MEMPHIS URBAN AREA
REGIONAL ITS ARCHITECTURE AND DEPLOYMENT PLAN

Introduction

Development of a regional intelligent transportation system (ITS) architecture and deployment plan is an important step in the planning and implementation of ITS in a region. The ITS architecture and deployment plan 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 ITS architecture and deployment plan encourages interoperability and resource sharing among agencies and allows for cohesive long-range planning among regional stakeholders.

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 serves 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), in coordination with the Tennessee Department of Transportation (TDOT), began an update of the Regional ITS Architecture in 2009. In addition to the planning benefits of developing a regional ITS architecture, project conformance to the regional ITS architecture is also a requirement for any agency in the Region to be eligible for federal funding of an ITS project.

What is ITS?
Intelligent Transportation Systems (ITS) are the application of electronic technologies and communications to improve the operation of roadway and transit systems.

Memphis Urban Area Regional Stakeholders

The development of the Memphis Urban Area Regional ITS Architecture and Deployment Plan was led by the Memphis Urban Area MPO in coordination with TDOT. The success of the plan is due in large part to the collaboration and continuous participation of the stakeholders representing the Memphis Urban Area Region. These stakeholders participated in a series of four workshops conducted in 2009 and 2010 to develop the Regional ITS Architecture and Deployment Plan.

Stakeholder agencies included:
- Arkansas Highway Patrol
- Arkansas State Highway and Transportation Department
- City of Bartlett
- City of Germantown
- City of Horn Lake
- City of Memphis
- City of Millington
- Federal Highway Administration – Arkansas Division
- Federal Highway Administration – Tennessee Division
- Memphis Area Regional Planning Organization
- Memphis Area Transit
- Memphis Urban Area MPO
- Mississippi Department of Transportation
- Shelby County Office of Preparedness
- TDOT – Long Range Planning Division
- TDOT – Region 4
- Tennessee Highway Patrol
- Town of Collierville
- West Memphis MPO

MEMPHIS URBAN AREA MPO — TDOT Go.

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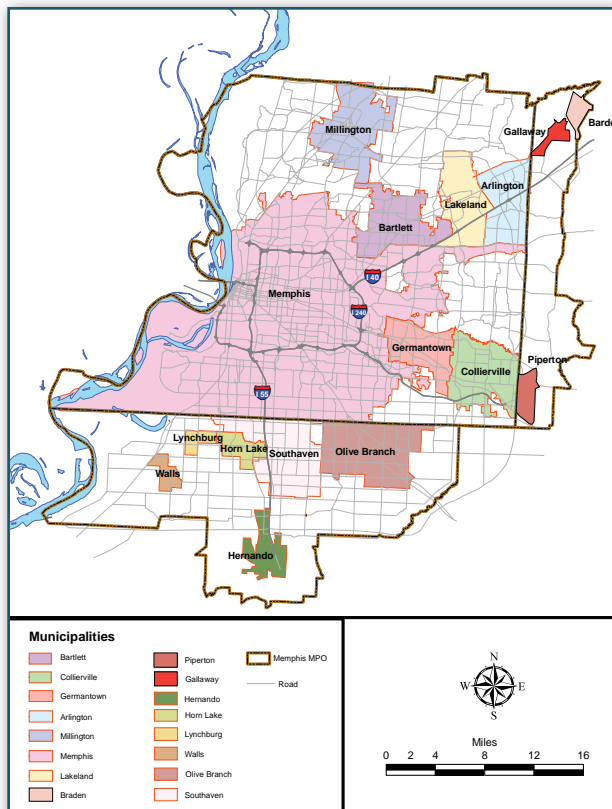

Memphis Use and Maintenance Plan

Use and maintenance of the Regional ITS Architecture and Deployment Plan will be important to preserve the plan's role as a guide for the implementation of ITS in the Memphis Urban Area. Stakeholders in the Region developed the following guidelines to address use of the plan for project deployments, and maintenance of the plan to reflect changing needs and priorities.

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 market packages. Any discrepancies between a planned project and the ITS Architecture will be resolved either by modifying the project or the market packages. Changes to the market 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 Memphis stakeholders will review the Regional ITS Deployment Plan annually. The recommended projects from the ITS Deployment Plan will be reviewed to determine changes in the project status, prioritization, or the addition of new projects. Any changes will be documented by the Memphis Urban Area MPO. Prior to the Long-Range Transportation Plan update the Regional ITS Architecture and Deployment Plan will undergo a complete update. During the complete update, Architecture Maintenance Documentation Forms and changes to the ITS Deployment Plan projects will be incorporated. In addition, any new stakeholders or elements in the Region will be included and any changes made to the National ITS Architecture will be evaluated for their impact on the Regional ITS Architecture.

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 the northern portion of De Soto 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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Memphis Urban Area 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 were identified. Elements were categorized as centers, vehicles, travelers, or field devices as shown in the diagram below.

Step 2 — Develop ITS Market Packages (Services)
ITS market packages represent the service that ITS can provide to address one or more needs in the Region. In the Memphis Urban Area a total of 44 market packages were identified and prioritized as high, medium, or low. Market 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 market packages.
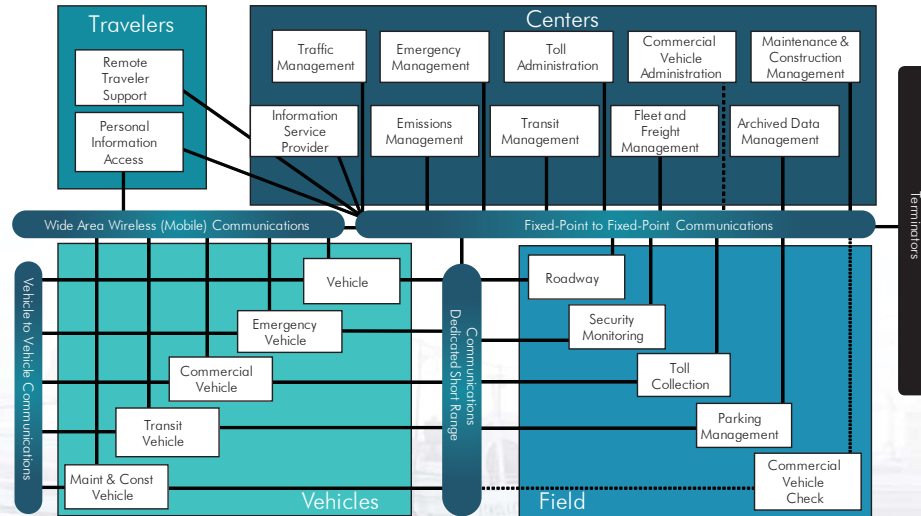
> **What is an ITS Architecture?**
> An ITS Architecture is a framework for the deployment and operation of ITS in a region.

Memphis Urban ITS Market Packages

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

Traffic Management
- Network Surveillance
- Surface Street Control
- Traffic Information Dissemination
- Regional Traffic Management
- Traffic Incident Management System

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

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

Public Transportation Management
- Transit Vehicle Tracking
- Transit Fixed-Route Operations
- Demand Response Transit Operations
- Transit Traveler Information
- Transit Signal Priority

Traveler Information
- Broadcast Traveler Information
- Interactive Traveler Information

ITS Deployment Plan

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 some of the key projects recommended for deployment by stakeholder agencies in the Region. A complete listing of all the projects identified is found in the Regional ITS Deployment Plan.

> **What is an ITS Deployment Plan?**
> An ITS Deployment Plan identifies the projects that need to be implemented in order to deliver the services identified in the ITS Architecture.

ITS Deployment Examples:

Transit Vehicle Tracking

Traffic Management Center

Closed Circuit Television Cameras

Traffic Signal Coordination

Dynamic Message Signs

Emergency Vehicle Traffic Signal Preemption

Memphis Area Transit Authority
- MATA Combined ITS Deployment:
  - Transit Vehicle Tracking
  - On-Board Security Cameras
  - Alarm System
  - Passenger Counters
  - Next-bus Arrival Dynamic Message Signs (DMS)
  - Real-time Traveler Information Website
- MATA Bus Rapid Transit Traffic Signal Priority
- MATA Transit Dispatch Coordination with Municipal Traffic Operations Centers (TOCs)

Memphis Urban Area Metropolitan Planning Organization Projects
- Memphis Urban Area MPO Archive Data Warehouse

Municipal/County Projects
- TOC Implementation
- TOC Coordination with the TDOT SmartWay Traffic Management Center (TMC)
- TOC Coordination with Public Safety Dispatch
- Advanced Traffic Management Signal System Implementation and Upgrades
- Closed Circuit Television (CCTV) Camera Implementation
- DMS Implementation
- Railroad Grade Crossing Advanced Notification System
- Arterial Street Service Patrol Implementation
- Real-Time Traveler Information Website
- Emergency Vehicle Traffic Signal Preemption

Tennessee Department of Transportation Recommended Projects
- SmartWay ITS Implementation on SR 385/I-269 (North and South Segments)
- SmartWay ITS Extension on I-40 and SR 385
- SmartWay TMC Coordination with Mississippi DOT Northwest Regional TMC
- SmartWay TMC Coordination with Memphis-Shelby County Emergency Management Agency
- HELP Service Patrol Expansion