

Johnson City Regional ITS Architecture and Deployment Plan

Executive Summary

March 2015

Introduction

The Johnson City Regional Intelligent Transportation System (ITS) Architecture provides a long-range plan for the deployment, integration, and operation of ITS in the Johnson City Region. The Regional ITS Architecture allows 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 an 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 is also required by the Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) in order to use federal transportation funds for ITS projects in the Region.

In the Johnson City Region, the first Regional ITS Architecture was developed in 2006. Since that time, several new ITS projects have been implemented and the National ITS Architecture, which serves as the basis for the Johnson City Regional ITS Architecture, has been updated. In order to reflect these changes, the Tennessee Department of Transportation (TDOT) in coordination with the Johnson City Metropolitan Transportation Planning Organization (MTPO), completed an update of the Regional ITS Architecture in 2015.

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Johnson City Regional Stakeholders

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

- Carter County/City of Elizabethton Emergency Management
- City of Elizabethton
- City of Johnson City
- FHWA – Tennessee Division
- First Tennessee Human Resource Agency
- Johnson City Transit System
- TDOT Region 1
- TDOT Long Range Planning Division
- TDOT Traffic Operations Division

What is ITS?

Intelligent Transportation Systems (ITS) are 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.



ITS Architecture

Johnson City Regional ITS Architecture Project Approach

The Johnson City 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 Johnson City 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 the Region

The ITS Deployment Plan section of the Regional ITS Architecture identifies the projects that stakeholders recommended for deployment in the Johnson City 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.

Johnson City 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 Johnson City Region are listed below.

Traffic Management

- Network Surveillance
- Traffic Probe Surveillance
- Traffic Signal Control
- Traffic Metering
- Traffic Information Dissemination
- Traffic Incident Management System
- Mixed Use Warning Systems

Emergency Management

- Emergency Call-Taking and Dispatch
- Emergency Routing
- Wide-Area Alert
- Disaster Traveler Information

Maintenance and Construction Management

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

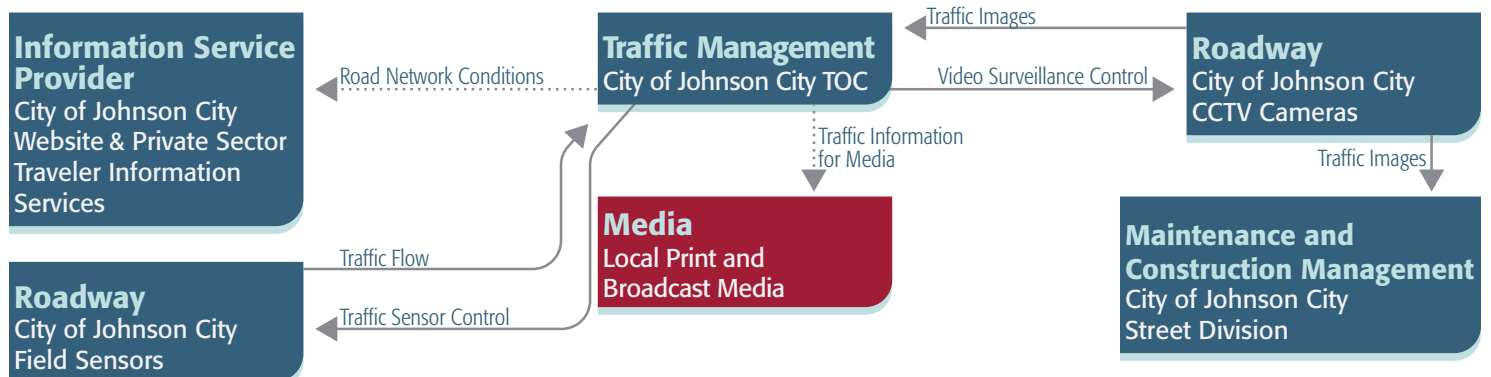
Public Transportation Management

- Transit Vehicle Tracking
- Transit Fixed-Route Operations
- Demand Response Transit Operations
- Transit Security

Traveler Information

- Broadcast Traveler Information
- Interactive Traveler Information

Example Service Package ATMS01 City of Johnson City Network Surveillance



Johnson City Region Recommended ITS Projects

A list of recommended ITS projects for the Johnson City 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

Tennessee Department of Transportation

- Improve Coordination between the TDOT Region 4 Transportation Management Center (TMC) and the Johnson City Traffic Operations Center (TOC)
- TDOT SmartWay Installation on I-26
- TDOT SmartWay ITS Expansion on I-81
- TDOT SmartView Implementation for Municipalities to View TDOT Closed Circuit Television (CCTV) Cameras

Municipal/County Projects

- Johnson City Adaptive Traffic Signals Control Implementation
- Johnson City CCCTV Camera Deployment
- Johnson City Dynamic Message Signs (DMS) Deployment
- Johnson City Flood Detection and Warning System Deployment
- Johnson City Speed Monitoring Deployment
- Johnson City Fiber Optic Communications Expansion
- Johnson City Maintenance Vehicle Automatic Vehicle Location (AVL)
- Johnson City Road Weather Information Systems (RWIS) Deployment
- City of Elizabethton TOC Implementation

What is an ITS Deployment Plan?

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



Traffic Signal Coordination



CCTV Cameras

Johnson City Transit System

- JCT Mobile Phone Real-Time Information Application Development
- JCT Paratransit Scheduling Implementation
- JCT Smart Card Payment System Implementation
- JCT Regional Transit Coordination
- JCT Northern Transfer Center Implementation

Other Projects

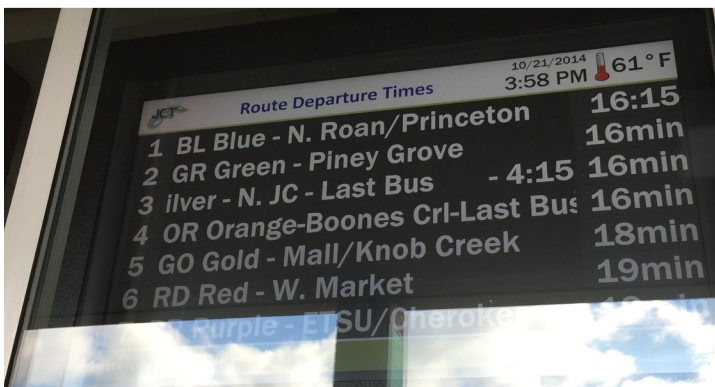
- Johnson City MTPo Data Warehouse Implementation



Traffic Operations Center



Highway Advisory Radio



Real-Time Transit Information



Dynamic Message Signs

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Johnson City Use and Maintenance Plan

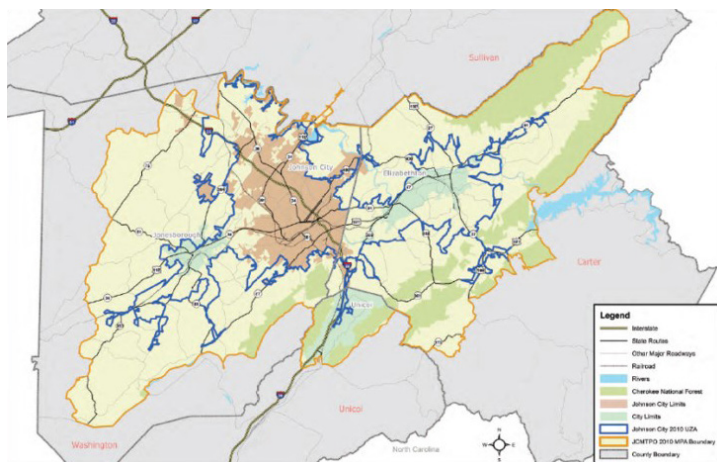
Use and maintenance of the Regional ITS Architecture and Deployment Plan will be important to ensure that requirements are met for the use of federal transportation funding of ITS in the Johnson City Region. Stakeholders in the Region developed the following guidelines to address use and maintenance 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 change forms will be retained by the Johnson City MTPO until the next plan update.

Johnson City Geographic Boundaries

The Johnson City Region is comprised of the majority of Washington County, the northern and western portions of Carter County, a northern portion of Unicoi County, and a southern portion of Sullivan County. Other municipalities within the region include the Town of Jonesborough, City of Watauga, City of Elizabethton, and Town of Unicoi. These boundaries correspond with the boundaries of the Johnson City Metropolitan Transportation Planning Organization.



Johnson City Regional ITS Architecture Boundaries

ITS Architecture Maintenance

The stakeholder group agreed that the Regional ITS Architecture should be reviewed approximately every four years, ideally in the year preceding the Long-Range Transportation Plan (LRTP) update, to determine if a full update is necessary. By completing a full update in the year prior to the LRTP update, stakeholders will be able to determine the ITS needs and projects that are most important to the Region and document those needs and projects for consideration when developing the LRTP. 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.

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