Introduction

The Regional Intelligent Transportation System (ITS) Architecture provides a long-range plan for the deployment, integration, and operation of ITS in the Memphis Urban Area. 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 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 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 Memphis Urban Area, the first regional ITS architecture was developed in 2002. Since that time a number of new ITS projects have been implemented and the National ITS Architecture, which served as the basis for the Memphis Urban Area Regional ITS Architecture, has been updated. In order to reflect these changes, the Memphis Urban Area Metropolitan Planning Organization (MPO) completed an update of the Regional ITS Architecture in 2010 and again in 2014.

Memphis Urban Area Regional Stakeholders

The update of the Memphis Urban Area Regional ITS Architecture and Deployment Plan was led by the Memphis Urban Area MPO in coordination with the Tennessee Department of Transportation (TDOT). The plan was driven by input from local, state, and federal stakeholders in the Memphis Urban Area. They participated in workshops and interviews conducted in 2014 to update the Regional ITS Architecture and Deployment Plan.

What is ITS?

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

Stakeholder Agencies Included:

- Arkansas Highway Patrol
- Arkansas State Highway and Transportation Department
- City of Bartlett
- City of Gallaway
- City of Germantown
- City of Hernando
- City of Marion
- City of Memphis
- City of Millington
- City of Olive Branch
- City of Piperton
- City of Southaven
- City of West Memphis
- DeSoto County
- Fayette County
- FHWA – Arkansas Division
- FHWA – Tennessee Division
- Marshall County
- Memphis Area Transit
- Memphis Urban Area MPO
- Mississippi Department of Transportation (MDOT)
- North Delta Planning and Development District
- Shelby County
- TDOT Region 4
- TDOT Long Range Planning Division
- TDOT Traffic Operations Division
- Town of Collierville
- West Memphis MPO

Memphis MPO
METROPOLITAN PLANNING ORGANIZATION

Strengthening Regional Transportation

Kimley»Horn

Memphis Urban Area Regional ITS Architecture Project Approach

The Memphis Urban Area 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.
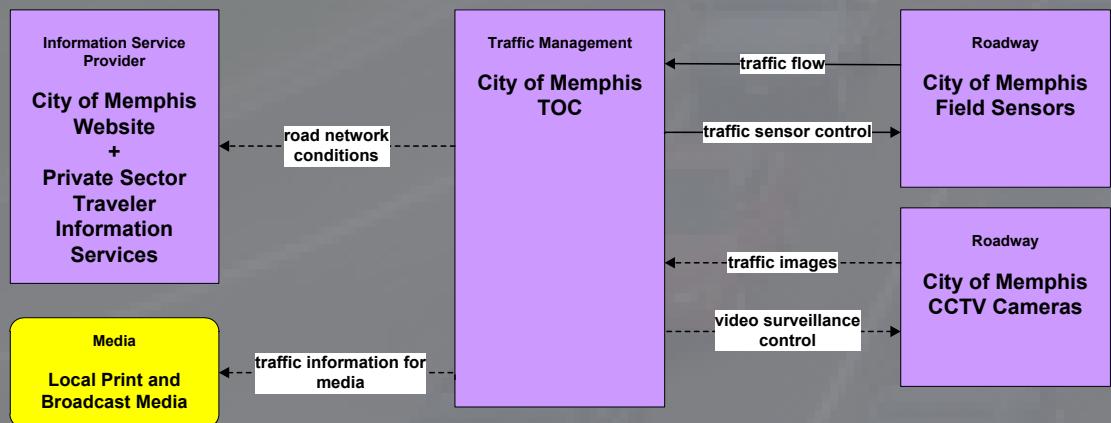
Step 2 – Develop ITS Service Packages

ITS service packages represent the services that ITS can provide to address one or more needs in the Region. In the Memphis Urban Area, a total of 50 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 identifies the projects that stakeholders recommended for deployment in order to implement 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.

Example Service Package — ATMS01 – City of Memphis Network Surveillance

Information Service Provider
City of Memphis Website + Private Sector Traveler Information Services

Traffic Management
City of Memphis TOC

Roadway
City of Memphis Field Sensors

Roadway
City of Memphis CCTV Cameras

Media
Local Print and Broadcast Media

- road network conditions
- traffic flow
- traffic sensor control
- traffic images
- video surveillance control
- traffic information for media

Memphis Urban Area ITS Service Packages

ITS service packages outline the functions and services that stakeholder envision ITS to 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 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 Memphis Urban Area are listed below.

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

Emergency Management
- Emergency Call-Taking and Dispatch
- Emergency Routing
- Roadway Service Patrols
- Transportation Infrastructure Protection

Maintenance and Construction Management
- Maintenance and Construction Activity Coordination
- Infrastructure Monitoring

Public Transportation Management
- Transit Vehicle Tracking
- Transit Fixed-Route Operations
- Demand Response Transit Operations
- Transit Fare Collection Management
- Transit Security
- Transit Fleet Management
- Transit Traveler Information

- Transit Signal Priority
- Transit Passenger Counting

Traveler Information
- Broadcast Traveler Information
- Interactive Traveler Information

Commercial Vehicle Operations
- Weigh-in-Motion

ITS Deployment Plan

Memphis Urban Area Recommended ITS Projects

A list of recommended ITS projects for the Memphis Urban Area was developed through input from stakeholders during the 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 the short-term projects recommended for deployment by stakeholder agencies in the Region. Short-term projects are projects that stakeholders would like to implement within the next five years. A complete listing of all the projects identified is found in the Regional ITS Deployment Plan section of the Regional ITS Architecture.

Memphis Area Transit Authority
- Mobile Phone Application
- Transit Signal Priority
- Electronic Fare Payment Card

Mississippi Department of Transportation
- MDOT CMAQ Projects (Includes Closed Circuit Television (CCTV) Cameras, Dynamic Message Signs (DMS), and Traffic Signal Coordination)
- MDOT DMS Installation on I-55

Municipal/County Projects
- Traffic Operations Center (TOC) Implementation
- TOC Coordination with TDOT Region 4 SmartWay Traffic Management Center (TMC)
- TOC Coordination with Municipal/County Public Safety Dispatch
- CCTV Camera Implementation
- Traffic Signal System Implementation and Upgrades
- Fire and EMS Vehicle Traffic Signal Preemption

Tennessee Department of Transportation Projects
- SmartWay ITS SR 385 Extension
- SmartWay Full Motion Video Feeds for Website and App
- SmartWay TMC Coordination with Shelby County Office of Preparedness
- SmartWay TMC Coordination with MDOT Northwest Regional TMC
- SmartWay ITS I-40 and I-55 Fiber Connection to Arkansas
- HELP Service Patrol Expansion
- Smart Work Zone Equipment
- Statewide Information for Travelers (SWIFT) Modification for Municipal Traffic Information Input

> ### 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.

CCTV Cameras

Emergency Vehicle Traffic Signal Preemption

Dynamic Messaging Signs

Traffic Signal Coordination

Freeway Safety Patrol

Transit Vehicle Tracking and Real-Time Information

Regional Routes of Significance

The need for Regional Real-time System Management Information was identified for the Interstates and several routes of significance in the region. Real-time System Management Information meets the requirements of the FHWA Real-time System Management Program (Part 522 of Title 23 Code of Federal Regulations).

Memphis 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 Memphis Urban Area. Stakeholders in the Region developed the following guidelines to address use and maintenance of the plan.
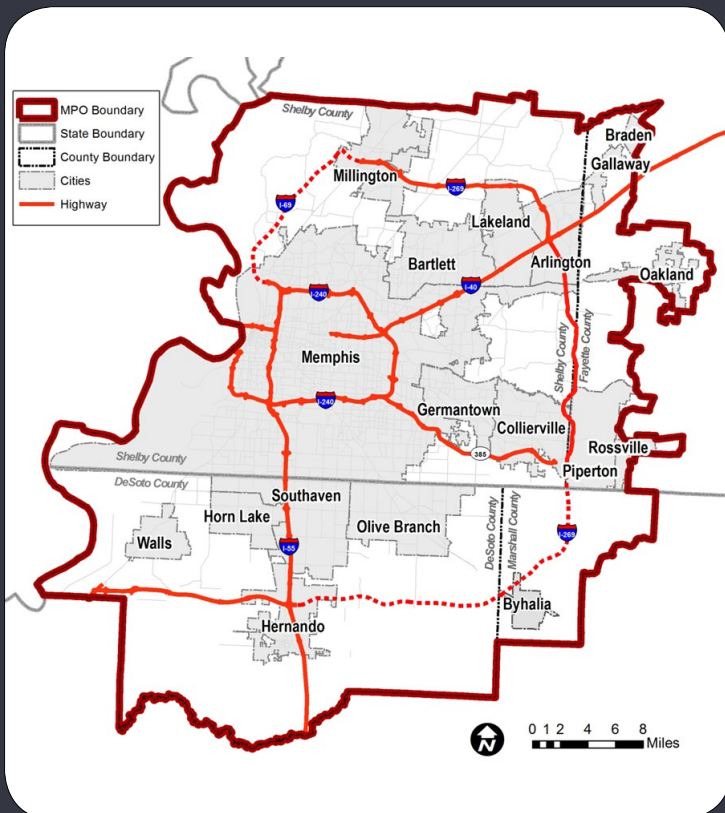
ITS Architecture Use

To ensure eligibility for the use of federal transportation funding of regional ITS projects, as projects are developed they will be compared to the applicable ITS service packages in the Regional ITS Architecture. Any discrepancies between the planned project and the 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 Memphis Urban Area MPO until the next plan update.

ITS Architecture Maintenance

The stakeholder group agreed that the Regional ITS Architecture should be updated approximately every four years, ideally in the year preceding the Long-Range Transportation Plan (LRTP) update. 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.

Memphis Urban Area Geographic Boundaries

The geographic boundaries were defined for the Memphis Urban Area Regional ITS Architecture using the boundaries of the Memphis Urban Area MPO. The MPO includes all of Shelby County and the western portion of Fayette County in Tennessee as well as De Soto County and the northwest portion of Marshall County in Mississippi. In addition, the TDOT SmartWay ITS deployments on I-40 and I-55 in Arkansas are also considered part of the Memphis Urban Area Regional ITS Architecture boundaries.

Memphis Urban Area Regional ITS Architecture Boundaries

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