Agency: Structural changes to the ITS service pa one agency in the Regional ITS Architecture.
  Examples include: Addition of a new ITS service package or changes to data existing ITS service package. The addition or changes would only impact a s
- ☐ Functional Change – Multiple Agencies: Structural changes to the ITS service the potential to impact multiple agencies in the Regional ITS Architecture.
  Examples include: Addition of a new ITS service package or changes to data existing ITS service package. The addition or changes would impact multiple coordination between the agencies.
- ☐ Project Change – Addition, modification, or removal of a project in the Region Plan.
- ☐ Other: _____

Submittal

Please submit ITS Architecture Maintenance Documentation form to:

Johnson City Metropolitan Transportation Planning Organization
137 West Market Street
Johnson City, TN 37604
Phone: 423-434-6272
E-mail: jcmpo@jcmpo.org

Form Submittal

Regional

Johnson City Region
Regional ITS Architecture
Maintenance Form

Johnson City MTPO
Metropolitan Transportation Planning Organization

Question 1 Describe the requested change to the Regional ITS Architecture or Deployment Plan.	
Question 2 Are any of the Regional ITS Architecture service packages impacted by the proposed change?	☐ Yes: Please complete Questions 2A and 2B ☐ No: Please proceed to Question 3 ☐ Unknown: Please coordinate with the Johnson City MTPO to determine impacts of the change to the Regional ITS Architecture
Question 2A List all of the ITS service packages impacted by the proposed change.	
Question 2B Include a copy of the ITS service packages impacted by the proposed change and mark any proposed modifications to the ITS service packages. Add any additional notes on proposed changes in this section.	
Question 3 Does the proposed change impact any stakeholder agencies other than the agency completing this form?	☐ Yes: Please complete Questions 3A and 3B ☐ No: Form is complete ☐ Unknown: Please coordinate with the Johnson City MTPO to determine impacts of change to other agencies in the Regional ITS Architecture
Question 3A Identify the stakeholder agencies impacted by the change and a contact person for each agency.	
Question 3B Describe the coordination that has occurred with the stakeholder agencies and the results of the coordination?	

Regional ITS Architecture Maintenance Form
Version 2.0 - March 2015

Regional ITS Architecture Maintenance

Historical maintenance and update schedule

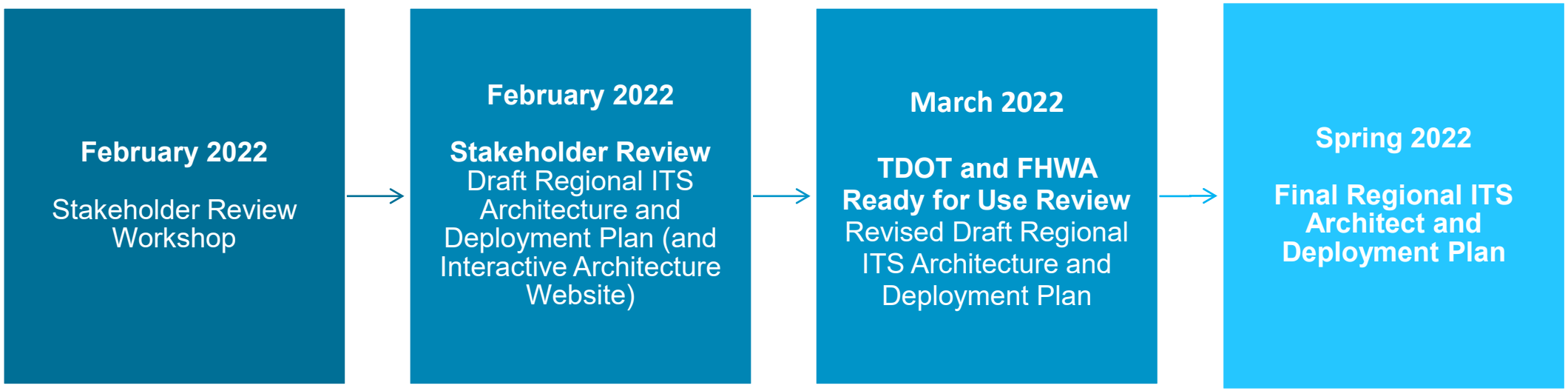
- Major RITSA updates occurred approximately every 4-5 years
- Schedule was tied to the Johnson City MTPO MTP regional transportation plan update process
- Minor RITSA updates would occur as projects were developed or deployed (using TPO RITSA update form)

New considerations for maintenance

- FHWA has recommended that Regions “consider the appropriateness of the current RITSA update schedule and additional methods to ensure responsiveness, flexibility, and continued relevance of the RITSA between major updates”
- TDOT SEA Decision Process can be used to streamline minor updates and build flexibility into the RITSA
- Major RITSA updates may be tied to regional and multi-agency project deployments, or major updates to the National ITS Architecture, rather than a specific timeframe

Next Steps and Wrap-Up

Upcoming Project Schedule



Deliverables

Draft and Final Regional ITS Architecture and Deployment Plan

RAD-IT Architecture Database (Version 9.0)

Project Website

Project Website

https://extsites.kimley-horn.com/projects/TennesseeITSArchitecture/johnsoncity.html

or Google

Johnson City ITS Architecture Kimley-Horn

Johnson City Regional ITS Architecture and Deployment Plan Update

Stakeholder Review Workshop

Contacts

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Terrance Hill
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Kate Stankiewicz
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737-443-0451

Johnson City MTPO
Metropolitan Transportation Planning Organization

TN TDOT Department of Transportation