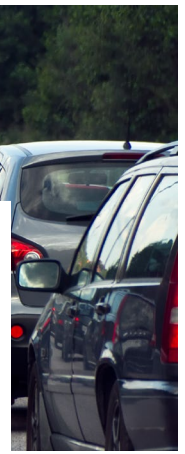
Chattanooga Regional ITS Architecture Update

Stakeholder Overview Workshop

RPA

October 19, 2021



Workshop Outline

- 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 and Emerging Focus Areas
- ITS Project Conformity and ITS Architecture Maintenance
- Next Steps and Wrap-Up

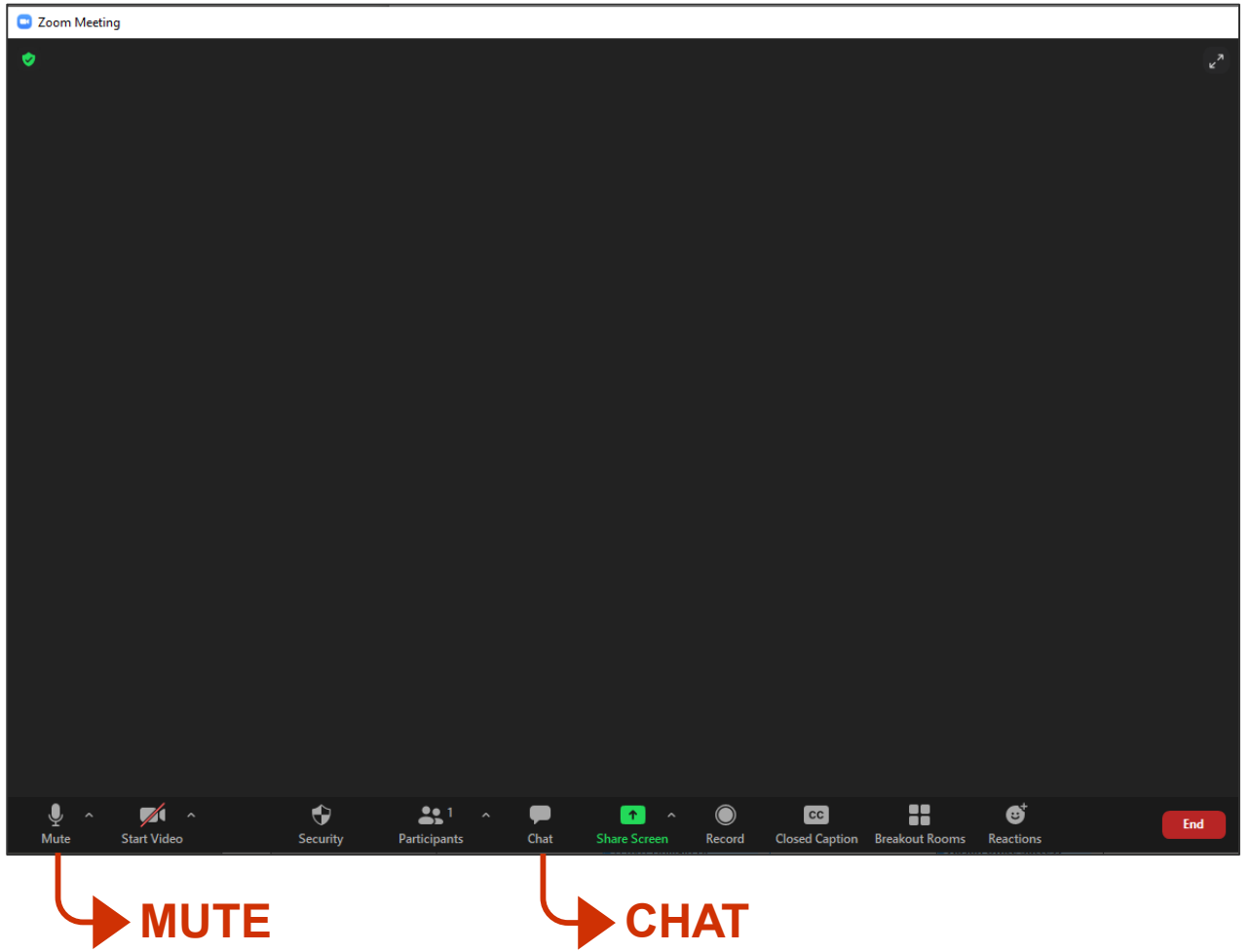
Housekeeping

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



Introductions

Overview of the Regional ITS Architecture Project

What is ITS?

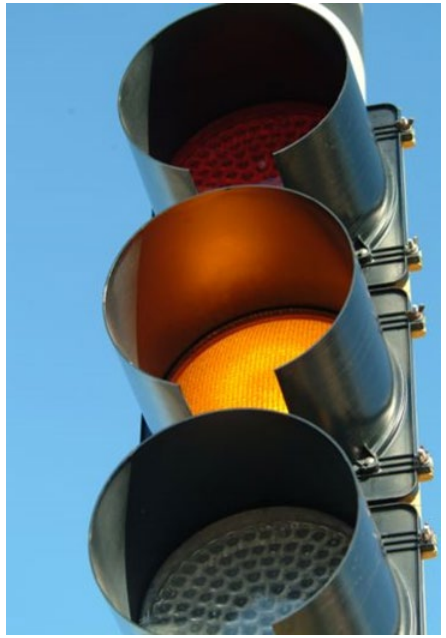
ITS
Intelligent Transportation Systems

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




WORK
CONVOY


LANES TO CLOSE
AT LOOP 1
9PM - 5AM

Emerging ITS Technologies

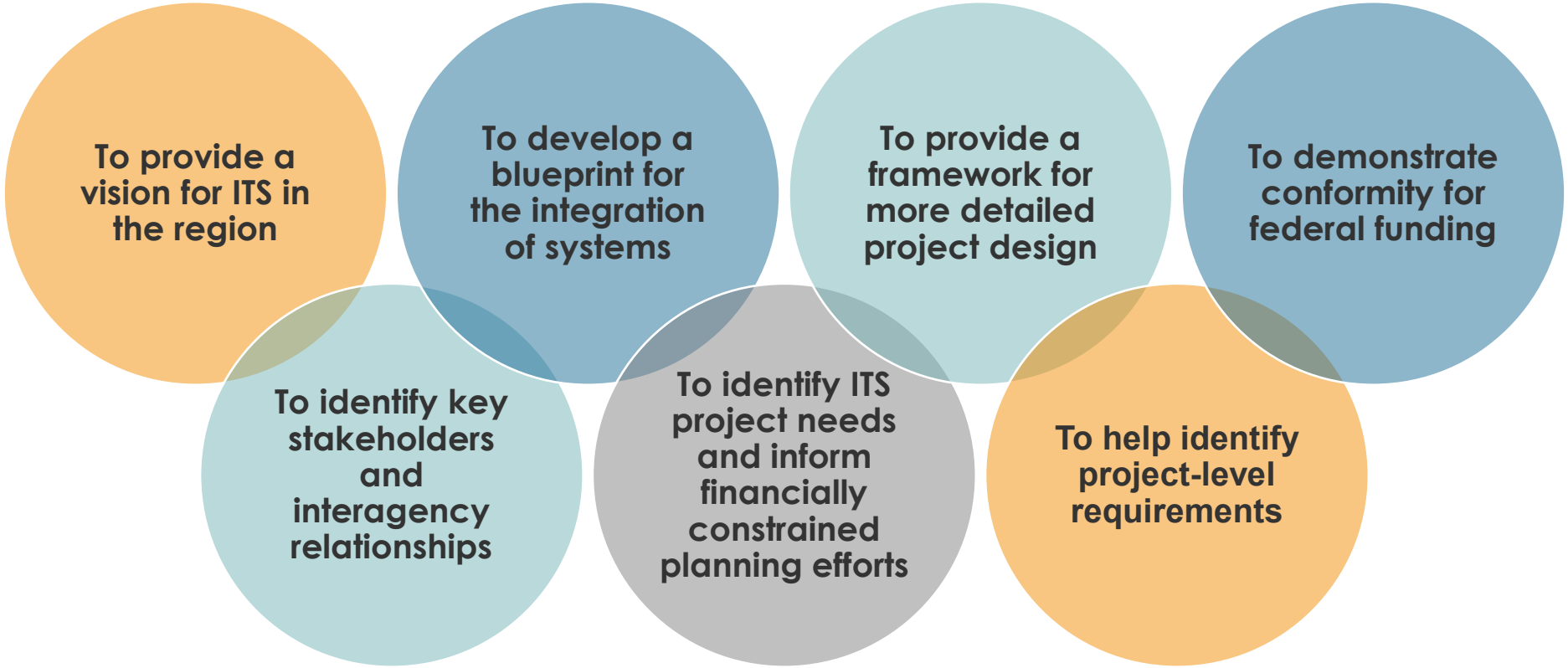
- Connected Vehicles
- Automated Vehicles
- Data Privacy and Security
- Integrated Corridor Management
- Decision Support Systems
- Privatized Traffic Data

What is a Regional ITS Architecture

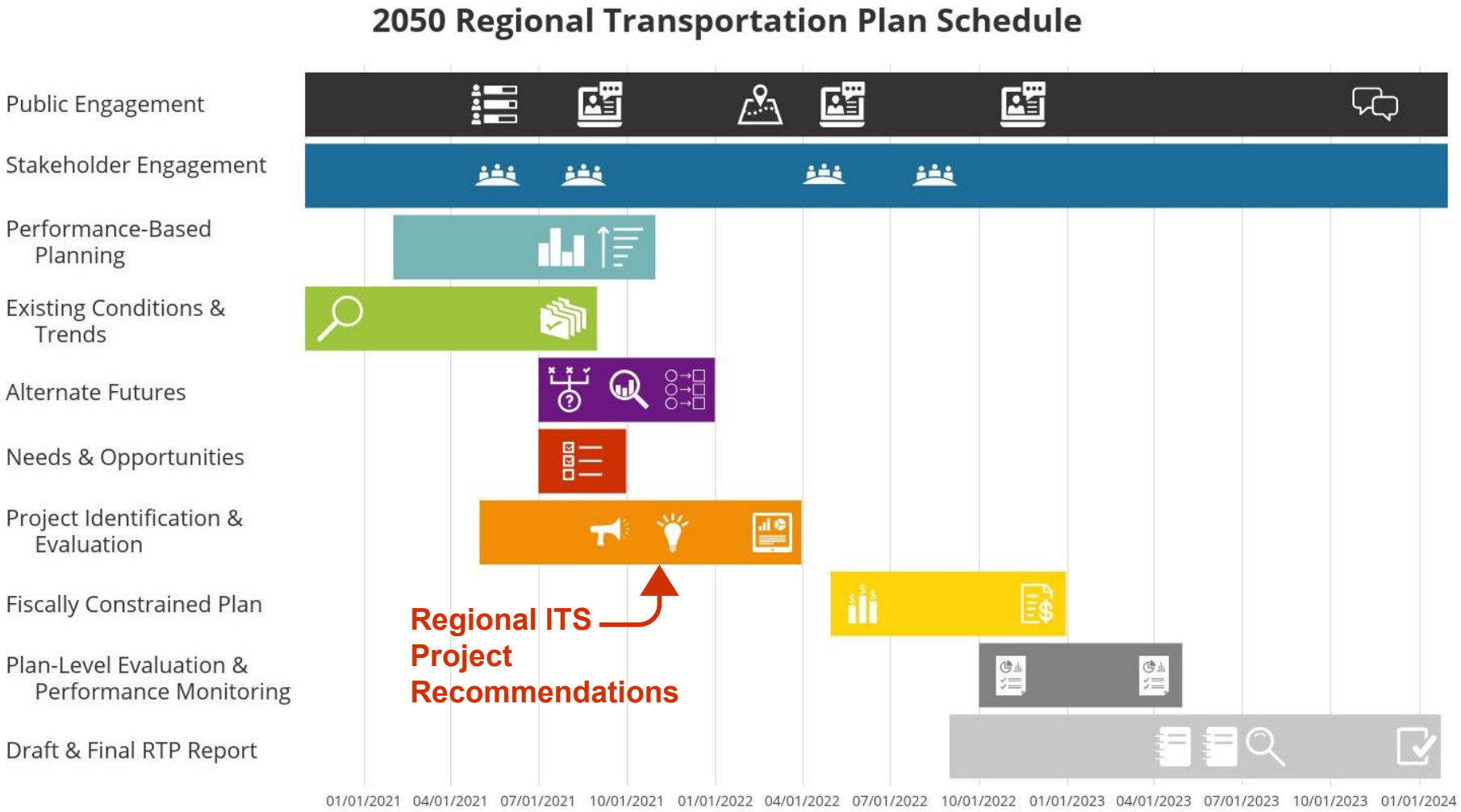
A plan for the deployment, integration, and operation of Intelligent Transportation Systems in a Region

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

Purpose of the Architecture



Regional Transportation Plan

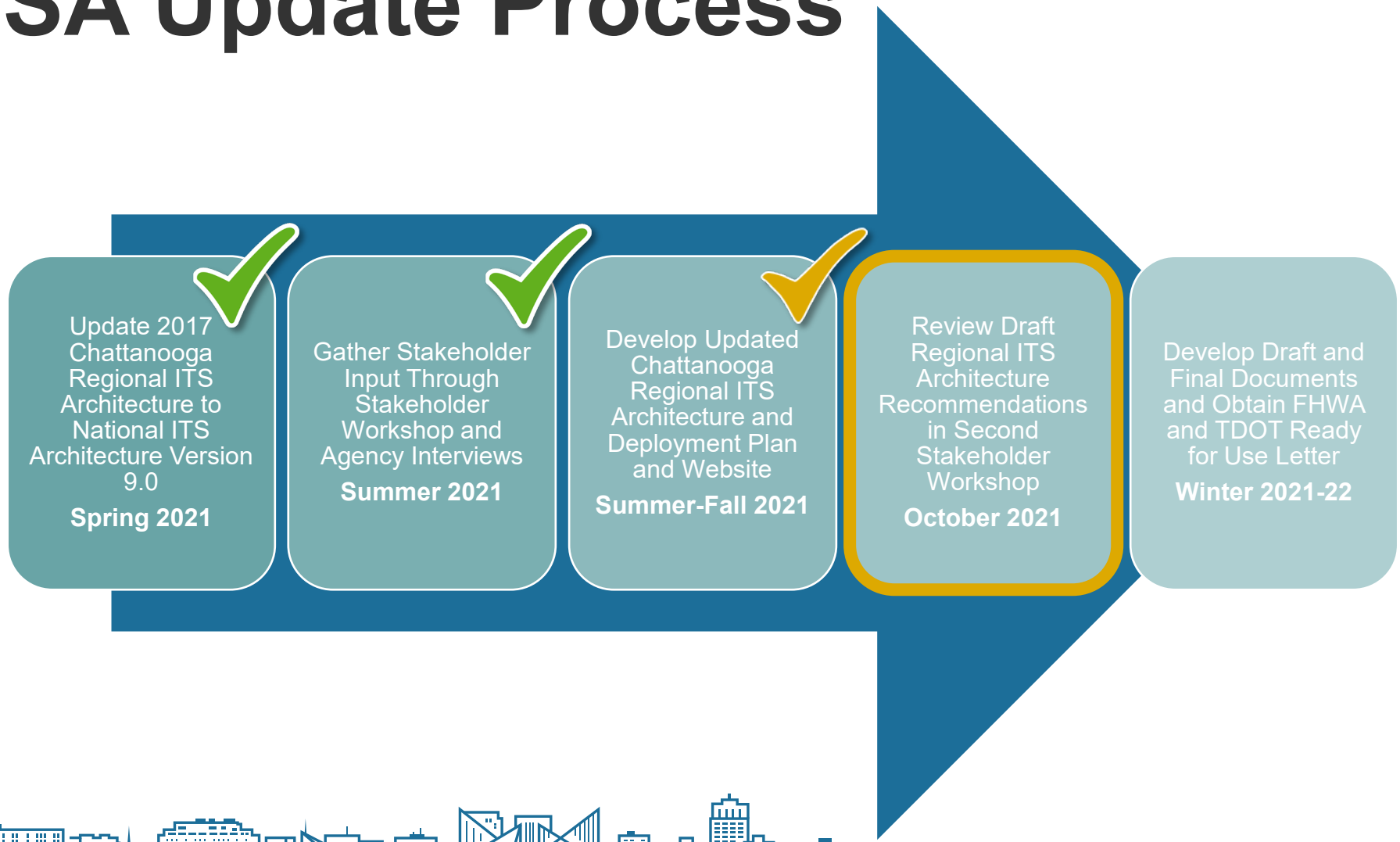


2050 REGIONAL TRANSPORTATION PLAN

RTP

Greater Chattanooga/North GA Region

RITSA Update Process



Stakeholder Engagement Summary

Regional ITS Architecture update stakeholder group includes:

- Chattanooga-Hamilton County RPA (as well as neighboring MPOs for partnering efforts)
- Tennessee and Georgia DOTs
- Tennessee and Georgia Highway Patrols and Emergency Management Agencies
- Cities and Towns (including transportation, public works, police, fire, and other staff)
- Counties (including transportation, public works, public safety, and emergency management staff)
- Transit Agencies (including CARTA and other providers that interface with CARTA)
- Federal Partners (including FHWA and FTA)
- Others (including Oak Ridge National Laboratory, higher education, and human resource agencies)

Stakeholder Engagement Summary

Individual stakeholder agency meetings have been conducted with:

- Chattanooga/Hamilton County RPA/TPO
- Tennessee DOT – Region 2
- Tennessee DOT – Traffic Operations Division
- Georgia DOT
- City of Chattanooga
- Chattanooga Area Regional Transportation Authority (CARTA)
- Hamilton County 911
- Oak Ridge National Laboratory

Please let us know if you would like for us to schedule a stakeholder meeting with your agency

Review of Draft Regional ITS Needs

Regional ITS Needs

26 needs statements identified in total

Needs statements were derived from three sources:

1. CHCNGA Regional Transportation Plan guidance,
2. TDOT strategic planning guidance, and
3. Feedback from stakeholder meetings

Needs statements were reviewed from 2017 update and were validated, modified, or removed to match the input received as part of this update.

2050 RTP

Regional ITS Needs – Plan Guidance

2050 RTP Operations Needs (5 needs statements)

1. Preserve sensitive natural resources and maintain existing transportation assets to reflect a state of repair that is reliable and resilient
2. Protect communities by making the safe movement of people and goods a top priority
3. Provide equitable options, access, and freedom of mobility to everyone
4. Propel the region's economic vitality and growth through an efficient, connected, and sustainable intermodal transportation network
5. Pioneer innovative technologies that put the transportation system ahead of the curve in an ever-changing world

TDOT Strategic Operations Needs (2 needs statements)

1. Operate and manage Tennessee's transportation system to provide a high level of safety and service for customers and workers
2. Manage the state transportation system to protect the long-term investments of infrastructure assets

Regional ITS Needs – Plan Guidance

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Regional ITS Needs – Agency Feedback

- Freeway operations – 4 needs statements
- Arterial and surface street operations – 3 needs statements
- Traffic signal operations – 2 needs statements
- Transit operations – 5 needs statements
- Emergency response operations – 2 needs statements
- Interagency coordination – 2 needs statements
- Regional data collection and analysis – 1 need statement

Example Regional ITS Needs

Freeway Operations

- Identify and deploy systems that improve traffic operations along freeway main lanes and ramps, and at interchanges
- Expand the region's safety service patrol to provide motorist assistance along freeways

Arterial and Surface Street Operations

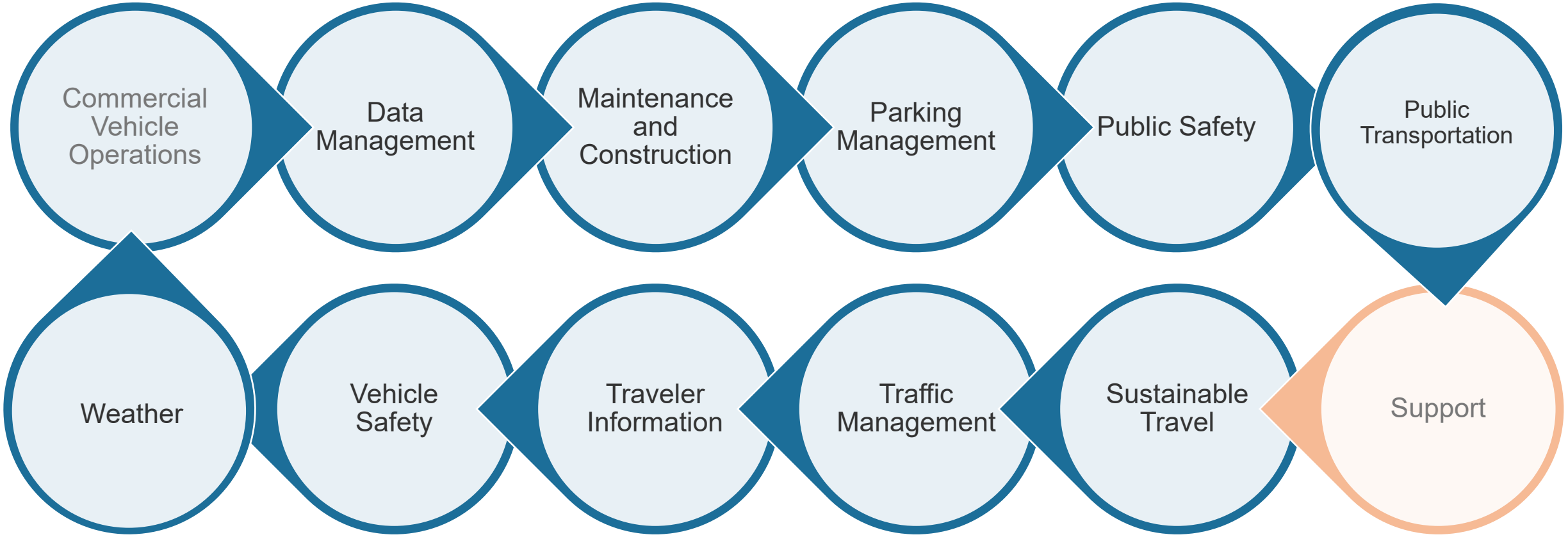
- Improve coordination of traffic signal system timing between the City of Chattanooga and adjacent cities
- Expand traffic signal system communications and system detection capabilities

Transit Operations

- Implement transit priority strategies that allow for improved transit system performance
- Monitor passenger boarding, alighting, and travel trends to improve service

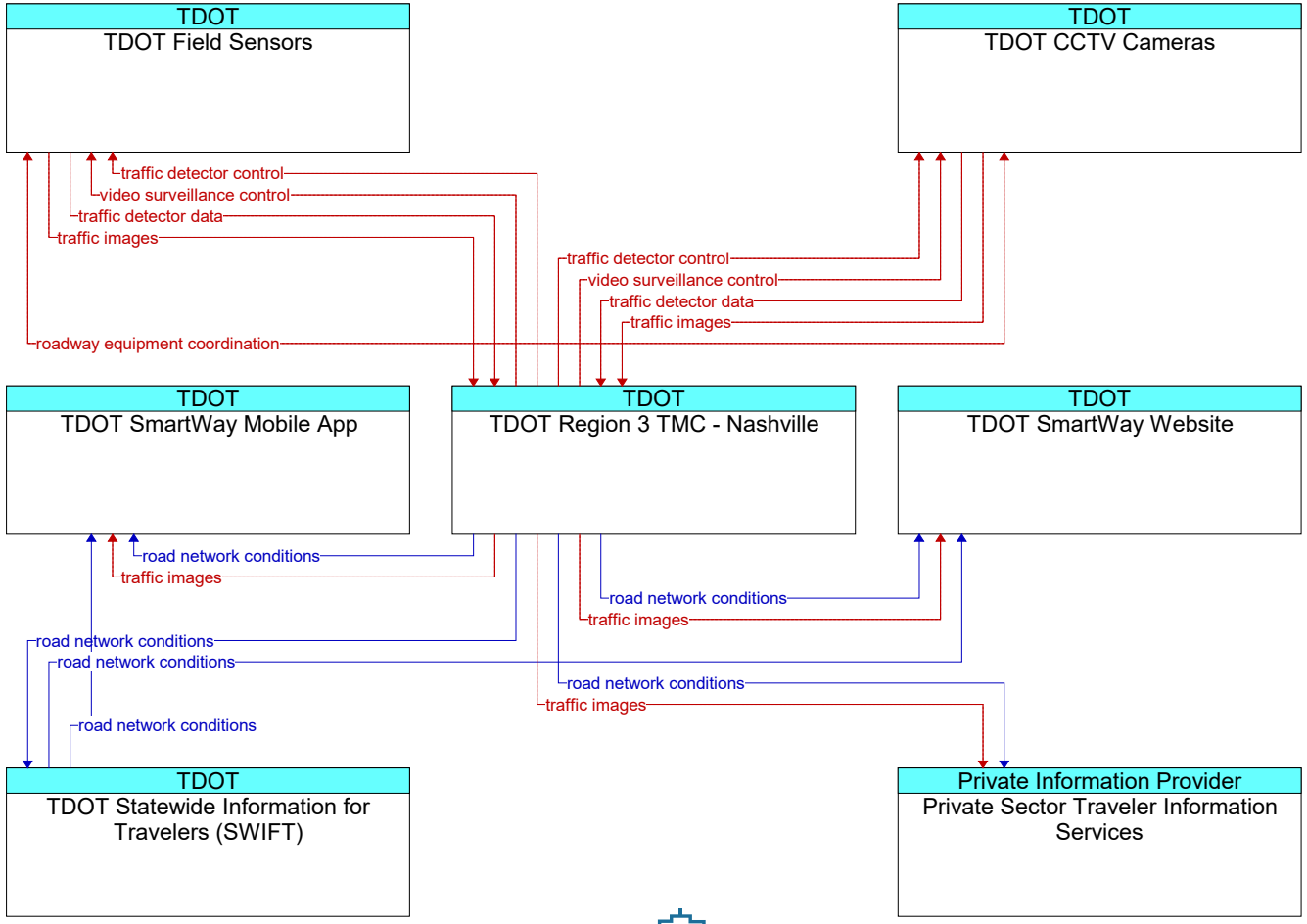
Review of New ITS Service Packages for the Region

ITS Service Package Areas



ITS Service Package Example

Example ITS Service Package – TM01 – Infrastructure Based Traffic Surveillance (TDOT Region 3)



New Service Packages for the Regional ITS Architecture

10 new service packages to add, based on projects list

New service packages from 6 different service areas

- Data Management (1 new)
- Public Safety (1 new)
- Traffic Management (3 new)
- Public Transportation (1 new)
- Sustainable Travel (1 new)
- Vehicle Safety (3 new)

New Service Package	Relevant Projects in the Region
Data Management Service Area	
DM02 – Performance Monitoring	City of Chattanooga Traffic Data Warehouse Implementation
Public Safety Service Area	
PS09 – Transportation Infrastructure Protection	City of Chattanooga Infrared Bridge Sensors
Traffic Management Service Area	
TM04 – Connected Vehicle Traffic Signal System	City of Chattanooga Adaptive Traffic Signal System Expansion City of Chattanooga Traffic Signal Communication Improvements
TM22 – Dynamic Lane Management and Shoulder Use	CARTA Transit Vehicle Freeway Shoulder Riding
TM25 – Wrong Way Vehicle Detection and Warning	TDOT Freeway Ramp Wrong-Way Detection

New Service Package	Relevant Projects in the Region
Public Transportation Service Area	
PT18 – Integrated Multi-Modal Electronic Payment	CARTA SmartCard Implementation
Sustainable Travel Service Area	
ST05 – Electric Charging Stations Management	CARTA Electric Vehicle Inductive Charging Pads
Vehicle Safety Service Area	
VS05 – Curve Speed Warning	City of Chattanooga Curve Speed Warning System
VS09 – Reduced Speed Zone Warning/Lane Closure	City of Chattanooga School Zone Flasher System Upgrade
VS11 – Oversize Vehicle Warning	TDOT Overheight Vehicle Detection at Bachman Tunnel City of Chattanooga Overheight Detection

Review of Draft ITS Projects and Emerging Focus Areas

Draft ITS Projects List

43 projects in total (2017 update had 30 projects in total)

- 15 projects have been added to the 2017 list
- 5 projects have been removed from 2017 list
- Several projects along I-24 involving TDOT and GDOT have been separated or reorganized for clarity

New ITS Projects – TDOT

Project Name	Project Description
TDOT Region 2 HELP 'Lite' Service Patrol Expansion	Deployment of TDOT HELP 'Lite' Service Patrol along I-24 in Marion County and along I-75 in Bradley and McMinn Counties to provide basic incident management support outside of CMAQ non-attainment areas.
TDOT Overheight Vehicle Detection at Bachman Tunnel	Install an overheight vehicle detection and warning system along Ringgold Road (State Route 8) in the vicinity of Bachman Tunnel. System would notify TDOT if an overheight vehicle continues toward tunnel past warning signs and will provide audio warnings and DMS message warnings to drivers in the area. System is currently under contract for design.
TDOT Incident Management Drone Acquisition	Acquire several drones for use by HELP vehicle operators to provide SmartWay TMC with video coverage of major incidents when they occur.
TDOT Freeway Ramp Wrong-Way Detection	Install Wrong-Way Driver Detection and Warning systems along freeway exit ramps.

New ITS Projects – City of Chattanooga

Project Name	Project Description
City of Chattanooga Smart Corridor Deployment	Deploy technology along Martin Luther King Boulevard, including signal controllers that enable active signal timing modifications and transit signal priority, as well as sensing devices that include pan-tilt-zoom cameras, LiDAR, and video detection.
City of Chattanooga Traffic Signal Communication Improvements	Reconfigure city IP address scheme and install ethernet field switches to support CDOT communication with city traffic signals.
City of Chattanooga School Zone Flasher System Upgrade	Update communications technology (tying into existing city fiber network if possible) at school zone flasher locations to allow for remote control of flasher systems.
City of Chattanooga Curve Speed Warning System	Install curve speed warning system, including sensors and signs, to warn speeding vehicles approaching curve along Manufacturers Road at Chattanooga Bakery.

New ITS Projects – City of Chattanooga
(continued)

Project Name	Project Description
City of Chattanooga Traffic Data Warehouse Implementation	Develop a transportation data warehouse that includes transportation data gathered by ITS devices managed by the City of Chattanooga.
City of Chattanooga Infrared Bridge Sensors	Install infrared sensors beneath bridge decks at city bridge locations to detect fires beneath bridges and alert emergency responders if fire is detected.
City of Chattanooga Traffic Signal Railroad Preemption Deployment	Install technology at traffic signals located near railroad crossings to allow for traffic signal railroad preemption and warning sign activation.
Hamilton County/City of Chattanooga Railroad Crossing Blockage Notification	Develop railroad crossing blockage detection and notification system to alert city transportation staff when trains are stationary and blocking a railroad crossing. Integrate notification system so that Hamilton County EMS also has access to these alerts.

New ITS Projects – CARTA

Project Name	Project Description
CARTA Downtown Multimodal Center and Route Reconfiguration	Build a centrally located multimodal transit center that houses microtransit and intercity bus services and reconfigure CARTA routes to connect with the transit center.
CARTA Video Analytics Passenger Counting	Deploy sensing technology on CARTA buses that uses video analytics to track passenger boarding, alighting, and individual origin-destination transit passenger trip data.
CARTA Transit Vehicle Freeway Shoulder Riding	Permit CARTA buses to use freeway shoulders along freeway segments that serve CARTA transit routes.
CARTA Electric Vehicle Inductive Charging Pads	Install in-pavement inductive charging pads along bus routes at locations where buses idle at either end of a given route.

Draft Regional ITS Projects Map

View of Project Map

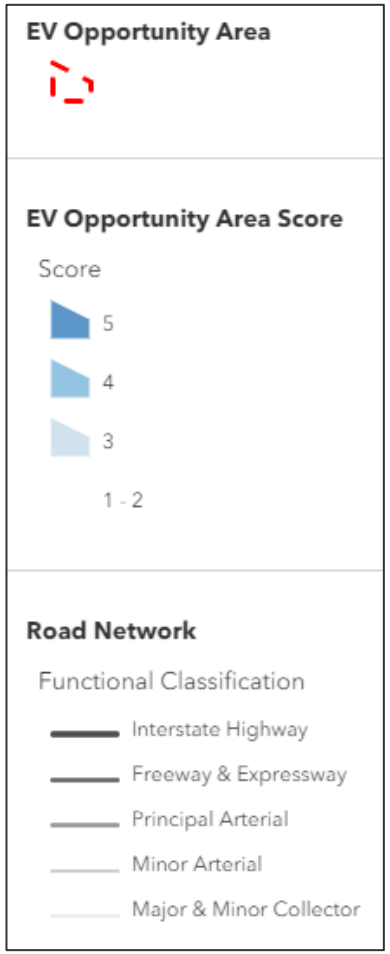
Emerging Focus – Electric Vehicles

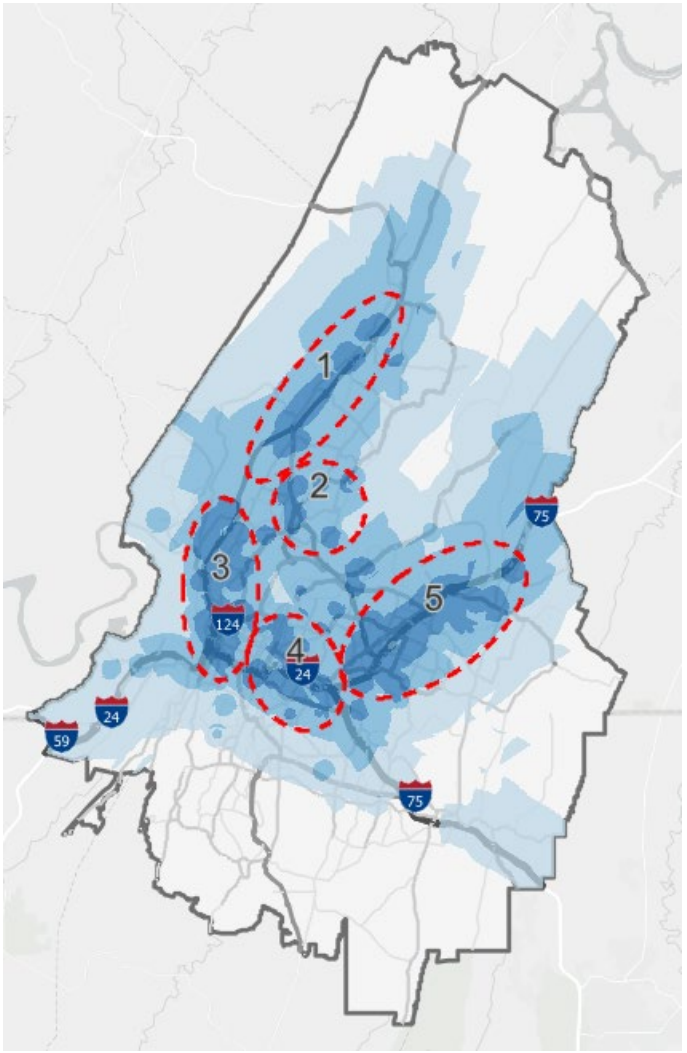
- Regional planning is already underway:

  https://storymaps.arcgis.com/stories/3c796f5ee045466ab751eb165ab4b8db

- How can ITS be used to support EV infrastructure deployment?

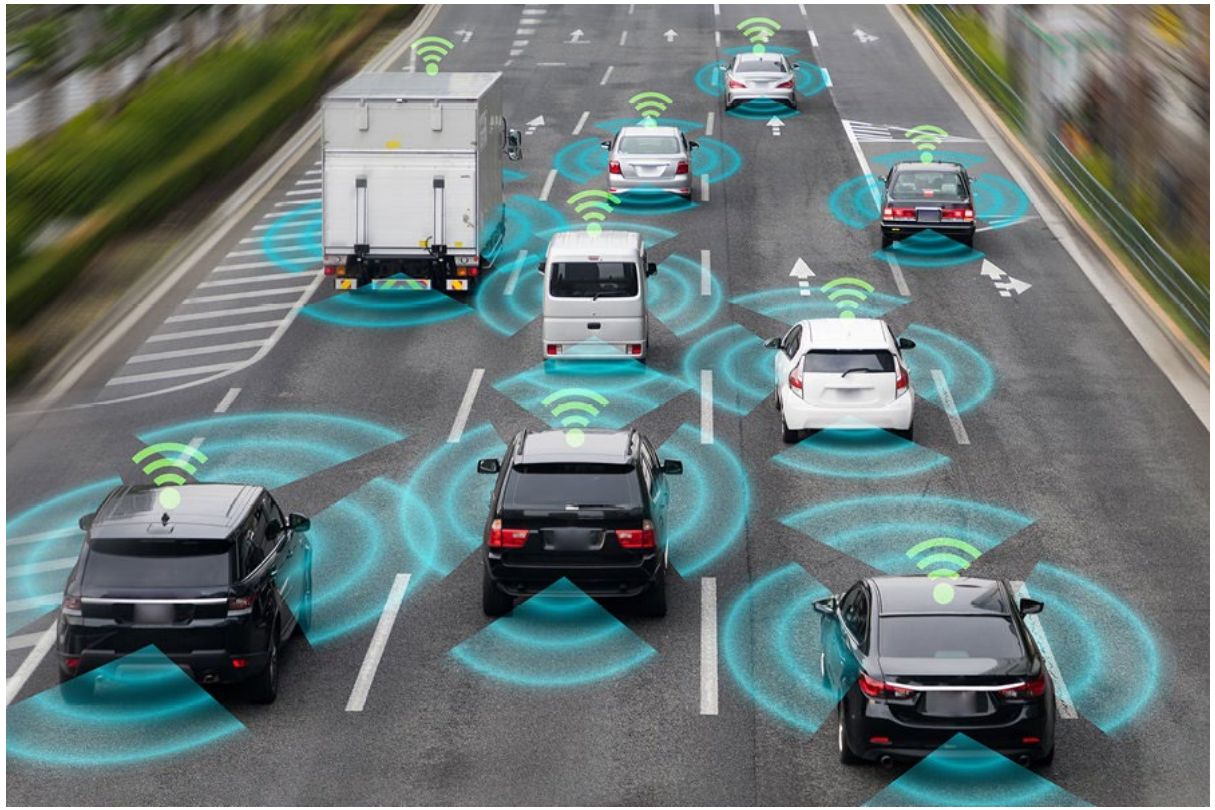
- How well is the region positioned to receive federal or state funding to support deployments?





Emerging Focus – Connected and Autonomous Vehicles

- What is the level of interest from regional stakeholders in planning for these technologies?
- What are existing local or state standards and best practices for planning and integration?



Emerging Focus – Data Security/Privacy

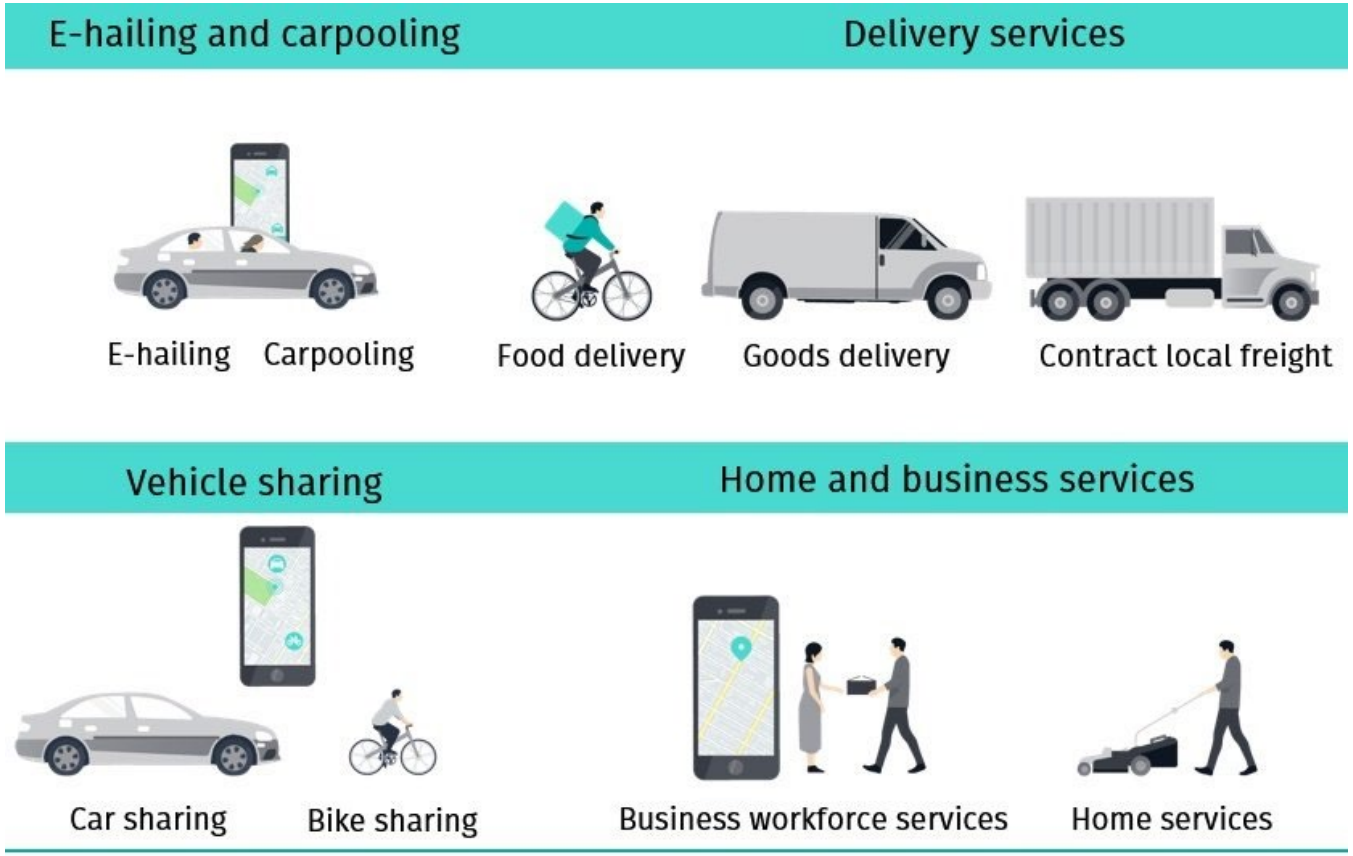
- What existing standards have agencies developed?
- What existing staffing, training, and other support have agencies invested in?
- How are these priorities communicated and standards enforced for private sector partners?

Emerging Focus – System Resiliency

- What redundant systems have been or can be deployed to support system resiliency within individual agencies?
- What interagency agreements or cooperation is required to support transportation network resiliency at a regional level?

Emerging Focus – Mobility-on-Demand

- How can these services be integrated with existing TDM strategies?
- How can these augment transit to help solve first mile/last mile challenges?
- What policy needs to be developed to mitigate potential risks?



Emerging Focus – Vetting Pilot Programs

- What processes do agencies have in place to evaluate and vet pilot deployments of transportation technology?
- What have been success stories or pitfalls from previous pilot deployments?

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

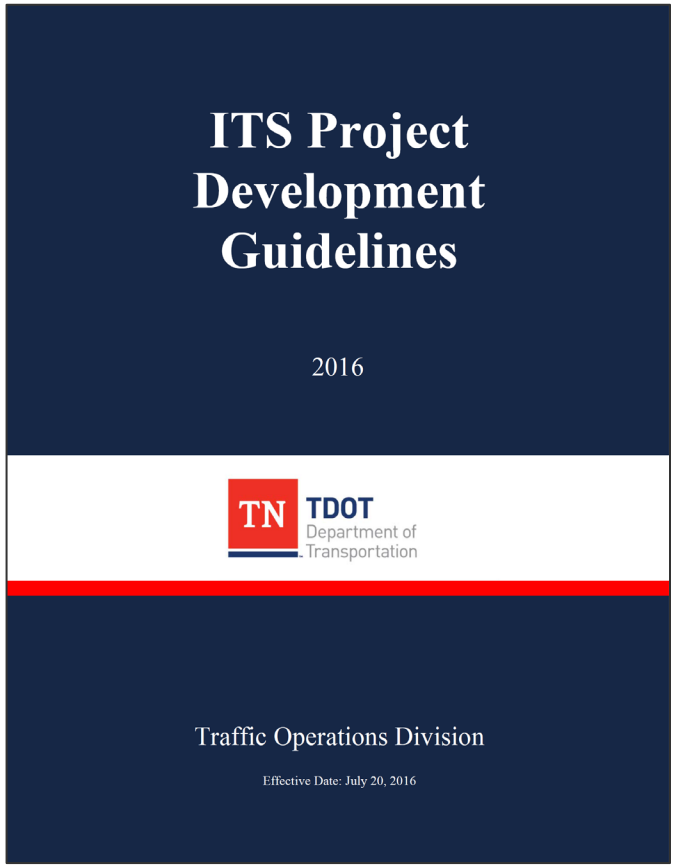
Systems Engineering

Systems engineering focuses on:

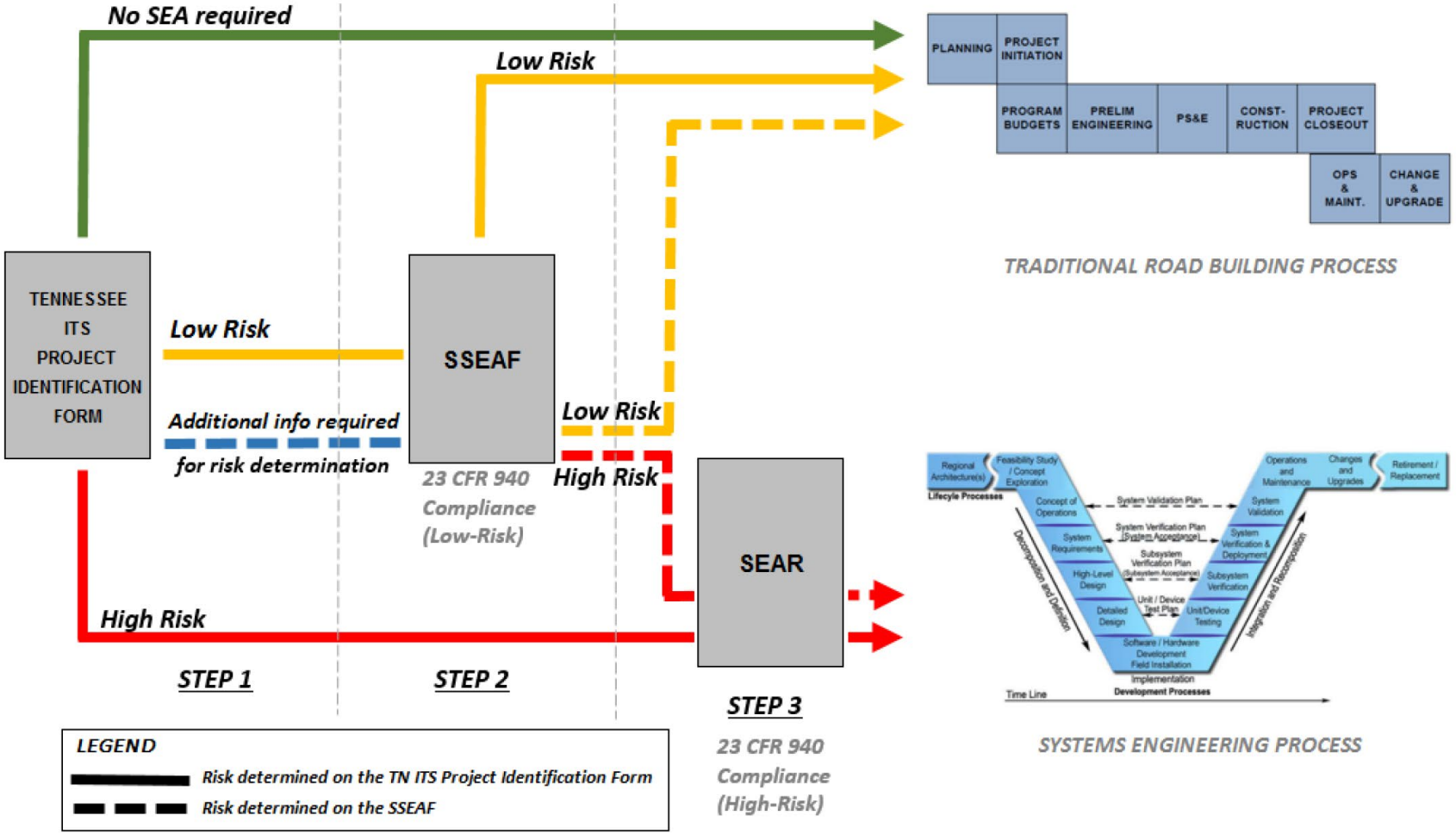
1. Defining customer needs and required functionality early in the project development cycle,
2. Documenting requirements, and then
3. Proceeding with design synthesis and system validation.

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

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



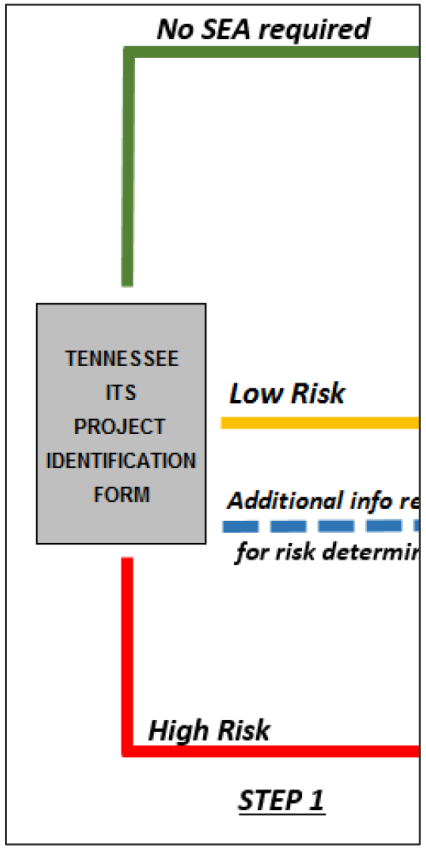
TDOT SEA Decision Process



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:

_____

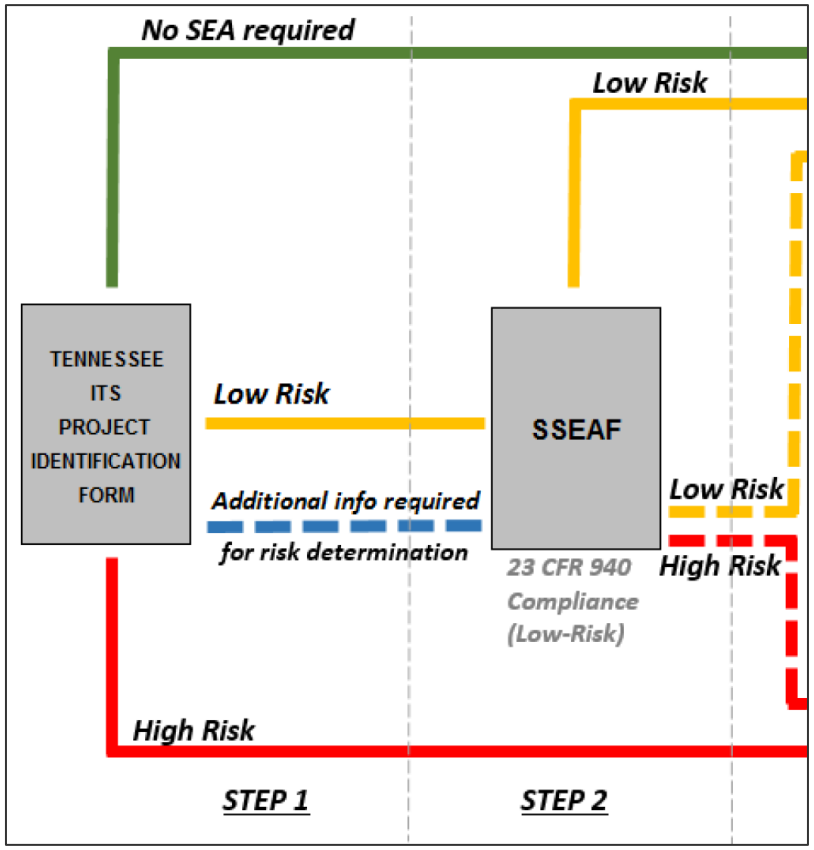
Agency Representative	Signature	Date
MPO/RPO Representative	Signature	Date

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

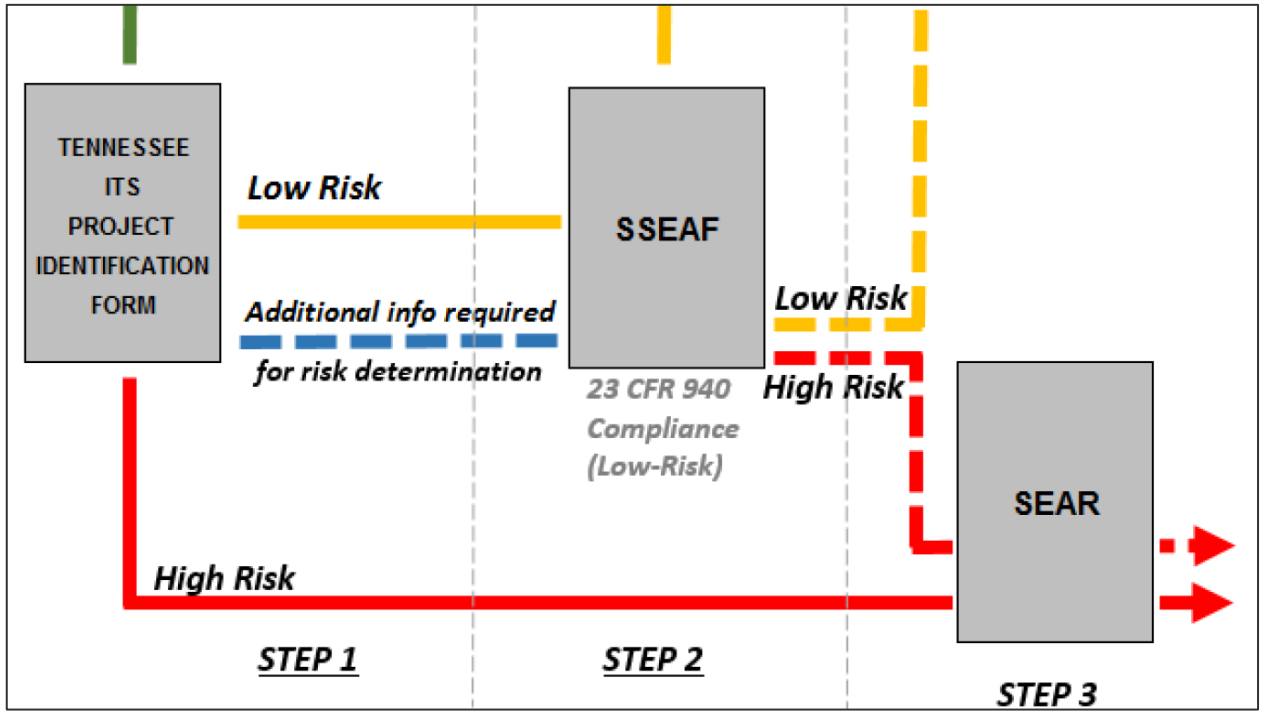


Simplified Systems Engineering Analysis Form (SSEAF)

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)

Regional ITS Architecture Maintenance

Historical maintenance and update schedule

- Major RITSA updates occurred approximately every 4-5 years
- Schedule was tied to the CHCNGA TPO 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 CHCNGA TPO “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 then a specific timeframe

Next Steps and Wrap-Up

Upcoming Project Schedule

Aug - Nov 2021

Develop Draft ITS Service Packages, Recommendations and Project List

→

Oct 2021

Stakeholder Review Workshop

→

Oct – Dec 2021

Develop Draft Regional ITS Architecture and Deployment Plan

↓

Jan - Feb 2022

Present to TPO TCC, TPO Executive Committee, and Public

→

Feb – Mar 2022

FHWA and TDOT: Review and Ready-for-Use Letter

→

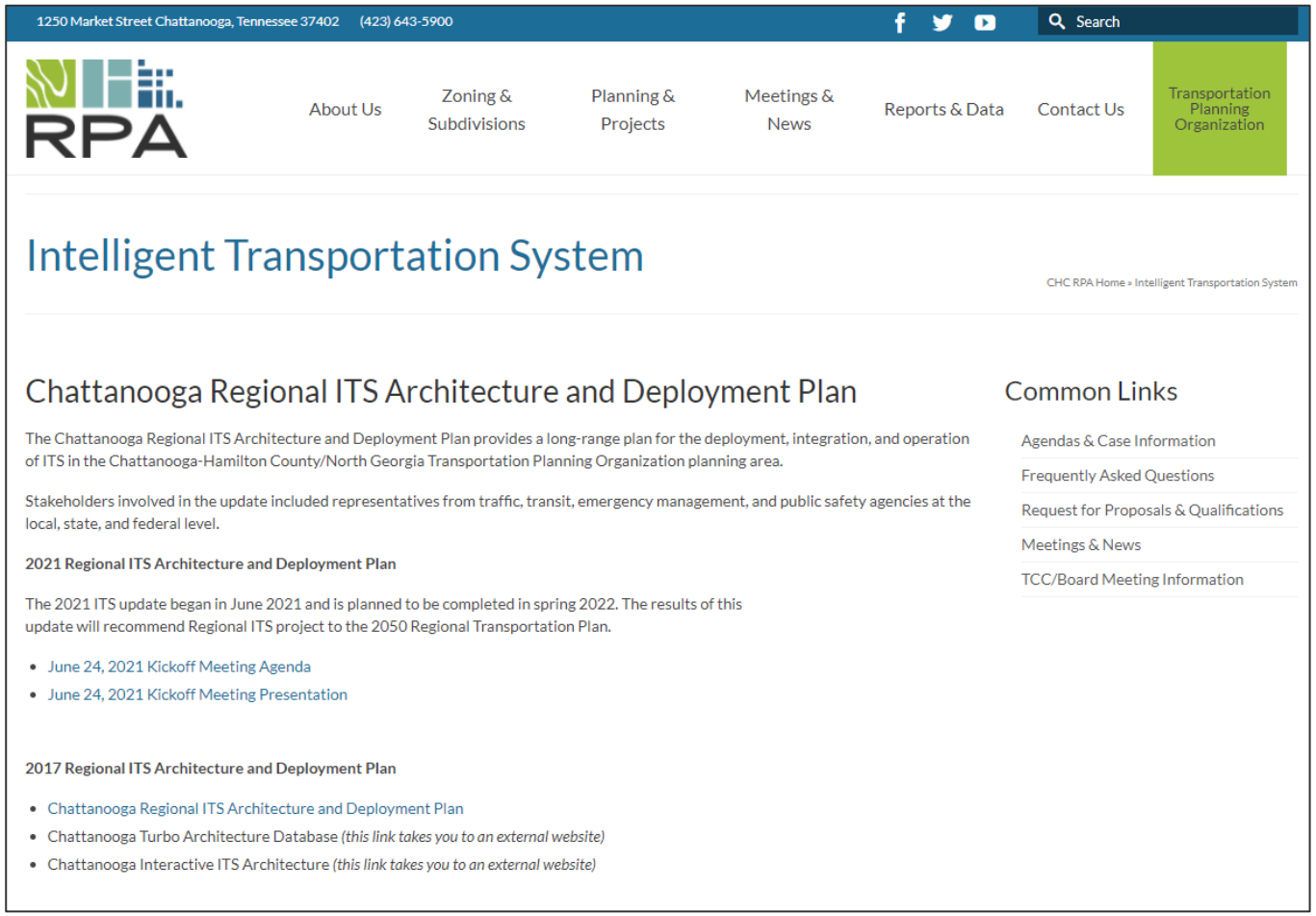
April 2022

Final Regional ITS Architecture and Deployment Plan and Website

Deliverables

- Revised Draft and Final Regional ITS Architecture Update and Deployment Plan Report
- Project Website
- Excel Table of ITS Projects
- GIS Map of ITS Projects
- RAD-IT Architecture Database (Version 9.0)
- Presentations to the TPO Technical Coordinating Committee, TPO Executive Board and Public

Project Website



https://chcrpa.org/intelligent-transportation-system/

Chattanooga Regional ITS Architecture Update

Stakeholder Overview Workshop

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RPA