

KINGSPO RT

Regional Intelligent Transportation System Architecture and Deployment Plan

INTRODUCTION

The Kingsport Regional Intelligent Transportation System (ITS) Architecture provides a long-range plan for the deployment, integration, and operation of ITS in the Kingsport region. The Regional ITS Architecture enables stakeholders to plan for what they want their system to look like in the long term and then break the system into smaller pieces that can be implemented over time as funding permits. Development of a Regional ITS Architecture encourages interoperability and resource sharing among agencies and allows for cohesive long-range planning among regional stakeholders. Completion and update of the plan are also required by the Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) to use federal transportation funds from the highway trust fund for ITS projects in the region.

In the Kingsport region, the first Regional ITS Architecture was developed in 2008. Since that time, several new ITS projects have been implemented, and the National ITS Architecture— which serves as the basis for the Kingsport Regional ITS Architecture—has been updated. To reflect these changes, the Tennessee Department of Transportation (TDOT), in coordination with the Kingsport Metro Transportation Planning Organization (TPO) and Virginia Department of Transportation (VDOT), completed an update of the Regional ITS Architecture in 2017.

WHAT IS ITS?

Intelligent Transportation Systems (ITS) is the application of electronic technologies and communications to improve the operation of the transportation system. Examples include traffic detectors, cameras, dynamic message signs, and real-time information on traffic conditions and bus locations.

KINGSPO RT REGIONAL STAKEHOLDERS

The update of the Kingsport Regional ITS Architecture and Deployment Plan was led by TDOT in coordination with the Kingsport Metro TPO and VDOT. The plan was driven by input from local, state, and federal stakeholders in the Kingsport region. These stakeholders participated in workshops, interviews, and document reviews to update the Regional ITS Architecture. Stakeholder agencies included:

- City of Kingsport, TN
- TDOT Region 1
- First Tennessee Human Resource Agency
- TDOT Long Range Planning Division
- FHWA – Tennessee Division
- TDOT Traffic Operations Division
- Kingsport Area Transit Service
- Tennessee Highway Patrol
- Kingsport Metro TPO
- VDOT



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ITS ARCHITECTURE

Kingsport Regional ITS Architecture Project Approach

The Kingsport Regional ITS Architecture was developed using a consensus approach with input from stakeholder agencies throughout the region. Three key steps were used to develop the plan.

Step 1 – Identify Needs and ITS Inventory

Stakeholder needs as well as existing and planned ITS elements in the region were identified. Elements were categorized as centers, vehicles, travelers, or field devices when developing the Regional ITS Architecture.

Step 2 – Develop ITS Service Packages

ITS service packages represent the services that ITS can provide to address one or more needs in the region. In the Kingsport region, a total of 40 service packages were identified and prioritized as high, medium, or low. Service packages not only identify a service, but also show how that service will be operated and the data flows that will occur between agencies.

Step 3 – Identify Sequence of ITS Projects to Deploy in Region

The ITS Deployment Plan section of the Regional ITS Architecture identifies the projects that stakeholders recommended for deployment in the Kingsport region. These projects will assist the region with implementing the ITS services identified in the ITS service packages.

What is an ITS Architecture?

An ITS architecture is a long-range plan for how to deploy, integrate, and operate ITS in a region.

Kingsport Region ITS Service Packages

ITS service packages outline the functions and services that stakeholders envision ITS will perform now and in the future. Stakeholders selected and prioritized ITS service packages into high, medium, and low priorities based on regional needs, feasibility, likelihood of deployment, and overall contribution of the ITS service package to meeting the goals and vision for ITS functionality in the region. The high priority ITS service packages identified by stakeholders in the Kingsport region are listed below.

Travel and Traffic Management

- ATMS01 - Network Surveillance
- ATMS03 - Traffic Signal Control
- ATMS06 - Traffic Information Dissemination
- ATMS07 - Regional Traffic Management
- ATMS08 - Traffic Incident Management System
- ATMS24 - Dynamic Roadway Warning

Emergency Management

- EM01 - Emergency Call-Taking and Dispatch
- EM02 - Emergency Routing
- EM04 - Roadway Service Patrols
- EM06 - Wide-Area Alert
- EM10 - Disaster Traveler Information

Maintenance and Construction Management

- MC01 - Maintenance, Construction Vehicle and Equipment Tracking
- MC03 - Road Weather Data Collection
- MC04 - Weather Information Processing and Distribution

Public Transportation Management

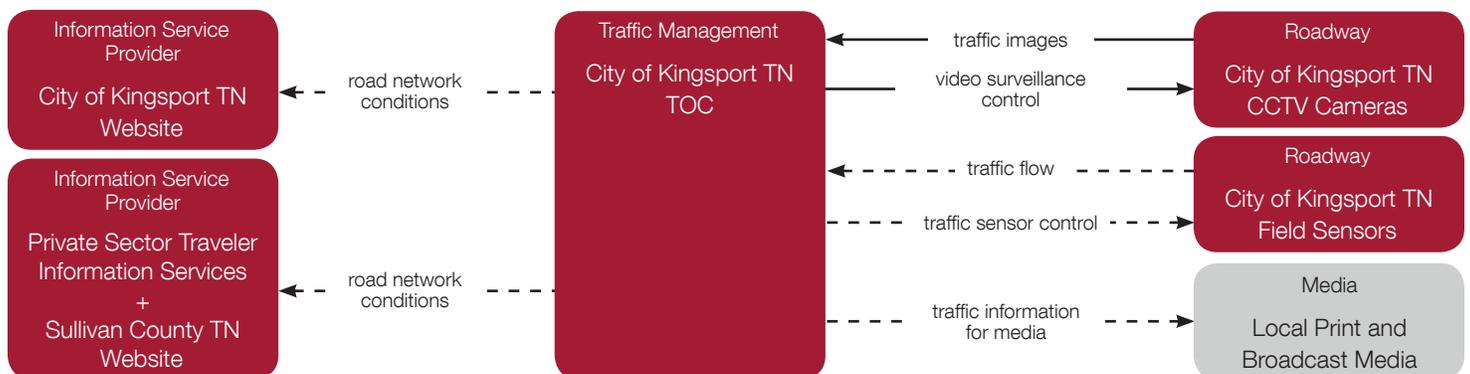
- APTS01 - Transit Vehicle Tracking
- APTS02 - Transit Fixed-Route Operations
- APTS03 - Demand Response Transit Operations
- APTS05 - Transit Security
- APTS08 - Transit Traveler Information

Traveler Information

- ATIS01 - Broadcast Traveler Information
- ATIS02 - Interactive Traveler Information

Example Service Package

ATMS01 – City of Kingsport TN Network Surveillance



KINGSPORT REGION RECOMMENDED ITS PROJECTS

A list of recommended ITS projects for the Kingsport region was developed through input from stakeholders during the Regional ITS Architecture development process. Stakeholders grouped projects into timeframes for deployment based on priority, dependence on other projects, technology, and feasibility. Below is a summary of projects recommended for deployment by stakeholder agencies in the region. A complete listing of all the projects identified is found in the ITS Deployment Plan section of the Regional ITS Architecture.

TDOT and VDOT

- TDOT/VDOT Combined Regional Traffic Management Center (TMC)

TDOT

- TDOT HELP Vehicle Service Area Expansion
- TDOT SmartWay Closed-Circuit Television (CCTV) Cameras and Dynamic Message Sign (DMS) Installation on I-26
- TDOT SmartView Access for Local Governments to View CCTV Cameras

VDOT

- VDOT DMS Installation on US 23 and SR 224
- VDOT Highway Advisory Radio (HAR) Installation
- VDOT CCTV Cameras Installation
- VDOT Snow Plow Automated Vehicle Location (AVL)

What is an ITS Deployment Plan?

An ITS Deployment Plan identifies the projects that need to be implemented to meet ITS needs and deliver the ITS services identified in the Regional ITS Architecture.

City of Kingsport TN Projects

- City of Kingsport TN Traffic Operations Center (TOC) Upgrades
- City of Kingsport TN Signal System Communications Expansion
- City of Kingsport TN Ramp Queue Detection and Signal Preemption
- City of Kingsport TN Speed Monitoring System
- City of Kingsport TN CCTV Cameras Expansion
- City of Kingsport TN TOC Coordination with TDOT Region 1 TMC – Knoxville and VDOT TOC – Salem
- City of Kingsport TN DMS
- City of Kingsport TN TOC Coordination with Kingsport TN 911
- City of Kingsport TN Public Works Department Vehicle AVL System

Kingsport Area Transit Service Projects

- Kingsport Area Transit Service AVL
- Kingsport Area Transit Comprehensive Transit Facility
- Kingsport Area Transit Service Real-Time Bus Arrival Information
- Kingsport Area Transit Service Automatic Passenger Counters
- Kingsport Area Transit Service Signal Priority

NET Trans (Northeast Tennessee Rural Public Transit) Projects

- NET Trans Vehicle Fleet Maintenance
- NET Trans Website Update
- NET Trans Regional Route Planning

MEOC Projects

- MEOC Transit AVL and Mobile Data Terminals (MDT)
- MEOC Transit On-Board Security Monitoring

Other Projects

- Kingsport Metro TPO Archive Data Warehouse
- Kingsport Regional Roadway Service Patrol
- School Bus AVL



Traffic Operations Center



Traffic Signal Coordination



Dynamic Message Sign



Dynamic Roadway Warning



CCTV Cameras



Highway Advisory Radio

KINGSPO RT USE AND MAINTENANCE PLAN

Use and maintenance of the Regional ITS Architecture and Deployment Plan will be important to ensure that requirements are met for the use of federal transportation funding on ITS in the Kingsport region. Stakeholders in the region developed the following guidelines to address use and maintenance of the plan.

ITS Architecture Use

As ITS projects are developed, they will be compared to the applicable ITS service packages in the Regional ITS Architecture to ensure those projects are eligible for federal transportation funding. Any discrepancies between the planned project and the Regional ITS Architecture will be resolved either by modifying the project or the ITS service packages. Changes to the ITS service packages will be documented on an Architecture Maintenance Documentation Form. All maintenance forms will be retained by the Kingsport Metro TPO until the next plan update.

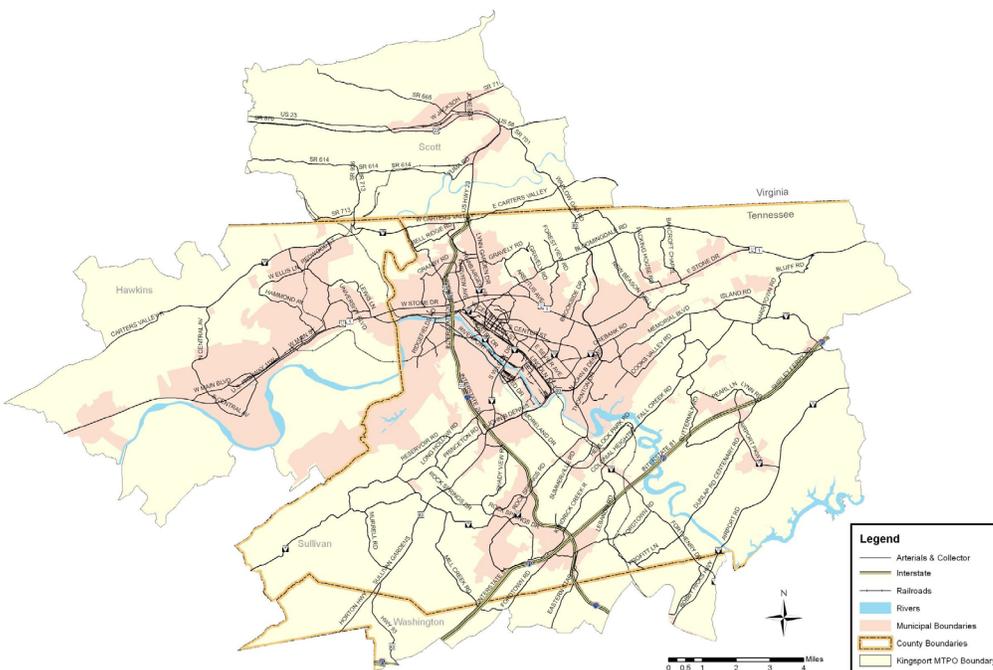
ITS Architecture Maintenance

The stakeholders agreed that a review of the Regional ITS Architecture should occur approximately every 4 years in the year preceding the Long Range Transportation Plan (LRTP) update to determine if a full update of the Regional ITS Architecture is necessary. The LRTP is updated every 5 years if the Kingsport region is designated in attainment; however, the update occurs every 4 years if the region is designated non-attainment. The need for an update will depend on the level of ITS implemented in the region since the previous update as well as changes that may have occurred in the National ITS Architecture. An updated Regional ITS Architecture will also make it easier for the stakeholders to show conformance to the Regional ITS Architecture, which is required when deploying ITS projects using federal transportation funds from the highway trust fund.

KINGSPO RT GEOGRAPHIC BOUNDARIES

The Kingsport Region comprises of western Sullivan County, TN; the northeastern portion of Hawkins County, TN; extreme north portions of Washington County, TN; and south central Scott County, VA. These boundaries correspond with the boundaries of the Kingsport Metro TPO.

Kingsport Regional ITS Architecture Boundaries



PROJECT CONTACTS



Joe Roach
joseph.roach@tn.gov

Said El Said
said.elsaid@tn.gov



Troy Ebbert
troyebbert@kingsporttn.gov



Terrance Hill
terrance.hill@kimley-horn.com

Thomas Fowler
thomas.fowler@kimley-horn.com