# Memphis Urban Area Regional ITS Architecture and Deployment Plan

Memphis MPO
METROPOLITAN PLANNING ORGANIZATION

October 2014

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# Memphis Urban Area

## Regional ITS Architecture and Deployment Plan

Memphis MPO
METROPOLITAN PLANNING ORGANIZATION
*Strengthening Regional Transportation*

## Final Report

*A Memphis Urban Area Metropolitan Planning Organization Project*

*Prepared by:*

Kimley»Horn

**October 2014**

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|---|---|
| AASHTO | American Association of State Highway and Transportation Officials |
| AD | Archived Data |
| AHTD | Arkansas State Highway and Transportation Department |
| AMBER | America's Missing: Broadcast Emergency Response |
| APTA | American Public Transportation Association |
| APTS | Advanced Public Transportation System |
| ASTM | American Society for Testing and Materials |
| ATIS | Advanced Traveler Information System |
| ATMS | Advanced Traffic Management System |
| AVL | Automated Vehicle Location |
| CCTV | Closed Circuit Television |
| CVISN | Commercial Vehicle Information Systems and Networks |
| CVO | Commercial Vehicle Operations |
| DARTS | Delta Area Rural Transit System |
| DMS | Dynamic Message Sign |
| DSRC | Dedicated Short Range Communication |
| EM | Emergency Management |
| EMA | Emergency Management Agency |
| EMS | Emergency Medical Services |
| EOC | Emergency Operations Center |
| FHWA | Federal Highway Administration |
| FTA | Federal Transit Administration |
| HAR | Highway Advisory Radio |
| HAZMAT | Hazardous Materials |
| HOT | High Occupancy Toll |
| HOV | High Occupancy Vehicle |
| HRA | Human Resource Agency |
| IEEE | Institute of Electrical and Electronics Engineers |
| ITE | Institute of Transportation Engineers |
| ITS | Intelligent Transportation System |
| IVR | Interactive Voice Response |
| LRTP | Long-Range Transportation Plan |

# LIST OF ACRONYMS

| | |
|---|---|
| MATA | Memphis Area Transit Authority |
| MC | Maintenance and Construction |
| MDOT | Mississippi Department of Transportation |
| MEMA | Mississippi Emergency Management Agency |
| MOU | Memorandum of Understanding |
| MPO | Metropolitan Planning Organization |
| NEMA | National Electrical Manufacturers Association |
| NOAA | National Oceanic and Atmospheric Administration |
| NTCIP | National Transportation Communications for ITS Protocol |
| PSAP | Public Safety Answering Point |
| RPO | Regional Planning Organization |
| RTMS | Remote Traffic Microwave Sensor |
| RWIS | Road Weather Information System |
| SAE | Society of Automotive Engineers |
| SAFETEA-LU | Safe, Accountable, Flexible and Efficient Transportation Equity Act – A Legacy for Users |
| SDO | Standards Development Organization |
| SWIFT | Statewide Information For Travelers |
| TDOT | Tennessee Department of Transportation |
| TEA-21 | Transportation Equity Act for the 21st Century |
| TEMA | Tennessee Emergency Management Agency |
| TIP | Transportation Improvement Program |
| THP | Tennessee Highway Patrol |
| TITAN | Tennessee Integrated Traffic Analysis Network |
| TMC | Transportation Management Center (or Traffic Management Center) |
| TOC | Traffic Operations Center |
| TraCS | Traffic and Criminal Software |
| USDOT | United States Department of Transportation |
| VIVDS | Video Image Vehicle Detection Systems |
| WAVE | Wireless Access in Vehicular Environments |

# 1. INTRODUCTION

## 1.1 Project Overview

The Memphis Urban Area Regional Intelligent Transportation System (ITS) Architecture was first developed in 2002. The Regional ITS Architecture provides a framework for implementing ITS projects, encourages interoperability and resource sharing among agencies, identifies applicable standards to apply to projects, and allows for cohesive long-range planning among regional stakeholders. ITS architectures allow stakeholders to plan for what they want their system to look like in the long-term and then break out the system into smaller pieces that can be implemented as funding permits.

The Regional ITS Architecture is a living document that should be periodically updated in order to accurately reflect the ITS needs, plans, and visions within a region as ITS infrastructure and processes are implemented and improved. In June 2010, the Memphis Metropolitan Planning Organization (MPO), in coordination with the Tennessee Department of Transportation (TDOT), updated the Memphis Urban Area Regional ITS Architecture. The maintenance plan that was developed in the 2010 Memphis Urban Area Regional ITS Architecture and Deployment Plan set a goal to update the plan every four years. In order to meet that goal, the Memphis MPO began updating the plan in 2013 and completed the update in 2014.

The Regional ITS Architecture consists of several key components:

- ITS Needs – The needs describe the transportation related needs in the Region that could possibly be addressed by ITS.
- ITS Inventory – The inventory describes all of the ITS related elements that either exist or are planned for the Region.
- ITS Service Packages – The ITS service packages describe the services that stakeholders in the region want ITS to provide. ITS service package diagrams have been developed to illustrate how each service will be deployed and operated by each agency in the Region that expressed interest in a particular service. In previous versions of the Memphis Urban Area Regional ITS Architecture, ITS service packages were referred to as ITS market packages. The name change has been made to be consistent with the terminology that is now used in Version 7.0 of the National ITS Architecture.
- ITS Deployment Plan – The Deployment Plan documents planned and potential ITS projects that could be implemented in the region to provide the ITS services that stakeholders identified as important to the Region.
- Use and Maintenance Plan – The use and maintenance plan describes how to use the Regional ITS Architecture for ITS planning and design efforts, such as the development of a Systems Engineering Analysis. It also describes how the Regional ITS Architecture should be maintained in the future.

A regional ITS architecture is necessary to satisfy the ITS conformity requirements first established in the Transportation Equity Act for the 21st Century (TEA-21) highway bill and continued in the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) bill passed in 2005 and the Moving Ahead for Progress in the 21st Century (MAP-21) bill passed in 2012. In response to Section 5206(e) of TEA-21, the Federal Highway Administration (FHWA) issued a final rule and the Federal Transit Administration (FTA) issued a final policy that required regions implementing any ITS project to have an ITS architecture in place by April 2005. After this date, any ITS projects must show conformance with their regional

ITS architecture in order to be eligible for funding from FHWA or FTA. In order to show this conformance, it is important that any region deploying ITS have an updated regional ITS architecture in place.

The Memphis Urban Area Regional ITS Architecture update included the same geographic area and agencies that are included as part of the Memphis MPO. In addition, the TDOT SmartWay ITS deployments on I-40 and I-55 in Crittenden County, Arkansas are also considered part of the Memphis Urban Area Regional ITS Architecture. These deployments, which were installed under a memorandum of understanding (MOU) between TDOT and the Arkansas State Highway and Transportation Department (AHTD), include closed circuit television (CCTV) cameras, dynamic message signs (DMS), and highway advisory radio (HAR), were deployed and are operated by TDOT to monitor freeways and provide traveler information to travelers approaching the Mississippi River bridges.

The stakeholders developed the Regional ITS Architecture based on a vision of how they wanted to implement and operate ITS through the year 2040 in the Memphis Urban Area. The 2040 vision corresponds to the Memphis Urban Area Long Range Transportation Plan, known as Direction 2040, which also used the 2040 time frame.

The Memphis Urban Area Regional ITS Architecture was developed with significant input from local, state, and federal officials. Two stakeholder workshops were held with all stakeholders and individual interviews were conducted with many of the stakeholders outside the workshops to solicit input and ensure that the plans reflected the unique needs of the Region. Copies of the draft reports were provided to all stakeholders. The Regional ITS Architecture and Deployment Plan developed reflects an accurate snapshot of existing ITS deployments and future ITS plans in the Region. Needs and priorities of the Region will change over time, and in order to remain effective, this plan should be periodically reviewed and updated.

## 1.2 Memphis Urban Area

### *1.2.1 Geographic Boundaries*

The Memphis MPO Region is comprised of Shelby County in Tennessee, DeSoto County in Mississippi, the western portion of Fayette County in Tennessee, and a northwest portion of Marshall County in Mississippi. These boundaries correspond with the boundaries of the Memphis MPO, which are shown in **Figure 1**. Also considered within the Memphis MPO Region are TDOT's SmartWay ITS deployments along I-40 and I-55 in Crittenden County, Arkansas. Although this system is outside the Memphis MPO boundaries, it is operated by the TDOT SmartWay Transportation Management Center (TMC) in Memphis.

When developing the stakeholder group, the project team coordinated with the Memphis MPO to invite the appropriate city, county, regional, state and federal agencies. Stakeholders included both local representatives as well as representatives from TDOT headquarters in Nashville, Arkansas State Highway and Transportation Department (AHTD) in Little Rock, Mississippi Department of Transportation (MDOT) in Jackson, and FHWA from the Tennessee Division Office in Nashville and Arkansas Division Office in Little Rock.

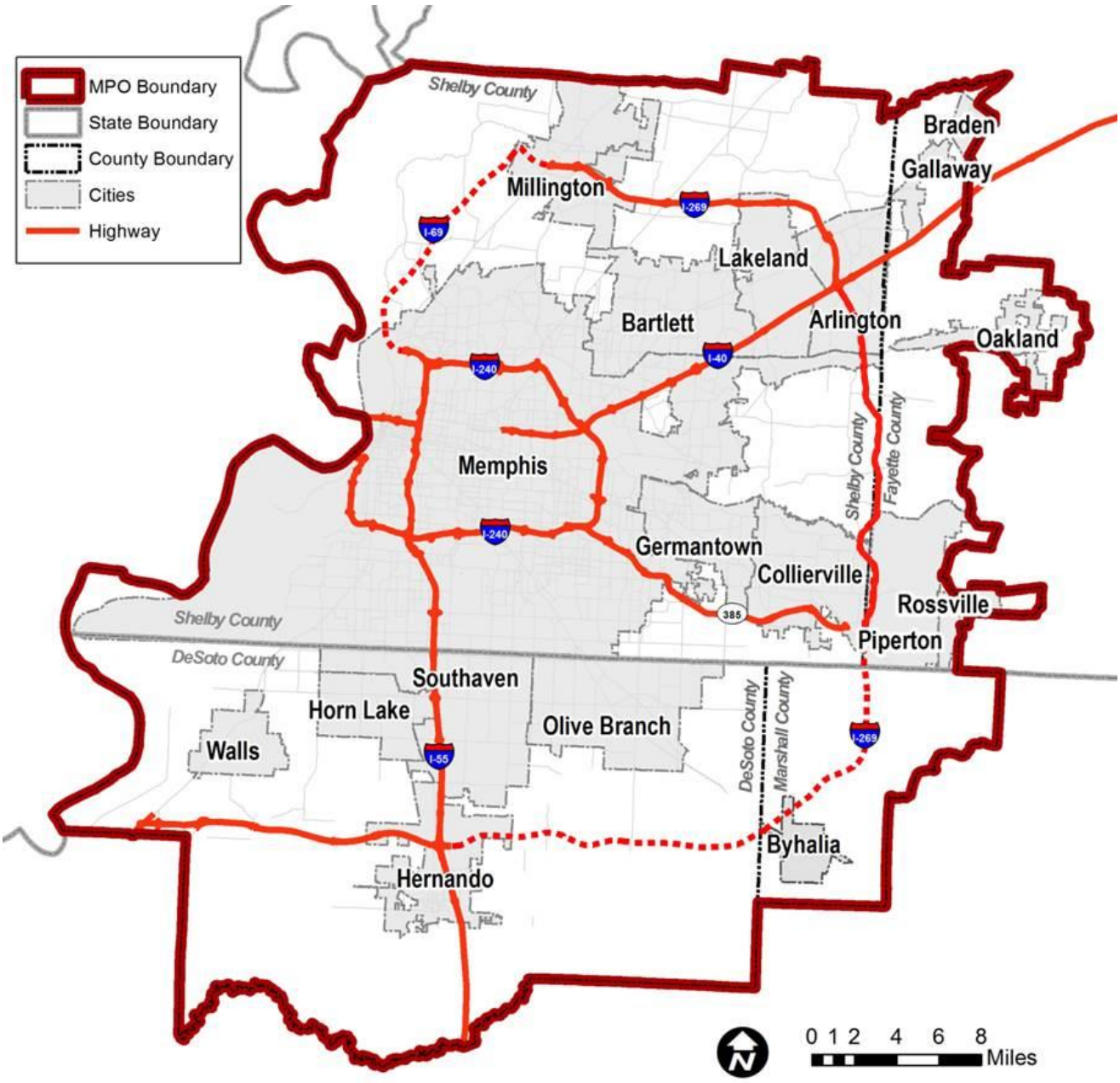



**Figure 1 – Memphis MPO Boundaries**

### 1.2.2 Transportation Infrastructure

The transportation infrastructure in the Memphis MPO Region is diverse and robust, consisting of all forms of transportation. The primary access controlled facilities include I-40, I-55, I-240, Tennessee State Route (SR) 385, Mississippi SR 304 (also cosigned as I-69), and Sam Cooper Boulevard. I-40 runs from North Carolina to California, and I-55 runs from New Orleans to Chicago. Additionally, portions of the I-69 international trade corridor and I-22 from Birmingham are presently under construction, and a significant portion of SR 385, an outer circumferential highway mostly east and north of Memphis, is planned to be renamed I-269. I-269 is also currently under construction in DeSoto and Marshall Counties. The other federal highways that serve the Memphis Urban Area include US 51, US 61, US 64, US 70, US 72, US 78, and US 79.

The Memphis Urban Area is also one of the few regions to be served by five Class 1 railroads. Burlington Northern Santa Fe, Union Pacific, Norfolk Southern Railroad and CNIC all have major intermodal facilities in the Memphis Urban Area. Only the CSX does not have an intermodal facility in Memphis. In addition, Memphis is being considered for the extension of a high speed passenger rail facility from Little Rock, Arkansas. The security of the existing railroad bridges across the Mississippi River is a major issue since any disruption of the rail service through Memphis would have impacts over most of the continental United States.

Being on the banks of the Mississippi River, Memphis also has a robust water port. The port facility serves numerous businesses and industries and is home to the Memphis District U.S. Corps of Engineers. The Memphis port handles the fourth largest amount of cargo of all of the inland water ports in the United States.

One of the key elements for transportation and the economics of the Memphis Urban Area is the Memphis International Airport. Being the home to Federal Express, the Memphis International Airport is the second busiest airport by cargo traffic in the world. Before 2010 the Memphis International Airport was the busiest airport by cargo in the world for nearly 20 years.

With all of these freight elements being part of the Memphis infrastructure, it follows that truck traffic is a significant element of the road system. Past studies have revealed that truck volumes on I-40 and I-55 are near 40 percent, with some sections of road experiencing truck volumes well in excess of 50 percent. Many of the truck origins and destinations are in the southern part of Memphis or northern DeSoto County in Mississippi. This puts most of the pressure for moving freight on the southern portion of I-240 and on I-55.

Fixed route and paratransit services are provided in Shelby County and a portion of West Memphis in Crittenden County, Arkansas by the Memphis Area Transit Authority (MATA). Demand response service in the Memphis MPO Region is provided by several different agencies depending on the county. Within Tennessee, the Delta Human Resource Agency (HRA) provides service in Fayette County and non-urbanized areas of Shelby County. In Mississippi, the Delta Area Rural Transit System (DARTS) provides service in Desoto County. Commuter rail or light rail services are not provided at this time. However, MATA has three fixed guideway trolley lines that total 10 route miles

Within the Memphis Urban Area there have been several ITS initiatives and deployments throughout the Region. These programs have come from multiple agencies and cover multiple transportation modes as well. Some of the larger ITS initiatives and deployments that are existing or underway in the Memphis Urban Area are listed below.

- **TDOT SmartWay Program** – This freeway management program is continuing to evolve and grow in the Memphis Urban Area and includes CCTV cameras, DMS, vehicle detectors, and HAR in Arkansas and Tennessee. The communications for the system are handled through a fiber optic backbone with a wireless connection to the elements in Arkansas. The system is managed from the TDOT Region 4 SmartWay TMC located near the I-40/I-240/Sam Cooper Boulevard interchange in east Memphis, and there is a microwave communications link to a workstation in the Region 4 office in Jackson, Tennessee. The reconstruction of the I-40/I-240/Sam Cooper Boulevard interchange east of Memphis will also include TDOT's first full color DMS with dynamic lane control.
- **TDOT HELP** – The TDOT HELP program has been in operation in the Memphis Urban Area since July 1999. The HELP program trucks patrol I-40, I-55, I-240, Sam Cooper Boulevard, and portions of SR-385, assisting motorists with flat tire changes, fuel, and minor vehicle repairs. The HELP program also provides assistance to the local police and State Highway Patrol with the management of incidents by providing traffic control and advance warning to motorists.
- **511 Traveler Information Number** – TDOT currently operates a statewide traveler information number that provides real-time traveler information throughout the state. Information is put into 511 through the TDOT Statewide Information for Travelers (SWIFT) system (formally known as TDOT SmartWay Information System [TSIS]) which is updated by the TDOT SmartWay TMC operators and the Tennessee Highway Patrol (THP) dispatchers. 511 information can also be accessed through the TDOT SmartWay website (http://www.tdot.state.tn.us/tdotsmartway/) which includes a subscription for Rich Site Summary (RSS) feeds, TDOT SmartWay App, and several social media sites such as Twitter and Facebook, and through.
- **City of Memphis Traffic Operations Center** – The City of Memphis has an existing signal system that supports real time monitoring and control of traffic signals, and from the TOC and the Signal Maintenance facility, the City has the capability to implement traffic signal timing plans, monitor traffic conditions and the operations of the signals, and to monitor the status of equipment. The City of Memphis also provides signal maintenance to all traffic signals within Shelby County. Memphis plans to begin the installation of CCTV cameras in the future as funding becomes available.
- **Shelby County Congestion Management Program (CMP)** - The CMP is a county-wide effort that includes the City of Bartlett, City of Germantown, City Lakeland, City of Memphis, City of Millington, Town of Arlington, Town of Collierville, and unincorporated areas of Shelby County. This initiative includes installing new traffic signals in addition to upgrading, replacing, retiming, and connecting various traffic signals and signal components throughout the county. ITS elements that will be installed include video detection, fiber optic cable, and emergency vehicle preemption.
- **City of Bartlett Signal System** – The City of Bartlett presently has a signal system that provides the ability to monitor traffic operations and change signal timing plans for a few signals within the City. Future plans include providing real time monitoring capabilities, CCTV cameras, and expanding the system which will allow it to be connected with the City of Memphis system as part of the CMP
- **City of Germantown Signal System** – The City of Germantown TOC is connected to many intersections across the city. The TOC will allow the traffic operations to be monitored and signal timing plans to be added or changed. Memphis and Germantown currently have memorandum of understanding in place, which was signed in 2012, to

coordinate the operation of traffic signals and ITS systems. Additionally, both TMCs agreed to provide mutual assistance and serve as backup coverage for traffic signal and ITS operations.

- **MATA ITS –** MATA has developed an extensive ITS program that includes automated vehicle location (AVL) on fixed-route buses and trolleys and paratransit vehicles, automated passenger counting that can distinguish a person from an inanimate object, onboard security cameras, transit signal priority for certain routes, and automated transit fleet maintenance monitoring. Additionally, MATA provides riders with next bus arrival DMS at all trolley stations and real-time bus location information on the MATA website.
- **MDOT Congestion Mitigation and Air Quality (CMAQ) Initiative and Other Deployments** – MDOT is in the process of determining how best allocate Federal CMAQ funds throughout DeSoto County including the City of Hernando, City of Horn Lake, City of Olive Branch, and City of Southaven. Potential Projects include ITS deployments along major corridors such as Goodman Road (SR302) and various signal improvements including signal timing. These ITS deployments would complement MDOT's existing ITS infrastructure that includes CCTV cameras, DMS, and field sensors. Additionally, the MDOTtraffic website and MDOT traffic App provide drivers with live streaming video, traffic alerts, and construction information.

### *1.2.3 Project Participants*

Due to the fact that ITS often transcends traditional transportation infrastructure, it is important to involve a wide range of local, state, and federal stakeholders in the ITS architecture development and visioning process. Input from these stakeholders is a critical part of defining the interfaces, integration needs, and overall vision for ITS in a region. In the Memphis MPO Region, stakeholders that participated included not just representatives from transportation and public transit agencies, but also stakeholders that represented public safety, health, and aviation.

**Table 1** contains a listing of stakeholders in the Memphis Urban Area who participated in the project workshops or provided input to the study team as to the needs and issues that should be considered as part of the Regional ITS Architecture. Other stakeholders that were invited to participate but were not able to attend were provided minutes of workshops and notified when copies of reports were available for review on the project website to encourage their participation as much as possible. A complete listing of stakeholders invited to participate in the project and workshop attendance records is included in the stakeholder database in **Appendix D**.

**Table 1 – Memphis Urban Area Stakeholder Agencies and Contacts**

| Stakeholder Agency | Address | Contact |
|---|---|---|
| Arkansas Highway Patrol | 3205 North Washington Street<br>Forrest City, AR 72335 | Jackie Clark |
| Arkansas State Highway & Transportation Department | 10324 Interstate 30<br>Little Rock, AR 72203 | Gary Bennett |
| Arkansas State Highway & Transportation Department | 10324 Interstate 30<br>Little Rock, AR 72203 | Dorothy Rhodes |
| Arkansas State Highway & Transportation Department | 2701 U.S. Highway 64<br>Wynne, AR 72396 | Rex Vines |
| Arkansas State Highway & Transportation Department | 2701 U.S. Highway 64<br>Wynne, AR 72396 | Ray Woodruff |
| City of Bartlett | 6382 Stage Road<br>Bartlett, TN 38134 | Becky Bailey |
| City of Gallaway | 607 Watson Drive<br>Gallaway, TN 38036 | Pat Brown |
| City of Germantown | 1930 Germantown Road South<br>Germantown, TN 38138 | Jeff Beaman |
| City of Germantown | 1930 Germantown Road South<br>Germantown, TN 38138 | Tim Gwaltney |
| City of Germantown | 1930 Germantown Road South<br>Germantown, TN 38138 | John Selberg |
| City of Hernando | 475 West Commerce Street<br>Hernando, MS 38632 | Jared Darby |
| City of Marion | 31 Military Road<br>Marion, AR 72364 | Edward Cain |
| City of Memphis | 125 North Main Street - Suite 668<br>Memphis, TN 38103 | Randall Tatum |
| City of Memphis | 65 South Front Street<br>Memphis, TN 38103 | Keith Staples |
| City of Millington | 7930 Nelson Street<br>Millington, TN 38053 | Darek Baskin |
| City of Olive Branch | 9200 Pigeon Roost Road<br>Olive Branch, MS 38654 | Steve Bigelow |
| City of Piperton | 3725 Highway 196, Suite A<br>Piperton, TN 38017 | Phil Hendricks |
| City of Southaven | 8710 Northwest Drive<br>Southaven, MS 38671 | Ronald Smith |
| City of West Memphis | 604 East Cooper Avenue<br>West Memphis, AR 72301 | Phillip Sorrell |
| DeSoto County | 365 Losher Street - Suite 200<br>Hernando, MS 38632 | Ted Garrod |
| DeSoto County | 365 Losher Street - Suite 200<br>Hernando, MS 38632 | Tom Haysley |
| Fayette County | 16265 Hwy 64<br>Somerville, TN 38068 | Esther Sykes-Wood |
| FHWA – Arkansas Division | 700 West Capitol Avenue - Room 3130<br>Little Rock, AR 72201-3298 | Gary Dalporto |
| FHWA – Tennessee Division | 404 BNA Drive - Building 200, Suite 508<br>Nashville, TN 37217 | Nick Renna |

**Table 1 – Memphis Urban Area Stakeholder Agencies and Contacts (continued)**

| Stakeholder Agency | Address | Contact |
|---|---|---|
| Marshall County | 520 J. M. Ash Drive<br>Holly Springs MS 38635 | Justin Hall |
| MDOT | 2567 N. West Street<br>Jackson, MS 39157 | Jake Wimberly |
| MDOT | 2567 N. West Street<br>Jackson, MS 39157 | John Gilligan |
| Memphis Area Transit Authority | 1370 Levee Road<br>Memphis, TN 38108 | John Lancaster |
| Memphis MPO | 125 North Main Street - Suite 450<br>Memphis, TN 38103 | Mitchell Lloyd |
| Memphis MPO | 125 North Main Street - Suite 450<br>Memphis, TN 38103 | Sajid Hossain |
| Memphis MPO | 125 North Main Street - Suite 450<br>Memphis, TN 38103 | Pragati Srivastava |
| North Delta Planning and Development District | 220 Power Drive<br>Batesville, MS 38606 | Trey Hamby |
| Shelby County | 6463 Haley Road<br>Memphis, TN | Bob Evans |
| Shelby County | 160 North Main Street - Suite 1127<br>Memphis, TN 38103 | Tom Needham |
| Shelby County | 6463 Haley Road<br>Memphis, TN 38134 | Darren Sanders |
| TDOT Long Range Planning Division | 5334 Boswell Avenue<br>Memphis, TN 38120 | Aury Kangelos |
| TDOT Long Range Planning Division | 5344 Boswell Avenue<br>Memphis, TN 38120 | Carlos McCloud |
| TDOT Traffic Operations Division | 505 Deaderick Street<br>Suite 300, James K Polk Building<br>Nashville, TN 37243 | Robert Benshoof |
| TDOT Traffic Operations Division | 505 Deaderick Street<br>Suite 300, James K Polk Building<br>Nashville, TN 37243 | Asem Halim |
| TDOT Region 4 TMC | 5334 Boswell Avenue<br>Memphis, TN 38120 | Carl Berry |
| TDOT Region 4 TMC | 5334 Boswell Avenue<br>Memphis, TN 38120 | Ed Johnson |
| Town of Collierville | 500 Poplar View Parkway<br>Collierville, TN 38017 | Frank McPhail |
| Town of Collierville | 500 Poplar View Pkwy<br>Collierville, TN 38017 | Mark King |
| West Memphis MPO | 796 W. Broadway<br>West Memphis, AR 72301 | Eddie Brawley |

## 1.3 Document Overview

The Memphis Urban Area Regional ITS Architecture report is organized into seven key sections:

**Section 1 – Introduction**

This section provides an overview of the Memphis Urban Area Regional ITS Architecture, including a description of the Region and list of participating stakeholders.

**Section 2 – Regional ITS Architecture Development Process**

This section provides an overview of the key steps involved in developing the ITS architecture for the Memphis MPO Region as well as an overview of the Turbo Architecture database and reports.

**Section 3 – Regional Needs**

This section contains a summary of regional needs for the Memphis MPO Region that are related to ITS.

**Section 4 – Regional ITS Inventory**

This section provides a description of the stakeholders and ITS elements in the Region. Elements are grouped based on the owner, such as the City of Memphis or MATA, and their current status is listed as either existing or planned.

**Section 5 – Regional ITS Architecture**

This section describes how the National ITS Architecture was customized to meet the ITS needs, plans, and visions for the Memphis MPO Region. The ITS service packages that are included in this section and interconnects are presented, including the "sausage diagram" showing the relationships of the key subsystems and elements in the Region. Functional requirements and standards that apply to the Region, as indicated by the Regional ITS Architecture, are also presented. Operational concepts identifying stakeholder roles and responsibilities have been prepared and potential agreements to support the sharing of data and resources have been identified.

**Section 6 – Regional ITS Deployment Plan**

This section describes the ITS projects that regional stakeholders expressed a need to deploy in order to deliver the ITS services identified in the regional ITS architecture. Project descriptions include a target deployment timeframe, responsible agency, an opinion of probable cost, funding status, and applicable ITS service packages.

**Section 7 – Use and Maintenance of the Regional ITS Architecture**

This section describes how the Regional ITS Architecture can be used to show architectural conformance of ITS projects in the planning or design phase. A process for maintaining the Regional ITS Architecture and submitting requested changes to the Regional ITS Architecture is also presented.

The Memphis Urban Area Regional ITS Architecture also contains six appendices:

- Appendix A – Service Package Definitions
- Appendix B – Customized Service Packages
- Appendix C – Element Functions

- Appendix D – Stakeholder Database
- Appendix E – Agreements
- Appendix F – Architecture Maintenance Documentation Form

A corresponding website was also developed for the Memphis Urban Area Regional ITS Architecture which contains electronic versions of all documents, meeting minutes, and an interactive version of the Turbo Architecture database. The website is located at the following address:

**www.memphismpo.org/plans/safety-mobility/its**

# 2. REGIONAL ITS ARCHITECTURE UPDATE PROCESS

The update of the Regional ITS Architecture and Deployment Plan for the Memphis MPO Region relied heavily on stakeholder input to ensure that the architecture reflected local needs. Two workshops were held along with a series of stakeholder interviews to gather input, and draft documents were made available to stakeholders for review and comment.

The process followed for the Memphis MPO Region was designed to ensure that stakeholders could provide input and review for the development of the Region's ITS Architecture and Deployment Plan. **Figure 2** illustrates the process followed.

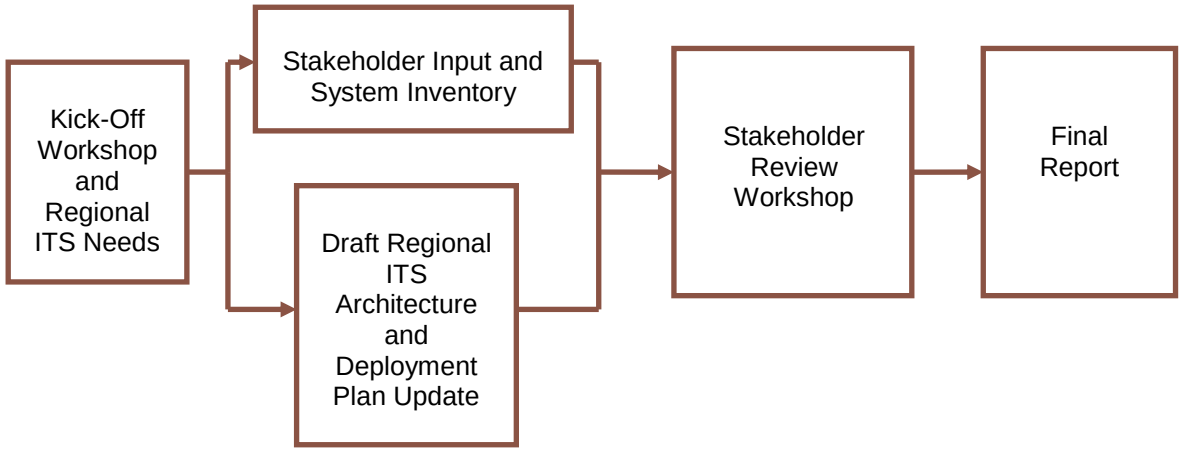



**Figure 2 – Regional ITS Architecture and Deployment Plan Development Process**

## 2.1 Stakeholder Workshops

Two workshops with stakeholders were held to update the Memphis Urban Area Regional ITS Architecture and Deployment Plan. These workshops included:

- Kick-Off Workshop
- Stakeholder Workshop

In addition, interviews were conducted with many of the key stakeholder agencies outside of the workshops to gather additional information for developing the Regional ITS Architecture. Key components of the process are described below:

**Kick-Off Workshop:** A stakeholder group was identified that included representatives from regional transportation, public works, public safety, and emergency management agencies. The group was invited to the project Kick-Off Workshop where an overview of the project was provided, the regional boundaries were defined, existing and planned ITS deployments in the Region were discusses, and ITS needs for the Region were identified.

**Stakeholder Input and System Inventory:** Stakeholder input was gathered through the two stakeholder workshops as well as a series of interviews that were conducted with stakeholder agencies. The interviews were used to complete the system inventory for the region, define how

ITS services are currently being operated, define how ITS services could be operated in the future, and identify potential ITS projects for the region.

**Develop Draft Regional ITS Architecture and Deployment Plan Update:** Following the stakeholder input, a draft report was developed which identifies the roles and responsibilities of participating agencies and stakeholders in the operation and implementation of the ITS system, identifies projects for deployment, and establishes a maintenance plan. Additionally, a website was created to allow stakeholders access to an interactive version of the ITS architecture and documents such as reports, meeting minutes, presentations, and the Turbo Architecture database.

**Stakeholder Review Workshop:** A second stakeholder workshop was conducted to review the Draft Regional ITS Architecture document as well as identify priorities for ITS service packages and confirm the list of potential ITS projects for the Memphis MPO Region. Use and maintenance of the Regional ITS Architecture was also discussed.

**Final Report:** The final Regional ITS Architecture and Deployment Plan was developed, which included an executive summary, project report, Turbo Architecture database, and project website with an interactive version of the Regional ITS Architecture.

## 2.2 Turbo Architecture

Turbo Architecture Version 7.0 was used to develop the Memphis Urban Area Regional ITS Architecture. Turbo Architecture is a software application that was developed by the United States Department of Transportation (USDOT) to be used as a tool for documenting and maintaining ITS architectures. Version 7.0 of Turbo Architecture was released in February 2012 and was developed to support Version 7.0 of the National ITS Architecture. Use of the Turbo Architecture software in development of the regional ITS architectures is recommended by both the FHWA and FTA.

In the Memphis MPO Region, the Turbo Architecture database that was developed was based on the ITS service packages which are provided in **Appendix B** of this report. The ITS service packages provide a graphical representation of the services stakeholders in the Region would like ITS to provide. In each service package, the elements, such as a TMC or a CCTV camera, and the data that is shared between them are shown. Turbo Architecture allows the Region to document all of the elements and data flows that exist or are planned in the Region. Turbo Architecture also allows the user to quickly access any standards that are associated with the data flows as well as generate reports and diagrams to assist in reviewing the data. Some examples of the useful reports and diagrams that may be generated using the Turbo Architecture software are included in **Table 2**.

Turbo Architecture saves data in Microsoft Access compatible data files. Turbo Architecture files can be accessed using Microsoft Access, although use of Access will not provide nearly the same amount of capabilities as accessing the files using the Turbo Architecture software. With the release of Version 4.1 of Turbo Architecture, the USDOT began offering the Turbo Architecture software free of charge and provides a link for downloading the software on the National ITS Architecture website. At the time this report was written, that site was located at www.iteris.com/itsarch/ and Version 7.0 was the most recent version available.

**Table 2 – Turbo Architecture Report and Diagrams**

| Report or Diagram Name | Functions |
|---|---|
| Stakeholder Report | Provides a description of the stakeholder and the associated elements for each stakeholder in the Regional ITS Architecture. |
| Inventory Report | Provides a description and status for each element in the Regional ITS Architecture. |
| Service Packages Report | Identifies each of the service packages selected for the Region and the elements associated with each service package. |
| Functional Requirements Report | Identifies the functions that each element provides. |
| Interconnect Report | Identifies for each element all of the other elements that are connected and the status of each connection. |
| Standards Activities Report | Identifies relevant standards associated with each of the data flows used in the Regional ITS Architecture. |
| Subsystem Diagram | Identifies the subsystems from the National ITS Architecture that are included in the Regional ITS Architecture. |
| Interconnect Diagrams | Identifies for each element all of the other elements that are connected and the status of each connection. The Interconnect Diagrams can be customized to show all elements in the Regional ITS Architecture or a single element can be selected so that only the connections it has with other elements are shown. Interconnect Diagrams can also be viewed by individual service packages to view all of the elements and connections in each service package. |
| Flow Diagrams | Flow Diagrams are similar to Interconnect Diagrams; however, the actual data flows that are part of each connection between elements are also shown. |

# 3. REGIONAL ITS NEEDS

Regional needs that could be addressed by ITS were identified by stakeholders in the Memphis Urban Area Regional ITS Architecture workshop held in March 2014 and interviews conducted in April 2014. In addition, the Memphis Urban Area Long Range Transportation Plan (LRTP): Direction 2040 was reviewed to determine other regional needs that could possibly be addressed in some way through ITS. The Memphis MPO is currently updating their LRTP, and the new plan will be referred to as the LIVABILITY 2040 Regional Transportation Plan (RTP).

Within the 2040 LRTP there were nine goals that were defined for the plan, each with a corresponding set of objectives. Two of the goals had objectives that could be met in part through the use of ITS. These goals and their objectives are summarized below.

**2040 Long-Range Transportation Plan Goal – Increase the safety and security of the transportation system for all users.**

Goal objectives include:

- Support projects that reduce crashes for motorized and non-motorized system users;
- Support projects that enhance evacuation routes;
- Support development of a system to track and monitor crash data and share with; jurisdictions to help identify and prioritize solutions for problem areas;
- Encourage plans and policies to increase safety;
- Identify transportation projects to eliminate unsafe conditions.

ITS systems offer a number of ways to improve the overall safety of the transportation system. ITS can improve the ability of an agency to detect an incident, improve coordination with public safety agencies for response, and be used to provide advanced warning of incidents to motorists. Through the HELP service patrol program TDOT is able to assist disabled motorists and move them out of travel lanes or off of shoulders quicker, which increases the safety of both the disabled motorists and reduces a potential roadside hazard for other drivers. During evacuations ITS can be used to monitor evacuation routes and provide information to travelers on which routes to use. Use of ITS to detect severe weather and provide advanced warning of railroad crossings are other examples of how ITS can increase safety. ITS can also be used in transit to provide alarms on buses and surveillance capabilities both on buses and at transit stops.

**2040 Long-Range Transportation Plan Goal – Develop a multi-modal transportation network using strategies to address congestion and air quality improvements.**

Goal objectives include:

- Reduce congestion using strategies that support reduction in vehicle miles traveled, reduction in air pollutant emissions, and improves system operations;
- Implement ITS solutions to disseminate real-time information for all modes of transportation;
- Support transportation investment at key intermodal and multimodal facilities;
- Maintain safe and reasonable levels of service for highway, rail, transit, trail, and aviation facilities;
- Implement policies to encourage transit ridership and explore options to provide express transit routes.

Incidents are one of the primary causes of congestion. Through ITS, transportation agencies are better able to manage incidents which can result in quicker clearance time and less people caught in congestion due to advanced notification. Improved traffic signal coordination, both within

cities and at jurisdictional boundaries, can also reduce congestion and lead to improvements in air quality. ITS can also be used to provide advanced traveler information to help travelers make decisions on the best modes and travel routes to use to avoid congested areas if possible.

The needs identified through the Regional ITS Architecture development process as well as the 2040 LRTP provided guidance for determining which ITS service packages should be included in the Regional ITS Architecture. Stakeholders identified a number of ITS needs for the Memphis Urban Area, with the majority of the needs focused on the following five areas:

- Traffic Management;
- Traveler Information;
- Emergency Management;
- Maintenance and Construction Management; and
- Public Transportation.

In Section 5.1.4 a complete list of regional needs is presented along with the ITS service packages that have been recommended for the Region to consider implementing or expanding (if the service package currently exists.) A summary of these needs is presented in **Table 3**.

**Table 3 – Summary of Memphis Urban Area ITS Needs**

| **Traffic and Traveler Information Needs** |
|---|
| Utilize strategies for mitigating congestion and improving air quality |
| Provide pre-trip and en-route traveler information |
| Establish or improve communication and coordination among agencies for traffic operations and incident management |
| **Emergency Management Needs** |
| Improve safety and security of the transportation system |
| Reestablish the Traffic Incident Management group (TIM) |
| Establish or increase the coverage area of roadway patrols along interstates and arterials |
| Improve emergency vehicle movements with signal preemption |
| **Maintenance and Construction Management Needs** |
| Monitor roadway weather conditions to minimize the effects of adverse conditions on traffic |
| Increase work zone safety for drivers and workers |
| **Public Transportation Management** |
| Optimize passenger travel times and establish coordination among transit agencies |
| Expand traffic signal priority for transit vehicles |
| Develop a mobile phone application that improves trip planning and real-time transit information |

Stakeholder interviews included discussions regarding the Real-time System Management Information Program, which is required under Part 511 of Title 23 Code of Federal Regulations. This rule requires that metropolitan areas with populations exceeding one million collect and make accessible real-time traffic information that includes roadway blockages, construction activities, roadway weather observations, and travel times along interstate highways and other routes of significance. States in coordination with local and regional agencies must determine which routes to designate as routes of significance. A list of non-interstate roadways in which

stakeholders expressed a desire to collect real-time traffic information within the Memphis MPO Area and Crittenden County, Arkansas is presented in Section 6.2. These routes could be considered for designation as routes of significance in the future; however, a more comprehensive regional collaborative effort would be required to make those designations.

# 4. REGIONAL ITS INVENTORY

The inventory and needs documented at the Kick-Off Workshop in addition to the individual interviews are the starting point for developing an ITS architecture for the Region. These ITS systems and components are used to customize the National ITS Architecture and create the Regional ITS Architecture for the Memphis MPO Region.

When developing customized elements in the 2010 update, the Memphis stakeholder group agreed to create individual traffic, maintenance, and emergency management elements for the City of Bartlett, City of Germantown, City of Horn Lake, City of Millington, City of Olive Branch, City of Southaven, and Town of Collierville. It was determined that no significant changes have occurred that would require customized elements for additional municipalities; therefore, the 2014 update incudes those same customized elements. The other smaller communities in the Region were documented as part of the municipal elements. This documentation allows the communities to be included in the Regional ITS Architecture, and therefore eligible to use federal funds for future ITS deployments, even if there are no specific plans for ITS implementation at this time.

## 4.1 Stakeholders

Each element included in the Memphis Urban Area Regional ITS Architecture is associated with a stakeholder agency. A listing of stakeholders as identified in the Memphis Urban Area Regional ITS Architecture can be found in **Table 4** along with a description of the stakeholder. Rather than individually documenting each of the smaller municipalities in the Region, a single stakeholder, which represents the cities and towns not specifically called out in the architecture, was created for municipal agencies.

**Table 4 – Memphis Urban Area Stakeholder Descriptions**

| Stakeholder | Stakeholder Description |
|---|---|
| AHTD | Arkansas State Highway and Transportation Department. Responsible for the construction, maintenance, and operation of state roadways in Arkansas. |
| Arkansas State Police | Statewide law enforcement agency responsible for enforcing all criminal and traffic laws of the State of Arkansas. |
| City of Bartlett | Municipal government for the City of Bartlett. Covers all city departments including those that deal with traffic and public safety. |
| City of Germantown | Municipal government for the City of Germantown. Covers all city departments including those that deal with traffic and public safety. |
| City of Horn Lake | Municipal government for the City of Horn Lake. Covers all city departments including those that deal with traffic and public safety. |
| City of Memphis | Municipal government for the City of Memphis. Covers all city departments including those that deal with traffic and public safety. |
| City of Millington | Municipal government for the City of Millington. Covers all city departments including those that deal with traffic and public safety. |
| City of Olive Branch | Municipal government for the City of Olive Branch. Covers all city departments including those that deal with traffic and public safety. |
| City of Southaven | Municipal government for the City of Southaven. Covers all city departments including those that deal with traffic and public safety. |
| City of West Memphis | Municipal government for the City of West Memphis. Covers all city departments including those that deal with traffic and public safety. |
| Commercial Vehicle Operators | Operators of commercial vehicles. |
| DARTS | Delta Area Rural Transit System. Provides demand response rural transit service in northwestern Mississippi including DeSoto County. |
| Delta HRA | Delta Human Resource Agency. Responsible for demand response transportation services in the Region. |
| DeSoto County | Government for DeSoto County. Includes all county departments including the Sheriff's Office and Highway Department as well as the DeSoto County Emergency Management Agency. |
| Fayette County | Government for Fayette County. Includes all county departments including the Sheriff's Office and Highway Department as well as the Fayette County Emergency Management Agency. |
| Financial Institution | Institution that handles exchange of money for transit electronic fare collection. |
| Greater Memphis Regional Express Bus | Regional express bus envisioned to travel between Tennessee and Mississippi. MDOT is currently studying the feasibility of developing a regional express bus system. |
| MATA | Memphis Area Transit Authority. Provides transit service in the City of Memphis and portions of Shelby County. MATA operates fixed route buses, paratransit service, a downtown trolley system, and various special event shuttles. |
| MDOT | Mississippi Department of Transportation. Responsible for the construction, maintenance, and operation of state roadways in Mississippi. |
| Media | Local media that provide traffic or incident information to the public. |

**Table 4 – Memphis Urban Area Stakeholder Descriptions (continued)**

| Stakeholder | Stakeholder Description |
|---|---|
| MEMA | Mississippi Emergency Management Agency. Responsible for emergency operations during a disaster or large scale incident. |
| Memphis and Shelby County Health Department | Health Department for Memphis and Shelby County. Responsible for providing a variety of environmental and personal health services. |
| Memphis MPO | Metropolitan Planning Organization for Memphis and Shelby County. |
| Mississippi Highway Patrol | Agency responsible for the enforcement of traffic safety laws on state and federal highways. |
| MS Municipal and County Emergency Management Stakeholder Group | Stakeholder group made up of Emergency Management Agencies in Mississippi including the following: City of Horn Lake, City of Olive Branch, City of Southaven, DeSoto County and Municipal/County Government. |
| MS Municipal and County Traffic Management Stakeholder Group | Stakeholder group made up of Traffic Management Agencies in Mississippi including the following: City of Horn Lake, City of Olive Branch, City of Southaven, and Municipal/County Government. |
| Municipal/County Government | Government for various municipalities and counties within the Region that are not specifically called out. Covers all departments including those that deal with traffic and public safety. |
| NOAA | National Oceanic and Atmospheric Administration. Responsible for gathering weather information and issuing severe weather warnings. |
| Other Agencies | Stakeholder group made up of a wide variety of agencies. The associated elements are groups of agencies or providers that do not have a primary stakeholder agency. |
| Private Information Provider | Private sector business responsible for the gathering and distribution of traveler information. This service is typically provided on a subscription basis. |
| Private Service Provider | Private business providing transportation related services. |
| Rail Operators | Companies that operate rail systems including the dispatch and control of trains and the maintenance and operations of railroad tracks. |
| Shelby County | Government for Shelby County. Includes all county departments including the Sheriff's Office and Highway Department as well as the Shelby County Emergency Management Agency. |
| Shelby County Emergency Management Stakeholder Group | Stakeholder group made up of Emergency Management Agencies in Shelby County including the following: City of Memphis, City of Bartlett, Town of Collierville, City of Germantown, Shelby County, and Municipal/County Government. |
| Shelby County Traffic Management Stakeholder Group | Stakeholder group made up of Traffic Management Agencies in Shelby County including the following: City of Memphis, City of Bartlett, Town of Collierville, City of Germantown, City of Millington, Shelby County, and Municipal/County Government. |
| Southwest HRA | Southwest Human Resource Agency. Responsible for demand response transportation services in several counties adjacent to the Memphis MPO Region. |
| System Users | All of the users of the transportation system. |
| TDOT | Tennessee Department of Transportation. Responsible for the construction, maintenance, and operation of state roadways in Tennessee. |

**Table 4 – Memphis Urban Area Stakeholder Descriptions (continued)**

| Stakeholder | Stakeholder Description |
|---|---|
| TEMA | Tennessee Emergency Management Agency. Responsible for emergency operations during a disaster or large scale incident. |
| Tennessee Bureau of Investigation | Statewide law enforcement agency responsible for issuing statewide AMBER Alerts in Tennessee. |
| THP | Tennessee Highway Patrol. Responsible for the statewide enforcement of traffic safety laws as well as commercial vehicle regulations. |
| TN Municipal and County Emergency Management Stakeholder Group | Stakeholder group made up of Emergency Management Agencies in Tennessee including the following: City of Memphis, City of Bartlett, Town of Collierville, City of Germantown, Shelby County, Fayette County and Municipal/County Government. |
| TN Municipal and County Traffic Management Stakeholder Group | Stakeholder group made up of Traffic Management Agencies in Tennessee including the following: City of Memphis, City of Bartlett, Town of Collierville, City of Germantown, City of Millington, Shelby County and Municipal/County Government. |
| Town of Collierville | Municipal government for the Town of Collierville. Covers all city departments including those that deal with traffic and public safety. |
| US Coast Guard | United States Coast Guard. Responsible for all navigable waterways including the Mississippi River. |

## 4.2 ITS Elements

The ITS inventory is documented in the Regional ITS Architecture as elements. **Table 5** sorts the inventory by stakeholder so that each stakeholder can easily identify and review all of the architecture elements associated with their agency. The table includes the status of the element. In many cases, an element classified as existing might still need to be enhanced to attain the service level desired by the Region.

The naming convention used for elements in the Memphis Urban Area Regional ITS Architecture is consistent with the naming convention used in the Statewide ITS Architecture. This consistency provides seamless connections between the Regional and Statewide ITS Architecture.

**Table 5 – Memphis Urban Area Inventory of ITS Elements**

| Stakeholder | Element Name | Element Description | Status |
|---|---|---|---|
| ADEM | Arkansas DEM | The Arkansas Department of Emergency Management is responsible for emergency operations during a disaster or large scale incident. | Existing |
| AHTD | AHTD Crittenden County Local TOC | Traffic operations workstation located at the weigh station in Crittenden County with shared access to TDOT CCTV cameras located in Arkansas. | Existing |
| | AHTD District 1 TMC | Transportation management center for AHTD District 1. Responsible for the operation of the ITS equipment located in District 1. | Planned |
| | AHTD District Maintenance | AHTD entity responsible for the oversight of maintenance activities in AHTD District 1. | Existing |
| | AHTD Statewide TMC | Arkansas Statewide Traffic Management Center located in Little Rock. | Existing |
| | Arkansas 511 System | Statewide 511 traveler information system central server. | Planned |
| | Arkansas TSIS/IDrive Arkansas.com | Statewide roadway conditions databases for Arkansas. | Existing |
| Arkansas State Police | Arkansas State Police | Statewide law enforcement agency with powers to enforce all criminal and traffic laws of the State of Arkansas. | Existing |
| City of Bartlett | City of Bartlett CCTV Cameras | Closed circuit television cameras for traffic surveillance and incident management. | Planned |
| | City of Bartlett DMS | Dynamic message signs for traffic information dissemination. | Planned |
| | City of Bartlett Field Sensors | Roadway equipment used to detect vehicle volumes and/or speeds. Includes equipment such as video image vehicle detection systems (VIVDS), remote traffic microwave sensors (RTMS), or traditional loops. Also includes sensors to detect train lengths and speeds to estimate the anticipated duration of closures. | Existing |
| | City of Bartlett Fire/EMS Vehicles | City of Bartlett Fire Department and Emergency Medical Services vehicles. | Existing |
| | City of Bartlett Notify Me | City of Bartlett email or phone service used to alert subscribers of current or pending issues. | Existing |
| | City of Bartlett Police Department | 911 Public Safety Answering Point (PSAP) responsible for answering all 911 calls made within the City and dispatching emergency responders. Non-emergency functions include the collection of crash data and enforcement of speed limits and commercial vehicles. | Existing |
| | City of Bartlett Police Vehicles | City of Bartlett Police Department vehicles. | Existing |
| | City of Bartlett Rail Notification System | Roadway equipment used to alert motorists that a crossing is currently blocked by a train. | Planned |

**Table 5 – Memphis Urban Area Inventory of ITS Elements (continued)**

| Stakeholder | Element Name | Element Description | Status |
|---|---|---|---|
| City of Bartlett (continued) | City of Bartlett Speed Monitoring Equipment | Field equipment used for monitoring roadway speeds. | Existing |
| | City of Bartlett TOC | Traffic operations center for the City of Bartlett. Responsible for the operation of the traffic signal system, closed circuit television (CCTV) cameras, dynamic message signs (DMS), and any other ITS infrastructure deployed by the City. | Existing |
| | City of Bartlett Traffic Signals | Traffic signal system operated by the City of Bartlett. | Existing |
| | City of Bartlett Website | Website for the City of Bartlett. Includes information on City departments and in the future it is envisioned that the website may have real-time information about roadway conditions, including traffic images. | Existing |
| City of Germantown | City of Germantown CCTV Cameras | Closed circuit television cameras for traffic surveillance and incident management. | Planned |
| | City of Germantown DMS | Dynamic message signs for traffic information dissemination. | Planned |
| | City of Germantown eNotices | City of Germantown email or phone service used to notify subscribers of requested news including public safety or traffic alerts. | Existing |
| | City of Germantown Field Sensors | Roadway equipment used to detect vehicle volumes and/or speeds. Includes equipment such as video image vehicle detection systems, remote traffic microwave sensors, or traditional loops. Also includes sensors to detect train lengths and speeds to estimate the anticipated duration of closures. | Existing |
| | City of Germantown Fire/EMS Vehicles | City of Germantown Fire Department Emergency Medical Services vehicles. | Existing |
| | City of Germantown Police Department | 911 Public Safety Answering Point responsible for answering all 911 calls made within the City and dispatching emergency responders. Non-emergency functions include the collection of crash data and enforcement of speed limits and commercial vehicles. | Existing |
| | City of Germantown Police Vehicles | City of Germantown Police Department vehicles. | Existing |
| | City of Germantown Rail Notification System | Roadway equipment used to alert motorists that a crossing is currently blocked by a train. | Planned |
| | City of Germantown Speed Monitoring Equipment | Field equipment used for monitoring roadway speeds. | Planned |
| | City of Germantown TOC | Traffic operations center for the City of Germantown. Responsible for the operation of the traffic signal system, closed circuit television cameras, dynamic message signs, and any other ITS infrastructure deployed by the City. | Existing |

**Table 5 – Memphis Urban Area Inventory of ITS Elements (continued)**

| Stakeholder | Element Name | Element Description | Status |
|---|---|---|---|
| City of Germantown (continued) | City of Germantown Traffic Signals | Traffic signal system operated by the City of Germantown. | Existing |
| | City of Germantown Website | Website for the City of Germantown. Includes information on City departments and in the future it is envisioned that the website may have real-time information about roadway conditions, including traffic images. | Existing |
| City of Horn Lake | City of Horn Lake 911 Dispatch | Responsible for emergency call-taking and dispatch for the City of Horn Lake. | Existing |
| | City of Horn Lake CCTV Cameras | Closed circuit television cameras for traffic surveillance and incident management. | Planned |
| | City of Horn Lake Fire/EMS Vehicles | City of Horn Lake Fire Department and Emergency Medical Services vehicles. | Existing |
| | City of Horn Lake Field Sensors | Roadway equipment used to detect vehicle volumes and/or speeds. Includes equipment such as video image vehicle detection systems, remote traffic microwave sensors, or traditional loops. Also includes sensors to detect train lengths and speeds to estimate the anticipated duration of closures. | Planned |
| | City of Horn Lake Police Vehicles | City of Horn Lake Police Department vehicles. | Existing |
| | City of Horn Lake Rail Notification System | Roadway equipment used to alert motorists that a crossing is currently blocked by a train. | Planned |
| | City of Horn Lake TOC | Traffic operations center for the City of Horn Lake. Responsible for the operation of the traffic signal system. | Planned |
| | City of Horn Lake Traffic Signals | Traffic signal system operated by the City of Horn Lake. | Existing |
| | City of Horn Lake Website | Website for the City of Horn Lake. Includes information on City departments and in the future it is envisioned that the website may have real-time information about roadway conditions, including traffic images. | Existing |
| City of Memphis | City of Memphis Arterial Emergency Response Dispatch | Dispatch for roadway service patrol vehicles operating on arterials in the City of Memphis. | Planned |
| | City of Memphis Arterial Emergency Response Vehicles | Roadway service patrol vehicles that operate off the interstate system in the City of Memphis to aid in incident clearance and incident scene traffic management. | Planned |
| | City of Memphis CCTV Cameras | Closed circuit television cameras for traffic surveillance and incident management. | Planned |
| | City of Memphis Changeable Speed Limit Signs | City of Memphis roadway equipment used to lower speed limits on the roadway. | Planned |

**Table 5 – Memphis Urban Area Inventory of ITS Elements (continued)**

| Stakeholder | Element Name | Element Description | Status |
|---|---|---|---|
| City of Memphis (continued) | City of Memphis City Engineer's Office | Office responsible for administration of maintenance and construction projects within the City as well as communicating work zone information to the public and other affected agencies. | Existing |
| | City of Memphis DMS | Dynamic message signs for traffic information dissemination. | Planned |
| | City of Memphis Engineering Division | Division responsible for design, survey, and inspection during construction of streets, bridges, storm drains, sanitary sewers, traffic control devices and City facilities. The division also provides installation and maintenance of signs and markings along streets and maintenance of traffic lights for the City and County municipalities. | Existing |
| | City of Memphis Field Sensors | Roadway equipment used to detect vehicle volumes and/or speeds. Includes equipment such as video image vehicle detection systems, remote traffic microwave sensors, or traditional loops. Also includes sensors to detect train lengths and speeds to estimate the anticipated duration of closures. | Existing |
| | City of Memphis Fire/EMS Vehicles | City of Memphis Fire Department and Emergency Medical Services vehicles. | Existing |
| | City of Memphis Parking Management System | Parking management system to provide real-time parking availability information to drivers in coordination with private parking facilities and transit and traffic management. | Planned |
| | City of Memphis Pedestrian Hybrid Beacons | A beacon that grants right of way to crossing pedestrians at a marked crosswalk. | Existing |
| | City of Memphis Police Department | 911 Public Safety Answering Point responsible for answering all 911 calls made within the City and dispatching emergency responders. Non-emergency functions include the collection of crash data and enforcement of speed limits and commercial vehicles. | Existing |
| | City of Memphis Police Portable DMS | Portable dynamic message signs owned and operated by the City of Memphis Police for the distribution of work zone information. In the future the Public Works and Engineering Divisions would like to be able to place messages on the signs as well. | Existing |
| | City of Memphis Police Vehicles | City of Memphis Police Department vehicles. | Existing |
| | City of Memphis Public Works Division | Division responsible for the operation and maintenance of the City's infrastructure which includes streets, sanitary sewers, storm drains, bridges and flood control. | Existing |
| | City of Memphis Rail Notification System | Roadway equipment used to alert motorists that a crossing is currently blocked by a train. | Existing |

**Table 5 – Memphis Urban Area Inventory of ITS Elements (continued)**

| Stakeholder | Element Name | Element Description | Status |
|---|---|---|---|
| City of Memphis (continued) | City of Memphis RWIS Sensors | Road weather information system sensors to monitor weather conditions at the roadway. | Planned |
| | City of Memphis Service Vehicles | City of Memphis vehicles used by the Public Works Division and Engineering Division to support maintenance, construction, and operation of the City's transportation infrastructure. | Existing |
| | City of Memphis Speed Monitoring Equipment | Field equipment used for monitoring roadway speeds. | Existing |
| | City of Memphis TOC | Traffic operations center for the City of Memphis. Responsible for the operation of the traffic signal system, closed circuit television cameras, dynamic message signs, and any other ITS infrastructure deployed by the City. | Existing |
| | City of Memphis Traffic Signals | Traffic signal system operated by the City of Memphis. | Existing |
| | City of Memphis Website | Website for the City of Memphis. Includes information on City departments and in the future it is envisioned that the website may have real-time information about roadway conditions, including traffic images. | Existing |
| City of Millington | City of Millington CCTV Cameras | Closed circuit television cameras for traffic surveillance and incident management. | Planned |
| | City of Millington DMS | Dynamic message signs for traffic information dissemination. | Planned |
| | City of Millington Field Sensors | Roadway equipment used to detect vehicle volumes and/or speeds. Includes equipment such as video image vehicle detection systems, remote traffic microwave sensors, or traditional loops. Also includes sensors to detect train lengths and speeds to estimate the anticipated duration of closures. | Existing |
| | City of Millington Fire Vehicles | City of Millington Fire Department vehicles. | Existing |
| | City of Millington Notify Me | City of Millington email or phone service used to notify subscribers of requested news including emergency alerts, and public works updates. | Existing |
| | City of Millington Police Department | 911 Public Safety Answering Point responsible for answering all 911 calls made within the City and dispatching emergency responders. Non-emergency functions include the collection of crash data and enforcement of speed limits and commercial vehicles. | Existing |
| | City of Millington Police Vehicles | City of Millington Police Department vehicles. | Existing |
| | City of Millington Rail Notification System | Roadway equipment used to alert motorists that a crossing is currently blocked by a train. | Existing |

**Table 5 – Memphis Urban Area Inventory of ITS Elements (continued)**

| Stakeholder | Element Name | Element Description | Status |
|---|---|---|---|
| City of Millington (continued) | City of Millington Speed Monitoring Equipment | Field equipment used for monitoring roadway speeds. | Planned |
| | City of Millington TOC | Traffic operations center for the City of Millington. Responsible for the operation of the traffic signal system, closed circuit television cameras, dynamic message signs, and any other ITS infrastructure deployed by the City. | Existing |
| | City of Millington Traffic Signals | Traffic signal system operated by the City of Millington. | Existing |
| | City of Millington Website | Website for the City of Millington. Includes information on City departments and in the future it is envisioned that the website may have real-time information about roadway conditions, including traffic images. | Existing |
| City of Olive Branch | City of Olive Branch CCTV Cameras | Closed circuit television cameras for traffic surveillance and incident management. | Planned |
| | City of Olive Branch CodeRED | City of Olive Branch email or phone service used to notify subscribers of requested alerts concerning emergency situations. | Existing |
| | City of Olive Branch DMS | Dynamic message signs for traffic information dissemination. | Planned |
| | City of Olive Branch Emergency Communications Center | 911 Public Safety Answering Point responsible for answering all 911 calls made within the City and dispatching emergency responders. Non-emergency functions include the collection of crash data and enforcement of speed limits and commercial vehicles. | Existing |
| | City of Olive Branch Field Sensors | Roadway equipment used to detect vehicle volumes and/or speeds. Includes equipment such as video image vehicle detection systems, remote traffic microwave sensors, or traditional loops. | Existing |
| | City of Olive Branch Fire/EMS Vehicles | City of Olive Branch Fire Department and Emergency Medical Services vehicles. | Existing |
| | City of Olive Branch Police Vehicles | City of Olive Branch Police Department vehicles. | Existing |
| | City of Olive Branch Rail Notification System | Roadway equipment used to alert motorists that a crossing is currently blocked by a train. | Existing |
| | City of Olive Branch TOC | Traffic operations center for the City of Olive Branch. Responsible for the operation of the traffic signal system, closed circuit television cameras, dynamic message signs, and any other ITS infrastructure deployed by the City. | Existing |

**Table 5 – Memphis Urban Area Inventory of ITS Elements (continued)**

| Stakeholder | Element Name | Element Description | Status |
|---|---|---|---|
| City of Olive Branch (continued) | City of Olive Branch Traffic Signals | Traffic signal system operated by the City of Olive Branch. | Existing |
| | City of Olive Branch Website | Website for the City of Olive Branch. Includes information on City departments and in the future it is envisioned that the website may have real-time information about roadway conditions, including traffic images. | Existing |
| City of Southaven | City of Southaven Fire/EMS Vehicles | City of Southaven Fire Department and Emergency Medical Services vehicles. | Existing |
| | City of Southaven Notify Me | City of Southaven email or phone service used to notify subscribers of requested news including emergency alerts, and public works updates. | Existing |
| | City of Southaven Police Department | Police Department for the City of Southaven. Responsible for emergency call-taking and dispatch for the City of Southaven. | Existing |
| | City of Southaven Police Vehicles | City of Southaven Police Department Vehicles. | Existing |
| | City of Southaven Rail Notification System | Roadway equipment used to alert motorists that a crossing is currently blocked by a train. | Planned |
| | City of Southaven Traffic Signals | Traffic signal system operated by the City of Southaven. | Existing |
| City of West Memphis | City of West Memphis Police Department | Police Department for the City of West Memphis. | Existing |
| | City of West Memphis TOC | Traffic operations center for the City of West Memphis. Responsible for the operation of the traffic signal system and any other ITS infrastructure deployed by the City. | Planned |
| | West Memphis MPO Data Archive | Archive of regional transportation data used in planning. | Planned |
| Commercial Vehicle Operators | Commercial Vehicles | Privately owned commercial vehicles traveling within the Region. | Existing |
| | Private Fleet Management Systems | Fleet and freight management for private carriers. | Existing |
| | Rail Freight | Rail cars traveling within the Region. | Existing |
| DARTS | DARTS Data Archive | Delta Area Rural Transit System transit ridership statistics used by the National Transit Database, FTA, and MDOT. | Planned |
| | DARTS Demand Response Vehicles | Delta Area Rural Transit System demand response vehicle fleet. | Existing |
| | DARTS Dispatch Center | Delta Area Rural Transit System dispatch center responsible for the tracking, scheduling, and dispatching of DARTS demand response services. | Existing |
| | DARTS Website | Delta Area Rural Transit System website. Includes information on services and in the future it is envisioned that the website will have real-time information about regional transit services and the ability to make trip requests online. | Existing |

**Table 5 – Memphis Urban Area Inventory of ITS Elements (continued)**

| Stakeholder | Element Name | Element Description | Status |
|---|---|---|---|
| Delta HRA | Delta HRA Data Archive | Delta Human Resource Agency transit ridership statistics used by the National Transit Database, FTA, and TDOT Office of Public Transportation. | Planned |
| | Delta HRA Demand Response Vehicles | Delta Human Resource Agency demand response vehicle fleet. | Existing |
| | Delta HRA Transportation Dispatch Center | Delta Human Resource Agency dispatch center responsible for the tracking, scheduling and dispatching of Delta HRA demand response services. | Existing |
| | Delta HRA Transportation Website | Delta Human Resource Agency transit website. Includes information on services and in the future it is envisioned that the website will have real-time information about regional transit services and the ability to make trip requests online. | Existing |
| DeSoto County | DeSoto County E-911 | Primary 911 Public Safety Answering Point (PSAP) responsible for answering 911 calls and dispatching emergency responders within unincorporated areas of the County. | Existing |
| | DeSoto County EMA | Emergency Management Agency for DeSoto County. Responsible for disaster planning for the County and operating the emergency operations center. | Existing |
| | DeSoto County EMS Dispatch | Emergency Medical Services dispatch for DeSoto County. | Existing |
| | DeSoto County EMS Vehicles | DeSoto County Emergency Medical Services vehicles. | Existing |
| | DeSoto County Sheriff Vehicles | DeSoto County Sheriff's Office vehicles. | Existing |
| Fayette County | Fayette County EMA | Emergency Management Agency for Fayette County. Responsible for disaster planning for the County and operating the emergency operations center. | Existing |
| | Fayette County EMS Dispatch | Emergency Medical Services dispatch for Fayette County. | Existing |
| | Fayette County EMS Vehicles | Fayette County Emergency Medical Services vehicles. | Existing |
| | Fayette County Sheriff | Primary 911 Public Safety Answering Point responsible for answering most 911 calls made within the County and dispatching emergency responders. Non-emergency functions include the collection of crash data and enforcement of speed limits and commercial vehicles. | Existing |
| | Fayette County Sheriff Vehicles | Fayette County Sheriff's Office vehicles. | Existing |
| Financial Institution | Financial Service Provider | Service provider that handles exchange of money for transit electronic payment collection. | Existing |

**Table 5 – Memphis Urban Area Inventory of ITS Elements (continued)**

| Stakeholder | Element Name | Element Description | Status |
|---|---|---|---|
| Greater Memphis Regional Express Bus | Greater Memphis Regional Express Bus Dispatch Center | Dispatch center for a future express bus system between Mississippi and Tennessee that is currently being evaluated by MDOT. | Planned |
| | Greater Memphis Regional Express Bus System Website | Website for potential regional express bus service between Mississippi and Tennessee. | Planned |
| | Regional Express Bus Vehicles | Express bus vehicles that may be part of a future express bus system between Mississippi and Tennessee that is currently being evaluated by MDOT. | Planned |
| MATA | Electronic Fare Payment Card | Memphis Area Transit Authority medium for collection of transit fares electronically. | Existing |
| | MATA Bus Arrival Status Boards | Memphis Area Transit Authority real-time next bus arrival information boards at transit transfer centers and select bus stops. | Existing |
| | MATA Data Archive | Memphis Area Transit Authority transit ridership statistics used by the National Transit Database, FTA, and TDOT Office of Public Transportation. | Existing |
| | MATA Dispatch Center | Memphis Area Transit Authority central dispatch for fixed route and paratransit operations. | Existing |
| | MATA Ticket Vending Machines | Memphis Area Transit Authority ticket vending machines used for the purchase and recharging of electronic fare payment cards. | Planned |
| | MATA Fixed-Route Vehicles | Memphis Area Transit Authority fixed-route vehicles. Includes neighborhood routes and any other fixed route service. | Existing |
| | MATA Mobile App | Mobile phone application that allows users to view transit service information, real-time bus location, and create a transit trip plan. | Existing |
| | MATA Paratransit Vehicles | Memphis Area Transit Authority paratransit vehicles known as MATAplus. | Existing |
| | MATA Transit Facility CCTV Surveillance | Memphis Area Transit Authority closed circuit television camera surveillance at transit transfer centers or other transit facilities. | Existing |
| | MATA Trolleys | Memphis Area Transit Authority trolley rail vehicles. | Existing |
| | MATA Website | Memphis Area Transit Authority website. Includes information on MATA services, provides real-time information about trolley and fixed-route services, and a routing application to assist travelers in developing a customized transit trip plan. | Existing |
| MDOT | MDOT CCTV Cameras | Closed circuit television cameras for traffic surveillance and incident management. | Existing |
| | MDOT Data Archive | Archive of transportation data used in planning. | Existing |

**Table 5 – Memphis Urban Area Inventory of ITS Elements (continued)**

| Stakeholder | Element Name | Element Description | Status |
|---|---|---|---|
| MDOT (continued) | MDOT District 2 Engineer's Office | District 2 Engineer's Office is responsible for administration of maintenance and construction projects within the District as well as communicating work zone information to the public through the Public Information Office. | Existing |
| | MDOT District 2 Maintenance | Office that handles most of the routine roadway maintenance and responds to incidents when services are requested by local emergency management. | Existing |
| | MDOT DMS | Dynamic message signs for traffic information dissemination. | Existing |
| | MDOT Emergency Services Coordinator | Coordinator responsible for managing the MDOT response in a large scale incident or disaster in which the Mississippi Emergency Management Agency activates the state emergency operations center. | Existing |
| | MDOT Field Sensors | Roadway equipment used to detect vehicle volumes and/or speeds. Includes equipment such as video image vehicle detection systems, remote traffic microwave sensors, or traditional loops. | Existing |
| | MDOT HAR | Highway advisory radio for traffic information dissemination. | Planned |
| | MDOT Maintenance Vehicles | MDOT vehicles used in maintenance operations. | Existing |
| | MDOT Northwest Regional TMC | MDOT Traffic Management Center for Northwest Mississippi, located in Southaven. Responsible for the operation of traffic signals and other ITS devices in the area. The City of Southaven is co-located with MDOT at the TMC. | Existing |
| | MDOT Office of Law Enforcement CVO Enforcement | Mississippi Department of Transportation commercial vehicle operations inspection and enforcement. | Existing |
| | MDOT Office of Law Enforcement Truck Weigh and Inspection Stations | Commercial vehicle inspection station with the capability to weigh commercial vehicles and evaluate their credentials. | Existing |
| | MDOT Office of Law Enforcement Weigh-in-Motion | MDOT facilities with the capability to weigh commercial vehicles while they are traveling at highway speeds. | Existing |
| | MDOT Portable DMS | Portable dynamic message signs for the distribution of traffic and roadway condition information. | Existing |
| | MDOT Public Information Office | Office responsible for the dissemination of traffic information to the media and the public. | Existing |
| | MDOT Roadway Service Patrol Dispatch | Roadway service patrol dispatch. | Planned |
| | MDOT Roadway Service Patrol Vehicles | Roadway Service patrol vehicles that operate primarily along controlled access highways and arterials in northern Mississippi. | Planned |
| | MDOT RWIS Sensors | Road weather information system sensors to monitor weather conditions at the roadway. | Existing |

**Table 5 – Memphis Urban Area Inventory of ITS Elements (continued)**

| Stakeholder | Element Name | Element Description | Status |
|---|---|---|---|
| MDOT (continued) | MDOT Smart Work Zone Equipment | Portable ITS equipment that can be used in work zones to more efficiently manage traffic and provide traveler information. Includes portable closed circuit television cameras, vehicle detection, and dynamic message signs. | Existing |
| | MDOT Traffic Signals | Traffic signal system operated by the Mississippi DOT. | Existing |
| | MDOTtraffic App | Mobile phone application that provides real-time traffic alert information and streaming video from traffic cameras. | Existing |
| | MDOTtraffic Website | Website providing road network conditions including incident and construction information and camera views. | Existing |
| | Mississippi 511 IVR | Mississippi 511 Interactive Voice Response. The IVR accepts callers' requests and provides responses to specific traveler information needs. This is the customer interface component of the 511 phone system. | Existing |
| | Mississippi 511 System | Statewide 511 traveler information system central server | Existing |
| | Mississippi Statewide TMC | Mississippi Statewide Traffic Management Center in Jackson, MS. | Existing |
| | Other MDOT District Construction and Maintenance Offices | Additional MDOT district construction and maintenance offices excluding those in District 2 | Existing |
| Media | Local Print and Broadcast Media | Local media outlets including television stations, newspapers, radio stations and their associated websites. | Existing |
| MEMA | Mississippi EMA | The Mississippi Emergency Management Agency manages emergency operations during a disaster or large scale incident. | Existing |
| Memphis and Shelby County Health Department | Memphis and Shelby County Health Department Emissions Sensors | Air quality sensors that monitor ozone and particulate matter levels. | Existing |
| | Memphis and Shelby County Health Department Pollution Control | Responsible for administering local air pollution control laws and monitoring air quality in Shelby County. | Existing |
| Memphis MPO | Memphis MPO Data Archive | Archive of regional transportation data used in planning. | Planned |
| | Memphis MPO Website | Website for the Memphis MPO. | Existing |
| Mississippi Highway Patrol | MHP Dispatch | Mississippi Highway Patrol dispatch center. There are several MHP dispatch centers around the state of Mississippi. | Existing |
| | MHP Vehicles | Mississippi Highway Patrol vehicles. | Existing |
| MS Municipal and County Emergency Management Stakeholder Group | All MS Municipal and County Emergency Dispatch Agencies | Group of emergency management agencies in Mississippi that includes the following: the City of Horn Lake 911 Dispatch, City of Olive Branch Emergency Communications Center, City of Southaven Police Department, DeSoto County E-911, and Municipal Emergency Dispatch. | Existing |

**Table 5 – Memphis Urban Area Inventory of ITS Elements (continued)**

| Stakeholder | Element Name | Element Description | Status |
|---|---|---|---|
| MS Municipal and County Traffic Management Stakeholder Group | All MS Municipal and County TOCs | Group of traffic management agencies in Mississippi that includes the following: City of Horn Lake TOC, City of Olive Branch TOC, City of Southaven (MDOT Northwest Regional TMC) and Municipal TOC. | Existing |
| Municipal/County Government | Municipal Arterial Emergency Response Dispatch | Dispatch for roadway service patrol vehicles operating on arterials in the municipality. | Planned |
| | Municipal Arterial Emergency Response Vehicles | Roadway service patrol vehicles that operate off the interstate system within the municipality to aid in incident clearance and incident scene traffic management. | Planned |
| | Municipal CCTV Cameras | Closed circuit television cameras for traffic surveillance and incident management. | Planned |
| | Municipal Field Sensors | Roadway equipment used to detect vehicle volumes and/or speeds. Includes equipment such as video image vehicle detection systems, remote traffic microwave sensors, or traditional loops. | Planned |
| | Municipal Public Safety Dispatch | Responsible for the dispatch of municipal public safety vehicles. | Existing |
| | Municipal Public Safety Vehicles | Vehicles used by municipal public safety agencies. | Existing |
| | Municipal Rail Notification System | Roadway equipment used to alert motorists that a crossing is currently blocked by a train. | Planned |
| | Municipal TOC | Municipal traffic operations center. Responsible for the operation of the traffic signal system, closed circuit television cameras, dynamic message signs, and any other ITS infrastructure deployed by the municipality. | Planned |
| | Municipal Traffic Signals | Municipal traffic signal systems within the Memphis MPO Region. | Existing |
| | Municipal/County Engineers Office | Municipal/County Engineer's office is responsible for administration of maintenance and construction projects within the municipality as well as communicating work zone information to the public through the Public Information Office. | Existing |
| | Municipal/County Maintenance | Department that oversees the maintenance of streets, sidewalks, and roadway right-of-way. | Existing |
| | Municipal/County Maintenance Vehicles | Municipal/County vehicles used in maintenance operations. | Existing |
| | Municipal/County Portable DMS | Portable dynamic message signs used for traffic information dissemination during maintenance and construction activities, special events, or incidents. | Planned |
| | Municipal/County RWIS Sensors | Road weather information system sensors to monitor weather conditions at the roadway. | Planned |

**Table 5 – Memphis Urban Area Inventory of ITS Elements (continued)**

| Stakeholder | Element Name | Element Description | Status |
|---|---|---|---|
| Municipal/County Government (continued) | Municipal/County Website | Municipal or county website that includes information on agency departments. In the future it is envisioned that the website would have real-time information about roadway conditions. | Planned |
| | Other Municipal/County Maintenance | Maintenance groups in adjacent municipalities or counties for coordination of maintenance activities. | Existing |
| NOAA | National Weather Service | Provides official US weather, marine, fire, and aviation forecasts, warnings, meteorological products, climate forecasts, and information about meteorology. | Existing |
| Other Agencies | Other Maintenance and Construction Management Agencies | Additional maintenance and construction operations agencies with which information is shared for coordination in an emergency situation. | Existing |
| | Other Traffic Management Agencies | Additional traffic management agencies with which information is shared for coordination in an emergency situation. | Existing |
| Private Information Providers | Private Sector Traveler Information Services | Traveler information service operated by a private entity. | Existing |
| | Private Transit Information Provider | Private company that repackages transit information for subscribers. | Existing |
| | Social Networking Services | Subscription based services operated by private providers that provide an option for real-time traveler information dissemination. Examples of such services include Facebook or Twitter. | Existing |
| Private Service Provider | Private Contract EMS Vehicles | Emergency Medical Services vehicles operating within Shelby County under contract with the Shelby County Fire Department. | Existing |
| | Private Parking Facilities | Privately owned public parking facilities that typically charge a fee for parking. | Existing |
| | Private Probe Data Provider | Private provider of aggregated vehicle probe data for monitoring of road network conditions. | Planned |
| | Private Transportation Providers | Private providers of transportation services in the Region. This includes taxis, Greyhound or other inter-city bus providers, Amtrak and the New Freedoms Program. | Existing |
| Rail Operators | Rail Operator Wayside Equipment | Equipment located along the tracks including railroad crossing gates, bells, and lights as well as the interface to the traffic signal controller indicating the presence of a train. | Existing |
| Shelby County | Shelby County Fire Department | Responsible for dispatch of private contract EMS vehicles operating on behalf of the Fire Department within Shelby County. | Existing |
| | Shelby County Fire Vehicles | Shelby County Fire Department vehicles. | Existing |

**Table 5 – Memphis Urban Area Inventory of ITS Elements (continued)**

| Stakeholder | Element Name | Element Description | Status |
|---|---|---|---|
| Shelby County (continued) | Shelby County Office of Preparedness | Emergency Management Agency for the City of Memphis and Shelby County. Responsible for disaster planning for the County and operating the emergency operations center. | Existing |
| | Shelby County Sheriff | 911 Public Safety Answering Point responsible for answering all 911 calls made within the County outside the Cities of Memphis, Bartlett, Collierville and Germantown and dispatching emergency responders. Non-emergency functions include the collection of crash data and enforcement of speed limits and commercial vehicles. | Existing |
| | Shelby County Sheriff Vehicles | Shelby County Sheriff's Office vehicles. | Existing |
| | Shelby County TOC | Traffic operations center for Shelby County. Responsible for the operation of the traffic signal system. | Planned |
| | Shelby County Traffic Signals | Traffic signal system operated by Shelby County. | Existing |
| Shelby County Emergency Management Stakeholder Group | All Shelby County Emergency Dispatch Agencies | Group of emergency management agencies in Shelby County that includes the following: the City of Memphis Police Department, City of Bartlett Police Department, Town of Collierville Police Department, City of Germantown Police Department, Shelby County Sheriff, and Municipal Emergency Dispatch. | Existing |
| Shelby County Traffic Management Stakeholder Group | All Shelby County TOCs | Group of traffic management agencies in Shelby County that includes the following: the City of Bartlett TOC, Town of Collierville TOC, City of Germantown TOC, City of Millington TOC, Shelby County TOC, and Municipal TOC. | Existing |
| Southwest HRA | Southwest HRA Transportation Dispatch Center | Southwest Human Resource Agency dispatch center responsible for the tracking, scheduling and dispatching of Southwest HRA demand response services. | Existing |
| System Users | Archive Data User | Those who request information from the data archive systems. | Existing |
| | Pedestrians | Individuals afoot or using a motorized or non-motorized wheelchair. | Existing |
| | Private Travelers Personal Computing Devices | Computing devices that travelers use to access public information. | Existing |
| | Public/Private Vehicles | Vehicles that traverse a specific region. | Existing |
| | Traveler | User of the transportation system. | Existing |
| | Vehicle Operator | Operators of commercial vehicles. | Existing |
| TDOT | Other TDOT Region Construction and Maintenance Offices | Other TDOT regional construction and maintenance offices besides those in Region 4. | Existing |
| | TDOT Automated Roadway Treatment Equipment | Equipment used for the automated application on anti-icing chemicals at locations prone to freezing. | Planned |

**Table 5 – Memphis Urban Area Inventory of ITS Elements (continued)**

| Stakeholder | Element Name | Element Description | Status |
|---|---|---|---|
| TDOT (continued) | TDOT CCTV Cameras | Closed circuit television cameras for traffic surveillance and incident management. | Existing |
| | TDOT District Maintenance | Office that handles most of the routine roadway maintenance and responds to incidents when services are requested by local emergency management. | Existing |
| | TDOT DMS | Dynamic message signs for traffic information dissemination. | Existing |
| | TDOT Emergency Services Coordinator | Coordinator responsible for managing the Tennessee Department of Transportation response in a large scale incident or disaster in which the Tennessee Emergency Management Agency activates the state emergency operations center. | Existing |
| | TDOT Field Sensors | Roadway equipment used to detect vehicle volumes and/or speeds. Includes equipment such as video image vehicle detection systems, remote traffic microwave sensors, or traditional loops. | Existing |
| | TDOT HAR | Highway advisory radio for traffic information dissemination. | Existing |
| | TDOT HELP Vehicles | Roadway service patrol vehicles. Currently operate primarily on controlled access highways in Shelby County and are dispatched elsewhere in the Region for large incidents. | Existing |
| | TDOT Infrastructure Monitoring Equipment | Surveillance equipment deployed on and near the Mississippi River bridges to monitor the security of the bridges. | Existing |
| | TDOT Infrastructure Monitoring Sensors | Sensors on bridge structures that are monitoring seismic activity. The data is transmitted to the University of Memphis Center for Earthquake Research and Information from the TDOT Region 4 TMC. | Existing |
| | TDOT Lane Control DMS | Dynamic message sign with the ability to display full-color traffic information messages and dynamic lane management. | Planned |
| | TDOT Long Range Planning Division Archive | Data archive for the Long Range Division. The Division is responsible for traffic data collection and analysis. | Existing |
| | TDOT Maintenance Headquarters | TDOT maintenance headquarters. | Existing |
| | TDOT Maintenance Vehicles | TDOT vehicles used in maintenance operations. | Existing |
| | TDOT Public Information Office | Office responsible for the dissemination of traffic information to the media and the public. | Existing |
| | TDOT Ramp Metering Equipment | Roadway equipment used in the operation of a ramp metering system. Includes the signals and any other ITS equipment. | Planned |

**Table 5 – Memphis Urban Area Inventory of ITS Elements (continued)**

| Stakeholder | Element Name | Element Description | Status |
|---|---|---|---|
| TDOT (continued) | TDOT Region 1 TMC - Knoxville | Transportation management center for Region 1, located in Knoxville. Responsible for the operation of the ITS equipment located in Region 1. This includes the freeway management system in Knoxville as well as rural ITS deployments. | Existing |
| | TDOT Region 2 TMC - Chattanooga | Transportation management center for Region 2, located in Chattanooga. Responsible for the operation of the ITS equipment located in Region 2. This includes the freeway management system in Chattanooga as well as rural ITS deployments. | Existing |
| | TDOT Region 3 TMC - Nashville | Transportation management center for Region 3, located in Nashville. Responsible for the operation of the ITS equipment located in Region 3. This includes the freeway management system in Nashville as well as rural ITS deployments. | Existing |
| | TDOT Region 4 | TDOT Region 4 is responsible for the administration and operation of the state highway system in 21 counties in west Tennessee. | Existing |
| | TDOT Region 4 Backup TMC - Jackson | Backup TMC for TDOT Region 4 located in Jackson at the Region 4 offices, and is connected to the TMC in Memphis via a wireless link. | Existing |
| | TDOT Region 4 Construction Office | Office responsible for oversight of construction projects in Region 4. | Existing |
| | TDOT Region 4 Engineer's Office | Office responsible for administration of maintenance and construction projects within the Region as well as communicating work zone information to the public through the Public Information Office. | Existing |
| | TDOT Region 4 HELP Dispatch | Roadway service patrol dispatch. Currently operate primarily on controlled access highways in Shelby County and are dispatched elsewhere in the Region for large incidents. | Existing |
| | TDOT Region 4 Maintenance | Region 4 maintenance headquarters. Responsible for maintenance operations in the Region; however, most routine maintenance is handled by the District Maintenance Offices. There are several District Maintenance Offices within the Region. | Existing |
| | TDOT Region 4 Smart Work Zone Equipment | Portable ITS equipment that can be used in work zones to more efficiently manage traffic and provide traveler information. Includes portable closed circuit television (CCTV) cameras, vehicle detection, and dynamic message signs (DMS). | Planned |
| | TDOT Region 4 TMC - Memphis | Transportation management center for Region 4, located in Memphis. Responsible for the operation of the ITS equipment located in Region 4. This includes the freeway management system in Memphis as well as rural ITS deployments. | Existing |
| | TDOT RWIS Sensors | Road weather information system sensors to monitor weather conditions at the roadway. | Planned |

**Table 5 – Memphis Urban Area Inventory of ITS Elements (continued)**

| Stakeholder | Element Name | Element Description | Status |
|---|---|---|---|
| TDOT (continued) | TDOT SmartWay Mobile App | Mobile phone application that allows users to view traffic images, receive incident information, and monitor traffic speeds. | Existing |
| | TDOT SmartWay Website | Website providing road network conditions including incident and construction information and camera views. Much of the data for the website comes from SWIFT. | Existing |
| | TDOT Statewide Information for Travelers (SWIFT) | SWIFT is a statewide roadway conditions database. Currently information can be entered by District and Regional maintenance personnel as well as staff at any of the Transportation Management Centers and the Tennessee Highway Patrol. SWIFT feeds the Statewide 511 system and SmartWay website. | Existing |
| | TDOT Toll Plazas | Toll plazas used for electronic toll collection on potential future toll roads. | Planned |
| | Tennessee 511 IVR | Tennessee 511 Interactive Voice Response. TDOT contracts the IVR operation to a vendor. The IVR accepts callers' requests and provides responses to specific traveler information needs. This is the customer interface component of the 511 phone system. | Existing |
| | Tennessee 511 System | 511 traveler information system central server. | Existing |
| TEMA | Tennessee EMA | Tennessee Emergency Management Agency responsible for managing emergency operations during a disaster or large scale incident. | Existing |
| Tennessee Bureau of Investigation | Tennessee Bureau of Investigation | Responsible for issuing statewide America's Missing: Broadcast Emergency Response (AMBER) Alerts in Tennessee. | Existing |
| THP | THP Dispatch | Tennessee Highway Patrol dispatch center. There are several THP dispatch centers around the state of Tennessee. | Existing |
| | THP Vehicles | Tennessee Highway Patrol vehicles. | Existing |
| | TITAN Database | The Tennessee Integrated Traffic Analysis Network is the Tennessee Department of Safety crash record database maintained by THP for the collection of crash record information. TITAN interfaces with the TraCS (Traffic and Criminal Software) system. | Existing |
| TN Municipal and County Emergency Management Stakeholder Group | All TN Municipal and County Emergency Dispatch Agencies | Group of emergency management agencies that includes the following: the City of Memphis Police Department, City of Bartlett Police Department, Town of Collierville Police Department, City of Germantown Police Department, Fayette County Sheriff, Shelby County Sheriff, and Municipal Emergency Dispatch. | Existing |
| | All TN Municipal and County Public Safety Vehicles | Public safety vehicles operated by municipal and county emergency management agencies. | Existing |

**Table 5 – Memphis Urban Area Inventory of ITS Elements (continued)**

| Stakeholder | Element Name | Element Description | Status |
|---|---|---|---|
| TN Municipal and County Traffic Management Stakeholder Group | All TN Municipal and County TOCs | Group of traffic management agencies that includes the following: the City of Bartlett TOC, Town of Collierville TOC, City of Germantown TOC, City of Millington TOC, Shelby County TOC, and Municipal TOC. | Existing |
| Town of Collierville | Town of Collierville Alert Collierville | Town of Collierville email or phone service used to notify subscribers of emergencies or disasters. | Existing |
| | Town of Collierville CCTV Cameras | Closed circuit television cameras for traffic surveillance and incident management. | Planned |
| | Town of Collierville DMS | Dynamic message signs for traffic information dissemination. | Planned |
| | Town of Collierville Field Sensors | Roadway equipment used to detect vehicle volumes and/or speeds. Includes equipment such as video image vehicle detection systems (VIVDS), remote traffic microwave sensors (RTMS), or traditional loops. Also includes sensors to detect train lengths and speeds to estimate the anticipated duration of closures. | Existing |
| | Town of Collierville Fire Vehicles | Town of Collierville Fire Department vehicles. | Existing |
| | Town of Collierville Police Department | 911 Public Safety Answering Point responsible for answering all 911 calls made within the City and dispatching emergency responders. Non-emergency functions include the collection of crash data and enforcement of speed limits and commercial vehicles. | Existing |
| | Town of Collierville Police Vehicles | Town of Collierville Police Department vehicles. | Existing |
| | Town of Collierville Rail Notification System | Roadway equipment used to alert motorists that a crossing is currently blocked by a train. | Existing |
| | Town of Collierville Speed Monitoring Equipment | Field equipment used for monitoring roadway speeds. | Existing |
| | Town of Collierville TOC | Traffic operations center for the Town of Collierville. Responsible for the operation of the traffic signal system, closed circuit television cameras, dynamic message signs, and any other ITS infrastructure deployed by the City. | Existing |
| | Town of Collierville Traffic Signals | Traffic signal system operated by the Town of Collierville. | Existing |
| | Town of Collierville Website | Website for the Town of Collierville. Includes information on City departments and in the future it is envisioned that the website may have real-time information about roadway conditions, including traffic images. | Existing |
| US Coast Guard | US Coast Guard | United States Coast Guard has jurisdiction on navigable waterways, such as the Mississippi River. | Existing |

# 5. REGIONAL ITS ARCHITECTURE

Upon completion of the system inventory, the next step in the development of the Regional ITS Architecture was to identify the ITS services that are important to the Memphis MPO Region. The National ITS Architecture has the following eight groups of ITS service areas:

- ***Traffic Management*** – includes the TDOT SmartWay TMC in Memphis as well as other existing and future TMCs and traffic operations centers (TOCs), detection systems, CCTV cameras, fixed and portable dynamic message signs (DMS), and other related technologies.
- ***Emergency Management*** – includes emergency operations and emergency management centers, improved information sharing among traffic and emergency services, automated vehicle location on emergency vehicles, traffic signal preemption for emergency vehicles, and wide-area alerts.
- ***Maintenance and Construction Management*** – includes work zone management, roadway maintenance and construction information, and road weather detection systems.
- ***Public Transportation Management*** – includes transit and paratransit AVL, transit travel information systems, electronic fare collection, and transit security.
- ***Commercial Vehicle Operations*** – includes coordination with the Commercial Vehicle Information Systems and Networks (CVISN) program.
- ***Traveler Information*** – includes broadcast traveler information, traveler information kiosks, and highway advisory radio (HAR).
- ***Archived Data Management*** – includes electronic data management and archiving systems.
- ***Vehicle Safety*** – these systems were discussed, but at this time this service group is primarily a private sector initiative to incorporate technologies such as intersection collision avoidance and automated vehicle operation systems into vehicles.

Existing, planned, and future systems in the Region were considered in each of the service areas. Vehicle Safety was not included in the Memphis Urban Area Regional ITS Architecture because implementation of those service packages would primarily be by private sector automobile manufacturers and information service providers.

## 5.1 ITS Service Packages

In the National ITS Architecture, services that are provided by ITS are referred to as service packages. ITS service packages can include several stakeholders and elements that work together to provide a service in the Region. Examples of service packages from the National ITS Architecture include Network Surveillance, Traffic Information Dissemination, and Transit Vehicle Tracking. There are currently a total of 97 ITS service packages identified in the National ITS Architecture Version 7.0, which was the most recent version available of the Nation ITS architecture at the time of the Memphis Urban Area Regional ITS Architecture update. It should be noted that in previous versions of the Memphis Urban Area Regional ITS Architecture, ITS service packages were referred to as ITS market packages. The name change has been made to be consistent with the terminology that is now used in Version 7.0 of the national ITS Architecture.

### *5.1.1 Overview of ITS Service Package Structure*

A service package is made up of elements and data flows. Each identified system or component in the Memphis Urban Area regional ITS inventory, which is documented in the previous section, was mapped to a subsystem or terminator in the National ITS Architecture. Subsystems and terminators represent the various functional categories that

define the role of an element in ITS and the regional architecture. The elements are connected together by architecture flows that document the existing and planned flow of information. **Figure 3** depicts a sample service package with each of the components identified. Additional explanation of the terminology used can be found after the figure.

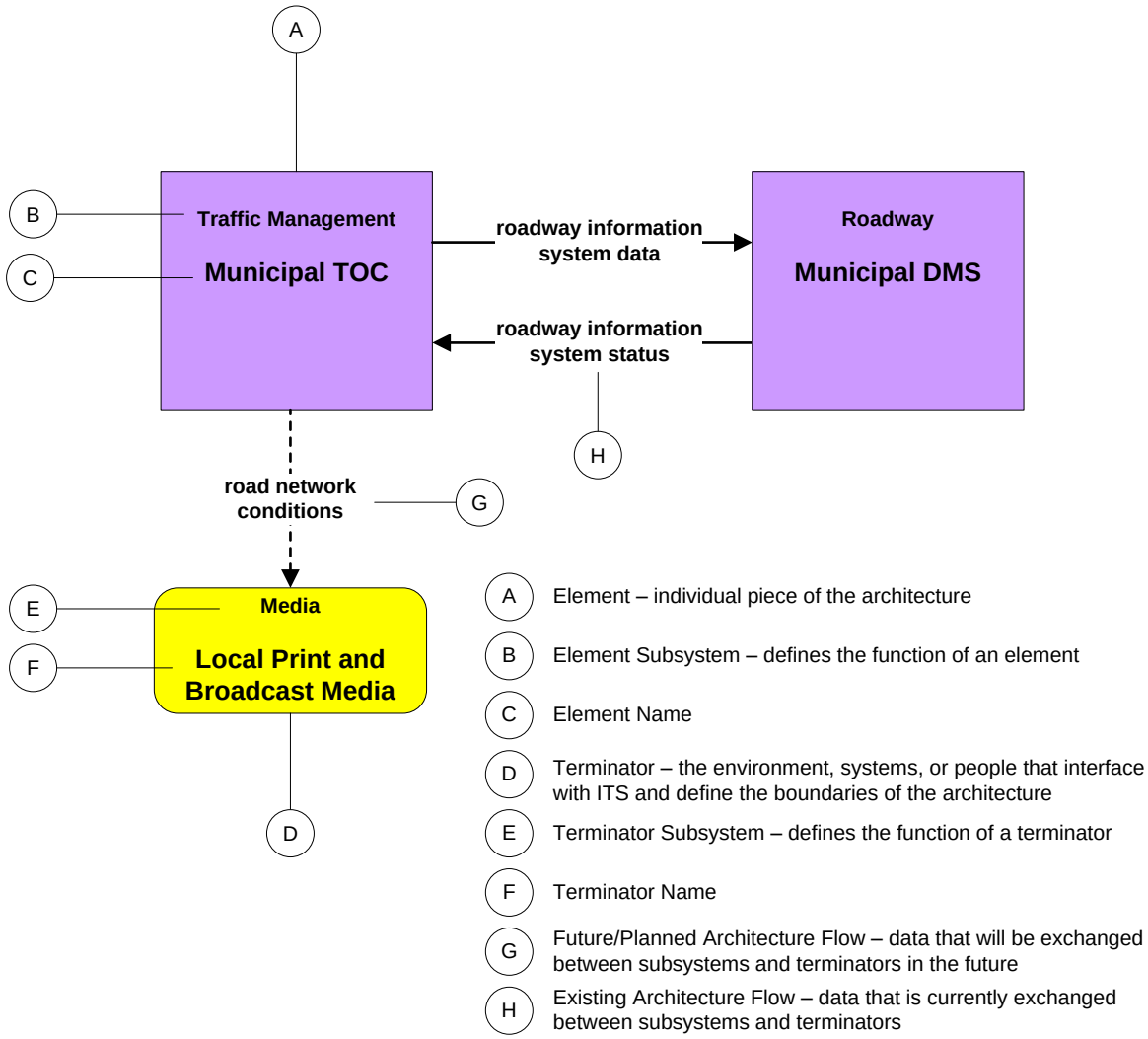



**Figure 3 – Overview of Service Package Structure**

*Elements* represent the ITS inventory for the Region. Both existing and planned elements have been included in the inventory and incorporated into the architecture through the development of the service package diagrams.

*Subsystems* are the highest level building blocks of the physical architecture, and the National ITS Architecture groups them into four major classes: Centers, Fields, Vehicles, and Travelers. Each of these major classes includes various subsystems that represent a set of transportation functions (or processes). Each set of functions is grouped under one agency, jurisdiction, or location, and corresponds to physical elements such as: traffic

operations centers, traffic signals, or vehicles. Each element is assigned to one or more subsystems.

*Terminators* are the people, systems, other facilities, and environmental conditions outside of ITS that need to communicate or interface with ITS subsystems. Terminators help define the boundaries of the National ITS Architecture as well as a regional system. Examples of terminators include drivers, weather services, and information service providers.

*Architecture Flows* provide a standardized method for documenting the types of information that flow between elements. A flow can be shown as either existing or future/planned. Existing flows indicate a connection that has already been established to share at least a portion of the desired information, but showing a flow as existing is not meant to imply that the function is complete. For example, the traffic information coordination flow between traffic management agencies includes the sharing of video images, incident information and other relevant data. The flow could be shown as existing to capture the sharing of video images while incident information is still a future desired expansion of functionality. Many of the architecture flows have associated technical specifications, known as standards, which define the format of the data being shared.

### *5.1.2 Selection and Prioritization of Regional Service Packages*

In the Memphis MPO Region, the National ITS Architecture service packages were reviewed by the stakeholders and selected based on the relevance of the functionality that the ITS service package could provide to the Region. Stakeholders selected 50 ITS service packages for implementation in the Region. The selected service packages are identified in **Table 6**. Stakeholders prioritized the selected service packages during the workshops, and the table organizes the service packages into service areas and priority groupings.

TDOT is leading a separate effort to develop and implement the CVISN program. CVISN addresses commercial vehicle operations, including ITS, on a statewide level and includes such applications as electronic clearance, safety enforcement, and registration. Unless a specific need was identified in the Memphis MPO Region that could be addressed locally, the commercial vehicle operations service packages were not selected and instead will be covered in the CVISN effort to ensure consistency.

After selecting the service packages that were applicable for the Region, stakeholders reviewed each service package and the elements that could be included to customize it for the Region. This customization is discussed further in the next section (Section 5.1.3.).

**Table 6 – Memphis Urban Area ITS Service Package Prioritization by Functional Area**

| High Priority ITS Service Packages | Medium Priority ITS Service Packages | Low Priority ITS Service Packages |
|---|---|---|
| ***Traffic Management*** | | |
| ATMS01 Network Surveillance<br>ATMS03 Traffic Signal Control<br>ATMS06 Traffic Information Dissemination<br>ATMS07 Regional Traffic Management<br>ATMS08 Traffic Incident Management System<br>ATMS26 Mixed Use Warning Systems | ATMS04 Traffic Metering<br>ATMS13 Standard Railroad Grade Crossing<br>ATMS17 Regional Parking Management<br>ATMS23 Dynamic Lane Management | ATMS02 Traffic Probe Surveillance<br>ATMS05 HOV Lane Management<br>ATMS10 Electronic Toll Collection<br>ATMS11 Emissions Monitoring and Management<br>ATMS19 Speed Warning and Enforcement<br>ATMS22 Variable Speed Limits |
| ***Emergency Management*** | | |
| EM01 Emergency Call-Taking and Dispatch<br>EM02 Emergency Routing<br>EM04 Roadway Service Patrols<br>EM05 Transportation Infrastructure Protection | EM06 Wide-Area Alert<br>EM08 Disaster Response and Recovery<br>EM09 Evacuation and Reentry Management<br>EM10 Disaster Traveler Information | |
| ***Maintenance and Construction Management*** | | |
| MC10 Maintenance and Construction Activity Coordination<br>MC12 Infrastructure Monitoring | MC01 Maintenance and Construction Vehicle and Equipment Tracking<br>MC03 Road Weather Data Collection<br>MC04 Weather Information Processing and Distribution<br>MC08 Work Zone Management | MC05 Roadway Automated Treatment<br>MC06 Winter Maintenance |
| ***Public Transportation Management*** | | |
| APTS01 Transit Vehicle Tracking<br>APTS02 Transit Fixed Route Operations<br>APTS03 Demand Response Transit Operations<br>APTS04 Transit Fare Collection Management<br>APTS05 Transit Security<br>APTS06 Transit Fleet Management<br>APTS08 Transit Traveler Information<br>APTS09 Transit Signal Priority<br>APTS10 Transit Passenger Counting | APTS07 Multi-modal Coordination | APTS11 Multimodal Connection Protection |

**Table 6 – Memphis Urban Area ITS Service Package Prioritization by Functional Area (continued)**

| High Priority ITS Service Packages | Medium Priority ITS Service Packages | Low Priority ITS Service Packages |
|---|---|---|
| ***Traveler Information*** | | |
| ATIS01 Broadcast Traveler Information<br>ATIS02 Interactive Traveler Information | | |
| ***Commercial Vehicle Operations*** | | |
| CVO06 Weigh-In-Motion | CVO10 HAZMAT Management | |
| ***Archived Data Management*** | | |
| | AD1 ITS Data Mart | AD2 ITS Data Warehouse<br>AD3 ITS Virtual Data Warehouse |

### 5.1.3 Customization of Regional Service Packages

The service packages in the National ITS Architecture were customized to reflect the unique systems, subsystems, and terminators in the Memphis MPO Region. ITS service packages represent a service that will be deployed as an integrated capability. Each service package is shown graphically with the service package name, local agencies involved, and desired data flows. The data flows are shown as either existing or planned/future. Data flows shown as existing indicate that in at least one location within the jurisdiction the connection exists. Data flows shown as existing should not be interpreted to mean that deployment of that service is complete as there are many cases where a data flow exists in a service but a need has been identified to expand the service to additional locations.

**Figure 4** is an example of an Advanced Traffic Management System (ATMS) service package for traffic information dissemination that has been customized for the Region. This instance focuses on the activities of TDOT Region 4. The service package shows the distribution of traffic information from the TDOT Region 4 TMC to emergency dispatch agencies and the media as well as in the future to transit management agencies. Messages are also placed on DMS and HAR and entered into SWIFT for inclusion on the SmartWay website and 511. Data flows between the subsystems indicate what information is being shared. The remainder of the service packages that were customized for the Memphis MPO Region are shown in **Appendix B**.

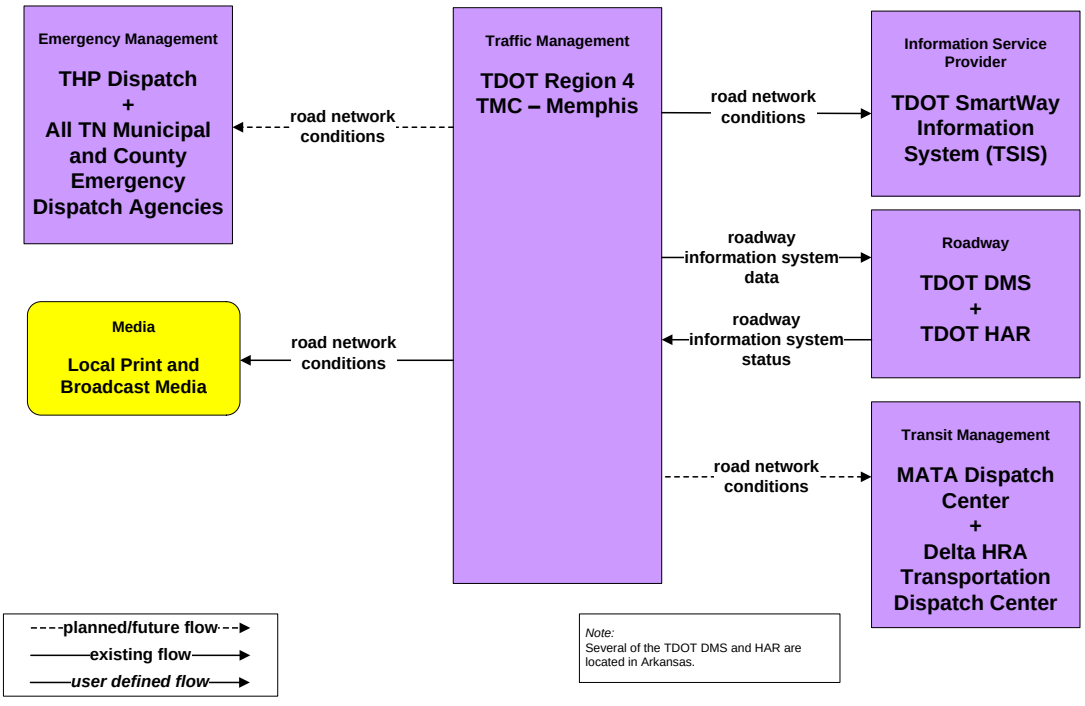



**Figure 4 – Example ITS Service Package Diagram: ATMS06 – Traffic Information Dissemination**

### 5.1.4 Regional Needs and Corresponding Service Packages

Input received from stakeholders at the Memphis Urban Area Regional ITS Architecture workshops provided valuable input for the service package customization process. The needs identified in the ITS Architecture workshops, as well as needs from the Memphis Urban Area 2030 Long-Range Transportation Plan are identified in **Table 7**. The table also identifies which service package documents the particular ITS need.

**Table 7 – Memphis Urban Area Regional ITS Needs and Corresponding Service Packages**

| ITS Need | Service Package |
|---|---|
| ***Traffic Management and Traveler Information*** | |
| Need to continue to develop a multi-modal transportation network that utilizes strategies for addressing congestion management and air quality issues in the Memphis MPO Region | ATMS01 – Network Surveillance<br>ATMS03 – Traffic Signal Control<br>ATMS04 – Traffic Metering<br>ATMS05 – HOV Lane Management<br>ATMS06 – Traffic Information Dissemination<br>ATMS07 – Regional Traffic Management<br>ATMS11 – Emissions Monitoring and Management<br>ATMS19 – Speed Warning and Enforcement<br>ATMS22 – Variable Speed Limits<br>ATMS23 – Dynamic Lane Management and Shoulder Use<br>ATMS26 – Mixed Use Warning Systems<br>EM04 – Roadway Service Patrols |
| Need to develop alternate signal timing plans and DMS messages and implement adaptive signals that can be implemented during incidents, special events, or construction detours | ATMS03 – Traffic Signal Control<br>ATMS07 – Regional Traffic Management<br>ATMS22 – Variable Speed Limits<br>EM02 – Emergency Routing<br>MC08 – Work Zone Management<br>MC10 – Maintenance and Construction Activity Coordination |
| Need to provide a transportation system that monitors and supports vulnerable road users | ATMS01 – Network Surveillance<br>ATMS03 – Traffic Signal Control<br>ATMS26 – Mixed Use Warning Systems |
| Need to utilize ITS elements to assist with the enforcement of HOV lanes | ATMS01 – Network Surveillance<br>ATMS02 – Traffic Probe Surveillance<br>ATMS05 – HOV Lane Management |
| Need to establish a regional TMC in eastern Arkansas | ATMS07 – Regional Traffic Management |
| Need to provide real-time travel times for interstates and major arterials in the Memphis MPO Region | ATMS01 – Network Surveillance<br>ATMS02 – Traffic Probe Surveillance<br>ATMS06 – Traffic Information Dissemination |
| Need to expand options to provide traveler information to reach as many travelers as possible, including the use of social media | ATMS06 – Traffic Information Dissemination<br>ATIS01 – Broadcast Traveler Information<br>ATIS02 – Interactive Traveler Information |
| Need to improve or establish communications between the TDOT Region 4 TMC in Memphis and all TMCs and TOCs in the Memphis MPO Region and Arkansas | ATMS07 – Regional Traffic Management<br>ATMS08 – Traffic Incident Management System |
| Need for TDOT to establish a fiber optic communications connection with AHTD and MDOT | ATMS07 – Regional Traffic Management |
| Need for more traffic signals to communicate with one another through fiber optic cable | ATMS03 – Traffic Signal Control |

**Table 7 – Memphis Urban Area Regional ITS Needs and Corresponding Service Packages (continued)**

| ITS Need | Service Package |
|---|---|
| ***Traffic Management and Traveler Information (continued)*** | |
| Need to create a formal agreement or memorandum of understanding between MDOT and TDOT regarding communications, traffic incidents, and the coordination of each agency's ITS equipment | ATMS01 – Network Surveillance<br>ATMS06 – Traffic Information Dissemination<br>ATMS07 – Regional Traffic Management<br>EM02 – Emergency Routing<br>EM04 – Roadway Service Patrols<br>MC04 – Weather Info Processing and Distribution<br>MC08 – Work Zone Management |
| ***Emergency Management*** | |
| Need to increase the safety and security of the transportation system for motorized and non-motorized users | ATMS08 – Traffic Incident Management System<br>ATMS26 – Mixed Use Warning Systems<br>EM01 – Emergency Call-Taking and Dispatch<br>EM02 – Emergency Routing<br>EM04 – Roadway Service Patrols<br>EM05 – Transportation Infrastructure Protection<br>EM06 – Wide-Area Alert<br>MC12 – Infrastructure Monitoring |
| Need to reestablish a Traffic Incident Management (TIM) group that plans for incidents and reviews response after large scale incidents | ATMS07 – Regional Traffic Management<br>ATMS08 – Traffic Incident Management System<br>EM04 – Roadway Service Patrols<br>EM08 – Disaster Response and Recovery<br>EM09 – Evacuation and Reentry Management<br>EM10 – Disaster Traveler Information |
| Need to establish an arterial version of the HELP service patrol program | EM04 – Roadway Service Patrols |
| Need for MDOT to provide service patrols in Mississippi similar to the TDOT HELP vehicles | EM04 – Roadway Service Patrols |
| Need to assist emergency vehicle movement with traffic signal preemption and monitoring | ATMS03 – Traffic Signal Control<br>EM02 – Emergency Routing |
| Need to utilize ITS equipment to reduce the impact that an earthquake would have on the road network and first responders. | ATMS07 – Regional Traffic Management<br>ATMS08 – Traffic Incident Management System<br>EM01 – Emergency Call-Taking and Dispatch<br>EM02 – Emergency Routing<br>EM04 – Roadway Service Patrols<br>EM06 – Wide-Area Alert<br>EM08 – Disaster Response and Recovery<br>EM09 – Evacuation and Reentry Management<br>EM10 – Disaster Traveler Information<br>MC08 – Work Zone Management<br>MC10 – Maintenance and Construction Activity Coordination<br>MC12 – Infrastructure Monitoring |

**Table 7 – Memphis Urban Area Regional ITS Needs and Corresponding Service Packages (continued)**

| ITS Need | Service Package |
|---|---|
| ***Maintenance and Construction Management*** | |
| Need to monitor roadway weather conditions through the installation of additional road weather data collection stations and mitigate the effects of adverse conditions on traffic | ATMS06 – Traffic Information Dissemination<br>MC03 – Road Weather Data Collection<br>MC04 – Weather Information Processing and Distribution<br>MC05 – Roadway Automated Treatment<br>MC06 – Winter Maintenance |
| Need to implement strategies to reduce the occurrences of and workers' exposure to crashes within a work zone | MC08 – Work Zone Management<br>MC10 – Maintenance and Construction Activity Coordination |
| ***Public Transportation Management*** | |
| Need to monitor multimodal schedule adherence to optimize passenger travel times and establish coordination between MATA and other transit agencies and private transportation service providers | APTS02 –Transit Fixed-Route Operations<br>APTS03 – Demand Response Transit Operations<br>APTS07 – Multi-modal Coordination<br>APTS11 – Multimodal Connection Protection |
| Need to improve fare collection and facilitate fare information for management evaluation | APTS04 – Transit Fare Collection Management |
| Need to increase the safety and security of transit riders | APTS05 – Transit Security |
| Need to expand traffic signal priority for buses | APTS09 – Transit Signal Priority |
| Need to supply trip planning and real-time information for transit users through a mobile phone application | APTS01 – Transit Vehicle Tracking<br>APTS08 – Transit Traveler Information<br>ATIS02 – Interactive Traveler |

## 5.2 Architecture Interfaces

While it is important to identify the various systems and stakeholders that are part of a regional ITS, a primary purpose of the ITS architecture is to identify the connectivity between transportation systems in the Memphis MPO Region. The system interconnect diagram shows the high-level relationships of the subsystems and terminators in the Memphis MPO Region and the associated local projects and systems. The customized service packages represent services that can be deployed as an integrated capability and the service package diagrams show the information flows between the subsystems and terminators that are most important to the operation of the service packages. How these systems interface with each other is an integral part of the overall ITS architecture.

### *5.2.1 Top Level Regional System Interconnect Diagram*

A system interconnect diagram, or "sausage diagram", shows the systems and primary interconnects in the Region. The National ITS Architecture interconnect diagram has been customized for the Memphis MPO Region based on the system inventory and information gathered from the stakeholders. **Figure 5** summarizes the existing and planned ITS elements for the Memphis MPO Region in the context of a physical interconnect. Subsystems and elements specific to the Region are called out in the boxes surrounding the main interconnect diagram, and these are color-coded to the subsystem with which they are associated.

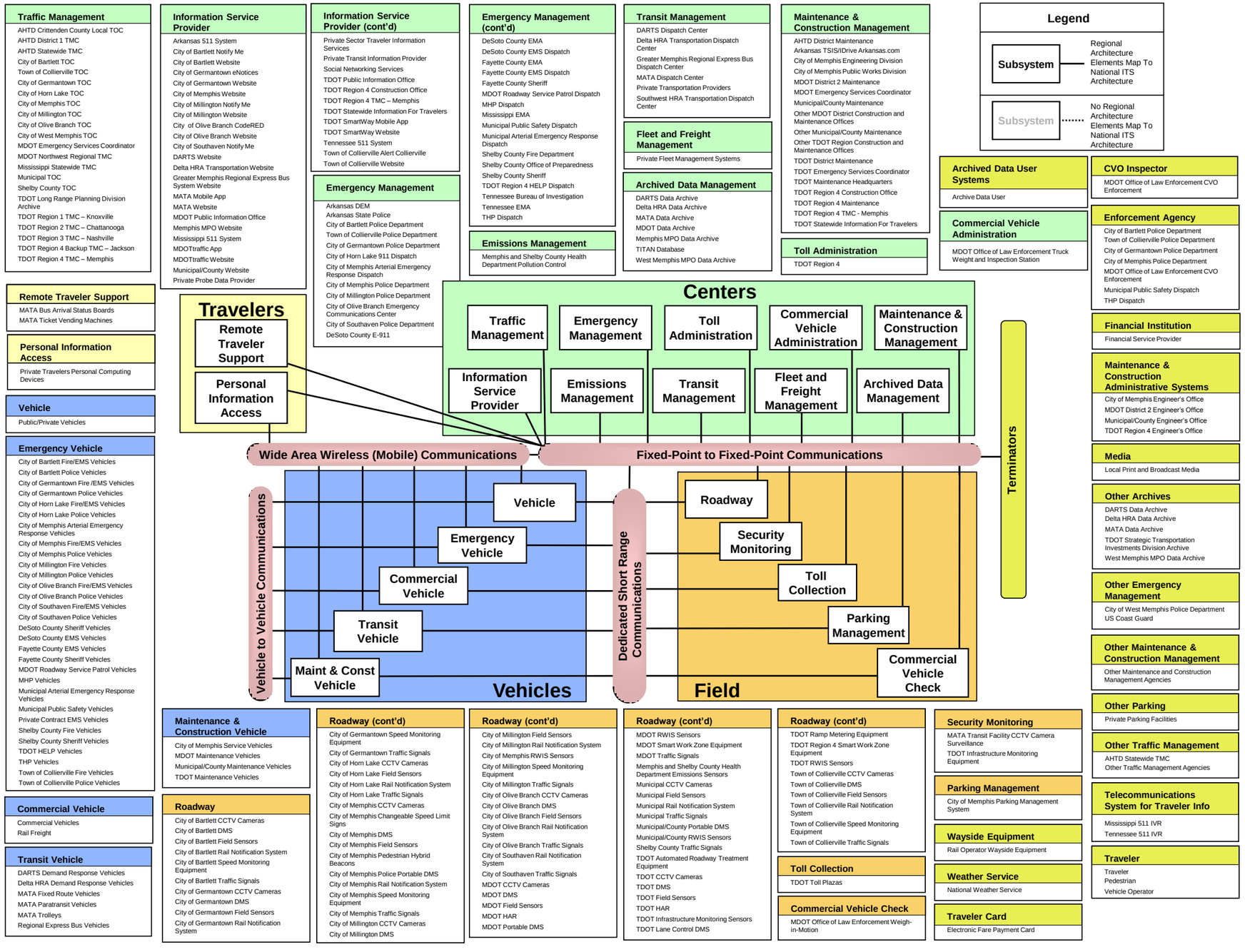



**Figure 5 – Memphis Urban Area Regional System Interconnect Diagram**

### 5.2.2 Element Connections

A number of different elements are identified as part of the Memphis Urban Area Regional ITS Architecture. These elements include transportation management centers, transit vehicles, dispatch systems, emergency management agencies, media outlets, and others—essentially, all of the existing and planned physical components that contribute to the regional ITS. Interfaces have been identified for each element in the Memphis Urban Area Regional ITS Architecture and each element has been mapped to those other elements with which it must interface. The Turbo Architecture software can generate interconnect diagrams for each element in the Region that show which elements are connected to one another. **Figure 6** is an example of an interconnect diagram from the Turbo database output. This particular interconnect diagram is for the City of Memphis Traffic Signals.

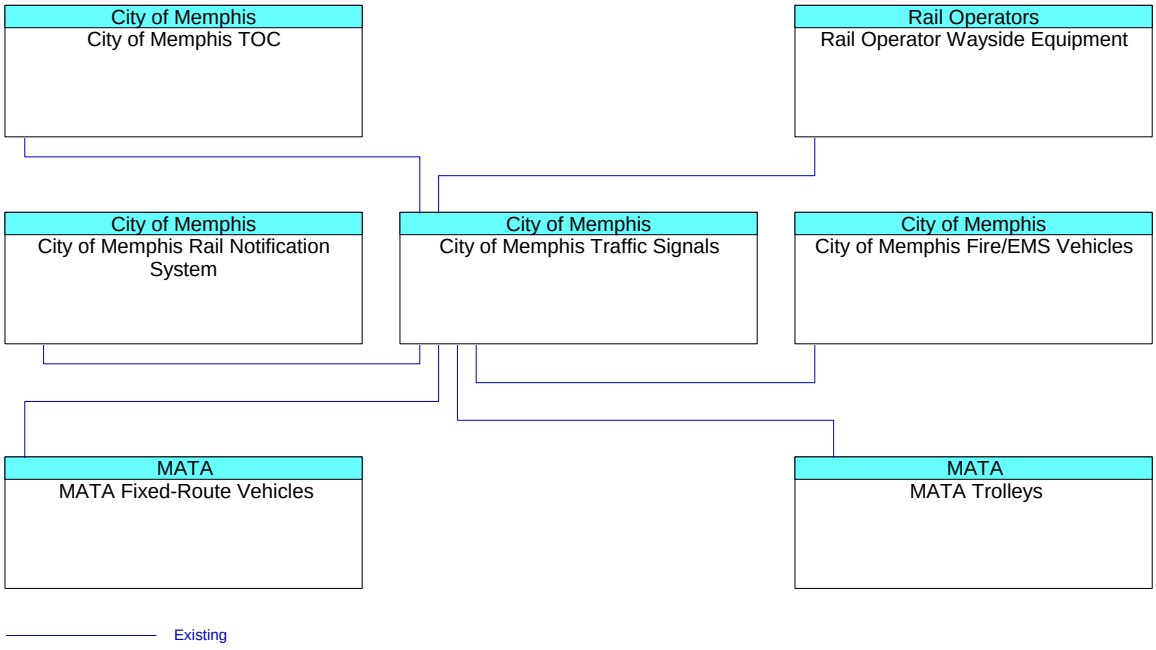



**Figure 6 – Example Interconnect Diagram: City of Memphis Traffic Signals**

### 5.2.3 Data Flows Between Elements

In the service package diagrams, flows between the subsystems and terminators define the specific information (data) that is exchanged between the elements and the direction of the exchange. The data flows could be requests for information, alerts and messages, status requests, broadcast advisories, event messages, confirmations, electronic credentials, and other key information requirements. Turbo Architecture can be used to output flow diagrams and can be filtered by service package for ease of interpretation; however, it is important to remember that custom data flows will not show up in diagrams that are filtered by service package. An example of a flow diagram that has been filtered for the ATMS06 – Traffic Information Dissemination for TDOT Region 4 is shown in **Figure 7**.

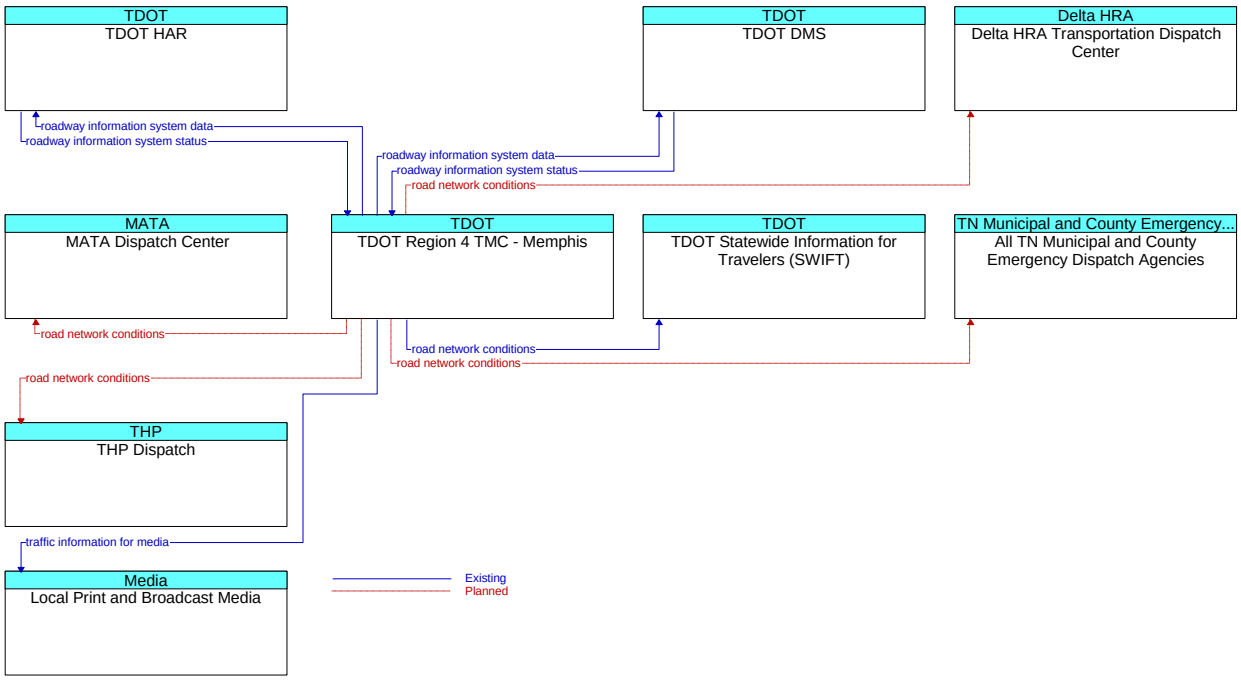



**Figure 7 – Example Flow Diagram: ATMS06 – TDOT Region 4 Traffic Information Dissemination**

## 5.3 Functional Requirements

Functions are a description of what the system has to do. In the National ITS Architecture, functions are defined at several different levels, ranging from general subsystem descriptions through somewhat more specific equipment package descriptions to Process Specifications that include substantial detail. Guidance from the USDOT on developing a Regional ITS Architecture recommends that each Region determine the level of detail of the functional requirements for their Region. In the Memphis MPO Region, it is recommended that the development of detailed functional requirements such as the "shall" statements included in process specifications for a system be developed at the project level. These detailed "shall" statements identify all functions that a project or system needs to perform.

For the Memphis Urban Area Regional ITS Architecture, functional requirements have been identified at two levels. The customized service packages, discussed previously in Section 5.1.3, describe the services that ITS needs to provide in the Region and the architecture flows between the elements. These service packages and data flows describe what ITS in the Memphis MPO Region has to do and the data that needs to be shared among elements.

At a more detailed level, functional requirements for the Memphis MPO Region are described in terms of functions that each element in the architecture performs or will perform in the future. **Appendix C** contains a table that summarizes the functions by element excluding terminators.

## 5.4 Standards

Standards are an important tool that will allow efficient implementation of the elements in the Memphis Urban Area Regional ITS Architecture over time. Standards facilitate deployment of interoperable systems at local, regional, and national levels without impeding innovation as technology advances, vendors change, and as new approaches evolve. The USDOT's ITS Joint Program Office is supporting Standards Development Organizations (SDOs) with an extensive, multi-year program of accelerated, consensus-based standards development to facilitate successful ITS deployment in the United States. **Table 8** identifies each of the ITS standards that could apply to the Memphis Urban Area Regional ITS Architecture. These standards are based on the physical subsystem architecture flows previously identified in Section 5.2.3 and shown in the service package diagrams in **Appendix B**.

While **Table 7** does not match the standards to specific architecture flows, that information is available through the National ITS Architecture website and Turbo Architecture. Since the website is updated more frequently than the software and links directly to additional information about the applicable standard, the website is the preferred method for determining which standards apply to a particular architecture flow. To locate this information do the following:

- Go to the main page of the National Architecture website at *http://www.iteris.com/itsarch/*;
- In the menu bar on the left hand side select the tab for Physical Architecture;
- Select the Architecture Flows link embedded in the descriptive paragraph about the Physical Architecture;
- From the alphabetical list of flows that appears locate and select the desired flow;
- Architecture flows are often used between multiple subsystems so scrolling may be required to find the appropriate information associated with the particular use of the flow, in the descriptive information any applicable standards will be identified; and
- For additional information on the applicable standards the standard name is a link that when selected leads to a more detailed description of the standard.

**Table 8 – Memphis Urban Area Regional ITS Standards**

| SDO | Document ID | Title |
|---|---|---|
| AASHTO/ITE | ITE TMDD | Traffic Management Data Dictionary (TMDD) and Message Sets for External Traffic Management Center Communications (MS/ETMCC) |
| AASHTO/ITE/NEMA | NTCIP 1201 | Global Object Definitions |
| | NTCIP 1202 | Object Definitions for Actuated Traffic Signal Controller Units |
| | NTCIP 1203 | Object Definitions for Dynamic Message Signs (DMS) |
| | NTCIP 1204 | Object Definitions for Environmental Sensor Stations |
| | NTCIP 1205 | Object Definitions for Closed Circuit Television (CCTV) Camera Control |
| | NTCIP 1207 | Object Definitions for Ramp Meter Control (RMC) Units |
| | NTCIP 1208 | Object Definition for CCTV Camera Switching |
| | NTCIP 1209 | Data Element Definitions for Transportation Sensor Systems |
| | NTCIP 1210 | Field Management Stations – Part 1: Object Definitions for Signal System Masters |
| | NTCIP 1211 | Object Definitions for Signal Control and Prioritization |
| | NTCIP 1214 | Object Definitions for Conflict Monitor Units (CMU) |
| | NTCIP Center to Center Standards Group | |
| | NTCIP 1102 | Octet Encoding Rules Base Protocol |
| | NTCIP 1104 | Center-to-Center Naming Convention Specification |
| | NTCIP 2104 | Ethernet Subnetwork Profile |
| | NTCIP 2202 | Internet (TCP/IP and UDP/IP) Transport Profile |
| | NTCIP 2303 | File Transfer Protocol (FTP) Application Profile |
| | NTCIP 2304 | Application Profile for DATEX-ASN (AP-DATEX) |
| | NTCIP 2306 | Application Profile for XML Message Encoding and Transport in ITS Center-to-Center Communications (C2C XML) |
| | NTCIP Center-to-Field Standards Group | |
| | NTCIP 1102 | Octet Encoding Rules Base Protocol |
| | NTCIP 1103 | Transportation Management Protocols (TMP) |
| | NTCIP 2101 | Point to Multi-Point Protocol Using RS-232 Subnetwork Profile |
| | NTCIP 2102 | Point to Multi-Point Protocol Using FSK Modem Subnetwork Profile |
| | NTCIP 2103 | Point-to-Point Protocol Over RS-232 Subnetwork Profile |
| | NTCIP 2104 | Ethernet Subnetwork Profile |
| | NTCIP 2201 | Transportation Transport Profile |
| | NTCIP 2202 | Internet (TCP/IP and UDP/IP) Transport Profile |
| | NTCIP 2301 | Simple Transportation Management Framework (STMF) Application Profile |
| | NTCIP 2302 | Trivial File Transfer Protocol (TFTP) Application Profile |
| | NTCIP 2303 | File Transfer Protocol (FTP) Application Profile |
| APTA | APTA TCIP-S-001 3.0.4 | Standard for Transit Communications Interface Profiles |

**Table 8 – Memphis Urban Area Applicable ITS Standards (continued)**

| SDO | Document ID | Title |
|---|---|---|
| ASTM | ASTM E2468-05 | Standard Practice for Metadata to Support Archived Data Management Systems |
| | ASTM E2665-08 | Standard Specifications for Archiving ITS-Generated Traffic Monitoring Data |
| | Dedicated Short Range Communication at 915 MHz Standards Group | |
| | ASTM E2158-01 | Standard Specification for Dedicated Short Range Communication (DSRC) Physical Layer using Microwave in the 902-928 MHz Band |
| ASTM/IEEE/SAE | Dedicated Short Range Communication at 5.9 GHz Standards Group | |
| | ASTM E2213-03 | Standard Specification for Telecommunications and Information Exchange Between Roadside and Vehicle Systems - 5 GHz Band Dedicated Short Range Communications (DSRC) Medium Access Control (MAC) and Physical Layer (PHY) Specifications |
| | IEEE 1609.1 – 2006 | Standard for Wireless Access in Vehicular Environments (WAVE) – Resource Manager |
| | IEEE 1609.2 – 2006 | Standard for Wireless Access in Vehicular Environments (WAVE) - Security Services for Applications and Management Messages |
| | IEEE 1609.3 | Standard for Wireless Access in Vehicular Environments (WAVE) –Networking Services |
| | IEEE 1609.4 – 2006 | Standard for Wireless Access in Vehicular Environments (WAVE) - Multi-Channel Operation |
| | IEEE 802.11p | Standard for Information Technology - Telecommunications and Information Exchange Between Systems - Local and Metropolitan Area Networks - Specific Requirements - Part II: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specification |
| | IEEE P1609.0 | Standard for Wireless Access in Vehicular Environments (WAVE) - Architecture |
| IEEE | IEEE 1455-1999 | Standard for Message Sets for Vehicle/Roadside Communications |
| | IEEE 1570-2002 | Standard for Interface Between the Rail Subsystem and the Highway Subsystem at a Highway Rail Intersection |
| | IEEE P1609.11 | Standard for Wireless Access in Vehicular Environments (WAVE) -Over-the-Air Data Exchange Protocol for Intelligent Transportation Systems (ITS) |
| | Incident Management Standards Group | |
| | IEEE 1512-2006 | Standard for Common Incident Management Message Sets for use by Emergency Management Centers |
| | IEEE 1512.1-2006 | Standard for Traffic Incident Management Message Sets for use by Emergency Management Centers |
| | IEEE 1512.2-2004 | Standard for Public Safety Traffic Management Message Sets for use by Emergency Management Centers |
| | IEEE 1512.3-2006 | Standard for Hazardous Material Incident Management Sets for use by Emergency Management Centers |
| | IEEE P1512.4 | Standard for Common Traffic Incident Management Message Sets for use in Entities External to Centers |

**Table 8 – Memphis Urban Area Applicable ITS Standards (continued)**

| SDO | Document ID | Title |
|---|---|---|
| SAE | Advanced Traveler Information Systems (ATIS) General Use Standards Group | |
| | SAE J2266 | Location Referencing Message Specification (LRMS) |
| | SAE J2354 | Message Set for Advanced Traveler Information System (ATIS) |
| | SAE J2540 | Messages for Handling Strings and Look-Up Tables in ATIS Standards |
| | SAE J2540/1 | RDS (Radio Data System) Phrase Lists |
| | SAE J2540/2 | ITIS (International Traveler Information Systems) Phrase Lists |
| | SAE J2540/3 | National Names Phrase List |

## 5.5 Operational Concepts

An operational concept documents each stakeholder's current and future roles and responsibilities across a range of transportation services, as grouped in the Operational Concepts section of Turbo Architecture, in the operation of the regional ITS. The services covered are:

- ***Traffic Signal Management*** – The development of signal systems that react to changing traffic conditions and provide coordinated intersection timing over a corridor, an area, or multiple jurisdictions.
- ***Traffic Metering Management*** – The development of systems to monitor freeway traffic flow and roadway conditions, and provide strategies such as ramp metering or lane access control to improve the flow of traffic on the freeway. Includes systems to provide information to travelers on the roadway.
- ***Incident Management*** – The development of systems to provide rapid and effective response to incidents. Includes systems to detect and verify incidents, along with coordinated agency response to the incidents.
- ***Emergency Management*** – The development of systems to provide emergency call taking, public safety dispatch, and emergency operations center operations.
- ***Maintenance and Construction Management*** – The development of systems to manage the maintenance of roadways in the Region, including winter snow and ice clearance. Also includes the management of construction operations and coordination of construction activities.
- ***Transit Management*** – The development of systems to more efficiently manage fleets of transit vehicles or transit rail. Includes systems to provide transit traveler information both pre-trip and during the trip.
- ***Traveler Information*** – The development of systems to provide static and real-time transportation information to travelers.
- ***Commercial Vehicle Operations*** – The development of systems to facilitate the management of commercial vehicles (e.g., electronic clearance).
- ***Archived Data Management*** – The development of systems to collect transportation data for use in non-operational purposes (e.g., planning and research).

**Table 9** identifies the roles and responsibilities of key stakeholders for a range of transportation services.

**Table 9 – Memphis Urban Area Stakeholder Roles and Responsibilities**

| Transportation Service | Stakeholder | Roles/Responsibilities |
|---|---|---|
| Traffic Signal Management | City of Bartlett | Operate and maintain traffic signal systems within the City. |
| | | Operate network surveillance equipment including CCTV cameras and vehicle detection on roadways within the City to facilitate traffic signal operations. |
| | | Remotely operate traffic signal controllers to implement traffic management strategies at signalized intersections based on traffic conditions, incidents, and emergency vehicle preemptions. |
| | | Provide traffic signal preemption for emergency vehicles. |
| | | Operate DMS for the distribution of traffic information and roadway conditions to travelers on the roadway. |
| | City of Germantown | Operate and maintain traffic signal systems within the City. |
| | | Operate network surveillance equipment including CCTV cameras and vehicle detection on roadways within the City to facilitate traffic signal operations. |
| | | Remotely operate traffic signal controllers to implement traffic management strategies at signalized intersections based on traffic conditions, incidents, and emergency vehicle preemptions. |
| | | Provide traffic signal preemption for emergency vehicles. |
| | | Operate DMS for the distribution of traffic information and roadway conditions to travelers on the roadway. |
| | City of Horn Lake | Operate and maintain traffic signal systems within the City. |
| | | Remotely operate traffic signal controllers to implement traffic management strategies at signalized intersections based on traffic conditions, incidents, and emergency vehicle preemptions. |
| | | Provide traffic signal preemption for emergency vehicles. |
| | City of Memphis | Operate and maintain traffic signal systems within the City of Memphis, City of Bartlett, and City of Germantown. |
| | | Maintain traffic signal systems within Shelby County. |
| | | Operate network surveillance equipment including CCTV cameras and vehicle detection on roadways within the City to facilitate traffic signal operations. |
| | | Remotely operate traffic signal controllers to implement traffic management strategies at signalized intersections based on traffic conditions, incidents, and emergency vehicle preemptions. |
| | | Provide traffic signal preemption for emergency vehicles. |
| | | Provide traffic signal priority for transit vehicles. |
| | | Operate DMS for the distribution of traffic information and roadway conditions to travelers on the roadway. |
| | City of Millington | Operate and maintain traffic signal systems within the City. |
| | | Operate network surveillance equipment including CCTV cameras and vehicle detection on roadways within the City to facilitate traffic signal operations. |

**Table 9 – Memphis Urban Area Stakeholder Roles and Responsibilities (continued)**

| Transportation Service | Stakeholder | Roles/Responsibilities |
|---|---|---|
| Traffic Signal Management (continued) | City of Millington (continued) | Remotely operate traffic signal controllers to implement traffic management strategies at signalized intersections based on traffic conditions, incidents, and emergency vehicle preemptions. |
| | | Provide traffic signal preemption for emergency vehicles. |
| | | Operate DMS for the distribution of traffic information and roadway conditions to travelers on the roadway. |
| | City of Olive Branch | Operate and maintain traffic signal systems within the City. |
| | | Operate network surveillance equipment including CCTV cameras and vehicle detection on roadways within the City to facilitate traffic signal operations. |
| | | Remotely operate traffic signal controllers to implement traffic management strategies at signalized intersections based on traffic conditions, incidents, and emergency vehicle preemptions. |
| | | Provide traffic signal preemption for emergency vehicles. |
| | | Operate DMS for the distribution of traffic information and roadway conditions to travelers on the roadway. |
| | City of Southaven | Operate and maintain traffic signal systems within the City. |
| | | Remotely operate traffic signal controllers to implement traffic management strategies at signalized intersections based on traffic conditions, incidents, and emergency vehicle preemptions. |
| | | Provide traffic signal preemption for emergency vehicles. |
| | MDOT | Operate and maintain traffic signal systems on state routes within the Region. |
| | | Operate network surveillance equipment including CCTV cameras and vehicle detection on roadways to facilitate traffic signal operations. |
| | | Remotely operate traffic signal controllers to implement traffic management strategies at signalized intersections based on traffic conditions, incidents, and emergency vehicle preemption requests. |
| | | Provide traffic signal preemption for emergency vehicles. |
| | Municipal | Operate and maintain traffic signal systems within the City. |
| | | Operate network surveillance equipment including CCTV cameras and vehicle detection on roadways within the City to facilitate traffic signal operations. |
| | | Remotely operate traffic signal controllers to implement traffic management strategies at signalized intersections based on traffic conditions, incidents, and emergency vehicle preemptions. |
| | | Provide traffic signal preemption for emergency vehicles. |
| | | Operate DMS for the distribution of traffic information and roadway conditions to travelers on the roadway. |

**Table 9 – Memphis Urban Area Stakeholder Roles and Responsibilities (continued)**

| Transportation Service | Stakeholder | Roles/Responsibilities |
|---|---|---|
| Traffic Signal Management (continued) | Shelby County | Operate and maintain traffic signal systems within the County. |
| | | Remotely operate traffic signal controllers to implement traffic management strategies at signalized intersections based on traffic conditions, incidents, and emergency vehicle preemptions. |
| | | Provide traffic signal preemption for emergency vehicles. |
| | Town of Collierville | Operate and maintain traffic signal systems within the City. |
| | | Operate network surveillance equipment including CCTV cameras and vehicle detection on roadways within the City to facilitate traffic signal operations. |
| | | Remotely operate traffic signal controllers to implement traffic management strategies at signalized intersections based on traffic conditions, incidents, and emergency vehicle preemptions. |
| | | Provide traffic signal preemption for emergency vehicles. |
| | | Operate DMS for the distribution of traffic information and roadway conditions to travelers on the roadway. |
| Traffic Metering Management | MDOT | Operate DMS to distribute traffic information and roadway conditions to travelers on the roadway. |
| | | Operate network surveillance equipment including CCTV cameras and vehicle detection on state roadways. |
| | TDOT | Operate DMS and HAR to distribute traffic information and roadway conditions to travelers on the roadway. |
| | | Operate network surveillance equipment including CCTV cameras and vehicle detection on state roadways. |
| Incident Management (Traffic) | City of Bartlett | Remotely control traffic and video sensors to support incident detection and verification. |
| | | Responsible for the dissemination of traffic related data to other centers and the media. |
| | | Responsible for coordination with other traffic operations centers and emergency management agencies for coordinated incident management. |
| | | Coordinate maintenance resources for incident response. |
| | City of Germantown | Remotely control traffic and video sensors to support incident detection and verification. |
| | | Responsible for the dissemination of traffic related data to other centers and the media. |
| | | Responsible for coordination with other traffic operations centers and emergency management agencies for coordinated incident management. |
| | | Coordinate maintenance resources for incident response. |
| | City of Memphis | Remotely control traffic and video sensors to support incident detection and verification. |
| | | Responsible for the dissemination of traffic related data to other centers and the media. |

**Table 9 – Memphis Urban Area Stakeholder Roles and Responsibilities (continued)**

| Transportation Service | Stakeholder | Roles/Responsibilities |
|---|---|---|
| Incident Management (Traffic) (continued) | City of Memphis (continued) | Responsible for coordination with other traffic operations centers and emergency management agencies for coordinated incident management. |
| | | Coordinate maintenance resources for incident response. |
| | City of Millington | Remotely control traffic and video sensors to support incident detection and verification. |
| | | Responsible for the dissemination of traffic related data to other centers and the media. |
| | | Responsible for coordination with other traffic operations centers and emergency management agencies for coordinated incident management. |
| | | Coordinate maintenance resources for incident response. |
| | City of Olive Branch | Remotely control traffic and video sensors to support incident detection and verification. |
| | | Responsible for the dissemination of traffic related data to other centers and the media. |
| | | Responsible for coordination with other traffic operations centers and emergency management agencies for coordinated incident management. |
| | | Coordinate maintenance resources for incident response. |
| | MDOT | Remotely control traffic and video sensors from the TMC to support incident detection and verification. |
| | | Responsible for the dissemination of traffic related data to other centers and the media. |
| | | Operate DMS and HAR to distribute incident information to travelers on the roadway. |
| | | Responsible for coordination with other TOCs and emergency management agencies for coordinated incident management. |
| | | Responsible for the development, coordination, and execution of special traffic management strategies during an evacuation. |
| | TDOT | Remotely control traffic and video sensors from the SmartWay TMC to support incident detection and verification. |
| | | Responsible for the dissemination of traffic related data to other centers and the media. |
| | | Operate DMS and HAR to distribute incident information to travelers on the roadway. |
| | | Responsible for coordination with other TOCs and emergency management agencies for coordinated incident management. |
| | | Responsible for the development, coordination, and execution of special traffic management strategies during an evacuation. |
| | Town of Collierville | Remotely control traffic and video sensors to support incident detection and verification. |

**Table 9 – Memphis Urban Area Stakeholder Roles and Responsibilities (continued)**

| Transportation Service | Stakeholder | Roles/Responsibilities |
|---|---|---|
| Incident Management (Traffic) (continued) | Town of Collierville (continued) | Responsible for the dissemination of traffic related data to other centers and the media. |
| | | Responsible for coordination with other traffic operations centers and emergency management agencies for coordinated incident management. |
| | | Coordinate maintenance resources for incident response. |
| Incident Management (Emergency) | City of Bartlett (Police Department) | Dispatch public safety vehicles to incidents. |
| | | Coordinate incident response with other emergency dispatch agencies and the TDOT SmartWay Center for incidents on state facilities. |
| | City of Germantown (Police Department) | Dispatch public safety vehicles to incidents. |
| | | Coordinate incident response with other emergency dispatch agencies and the TDOT SmartWay Center for incidents on state facilities. |
| | City of Horn Lake (911 Dispatch) | Dispatch public safety vehicles to incidents. |
| | | Coordinate incident response with other emergency dispatch agencies and the MDOT Northwest Regional TMC for incidents on state facilities. |
| | City of Memphis (Police Department) | Dispatch public safety vehicles to incidents. |
| | | Coordinate incident response with other emergency dispatch agencies and the TDOT SmartWay Center for incidents on state facilities. |
| | City of Millington (Police Department) | Dispatch public safety vehicles to incidents. |
| | | Coordinate incident response with other emergency dispatch agencies and the TDOT SmartWay Center for incidents on state facilities. |
| | City of Olive Branch (Emergency Communications Center) | Dispatch public safety vehicles to incidents. |
| | | Coordinate incident response with other emergency dispatch agencies and the MDOT Northwest Regional TMC for incidents on state facilities. |
| | City of Southaven (Police Department) | Dispatch public safety vehicles to incidents. |
| | | Coordinate incident response with other emergency dispatch agencies and the MDOT Northwest Regional TMC for incidents on state facilities. |
| | DeSoto County (E-911) | Dispatch public safety vehicles to incidents. |
| | | Coordinate incident response with other emergency dispatch agencies and the MDOT Northwest Regional TMC for incidents on state facilities. |
| | Fayette County (Sheriff) | Dispatch public safety vehicles to incidents. |
| | | Coordinate incident response with other emergency dispatch agencies and the TDOT SmartWay Center for incidents on state facilities. |
| | Shelby County (Sheriff) | Dispatch public safety vehicles to incidents. |
| | | Coordinate incident response with other emergency dispatch agencies and the TDOT SmartWay Center for incidents on state facilities. |

**Table 9 – Memphis Urban Area Stakeholder Roles and Responsibilities (continued)**

| Transportation Service | Stakeholder | Roles/Responsibilities |
|---|---|---|
| Incident Management (Emergency) (continued) | THP (Dispatch) | Dispatch public safety vehicles to incidents. |
| | | Coordinate incident response with other public safety and traffic management agencies as well as the TDOT SmartWay Center for incidents on state facilities. |
| | Town of Collierville (Police Department) | Dispatch public safety vehicles to incidents. |
| | | Coordinate incident response with other emergency dispatch agencies and the TDOT SmartWay Center for incidents on state facilities. |
| Emergency Management | City of Bartlett (Police Department) | Responsible for emergency call-taking for the City of Bartlett as the 911 PSAP. |
| | | Responsible for the dispatch of emergency vehicles to incidents and tracking of their location and status. |
| | | Responsible for the routing of emergency vehicles to facilitate the safest/quickest arrival at an incident. |
| | | Participate in regional emergency planning to support large-scale incidents and disasters. |
| | | Participate in evacuation planning and coordination to manage evacuation and reentry in the vicinity of a disaster or other emergency situation. |
| | City of Germantown (Police Department) | Responsible for emergency call-taking for the City of Germantown as the 911 PSAP. |
| | | Responsible for the dispatch of emergency vehicles to incidents and tracking of their location and status. |
| | | Responsible for the routing of emergency vehicles to facilitate the safest/quickest arrival at an incident. |
| | | Participate in regional emergency planning to support large-scale incidents and disasters. |
| | | Participate in evacuation planning and coordination to manage evacuation and reentry in the vicinity of a disaster or other emergency situation. |
| | City of Horn Lake (911 Dispatch) | Responsible for emergency call-taking for the City of Horn Lake as the 911 PSAP. |
| | | Responsible for the dispatch of emergency vehicles to incidents and tracking of their location and status. |
| | | Responsible for the routing of emergency vehicles to facilitate the safest/quickest arrival at an incident. |
| | | Participate in regional emergency planning to support large-scale incidents and disasters. |
| | | Participate in evacuation planning and coordination to manage evacuation and reentry in the vicinity of a disaster or other emergency situation. |
| | City of Memphis (Police Department) | Responsible for emergency call-taking as the 911 PSAP for the City of Memphis. |
| | | Responsible for the dispatch of emergency vehicles to incidents and tracking of their location and status. |
| | | Responsible for the routing of emergency vehicles to facilitate the safest/quickest arrival at an incident. |

**Table 9 – Memphis Urban Area Stakeholder Roles and Responsibilities (continued)**

| Transportation Service | Stakeholder | Roles/Responsibilities |
|---|---|---|
| Emergency Management (continued) | City of Memphis (Police Department) (continued) | Participate in regional emergency planning to support large-scale incidents and disasters. |
| | | Participate in evacuation planning and coordination to manage evacuation and reentry in the vicinity of a disaster or other emergency situation. |
| | City of Millington (Police Department) | Responsible for emergency call-taking as the 911 PSAP for the City of Millington |
| | | Responsible for the dispatch of emergency vehicles to incidents and tracking of their location and status. |
| | | Responsible for the routing of emergency vehicles to facilitate the safest/quickest arrival at an incident. |
| | | Participate in regional emergency planning to support large-scale incidents and disasters. |
| | | Participate in evacuation planning and coordination to manage evacuation and reentry in the vicinity of a disaster or other emergency situation. |
| | City of Olive Branch (Emergency Communications Center) | Responsible for emergency call-taking for the City of Olive Branch as the 911 PSAP. |
| | | Responsible for the dispatch of emergency vehicles to incidents and tracking of their location and status. |
| | | Responsible for the routing of emergency vehicles to facilitate the safest/quickest arrival at an incident. |
| | | Participate in regional emergency planning to support large-scale incidents and disasters. |
| | | Participate in evacuation planning and coordination to manage evacuation and reentry in the vicinity of a disaster or other emergency situation. |
| | City of Southaven (Police Department) | Responsible for emergency call-taking for the City of Southaven as the 911 PSAP. |
| | | Responsible for the dispatch of emergency vehicles to incidents and tracking of their location and status. |
| | | Responsible for the routing of emergency vehicles to facilitate the safest/quickest arrival at an incident. |
| | | Participate in regional emergency planning to support large-scale incidents and disasters. |
| | | Participate in evacuation planning and coordination to manage evacuation and reentry in the vicinity of a disaster or other emergency situation. |
| | DeSoto County (E-911) | Responsible for emergency call-taking for DeSoto County as the 911 PSAP outside of the boundaries of the municipalities that operate their own 911 PSAPs. |
| | | Responsible for the dispatch of emergency vehicles to incidents and tracking of their location and status. |
| | | Responsible for the routing of emergency vehicles to facilitate the safest/quickest arrival at an incident. |
| | | Participate in regional emergency planning to support large-scale incidents and disasters. |

**Table 9 – Memphis Urban Area Stakeholder Roles and Responsibilities (continued)**

| Transportation Service | Stakeholder | Roles/Responsibilities |
|---|---|---|
| Emergency Management (continued) | DeSoto County (E-911) (continued) | Participate in evacuation planning and coordination to manage evacuation and reentry in the vicinity of a disaster or other emergency situation. |
| | DeSoto County (EMA) | Operates the EOC for DeSoto County in the event of a disaster or other large-scale emergency situation. |
| | | Responsible for tactical decision support, resource coordination, and communications integration among emergency management agencies in the County. |
| | | Lead regional efforts for emergency planning to support large-scale incidents and disasters. |
| | | Lead evacuation planning and coordination to manage evacuation and reentry in the vicinity of a disaster or other emergency situation. |
| | DeSoto County (EMS Dispatch) | Responsible for the dispatch of emergency vehicles to incidents and tracking of their location and status. |
| | | Responsible for the routing of emergency vehicles to facilitate the safest/quickest arrival at an incident. |
| | | Participate in regional emergency planning to support large-scale incidents and disasters. |
| | | Participate in evacuation planning and coordination to manage evacuation and reentry in the vicinity of a disaster or other emergency situation. |
| | Fayette County (EMA) | Operates the EOC for Fayette County in the event of a disaster or other large-scale emergency situation. |
| | | Responsible for tactical decision support, resource coordination, and communications integration among emergency management agencies in the County. |
| | | Lead regional efforts for emergency planning to support large-scale incidents and disasters. |
| | | Lead evacuation planning and coordination to manage evacuation and reentry in the vicinity of a disaster or other emergency situation. |
| | Fayette County (EMS Dispatch) | Responsible for the dispatch of emergency vehicles to incidents and tracking of their location and status. |
| | | Responsible for the routing of emergency vehicles to facilitate the safest/quickest arrival at an incident. |
| | | Participate in regional emergency planning to support large-scale incidents and disasters. |
| | | Participate in evacuation planning and coordination to manage evacuation and reentry in the vicinity of a disaster or other emergency situation. |
| | Fayette County (Sheriff) | Responsible for emergency call-taking for Fayette County as the 911 PSAP. |
| | | Responsible for the dispatch of emergency vehicles to incidents and tracking of their location and status. |
| | | Responsible for the routing of emergency vehicles to facilitate the safest/quickest arrival at an incident. |

**Table 9 – Memphis Urban Area Stakeholder Roles and Responsibilities (continued)**

| Transportation Service | Stakeholder | Roles/Responsibilities |
|---|---|---|
| Emergency Management (continued) | Fayette County (Sheriff) (continued) | Participate in regional emergency planning to support large-scale incidents and disasters. |
| | | Participate in evacuation planning and coordination to manage evacuation and reentry in the vicinity of a disaster or other emergency situation. |
| | MEMA | Operates the EOC for the State of Mississippi in the event of a disaster or other large-scale emergency situation. |
| | | Responsible for tactical decision support, resource coordination, and communications integration among emergency management agencies in the State. |
| | | Responsible for coordination with adjacent states, including the State of Tennessee, as needed to support emergency management. |
| | | Lead statewide efforts for emergency planning to support large-scale incidents and disasters. |
| | | Lead evacuation planning and coordination to manage evacuation and reentry in the vicinity of a disaster or other emergency situation. |
| | Shelby County Office of Preparedness | Operates the EOC for the City of Memphis and Shelby County in the event of a disaster or other large-scale emergency situation. |
| | | Responsible for tactical decision support, resource coordination, and communications integration among emergency management agencies in the County. |
| | | Lead regional efforts for emergency planning to support large-scale incidents and disasters. |
| | | Lead evacuation planning and coordination to manage evacuation and reentry in the vicinity of a disaster or other emergency situation. |
| | MHP | Responsible for the dispatch of emergency vehicles to incidents and tracking of their location and status. |
| | | Responsible for the routing of emergency vehicles to facilitate the safest/quickest arrival at an incident. |
| | | Participate in regional emergency planning to support large-scale incidents and disasters. |
| | | Participate in evacuation planning and coordination to manage evacuation and reentry in the vicinity of a disaster or other emergency situation. |
| | Municipal/County Government (Public Safety Dispatch) | Responsible for the dispatch of emergency vehicles to incidents and tracking of their location and status. |
| | | Responsible for the routing of emergency vehicles to facilitate the safest/quickest arrival at an incident. |
| | | Participate in regional emergency planning to support large-scale incidents and disasters. |
| | | Participate in evacuation planning and coordination to manage evacuation and reentry in the vicinity of a disaster or other emergency situation. |

**Table 9 – Memphis Urban Area Stakeholder Roles and Responsibilities (continued)**

| Transportation Service | Stakeholder | Roles/Responsibilities |
|---|---|---|
| Emergency Management (continued) | Shelby County (Fire Department) | Responsible for the dispatch of emergency vehicles to incidents and tracking of their location and status. |
| | | Responsible for the routing of emergency vehicles to facilitate the safest/quickest arrival at an incident. |
| | | Participate in regional emergency planning to support large-scale incidents and disasters. |
| | | Participate in evacuation planning and coordination to manage evacuation and reentry in the vicinity of a disaster or other emergency situation. |
| | Shelby County (Sheriff) | Responsible for emergency call-taking for Shelby County as the 911 PSAP outside of the boundaries of the municipalities that operate their own 911 PSAPs. |
| | | Responsible for the dispatch of emergency vehicles to incidents and tracking of their location and status. |
| | | Responsible for the routing of emergency vehicles to facilitate the safest/quickest arrival at an incident. |
| | | Participate in regional emergency planning to support large-scale incidents and disasters. |
| | | Participate in evacuation planning and coordination to manage evacuation and reentry in the vicinity of a disaster or other emergency situation. |
| | TEMA | Operates the EOC for the State of Tennessee in the event of a disaster or other large-scale emergency situation. |
| | | Responsible for tactical decision support, resource coordination, and communications integration among emergency management agencies in the State. |
| | | Responsible for coordination with adjacent states, including Arkansas and Mississippi, as needed to support emergency management. |
| | | Lead statewide efforts for emergency planning to support large-scale incidents and disasters. |
| | | Lead evacuation planning and coordination to manage evacuation and reentry in the vicinity of a disaster or other emergency situation. |
| | Tennessee Bureau of Investigation | Responsible for the initiation of AMBER Alerts. |
| | THP | Responsible for the dispatch of emergency vehicles to incidents and tracking of their location and status. |
| | | Responsible for the routing of emergency vehicles to facilitate the safest/quickest arrival at an incident. |
| | | Participate in regional emergency planning to support large-scale incidents and disasters. |
| | | Participate in evacuation planning and coordination to manage evacuation and reentry in the vicinity of a disaster or other emergency situation. |
| Maintenance and Construction Management | City of Memphis | Responsible for the tracking and dispatch of maintenance vehicles. |
| | | Supports coordinated response to incidents. |

**Table 9 – Memphis Urban Area Stakeholder Roles and Responsibilities (continued)**

| Transportation Service | Stakeholder | Roles/Responsibilities |
|---|---|---|
| Maintenance and Construction Management (continued) | City of Memphis (continued) | Supports work zone activities including the dissemination of work zone information through portable DMS and sharing of information with other groups. |
| | | Disseminates work zone activity schedules and current asset restrictions to other agencies. |
| | Municipal/County Government | Responsible for the tracking and dispatch of maintenance vehicles. |
| | | Supports coordinated response to incidents. |
| | | Monitors environmental sensors and distributes information about road weather conditions. |
| | | Supports work zone activities including the dissemination of work zone information through portable DMS and sharing of information with other groups. |
| | | Disseminates work zone activity schedules and current asset restrictions to other agencies. |
| | MDOT | Monitors environmental sensors and distributes information about road weather conditions. |
| | | Responsible for the tracking and dispatch of maintenance vehicles. |
| | | Supports coordinated response to incidents. |
| | | Supports work zone activities including the dissemination of work zone information through portable DMS and sharing of information with other groups. |
| | | Responsible for entering and updating work zone information on the MDOTtraffic App and Website. |
| | | Disseminates work activity schedules and current asset restrictions to other agencies. |
| | | Operates work zone traffic control equipment including portable surveillance equipment and DMS. |
| | TDOT | Monitors environmental sensors and distributes information about road weather conditions. |
| | | Responsible for the tracking and dispatch of maintenance vehicles. |
| | | Supports coordinated response to incidents. |
| | | Supports work zone activities including the dissemination of work zone information through portable DMS, HAR, and sharing of information with other groups. |
| | | Responsible for entering and updating work zone information in SWIFT. |
| | | Disseminates work activity schedules and current asset restrictions to other agencies. |
| | | Operates work zone traffic control equipment including portable surveillance equipment, DMS, and HAR transmitters. |
| Transit Management | DARTS | Operates demand response transit services from a central dispatch facility responsible for tracking vehicle location and status. |

**Table 9 – Memphis Urban Area Stakeholder Roles and Responsibilities (continued)**

| Transportation Service | Stakeholder | Roles/Responsibilities |
|---|---|---|
| Transit Management (continued) | DARTS (continued) | Provide transit security on transit vehicles through silent alarms and surveillance systems. |
| | | Provide transit traveler information to the agency website, local private sector traveler information services, and the Mississippi 511 Traveler Information System. |
| | | Participate in evacuation planning and coordination to manage evacuation and reentry in the vicinity of a disaster or other emergency situation. |
| | Delta Human Resource Agency | Operates demand response transit services from a central dispatch facility responsible for tracking vehicle location and status. |
| | | Provide transit security on transit vehicles through silent alarms and surveillance systems. |
| | | Provide transit traveler information to the agency website, local private sector traveler information services, and the Tennessee 511 System. |
| | | Participate in evacuation planning and coordination to manage evacuation and reentry in the vicinity of a disaster or other emergency situation. |
| | MATA | Operates fixed-route and paratransit services from a central dispatch facility responsible for tracking their location and status. |
| | | Provide transit passenger electronic fare payment on fixed route transit vehicles. |
| | | Provide transit security on transit vehicles and at transit terminals through silent alarms and surveillance systems. |
| | | Coordinate with the City of Memphis Engineering Division on transit signal priority. |
| | | Provide transit traveler information to the agency website, local private sector traveler information services, and the Tennessee 511 system. |
| | | Provide real-time MATA Bus Arrival Status Boards at transit stops and bus location information on MATA Website and MATA Mobile App |
| | | Operate on-board systems to provide next stop annunciation. |
| | | Participate in evacuation planning and coordination to manage evacuation and reentry in the vicinity of a disaster or other emergency situation. |
| Traveler Information | City of Bartlett | Responsible for the collection and distribution of traveler information including incident information and maintenance and construction closure information. |
| | | Responsible for the collection and distribution of emergency information to the traveling public, including evacuation information and wide-area alerts. |

**Table 9 – Memphis Urban Area Stakeholder Roles and Responsibilities (continued)**

| Transportation Service | Stakeholder | Roles/Responsibilities |
|---|---|---|
| Traveler Information (continued) | City of Germantown | Responsible for the collection and distribution of traveler information including incident information and maintenance and construction closure information. |
| | | Responsible for the collection and distribution of emergency information to the traveling public, including evacuation information and wide-area alerts. |
| | MDOT | Collection, processing, storage, and broadcast dissemination of traffic, transit, maintenance and construction, event and weather information to travelers via the MDOTtraffic Website and MDOTtraffic App. |
| | | Provide transportation network condition data to private sector information service providers. |
| | City of Memphis | Responsible for the collection and distribution of traveler information including incident information and maintenance and construction closure information. |
| | | Responsible for the collection and distribution of emergency information to the traveling public, including evacuation information and wide-area alerts. |
| | City of Millington | Responsible for the collection and distribution of traveler information including incident information and maintenance and construction closure information. |
| | | Responsible for the collection and distribution of emergency information to the traveling public, including evacuation information and wide-area alerts. |
| | City of Olive Branch | Responsible for the collection and distribution of traveler information including incident information and maintenance and construction closure information. |
| | | Responsible for the collection and distribution of emergency information to the traveling public, including evacuation information and wide-area alerts. |
| | City of Southaven | Responsible for the collection and distribution of traveler information including incident information and maintenance and construction closure information. |
| | | Responsible for the collection and distribution of emergency information to the traveling public, including evacuation information and wide-area alerts. |
| | TDOT | Collection, processing, storage, and broadcast dissemination of traffic, transit, maintenance and construction, event and weather information to travelers via the SmartWay Website, SmartWay Mobile App, and the Tennessee 511 system. |
| | | Provide transportation information to travelers via traveler information kiosks. |
| | | Provide transportation network condition data to private sector information service providers. |
| | Town of Collierville | Responsible for the collection and distribution of traveler information including incident information and maintenance and construction closure information. |

**Table 9 – Memphis Urban Area Stakeholder Roles and Responsibilities (continued)**

| Transportation Service | Stakeholder | Roles/Responsibilities |
|---|---|---|
| Traveler Information (continued) | Town of Collierville (continued) | Responsible for the collection and distribution of emergency information to the traveling public, including evacuation information and wide-area alerts. |
| Commercial Vehicle Operations | MDOT | Operate weigh-in-motion commercial vehicle inspection station. |
| | | Enforce commercial vehicle regulations in the State of Mississippi. |
| | THP | Operate weigh-in-motion commercial vehicle inspection station. |
| | | Enforce commercial vehicle regulations in the State of Tennessee. |
| Archived Data Management | DARTS | Collect and maintain transit archive data. |
| | Delta HRA | Collect and maintain transit archive data. |
| | MATA | Collect and maintain transit archive data. |
| | Memphis MPO | Collect and maintain data from regional traffic, transit, and emergency management agencies. |
| | TDOT | Collect and maintain traffic archive data. |
| | THP | Collect and maintain crash record information from regional emergency management agencies. |

## 5.6 Potential Agreements

The Regional ITS Architecture for the Memphis MPO Region has identified many agency interfaces, information exchanges, and integration strategies that would be needed to provide the ITS services and systems identified by the stakeholders in the Region. Interfaces and data flows among public and private entities in the Region will require agreements among agencies that establish parameters for sharing agency information to support traffic management, incident management, provide traveler information, and perform other functions identified in the Regional ITS Architecture.

With the implementation of ITS technologies, integrating systems from one or more agencies, and the anticipated level of information exchange identified in the Regional ITS Architecture, it is likely that formal agreements between agencies will be needed in the future. These agreements, while perhaps not requiring a financial commitment from agencies in the Region, should outline specific roles, responsibilities, data exchanges, levels of authority, and other facets of regional operations. Some agreements will also outline specific funding responsibilities, where appropriate and applicable.

Agreements should avoid being specific with regard to technology when possible. Technology is likely to change and changes to technology could require an update of the agreement if the agreement was not technology neutral. Focus of the agreement should be on the responsibilities of the agencies and types of information that need to be exchanged. Depending on the type of agreement being used, agencies should be prepared for the process to complete an agreement to take several months to years. Agencies must first reach consensus on what should be in an agreement and then proceed through the approval process. The approval process for formal agreements varies by agency and can often be quite lengthy, so it is recommended that agencies plan ahead to ensure that the agreement does not delay the project.

When implementing an agreement for ITS, it is recommended that as a first step any existing agreements are reviewed to determine whether they can be amended or modified to include the additional requirements that will come with deploying a system. If there are no existing agreements that can be modified or used for ITS implementation, then a new agreement will need to be developed. The formality and type of agreement used is a key consideration. If the arrangement will be in effect for an extended duration or involve any sort of long-term maintenance, then written agreements should be used. Often during long-term operations, staff may change and a verbal agreement between agency representatives may be forgotten by new staff.

Common agreement types and potential applications include:

- *Handshake Agreement:* Handshake agreements are often used in the early stage of a project. This type of informal agreement depends very much on relationships between agencies and may not be appropriate for long-term operations where staff is likely to change.
- *Memorandum of Understanding (MOU):* A MOU demonstrates general consensus but is not typically very detailed. MOUs often identify high-level goals and partnerships.
- *Interagency and Intergovernmental Agreements:* These agreements between public agencies can be used for operation, maintenance, or funding projects and systems. They can include documentation on the responsibility of each agency, functions they will provide, and liability.
- *Funding Agreements:* Funding agreements document the funding arrangements for ITS projects. At a minimum, funding agreements include a detailed scope, services to be

performed, and a detailed project budget. Agency funding expectations or funding sources are also typically identified.

- *Master Agreements:* Master agreements include standard contract language for an agency and serve as the main agreement between two entities which guides all business transactions. Use of a master agreement can allow an agency to do business with another agency or private entity without having to go through the often lengthy development of a formal agreement each time.

**Table 10** provides a list of existing and potential agreements for the Memphis MPO Region based on the interfaces identified in the Regional ITS Architecture. It is important to note that as ITS services and systems are implemented in the Region, part of the planning and review process for those projects should include a review of potential agreements that would be needed for implementation or operations.

The following agreements were identified as existing in the Memphis MPO Region and have been included in **Appendix E** if available.

- Memorandum of Understanding between the City of Memphis and the City of Germantown regarding traffic signal ITS coordination;
- Memorandum of Agreement between MDOT and the City of Southaven for locating their TMC within the Southaven Police Department and sharing of ITS resources;
- Agreement developed by TDOT for live CCTV video access for governmental agency users;
- Agreement developed by TDOT for live CCTV video access for private entity users; and
- Memorandum of Understanding between the Memphis Urban Area MPO and the West Memphis MPO for consistency and conformity of plans, programs and projects.
- Agreement between TDOT and AHTD for the ITS components (including CCTV cameras and DMS) along I-40 and I-55 in Crittenden County Arkansas. (This agreement was not available at the time the Regional ITS Architecture report was completed. For additional information regarding this agreement, contact Ed Johnson with the Tennessee Department of Transportation at edward.r.johnson@tn.gov or Gary Bennett with the Arkansas State Highway and Transportation Department at gary.bennett@arkansashighways.com)

**Table 10 – Memphis Urban Area Existing and Potential ITS Agreements**

| Status | Agreement and Agencies | Agreement Description |
|---|---|---|
| Existing | **Data Sharing and Usage (Public-Private)** – TDOT and Media | Agreement to allow private sector media and information service providers to access and broadcast public sector transportation agency CCTV camera video feeds, real time traffic speed and volume data, and incident data. Agreements should specify the control priority to allow traffic agencies first priority to control cameras during incidents or other events. The ability of the traffic agency to deny access to video and data feeds if a situation warrants such action is also part of the agreement. |
| Future | **Data Sharing and Usage (Public-Private) –** City of Memphis and Media | Agreement to allow private sector media and information service providers to access and broadcast public sector transportation agency CCTV camera video feeds, real time traffic speed and volume data, and incident data. Agreements should specify the control priority to allow traffic agencies first priority to control cameras during incidents or other events. The ability of the traffic agency to deny access to video and data feeds if a situation warrants such action should also be part of the agreement. |
| Existing | **Data Sharing and Usage (Public-Public)** – AHTD and TDOT | Agreement to define the parameters, guidelines, and policies for inter-agency ITS data sharing between public sector agencies including CCTV camera feeds. Similar to data sharing and usage agreements for public-private agencies, the agency that owns the equipment should have first priority of the equipment and the ability to discontinue data sharing if a situation warrants such action. |
| Future | **Data Sharing and Usage (Public-Public)** – AHTD, City Of Bartlett, City of Germantown, City of Horn Lake, City of Memphis, City of Millington, City of Olive Branch, City of Southaven, MDOT, TDOT, Town of Collierville | Agreement to define the parameters, guidelines, and policies for inter-agency ITS data sharing between public sector agencies including CCTV camera feeds. Similar to data sharing and usage agreements for public-private agencies, the agency that owns the equipment should have first priority of the equipment and the ability to discontinue data sharing if a situation warrants such action. |
| Existing | **Traffic Signal Timing Data Sharing and Usage (Public-Public)** – City of Germantown and City of Memphis | Agreement to define the parameters, guidelines, and policies for inter-agency traffic signal timing, including sharing of timing plans and joint operations of signals, between cities and counties. This agreement also includes operation and maintenance parameters regarding ITS equipment. |
| Future | **Traffic Signal Timing Data Sharing and Usage (Public-Public)** – City of Bartlett, City of Germantown, City of Millington, City of Memphis, Municipal/County Government, Shelby County, Town of Collierville | Agreement to define the parameters, guidelines, and policies for inter-agency traffic signal timing, including sharing of timing plans and joint operations of signals, between cities and counties. This agreement also includes operation and maintenance parameters regarding ITS equipment. |
| Existing | **TMC Operations Data Sharing and Usage (Public-Public)** – MDOT and City of Southaven | Agreement to house the MDOT Regional TMC within the City of Southaven Police Department. The memorandum of agreement identifies the terms of use and responsibilities of MDOT and the City regarding ITS resources including fiber and conduit, center-to-center connectivity, CCTV cameras, and DMS. |
| Future | **Incident Data Sharing and Usage (Public-Public)** – AHTD, MDOT, MHP, Shelby County Office of Preparedness, TDOT, THP | Agreement to define the parameters, guidelines, and policies for inter-agency sharing of incident data between transportation and emergency management agencies in the Region. Incident information could be sent directly to computer-aided dispatch systems and include information on lane closures, travel delays, and weather. |
| Existing | **Planning Coordination and Cooperation (Public-Public)** – Memphis MPO and West Memphis MPO | Agreement between the Memphis Urban Area MPO and the West Memphis MPO. The agreement states that the MPO will develop separate transportation plans, programs, and projects, but will coordinate data collection analysis activities and will consult with one another to ensure that their plans, programs, and projects are integrated and consistent. |

## 5.7 Phases of Implementation

The Memphis Urban Area Regional ITS Architecture will be implemented over time through a series of projects. Though TDOT, MDOT, and many of the larger municipalities have already made significant ITS deployments in the Region, for other agencies key foundation systems will need to be implemented in order to support other systems that have been identified in the Regional ITS Architecture. The deployment of all of the systems required to achieve the final Regional ITS Architecture build out will occur over many years.

A sequence of projects and their respective time frames have been identified in the Regional ITS Deployment Plan presented in Section 6. These projects have been sequenced over a period of time that coincides with the 2040 Long Range Transportation Plan (LRTP), with projects identified for deployment in the short-term (0 to 5 years), mid-term (5 to10 years), and long term (beyond 10 years.) It should be noted that the Memphis MPO is developing a Regional Transportation Plan (RTP) which will update and replace the existing LRTP; however, the RTP will maintain the 2040 horizon year.

Some of the key service packages that will provide the functions for the foundation systems in the Memphis MPO Region are listed below. Projects associated with these and other service packages identified for the Region have been included in the Memphis Urban Area Regional ITS Deployment Plan.

- ATMS01 – Network Surveillance;
- ATMS03 – Traffic Signal Control;
- ATMS06 – Traffic Information Dissemination;
- ATMS07 – Regional Traffic Management;
- ATMS08 – Traffic Incident Management System;
- EM02 – Emergency Routing;
- EM04 – Roadway Service Patrols;
- EM05 – Transportation Infrastructure Protection;
- APTS01 – Transit Vehicle Tracking;
- APTS02 – Transit Fixed Route Operations;
- APTS03 – Demand Response Transit Operations; and
- APTS08 – Transit Traveler Information.

# 6. REGIONAL ITS DEPLOYMENT PLAN

The Regional ITS Deployment Plan serves as a tool for the Memphis MPO Region to identify specific projects that should be deployed in order to achieve the desired functionality identified in the Regional ITS Architecture. The Regional ITS Deployment Plan builds on the Regional ITS Architecture by outlining specific ITS project recommendations and strategies for the Region and identifying deployment timeframes so that the recommended projects and strategies can be implemented over time.

The Regional ITS Deployment Plan also shows the correlation between each project and the Regional ITS Architecture by identifying the ITS service packages that correspond to each project. If projects were identified that did not correspond to an ITS service package, the ITS service packages in the Regional ITS Architecture were revised while the Regional ITS Architecture was still in draft format; therefore, the resulting ITS deployment projects are supported by the Regional ITS Architecture.

The Memphis Urban Area Regional ITS Deployment Plan provides stakeholders with a list of regionally significant ITS projects that are consistent with the Regional ITS Architecture and assists with addressing transportation needs in the Region. It is important to note that the Regional ITS Deployment Plan is not fiscally constrained. The projects in the plan represent those projects that stakeholders would like to implement; however funding will still be needed in order for these projects to actually be implemented.

## 6.1 Deployment Plan Project Development Process

An overview of the process used to develop the Regional ITS Deployment Plan is provided in **Figure 8**. This figure demonstrates that a variety of inputs were used to gather information and develop a set of ITS projects for selection by stakeholders, including a review of the regional needs, ITS service package priorities, and regional and local plans.

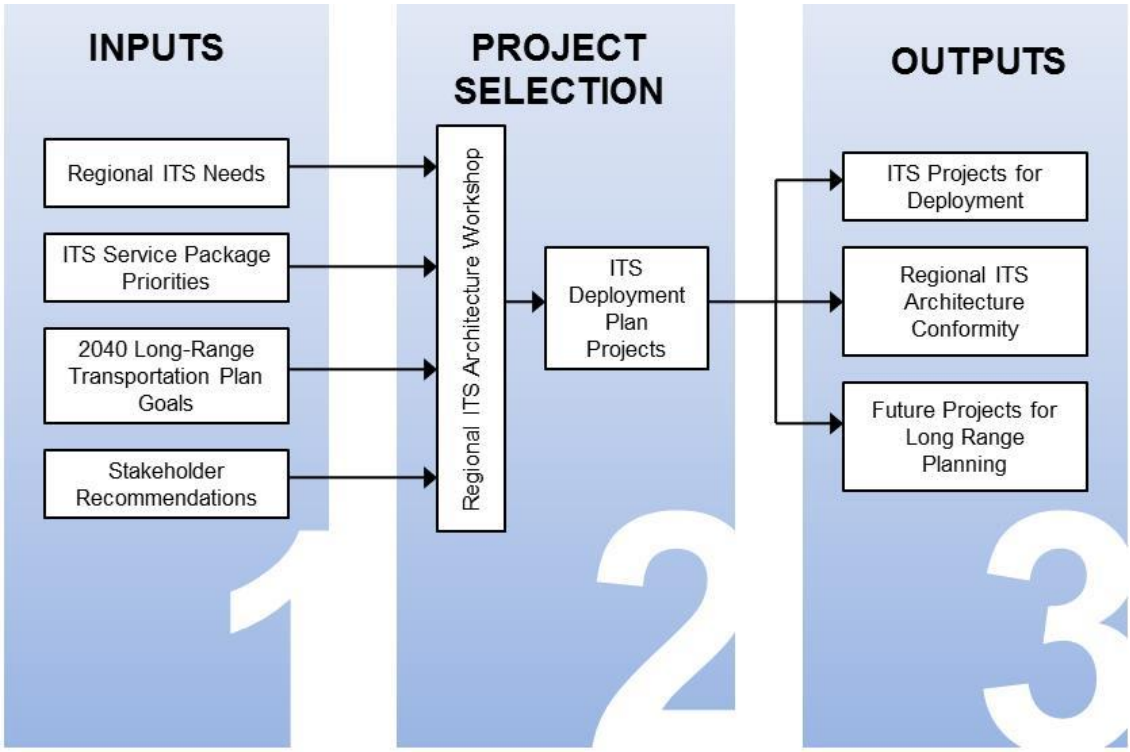



**Figure 8 – Project Development and Selection Process**

Stakeholder input in Step 1 was gathered through a stakeholder workshop where the regional ITS needs, ITS service package priorities, and planned ITS projects were discussed. A series of interviews were also conducted to discuss this same information in more detail with key agencies in the region. A review of regional and local plans was also conducted to identify potential project ideas.

The inputs in Step 1 led to the project selection in Step 2. Project selection was completed through a combination of a stakeholder workshop held in July 2014 as well as stakeholder review of the Regional ITS Architecture Report.

The outputs of the plan, shown in Step 3, will provide stakeholders and the Memphis MPO with a list of many of the priority ITS projects for the Memphis MPO Region. Each of the projects recommended in the plan has been checked against the Memphis Urban Area Regional ITS Architecture to ensure they are in conformance. This should assist agencies deploying these projects in the future with meeting FHWA and FTA requirements for ITS architecture conformity. The projects in the plan could also feed into the long-range planning process and provide agencies with a list of priority ITS projects for consideration during future calls for projects from the Memphis MPO.

## 6.2 ITS Project Recommendations

In order to achieve the ITS deployment levels outlined in their Regional ITS Architecture, a region must deploy carefully developed projects that provide the functionality and interoperability identified in their ITS Architecture. A key step toward achieving the Memphis MPO Region's ITS vision as established in the Regional ITS Architecture is the development of an ITS Deployment Plan that identifies specific projects, timeframes, and responsible agencies.

Input from all stakeholders is required for stakeholders to have ownership of the ITS Deployment Plan and to ensure that the plan has realistically identified projects and timeframes for deployment. Cost is another important factor—cost can vary a great deal for many ITS elements, depending on the level of deployment, maturity of the technology, type of communications, etc. For example, freeway network surveillance could be adequately achieved for one region by the deployment of still frame CCTV cameras only at freeway interchanges. In another region, full motion cameras may be deployed at one-mile intervals to provide complete coverage of the freeway. The infrastructure and telecommunications costs for these two projects would vary a great deal, yet either one could be suitable for a particular region.

Regional projects are identified in **Table 11** through **Table 14**. The tables are divided by primary responsible agency as follows:

- **Table 11** – State Department of Transportation Projects
- **Table 12** – Municipal ITS Projects
- **Table 13** – Transit ITS Projects
- **Table 14** – Other ITS Projects

The projects identified in the tables represent priority projects for each agency that are needed in order to implement the ITS services that were identified as part of the Regional ITS Architecture development. Many of the projects identified are not funded and identification of a funding source will likely be the most significant challenge in getting the projects implemented.

For each project, the following categories are discussed:

- **Project** – Identifies the project name including the agency responsible for implementation where applicable.

- **Description** – Provides a description of the project including notes on time-frames for deployment, and costs if applicable. The level of detail in the project descriptions varies depending on the implementing agency and how much detail they wanted to include regarding a project. In some cases, projects had not been discussed beyond a very high conceptual level and there was limited or no information available on cost and scale of the potential project.
- **Deployment Timeframe and Responsible Agency** – Provides a recommended timeframe for deployment for each project. Timeframes have been identified as short-term (deployment recommended in 0-5 years), mid-term (deployment recommended in 5-10 years), and long-term (deployment recommended beyond 10 years). Recommendations for deployment timeframes were based on input from each agency and considered the project priority, possibility of funding, and dependency on other project deployments.
- **Funding Status** – Indicates whether funding has been identified or is still needed for the project.
- **Applicable Service Packages** – Identifies the ITS service packages from the Regional ITS Architecture that each project will assist in implementing. Knowing which ITS service packages each project identifies is an important part of an ITS architecture conformance review.

**Table 11 – State Department of Transportation ITS Projects**

| Project | Description | Deployment Timeframe and Responsible Agency[1] | Funding Status | Applicable Service Packages |
|---|---|---|---|---|
| TDOT Region 4 SmartWay ITS SR 385 Extension | Extend the current SmartWay ITS system eastward on SR 385 from MM7 to approximately MM15 at the junction of future I-269. The SmartWay ITS system extension will include the installation of fiber, CCTV cameras, DMS, and HAR. Cost for this project is expected to be approximately $4M. | Short or Mid-Term: TDOT | Funding Identified: No | ATMS01 – Network Surveillance<br>ATMS06 – Traffic Information Dissemination |
| TDOT Region 4 SmartWay ITS SR 385/I-269 (South) Implementation | Implement SmartWay ITS system on SR 385/I-269 from I-40 southward to the Mississippi state line and connect it to the MDOT ITS system. The implementation of the SmartWay ITS system will include the installation of fiber, CCTV cameras, DMS, and HAR. Cost for this project is expected to be approximately $9M. | Mid-Term: TDOT | Cost: $9,000,000<br>Funding Identified: No | ATMS01 – Network Surveillance<br>ATMS06 – Traffic Information Dissemination |
| TDOT Region 4 SmartWay ITS SR 385/I-269 (North) Implementation | Implement SmartWay ITS system on SR 385/I-269 from I-40 northward to the future I-69 near Highway 51. The implementation of the SmartWay ITS system will include the installation of fiber, CCTV cameras, DMS, and HAR. Cost for this project is expected to be approximately $8M. | Mid-Term: TDOT | Cost: $8,000,000<br>Funding Identified: No | ATMS01 – Network Surveillance<br>ATMS06 – Traffic Information Dissemination |
| TDOT HELP Service Patrol Expansion | Expand the existing HELP Service Patrol program including additional freeway miles of coverage and hours of operation. HELP Service Patrol will be expanded in coordination with implementation of new TDOT SmartWay ITS segments on freeways. | Short to Mid-Term: TDOT | Funding Identified: No | EM04 – Roadway Service Patrols |
| TDOT Region 4 Smart Work Zone Equipment | Utilize portable ITS equipment that can be used in work zones to more efficiently manage traffic and provide traveler information. Includes CCTV cameras, vehicle detection, and DMS. | Short to Mid-Term: TDOT | Funding Identified: No | ATMS01 – Network Surveillance<br>MC08 – Work Zone Management<br>MC10 – Maintenance and Construction Activity Coordination |

**Table 11 – State Department of Transportation ITS Projects (Continued)**

| Project | Description | Deployment Timeframe and Responsible Agency[1] | Funding Status | Applicable Service Packages |
|---|---|---|---|---|
| TDOT Video feeds for TDOT SmartWay Website and App | Provide streaming video from TDOT CCTV cameras for the public on the TDOT SmartWay Website and App. Video is proposed to utilize video compression format H.264. It is expected that this will be an internal effort and no direct costs, other than staff time, will be associated with this project. | Short-Term: TDOT | Funding Identified: Not Applicable | ATMS01 – Video Surveillance<br>ATIS02 – Interactive Traveler Information |
| TDOT Statewide Information For Travelers (SWIFT) Modification for Municipal Traffic Information Input | Allow direct input by municipal TOCs into the TDOT Statewide Information For Travelers (SWIFT)system including incident information, planned road closures, and real time traffic conditions. The effort to accomplish this project will primarily be through training of the municipalities on how to input data into SWIFT. It is expected that this will be an internal effort and no direct costs, other than staff time, will be associated with this project. | Short-Term: TDOT and Municipalities | Funding Identified: Not Applicable | ATMS08 – Traffic Incident Management System<br>ATMS 07 – Regional Traffic Management<br>ATIS01 – Broadcast Traveler Information |
| TDOT Region 4 SmartWay TMC Coordination with the Shelby County Office of Preparedness | Establish a communications connection between the TDOT Region 4 SmartWay TMC and the Memphis-Shelby County Office of Preparedness. This communications connection will provide the Office of Preparedness with access to TDOT video feeds and roadway condition information and facilitate coordination between TDOT and the Office of Preparedness during major incidents. | Short-Term: TDOT and Shelby County Office of Preparedness | Funding Identified: No | EM08 – Disaster Response and Recovery<br>EM09 – Evacuation and Reentry Management |
| TDOT Region 4 SmartWay ITS I-40 and I-55 Fiber Connection to Arkansas | Install fiber to replace the wireless existing connection across the Mississippi River to connect with The TDOT Region 4 SmartWay TMC to the TDOT CCTV cameras and DMS along I-40 and I-55 in Arkansas. | Short to Mid-Term: TDOT | Funding Identified: No | ATMS01 – Network Surveillance<br>ATMS06 – Traffic Information Dissemination |

**Table 11 – State Department of Transportation ITS Projects (Continued)**

| Project | Description | Deployment Timeframe and Responsible Agency[1] | Funding Status | Applicable Service Packages |
|---|---|---|---|---|
| TDOT Region 4 SmartWay TMC Coordination with MDOT Northwest Regional TMC | Establish a communications connection between the TDOT Region 4 SmartWay TMC and MDOT Northwest Regional TMC for the coordination of traffic information. This communications connection will allow the sharing of video feeds, traffic conditions, and incident locations between the TDOT Region 4 SmartWay TMC and MDOT Northwest Regional TMC. | Short-Term:<br>TDOT and MDOT | Funding Identified:<br>No | ATMS07 – Regional Traffic Management<br>ATMS08 – Traffic Incident Management System |
| MDOT Congestion Mitigation and Air Quality (CMAQ) Projects | MDOT is coordinating with the jurisdictions within DeSoto County to determine how to allocate CMAQ funds. Potential projects include additional CCTV cameras, DMS, and traffic signal coordination. Cost for this project is expected to be approximately $9M. | Short to Mid-Term:<br>City of Hernando<br>City of Horn Lake<br>City of Olive Branch<br>City of Southaven<br>DeSoto County<br>MDOT | Funding Identified:<br>Yes | ATMS01 – Network Surveillance<br>ATMS03 – Traffic Signal Control<br>ATMS07 – Regional traffic Management |
| MDOT Installation of DMS | Install a DMS along the southbound lanes of I-55 in Desoto County south of the Tennessee State line. | Short-Term:<br>MDOT | Funding Identified:<br>No | ATMS06 – Traffic Information Dissemination |

[1]Deployment timeframes include short-term (0-5 years), mid-term (5-10 years), and long-term (10+ years).

**Table 12 – Municipal ITS Projects**

| Project | Description | Deployment Timeframe and Responsible Agency[1] | Funding Status | Applicable Service Packages |
|---|---|---|---|---|
| Municipal/County TOC | Establish a municipal or County Traffic Operations Center (TOC). The TOC will manage the traffic signal system, monitor CCTV cameras and vehicle detection, and control DMS. Costs will include equipment costs and the costs associated with either modifying space in an existing facility or building a new facility for use as a TOC. Depending on the functionality desired costs could vary. The City of Memphis is determining how best to reconfigure their TMC. | Short-Term:<br>City of Memphis<br>Mid to Long-Term:<br>City of Bartlett<br>City of Millington<br>City of Olive Branch<br>Town of Collierville<br>Other Municipalities<br>Shelby County | Funding Identified:<br>City of Memphis – Yes<br>Other Agencies – No | ATMS01 – Network Surveillance<br>ATMS03 – Traffic Signal Control<br>ATMS06 – Traffic Information Dissemination<br>ATMS08 – Traffic Incident Management System |
| Municipal/County ATMS Signal System Implementation | Implement an Advanced Traffic Management System (ATMS) in municipalities within Shelby County through the Shelby County CMP initiative. System will include communications and hardware to allow signal coordination and real time monitoring of signal systems. Cost will vary significantly based on the system and communications implemented. The timeframe for this project will vary depending on the need and funding in the various municipalities and jurisdictions. | Short to Long-Term:<br>City of Bartlett<br>City of Germantown<br>City of Memphis<br>City of Millington<br>Shelby County<br>Town of Collierville<br>Other Municipalities<br>Shelby County | Funding Identified: Yes | ATMS03 – Traffic Signal Control |
| Municipal/County ATMS Signal System Upgrades | Upgrade and expand the existing ATMS in municipalities within Shelby County through the Shelby County CMP initiative including improved traffic signal coordination and communications, to allow real time monitoring of traffic signals. Cost represents an average cost per intersection for upgrading and adding to the ATMS. Cost will vary based on the level of upgrades required and the communication infrastructure needed. | Short to Long Term:<br>City of Bartlett<br>City of Germantown<br>City of Memphis<br>City of Millington<br>Shelby County<br>Town of Collierville<br>Other Municipalities<br>Shelby County | Funding Identified: Yes | ATMS03 – Traffic Signal Control |

**Table 12 – Municipal ITS Projects (Continued)**

| Project | Description | Deployment Timeframe and Responsible Agency[1] | Funding Status | Applicable Service Packages |
|---|---|---|---|---|
| Municipal Arterial CCTV Cameras | Implement CCTV cameras on key sections of arterial roadways. CCTV cameras can be used to monitor traffic conditions and to aid in incident management. Video feeds can be shared with emergency management agencies to facilitate emergency response, and with the TDOT Region 4 SmartWay TMC for monitoring traffic on arterials during freeway closures. | Mid-Term:<br>City of Memphis<br>City of Germantown<br><br>Long-Term:<br>City of Bartlett<br>Others as Needed | Funding Identified: No | ATMS01 – Network Surveillance |
| Municipal Arterial DMS | Deploy arterial dynamic message signs (DMS) to provide traveler information on arterials for incident management and special event management capabilities. The arterial DMS could also be used to provide information on freeway conditions prior to travelers entering freeways. | Long-Term:<br>Municipalities as Needed | Funding Identified: No | ATMS06 – Traffic Information Dissemination |
| Municipal Railroad Grade Crossing Advance Notification System | Implement advanced warning signs at railroad crossings to alert motorists of road blockages due to stopped trains. This project will be for locations with high volumes of traffic where rail crossings are routinely blocked for extended periods. | Mid-Term:<br>Municipalities as Needed | Funding Identified: No | ATMS13 – Standard Railroad Grade Crossing |
| Municipal/County Portable DMS | Procure portable DMS with the capability to change the messages remotely for use during maintenance activities, special events, and long-term incidents. This project will be implemented as needed by the municipalities and Shelby County on an as needed basis. | Short to Long-Term:<br>Municipalities and Shelby County as Needed | Funding Identified: No | MC08 – Work Zone Management |

**Table 12 – Municipal ITS Projects (Continued)**

| Project | Description | Deployment Timeframe and Responsible Agency[1] | Funding Status | Applicable Service Packages |
|---|---|---|---|---|
| Municipal Service Patrol Implementation | Implement a municipal service patrol program to provide assistance with incident management, including traffic control, detour routing, and roadside assistance to motorists. The City of Memphis was identified as the most likely municipality to implement this service, however funding for operation of the service has not been identified and was seen as the primary obstacle to implementation of the service. | Long-Term:<br>City of Memphis | Cost: Dependent on Coverage Area and Service Schedule<br>Funding Identified: No | EM04 – Roadway Service Patrols |
| Municipal Real-Time Traveler Information Website | Add real-time traveler information, such as incident locations, speed, and CCTV camera images to municipal websites in the Region. The Cities of Memphis, Bartlett, and Germantown each identified a need to implement this project. | Long-Term:<br>City of Memphis<br>City of Bartlett<br>City of Germantown<br>Other Municipalities as Needed | Funding Identified: No | ATIS01 – Broadcast Traveler Information |
| Municipal/County Fire and EMS Vehicles Traffic Signal Preemption | Implement emergency vehicle signal preemption for fire and emergency medical services (EMS) vehicles to improve incident response times and emergency responder safety. This project was considered on-going as needed by most municipalities in the Region that provide traffic signal preemption for public safety vehicles. | On-Going Project:<br>Municipalities as Needed | Funding Identified: No | ATMS03 – Traffic Signal Control<br>EM02 – Emergency Routing |
| Municipal TOC Coordination with TDOT Region 4 SmartWay TMC | Establish a communications connection between the TDOT Region 4 SmartWay TMC and municipal TOCs for the coordination of traffic information. This communications connection will allow the sharing of video feeds, traffic conditions, and incident locations between the TDOT Region 4 SmartWay TMC and municipal TOCs. | Short-Term:<br>City of Memphis and TDOT<br>Mid-Term:<br>Other Municipalities and TDOT | Funding Identified: No | ATMS07 – Regional Traffic Management<br>ATMS08 – Traffic Incident Management System |

**Table 12 – Municipal ITS Projects (Continued)**

| Project | Description | Deployment Timeframe and Responsible Agency[1] | Funding Status | Applicable Service Packages |
|---|---|---|---|---|
| Municipal TOC Coordination with MDOT Northwest Regional TMC | Establish a communications connection between the MDOT Northwest Regional TMC and municipal TOCs for the coordination of traffic information. This communications connection will allow the sharing of video feeds, traffic conditions, and incident locations between the MDOT Northwest Regional TMC and municipal TOCs. A connection currently exists between MDOT and the City of Southaven TOC | Mid-Term: Municipalities and MDOT | Funding Identified: No | ATMS07 – Regional Traffic Management<br>ATMS08 – Traffic Incident Management System |
| Municipal/County TOC Coordination with Municipal/County Public Safety Dispatch | Establish a communications connection between the TOCs and dispatch agencies for police, fire, and EMS. The purpose of the communication connection is to allow TOCs and dispatch agencies the ability to share video, road network conditions, and incident information. The City of Memphis identified this project as a short-term project. | Short-Term: City of Memphis<br>Mid to Long-Term: City of Germantown Other Municipalities Shelby County | Funding Identified: No | ATMS08 – Traffic Incident Management System<br>ATMS13 – Standard Railroad Grade Crossing<br>EM02 – Emergency Routing<br>MC10 – Maintenance and Construction Activity Coordination |

[1]Deployment timeframes include short-term (0-5 years), mid-term (5-10 years), and long-term (10+ years).

**Table 13 – Transit ITS Projects**

| Project | Description | Deployment Timeframe and Responsible Agency[1] | Funding Status | Applicable Service Packages |
|---|---|---|---|---|
| MATA Mobile Phone Application | Mobile phone application that allows users to view transit service information, real-time bus location, and create a transit trip plan. | Short Term: MATA<br><br>MATA is in the process of finalizing the mobile app | Funding Identified: Yes | APTS08 – Transit Traveler Information |
| MATA Transit Signal Priority System | Expand transit signal priority to additional key corridors identified in MATA's 2012 Short Range Transit Plan. Corridors include Jackson Ave. Poplar Ave., Third St., Summer Ave., Winchester Rd., and Elvis Presley Blvd/Bellevue Blvd. This project will be done in coordination with the municipality where the transit signal priority is being implemented. MATA does not currently have funding for specific projects but it could be implanted quickly once funding is identified. | Short to Mid-Term: MATA and Municipalities | Funding Identified: No | ATMS03 – Traffic Signal Control<br><br>APTS09 – Transit Signal Priority |
| MATA Transit Dispatch Coordination with Municipal TOC | Implement communications connection between transit dispatch and municipal TOCs. Communications connection will allow the TOCs to provide transit dispatch with real-time traffic information including access to video, information on incidents, and information on existing and planned closures that impact routes. | Mid to Long-Term: Transit Agency Municipality | Funding Identified: No | APTS02 – Transit Fixed Route Operations<br><br>APTS03 – Demand Response Transit Operations |
| MATA Electronic Fare Payment Card | Deploy a Smart Card program that allows riders to purchase tickets electronically and through ticket vending machines. | Short to Mid-Term: MATA | Funding Identified: No | APTS04 – Transit Fare Collection Management |

[1]Deployment timeframes include short-term (0-5 years), mid-term (5-10 years), and long-term (10+ years).

**Table 13 – Transit ITS Projects (Continued)**

| Project | Description | Deployment Timeframe and Responsible Agency[1] | Funding Status | Applicable Service Packages |
|---|---|---|---|---|
| MATA Maintenance of Existing ITS Elements | Maintain all existing and future ITS components including transit signal priority, transit vehicle tracking, on-board and transit center security cameras, DMS, and rider information. | Short to Long-Term:<br>MATA | Funding Identified: Partial | APTS01 – Transit Vehicle Tracking<br>APTS04 – Transit Fare Collection Management<br>APTS05 – Transit Security<br>APTS06 – Transit Management<br>APTS08 – Transit Traveler Information<br>APTS09 – Transit Signal Priority<br>APTS10 – Transit Passenger Counting |

[1]Deployment timeframes include short-term (0-5 years), mid-term (5-10 years), and long-term (10+ years).

**Table 14 – Other ITS Projects**

| Project | Description | Deployment Timeframe and Responsible Agency[1] | Funding Status | Applicable Service Packages |
|---|---|---|---|---|
| Regional Real-Time System Management Information Program | Collect and make available real-time system information along interstates and other routes of significance which includes construction activities, roadway or lane blockages, road weather observations, and travel times. Infrastructure components could include CCTV cameras, DMS, and field sensors. | Short-Term:<br>AHTD<br>MDOT<br>Memphis MPO<br>Municipalities<br>TDOT<br>West Memphis MPO | Funding Identifies: No | ATMS01 – Network Surveillance<br>ATMS06 – Traffic Information Dissemination<br>ATMS07 – Regional Traffic Management |
| Memphis MPO Archive Data Warehouse | Establish a data warehouse to archive data from cities and transit agencies within the Memphis MPO boundaries for use in regional planning. Cost for this project represents an average range for developing a data warehouse system. Cost could vary widely depending on the level of detail and functionality of the system as well as the amount of development that is done in-house by the Memphis MPO. | Long-Term:<br>Memphis MPO | Funding Identified: No | AD2 – ITS Data Warehouse<br>AD3 – ITS Virtual Data Warehouse |
| Shelby County Emergency Agencies Fiber Optic Cable Expansion | Increase the bandwidth of an existing fiber optic cable connection between the City Memphis Fire Department, City of Memphis Police Department and the Shelby County Office of Emergency Management to allow sharing of CCTV cameras. | Short-Term:<br>Shelby County Office of Preparedness and City of Memphis Police Department | Funding Identified: No | ATMS01 – Network Surveillance<br>EM08 – Disaster Response and Recovery |

[1]Deployment timeframes include short-term (0-5 years), mid-term (5-10 years), and long-term (10+ years).

Many of the projects outlined in **Table 11** through **Table 14** include elements that will assist in the compliance of the Real-time System Management Program (Part 511 of Title 23 Code of Federal Regulations) which requires that metropolitan areas with population exceeding one million to collect and makes accessible real-time traffic information on interstates and designated routes of significance. The information includes roadway blockages, construction activities, roadway weather observations and travel times along interstate highways and other routes of significance. During interviews, stakeholders within the Memphis MPO Region were asked to identify which routes they would like to receive real-time traffic information on in the future. These routes should be considered by the Region when identifying routes of significance to comply with Part 511 of Title 23.

**Table 15** depicts the routes that were identified by stakeholders where real-time system management information in desired. It is expected that the number of routes that will be designated as routes of significance within in the Region will actually be much smaller than the number of routes shown in **Table 15**.

**Table 15 – Routes Identified by Stakeholders for Real-time System Management Information**

| County | Route | |
|---|---|---|
| **Shelby** | • 3rd Street (SR 14/US 61)<br>• Austin Peay Highway (SR14)<br>• Danny Thomas Boulevard (SR 1/US 51)<br>• East Parkway (SR 277/US 64/US 70/US 79)<br>• E. Shelby Drive (SR 175)<br>• Germantown Road/ Germantown Parkway (SR 177)<br>• Holmes Road<br>• Houston Levee Road | • Kirby-Whitten Parkway/ Whitten Road<br>• Lamar Avenue (SR 4/US 78)<br>• North Parkway/Summer Avenue (SR 1/US 64/US 70/US 79)<br>• Poplar Avenue (SR 57/US 72)<br>• Sycamore View Road<br>• Union Avenue (SR 3/SR 23/US 64/US79)<br>• US 64/SR 15 (Stage Road)<br>• Walnut Grove Road (SR 23)<br>• Winchester Road<br>• Wolf River Boulevard |
| **DeSoto** | • Airways Boulevard<br>• Byhalia Road (SR 309)<br>• Church Road<br>• Commerce Street<br>• Getwell Road | • Germantown Road/ Cockrum Road (SR 305)<br>• Goodman Road (SR 302)<br>• Hacks Cross Road<br>• US 51<br>• Stateline Road |
| **Fayette** | • Macon Road (SR 193)<br>• SR 57<br>• SR 196 | • US 64/SR15<br>• US 70/SR 1<br>• US 72/SR 86 |
| **Crittenden** | • SR 77<br>• US 64 | • US 70 Broadway Avenue |
| **Marshall** | • SR 302<br>• US 72 | • US 78 |

# 7. USE AND MAINTENANCE PLAN

The Regional ITS Architecture developed for the Memphis MPO Region addresses the Region's vision for ITS implementation at the time the plan was developed. With the growth of the Region, needs will change and as technology progresses new ITS opportunities will arise. Shifts in regional needs and focus as well as changes in the National ITS Architecture will necessitate that the Memphis Urban Area Regional ITS Architecture be updated periodically to remain a useful resource for the Region. As projects are developed and deployed, it will be important that those projects conform to the Regional ITS Architecture so that they are consistent with both the Region's vision for ITS as well as the National standards described in the Regional ITS Architecture. In some cases, if projects do not conform, it may be necessary to modify the Regional ITS Architecture to reflect changes in the Region's vision for ITS rather than modify the project. In this Section, a process for determining architecture conformity of projects is presented and a plan for how to maintain and update the Regional ITS Architecture is described.

In 2001 the FHWA issued Final Rule 23 CFR 940, which required that ITS projects using federal funds (or ITS projects that integrate with systems that were deployed with federal funds) conform to a regional ITS architecture and also be developed using a systems engineering process. The purpose of this Section 7 is to discuss how the Memphis Urban Area Regional ITS Architecture can be used to support meeting the ITS architecture conformity and systems engineering requirements. A process for maintaining the Regional ITS Architecture, including the Regional ITS Deployment Plan which has been incorporated as Section 6 of the Regional ITS Architecture, is also presented. In Section 7.2 the systems engineering analysis requirements and the guidance provided by TDOT and the FHWA Tennessee Division are discussed. In Section 7.3, the process for determining ITS architecture conformity of an ITS project is presented.

The Regional ITS Architecture is considered a living document. Shifts in regional focus and priorities, changes and new developments in technology, and changes to the National ITS Architecture will necessitate that the Memphis Urban Area Regional ITS Architecture be updated to remain a useful resource for the Region. In the Regional ITS Architecture, a process for maintaining the plan was developed in coordination with stakeholders. The process covers both major updates to the Regional ITS Architecture that will happen approximately every four years as well as minor changes that may be needed between major updates of the documents. These processes have been included in this document in Sections 7.3 and 7.4.

## 7.1 Incorporation into the Regional Planning Process

Stakeholders invested a considerable amount of effort in the development of the Regional ITS Architecture for the Memphis MPO Region. The plans need to be incorporated into the regional planning process so that the ITS vision for the Region is considered when implementing ITS projects in the future, and to ensure that the Region remains eligible for federal funding. The FHWA and FTA require that any project that is implemented with federal funds conform to the Regional ITS Architecture. Many metropolitan or transportation planning organizations around the country now require that an agency certify that a project with ITS elements conforms to the Regional ITS Architecture before allowing the project to be included in the Transportation Improvement Program (TIP).

Stakeholders in the Memphis MPO Region agreed that as projects are submitted for inclusion in the TIP, each project should be evaluated by the submitting agency to determine if the project includes any ITS elements. If the project contains any ITS elements, then the project needs to be reviewed to determine if the ITS elements in the project are in conformance with the Regional

ITS Architecture. The submitting agency will perform this examination as part of the planning process using the procedure outlined in Section 7.3 and the Memphis MPO will review each project to confirm it does conform to the Regional ITS Architecture.

## 7.2 Systems Engineering Analysis

The TDOT Traffic Operations Division and the FHWA Tennessee Division have developed a guidance document to assist agencies with meeting the systems engineering requirement for ITS projects. The guidance states that a systems engineering analysis must be performed for all Federal Aid ITS projects unless the project is categorically excluded. Projects may be categorically excluded because they do not use federal funding or they are an ITS system expansion that do not add new functionality. For example, installation of an isolated traffic signal or expansion of a freeway management system through the deployment of additional CCTV cameras would be categorically excluded and not require a systems engineering analysis.

The goal of performing a systems engineering analysis is to systematically think through the project deployment process. Thorough upfront planning has been shown to help control costs and ensure schedule adherence. The Tennessee procedures indicate that the following should be included in a systems engineering analysis:

- Identification of portions of the Regional ITS Architecture being implemented;
- Identification of participating agencies roles and responsibilities;
- Definition of system requirements;
- Analysis of alternative system configurations and technology options the meet the system requirements;
- Identification of various procurement options;
- Identification of applicable ITS standards and testing procedures; and
- Documentation of the procedures and resources necessary for operations and management of the system.

The Memphis Urban Area Regional ITS Architecture and associated Turbo Architecture database can supply information for many of the required components for a systems engineering analysis. These include:

- Portions of the Regional ITS Architecture being implemented (discussed in Section 7.3);
- Participating agencies roles and responsibilities;
- Definition of system requirements (identified in the Memphis Urban Area Regional ITS Architecture Turbo Architecture database equipment packages); and
- Applicable ITS standards (identified using the ITS service package data flows from the Memphis Urban Area Regional ITS Architecture document and the National standards associated with the ITS service package data flows).

The Vee Diagram, shown as **Figure 9**, is frequently used in systems engineering discussions to demonstrate where the Regional ITS Architecture and systems engineering process fits into the life cycle of an ITS project. The Regional ITS Architecture is shown unattached from the rest of the diagram because it is not specifically project related and an undetermined amount of time can pass between the architecture development and the beginning of project implementation. Traveling along the diagram the systems engineering process addresses concept exploration, the systems engineering management plan framework, concept of operations, and systems requirements.

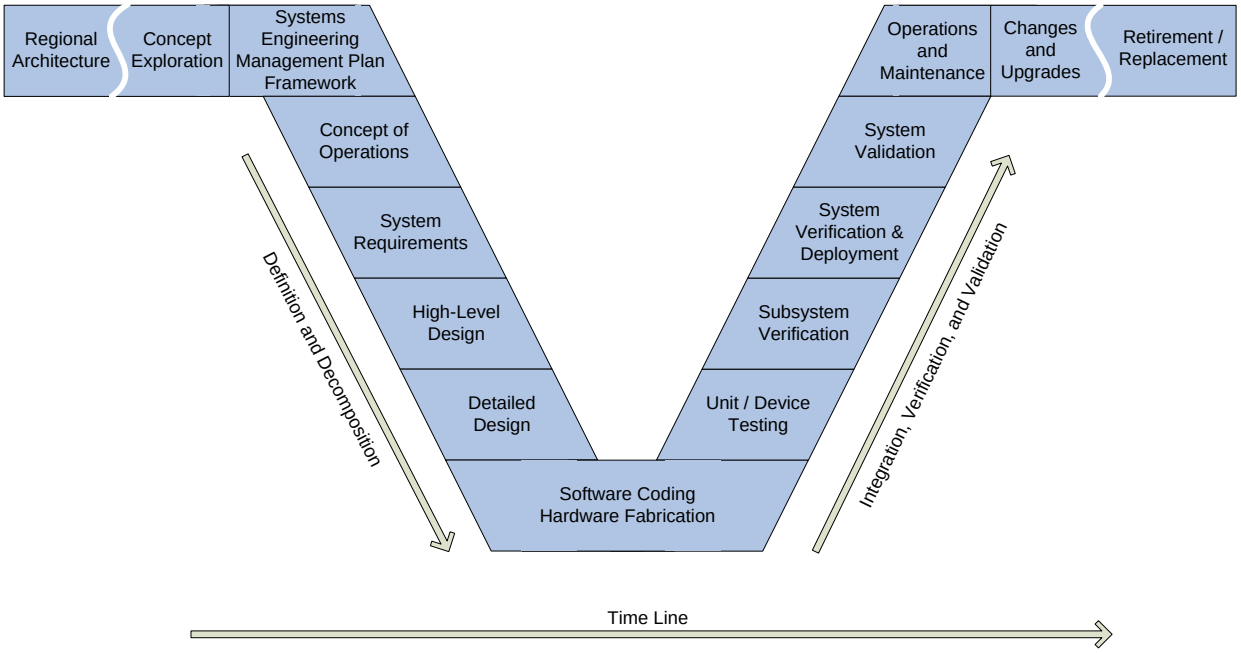



**Figure 9 – Systems Engineering Vee Diagram**

The Tennessee guidance document contains an example worksheet to aid in the preparation of a systems engineering analysis. During the process, if it is determined that a project is not adequately addressed in the Regional ITS Architecture, the Regional ITS Architecture maintenance process should be used to document the necessary changes.

## 7.3 Process for Determining ITS Architecture Conformity

The Memphis Urban Area Regional ITS Architecture documents the customized service packages that were developed as part of the ITS architecture process. To satisfy FHWA and FTA requirements and remain eligible to use Federal funds, a project must be accurately documented. The steps of the process are as follows:

- Identify the ITS components in the project;
- Identify the corresponding service packages(s) from the Regional ITS Architecture;
- Locate the component within the service package;
- Compare the connections to other agencies or elements documented in the ITS architecture as well as the information flows between them to the connections that will be part of the project; and
- Document any changes necessary to the Regional ITS Architecture or the project to ensure there is conformance.

The steps for determining ITS architecture conformity of a project are described in more detail below.

**Step 1 – Identify the ITS Components**

ITS components can be fairly apparent in an ITS focused project such as CCTV or DMS deployments, but could also be included in other types of projects where they are not as apparent. For example, an arterial widening project could include the installation of signal system interconnect, signal upgrades, and the incorporation of the signals in the project limits into a city's closed loop signal system. These are all ITS functions and should be included in the ITS Architecture.

**Step 2 – Identify the Corresponding Service Packages**

If a project was included in the list of projects identified in the Memphis Urban Area Regional ITS Deployment Plan, then the applicable service package(s) for that project were also identified. However, ITS projects are not required to be included in the ITS Deployment Plan in order to be eligible for federal funding; therefore, service packages might need to be identified for projects that have not been covered in the ITS Deployment Plan. In that case, the service packages selected and customized for the Memphis Urban Area should be reviewed to determine if they adequately cover the project. Service packages selected for the Memphis Urban Area Regional ITS Architecture are identified in **Table 6** of this document and detailed service package definitions are located in **Appendix A**.

**Step 3 – Identify the Component within the Service Package**

The customized service packages for the Memphis MPO Region are located in **Appendix B**. Once the element is located within the appropriate service package, the evaluator should determine if the element name used in the service package is accurate or if a change to the name is needed. For example, a future element called the City of Memphis Arterial Emergency Response Vehicles was included in the Memphis Urban Area Regional ITS Architecture for a future roadway service patrol to be operated by the City of Memphis. Detailed planning for this system has not begun and it would not be unusual for City of Memphis to select a different name for the system once planning and implementation is underway. Such a name change should be documented using the process outlined in Section 7.5.

**Step 4 – Evaluate the Connections and Flows**

The connections and architecture flows documented in the service package diagrams were selected based on the information available at the time the Regional ITS Architecture was developed. As the projects are designed, decisions will be made on the system layout that might differ from what is shown in the service package. These changes in the project should be documented in the ITS service packages using the process outlined in Section 5.4.

**Step 5 – Document Required Changes**

If any changes are needed to accommodate the project under review, Section 7.5 describes how those changes should be documented. Any changes will be incorporated during the next Regional ITS Architecture update. Conformance will be accomplished by documenting how the service package(s) should be modified so that the connections and data flows are consistent with the project.

## 7.4 Regional ITS Architecture Maintenance Process

The Memphis MPO will be responsible for leading the process to update the Memphis Urban Area Regional ITS Architecture in coordination with the TDOT Traffic Operations Division. **Table 16** summarizes the maintenance process agreed upon by stakeholders in the Region.

**Table 16 – Regional ITS Architecture and Deployment Plan Maintenance Summary**

| Maintenance Details | Regional ITS Architecture and Deployment Plan | |
|---|---|---|
| | **Minor Update** | **Major Update** |
| **Timeframe for Updates** | As needed | Approximately every 4 years |
| **Scope of Update** | Review and update service packages to satisfy architecture compliance requirements of projects or to document other changes that impact the Regional ITS Architecture | Entire Regional ITS Architecture and Deployment Plan |
| **Lead Agency** | Memphis MPO | |
| **Participants** | Stakeholders impacted by service package modifications | Entire stakeholder group |
| **Results** | Service package or other change(s) documented for next complete update | Updated Regional ITS Architecture and Deployment Plan document, Appendices, and Turbo Architecture database |

Stakeholders agreed that a full update of the Regional ITS Architecture and Deployment Plan should occur approximately every four years 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. The Memphis MPO, in coordination with the TDOT Traffic Operations Division, will be responsible for completing the full updates. During the update process, all of the stakeholder agencies that participated in the original development of the Regional ITS Architecture and Deployment Plan should be included as well as any other agencies in the Region that are deploying or may be impacted by ITS projects.

Minor changes to the Regional ITS Architecture and Deployment Plan should occur as needed between full updates of the plan. In Section 7.5 of this document, the procedure for submitting a change to the Regional ITS Architecture is documented. Documentation of changes to the Regional ITS Architecture is particularly important if a project is being deployed and requires a change to the Regional ITS Architecture in order to establish conformity.

## 7.5 Procedure for Submitting ITS Architecture Changes Between Major Updates

Updates to the Memphis Urban Area Regional ITS Architecture will occur on a regular basis as described in Section 7.4 to maintain the architecture as a useful planning tool. Between major plan updates, smaller modifications will likely be required to accommodate ITS projects in the Region. Section 7.3 contains step by step guidance for determining whether or not a project requires architecture modifications to the Regional ITS Architecture.

For situations where a change is required, an Architecture Maintenance Documentation Form was developed and is included in **Appendix F**. This form should be completed and submitted to the architecture maintenance contact person identified on the form whenever a change to the Regional ITS Architecture is proposed. There are several key questions that need to be answered when completing the Architecture Maintenance Documentation Form including those described below.

**Change Information:** The type of change that is being requested can include an Administrative Change, Functional Change – Single Agency, Functional Change – Multiple Agency, or a Project Change. A description of each type of change is summarized below.

- Administrative Change: Basic changes that do not affect the structure of the ITS service packages in the Regional ITS Architecture. Examples include changes to stakeholder or element names, element status, or data flow status.
- Functional Change – Single Agency: Structural changes to the ITS service packages that impact only one agency in the Regional ITS Architecture. Examples include the addition of a new ITS service package or changes to data flow connections of an existing service package. The addition or change would only impact a single agency.
- Functional Change – Multiple Agencies: Structural changes to the ITS service packages that have the potential to impact multiple agencies in the Regional ITS Architecture. Examples include the addition of a new ITS service package or changes to data flow connections of an existing ITS service package. The addition or changes would impact multiple agencies and require coordination between the agencies.
- Project Change: Addition, modification, or removal of a project in the Regional ITS Deployment Plan Section of the Regional ITS Architecture.

**Description of the requested change:** A brief description of the type of change being requested should be included.

**Service packages being impacted by the change:** Each of the ITS service packages that are impacted by the proposed change should be listed on the ITS Architecture Maintenance Documentation Form. If the proposed change involves creating or modifying an ITS service package, then the agency completing the ITS Architecture Maintenance Documentation Form is asked to include a sketch of the new or modified service package.

**Impact of proposed change on other stakeholders**: If the proposed change is expected to have any impact on other stakeholders in the Region, then those stakeholders should be listed on the ITS Architecture Maintenance Documentation Form. A description of any coordination that has occurred with other stakeholders that may be impacted by the change should be also included. Ideally all stakeholders that may be impacted by the change should be contacted and consensus should be reached on any new or modified ITS service packages that will be included as part of the Regional ITS Architecture.

The Memphis MPO will review and accept the proposed changes and forward the form to the TDOT Traffic Operations Division for their records. When a major update is performed, all of the documented changes should be incorporated into the Regional ITS Architecture.

# APPENDIX A – SERVICE PACKAGE DEFINITIONS

| Service Package | Service Package Name | Description |
|---|---|---|
| **Traffic Management Service Area** | | |
| ATMS01 | Network Surveillance | Includes traffic detectors, CCTV cameras, other surveillance equipment, supporting field equipment and fixed point to point communications to transmit the collected data back to a traffic management center. |
| ATMS02 | Traffic Probe Surveillance | Provides an alternative approach for surveillance of the roadway network. Probe vehicles are tracked, and the vehicle's position and speed information are utilized to determine road network conditions such as average speed and congestion conditions. |
| ATMS03 | Traffic Signal Control | Provides the central control and monitoring equipment, communication links, and the signal control equipment that support traffic control at signalized intersections. This service package is consistent with typical traffic signal control systems. |
| ATMS04 | Traffic Metering | Includes central monitoring and control, communications, and field equipment that support metering of traffic. It supports the complete range of metering strategies including ramp, interchange, and mainline metering. |
| ATMS05 | HOV Lane Management | Manages HOV lanes by coordinating freeway ramp meters and connector signals with HOV lane usage signals. |
| ATMS06 | Traffic Information Dissemination | Provides driver information using roadway equipment such as dynamic message signs or highway advisory radio. Information can include traffic and road conditions, closure and detour information, incident information, emergency alerts and driver advisories. |
| ATMS07 | Regional Traffic Management | Sharing of traffic information and control among traffic management centers to support a regional management strategy. The nature of optimization and extent of information and control sharing is determined through working arrangements between jurisdictions. |
| ATMS08 | Traffic Incident Management System | Manages both unexpected incidents and planned events so that the impact to the transportation network and traveler safety is minimized. This service package includes incident detection capabilities and coordination with other agencies. It supports traffic operations personnel in developing an appropriate response in coordination with emergency management, maintenance and construction management, and other incident response personnel. |
| ATMS09 | Traffic Decision Support and Demand Management | Recommends courses of action to traffic operations personnel based on an assessment of current and forecast road network performance. All recommendations are based on historical evaluation, real-time assessment, and forecast of the roadway network performance based on predicted travel demand patterns. This service package also collects air quality, parking availability, transit usage, and vehicle occupancy data to support TDM, where applicable. |
| ATMS10 | Electronic Toll Collection | Provides toll operators with the ability to collect tolls electronically and detect and process violations. |
| ATMS11 | Emissions Monitoring and Management | Monitors individual vehicle emissions and provides general air quality monitoring using distributed sensors to collect the data. |
| ATMS12 | Roadside Lighting System Control | Manages electrical lighting systems by monitoring operational conditions and using the lighting controls to vary the amount of light provided along the roadside. |
| ATMS13 | Standard Railroad Grade Crossing | Manages highway traffic at highway-rail intersections (HRIs) where rail operational speeds are less than 80 mph. |
| ATMS14 | Advanced Railroad Grade Crossing | Manages highway traffic at highway-rail intersections (HRIs) where operational speeds are greater than 80 mph. Augments Standard Railroad Grade Crossing service package with additional safety features to mitigate the risks associated with higher rail speeds. |
| ATMS15 | Railroad Operations Coordination | Provides an additional level of strategic coordination between freight rail operations and traffic management centers. Could include train schedules, maintenance schedules or any other anticipated HRI closures. |

| Service Package | Service Package Name | Description |
|---|---|---|
| **Traffic Management Service Area (continued)** | | |
| ATMS16 | Parking Facility Management | Provides enhanced monitoring and management of parking facilities. Service package assists in the management of parking operations, coordinates with transportation authorities, and supports electronic collection of parking fees. |
| ATMS17 | Regional Parking Management | Supports communication and coordination between parking facilities as well as coordination between parking facilities and traffic and transit management systems. |
| ATMS18 | Reversible Lane Management | Provides for the management of reversible lane facilities and includes the field equipment, physical lane access controls, and associated control electronics. |
| ATMS19 | Speed Warning and Enforcement | Monitors vehicle speeds and supports warning drivers when their speed is excessive. Also the service includes notifications to an enforcement agency to enforce the speed limit of the roadway. |
| ATMS20 | Drawbridge Management | Supports systems that manage drawbridges at rivers and canals and other multimodal crossings. Includes control devices as well as traveler information systems. |
| ATMS21 | Roadway Closure Management | Closes roadways to vehicular traffic when driving conditions are unsafe, maintenance must be performed, or other situations. Service package covers general road closures applications; specific closure systems that are used at railroad grade crossings, drawbridges, reversible lanes, etc. are covered by other service packages. |
| ATMS22 | Variable Speed Limits | Sets variable speed limits along a roadway to create more uniform speeds, to promote safer driving during adverse conditions (such as fog), and/or to reduce air pollution. Also known as speed harmonization, this service monitors traffic and environmental conditions along the roadway. |
| ATMS23 | Dynamic Lane Management and Shoulder Use | Includes the field equipment, physical overhead lane signs and associated control electronics that are used to manage and control specific lanes and/or the shoulders along a roadway. This equipment can be used to change the lane configuration on the roadway according to traffic demand and lane destination along a typical roadway section or on approach to or access from a border crossing, multimodal crossing or intermodal freight depot. This package can be used to allow temporary or interim use of shoulders as travel lanes. |
| ATMS24 | Dynamic Roadway Warning | Includes systems that dynamically warn drivers approaching hazards on a roadway. These dynamic roadway warning systems can alert approaching drivers via warning signs, flashing lights, in-vehicle messages, etc. Such systems can increase the safety of a roadway by reducing the occurrence of incidents. |
| ATMS25 | VMT Road User Payment | Facilitates charging fees to roadway vehicle owners for using specific roadways with potentially differential payment rates based on time-of-day, which specific roadway is used, and class of vehicle (a local policy decision by each roadway owner). |
| ATMS26 | Mixed Use Warning Systems | Supports the sensing and warning systems used to interact with pedestrians, bicyclists, and other vehicles that operate on the main vehicle roadways, or on pathways which intersect the main vehicle roadways. These systems could allow automated warning or active protection for this class of users. |
| **Emergency Management Service Area** | | |
| EM01 | Emergency Call-Taking and Dispatch | Provides basic public safety call-taking and dispatch services. Includes emergency vehicle equipment, equipment used to receive and route emergency calls, wireless communications and coordination between emergency management agencies. |
| EM02 | Emergency Routing | Supports automated vehicle location and dynamic routing of emergency vehicles. Traffic information, road conditions and suggested routing information are provided to enhance emergency vehicle routing. Includes signal preemption and priority applications. |

| Service Package | Service Package Name | Description |
|---|---|---|
| **Emergency Management Service Area (continued)** | | |
| EM03 | Mayday and Alarms Support | Allows the user to initiate a request for emergency assistance and enables the emergency management subsystem to locate the user, gather information about the incident and determine the appropriate response. |
| EM04 | Roadway Service Patrols | Supports the roadway service patrol vehicles that aid motorists, offering rapid response to minor incidents (flat tire, crashes, out of gas) to minimize disruption to the traffic stream. This service package monitors service patrol vehicle locations and supports vehicle dispatch. |
| EM05 | Transportation Infrastructure Protection | Includes the monitoring of transportation infrastructure (e.g. bridges, tunnels and management centers) for potential threats using sensors, surveillance equipment, barriers and safeguard systems to preclude an incident, control access during and after an incident or mitigate the impact of an incident. Threats can be acts of nature, terrorist attacks or other incidents causing damage to the infrastructure. |
| EM06 | Wide-Area Alert | Uses ITS driver and traveler information systems to alert the public in emergency situations such as child abductions, severe weather, civil emergencies or other situations that pose a threat to life and property. |
| EM07 | Early Warning System | Monitors and detects potential, looming and actual disasters including natural, technological and man-made disasters. |
| EM08 | Disaster Response and Recovery | Enhances the ability of the surface transportation system to respond to and recover from disasters. Supports coordination of emergency response plans, provides enhanced access to the scene and better information about the transportation system in the vicinity of the disaster, and maintains situation awareness. |
| EM09 | Evacuation and Reentry Management | Supports evacuation of the general public from a disaster area and manages subsequent reentry to the disaster area. This service package supports both anticipated, well-planned and orderly evacuations such as for a hurricane, as well as sudden evacuations with little or no time for preparation or public warning such as a terrorist act. Employs a number of strategies to maximize capacity along an evacuation route including coordination with transit. |
| EM10 | Disaster Traveler Information | Use of ITS to provide disaster-related traveler information to the general public, including evacuation and reentry information and other information concerning the operation of the transportation system during a disaster. |
| **Maintenance and Construction Management Service Area** | | |
| MC01 | Maintenance and Construction Vehicle and Equipment Tracking | Tracks the location of maintenance and construction vehicles and other equipment to ascertain the progress of their activities. |
| MC02 | Maintenance and Construction Vehicle Maintenance | Performs vehicle maintenance scheduling and manages both routine and corrective maintenance activities. Includes on-board sensors capable of automatically performing diagnostics. |
| MC03 | Road Weather Data Collection | Collects current road weather conditions using data collected from environmental sensors deployed on and about the roadway. |
| MC04 | Weather Information Processing and Distribution | Processes and distributes the environmental information collected from the Road Weather Data Collection service package. This service package uses the environmental data to detect environmental hazards such as icy road conditions, high winds, dense fog, etc. so system operators can make decisions on corrective actions to take. |
| MC05 | Roadway Automated Treatment | Automatically treats a roadway section based on environmental or atmospheric conditions. Includes the sensors that detect adverse conditions, automated treatment (such as anti-icing chemicals), and driver information systems. |
| MC06 | Winter Maintenance | Supports winter road maintenance. Monitors environmental conditions and weather forecasts and uses the information to schedule winter maintenance activities. |

| Service Package | Service Package Name | Description |
|---|---|---|
| **Maintenance and Construction Management Service Area (continued)** | | |
| MC07 | Roadway Maintenance and Construction | Supports numerous services for scheduled and unscheduled maintenance and construction on a roadway system or right-of-way. Environmental conditions information is also received from various weather sources to aid in scheduling maintenance and construction activities. |
| MC08 | Work Zone Management | Directs activity in work zones, controlling traffic through portable dynamic message signs and informing other groups of activity for better coordination management. Also provides speed and delay information to motorists prior to the work zone. |
| MC09 | Work Zone Safety Monitoring | Includes systems that improve work crew safety and reduce collisions between the motoring public and maintenance and construction vehicles. Detects vehicle intrusions in work zones and warns workers and drivers of safety hazards when encroachment occurs. |
| MC10 | Maintenance and Construction Activity Coordination | Supports the dissemination of maintenance and construction activity to centers that can utilize it as part of their operations. (i.e., traffic management, transit, emergency management) |
| MC11 | Environmental Probe Surveillance | Collects data from vehicles in the road network that can be used to directly measure on infer current environmental conditions. |
| MC12 | Infrastructure Monitoring | Monitors the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure using both fixed and vehicle-based infrastructure monitoring sensors. Monitors vehicle probes used to determine current pavement conditions. |
| **Public Transportation Service Area** | | |
| APTS01 | Transit Vehicle Tracking | Monitors current transit vehicle location using an automated vehicle location system. Location data may be used to determine real time schedule adherence and update the transit system's schedule in real time. |
| APTS02 | Transit Fixed-Route Operations | Performs vehicle routing and scheduling, as well as operator assignment and system monitoring for fixed-route and flexible-route transit services. |
| APTS03 | Demand Response Transit Operations | Performs vehicle routing and scheduling, as well as operator assignment and system monitoring for demand responsive transit services. |
| APTS04 | Transit Fare Collection Management | Manages transit fare collection on-board transit vehicles and at transit stops using electronic means. Allows the use of a traveler card or other electronic payment device. |
| APTS05 | Transit Security | Provides for the physical security of transit passengers and transit vehicle operators. Includes on-board security cameras and panic buttons. |
| APTS06 | Transit Fleet Management | Supports automatic transit maintenance scheduling and monitoring for both routine and corrective maintenance. |
| APTS07 | Multi-modal Coordination | Establishes two way communications between multiple transit and traffic agencies to improve service coordination. |
| APTS08 | Transit Traveler Information | Provides transit users at transit stops and on board transit vehicles with ready access to transit information. Services include stop annunciation, imminent arrival signs and real-time transit schedule displays. Systems that provide custom transit trip itineraries and other tailored transit information services are also represented by this service package. |
| APTS09 | Transit Signal Priority | Determines the need for transit priority on routes and at certain intersections and requests transit vehicle priority at these locations to improve on-time performance of the transit system. |
| APTS10 | Transit Passenger Counting | Counts the number of passengers entering and exiting a transit vehicle using sensors mounted on the vehicle and communicates the collected passenger data back to the management center. |
| APTS11 | Multi-modal Connection Protection | Supports the coordination of multimodal services to optimize the travel time of travelers as they move from mode to mode (or to different routes within a single mode). |

| Service Package | Service Package Name | Description |
|---|---|---|
| **Commercial Vehicle Operations Service Area** | | |
| CVO01 | Carrier Operations and Fleet Management | Provides the capabilities to manage a fleet of commercial vehicles. Vehicle routing and tracking as well as notification of emergency management of any troublesome route deviations (such as a HAZMAT vehicle) are part of this service package. |
| CVO02 | Freight Administration | Tracks the movement of cargo and monitors the cargo condition. |
| CVO03 | Electronic Clearance | Provides for automatic clearance at roadside check facilities. Allows a good driver/vehicle/carrier to pass roadside facilities at highway speeds using transponders and dedicated short range communications to the roadside. |
| CVO04 | CV Administrative Processes | Provides for electronic application, processing, fee collection, issuance and distribution of CVO credentials and tax filing. |
| CVO05 | International Border Electronic Clearance | Provides for automated clearance at international border crossings. |
| CVO06 | Weigh-In-Motion | Provides for high speed weigh-in-motion with or without automated vehicle identification capabilities. |
| CVO07 | Roadside CVO Safety | Provides for automated roadside safety monitoring and reporting. Automates commercial vehicle safety inspections at the roadside check facilities. |
| CVO08 | On-board CVO Safety | Provides for on-board commercial vehicle safety monitoring and reporting, and includes support for collecting on-board safety data via transceivers or other means. The on-board safety data are assessed by an off-board system. In some cases the monitoring and safety assessment may occur remotely (i.e., not at a roadside site). |
| CVO09 | CVO Fleet Maintenance | Supports maintenance of CVO fleet vehicles with on-board monitoring equipment and automated vehicle location capabilities. |
| CVO10 | HAZMAT Management | Integrates incident management capabilities with commercial vehicle tracking to assure effective treatment of HAZMAT material and incidents. |
| CVO11 | Roadside HAZMAT Security Detection and Mitigation | Provides the capability to detect and classify security sensitive HAZMAT on commercial vehicles using roadside sensing and imaging technology. Credentials information can be accessed to verify if the commercial driver, vehicle and carrier are permitted to transport the identified HAZMAT. |
| CVO12 | CV Driver Security Authentication | Provides the ability for fleet and freight management to detect when an unauthorized commercial vehicle driver attempts to drive a vehicle based on stored identity information. If an unauthorized driver has been detected the commercial vehicle can be disabled. |
| CVO13 | Freight Assignment Tracking | Provides for the planning and tracking of the commercial vehicle, freight equipment and the commercial vehicle driver. |
| **Traveler Information Service Area** | | |
| ATIS01 | Broadcast Traveler Information | Collects traffic conditions, advisories, general public transportation, toll and parking information, incident information, roadway maintenance and construction information, air quality and weather information, and broadly disseminates this information through existing infrastructures (radio, cell phones, etc.). |
| ATIS02 | Interactive Traveler Information | Provides tailored information in response to a traveler request. The traveler can obtain current information regarding traffic conditions, roadway maintenance and construction, transit services, ride share/ride match, parking management, detours and pricing information. |
| ATIS03 | Autonomous Route Guidance | Using vehicle location and other information, this service package enables route planning and detailed route guidance based on static, stored information. |
| ATIS04 | Dynamic Route Guidance | Offers advanced route planning and guidance that is responsive to current conditions. |
| ATIS05 | ISP Based Trip Planning and Route Guidance | Offers the user pre-trip route planning and en-route guidance services. Routes may be based on static or real time network conditions. |

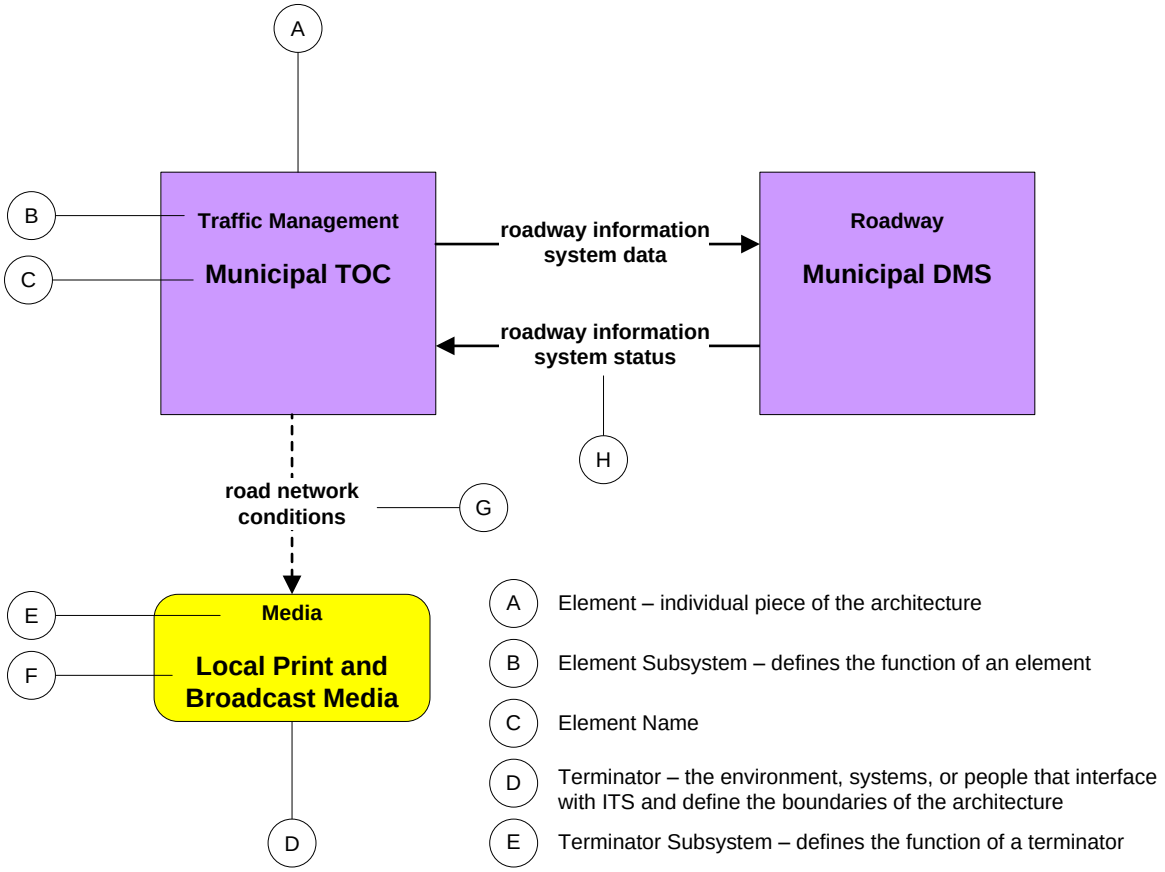
| Service Package | Service Package Name | Description |
|---|---|---|
| **Traveler Information Service Area** | | |
| ATIS06 | Transportation Operations Data Sharing | Collects, processes, and stores current information on traffic and travel conditions and other information about the current state of the transportation network and makes the information available to transportation system operators. |
| ATIS07 | Travel Service Information and Reservation | Provides travel information and reservation services to the user. This service package provides multiple ways for accessing information either while en route in a vehicle using wide-area wireless communications or pre-trip via fixed-point to fixed-point connections. |
| ATIS08 | Dynamic Ridesharing | Provides dynamic ridesharing/ride matching services to travelers. |
| ATIS09 | In Vehicle Signing | Supports the distribution of traffic and travel advisory information to drivers through in-vehicle devices. |
| ATIS10 | Short Range Communications Traveler Information | Provides location-specific or situation-relevant information to travelers in vehicles using Dedicated Short Range Communications (DSRC) infrastructure supporting mobility applications for connected vehicles. Delivers real-time traveler information including travel times, incident information, road conditions, and emergency traveler information to vehicles as they pass DSRC roadside equipment along their route. |
| **Archived Data Management Service Area** | | |
| AD1 | ITS Data Mart | Provides a focused archive that houses data collected and owned by a single agency or other organization. Focused archive typically covers a single transportation mode and one jurisdiction. |
| AD2 | ITS Data Warehouse | Includes all the data collection and management capabilities of the ITS Data Mart. Adds the functionality to allow collection of data from multiple agencies and data sources across modal and jurisdictional boundaries. |
| AD3 | ITS Virtual Data Warehouse | Provides the same broad access to multimodal, multidimensional data from varied sources as in the ITS Data Warehouse Service Package, but provides this access using enhanced interoperability between physically distributed ITS archives that are each locally managed. |
| **Vehicle Safety Service Area** | | |
| AVSS01 | Vehicle Safety Monitoring | Diagnoses critical components of the vehicle and warns the driver of potential dangers. On-board sensors will determine the vehicle's condition, performance, and on-board safety data and display that information to the driver. |
| AVSS02 | Driver Safety Monitoring | Determines the driver's condition and warns the driver of potential dangers. On-board sensors will determine the driver's condition, performance, and on-board safety data and display that information to the driver. |
| AVSS03 | Longitudinal Safety Monitoring | Uses on-board safety sensors and collision sensors to monitor the areas in front of and behind the vehicle and present warnings to the driver about potential hazards. |
| AVSS04 | Lateral Safety Warning | Uses on-board safety sensors and collision sensors to monitor the areas to the sides of the vehicle and present warnings to the driver about potential hazards. |
| AVSS05 | Intersection Safety Warning | Determines the probability of a collision in an equipped intersection (either highway-highway or highway-rail) and provides timely warnings to drivers in response to hazardous conditions. Monitors in the roadway infrastructure assess vehicle locations and speeds near an intersection. Using this information, a warning is determined and communicated to the approaching vehicle using a short range communications system. Information can be provided to the driver through the ATIS09 – In-Vehicle Signing service package. |
| AVSS06 | Pre-Crash Restraint Deployment | Provides in-vehicle sensors to monitor the vehicle's local environment (lateral and longitudinal gaps, weather, and roadway conditions), determine collision probability, and deploy a pre-crash safety system. |

| Service Package | Service Package Name | Description |
|---|---|---|
| **Vehicle Safety Service Area (continued)** | | |
| AVSS07 | Driver Visibility Improvement | Enhances the driver visibility using an enhanced vision system. On-board display hardware is needed. |
| AVSS08 | Advanced Vehicle Longitudinal Control | Automates the speed and headway control functions on board the vehicle utilizing safety sensors and collision sensors combined with vehicle dynamics processing to control the throttle and brakes. Requires on-board sensors to measure longitudinal gaps and a processor for controlling the vehicle speed. |
| AVSS09 | Advanced Vehicle Lateral Control | Automates the steering control on board the vehicle utilizing safety sensors and collision sensors combined with vehicle dynamics processing to control the steering. Requires on-board sensors to measure lane position and lateral deviations and a processor for controlling the vehicle steering. |
| AVSS10 | Intersection Collision Avoidance | Determines the probability of an intersection collision and provides timely warnings to approaching vehicles so that avoidance actions can be taken. This service package builds on the intersection collision warning infrastructure and in-vehicle equipment and adds equipment in the vehicle that can take control of the vehicle in emergency situations. |
| AVSS11 | Automated Vehicle Operations | Enables “hands-off” operation of the vehicle on the automated portion of the highway system. Implementation requires lateral lane holding, vehicle speed and steering control, and automated highway system check-in and check-out. |
| AVSS12 | Cooperative Vehicle Safety Systems | Enhances the on-board longitudinal and lateral warning stand-alone systems by exchanging messages wirelessly with other surrounding vehicles. Vehicles send out information concerning their location, speed, and direction to any surrounding vehicles. Special messages from approaching emergency vehicles may also be received and processed. |

# APPENDIX B – CUSTOMIZED MARKET PACKAGES

# APPENDIX B

## MARKET PACKAGE DIAGRAM COMPONENT AND TERMINOLOGY KEY




A – Element – individual piece of the architecture

B – Element Subsystem – defines the function of an element

C – Element Name

D – Terminator – the environment, systems, or people that interface with ITS and define the boundaries of the architecture

E – Terminator Subsystem – defines the function of a terminator

F – Terminator Name

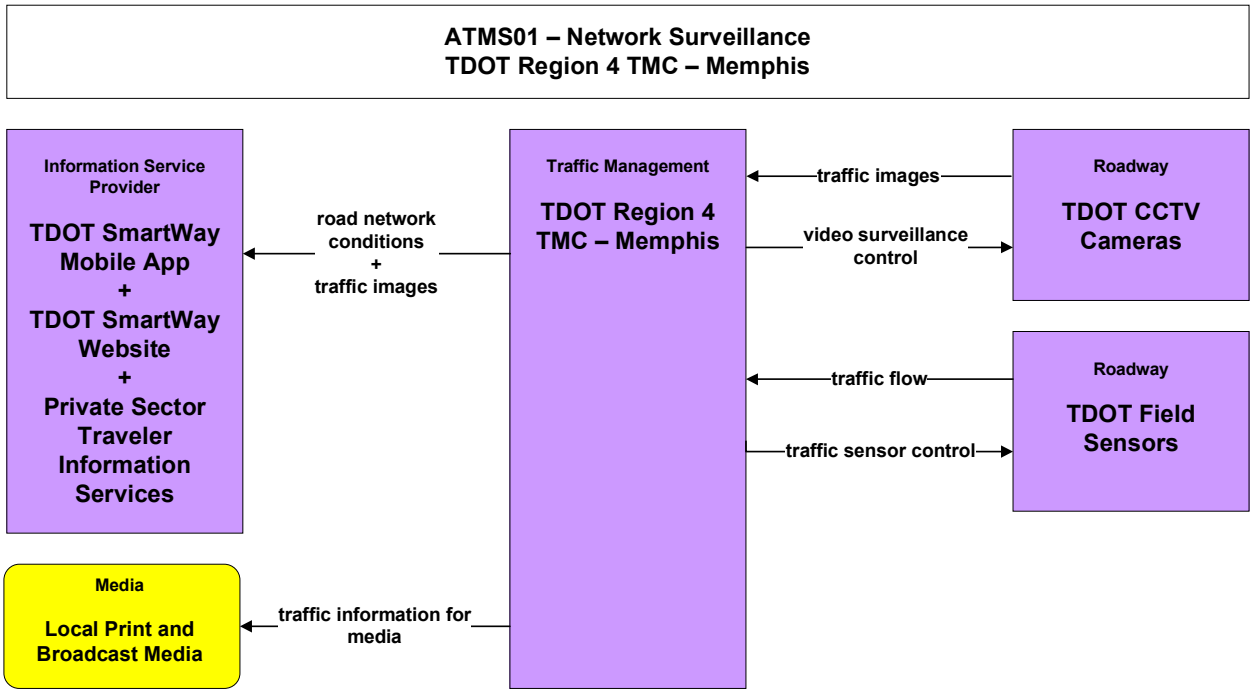
G – Future/Planned Architecture Flow – data that will be exchanged between subsystems and terminators in the future

H – Existing Architecture Flow – data that is currently exchanged between subsystems and terminators

# Memphis Urban Area Regional ITS Architecture Service Packages

**October 2014**

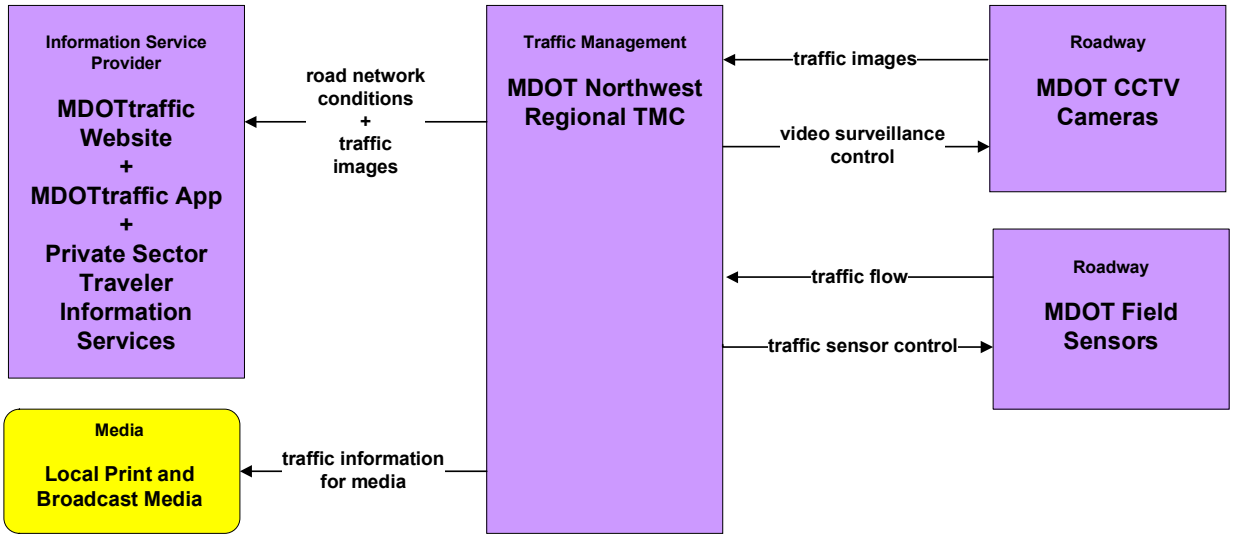
# Advanced Traffic Management System



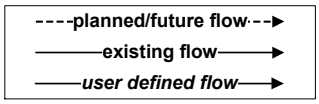

*Note:*
TDOT Field Sensors include mainline loops, VIVDS, RTMS, and any other type of vehicle detection.

Several of the TDOT CCTV Cameras and Field Sensors are located in Arkansas. Though the equipment is primarily operated by TDOT, AHTD has the capability to view the camera feeds. This functionality is documented in ATMS07.

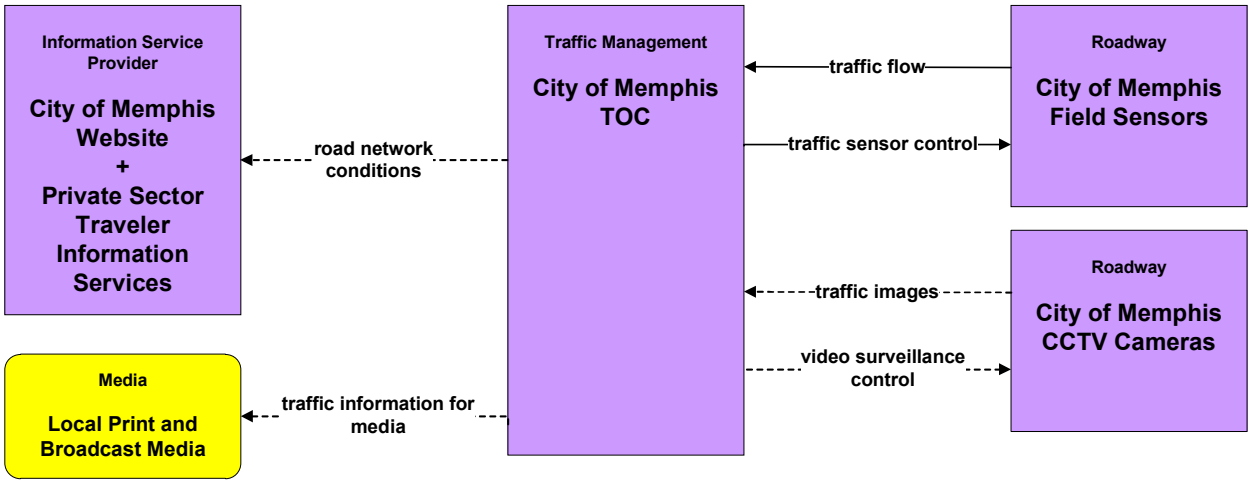
## ATMS01 – Network Surveillance
## MDOT Northwest Regional TMC



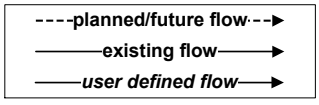

*Note:*
*The City of Southaven is co-located with MDOT in the Northwest Regional TMC and therefore shares MDOT ITS devices. The City has no plans to deploy cameras or sensors of their own.*



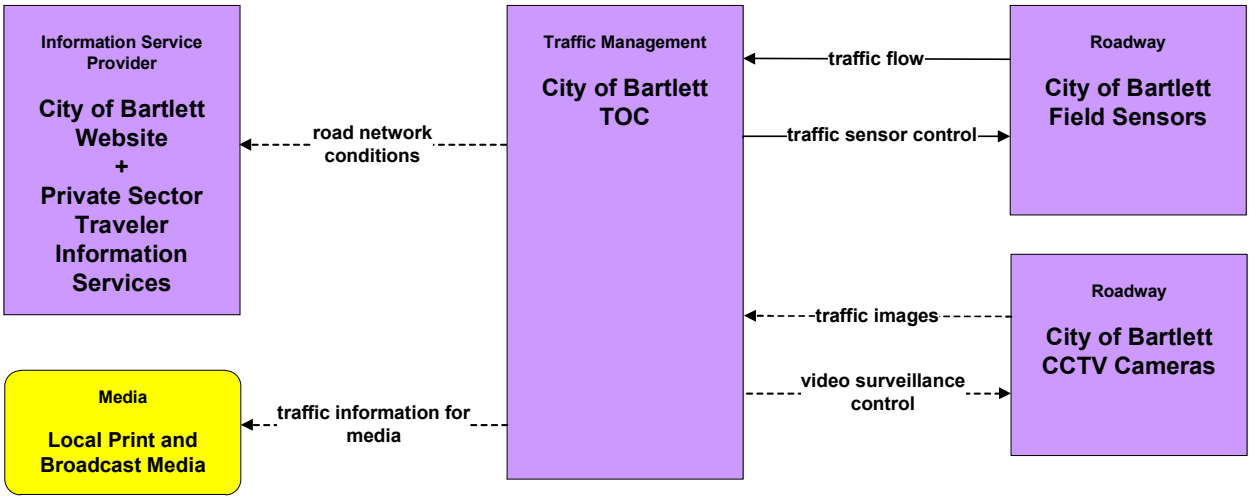

## ATMS01 – Network Surveillance
## City of Memphis




*Note:*
*City of Memphis Field Sensors include VIVDS and any other type of vehicle detection.*



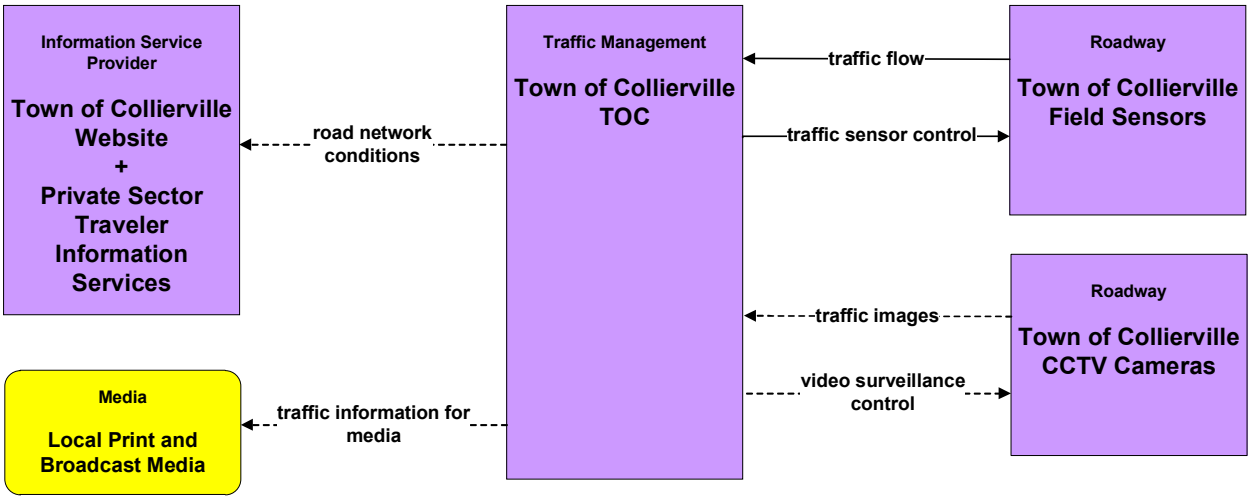
## ATMS01 – Network Surveillance
## City of Bartlett




*Note:*
*Field Sensors include VIVDS and any other type of vehicle detection.*

planned/future flow
existing flow
*user defined flow*

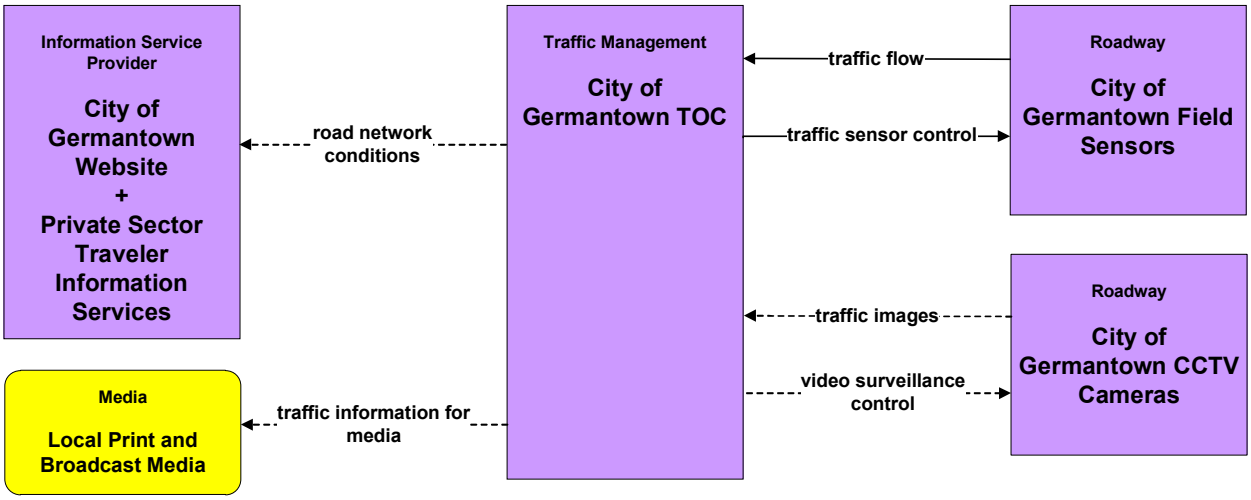
## ATMS01 – Network Surveillance
## Town of Collierville




*Note:*
*Field Sensors include VIVDS and any other type of vehicle detection.*

planned/future flow
existing flow
*user defined flow*

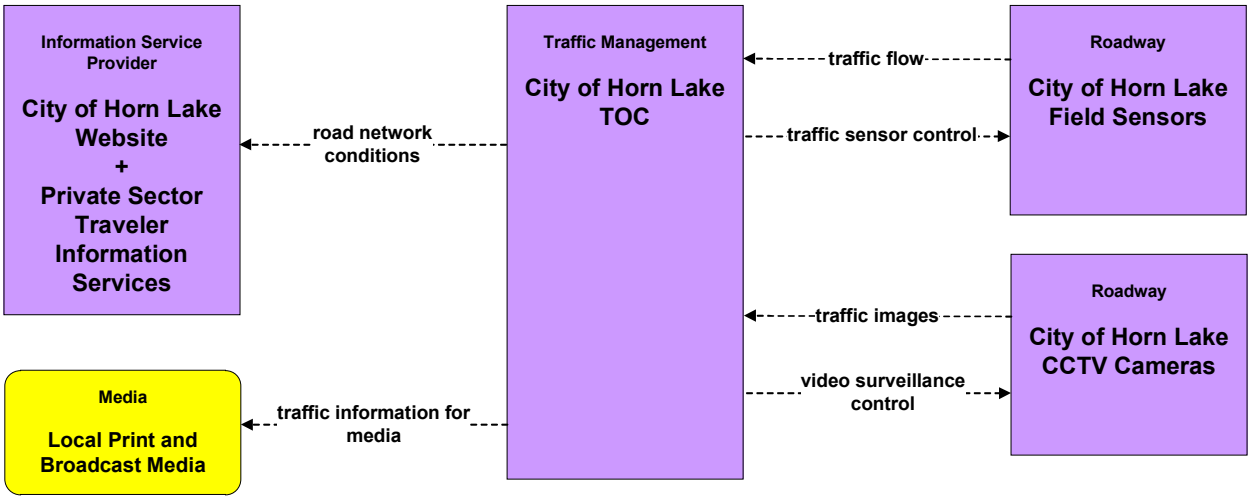
## ATMS01 – Network Surveillance
## City of Germantown




*Note:*
*Field Sensors include VIVDS and any other type of vehicle detection.*

planned/future flow
existing flow
*user defined flow*

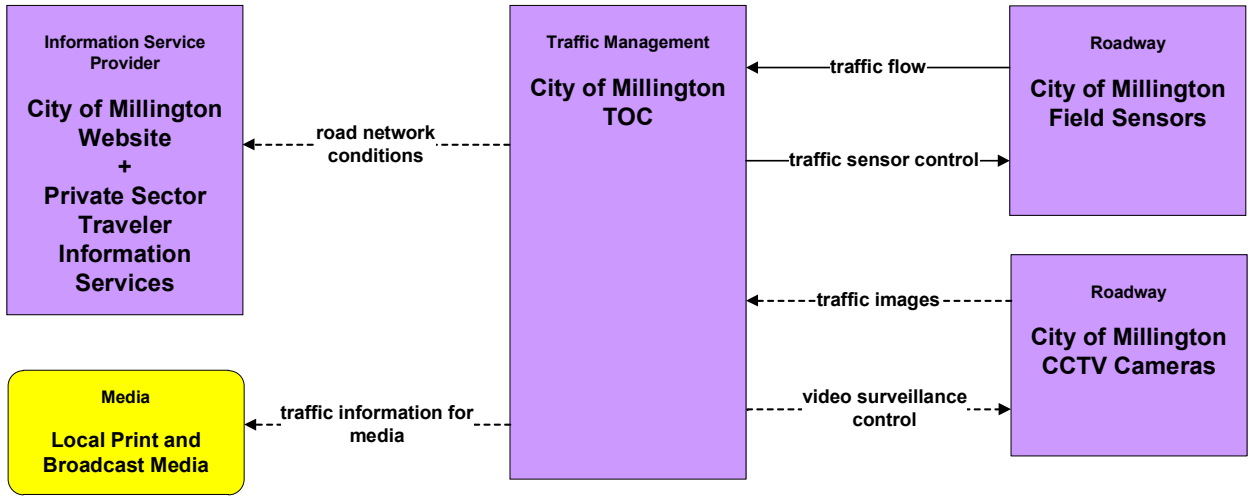
## ATMS01 – Network Surveillance
## City of Horn Lake



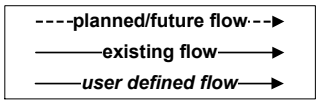

planned/future flow
existing flow
*user defined flow*

*Note:*
*Field Sensors include VIVDS and any other type of vehicle detection.*

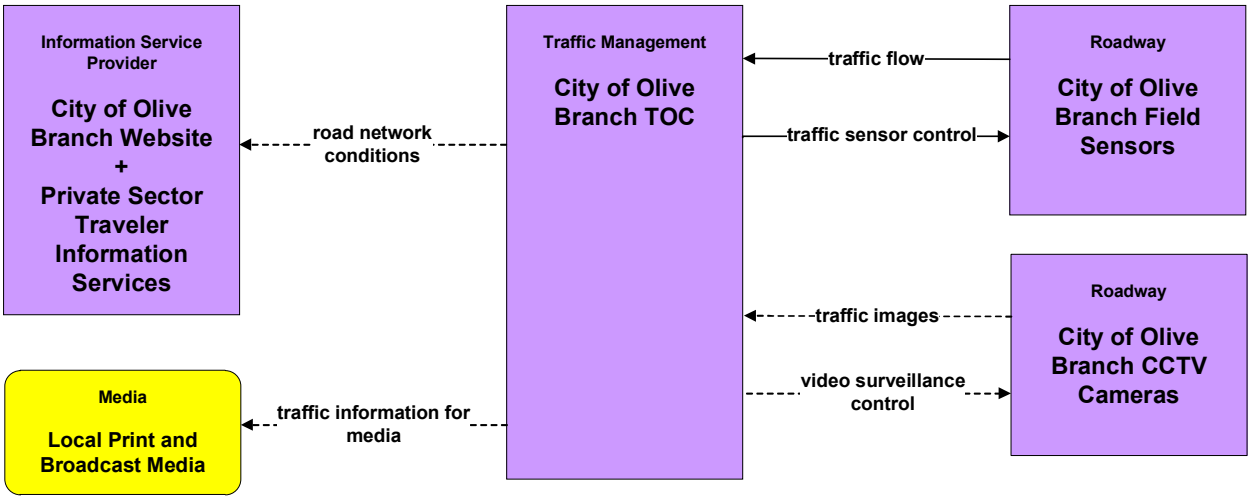
## ATMS01 – Network Surveillance
## City of Millington

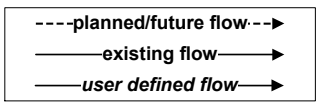



*Note:*
*Field Sensors include VIVDS and any other type of vehicle detection.*



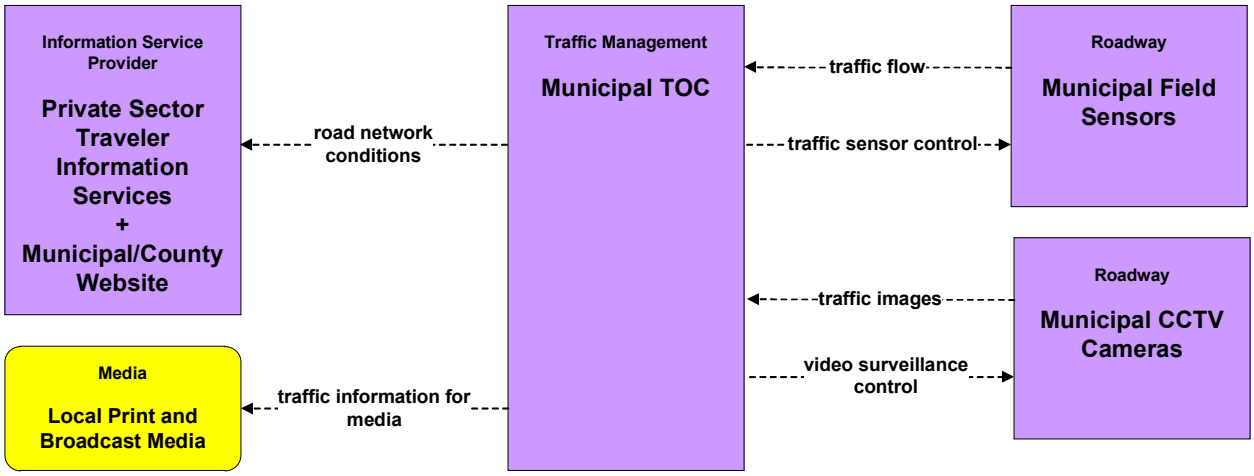

## ATMS01 – Network Surveillance
## City of Olive Branch




*Note:*
*Field Sensors include VIVDS and any other type of vehicle detection.*

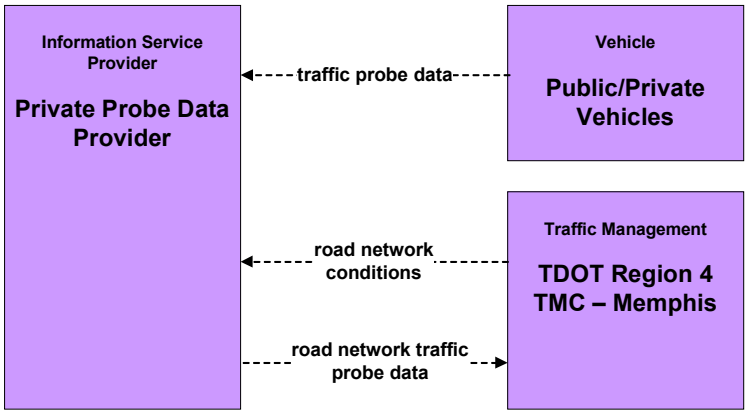
## ATMS01 – Network Surveillance
## Municipal




*Note:*
*Municipal Field Sensors include VIVDS and any other type of vehicle detection.*

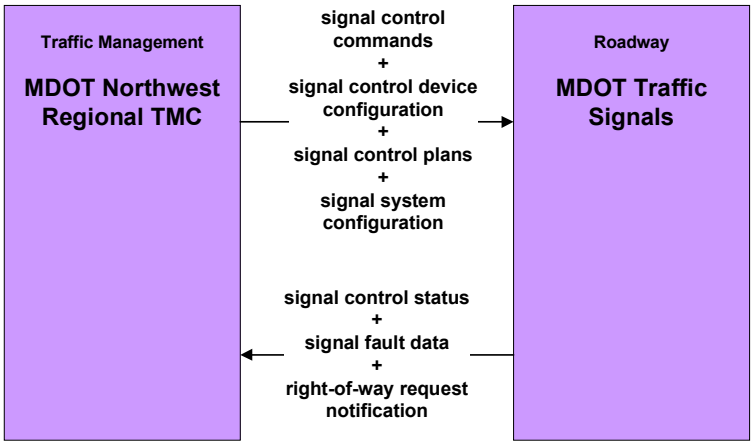
planned/future flow
existing flow
*user defined flow*

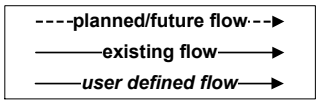
## ATMS02 – Traffic Probe Surveillance
## TDOT



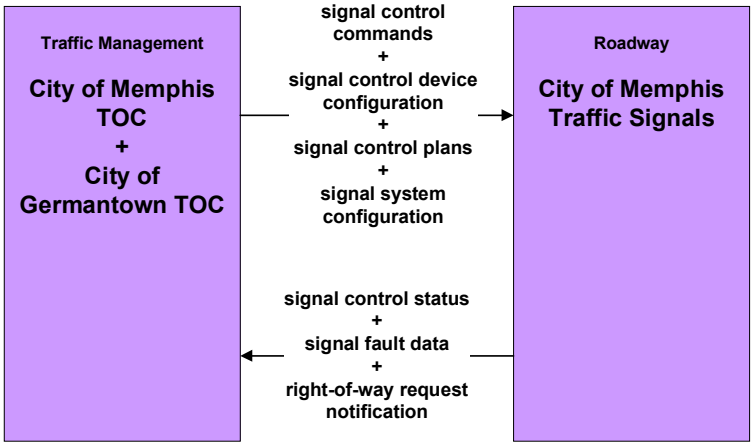

planned/future flow
existing flow
*user defined flow*

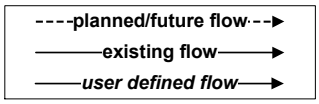
**ATMS03 – Traffic Signal Control**
**MDOT**



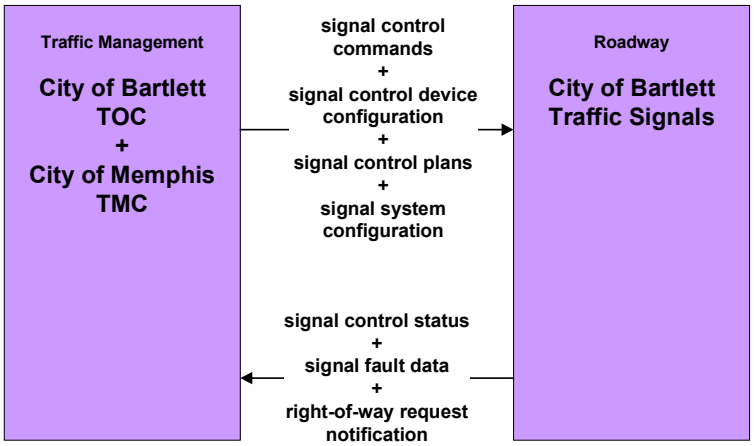



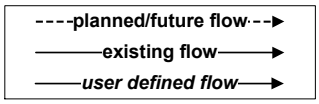

**ATMS03 – Traffic Signal Control**
**City of Memphis**



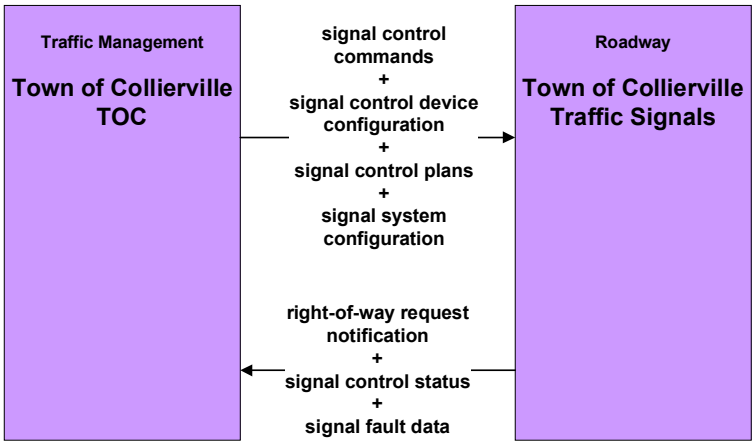



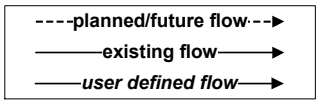
## ATMS03 – Traffic Signal Control
## City of Bartlett



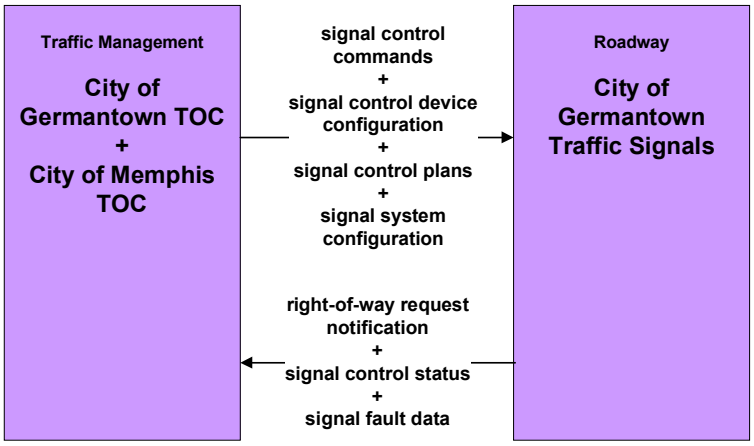



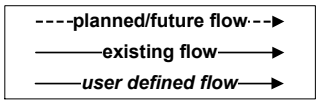

## ATMS03 – Traffic Signal Control
## Town of Collierville



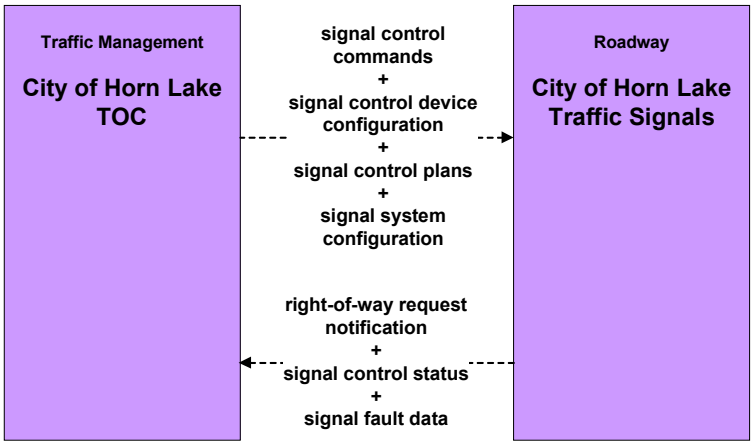



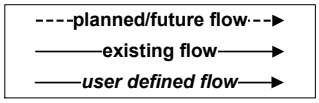
**ATMS03 – Traffic Signal Control**
**City of Germantown**



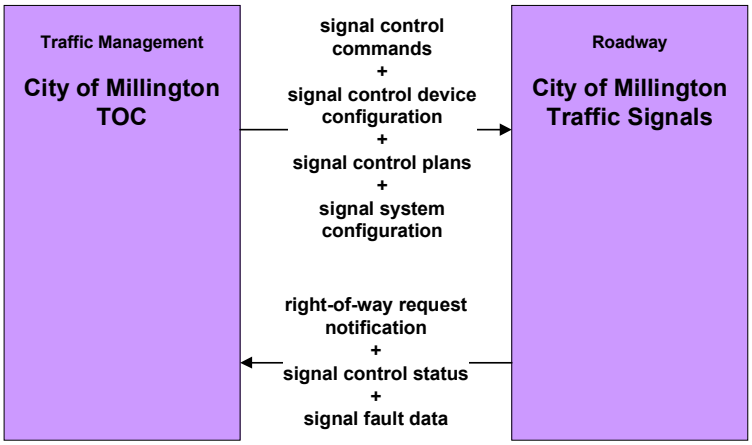



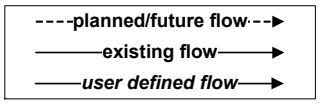

**ATMS03 – Traffic Signal Control**
**City of Horn Lake**



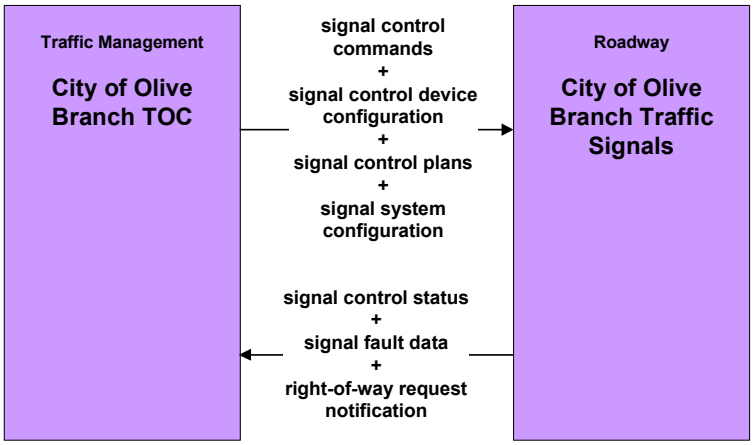



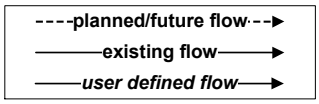
**ATMS03 – Traffic Signal Control**
**City of Millington**



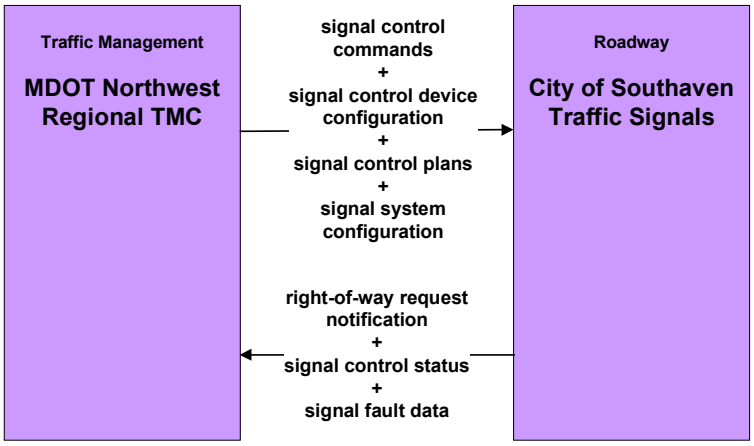



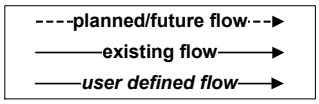

**ATMS03 – Traffic Signal Control**
**City of Olive Branch**



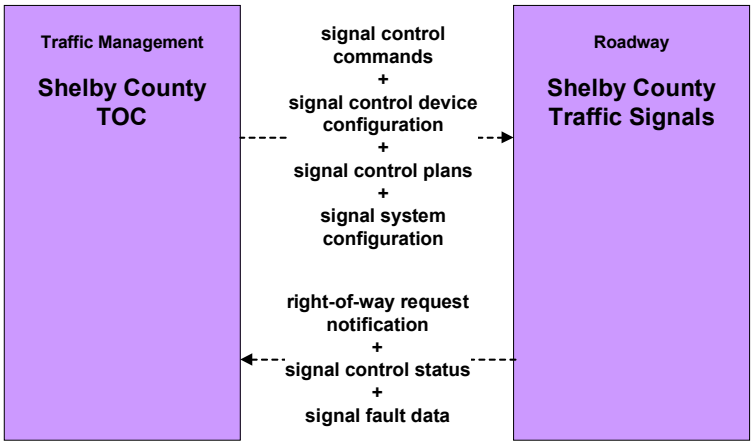
## ATMS03 – Traffic Signal Control
## City of Southaven

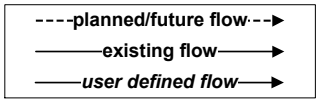


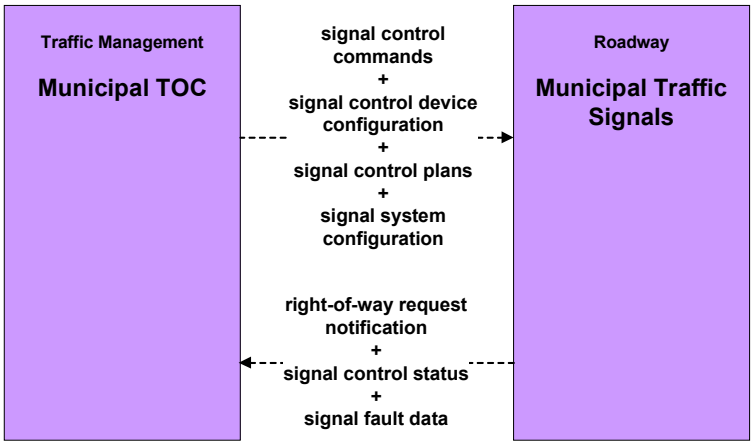

*Note:*
*The City of Southaven is co-located with and controls their traffic signals from the MDOT Northwest Regional TMC.*

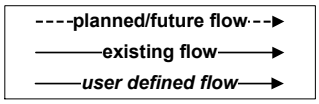
## ATMS03 – Traffic Signal Control
## Shelby County



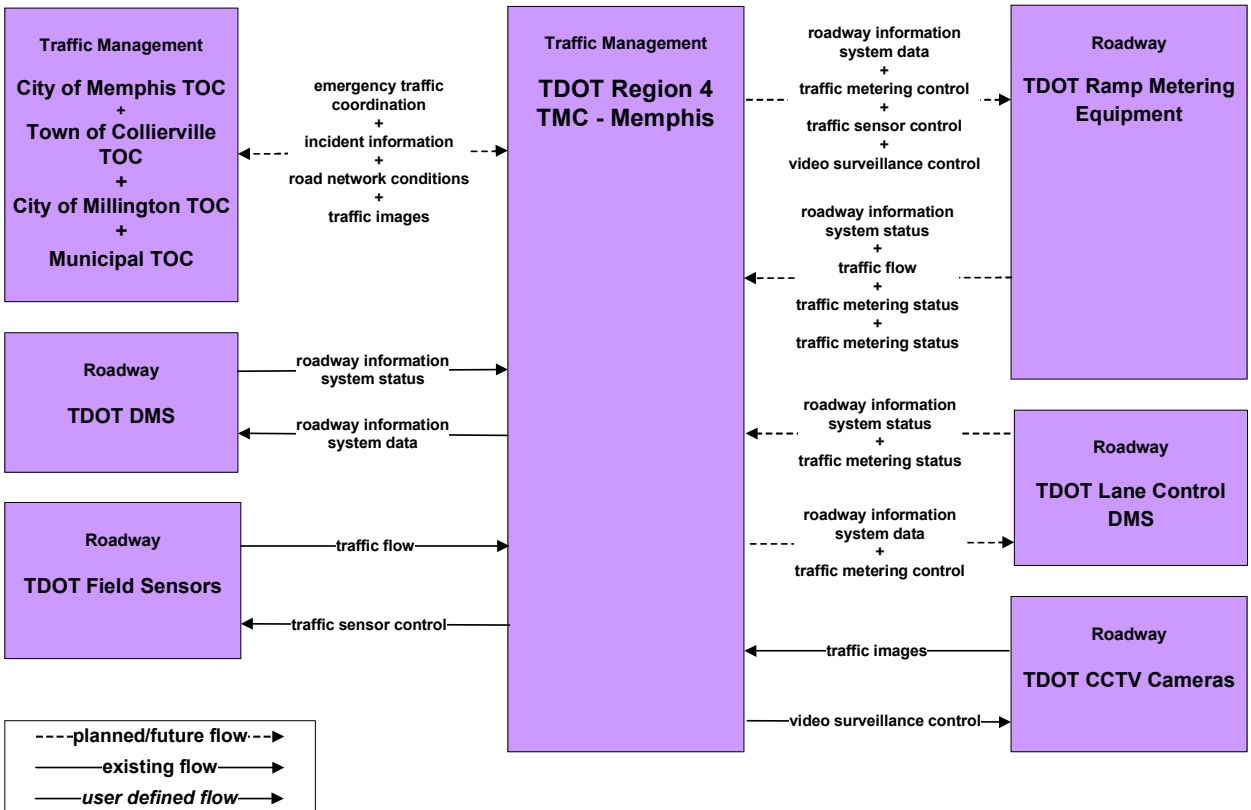



## ATMS03 – Traffic Signal Control
## Municipal

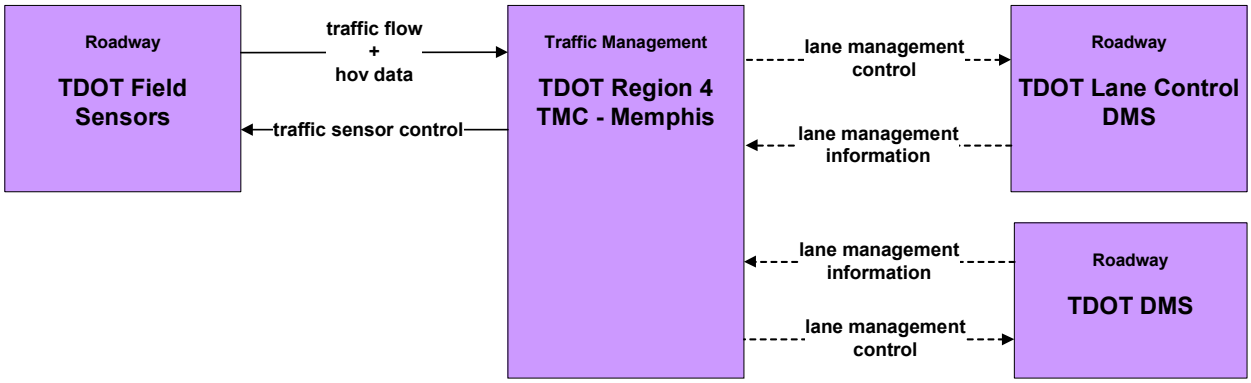


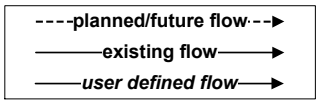




## ATMS04 – Traffic Metering
## TDOT Region 4 TMC – Memphis

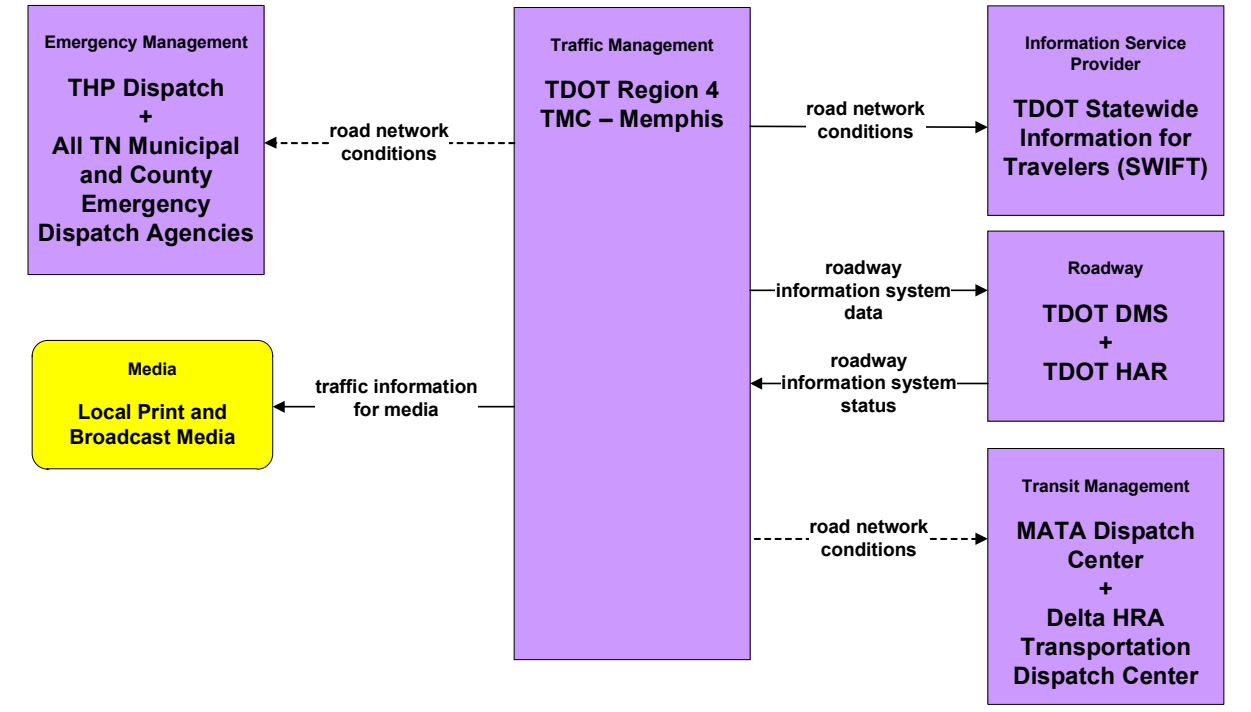


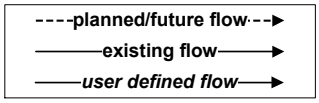
## ATMS05 – HOV Lane Management
## TDOT Region 4 TMC – Memphis



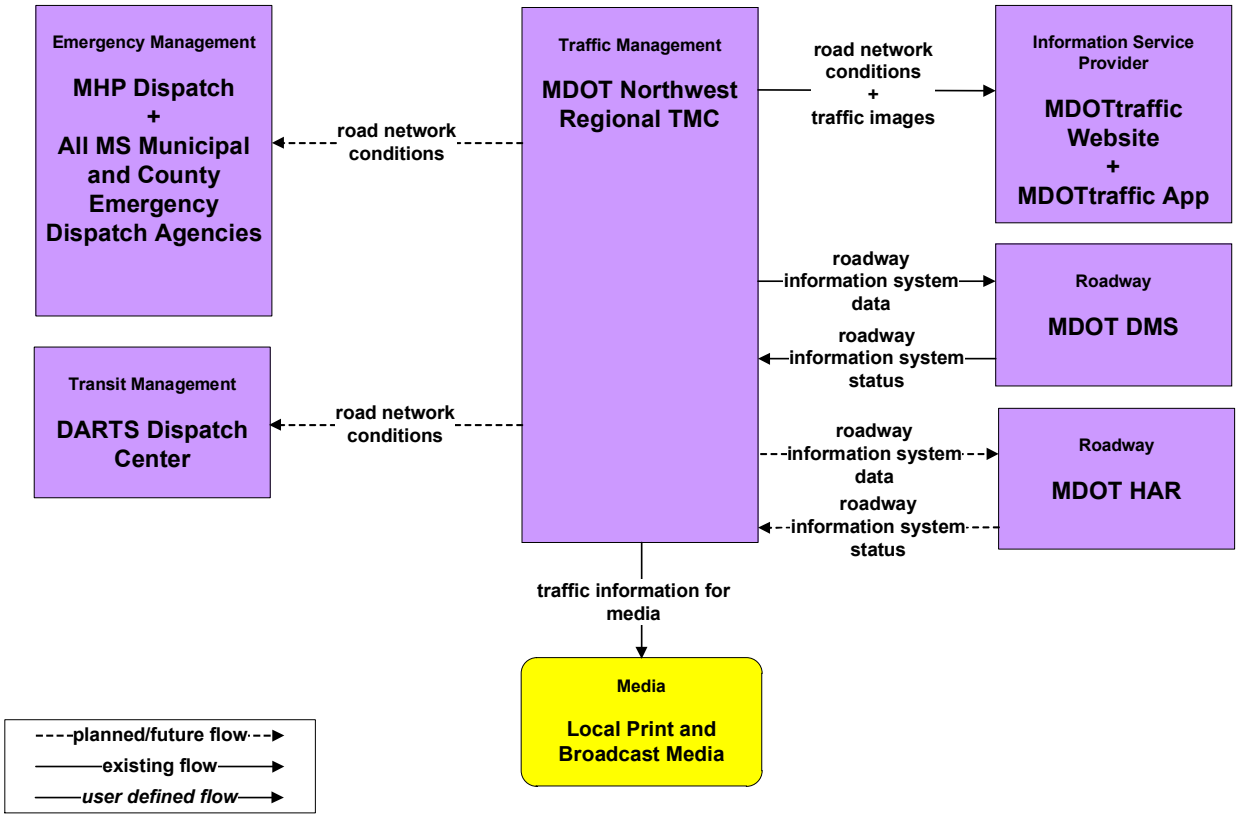

## ATMS06 – Traffic Information Dissemination
## TDOT Region 4 TMC – Memphis



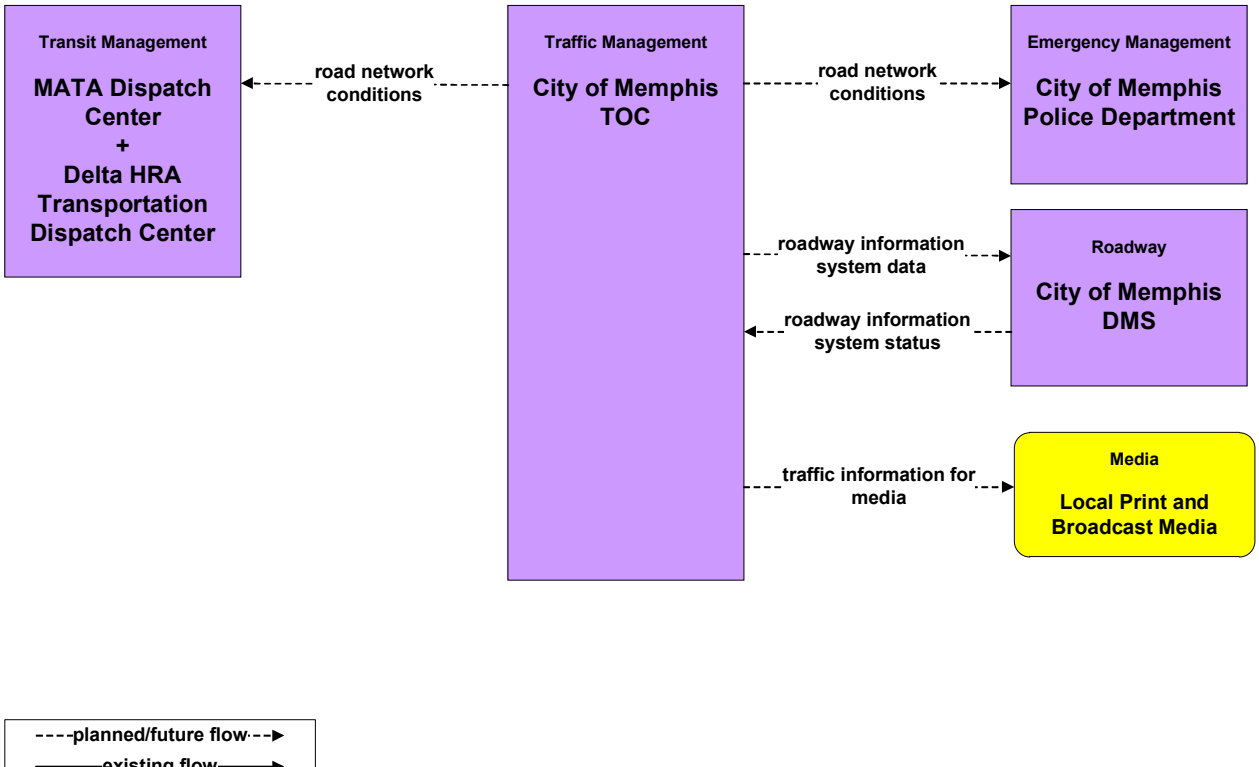




*Note:*
Several of the TDOT DMS and HAR are located in Arkansas.

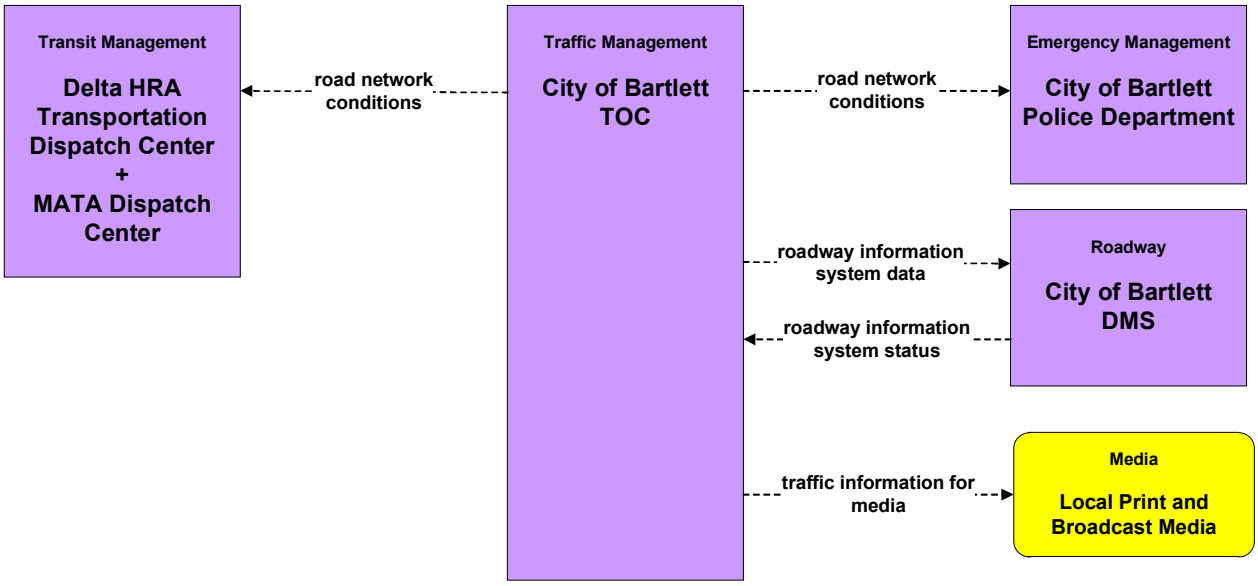
## ATMS06 – Traffic Information Dissemination
## MDOT Northwest Regional TMC

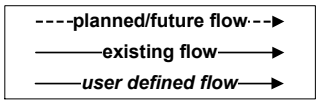



## ATMS06 – Traffic Information Dissemination
## City of Memphis

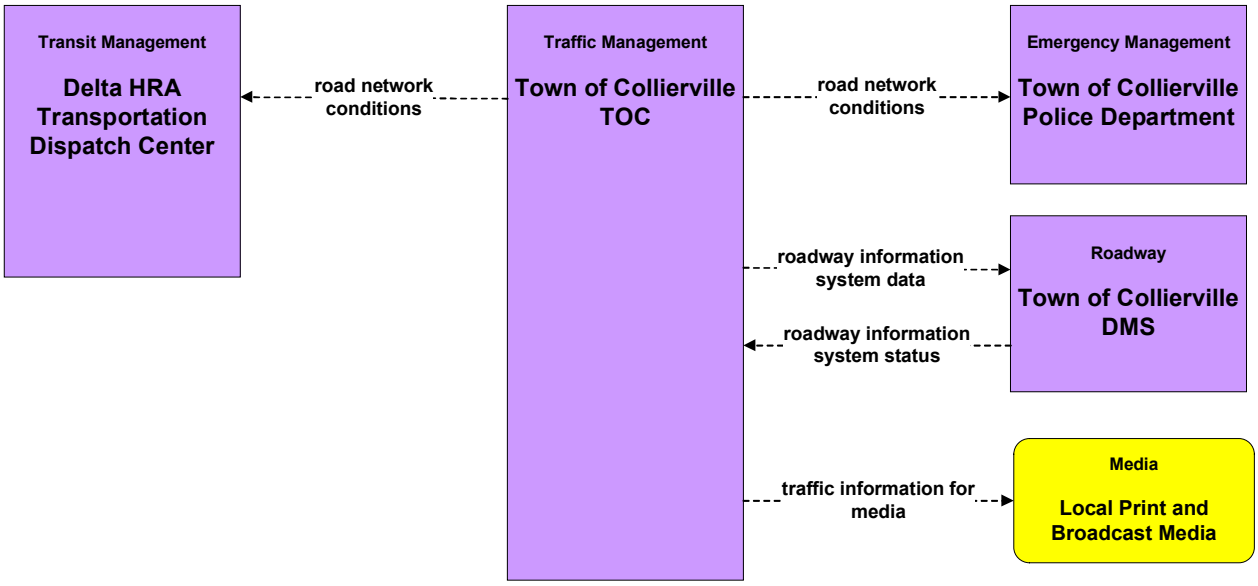


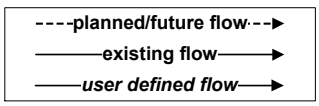
## ATMS06 – Traffic Information Dissemination
## City of Bartlett

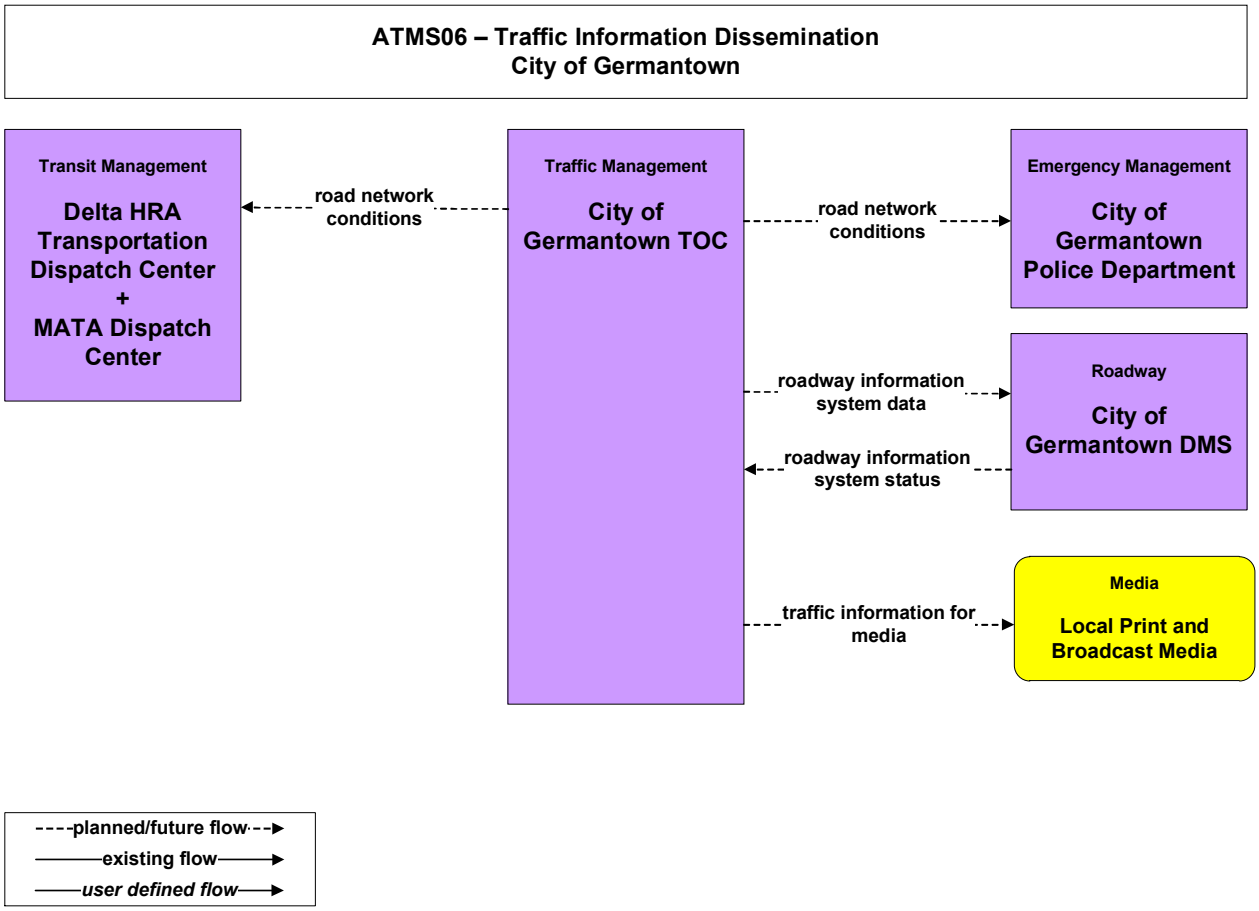


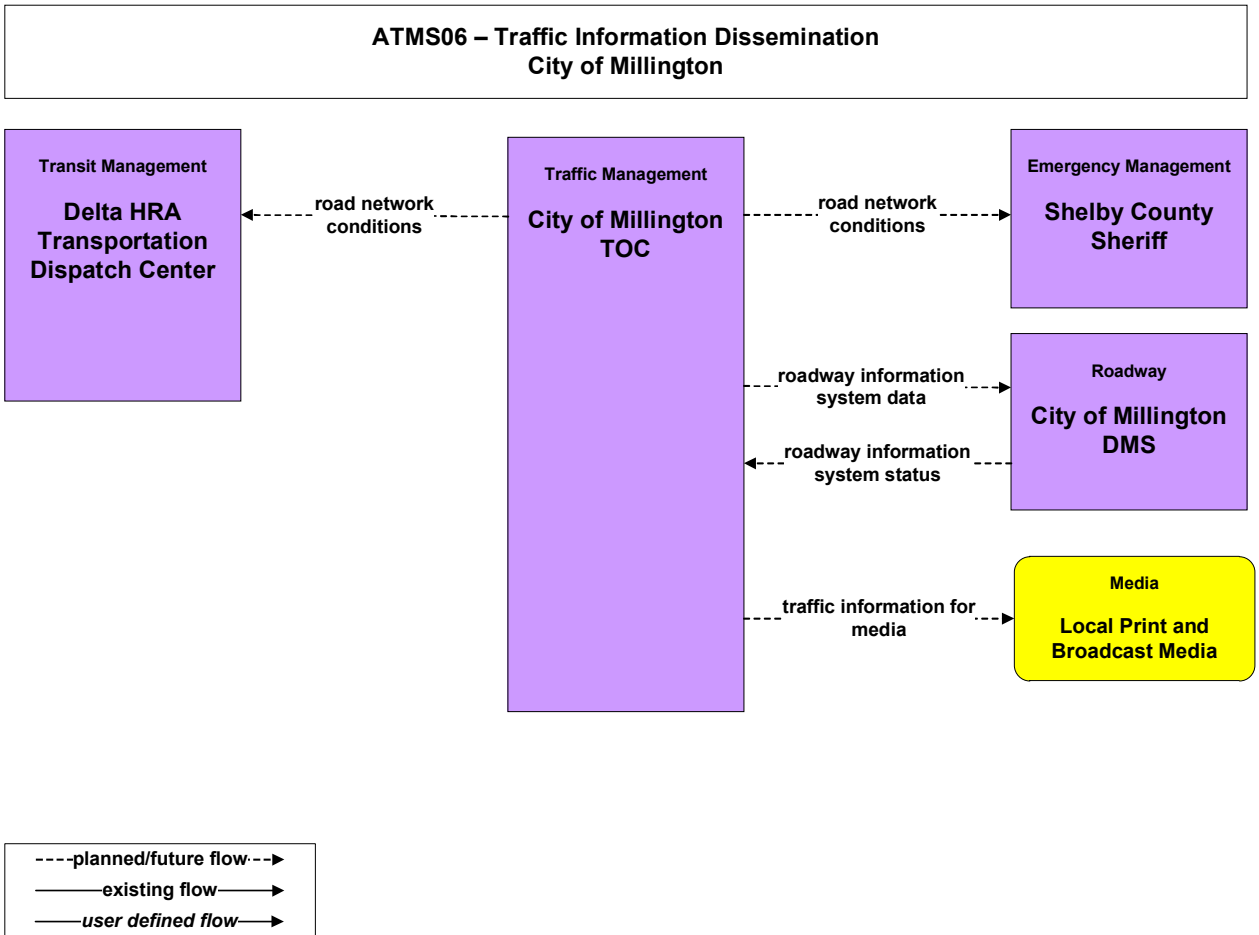




## ATMS06 – Traffic Information Dissemination
## Town of Collierville

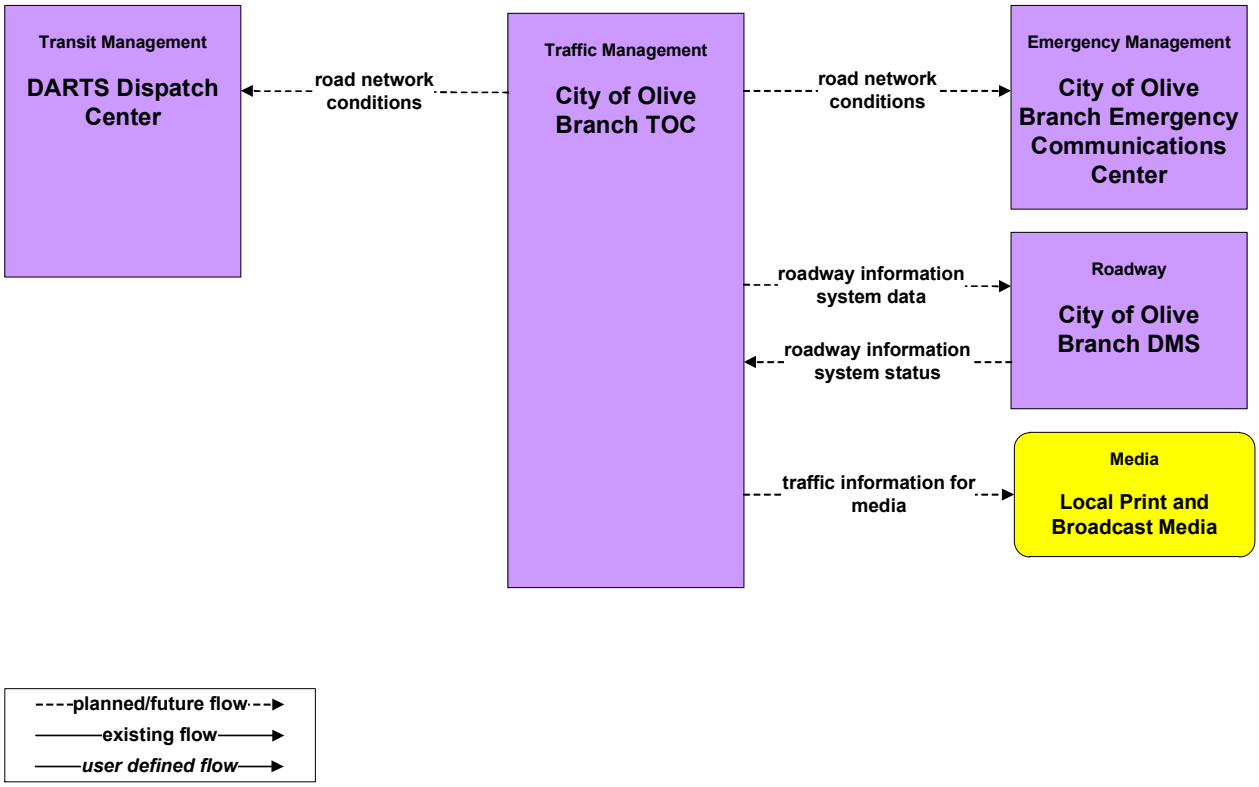


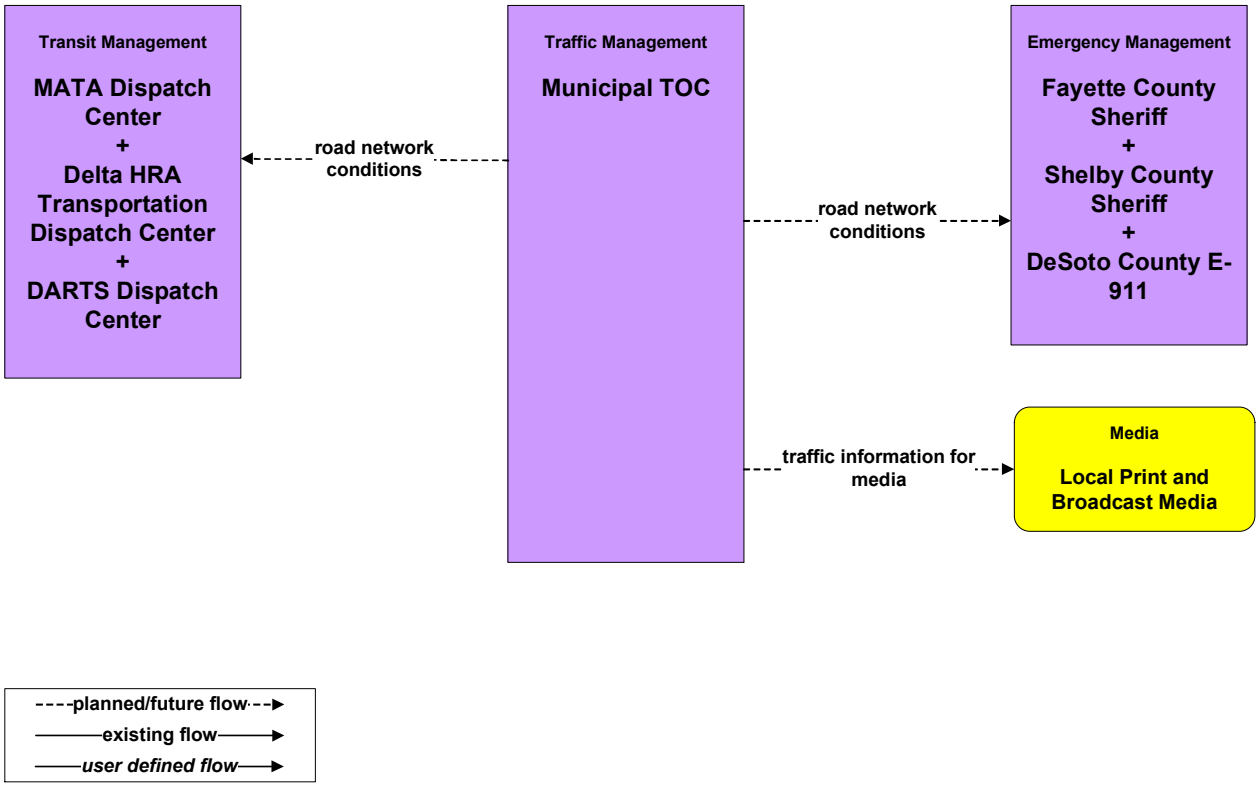

ATMS06 – Traffic Information Dissemination
City of Germantown
Transit Management
Delta HRA Transportation Dispatch Center + MATA Dispatch Center
road network conditions
Traffic Management
City of Germantown TOC
road network conditions
Emergency Management
City of Germantown Police Department
roadway information system data
roadway information system status
Roadway
City of Germantown DMS
traffic information for media
Media
Local Print and Broadcast Media
planned/future flow
existing flow
user defined flow


ATMS06 – Traffic Information Dissemination
City of Millington
Transit Management
Delta HRA Transportation Dispatch Center
road network conditions
Traffic Management
City of Millington TOC
road network conditions
Emergency Management
Shelby County Sheriff
roadway information system data
roadway information system status
Roadway
City of Millington DMS
traffic information for media
Media
Local Print and Broadcast Media
planned/future flow
existing flow
user defined flow

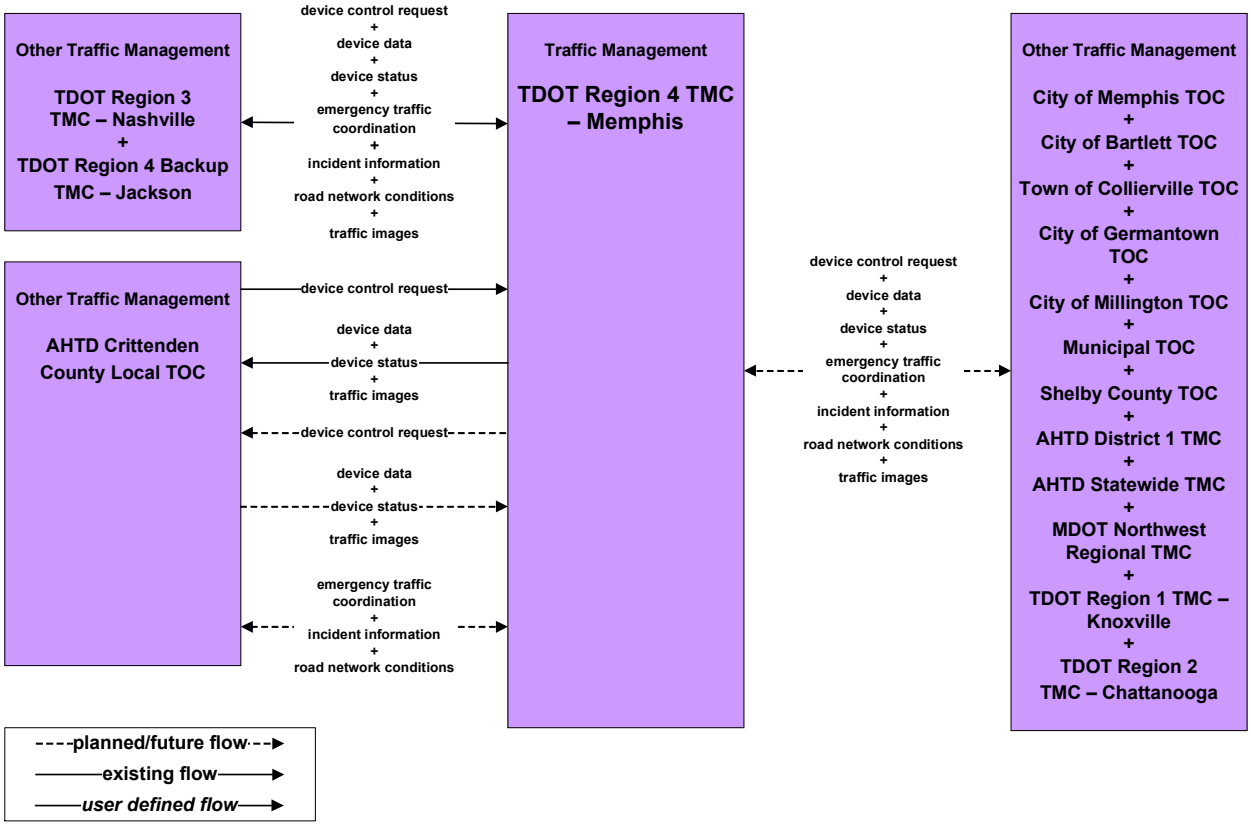
## ATMS06 – Traffic Information Dissemination
## City of Olive Branch



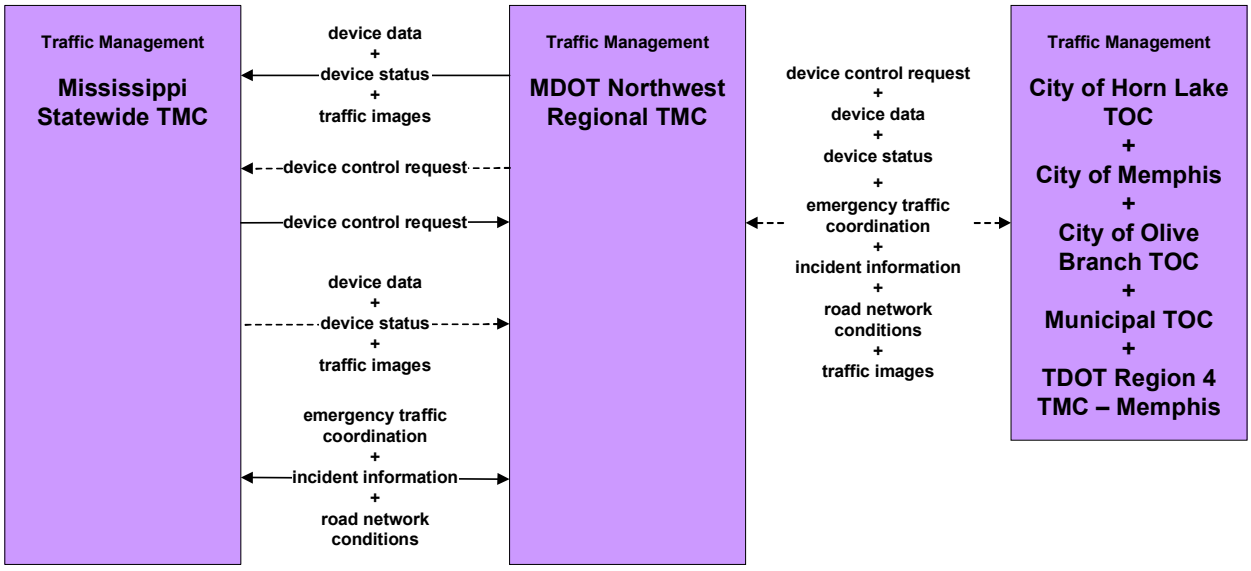

## ATMS06 – Traffic Information Dissemination
## Municipal



## ATMS07 – Regional Traffic Management
## TDOT Region 4 TMC – Memphis

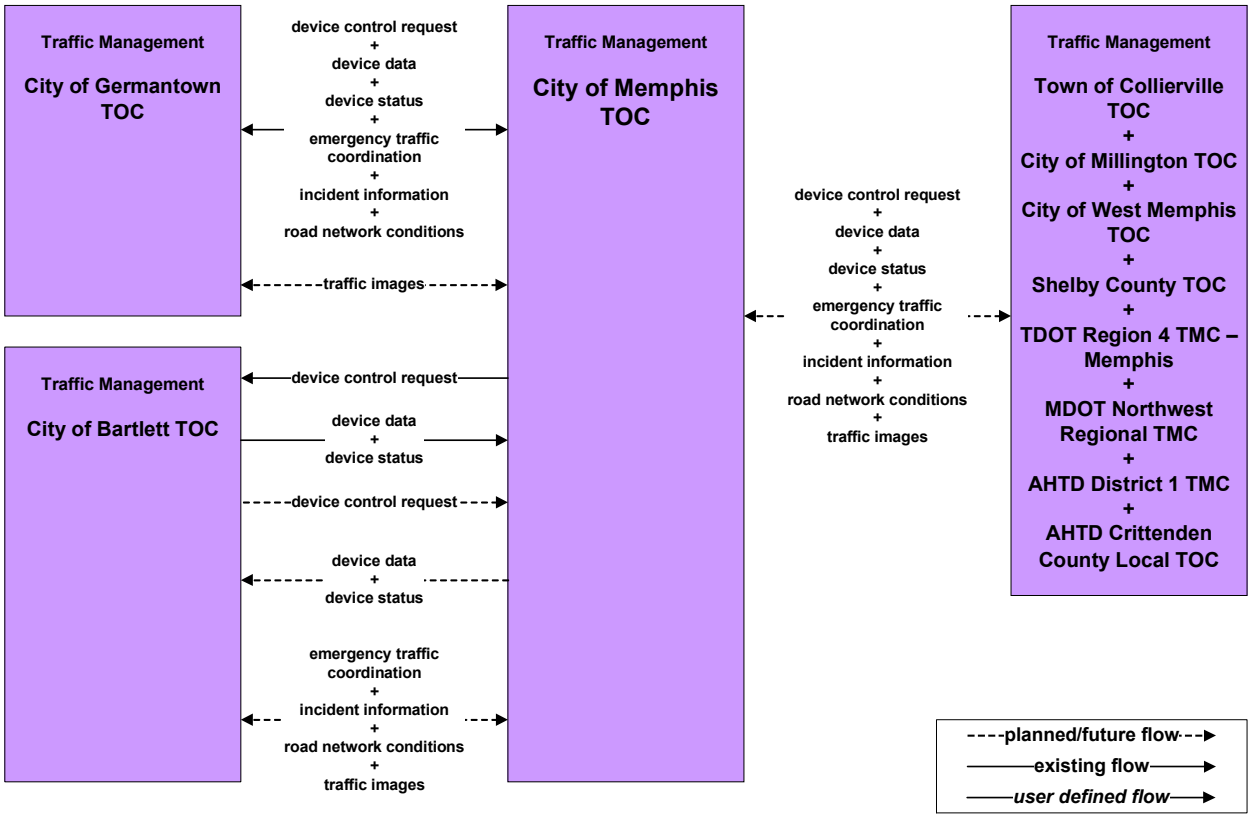



## ATMS07 – Regional Traffic Management
## MDOT Northwest Regional TMC

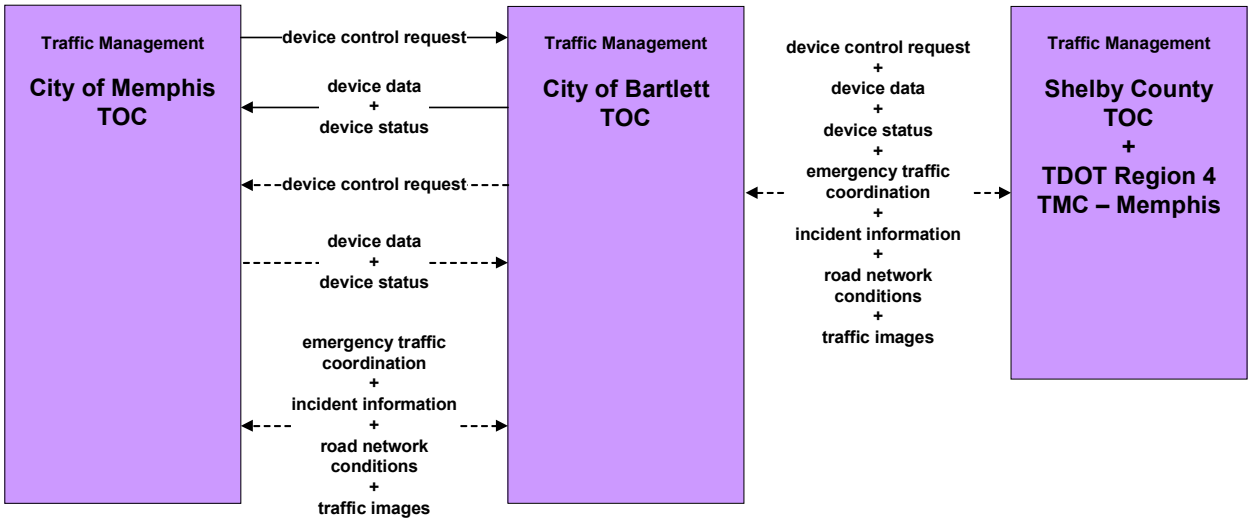



*Note:*
*The City of Southaven TOC is co-located with MDOT at the Northwest Regional TMC*

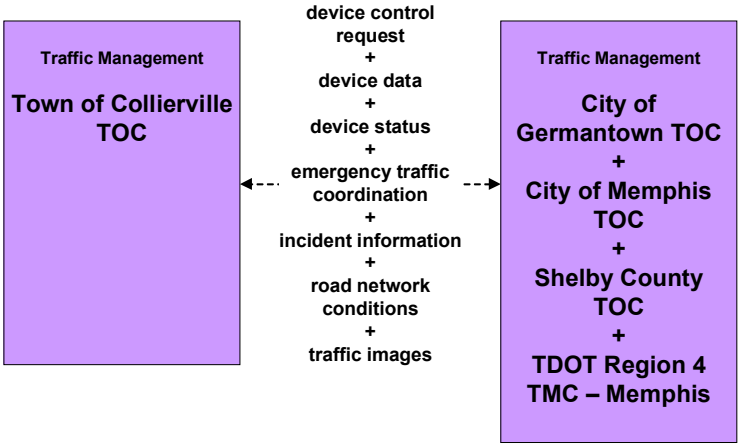
## ATMS07 – Regional Traffic Management
## City of Memphis

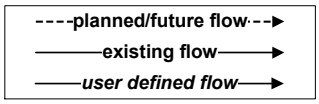



## ATMS07 – Regional Traffic Management
## City of Bartlett

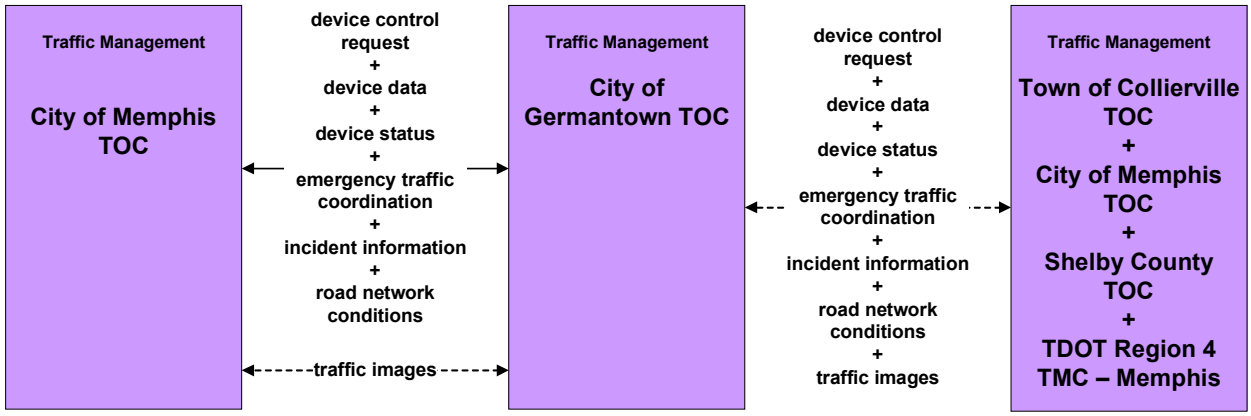


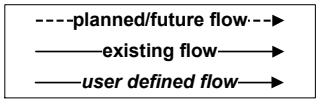
**ATMS07 – Regional Traffic Management**
**Town of Collierville**



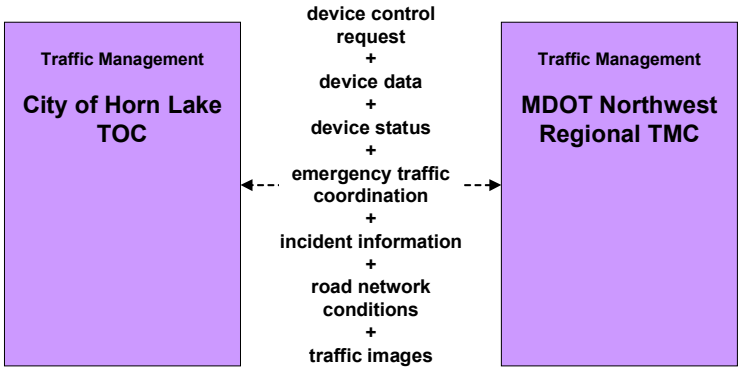



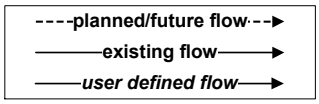

**ATMS07 – Regional Traffic Management**
**City of Germantown**



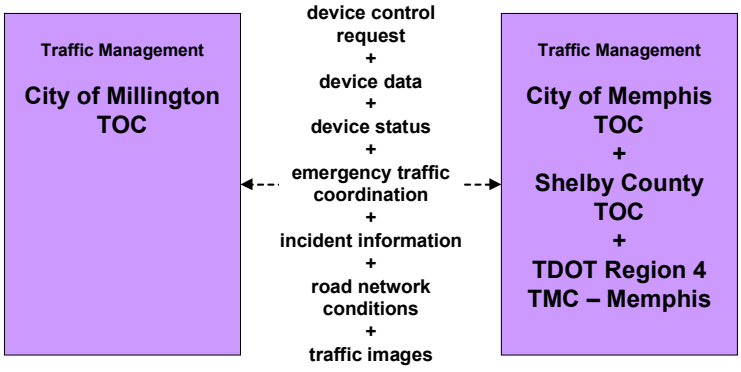



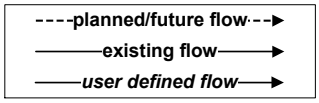
**ATMS07 – Regional Traffic Management**
**City of Horn Lake**



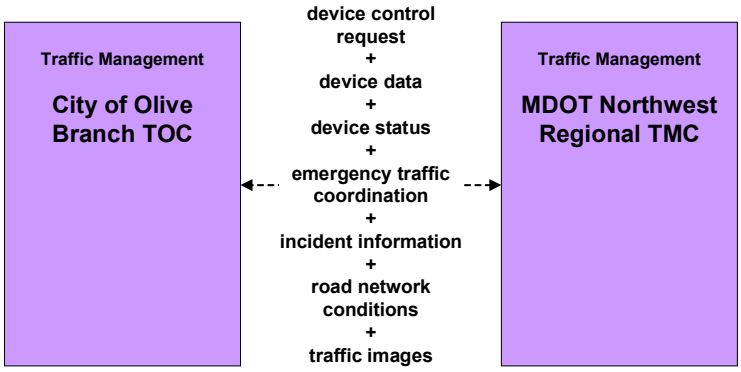



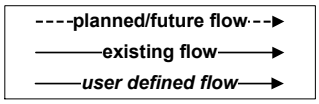

**ATMS07 – Regional Traffic Management**
**City of Millington**



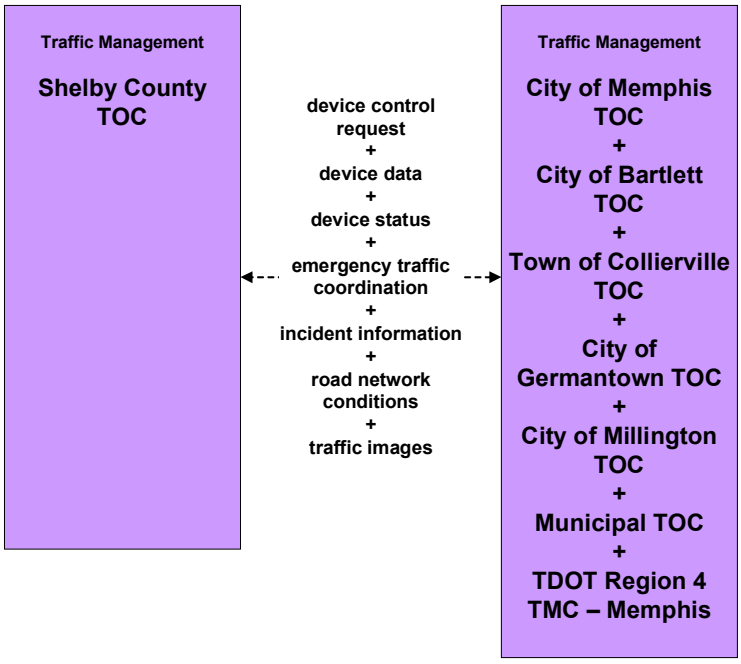



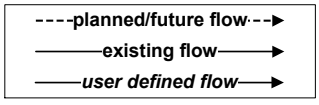
**ATMS07 – Regional Traffic Management**
**City of Olive Branch**



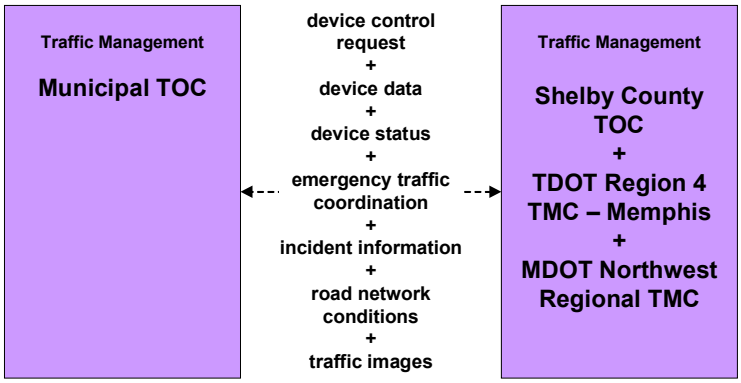



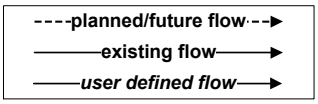

**ATMS07 – Regional Traffic Management**
**Shelby County**



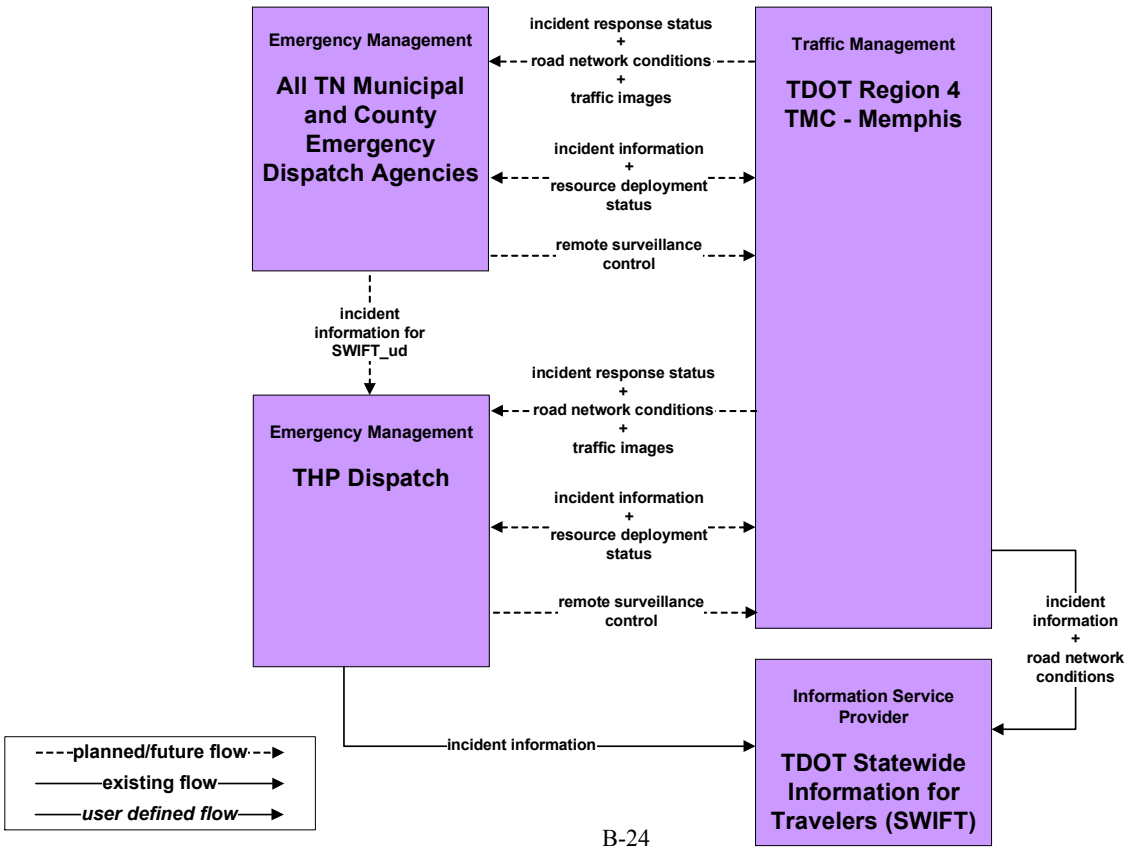



## ATMS07 – Regional Traffic Management
## Municipal

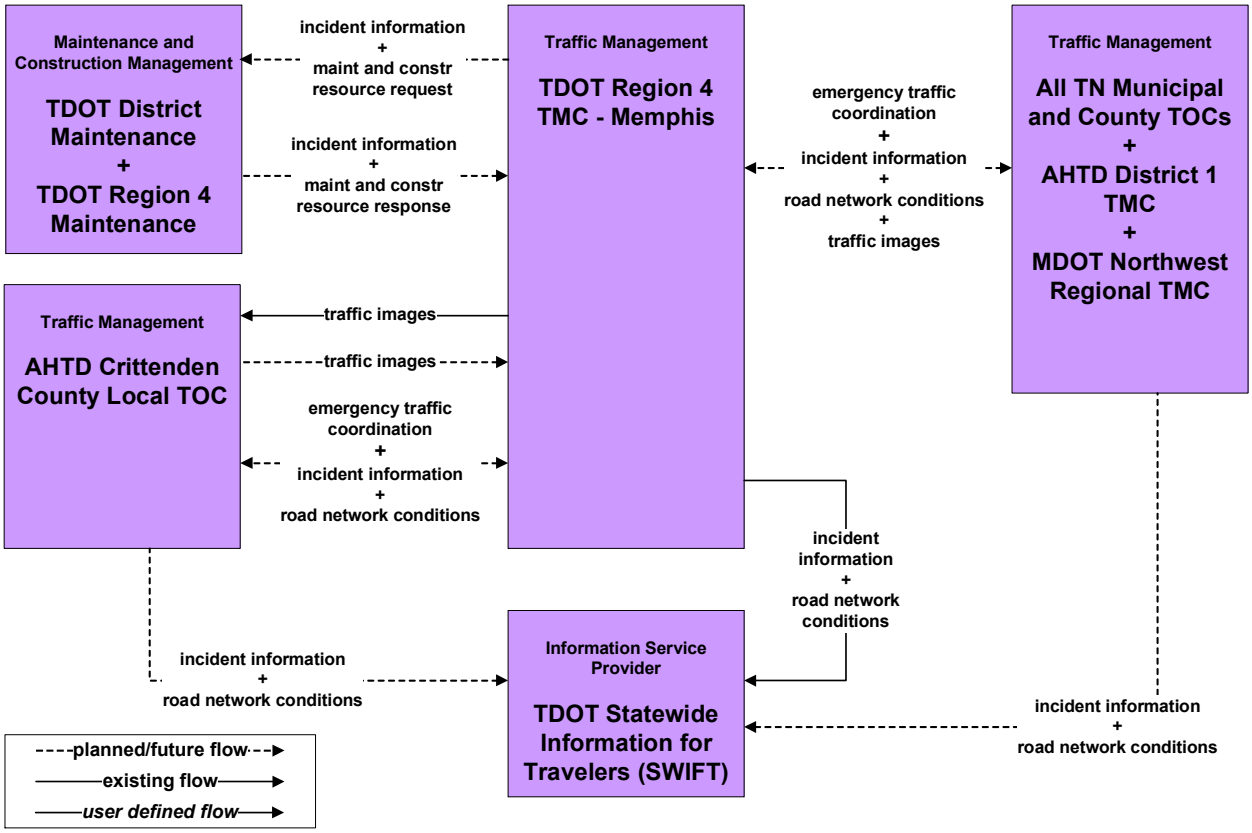


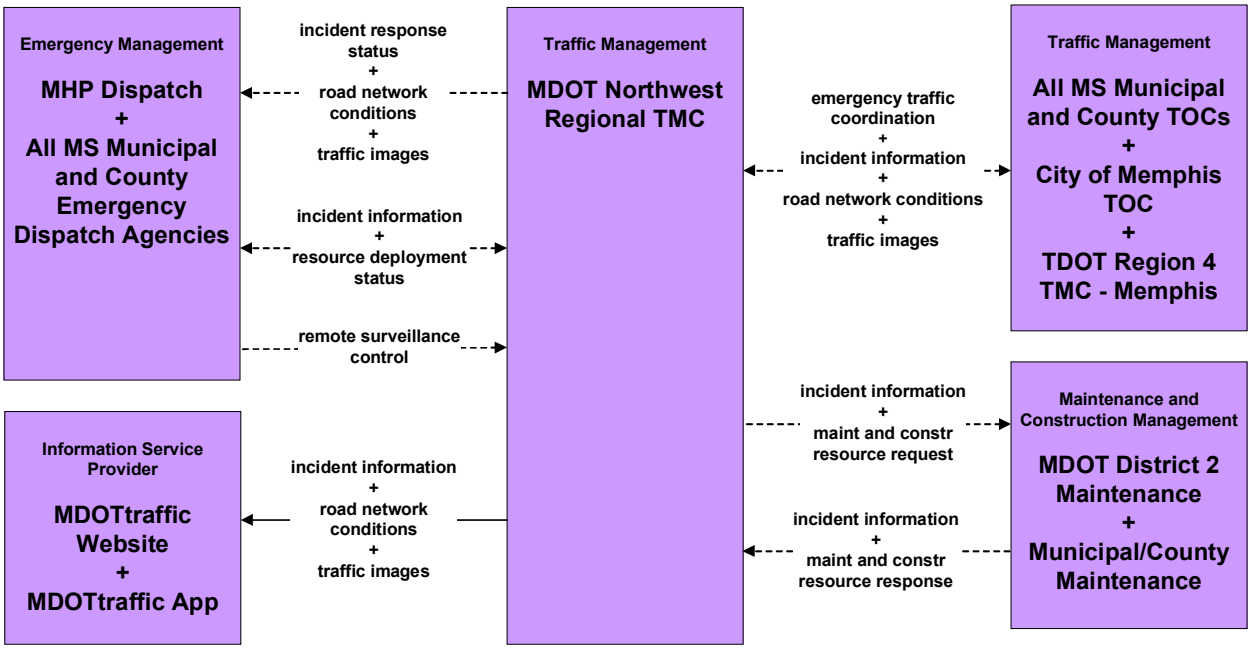

## ATMS08 - Traffic Incident Management System
## TDOT Region 4 TMC – Memphis (1 of 2)



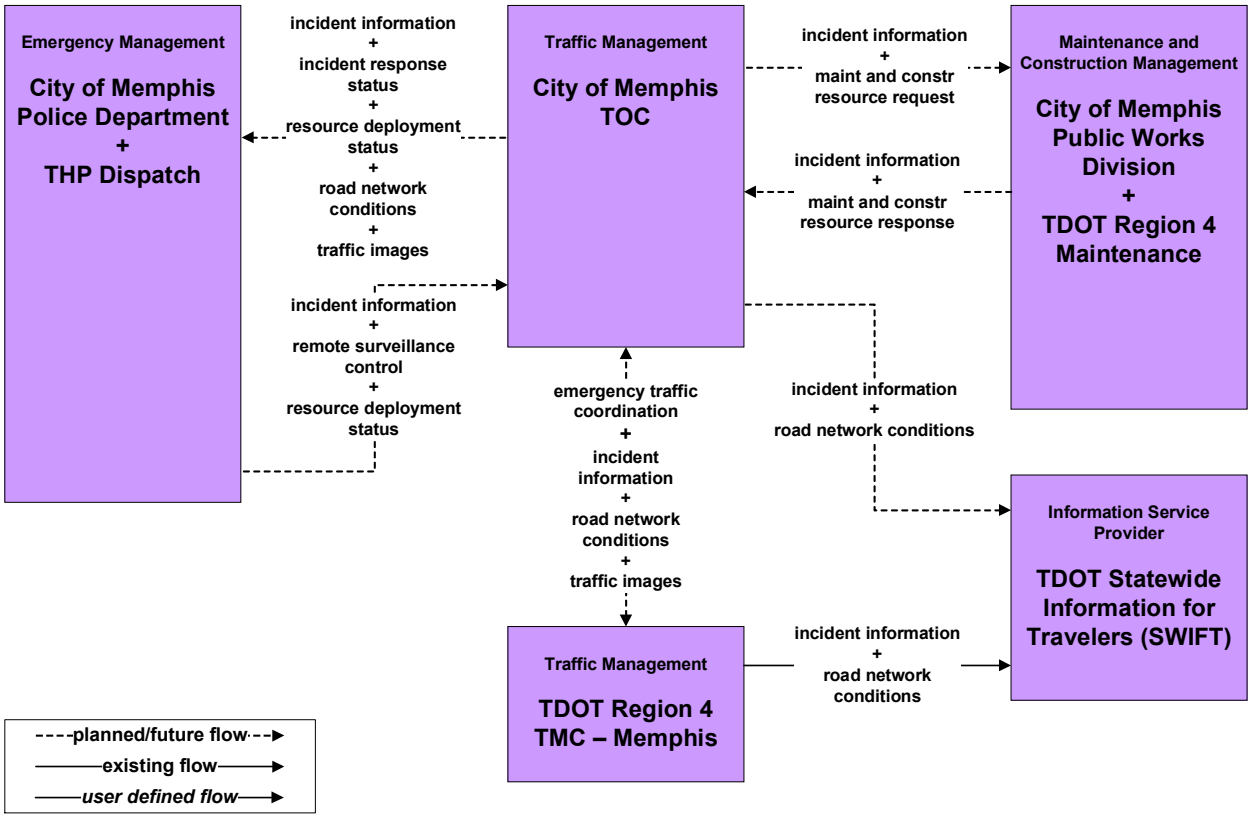
## ATMS08 - Traffic Incident Management System
## TDOT Region 4 TMC – Memphis (2 of 2)



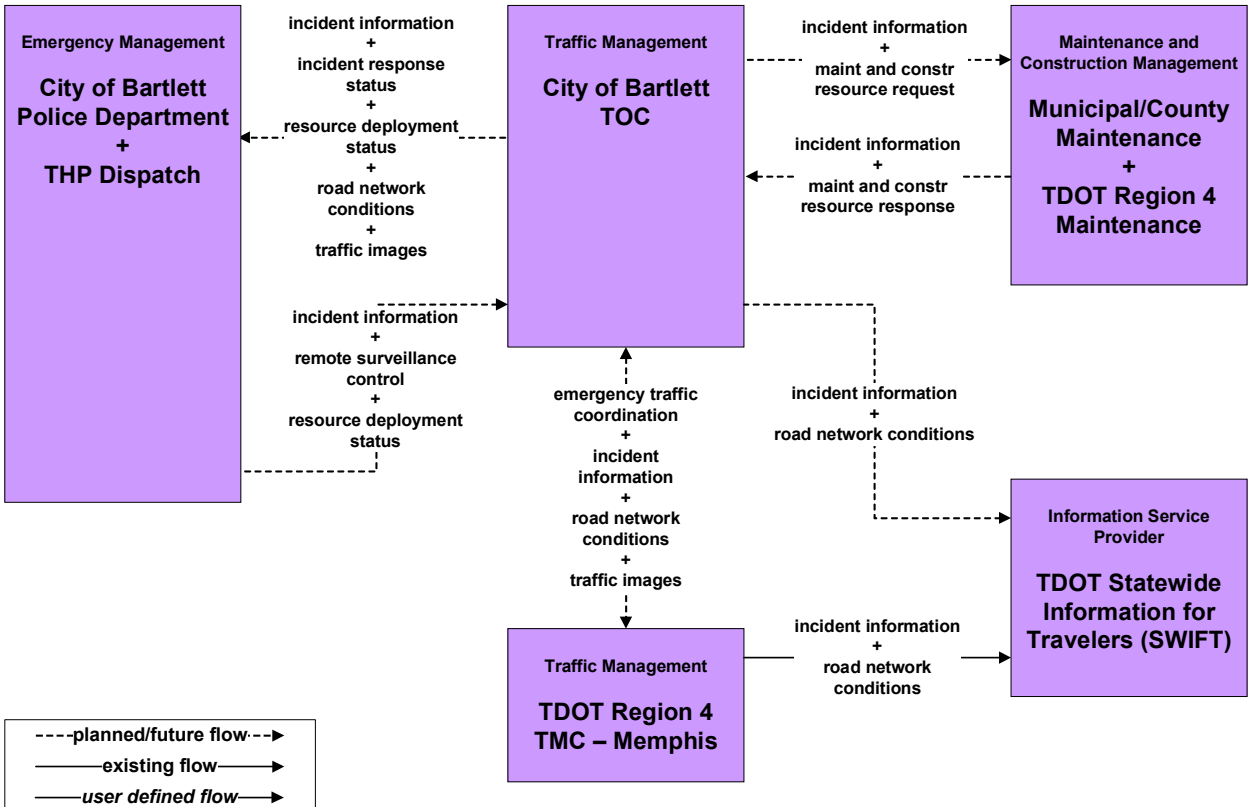

## ATMS08 – Traffic Incident Management System
## MDOT Northwest Regional TMC



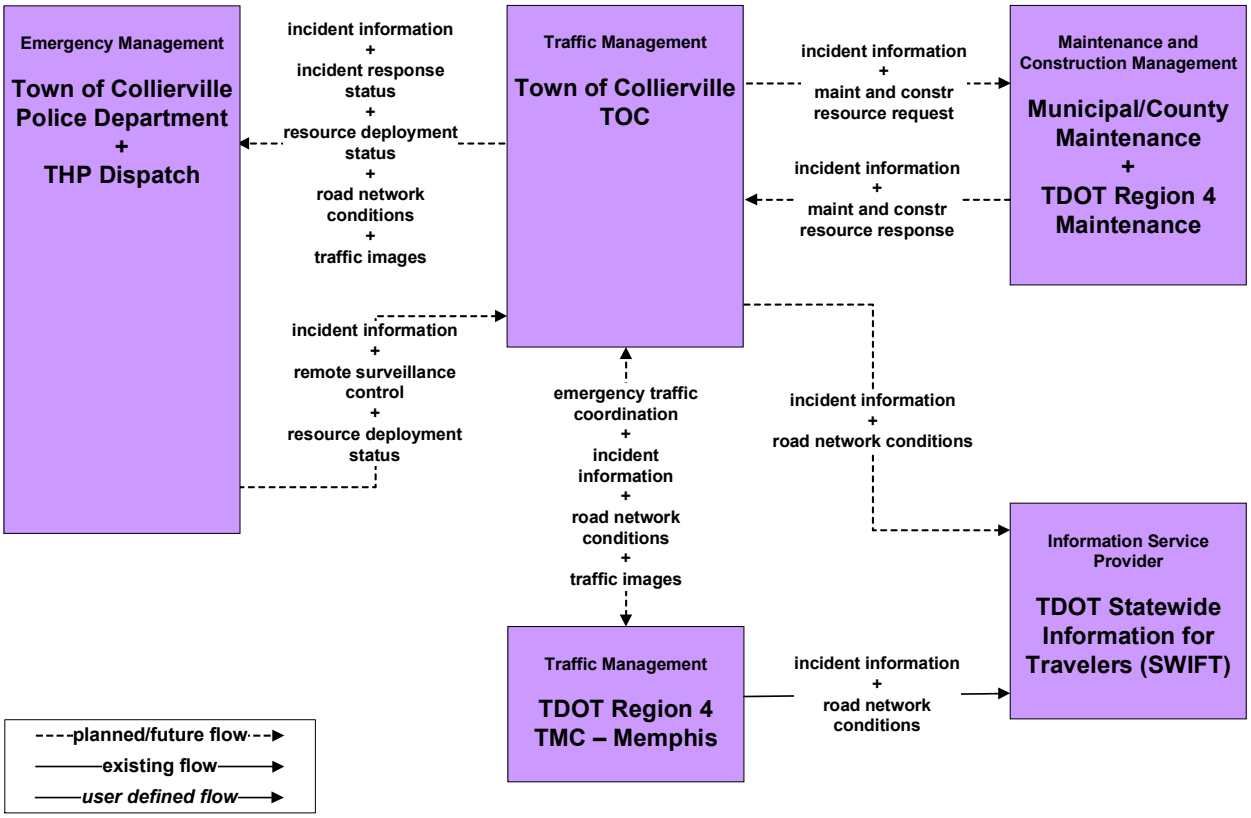
## ATMS08 – Traffic Incident Management System
## City of Memphis



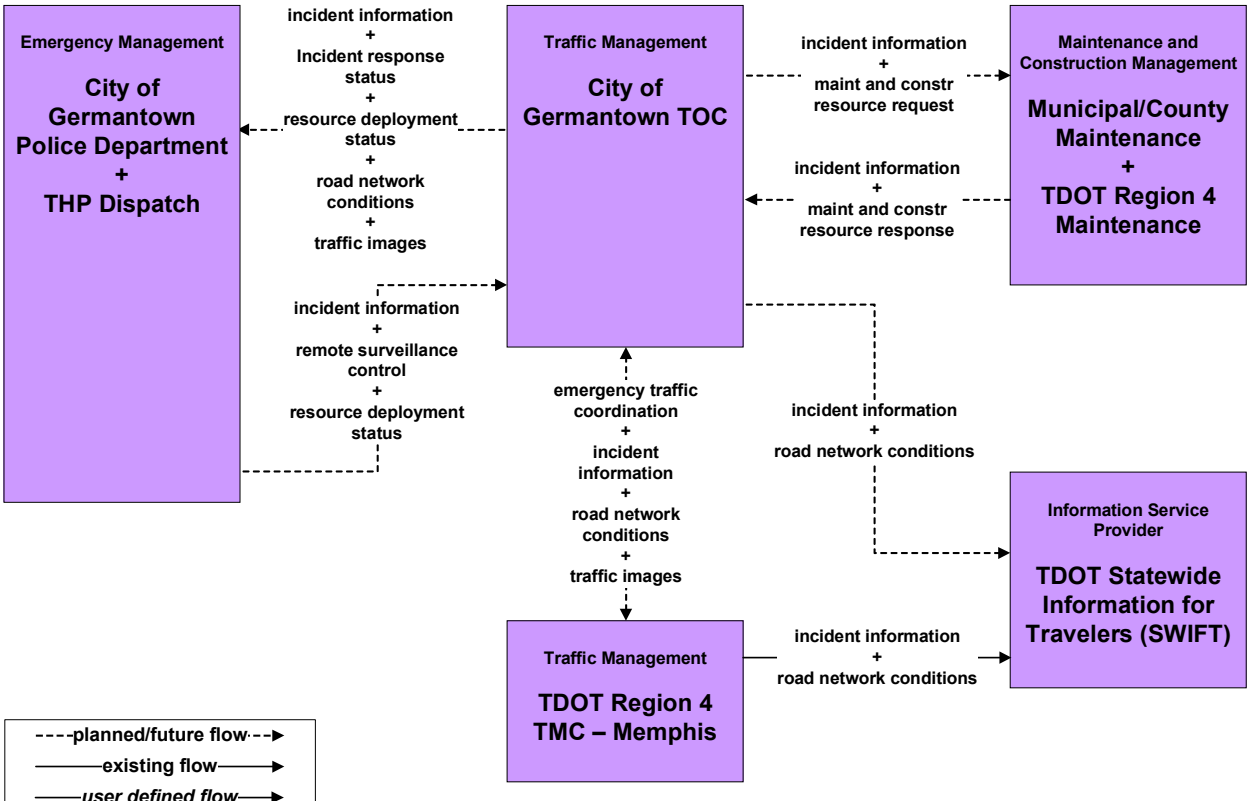

## ATMS08 – Traffic Incident Management System
## City of Bartlett



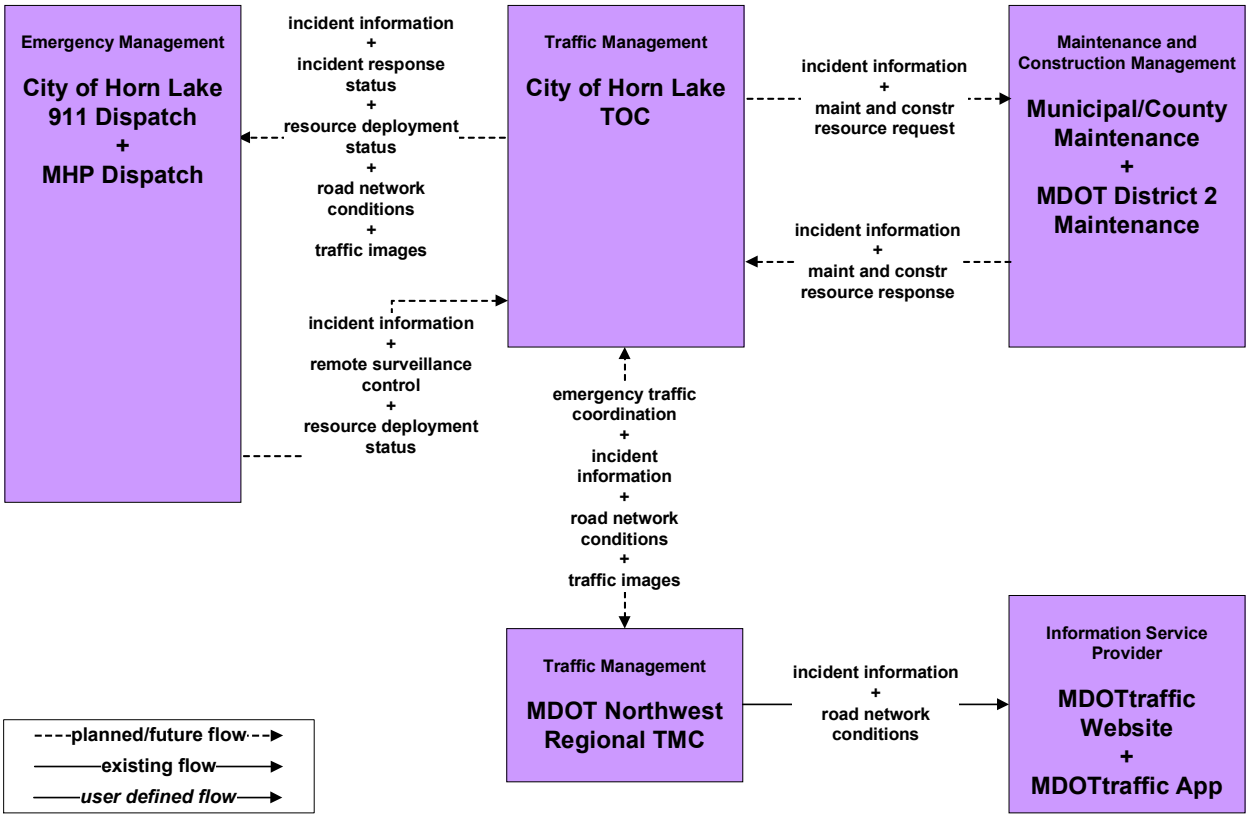
## ATMS08 – Traffic Incident Management System
## Town of Collierville



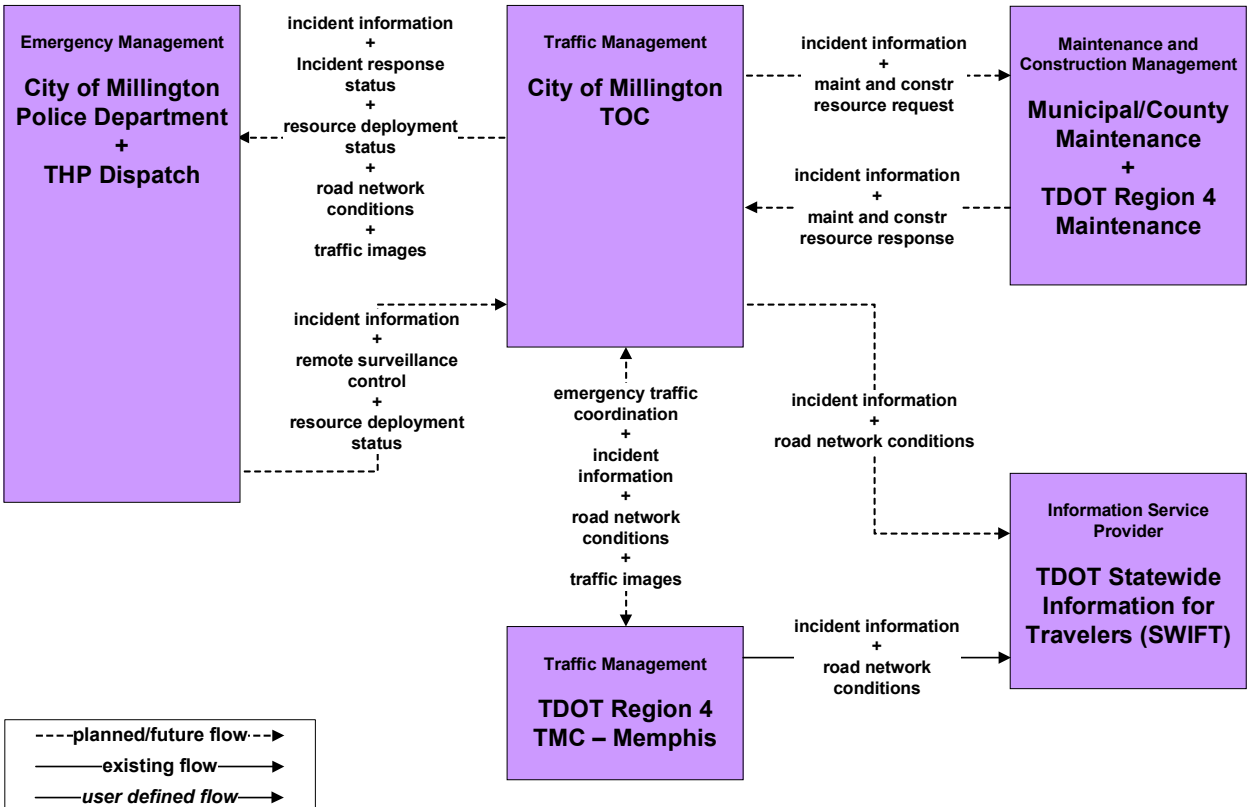

## ATMS08 – Traffic Incident Management System
## City of Germantown



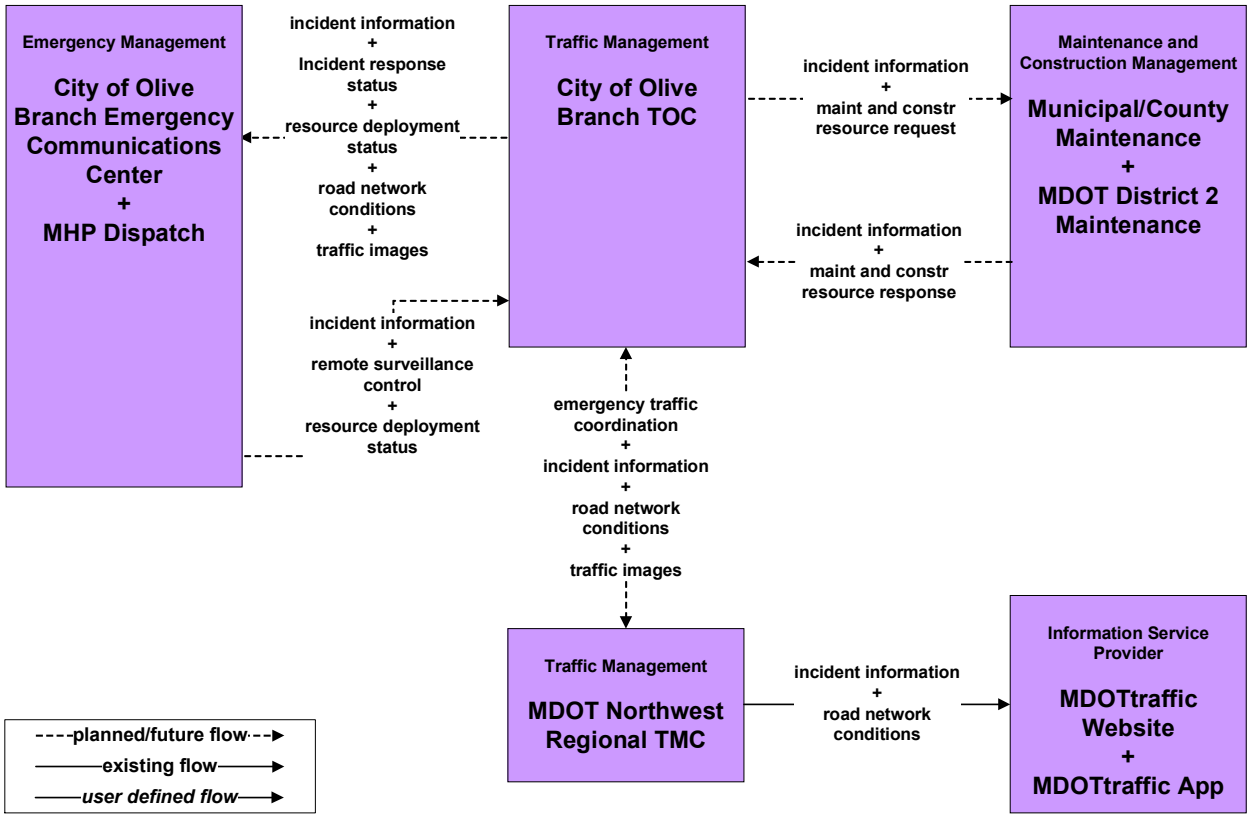
## ATMS08 – Traffic Incident Management System
## City of Horn Lake



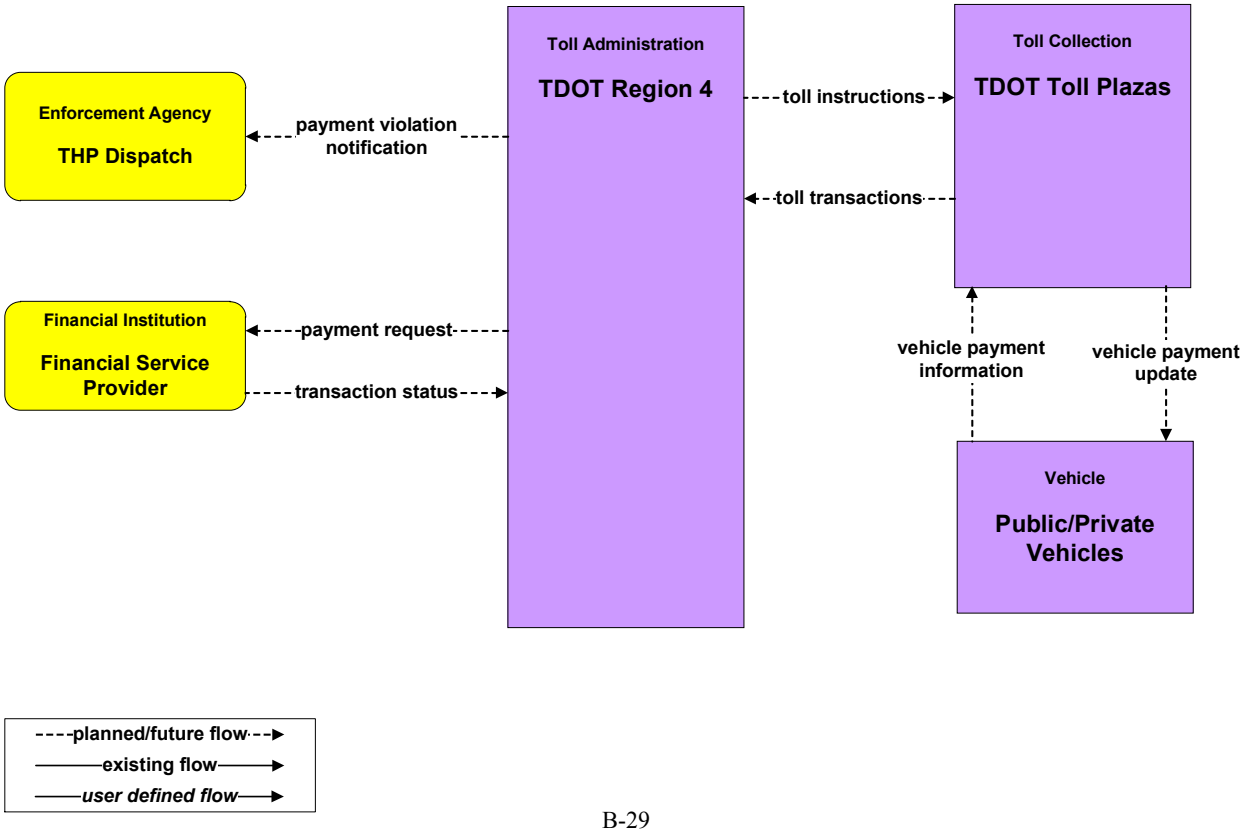

## ATMS08 – Traffic Incident Management System
## City of Millington



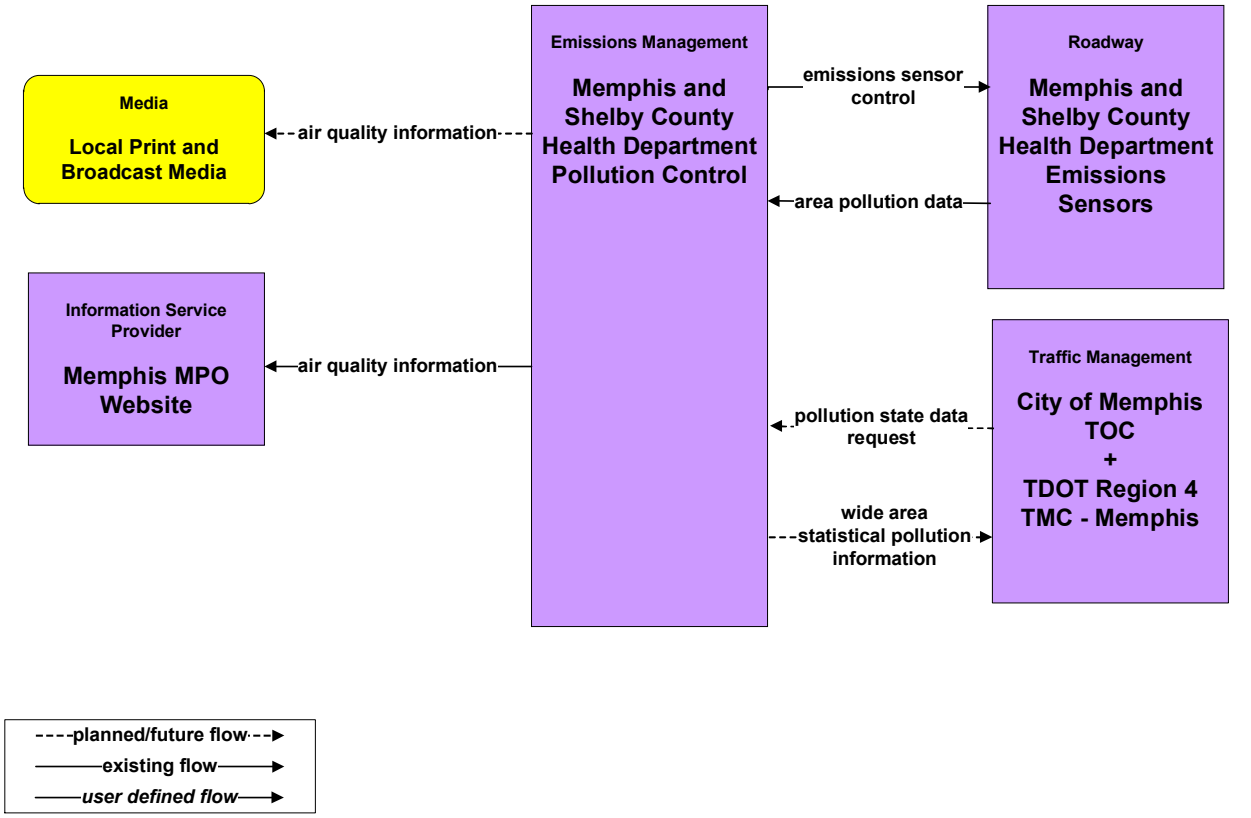
## ATMS08 – Traffic Incident Management System
## City of Olive Branch




## ATMS10 – Electronic Toll Collection
## TDOT Region 4



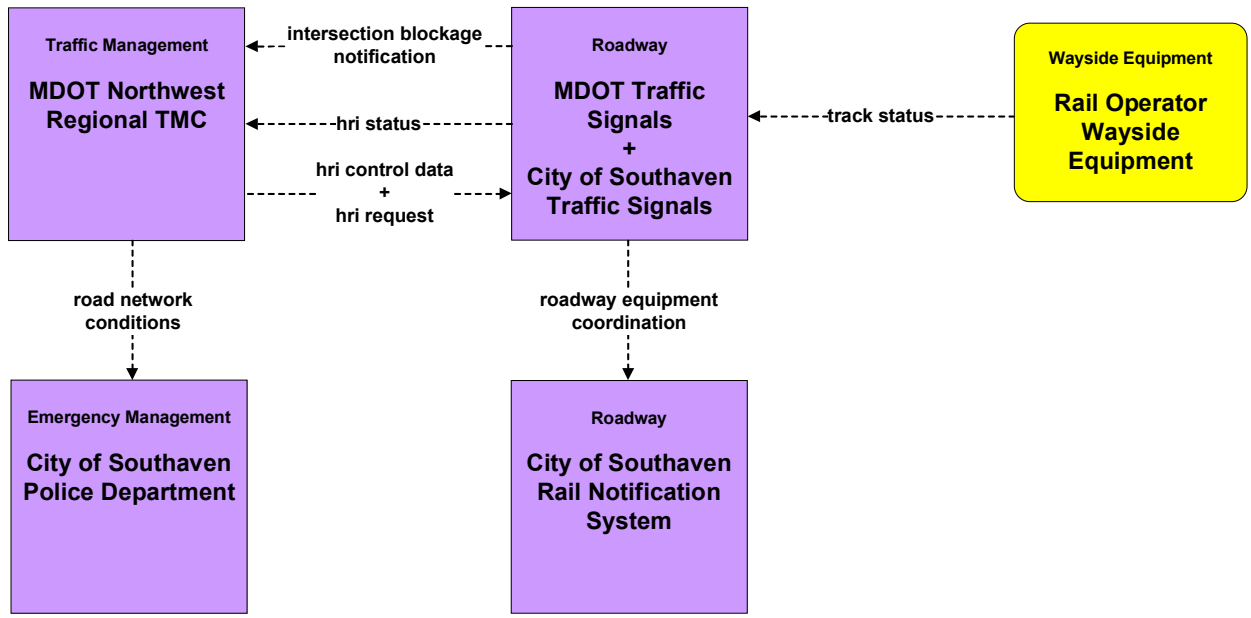
## ATMS11 – Emissions Monitoring and Management
## Memphis and Shelby County Health Department

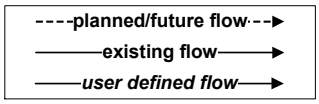




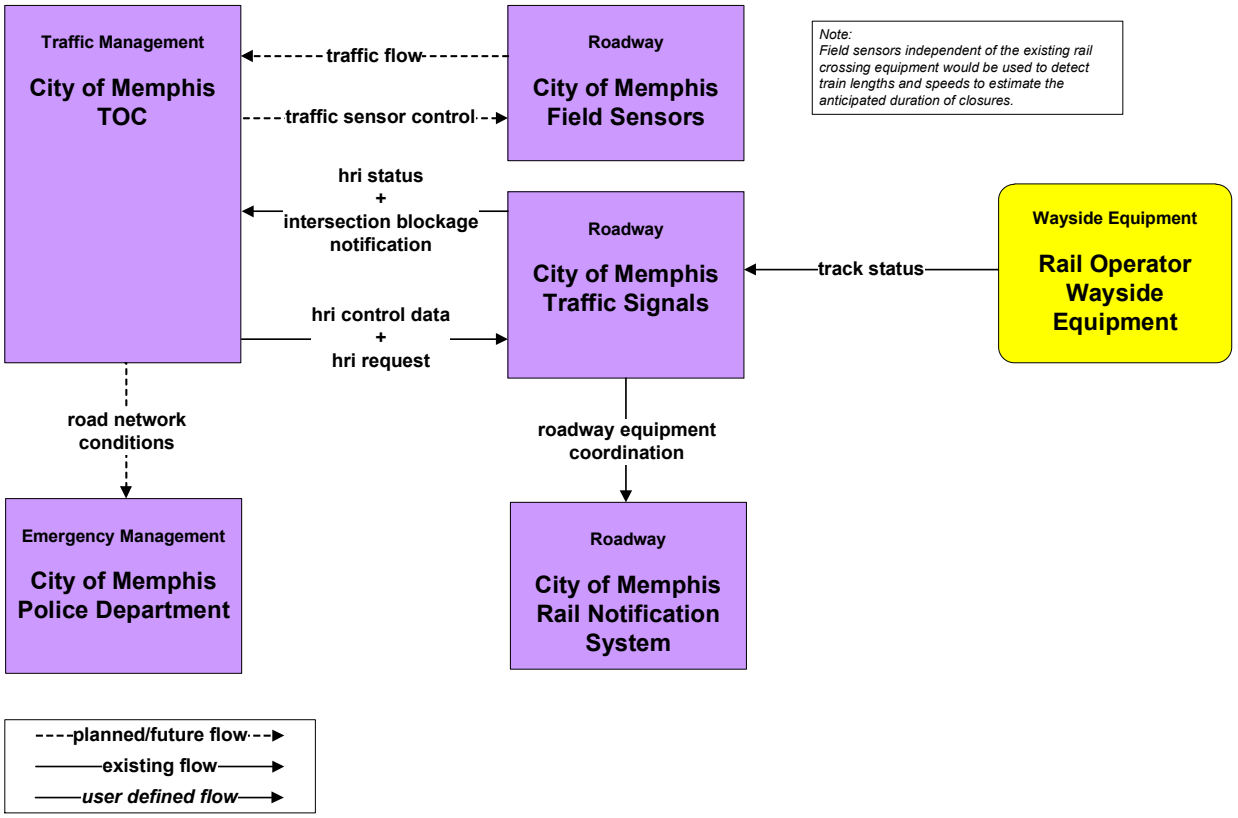


## ATMS13 – Standard Railroad Grade Crossing
## MDOT and City of Southaven

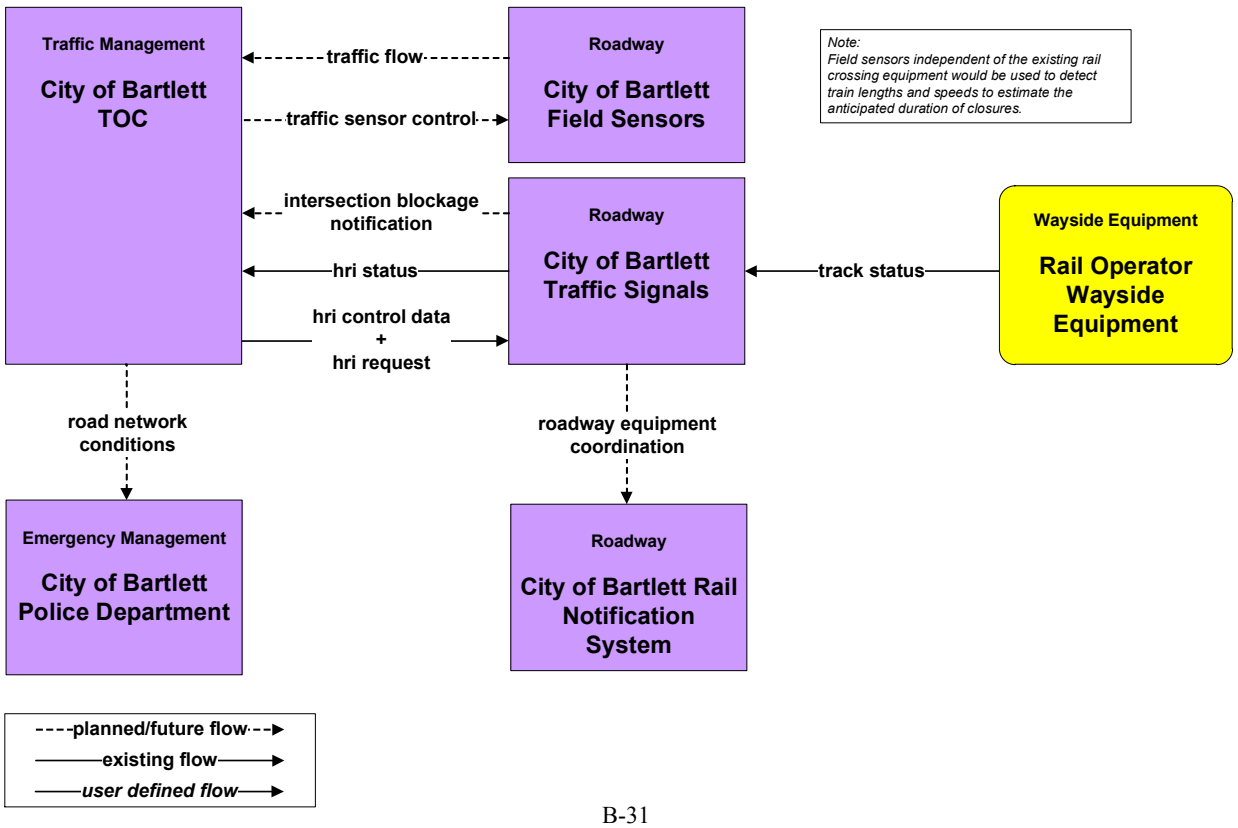


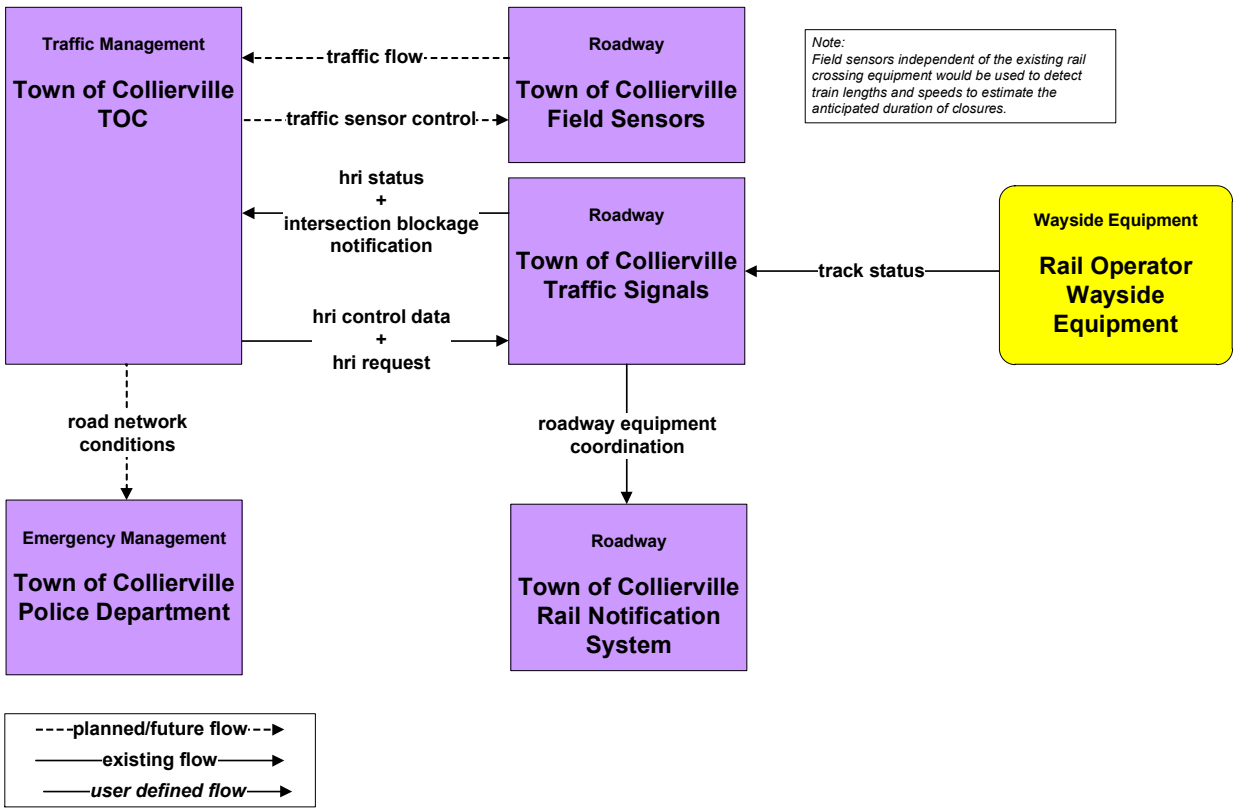
## ATMS13 – Standard Railroad Grade Crossing
## City of Memphis



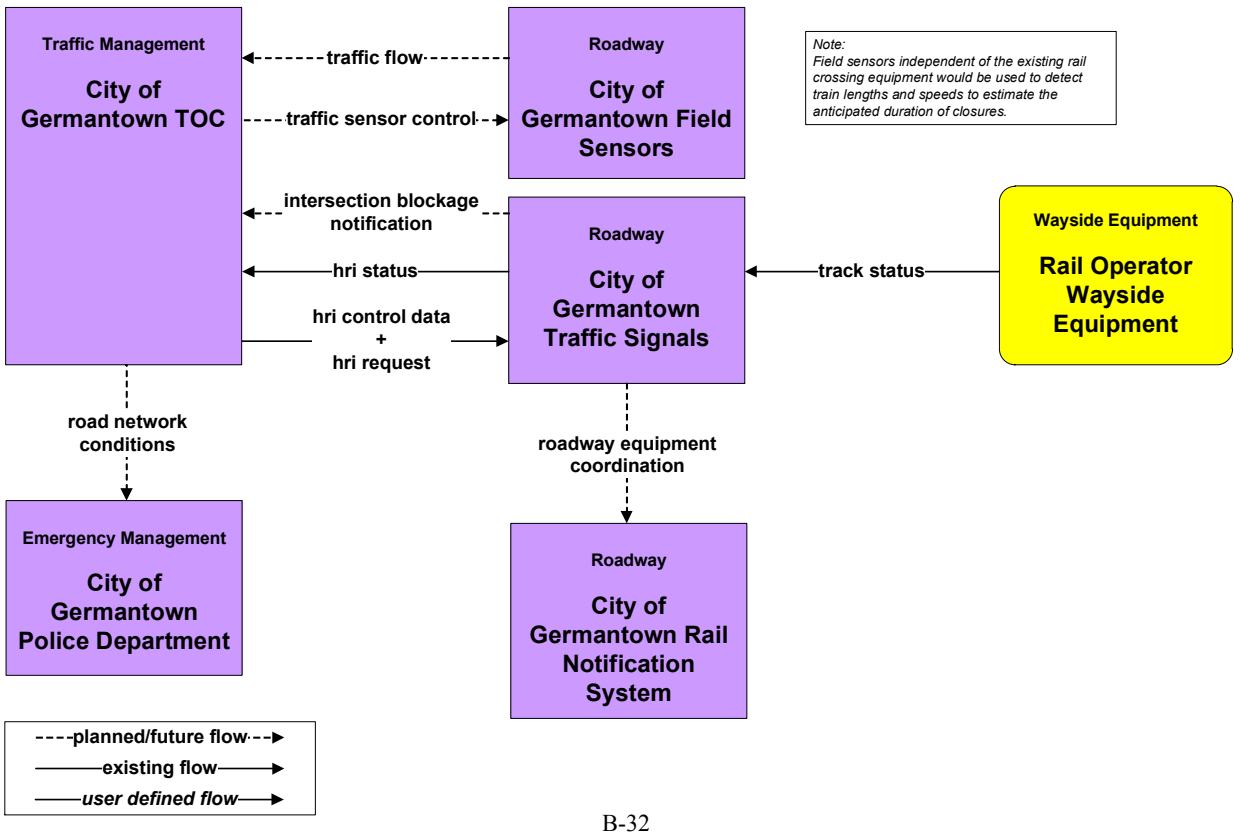

## ATMS13 – Standard Railroad Grade Crossing
## City of Bartlett



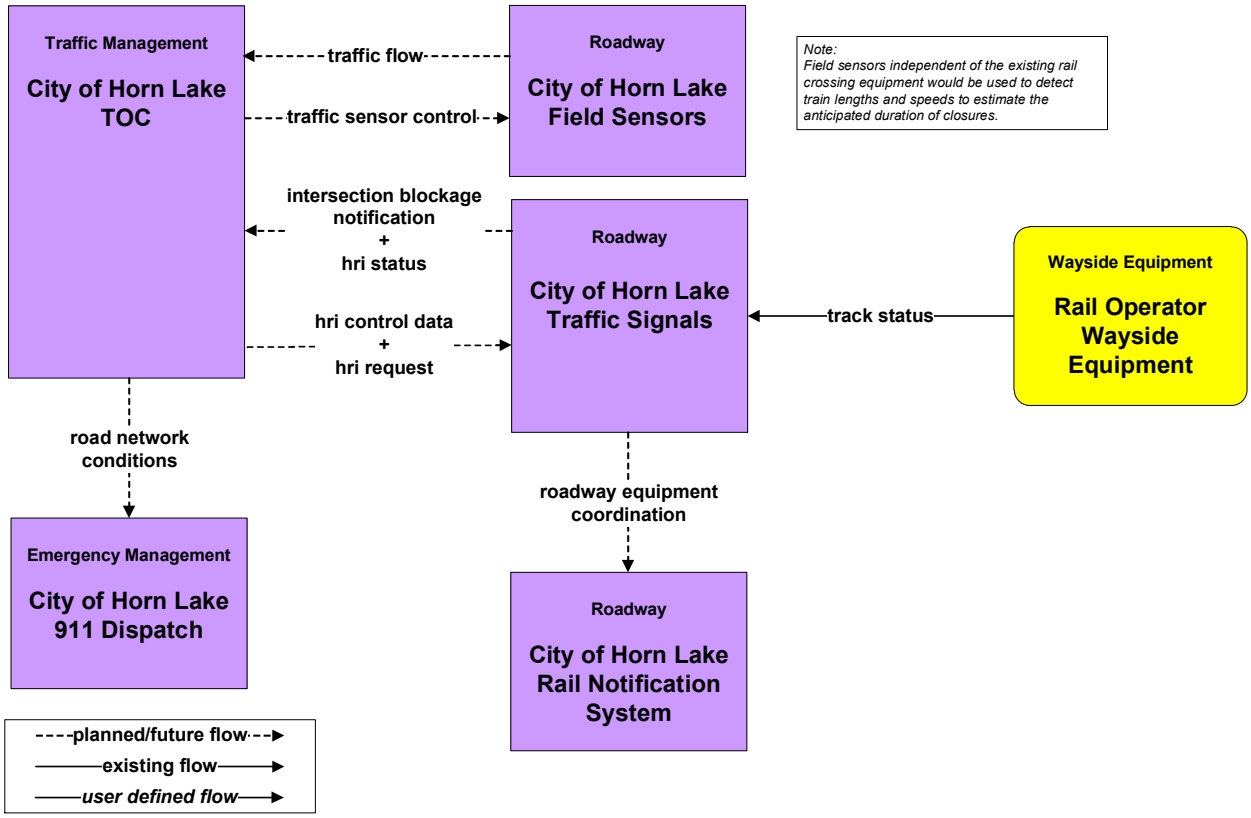
## ATMS13 – Standard Railroad Grade Crossing
## Town of Collierville



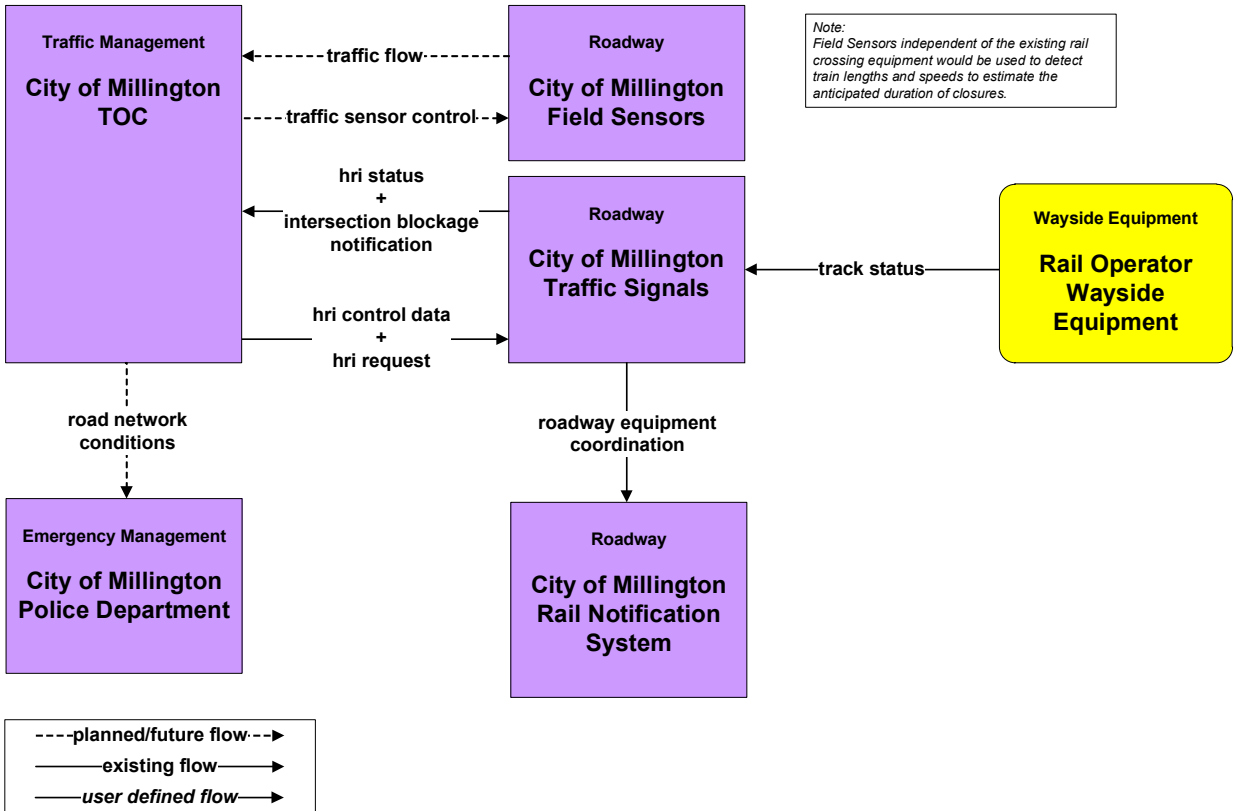

## ATMS13 – Standard Railroad Grade Crossing
## City of Germantown



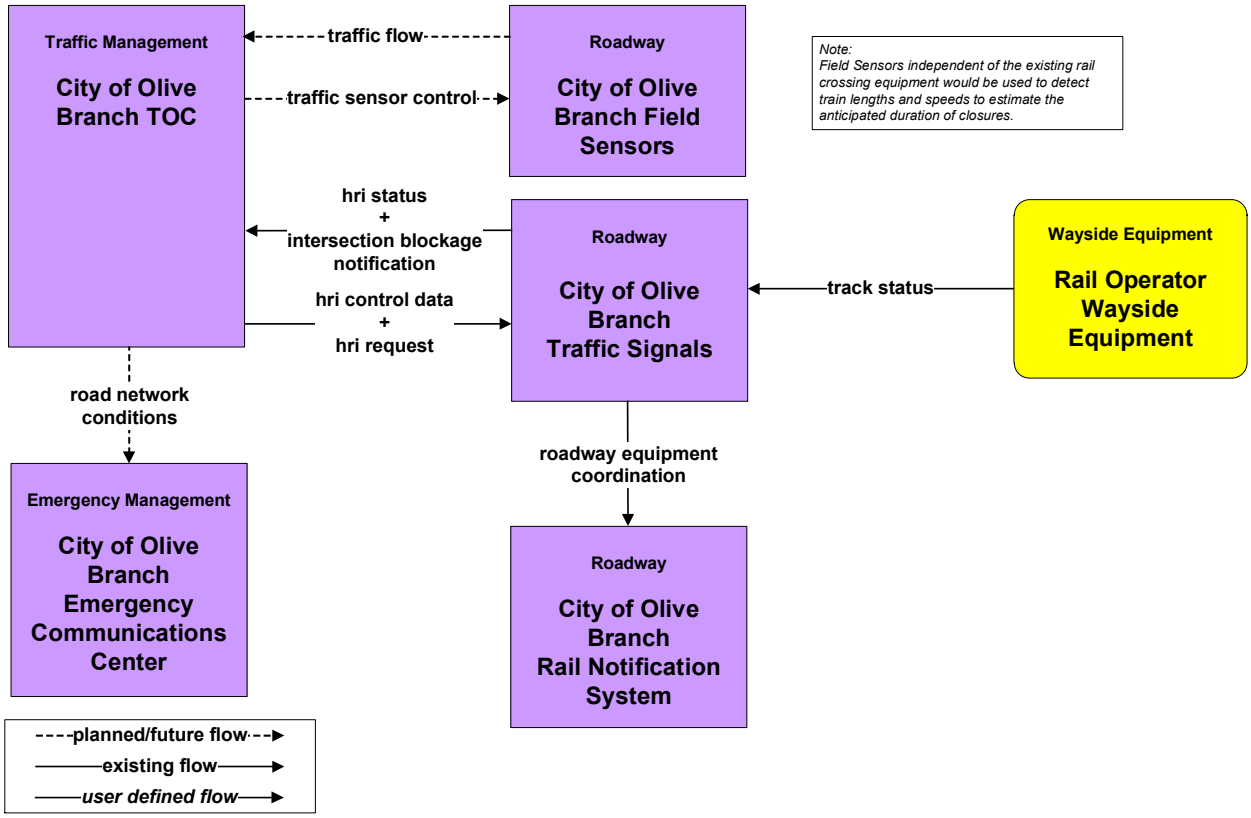
## ATMS13 – Standard Railroad Grade Crossing
## City of Horn Lake



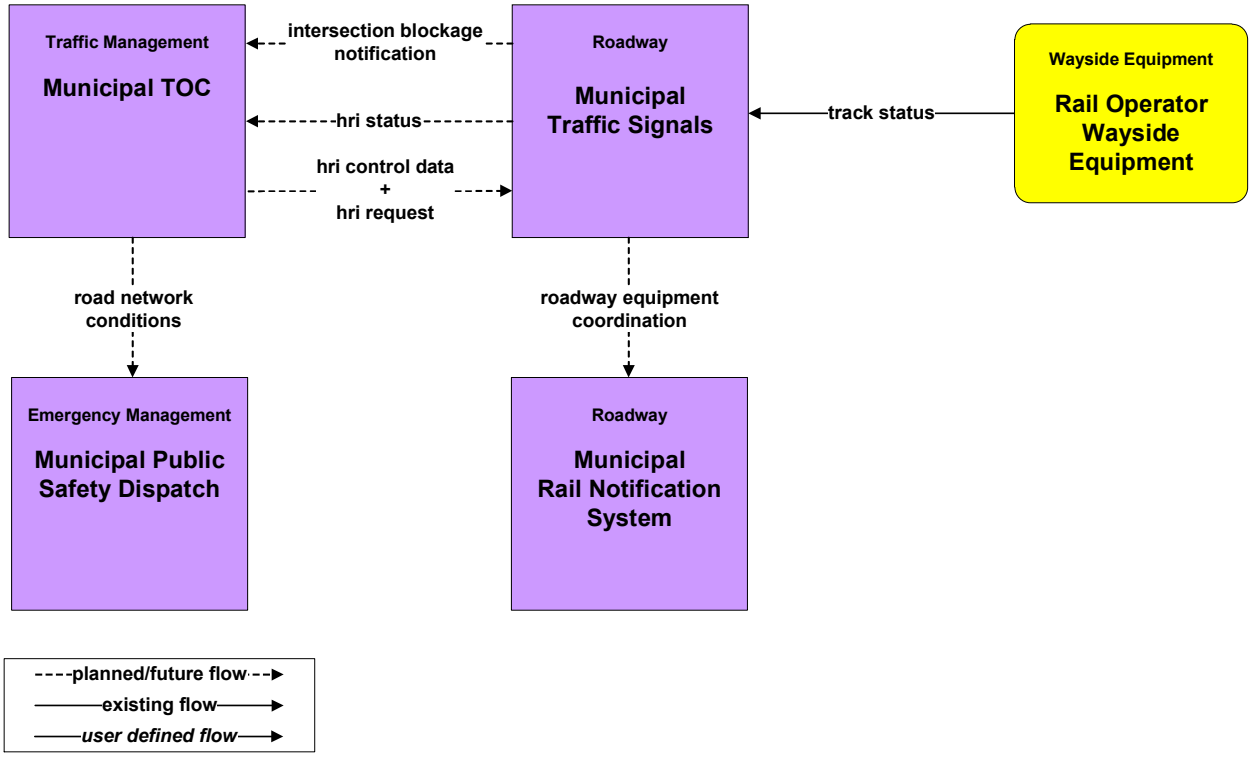

## ATMS13 – Standard Railroad Grade Crossing
## City of Millington



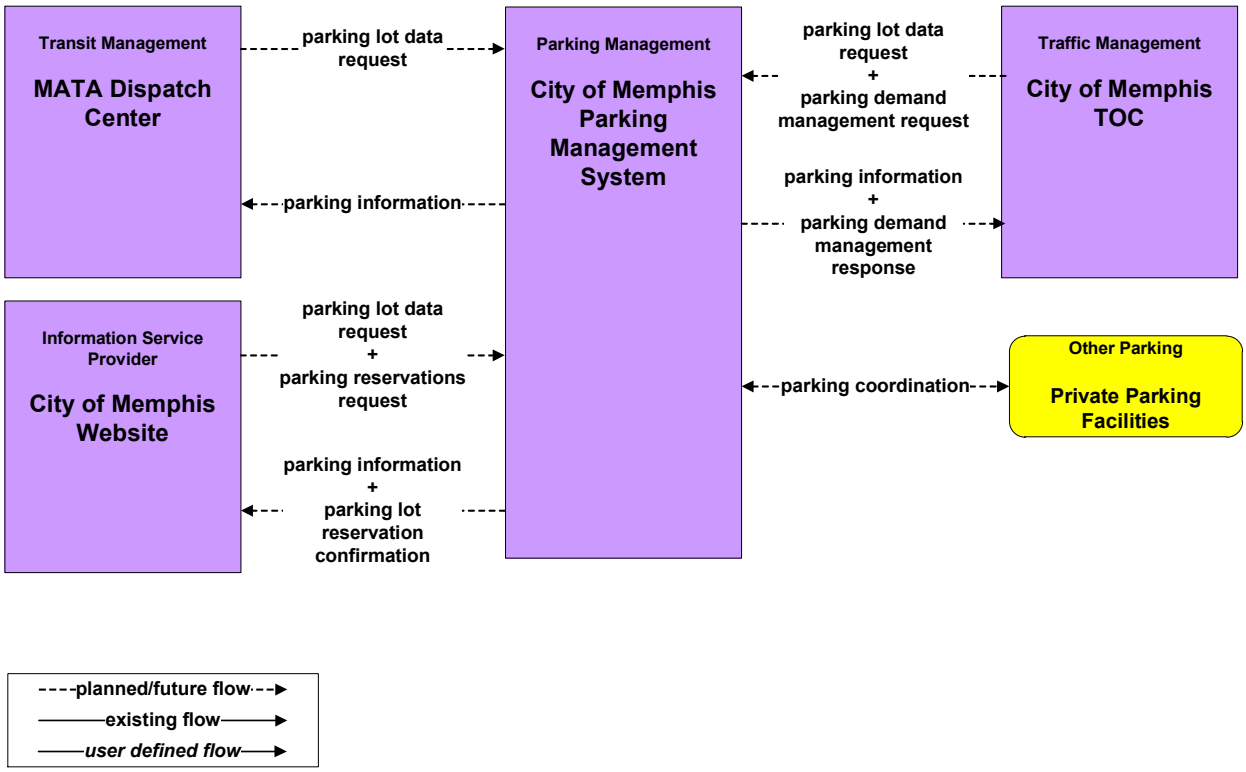
## ATMS13 – Standard Railroad Grade Crossing
## City of Olive Branch



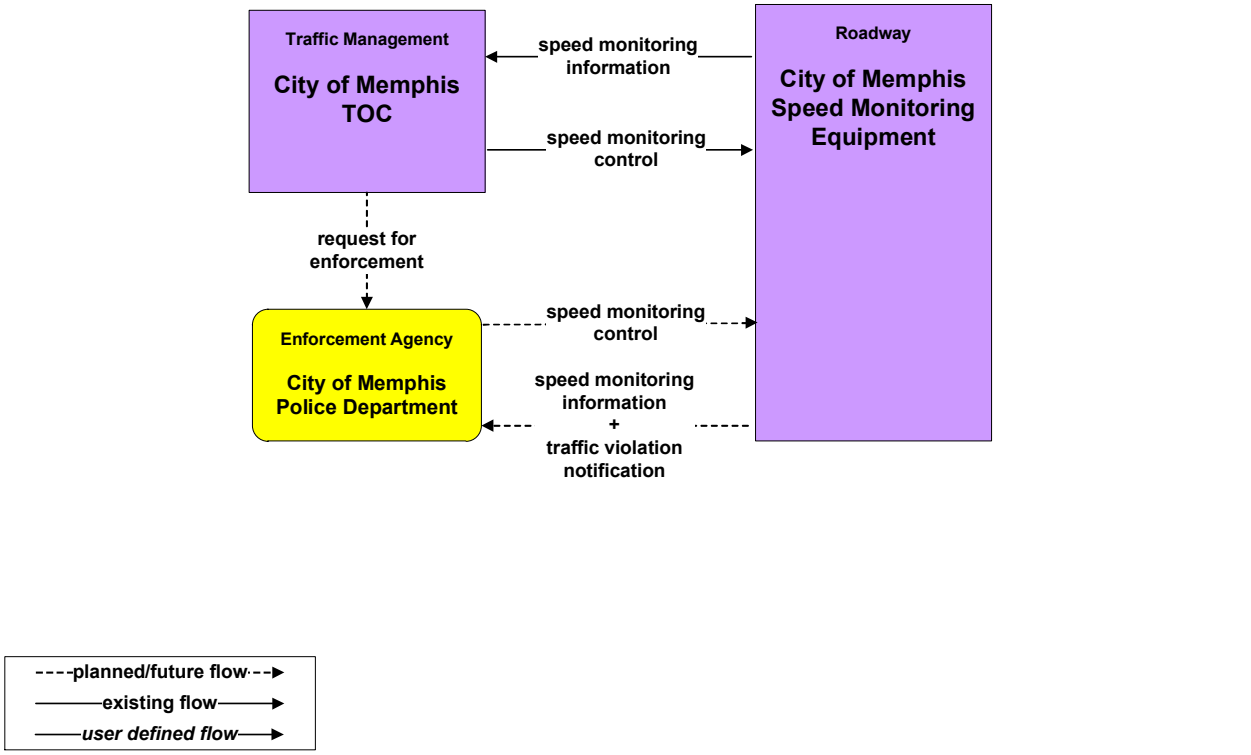

## ATMS13 – Standard Railroad Grade Crossing
## Municipal



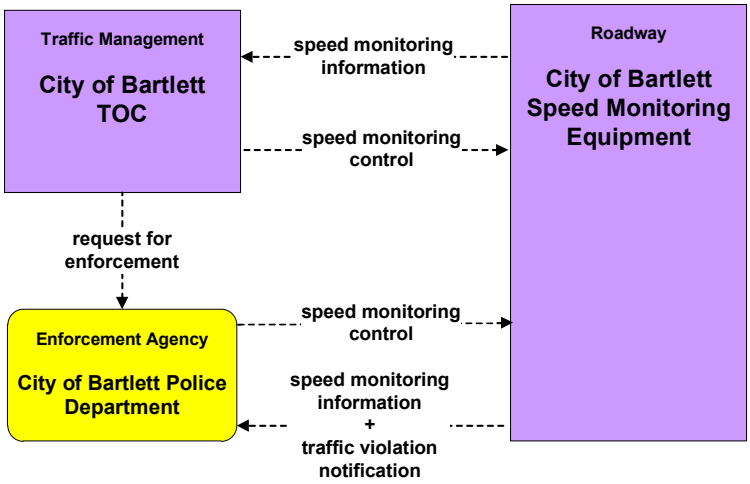
## ATMS17 – Regional Parking Management
## City of Memphis

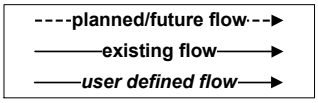



## ATMS19 – Speed Warning and Enforcement
## City of Memphis

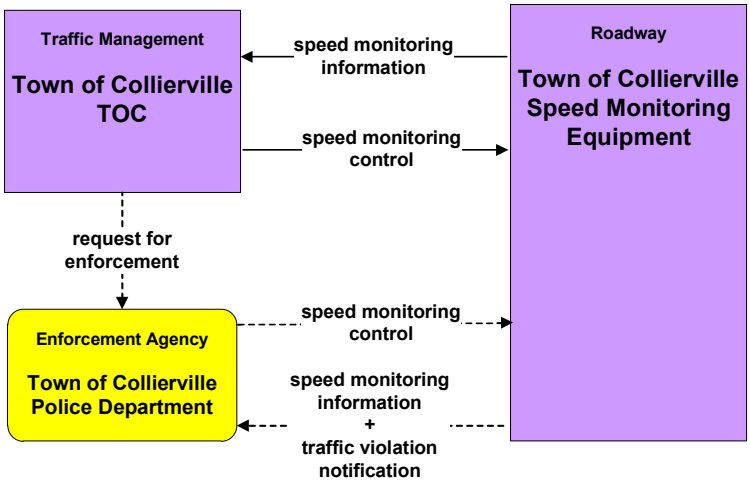


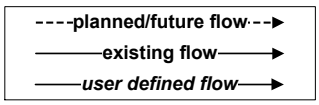
## ATMS19 – Speed Warning and Enforcement
## City of Bartlett



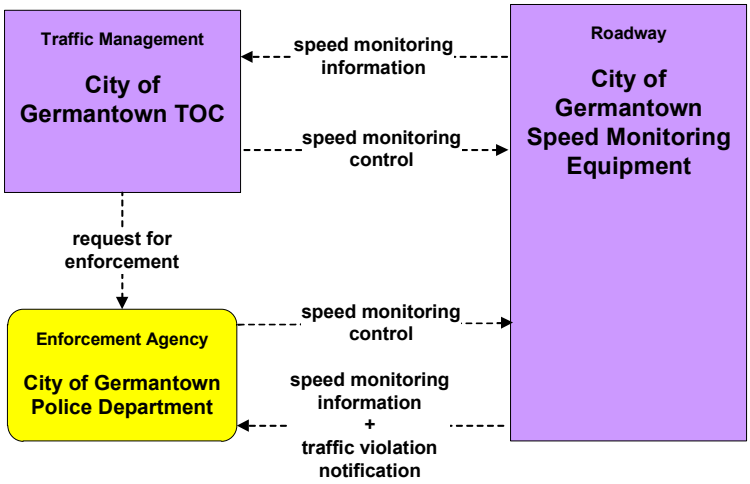



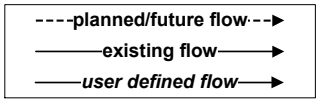

## ATMS19 – Speed Warning and Enforcement
## Town of Collierville



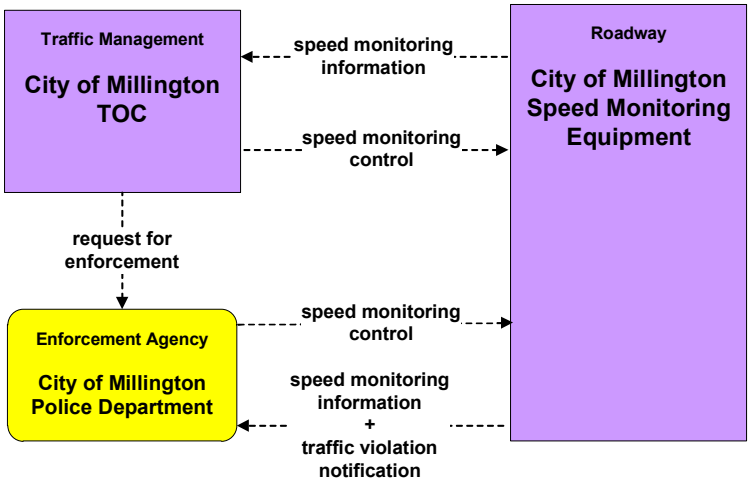



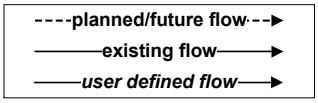
## ATMS19 – Speed Warning and Enforcement
## City of Germantown



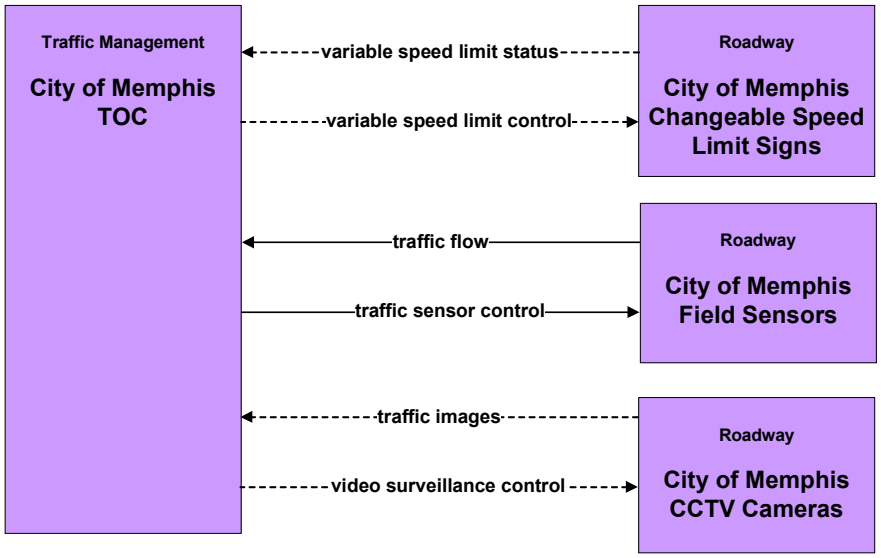



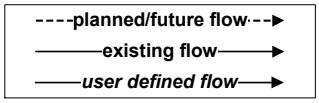

## ATMS19 – Speed Warning and Enforcement
## City of Millington



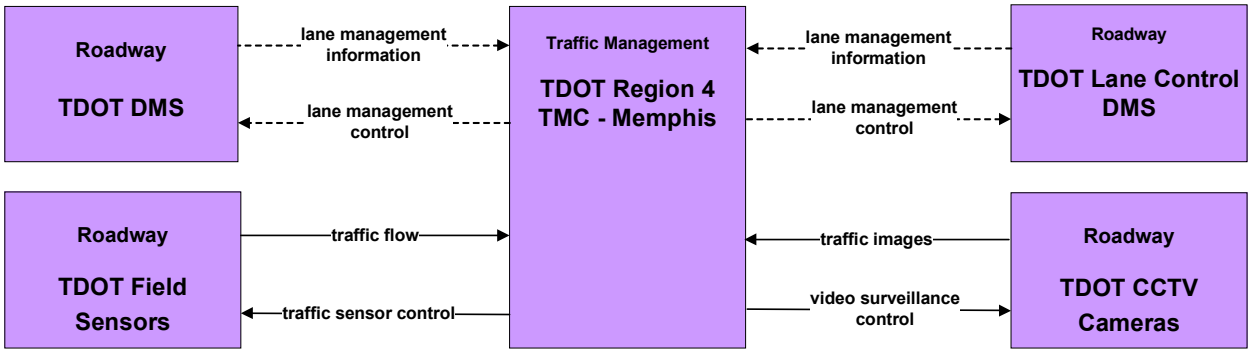



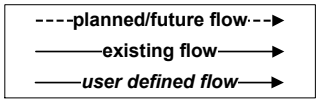
**ATMS22 – Variable Speed Limits**
**City of Memphis**



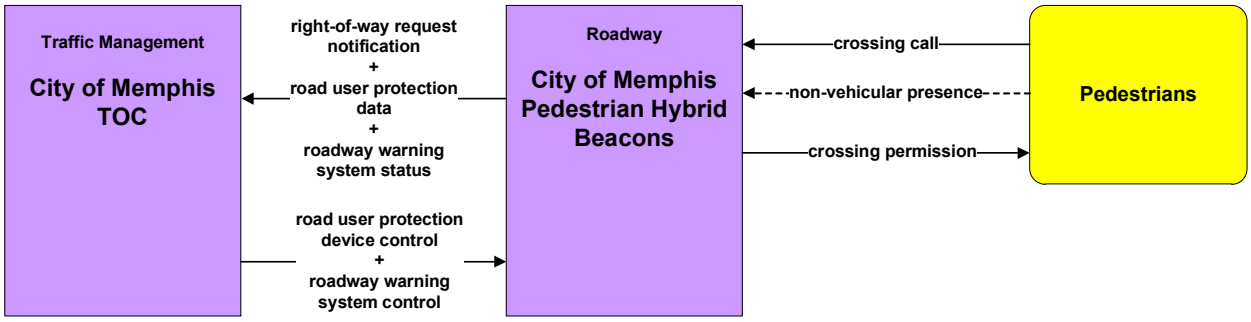



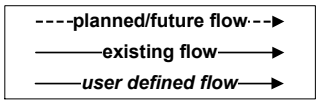

**ATMS23 – Dynamic Lane Management and Shoulder Use**
**TDOT Region 4**



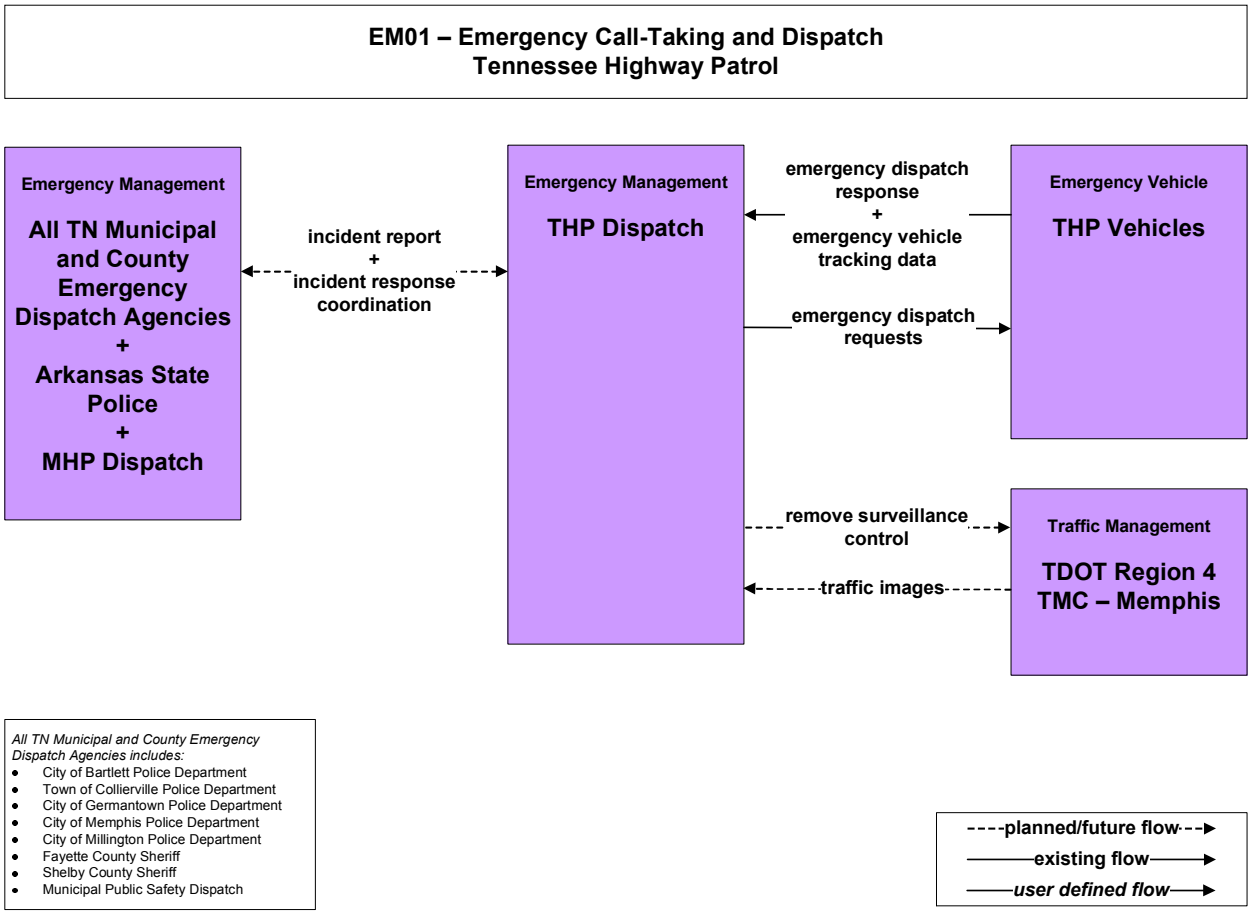



**ATMS26 – Mixed Use Warning Systems**
**City of Memphis**

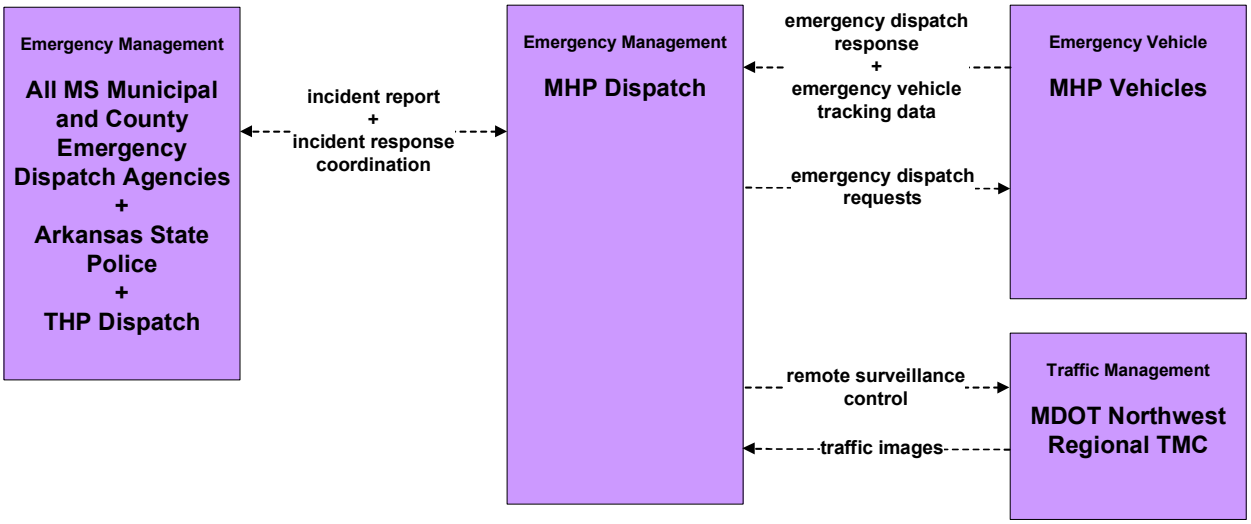


# Emergency Management

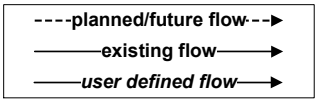


## EM01 – Emergency Call-Taking and Dispatch
## Mississippi Highway Patrol

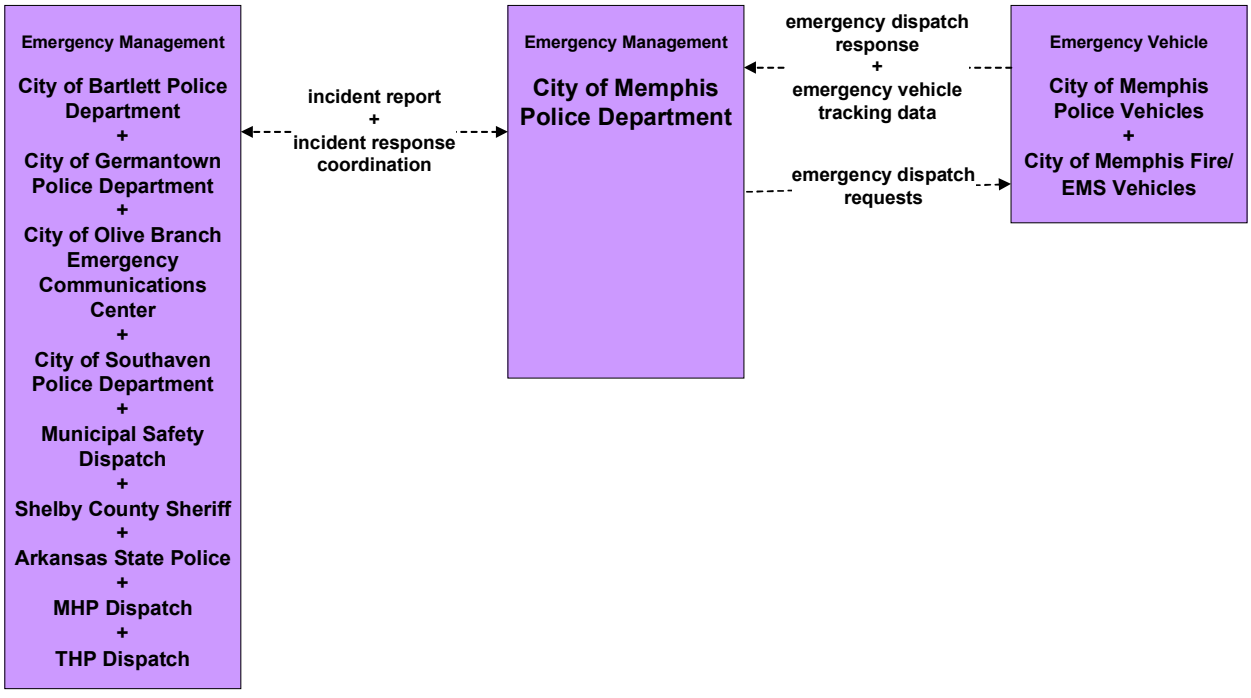


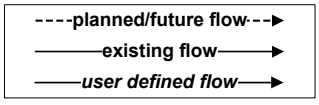

*All MS Municipal and County Emergency Dispatch Agencies includes:*

- City of Horn Lake 911 Dispatch
- City of Olive Branch Emergency Communications Center
- City of Southaven Police Department
- DeSoto County E-911
- Municipal Public Safety Dispatch

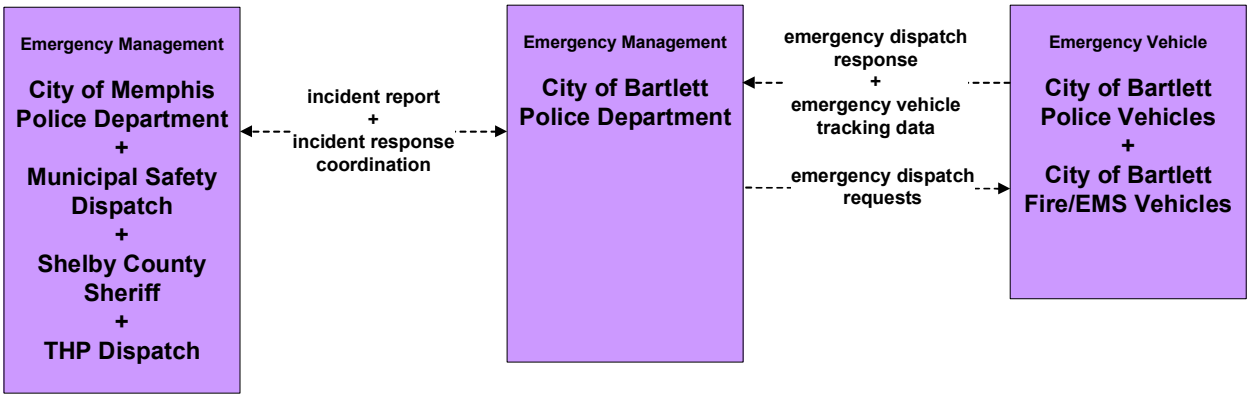


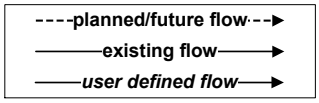

## EM01 – Emergency Call-Taking and Dispatch
## City of Memphis Police Department



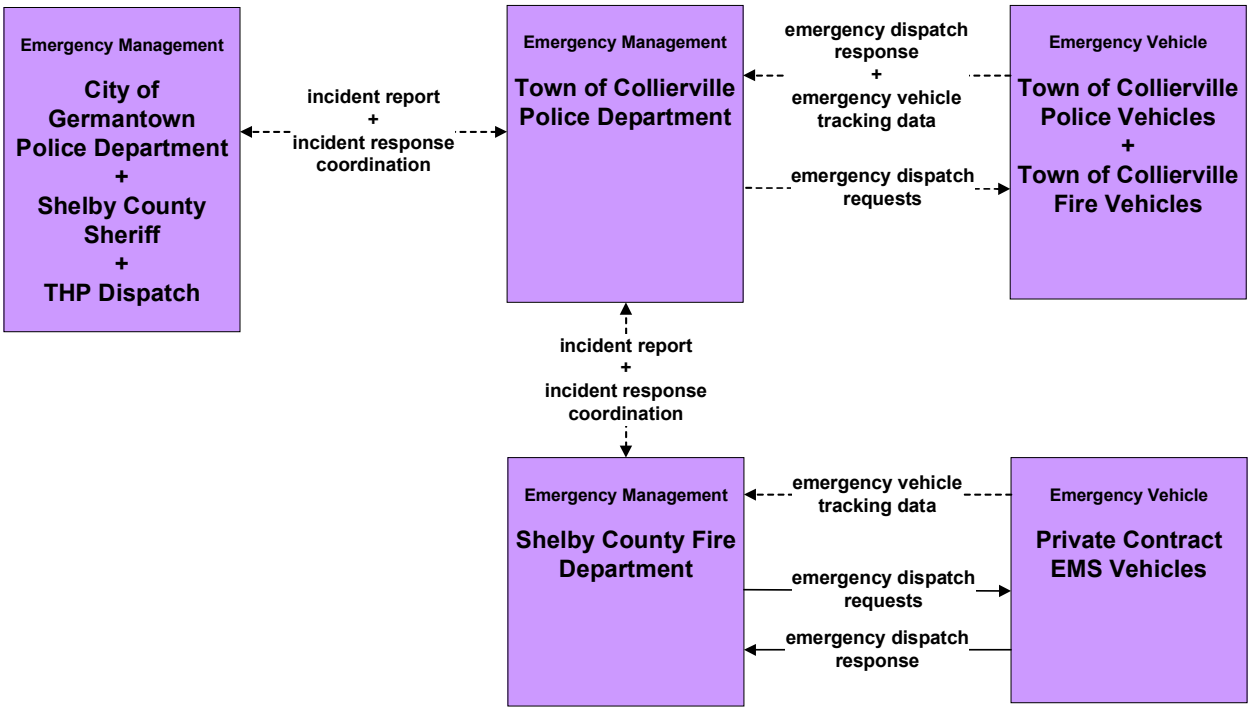



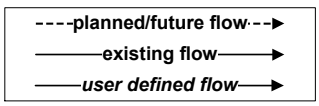
**EM01 – Emergency Call-Taking and Dispatch**
**City of Bartlett Police Department**



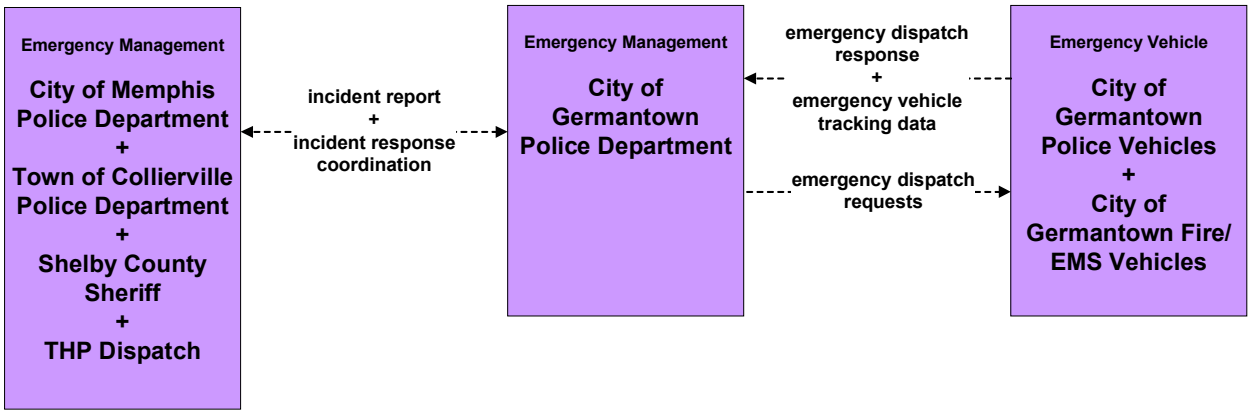



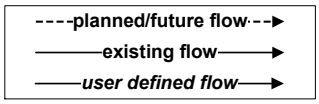

**EM01 – Emergency Call-Taking and Dispatch**
**Town of Collierville Police Department**



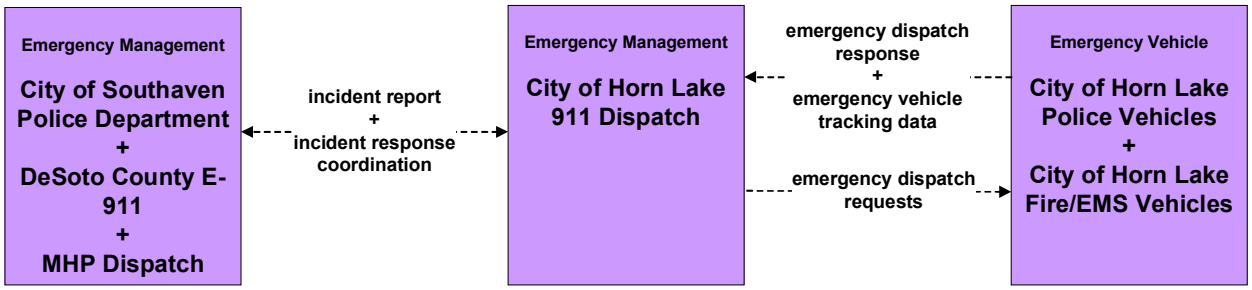



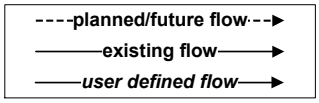
**EM01 – Emergency Call-Taking and Dispatch**
**City of Germantown Police Department**



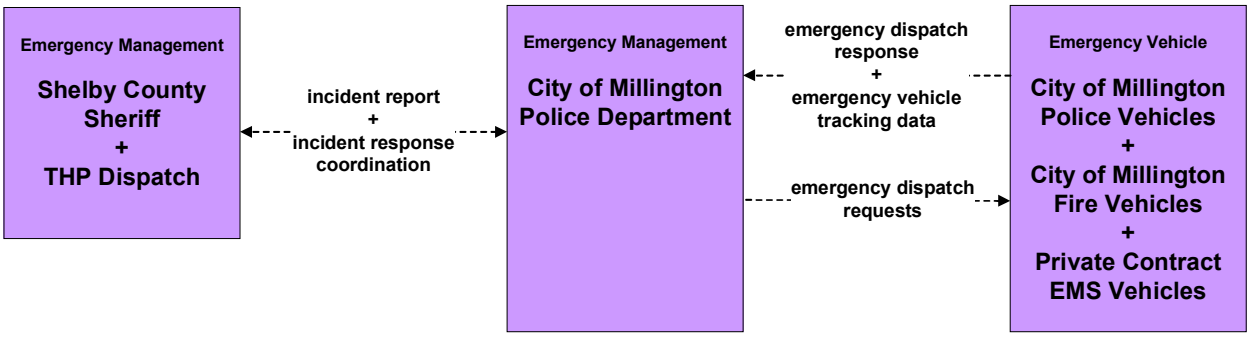



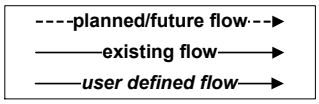

**EM01 – Emergency Call-Taking and Dispatch**
**City of Horn Lake 911 Dispatch**



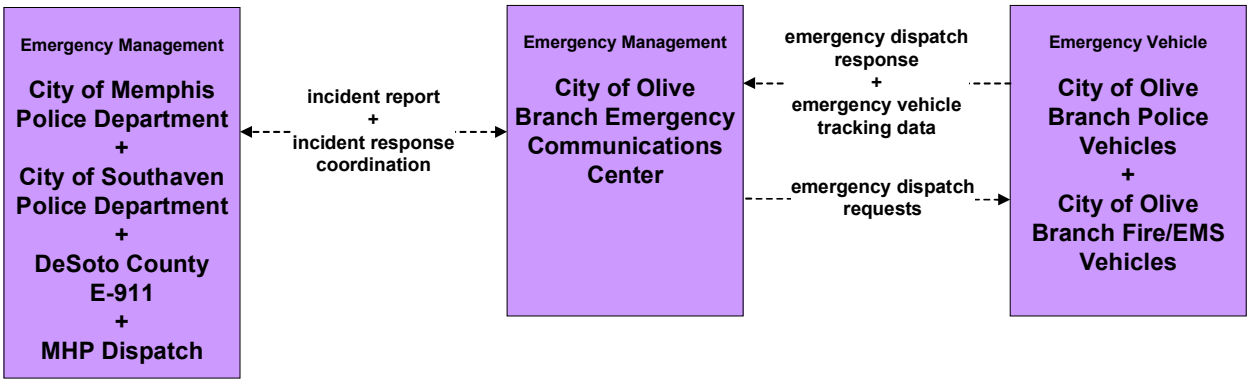



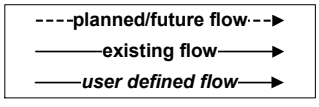
**EM01 – Emergency Call-Taking and Dispatch**
**City of Millington Police Department**



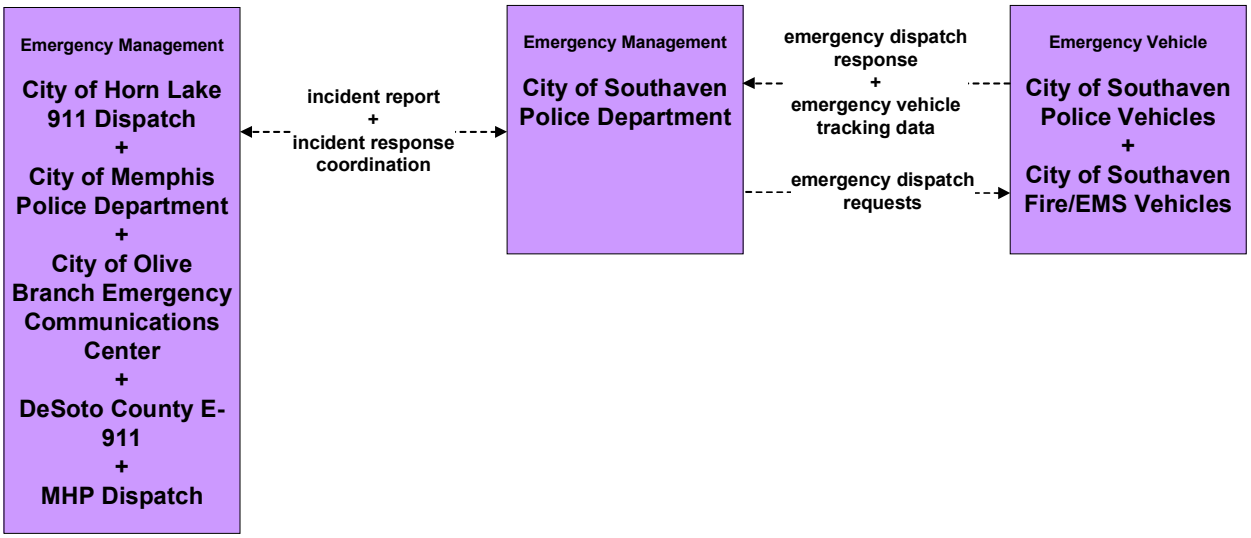



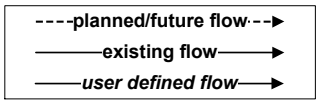

**EM01 – Emergency Call-Taking and Dispatch**
**City of Olive Branch Emergency Communications Center**



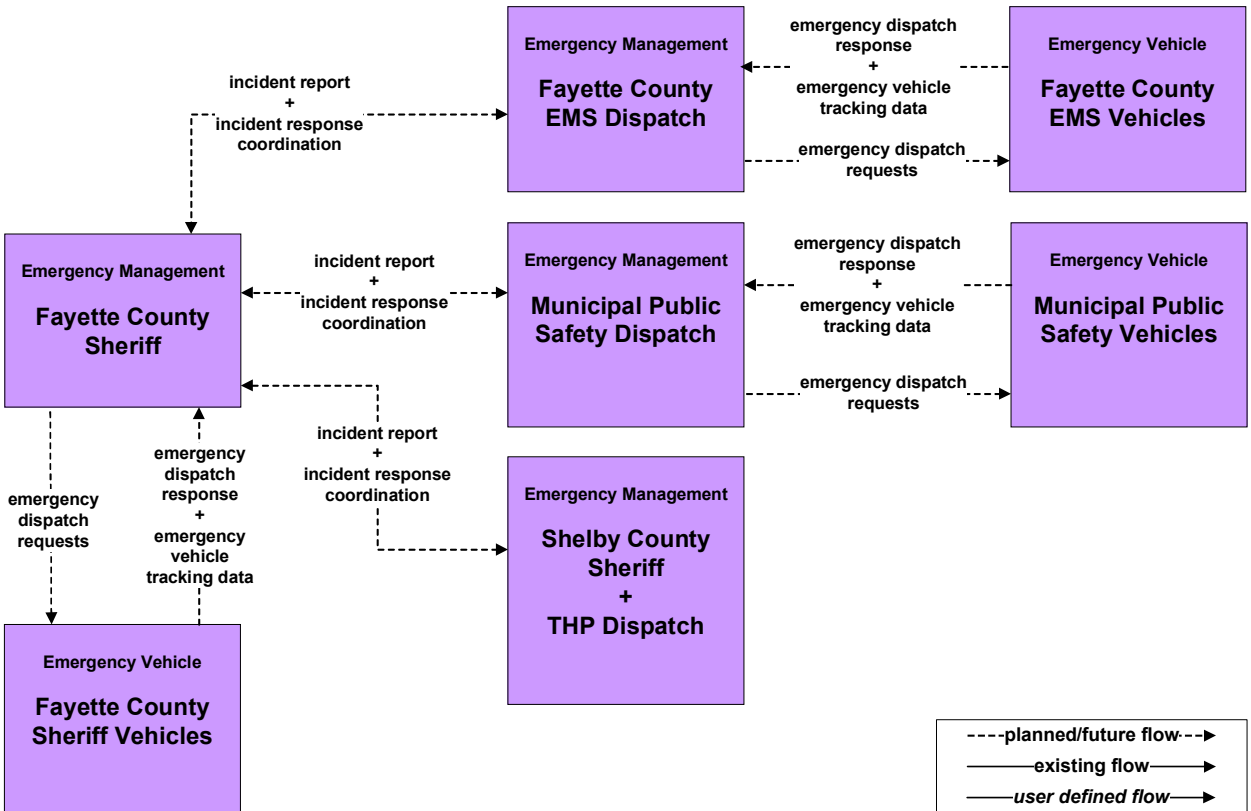



## EM01 – Emergency Call-Taking and Dispatch
## City of Southaven Police Department

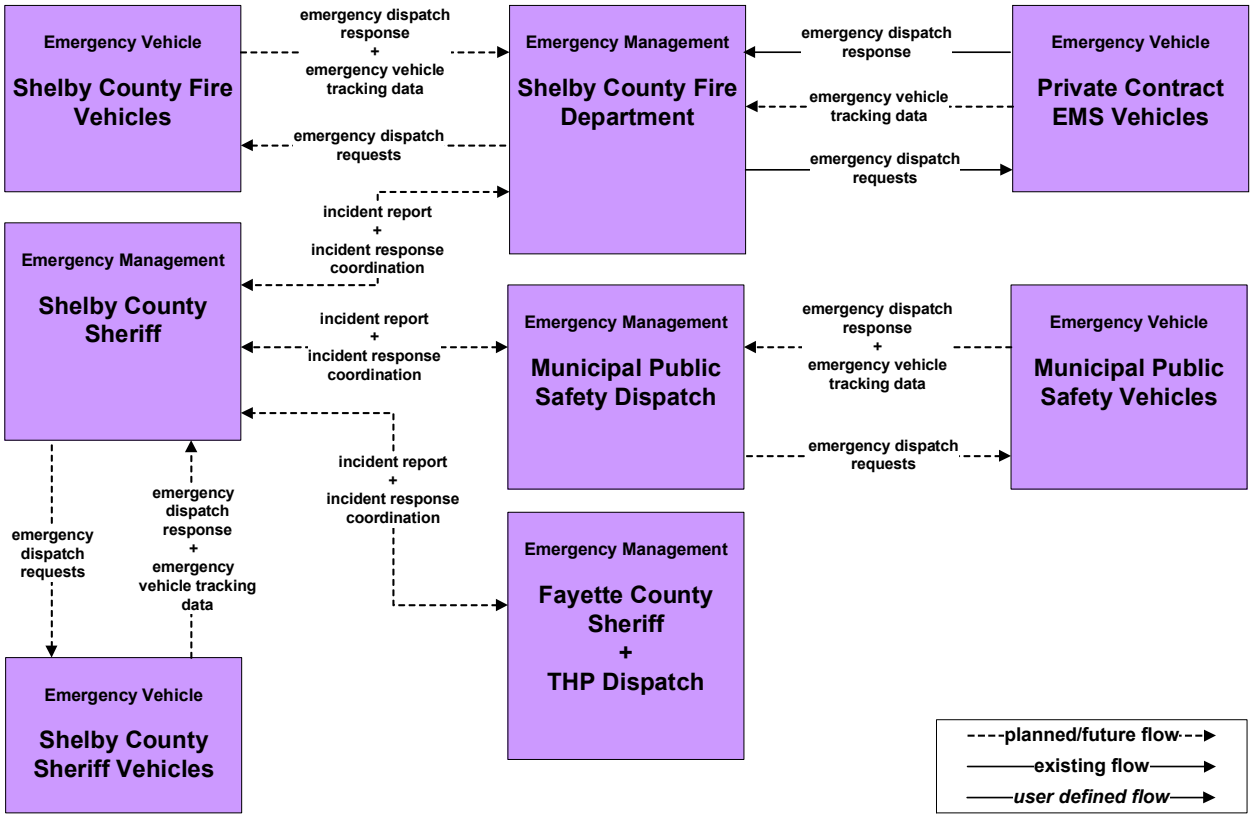


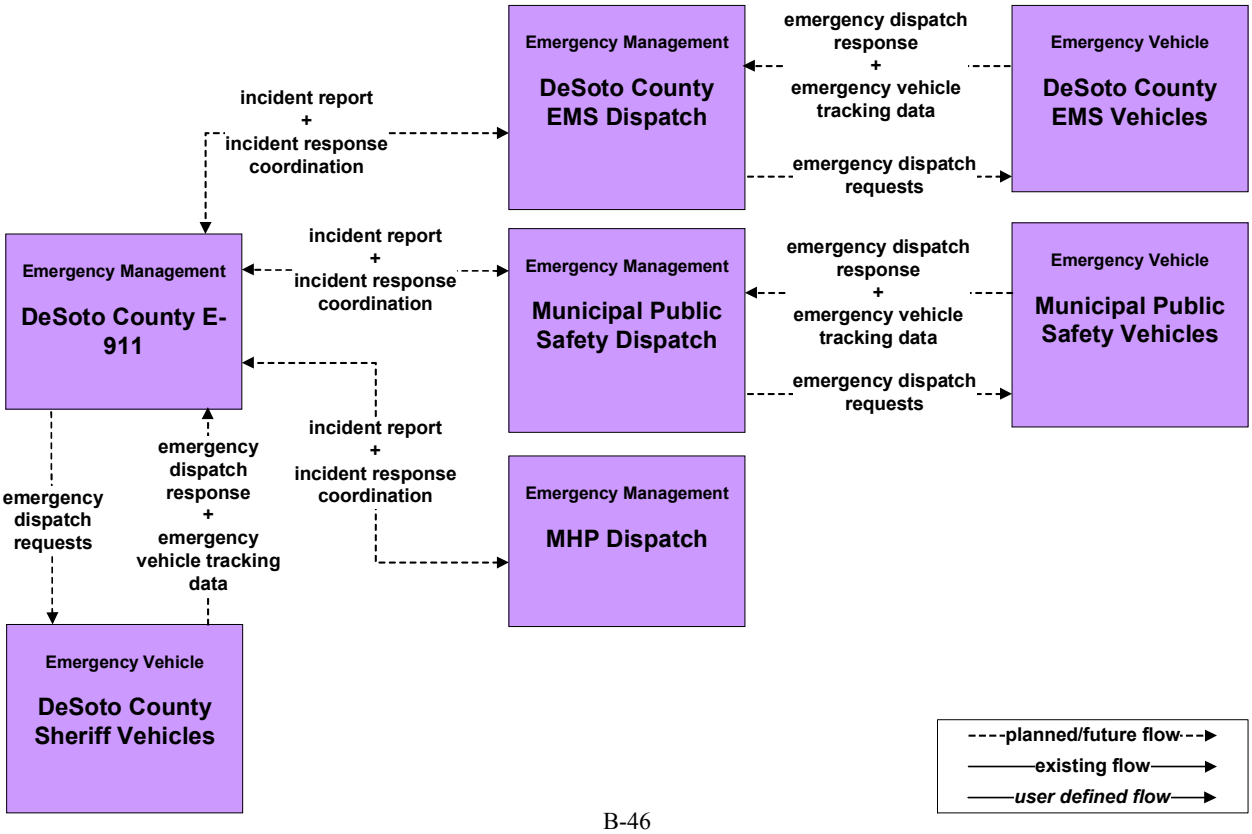

## EM01 - Emergency Call-Taking and Dispatch
## Fayette County Sheriff



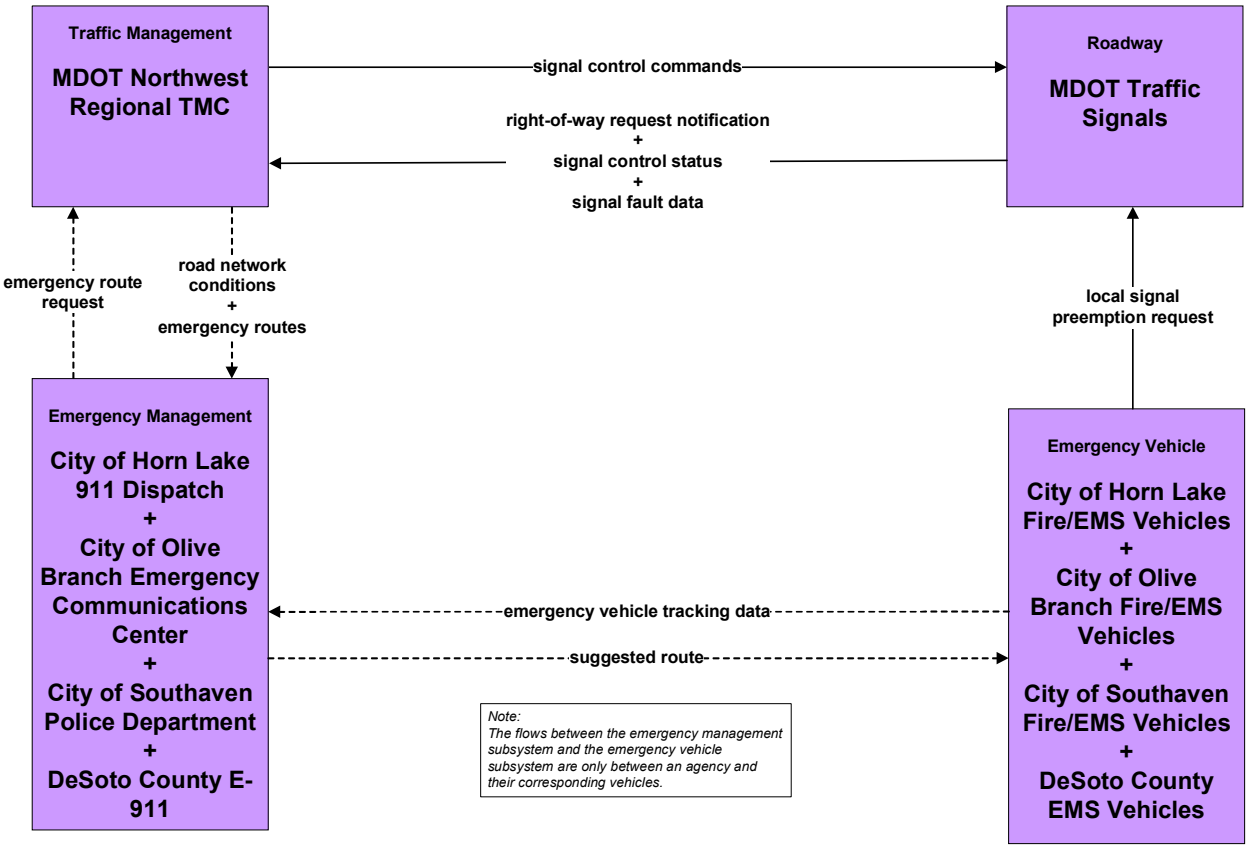
## EM01 - Emergency Call-Taking and Dispatch
## Shelby County Sheriff



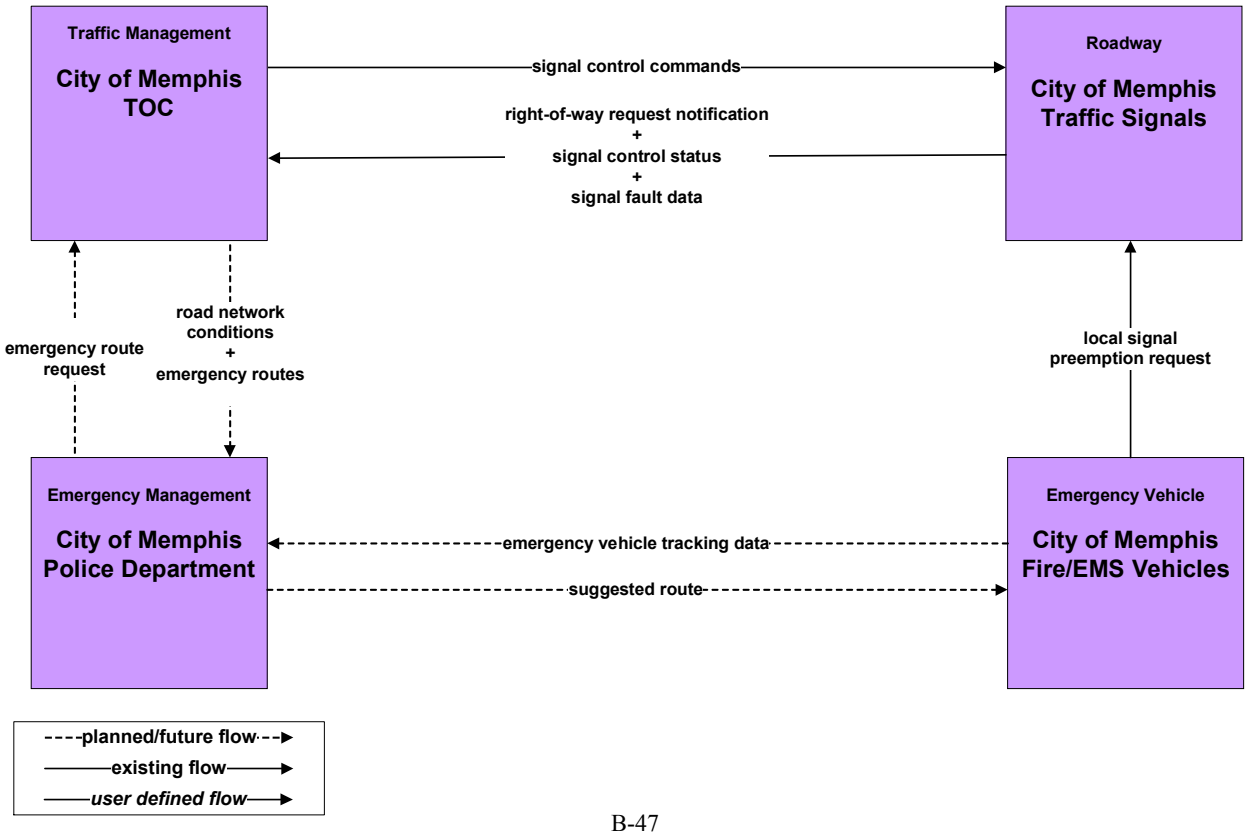

## EM01 - Emergency Call-Taking and Dispatch
## DeSoto County E-911

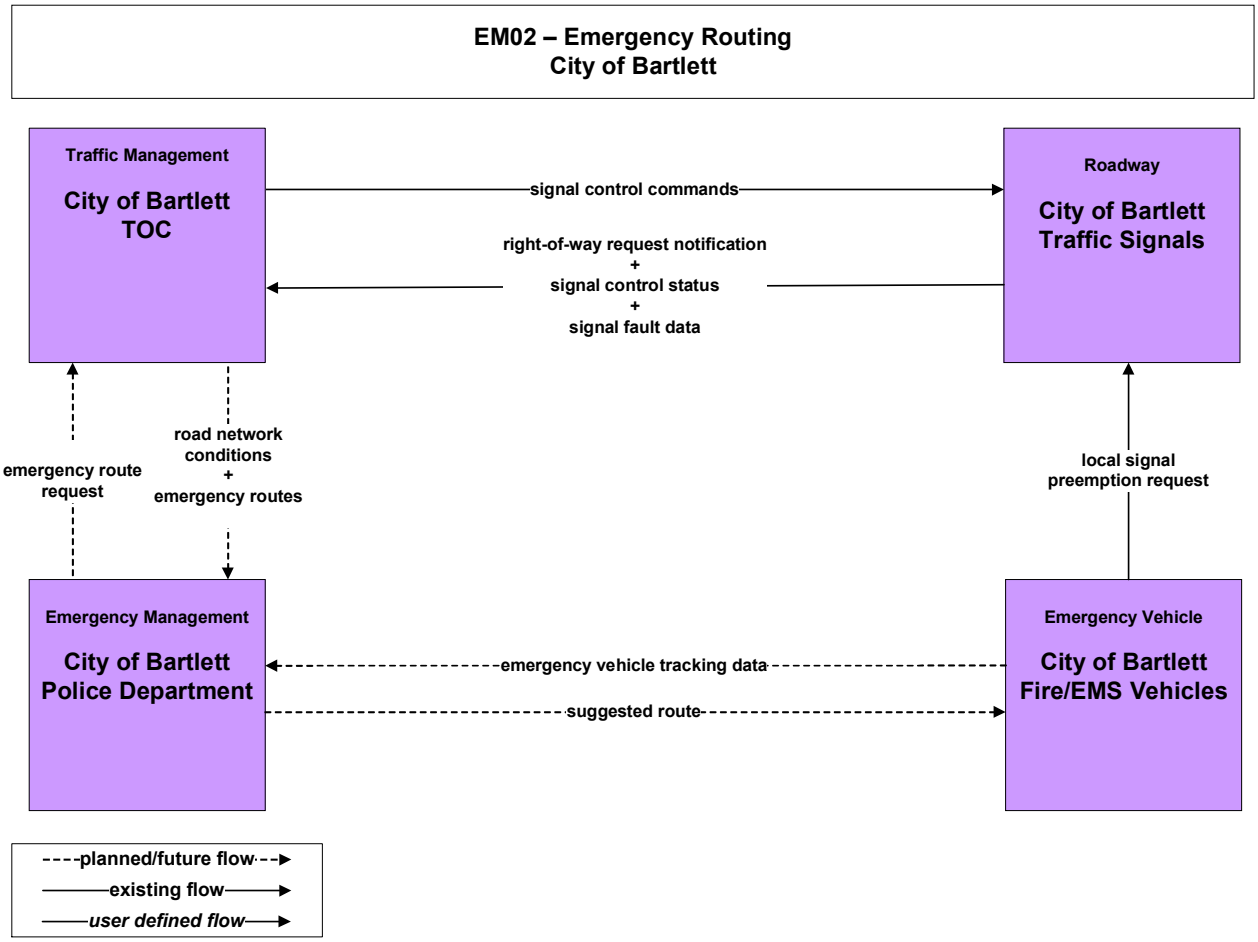


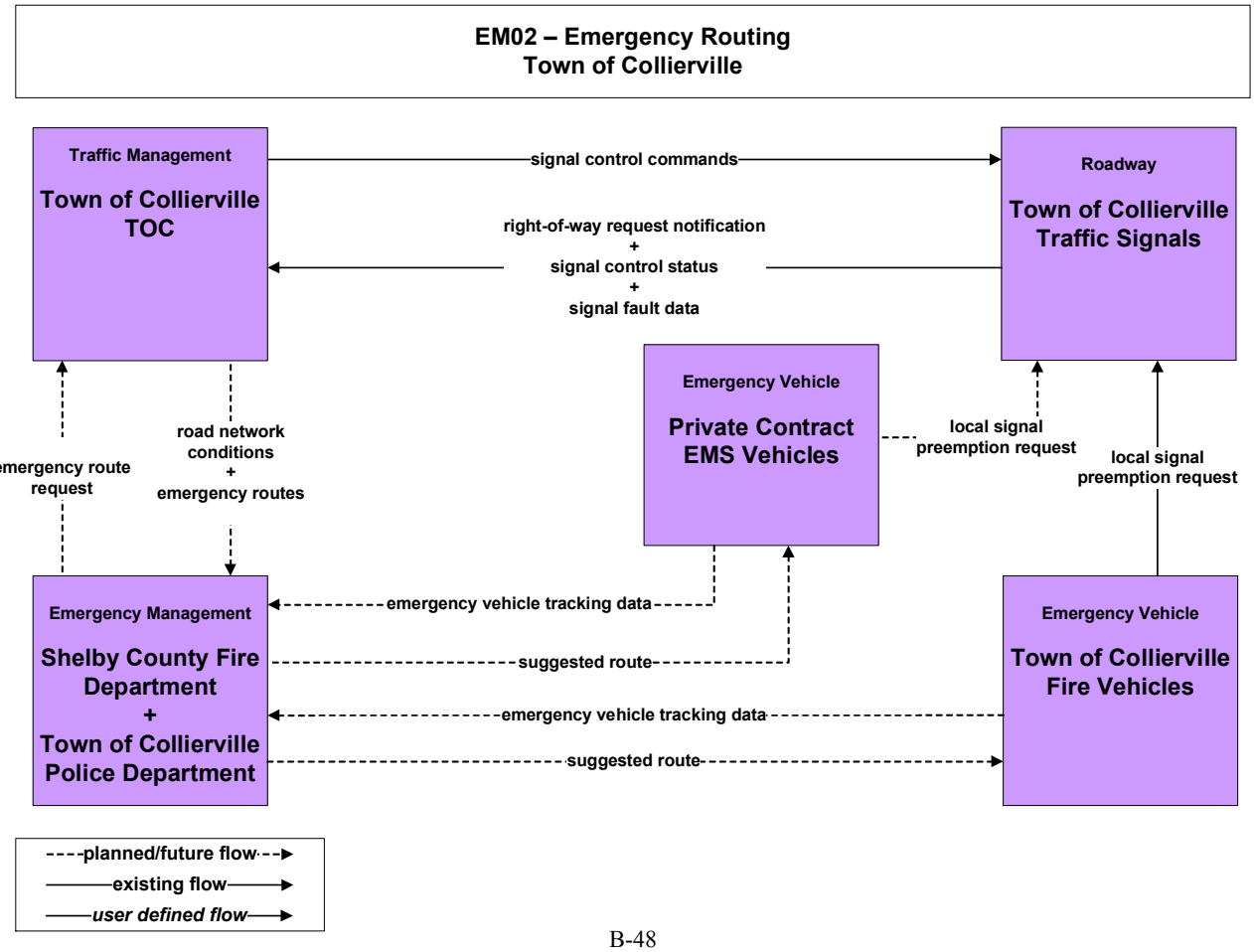
## EM02 – Emergency Routing
## MDOT



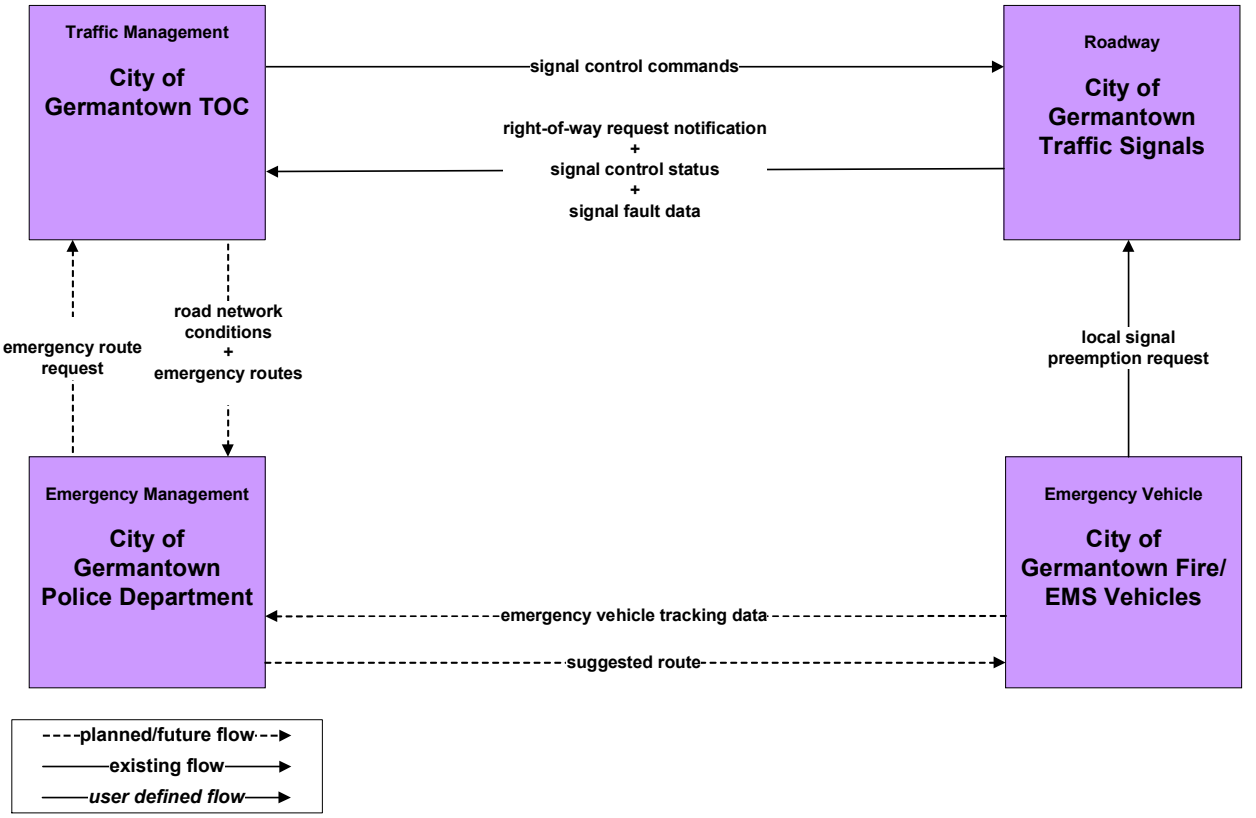

## EM02 – Emergency Routing
## City of Memphis



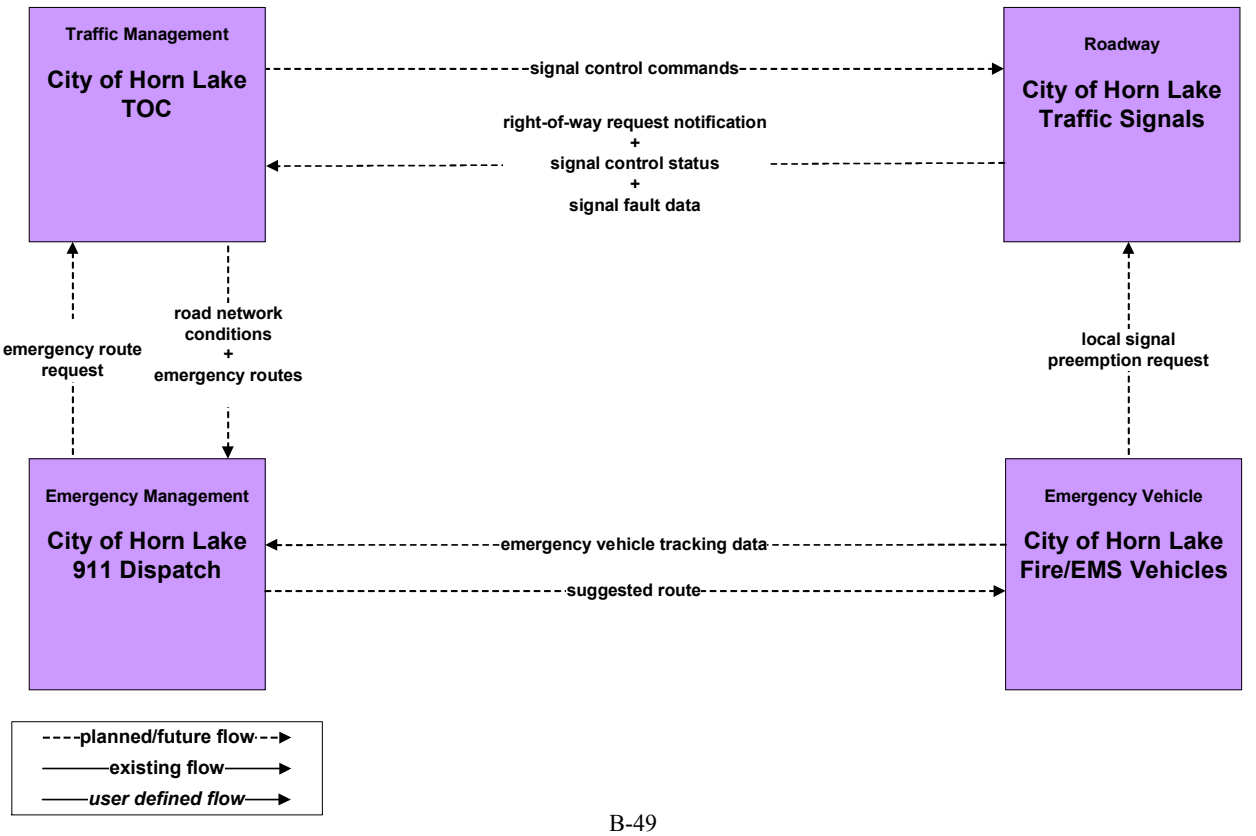

EM02 – Emergency Routing
City of Bartlett
Traffic Management
City of Bartlett TOC
signal control commands
right-of-way request notification
+
signal control status
+
signal fault data
Roadway
City of Bartlett Traffic Signals
emergency route request
road network conditions
+
emergency routes
local signal preemption request
Emergency Management
City of Bartlett Police Department
emergency vehicle tracking data
suggested route
Emergency Vehicle
City of Bartlett Fire/EMS Vehicles
planned/future flow
existing flow
user defined flow

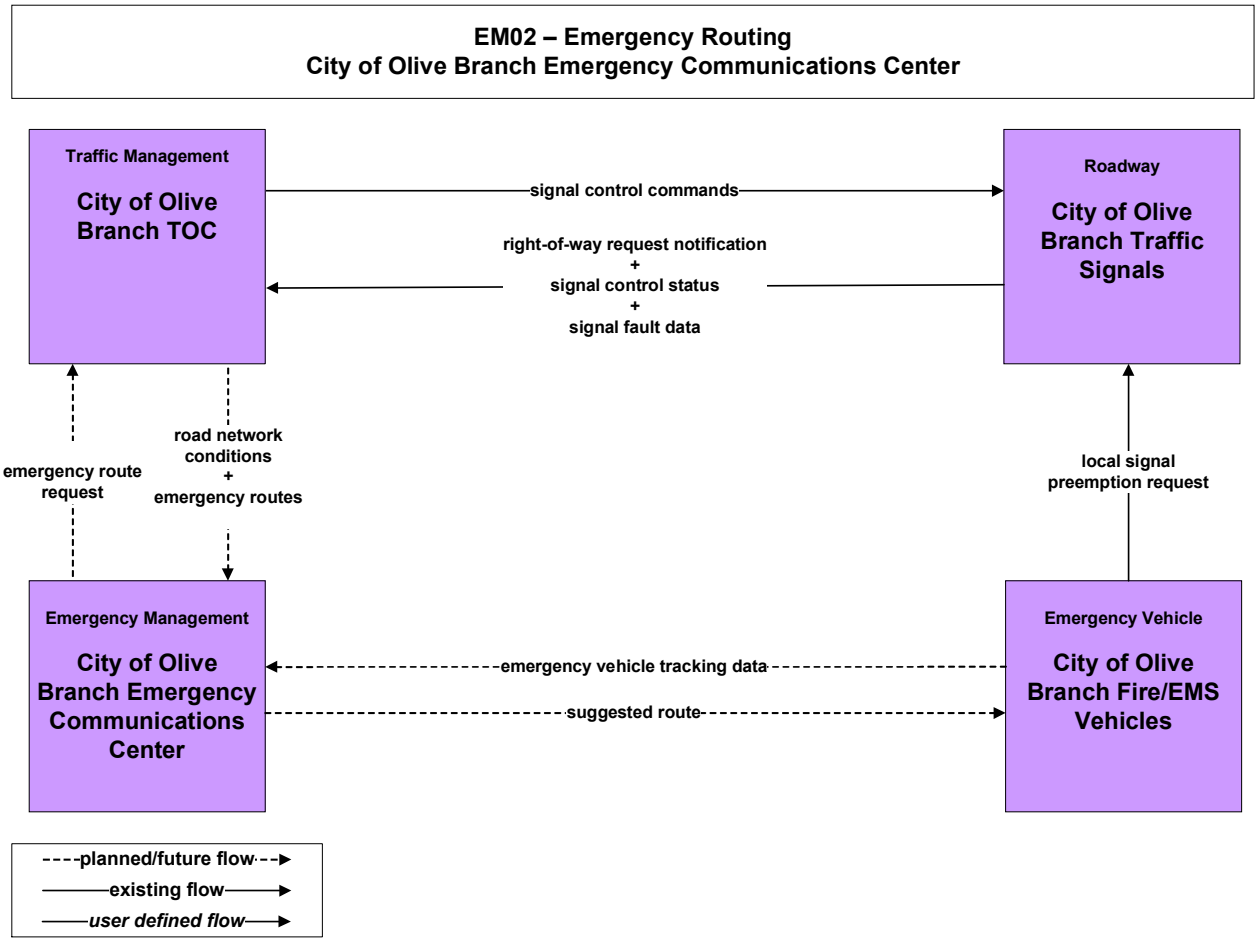

EM02 – Emergency Routing
Town of Collierville
Traffic Management
Town of Collierville TOC
signal control commands
right-of-way request notification
+
signal control status
+
signal fault data
Roadway
Town of Collierville Traffic Signals
Emergency Vehicle
Private Contract EMS Vehicles
local signal preemption request
local signal preemption request
emergency route request
road network conditions
+
emergency routes
Emergency Management
Shelby County Fire Department
+
Town of Collierville Police Department
emergency vehicle tracking data
suggested route
emergency vehicle tracking data
suggested route
Emergency Vehicle
Town of Collierville Fire Vehicles
planned/future flow
existing flow
user defined flow

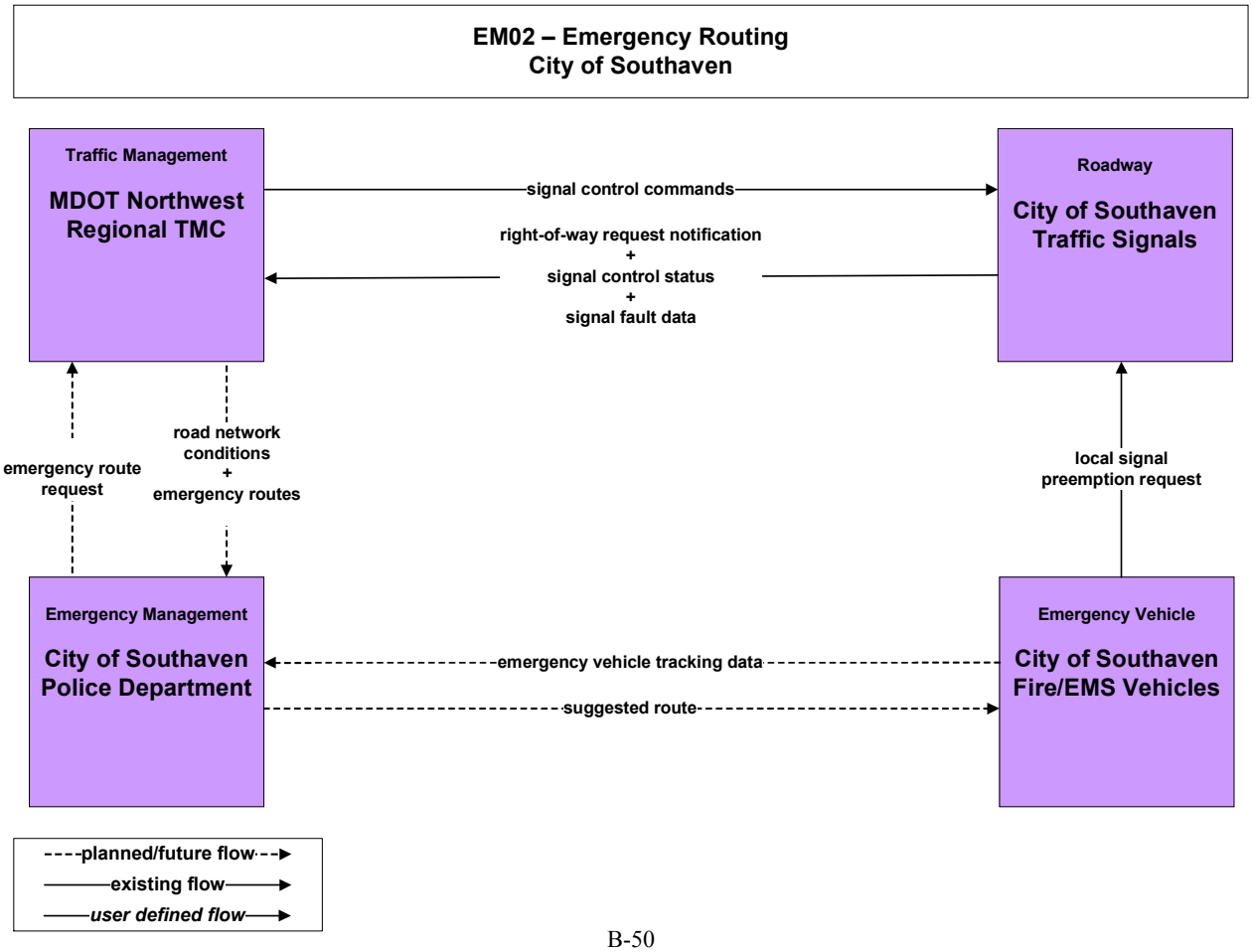
## EM02 – Emergency Routing
## City of Germantown



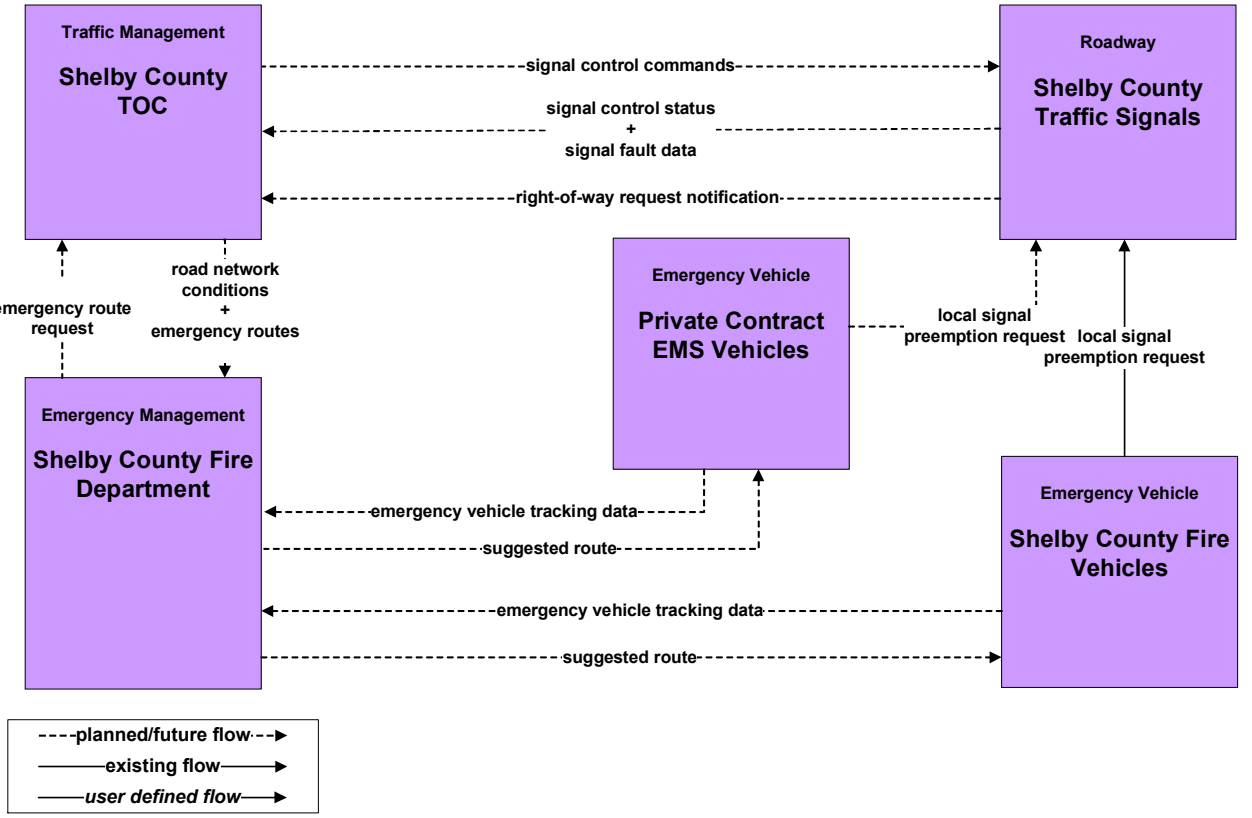

## EM02 – Emergency Routing
## City of Horn Lake



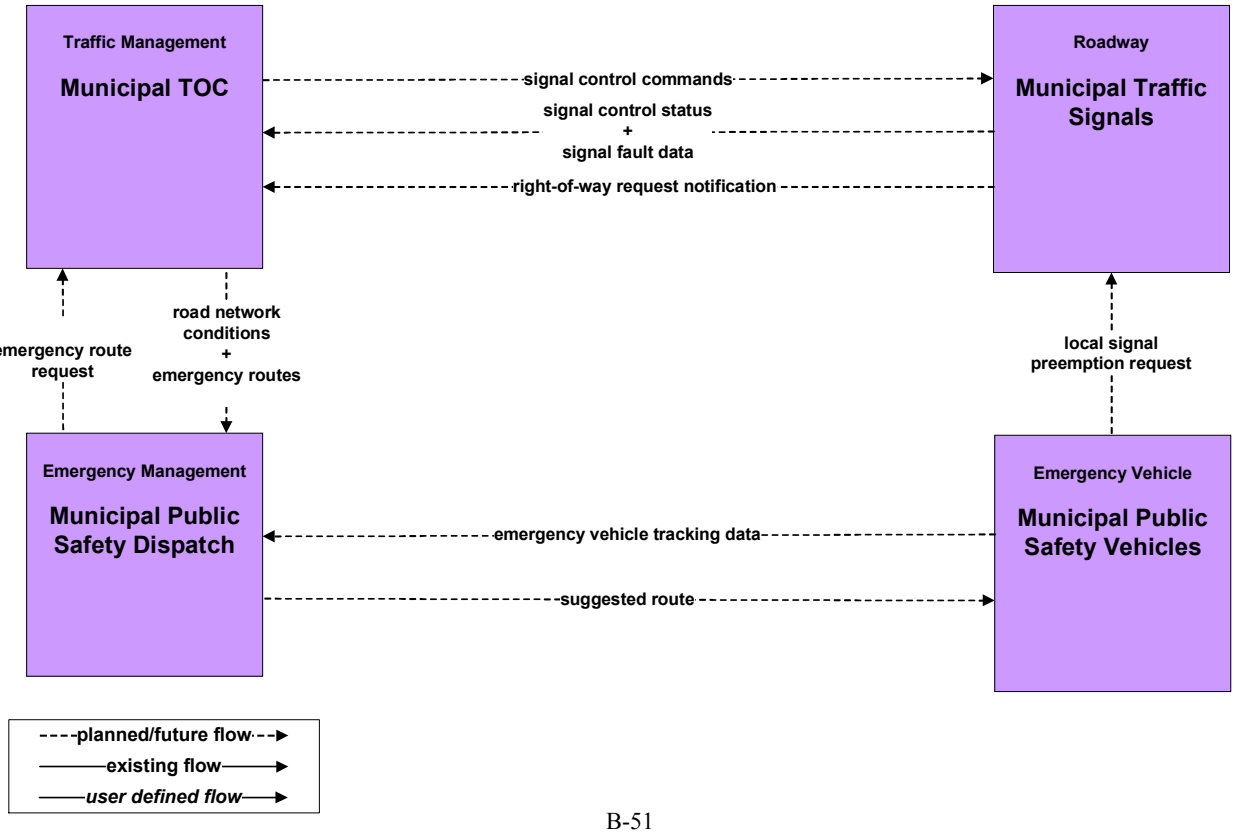

EM02 – Emergency Routing
City of Olive Branch Emergency Communications Center
Traffic Management
City of Olive Branch TOC
Roadway
City of Olive Branch Traffic Signals
signal control commands
right-of-way request notification
+
signal control status
+
signal fault data
emergency route request
road network conditions
+
emergency routes
local signal preemption request
Emergency Management
City of Olive Branch Emergency Communications Center
Emergency Vehicle
City of Olive Branch Fire/EMS Vehicles
emergency vehicle tracking data
suggested route
planned/future flow
existing flow
user defined flow


EM02 – Emergency Routing
City of Southaven
Traffic Management
MDOT Northwest Regional TMC
Roadway
City of Southaven Traffic Signals
signal control commands
right-of-way request notification
+
signal control status
+
signal fault data
emergency route request
road network conditions
+
emergency routes
local signal preemption request
Emergency Management
City of Southaven Police Department
Emergency Vehicle
City of Southaven Fire/EMS Vehicles
emergency vehicle tracking data
suggested route
planned/future flow
existing flow
user defined flow

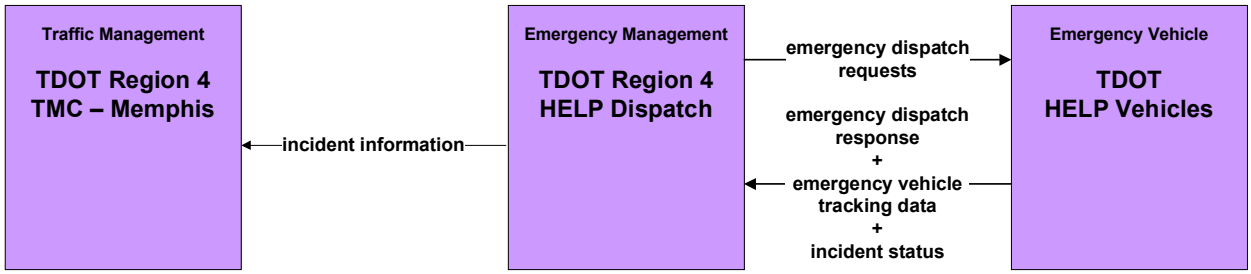
## EM02 – Emergency Routing
## Shelby County

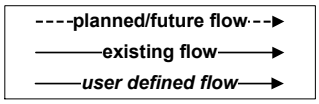



## EM02 – Emergency Routing
## Municipal

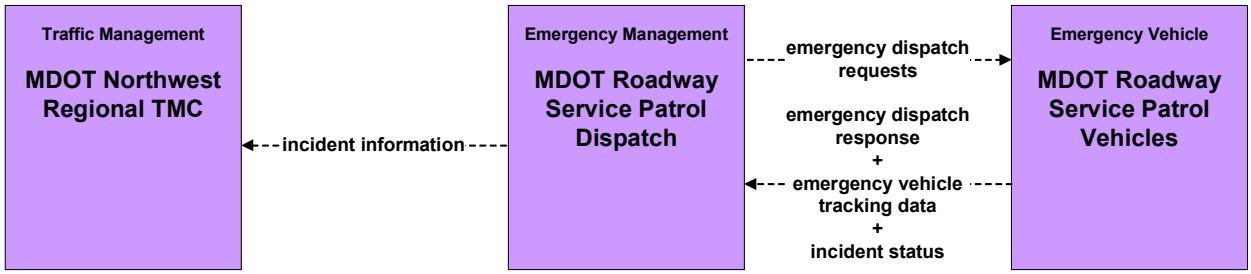


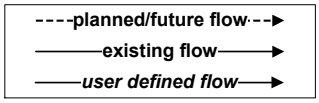
**EM04 – Roadway Service Patrols**
**HELP**



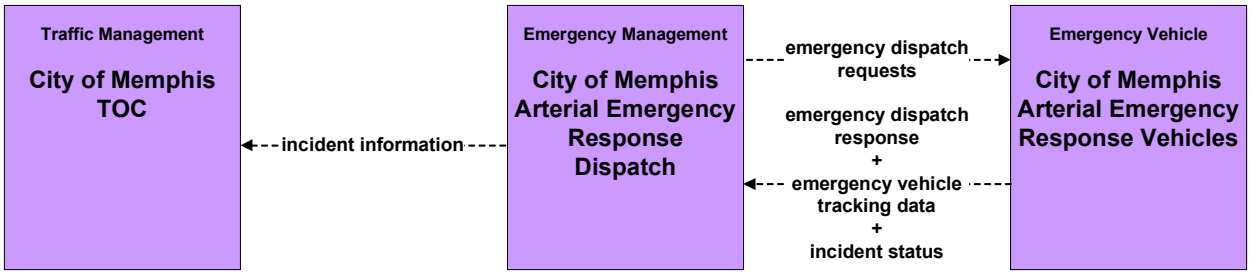



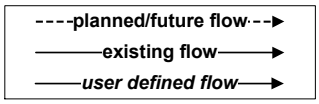

**EM04 – Roadway Service Patrols**
**MDOT**



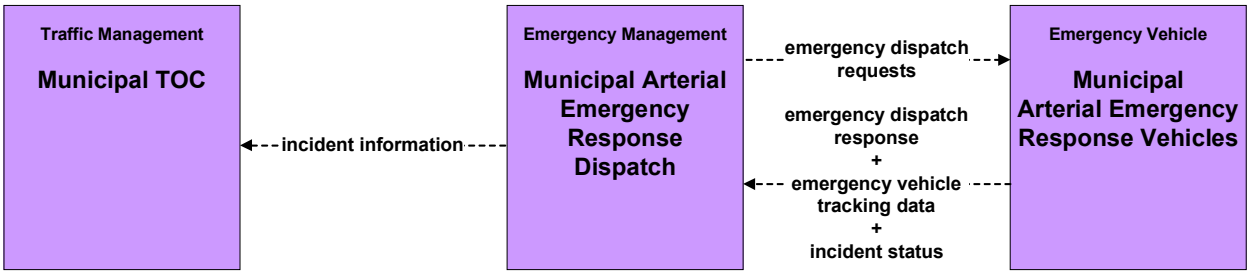



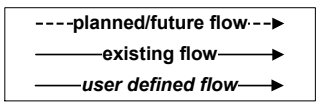
**EM04 – Roadway Service Patrols**
**City of Memphis Arterial Emergency Response Team**



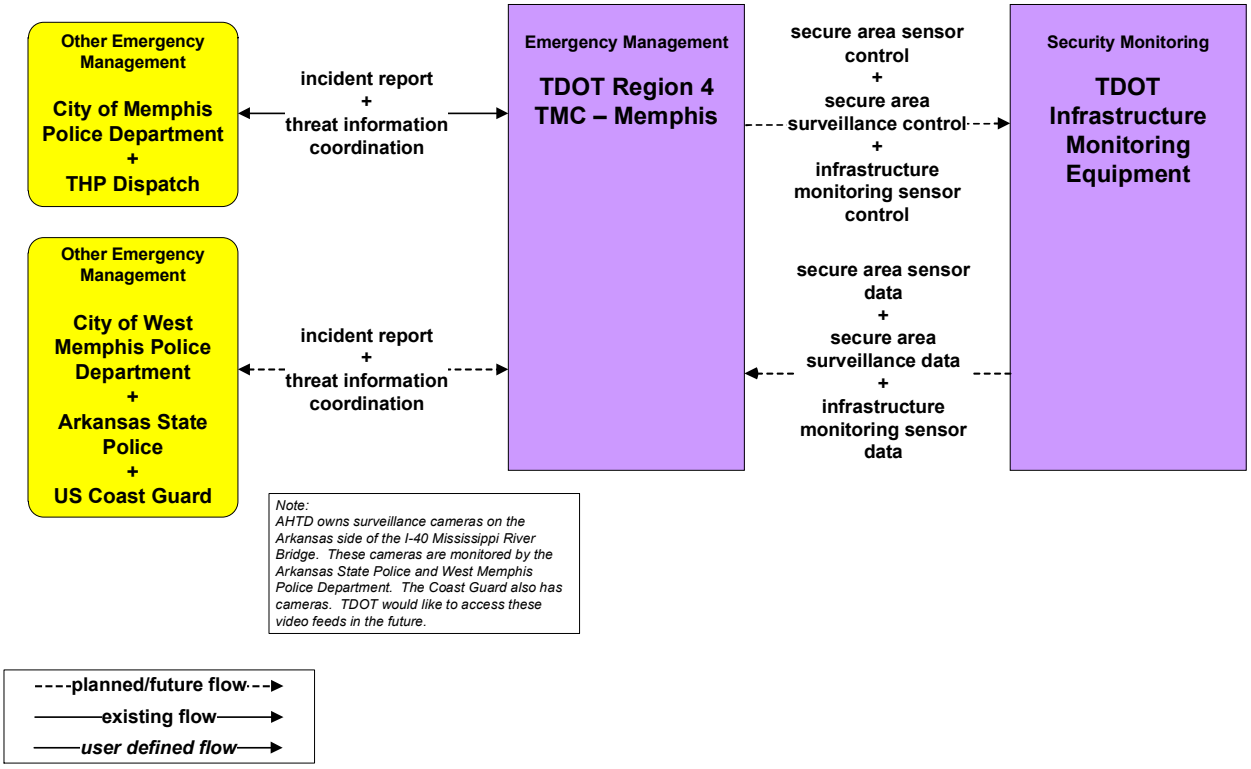




**EM04 – Roadway Service Patrols**
**Municipal Arterial Emergency Response Team**

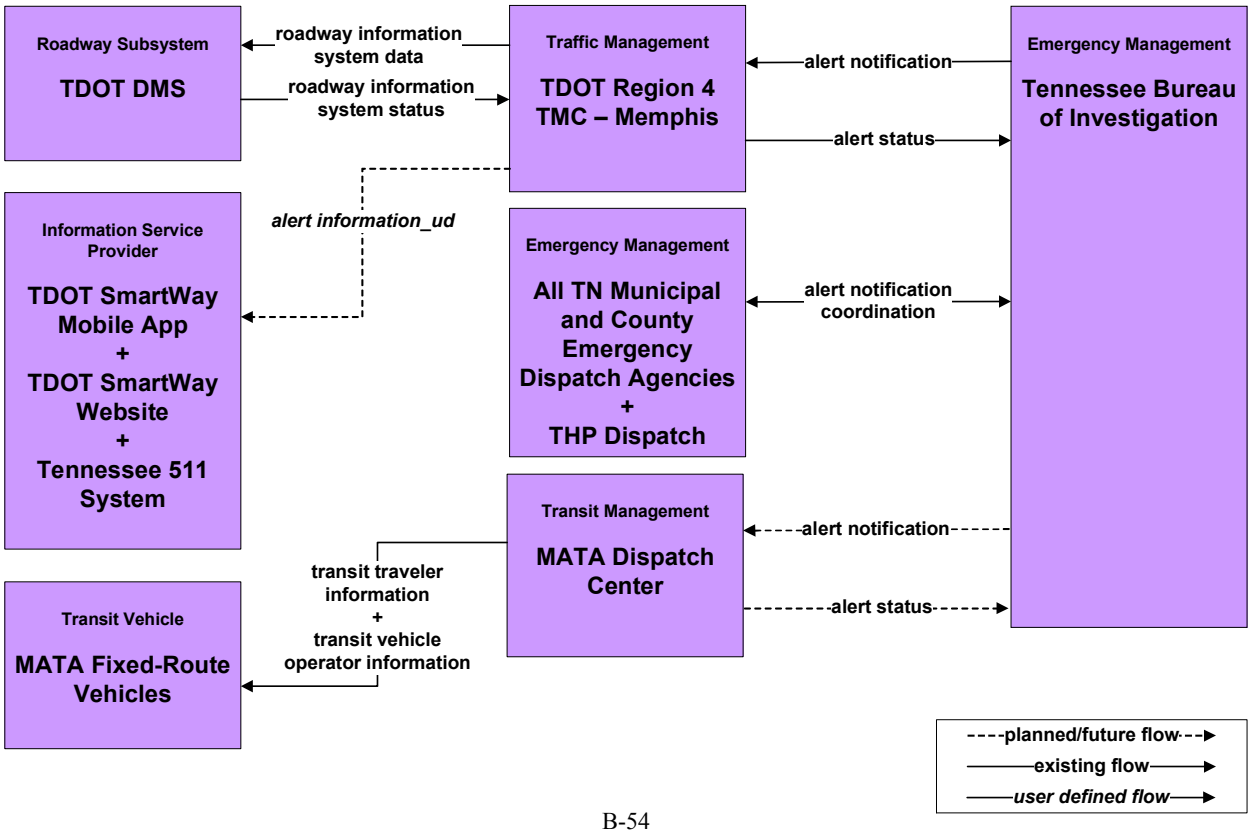


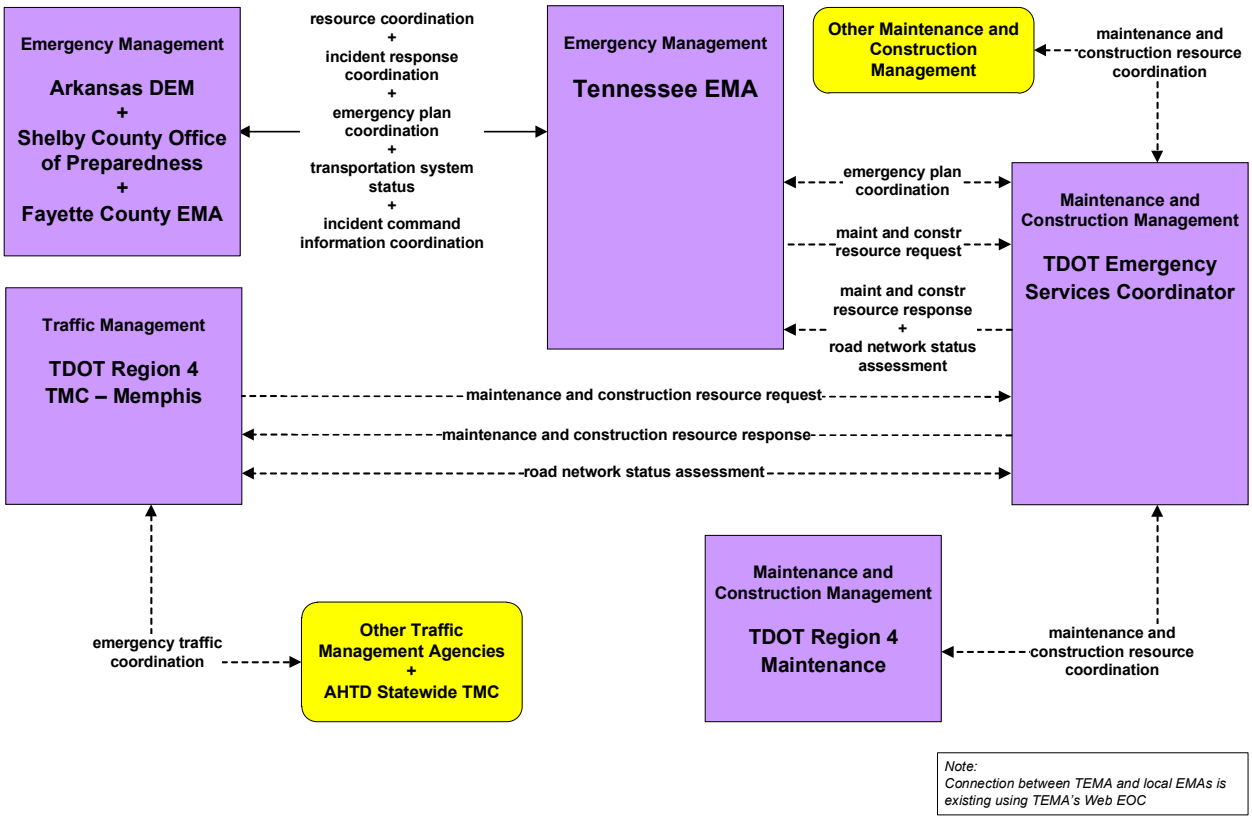
## EM05 – Transportation Infrastructure Protection
## TDOT




## EM06 – Wide-Area Alert
## Tennessee AMBER Alert

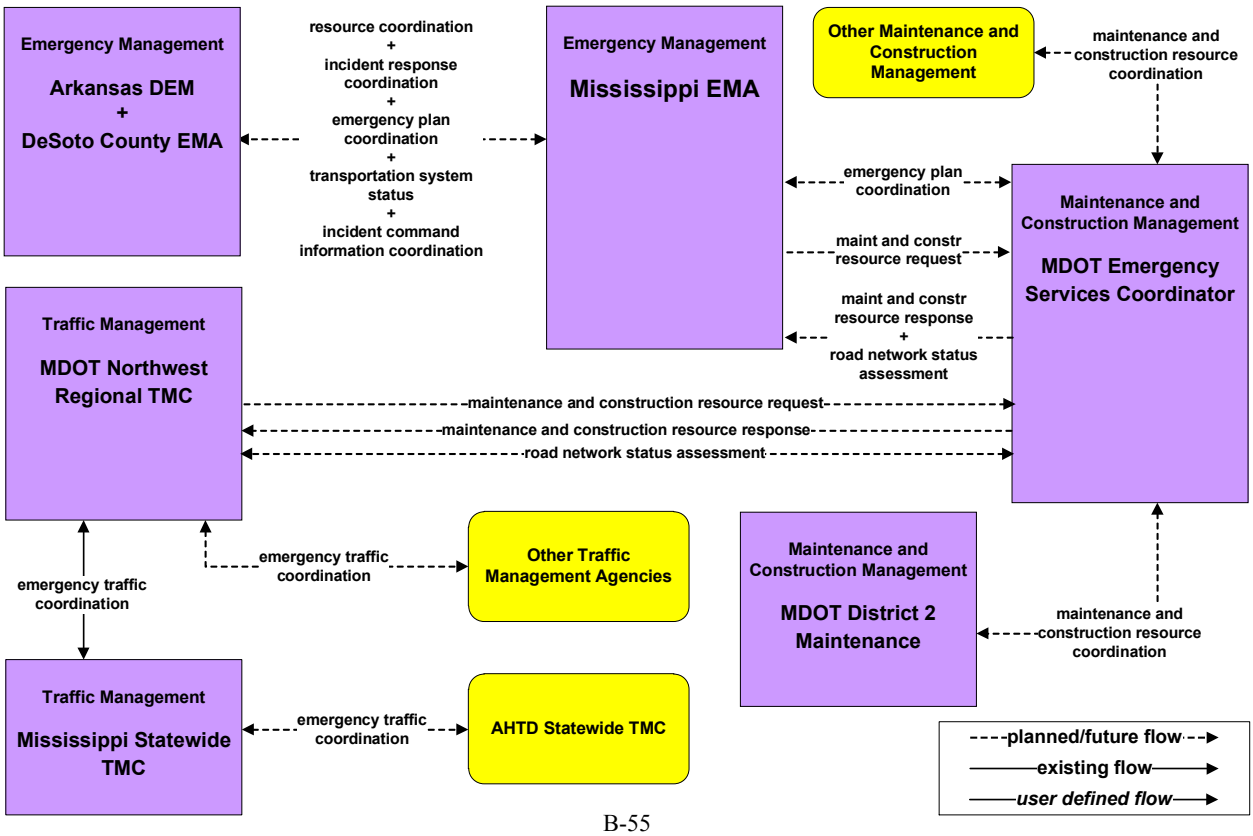


## EM08 – Disaster Response and Recovery
## Tennessee EMA

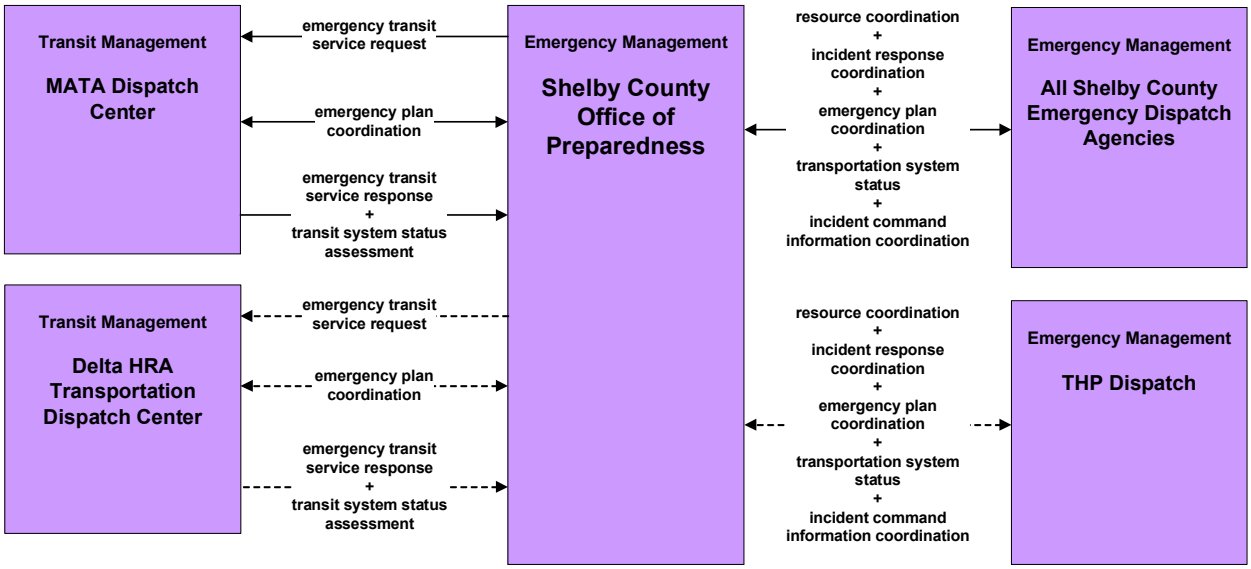



*Note:*
*Connection between TEMA and local EMAs is existing using TEMA's Web EOC*

## EM08 – Disaster Response and Recovery
## Mississippi EMA



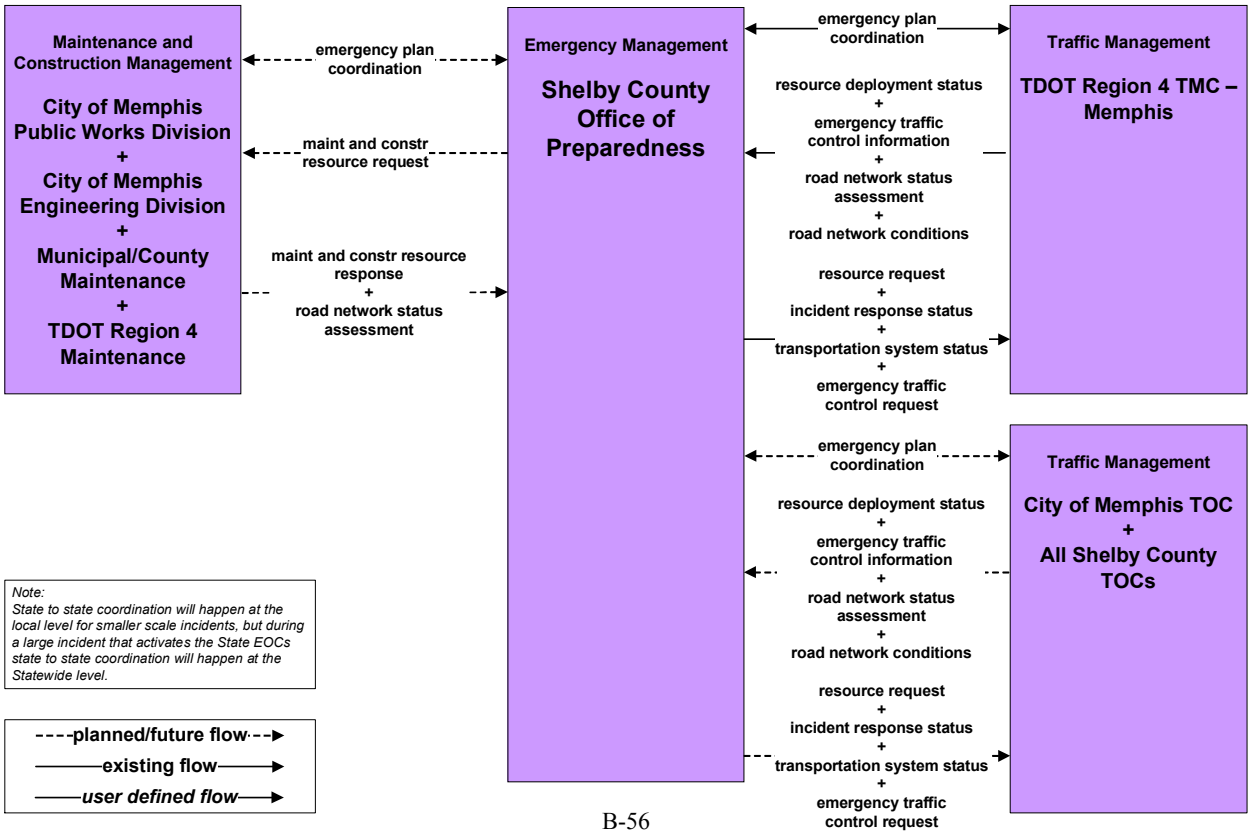
## EM08 – Disaster Response and Recovery
## Shelby County Office of Preparedness (1 of 2)




----planned/future flow-->
————existing flow————>
——*user defined flow*——>

*Note:*
*State to state coordination will happen at the local level for smaller scale incidents, but during a large incident that activates the State EOCs state to state coordination will happen at the Statewide level.*

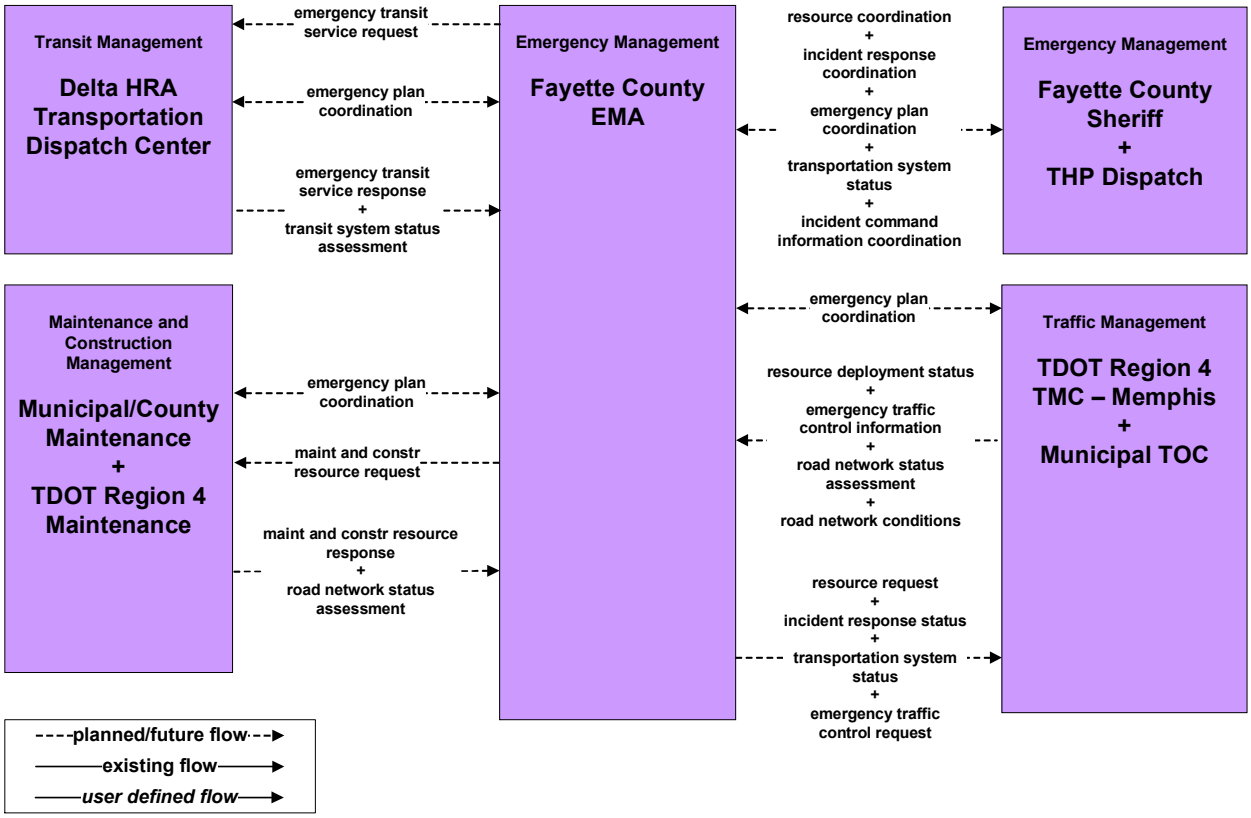
## EM08 – Disaster Response and Recovery
## Shelby County Office of Preparedness (2 of 2)



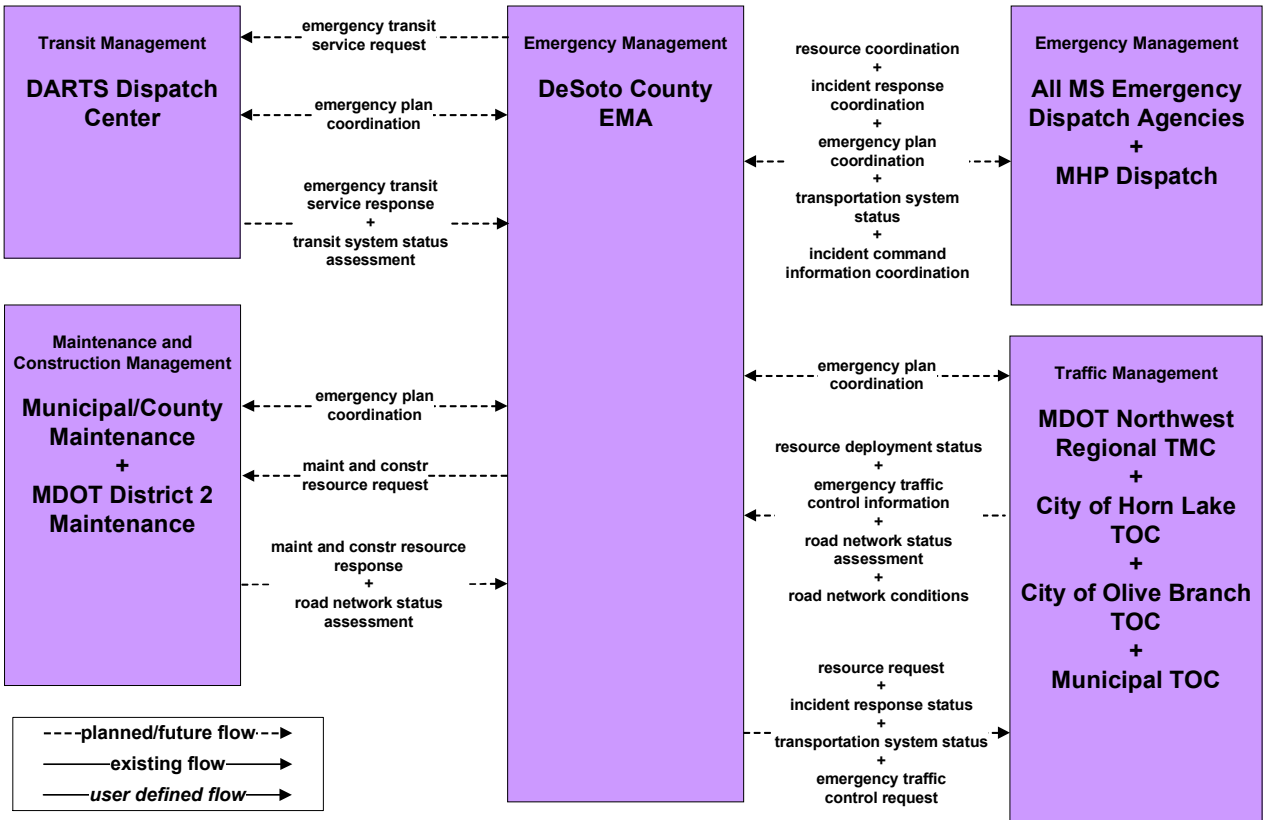

*Note:*
*State to state coordination will happen at the local level for smaller scale incidents, but during a large incident that activates the State EOCs state to state coordination will happen at the Statewide level.*

----planned/future flow-->
————existing flow————>
——*user defined flow*——>

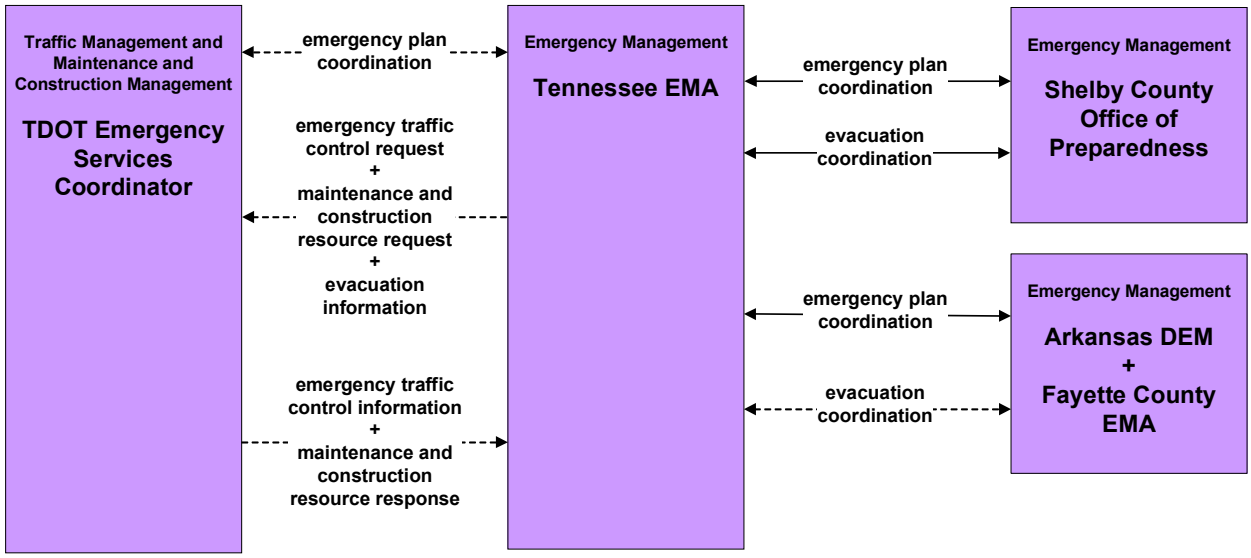
## EM08 – Disaster Response and Recovery
## Fayette County EMA




## EM08 – Disaster Response and Recovery
## DeSoto County EMA



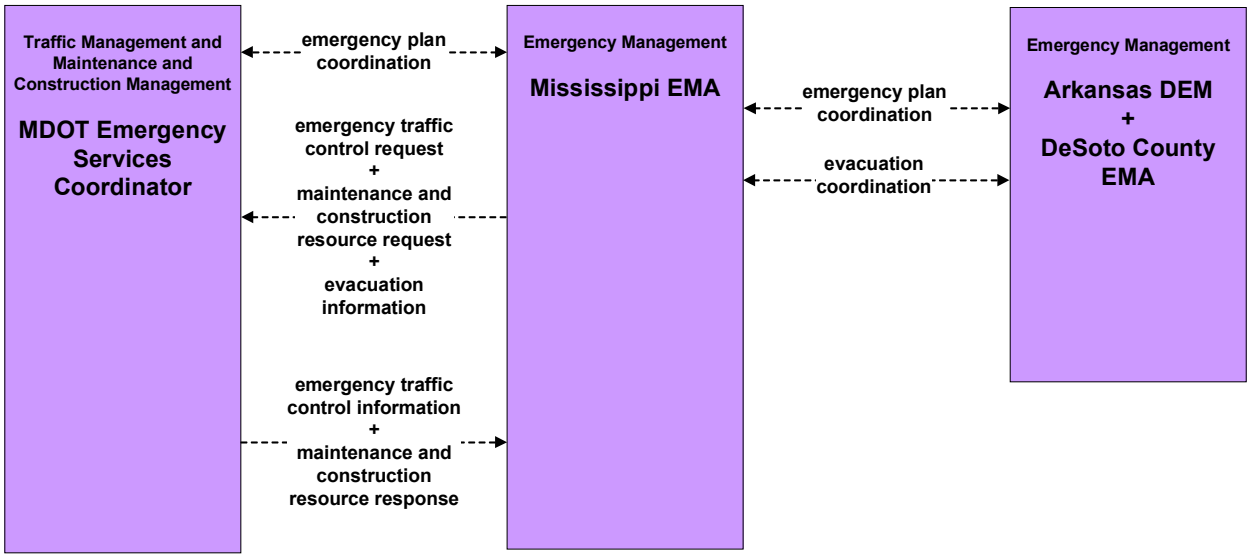
## EM09 – Evacuation and Reentry Management
## Tennessee EMA




planned/future flow
existing flow
*user defined flow*

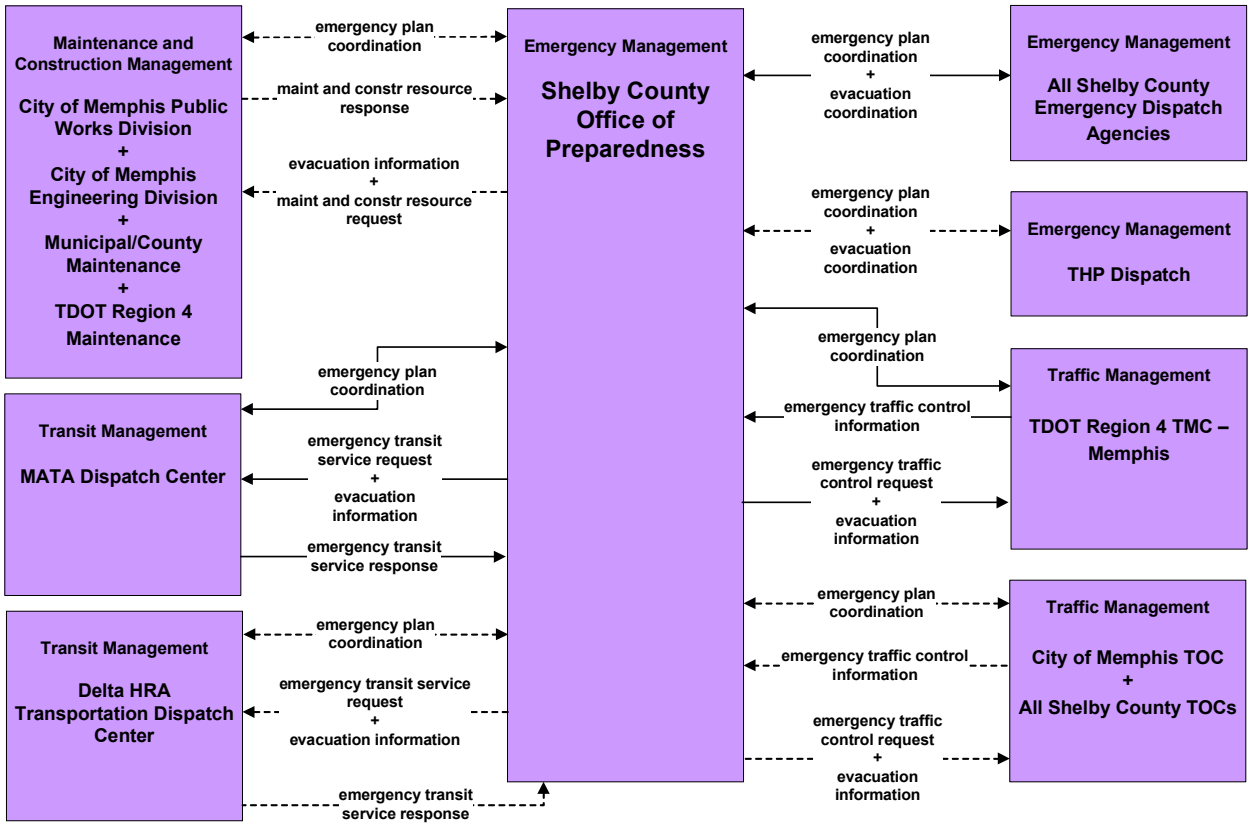
*Note:*
*Connection between TEMA and local EMAs is existing using TEMA's Web EOC*

## EM09 – Evacuation and Reentry Management
## Mississippi EMA

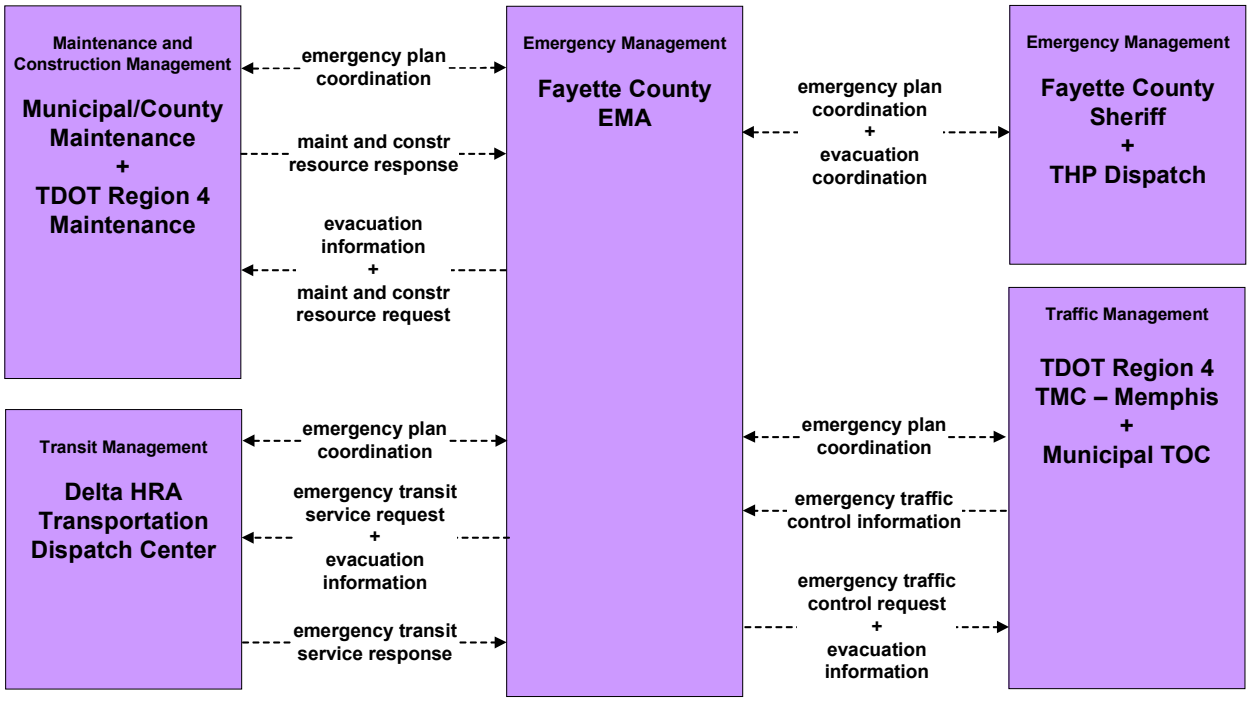



planned/future flow
existing flow
*user defined flow*

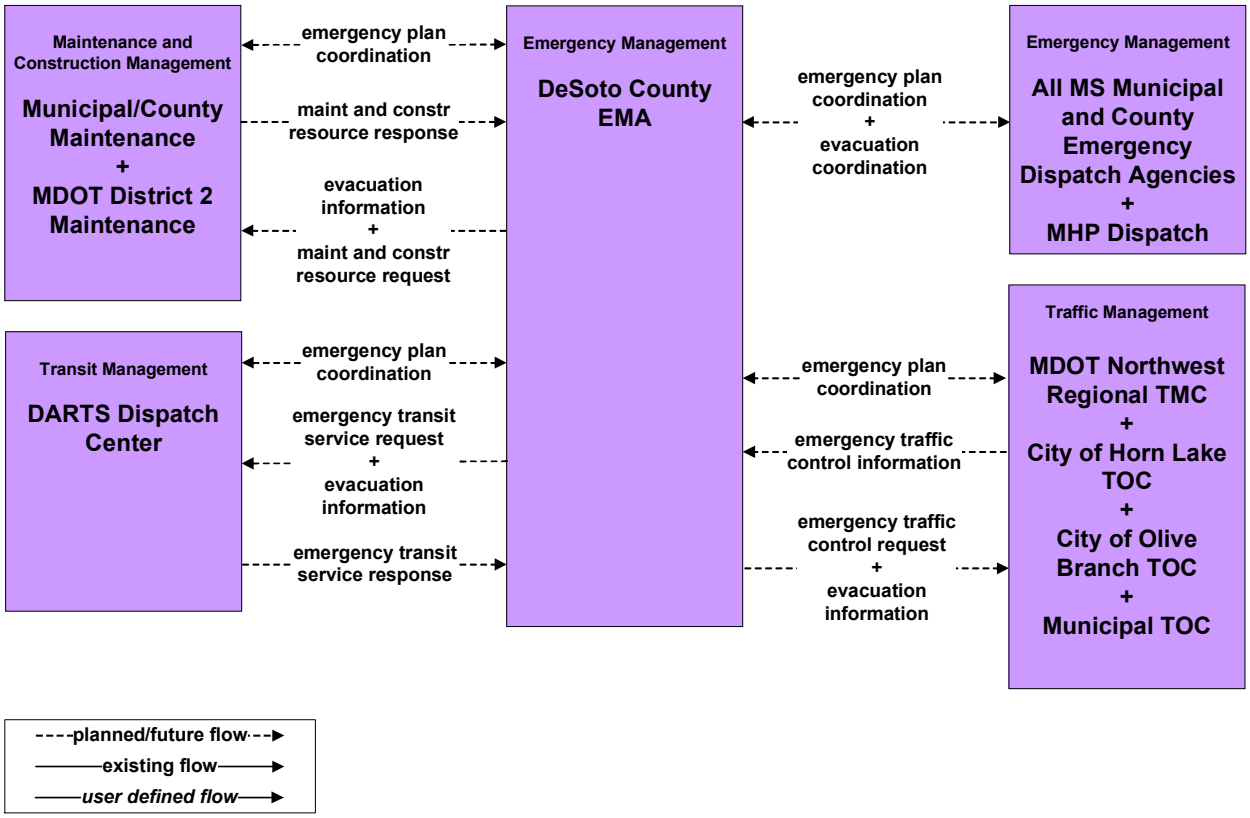
## EM09 – Evacuation and Reentry Management
## Shelby County Office of Preparedness



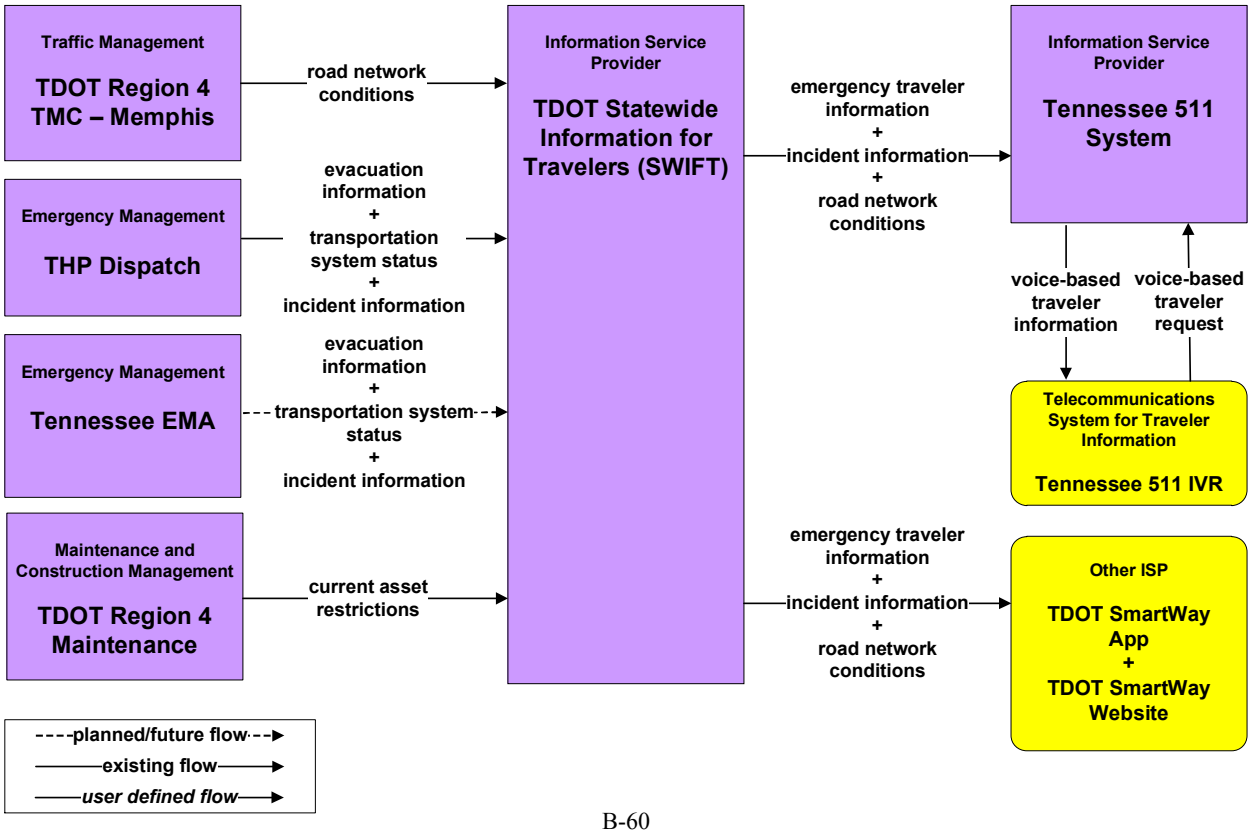

## EM09 – Evacuation and Reentry Management
## Fayette County EMA



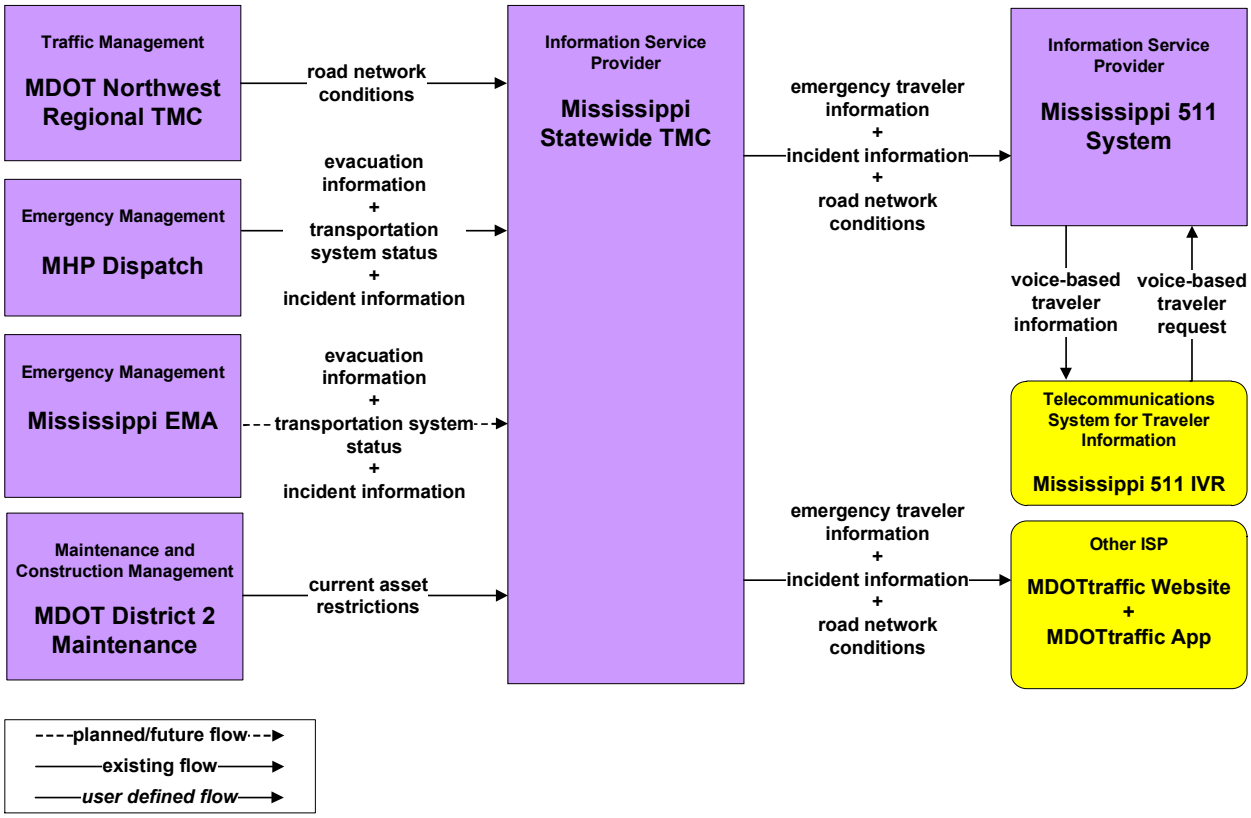
## EM09 – Evacuation and Reentry Management
## DeSoto County EMA




## EM10 – Disaster Traveler Information
## Tennessee 511 and SWIFT

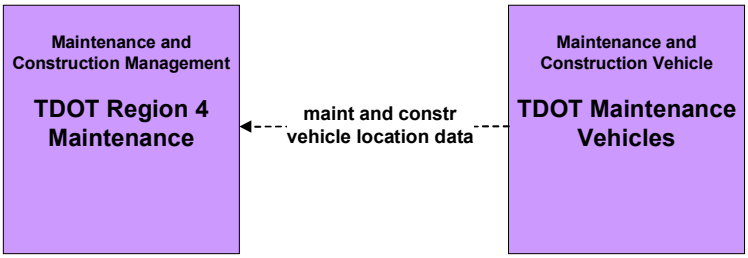


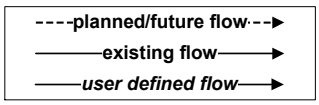
**EM10 – Disaster Traveler Information**
**MDOT**



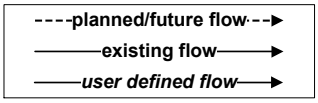
# Maintenance and Construction Management

**MC01 – Maintenance and Construction Vehicle and Equipment Tracking**
**TDOT Region 4 Maintenance**

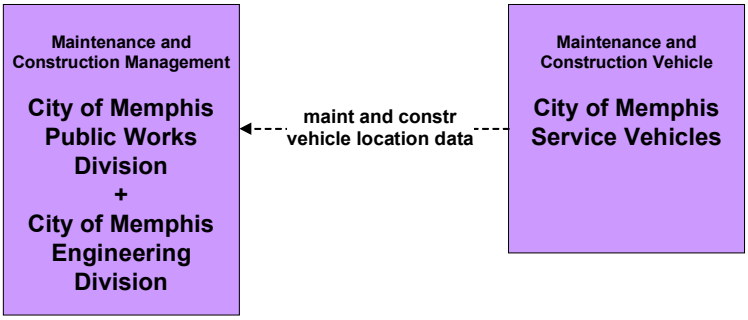


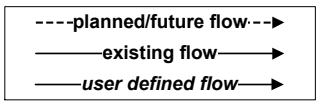



**MC01 – Maintenance and Construction Vehicle and Equipment Tracking**
**MDOT District 2 Maintenance**

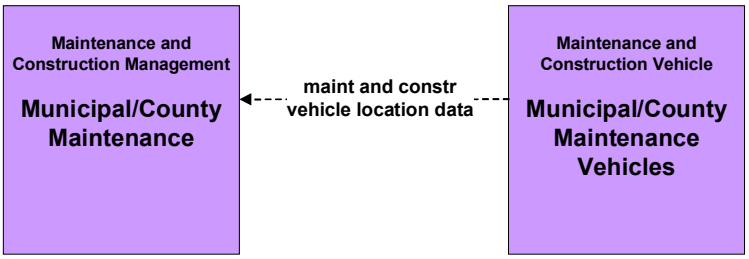



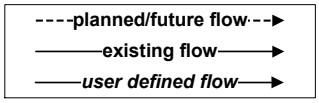

**MC01 – Maintenance and Construction Vehicle and Equipment Tracking**
**City of Memphis**



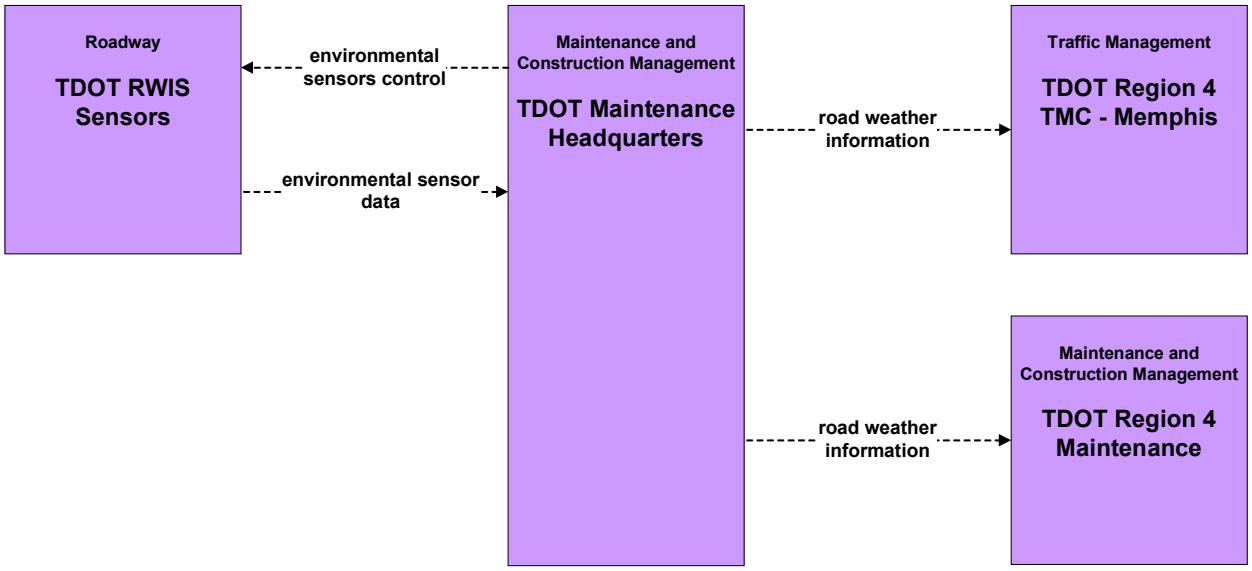



## MC01 – Maintenance and Construction Vehicle and Equipment Tracking
## Municipal/County

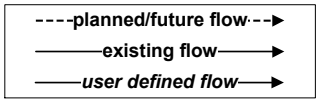


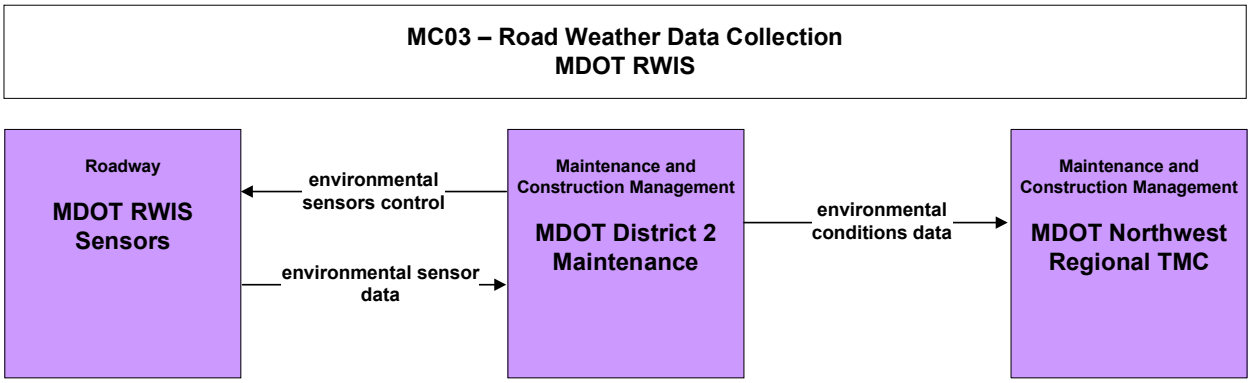



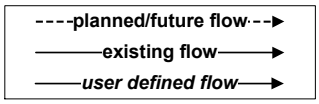

## MC03 – Road Weather Data Collection
## TDOT RWIS

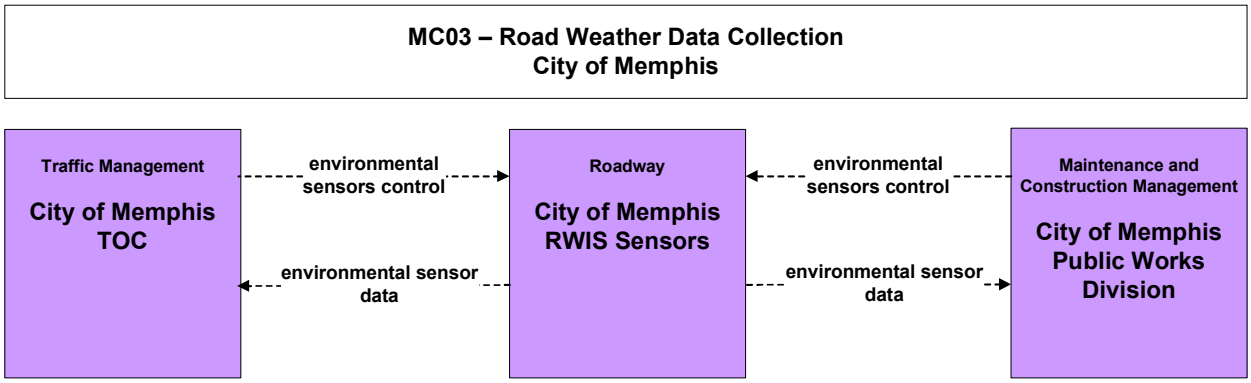


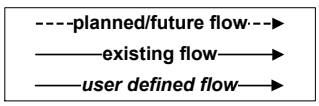

*Note:*
*The statewide structure for RWIS data collection is existing, but there are no existing sensors in Region 4*



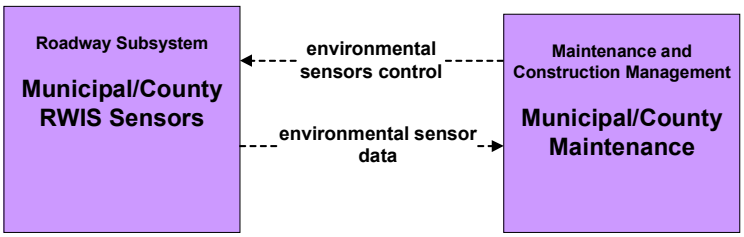

MC03 – Road Weather Data Collection
MDOT RWIS
Roadway
MDOT RWIS Sensors
environmental sensors control
environmental sensor data
Maintenance and Construction Management
MDOT District 2 Maintenance
environmental conditions data
Maintenance and Construction Management
MDOT Northwest Regional TMC

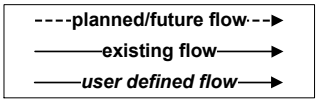

planned/future flow
existing flow
user defined flow


MC03 – Road Weather Data Collection
City of Memphis
Traffic Management
City of Memphis TOC
environmental sensors control
environmental sensor data
Roadway
City of Memphis RWIS Sensors
environmental sensors control
environmental sensor data
Maintenance and Construction Management
City of Memphis Public Works Division

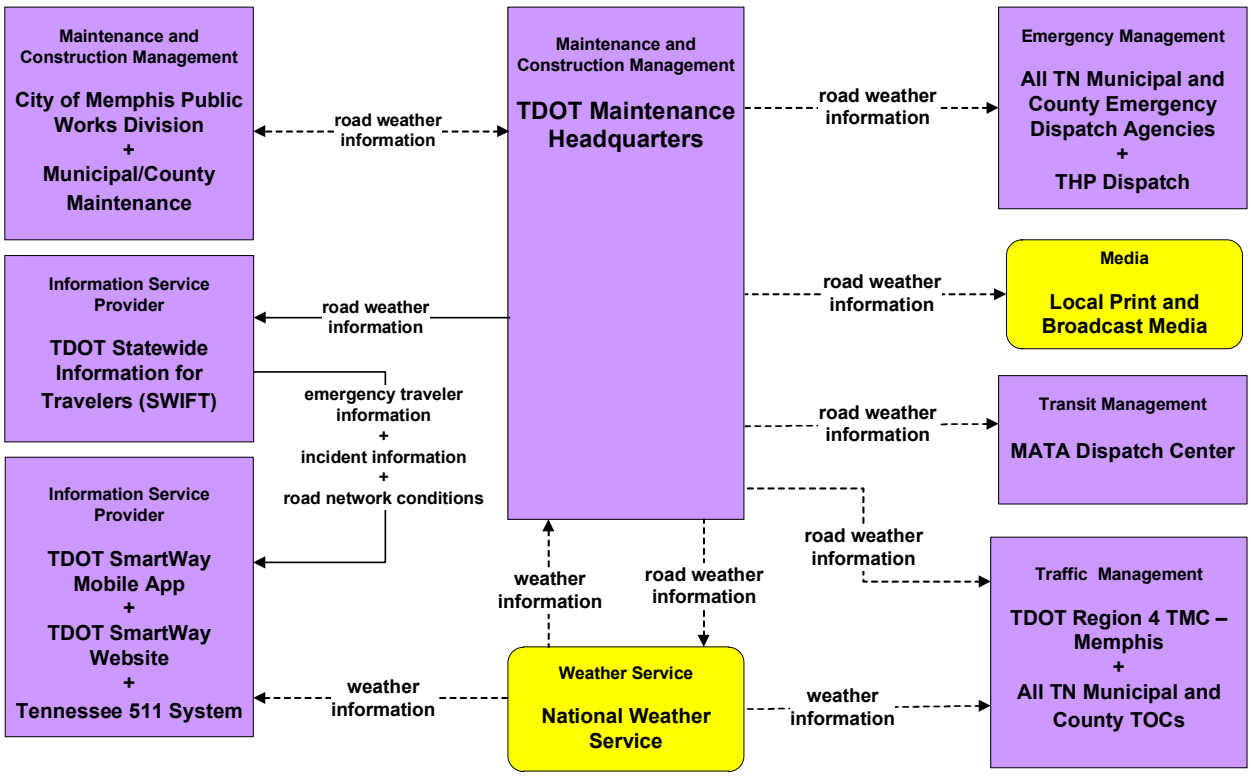

planned/future flow
existing flow
user defined flow

## MC03 – Road Weather Data Collection
## Municipal/County

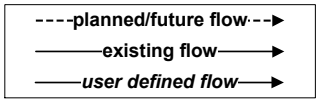


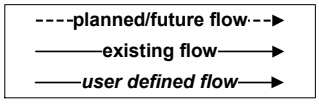

## MC04 – Weather Information Processing and Distribution
## TDOT Maintenance Headquarters



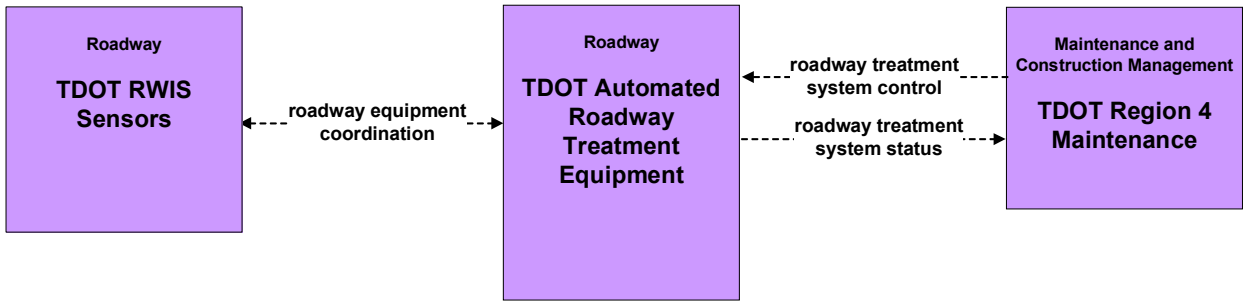
**MC04 – Weather Information Processing and Distribution**
**MDOT**

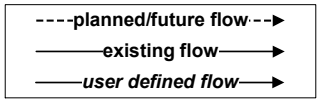




**MC04 – Weather Information Processing and Distribution**
**Municipal**

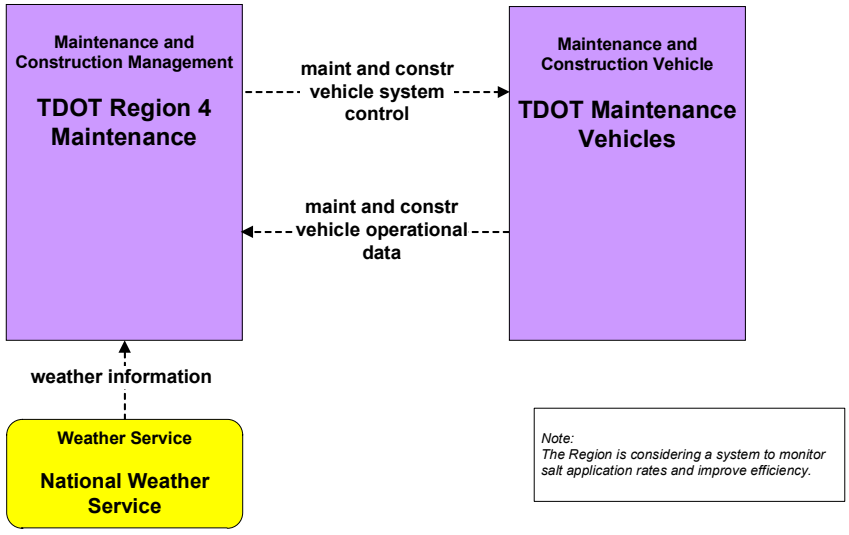



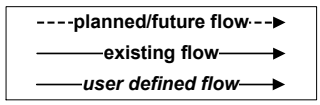
## MC05 – Roadway Automated Treatment
## TDOT Region 4 Maintenance

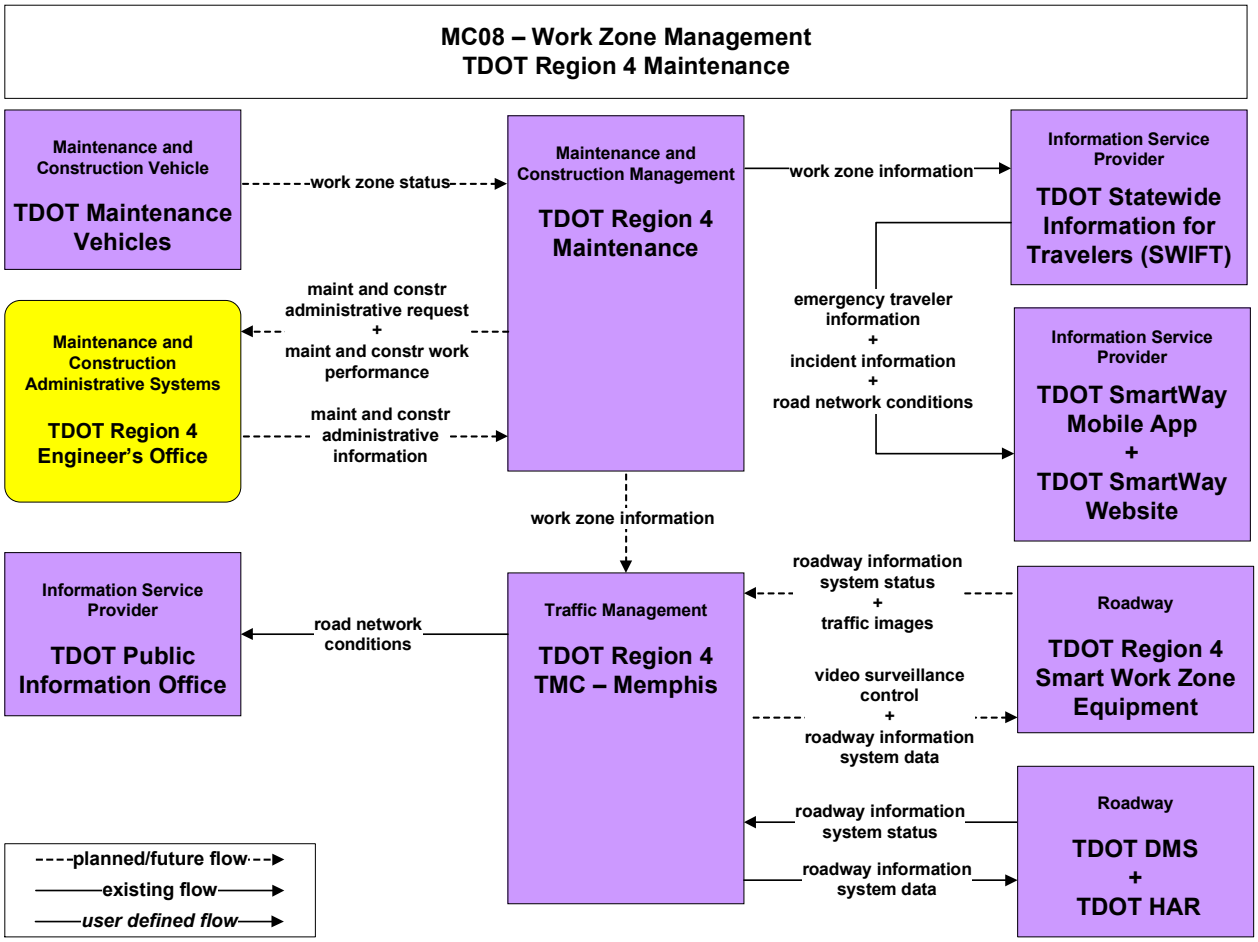


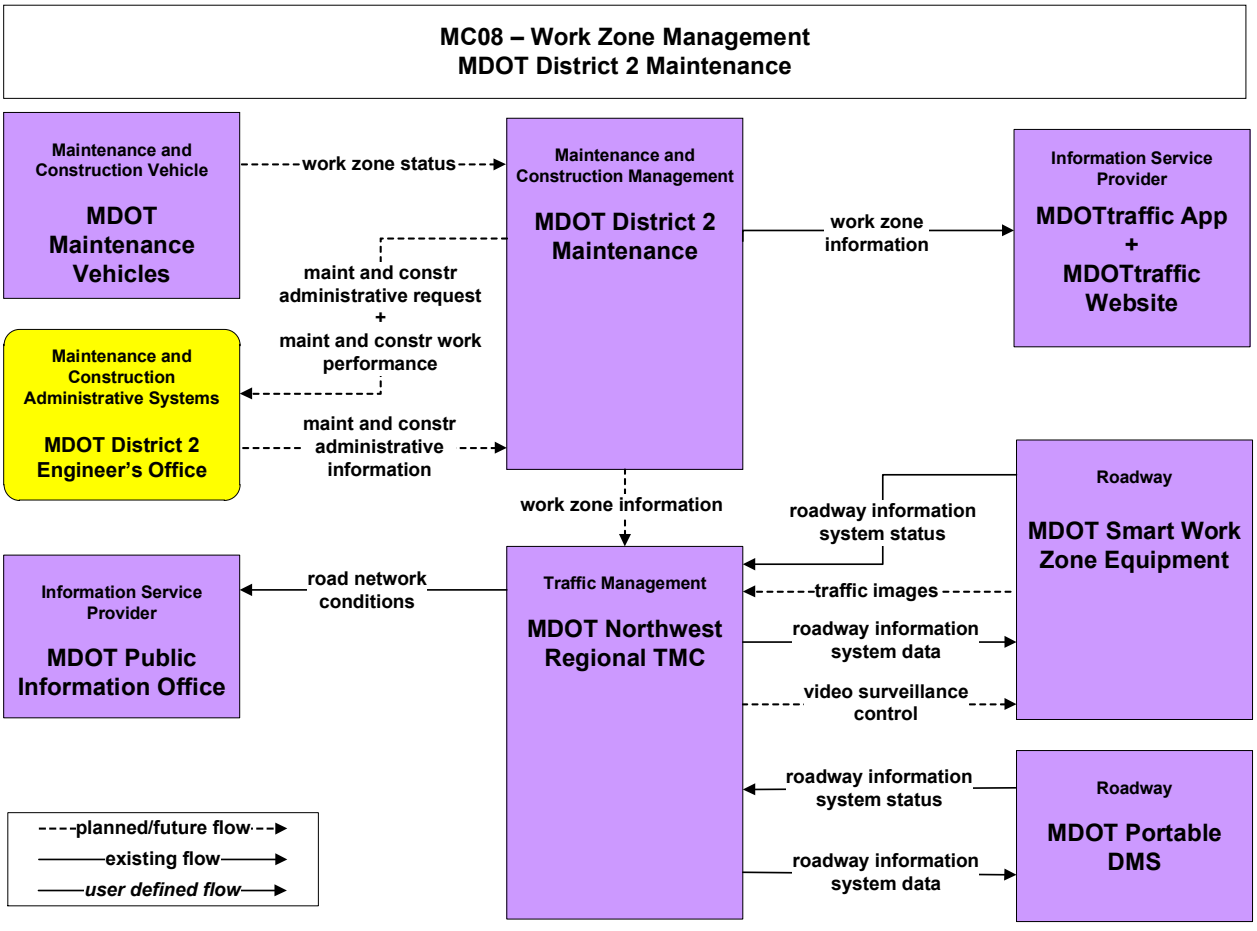




## MC06 – Winter Maintenance
## TDOT Region 4 Maintenance

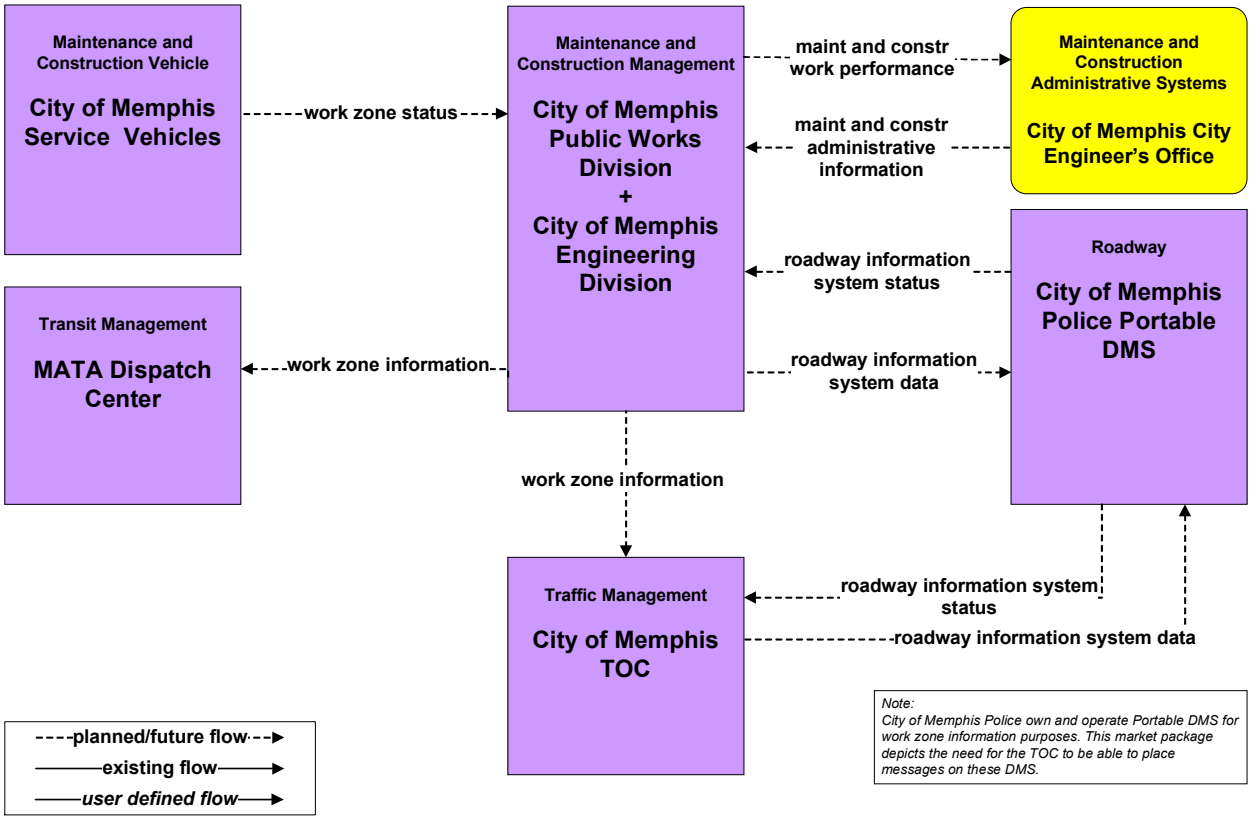



MC08 – Work Zone Management
TDOT Region 4 Maintenance
Maintenance and Construction Vehicle
TDOT Maintenance Vehicles
work zone status
Maintenance and Construction Management
TDOT Region 4 Maintenance
work zone information
Information Service Provider
TDOT Statewide Information for Travelers (SWIFT)
maint and constr administrative request
+
maint and constr work performance
Maintenance and Construction Administrative Systems
TDOT Region 4 Engineer's Office
maint and constr administrative information
emergency traveler information
+
incident information
+
road network conditions
Information Service Provider
TDOT SmartWay Mobile App
+
TDOT SmartWay Website
work zone information
Information Service Provider
TDOT Public Information Office
road network conditions
Traffic Management
TDOT Region 4 TMC – Memphis
roadway information system status
+
traffic images
Roadway
TDOT Region 4 Smart Work Zone Equipment
video surveillance control
+
roadway information system data
roadway information system status
roadway information system data
Roadway
TDOT DMS
+
TDOT HAR
planned/future flow
existing flow
user defined flow

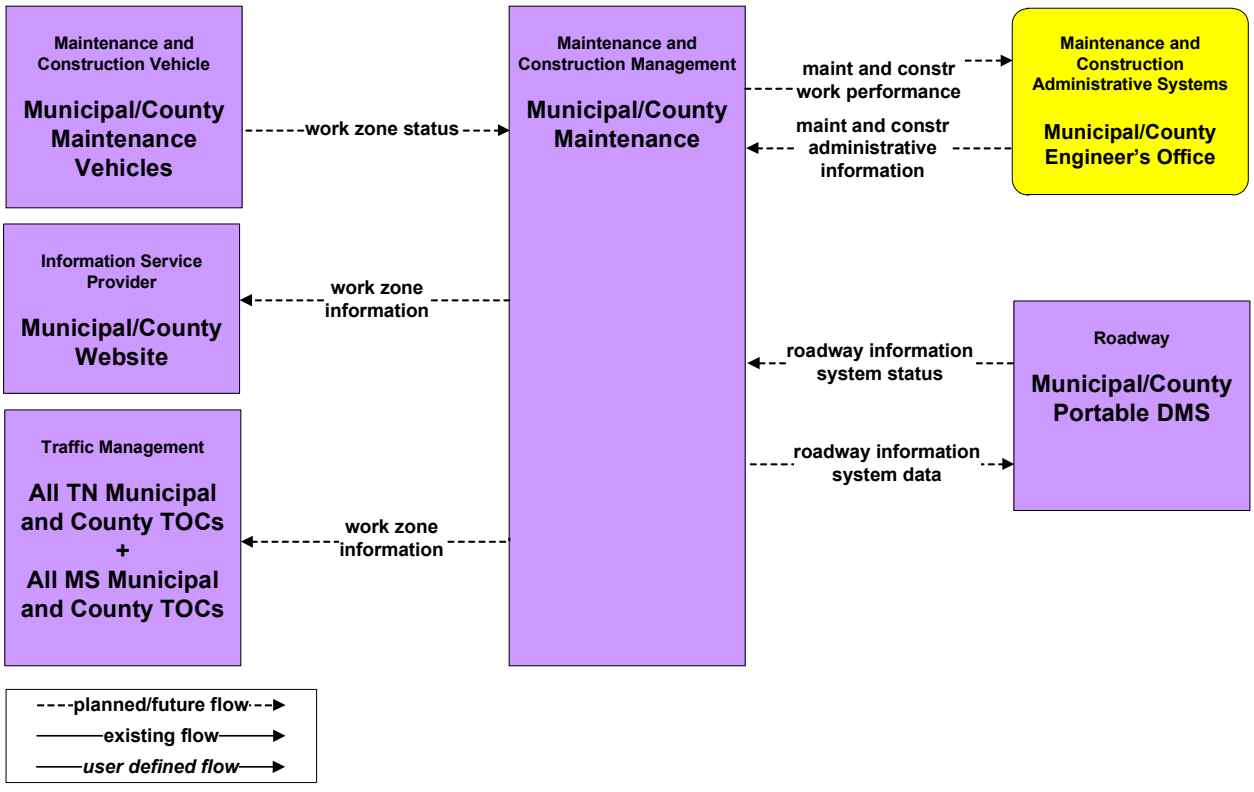

MC08 – Work Zone Management
MDOT District 2 Maintenance
Maintenance and Construction Vehicle
MDOT Maintenance Vehicles
work zone status
Maintenance and Construction Management
MDOT District 2 Maintenance
work zone information
Information Service Provider
MDOTtraffic App
+
MDOTtraffic Website
maint and constr administrative request
+
maint and constr work performance
Maintenance and Construction Administrative Systems
MDOT District 2 Engineer's Office
maint and constr administrative information
work zone information
roadway information system status
Roadway
MDOT Smart Work Zone Equipment
Information Service Provider
MDOT Public Information Office
road network conditions
Traffic Management
MDOT Northwest Regional TMC
traffic images
roadway information system data
video surveillance control
roadway information system status
roadway information system data
Roadway
MDOT Portable DMS
planned/future flow
existing flow
user defined flow

## MC08 – Work Zone Management
## City of Memphis

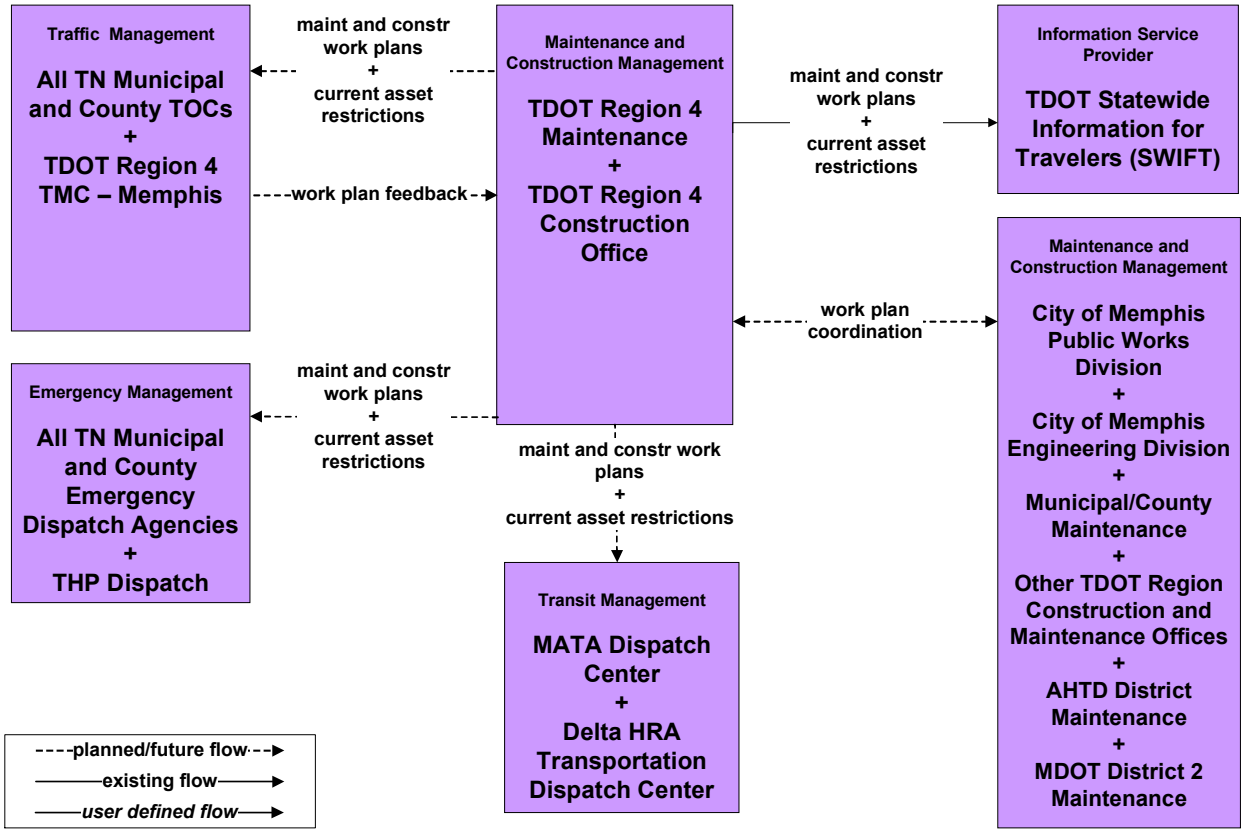



*Note:*
*City of Memphis Police own and operate Portable DMS for work zone information purposes. This market package depicts the need for the TOC to be able to place messages on these DMS.*

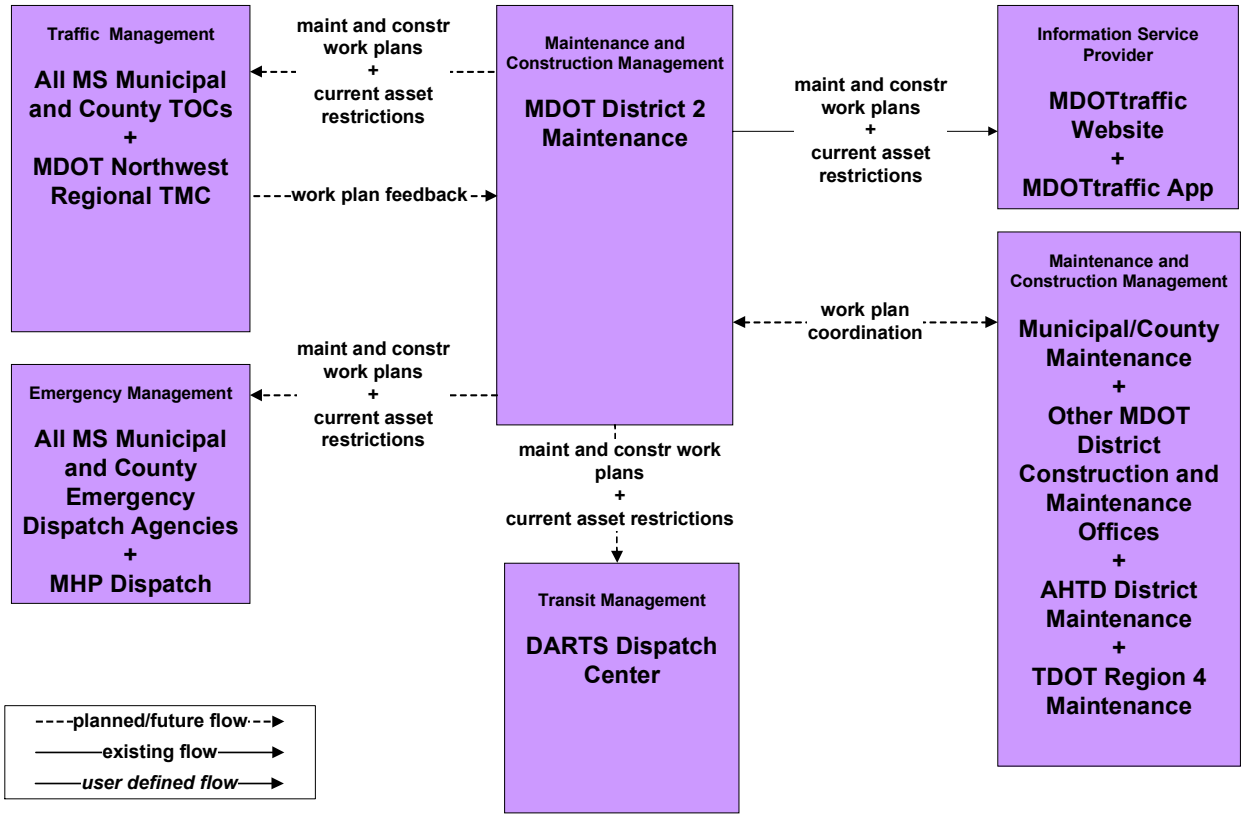
## MC08 – Work Zone Management
## Municipal/County



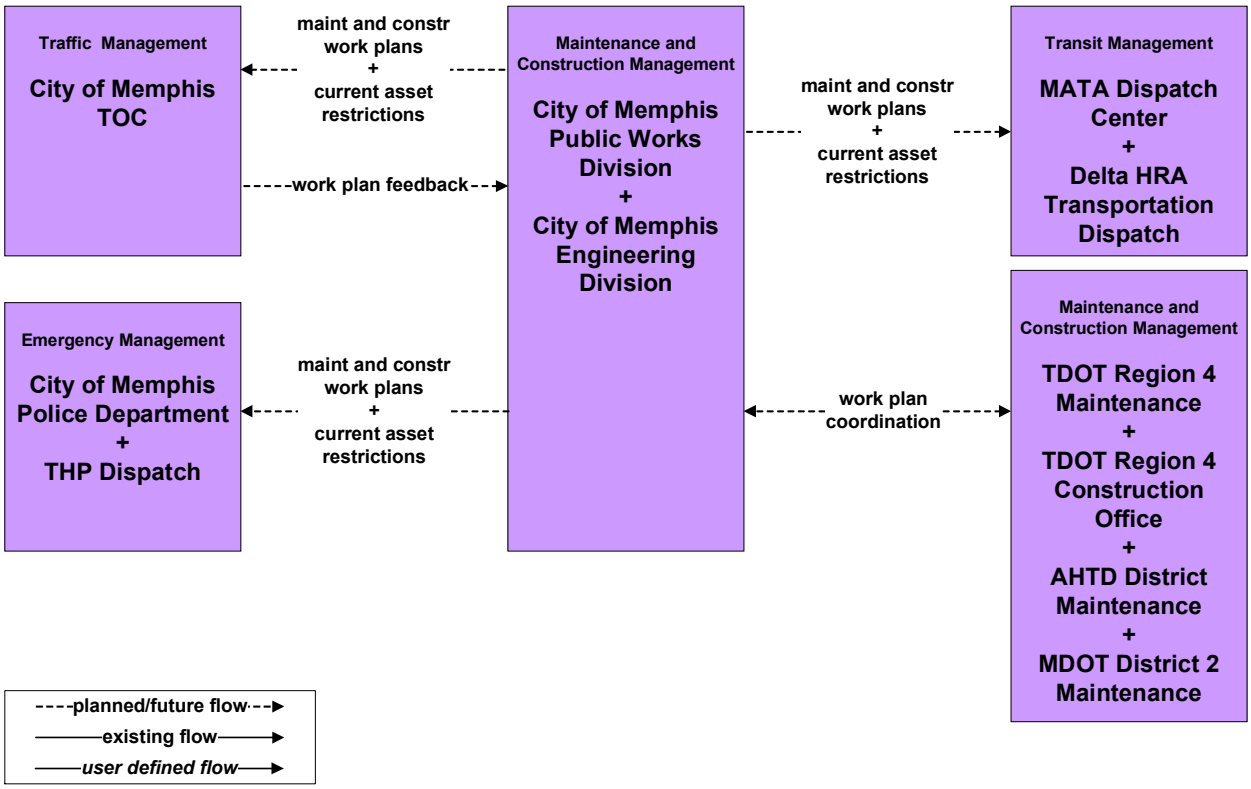
## MC10 – Maintenance and Construction Activity Coordination
## TDOT



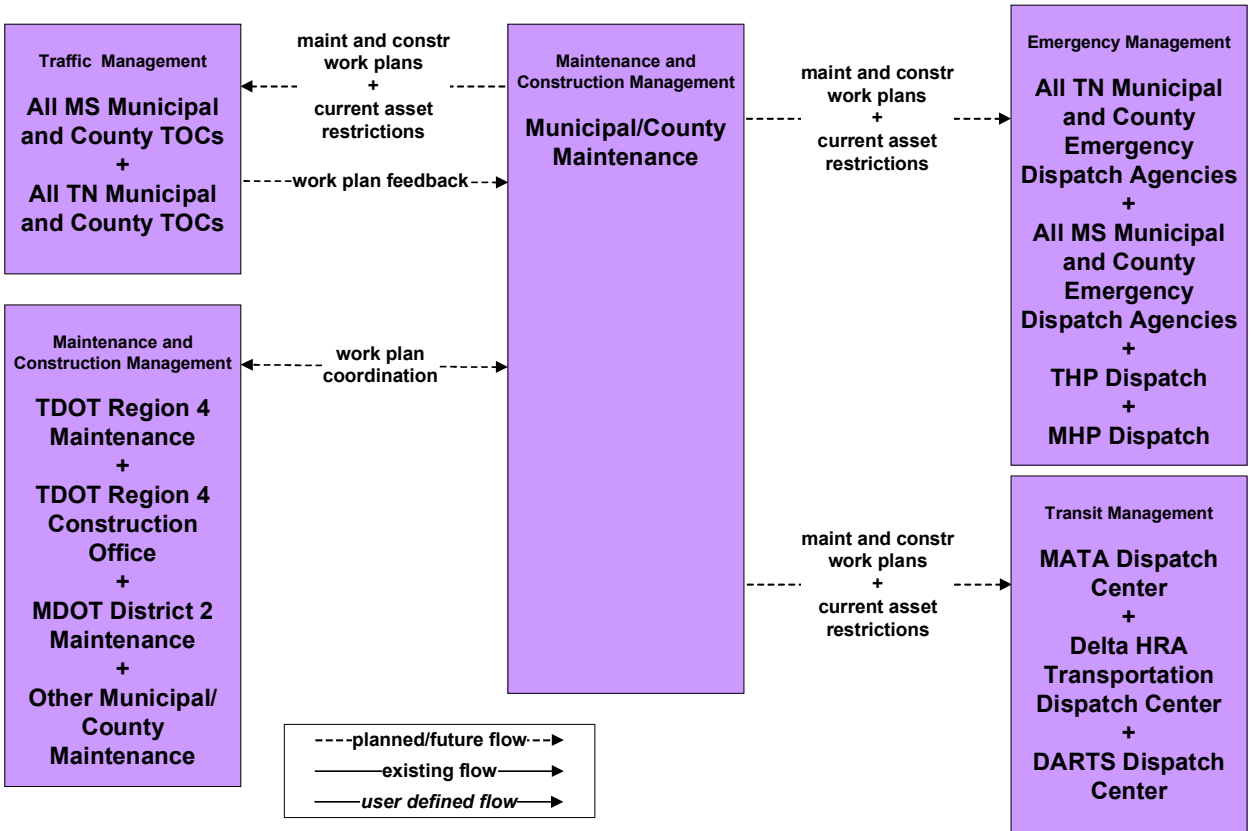

## MC10 – Maintenance and Construction Activity Coordination
## MDOT



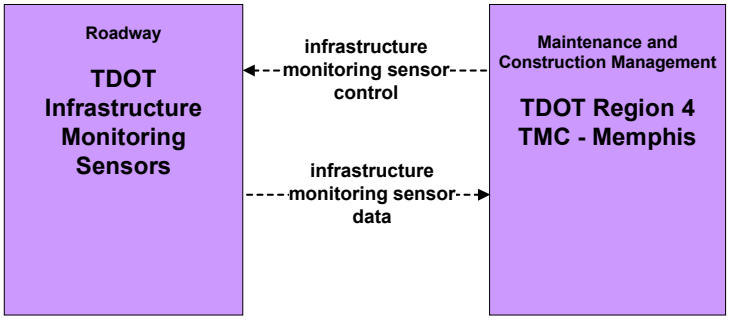
## MC10 – Maintenance and Construction Activity Coordination
## City of Memphis




## MC10 – Maintenance and Construction Activity Coordination
## Municipal/County



## MC12 – Infrastructure Monitoring
## TDOT

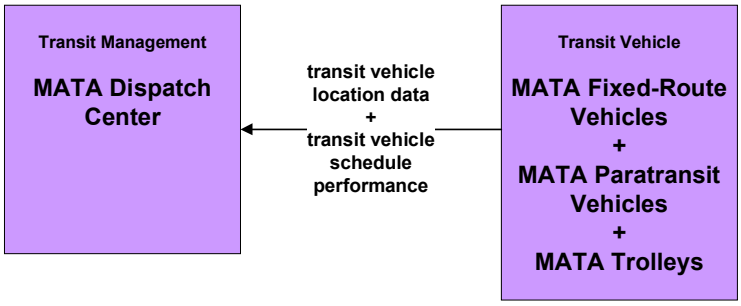


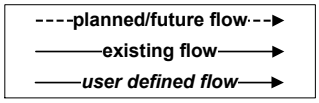

*Note:*
*Infrastructure monitoring data is transmitted from the TMC to the University of Memphis Center for Earthquake Research and Information.*

planned/future flow
existing flow
*user defined flow*

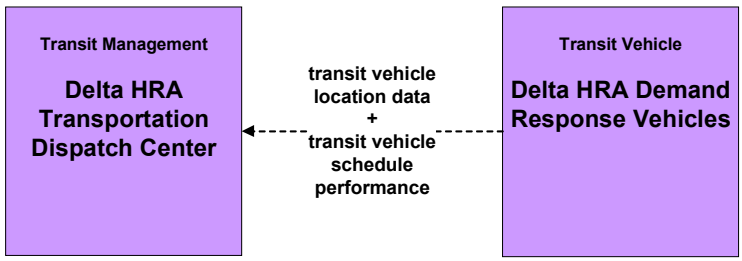
# Advanced Public Transportation Systems

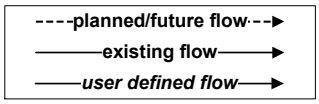
**APTS01 – Transit Vehicle Tracking**
**Memphis Area Transit Authority**



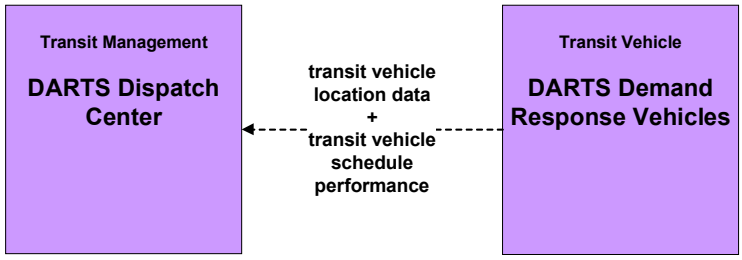



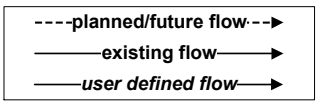
**APTS01 – Transit Vehicle Tracking**
**Delta HRA Transportation**



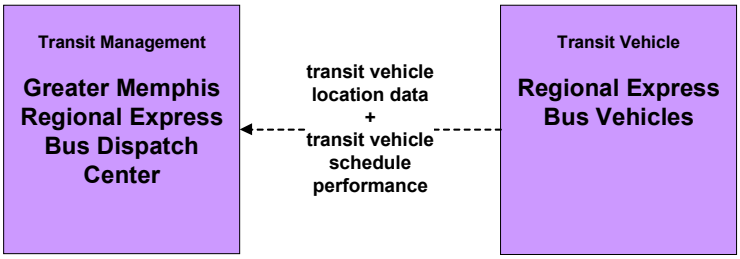




**APTS01 – Transit Vehicle Tracking**
**DARTS**



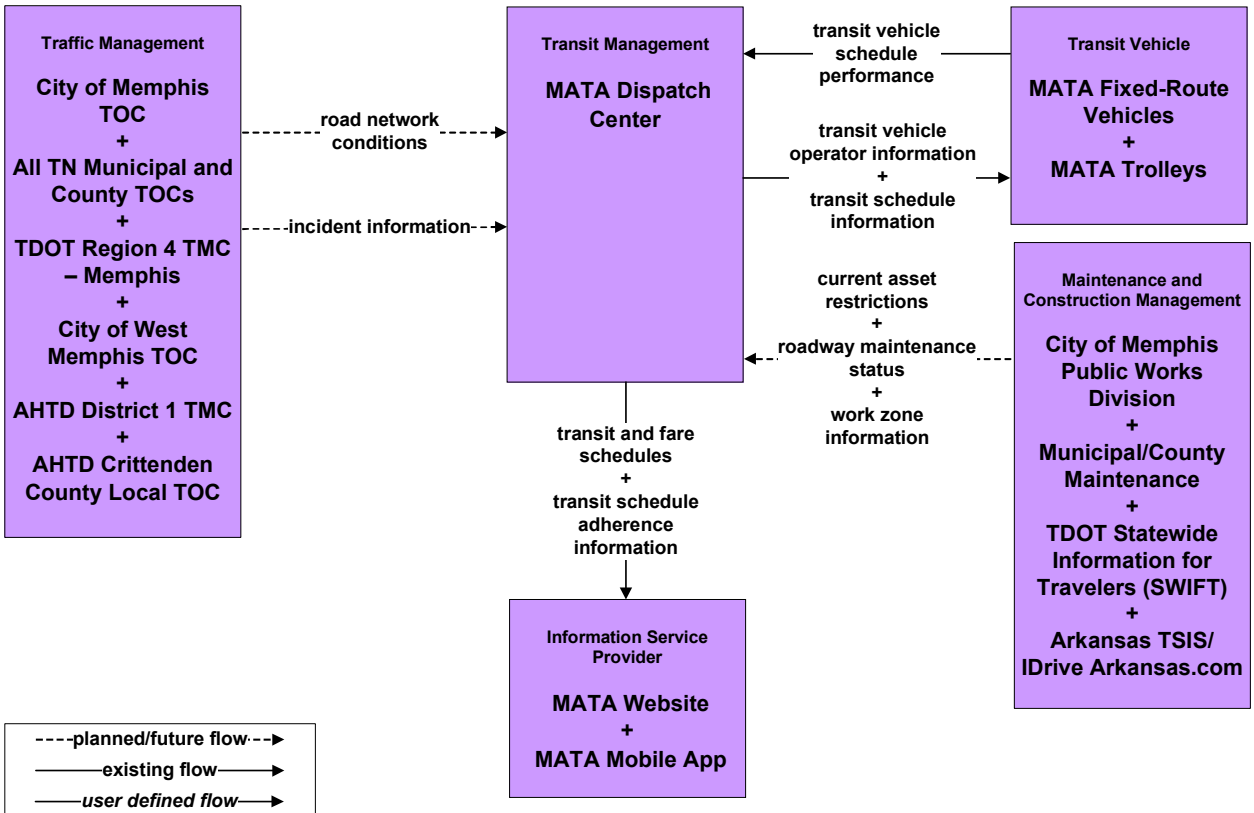
## APTS01 – Transit Vehicle Tracking
## Greater Memphis Regional Express Bus System




*Note:*
*The Greater Memphis Regional Express Bus System is a future element. MDOT is currently studying the feasibility of an express bus system that would travel between TN and MS.*

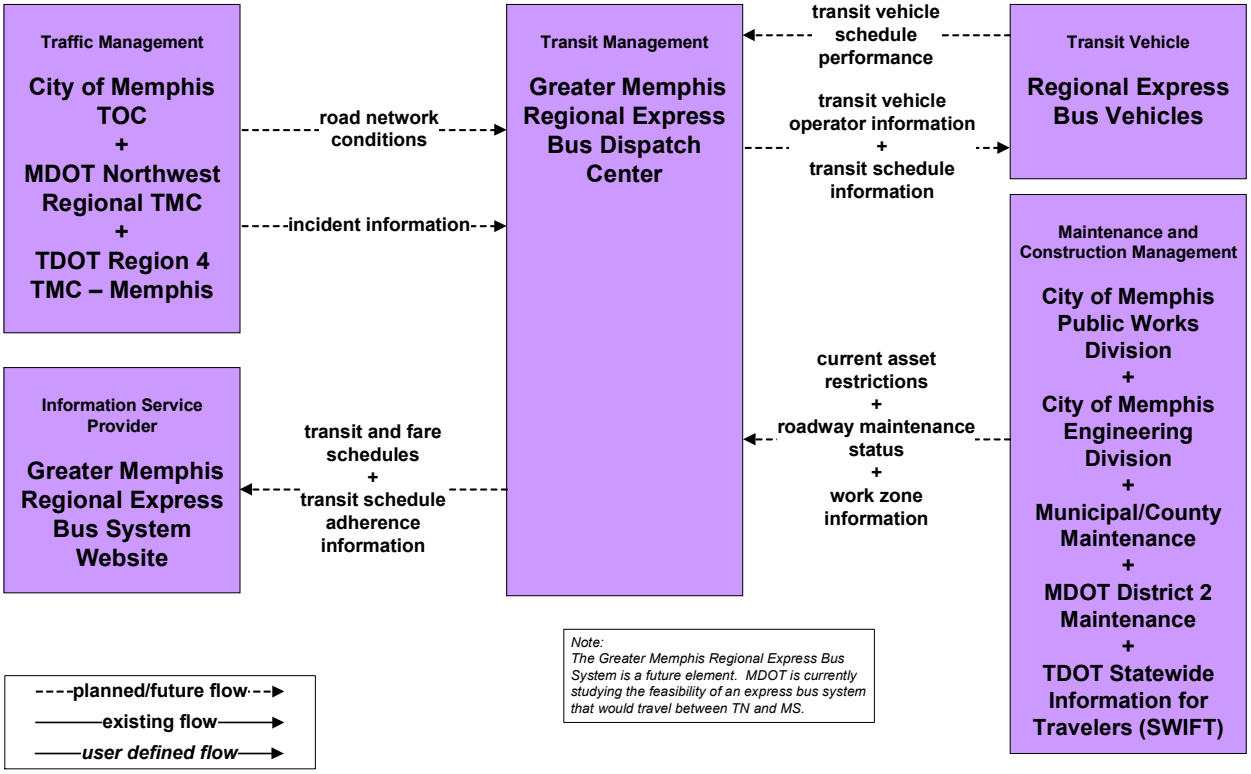
----planned/future flow-->
————existing flow————>
——*user defined flow*——>

## APTS02 – Transit Fixed-Route Operations
## Memphis Area Transit Authority

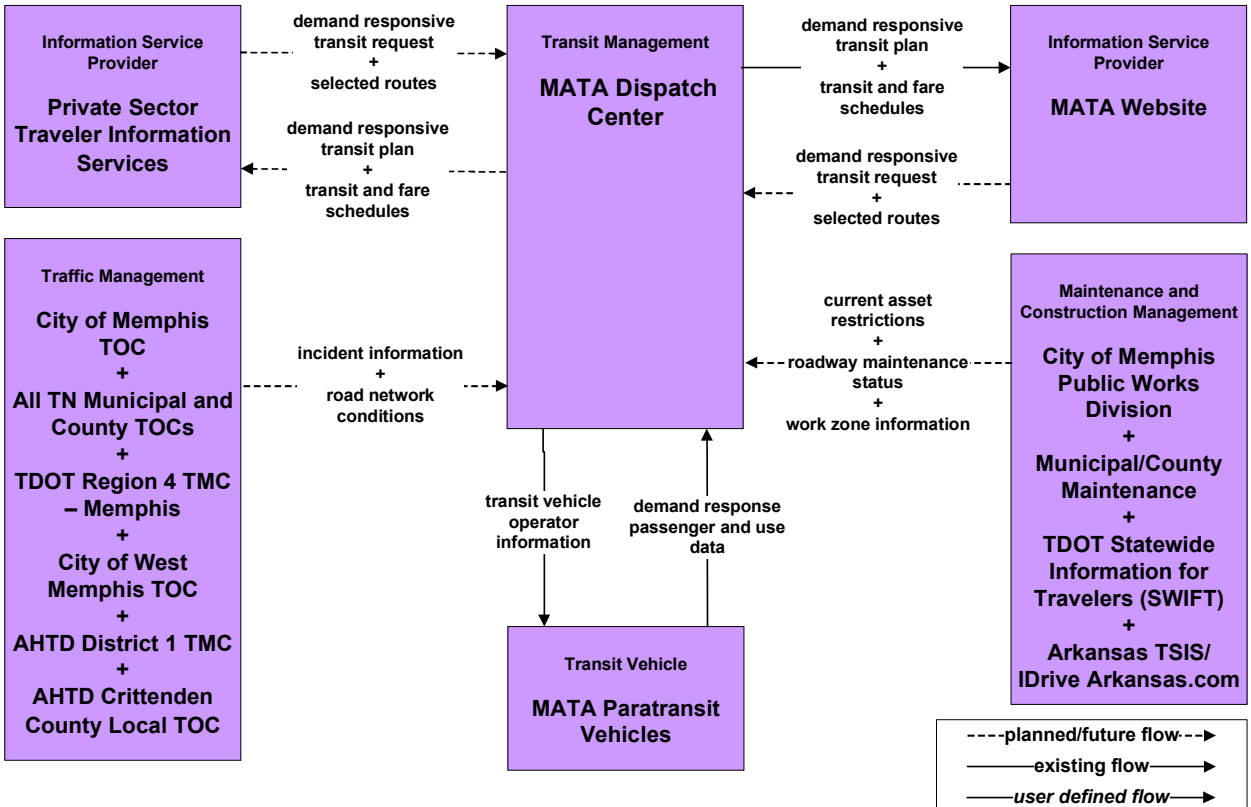



----planned/future flow-->
————existing flow————>
——*user defined flow*——>

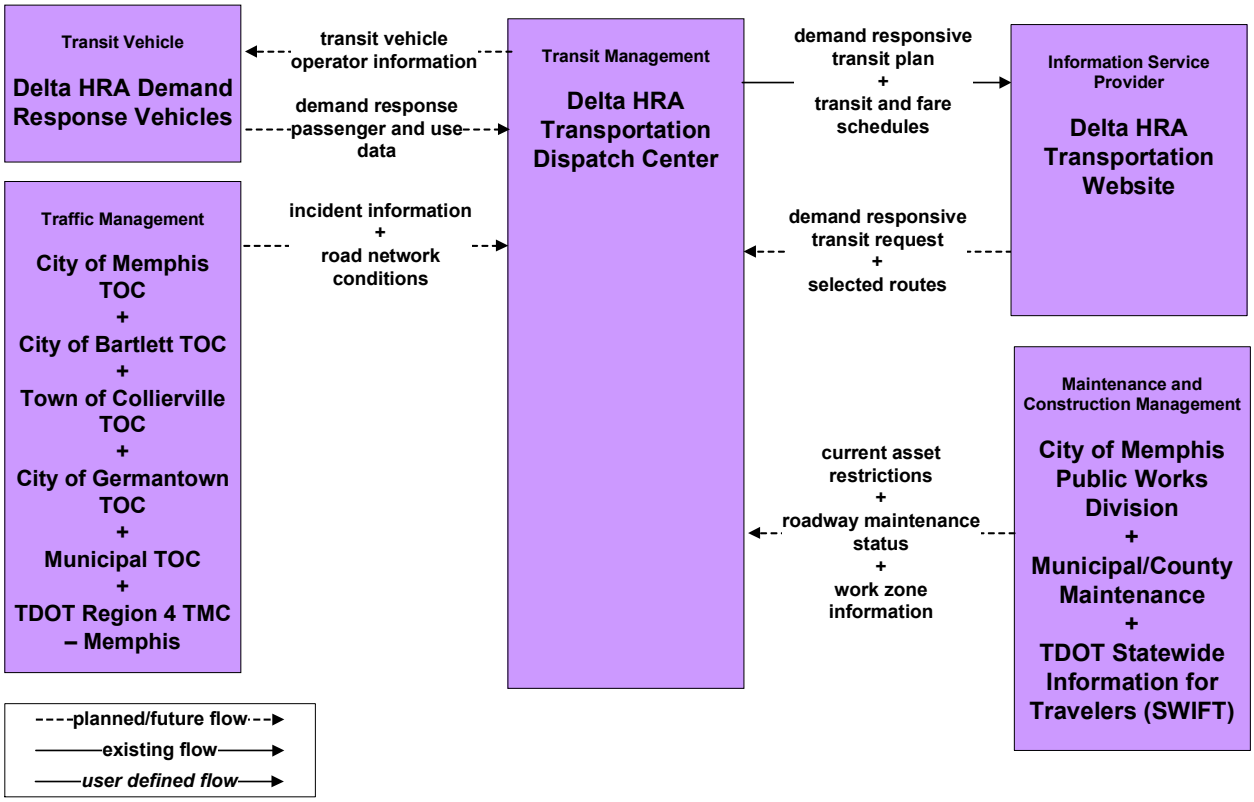
## APTS02 – Transit Fixed-Route Operations
## Greater Memphis Regional Express Bus System



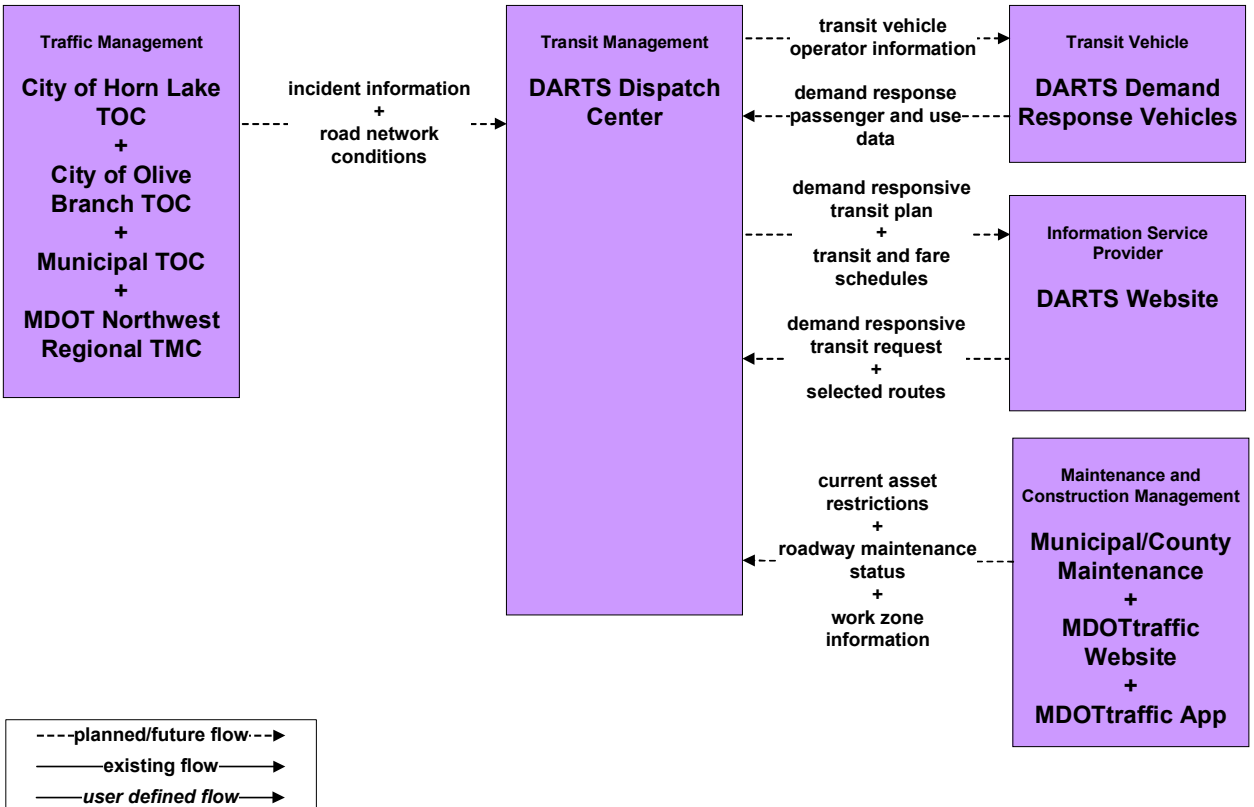

## APTS03 – Demand Response Transit Operations
## Memphis Area Transit Authority



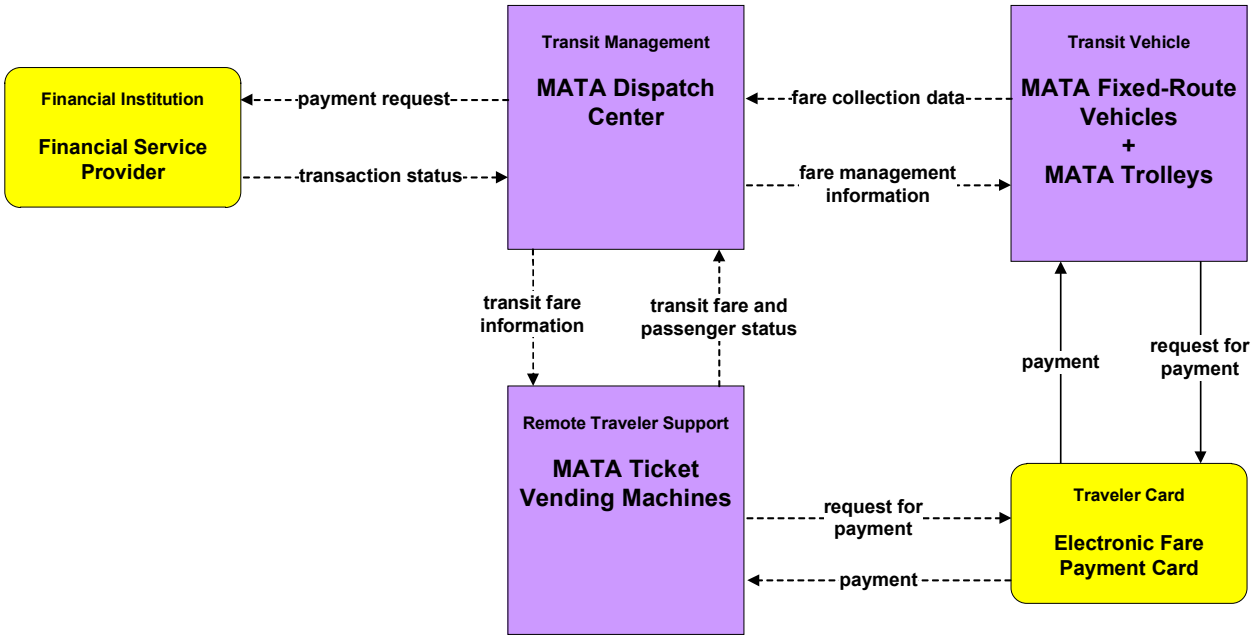
## APTS03 – Demand Response Transit Operations
## Delta HRA Transportation

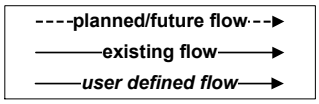



## APTS03 – Demand Response Transit Operations
## DARTS

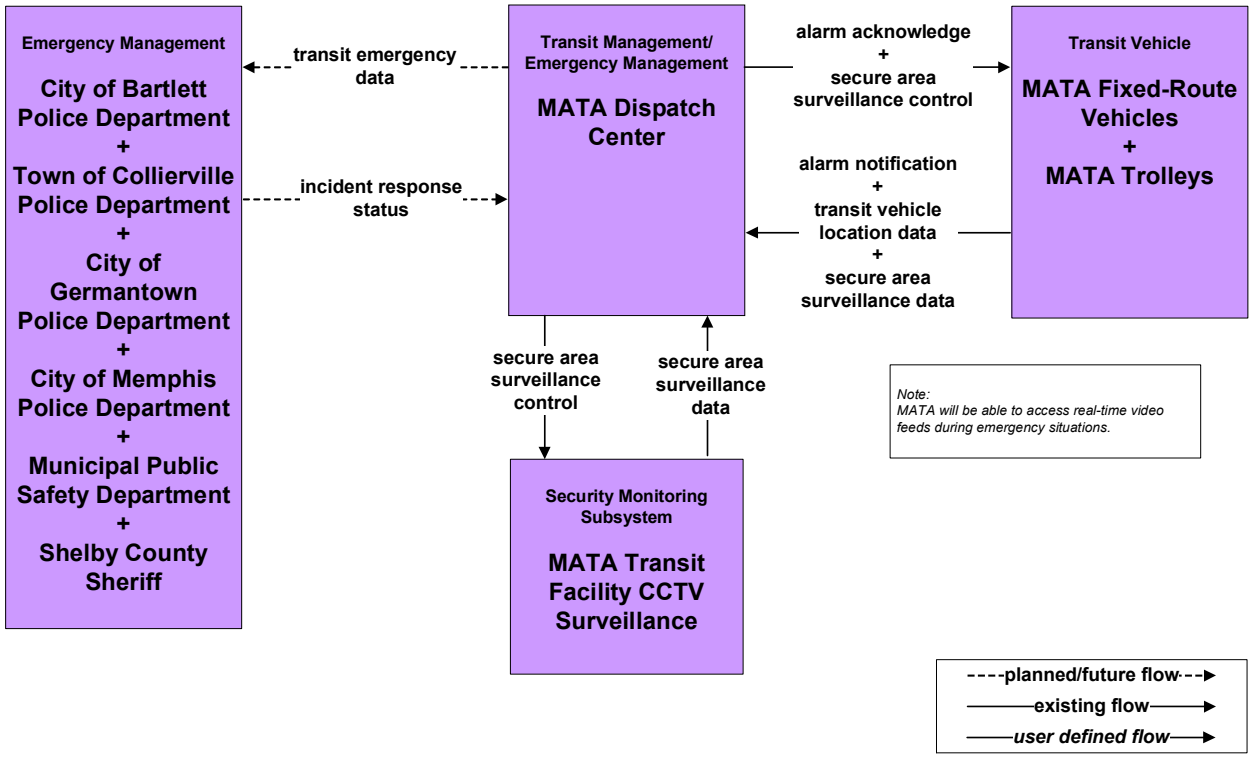


## APTS04 – Transit Fare Collection Management
## Memphis Area Transit Authority

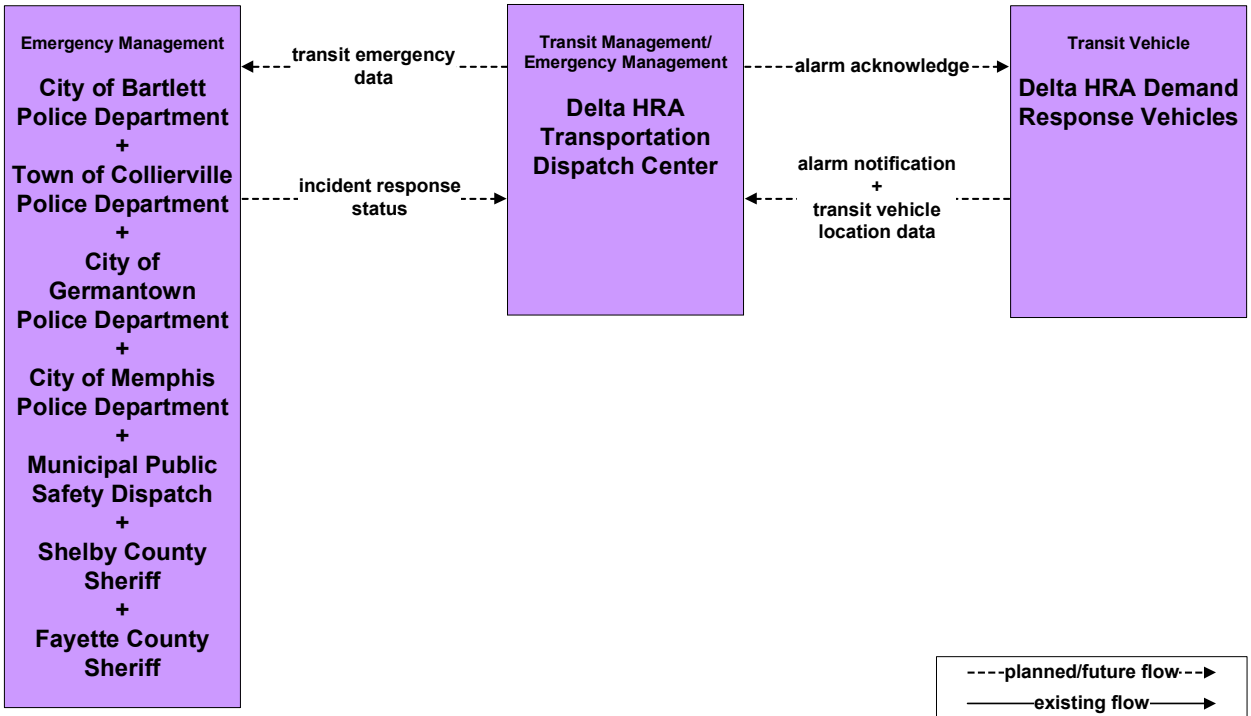


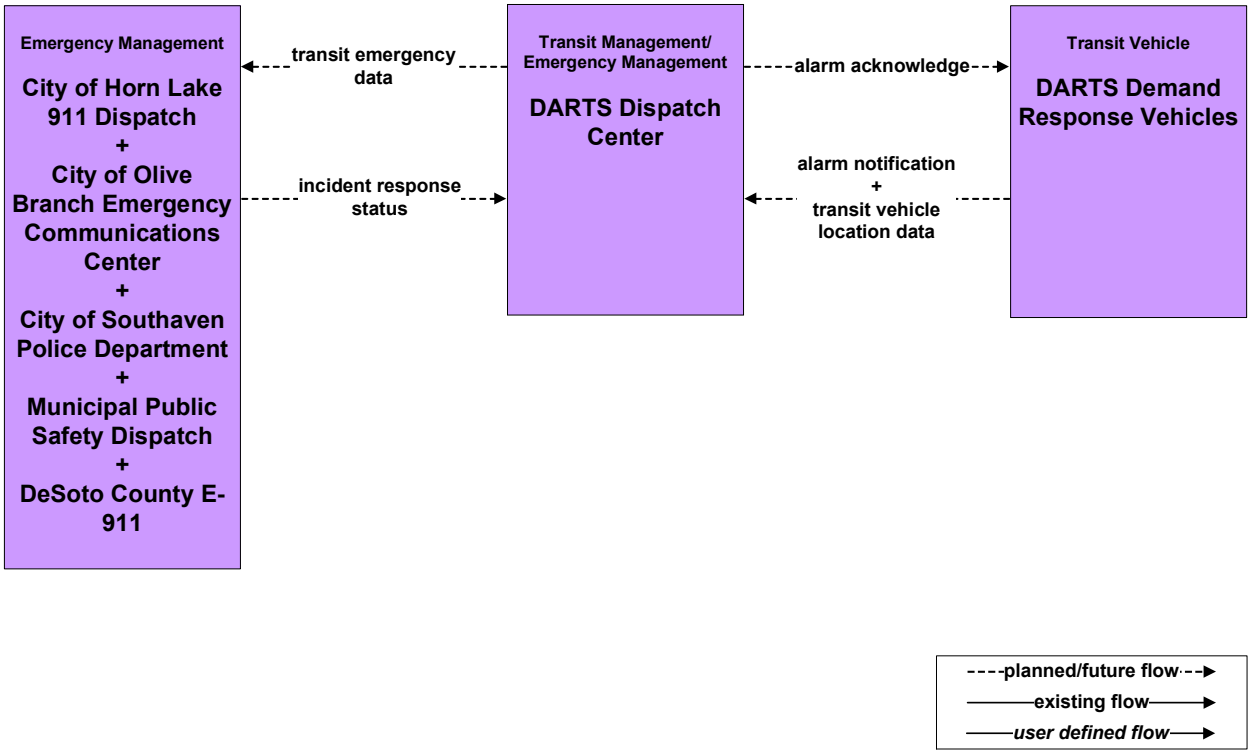

## APTS05 – Transit Security
## Memphis Area Transit Authority



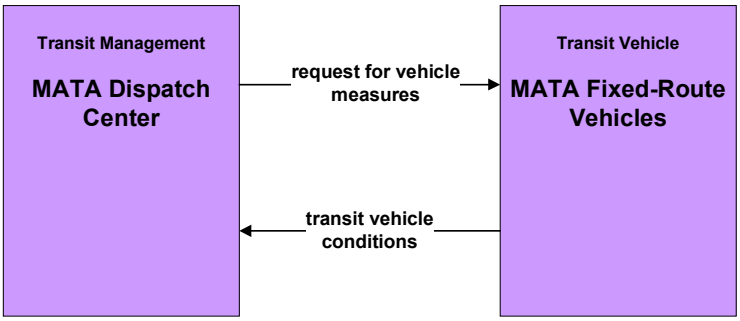
**APTS05 – Transit Security**
**Delta HRA Transportation**

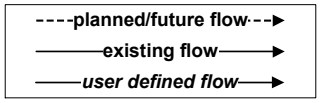



**APTS05 – Transit Security**
**DARTS**

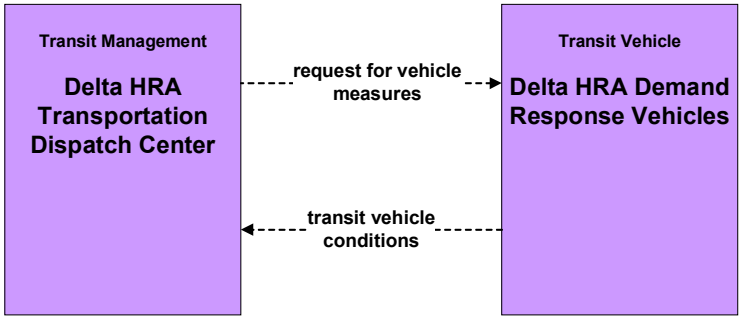


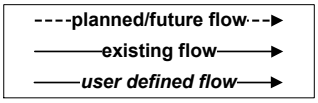
**APTS06 – Transit Fleet Management**
**Memphis Area Transit Authority**



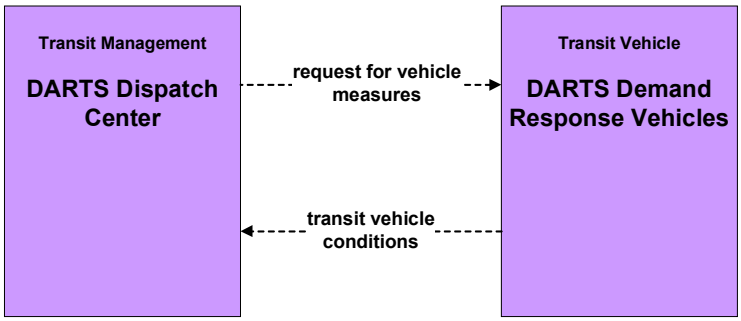



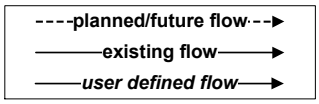

**APTS06 – Transit Fleet Management**
**Delta HRA Transportation**



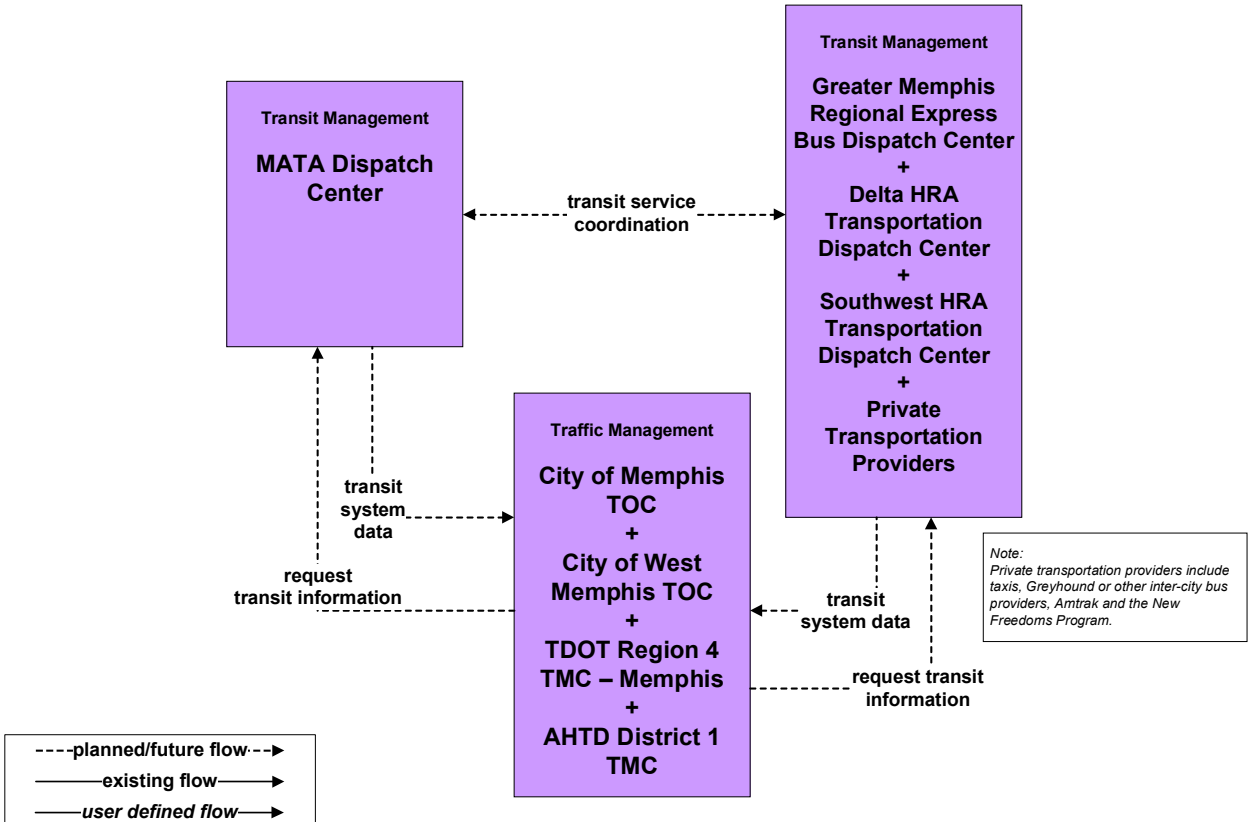



## APTS06 – Transit Fleet Management
## DARTS

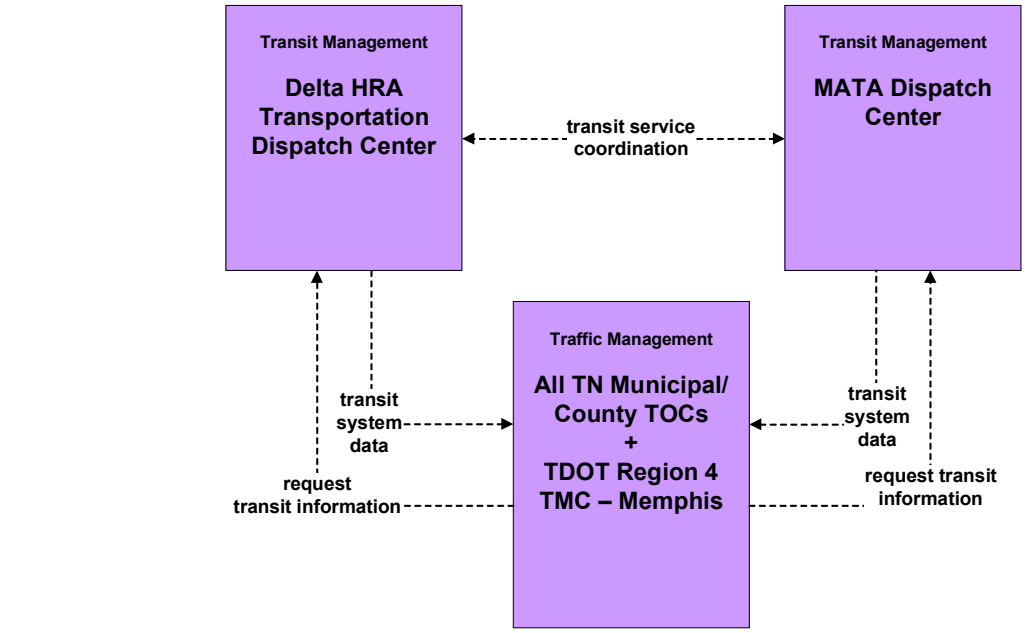


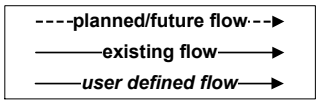




## APTS07 – Multi-Modal Coordination
## Memphis Area Transit Authority

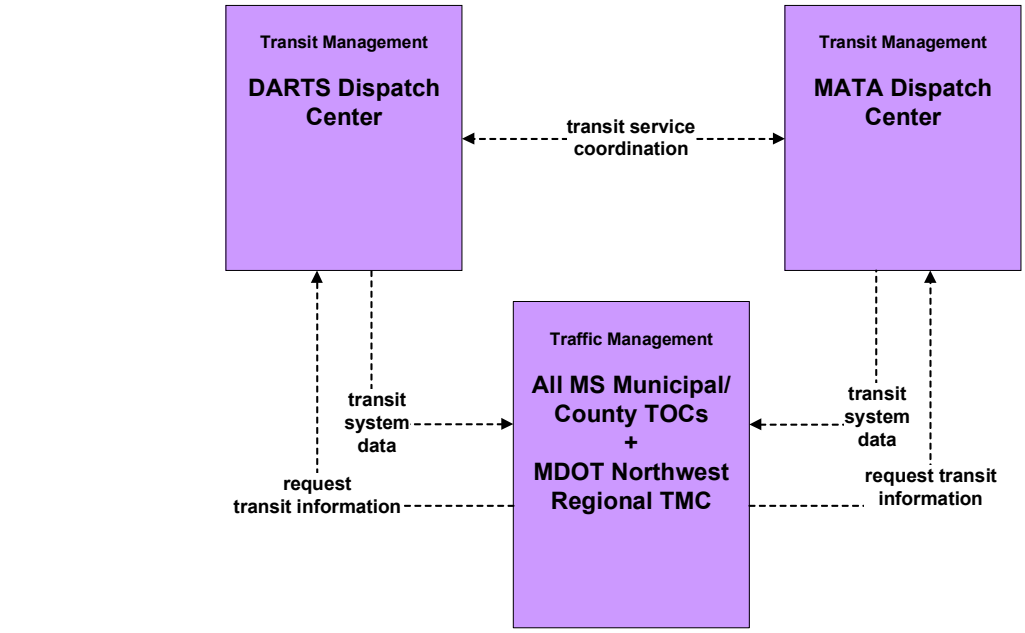


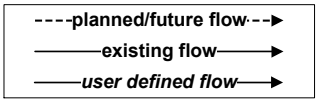
**APTS07 – Multi-Modal Coordination**
**Delta HRA Transportation**



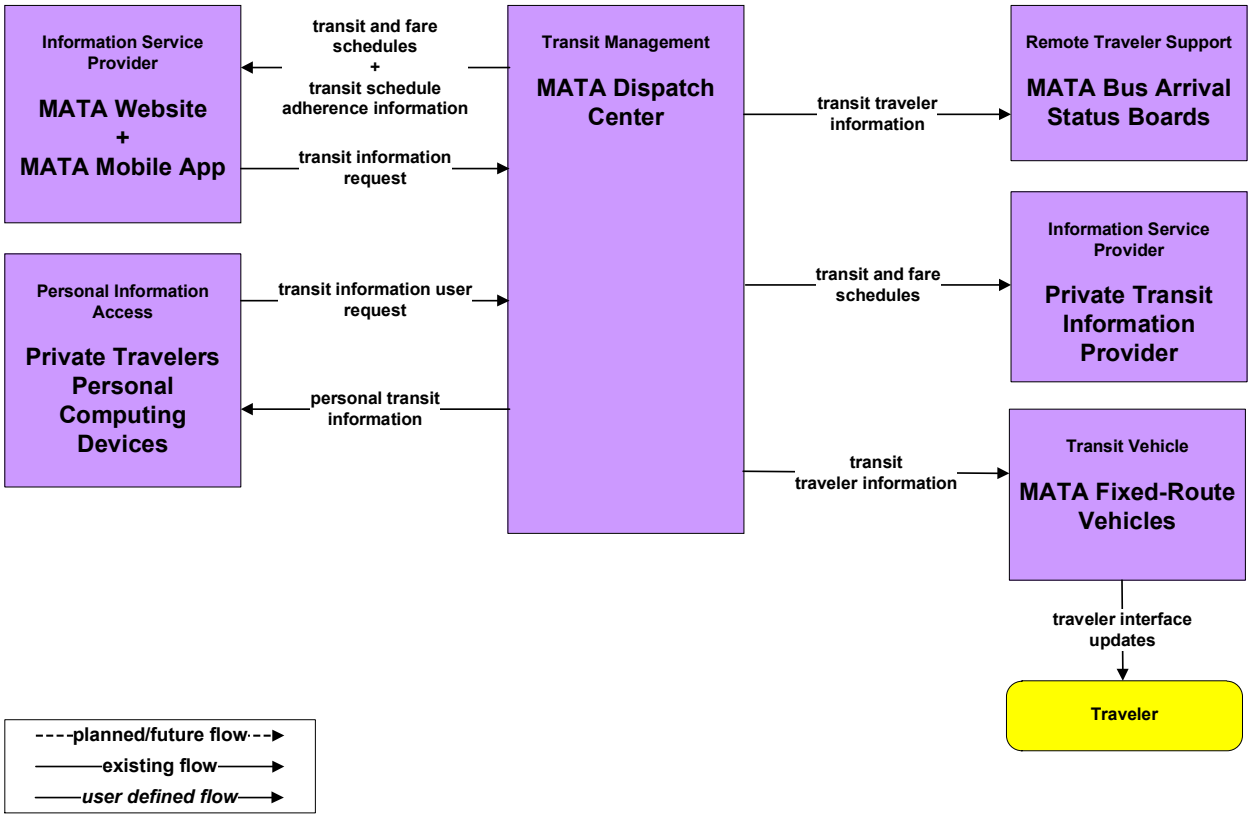




**APTS07 – Multi-Modal Coordination**
**DARTS**

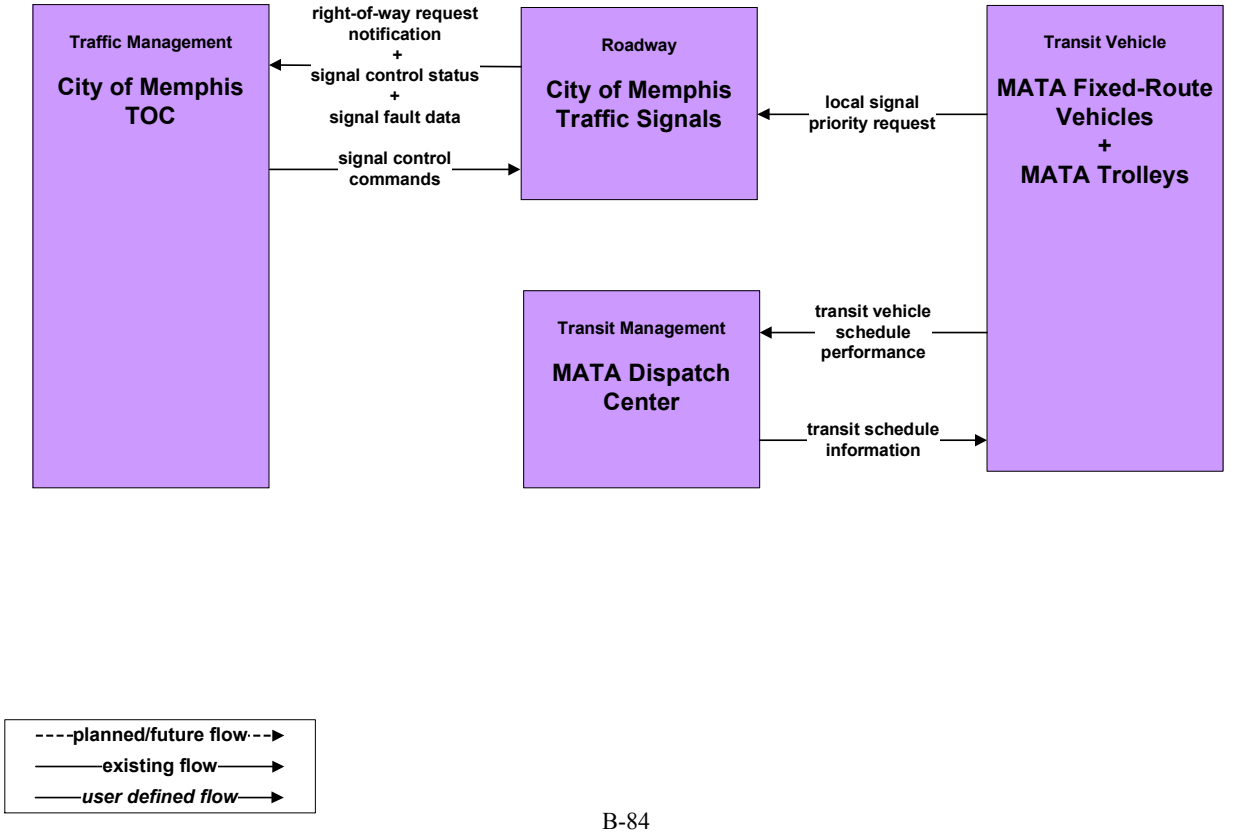


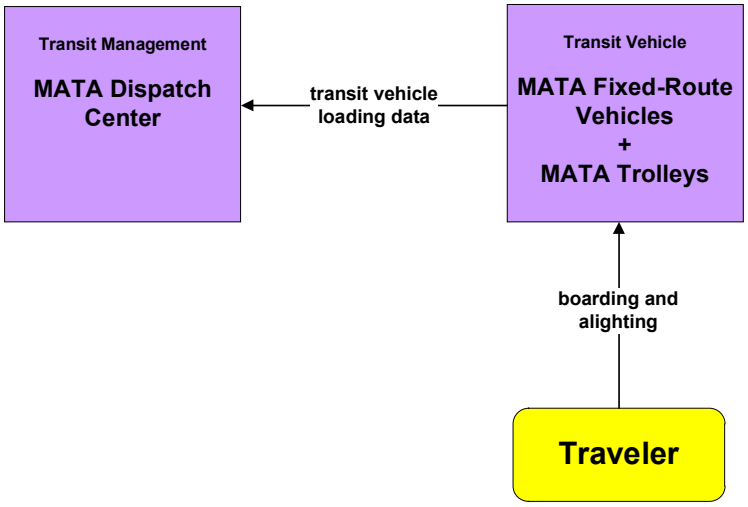
## APTS08 – Transit Traveler Information
## Memphis Area Transit Authority

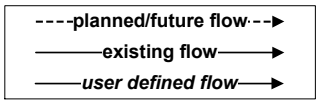



## APTS09 – Transit Signal Priority
## Memphis Area Transit Authority

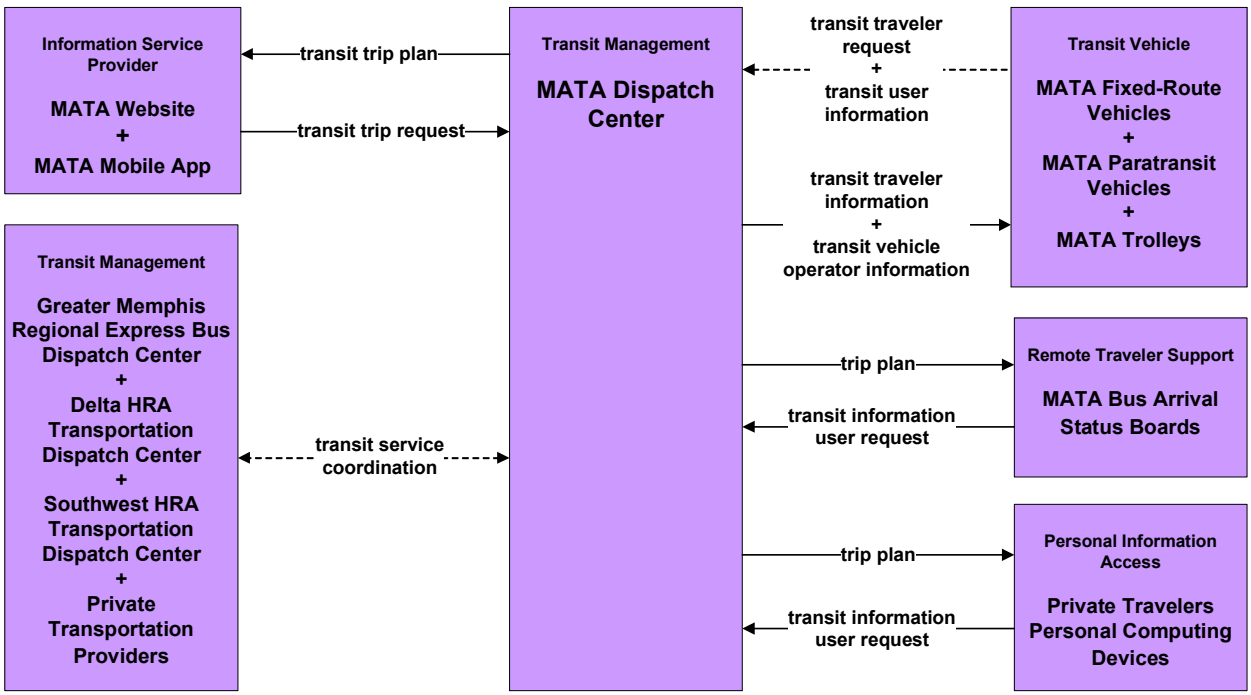


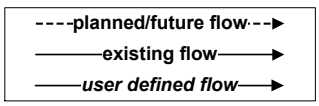
## APTS10 – Transit Passenger Counting
## Memphis Area Transit Authority



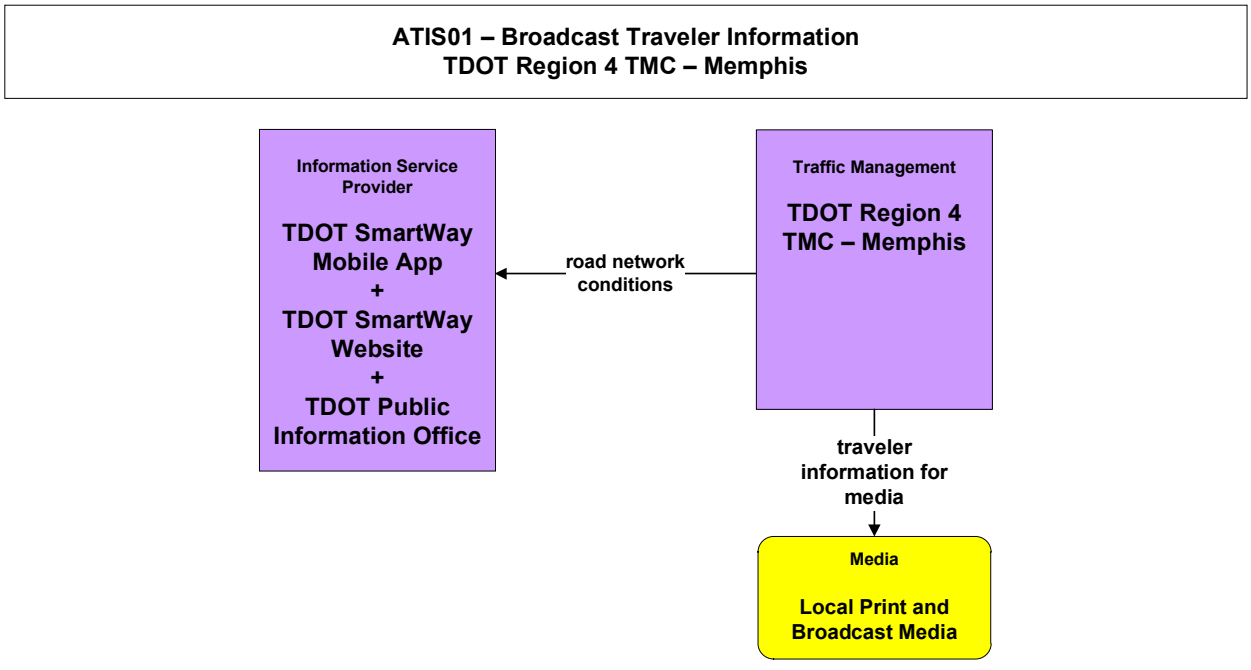




## APTS11 – Multimodal Connection Protection
## Memphis Area Transit Authority

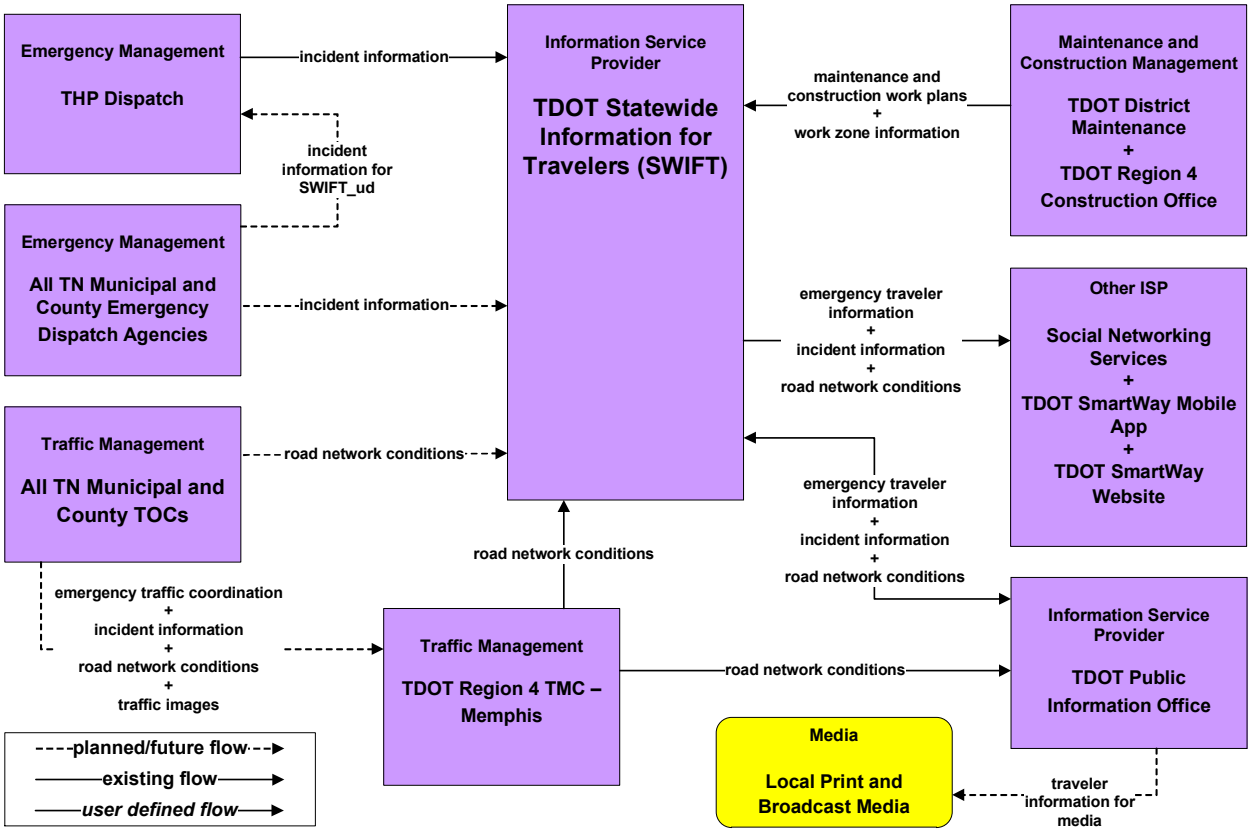


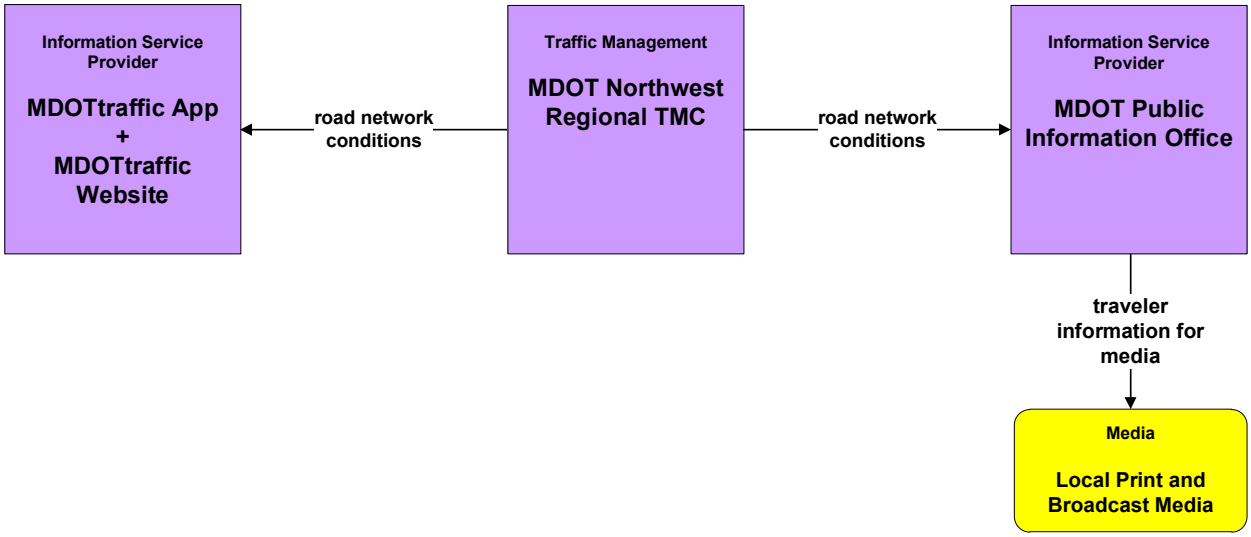
# Advanced Traveler Information System



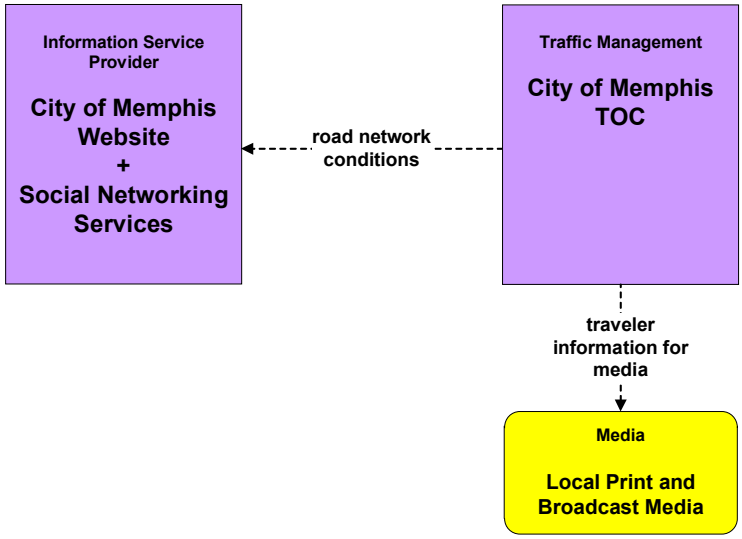
## ATIS01 – Broadcast Traveler Information
## SWIFT

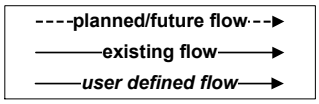



## ATIS01 – Broadcast Traveler Information
## MDOT

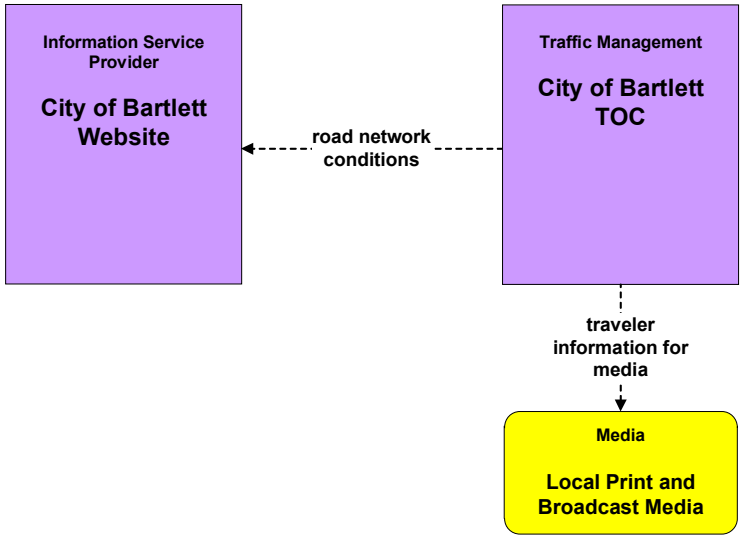


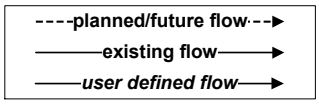
**ATIS01 – Broadcast Traveler Information**
**City of Memphis**



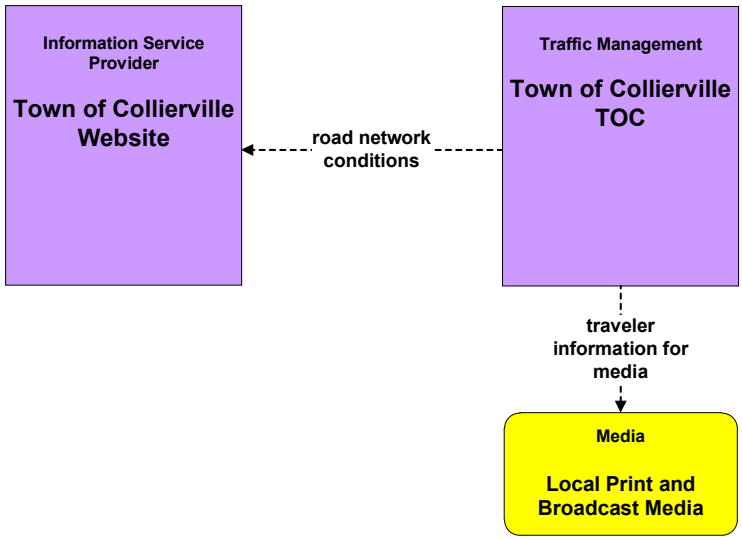



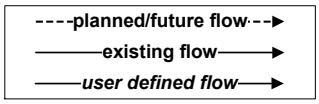

**ATIS01 – Broadcast Traveler Information**
**City of Bartlett**



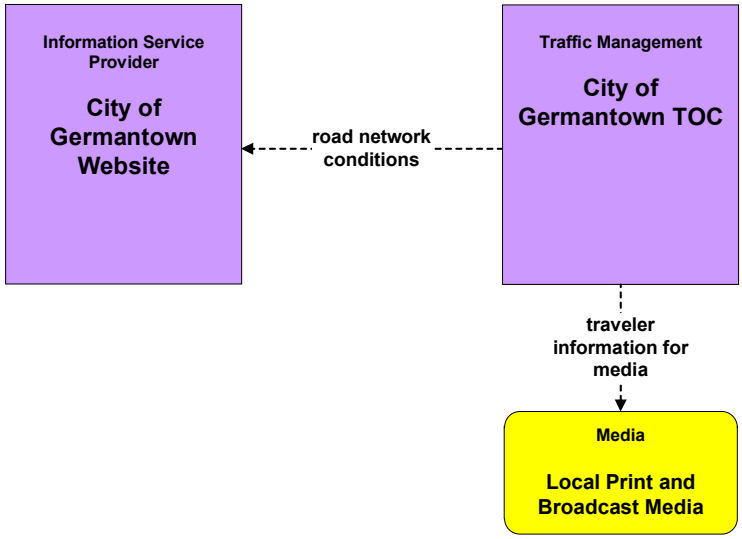



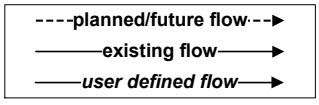
**ATIS01 – Broadcast Traveler Information**
**Town of Collierville**



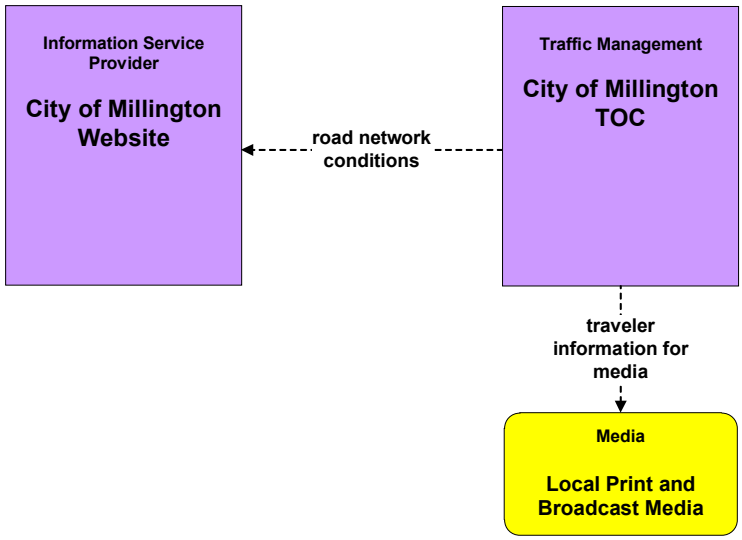



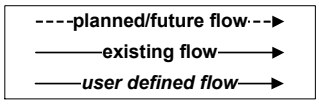

**ATIS01 – Broadcast Traveler Information**
**City of Germantown**



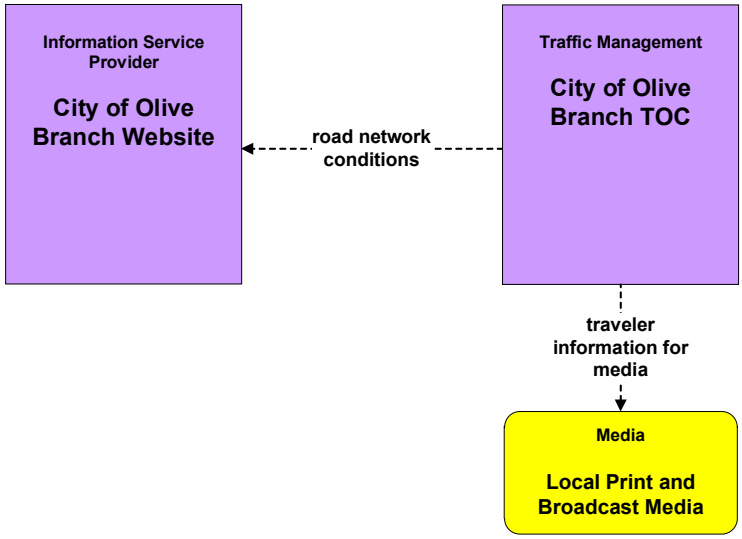



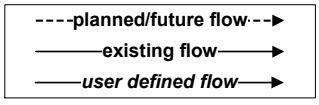
**ATIS01 – Broadcast Traveler Information**
**City of Millington**



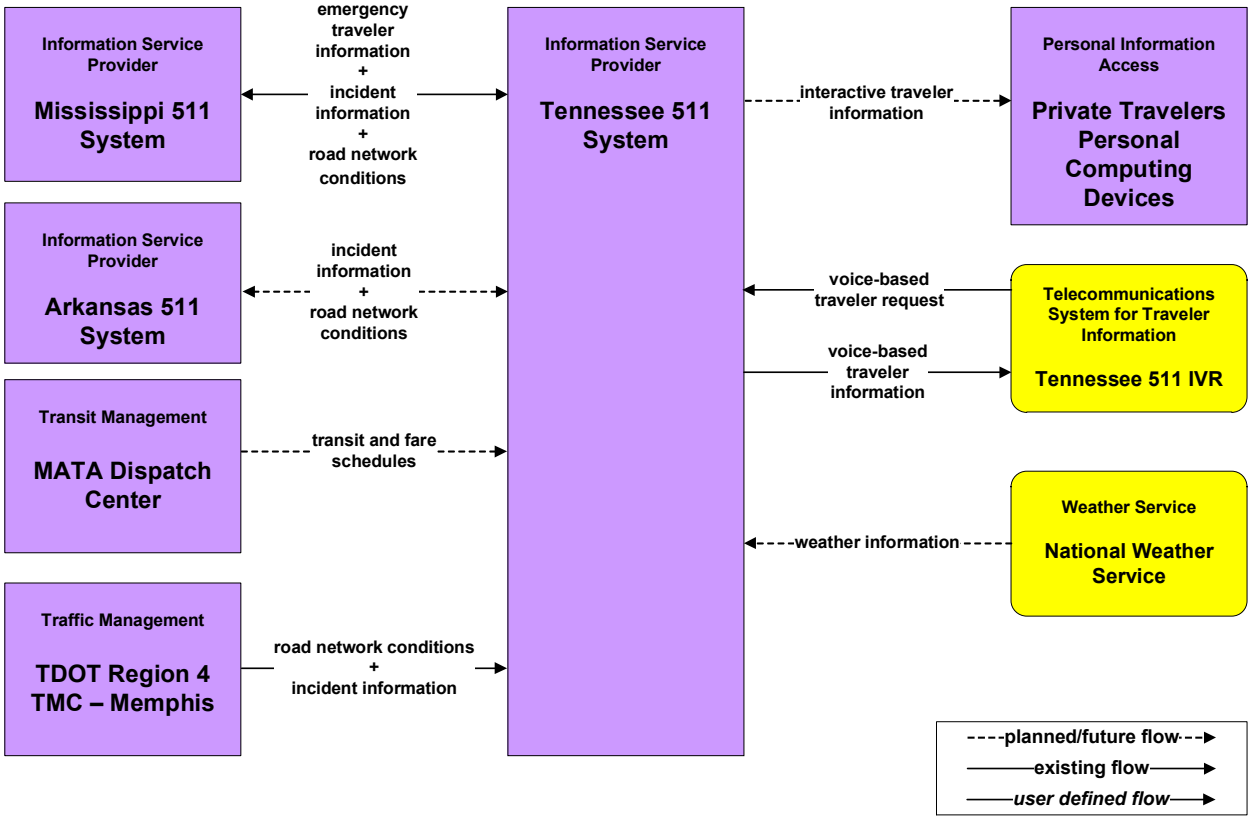




**ATIS01 – Broadcast Traveler Information**
**City of Olive Branch**

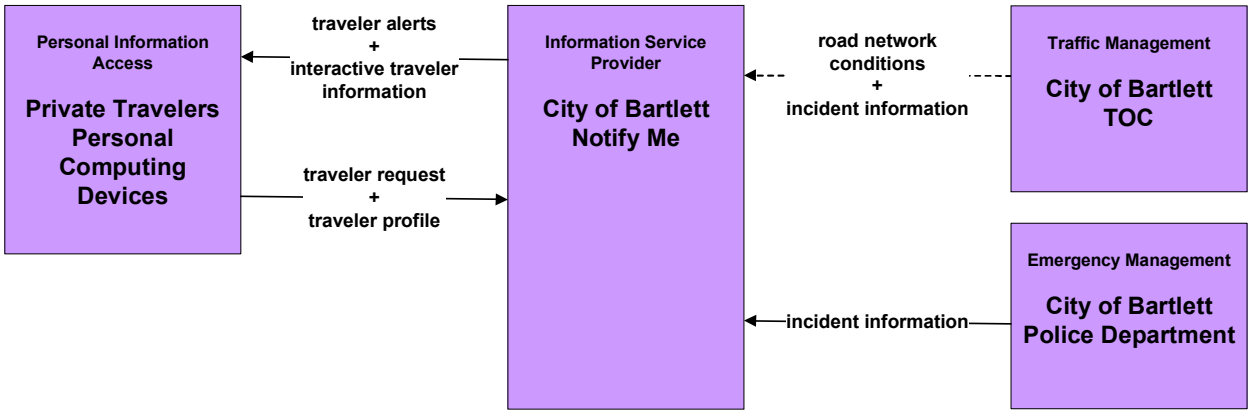


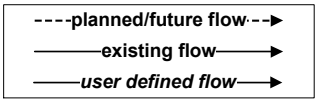



## ATIS02 – Interactive Traveler Information
## Tennessee 511

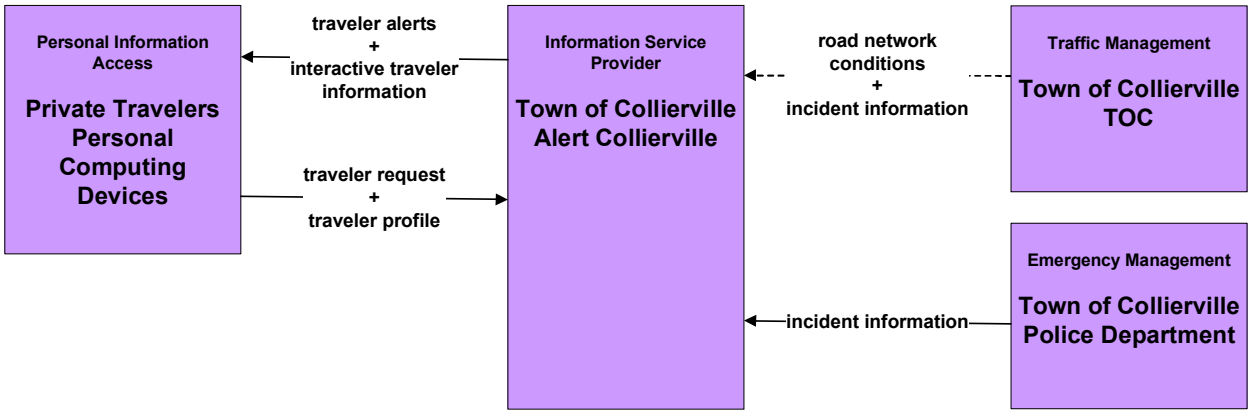


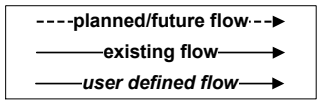

## ATIS02 – Interactive Traveler Information
## City of Bartlett



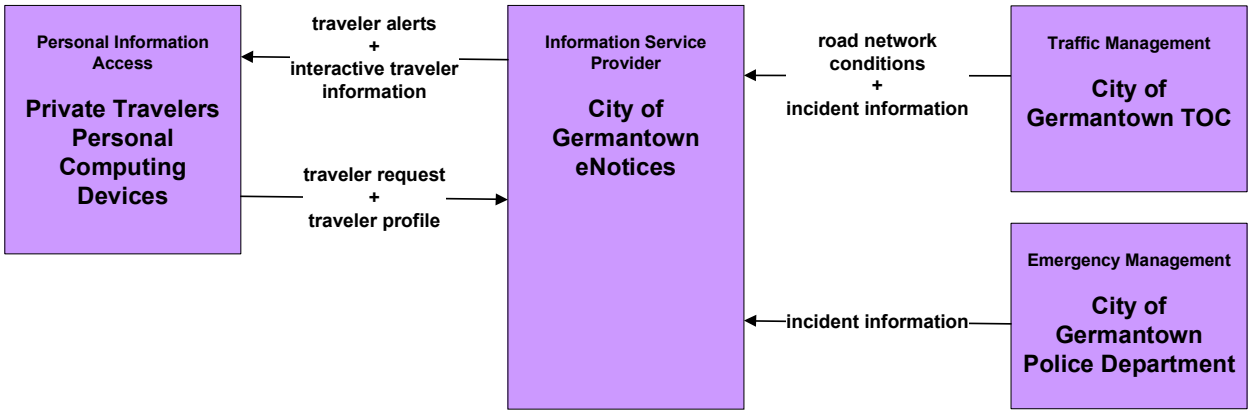



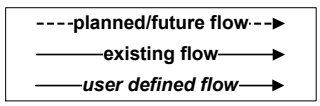
## ATIS02 – Interactive Traveler Information
## Town of Collierville



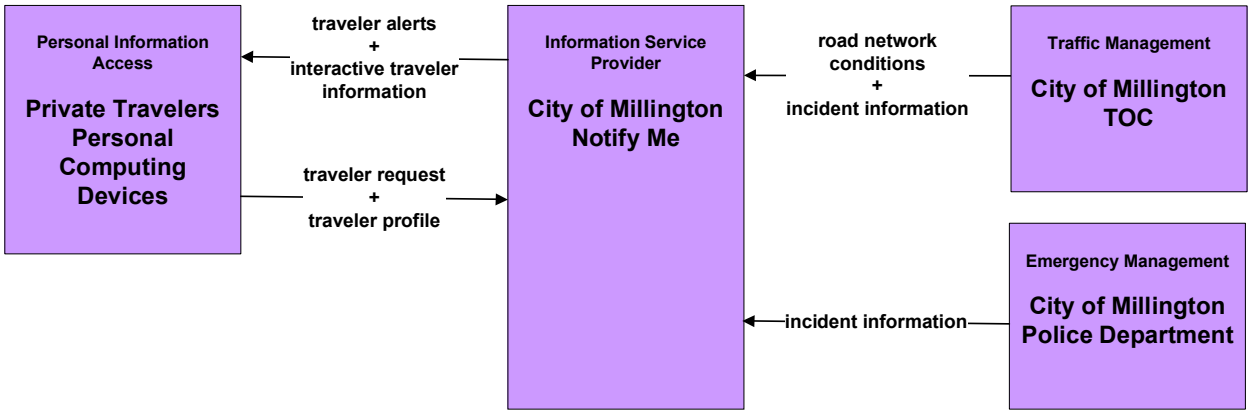



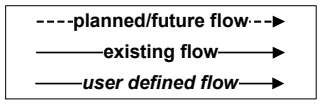

## ATIS02 – Interactive Traveler Information
## City of Germantown



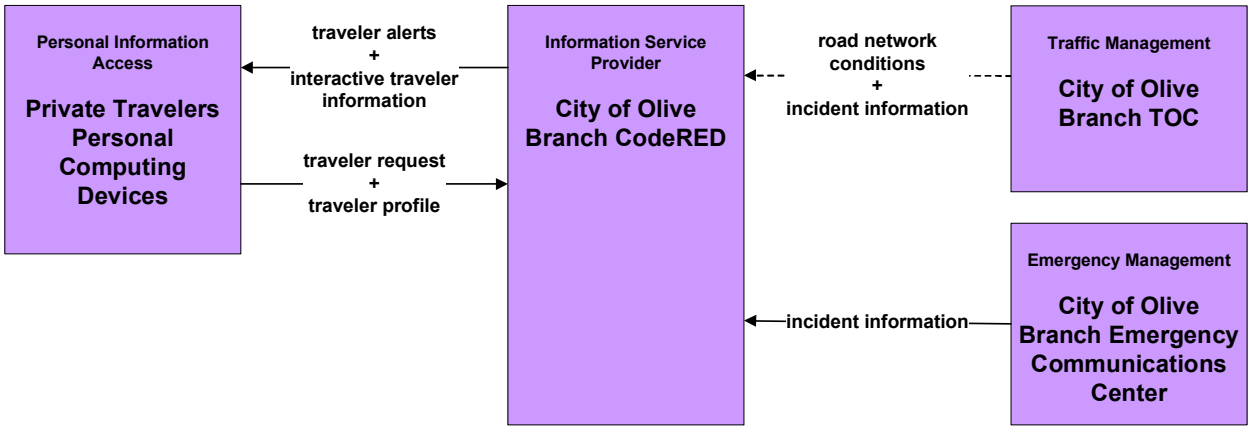



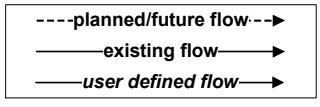
**ATIS02 – Interactive Traveler Information**
**City of Millington**



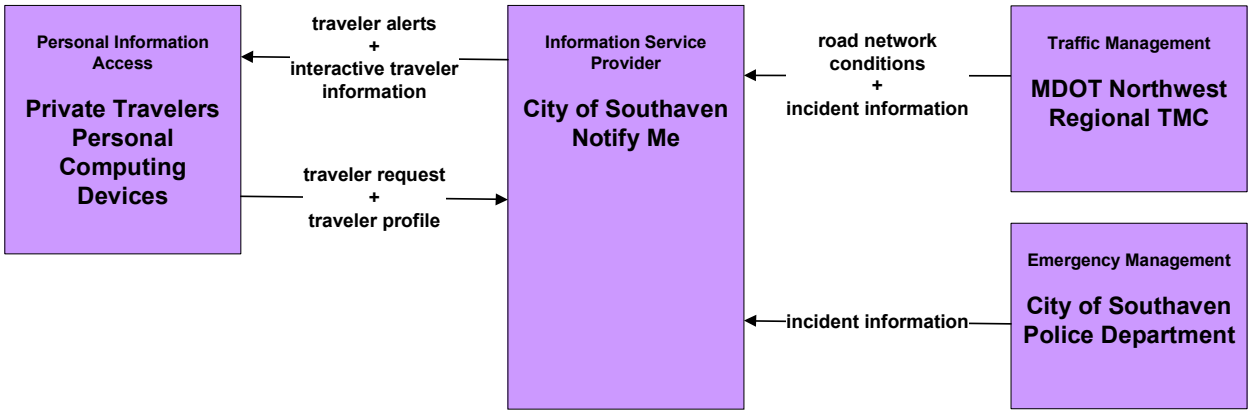



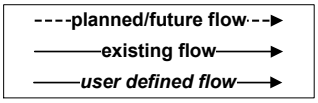

**ATIS02 – Interactive Traveler Information**
**City of Olive Branch**



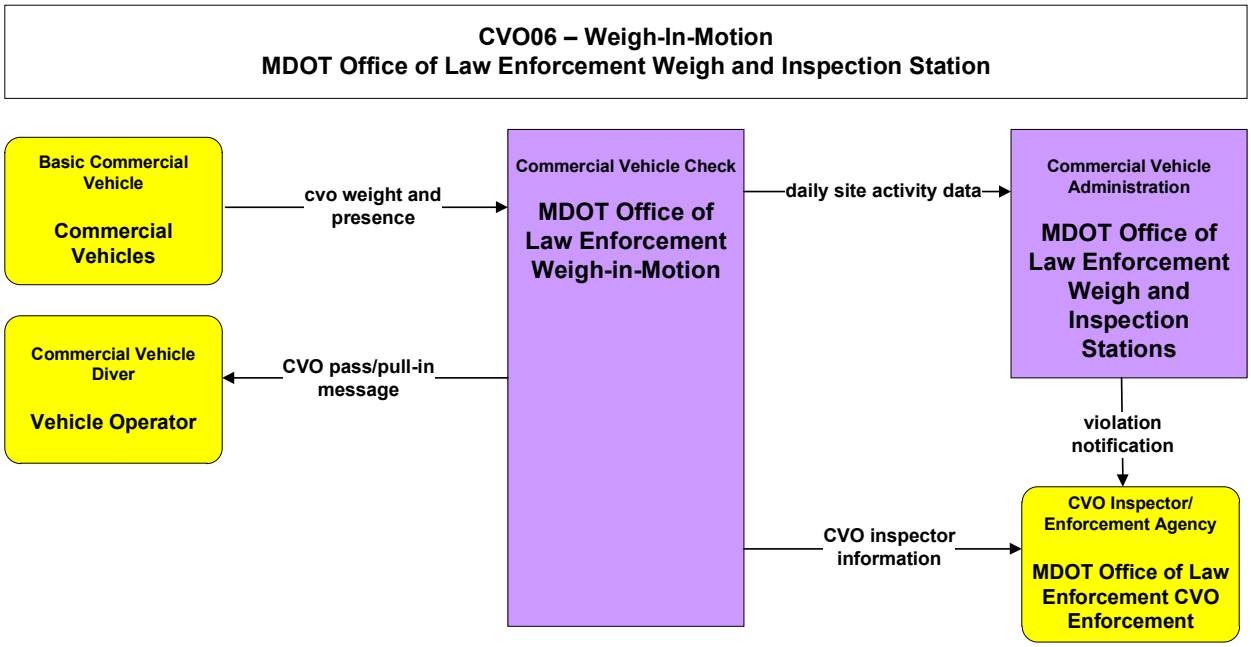



**ATIS02 – Interactive Traveler Information**
**City of Southaven**

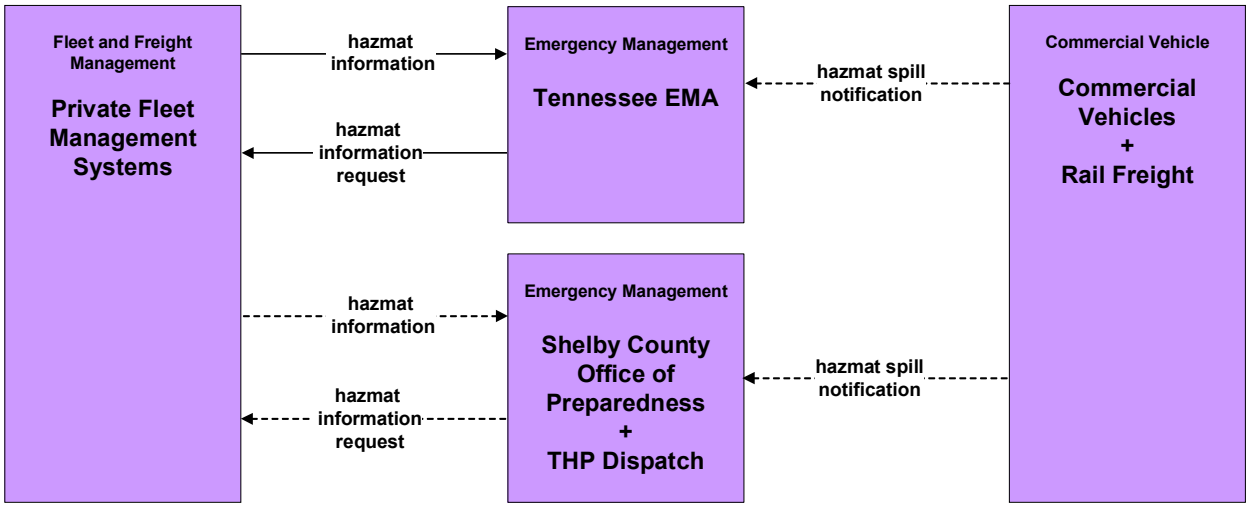


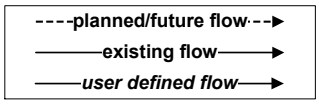



# Commercial Vehicle Operations

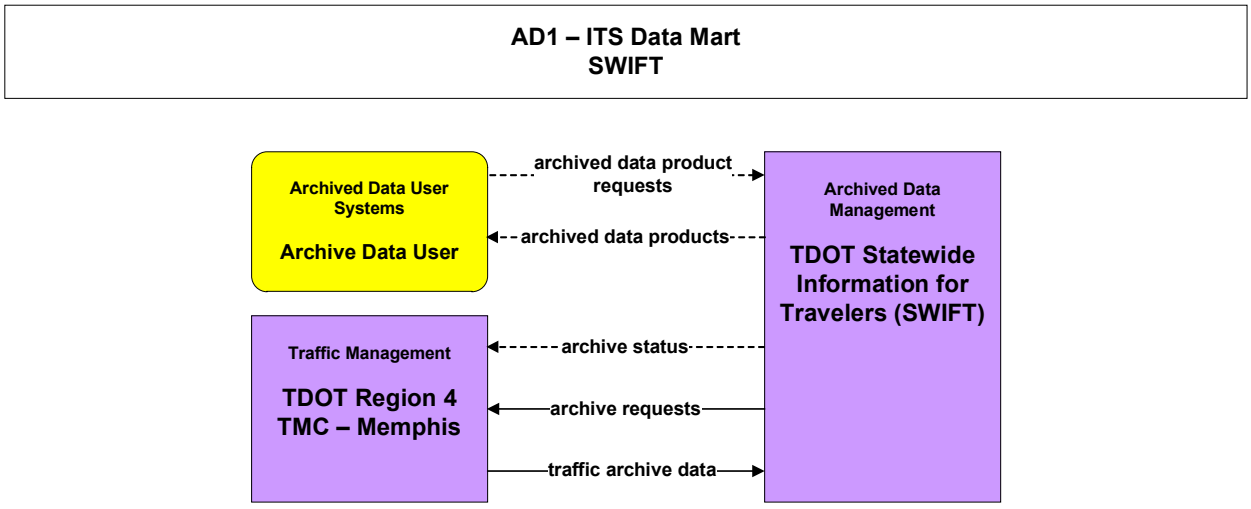


**CVO10 – HAZMAT Management**
**Memphis Region**

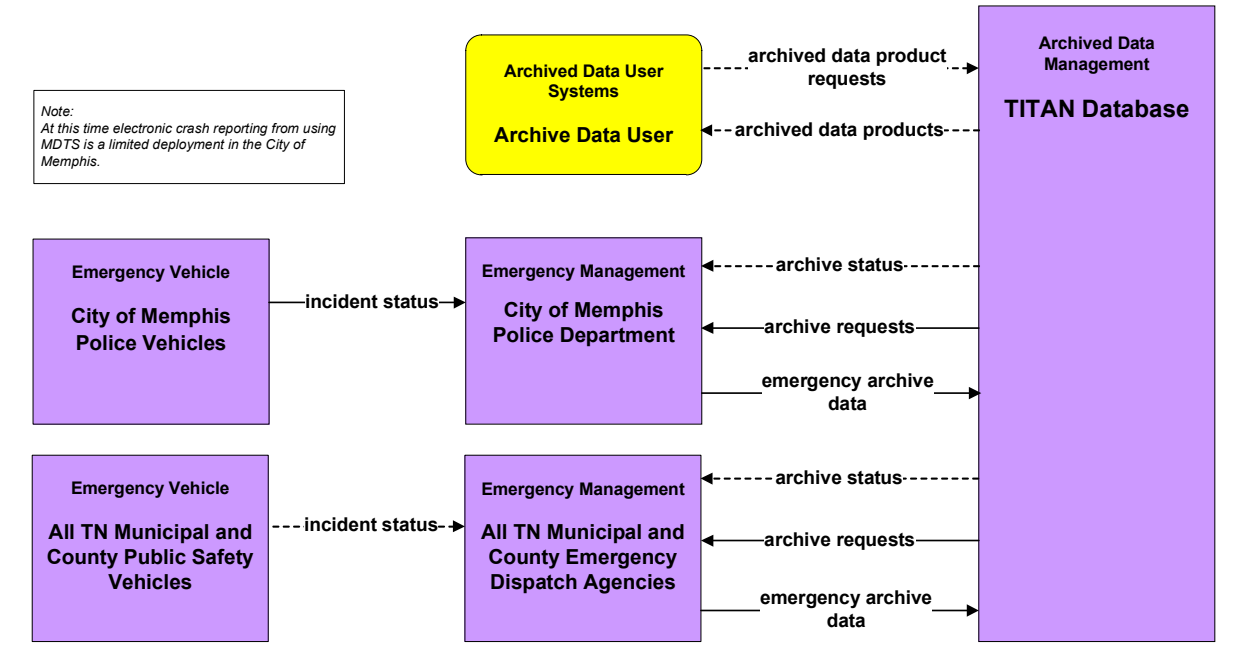


# Archived Data



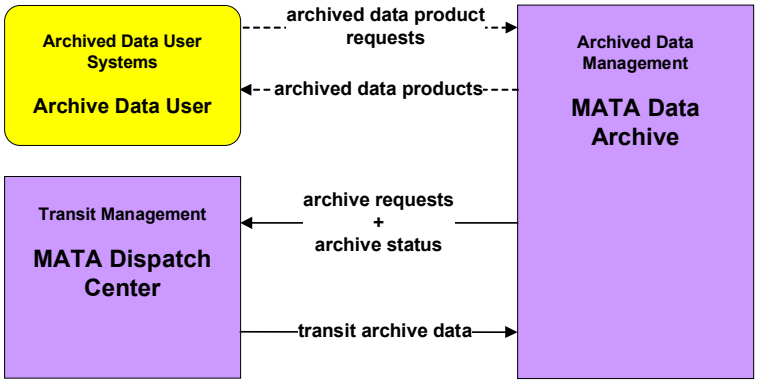
## AD1 – ITS Data Mart
## TITAN




planned/future flow
existing flow
*user defined flow*

*Note:*
*Only reportable crashes are sent to the TITAN database.*

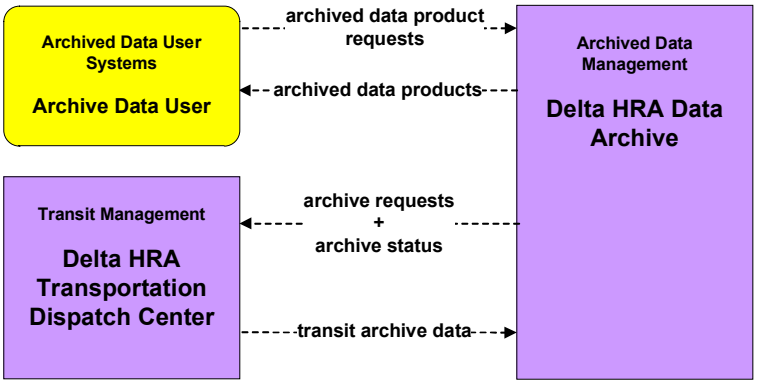
## AD1 – ITS Data Mart
## Memphis Area Transit Authority




*Note:*
*Data archive used by the National Transit Database, FTA, and TDOT Office of Public Transportation.*

planned/future flow
existing flow
*user defined flow*

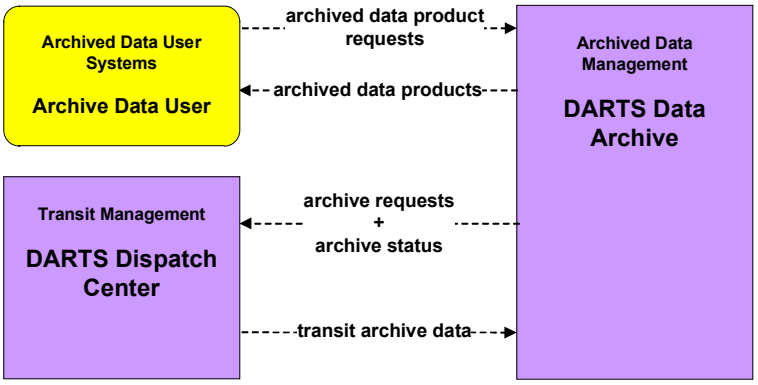
**AD1 – ITS Data Mart**
**Delta HRA Transportation**




*Note:*
*Data archive used by the National Transit Database, FTA, and TDOT Office of Public Transportation.*

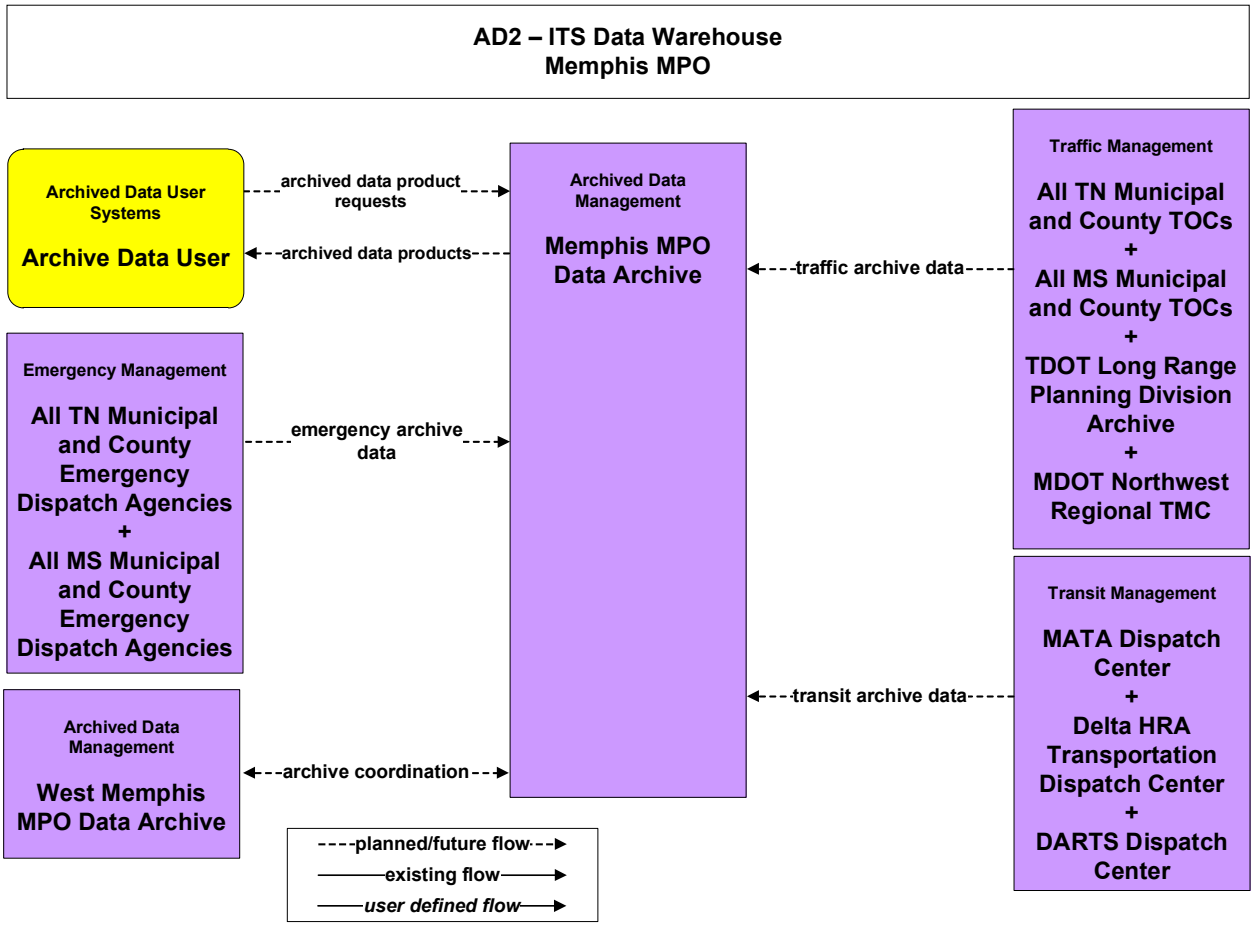
planned/future flow
existing flow
*user defined flow*

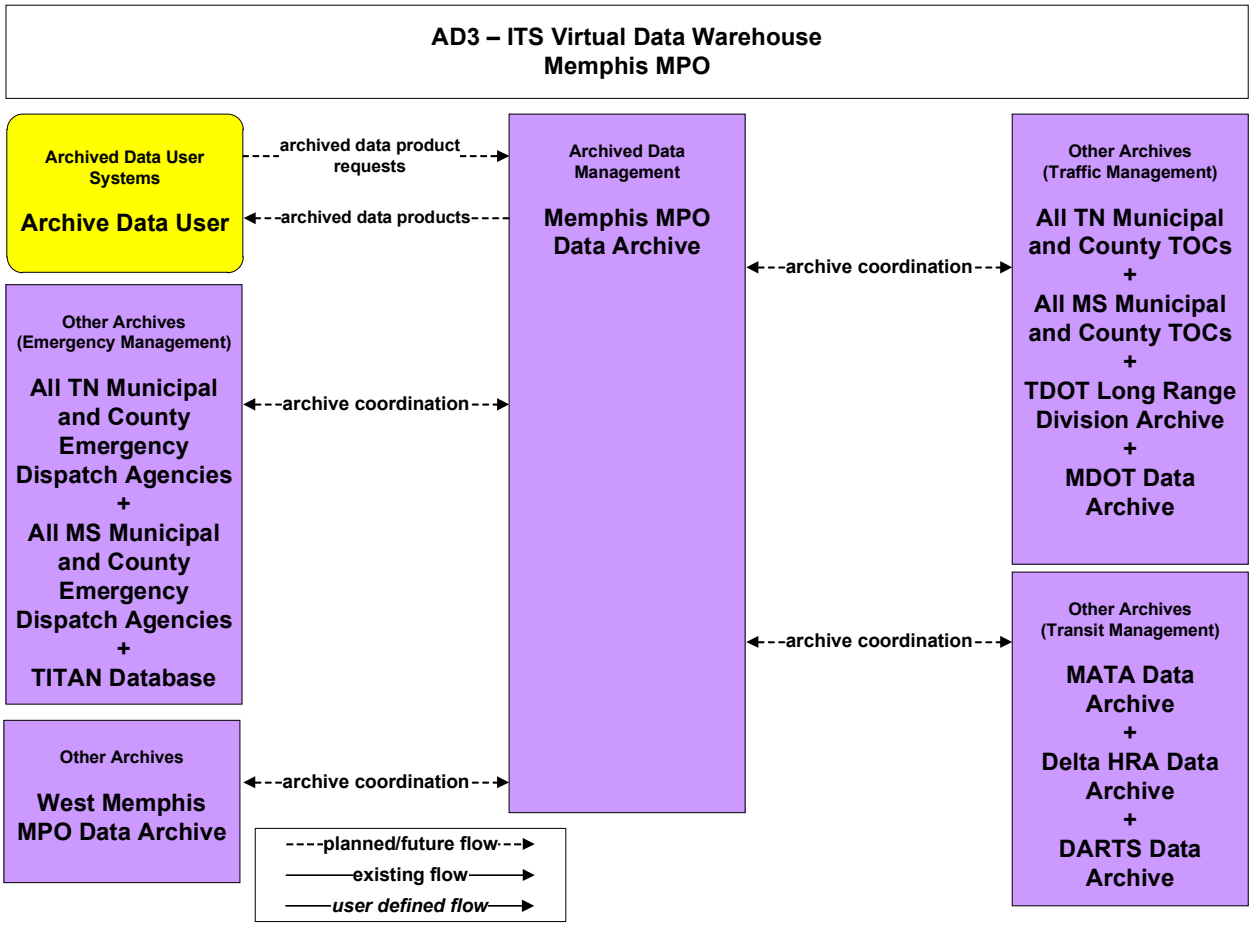
**AD1 – ITS Data Mart**
**DARTS**




*Note:*
*Data archive used by the National Transit Database, FTA, and MDOT*

planned/future flow
existing flow
*user defined flow*


AD2 – ITS Data Warehouse
Memphis MPO
Archived Data User Systems
Archive Data User
archived data product requests
archived data products
Archived Data Management
Memphis MPO Data Archive
Traffic Management
All TN Municipal and County TOCs
+
All MS Municipal and County TOCs
+
TDOT Long Range Planning Division Archive
+
MDOT Northwest Regional TMC
traffic archive data
Emergency Management
All TN Municipal and County Emergency Dispatch Agencies
+
All MS Municipal and County Emergency Dispatch Agencies
emergency archive data
Transit Management
MATA Dispatch Center
+
Delta HRA Transportation Dispatch Center
+
DARTS Dispatch Center
transit archive data
Archived Data Management
West Memphis MPO Data Archive
archive coordination
planned/future flow
existing flow
user defined flow


AD3 – ITS Virtual Data Warehouse
Memphis MPO
Archived Data User Systems
Archive Data User
archived data product requests
archived data products
Archived Data Management
Memphis MPO Data Archive
Other Archives (Traffic Management)
All TN Municipal and County TOCs
+
All MS Municipal and County TOCs
+
TDOT Long Range Division Archive
+
MDOT Data Archive
archive coordination
Other Archives (Emergency Management)
All TN Municipal and County Emergency Dispatch Agencies
+
All MS Municipal and County Emergency Dispatch Agencies
+
TITAN Database
archive coordination
Other Archives (Transit Management)
MATA Data Archive
+
Delta HRA Data Archive
+
DARTS Data Archive
archive coordination
Other Archives
West Memphis MPO Data Archive
archive coordination
planned/future flow
existing flow
user defined flow

# APPENDIX C – ELEMENT FUNCTIONS

| Element Name | Equipment Package (Function) |
|---|---|
| AHTD Crittenden County Local TOC | TMC Regional Traffic Management |
| AHTD District 1 TMC | TMC Regional Traffic Management |
| AHTD District Maintenance | MCM Work Activity Coordination |
| AHTD Statewide TMC | TMC Regional Traffic Management |
| All MS Municipal and County Emergency Dispatch Agencies | Emergency Call-Taking |
| | Emergency Data Collection |
| | Emergency Dispatch |
| | Emergency Evacuation Support |
| | Emergency Response Management |
| | Emergency Routing |
| | Incident Command |
| All MS Municipal and County TOCs | TMC Evacuation Support |
| | TMC Incident Detection |
| | TMC Incident Dispatch Coordination/Communication |
| | TMC Regional Traffic Management |
| | TMC Signal Control |
| | TMC Traffic Information Dissemination |
| | TMC Work Zone Traffic Management |
| | Traffic Data Collection |
| All Shelby County Emergency Dispatch Agencies | Emergency Call-Taking |
| | Emergency Data Collection |
| | Emergency Dispatch |
| | Emergency Evacuation Support |
| | Emergency Response Management |
| | Emergency Routing |
| | Incident Command |
| All Shelby County TOCs | TMC Evacuation Support |
| | TMC Incident Detection |
| | TMC Incident Dispatch Coordination/Communication |
| | TMC Regional Traffic Management |
| | TMC Signal Control |
| | TMC Traffic Information Dissemination |
| | TMC Work Zone Traffic Management |
| | Traffic Data Collection |

| Element Name | Equipment Package (Function) |
|---|---|
| All TN Municipal and County Emergency Dispatch Agencies | Emergency Call-Taking |
| | Emergency Data Collection |
| | Emergency Dispatch |
| | Emergency Evacuation Support |
| | Emergency Response Management |
| | Emergency Routing |
| | Incident Command |
| All TN Municipal and County Public Safety Vehicles | On-board EV En Route Support |
| | On-board EV Incident Management Communication |
| All TN Municipal and County TOCs | TMC Evacuation Support |
| | TMC Incident Detection |
| | TMC Incident Dispatch Coordination/Communication |
| | TMC Regional Traffic Management |
| | TMC Signal Control |
| | TMC Traffic Information Dissemination |
| | TMC Work Zone Traffic Management |
| | Traffic Data Collection |
| Arkansas 511 System | ISP Traveler Data Collection |
| | ISP Traveler Information Alerts |
| | Interactive Infrastructure Information |
| | Traveler Telephone Information |
| Arkansas DEM | Incident Command |
| | Emergency Response Management |
| | Emergency Evacuation Support |
| Arkansas State Police | Emergency Call-Taking |
| | Emergency Dispatch |
| | Incident Command |
| | Emergency Evacuation Support |
| | Center Secure Area Surveillance |
| | Center Secure Area Sensor Management |
| Arkansas TSIS/IDrive Arkansas.com | Basic Information Broadcast |
| | ISP Emergency Traveler Information |
| | ISP Traveler Data Collection |
| | MCM Data Collection |
| | MCM Environmental Information Processing |
| | MCM Incident Management |
| | MCM Work Activity Coordination |
| | MCM Work Zone Management |
| City of Bartlett CCTV Cameras | Roadway Basic Surveillance |

| Element Name | Equipment Package (Function) |
|---|---|
| City of Bartlett DMS | Roadway Traffic Information Dissemination |
| City of Bartlett Field Sensors | Roadway Basic Surveillance |
| | Standard Rail Crossing |
| | Roadway Equipment Coordination |
| City of Bartlett Fire/EMS Vehicles | On-board EV En Route Support |
| | On-board EV Incident Management Communication |
| City of Bartlett Notify Me | Interactive Infrastructure Information |
| | ISP Emergency Traveler Information |
| | ISP Traveler Information Alerts |
| | Traveler Telephone Information |
| City of Bartlett Police Department | Emergency Call-Taking |
| | Emergency Dispatch |
| | Emergency Routing |
| | Incident Command |
| | Emergency Response Management |
| | Emergency Evacuation Support |
| | Center Secure Area Surveillance |
| | Center Secure Area Sensor Management |
| | Center Secure Area Alarm Support |
| City of Bartlett Police Vehicles | On-board EV En Route Support |
| | On-board EV Incident Management Communication |
| City of Bartlett Rail Notification System | Roadway Traffic Information Dissemination |
| | Standard Rail Crossing |
| City of Bartlett Speed Monitoring Equipment | Roadway Speed Monitoring |
| City of Bartlett TOC | Collect Traffic Surveillance |
| | TMC Signal Control |
| | TMC Traffic Information Dissemination |
| | TMC Regional Traffic Management |
| | TMC Incident Detection |
| | TMC Incident Dispatch Coordination/Communication |
| | TMC Evacuation Support |
| | HRI Traffic Management |
| | TMC Speed Monitoring |
| | Traffic Maintenance |
| City of Bartlett Traffic Signals | Roadway Basic Surveillance |
| | Roadway Signal Controls |
| | Roadway Signal Priority |
| | Standard Rail Crossing |
| | Advanced Rail Crossing |
| | Roadway Equipment Coordination |

| Element Name | Equipment Package (Function) |
|---|---|
| City of Bartlett Website | ISP Traveler Data Collection |
| | Basic Information Broadcast |
| City of Germantown CCTV Cameras | Roadway Basic Surveillance |
| City of Germantown DMS | Roadway Traffic Information Dissemination |
| City of Germantown eNotices | Interactive Infrastructure Information |
| | ISP Emergency Traveler Information |
| | ISP Traveler Information Alerts |
| | Traveler Telephone Information |
| City of Germantown Field Sensors | Roadway Basic Surveillance |
| | Standard Rail Crossing |
| | Roadway Equipment Coordination |
| City of Germantown Fire/EMS Vehicles | On-board EV En Route Support |
| | On-board EV Incident Management Communication |
| City of Germantown Police Department | Emergency Call-Taking |
| | Emergency Dispatch |
| | Emergency Routing |
| | Incident Command |
| | Emergency Response Management |
| | Emergency Evacuation Support |
| | Center Secure Area Surveillance |
| | Center Secure Area Sensor Management |
| | Center Secure Area Alarm Support |
| City of Germantown Police Vehicles | On-board EV En Route Support |
| | On-board EV Incident Management Communication |
| City of Germantown Rail Notification System | Roadway Traffic Information Dissemination |
| | Standard Rail Crossing |
| City of Germantown Speed Monitoring Equipment | Roadway Speed Monitoring |
| City of Germantown TOC | Collect Traffic Surveillance |
| | TMC Signal Control |
| | TMC Traffic Information Dissemination |
| | TMC Regional Traffic Management |
| | TMC Incident Detection |
| | TMC Incident Dispatch Coordination/Communication |
| | TMC Evacuation Support |
| | HRI Traffic Management |
| | TMC Speed Monitoring |
| | Traffic Maintenance |

| Element Name | Equipment Package (Function) |
|---|---|
| City of Germantown Traffic Signals | Roadway Basic Surveillance |
| | Roadway Signal Controls |
| | Roadway Signal Priority |
| | Standard Rail Crossing |
| | Advanced Rail Crossing |
| | Roadway Equipment Coordination |
| City of Germantown Website | ISP Traveler Data Collection |
| | Basic Information Broadcast |
| City of Horn Lake 911 Dispatch | Emergency Call-Taking |
| | Emergency Dispatch |
| | Emergency Routing |
| | Emergency Response Management |
| | Emergency Evacuation Support |
| | Center Secure Area Surveillance |
| | Center Secure Area Sensor Management |
| | Center Secure Area Alarm Support |
| City of Horn Lake CCTV Cameras | Roadway Basic Surveillance |
| City of Horn Lake Field Sensors | Roadway Basic Surveillance |
| | Roadway Equipment Coordination |
| | Standard Rail Crossing |
| City of Horn Lake Fire/EMS Vehicles | On-board EV En Route Support |
| | On-board EV Incident Management Communication |
| City of Horn Lake Police Vehicles | On-board EV En Route Support |
| | On-board EV Incident Management Communication |
| City of Horn Lake Rail Notification System | Roadway Traffic Information Dissemination |
| | Standard Rail Crossing |
| City of Horn Lake TOC | Collect Traffic Surveillance |
| | TMC Signal Control |
| | TMC Regional Traffic Management |
| | TMC Incident Dispatch Coordination/Communication |
| | TMC Evacuation Support |
| | HRI Traffic Management |
| | Traffic Maintenance |
| City of Horn Lake Traffic Signals | Roadway Basic Surveillance |
| | Roadway Signal Controls |
| | Roadway Signal Priority |
| | Standard Rail Crossing |
| | Advanced Rail Crossing |
| | Roadway Equipment Coordination |
| City of Horn Lake Website | Basic Information Broadcast |
| | ISP Traveler Data Collection |

| Element Name | Equipment Package (Function) |
|---|---|
| City of Memphis Arterial Emergency Response Dispatch | Service Patrol Management |
| City of Memphis Arterial Emergency Response Vehicles | On-board EV En Route Support |
| | On-board EV Incident Management Communication |
| City of Memphis CCTV Cameras | Roadway Basic Surveillance |
| City of Memphis Changeable Speed Limit Signs | Roadway Equipment Coordination |
| | Roadway Speed Monitoring and Warning |
| City of Memphis DMS | Roadway Traffic Information Dissemination |
| City of Memphis Engineering Division | MCM Vehicle Tracking |
| | MCM Incident Management |
| | MCM Roadway Maintenance and Construction |
| | MCM Work Zone Management |
| | MCM Work Activity Coordination |
| City of Memphis Field Sensors | Roadway Basic Surveillance |
| | Standard Rail Crossing |
| | Roadway Equipment Coordination |
| City of Memphis Fire/EMS Vehicles | On-board EV En Route Support |
| | On-board EV Incident Management Communication |
| City of Memphis Parking Management System | Parking Coordination |
| City of Memphis Pedestrian Hybrid Beacons | Roadway Mixed Use Sensing |
| | Roadway Warning |
| City of Memphis Police Department | Emergency Call-Taking |
| | Emergency Dispatch |
| | Emergency Routing |
| | Incident Command |
| | Emergency Response Management |
| | Emergency Evacuation Support |
| | Center Secure Area Surveillance |
| | Center Secure Area Sensor Management |
| | Center Secure Area Alarm Support |
| | Emergency Data Collection |
| City of Memphis Police Portable DMS | Roadway Work Zone Traffic Control |
| City of Memphis Police Vehicles | On-board EV En Route Support |
| | On-board EV Incident Management Communication |
| City of Memphis Public Works Division | MCM Vehicle Tracking |
| | MCM Environmental Information Processing |
| | MCM Incident Management |
| | MCM Roadway Maintenance and Construction |
| | MCM Work Zone Management |
| | MCM Work Activity Coordination |

| Element Name | Equipment Package (Function) |
|---|---|
| City of Memphis Rail Notification System | Roadway Traffic Information Dissemination |
| | Standard Rail Crossing |
| City of Memphis RWIS Sensors | Roadway Environmental Monitoring |
| City of Memphis Service Vehicles | MCV Vehicle Location Tracking |
| | MCV Work Zone Support |
| City of Memphis Speed Monitoring Equipment | Roadway Speed Monitoring |
| City of Memphis TOC | Collect Traffic Surveillance |
| | TMC Signal Control |
| | TMC Traffic Information Dissemination |
| | TMC Regional Traffic Management |
| | TMC Incident Detection |
| | TMC Incident Dispatch Coordination/Communication |
| | TMC Evacuation Support |
| | HRI Traffic Management |
| | TMC Speed Monitoring |
| | Traffic Maintenance |
| | TMC Work Zone Traffic Management |
| | TMC Multimodal Coordination |
| City of Memphis Traffic Signals | Roadway Basic Surveillance |
| | Roadway Signal Controls |
| | Roadway Signal Priority |
| | Standard Rail Crossing |
| | Advanced Rail Crossing |
| | Roadway Equipment Coordination |
| City of Memphis Website | ISP Traveler Data Collection |
| | Basic Information Broadcast |
| City of Millington CCTV Cameras | Roadway Basic Surveillance |
| City of Millington DMS | Roadway Traffic Information Dissemination |
| City of Millington Field Sensors | Roadway Basic Surveillance |
| | Standard Rail Crossing |
| | Roadway Equipment Coordination |
| City of Millington Fire Vehicles | On-board EV En Route Support |
| | On-board EV incident Management Communication |
| City of Millington Notify Me | Interactive Infrastructure Information |
| | ISP Emergency Traveler Information |
| | ISP Traveler Information Alerts |
| | Traveler Telephone Information |

| Element Name | Equipment Package (Function) |
|---|---|
| City of Millington Police Department | Center Secure Area Alarm Support |
| | Center Secure Area Sensor Management |
| | Center Secure Area Surveillance |
| | Emergency Call-Taking |
| | Emergency Dispatch |
| | Emergency Evacuation Support |
| | Emergency Response Management |
| | Emergency Routing |
| | Incident Command |
| City of Millington Police Vehicles | On-board EV En Route Support |
| | On-board EV incident Management Communication |
| City of Millington Rail Notification System | Roadway Traffic Information Dissemination |
| | Standard Rail Crossing |
| City of Millington Speed Monitoring Equipment | Roadway Speed Monitoring |
| City of Millington TOC | Collect Traffic Surveillance |
| | TMC Signal Control |
| | TMC Traffic Information Dissemination |
| | TMC Regional Traffic Management |
| | TMC Incident Detection |
| | TMC Incident Dispatch Coordination/Communication |
| | TMC Evacuation Support |
| | HRI Traffic Management |
| | TMC Speed Monitoring |
| | Traffic Maintenance |
| City of Millington Traffic Signals | Roadway Basic Surveillance |
| | Roadway Signal Controls |
| | Standard Rail Crossing |
| | Advanced Rail Crossing |
| | Roadway Equipment Coordination |
| City of Millington Website | ISP Traveler Data Collection |
| | Basic Information Broadcast |
| City of Olive Branch CCTV Cameras | Roadway Basic Surveillance |
| City of Olive Branch CodeRED | Interactive Infrastructure Information |
| | ISP Emergency Traveler Information |
| | ISP Traveler Information Alerts |
| | Traveler Telephone Information |
| City of Olive Branch DMS | Roadway Traffic Information Dissemination |

| Element Name | Equipment Package (Function) |
|---|---|
| City of Olive Branch Emergency Communications Center | Emergency Call-Taking |
| | Emergency Dispatch |
| | Emergency Routing |
| | Incident Command |
| | Emergency Response Management |
| | Emergency Evacuation Support |
| | Center Secure Area Surveillance |
| | Center Secure Area Sensor Management |
| | Center Secure Area Alarm Support |
| City of Olive Branch Field Sensors | Roadway Basic Surveillance |
| | Roadway Equipment Coordination |
| City of Olive Branch Fire/EMS Vehicles | On-board EV En Route Support |
| | On-board EV Incident Management Communication |
| City of Olive Branch Police Vehicles | On-board EV En Route Support |
| | On-board EV Incident Management Communication |
| City of Olive Branch Rail Notification System | Roadway Traffic Information Dissemination |
| | Standard Rail Crossing |
| City of Olive Branch TOC | Collect Traffic Surveillance |
| | TMC Signal Control |
| | TMC Traffic Information Dissemination |
| | TMC Regional Traffic Management |
| | TMC Incident Detection |
| | TMC Incident Dispatch Coordination/Communication |
| | TMC Evacuation Support |
| | HRI Traffic Management |
| | Traffic Maintenance |
| City of Olive Branch Traffic Signals | Roadway Basic Surveillance |
| | Roadway Signal Controls |
| | Roadway Signal Priority |
| | Standard Rail Crossing |
| | Advanced Rail Crossing |
| | Roadway Equipment Coordination |
| City of Olive Branch Website | ISP Traveler Data Collection |
| | Basic Information Broadcast |
| City of Southaven Fire/EMS Vehicles | On-board EV En Route Support |
| | On-board EV Incident Management Communication |
| City of Southaven Notify Me | Interactive Infrastructure Information |
| | ISP Emergency Traveler Information |
| | ISP Traveler Information Alerts |
| | Traveler Telephone Information |

| Element Name | Equipment Package (Function) |
|---|---|
| City of Southaven Police Department | Emergency Call-Taking |
| | Emergency Dispatch |
| | Emergency Routing |
| | Emergency Response Management |
| | Center Secure Area Surveillance |
| | Center Secure Area Sensor Management |
| | Center Secure Area Alarm Support |
| City of Southaven Police Vehicles | On-board EV En Route Support |
| | On-board EV Incident Management Communication |
| City of Southaven Rail Notification System | Roadway Traffic Information Dissemination |
| | Standard Rail Crossing |
| City of Southaven Traffic Signals | Roadway Basic Surveillance |
| | Roadway Signal Controls |
| | Roadway Signal Priority |
| | Standard Rail Crossing |
| | Advanced Rail Crossing |
| | Roadway Equipment Coordination |
| City of West Memphis Police Department | Emergency Dispatch |
| | Emergency Routing |
| | Emergency Response Management |
| | Center Secure Area Surveillance |
| | Center Secure Area Sensor Management |
| | Center Secure Area Alarm Support |
| City of West Memphis TOC | TMC Regional Traffic Management |
| City of West Memphis MPO Data Archive | ITS Data Repository |
| | Government Reporting Systems Support |
| | On-Line Analysis and Mining |
| | Virtual Data Warehouse Services |
| Commercial Vehicles | On-board Cargo Monitoring |
| DARTS Data Archive | ITS Data Repository |
| | Traffic and Roadside Data Archival |
| | Government Reporting Systems Support |
| | Virtual Data Warehouse Services |
| DARTS Demand Response Vehicles | On-board Transit Trip Monitoring |
| | On-board Schedule Management |
| | On-board Paratransit Operations |
| | On-board Transit Security |
| | On-board Maintenance |

| Element Name | Equipment Package (Function) |
|---|---|
| DARTS Dispatch Center | Transit Center Vehicle Tracking |
| | Transit Center Paratransit Operations |
| | Transit Center Security |
| | Transit Vehicle Operator Assignment |
| | Transit Garage Maintenance |
| | Transit Vehicle Assignment |
| | Transit Center Multi-Modal Coordination |
| | Transit Evacuation Support |
| | Transit Data Collection |
| DARTS Transit Facility CCTV Camera Surveillance | Field Secure Area Sensor Monitoring |
| | Field Secure Area Surveillance |
| DARTS Website | Infrastructure Provided Trip Planning |
| | ISP Data Collection |
| | ISP Travel Service Information and Reservation |
| Delta HRA Data Archive | ITS Data Repository |
| | Traffic and Roadside Data Archival |
| | Government Reporting Systems Support |
| | Virtual Data Warehouse Services |
| Delta HRA Demand Response Vehicles | On-board Transit Trip Monitoring |
| | On-board Schedule Management |
| | On-board Paratransit Operations |
| | On-board Transit Security |
| | On-board Maintenance |
| Delta HRA Transit Facility CCTV Camera Surveillance | Field Secure Area Sensor Monitoring |
| | Field Secure Area Surveillance |
| Delta HRA Transportation Dispatch Center | Transit Center Vehicle Tracking |
| | Transit Center Paratransit Operations |
| | Transit Center Security |
| | Transit Vehicle Operator Assignment |
| | Transit Garage Maintenance |
| | Transit Vehicle Assignment |
| | Transit Center Multi-Modal Coordination |
| | Transit Evacuation Support |
| | Transit Data Collection |
| Delta HRA Transportation Website | Infrastructure Provided Trip Planning |
| | ISP Data Collection |
| | ISP Travel Service Information and Reservation |

| Element Name | Equipment Package (Function) |
|---|---|
| DeSoto County E-911 | Emergency Call-Taking |
| | Emergency Dispatch |
| | Emergency Routing |
| | Emergency Response Management |
| | Center Secure Area Surveillance |
| | Center Secure Area Sensor Management |
| | Center Secure Area Alarm Support |
| DeSoto County EMA | Incident Command |
| | Emergency Response Management |
| | Emergency Evacuation Support |
| DeSoto County EMS Dispatch | Emergency Call-Taking |
| | Emergency Dispatch |
| | Emergency Routing |
| DeSoto County EMS Vehicles | On-board EV En Route Support |
| | On-board EV Incident Management Communication |
| DeSoto County Sheriff Vehicles | On-board EV En Route Support |
| | On-board EV Incident Management Communication |
| Fayette County EMA | Incident Command |
| | Emergency Response Management |
| | Emergency Evacuation Support |
| Fayette County EMS Dispatch | Emergency Call-Taking |
| | Emergency Dispatch |
| Fayette County EMS Vehicles | On-board EV En Route Support |
| | On-board EV Incident Management Communication |
| Fayette County Sheriff | Emergency Call-Taking |
| | Emergency Dispatch |
| | Emergency Routing |
| | Incident Command |
| | Emergency Response Management |
| | Emergency Evacuation Support |
| | Center Secure Area Surveillance |
| | Center Secure Area Sensor Management |
| | Center Secure Area Alarm Support |
| Fayette County Sheriff Vehicles | On-board EV En Route Support |
| | On-board EV Incident Management Communication |
| Greater Memphis Regional Express Bus Dispatch Center | Transit Center Vehicle Tracking |
| | Transit Center Fixed-Route Operations |
| | Transit Center Multi-Modal Coordination |

| Element Name | Equipment Package (Function) |
|---|---|
| Greater Memphis Regional Express Bus System Website | Infrastructure Provided Trip Planning<br>ISP Traveler Data Collection |
| MATA Bus Arrival Status Boards | Remote Transit Information Services |
| MATA Data Archive | ITS Data Repository |
| | Traffic and Roadside Data Archival |
| | Government Reporting Systems Support |
| | Virtual Data Warehouse Services |
| MATA Dispatch Center | Transit Center Vehicle Tracking |
| | Transit Center Fixed-Route Operations |
| | Transit Center Paratransit Operations |
| | Transit Center Fare Management |
| | Transit Center Passenger Counting |
| | Transit Center Signal Priority |
| | Transit Center Security |
| | Transit Vehicle Operator Assignment |
| | Transit Garage Maintenance |
| | Transit Vehicle Assignment |
| | Transit Center Information Services |
| | Transit Environmental Monitoring |
| | Transit Center Multi-Modal Coordination |
| | Transit Evacuation Support |
| | Transit Data Collection |
| | Transit Transportation Operations Data Collection |
| MATA Ticket Vending Machines | Remote Transit Fare Management |
| MATA Fixed-Route Vehicles | On-board Transit Trip Monitoring |
| | On-board Schedule Management |
| | On-board Transit Fare Management |
| | On-board Passenger Counting |
| | On-board Transit Security |
| | On-board Maintenance |
| | On-board Transit Information Services |
| MATA Mobile App | ISP Traveler Data Collection |
| | Infrastructure Provided Trip Planning |
| MATA Paratransit Vehicles | On-board Transit Trip Monitoring |
| | On-board Paratransit Operations |
| MATA Transit Facility CCTV Surveillance | Field Secure Area Sensor Monitoring |
| | Field Secure Area Surveillance |

| Element Name | Equipment Package (Function) |
|---|---|
| MATA Trolleys | On-board Transit Trip Monitoring |
| | On-board Schedule Management |
| | On-board Transit Fare Management |
| | On-board Transit Security |
| | On-board Transit Signal Priority |
| MATA Website | ISP Traveler Data Collection |
| | Infrastructure Provided Trip Planning |
| MDOT CCTV Cameras | Roadway Basic Surveillance |
| MDOT Data Archive | ITS Data Repository |
| | Virtual Data Warehouse Services |
| MDOT District 2 Maintenance | MCM Vehicle Tracking |
| | MCM Environmental Information Collection |
| | MCM Environmental Information Processing |
| | MCM Incident Management |
| | MCM Roadway Maintenance and Construction |
| | MCM Work Zone Management |
| | MCM Work Activity Coordination |
| MDOT DMS | Roadway Traffic Information Dissemination |
| MDOT Emergency Services Coordinator | MCM Incident Management |
| | MCM Roadway Maintenance and Construction |
| | TMC Incident Dispatch Coordination/Communication |
| | TMC Evacuation Support |
| MDOT Field Sensors | Roadway Basic Surveillance |
| | Roadway Equipment Coordination |
| MDOT HAR | Roadway Traffic Information Dissemination |
| MDOT Maintenance Vehicles | MCV Vehicle Location Tracking |
| | MCV Work Zone Support |
| MDOT Northwest Regional TMC | Collect Traffic Surveillance |
| | TMC Signal Control |
| | TMC Freeway Management |
| | TMC Traffic Information Dissemination |
| | TMC Regional Traffic Management |
| | TMC Incident Detection |
| | TMC Incident Dispatch Coordination/Communication |
| | TMC Evacuation Support |
| | HRI Traffic Management |
| | Traffic Maintenance |
| | TMC Work Zone Traffic Management |
| | Traffic Data Collection |

| Element Name | Equipment Package (Function) |
|---|---|
| MDOT Office of Law Enforcement Truck Weigh and Inspection Stations | CV Data Collection |
| | CV Information Exchange |
| | CV Safety and Security Administration |
| MDOT Office of Law Enforcement Weigh-in-Motion | Roadside WIM |
| MDOT Portable DMS | Roadway Work Zone Traffic Control |
| MDOT Public Information Office | Basic Information Broadcast |
| | ISP Traveler Data Collection |
| MDOT Roadway Service Patrol Dispatch | Service Patrol Management |
| MDOT Roadway Service Patrol Vehicles | On-board EV En Route Support |
| | On-board EV Incident Management Communication |
| MDOT RWIS Sensors | Roadway Environmental Monitoring |
| MDOT Smart Work Zone Equipment | Roadway Work Zone Traffic Control |
| MDOT Traffic Signals | Roadway Basic Surveillance |
| | Roadway Signal Controls |
| | Roadway Signal Priority |
| | Standard Rail Crossing |
| | Advanced Rail Crossing |
| | Roadway Equipment Coordination |
| MDOTtraffic App | Basic Information Broadcast |
| | ISP Emergency Traveler Information |
| | ISP Traveler Data Collection |
| | ISP Traveler Information Alerts |
| MDOTtraffic Website | Basic Information Broadcast |
| | ISP Emergency Traveler Information |
| | ISP Traveler Data Collection |
| Memphis and Shelby County Health Department Emissions Sensors | Roadway Emissions Monitoring |
| Memphis and Shelby County Health Department Pollution Control | Emissions Data Management |
| Memphis MPO Data Archive | ITS Data Repository |
| | Government Reporting Systems Support |
| | On-Line Analysis and Mining |
| | Virtual Data Warehouse Services |
| Memphis MPO Website | ISP Data Collection |
| | ISP Traveler Data Collection |
| Shelby County Office of Preparedness | Incident Command |
| | Emergency Response Management |
| | Emergency Evacuation Support |
| | Mayday Support |
| | Emergency Commercial Vehicle Response |

| Element Name | Equipment Package (Function) |
|---|---|
| MHP Dispatch | Emergency Call-Taking |
| | Emergency Dispatch |
| | Incident Command |
| | Emergency Response Management |
| | Emergency Evacuation Support |
| MHP Vehicles | On-board EV En Route Support |
| | On-board EV Incident Management Communication |
| Mississippi 511 System | ISP Traveler Data Collection |
| | ISP Traveler Information Alerts |
| | Interactive Infrastructure Information |
| | Traveler Telephone Information |
| | ISP Emergency Traveler Information |
| Mississippi EMA | Incident Command |
| | Emergency Response Management |
| | Emergency Evacuation Support |
| Mississippi Statewide TMC | TMC Regional Traffic Management |
| Municipal Arterial Emergency Response Dispatch | Service Patrol Management |
| Municipal Arterial Emergency Response Vehicles | On-board EV En Route Support |
| Municipal CCTV Cameras | Roadway Basic Surveillance |
| Municipal Field Sensors | Roadway Basic Surveillance |
| | Roadway Equipment Coordination |
| Municipal Public Safety Dispatch | Emergency Call-Taking |
| | Emergency Dispatch |
| | Emergency Routing |
| | Emergency Response Management |
| | Emergency Evacuation Support |
| | Center Secure Area Surveillance |
| | Center Secure Area Sensor Management |
| | Center Secure Area Alarm Support |
| Municipal Public Safety Vehicles | On-board EV En Route Support |
| | On-board EV Incident Management Communication |
| Municipal Rail Notification System | Standard Rail Crossing |

| Element Name | Equipment Package (Function) |
|---|---|
| Municipal TOC | Collect Traffic Surveillance |
| | TMC Signal Control |
| | TMC Traffic Information Dissemination |
| | TMC Regional Traffic Management |
| | TMC Incident Dispatch Coordination/Communication |
| | TMC Evacuation Support |
| | HRI Traffic Management |
| | Traffic Maintenance |
| Municipal Traffic Signals | Roadway Basic Surveillance |
| | Roadway Signal Controls |
| | Roadway Signal Priority |
| | Standard Rail Crossing |
| | Advanced Rail Crossing |
| | Roadway Equipment Coordination |
| Municipal/County Maintenance | MCM Vehicle Tracking |
| | MCM Environmental Information Collection |
| | MCM Environmental Information Processing |
| | MCM Incident Management |
| | MCM Roadway Maintenance and Construction |
| | MCM Work Zone Management |
| | MCM Work Activity Coordination |
| Municipal/County Maintenance Vehicles | MCV Vehicle Location Tracking |
| | MCV Work Zone Support |
| Municipal/County Portable DMS | Roadway Work Zone Traffic Control |
| Municipal/County RWIS Sensors | Roadway Environmental Monitoring |
| Municipal/County Website | Basic Information Broadcast |
| | ISP Traveler Data Collection |
| Other MDOT District Construction and Maintenance Offices | MCM Work Activity Coordination |
| Other Municipal/County Maintenance | MCM Work Activity Coordination |
| Other TDOT Region Construction and Maintenance Offices | MCM Work Activity Coordination |
| Private Contract EMS Vehicles | On-board EV En Route Support |
| | On-board EV Incident Management Communication |
| Private Fleet Management Systems | Commercial Vehicle and Freight Security |
| | Fleet HAZMAT Management |
| Private Probe Data Provider | ISP Traveler Data Collection |
| | ISP Probe Information Collection |

| Element Name | Equipment Package (Function) |
|---|---|
| Private Sector Traveler Information Services | Basic Information Broadcast |
| | Infrastructure Provided Trip Planning |
| | Infrastructure Provided Dynamic Ridesharing |
| | Interactive Infrastructure Information |
| | ISP Data Collection |
| Private Transit Information Provider | ISP Traveler Data Collection |
| | Infrastructure Provided Trip Planning |
| Private Transportation Providers | Transit Center Multi-Modal Coordination |
| Private Travelers Personal Computing Devices | Personal Interactive Information Reception |
| Public/Private Vehicles | Vehicle Location Determination |
| | Vehicle Toll/Parking Interface |
| | Vehicle Traffic Probe Support |
| Rail Freight | On-board Cargo Monitoring |
| Regional Express Bus Vehicles | On-board Transit Trip Monitoring |
| | On-board Schedule Management |
| Shelby County Fire Department | Emergency Call-Taking |
| | Emergency Dispatch |
| | Emergency Routing |
| Shelby County Fire Vehicles | On-board EV En Route Support |
| | On-board EV Incident Management Communication |
| Shelby County Sheriff | Emergency Call-Taking |
| | Emergency Dispatch |
| | Incident Command |
| | Emergency Response Management |
| | Center Secure Area Surveillance |
| | Center Secure Area Sensor Management |
| | Center Secure Area Alarm Support |
| Shelby County Sheriff Vehicles | On-board EV En Route Support |
| | On-board EV Incident Management Communication |
| Shelby County TOC | Collect Traffic Surveillance |
| | TMC Signal Control |
| | TMC Freeway Management |
| | TMC Regional Traffic Management |
| | TMC Incident Dispatch Coordination/Communication |
| | TMC Evacuation Support |
| | Traffic Maintenance |
| Shelby County Traffic Signals | Roadway Basic Surveillance |
| | Roadway Signal Controls |
| | Roadway Equipment Coordination |

| Element Name | Equipment Package (Function) |
|---|---|
| Social Networking Services | Basic Information Broadcast |
| | ISP Traveler Information Alerts |
| Southwest HRA Transportation Dispatch Center | Transit Center Multi-Modal Coordination |
| TDOT Automated Roadway Treatment Equipment | Roadway Traffic Information Dissemination |
| | Roadway Automated Treatment |
| TDOT CCTV Cameras | Roadway Basic Surveillance |
| TDOT District Maintenance | MCM Incident Management |
| TDOT DMS | Roadway Traffic Information Dissemination |
| | Roadway Work Zone Traffic Control |
| TDOT Emergency Services Coordinator | MCM Incident Management |
| | MCM Roadway Maintenance and Construction |
| TDOT Field Sensors | Roadway Basic Surveillance |
| TDOT HAR | Roadway Traffic Information Dissemination |
| | Roadway Work Zone Traffic Control |
| TDOT HELP Vehicles | On-board EV En Route Support |
| | On-board EV Incident Management Communication |
| TDOT Infrastructure Monitoring Equipment | Field Secure Area Surveillance |
| TDOT Infrastructure Monitoring Sensors | Roadway Infrastructure Monitoring |
| TDOT Lane Control DMS | Roadway Dynamic Lane Management and Shoulder Use |
| | Roadway Equipment Coordination |
| | Roadway HOV Control |
| | Roadway Traffic Information Dissemination |
| | Roadway Work Zone Traffic Control |
| TDOT Maintenance Headquarters | MCM Environmental Information Collection |
| | MCM Environmental Information Processing |
| TDOT Maintenance Vehicles | MCV Vehicle Location Tracking |
| | MCV Winter Maintenance |
| | MCV Work Zone Support |
| TDOT Long Range Planning Division Archive | Traffic Data Collection |
| TDOT Public Information Office | ISP Traveler Data Collection |
| | Basic Information Broadcast |
| TDOT Ramp Metering Equipment | Roadway Basic Surveillance |
| | Roadway Freeway Control |
| | Roadway Traffic Information Dissemination |
| | Roadway Equipment Coordination |
| TDOT Region 1 TMC - Knoxville | TMC Regional Traffic Management |
| TDOT Region 2 TMC - Chattanooga | TMC Regional Traffic Management |
| TDOT Region 3 TMC - Nashville | TMC Regional Traffic Management |
| TDOT Region 4 | Toll Administration |

| Element Name | Equipment Package (Function) |
|---|---|
| TDOT Region 4 Backup TMC - Jackson | TMC Freeway Management |
| | TMC Traffic Information Dissemination |
| | TMC Regional Traffic Management |
| | TMC Incident Detection |
| | TMC Incident Dispatch Coordination/Communication |
| | TMC Evacuation Support |
| | TMC Work Zone Traffic Management |
| TDOT Region 4 Construction Office | MCM Work Activity Coordination |
| TDOT Region 4 HELP Dispatch | Service Patrol Management |
| TDOT Region 4 Maintenance | MCM Vehicle Tracking |
| | MCM Automated Treatment System Control |
| | MCM Incident Management |
| | MCM Winter Maintenance Management |
| | MCM Roadway Maintenance and Construction |
| | MCM Work Zone Management |
| | MCM Work Activity Coordination |
| TDOT Region 4 Smart Work Zone Equipment | Roadway Work Zone Traffic Control |
| TDOT Region 4 TMC - Memphis | MCM Environmental Information Processing |
| | MCM Data Collection |
| | Collect Traffic Surveillance |
| | TMC Probe Information Collection |
| | TMC Freeway Management |
| | TMC Traffic Information Dissemination |
| | TMC Regional Traffic Management |
| | TMC Incident Detection |
| | TMC Incident Dispatch Coordination/Communication |
| | TMC Evacuation Support |
| | Traffic Maintenance |
| | TMC Work Zone Traffic Management |
| | Traffic Data Collection |
| TDOT RWIS Sensors | Roadway Environmental Monitoring |
| TDOT Statewide Information for Travelers (SWIFT) | ISP Traveler Data Collection |
| | Basic Information Broadcast |
| | ISP Emergency Traveler Information |
| | ISP Data Collection |
| | MCM Environmental Information Processing |
| | MCM Incident Management |
| | MCM Work Zone Management |
| | MCM Work Activity Coordination |
| | MCM Data Collection |

| Element Name | Equipment Package (Function) |
|---|---|
| TDOT SmartWay Mobile App | ISP Traveler Data Collection |
| | Basic Information Broadcast |
| | ISP Emergency Traveler Information |
| | ISP Traveler Information Alerts |
| TDOT SmartWay Website | ISP Traveler Data Collection |
| | Basic Information Broadcast |
| | ISP Emergency Traveler Information |
| TDOT Toll Plazas | Toll Plaza Toll Collection |
| Tennessee 511 System | ISP Traveler Data Collection |
| | ISP Traveler Information Alerts |
| | Interactive Infrastructure Information |
| | Traveler Telephone Information |
| | ISP Emergency Traveler Information |
| Tennessee Bureau of Investigation | Incident Command |
| Tennessee EMA | Incident Command |
| | Emergency Response Management |
| | Emergency Evacuation Support |
| | Mayday Support |
| | Emergency Commercial Vehicle Response |
| THP Dispatch | Emergency Call-Taking |
| | Emergency Dispatch |
| | Emergency Routing |
| | Incident Command |
| | Emergency Early Warning System |
| | Emergency Response Management |
| | Emergency Evacuation Support |
| | Emergency Environmental Monitoring |
| | Center Secure Area Surveillance |
| | Center Secure Area Sensor Management |
| | Mayday Support |
| | Emergency Commercial Vehicle Response |
| THP Vehicles | On-board EV En Route Support |
| | On-board EV Incident Management Communication |
| TITAN Database | ITS Data Repository |
| | Government Reporting Systems Support |
| | Virtual Data Warehouse Services |
| Town of Collierville Alert Collierville | Interactive Infrastructure Information |
| | ISP Emergency Traveler Information |
| | ISP Traveler Information Alerts |
| | Traveler Telephone Information |

| Element Name | Equipment Package (Function) |
|---|---|
| Town of Collierville CCTV Cameras | Roadway Basic Surveillance |
| Town of Collierville DMS | Roadway Traffic Information Dissemination |
| Town of Collierville Field Sensors | Roadway Basic Surveillance |
| | Standard Rail Crossing |
| | Roadway Equipment Coordination |
| Town of Collierville Fire Vehicles | On-board EV En Route Support |
| | On-board EV Incident Management Communication |
| Town of Collierville Police Department | Emergency Call-Taking |
| | Emergency Dispatch |
| | Emergency Routing |
| | Incident Command |
| | Emergency Response Management |
| | Emergency Evacuation Support |
| | Center Secure Area Surveillance |
| | Center Secure Area Sensor Management |
| | Center Secure Area Alarm Support |
| Town of Collierville Police Vehicles | On-board EV En Route Support |
| | On-board EV Incident Management Communication |
| Town of Collierville Rail Notification System | Roadway Traffic Information Dissemination |
| | Standard Rail Crossing |
| Town of Collierville Speed Monitoring Equipment | Roadway Speed Monitoring |
| Town of Collierville TOC | Collect Traffic Surveillance |
| | TMC Signal Control |
| | TMC Traffic Information Dissemination |
| | TMC Regional Traffic Management |
| | TMC Incident Detection |
| | TMC Incident Dispatch Coordination/Communication |
| | TMC Evacuation Support |
| | HRI Traffic Management |
| | TMC Speed Monitoring |
| | Traffic Maintenance |
| Town of Collierville Traffic Signals | Roadway Basic Surveillance |
| | Roadway Signal Controls |
| | Roadway Signal Priority |
| | Standard Rail Crossing |
| | Advanced Rail Crossing |
| | Roadway Equipment Coordination |
| Town of Collierville Website | ISP Traveler Data Collection |
| | Basic Information Broadcast |

| Element Name | Equipment Package (Function) |
|---|---|
| West Memphis MPO Data Archive | ITS Data Repository |
| | Government Reporting Systems Support |
| | On-Line Analysis and Mining |
| | Virtual Data Warehouse Services |

# APPENDIX D – STAKEHOLDER DATABASE

# Memphis Urban Area Regional ITS Architecture Update
# Stakeholder Participation Record

| Invitees | | | Attendance | | |
|---|---|---|---|---|---|
| **Organization** | **First Name** | **Last Name** | **Kick-off Workshop** | **Interview** | **Architecture Workshop** |
| AHTD | Gary | Bennett | X | X | X |
| AHTD | Dorothy | Rhodes | | X | |
| AHTD | Rex | Vines | | X | X |
| AHTD | Ray | Woodruff | | X | |
| Airport Authority | James | Hay | | | |
| Arkansas Highway Patrol | Jackie | Clark | X | | |
| City of Bartlett | Becky | Bailey | X | X | X |
| City of Bartlett | Gary | Rikard | | | |
| City of Bartlett | Terry | Wiggins | | | |
| City of Bartlett | Bill | Yearwood | | | |
| City of Bartlett Engineering Department | Rick | McClanahan | | | |
| City of Braden | Chester | Cocke | | | |
| City of Gallaway | Pat | Brown | X | | X |
| City of Germantown | Tim | Gwaltney | X | X | X |
| City of Germantown | Richard | Hall | | | |
| City of Germantown | Bo | Mills | | | |
| City of Germantown Fire Department | Jeff | Beaman | X | | X |
| City of Germantown Fire Department | John | Selberg | X | | |
| City of Hernando | Jared | Darby | | X | |
| City of Hernando | Hubert | Jones | | | |
| City of Hernando | Mike | Riley | | | |
| City of Horn Lake | Jason | Allen | | | |
| City of Horn Lake | Austin | Cardosi | | | |
| City of Horn Lake | David | Linville | | | |
| City of Horn Lake | Spencer | Shields | | | |
| City of Horn Lake | Darryl | Whaley | | | |

# Memphis Urban Area Regional ITS Architecture Update
# Stakeholder Participation Record

| Invitees | | | Attendance | | |
|---|---|---|---|---|---|
| **Organization** | **First Name** | **Last Name** | **Kick-off Workshop** | **Interview** | **Architecture Workshop** |
| City of Horn Lake Police Department | Troy | Rowell | | | |
| City of Lakeland | Philip | Stuckert | | | |
| City of Lakeland Emergency Management | Bristol | Roberts | | | |
| City of Marion | Edward | Cain | | X | |
| City of Memphis | John | Cameron | | | |
| City of Memphis | Randall | Tatum | | X | |
| City of Memphis Fire Services | Alvin | Benson | | | |
| City of Memphis Fire Services | Keith | Staples | | | X |
| City of Memphis Office of Emergency Mgmt | Alvin | Benson | | | |
| City of Memphis Police Department | Toney | Armstrong | | | |
| City of Memphis Police Department | Kenneth | Shackleford | | | |
| City of Millington | Darek | Baskin | | | X |
| City of Millington | Gary | Graves | | | |
| City of Millington | Mike | Lantrip | | | |
| City of Millington | Rita | Stanback | | | |
| City of Olive Branch | Steve | Bigelow | | X | |
| City of Olive Branch | John | Eason | | | |
| City of Olive Branch | Don | Gammage | | | |
| City of Olive Branch | BJ | Page | | | |
| City of Piperton | Reed | Bullock | | | |
| City of Piperton | Phil | Hendricks | | | X |
| City of Southaven | Tom | Long | | | |
| City of Southaven | Ronald | Smith | | X | |
| City of Southaven | Ray | Tarrance | | | |
| City of Southaven | Ron | White | | | |
| City of West Memphis | Paul | Luker | | | |

# Memphis Urban Area Regional ITS Architecture Update
# Stakeholder Participation Record

| Invitees | | | Attendance | | |
|---|---|---|---|---|---|
| **Organization** | **First Name** | **Last Name** | **Kick-off Workshop** | **Interview** | **Architecture Workshop** |
| City of West Memphis | Phillip | Sorrell | | X | X |
| Delta Area Rural Transit System (DARTS) | Antoinette | Gray-Brown | | | |
| Delta HRA Transportation | Wesley | Fowler | | | |
| Desoto County | Ted | Garrod | | | |
| Desoto County | Tom | Haysley | | X | |
| DeSoto County | Bill | Rasco | | | |
| DeSoto County | Bobby | Storey | | | |
| DeSoto County | Andy | Swims | | | |
| Fayette County | John | Pitner | | | |
| Fayette County | Bobby | Riles | | | |
| Fayette County | Esther | Sykes-Wood | | X | |
| Fayette County Emergency Mgmt Agency | Bobby | Martin | | | |
| Federal Transit Authority - Region IV | David | Schilling | | | |
| Federal Transit Authority - Region IV | Brandy | Smith | | | |
| FHWA - Arkansas Division | Gary | Dalporto | X | | |
| FHWA - Arkansas Division | Joe | Heflin | | | |
| FHWA - Mississippi Division | Randy | Jansen | | | |
| FHWA - Tennessee Division | Corbin | Davis | | | |
| FHWA - Tennessee Division | Pam | Heimsness | | | |
| FHWA - Tennessee Division | Nick | Renna | X | | X |
| Marshall County | Justin | Hall | | X | |
| Memphis Area Transit Authority | Tom | Fox | | | |
| Memphis Area Transit Authority | John | Lancaster | X | X | X |
| Memphis Urban Area MPO | Sajid | Hossain | X | X | X |
| Memphis Urban Area MPO | Mitchell | Lloyd | X | X | X |
| Memphis Urban Area MPO | Pragati | Srivastava | X | X | |

# Memphis Urban Area Regional ITS Architecture Update
# Stakeholder Participation Record

| Invitees | | | Attendance | | |
|---|---|---|---|---|---|
| **Organization** | **First Name** | **Last Name** | **Kick-off Workshop** | **Interview** | **Architecture Workshop** |
| Memphis Urban Area MPO | Kyle | Wagenschutz | | | |
| Mississippi DOT | Perry | Brown | | | |
| Mississippi DOT | John | Gilligan | | X | |
| Mississippi DOT | Acey | Roberts | | | |
| Mississippi DOT | Mike | Stokes | | | |
| Mississippi DOT | Jake | Wimberly | | | X |
| Mississippi Highway Patrol - Troop E Northern Region | Walter | Duncan | | | |
| North Delta Planning and Development District | Fadlalla | Zein, PhD. | | | |
| North Delta Planning and Development District | Trey | Hamby | | | X |
| Port Authority | Randy | Richardson | | | |
| Premier Transportation Services | Ham | Smythe | | | |
| Shelby County | Clarence | Cash, Jr. | | | |
| Shelby County | Bob | Evans | | | |
| Shelby County | Tom | Needham | X | X | |
| Shelby County | Darren | Sanders | | X | |
| Shelby County Office of Preparedness | Mike | Brazzell | | | |
| Shelby County Office of Preparedness | Bob | Nations, Jr. | | | |
| TDOT Long Range Planning Division | Angela | Midgett | | | |
| TDOT Office of Community Transp - Memphis | Aury | Kangelos | X | X | X |
| TDOT Office of Community Transp - Memphis | Carlos | McCloud | X | X | X |
| TDOT Region 4 | Carl | Berry | | X | |
| TDOT Region 4 | Ed | Johnson | X | X | X |
| TDOT Region 4 | Jason | Moody | | | |
| TDOT Region 4 | Scott | Pate | | | |
| TDOT Region 4 | Chuck | Rychen | | | |
| TDOT Region 4 | John | Thomas | | | |

# Memphis Urban Area Regional ITS Architecture Update
# Stakeholder Participation Record

| Invitees | | | Attendance | | |
|---|---|---|---|---|---|
| **Organization** | **First Name** | **Last Name** | **Kick-off Workshop** | **Interview** | **Architecture Workshop** |
| TDOT Traffic Operations Division | Brad | Freeze | | | |
| TDOT Traffic Operations Division | Robert | Benshoof | X | | |
| TDOT Traffic Operations Division | Said | El Said | | | |
| TDOT Traffic Operations Division | Asem | Halim | X | | |
| Tennessee Highway Patrol District 4 | Joel | Deal | | | |
| Tennessee Highway Patrol District 4 | Cheryl | McNeary | | | |
| Tennessee Highway Patrol District 4 | Vance | Pitts | | | |
| Town of Arlington | David | Franks | | | |
| Town of Arlington | Steve | Hill | | | |
| Town of Arlington | Nisha | Powers | | | |
| Town of Arlington | Dickie | Wiseman | | | |
| Town of Collierville | Bill | Kilp | | | |
| Town of Collierville | Frank | McPhail | X | X | |
| Town of Collierville Fire Department | Jerry | Crawford | | | |
| Town of Collierville Fire Department | Mark | King | X | | |
| Town of Collierville Police Department | Lawrence | Goodwin | | | |
| Town of Oakland | Rudy | Doyle | | | |
| Town of Oakland | Chris | Earl | | | |
| Town of Oakland | Chris | Goodman | | | |
| Town of Rossville | Sam | DeVore | | | |
| Town of Rossville | William | Hamric | | | |
| U.S. Coast Guard | James | Dixon | | | |
| West Memphis MPO | Eddie | Brawley | X | X | |
| West Tennessee RPO | Josh | Shumaker | | | |

Memphis MPO
METROPOLITAN PLANNING ORGANIZATION
*Strengthening Regional Transportation*

# APPENDIX E – AGREEMENTS

**CITY OF MEMPHIS AND CITY OF GERMANTOWN TRAFFIC SIGNAL ITS COORDINATION MEMORANDUM OF UNDERSTANDING**

**MEMPHIS MPO AND WEST MEMPHIS MPO CONSISTENCY AND CONFORMITY OF PLANS, PROGRAMS AND PROJECTS MEMORANDUM OF UNDERSTANDING**

**MDOT AND CITY OF SOUTHAVEN SHARING OF ITS RESOURCES MEMORANDUM OF AGREEMENT**

**TDOT LIVE CCTV VIDEO ACCESS AGREEMENT FOR GOVERNMENTAL USERS**

**TDOT LIVE CCTV VIDEO ACCESS AGREEMENT FOR PRIVATE ENTITY USERS**

City of Memphis
TENNESSEE

A C WHARTON JR. - Mayor
GEORGE M. LITTLE - Chief Administrative Officer

**DIVISION OF FINANCE**
ROLAND McELRATH - Director
**Purchasing Agent**
**Jerome Smith**

*February 28, 2012*

*City Contract #28940*

*City of Germantown*
*1930 South Germantown Road*
*Germantown, TN 38138*

*Gentlemen:*

*We are enclosing, herewith, an executed copy of a Negotiated Contract for: Memorandum of Understanding – Traffic Signal System ITS coordination for the Division of Engineering*

*This copy is for your files.*

*Sincerely,*

Jerome Smith

*Jerome Smith*
*Purchasing Agent*

*cc: City Comptroller*
*Engineering - Administration*

TRAFFIC SIGNAL SYSTEM AND INTELLIGENT TRANSPORTATION SYSTEM
MEMORANDUM OF UNDERSTANDING

THIS AGREEMENT, made and entered into on the 28 day of Feb ,2013, by and between the City of Memphis, Tennessee, hereinafter referred to as MEMPHIS, and the City of Germantown, Tennessee, hereinafter referred to as GERMANTOWN,

WITNESSTH, That:

WHEREAS, MEMPHIS and GERMANTOWN desire to foster an atmosphere of cooperation, which will afford advantages to the citizens and businesses within the municipal boundaries of these two cities, and

WHEREAS, it is beneficial to all citizens in MEMPHIS and GERMANTOWN that the governments cooperate to address community needs in matters affecting health, safety, welfare, economic conditions and countywide mobility, and

WHEREAS, it is mutually beneficial to install and operate Traffic Signal Systems on arterial roads and other major thoroughfares to provide for the most efficient operation of those facilities within these communities, and

WHEREAS, it is mutually beneficial to install and operate Intelligent Transportation Systems (ITS) on arterial roads and other major thoroughfares to provide for the most efficient operation of those facilities within these communities, and

WHEREAS, it is mutually beneficial to coordinate the operation of all Traffic Signal and ITS systems, disregarding jurisdictional boundaries and share Traffic Signal and ITS hardware resources, data, and other available information that may be useful to the public, municipalities, and other agencies, and

WHEREAS, the proposed services to be provided through the system include Corridor Management, Incident Management, Traveler Information Services, and Special Event Management on these roadways, and

WHEREAS, MEMPHIS and GERMANTOWN intend to allow the Memphis Traffic Signal Maintenance Department to have the capability to communicate with the traffic signals in GERMANTOWN, MEMPHIS, and other local communities for maintenance purposes, and;

WHEREAS, MEMPHIS and GERMANTOWN are willing to provide mutual assistance and backup coverage of the Traffic Signal System and ITS resources to successfully implement the proposed services, and

WHEREAS, these cities will continue to seek funding for the Traffic Signal and ITS systems, and

WHEREAS, MEMPHIS and GERMANTOWN agree the existing MEMPHIS Traffic Operations Center shall be utilized as the Primary Control Center to coordinate the collection and distribution of ITS information.

NOW THEREFORE, the parties, in consideration of mutual promises herein contained, and for other goods and valuable consideration, receipt of which is hereby acknowledged by all parties, hereby agree as follows:

**Section 1. Definitions**

1. Traffic Signal Equipment - All equipment installed to operate signalized intersections. This includes:

   - local controllers and internal cabinet equipment;
   - detection systems, which include video detection, radar detection, inductive loops, and other detection technologies for local intersection and coordinated signal operation;
   - vehicular and pedestrian signal displays;
   - internal communication equipment; and
   - local fiber optic cabling from the pull box adjacent to the controller cabinet to the controller cabinet (drop cable).

2. Central Software and Hardware - Software and hardware that operates the coordinated signal system including MARC, ACTRA, TACTICS, or other software, and all hardware necessary to operate the coordinated signal system, including servers, monitors, video walls, personal computer workstations, and other ancillary equipment.

3. ITS Equipment - The following equipment shall be designated as ITS equipment:

   - Closed Circuit Television cameras (CCTV),
   - Dynamic Message Signs (DMS),
   - Dynamic Trailblazer Signs (DTBS),
   - Automated warning systems,
   - Road Weather Information Systems (RWIS),
   - Highway advisory radio, and
   - other associated electronic equipment that is required to operate the ITS system.

4. Fiber Optic Trunk Line (FTL) – the fiber optic cable that provides communications between control centers, from hub to hub and from control center to hub.

5. Fiber Optic Distribution Line (FDL) – the fiber optic cable that provides communication from control center to signalized intersection, between signalized intersections, and from hub to signalized intersection.

6. Advanced Traffic Management Systems (ATMS) - integrate technology primarily to improve the flow of vehicle traffic and improve safety.

7. Hub Cabinet – the cabinet which serves as the point at which FTL's converge, FTL's are spliced, communications are amplified, and/ or FTL's are connected to FDL's.

**Section 2. General**

1. The MEMPHIS and GERMANTOWN Traffic Control Centers shall be interconnected to facilitate the exchange of system related data. Other facilities including the Tennessee Department of Transportation (TDOT), the Town of Collierville, the City of Bartlett and the Police Departments of each of these municipalities, Shelby County 911 Dispatch Center, and other appropriate locations may also be interconnected to facilitate exchange of system related data, as the communications system connects to those jurisdictions.

2. An "Operators Group" will be established that includes operations representatives from all agencies to develop, maintain and review Standard Operating Procedures (SOP), make design related decisions, and prioritize ATMS projects. This "Operators Group" will initially be made up of a representative from

MEMPHIS and GERMANTOWN, with a City of Memphis Traffic Signal Maintenance Department representative serving in a technical advisory capacity. Other jurisdictions and a Metropolitan Planning Organization representative shall be added to this group as the ITS system expands into other communities. The group shall meet as needed to accomplish this task.

3. The FTL shall be designated the trunk line for the signal system and ITS, disregarding jurisdictional boundaries. This fiber shall be used to serve any project that supports the system.

4. The staff of MEMPHIS and GERMANTOWN and other agencies as deemed necessary by the Operators Group shall provide mutual assistance and backup coverage of the signal system and ITS resources. A Standard Operating Proceedure will be developed that deals with the hand off of coverage and control of ITS field equipment when a Traffic Control Center is not occupied. These services for mutual assistance by any party will be provided without cost to any other party.

5. Any and all projects that will connect to the signal system or ITS system shall use technical equipment and software specifications either used in previous projects or proven to be compatible with existing system components.

**Section 3. Signal System Operation**

1. Primary control and operation of signalized intersections will occur at the local Traffic Control Center.

2. Signalized intersections shall be connected to the most appropriate Traffic Control Center based on system wide communication routing and corridor integrity. Representatives of the Operator's Group will make the determination of the appropriate system allocation during the design phase of any traffic signal project. Maintenance and traffic control jurisdictional responsibilities for these intersections will remain with the local jurisdiction.

3. Status of intersections, Level of Service (LOS), counts and other data that is produced by the individual systems should be transferred to the MEMPHIS Traffic Control Center and Metropolitan Planning Organization (MPO) so that an overall view of the transportation network can be developed.

**Section 4. ITS Operation**

1. Primary control and operation of ITS equipment will occur at the local Traffic Control Center.

2. All ITS field equipment installed and connected to the MEMPHIS traffic control center, or GERMANTOWN Operations Center will be considered part of the ITS system to the extent that all data from this equipment shall be transmitted to MEMPHIS to be shared with all other agencies and integrated systems. This excludes equipment owned and operated by the TDOT for their Freeway Management System (FMS).

**Section 5. MEMPHIS Traffic Operations Center (TOC)**

The MEMPHIS TOC will be the centralized hub for data collection, fusion and dissemination of information to the public and other agencies within the county. To accomplish this task the MEMPHIS TOC will maintain secondary control priority for all ITS field equipment not within the City of Memphis but may assert its control of those ITS devices, as necessary to insure consistency and provide information to the appropriate agencies. The City of Memphis shall not assert control of the ITS field equipment or devices outside of their jurisdiction without the prior consent of the jurisdiction in which the components reside.

**Section 6. Jurisdictional Responsibilities**

1. Operation and maintenance for the traffic signal and ITS components shall remain the responsibility of the local jurisdiction in which the components reside.

2. The operation and maintenance of the FTL will be the responsibility of MEMPHIS.

3. The operation and maintenance of the FDL where it resides in a conduit separate from the FTL will be the responsibility of the jurisdiction in which the FDL resides.

4. The operation and maintenance of the FDL where it resides in a conduit that also contains the FTL will be the responsibility of MEMPHIS.

5. The operation and maintenance of the hub cabinets and all associated equipment will be the responsibility of MEMPHIS.

**Section 7. Effective Date and Termination**

1. This Agreement shall take effect upon execution by all parties and filing with the Shelby County, TN, Register's Office. This Agreement shall be effective for a period of five years from the date of execution. This Agreement may be renewed subject to execution of a written renewal agreement between MEMPHIS and GERMANTOWN. Each renewal period may not exceed five years. There is no limit to the number of renewals unless so specified in a subsequent renewal agreement.

2. This Agreement may be expanded to include other jurisdictions upon execution of a written agreement in which the jurisdiction that is added agrees to abide by the terms and conditions of this Agreement, and upon mutual consent of MEMPHIS, GERMANTOWN, and other jurisdictions that are party to this Agreement at that time.

3. This Agreement shall be terminated upon mutual consent of the parties or by any party, upon formal written notice received prior to January 1st of any calendar year with termination becoming effective on the following October 1st.

The remainder of this page left blank intentionally

**CITY OF MEMPHIS, TENNESSEE**

By _____
A C Wharton, Mayor

Date: 2/26/2012

By _____
City Engineer

Date: _____

APPROVED AS TO LEGAL FORM AND CONTENT:

By _____
City Attorney

ATTEST:

By _____
Comptroller

**CITY OF GERMANTOWN, TN**

By _____
Sharon Goldsworthy, Mayor

Date: 01.11.12

By _____
City Engineer

Date: 1/10/12

By _____
City Attorney

ATTEST:

By _____
City Clerk/ Recorder

**MEMORANDUM OF UNDERSTANDING**
**Between**
**THE MEMPHIS URBAN AREA METROPOLITAN PLANNING ORGANIZATION (MPO)**
**and**
**THE WEST MEMPHIS METROPOLITAN PLANNING ORGANIZATION (WMPO)**
**on**
**CONSISTENCY AND CONFORMITY OF PLANS, PROGRAMS, AND PROJECTS**

---

Recognizing that Crittenden County, Arkansas, is a member of the West Memphis Metropolitan Planning Organization (WMPO) and is included in the Shelby County/Crittenden County nonattainment area for ozone, WMPO and the Memphis Urban Area Metropolitan Planning Organization (MPO) have agreed upon the following procedures for ensuring consistency and conformity of their plans, programs and projects:

1. Crittenden County shall continue to be designated within the planning area of the WMPO. The WMPO and MPO will continue to develop separate transportation plans, programs, and projects including the Long Range Transportation Plan and Transportation Improvement Program (TIP).

2. While MPO and WMPO will develop their plans, programs and projects separately, MPO and WMPO will coordinate their data collection and analysis activities, and will consult with each other to ensure that their plans, programs, and projects are integrated and consistent.

3. The WMPO, including the Crittenden County area outside the WMPO planning area, and the MPO will coordinate concerning their respective air quality conformity analyses and determinations.

   A.) Formal involvement will be provided through each of the Metropolitan Planning Organization's membership on each other's respective Air Quality Committee and Engineering/Technical Committee.

   B.) Informal involvement will be provided through the participation of each Metropolitan Planning Organization in their respective State Air Quality Implementation Plans (SIPs) and the required coordination and compatibility of these SIPs.

4. MPO and WMPO shall establish policy mechanisms for resolving

potential conflicts that may arise between MPO and WMPO, which mechanisms may include, without limitation, informal dispute resolution techniques such as mediation by a neutral party mutually agreed upon by the MPO and WMPO.

5. MPO and WMPO agree to the adoption and implementation of any further policies and procedures required or reasonably necessary to comply with applicable provisions of 23 C.F.R. § 450.310(g), to include, without limitation, the preparation, adoption and execution of a separate agreement that more particularly addresses matters relating to air quality conformity, which agreement shall also be executed by the appropriate State and local air quality agencies and any other required parties.

IN WITNESS WHEREOF, the parties hereto have executed this Memorandum of Understanding effective as of the 5th day of October, 2004.

WEST MEMPHIS METROPOLITAN PLANNING ORGANIZATION (WMPO)

By: _____
Chair, Policy Committee

Date: OCTOBER 5, 2004

MEMPHIS URBAN AREA METROPOLITAN PLANNING ORGANIZATION (MPO)

By: _____
Chair, Executive Committee

Date: September 16, 2004

# MEMORANDUM OF AGREEMENT

## BETWEEN

## THE MISSISSIPPI TRANSPORTATION COMMISSION

## AND

## City of Southaven, Mississippi

THIS MEMORANDUM OF AGREEMENT ("AGREEMENT") is made and entered into by and between the Mississippi Transportation Commission, a body corporate of the State of Mississippi ("COMMISSION"), acting by and through the duly-authorized Executive Director of the Mississippi Department of Transportation ("MDOT"), and City of Southaven, Mississippi, ("USER"). This AGREEMENT identifies the terms of use and responsibilities of both parties for the sharing of resources between the COMMISSION and the USER for one or more of the following Intelligent Transportation System (ITS) resources: Fiber and Conduit, Wireless Equipment and Towers, Center to Center (C2C) Connectivity and Information Sharing, Closed Circuit Television (CCTV), and Dynamic Message Signs (DMS), effective as of the date of latest execution below.

WHEREAS, COMMISSION and USER agree that neither Party shall adjust, align, repair, relocate, or remove the other Party's equipment, except as expressly authorized by the other Party.

WHEREAS, COMMISSION and USER understand and agree that the resources exchanged by this AGREEMENT involve benefits, both tangible and intangible, that may not be equal but that are valuable and beneficial to the parties.

The provisions of this AGREEMENT are provided to ensure that the resources are used in compliance with the COMMISSION's and the USER's policies for the particular resources being shared.

**WITNESSETH:**

**FIBER AND CONDUIT**

WHEREAS, COMMISSION and USER recognize the value of system-wide and regional real-time traveler information systems and traffic/incident management systems; and have determined that a fiber optic communication network helps provide the needed infrastructure for implementing system-wide and regional real-time traveler and traffic/incident management systems; and have installed or may install fiber optic cable and/or conduit for their respective use; and agree that if such cable and/or conduit is not fully utilized, that unutilized fiber optic cable and/or conduit ("Excess Fiber") may be made available, under the terms and conditions of this AGREEMENT, for utilization by the other Party; and have and will continue to construct noncontiguous roadway segments; and each recognizes the benefit of utilizing the other Party's rights-of-way to connect noncontiguous sections of its own fiber optic network; and both acknowledge each to the other that the utilization of Excess Fiber in the right-of-way of the other is valuable and cannot be calculated in dollars; and

WHEREAS, COMMISSION and USER agree that this AGREEMENT grants the use of specific segments of COMMISSION fibers to USER for its use in connecting noncontiguous sections of USER's fiber optic network; and that this AGREEMENT also grants the use of specific segments of USER fibers to COMMISSION for its use in connecting noncontiguous sections of COMMISSION's fiber optic

network; and that specific segments, the details on the fiber, and its use are shown in Appendix A: Fiber Resource Details; and

**WIRELESS EQUIPMENT AND TOWERS**

WHEREAS, COMMISSION and USER recognize the value of system-wide and regional real-time traveler information systems and traffic/incident management systems; and have determined that wireless equipment and/or towers help provide the needed infrastructure for implementing system-wide and regional real-time traveler and traffic/incident management systems; and have installed or may install wireless equipment and/or towers for their respective use; and agree that if such equipment and/or towers are not fully utilized, that unutilized wireless capacity or tower space ("Excess Wireless") may be made available, under the terms and conditions of this AGREEMENT, for utilization by the other Party.

WHEREAS, COMMISSION and USER agree that this AGREEMENT grants the use of COMMISSION wireless equipment and/or towers to USER for its use in connecting noncontiguous sections of USER's network; and that this AGREEMENT also grants the use of USER wireless equipment and/or towers to COMMISSION for its use in connecting noncontiguous sections of COMMISSION's network; and that specific segments, the details on the wireless equipment and/or towers, and their use are shown in Appendix B: Wireless Equipment and Tower Details; and

WHEREAS, COMMISSION and USER acknowledge that there may be existing leases with commercial telecommunication companies that permits them to locate, maintain, and operate telecommunications equipment on the USER's Towers identified in Appendix B: COMMISSION agrees that it shall not locate or operate any equipment which shall cause unreasonable interference of any kind to the operations of the commercial tenants utilizing such towers and shall take all measures required of USER under commercial leases to eliminate such interference. If such interference cannot be eliminated the USER and COMMISSION shall attempt to relocate the wireless equipment identified on the tower in Appendix B to another tower or facility owned by USER under the same terms and conditions as the original Tower site. and

WHEREAS, COMMISSION and USER agree that this AGREEMENT grants each Party reasonable access to a tower site for installation, service and maintenance of the equipment. The details regarding equipment cabinet locations, antenna height, and responsibility for power service shall be outlined in Appendix B; and

**CENTER to CENTER (C2C) CONNECTIVITY AND INFORMATION SHARING**

WHEREAS, COMMISSION and USER recognize the value of system-wide and regional real-time traveler information systems and traffic/incident management systems; and have determined that a C2C communication network helps provide the needed infrastructure for sharing system-wide and regional real-time traveler information, closed circuit television (CCTV), and traffic/incident management systems; and

WHEREAS, COMMISSION and USER agree that a C2C network will be connected via resources detailed in Appendix C: The Center to Center (C2C) Connectivity Resource Details. Fiber optic cable and conduit use will be governed by the Fiber and Conduit Section of this AGREEMENT: and

WHEREAS, COMMISSION and USER agree that all equipment used for a C2C link will be identified and listed in Appendix B; and that each Party will be responsible for and will manage equipment it owns which is used to operate the C2C connection unless otherwise stated in Appendix B. Each Party will be

responsible to make enough space available in its own equipment room for equipment needed for C2C connection(s). Access to C2C equipment will be granted to an equipment-owning or -managing Party within twenty four (24) hours of a written request being made to the Party where the equipment is located by the equipment-owning or -managing Party; and

WHEREAS, COMMISSION and USER agree that data shared via a C2C connection will be listed by Type, Description, and Limitations, if any, in Appendix B.

WHEREAS, COMMISSION and USER agree that should any networking equipment impact either Party's operation in any way, the responsible Party shall immediately remedy the situation in a manner satisfactory to the other Party; and that failure to remedy transmitting equipment impact or to comply with any licensing requirement(s) shall, at either Party's option, result in immediate termination of this AGREEMENT.

## CLOSED CIRCUIT TELEVISION (CCTV)

WHEREAS, COMMISSION and USER have determined that sharing of video from their respective CCTV cameras will provide additional information and resources in order for each Party to better provide regional real-time traveler and traffic/incident management information to the traveling public; and

WHEREAS, COMMISSION and USER each agree to allow the other Party to control the pan, tilt, and zoom capabilities of selected CCTV cameras, detailed in Appendix D according to these operational procedures; and

WHEREAS, COMMISSION and USER agree that the owning Party will maintain an override capability of these pan, tilt, and zoom functions as follows:

> If any transmitting equipment impacts a Party's operation in any way, the other Party shall immediately remedy the situation in a manner satisfactory to the other Party. Failure to remedy transmitting equipment impact or to comply with any licensing requirement(s) shall, at either Party's option, result in immediate termination of this AGREEMENT; and
>
> Use and/or control of a video source by one Party shall not prohibit use and/or control by the owning Party. If incidental conflict occurs, the first remedy will be notification by the owning Party to the other Party that current use and/or control (viewing and/or control) is disrupting or will disrupt Traffic Management Center (TMC) operations, and the other Party must take corrective action or stop said use and/or control.

## DYNAMIC MESSAGE SIGNS (DMS)

WHEREAS, COMMISSION and USER agree that sharing of DMS for the purpose of displaying messages for traffic conditions, incident information, Amber Alerts, and safety information would be beneficial to both parties and the public, which shared use will allow DMS of one Party to alert travelers of situations and incidents in area(s) managed by the other Party; and

WHEREAS, COMMISSION and USER agree that the DMS to be shared are detailed in Appendix E; and

WHEREAS, COMMISSION and USER agree that the owning Party shall provide an approved message library so that only approved messages will be displayed on the other party's DMS. Approval of any

messages not included in the approved message library shall be obtained in writing prior to addition to the library and/or to the use of such messages; and

WHEREAS, COMMISSION and USER agree that the owning Party shall determine priority levels of incident messages and alerts so that, if both parties need to display messages on the same sign at the same time, the owning Party determines priority level and which message(s) will be displayed and the necessary time period; and

WHEREAS, COMMISSION and USER agree that use and/or control of a DMS by a requesting Party shall not prohibit use and/or control by the owning Party, and that in the case of a conflict, the first remedy will be a notification by the owning Party to the other Party that current use (viewing and/or control) is disrupting or will disrupt TMC operations and that the other Party must take immediate corrective action;

**PROCESSES**

NOW, THEREFORE, for and in consideration of the promises contained herein and for good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, COMMISSION and USER each agree to abide by the following processes for obtaining, maintaining, and modifying the use of the other Party's System Resources (i.e. Fiber and Conduit, Wireless Equipment and Towers, C2C Connectivity and Information Sharing, CCTV, and DMS) and Excess Fiber and Excess Wireless, as defined in this AGREEMENT as follows:

1. **Amendments.**
   Any revision to this Memorandum of Agreement shall be an Amendment made by Supplemental Agreement and shall require the written approval of both Parties.

2. **Appendix Modification.**
   Appendices to this Memorandum of Agreement list the specific resources covered by this AGREEMENT and specify which Party is responsible for each resource. Each Appendix may be modified by signature(s) of each of the Designated Agent(s) of each Party to the AGREEMENT. However, addition of a new Appendix and/or deletion of an entire Appendix constitutes a revision to this AGREEMENT and shall be considered an Amendment under Section 1 above.

3. **Request for Use of ITS Resources**
   a. COMMISSION: The COMMISSION shall document in writing via this AGREEMENT or subsequent Supplemental Agreement(s) the use of USER Excess Fiber, sharing of USER video feeds, use of USER DMS, and/or other USER ITS resources. This AGREEMENT shall contain in the Appendices specific details of the type, number, and location of resources to be covered under this AGREEMENT.

   b. USER: USER shall document in writing via this AGREEMENT or subsequent Supplemental Agreement(s) the use of COMMISSION Excess Fiber, sharing of COMMISSION video feeds, use of COMMISSION DMS, and/or other COMMISSION ITS resources. This AGREEMENT shall contain in the Appendices specific details of the type, number, and location of resources to be covered under this AGREEMENT.

4. **Equipment Installation.**
   If USER wishes to install any equipment at COMMISSION's TMC to access video feeds or other information, USER is solely responsible for any costs related to the purchase and installation of said equipment. COMMISSION personnel shall determine at what

location within its TMC said equipment is to be placed, and COMMISSION reserves the right to inspect all installation(s) of said equipment. Under no circumstances shall the placement and installation of any USER equipment interfere with COMMISSION TMC equipment or activities of COMMISSION TMC personnel. The responsibility for the service, maintenance, and upkeep of USER-installed equipment is exclusively that of the USER unless otherwise indicated in the Appendices. USER must give COMMISSION TMC management twenty four (24) hours written advance notice of any routine maintenance/repair visits or four (4) hours voice notice of a visit for emergency repairs of USER equipment. COMMISSION reserves the right to schedule any such visit(s) at a time and in a manner which does not interfere with COMMISSION TMC operations. USER assumes any and all liability for the cost of repair of any damage to COMMISSION's system caused in any manner by the installation, servicing, or maintenance of USER equipment or by said equipment once installed. USER staff at the COMMISSION TMC shall be under the general direction of the COMMISSION TMC Manager for routine conduct, privileges, and protocols within the TMC. If COMMISSION determines any USER equipment must be relocated, USER agrees to move or alter same at its own expense and in compliance with COMMISSION's TMC schedule. Upon removal of such equipment for any reason, including termination of the AGREEMENT, USER shall be responsible for placing affected COMMISSION TMC space or equipment in as close to its condition as reasonably possible as it was prior to USER's equipment installation.

The provisions and requirements of this Section shall apply to COMMISSION in the event COMMISSION installs COMMISSION equipment at USER's location(s) under the terms of this AGREEMENT.

The provisions and requirements of this Section shall also apply to the COMMISSION's and USER's Tower Sites that are included as part of this AGREEMENT and as outlined in Appendix B.

5. **Revocation.**
If the use of any system resource(s) is granted by either Party to the other Party, and that resource(s) is needed by the granting Party at any time and for any reason, the other Party will be so notified in writing by the granting Party and requested to terminate use of the needed resource(s) within six (6) months of the written request, unless the resource(s) in question is fiber. If the resource(s) in question is fiber, then a preliminary notification shall be submitted in writing by the granting Party to the other Party six (6) months prior to a twelve (12) month request to vacate, thereby providing eighteen (18) months' notice.

6. **Compensation.**
COMMISSION and USER agree that neither Party will charge the other for the use of system resources covered in this AGREEMENT.

7. **Guarantees.**
Neither COMMISSION nor USER guarantees the uninterruptible access to fiber, the quality or continuity of video images or data, or the availability of dynamic message signs or messages. Any reliance on the COMMISSION's fiber, CCTV, or DMS shall be at the sole risk of the USER. Any reliance on the USER's fiber, CCTV, or DMS shall be at the sole risk of the COMMISSION.

8. **Video Images.**
COMMISSION and USER agree that neither Party will record video images except for staff training, safety, traffic study or law enforcement purposes, and that no videotapes will be made available to USER under this AGREEMENT; that COMMISSION will maintain exclusive ownership and control of the COMMISION owned information and images released from the CCTV system to USER; that neither Party to this AGREEMENT shall use video feeds to focus on vehicle license plates, drivers, and/or other means of personal identification of individuals involved in any traffic-related incident, except for purposes of a criminal investigation by authorized law enforcement officials; that no image shall focus on any property or person outside the COMMISSION or USER right-of-way; and that all images shall be used only for traffic-related, emergency response or law enforcement activities by either Party to this AGREEMENT.

9. **Dynamic Message Sign Messages.**
COMMISSION shall have sole authority to determine what messages may be displayed on COMMISSION-owned DMS. USER agrees to post on the COMMISSION DMS only messages which are in compliance with the DMS Message Policy provided to USER by COMMISSION. USER shall have sole authority to determine what messages may be displayed on USER-owned DMS. COMMISSION agrees to post on the USER DMS only messages which are in compliance with the DMS Message Policy provided to COMMISSION by USER. Identified Message Type priority levels, such as Amber Alerts, shall be listed in Appendix D: DMS Details.

10. **Maintenance and Limitation of Damages.**
COMMISSION and USER agree that each will be responsible for maintaining its own facilities within its own right-of-way. COMMISSION and USER agree that each will be responsible for performing utility locates for its own facilities within its right-of-way on behalf of the other Party needing such locates. COMMISSION and USER understand and agree that accidental cuts and dig-ups may occur causing damage to COMMISSION and/or USER facilities. Neither Party shall be liable for incidental or consequential damages or downtime arising from accidental cuts or dig-ups. Neither Party shall be liable to the other for incidental or consequential damages or downtime arising from network or system downtime caused by equipment failures, downtime, maintenance, or configuration of the other Party's system.

11. **Relocation.**
COMMISSION and USER agree that each shall be responsible for all costs of relocation and for performing such relocation activities of its own fiber optic systems, CCTV cameras, dynamic message signs, and other ITS resources. COMMISSION and USER agree to each use its best efforts to avoid the need for relocation.

12. **Sovereign Immunity.**
Each Party hereto agrees that it shall be solely responsible for the wrongful or negligent acts of its employees, contractors, and agents. However, nothing contained herein shall constitute a waiver by either Party of its sovereign immunity under state statutes.

13. **Term and Termination.**
The term of this Memorandum of Agreement shall continue for as long as COMMISSION and/or USER continue to use each other's system resources or until this AGREEMENT is terminated. This AGREEMENT may be terminated for any reason or no reason by either Party upon thirty (30) days' written notice or under the relevant revocation, relocation, or equipment removal terms herein.

14. **Assignment.**
This Memorandum of Agreement is intended for the exclusive privilege and benefit of the undersigned Parties; any assignment to another agency, department, entity, or person, is strictly prohibited and shall vest in the non-assigning Party the immediate right to termination, unless approved, in advance, by written instrument executed by both Parties. It is specifically agreed between COMMISSION and USER that the video, audio, and data received under this AGREEMENT is limited to use in TMCs only by the non-owning Party and is not for public or third-party use unless approved in writing by both Parties or unless ordered for release by a court of competent jurisdiction.

15. **Copyright.**
The copyright to all video, audio, data, or any other information provided or generated by COMMISSION's equipment shall belong to the COMMISSION.

16. **Limitations.**
This AGREEMENT in no way limits or restricts COMMISSION or USER from providing video, audio, or data feeds or any other information owned or controlled by each respective Party to other potential users. The COMMISSION shall own all video, audio, data, and any other information provided or generated by its equipment, regardless of the resources or communications path(s) utilized. The USER shall own all video, audio, data, and any other information provided or generated by its equipment, regardless of the resources or communications path(s) utilized.

17. **No Third-Party Beneficiary.**
COMMISSION and USER agree that no provisions of any part of this AGREEMENT are intended to establish in favor of either Party, the public, or any member thereof, the rights of a third-Party beneficiary hereunder, or to create or authorize any private right of action by any person or entity not a signatory Party to this AGREEMENT to enforce this AGREEMENT. The duties, obligations, and responsibilities of COMMISSION and USER with respect to third parties shall remain as imposed by law.

18. **Contact Information.**
Each Party agrees to provide the other with a list of technical contacts and manager(s) who may be contacted at any time regarding the resources that are being shared under this AGREEMENT and to update that list as necessary to maintain its currency.

19. **Liability.**
COMMISSION and USER each agree to be responsible for any and all liability and expense, including defense costs and legal fees, caused by the negligent or wrongful act or omission of itself, its agents, officers, and employees, in the use, possession, or dissemination of information made available from this AGREEMENT to the extent that such liability may be imposed upon a Party, including but not limited to, personal injury, bodily injury, death, property damage, and/or injury to privacy or reputation.

The liability obligations assumed by the Parties pursuant to this AGREEMENT shall survive the termination of the AGREEMENT as to any and all claims including, without limitation, liability for any damages to a Party's property or for personal injury, bodily injury, death, property damage, or injury to personal reputation or privacy occurring as a proximate result of information made available from the sharing of resources outlined in this AGREEMENT.

20. **Designated Agents.**

| **COMMISSION:** | **USER:** |
|---|---|
| Name: Robert W. Dean, Jr. | Name: |
| Title: State Traffic Engineer | Title: Mayor |
| MDOT | 8710 Northwest Drive |
| P.O. Box 1850 | Southaven, MS 38671 |
| Jackson, MS 39215-1850 | |
| Telephone: 601-359-1454 | Telephone: (662) 393-5531 |
| Facsimile: 601-359-5918 | Facsimile: (662) 393-7294 |

21. **Entire Agreement.**

This AGREEMENT constitutes the entire agreement of the Parties with respect to the subject matter contained herein and supersedes and replaces any and all prior negotiations, understandings, and agreements, written or oral, between the Parties relating thereto.

WITNESS this my signature in execution hereof, this the ____ day of _____, 20____.

**MISSISSIPPI TRANSPORTATION COMMISSION BY AND THROUGH THE DULY-AUTHORIZED EXECUTIVE DIRECTOR OF THE MISSISSIPPI DEPARTMENT OF TRANSPORTATION**

By: _____
*Larry L. "Butch" Brown, Executive Director*

ATTEST:

_____
SECRETARY TO THE COMMISSION

*(Affix Seal)*

WITNESS this my signature in execution hereof, this the ____ day of _____, 20____.

USER: City Southeast

By: _____

Name: Charles C. Davis

Title: Mayor

ATTEST:

Wanda Swallwood

Title: City Clerk

*(Affix Seal)*

Tennessee Department of Transportation

# TRAFFIC OPERATIONS PROGRAM POLICY

**Effective Date:**
**Title: Access to Live Video**

## POLICY

The Tennessee Department of Transportation (TDOT) will make live video of traffic conditions from Closed Circuit Television (CCTV) available to the public. CCTV images will be supplied from the Chattanooga Regional Transportation Management Center (RTMC) at the site of the future TDOT Region 2 Complex. The video images provided will be those selected by the RTMC Operators from the images on the traffic surveillance monitors within the RTMC and that are consistent with the objectives of traffic management.

Live video images will generally be made available upon request to other government and public agencies to better coordinate traffic management strategies on incidents and crashes, and to private news media and other companies for their use in providing traffic information to the public or their customers.

A non-exclusive access agreement is required in order for governmental and private interests to receive direct access to live video. Costs for the access connection will be determined by TDOT and paid for by the USER.

## BACKGROUND

In order to gather real-time traffic condition information, TDOT has constructed and operates an RTMC at the site of the future Region 2 Complex on Volkswagen Drive. The RTMC is the central collection point for freeway condition information. The RTMC support systems gather and disseminate traffic information using the latest technologies.

CCTV has proven to be a significant management and delay-reduction tool for the identification and verification of incidents and crashes, thereby enabling a proper and timely response. The sharing of video information enhances the communication of current traffic conditions, thereby aiding travelers in planning their trip times, routes, and travel mode using the latest available information. TDOT will operate and maintain the CCTV system for the purpose of enhancing response to traffic incidents on the Chattanooga regional freeway system. TDOT wishes to share that traffic information with other transportation operating agencies, incident response agencies and the public.

# Live CCTV Video Access Agreement Between
# Tennessee Department of Transportation
# And
# Governmental Agency Users

# Tennessee Department of Transportation
# And
# Governmental Agency Users

ACCESS AGREEMENT FOR LIVE VIDEO

This Access Agreement for Live Video (Agreement) is an agreement between the Tennessee Department of Transportation (TDOT) and _____, hereafter referred to as the "USER."

The effective date of this Agreement is _____.

The "Access to Live Video" is that video provided by a Closed Circuit Television (CCTV) system developed for traffic management and provided by the Chattanooga Regional Transportation Management Center (RTMC) which is operated by TDOT. The CCTV images will show live traffic conditions, including crashes, stalled vehicles, road hazards, weather conditions, traffic congestion, and maintenance and repair work locations.

The purpose of providing the USER with Access to Live Video is to disseminate real-time traffic information to motorists and to help improve incident management response times. The following provisions of this Agreement are provided to ensure that the CCTV system is accessed and its information used for this purpose and this purpose alone.

The USER hereby acknowledges that other matters not addressed in this Agreement may arise after the signing of this Agreement. Therefore, TDOT reserves the right to make changes in this Agreement, by adding provisions, deleting provisions, and/or changing existing provisions when in TDOT's opinion circumstances require such changes.

**A. GENERAL INFORMATION:**

1. TDOT will operate and maintain the CCTV system as a traffic management tool and, consistent with this purpose, TDOT agrees to provide the USER with Access to Live Video. TDOT does not guarantee the continuity of this access, and TDOT does not warrant the quality of any video image or the accuracy of any image or information provided. Any reliance on such images or information is at the risk of the USER.

2. TDOT will not record video images except for staff training purposes, and no videotapes will be made available to the USER under this Agreement.

3. TDOT will maintain exclusive control of the information and images released from the CCTV system to the USER, including but not limited to determining whether and when to provide a CCTV system feed, from what location, and for what duration. No feed will deploy the cameras' zoom capabilities, and no image will focus on vehicle license plates, drivers, or other personal identification of individuals involved in any

traffic-related incident. No image will focus on any property or person outside the TDOT right-of-way. Access via feed will not be provided for events that are not, in the opinion of TDOT personnel, traffic-related. The decision whether to activate, and upon activation to terminate the access, is exclusively at the discretion of TDOT personnel.

4. RTMC personnel will not accept requests that specific CCTV cameras be operated or that cameras be repositioned.

5. Each USER will receive the same video feed from the CCTV system as any other USER participating in this Agreement. This Agreement in no way limits or restricts TDOT from providing video information to any other potential USER.

6. TDOT reserves the right to terminate this video access program or to change the areas, times, or levels of access within the RTMC at any time.

**B. USER'S RESPONSIBILITIES:**

1. USER, through this Agreement, may be allowed to control the pan, tilt and zoom capabilities of selected CCTV cameras. TDOT will maintain an override capability of these functions.

2. USER agrees not to focus on vehicle license plates, drivers, or other personal identification of individuals involved in any traffic-related incident, nor focus on any property or person outside the TDOT right-of-way. USER further agrees to access the feed only for traffic-related or emergency response activities.

3. USER may install necessary equipment at the RTMC in order to obtain the video feed; the USER is exclusively responsible for any costs related to the purchase and installation of the equipment. TDOT personnel shall determine at what location within the RTMC the equipment is to be placed, and TDOT reserves the right to inspect all installation of equipment. Under no circumstances shall the placement and installation of USER's equipment interfere with RTMC equipment or activities of RTMC personnel. The responsibility for the service, maintenance, and upkeep of the installed equipment is exclusively that of the USER. USER must give RTMC personnel reasonable advance notice of any maintenance/repair visits, and RTMC personnel reserve the right to schedule such visits at a time and in such a manner so as to not interrupt or otherwise obstruct RTMC operations. USER assumes any and all liability for the cost of repair and/or other damages to TDOT's CCTV system caused in any manner by the installation, servicing or maintenance of the USER equipment or by the equipment once installed. USER staff at the RTMC shall be under the general direction of the RTMC Manager for routine conduct, privileges, and protocols within the RTMC.

4. USER shall maintain the security and integrity of the CCTV system by limiting use of the system to trained and authorized individuals, and by insuring that the system is used for the specific purpose stated in this Agreement. No feed shall be purposely

broadcast live or rebroadcast that is zoomed in on an accident where individuals or license numbers are recognizable.

5. USER agrees to move or alter, at its own expense, any of its equipment, hardware, or software, as TDOT deems necessary to accommodate future alterations, improvements, or other changes to the RTMC equipment or facilities.

6. USER accepts all risks inherent with the live video feeds, including, but not limited to, interruptions in the video feed, downtime for maintenance, or unannounced adjustments to the camera displays. TDOT is providing the video feeds as a convenience to the USER and agrees to provide a good faith effort to maintain the video feed from TDOT equipment.

7. USER agrees to provide TDOT with a technical contact person and with a list of all USER'S owned and supplied equipment connected to the RTMC, including the basic operational capabilities of such equipment. USER shall limit calls to the RTMC for monitoring, diagnosing problems or otherwise performing any minor service on USER owned and supplied equipment.

8. USER agrees that video feed will not be used for automated traffic enforcement purposes unless it is specifically allowed by legislation.

**C. LIABILILTY AND INDEMNITY PROVISIONS:**

1. The USER agrees to be responsible for any and all liability and expense, including defense costs and legal fees, caused by the negligent or wrongful act or omission of the USER, or its agents, officers, and employees, in the use, possession, or dissemination of information made available from the CCTV system to the extent provided by law, including but not limited to, personal injury, bodily injury, death, property damage, and/or injury to privacy or reputation.

2. The liability obligations assumed by the USER pursuant to this Agreement shall survive the termination of this Agreement, as to any and all claims, including without limitation liability for any damages to TDOT property or for personal injury, death, property damage, or injury to personal reputation or privacy occurring as a proximate result of information made available from the CCTV system.

**D. TERMINATION:**

1. TDOT or USER may terminate this Agreement any time for any reason by providing written notice of termination.

2. Upon termination of this Agreement by either party, the USER shall promptly remove its equipment from the RTMC as directed by TDOT.

**State of Tennessee**
**Department of Transportation**

By:_____ Date:_____
John Schroer
Commissioner

Approved as to Form:

By:_____ Date: _____
General Counsel

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**USER AGENCY:_____**

By_____

(Print Name)_____

(Title)_____

Date:_____

Approved by Legal Counsel for USER AGENCY

By_____

(Print Name)_____

(Title)_____

Date:_____

Tennessee Department of Transportation

# TRAFFIC OPERATIONS PROGRAM POLICY

**Effective Date: July 1st 2012**
**Title: Access to Live Video**

## POLICY

The Tennessee Department of Transportation (TDOT) will make live video of traffic conditions from Closed Circuit Television (CCTV) available to the public. CCTV images will be supplied from a Regional Transportation Management Center (RTMC) which are located in each of TDOT's four regions. The video images provided will be those selected by the RTMC Operators from the images on the traffic surveillance monitors within the RTMC and that are consistent with the objectives of traffic management.

Live video images will generally be made available upon request to other government and public agencies to better coordinate traffic management strategies on incidents and crashes, and to private news media and other companies for their use in providing traffic information to the public or their customers.

A non-exclusive access agreement is required in order for governmental and private interests to receive direct access to live video. Costs for access connection are solely the responsibility of the USER and are not set by TDOT.

## BACKGROUND

In order to gather real-time traffic condition information, TDOT has constructed and operates an RTMC within each of TDOT's four regions. The RTMC is being developed into the central collection point for freeway condition information. The RTMC support systems gather and disseminate traffic information using the latest technologies.

CCTV has proven to be a significant management and delay-reduction tool for the identification and verification of incidents and crashes, thereby enabling a proper and timely response. The sharing of video information enhances the communication of current traffic conditions, thereby aiding travelers in planning their trip times, routes, and travel mode using the latest available information. TDOT will operate and maintain the CCTV system for the purpose of enhancing traffic incident response on each regional freeway system. TDOT wishes to share that traffic information with other transportation operating agencies, incident response agencies and the public.

# Live CCTV Video Access Agreement Between
# Tennessee Department of Transportation
# And
# Private Entity Users

# Tennessee Department of Transportation
# And
# Private Entity Users

ACCESS AGREEMENT FOR LIVE VIDEO

This Access Agreement for Live Video (Agreement) is an agreement between the Tennessee Department of Transportation (TDOT) and _____, hereafter referred to as the "USER."

The effective date of this Agreement is July 1st 2012. This Agreement replaces and supersedes any and all other agreements between the parties with respect to the same subject matter.

The "Access to Live Video" is that video provided by a Closed Circuit Television (CCTV) system developed for traffic management and provided by the Regional Transportation Management Center (RTMC) which is operated by TDOT. The CCTV images will show live traffic conditions including crashes, stalled vehicles, road hazards, weather conditions, traffic congestion, and maintenance and repair work locations.

The purpose of providing the USER with Access to Live Video is to disseminate real-time traffic information to motorists and to help improve incident management response times. The following provisions of this Agreement are intended to ensure that the CCTV system is accessed and its information used for this purpose and this purpose alone.

The USER hereby acknowledges that other matters not addressed in this Agreement may arise after the signing of this Agreement. Therefore, TDOT reserves the right to make changes in this Agreement by adding provisions, deleting provisions, and/or changing existing provisions when in TDOT's opinion circumstances require such changes.

**A. GENERAL INFORMATION:**

1. TDOT will operate and maintain the CCTV system as a traffic management tool and, consistent with this purpose, TDOT agrees to provide the USER with Access to Live Video. TDOT does not guarantee the continuity of this access, and TDOT does not warrant the quality of any video image or the accuracy of any image or information provided. Any reliance on such images or information is at the risk of the USER.

2. TDOT will not record video images except for staff training purposes, and no video captures will be made available to the USER under this Agreement.

3. TDOT will maintain exclusive control of the information and images released from the CCTV system to the USER, including but not limited to determining whether and when to provide a CCTV system feed, from what location, and for what duration. No feed will deploy the cameras' zoom capabilities, and no image will focus on vehicle license plates, drivers, or other personal identification of individuals involved in any traffic-related incident. No image will focus on any property or person outside the TDOT right-of-way. Access via feed will not be provided for events that are not, in the opinion of TDOT personnel, traffic-related. The decision whether to activate, and upon activation to terminate the access, is exclusively at the discretion of TDOT personnel.

4. RTMC personnel will not accept requests that specific CCTV cameras be operated or that camera's be repositioned.

5. Each USER will receive the same video feed from the CCTV system as any other USER participating in this Agreement. This Agreement in no way limits or restricts TDOT from providing video information to any other potential USER.

6. TDOT reserves the right to terminate this video access program or to change the areas, times, or levels of access within the RTMC at any time.

**B. USER'S RESPONSIBILITIES:**

1. USER may install necessary equipment at the RTMC in order to obtain the video feed; the USER is exclusively responsible for any costs related to the purchase and installation of the equipment. TDOT personnel shall determine the amount of rack space that will be provided and at what location within the RTMC the equipment will be placed. TDOT reserves the right to inspect all installed equipment and its configuration. Under no circumstances shall the placement and installation of USER's equipment interfere with RTMC equipment or activities of RTMC personnel. The responsibility for the service, maintenance, and upkeep of the installed equipment is exclusively that of the USER. USER must give RTMC personnel reasonable advance notice of any maintenance/repair visits, and RTMC personnel reserves the right to schedule such visits at a time and in such a manner so as to not interrupt or otherwise obstruct RTMC operations. USER assumes any and all liability, to the extent provided by law, for the cost of any repair and/or other damages to TDOT's CCTV system caused in any manner by the installation, servicing or maintenance of the USER's equipment or by the equipment once installed. USER staff at the RTMC shall be under the general direction of the RTMC Manager for routine conduct, privileges, and protocols within the RTMC.

2. USER shall maintain the security and integrity of the CCTV system by limiting use of the system to trained and authorized individuals, and by insuring the system is used for the specific purpose stated in this Agreement. No feed shall be purposely

broadcast live or rebroadcast that is zoomed in on an accident where individuals or license numbers are recognizable.

3. USER agrees to move or alter, at its own expense, any of its equipment, hardware, or software, as TDOT deems necessary to accommodate future alterations, improvements, or other changes to the RTMC equipment or facilities.

4. USER accepts all risks inherent with the live video feeds, including, but not limited to, interruptions in the video feed, downtime for maintenance, or unannounced adjustments to the camera displays. TDOT is providing the video feeds as a convenience to the USER and agrees to provide a good faith effort to maintain the video feed from TDOT equipment. The USER agrees to hold TDOT harmless, including TDOT employees and TDOT-designated agents, from any damages caused to USER by loss of a video signal due to equipment failure or any act or omission on their part.

5. USER agrees to provide TDOT with a technical contact person and with a list of all USER's owned and supplied equipment connected to the RTMC, including the basic operational capabilities of such equipment. USER shall limit calls to the RTMC for monitoring, diagnosing problems or otherwise performing any minor service on USER owned and supplied equipment.

6. USER agrees to acknowledge the video images are provided by the Tennessee Department of Transportation. This must be done by showing either of the two TDOT SmartWay logos provided by TDOT (unaltered) that is readable to the viewer and shown during the entire use of camera images.

**C. LIABILITY AND INDEMNITY PROVISIONS:**

1. To the extent provided by law, the USER agrees to defend, indemnify, and hold TDOT harmless from and against any and all liability and expense, including defense costs and legal fees, caused by any negligent or wrongful act or omission of the USER, or its agents, officers, and employees, in the use, possession, or dissemination of information made available from the CCTV system to the extent that such expenses or liability may be incurred by TDOT, including but not limited to, personal injury, bodily injury, death, property damage, and/or injury to privacy or reputation.

2. The liability obligations assumed by the USER pursuant to this Agreement shall survive the termination of this Agreement, as to any and all claims including without limitation liability for any damages to TDOT property or for injury, death, property damage, or injury to personal reputation or privacy occurring as a proximate result of information made available from the CCTV system.

**D. TERMINATION:**

1. TDOT or USER may terminate this Agreement at any time for any reason by providing written notice of termination.

2. Upon termination of this Agreement by either party, the USER shall promptly remove its equipment from the RTMC as directed by TDOT.

**State of Tennessee**
**Department of Transportation**

Approved as to Form:

By:_____ _____
JOHN C. SCHROER
Commissioner General Counsel

Date:_____

USER AGENCY_____

By_____

(Print Name)_____

(Title)_____

Date:_____

Approved by Legal Counsel for USER AGENCY

By_____

(Print Name)_____

(Title)_____

Date:_____

# APPENDIX F – REGIONAL ITS ARCHITECTURE MAINTENANCE FORM

# Memphis Urban Area
# Regional ITS Architecture
## Maintenance Form

**Please complete the following form to document changes to the 2014 Memphis Urban Area Regional ITS Architecture. Forms should be submitted to the Memphis Urban Area Metropolitan Planning Organization (MPO) for review and acceptance. All accepted changes will be kept on file by the MPO and shared with the TDOT Traffic Operations Division. Changes will be incorporated into the 2014 Memphis Urban Area Regional ITS Architecture during the next scheduled update.**

### Contact Information

| | |
|---|---|
| Agency | |
| Agency Contact Person | |
| Street Address | |
| City | |
| State, Zip Code | |
| Telephone | |
| Fax | |
| E-Mail | |

### Change Information

Please indicate the type of change to the Regional ITS Architecture or Deployment Plan:

- ☐ Administrative Change: Basic changes that do not affect the structure of the ITS service packages in the Regional ITS Architecture.
  *Examples include: Changes to stakeholder or element name, element status, or data flow status.*
- ☐ Functional Change – Single Agency: Structural changes to the ITS service packages that impact only one agency in the Regional ITS Architecture.
  *Examples include: Addition of a new ITS service package or changes to data flow connections of an existing ITS service package. The addition or changes would only impact a single agency.*
- ☐ Functional Change – Multiple Agencies: Structural changes to the ITS service packages that have the potential to impact multiple agencies in the Regional ITS Architecture.
  *Examples include: Addition of a new ITS service package or changes to data flow connections of an existing ITS service package. The addition or changes would impact multiple agencies and require coordination between the agencies.*
- ☐ Project Change: Addition, modification, or removal of a project in the Regional ITS Deployment Plan.
- ☐ Other: _____
  _____

### Submittal

Please submit ITS Architecture Maintenance Documentation form to:

Memphis Urban Area Metropolitan Planning Organization
125 North Main Street, Suite 450
Memphis, TN 38103
Phone: 901-379-7840
Fax: 901-379-7865

Form Submittal Date: _____

# Memphis Urban Area
# Regional ITS Architecture
## Maintenance Form

| | |
|---|---|
| **Question 1**<br>Describe the requested change to the Regional ITS Architecture or Deployment Plan. | *Example: City A is planning to deploy CCTV cameras for network surveillance on arterial streets. In the Regional ITS Architecture, the City A Traffic Operations Center (TOC) is shown as the only center controlling the CCTV cameras. The City A TOC is now planning to provide images and control of the CCTV cameras to the City A Police Department for use during incidents.* |
| **Question 2**<br>Are any of the Regional ITS Architecture service packages impacted by the proposed change? | ☐ Yes: Please complete Questions 2A and 2B<br>☐ No: Please proceed to Question 3<br>☐ Unknown: Please coordinate with the Memphis Urban Area MPO to determine impacts of the change to the Regional ITS Architecture |
| *Question 2A*<br>List all of the ITS service packages impacted by the proposed change. | *Example: ATMS08 – Traffic Incident Management System*<br>*ATMS01 – Network Surveillance* |
| *Question 2B*<br>Include a copy of the ITS service packages impacted by the proposed change and mark any proposed modifications to the ITS service packages. Add any additional notes on proposed changes in this section. | *Example: A sketch of the ATMS08 – Traffic Incident Management System service package diagram for City A is attached. Changes have been marked by hand to indicate the new data connections that will be established to allow the City A TOC to send traffic images to the City A Police Department and for the City A Police Department to control the CCTV cameras. The deployment of the CCTV cameras will also result in several of the data flows in ATMS01 – Network Surveillance being changed from planned to existing. These have also been marked on the service package diagram. (Note: The ITS service package diagrams can be found in Appendix B of the Regional ITS Architecture.)* |
| **Question 3**<br>Does the proposed change impact any stakeholder agencies other than the agency completing this form? | ☐ Yes: Please complete Questions 3A and 3B<br>☐ No: Form is complete<br>☐ Unknown: Please coordinate with the Memphis Urban Area MPO to determine impacts of change to other agencies in the Regional ITS Architecture |
| *Question 3A*<br>Identify the stakeholder agencies impacted by the change and a contact person for each agency. | *Example: The City A TOC and City A Police Department are the two agencies impacted by this change. (Note: Assuming the City A TOC representative is completing this form, the contact person from the City A Police Department working on this project should be listed.)* |
| *Question 3B*<br>Describe the coordination that has occurred with the stakeholder agencies and the results of the coordination? | *Example: The City A TOC and City A Police Department have had several meetings in the last year to discuss the operations of the arterial CCTV cameras. An operational agreement for the joint operations of the CCTV cameras is currently being developed.* |