

BRISTOL

Regional Intelligent Transportation System Architecture and Deployment Plan

INTRODUCTION

The Bristol Regional Intelligent Transportation System (ITS) Architecture provides a long-range plan for the deployment, integration, and operation of ITS in the Bristol 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 Bristol 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 Bristol regional ITS Architecture—has been updated. To reflect these changes, the Tennessee Department of Transportation (TDOT), in coordination with the Bristol Metropolitan Planning Organization (MPO) 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.

BRISTOL REGIONAL STAKEHOLDERS

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

- Bristol MPO
- City of Bristol, TN
- City of Bristol, VA
- First Tennessee Human Resource Agency
- FHWA – Tennessee Division
- TDOT Region 1
- TDOT Long Range Planning Division
- TDOT Traffic Operations Division
- Town of Abingdon, VA
- VDOT

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ITS ARCHITECTURE

Bristol Regional ITS Architecture Project Approach

The Bristol 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 Bristol region, a total of 39 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 Bristol region. These projects will assist the region with implementing the ITS services identified in the ITS service packages.

Bristol 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 Bristol 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

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

- MC03 - Road Weather Data Collection
- MC04 - Weather Information Processing and Distribution
- MC08 - Work Zone Management
- MC10 - Maintenance and Construction Activity Coordination

Public Transportation Management

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

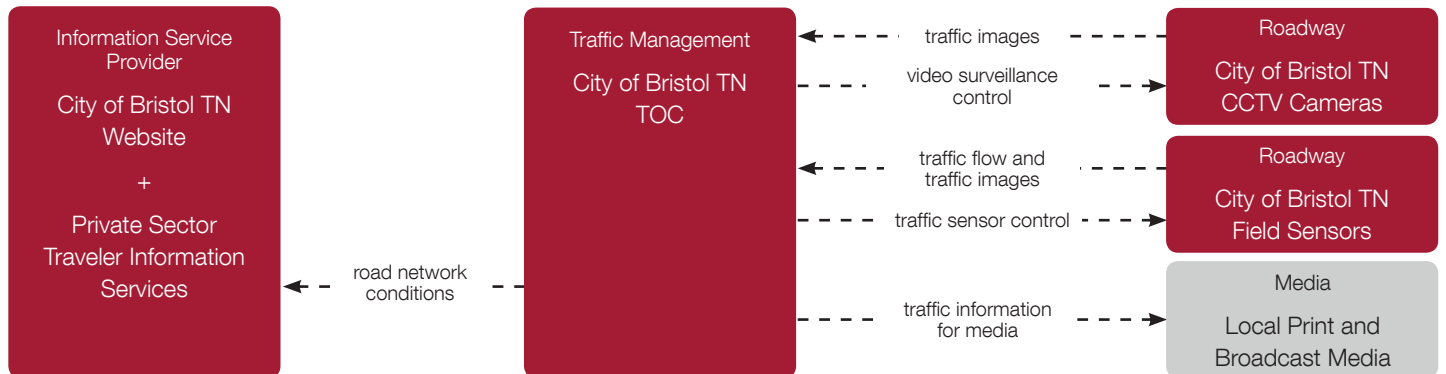
Traveler Information

- ATIS01 - Broadcast Traveler Information
- ATIS08 - Interactive Traveler Information

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

Example Service Package

ATMS01 – City of Bristol TN Network Surveillance



BRISTOL REGION RECOMMENDED ITS PROJECTS

A list of recommended ITS projects for the Bristol 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 Closed-Circuit Television (CCTV) Camera Expansion
- TDOT SmartView Access for Local Governments to View CCTV Cameras
- TDOT Dynamic Message Sign (DMS) Deployment

VDOT

- VDOT Bristol District Office Satellite Traffic Operations Center (TOC)
- VDOT CCTV Camera Expansion on I-81
- VDOT Safety Service Patrol (SSP) Service Area Expansion
- VDOT Ramp Queue Vehicle Detection Deployment
- VDOT Snow Plow Automated Vehicle Location (AVL)

City of Bristol TN Projects

- City of Bristol TN Centrally Controlled Signal System
- City of Bristol TN Traffic TOC
- City of Bristol TN Signal System Upgrades
- City of Bristol TN Railroad Grade Crossing Improvements
- City of Bristol TN CCTV Cameras

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 Bristol VA Projects

- City of Bristol VA Centrally Controlled Signal System
- City of Bristol VA TOC
- City of Bristol VA Signal System Upgrades
- City of Bristol VA TOC Coordination with VDOT Bristol District

Town of Abingdon VA Projects

- Town of Abingdon VA TOC
- Town of Abingdon VA Centrally Controlled Signal System
- Town of Abingdon VA CCTV Cameras

Bristol Tennessee Transit (BTT) Projects

- BTT AVL, Mobile Data Terminals (MDT), and Mayday Alarms
- BTT On-Board Security Monitoring
- BTT Automatic Passenger Counters

Bristol Virginia (BVT) Transit Projects

- BVT AVL, MDTs, and Mayday Alarms
- BVT On-Board Security Monitoring
- BVT Automatic Passenger Counters

NET Trans (Northeast Tennessee Rural Public Transit)

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



Freeway Service Patrol



CCTV Cameras



Dynamic Message Sign



Traffic Signal Coordination



Highway Advisory Radio



Real-Time Transit Information

BRISTOL 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 Bristol 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 Bristol MPO until the next plan update.

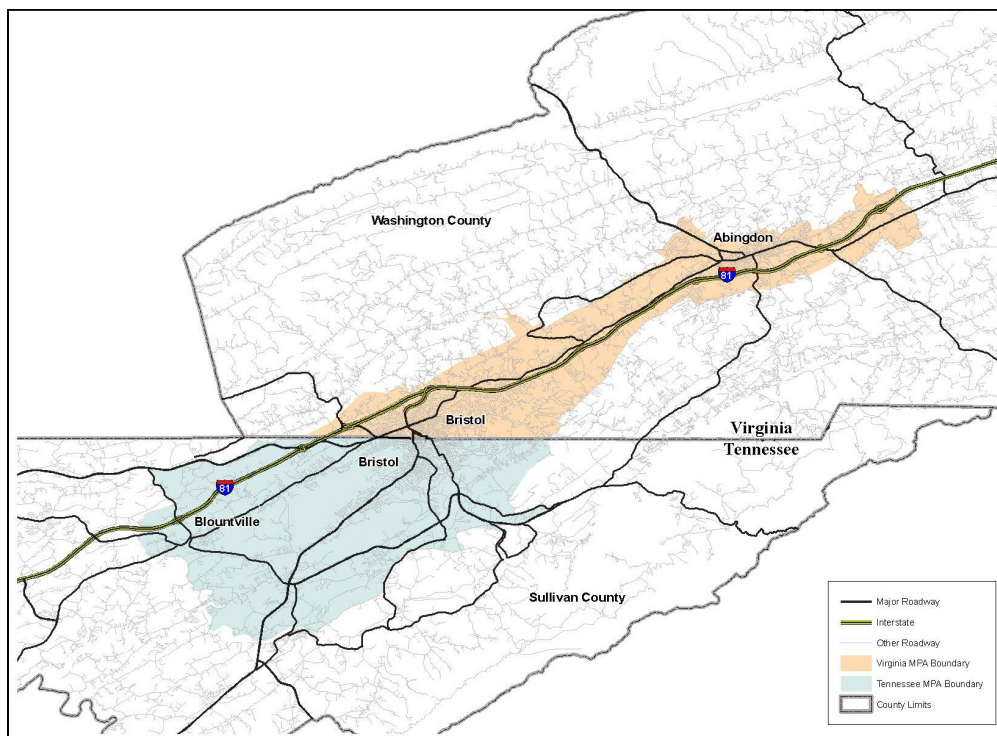
ITS Architecture Maintenance

The stakeholder group agreed that the Regional ITS Architecture should be reviewed on the same cycle as the Long-Range Transportation Plan (LRTP) update, to determine if a full update is necessary. The LRTP is updated every 5 years if the Bristol 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.

BRISTOL GEOGRAPHIC BOUNDARIES

The Bristol region comprises of eastern Sullivan County, TN; central Washington County, VA; and the City of Bristol, VA. Additionally, the City of Bristol, TN and the Town of Abingdon, VA are located within these boundaries. These boundaries correspond with the boundaries of the Bristol Metropolitan Planning Organization.

Bristol Regional ITS Architecture Boundaries



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