



7. INTELLIGENT TRANSPORTATION SYSTEMS

7.1 Introduction

Intelligent Transportation Systems (ITS) improve transportation safety and mobility and enhance productivity through the use of advanced information and communications technologies. ITS include a broad range of wireless and wire line communications-based information and electronics technologies. When integrated into the transportation system's infrastructure, and in vehicles themselves, these technologies relieve congestion, improve safety and enhance American productivity.⁶⁸ Before ITS technologies are deployed, ITS Architecture Plans and ITS Deployment Plans are completed by providers.

7.1.1 ITS Architecture Plans

ITS Architecture Plans provide a framework for implementing ITS projects, encouraging resource sharing among agencies, identifying applicable standards to apply to projects, and allowing cohesive long-range planning among regional stakeholders. The following stakeholders have an ITS Architecture Plan in place:

- Illinois Department of Transportation;
- City of Jackson, Tennessee;
- Kentucky Transportation Cabinet;
- Mississippi Department of Transportation;
- Missouri Department of Transportation; and
- Tennessee Department of Transportation – Statewide Plan and the City of Memphis.

7.1.2 ITS Deployment Plans

ITS Deployment Plan identify specific projects for deployment in order to implement the architecture and build on the ITS Architecture by outlining specific ITS project recommendations and strategies and identifying deployment timeframes so recommended projects and strategies can be implemented over time. The following ITS stakeholders have an ITS Deployment or Strategic Plan in place:

- Arkansas Highway and Transportation Department;
- Illinois Department of Transportation;
- Kentucky Transportation Cabinet;

⁶⁸ U.S. DOT Research and Innovative Technology Administration (RITA).



- City of Jackson, Tennessee;
- Louisiana Department of Transportation and Development – Statewide Plan, City of New Orleans and City of Baton Rouge;
- Mississippi Department of Transportation; and
- Tennessee Department of Transportation – Statewide SmartWay System and SmartWay for the City of Memphis.

7.2 ITS in the DRA Region

Currently, there are 14 Intelligent Transportation System providers in the DRA. Each of the eight states, along with six cities and municipalities, provides some type of ITS service along its interstate system, state highways, and city streets. These systems include Traffic Management Centers (TMCs), closed circuit television cameras, dynamic message signs, highway advisory radio, 511 toll free traffic phone service, roadway weather information, and websites specific to traffic information.

7.2.1 Traffic Management Centers

The Traffic Management Centers are the center of a transportation management system, where transportation network information is collected and combined with other operational information to efficiently manage the transportation network and provide the public critical traveler information. A TMC links different aspects of ITS, such as dynamic message signs, closed circuit video equipment, traffic signals and roadside count stations, which allows decision-makers to identify and respond to a highway incident in a timely manner. A TMC also has the capability to communicate important transportation information to the media and public in a quick and efficient manner. There are currently 12 Traffic Management Centers in the DRA region and these are located in the following areas:

- Arkansas Highway and Transportation Department, Little Rock, Arkansas;
- Illinois Department of Transportation, Collinsville, Illinois;
- Louisiana Department of Transportation and Development, Baton Rouge, Louisiana;
- Mississippi Department of Transportation, Jackson, Mississippi;
- Tennessee Department of Transportation, Jackson, Tennessee;
- Tennessee Department of Transportation, Memphis, Tennessee;
- City of Little Rock, Arkansas;
- City of Jackson, Mississippi;
- City Jackson, Tennessee;
- City of Ridgeland, Mississippi;



- City of Southaven, Mississippi; and
- Pearl River Valley Water Supply District, Ridgeland, Mississippi.

7.2.2 Closed Circuit Television Cameras

Closed Circuit Television Cameras (CCTV) are an integral part of a traffic management system and these cameras provide traffic engineers with live, visual information that is crucial for making informed decisions on traffic control and incident management. CCTV cameras have the ability to monitor roadway conditions, traffic incidents, weather conditions, and provide security surveillance on major bridges. CCTV cameras are also becoming more helpful in the coordination and communication between state DOTs, MPOs, Homeland Security, local emergency management, and law enforcement offices in cases of major incidents and other unforeseeable events. Furthermore, CCTV cameras are being used by travel information websites and by local television stations to inform the public of current travel conditions. There are currently 570 CCTV cameras located throughout the DRA region.

7.2.3 Dynamic Message Signs

Dynamic Message Signs (DMS) are electronic message signs used on roadways to give travelers updated information and advanced warnings on traffic congestion, construction zones, lane closures, traffic accidents, and any required actions to perform. DMS can also be very useful in handling special events that tend to cause heavier traffic volumes such as sporting events and concerts, as well as during times of natural disaster, such as where contra-flow traffic is being implemented. There are approximately 194 dynamic message signs, which includes both permanent and portable signs, being used the DRA region

7.2.4 Highway Advisory Radio

Highway Advisory Radio (HAR) are licensed low-powered AM radio stations set up by state and local transportation departments to provide bulletins to motorists and other travelers regarding traffic conditions and other delays. HARs can be linked to a traffic management center so that traffic managers can provide up-to-date information, or HARs can provide a loop of prerecorded information. Currently there are only eight HARs being used in the DRA region, with more planned in the future.

7.2.5 511 Toll Free Phone Service

On July 21, 2000, the Federal Communications Commission (FCC) designated "511" as the single traffic information telephone number to be made available to states and local jurisdictions across the U.S. A great deal of traffic information is collected via intelligent transportation systems. Providing access to this traffic information via one nationwide, three-digit telephone number is a means to make the most of the ITS investment. That is, to get that information to the



driver and shipper by this country's most common means of communication – the telephone.⁶⁹ The 511 toll free phone service is currently available in Kentucky, Tennessee, Louisiana, and portions of Missouri.

7.2.6 Traffic Information Website

Travel information websites offer updated information on traffic conditions, such as construction zones, traffic accidents, weather conditions, lane closures, etc. These websites can also be linked to CCTV cameras to allow the public users to see actual traffic conditions and plan accordingly. There are 22 traffic related websites throughout the DRA region available to the public offering real time traffic information.

7.2.7 Fiber Optic Cable

Fiber optic cable is the backbone of an Intelligent Transportation System. It is used to link traffic signals, CCTV cameras, dynamic message signs, and traffic detectors to the traffic management center. There is currently over 1,600 miles of fiber optic cable being used for ITS purposes in the Delta Regional Authority.

7.2.8 Traffic Detectors

Traffic detectors can be found in various forms, from in-ground loop detectors, video detection, and radar detection, and offer a wide range of capabilities, such as gathering traffic counts, vehicle classification, speed, and weight. This information assists traffic engineers to better understand current and future traffic conditions, as well as help alleviate congestion. There are approximately 580 traffic detectors in the DRA region being used for traffic monitoring and traffic control.

7.3 Intelligent Transportation System Needs

ITS needs were grouped into safety, congestion relief, increased intermodal connectivity, improved freight mobility and economic development categories. The following provides an overview of the ITS needs identified by the 14 providers in the DRA region.

7.3.1 Safety and Security

An explicit objective of the transportation system is to provide a safe environment for travel while continuing to strive to improve the performance of the system. The total ITS needs in the

⁶⁹ Federal Highway Administration (FHWA).



DRA region totals \$408.1 million.⁷⁰ The following ITS needs were identified in the DRA region and once completed will assist in enhancing safety and security.

- Install Dynamic Message Signs to warn motorists of traffic incidents and construction zones. The following is a list of the some of the more heavily traveled roadways in the DRA region that needs Dynamic Message Signs:
 - I-55, I-20, and US 49 in Jackson, Mississippi;
 - I-55, I-40 and I-240 through Memphis, Tennessee;
 - I-40 through Jackson, Tennessee;
 - I-10 through New Orleans and Baton Rouge, Louisiana; and
 - I-40 and I-30 through Little Rock, Arkansas.
- Provide Toll free 511 phone service to provide motorists updated traffic information. The following is a list of states in the DRA that do not have a 511 phone service in place:
 - Alabama;
 - Arkansas;
 - Mississippi;
 - Illinois; and
 - Missouri.
- Install video surveillance cameras on major river bridge crossings throughout the DRA region. The following is a list of major river crossings in the DRA region that needs cameras:
 - I-10 over Lake Pontchartrain in New Orleans, Louisiana;
 - I-310 over the Mississippi River in New Orleans, Louisiana;
 - US 90 over the Mississippi River in New Orleans, Louisiana;
 - I-10 over the Mississippi River in Baton Rouge, Louisiana;
 - US 84 over the Mississippi River in Natchez, Mississippi;
 - I-20 over the Mississippi River in Vicksburg, Mississippi;
 - US 82 over the Mississippi River in Greenville, Mississippi;
 - US 49 over the Mississippi River in Helena, Arkansas;
 - I-55 over the Mississippi River in Memphis, Tennessee;
 - I-40 over the Mississippi River in Memphis, Tennessee;
 - I-155 over the Mississippi River in Caruthersville, Missouri;
 - MO 34, MO 74, and IL 146 (Bill Emerson Bridge) over the Mississippi River in Cape Girardeau, Missouri; and
 - I-24 over the Ohio River in Paducah, Kentucky.
- Install video surveillance cameras in public transit vehicles and at transit stations in cities such as New Orleans, LA; Baton Rouge, LA; Jackson, MS; Memphis, TN; Jackson, TN; and Little Rock, AR.

⁷⁰ Needs calculated by consulting each state DOT and ITS provider in the DRA region.



- Install red light running monitoring systems at traffic signals in the larger metropolitan areas to help control and monitor traffic.

7.3.2 Congestion Relief

In 2003, over 39,000 miles of highways in the United States had peak period congestion, and of these, over 6,800 miles were in rural areas⁷¹. Demand for highway travel by Americans continues to grow as population increases, particularly in metropolitan areas. Construction of new highway capacity to accommodate this growth in travel has not kept pace due to funding limitation and environmental concerns. Congestion is largely thought of as a big city problem in the DRA region, but delays are becoming increasingly common in small cities and some rural areas. Congestion will continue to worsen, especially since freight movement is forecasted to nearly double by 2020. One major effort to reduce congestion is through installing ITS technologies, which can be used to aid in getting travelers real-time traffic information, managing traffic incidents by increasing cooperation between public agencies, and through coordinated traffic signal timings to help prevent unnecessary delays. ITS elements such as upgraded traffic management centers, 511 phone service, dynamic message signs, etc. are all valuable components in relieving traffic congestion. The following provides some ITS solutions to assist in reducing congestion in the DRA region:

- Upgrade existing and construct new Traffic Management Centers throughout the region to allow the states and MPOs to better handle the ever-growing traffic conditions. This includes ITS elements such as local and regional traffic signal coordination, CCTV cameras, fiber optic cable, traffic detectors, highway advisory radio, dynamic message signs, etc. The following is a list of areas that have been provided by the ITS stakeholders where a new traffic management center is needed or an existing one needs to be upgraded:
 - Little Rock, North Little Rock, and West Memphis, Arkansas;
 - Collinsville and Carbondale, Illinois;
 - New Orleans, Houma, Lafayette and Baton Rouge, Louisiana;
 - Paducah and Madisonville, Kentucky;
 - Jackson, Ridgeland, McComb, and Southaven, Mississippi; and
 - Memphis and Jackson, Tennessee.
- Install Dynamic Message Signs to warn motorists of traffic incidents and construction zones in the following areas:
 - I-55, I-20, and US 49 in Jackson, Mississippi;
 - I-55, I-40 and I-240 through Memphis, Tennessee;
 - I-40 through Jackson, Tennessee;

⁷¹ Federal Highway Administration.



- I-10 through New Orleans and Baton Rouge, Louisiana; and
- I-40 and I-30 through Little Rock, Arkansas.

7.3.3 Increased Intermodal Connectivity

Intermodal connectivity has been an important issue in transportation since the Intermodal Surface Transportation Efficiency Act (ISTEA) was passed in 1991. With policies outlined in ISTEA, then in the Transportation Equity Act for the 21st Century (TEA-21) in 1998, and now with the Safe, Accountable, Flexible, Efficient Transportation Equity Act (SAFETEA-LU) in 2005, the federal government has sought to encourage intermodal connections – the links that allow passengers to switch from one mode of public transportation to another.⁷² SAFETEA-LU addresses the many challenges facing the U.S. transportation system today – challenges such as improving safety, reducing traffic congestion, improving efficiency in freight movement, increasing intermodal connectivity, and protecting the environment – as well as laying the groundwork for addressing future challenges.⁷³

Intelligent Transportation Systems can help overcome these challenges of increasing intermodal connectivity through a number of ways. ITS infrastructure can be integrated into an existing public transportation network through GPS vehicle tracking systems, video surveillance, electronic payment, and customer real-time information systems. These systems can address problems such as inefficient routes, poor vehicle scheduling and connections, long transfer or wait times, and safety issues. Together, these elements would help improve the entire operation of a public transit system.

7.3.4 Improved Freight Mobility

Freight volumes are forecasted to increase significantly in the DRA region by 2020. Improvements in speed, accuracy and visibility of information transfer in a freight exchange could reap large rewards for the U.S. and DRA region economy. The U.S. DOT has developed a National ITS Program Plan for ITS which provides a new vision for surface transportation in America. One of the major elements of this program is Commercial Vehicle Operations (CVO). The scope of CVO includes the operations associated with moving goods and passengers via commercial vehicles over the North American highway system and the activities necessary to regulate these operations. As shown in **Figure 13**, CVO includes activities related to safety assurance, commercial vehicle credentials and tax administration, roadside operations, freight and fleet management, and vehicle operation.⁷⁴

⁷² Goldberg, Making Connections: Intermodal Links in the Public Transportation System, Bureau of Transportation Statistics, September 2007.

⁷³ SAFETEA-LU, Federal Highway Administration, 2005.

⁷⁴ The Federal Motor Carrier Safety Administration.



Figure 13: National ITS Program Plan



Source: U.S. Department of Transportation

The term commercial vehicle information systems and networks (CVISN) refers to the ITS information system elements that support CVO. Carriers are able to equip vehicles with a variety of productivity and safety improvements such as mobile communications systems, navigation and tracking systems, on-board vehicle monitors, collision avoidance devices, crash restraints, and vision enhancement equipment.⁷⁵ These elements will help eliminate en-route delays caused by weigh stations and by inspections, and increase the efficiency of freight movement throughout the region.

7.4 ITS Recommendations

The expected installation of new ITS technologies has great potential to benefit trucking by reducing common delays for weighing, safety, and credentials inspection as well as indirect benefits through improved safety, congestion management, and incident communication and response. The following provides ITS policy, project, coordination, funding and priority recommendations.

⁷⁵ The Federal Motor Carrier Safety Administration.



7.4.1 Policy Recommendations

- Promote the development and deployment of ITS technologies including incident management techniques and procedures to reduce congestion on the transportation system throughout the DRA region.
- Promote the development and deployment of ITS technologies to improve safety along the interstate system in the DRA region.
- Promote the development and deployment of ITS technologies to improve security at ports, airports and major Mississippi and Ohio River bridge crossings in the DRA region.
- Connect the fiber optic cables across state lines to provide a seamless and integrated system.
- Fund and develop a DRA Regional ITS Deployment Plan in coordination with the 14 ITS providers.

7.4.2 Project Recommendations

- Include ITS elements such as fiber optic cable, DMS, and CCTV cameras in the construction of I-69 and I-269 through Arkansas, Louisiana, Mississippi, Tennessee, and Kentucky.
- Install fiber optic cable, CCTV cameras and DMS on bridges of major river crossings, such as the Mississippi River and Ohio River bridges, to improve safety, traffic awareness, and security.
- Connect the Traffic Management Centers in New Orleans, Baton Rouge, and Jackson, Mississippi so these centers will be able to coordinate with each other in hurricane evacuation procedures and contra-flow lane operations.
- Install virtual weigh stations, weigh-in-motion stations, electronic information exchange, and electronic over-height detection warnings along major truck routes to improve freight movement and commercial vehicle operations in the DRA region.
- Install Commercial Vehicle Operations (CVO), which include elements such as automated vehicle inspection, electronic information exchange, virtual weigh-in-motion sites, and over-height vehicle detection, in large metropolitan areas, across state lines, and along major freight corridors such as I-40, I-20, I-24, and I-55 through the DRA region.
- Provide a single statewide toll free phone number in each of the eight states to supply the public up-to-date travel information. The states of Kentucky, Tennessee, Louisiana, and Missouri currently have a 511 phone service in place.
- Construct a Traffic Management Center at I-10 near West End in New Orleans. This regional center will monitor traffic conditions and alert emergency responders of an incident on interstate and principal arterial roadways for all parishes in the region.
- Install CCTV cameras along key corridors in the New Orleans region. The New Orleans RPC intends to devote significant resources toward installing surveillance cameras along



Congestion Management System corridors in the region to monitor traffic flow and alert local emergency responders of problems along the network. Access to the cameras will be given as a priority to first responders to an incident per agreements outlined in the ITS Deployment Plan.

- Install new or upgrade existing traffic management centers throughout the region. The following is a list provided by the ITS stakeholders where a traffic management center is needed or an existing one needs upgrading:
 - Little Rock, North Little Rock, and West Memphis, Arkansas;
 - Collinsville and Carbondale, Illinois;
 - New Orleans, Houma, Lafayette and Baton Rouge, Louisiana;
 - Paducah and Madisonville, Kentucky;
 - Jackson, Ridgeland, McComb, and Southaven, Mississippi; and
 - Memphis and Jackson, Tennessee.

7.4.3 Coordination Recommendations

- Develop a DRA ITS Working Group, which would have representatives from each of the 14 ITS providers in the DRA region, as well as FHWA and Homeland Security and would meet twice a year.
- Improve coordination and communication between all the stakeholders (DOTs, cities, FHWA, Homeland Security, utility companies, etc) on the front end of an ITS construction project to avoid any problems with the management and integration of the ITS elements.
- Connect Traffic Management Centers in neighboring states to aid in coordination and maintenance of traffic at major river crossings and in the event of natural disasters where regional coordination is needed. This will be extremely beneficial in the states of Mississippi, Louisiana, and Alabama in hurricane evacuation and contra-flow lane operations.
- Use of ITS elements to provide communication between major government agencies such as Homeland Security, Federal Emergency Management Agency (FEMA), Federal Highway Administration (FHWA), and state DOTs.
- Use ITS integration between state DOTs, local MPOs, local news stations, law enforcement, fire departments and emergency medical responders to improve response times for traffic incidents.

7.4.4 Funding Recommendations

- Develop and fund an ITS categorical grant program to assist in the development and construction of the ITS infrastructure in the DRA region.



- Fund all ITS elements and installation in the initial construction of new highway, rail and bridge projects. These types of ITS projects would be most beneficial along new interstate routes such as the I69/269 Corridor.
- With stand alone ITS projects, such as upgrading Traffic Management Centers or installing fiber optic cable, funding may be handled by dividing these large ITS projects in smaller pieces and completing them over a period of time. Since some of these projects are very costly, it may be difficult to secure adequate funding for large ITS projects. While it is desirable to be able to expedite the implementation of the overall systems, it may be more realistic to phase the overall implementation.

7.4.5 Priority Recommendations

- Develop and fund an ITS categorical grant program to assist in the development and construction of the ITS infrastructure in the DRA region.
- Develop a DRA ITS Working Group.
- Update Traffic Management Centers in the DRA region. This can include traffic incident management that will help develop appropriate response times for emergency management, maintenance, and construction personnel.
- Install fiber optic cable system along interstates and connect to neighboring Traffic Management Centers.
- Connect fiber optic and other ITS equipment to provide communication links and signal control at the state and city levels.
- Install video surveillance cameras on major bridges to support homeland security and to monitor traffic operations.
- Coordinate regional commercial vehicle operations consistent through each state to improve freight mobility.
- Install CCTV cameras, dynamic message signs, and vehicle detection units along interstates, highways, and major intersections.
- Install a 511 telephone system in each state that does not currently have a system.