



**CENTRAL REGION
INTELLIGENT
TRANSPORTATION SYSTEM
ARCHITECTURE
MDOT-ITS 002-01-003
Version 1.1**



Prepared by:

**URS Corporation
Gresham, Smith and Partners, MS, P.C.**

November 2008



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FINAL REPORT

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EXECUTIVE SUMMARY

The Central Region Intelligent Transportation System (ITS) Architecture is a framework for ITS deployment and integration in the Central Mississippi region. The purpose of the Central Region ITS Architecture is to provide a “road map” for the deployment of ITS programs and projects in the Central Mississippi region over the next 20 years. While a Statewide ITS Architecture has been developed and updated for the entire state of Mississippi, this Central Region ITS Architecture specifically concentrates on the ITS components planned for the Central Mississippi region.

An ITS Architecture describes the “big picture” for ITS deployment in terms of individual components (i.e. subsystems) that will perform the functions necessary to deliver the desired services. An ITS Architecture supports effective and efficient deployment of transportation and ITS projects that address the transportation problems and needs. The Central Region ITS Architecture has been developed by the Mississippi Department of Transportation (MDOT) in conjunction with the Central Mississippi Planning and Development District (CMPDD) and various stakeholders in the Central Mississippi region. The architecture represents a shared vision of how each agency’s systems will work together in the future, sharing information and resources to provide a safer, more efficient, and more effective transportation system for travelers. The architecture is a living document and will change as stakeholders and needs change.

VISION, MISSION, AND GOALS

The CMPDD and various stakeholders in the Central Mississippi region have recognized the need for vision and strategic planning with respect to ITS technology. The vision for the Central Region ITS Architecture is one of enhanced transportation productivity, mobility, safety, efficiency and security through the use of integrated, cost-effective ITS technologies and systems and strong operational relationships.

The Central Region ITS program mission is similar to the MDOT ITS program mission and their corresponding Mission Statement is:

“Central Region Stakeholders will use ITS technologies to improve the quality of life for Central Mississippi residents and visitors by providing more reliable, informative, safer, and flexible passenger and freight multi-modal transportation services.”

In developing the Central Region ITS Architecture, it is important to consider the transportation-related goals of the stakeholders in the Central Mississippi region. These transportation goals for the Central Mississippi region were set forth by the CMPDD and are as follows:

GOAL ONE:

Enhance transportation system mobility and accessibility for all users, uses and modes

GOAL TWO:

Enhance regional connectivity and economic viability

GOAL THREE:

Enhance environmental quality and public safety

GOAL FOUR:

Support local values and conserve existing community resources

GOAL FIVE:

Provide a transportation planning process that informs and involves the public as well as elected officials

GOAL SIX:

Develop a long-range regional transportation plan that is consistent with all applicable federal, state and local laws

While these goals do not provide specific details regarding the deployment of individual ITS projects, they do outline the general requirements necessary when considering the development

of the Central Region's ITS program. It is from these goals that specific objectives and ITS projects will be developed.

DESCRIPTION OF REGION

The area covered by this architecture is the Central Mississippi region, including all portions of Copiah, Hinds, Madison, Rankin and Simpson Counties. The region also includes the four cities with populations (based on a 2005 estimate) greater than 20,000:

- Clinton
- Jackson
- Pearl
- Ridgeland

The region is centrally located in the state. The CMPDD serves as the MPO and coordinates the transportation planning efforts within the region. The CMPDD is also the lead agency responsible for the future utilization and maintenance/update of the Central Region ITS Architecture. The MPO addresses transportation planning and programming issues in the Central Mississippi metropolitan area, and is responsible for developing metropolitan transportation plans and the transportation improvement programs (TIP) within regional boundaries.

ARCHITECTURE DEVELOPMENT PROCESS

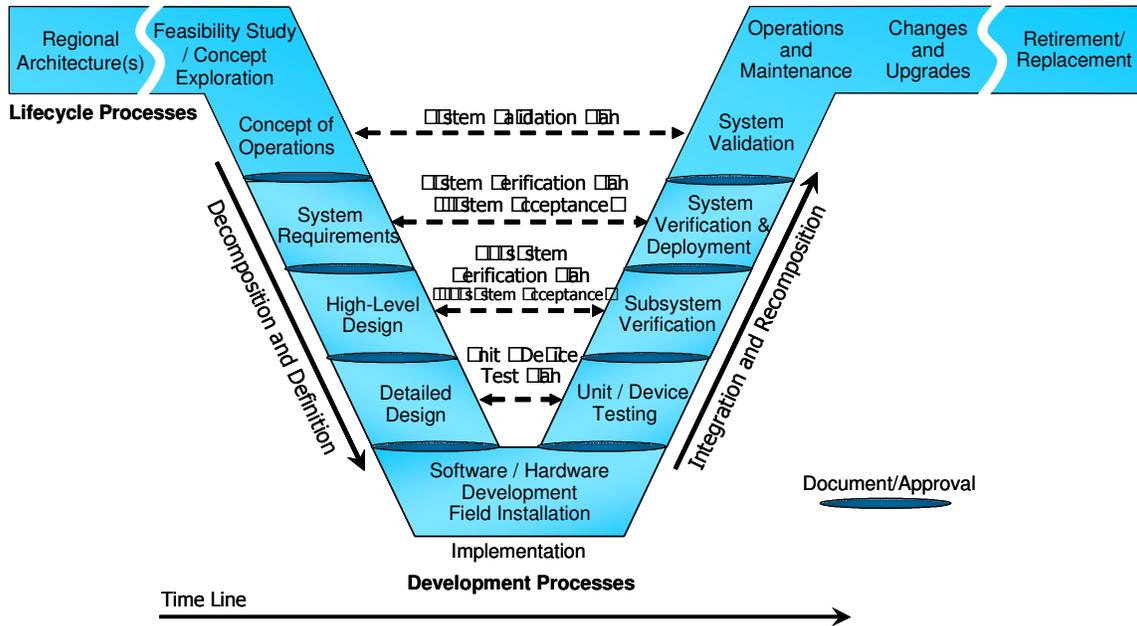
The process for developing the Central Region ITS Architecture was based on the National ITS Architecture developed by the United States Department of Transportation (USDOT). Compliance with the National Architecture is mandatory, as set forth in Final Rule 940 published by the Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) on January 8, 2001, for receiving federal funds for ITS projects. By taking advantage of the USDOT's National ITS Architecture and developing a regional ITS Architecture that is consistent with the National ITS Architecture, the Central Region will be able to take advantage of the growing supplier/vendor market for ITS products and services.

Development of the Central Region ITS Architecture began with the identification of stakeholders and their needs. The objective of this task was to identify and engage stakeholders

that own or operate ITS systems and other agencies that have an interest in the transportation issues within the Central Region. Information on existing and planned ITS projects within the region was collected through a comprehensive stakeholder survey. The survey results were then compiled and used as a baseline for the Central Region ITS Architecture. As transportation systems become increasingly complex, it is important to ensure that the ITS systems deployed within a state or region are compatible and can be integrated with one another. This, in turn, promotes the use of common standards and facilitates the expansion of ITS systems, which will lead to national compatibility of ITS systems.

A series of stakeholder meetings was held in the Central Region in April and July 2007. Stakeholders from MDOT, city and county traffic engineering, law enforcement, planning, and other agencies attended one of two meetings held in Jackson. During these meetings, the attendees were given an overview of the Central Region ITS Architecture project and the National ITS Architecture effort, and common themes and user needs were addressed on a regional basis.

As illustrated in the Systems Engineering Approach recommended by the FHWA, an ITS Architecture provides a starting point for systems engineering analyses that are performed during ITS project development. The ITS Architecture is a dynamic document that requires periodic updates to reflect changes in an agency's ITS program due to funding levels, evolving project or system requirements, or the introduction of improved technology. Once ITS projects are programmed, the ITS Architecture provides initial inputs to support the systems engineering process, including the establishment of the concept of operations, requirements, and high-level design and test planning of ITS projects. The ITS Architecture improves continuity across the project lifecycle, from planning through project development and operations. As required by the FHWA, the regional ITS Architecture serves to meet the criteria of Final Rule 940. Final Rule 940 requires that all ITS projects funded with highway trust funds be developed based on a systems engineering analysis.



Systems Engineering Approach

OPERATIONAL CONCEPT

The Central Region ITS Architecture is intended to facilitate data sharing and cooperative control among ITS systems throughout the Central Mississippi region. The architecture defines an operational concept that describes each stakeholder’s current and future roles and responsibilities in the implementation and operation of ITS systems. The architecture describes and categorizes the stakeholders’ roles and responsibilities in eleven transportation service areas. These areas provide general classifications of the functions that the participating agencies are providing or will provide. The eleven transportation service areas are:

- Archived Data Management
- Electronic Payment
- Incident Management
- Parking Management
- Transportation Planning and Architecture Maintenance
- Traffic Management
- Commercial Vehicle Operations
- Emergency Management
- Public Transportation
- Traveler Information
- Maintenance and Construction Management

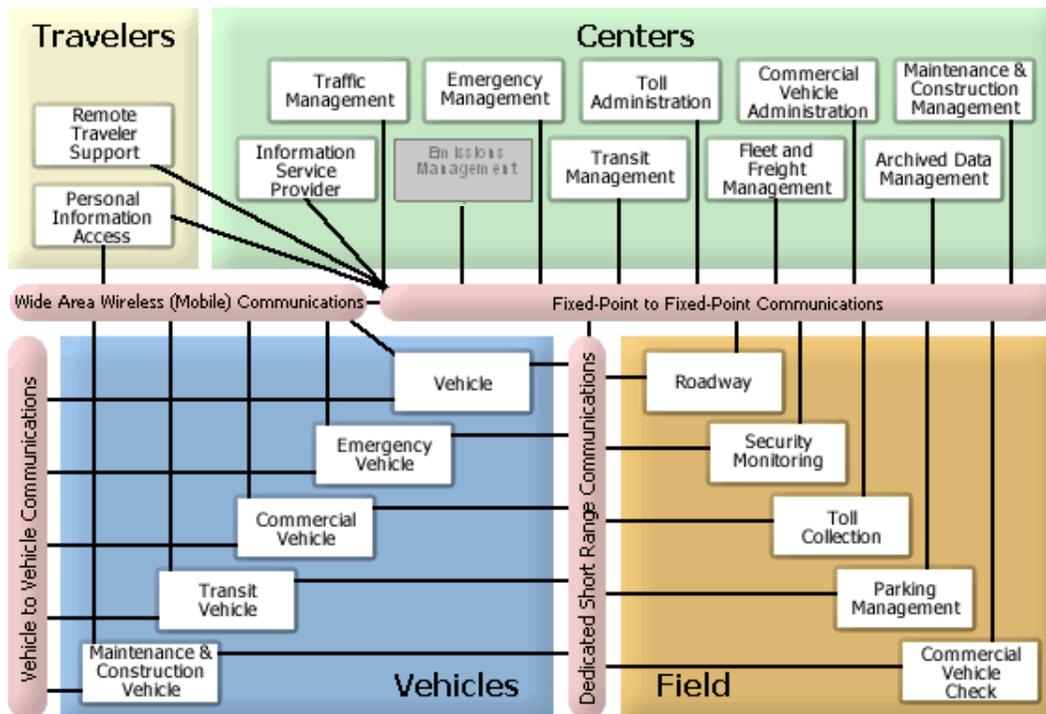
CENTRAL REGION ITS ARCHITECTURE

The Central Region ITS Architecture describes coordination of overall system operations by defining interfaces between equipment and systems which have been or will be deployed by

different organizational or operating agencies throughout the Central Mississippi region. The architecture identifies the current ITS deployment and how these systems interact and communicate with each other. It also builds on the existing systems and addresses the additional components deemed necessary to grow the ITS systems in the Central Mississippi region over the next 20 years to accommodate specific needs and to address issues of participating stakeholders.

A high-level interconnect diagram for the Central Region ITS Architecture, often referred to as a “sausage diagram” illustrates the architecture subsystems and primary types of interconnections (or communications) between these subsystems. The sausage diagram shown below was customized to reflect the systems in the Central Region ITS Architecture. The shaded areas indicate the functions and services that are not currently existing or planned in the Central Mississippi region.

This diagram shows the four classes of subsystems (Travelers, Centers, Vehicles, and Field) of an ITS system and how each subsystem can communicate with the other subsystems.



APPLICABLE ITS STANDARDS

ITS Standards are fundamental to the establishment of an open ITS environment that achieves the goals originally envisioned by the USDOT. Standards facilitate deployment of interoperable systems at local, regional, and national levels without impeding innovation as technology advances and new approaches evolve. Standards can be thought of as the glue that holds the various pieces of architecture together. They define how the communications within an ITS environment take place.

While the Central Region ITS Architecture is a comprehensive plan which includes various ITS applications, it does not cover every conceivable ITS technology. As such, not all ITS standards will be applicable to the existing and planned projects. The applicable National ITS standards were identified that support the ITS projects in the Central Mississippi region. A guide to the key ITS standards that should be considered for use in different types of ITS projects was developed in terms of an application area matrix on Page 87. The application areas are deployment-oriented categories focused on specific ITS services or systems. They can assist developers in finding the application area within which a particular ITS project fits.

PROJECT SEQUENCE

The Central Region ITS Architecture recommends a sequence in which ITS projects may be implemented. The project implementation sequence is based on a combination of two factors:

- **Prioritization of projects based on existing conditions and stakeholder needs.** ITS projects were prioritized to reflect a deployment path (sequence) of stakeholder needs. As technology, funding opportunities, and requirements continue to evolve, it is expected that the CMPDD will reevaluate and reprioritize projects frequently.
- **Project dependencies, based on how successive ITS projects can build upon one another.** Project dependencies influence the project sequencing. It is beneficial to identify the information and functional dependencies between projects.

AGREEMENTS FOR IMPLEMENTATION AND OPERATION

The Central Region ITS Architecture provides both a technical and institutional framework for the deployment of ITS in the Central Mississippi region. Institutional integration involves cooperation and coordination between various agencies and jurisdictions to achieve seamless operations and interoperability. Information sharing and exchanges between systems require knowledge of the transmission protocol and data formats to ensure compatibility. Coordinating field device operations owned by different agencies requires procedures for submitting data requests and rules that govern when such requests can be honored. While all interfaces involve good working relationships between agencies for data compatibility, agreements for procedure, operation, maintenance, and training may also be critical elements to optimizing the benefits of the architecture. The Central Region ITS Architecture identifies and summarizes common types of agreements used for implementation and operation of ITS projects and systems.

IMPLEMENTATION AND INTEGRATION STRATEGIES

The Central Region ITS Architecture provides guidance for planning and deploying ITS projects within the Central Mississippi region. It represents a detailed plan for the evolution of ITS systems and can be used to support transportation planning efforts and ITS project development efforts. In addition, the Central Region ITS Architecture defines how the planning of ITS projects will be integrated into the existing Project Development Process for the CMPDD MPO. It provides information that can be used in the initial stages of project definition and

development. A typical ITS project development cycle begins with project definition, followed by Request for Proposal (RFP) generation, which leads to project implementation. Information in the Central Region ITS Architecture can assist in all phases of project development. It is through the Central Region ITS Architecture that program management and project deployment will be a planned and coordinated effort on a regional basis.

An ITS Architecture focuses on the integration of systems to gain the maximum benefit of each system's information and capabilities across the transportation network. The most challenging issue in the integration of an ITS Architecture in the planning process is the fact that there is more than one planning process. Coordination is important among MDOT, the CMPDD and local cities/counties for ITS projects in their respective plans. Integration opportunities can be taken advantage of within the region and with other regions. This is the primary intent of the ITS Architecture compliance where federal funding is involved.

Another difficult issue to address is coordination of ITS project planning between the federally funded projects and non-federally funded projects. The Central Region ITS Architecture provides a bridge between federally and non-federally funded projects and systems. Coordinating all of these projects requires an understanding by all existing and potential ITS stakeholders within the entire region. The Central Region ITS Architecture provides a common reference point for all stakeholders to gain insight into the integration of the systems in the region.

DOCUMENTATION OF ITS ARCHITECTURES

The Central Region ITS Architecture is documented in two forms. The first is this document, which provides an overview of the architecture and summary information regarding various aspects of the architecture. The second form of documentation is the Turbo Architecture database. The database, prepared using Turbo Architecture, a software tool developed by FHWA, captures the details of the Central Region ITS Architecture including definitions of:

- stakeholders
- projects
- market packages
- interconnects
- functional requirements
- agreements
- inventory
- operational concept
- equipment packages
- interfaces
- standards

ARCHITECTURE MAINTENANCE

By its nature, an ITS Architecture is not a static set of outputs. The Central Region ITS Architecture is a living document and should be modified as plans and priorities change, ITS projects are implemented, and the ITS needs and services evolve in the Central Mississippi region. An architecture maintenance plan is developed to address the needs for maintenance and updates. The architecture maintenance plan defines the key aspects of the process for updating and maintaining the Central Region ITS Architecture, including:

- Who is responsible for architecture maintenance?
- What will be maintained?
- How will it be maintained?

The CMPDD will be responsible for all aspects of maintenance of the Central Region ITS Architecture.

1. INTRODUCTION

The Central Region Intelligent Transportation System (ITS) Architecture provides a roadmap for the ITS deployment and integration in the Central Mississippi region and ensures ITS system compatibility, connectivity, and standardization.

An ITS Architecture describes the “big picture” for ITS deployment in terms of individual components (i.e. subsystems) that will perform the functions necessary to deliver the desired services. It does not specify the technology used in project implementation, nor does it define how a project is deployed. The ITS Architecture does, however, describe the functions (e.g., gather traffic information or request a route) that are required for ITS, the physical entities or subsystems where these functions reside (e.g., the field or the vehicle), and the information flows and data flows that connect these functions and physical subsystems together into an integrated system.

The United States Department of Transportation (USDOT) set a deadline for the implementation of a regional architecture in order for an agency or region to continue receiving funding through the federal Highway Trust Fund for ITS projects. Any region that is currently implementing ITS projects shall have a regional architecture. In addition, any region that is not implementing ITS projects shall have a regional ITS Architecture within four years of the first ITS project for that region advancing to final design. Generally, rural areas may adopt the statewide architecture as their regional architecture.

The Central Region ITS Architecture has been developed by the Mississippi Department of Transportation (MDOT) in conjunction with the Central Mississippi Planning and Development District (CMPDD) which is the Metropolitan Planning Organization (MPO) for the Greater Jackson urbanized area. The architecture represents a vision of how each agency’s systems will work together in the future, sharing information and resources to provide a safer, more efficient, and more effective transportation system for travelers in the Central Mississippi region.

This architecture is based on a 20-year horizon for ITS activities in the Central Mississippi region, which will address existing ITS systems, as well as those planned for development over

the next 20 years. It represents a snapshot of the currently anticipated projects based on information from stakeholders. As such, the architecture requires regular updates to ensure that it accurately represents the region.

The process for developing the Central Region ITS Architecture was based on the National ITS Architecture developed by the USDOT. Compliance with the National Architecture is mandatory, as part of Final Rule 940 published by the Federal Highway Administration (FHWA) and the policy published by the Federal Transit Administration (FTA) on January 8, 2001 for receiving federal funds for ITS projects. By taking advantage of the USDOT's National ITS Architecture for developing the Central Region ITS Architecture, the Central Mississippi region will be able to take advantage of consistent standards and a growing supplier/vendor market for ITS products and services. As the standards are implemented across the nation, economies of scale will be realized in the purchase and development of ITS related products and services.

1.1 Vision, Mission, and Goals

Vision

The CMPDD and various stakeholders in the Central Mississippi region have recognized the need for vision and strategic planning with respect to ITS technology. The vision for the Central Region ITS Architecture is one of enhanced transportation productivity, mobility, safety, efficiency, and security through the use of integrated, cost-effective ITS technologies and systems and strong operational relationships.

Mission

The Central Region ITS program mission is similar to MDOT's ITS program mission, and their corresponding Mission Statement is:

“Central Region Stakeholders will use ITS technologies to improve the quality of life for Central Mississippi residents and visitors by providing more reliable, informative, safer, and flexible passenger and freight multi-modal transportation services.”

Goals

In developing the Central Region ITS Architecture, it was important to consider the goals and objectives of the stakeholders in the Central Mississippi region. All ITS projects in the Central Mississippi region should be developed in an effort to achieve these goals and objectives. The goals and objectives set forth by the CMPDD are as follows:

GOAL ONE:

Enhance transportation system mobility and accessibility for all users, uses and modes

Objectives:

- Relieve traffic congestion and decrease travel time on Jackson Urbanized Area roadways.
- Optimize the use of available resources by prioritizing potential projects on the basis of their probable effectiveness in relieving congested conditions.
- Expand the availability and attractiveness of public transportation and other ridesharing modes that serve to reduce congestion by increasing average vehicle occupancy.
- Improve regional access to community facilities, recreation sites, shopping outlets, employment centers, hospitals and other medical facilities.
- Enhance the mobility of those who are elderly, physically or mentally impaired or lacking the economic means to take advantage of existing transportation options.
- Facilitate multimodal travel opportunities and intermodal goods movement.

GOAL TWO:

Enhance regional connectivity and economic viability

Objectives:

- Improve mobility between different parts of the Jackson Urbanized Area in order to promote the overall economic sustainability of the region as a whole.
- Optimize the use of available resources by prioritizing potential projects on the basis of their regional significance and potential benefit to the Jackson Urbanized Area as a whole.

- Maximize the economic development potential of transportation system improvements by giving priority consideration to potential projects that would enhance access to employment centers, ports, airports, industrial areas and other locations characterized by the concentration of significant economic activity.
- Increase the potential benefits to be derived from expenditure of scarce public resources by developing projects capable of attracting private-sector investment and broad community support.

GOAL THREE:

Enhance environmental quality and public safety

Objectives:

- Support emergency evacuation planning efforts by giving priority consideration to proposed transportation system improvements that would facilitate the safe and expeditious removal of people from the area in the event of an impending catastrophe.
- Promote the safety of motorists, pedestrians and bicyclists by giving priority consideration to potential projects that would mitigate existing safety deficiencies.
- Promote the safety of users of non-motorized modes by giving priority consideration to potential roadway or transit projects that would incorporate facilities or meet design standards intended to ensure the safety and well-being of pedestrians and bicyclists.
- Promote the safety of motorists and users of non-motorized modes by supporting the allocation of resources to upgrade grade crossing protection and warning systems on major rail lines in the region.
- Enhance air quality in the region by developing projects that would help reduce mobile-source emissions of pollutants.

GOAL FOUR:

Support local values and conserve existing community resources

Objectives:

- Preserve and make use of existing transportation infrastructure wherever possible by encouraging the development of projects that optimize available system capacity through the application of intelligent transportation system (ITS) techniques and transportation system management (TSM) concepts.
- Ensure that proposed improvements are consistent with local plans, goals, and objectives.
- Support local standards by giving priority consideration to projects that meet community expectations regarding walkability, aesthetic appeal and other quality-of-life issues.
- Support local land use and community planning activities by developing projects that are consistent with access management and traffic-calming strategies for transportation system development.

GOAL FIVE:

Provide a transportation planning process that informs and involves the public and elected officials

Objectives:

- Increase public understanding of and involvement in the regional transportation planning process.
- Identify stakeholders and encourage their participation in development of the long-range Regional Transportation Plan.
- Identify and implement appropriate strategies for securing the involvement of groups that historically have been inadequately represented in the process of planning transportation system improvements.

GOAL SIX:

Develop a long-range regional transportation plan that is consistent with all applicable federal, state and local laws.

Objectives:

- Develop a plan that meets the requirements of the U. S. Department of Transportation (Federal Highway Administration and Federal Transit Administration) and the Mississippi Department of Transportation

1.2 Description of the Region

Geographic Scope

The area covered by the Central Region ITS Architecture is the Central Mississippi region including all portions of Copiah, Hinds, Madison, Rankin and Simpson Counties. In addition to the five counties, the region consists of the four cities with populations greater than 20,000 shown below and in Figure 1-1.

- Clinton
- Jackson
- Pearl
- Ridgeland

The region is centrally located in the state. The CMPDD serves as the MPO and coordinates the transportation planning efforts within the region. The CMPDD is also the lead agency responsible for the future utilization and maintenance/update of the Central Region ITS Architecture. The MPO addresses transportation planning and programming issues in the Central Mississippi metropolitan area, and is responsible for developing metropolitan transportation plans and the transportation improvement programs (TIP) within regional boundaries.

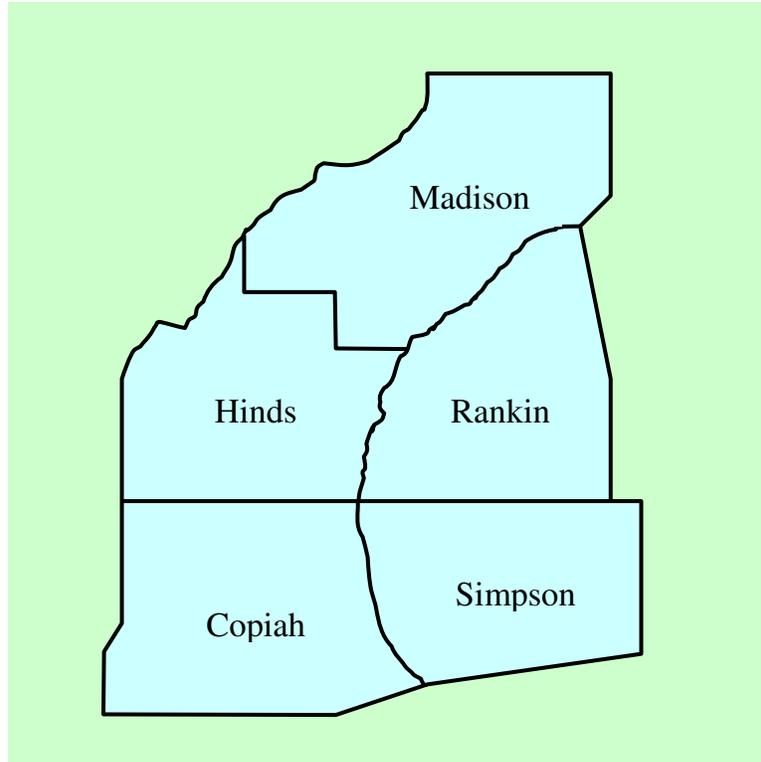


Figure 1-1. Central Region ITS Architecture Boundaries

Service Scope

The Central Region ITS Architecture covers services across a broad range of ITS, including traffic management, public transportation, traveler information, commercial vehicle operations, emergency management, maintenance and construction management, archived data management, and electronic payment.

Time Frame

The timeframe considered for the Central Region ITS Architecture is a 20-year vision for ITS activities in the Central Mississippi region and addresses existing ITS systems as well as those planned for development over the next 20 years. It represents a vision of how each agency's systems will work together in the future, sharing information and resources to provide a safer, more efficient, and more effective transportation system for residents and travelers in the Central Mississippi region. The architecture represents a snapshot of the currently anticipated projects

based on information from stakeholders and requires regular updates to ensure that it maintains an accurate representation of the region.

1.3 Organization of the Report

This report is organized to reflect the steps undertaken in the development of the Central Region ITS Architecture. The major sections of the report are summarized below:

- **Section 1 – Introduction:** This section identifies the vision, mission, and goals of the Central Region ITS Architecture. It also provides a general description of the area covered and timeframe associated with the Central Region ITS Architecture.
- **Section 2 – ITS Architecture Development Process:** This section describes the process for developing the Central Region ITS Architecture and summarizes the requirements of Final Rule 940 and FTA policy on ITS Architecture and Standards.
- **Section 3 – Stakeholders and Operational Concept:** This section identifies and describes participating agencies and stakeholders and their roles and responsibilities in the operation and implementation of the ITS systems and/or components within the Central Mississippi region.
- **Section 4 – Inventory:** This section identifies existing and planned ITS elements within the Central Mississippi region.
- **Section 5 – User Services and Market Packages:** This section identifies a list of user services and market packages that are applicable to the Central Mississippi region. The user services describe what transportation functions and services should be provided from the user’s perspective. The market packages provide a collection of service-oriented technology bundles that can be incorporated in the development of the Central Region ITS Architecture.

- **Section 6 – Subsystems, Equipment Packages and Functional Requirements:** The customized list of market packages developed in Section 5 was used to define the subsystems, equipment packages, and functional requirements that are necessary for the implementation of those customized market packages.
- **Section 7 – Interconnects and Architecture Flows:** This section describes the physical architecture by defining interfaces between equipment and systems that may be deployed by different organizational or operating agencies throughout the region.
- **Section 8 – ITS Standards:** This section describes a list of key standards that support the implementation of the Central Region ITS Architecture.
- **Section 9 – Project Sequencing:** This section provides an implementation strategy as well as the sequencing of ITS project required for implementation over the next 20 years.
- **Section 10 – Agreements:** This section identifies and summarizes a list of agreements between agencies that may be necessary for operations.
- **Section 11 – Implementation and Integration Strategy:** This section describes the relationship between the Central Region ITS Architecture and the transportation planning process. It summarizes how the Central Region ITS Architecture can be used to assist in transportation planning and project implementation. This section also describes the opportunities and considerations for integrating ITS projects and systems at the regional and statewide levels.
- **Section 12 – Architecture Maintenance Plan:** This section describes a process for controlled updates to the Central Region ITS Architecture baseline so that the architecture continues to accurately reflect the existing ITS capabilities and future plans in the Central Mississippi region.

2. ITS ARCHITECTURE DEVELOPMENT PROCESS

2.1 National ITS Architecture

The process for developing the Central Region ITS Architecture is based on the National ITS Architecture developed by the USDOT. Compliance with the National Architecture is mandatory, as part of Final Rule 940. By taking advantage of the USDOT's National ITS Architecture and developing the Central Region ITS Architecture that is consistent with the National ITS Architecture, the Central Mississippi region will be able to secure federal funding for ITS projects as well as take advantage of the growing supplier/vendor market for ITS products and services.

As stated previously, an ITS Architecture provides a “road map” for system development and ensures system compatibility, connectivity, and standardization. This is accomplished by:

- Identifying key stakeholders and interrelationships in the region;
- Describing required activities and/or functions to be completed;
- Defining the interconnections and interdependencies between functions; and
- Developing a “blueprint” for integration of systems.

Standardization helps by establishing a common “language” or vocabulary to describe ITS systems, which reduces confusion and facilitates communication within an organization, between organizations within a region, with contractors or clients, and among counterparts and colleagues nationwide.

The National ITS Architecture provides a common framework for planning, defining and integrating ITS systems and ensures system compatibility, connectivity, and standardization. It comprises the logical and physical architecture which satisfies a defined set of user services. Compliance with the National ITS Architecture is a mandatory requirement for receiving federal funds for ITS projects. The National ITS Architecture is maintained by the United States Department of Transportation (DOT) and the latest version is available on the DOT web site at <http://www.iteris.com/itsarch/index.htm>.

In discussing the National ITS Architecture, it is important to be familiar with certain terminologies, which are described below:

User Services describe what the system will do from the user's perspective. This term can be used to describe ITS systems in a rural, suburban, or urban setting. Identifying user services allows the process of system or project definition to begin by establishing the high-level services that will be provided to address a region's problems and/or needs. There are 33 user services defined in Version 5.1 of the National ITS Architecture. These user services are grouped by eight user service bundles, including:

- Travel and Traffic Management
- Public Transportation Management
- Electronic Payment
- Commercial Vehicle Operations
- Emergency Management
- Advanced Vehicle Safety Systems
- Information Management
- Maintenance and Construction Management

The *Logical Architecture* part of the National ITS Architecture “defines what must be done to support the ITS user services. It defines the processes that perform ITS functions and the information that is shared between these processes. The logical architecture consists of data flow diagrams, process specifications, and data dictionary entries. The logical architecture is not technology specific, nor does it dictate a particular implementation. This implementation independence makes the logical architecture accommodating to innovation, scalable from small-scale implementations to large regional systems, and supportive of widely varied system designs”.¹

The *Physical Architecture* part of the National ITS Architecture “provides agencies with a physical representation of the important ITS interfaces and major system components. It

¹ US Department of Transportation. <http://itsarch.iteris.com/itsarch/html/glossary/glossary.htm>.

provides a high-level structure around the processes and data flows defined in the logical architecture. The principal elements in the physical architecture are the subsystems and architecture flows that connect these subsystems and terminators into an overall structure. The physical architecture takes the processes identified in the logical architecture and assigns them to subsystems. In addition, the data flows (also from the logical architecture) are grouped together into architecture flows. These architecture flows and their communication requirements define the interfaces required between subsystems, which form the basis for much of the ongoing standards work in the ITS program”.¹

Subsystems are individual pieces of the overall ITS that perform particular functions, such as managing traffic or providing traveler information. Subsystems are grouped into four classes: centers, vehicles, field, and travelers.

Market Packages are pieces of the architecture that are required to implement a particular transportation service. It also describes a collection of equipment packages that provides the functions necessary to deliver a given ITS service. Market packages are tailored to fit real world transportation problems and needs, either separately or in combination with each other. Currently, there are 91 market packages in the National ITS Architecture.

Equipment Packages group similar functions of a particular subsystem together into a package of hardware and software capabilities. They are closely associated with market packages and are used as a basis for estimating deployment costs. Currently, there are 198 equipment packages defined in the National ITS Architecture.

Standards define the interfaces between physical architecture components or entities and are fundamental to the establishment of an open ITS environment. Standards also facilitate the deployment of interoperable systems at local, regional, and national levels without impeding innovation as technology advances and new approaches evolve. There are currently over 110 ITS standards defined in the National ITS Architecture. By requiring compliance with these defined standards, the interoperability, interchangeability, and expandability of ITS systems can be ensured.

2.2 Central Region ITS Architecture Development Process

The process to develop the Central Region ITS Architecture is illustrated in Figure 2-1. Figure 2-1 shows six general steps in the “lifecycle” of an ITS Architecture. In the first four steps, the ITS Architecture products were developed, and then these products are used and maintained in Steps 5 and 6. The development process began with basic scope definition and team building and moves through increasingly detailed steps, culminating in specific products that will guide the “implementation” of the Central Region ITS Architecture.

Development of the Central Region ITS Architecture began with the identification of stakeholders and their corresponding transportation needs. The initial list of regional ITS stakeholders was developed from the ITS stakeholder list used for the Statewide ITS Architecture and expanded by CMPDD staff who were familiar with the various transportation stakeholders in the region. The objective of this task was to identify and engage stakeholders that own or operate ITS systems and other agencies interested in the transportation issues within the Central Mississippi region. Information on existing and planned ITS projects within the region was collected from a comprehensive stakeholder survey that was distributed to ITS Stakeholders in the region. The survey results were then compiled and used as the foundation for developing the Central Region ITS Architecture and further augmented with stakeholder input received during the two Central Region stakeholder meetings conducted in April and July 2007.

The stakeholders’ needs were then consolidated and mapped against the market packages and the physical architecture defined in the National ITS Architecture. A market package is a “bundle” of technology services that is often purchased together as a group to provide the functions necessary to deploy the services. The selection of market packages allows for the identification of equipment packages and subsystems – a collection of building blocks for the development of an ITS Architecture. The physical architecture defines the physical entities (Subsystems and Terminators) that make up an ITS system. It defines the architecture flows that connect the various Subsystems and Terminators into an integrated system.

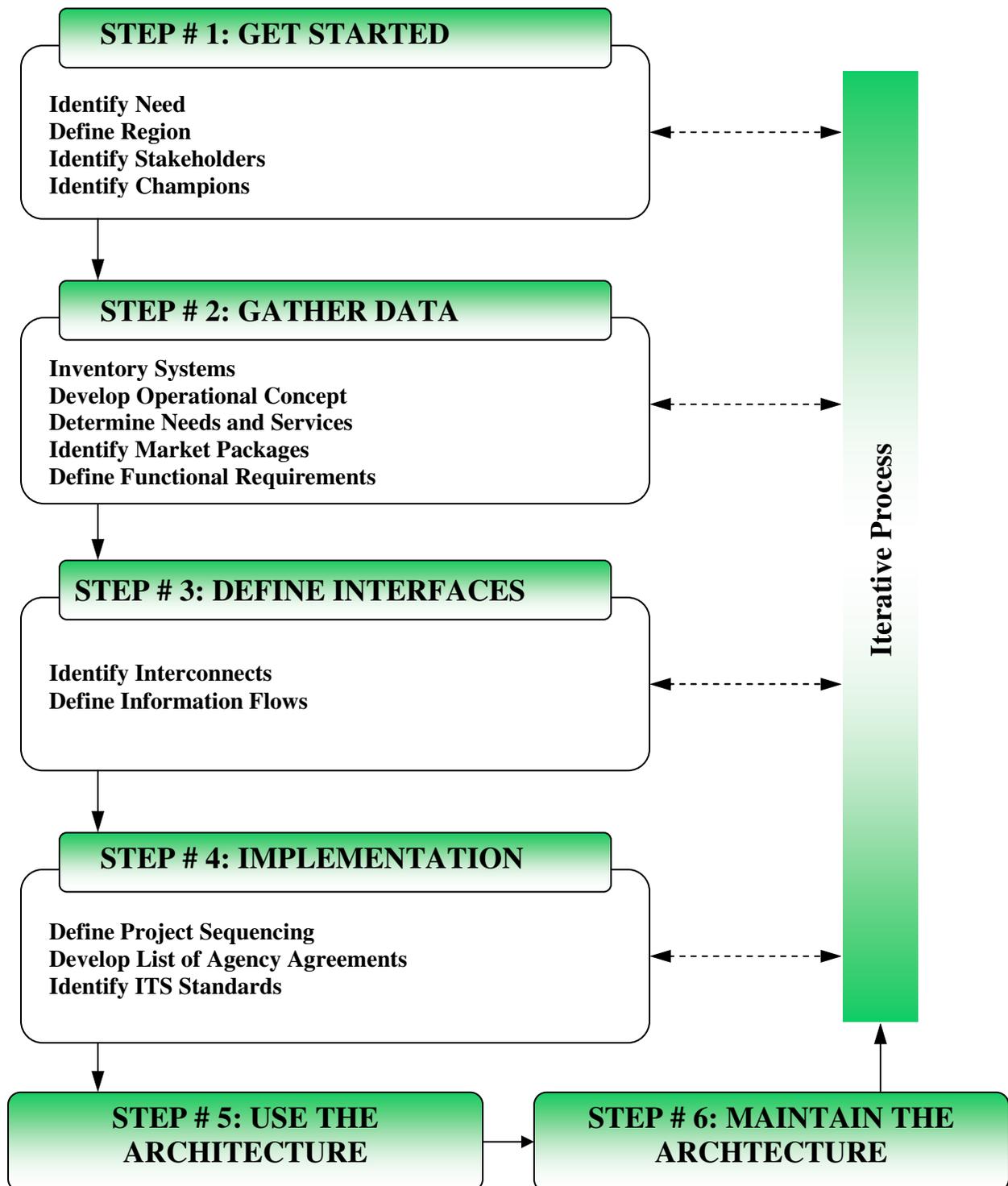


Figure 2-1. Architecture Development Process

This Central Region ITS Architecture coordinates overall system operations by defining interfaces between equipment and systems (interconnects and architecture flows). These interfaces describe the functions of the systems by showing the information that flows between various systems and subsystems.

Upon identification of the system interfaces, additional products were defined to guide the implementation of planned ITS projects. These products include a sequence of projects, list of agency agreements required for operations, and a list of ITS standards that should be considered for project implementation.

2.3 Systems Engineering

Final Rule 940 requires that all ITS projects funded with highway trust funds be developed based on a systems engineering analysis. Systems engineering is a phrase used to describe the cyclical process of planning, designing, implementing, testing, operation, and maintenance of an ITS system or project throughout its useful life. The system engineering process begins with the development and implementation of an ITS Architecture and continues by outlining the steps and level of detail of each phase of project deployment, from high-level tasks such as establishing the Concept of Operations to very detailed component design, installation, and testing. The purpose of the system engineering process is to ensure that a well-planned foundation is in place and to affirm the requirements of an ITS system.

As illustrated in Figure 2-2, the Systems Engineering Approach recommended by the FHWA, provides a starting point for the systems engineering analyses that are performed during ITS project development. The ITS Architecture is a dynamic document that requires periodic updates to reflect changes in an agency's ITS program due to funding levels, evolving project or system requirements, or the introduction of improved technology. Once ITS projects are programmed, the ITS Architecture provides initial inputs to support the systems engineering process including the establishment of the concept of operations, requirements, high-level design and test planning of ITS projects. The ITS Architecture improves continuity across the project lifecycle, from planning through development and operations. As required by the FHWA, the Central Region ITS Architecture serves to meet the criteria set forth in Final Rule 940.

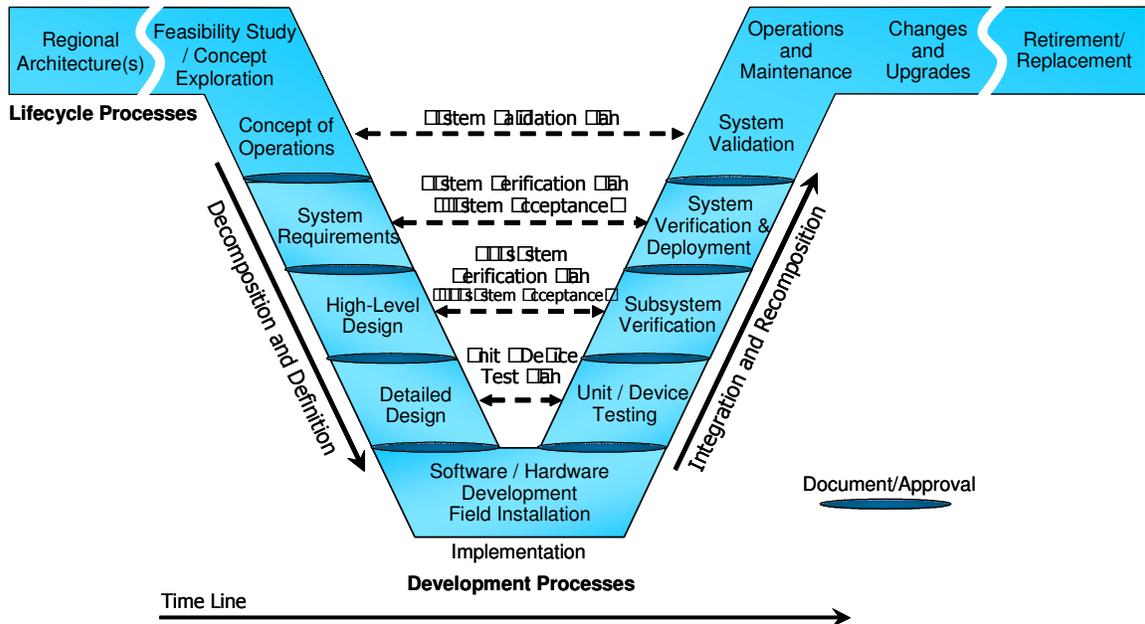


Figure 2-2. Systems Engineering Approach

2.4 Requirements of the Final FHWA Rule 940 and FTA Policy on Architecture

Final Rule 940 (23 CFR 940) and FTA Policy on ITS Architecture and Standards define a set of requirements that regional ITS Architectures should meet. Final Rule 940 and FTA Final Policy state that “ITS projects shall conform to the National ITS Architecture and Standards in accordance with the requirements. Conformance with the National ITS Architecture is interpreted to mean the use of the National ITS Architecture to develop a regional ITS Architecture, and the subsequent adherence of all ITS projects to that regional ITS Architecture. Development of the regional ITS Architecture should be consistent with the transportation planning process for Statewide and Metropolitan Transportation Planning.” Table 2-1 shows how the requirements of the rule are met by the outputs developed for the Central Region ITS Architecture.

Table 2-1. Mapping of Requirements to Architecture Outputs

Statewide/Regional ITS Architecture Requirements	Where Requirements are Documented
Description of region	Geographic definition, as well as timeframe and scope of services are given in Section 1 of this document.
Identification of participating agencies/stakeholders, their respective needs and the existing ITS inventory	Listing of stakeholders and their definitions is given in Section 3.1 of this document. An inventory of the elements operated by the stakeholders is contained in Section 4 of this document.
An operational concept that identifies the roles and responsibilities of participating agencies and stakeholders	The operational concept is defined in Section 3.2 of this document.
A list of any agreements (existing or new) for deployment and/or operations	A discussion of existing and new agreements is given in Section 10 of this document.
System functional requirements	The functional requirements of the ITS systems are described in an overview in Section 6 of this document, and are provided in detail in the Turbo Architecture database.
Interface requirements and information exchanges with planned and existing systems and subsystems	The interfaces and information flows are described in an overview in Section 6 of the document, and are described in detail in the Turbo Architecture database.
Identification of ITS standards supporting regional and national interoperability	An overview of the ITS standards is given in Section 8 of the document. The detailed listing of ITS standards applicable to each interface in the architecture is described in the Turbo Architecture database.
The sequence of projects required for implementation	Projects and their sequencing are covered in Section 9 of this document.

As summarized in Table 2-1, this document, with the Turbo Architecture database for the Central Region ITS Architecture, satisfies the mandatory requirements defined in Final Rule 940 and Policy set forth by the FHWA and FTA.

3. STAKEHOLDERS AND OPERATIONAL CONCEPT

3.1 Identification of Participating Agencies and Stakeholders

Stakeholders are commonly considered those who own or operate ITS systems in the region as well as those who have an interest in regional transportation issues. Stakeholders provide crucial input regarding the region’s transportation investment and ITS deployments, and stakeholder participation and coordination is critical to the successful development of an ITS Architecture. Through an extensive outreach process, including meetings and surveys, a wide range of participating agencies and stakeholders for the Central Region ITS Architecture were identified. Table 3-1 lists the agencies and stakeholders participating in the implementation and operation of the ITS projects in the region.

Table 3-1 includes both specific individual stakeholders and broadly defined generic stakeholders. Generic stakeholders, representing a group of stakeholders that provide similar roles, responsibilities and functions, are typically at county/city levels. The main purpose of defining and using generic stakeholder was to allow a more efficient way to organize the Central Region ITS Architecture and to keep the architecture at a maintainable level.

Table 3-1. Central Region ITS Architecture Stakeholders

Stakeholder	Description
AMTRAK	Commercial rail service providing passenger rail transportation
Central Mississippi Planning And Development District (CMPDD)	Serves as the MPO for the Central Mississippi regional urbanized area and provides transportation planning and technical assistance services to various agencies within the region.
City of Clinton	City of Clinton departments/services include Engineering, Community Development, Police, Fire and Public Works.
City of Jackson	City of Jackson departments/services include Engineering, Planning & Development, Police, Fire and Public Works.
City of Pearl	City of Pearl departments/services include Community Development, Streets and Garbage, Police and Fire.
City of Ridgeland	City of Ridgeland departments/services include Community Development, Police, Fire and Public Works.
City/County 911 Dispatch Centers	A stakeholder group representing 911 dispatch centers that receive 911 emergency call and dispatch sheriff, police, fire and EMS within the jurisdiction areas. Dispatch centers may belong to city police departments, county sheriffs’ offices or university police.
City/County Public Safety Agencies	A stakeholder group representing agencies and stakeholders (sheriff, police, fire and EMS) that receive emergency calls and respond to emergency dispatch within the jurisdiction area.

Stakeholder	Description
County Emergency Management Agencies (EMA)	A stakeholder group representing county civil defense and emergency management agencies promoting emergency preparedness, assisting with the coordination of disaster response and recovery operations, and encouraging mitigation efforts before, during and after a disaster or major emergency.
Educational Institutions	A stakeholder group representing public and private schools, colleges and universities. Stakeholder group members may have or provide transportation/transit services.
Greyhound Bus Service	Commercial provider of passenger transportation service between cities.
Intermodal Rail Facilities	Represent railroad intermodal facilities which transport goods between railroad and other transportation modes including truck and water. The terminals coordinate freight movement with fleet-freight management, gather information on traffic conditions, and provide information on intermodal freight activities that is pertinent to traffic movement in the surrounding area.
Jackson Municipal Airport Authority	Jackson-Evers International Airport is a general aviation airport that serves air traffic in the Central Mississippi region.
Jackson Transit System (JATRAM)	JATRAM is public transportation service provided by the City of Jackson. JATRAM is managed by the Planning and Development Department and is a designated recipient of State and Federal funding for urban transportation in the Jackson area.
Local Cities and Counties	This stakeholder group represents cities with a population < 20,000 as well as the counties of Copiah, Hinds, Madison, Rankin and Simpson. These jurisdictions may contain public works, engineering departments, community development, fire, and police.
Local Traffic Generators	A stakeholder group representing agencies and stakeholders that share knowledge of events (date, time, location, duration, etc.) that may impact travel on roadways with MDOT, city/county governments, and emergency service providers.
Media Outlets	Provide public broadcast of information pertaining to travel conditions, incidents, special events and other transportation related news services to the traveling public through radio, TV and other media.
Medical Providers	A stakeholder group representing hospitals and other medical care facilities/institutions.
Mississippi Department of Transportation (MDOT)	MDOT plans, constructs, maintains and improves the state's road and bridges, and provides planning and financial support for other modes of transportation.
MDOT Districts 3, 5 & 7	The Central Mississippi regional area is under the jurisdiction of MDOT Districts 3, 5 and 7, which serves the counties of Copiah, Hinds, Madison, Rankin and Simpson.
Mississippi Emergency Management Agency (MEMA)	Plans and coordinates with local emergency service providers to respond to threats from technological, fabricated and natural origins; activates Emergency Operations Center, allocate resources, and maintains operational control of the State Emergency Response Team, the Mobile Operations Center, the Disaster Reconnaissance Team and the communications/state warning point section.
Mississippi Bureau of Investigations	A bureau of the Mississippi Dept. of Public Safety that is responsible for issuing AMBER Alerts.

Stakeholder	Description
Mississippi Department of Environmental Quality	A government agency that works with MEMA and other agencies to respond to truck or train hazardous material incidents.
Mississippi Department of Public Safety	A government agency that protects citizens and property by enforcing state laws, deterring criminal activity, assuring highway and public safety, and providing scientific, technical, and operational support to other criminal justice agencies.
Mississippi Highway Patrol (MHP)	A division of the Mississippi Department of Public Safety, which routinely patrols state roadways, including interstates, state highways and secondary county roads, enforces motor vehicle laws, and assists in major incidents.
Mississippi Office of Homeland Security (OHS)	An office of the Mississippi Dept. of Public Safety that coordinates maintains and administers homeland security practices within the state.
Mississippi Public Service Commission	The Motor Carrier Division that manages motor carrier applications and registrations within the state.
Mississippi Tax Commission	Tax Commission administers tax laws of the state and manages motor carrier applications and registrations within the state.
National Park Service	The NPS operates the 444-mile Natchez Trace Parkway.
National Weather Service (NWS)	The National Weather Service provides weather, hydrologic, and climate forecasts and warnings for the United States. NWS data and products form a national information database and infrastructure that may be used by other governmental agencies, the private sector, the public, and the global community.
Private Partnership Toll Facility Operations	A private vendor who will have the responsibility for operating a toll facility on the proposed Airport Parkway.
Private Trucking Companies	A stakeholder group representing trucking companies who operate commercial vehicles.
Railroad Companies	A stakeholder group representing owner/operators of rail transportation facilities their associated ITS equipment and communications. Includes Kansas City Southern, Canadian National, Illinois Central, CSC, BNSF, and Norfolk Southern.
Transit Service Providers	A stakeholder group that provides fixed-time, demand responsive, or intercity transit services to the general public, elderly, disabled, school students, and others within the Central Mississippi region.

3.2 Operational Concept

An operational concept defines each stakeholder's current and future roles and responsibilities in the implementation and operation of the regional ITS systems. Table 3-2 summarizes the general roles and responsibilities of the participating stakeholders identified above. As illustrated, the roles and responsibilities are categorized into eleven transportation service areas. These transportation service areas provide general classifications of what functions the participating agencies are providing or will provide. The eleven service areas and their major functions are described below.

Archived Data Management – Represents the functions that collect, process, store and utilize transportation data for traffic, accidents, maintenance and construction, public transportation, commercial vehicle, vehicle emissions, parking and other types of transportation related data.

Commercial Vehicle Operations – Represents the administrative functions that support commercial vehicle credentials, tax, and safety regulations.

Emergency Management – Represents the functions that provide emergency call taking, public safety dispatch, disaster response and evacuation, securing monitoring and other security and public safety-oriented services.

Incident Management – Represents the functions that manage both unexpected incidents and planned events to minimize the impact to the transportation network and traveler safety. It includes incident detection and verification, appropriate incident response, and regional coordination between traffic management agencies, maintenance and construction management agencies, emergency management agencies and others.

Maintenance and Construction Management – Represents the functions that provide construction management and maintenance of roadways, including snow and ice removal.

Public Transportation – Represents the functions that plan, manage, operate and maintain transit services. It also includes the function that provides transit traveler information.

Traffic Management – Represents the functions that manage a broad range of transportation facilities including freeway systems, rural and suburban highway systems, and urban and suburban traffic control systems. In the context of this project, it primarily includes network monitoring, traffic signal control, traffic information dissemination, and highway-rail intersection management.

Traveler Information – Represents the functions that collect, process, store, and disseminate static and real time transportation information to the traveling public.

Transportation Planning and Architecture Maintenance – Represents transportation planning functions and other related services. It also includes roles and responsibilities for the development and maintenance of an ITS Architecture within the stakeholder’s jurisdictional boundary.

Electronic Payment – Represents the functions associated with payment and administration of electronic payment for transit, parking and tolls.

Parking Management – Represents the functions for electronic monitoring and management of parking facilities. It supports a dedicated short-range communications (DSRC) link to the Vehicle Subsystem that allows electronic collection of parking fees. It also includes the instrumentation, signs, and other infrastructure that monitors parking lot usage and provides local information about parking availability and other general parking information.

Table 3-2. Operational Concept for the Central Region ITS Architecture

Stakeholder	Transportation Service	Role/Responsibility	Status
City of Jackson	Emergency Management	Support disaster response, recovery and evacuation.	Existing
	Incident Management	Coordinate incident information and response with local incident response agencies.	Existing
		Perform incident detection and verification through video surveillance.	Existing
		Distribute incident information to the public.	Existing
		Operate roadside equipment for incident response.	Existing
	Maintenance and Construction Management	Coordinate construction and maintenance activities with other agencies, as needed.	Existing
	Surface Street Management	Notify MDOT District office of incidents or events that will impact freeway operations.	Existing
		Operate and maintain signal systems and other infrastructure as required.	Existing
		Request traffic management assistance from law enforcement agencies as needed.	Existing
	Traffic Management	Provide road closure updates and live traffic conditions (sharing MDOT camera images) to the public via website.	Existing
City of Clinton	Emergency Management	Support disaster response, recovery and evacuation.	Existing
	Incident Management	Coordinate incident information and response with local incident response agencies.	Existing
		Operate roadside equipment for incident response.	Existing
		Distribute incident information to the public.	Existing
		Perform incident detection and verification through video monitoring.	Planned
	Maintenance and Construction Management	Coordinate construction and maintenance activities with other agencies, as needed.	Existing
	Surface Street Management	Notify MDOT District office of incidents or events that will impact freeway operations.	Existing
		Operate and maintain signal systems and other infrastructure as required.	Existing
		Request traffic management assistance from law enforcement agencies as needed.	Existing
	City of Pearl	Emergency Management	Support disaster response, recovery and evacuation.
Incident Management		Coordinate incident information and response with local incident response agencies.	Existing

Stakeholder	Transportation Service	Role/Responsibility	Status
City of Pearl (cont'd)	Incident Management (cont'd)	Distribute incident information to the public.	Existing
		Perform incident detection and verification through video surveillance.	Existing
		Operate roadside equipment for incident response and traveler information dissemination.	Existing
	Maintenance and Construction Management	Coordinate construction and maintenance activities with other agencies, as needed.	Existing
	Surface Street Management	Notify MDOT District office of incidents or events that will impact freeway operations.	Existing
		Operate and maintain signal systems and other infrastructure as required.	Existing
		Request traffic management assistance from law enforcement agencies as needed.	Existing
City of Ridgeland	Emergency Management	Support disaster response, recovery and evacuation.	Existing
	Incident Management	Coordinate incident information and response with local incident response agencies.	Existing
		Distribute incident information to the public.	Existing
		Operate roadside equipment for incident response and traveler information dissemination.	Existing
		Perform incident detection and verification through video surveillance.	Existing
	Maintenance and Construction Management	Coordinate construction and maintenance activities with other agencies, as needed.	Existing
	Surface Street Management	Notify MDOT District office of incidents or events that will impact freeway operations.	Existing
Operate and maintain signal systems and other infrastructure as required.		Existing	
Request traffic management assistance from law enforcement agencies as needed.		Existing	
City/County Parking Operators	Parking Management	Operate smart parking management system that includes transit information signs and information kiosks.	Planned
City/County Public Safety Agencies	Commercial Vehicle Operations	Exchange safety and/or security information with other agencies.	Existing
		Participate in roadside vehicle inspection for law and regulation enforcement.	Existing
	Emergency Management	Coordinate emergency response with local emergency agencies.	Existing
		Dispatch appropriate response vehicles to scene.	Existing

Stakeholder	Transportation Service	Role/Responsibility	Status
City/County Public Safety Agencies (cont'd)	Emergency Management (cont'd)	Implement appropriate emergency or disaster response plan based on level of emergency.	Existing
		Provide disaster-related information to the public.	Existing
		Respond to emergency dispatches.	Existing
		Receive emergency calls and information regarding disasters and other emergencies.	Existing
		Support disaster evacuation, response and recovery.	Existing
	Incident Management	Coordinate incident response with local incident response agencies including emergency management, public safety, and/or transportation	Existing
		Monitor situation and adjust response plans accordingly.	Existing
		Provide emergency call taking for incidents within the county and/or city jurisdiction area and dispatch appropriate vehicles to scene, as needed.	Existing
		Respond to incident dispatches.	Existing
	Surface Street Management	Responsible for accident reporting	Existing
Provide traffic management assistance from law enforcement agencies as needed.		Existing	
County Emergency Management Agencies	Emergency Management	Develop countywide emergency management plan addressing preparation, response, recover and mitigation actions for all potential risks to the public.	Existing
		Issue countywide warnings	Existing
		Provide emergency management center for countywide emergency operations and homeland security practices during major emergencies and disasters.	Existing
	Incident Management	Coordinate incident response with local incident response agencies.	Existing
CMPDD MPO	Archived Data Management	Collect and archive transportation-related data within the region.	Existing
	Surface Street Management	Provide traffic forecast and demand management for the region.	Existing
	Traffic Management	Provide traffic forecast and demand management for the region.	Existing
Inner City Transit Providers	Public Transportation	Coordinate with other transit service providers.	Existing
		Provide fixed-time and demand responsive transit services between cities.	Existing
		Operate AVL/GPS system to track vehicle locations.	Existing

Stakeholder	Transportation Service	Role/Responsibility	Status
Inner City Transit Providers (cont'd)	Traveler Information	Utilize websites, telephone systems, Kiosks, etc. to provide transit information.	Existing
Intermodal Rail Facilities	Public Transportation	Operate railroad intermodal facilities, which transport goods between railroad and other transportation modes including truck and water.	Existing
Jackson Municipal Airport Authority	Incident Management	Coordinate incident information and response with local incident response agencies within airport area.	Existing
	Parking Management	Operate electronic parking payment system.	Planned
		Provide electronic parking management and parking information to prospective users.	Existing
	Transit Management	Provide access to multimodal services for travelers (bus, taxi, etc.)	Existing
Provide current schedule information regarding airline operations.		Existing	
Jackson Transit System	Public Transportation	Coordinate with other transit service providers.	
		Operate AVL/GPS system to track vehicle locations.	
		Provide fixed-time and demand responsive transit services between cities.	
Local Cities and Counties	Emergency Management	Support disaster response, recovery and evacuation.	Existing
	Incident Management	Coordinate incident information and response with local incident response agencies.	Existing
		Operate roadside equipment for incident response.	Existing
	Surface Street Management	Notify MDOT District office of incidents or events that will impact freeway operations.	Existing
		Operate and maintain signal systems and other infrastructure as required.	Existing
Request traffic management assistance from law enforcement agencies as needed.		Existing	
MDOT	Archived Data Management	Maintain MDOT databases including accident, traffic volume, road weather information, commercial vehicle credential and safety data, etc.	Existing
	Commercial Vehicle Operations (CVO)	Issue PrePass and ExpressPass permits.	Existing
		Operate and maintain PrePass, WIM and oversize/overweight monitoring devices and field equipment.	Existing
		Provide enforcement of CVO laws, rules, and regulations.	Existing

Stakeholder	Transportation Service	Role/Responsibility	Status
MDOT (cont'd)	Commercial Vehicle Operations (CVO) (cont'd)	Provide weather, traffic, and other information via Internet, kiosks, etc. to CVO carriers.	Existing
		Receive and disseminate credential and safety information to appropriate agencies as needed or requested.	Existing
		Administer credential and safety information of carriers, drivers and vehicles.	Existing
		Coordinate commercial vehicle inspection with Mississippi Highway Patrol and local law enforcement agencies.	Existing
		Manage Commercial Vehicle Information Systems and Networks (CVISN) Credentialing Infrastructure System.	Existing
		Operate permanent and portable Weigh-in-Motion stations, PrePass, and other roadside inspection equipment throughout the state for law and regulations enforcement.	Existing
		Provide electronic permit applications and reporting, electronic commercial vehicle inspection system, and commercial vehicle operation and management information via Internet.	Existing
	Emergency Management	Coordinate emergency response plans with EMAs and EOCs regarding the statewide transportation system, as applicable.	Existing
		Disseminate emergency information to motoring public through DMSs, HAR, etc.	Existing
		Provide support on transportation infrastructure as needed in the event of an emergency or disaster.	Existing
		Participate in coordinated emergency response with local emergency agencies.	Existing
		Provide resources to support emergency management when requested by emergency agencies.	Existing
		Support disaster response and recovery, and disaster evacuation.	Existing
		Operate permanent Dynamic Message Signs (DMS) for AMBER Alerts and weather alerts.	Planned
	Maintenance and Construction Management	Communicate maintenance and construction schedule and other related information with local agencies.	Existing
Dispatch maintenance vehicles for planned activities (road maintenance, snow plowing, etc.) and unplanned incidents within the jurisdiction area.		Existing	
Maintain DOT roadside equipment.		Existing	

Stakeholder	Transportation Service	Role/Responsibility	Status
MDOT (cont'd)	Maintenance and Construction Management (cont'd)	Provide construction management and perform maintenance of interstate, state highways and bridges.	Existing
		Provide maintenance on agency vehicle fleet.	Existing
		Operate automated vehicle location (AVL)/global positioning system (GPS) technology to track maintenance vehicles locations and collect relative data for analysis.	Planned
		Operate field devices including sensors, cameras, and DMS for maintenance and construction activities.	Planned
		Operate portable TMCs to manage work zone activities.	Planned
		Operate RWIS system (weather sensors and fog sensors) and collect road weather information along major roadways, and distribute road weather information to local public safety agencies and transportation agencies.	Planned
	Public Transportation	Coordinate ITS projects, funding support and other related management activities with local public transit agencies.	Existing
	Traffic Management	Manage and control roadside equipment (including CCTV, DMS, HAR, detection sensors, signal systems, and others).	Existing
		Operate highway-rail preemption and warning systems.	Existing
		Operate TMCs and communicate traffic related information to other agencies.	Existing
		Operate automatic gate closure systems.	Planned
		Operate portable TMCs for special events, etc.	Planned
		Operate reversible lane management systems.	Planned
		Operate speed-warning systems.	Planned
	Transportation Planning and Architecture Maintenance	Coordinate planning activities with the MPOs.	Existing
		Coordinate the Mississippi Statewide ITS Architecture development and implementation with stakeholders.	Existing
		Provide transportation planning services for state DOT.	Existing
		Responsible for the maintenance of the Mississippi Statewide ITS Architecture.	Existing
	Traveler Information	Provide real time traffic information through Internet, Kiosks, etc.	Existing
		Provide telephone traveler information (511 System) via either cell phone or landline.	Planned

Stakeholder	Transportation Service	Role/Responsibility	Status
MDOT Districts 3, 5 & 7	Emergency Management	Communicate traffic information to local law enforcement and emergency response agencies, as needed.	Existing
		Coordinate emergency response plans with state MDOT office, regarding the statewide transportation system, as applicable.	Existing
		Disseminate emergency information to motoring public through DMSs, HAR, etc.	Existing
		Monitor and implement roadway closure measures as needed to manage evacuation efforts.	Existing
		Monitor emergency situations via CCTV system.	Existing
		Provide district-level support on transportation infrastructure as needed in the event of an emergency or disaster.	Existing
	Freeway Management	Operate and maintain roadside equipment (CCTV, traffic sensors, DMS, HAR, speed warning system, etc.) for freeway traffic control and management, and disseminate traveler information (congestion, incident, etc.) to drivers.	Existing
		Request traffic management assistance from MHP, service patrols, etc. as needed.	Existing
	Incident Management	Deploy maintenance personnel/equipment as appropriate to mitigate effects of incident.	Existing
		Monitor situation via CCTV system and adjust response plans according to current conditions.	Existing
		Monitor weather and external conditions and adjust response plans accordingly.	Existing
		Receive and disseminate freeway incident information to motoring public via DMSs, HAR, etc.	Existing
		Request traffic management assistance from MHP, service patrols, etc. as needed.	Existing
		Dispatch highway service patrol vehicle assisting motorists in minor incidents.	Planned
	Maintenance and Construction Management	Coordinate construction and maintenance activities with local City and County transportation agencies, as needed.	Existing
		Maintain construction and maintenance schedule for posting on websites and other traveler information sources.	Existing

Stakeholder	Transportation Service	Role/Responsibility	Status
MDOT Districts 3, 5 & 7 (cont'd)	Maintenance and Construction Management (cont'd)	Operate and maintain RWIS system (weather sensors and fog sensors) and collect road weather information along major roadways, and distribute information to other agencies.	Planned
	Surface Street Management	Operate and maintain signal systems and other infrastructure as required.	Existing
		Receive and disseminate traveler information regarding surface street operations to motorists.	Existing
		Request traffic management assistance from law enforcement agencies as needed.	Existing
		Coordinate rail operations with railroad companies.	Planned
Media Outlets	Traveler Information	Collect travel-related information from the public sector and private information sources, and broadcast that information to their customers via TV, radio stations, news media, etc.	Existing
		Receive information from MDOT, MHP, etc. regarding congestion and incidents.	Existing
MEMA	Emergency Management	Disseminate emergency/disaster information to MDOT, MHP, local EMAs & EOCs, etc., as appropriate.	Existing
		Issue nationwide and regional warnings to government authorities and the civilian population in areas endangered by disasters.	Existing
		Manage statewide response plans and coordinate with local EMAs.	Existing
		Provide emergency management center for statewide emergency operations and homeland security practices during major emergencies and disasters.	Existing
		Work with MEMA and other agencies to deal with truck or train hazardous material incidents.	Existing
Mississippi Bureau of Investigations	Emergency Management	Responsible for issuing AMBER Alerts	Existing
Mississippi Department of Environmental Quality	Incident Management	Respond to truck or train hazardous material incidents.	Existing
Mississippi Department of Public Safety	Emergency Management	Monitor changes in situation and adjust response plans accordingly.	Existing
		Receive and disseminate emergency information to appropriate agencies.	Existing
	Traveler Information	Provide weather/road conditions to the public via website.	Existing

Stakeholder	Transportation Service	Role/Responsibility	Status	
Mississippi Highway Patrol	Commercial Vehicle Operations	Exchange safety and/or security information with other agencies.	Existing	
		Participate in roadside vehicle inspection for law and regulations enforcement.	Existing	
	Emergency Management	Coordinate emergency response with local emergency agencies.	Existing	
		Operate dispatch centers to provide emergency call taking (911, *HP, and Motorist Assistance Call Boxes), and dispatch state patrol vehicles on the jurisdiction roadways.	Existing	
		Provide disaster-related information to the public.	Existing	
		Support disaster response and recovery, and disaster evacuation.	Existing	
	Incident Management	Coordinate incident response with local incident response agencies including emergency management, public safety, and/or transportation, including road closure.	Existing	
		Receive emergency calls for incidents within the jurisdiction area and dispatch state patrol vehicles responding to emergency calls.	Existing	
		Routinely patrol major roadways including interstates, US highways, state highways and secondary county roads, and enforce motor vehicle laws.	Existing	
	Traveler Information	Observe/collect road/weather conditions on Interstates, US highways, and major state highways.	Existing	
	Mississippi Office of Homeland Security	Emergency Management	Disseminate emergency and disaster information to appropriate agencies (MEMA, MDOT, MHP, etc.)	Existing
			Implement and coordinate appropriate response plans on statewide level.	Existing
Issue homeland security warnings			Existing	
Mississippi Public Service Commission	Archived Data Management	Maintain and provide a SAFETYNET database management system.	Existing	
	Commercial Vehicle Operations	Exchange safety and credential information as needed or requested.	Existing	
		Manage motor carrier state application and registration.	Existing	
Mississippi Tax Commission	Archived Data Management	Maintain a database for commercial vehicle tax records.	Existing	
	Commercial Vehicle Operations	Manage commercial vehicle taxes including International Fuel Tax Agreement (IFTA) and Internal Registration Plan (IRP).	Existing	
		Provide tax information to appropriate agencies as needed or requested.	Existing	

Stakeholder	Transportation Service	Role/Responsibility	Status
National Park Service	Incident Management	Report traffic incidents that occur on the Natchez Trace Parkway and send incident and work zone information to the MDOT.	Existing
		Responds to incidents and provide MDOT with incident data.	Existing
National Weather Service	Emergency Management	Provide weather alerts to local responding agencies.	Existing
Private Partnership Toll Facility Operations	Electronic Payment	Collect tolls from drivers using the Airport Parkway and collect and process data collected.	Proposed
Private Trucking Companies	Commercial Vehicle Operations	Coordinate commercial vehicle management activities with public agencies.	Existing
		Manage company vehicle fleets.	Existing
Railroad Companies	Surface Street Management	Coordinate rail operations with MDOT district office.	Planned
	Traffic Management	Operate and maintain rail roadside equipment communicating with traffic signal systems or other traffic control devices at highway rail intersections.	Existing
Transit Service Providers	Emergency Management	Coordinate and implement response plans in the event that transit vehicles are needed in extraordinary situations (hurricane evacuations, etc.)	Existing
		Support disaster response, recovery, and evacuation.	Existing
	Transit Management	Coordinate transit information and operation with other transit service providers.	Existing
		Provide transit schedule information to users and information service providers.	Existing

4. INVENTORY

The inventory of existing and planned Central Mississippi regional ITS elements supports development of interface requirements and information exchanges with these systems. A comprehensive inventory of these existing and planned systems was developed based on a survey of the region and stakeholder input. For development of the regional architecture, the Central Mississippi Region was defined to encompass the following cities and counties:

- City of Clinton
- City of Jackson
- City of Pearl
- City of Ridgeland
- Covich County
- Hinds County
- Madison County
- Rankin County
- Simpson County

A regional ITS Architecture inventory is a list of all existing and planned ITS systems in the region as well as non-ITS systems that provide information to or get information from the ITS systems. The focus of the inventory is on those systems that support, or may support, interfaces that cross stakeholder boundaries. In general, the inventory should be managed so that it is as small as possible while still supporting the goal of identifying all key integration opportunities in the region. Each element in the inventory will normally include a name, associated stakeholder(s), a concise description, general status, and the associated subsystems or terminators from the National ITS Architecture. Table 4-1 provides a list of ITS systems, their general descriptions, and stakeholders involved with or responsible for operations and management of the systems. This inventory was developed based on the following sources:

- Central Region ITS Architecture Stakeholder Survey Responses
- Mississippi Statewide ITS Architecture
- Mississippi ITS Strategic Plan
- Comprehensive Emergency Transportation Response Plan
- Other relevant project reports and websites

The stakeholder survey questionnaire is included in Appendix A.

Table 4-1. Central Region ITS Inventory

Primary Stakeholder	System	Description	Status	Other Associated Stakeholder
AMTRAK	AMTRAK	Provide passenger train services, and coordinate with other transit modes for efficient movement of people.	Existing	
Central Mississippi Planning & Development District	CMPDD	Provide traffic forecast and demand management for the Central Mississippi region.	Existing	
	CMPDD MPO Databases	Databases for all transportation related data in the Central Mississippi region.	Existing	
City of Clinton	Public Works	Responsible for maintenance and construction activities	Existing	
City of Jackson	Database	Maintain/archive city data for a variety of uses such as traffic data and accident data.	Existing	
	Public Works	Responsible for maintenance and construction activities. Plan to operate DMS for work zone management.	Existing	
	TOC	Operate city roadside equipment including traffic signal system and interconnected signal railroad crossings, for traffic control and management. Closed-loop signal systems, CCTV, traffic sensors and emergency vehicle preemption are planned.	Existing/ Planned	
	TOC Roadside Equipment	Roadside equipment includes all equipment distributed on and along the roadway that monitors and controls traffic. Closed-loop signal systems, CCTV, DMS, traffic sensors, and emergency vehicle preemption are planned. Trailblazer directional signs are also desired for evacuation.	Existing/ Planned	
City of Pearl	Public Works	Responsible for traffic management, maintenance and construction activities	Existing	
City of Ridgeland	Public Works	Responsible for maintenance and construction activities	Existing	
	TMC	Operate city roadside traffic equipment including closed-loop signal systems and DMSs for traffic control and management. HAR, emergency vehicle preemption, lane control devices and remotely controlled barrier systems are planned.	Planned	

Primary Stakeholder	System	Description	Status	Other Associated Stakeholder
City of Ridgeland (cont'd)	TMC Roadside Equipment	Roadside equipment includes all equipment distributed on and along the roadway that monitors and controls traffic. This includes closed-loop signal systems and DMSs. HAR, emergency vehicle preemption, lane control devices and remotely controlled barrier systems are planned. Trailblazer directional signs are also desired for evacuation.	Planned	
City/County 911 Dispatch Centers	City/County 911 Dispatch Centers	Receive 911 calls, and dispatch sheriff, police, fire and EMS within the jurisdiction area via communication system. Exchange mutual aid and incident information with other local agencies. CAD dispatch may be equipped.	Existing/ Planned	Counties of Copiah, Hinds, Madison, Rankin & Simpson; Cities with a population < 20,000
City/County Public Safety Agencies	City/County Emergency Vehicles	A collection of emergency vehicles responding to emergency/incident dispatches. Vehicles may be equipped with communication system, signal preemption, in-vehicle navigation system, etc.	Existing	
	Emergency Response Performance Information	Review of emergency response times (from accident scene to hospitals).	Existing	
County Emergency Management Agencies	County Emergency Operations Centers	Provide emergency operations center for countywide emergency operations and homeland security practices during major emergencies and disasters.	Existing	Counties of Copiah, Hinds, Madison, Rankin & Simpson
Educational Institutions	Colleges & Universities	A stakeholder group consisting of all school systems, colleges and universities.	Existing	
Intermodal Rail Facilities	Intermodal Rail Freight Facility	Represent railroad intermodal facilities that transport goods between railroad and other transportation modes including truck and water. The terminals coordinate freight movement with Fleet-Freight management, gather information on traffic conditions, and to provide information on intermodal freight activities that is pertinent to traffic movement in the surrounding area.	Existing	

Primary Stakeholder	System	Description	Status	Other Associated Stakeholder
Jackson Municipal Airport Authority	Airport Information System	Use website, email, PDA, and other methods to provide traveler information such as flight delay, ground transportation schedule, maintenance, incident, and disaster response.	Existing	
	Airport Security Monitoring System	Use CCTV to monitor airport terminals including ground transportation areas and parking ramps.	Existing	
Jackson Transit System (JATRAN)	JATRAN	Provide fixed-time and demand responsive transit services within the urbanized area. RouteMatch software is used for administration and to dispatch and schedule other transit operation management activities. CTA also has the capability to automate vehicle maintenance scheduling based on vehicle and equipment condition and availability. AVL/GPS, On-board security monitoring system, electronic fare payment system, and transit signal priority system is planned.	Existing/ Planned	
	JATRAN Traveler Information Systems	Collect and store transit-related data including ridership.	Existing	
	JATRAN Transit System Kiosks	Kiosks are public informational displays supporting various levels of interaction and information access.	Existing	
	JATRAN Transit Vehicles	A collection of transit vehicles responding to transit dispatches, AVL/GPS, on-board security cameras, electronic fare payment system, and transit signal priority are planned.	Existing/ Planned	
Local Cities and Counties	Local City/County Databases	Maintain/archive county or city data for a variety of uses such as maintaining emergency/accident data.	Existing	Counties of Copiah, Hinds, Madison, Rankin & Simpson; Cities with a population < 20,000
	Local City/County Public Works	Responsible for maintenance and construction activities	Planned	
	Local City/County TMCs	Manage and control traffic signals, CCTV, DMS, detection sensors and other roadside equipment within the jurisdiction area for traffic control and management, and communicate traffic related information to other agencies.	Existing/ Planned	

Primary Stakeholder	System	Description	Status	Other Associated Stakeholder
Local Cities and Counties (cont'd)	Local City /County TMC Roadside Equipment	Roadside equipment includes all equipment distributed on and along the roadway that monitors and controls traffic. Trailblazer directional signs are also desired for evacuation.	Existing/ Planned	
Local Traffic Generators	Event Promoters and Traffic Generators	Private entities that share knowledge of events, (date, time, location, duration, etc.) that may affect travel on roadways with MDOT, City/County TCCs and emergency service providers.	Existing	
Greyhound	Greyhound	Commercial provider of transportation service between cities	Existing	
MDOT	MS Traffic.com	MDOT website provides real time traffic information (http://www.mstraffic.com/) including traffic conditions, incidents, streaming traffic video, road restrictions, roadway work, alerts, hurricane evacuation information, and other transportation-related information. Clearing house for real time incidents and travel speed information will be established, as well as information on transit service, airport/airline info, and commercial vehicle operation information.	Existing	
	Traveler Information Repository	A 511 or similar system that collects traveler information.	Planned	
	Statewide 511 System	Statewide 511 System will be an integrated statewide service, developed in phases. Initially the system will be implemented in Jackson. It will be connected to bordering states' 511 services where possible and available, and will be available to the traveling public 24 hours per day, 7 days per week.	Planned	
	Accident Database	Maintains records on traffic accidents occurring on public roadways. A Safety Analysis Management System (SAMS) is planned as a Web-based application providing interactive GIS tools to assist in the query, visualization, and analysis of crash data.	Planned	
	Cellular Phone System for Incident Reporting	A system enables motorists to report incidents to the MDOT TMC using cellular phone numbers such as #999. This system could also allow users to contact local law enforcement, towing companies, ambulance services, and local transportation organizations highway helper vehicles.	Planned	

Primary Stakeholder	System	Description	Status	Other Associated Stakeholder
MDOT (cont'd)	Commercial Vehicle Traveler Information Network	Provide specific information to truck operators via the internet and/or public kiosks at truck stops. The information might include road closures, incident, weather (i.e., fog, flooding), construction, and special permit routing.	Planned	
	Commercial Vehicle Information Systems & Networks (CVISN) Credentialing Infrastructure System	Develop a virtual one-stop shop for all the motor carrier transactions which process credential applications and collect fuel taxes, weight/distance taxes, and other taxes and fees associated with commercial vehicle operation. It will provide electronic access for motor carrier credentialing, tax payments and permits. In addition, future planning is to provide Mississippi Public Service Commission and MDOT enforcement personnel with real-time safety and credential information. The national CVISN system databases will be connected and accessed, including Commercial Driver's License Information System (CDLIS), Safety and Fitness Electronic Records (SAFER), Motor Carrier Management System (MCMIS), National Law Enforcement Telecommunication System (NLETS), etc.	Existing	
	ExpressPass Permitting System	The website https://www.expresspass.ms.gov/trucking enables online application and account management of oversize/overweight commercial vehicle permits. Available ExpressPass routes are also provided.	Existing	
	PrePass System	PrePass is an automatic vehicle identification system that allows participating transponder equipped commercial vehicles to bypass designated weigh stations and port-of-entry facilities across the United States. The PrePass system has been installed at 12 locations in the state.	Existing	
	Highway Advisory Radio	Disseminate information to travelers via radio systems. HAR systems installation is planned during roadway and bridge reconstruction/rehabilitation, in advance of decision points on high volume/high accident routes, near major attractions, airports, and parking facilities.	Planned	

Primary Stakeholder	System	Description	Status	Other Associated Stakeholder
MDOT (cont'd)	Highway Performance Monitoring System (HPMS)	A highway information system that includes data on the extent, condition, performance, use, and operating characteristics of the highways.	Existing	
	Statewide TMC	Statewide TMC in Jackson provides overall planning and implementation of incident management program, assists in incident detection and verification, initiates traffic management strategies on incident impacted facilities, controls signals on State routes outside of Jackson, provides traffic control, assists motorists with disabled vehicles, provides motorist information (HAR, VMS), determines incident clearance and roadway repair needs, establishes and operates alternate routes, dispatches freeway service patrols, dispatches maintenance resources such as dump trucks and sweepers, operates the GoMDOT web server, and shares video and data with City of Jackson TOC, media and police agencies.	Existing	
	Statewide TMC Kiosks	Kiosks are public informational displays supporting various levels of interaction and information access.	Existing	
	Truck Stop Kiosks	Provide specific information to truck operators. The information might include road closures, incident, weather (i.e., fog, flooding), construction, and special permit routing.	Planned	
	Variable Trailblazer Signs	Variable trailblazer signs form a directionally oriented signing system on surface streets. This can provide necessary information to bypass heavily congested or closed interstate freeway entrance ramps or segments (for appropriate alternate routes), as well as keep traffic moving towards specific destinations (such as parking lots or special event centers, e.g. Jackson Coliseum). These signs combine route shields or destination symbols with variable directional arrow displays to provide travelers with the necessary directional information to reduce the chances of getting lost and tying up traffic due to quick movements.	Planned	

Primary Stakeholder	System	Description	Status	Other Associated Stakeholder
MDOT Districts 3, 5 & 7	Traffic Management Center	The District TMC will operate and maintain the ITS equipment deployed in the MDOT district. The District TMC will also participate in local incident management programs, assist in incident detection and verification (CCTV), initiate traffic management strategies on incident impacted facilities, provide motorist information (HAR/LPFM, VMS), determine incident clearance and roadway repair needs, establish and operate alternate routes, dispatch maintenance resources such as dump trucks and sweepers.	Planned	
	Maintenance Vehicles	Maintenance vehicles are utilized to support road maintenance, such as Salt/Sand trucks, and Road Repair trucks. Once an Automated Vehicle Location (AVL) system is implemented, the equipped maintenance vehicles, service patrol vehicles or buses can serve as traffic probes to provide additional traffic flow data to the ITS systems.	Planned	
	Closed Loop Signal System	Signal systems including traffic signals, loop detectors, video detection, and communications infrastructure. Signal systems may be operated and maintained by Counties and Cities under joint agreements. Emergency vehicle signal preemption and transit signal priority may be existing or planned at cities or counties.		
	Portable Dynamic Message Signs	Used to direct traffic for special events, maintenance and construction, and incident management	Existing	
	Dynamic Message Signs	Permanent DMS are installed at major metro/municipal areas to disseminate information related to traffic incidents, amber alerts, special events and weather conditions.	Existing	
	Dynamic Speed Zone Signs	Dynamic signs displaying speeds of vehicles approaching speed zones.	Planned	

Primary Stakeholder	System	Description	Status	Other Associated Stakeholder
MDOT Districts 3, 5 & 7 (cont'd)	Maintenance and Construction Offices	Dispatch maintenance vehicles for planned activities (road maintenance, snow plowing, etc.) and unplanned incidents within the jurisdiction area, and communicate maintenance and construction schedule and other related information to other agencies.	Existing	
	Weigh-in-Motion Stations	Weigh-in-Motion (WIM) stations to measure truck weights and axle configuration for enforcing law and regulations. On-line access to enforcement data at all permanent scale facilities is planned. WIM data is also planned to be available to relevant agencies via internet or through a database.	Existing	
	Highway Service Patrol Vehicles	Highway service patrol vehicles assist motorists in minor incidents (flat tire, accident, out of gas, etc.) to minimize disruption to the traffic stream. Vehicles planned for the Jackson area will communicate with the MDOT TMC via voice communications. Vehicles will be equipped with AVL capability.	Planned	
	Weather Sensors	Weather sensors collect pavement temperature, surface temperature, ambient temperature, wind speed and direction, pavement wet/dry, perspiration, and relative humidity. Provides a network of pavement, visibility and other weather information that could be disseminated through various pre-trip and en-route information means.	Planned	
	Railroad Crossing Control	Deployment of railroad pre-emption and warning systems at at-grade railroad crossings. This process enables signals near the rail crossing to coordinate their timing when a train approaches. The system consists of gates and signals. Train detector circuitry and communication line from intelligent interface controller (IIC) to wayside interface equipment (WIE).	Planned	
	Traffic Surveillance Equipment	Monitor state major roadways to assist in incident management/emergency management. The CCTV camera is used to provide the ability to confirm specific conditions (e.g., incidents, lane blockages, congestion) and can aid in dispatching appropriate resources or formulating an appropriate traffic response.	Existing	

Primary Stakeholder	System	Description	Status	Other Associated Stakeholder
MDOT Districts 3, 5 & 7 (cont'd)	Traffic Sensors	There are numerous types of traffic sensors to choose from, including in-pavement devices such as the commonly used inductive loop detector and "non-intrusive" devices, including overhead sensors, including radar and microwave technologies, video image processing systems and acoustic sensors.	Existing	
	Speed Warning System	Includes static speed sign, speed detector (radar), and display system. Key features of the concept include mandatory speed limit signals, automatic and effective enforcement and automatic control of the speed signals.	Planned	
	Communication Infrastructure	It is planned to establish a more permanent approach for the primary communication links between MDOT Central Office and the Districts. As more ITS functionality is added, the demand on the communication infrastructure will increase.	Existing	
Media Outlets	Media	Provide traffic reports on travel conditions, traffic and travel advisory, incident and special events and other transportation-related news services to the traveling public through radio, TV and other media.	Existing	
Mississippi Emergency Management Agency	Mississippi Emergency Management Agency	Plan and coordinate with local emergency service providers to respond to threats from technological, fabricated and natural origins; activate Emergency Operations Center, allocate resources, and maintain operational control of the State Emergency Response Team, the Mobile Operations Center, the Disaster Reconnaissance Team and the communications/state warning point section.	Existing	
Mississippi Emergency Management Agency (cont'd)	MEMA Emergency Operations Center	The State Emergency Operations Center provide emergency management center for statewide emergency operations and homeland security practices during major emergencies and disasters, and coordinate with local, state, and federal agencies. The center alerts state and local officials to all natural or fabricated incidents throughout the state. Communications includes satellite, low band and UHF radios. A computerized alphanumeric paging system allows for rapid notification of all MEMA personnel as well as personnel in 78 counties. A high-speed digital fax system has enhanced the communications ability to the field. Emergency management software for recording disaster/incident information is also used.	Existing	

Primary Stakeholder	System	Description	Status	Other Associated Stakeholder
Mississippi Bureau of Investigation	Mississippi Bureau of Investigation	Issue AMBER Alerts.	Existing	
Mississippi Department of Environmental Quality	Mississippi Department of Environmental Quality	Work with MEMA and other agencies to deal with truck or train hazardous material incidents.	Existing	
Mississippi Department of Public Safety	Mississippi Road/Weather Conditions Website	Provides weather/road conditions for the entire state. The website is at http://www.dps.state.ms.us/dps/dps.nsf/roadmap?OpenForm .	Existing	
Mississippi Highway Patrol	MHP District 1 Offices	Enforce traffic laws on state highways within the jurisdiction area covering the Central Region; assist local law enforcement agencies and responding to statewide/regional emergencies.	Existing	
	*HP Cellular Phone System	Receive incident/emergency calls from travelers who use cellular *HP.	Existing	
Mississippi Highway Patrol (cont'd)	MHP Dispatch Centers	Receive incident/emergency calls, and utilize CAD system to dispatch emergency vehicles. CAD incident data and camera images will be shared between MHP dispatch centers and MDOT TMC.	Existing	
	MHP Emergency Vehicles	Dispatched emergency vehicles. AVL is planned.	Existing	
Mississippi Public Service Commission	SAFETYNET	A database management system that allows entry, access, analysis, and reporting of data from driver/vehicle inspections, crashes, compliance reviews, assignments, and complaints.	Existing	
Mississippi Office of Homeland Security	Mississippi Office of Homeland Security	Coordinate, maintain and administer homeland security practices within the state and region.	Existing	

Primary Stakeholder	System	Description	Status	Other Associated Stakeholder
Mississippi Tax Commission	Commercial Vehicle Databases	A database for commercial vehicle tax records.	Existing	
National Park Service	NPS Center Natchez Trace Parkway	The National Park Service Center for Natchez Trace Parkway reports traffic incidents that occur on the parkway. The center will also send incident and work zone information to MDOT Statewide TMC. Public safety services are also represented in this element through the park police that respond to emergencies on the parkway.	Existing	
National Weather Service	National Weather Service Information	The National Weather Service (NWS) provides weather, hydrologic, and climate forecasts and warnings for the United States. NWS data and products form a national information database and infrastructure that can be used by other governmental agencies, the private sector, the public, and the global community.	Existing	
Private Partnership Toll Facility Operations	Toll Administration	The entity that manages the operation of tolling operations on the proposed Airport Parkway.	Planned	
	Toll Operation	The toll collection facility for the proposed Airport Parkway as well as all equipment used to validate toll payment and process the data for use by MDOT and other entities.	Planned	
Private Trucking Companies	Private Trucking Companies	Own and manage commercial fleets of vehicles.	Existing	
	Private Trucking Companies Commercial Vehicles	Commercial vehicle equipped with the sensory, processing, storage, and communications functions necessary to support safe and efficient commercial vehicle operations.	Existing	
Railroad Companies	Railroad Wayside Equipment	Rail roadside equipment communicating with traffic signal systems or other traffic control devices at highway rail intersections.	Existing	

Primary Stakeholder	System	Description	Status	Other Associated Stakeholder
	Rail Companies	Coordinate with traffic management centers, and provide train schedules, maintenance schedules, and any other forecast events that will result in highway-rail intersection (HRI) closures. The information is used to develop forecasts of rail intersection closure times and durations that may be used in advanced traffic control strategies or to enhance the quality of traveler information.	Existing	
	Driver	This terminator represents a human entity that operates a licensed vehicle on the roadway.		
	Emergency Telecommunications System	This terminator represents the telecommunications systems that connect a caller with a Public Safety Answering Point (PSAP). These systems transparently support priority land line and wireless caller access to the PSAP through 9-1-1 and other access mechanisms like 7 digit local access numbers, and motorist aid call boxes. The calls are routed to the appropriate PSAP, based on caller location when this information is available. The caller's location and callback number are also provided to the PSAP by this interface.	Existing	
	IFTA Clearinghouse	The IFTA Clearinghouse supports the IFTA base state agreement electronically. The IFTA Clearinghouse coordinates IFTA carrier information and transmittal records between participated jurisdictions.	Existing	
	IRP Clearinghouse	The IRP Clearinghouse supports the IRP base state agreement electronically. The Clearinghouse supports exchange of motor carrier and financial information between participating jurisdictions.	Existing	

Primary Stakeholder	System	Description	Status	Other Associated Stakeholder
	Telecommunications System for Traveler Information	This terminator provides the caller interface and voice processing (voice recognition/synthesis) that supports voice-enabled traveler telephone information systems. It provides landline and wireless caller access to 511 systems and other telephone access mechanisms like 7 or 10 digit local access numbers. It represents the boundary of the architecture where a call is received and processed and includes voice portal capabilities in scenarios where a distinct voice portal exists between ITS Centers and telecommunications providers. The terminator gathers traveler information, alerts, and advisories from information service provider(s) and uses this information to support voice-based interactions with a traveler.	Planned	
	Traveler Card	Traveler Cards enable the actual transfer of electronic information from the user of a service (i.e. a traveler) to the provider of the service.	Existing	
	User Personal Computing Devices	This terminator refers to equipment an individual owns and can personalize with their choices for information about transportation networks. An internet-connected PC is an example.	Existing	

5. USER SERVICES AND MARKET PACKAGES

5.1 Identification of User Services

User services describe what should be provided from the user’s perspective. Identification of user services for the Central Region ITS Architecture helps to reveal the problems with transportation systems and the associated needs of stakeholders, and assists in selecting market packages, which should support locally applicable user services. The National ITS Architecture defines thirty-three user services covering a wide breadth of surface transportation needs. Since many of the user services share common infrastructure elements, such as communications, they have been grouped together into eight “bundles”:

- Travel and Traffic Management
- Public Transportation Management
- Electronic Payment
- Commercial Vehicle Operations
- Emergency Management
- Advanced Vehicle Safety Management
- Information Management
- Maintenance and Construction Management

Table 5-1 contains a list of all National ITS Architecture user services. Based upon the information obtained from the ITS inventory, stakeholder surveys and Mississippi Statewide ITS Architecture, those user services not applicable to the Central Region ITS Architecture are shown in gray; all others are applicable to the Central Mississippi region. A complete list of user service definitions can be obtained on the National ITS Architecture website at <http://itsarch.iteris.com/itsarch/>.

Table 5-1. List of User Services for the Central Region

User Service Bundle	User Service
1. Travel and Traffic Management	1.1 Pre-Trip Information
	1.2 En-Route Driver Information
	1.3 Route Guidance
	1.4 Ride Matching and Reservation
	1.5 Traveler Services Information
	1.6 Traffic Control
	1.7 Incident Management
	1.8 Travel Demand Management
	1.9 Emissions Testing and Mitigation
	1.10 Highway Rail Intersection
2. Public Transportation Management	2.1 Public Transportation Management
	2.2 En-Route Transit Information
	2.3 Personalized Public Transit
	2.4 Public Travel Security
3. Electronic Payment	3.1 Electronic Payment Services
4. Commercial Vehicle Operations	4.1 Commercial Vehicle Electronic Clearance
	4.2 Automated Roadside Safety Inspections
	4.3 On-board Safety Monitoring
	4.4 Commercial Vehicle Administration Processes
	4.5 Hazardous Material Security and Incident Response
	4.6 Freight Mobility
5. Emergency Management	5.1 Emergency Notification and Personal Security
	5.2 Emergency Vehicle Management
	5.3 Disaster Response and Evacuation
6. Advanced Vehicle Safety Systems	6.1 Longitudinal Collision Avoidance
	6.2 Lateral Collision Avoidance
	6.3 Intersection Collision Avoidance
	6.4 Vision Enhancement for Crash Avoidance
	6.5 Safety Readiness
	6.6 Pre-Crash Restraint Deployment
	6.7 Automated Vehicle Operation
7. Information Management	7.1 Archived Data
8. Maintenance and Construction Management	8.1 Maintenance and Construction Operations

Note: User services shown as gray are not applicable to the Central Region ITS Architecture.

5.2 Mapping User Services to Market Packages

Market packages provide an accessible, deployment-oriented perspective to the National ITS Architecture. They are tailored to address the region's real world transportation problems and needs. Market packages enable transportation planners and decision makers to determine appropriate ITS services that satisfy local and statewide needs. Market packages consist of one or more equipment packages that work together to deliver a given transportation service and the architecture flows that connect them and other important external systems. They identify the pieces of the physical architecture required to implement a particular transportation service. As illustrated in Table 5-2, all eighty-five (85) market packages (in National ITS Architecture Version 5.1) were considered for their applicability to all thirty-three (33) user services. The user services, market packages and associated mapping relationships, which are applicable for the Central Region ITS Architecture, have been identified through the mapping exercise.

Table 5-3 presents a list of market packages that are identified through the mapping process in Table 5-2. The market packages are grouped according to the type of ITS category they fall under, i.e., Archived Data Management, Advanced Public Transportation Systems, etc. As illustrated in Table 5-3, some of the market packages do not specifically address the user services identified for the Central Region ITS Architecture, and they are not applicable to the implementation of the existing and proposed ITS systems in the Central Mississippi region. Therefore, customization of the market packages is necessary so those that are inappropriate for the Central Region ITS Architecture are eliminated. Descriptions of the market packages can be found on the National ITS Architecture website at <http://itsarch.iteris.com/itsarch/>.

Table 5-3. List of Market Packages for the Central Region ITS Architecture

Category	Market Package	Market Package Name	Status
Archived Data Management (AD)	AD1	ITS Data Mart	Existing
	AD2	ITS Data Warehouse	Existing
Advanced Public Transportation Systems (APTS)	APTS1	Transit Vehicle Tracking	Existing
	APTS2	Transit Fixed Route Operations	Existing
	APTS3	Demand Response Transit Operations	Existing
	APTS4	Transit Passenger and Fare Management	Existing
	APTS5	Transit Security	Planned
	APTS6	Transit Maintenance	Existing
	APTS7	Multi-Modal Coordination	Planned
	APTS8	Transit Traveler Information	Existing
Advanced Traveler Information Systems (ATIS)	ATIS1	Broadcast Traveler Information	Existing
	ATIS2	Interactive Traveler Information	Planned
Advanced Traffic Management Systems (ATMS)	ATMS01	Network Surveillance	Existing
	ATMS03	Surface Street Control	Existing
	ATMS04	Freeway Control	Planned
	ATMS06	Traffic Information Dissemination	Existing
	ATMS07	Regional Traffic Control	Planned
	ATMS08	Traffic Incident Management System	Existing
	ATMS09	Traffic Forecast and Demand Management	Existing
	ATMS10	Electronic Toll Collection	Planned
	ATMS13	Standard Railroad Grade Crossing	Existing
	ATMS14	Advanced Railroad Grade Crossing	Planned
	ATMS16	Parking Facility Management	Planned
	ATMS19	Speed Monitoring	Planned
	ATMS21	Roadway Closure Management	Planned
Commercial Vehicle Operations (CVO)	CVO03	Electronic Clearance	Existing
	CVO04	CV Administrative Processes	Existing
	CVO06	Weigh In Motion	Existing
	CVO07	Roadside CVO Safety	Existing
	CVO10	HAZMAT Management	Existing
Emergency Management (EM)	EM01	Emergency Call-Taking and Dispatch	Existing
	EM02	Emergency Routing	Existing
	EM04	Roadway Service Patrols	Planned
	EM06	Wide-Area Alert	Existing
	EM07	Early Warning System	Existing
	EM08	Disaster Response and Recovery	Existing
	EM09	Evacuation and Reentry Management	Existing
	EM10	Disaster Traveler Information	Existing
Maintenance & Construction Management (MC)	MC02	Maintenance and Construction Vehicle Maintenance	Existing
	MC06	Winter Maintenance	Existing
	MC07	Roadway Maintenance and Construction	Existing
	MC08	Work Zone Management	Existing
	MC10	Maintenance and Construction Activity Coordination	Existing

5.3 Customization of Market Packages

Market packages, customized for the specific requirements of each stakeholder, represent the information that will be exchanged between specific stakeholder elements. The above market packages selected for the Central Region ITS Architecture were customized to correspond with the existing ITS system elements and operations as well as future deployment and planned operations. Customization of market packages requires tailoring the elements (subsystems or terminators) in these market packages, along with associated architecture flows. In addition, architecture flows deemed by the stakeholders as not relevant to the deployment need to be removed. The results of such customization are summarized in terms of ITS elements and their deployment status as presented in Table 5-4. A comprehensive listing of the completed results of the customization is detailed in the Turbo Architecture database.

Table 5-4. List of Market Packages by Architecture Elements

Market Package	Market Package Name	Associated Element	Status
AD1	ITS Data Mart	City of Clinton Public Works	
		City of Jackson Public Works	
		City of Jackson Database	
		City of Jackson TOC	
		City of Jackson TOC Roadside Equipment	
		City of Pearl Public Works	
		City of Ridgeland Public Works	
		City of Ridgeland TCC	
		City of Ridgeland TCC Roadside Equipment	
		County Emergency Operations Centers	
		Jackson-Evers International Airport Information System	
		JATLAN	
		JATLAN Traveler Information System	
		Local City/County 911 Dispatch Centers	
		Local City/County Databases	
		Local City/County Public Works	
		Local City/County TCCs	
		MDOT District TMCs	
		Mississippi Public Service Commission SAFETYNET	
		Mississippi State Tax Commission CV Databases	
Multimodal Transit Centers			
AD2	ITS Data Warehouse	CMPDD MPO Databases	
		Local City/County 911 Dispatch Centers	
		Emergency Response Performance Information	

Market Package	Market Package Name	Associated Element	Status
AD2 (cont'd)	ITS Data Warehouse	MDOT Accident Database	
		MDOT District Maintenance and Construction Office	
		MDOT District TMC	
		MDOT District Traffic Sensors	
		MDOT ExpressPass Permitting System	
		MDOT Highway Performance Monitoring System (HPMS)	
		MHP District 1 Offices	
		MHP Dispatch Centers	
		Mississippi Public Service Commission SAFETYNET	
		Mississippi State Tax Commission Commercial Vehicle Database	
		Multimodal Transit Centers	
APTS01	Transit Vehicle Tracking	Multimodal Transit Centers	
		JATRAN	
		JATRAN Transit Vehicles	
		Jackson-Evers International Airport Information System	
APTS02	Transit Fixed-Route Operations	Multimodal Transit Centers	
		JATRAN	
		JATRAN Transit Vehicles	
		Jackson-Evers International Airport Information System	
APTS03	Demand Response Transit Ops	JATRAN	
		JATRAN Transit Vehicles	
APTS04	Transit Passenger and Fare Management	JATRAN	
		JATRAN Transit Systems Kiosks	
		JATRAN Transit Vehicles	
		Multimodal Transit Centers	
		Multimodal Transit Centers Kiosks	
APTS05	Transit Security	City of Jackson Police	
		JATRAN	
		JATRAN Transit Vehicles	
		Local City/County 911 Dispatch Centers	
		MHP Dispatch Centers	
		Multimodal Transit Centers	
APTS06	Transit Maintenance	JATRAN	
		JATRAN Transit Vehicles	
APTS07	Multi-modal Coordination	AMTRAK	
		JATRAN	
		JATRAN Transit Vehicles	
		Greyhound	
		Multimodal Transit Centers	
APTS08	Transit Traveler Information	Other Transit Service Providers	
		Multimodal Transit Centers	
		Multimodal Transit Centers Kiosks	
		JATRAN	
		JATRAN Transit System Kiosks	
		JATRAN Traveler Information System	
		Jackson-Evers International Airport Information System	
Other Transit Service Providers			
User Personal Computing Devices			

Market Package	Market Package Name	Associated Element	Status
ATIS01	Broadcast Traveler Information	Multimodal Transit Centers	
		Multimodal Transit Centers Kiosks	
		Jackson-Evers International Airport Information System	
		JATRAM Traveler Information System	
		MDOT Commercial Vehicle Traveler Information Network	
		MDOT MSTraffic.com	
		MDOT Statewide 511 System	
		MDOT Statewide TMC	
		MDOT Statewide TMC Kiosks	
		MDOT Truck Stop Kiosks	
		Media	
		Mississippi Road/Weather Conditions Website	
		User Personal Computing Devices	
ATIS02	Interactive Traveler Information	MDOT Statewide 511 System	
		Telecommunications Systems for Traveler Information	
ATMS01	Network Surveillance	City of Jackson TOC	
		City of Jackson TOC Roadside Equipment	
		City of Ridgeland TCC	
		City of Ridgeland TCC Roadside Equipment	
		Local City/County TCCs	
		Local City/County TCCs Roadside Equipment	
		MDOT District Traffic Management Centers	
		MDOT District Traffic Sensors	
		MDOT District Traffic Surveillance Equipment	
		MDOT MSTraffic.com	
ATMS03	Surface Street Control	City of Jackson TOC	
		City of Jackson TOC Roadside Equipment	
		City of Ridgeland TCC	
		City of Ridgeland TCC Roadside Equipment	
		City of Pearl Public Works	
		City of Clinton Public Works	
		Local City/County TCCs	
		Local City/County TCCs Roadside Equipment	
		MDOT District TMC	
		MDOT District Closed Loop Signal Systems	
		MDOT District 3, 5, and 7 Traffic Surveillance Equipment	
		MDOT District 3, 5 and 7 Traffic Sensors	
ATMS04	Freeway Control	MDOT District Dynamic Message Signs	
		MDOT District Dynamic Speed Signs	
		MDOT District Portable Dynamic Message Signs	
		MDOT District Speed Warning System	
		MDOT District TMCs	
		MDOT District Traffic Sensors	
		MDOT District Traffic Surveillance Equipment	
		MDOT Statewide TMC	
ATMS06	Traffic Information Dissemination	City of Jackson TOC	
		City of Jackson TOC Roadside Equipment	
		City of Ridgeland TCC	
		City of Ridgeland TCC Roadside Equipment	
		Local City/County TCCs	

Market Package	Market Package Name	Associated Element	Status
ATMS06 (cont'd)	Traffic Information Dissemination	Local City/County TCCs Roadside Equipment	
		MDOT District Dynamic Message Signs	
		MDOT District Portable Dynamic Message Signs	
		MDOT District TMCs	
		MDOT Highway Advisory Radio	
		MDOT MSTraffic.com	
		MDOT Statewide 511 System	
		MDOT Statewide TMC	
		MDOT Variable Trailblazer Sign	
		Media	
ATMS07	Regional Traffic Control	City of Clinton Public Works	
		City of Jackson Public Works	
		City of Jackson TOC	
		City of Jackson TOC Roadside Equipment	
		City of Pearl Public Works	
		City of Ridgeland Public Works	
		City of Ridgeland TCC	
		City of Ridgeland TCC Roadside Equipment	
		Local City/County TCCs	
		Local City/County TCCs Roadside Equipment	
		MDOT District TMC	
		MDOT Statewide TMC	
		ATMS08	Traffic Incident Management System
City of Jackson TOC Roadside Equipment			
City of Ridgeland TCC			
City of Ridgeland TCC Roadside Equipment			
County Emergency Operations Centers			
Event Promoters and Traffic Generators			
Intermodal Rail Freight Facility			
Jackson-Evers International Airport Information System			
JATRAM			
Local City/County 911 Dispatch Centers			
Local City/County Emergency Vehicles			
Local City/County TCCs			
Local City/County TCCs Roadside Equipment			
MDOT Commercial Vehicle Traveler Information Network			
MDOT District Highway Service Patrol Vehicles			
MDOT District Maintenance and Construction Offices			
MDOT District TMCs			
MDOT District Traffic Sensors			
MDOT District Traffic Surveillance Equipment			
MDOT MSTraffic.com			
MDOT Statewide 511 System			
MDOT Statewide TMC			
Media			
MHP Dispatch Centers			
MHP District 1 Office			
MHP Emergency Vehicles			
Mississippi Department of Environmental Quality			
Mississippi Road/Weather Conditions Website			
Multimodal Transit Centers			
National Park Service Center Natchez Trace Parkway			

Market Package	Market Package Name	Associated Element	Status
ATMS08 (cont'd)	Traffic Incident Management System	Rail Companies	
ATMS09	Traffic Forecast and Demand Management	City of Jackson TOC	
		City of Ridgeland TCC	
		CMPDD	
		Jackson-Evers International Airport Information System	
		JATLAN	
		Local City/County TCCs	
		MDOT District TMCS	
		Multimodal Transit Centers	
ATMS10	Electronic Toll Collection	MDOT District 5	
		CMPDD	
		Airport Parkway Toll Administration	
		Airport Parkway Toll Operations	
ATMS13	Standard Railroad Grade Crossing	City of Clinton Public Works	
		City of Jackson TOC	
		City of Jackson TOC Roadside Equipment	
		City of Ridgeland TCC	
		City of Ridgeland TCC Roadside Equipment	
		City of Pearl Public Works	
		Local City/County TCCs	
		Local City/County TCCs Roadside Equipment	
		MDOT District TMCs	
		MDOT District Closed Loop Signal System	
		MDOT District Railroad Crossing Control	
		Rail Companies	
		Railroad Wayside Equipment	
ATMS14	Advanced Railroad Grade Crossing	City of Clinton Public Works	
		City of Jackson TOC and Roadside Equipment	
		City of Ridgeland TCC	
		City of Ridgeland TCC Roadside Equipment	
		City of Pearl Public Works	
		Local City/County TCCs	
		Local City/County TCCs Roadside Equipment	
		MDOT District TMCs	
		MDOT District Closed Loop Signal System	
		MDOT District Railroad Crossing Control	
		Rail Companies	
Railroad Wayside Equipment			
ATMS16	Parking Facility Management	Colleges and Universities	
		Driver	
		Jackson-Evers International Airport Security System	
		Traveler Card	
ATMS19	Speed Monitoring	Driver	
		MDOT District Dynamic Speed Zone Signs	
		MDOT District Speed Warning System	
		MHP District 1 Offices	
ATMS21	Roadway Closure Management	City of Clinton Public Works	
		City of Jackson TOC and Roadside Equipment	
		City of Pearl Public Works	
		City of Ridgeland TCC	

Market Package	Market Package Name	Associated Element	Status
ATMS21 (cont'd)	Roadway Closure Management	City of Ridgeland TCC Roadside Equipment	
		County Emergency Operations Center	
		Local City/County 911 Dispatch Centers	
		Local City/County Public Works	
		Local City/County TCCs	
		Local City/County TCCs Roadside Equipment	
		MDOT District Portable Dynamic Message Signs	
		MDOT District TMCs	
		MDOT Statewide TMC	
		MEMA Emergency Operations Center	
		MHP Dispatch Center	
CVO03	Electronic Clearance	MDOT CVISN Credentialing Infrastructure System	
		MDOT PrePass System	
		MHP District 1 Offices	
		Private Trucking Companies	
		Private Trucking Companies Commercial Vehicles	
CVO04	CV Administrative Processes	IFTA Clearinghouse	
		IRP Clearinghouse	
		MDOT CVISN Credentialing Infrastructure System	
		MDOT ExpressPass Permitting System	
		Mississippi Public Service Commission SAFETYNET	
		Mississippi State Tax Commission Commercial Vehicle Database	
CVO06	Weigh-In-Motion	MDOT District Weigh-in-Motion Stations	
		Private Trucking Companies Commercial Vehicles	
CVO07	Roadside CVO Safety	MDOT CVISN Credentialing Infrastructure System	
		MDOT District PrePass System	
		MDOT District Weigh-in-Motion Stations	
		MHP District 1 Offices	
		Private Trucking Companies	
		Private Trucking Companies Commercial Vehicles	
CVO10	HAZMAT Management	County Emergency Operations Centers	
		Local City/County 911 Dispatch Centers	
		MDOT District Highway Service Patrol Vehicles	
		MDOT District TMCs	
		MHP Dispatch Centers	
		Mississippi Department of Environmental Quality	
EM01	Emergency Call-Taking and Dispatch	MHP *HP Cellular Phone System	
		Multimodal Transit Centers	
		City of Clinton Emergency Vehicles	
		City of Jackson Emergency Vehicles	
		City of Pearl Emergency Vehicles	
		City of Ridgeland Emergency Vehicles	
		Local City/County Emergency Vehicles	
		Local City/County 911 Dispatch Centers	
		JATRAN	
		County Emergency Operations Center	
		Emergency Telecommunications System	
		MHP Dispatch Centers	
		MHP Emergency Vehicles	
MHP District 1 Offices			

Market Package	Market Package Name	Associated Element	Status
EM02	Emergency Routing	City of Clinton Emergency Vehicles	
		City of Jackson TOC Roadside Equipment	
		City of Jackson Emergency Vehicles	
		City of Pearl Emergency Vehicles	
		City of Ridgeland Emergency Vehicles	
		City of Ridgeland TCC Roadside Equipment	
		Local City/County 911 Dispatch Centers	
		Local City/County Emergency Vehicles	
		Local City/County TCCs Roadside Equipment	
		MDOT District Closed Loop Signal Systems	
		MHP Dispatch Centers	
		MHP Emergency Vehicles	
EM04	Roadway Service Patrols	MDOT District TMCs	
		MDOT District Highway Service Patrol Vehicles	
EM06	Wide-Area Alert	Multimodal Transit Centers	
		Multimodal Transit Center Kiosks	
		City of Jackson TOC	
		City of Ridgeland TCC	
		Local City/County 911 Dispatch Centers	
		JATLAN Transit System Kiosks	
		JATLAN Traveler Information Systems	
		County Emergency Operations Centers	
		Jackson-Evers International Airport Information System	
		Local City/County TCCs	
		MDOT Commercial Vehicle Traveler Information Network	
		MDOT District Highway Advisory Radio	
		MDOT District Dynamic Message Signs	
		MDOT District Portable Dynamic Message Signs	
		MDOT District TMCs	
		MDOT MSTraffic.com	
		MDOT Statewide 511 System	
		MDOT Truck Stop Kiosks	
		MEMA Emergency Operations Center	
		MHP District 1 Offices	
		MHP Dispatch Centers	
		Mississippi Bureau of Investigation	
		Mississippi Emergency Management Agency	
		Mississippi Office of Homeland Security	
		Mississippi Road/Weather Conditions Website	
		Telecommunications Systems for Traveler Information	
		User Personal Computing Devices	
Weather Service			
EM07	Early Warning System	City of Jackson TOC	
		City of Ridgeland TCC	
		County Emergency Operations Center	
		JATLAN	
		Local City/County TCCs	
		MDOT Statewide TMC	

Market Package	Market Package Name	Associated Element	Status
EM07 (cont'd)	Early Warning System	MDOT District TMCs	
		MEMA Emergency Operations Center	
		MHP Dispatch Centers	
		Mississippi Emergency Management Agency	
		Mississippi Office of Homeland Security	
		Weather Service	
EM08	Disaster Response and Recovery	City of Jackson TOC	
		City of Ridgeland TCC	
		County Emergency Operations Center	
		JATRAM	
		Local City/County TCCs	
		Local City/County 911 Dispatch Centers	
		Multimodal Transit Centers	
		MDOT District TMCs	
		MDOT District Maintenance and Construction Offices	
		MDOT Statewide TMC	
		MEMA Emergency Operations Center	
		MHP District 1 Offices	
		MHP Dispatch Centers	
		Mississippi Department of Environmental Quality	
		Mississippi Emergency Management Agency	
		Mississippi Office of Homeland Security	
Other Transit Service Providers			
EM09	Evacuation and Reentry Management	City of Jackson TOC	
		City of Ridgeland TCC	
		County Emergency Operations Center	
		JATRAM	
		Local City/County TCCs	
		Local City/County 911 Dispatch Centers	
		Multimodal Transit Centers	
		MDOT District TMCs	
		MDOT District Maintenance and Construction Offices	
		MDOT Statewide TMC	
		MEMA Emergency Operations Center	
		MHP Dispatch Centers	
		Mississippi Emergency Management Agency	
		Mississippi Office of Homeland Security	
EM10	Disaster Traveler Information	Multimodal Transit Centers	
		Multimodal Transit Centers Kiosks	
		County Emergency Operations Center	
		Jackson-Evers International Airport Information System	
		MDOT Statewide 511 System	
		MDOT MSTraffic.com	
		MDOT District TMCs	
		Media	
		MEMA Emergency Operations Center	
		Mississippi Emergency Management Agency	
		Mississippi Office of Homeland Security	
		Telecommunications Systems for Traveler Information	
User Personal Computing Devices			

Market Package	Market Package Name	Associated Element	Status
MC02	Maintenance and Construction Vehicle Maintenance	MDOT District Maintenance and Construction Offices	
		MDOT District 6 Maintenance Vehicles	
MC06	Winter Maintenance	City of Jackson Public Works	
		City of Jackson TOC	
		City of Pearl Public Works	
		City of Ridgeland Public Works	
		City of Ridgeland TCC	
		Local City/County Public Works	
		Local City/County TCCs	
		MDOT District Maintenance and Construction Offices	
		MDOT District Maintenance Vehicles	
		MDOT District TMCs	
		Weather Service	
MC07	Roadway Maintenance and Construction	City of Clinton Public Works	
		City of Jackson Public Works	
		City of Jackson TOC	
		City of Pearl Public Works	
		City of Ridgeland Public Works	
		City of Ridgeland TCC	
		Local City/County Public Works	
		Local City/County TCCs	
		MDOT District Maintenance and Construction Offices	
		MDOT District Maintenance Vehicles	
		MDOT District TMCs	
MC08	Work Zone Management	City of Clinton Public Works	
		City of Jackson Public Works	
		City of Jackson TOC	
		City of Jackson TOC Roadside Equipment	
		City of Pearl Public Works	
		City of Ridgeland Public Works	
		City of Ridgeland TCC	
		City of Ridgeland TCC Roadside Equipment	
		Local City/County Public Works	
		Local City/County TCCs	
		Local City/County TCCs Roadside Equipment	
		MDOT District Dynamic Message Signs	
		MDOT District Dynamic Speed Zone Signs	
		MDOT District Maintenance and Construction Field Devices	
		MDOT District Maintenance and Construction Offices	
		MDOT District TMCs	
MDOT District Traffic Surveillance Equipment			
MDOT Highway Advisory Radio			
Media			
MC10	Maintenance & Construction Activity Coordination	City of Clinton Public Works	
		City of Jackson Public Works	
		City of Jackson TOC	

Market Package	Market Package Name	Associated Element	Status
MC10 (cont'd)	Maintenance & Construction Activity Coordination	City of Pearl Public Works	
		City of Ridgeland Public Works	
		City of Ridgeland TCC	
		JATRAM	
		Local City/County 911 Dispatch Centers	
		Local City/County Public Works	
		Local City/County TCCs	
		MDOT District Maintenance and Construction Offices	
		MDOT District TMC	
		MDOT MSTraffic.com	
		MDOT Statewide 511 System	
		Media	
		MHP Dispatch Centers	
		MHP District 1 Office	
		Multimodal Transit Center	
		Rail Companies	

6. SUBSYSTEMS, EQUIPMENT PACKAGES AND FUNCTIONAL REQUIREMENTS

As one of the required components of an ITS Architecture identified in Final Rule 940 and the FTA Policy on ITS Architecture and Standards, this section of the report summarizes the system functional requirements for the Central Region ITS Architecture in terms of market packages, subsystems, and equipment packages.

6.1 Mapping of Market Packages to Subsystems and Equipment Packages

The implemented market package is complete with a combination of interrelated equipment; this equipment often resides in several different subsystems within the architecture framework and operated by different stakeholders. For instance, the Maintenance and Construction Equipment and Vehicle Tracking market package includes equipment in the Vehicle Subsystem and a utilization and management element in the Maintenance and Construction Management Subsystem. In this example, the market package elements are owned and operated by the same traffic management stakeholder.

In other cases, the market package elements are owned and operated by different stakeholders. Many of the Advanced Traveler Information Systems (ATIS) market packages require equipment in the Information Service Provider Subsystem that is owned and operated by a public or private information provider and equipment that is acquired and operated by the consumer as part of the Vehicle Subsystem or Personal Information Access Subsystem. Since equipment in different subsystems may be purchased and operated by different end-users, these subsystem-specific components may encounter varied deployment.

To understand and analyze these potential deployment variations, the defined market packages must be reduced to their constituent elements. The portion of the market package capabilities allocated to each subsystem are segregated and defined as equipment packages to support this additional resolution. An equipment package represents a set of equipment/capabilities likely to be purchased by an end-user as a component to an overall system. It should be noted that there are no equipment packages defined for the terminators of the National ITS Architecture, as they

represent systems on the boundary of the architecture and do not have functional descriptions within the architecture.

Table 6-1 illustrates the subsystems and equipment packages that are mapped to the customized list of market packages. The table illustrates the specific market packages in the Central Region ITS Architecture, to include subsystems and equipment packages. As indicated in the table, the architecture provides a means to map the market package to appropriate subsystems (components) and equipment packages (technology). The equipment packages identified in Table 6-1 were used to develop the specific functional requirements of each element. The definitions of the equipment packages can be found on the National ITS Architecture website at <http://itsarch.iteris.com/itsarch/>.

Table 6-1. Market Packages, Subsystems and Equipment Packages

Market Package	Market Package Name	Subsystem	Equipment Package
AD1	ITS Data Mart	Archived Data Management	Traffic and Roadside Data Archival
			ITS Data Repository
			Government Reporting System Support
			Online Analysis and Mining
		Commercial Vehicle Administration	CV Data Collection
		Emergency Management	Emergency Data Collection
		Maintenance and Construction Management	MCM Data Collection
		Roadway Subsystem	Roadway Data Collection
		Traffic Management	Traffic Data Collection
Transit Subsystem	Transit Data Collection		
AD2	ITS Data Warehouse	Archived Data Management	ITS Data Repository
			Traffic and Roadside Data Archival
			Government Reporting System Support
			On-line Analysis and Mining
		Commercial Vehicle Administration	CV Data Collection
		Emergency Management	Emergency Data Collection
		Maintenance and Construction Management	MCM Data Collection
		Roadway Subsystem	Roadway Data Collection
		Traffic Subsystem	Traffic Data Collection
Transit Subsystem	Transit Data Collection		
APTS1	Transit Vehicle Tracking	Transit Management	Transit Center Vehicle Tracking
		Transit Vehicle Subsystem	On-board Transit Trip Monitoring
		Vehicle Subsystem	Vehicle Location Determination
APTS2	Transit Fixed-Route Operations	Transit Management	Transit Center Fixed-Route Operations
		Transit Vehicle Subsystem	Transit Vehicle Operator Scheduling
APTS3	Demand Response Transit Operations	Transit Management	On-board Fixed Route Schedule Management
		Transit Vehicle Subsystem	Transit Center Paratransit Operations
APTS4	Transit Passenger and Fare Management	Transit Management	Transit Vehicle Operator Scheduling
		Transit Vehicle Subsystem	On-board Paratransit Operations
		Remote Traveler Support	On-board Transit Fare and Load Management
APTS5	Transit Security	Transit Management	Remote Transit Fare Management
		Transit Vehicle Subsystem	Transit Center Security
			On-board Transit Security

Market Package	Market Package Name	Subsystem	Equipment Package
APTS5 (cont'd)	Transit Security (cont'd)	Emergency Management	Center Secure Area Surveillance
			Emergency Response Management
		Security Monitoring	Field Secure Area Surveillance
APTS6	Transit Maintenance	Transit Management	Transit Garage Maintenance
		Transit Vehicle Subsystem	On-board Maintenance
ATPS7	Multi-modal Coordination	Transit Management	Transit Center Multi-Modal Coordination
		Transit Vehicle Subsystem	On-board Transit Signal Priority
		Traffic Management	TMC Multimodal Coordination
			TMC Signal Control
		Roadway Subsystem	Roadway Signal Priority
APTS8	Transit Traveler Information	Transit Management	Transit Center Information Services
		Personal Information Access	Personal Interactive Information Reception
		Remote Traveler Support	Remote Transit Information Services
		Transit Vehicle Subsystem	On-board Transit Information Services
		Information Service Provider	Infrastructure Provided Trip Planning
			ISP Traveler Data Collection
ATIS1	Broadcast Traveler Information	Information Service Provider	Basic Information Broadcast
			ISP Traveler Data Collection
		Personal Information Access	Personal Basic Information Reception
		Remote Traveler Support	Remote Basic Information Reception
ATIS2	Interactive Traveler Information	Information Service Provider	Traveler Telephone Information
			ISP Traveler Data Collection
		Personal Information Access	Personal Interactive Information Reception
		Remote Traveler Support	Remote Interactive Information Reception
ATMS01	Network Surveillance	Traffic Management	Collect Traffic Surveillance
			Traffic Maintenance
		Roadway Subsystem	Roadway Basic Surveillance
			Roadway Equipment Coordination
ATMS03	Surface Street Control	Traffic Management	Collect Traffic Surveillance
			TMC Signal Control
			Traffic Maintenance
		Roadway Subsystem	Roadway Signal Controls
			Roadway Basic Surveillance
			Roadway Equipment Coordination
AMTS04	Freeway Control	Traffic Management	Collect Traffic Surveillance
			TMC Freeway Management
			TMC Traffic Information Dissemination
			Traffic Maintenance

Market Package	Market Package Name	Subsystem	Equipment Package
AMTS04 (cont'd)	Freeway Control (cont'd)	Roadway Subsystem	Roadway Basic Surveillance
			Roadway Equipment Coordination
			Roadway Traffic Information Dissemination
ATMS06	Traffic Information Dissemination	Traffic Management	TMC Traffic Information Dissemination
		Roadway Subsystem	Roadway Traffic Information Dissemination
			Roadway Equipment Coordination
ATMS07	Regional Traffic Control	Traffic Management	TMC Regional Traffic Control
			TMC Signal Control
ATMS08	Traffic Incident Management System	Traffic Management	TMC Incident Detection
			TMC Incident Dispatch Coordination/Communication
		Roadway Subsystem	Roadway Incident Detection
			Roadway Equipment Coordination
		Emergency Management	Emergency Response Management
		Maintenance and Construction Management	Incident Command
Emergency Vehicle Subsystem	MCM Incident Management		
ATMS09	Traffic Forecast and Demand Management	Traffic Management	On-board EV Incident Management Communication
		Transit Management	TMC Traffic Network Performance Evaluation
ATMS10	Electronic Toll Collection	Traffic Management	Transit Center Multimodal Coordination
		Toll Administration	Toll Administration
ATMS13	Standard Railroad Grade Crossing	Toll Collection	Toll Plaza Toll Collection
		Traffic Management	HRI Traffic Management
ATMS14	Advanced Railroad Grade Crossing	Roadway Subsystem	Standard Rail Crossing
		Traffic Management	HRI Traffic Management
ATMS16	Parking Facility Management	Roadway	Advanced Rail Crossing
		Parking Management	Parking Management
ATMS19	Speed Monitoring	Roadway	Parking Management
			Roadway Speed Monitoring
ATMS21	Roadway Closure Management	Roadway Equipment Coordination	
		Emergency Management	Emergency Response Management
		Traffic Management	TMC Traffic Information Dissemination
		Traffic Management	Collect Traffic Surveillance
		Traffic Management	Barrier System Management
		Roadway	Roadway Traffic Information Dissemination
Roadway	Roadway Basic Surveillance		
Roadway	Roadway Work Zone Traffic Control		

Market Package	Market Package Name	Subsystem	Equipment Package
ATMS21 (cont'd)	Roadway Closure Management (cont'd)	Roadway (cont'd)	Roadway Equipment Coordination
		Maintenance and Construction Management	MCM Work Zone Management
CVO03	Electronic Clearance	Commercial Vehicle Administration	CV Information Exchange
			CV Safety Administration
		Commercial Vehicle Check	Citation and Accident Electronic Recording
			Roadside Electronic Screening
		Commercial Vehicle	On-board CV Electronic Data
CVO04	CV Administrative Processes	Commercial Vehicle Administration	Credentials and Taxes Administration
			CV Information Exchange
		Fleet and Freight Management	Fleet Administration
			Fleet Credentials and Taxes Management and Reporting
CVO06	Weigh-In-Motion	Commercial Vehicle Check	Roadside WIM
		Commercial Vehicle Subsystem	On-board CV Electronic Data
CVO07	Roadside CVO Safety	Commercial Vehicle Administration	CV Information Exchange
			CV Safety Administration
		Commercial Vehicle Check	Roadside Electronic Screening
			Roadside Safety and Security Inspection
			Citation and Accident Electronic Recording
		Commercial Vehicle	On-board CV Electronic Data
CVO10	HAZMAT Management	Emergency Management	Emergency Commercial Vehicle Response
		Vehicle	Vehicle Location Determination
EM01	Emergency Call-Taking and Dispatch	Emergency Management	Emergency Call-Taking
			Emergency Dispatch
		Emergency Vehicle Subsystem	On-board EV En Route Support
EM02	Emergency Routing	Emergency Management	Emergency Routing
		Emergency Vehicle Subsystem	On-board EV En Route Support
		Traffic Management	TMC Incident Dispatch Coordination/Communication
			TMC Signal Control
		Roadway Subsystem	Roadway Signal Priority
	Vehicle Subsystem	Vehicle Location Determination	
EM04	Roadway Service Patrols	Emergency Management	Service Patrol Management

Market Package	Market Package Name	Subsystem	Equipment Package
EM04 (cont'd)	Roadway Service Patrols (cont'd)	Emergency Vehicle Subsystem	On-board EV En-route Support
			On-board EV Incident Management Communication
EM06	Wide-Area Alert	Emergency Management	Emergency Early Warning System
		Information Service Provider	ISP Emergency Traveler Information
			ISP Traveler Data Collection
			Traveler Telephone Information
		Maintenance and Construction Management	MCM Incident Management
		Personal Information Access	Personal Basic Information Reception
		Traffic Management	TMC Traffic Information Dissemination
			TMC Incident Dispatch Coordination/Communication
		Transit Management	Transit Center Information Services
			Transit Center Security
Remote Traveler Support	Remote Basic Information Reception		
	Remote Transit Information Services		
Roadway Subsystem	Roadway Traffic Information Dissemination		
EM07	Early Warning System	Emergency Management	Emergency Early Warning System
			Center Secure Area Surveillance
			Emergency Environmental Monitoring
		Security Monitoring	Field Secure Area Surveillance
		Traffic Management	TMC Incident Detection
		Transit Management	Transit Center Security
		Maintenance and Construction Management	MCM Incident Management
EM08	Disaster Response and Recovery	Emergency Management	Emergency Response Management
			Incident Command
		Maintenance and Construction Management	MCM Incident Management
			MCM Roadway Maintenance and Construction
Transit Management	Transit Center Security		
Traffic Management	TMC Incident Dispatch Coordination/Communication		
EM09	Evacuation and Reentry Management	Emergency Management	Emergency Evacuation Support
		Traffic Management	TMC Evacuation Support
		Transit Management	Transit Evacuation Support
		Maintenance and Construction Management	MCM Incident Management
EM10	Disaster Traveler Information	Information Service Provider	ISP Emergency Traveler Information
			ISP Traveler Data Collection
			Traveler Telephone Information

Market Package	Market Package Name	Subsystem	Equipment Package
EM10 (cont'd)	Disaster Traveler Information (cont'd)	Emergency Management	Emergency Evacuation Support
			Emergency Response Management
		Personal Information Access	Personal Basic Information Reception
			Personal Interactive Information Reception
		Remote Traveler Support	Remote Basic Information Reception
			Remote Interactive Information Reception
MC02	Maintenance and Construction Vehicle Maintenance	Maintenance and Construction Management	MCM Vehicle and Equipment Maintenance Management
			MCM Vehicle Tracking
			MCM Environmental Information Collection
			MCM Environmental Information Processing
			MCM Incident Management
			MCM Maintenance Decision Support
			MCM Winter Maintenance Management
			MCM Roadway Maintenance and Construction
			MCM Work Zone Management
			MCM Work Activity Coordination
		MCM Data Collection	
		Maintenance and Construction Vehicle	MCV Vehicle System Monitoring and Diagnostics
			MCV Vehicle Location Tracking
			MCV Winter Maintenance
		Vehicle	MCV Roadway Maintenance and Construction
Vehicle Location Determination			
MC06	Weather Information Processing and Distribution	Maintenance and Construction Management	MCM Environmental Information Processing
		Emergency Management	Emergency Environmental Monitoring
		Information Service Provider	ISP Traveler Data Collection
MC07	Roadway Maintenance and Construction	Maintenance and Construction Management	MCM Roadway Maintenance and Construction
			MCM Maintenance Decision Support
		Traffic Management	Traffic Maintenance
MC08	Work Zone Management	Maintenance and Construction Management	MCM Work Zone Management
		Roadway Subsystem	Roadway Work Zone Traffic Control

Market Package	Market Package Name	Subsystem	Equipment Package
MC10	Maintenance and Construction Activity Coordination	Maintenance and Construction Management	MCM Work Activity Coordination
		Emergency Management	Emergency Response Management

6.2 Functional Requirements

A functional requirement is a task or activity currently performed or planned to be performed by each system in the region to provide the required regional ITS services. In the National ITS Architecture, each functional area (i.e. equipment package) has several specific functional requirements that are necessary for performing the equipment package capabilities. These functional requirements of the National ITS Architecture are commonly used as a baseline to develop the functional requirements of a regional ITS Architecture.

The process to develop the functional requirements of the Central Region ITS Architecture began with the mapping of functional areas to market packages and associated elements as an initial definition of the functions being performed by each element. The functional requirements of each equipment package are then tailored to provide a more accurate picture of the functions performed. Using Turbo Architecture, functional requirements that support ITS projects for the region were identified. These functional requirements are listed in Appendix B. The appendix includes the following information for each ITS element:

- **Element.** Name of the system that will be performing the function
- **Entity.** Describes the National ITS Architecture subsystem to which the element is mapped
- **Functional Area.** Description of the function performed by the element
- **Requirement.** High-level functional requirement to be performed by the element supporting the functional area

To illustrate functions and functional requirements, the traffic signal control and management function of MDOT District 5 Traffic Signal Systems is used as an example. In the Central Region ITS Architecture, MDOT District 5 Traffic Signal Systems was mapped to the Roadway Subsystem as it provides signal control and management functions. The market package

associated with these functions is ATMS03 Surface Street Control. Four functional areas (equipment packages) are required for the MDOT District 5 Traffic Signal Systems to perform the signal control and management functions. They are:

- **Roadway Signal Control:** This equipment package includes field elements such as traffic signal controllers for use at signalized intersections; also supports pedestrian crossings. It contains seven specific functional requirements in the National ITS Architecture.
- **Roadway Signal Priority:** This equipment package includes field elements that provide the capability to receive vehicle signal priority requests and control traffic signals accordingly. It contains three specific functional requirements.
- **Standard Rail Crossing:** This equipment package includes field elements at highway-rail intersections (HRIs) where operational requirements do not dictate advanced features (e.g., where rail operational speeds are less than 80 miles per hour). Additionally, traditional HRI warning systems augmented with other standard traffic management devices are included. It contains nine specific functional requirements.
- **Roadway Equipment Coordination:** This equipment package includes field elements that control and send data to other field elements (such as environmental sensors that send data to a DMS or coordination between traffic controllers on adjacent intersections), without center control. It contains four specific functional requirements.

Not all of the functional requirements described above are applicable to the Central Region ITS Architecture. The appropriate tailored functional requirements for each equipment package in the Central Mississippi region are identified in Table 6-2.

Table 6-2. Functional Requirements Example: MDOT District 5 Traffic Signal Systems

Functional Area (Equipment Package)	Functional Requirements	Status
Roadway Signal Control	The field element shall control traffic signals at intersections and on main highways for urban and rural areas, under center control.	Existing
	The field element shall collect pedestrian images and pedestrian sensor data, and respond to pedestrian crossing requests via display, audio signal, or other manner.	Existing
	The field element shall provide the capability to notify the traffic management center that a pedestrian has requested right-of-way and when the request was or will be granted (request for right-of-way).	Existing
	The field element shall monitor operation of traffic signal controllers and report to the center any instances in which the indicator response does not match that expected from the indicator control information.	Existing
	The field element shall monitor operation of traffic signal controllers and report to the center any instances in which the indicator response does not match that expected from known indicator preemptions.	Existing
	The field element shall return traffic signal controller operational status to the controlling center.	Existing
	The field element shall return traffic signal controller fault data to the maintenance center for repair.	Existing
Roadway Signal Priority	The field element shall respond to requests for indicator (e.g., signal) preemption requests from emergency vehicles at intersections, pedestrian crossings, and multimodal crossings.	Planned
	The field element shall respond to requests for indicator (e.g., signal) priority requests from transit vehicles at intersections, pedestrian crossings, and multimodal crossings.	Planned
	The field element shall notify controlling traffic management center and maintenance center that the signal timing has changed based on a signal preemption/priority request to help those centers determine whether a fault detected at the signal is a true malfunction or due to a signal override.	Planned
Standard Rail Crossing	The field element shall collect and process, traffic sensor data in the vicinity of a highway-rail intersection (HRI).	Existing
	The field element shall monitor the status of the highway-rail intersection (HRI) equipment, including both the current state and mode of operation and the current equipment condition, to be forwarded on to the traffic management center.	Existing
	The field element shall monitor the status of the highway-rail intersection (HRI) equipment, including both the current state and mode of operation and the current equipment condition, to be forwarded on to the rail wayside equipment.	Existing

Functional Area (Equipment Package)	Functional Requirements	Status
Standard Rail Crossing (cont'd)	The field element shall receive track status from the rail wayside equipment that can be passed on to the traffic management center. This may include the current status of the tracks and whether a train is approaching.	Existing
	The field element shall support the integrated control of adjacent traffic signals to clear an area in advance of an approaching train and to manage traffic around the intersection.	Existing
Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.	Existing
	The field element shall include sensors (such as traffic, environmental and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.	Existing
	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.	Existing
	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.	Existing

7. INTERCONNECTS AND ARCHITECTURE FLOWS

While it is important to identify the various ITS systems and associated stakeholders, a primary purpose of the Central Region ITS Architecture is to identify the *connectivity* between systems, which includes:

- **Interconnects** define an ITS Architecture from a physical perspective, which shows the connections that can be established between equipment and systems which may be deployed by different organizational or operating agencies throughout the region.
- **Architecture Flows** define an ITS Architecture from a logical perspective, which identify high-level information exchange associated with each interconnect between equipment and systems.

7.1 System Interconnects

Based on subsystems and market packages selected for each ITS inventory element, a set of interconnects between the elements has been identified. As shown in Figure 7-1, a high-level interconnect diagram for the Central Region ITS Architecture, often referred to as a “sausage diagram,” illustrates the subsystems and primary types of interconnects (or communications) between these subsystems. The sausage diagram was customized to reflect the ITS systems in the region. The shaded areas in Figure 7-1 indicate not current nor planned functions and services in the region. The sausage diagram identifies four basic types of communications used to interconnect the elements. The definitions of the four types of communications are:

- **Fixed-point to fixed-point Communications:** a communication link serving stationary entities. It may be implemented using a variety of public or private communication networks and technologies. It can include, but is not limited to, twisted pair, coaxial cable, fiber optic, microwave relay networks, spread spectrum, etc. In fixed-point to fixed-point communication, the important issue is that it serves stationary entities. Both dedicated and shared communication resources may be used.
- **Wide-Area Wireless Communications:** a communications link that provides wireless communications between a user and an infrastructure-based system. Both broadcast (one-way) and interactive (two-way) communications services are grouped into wide-area wireless communications in the National ITS Architecture. These links support a range of services in the National ITS Architecture including real-time traveler

information and various forms of fleet communications.

- **Dedicated Short-Range Communications:** a wireless communications channel used for communications between close-proximity vehicles and the immediate infrastructure. It supports location-specific communications for ITS capabilities such as toll collection, transit vehicle management, driver information, and automated commercial vehicle operations.
- **Vehicle-to-Vehicle Communications:** dedicated wireless line-of-sight system handling high data rate, and low probability of error communications between vehicles. Advanced vehicle services may use this link in the future to support advanced collision avoidance implementations, road condition information sharing, and active coordination to advanced control systems.

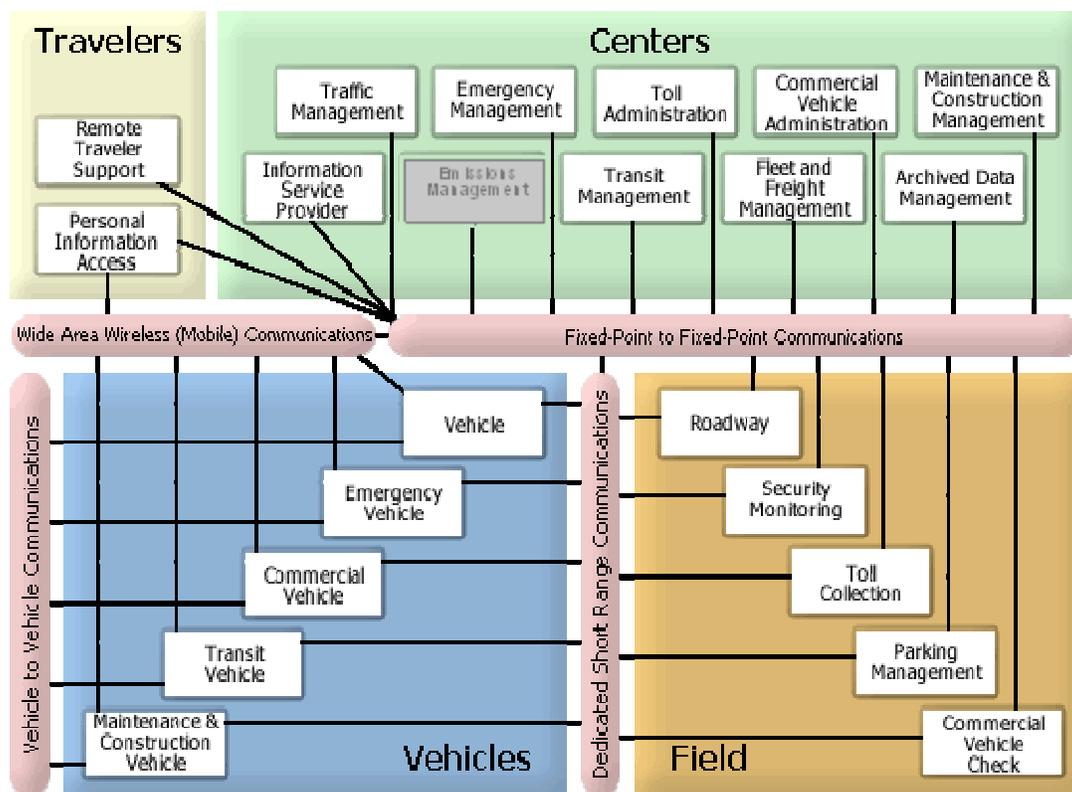


Figure 7-1. High Level Interconnect Diagram

On a more specific level, interconnect diagrams can depict the interactions between agencies and their systems for each Market Package within the architecture. Figures 7-2 to 7-4 illustrates interconnects focused on the following key regional ITS elements:

- MDOT District 5;
- Local City/County TMCs; and
- JATLAN

A complete set of the interconnect diagrams for the Central Region ITS Architecture is included in Appendix C and can also be found in the Turbo Architecture database.

7.2 Architecture Flows

Architecture flows provide a high level description of information exchange associated with each interconnect between equipment and systems. The architecture flows identified in the Central Region ITS Architecture were derived from the architecture flow diagrams within the National ITS Architecture, and therefore, they are consistent with the National ITS Architecture. Through the architecture flows, stakeholders can easily identify the existing or future information exchange between agencies and systems. This provides a framework analyses for elements that are related and areas for potential coordination and cooperation among agencies. Detailed definitions of architecture flows can be found on the National ITS Architecture website at <http://www.iteris.com/itsarch/>. A sample architecture flow diagram for a portion of MDOT's MSTRaffic.com interconnected elements is presented in Figure 7-5. A complete list of architecture flows for the Central Region ITS Architecture is provided in Appendix D and can be found in the Turbo Architecture database.

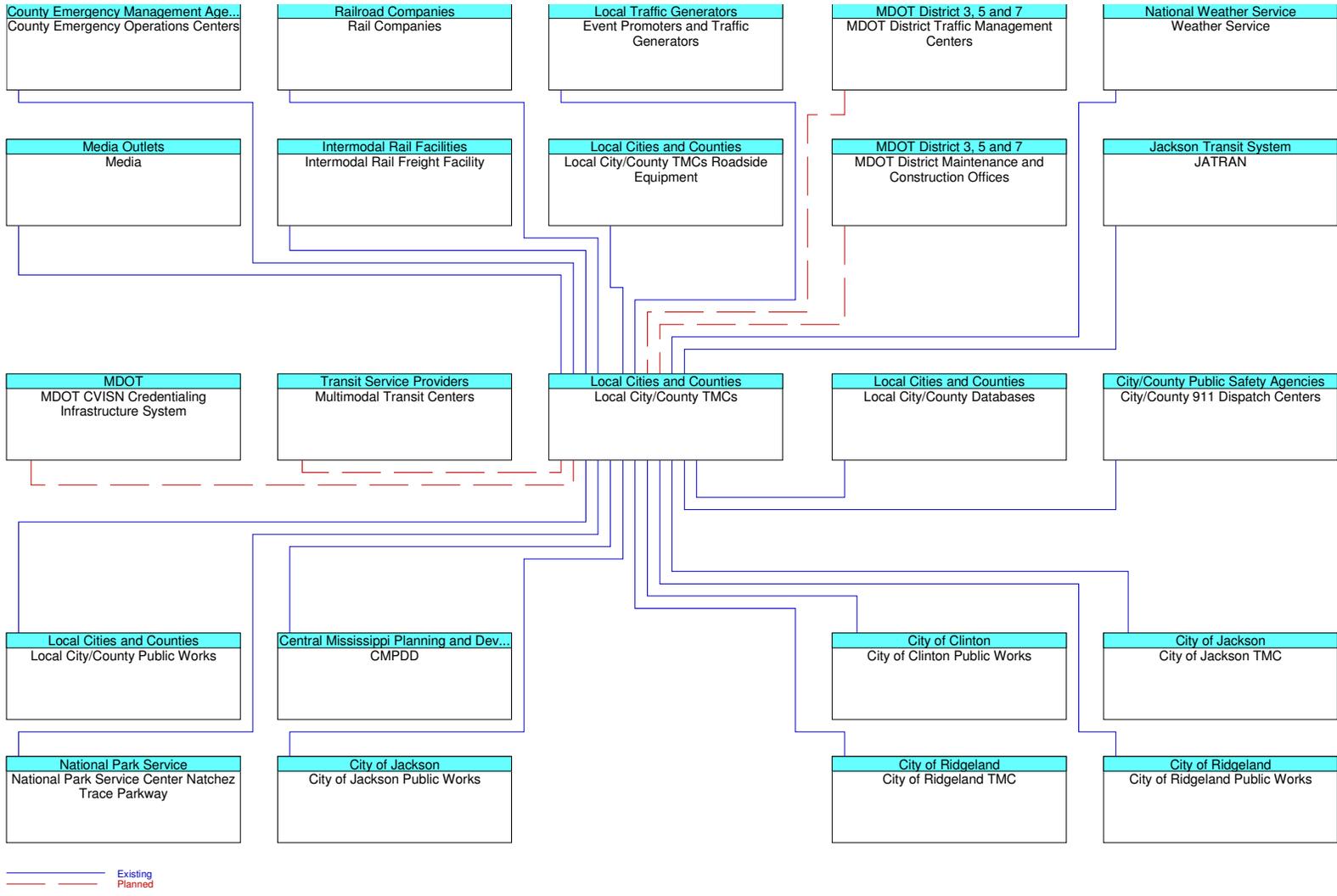


Figure 7-3. Local City/County TMCs Interconnect Diagram

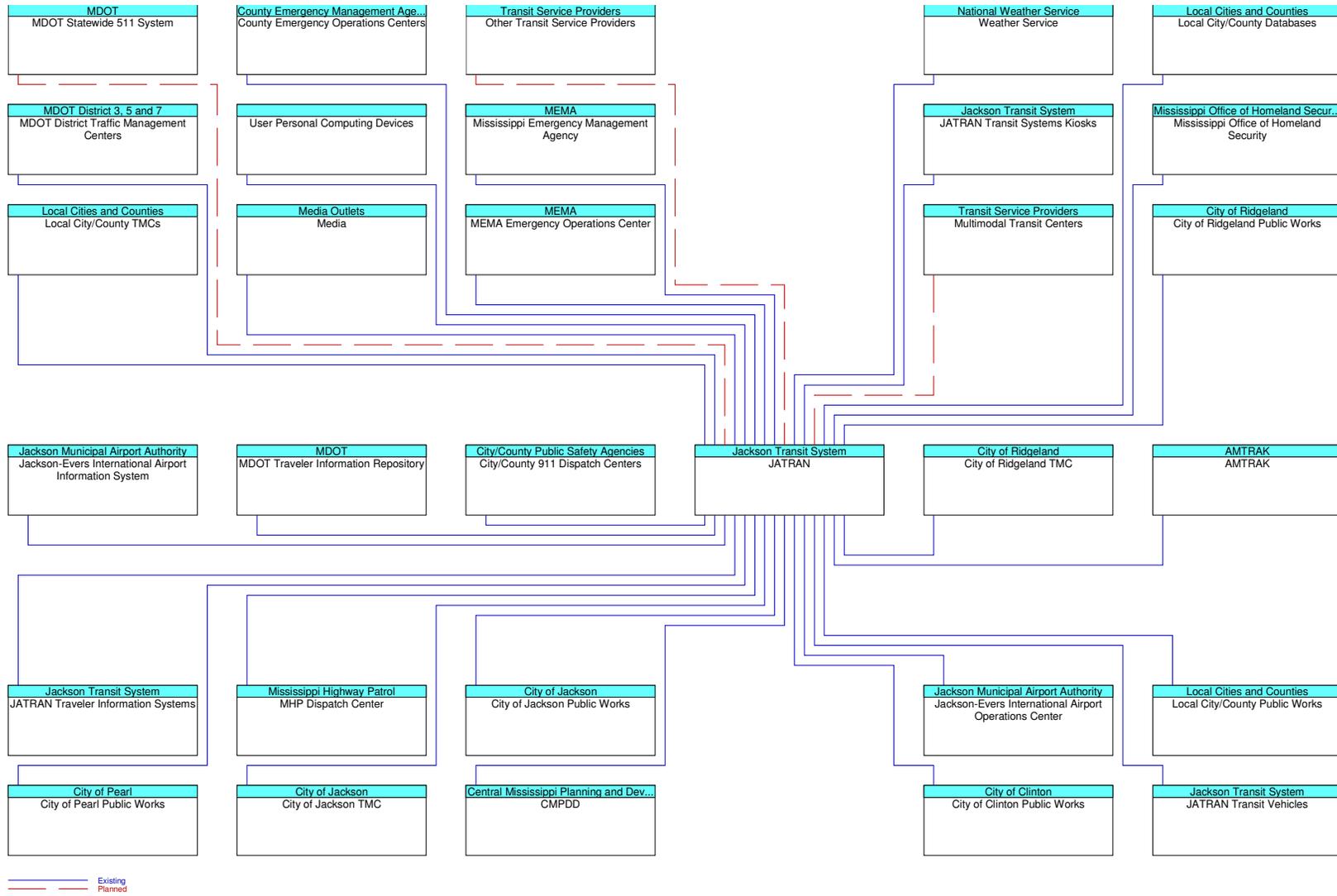


Figure 7-4. JATran Interconnect Diagram

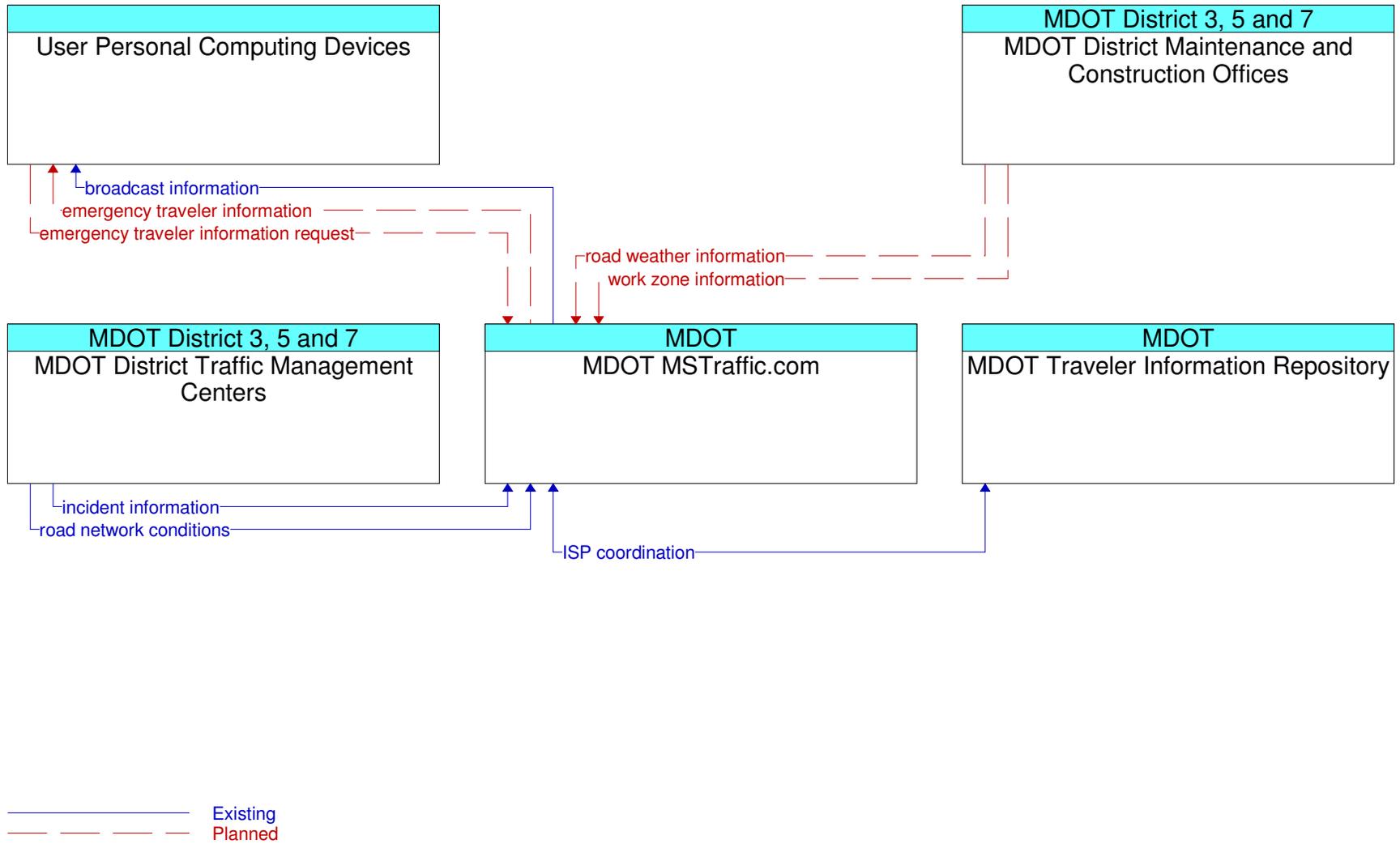


Figure 7-5. Sample: MDOT MStTraffic.com Architecture Flow Diagram

8. ITS STANDARDS

ITS Standards are fundamental to the establishment of an open environment that achieves the goals originally envisioned by the USDOT. Standards facilitate deployment of interoperable systems at local, regional, and national levels without impeding innovation as technology advances and new approaches evolve.

Standards can be thought of as the glue that holds the various components of architecture together. The logical architecture presents a functional view of the ITS user services. It defines the functions or processes that are required to perform the selected ITS user services, and the information or data flows that need to be exchanged between these functions. The physical architecture partitions the functions defined by the logical architecture into systems and subsystems. To accomplish the functions outlined in the logical architecture, communication must take place between the elements of the physical architecture. Standards define how these communications take place.

8.1 Standards Benefits

Many of the benefits the public receives from the National ITS Architecture are a direct result of the development and implementation of standards. Primarily, standards provide benefits in the following areas:

- **National Compatibility** – National compatibility is represented by the ability to use the same equipment and services, regardless of the geographical location. The architecture identifies specific interfaces requiring nationwide compatibility. Examples include the delivery of real-time traveler information to in-vehicle devices and the dedicated short-range communication interface between the vehicle and the roadside. Nationwide standards for these types of interfaces will allow travelers and commercial vehicles to use their compliant equipment anywhere within the United States.
- **Multiple Suppliers** – The architecture can encourage competition in the delivery of ITS services through the implementation of standards in areas where a standard is not necessarily required to provide a traveler with seamless operation of his ITS service.

These interfaces will benefit from standards in allowing multiple suppliers of equipment and software that will directly connect to other ITS systems.

- **Ranges of Functionality** – The standard packages contain data flows that support several levels of service. For example, the *trip plan* data flow contains a large number of optional data fields. The standards developer is encouraged to maintain the flexibility in the data flow specifications to allow for multiple implementations.
- **Synergy** – As discussed above, the architecture began with a logical architecture that satisfied the identified user services. As a result, there are functions and data flows common to several of the services. These “processes” appear in several higher-level data flows, and because they come from a single source, they support synergy and consistency.
- **Risk Reduction** – The architecture reduces risk to public providers, private providers and consumers. For public providers, the existence of standards means that equipment purchased in one year will be likely to operate with new equipment purchased several years from now. This also means that agencies will not be locked into specific vendors since all vendors will be able to build to the same standard. For private providers, the existence of standards means that they can gather information from multiple sources using well-defined message sets and thereby increase the level of service to their customers. For consumers, products built to a particular standard will allow a user to select their service provider from a number of companies, not just the company that manufactured their equipment.

Defined standards are fundamental to the establishment of nationally compatible and interoperable ITS deployments. Standards will enable deployment of consistent, non-interfering, reliable systems on local, regional and national levels. Open standards will further benefit the consumer by enhancing competition for the range of products necessary to implement the ITS user services. Larger markets for specific products will reduce production costs through economy of scale. Producers benefit from standards because they assure a wider market over which the product can be sold. As deployment occurs, diverse systems will be developed to address the special needs of urban, suburban and rural environments. Standards must ensure

interoperability across these implementations without impeding innovation as technology advances and new approaches evolve.

Well-chosen, well-timed, and broadly-accepted standards can provide the following frequently referenced benefits:

- **Interoperability between diverse systems** – This benefit facilitates cost-effective area-wide implementations that ultimately provide enhanced service to the consumer.
- **Preservation of investment** – Timely standards can reduce investments in multiple incompatible approaches, some of which will become casualties of natural selection in the market place.
- **Technology insertion** – Systems can be incrementally improved to take advantage of new technologies.
- **Creation of broader markets** – Interoperability standards set the stage for national and/or international markets. The lack of a standard may ultimately limit the size of the market.
- **Interchangeability** – Interchangeable equipment reduces capital costs through increased competition and reduces maintenance costs through smaller spares inventories of less expensive replacement parts.

It should be noted that the adopted standards must be comprehensive in order to support interoperability.

8.2 Using Standards

More than 110 standards have been identified as part of the National ITS Architecture standard development activities. The task of working with the public and private sector ITS community to develop these standards has been assigned to seven different Standards Development Organizations (SDOs). These SDOs include:

- American Association of State Highway and Transportation Officials (AASHTO)
- American National Standards Institute (ANSI)
- American Society for Testing and Materials (ASTM)
- Institute of Electrical and Electronics Engineers (IEEE)

- International Organization for Standardization (ISO)
- Institute of Transportation Engineers (ITE)
- National Electrical Manufacturers Association (NEMA)
- Society of Automotive Engineers (SAE)

Information on the complete list of ITS Standards can be found on the ITS Standards webpage at <http://www.standards.its.dot.gov/>.

While the Central Region ITS Architecture is a comprehensive plan which includes various ITS applications, it does not cover every conceivable ITS technology. As such, not all ITS standards will be applicable to the existing and proposed projects. Table 8-1 summarizes the appropriate ITS standards for all existing and proposed projects in the Central Mississippi region.

8.3 Mapping of Standards to Application Areas

Table 8-2 provides a guide to ITS standards that could be considered for use in different types of ITS projects in the Central Mississippi region. Each row in the table represents an ITS standard and each column represents one of nineteen application areas. The standards included in the table are those that relate to the subsystems and information flows between them that are likely to be included in the ITS projects in the region. The application areas are deployment-oriented categories that focus on specific ITS services or systems. Each application area consists of one or more interfaces in the National ITS Architecture. They were chosen so that agencies and service providers can easily find the application area within which a particular ITS project fits. Most ITS projects will relate to only one application area, although larger projects may relate to more than one application area.

Note that not all interfaces in the Central Region ITS Architecture are represented by an application area. Currently not all interfaces are approved or published ITS standards. Additional application areas may be added in the future as additional ITS standards become available. The inclusion of a standard in an application area indicates that standard may apply — not that it must apply. Conversely, the exclusion of a standard from an application area does not mean that the standard may not be used in a project for that application area. For example,

traffic management standards do not include traveler information standards; however, traffic management centers may benefit from knowing what traveler information systems do with the information.

Table 8-1. Key Standards Supporting the Central Region ITS Projects

Standard Name	SDO	Document ID	Status*
Simple Transportation Management Framework (STMF)	AASHTO/ITE/NEMA	NTCIP 1101	P
Octet Encoding Rules (OER) Base Protocol	AASHTO/ITE/NEMA	NTCIP 1102	P
Transportation Management Protocols (TMP)	AASHTO/ITE/NEMA	NTCIP 1103	A
Center-to-Center Naming Convention Specification	AASHTO/ITE/NEMA	NTCIP 1104	A
CORBA Security Service Specification	AASHTO/ITE/NEMA	NTCIP 1105	S
CORBA Near-Real Time Data Service Specification	AASHTO/ITE/NEMA	NTCIP 1106	S
Global Object Definitions	AASHTO/ITE/NEMA	NTCIP 1201	P
Object Definitions for Actuated Traffic Signal Controller Units	AASHTO/ITE/NEMA	NTCIP 1202	P
Object Definitions for Dynamic Message Signs (DMS)	AASHTO/ITE/NEMA	NTCIP 1203	P
Environmental Sensor Station (ESS) Interface Standard	AASHTO/ITE/NEMA	NTCIP 1204	P
Object Definitions for Closed Circuit Television (CCTV) Camera Control	AASHTO/ITE/NEMA	NTCIP 1205	P
Object Definitions for Data Collection and Monitoring (DCM) Devices	AASHTO/ITE/NEMA	NTCIP 1206	P
Object Definitions for Closed Circuit Television (CCTV) Switching	AASHTO/ITE/NEMA	NTCIP 1208	P
Data Element Definitions for Transportation Sensor Systems (TSS)	AASHTO/ITE/NEMA	NTCIP 1209	P
Field Management Stations - Part 1: Object Definitions for Signal System Masters	AASHTO/ITE/NEMA	NTCIP 1210	U
Object Definitions for Signal Control and Prioritization	AASHTO/ITE/NEMA	NTCIP 1211	A
TCIP Common Public Transportation (CPT) Objects	AASHTO/ITE/NEMA	NTCIP 1401	P
TCIP Incident Management (IM) Objects	AASHTO/ITE/NEMA	NTCIP 1402	P
TCIP Passenger Information (PI) Objects	AASHTO/ITE/NEMA	NTCIP 1403	P
TCIP Scheduling/Runcutting (SCH) Objects	AASHTO/ITE/NEMA	NTCIP 1404	P
TCIP Spatial Representation (SP) Objects	AASHTO/ITE/NEMA	NTCIP 1405	P
TCIP On-Board (OB) Objects	AASHTO/ITE/NEMA	NTCIP 1406	P
TCIP Control Center (CC) Objects	AASHTO/ITE/NEMA	NTCIP 1407	P
TCIP Fare Collection (FC) Business Area Objects	AASHTO/ITE/NEMA	NTCIP 1408	P
Point to Multi-Point Protocol Using RS-232 Subnetwork Profile	AASHTO/ITE/NEMA	NTCIP 2101	P
Point to Multi-Point Protocol Using FSK Modem Subnetwork Profile	AASHTO/ITE/NEMA	NTCIP 2102	P
Point-to-Point Protocol Over RS-232 Subnetwork Profile	AASHTO/ITE/NEMA	NTCIP 2103	P
Ethernet Subnetwork Profile	AASHTO/ITE/NEMA	NTCIP 2104	P
Transportation Transport Profile	AASHTO/ITE/NEMA	NTCIP 2201	P
Internet (TCP/IP and UDP/IP) Transport Profile	AASHTO/ITE/NEMA	NTCIP 2202	P
Simple Transportation Management Framework (STMF) Application Profile	AASHTO/ITE/NEMA	NTCIP 2301	P
Trivial File Transfer Protocol (TFTP) Application Profile	AASHTO/ITE/NEMA	NTCIP 2302	P
File Transfer Protocol (FTP) Application Profile	AASHTO/ITE/NEMA	NTCIP 2303	P
Application Profile for DATEX-ASN (AP-DATEX)	AASHTO/ITE/NEMA	NTCIP 2304	P
Application Profile for CORBA (AP-CORBA)	AASHTO/ITE/NEMA	NTCIP 2305	S

Standard Name	SDO	Document ID	Status*
Application Profile for XML Message Encoding and Transport in ITS C2C Communications	AASHTO/ITE/NEMA	NTCIP 2306	B
Information Profile for DATEX	AASHTO/ITE/NEMA	NTCIP 2501	S
Information Profile for CORBA	AASHTO/ITE/NEMA	NTCIP 2502	S
Commercial Vehicle Safety Reports	ANSI	ANSI TS284	P
Commercial Vehicle Safety and Credentials Information Exchange	ANSI	ANSI TS285	P
Commercial Vehicle Credentials	ANSI	ANSI TS286	P
Electronic Filing of Tax Return Data	ANSI	ANSI TS813	P
Transit Communications Interface Profile	APTA	TCIP-S-001	P
Standard Specification for Dedicated Short Range Communication (DSRC) Physical Layer using Microwave in the 902-928 MHz Band	ASTM	ASTM E2158-01	P
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	ASTM	ASTM E2213-03	P
Standard Practice for Metadata to Support Archived Data Management Systems	ASTM	ASTM WK7592	U
Standard Specification for Archiving ITS Generated Traffic Monitoring Data	ASTM	ASTM WK7604	U
Standard Provisional Specification for Dedicated Short Range Communication (DSRC) Data Link Layer	ASTM	ASTM PS 105-99	S
Logical Link (Layer 2) for DSRC 5.9 GHz	IEEE	IEEE 802.2	P
Standard for Message Sets for Vehicle/Roadside Communications	IEEE	IEEE 1455-1999	P
Standard for Common Incident Management Message Sets (IMMS) for use by EMCs	IEEE	IEEE 1512-2006	P
Standard for Traffic Incident Management Message Sets for Use by EMCs	IEEE	IEEE 1512.1-2006	P
Standard for Public Safety IMMS for use by EMCs	IEEE	IEEE 1512.2-2004	P
Standard for Hazardous Material IMMS for use by EMCs	IEEE	IEEE 1512.3-2006	P
Standard for Common Traffic Incident Management Message Sets for Use in Entities External to Centers	IEEE	IEEE 1512.4	U
Standard for Interface Between the Rail Subsystem and the Highway Subsystem at a Highway Rail Intersection	IEEE	IEEE 1570-2002	P
Resource Manager for DSRC 5.9 GHz	IEEE	IEEE 1609.1	U
Application Services (Layers 6,7) for DSRC 5.9 GHz	IEEE	IEEE 1609.2	U
Communications Services (Layers 4,5) for DSRC 5.9 GHz (Future Standard)	IEEE	IEEE 1609.3	U
Medium Access Control (MAC) Extension & the MAC Extension Management Entity for DSRC 5.9 GHz	IEEE	IEEE 1609.4	U
Networking Services (Layer 3) for DSRC 5.9 GHz	ISO	ISO 21210	U

***Status (as of December 2006):**

P – Published: Standards that are available for purchase.

A – Approved: Standards that have passed all necessary ballots and have been approved by a standards development organization, but not yet published.

B – In Ballot: Standards that are being voted upon by a committee or working group, or are undergoing other SDO procedures.

U – Under Development: Standards that are being written, but are not yet ready for a formal ballot.

S – Standard Development Work has been suspended; or standards have been withdrawn.

Standard Name	SDO	Document ID	Status*
Standard for Functional Level Traffic Management Data Dictionary (TMDD)	ITE	ITE TM 1.03	A
Message Sets for External TMC Communication (MS/ETMCC)	ITE	ITE TM 2.01	A
Location Referencing Message Specification (LRMS)	SAE	SAE J2266	P
Message Set for Advanced Traveler Information System (ATIS)	SAE	SAE J2354	P
Standard for ATIS Message Sets Delivered Over Reduced Bandwidth Media	SAE	SAE J2369	P
Messages for Handling Strings and Look-Up Tables in ATIS Standards	SAE	SAE J2540	P
RDS (Radio Data System) Phrase Lists	SAE	SAE J2540-1	P
ITIS (International Traveler Information Systems) Phrase Lists	SAE	SAE J2540-2	P
National Names Phrase List	SAE	SAE J2540-3	P

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P – Published: Standards that are available for purchase.

A – Approved: Standards that have passed all necessary ballots and have been approved by a standards development organization, but not yet published.

B – In Ballot: Standards that are being voted upon by a committee or working group, or are undergoing other SDO procedures.

U – Under Development: Standards that are being written, but are not yet ready for a formal ballot.

S – Standard Development Work has been suspended; or standards have been withdrawn.

Table 8-2. Key ITS Standards Application Area Matrix

SDO	Doc ID	Standard Name	Center to Center							Center to Roadside							Center to Vehicle/Traveler		Roadside to Roadside	Roadside to Vehicle
			Data Archival	Incident Management	Rail Coordination	Traffic Management	Transit Management	Traveler Information	Data Collection/Monitoring	Dynamic Message Signs	Environmental Monitoring	Ramp Metering	Traffic Signals	Vehicle Sensors	Video Surveillance	Mayday	Transit Vehicle Communications	Traveler Information	Highway Rail Intersection (HRI)	Signal Priority
AASHTO	1101	Simple Transportation Management Framework (STMF)																		
AASHTO	1102	Octet Encoding Rules (OER) Base Protocol	●	●	●	●	●	●	●	●	●	●	●	●						
AASHTO	1103	Transportation Management Protocols (TMP)						●	●	●	●	●	●							
AASHTO	1104	Center-to-Center Naming Convention Specification	●	●	●	●	●	●												
AASHTO	1105	CORBA Security Service Specification	●	●	●	●	●	●												
AASHTO	1106	CORBA Near-Real Time Data Service Specification	●	●	●	●	●	●												
AASHTO	1201	Global Object Definitions		●				●	●	●	●	●	●					●		
AASHTO	1202	Object Definitions for Actuated Traffic Signal Controller Units									●									
AASHTO	1203	Object Definitions for Dynamic Message Signs (DMS)							●											
AASHTO	1204	Environmental Sensor Station (ESS) Interface Standard						●		●										
AASHTO	1205	Object Definitions for Closed Circuit Television (CCTV) Camera Control						●				●	●							

SDO	Doc ID	Standard Name	Center to Center						Center to Roadside						Center to Vehicle/Traveler		Roadside to Roadside	Roadside to Vehicle		
			Data Archival	Incident Management	Rail Coordination	Traffic Management	Transit Management	Traveler Information	Data Collection/Monitoring	Dynamic Message Signs	Environmental Monitoring	Ramp Metering	Traffic Signals	Vehicle Sensors	Video Surveillance	Mayday	Transit Vehicle Communications	Traveler Information	Highway Rail Intersection (HRI)	Signal Priority
AASHTO	1206	Object Definitions for Data Collection and Monitoring (DCM) Devices																		
AASHTO	1208	Object Definitions for Closed Circuit Television (CCTV) Switching																		
AASHTO	1209	Data Element Definitions for Transportation Sensor Systems (TSS)																		
AASHTO	1210	Field Management Stations - Part 1: Object Definitions for Signal System Masters																		
AASHTO	1211	Object Definitions for Signal Control and Prioritization																		
AASHTO	1401	TCIP Common Public Transportation (CPT) Objects																		
AASHTO	1402	TCIP Incident Management (IM) Objects																		
AASHTO	1403	TCIP Passenger Information (PI) Objects																		
AASHTO	1404	TCIP Scheduling/Runcutting (SCH) Objects																		
AASHTO	1405	TCIP Spatial Representation (SP) Objects																		
AASHTO	1406	TCIP On-Board (OB) Objects																		
AASHTO	1407	TCIP Control Center (CC) Objects																		

SDO	Doc ID	Standard Name	Center to Center							Center to Roadside							Center to Vehicle/Traveler	Roadside to Roadside	Roadside to Vehicle
			Data Archival	Incident Management	Rail Coordination	Traffic Management	Transit Management	Traveler Information	Data Collection/Monitoring	Dynamic Message Signs	Environmental Monitoring	Ramp Metering	Traffic Signals	Vehicle Sensors	Video Surveillance	Mayday	Transit Vehicle Communications	Traveler Information	Highway Rail Intersection (HRI)
AASHTO	1408	TCIP Fare Collection (FC) Business Area Objects	●				●								●	●			
AASHTO	2101	Point to Multi-Point Protocol Using RS-232 Subnetwork Profile					●	●	●	●	●	●	●						
AASHTO	2102	Point to Multi-Point Protocol Using FSK Modem Subnetwork Profile					●	●	●	●	●	●	●						
AASHTO	2103	Point-to-Point Protocol Over RS-232 Subnetwork Profile					●	●	●	●	●	●	●						
AASHTO	2104	Ethernet Subnetwork Profile	●	●	●	●	●	●	●	●	●	●	●						
AASHTO	2201	Transportation Transport Profile					●	●	●	●	●	●	●						
AASHTO	2202	Internet (TCP/IP and UDP/IP) Transport Profile	●	●	●	●	●	●	●	●	●	●	●						
AASHTO	2301	Simple Transportation Management Framework (STMF) Application Profile					●	●	●	●	●	●	●						
AASHTO	2302	Trivial File Transfer Protocol (TFTP) Application Profile					●	●	●			●	●						
AASHTO	2303	File Transfer Protocol (FTP) Application Profile	●	●	●	●	●	●	●			●	●						
AASHTO	2304	Application Profile for DATEX-ASN (AP-DATEX)	●	●	●	●	●	●											
AASHTO	2305	Application Profile for CORBA (AP-CORBA)	●	●	●	●	●	●											
AASHTO	2306	Application Profile for XML Message Encoding and Transport in ITS C2C Communications	●	●	●	●	●												

SDO	Doc ID	Standard Name	Center to Center						Center to Roadside						Center to Vehicle/Traveler		Roadside to Roadside	Roadside to Vehicle		
			Data Archival	Incident Management	Rail Coordination	Traffic Management	Transit Management	Traveler Information	Data Collection/Monitoring	Dynamic Message Signs	Environmental Monitoring	Ramp Metering	Traffic Signals	Vehicle Sensors	Video Surveillance	Mayday	Transit Vehicle Communications	Traveler Information	Highway Rail Intersection (HRI)	Signal Priority
AASHTO	2501	Information Profile for DATEX	●	●	●	●	●	●												
AASHTO	2502	Information Profile for CORBA	●	●	●	●	●	●												
ANSI	TS285	Commercial Vehicle Safety and Credentials Information Exchange	●																	
ANSI	TS286	Commercial Vehicle Credentials	●																	
APTA	TCIP-S-001	Transit Communications Interface Profile		●			●							●	●	●				
ASTM	E2158-01	Standard Specification for Dedicated Short Range Communication (DSRC) Physical Layer using Microwave in the 902-928 MHz Band																	●	●
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																	●	●
ASTM	WK7592	Standard Practice for Metadata to Support Archived Data Management Systems	●																	

SDO	Doc ID	Standard Name	Center to Center						Center to Roadside						Center to Vehicle/Traveler	Roadside to Roadside	Roadside to Vehicle		
			Data Archival	Incident Management	Rail Coordination	Traffic Management	Transit Management	Traveler Information	Data Collection/Monitoring	Dynamic Message Signs	Environmental Monitoring	Ramp Metering	Traffic Signals	Vehicle Sensors	Video Surveillance	Mayday	Transit Vehicle Communications	Traveler Information	Highway Rail Intersection (HRI)
ASTM	WK7604	Standard Specification for Archiving ITS Generated Traffic Monitoring Data	●																
ASTM	PS 105-99	Standard Provisional Specification for Dedicated Short Range Communication (DSRC) Data Link Layer																●	
IEEE	802.2	Logical Link (Layer 2) for DSRC 5.9 GHz																●	●
IEEE	1455-1999	Standard for Message Sets for Vehicle/Roadside Communications																	●
IEEE	1512-2000	Standard for Common Incident Management Message Sets (IMMS) for use by EMCs	●	●															
IEEE	1512.1-2003	Standard for Traffic Incident Management Message Sets for Use by EMCs	●	●	●														
IEEE	1512.2-2004	Standard for Public Safety IMMS for use by EMCs	●	●															
IEEE	1512.3-2002	Standard for Hazardous Material IMMS for use by EMCs	●	●															
IEEE	1512.4	Standard for Common Traffic Incident Management Message Sets for Use in Entities External to Centers	●	●															

SDO	Doc ID	Standard Name	Center to Center						Center to Roadside						Center to Vehicle/Traveler	Roadside to Roadside	Roadside to Vehicle		
			Data Archival	Incident Management	Rail Coordination	Traffic Management	Transit Management	Traveler Information	Data Collection/Monitoring	Dynamic Message Signs	Environmental Monitoring	Ramp Metering	Traffic Signals	Vehicle Sensors	Video Surveillance	Mayday	Transit Vehicle Communications	Traveler Information	Highway Rail Intersection (HRI)
IEEE	1570-2002	Standard for Interface Between the Rail Subsystem and the Highway Subsystem at a Highway Rail Intersection															●		
IEEE	1609.1	Resource Manager for DSRC 5.9 GHz																●	●
IEEE	1609.2	Application Services (Layers 6,7) for DSRC 5.9 GHz																●	●
IEEE	1609.3	Communications Services (Layers 4,5) for DSRC 5.9 GHz																●	●
IEEE	1609.4	Medium Access Control (MAC) Extension & the MAC Extension Management Entity for DSRC 5.9 GHz																●	●
ISO	21210	Networking Services (Layer 3) for DSRC 5.9 GHz																●	●
ITE	TM 1.03	Standard for Functional Level Traffic Management Data Dictionary (TMDD)	●	●		●	●												
ITE	TM 2.01	Message Sets for External TMC Communication (MS/ETMCC)	●	●		●	●												
SAE	J2266	Location Referencing Message Specification (LRMS)	●	●	●	●	●	●	●	●	●	●	●	●	●	●			
SAE	J2354	Message Set for Advanced Traveler Information System (ATIS)	●			●	●	●						●	●	●			
SAE	J2369	Standard for ATIS Message Sets Delivered Over Reduced Bandwidth Media														●			

SDO	Doc ID	Standard Name	Center to Center						Center to Roadside						Center to Vehicle/Traveler		Roadside to Roadside	Roadside to Vehicle		
			Data Archival	Incident Management	Rail Coordination	Traffic Management	Transit Management	Traveler Information	Data Collection/Monitoring	Dynamic Message Signs	Environmental Monitoring	Ramp Metering	Traffic Signals	Vehicle Sensors	Video Surveillance	Mayday	Transit Vehicle Communications	Traveler Information	Highway Rail Intersection (HRI)	Signal Priority
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	●			●	●	●							●	●	●			

9. PROJECT SEQUENCING

A project sequence defines the order in which ITS projects may be implemented. A good sequence is based on a combination of two factors:

- **Prioritization of projects based on existing conditions and stakeholder needs.** The ITS projects were prioritized to reflect a deployment path (sequence) on stakeholder needs. Although the information, which was collected through stakeholder surveys and meetings, was the basis of the ITS Architecture, technology, funding opportunities and requirements continue to evolve. It is expected that MDOT will reevaluate and reprioritize projects frequently.
- **Project dependencies, based on how successive ITS projects can build upon one another.** Project dependencies influence the project sequencing. It is beneficial to identify the information and functional dependencies between projects.

In most cases, the sequence of planned projects has already been programmed and can simply be extracted from existing transportation plans. Successive projects will then be added to the sequence based on the project dependencies and other planning factors.

The process for determining the sequence of projects for the Central Region ITS Architecture includes three steps:

- Review of the Mississippi Statewide ITS Architecture;
- Review of relevant planning documents; and
- Stakeholder feedback.

The Central Region ITS Architecture represents a roadmap for systems deployment and integration in the Central Mississippi region over the next 20 years. ITS projects that are planned during this time are listed in Table 9-1. While there is no true sequencing of ITS projects for the Central Mississippi region, the list was further refined to establish which projects were allocated to the short-term (<5 years), medium-term (5 to 10 years), and long-term (>10 years). This list denotes a general order for project implementation, and it should be noted that although Table 9-1 does not include all planned ITS projects within the region, it mainly consists of projects that may impact ITS operations and management at local and regional levels.

Table 9-1. Planned ITS Projects for the Central Mississippi Region

Project	Description	Timeframe*	Dependency
City/County Trailblazer Signs for Evacuation	This project would provide for the deployment of emergency evacuation trailblazer signs throughout the Central region to facilitate the evacuation of residents and visitors along designated evacuation routes.	Short Term	Stand Alone
MDOT Central Region TMC	This project includes the development of a fully operational Traffic Management Center for the Central Region. Initially, the center will start out small with responsibility for controlling traffic signals. The center will then integrate other ITS elements such as DMS, HAR, and CCTV. This TMC is to be co-located with the MDOT Statewide TMC.	Live August 2008, for initial operations, additional integration Short to Medium term	Stand Alone
MDOT Emergency Vehicle Signal Preemption	This project will deploy signal preemption in corridors in urban areas with high density of emergency vehicle response vehicles (e.g. fire routes) and congested traffic conditions.	Short Term	Stand Alone
Mississippi Automated System Project	This project will enhance public safety among law enforcement, fire, and EMS agencies. It will provide secure access to critical data, jail management and records management or computer aided dispatch information. Two centralized (redundant) data centers will be created to support data exchange.	Short Term	Stand Alone
County and City Portable DMS	Used to direct traffic for special events, maintenance and construction, and incident management.	Short Term	Stand Alone
MDOT Highway Service Patrol	In the medium term, MDOT should deploy 1-2 vehicles operating on fixed routes in the Central Region and will communicate with the MDOT Statewide TMC via voice communications. In the long term, vehicles/routes can be added. Vehicles will be equipped with AVL capability.	Short Term	MDOT Statewide TMC
County and City Signal System Upgrades	This project would allow for the interconnection of signals through a corridor and facilitate more efficient movement of traffic, particularly during peak travel times.	Short/Medium Term	Stand Alone
Barnett Reservoir CCTV System	This project includes the deployment of a CCTV system for monitoring key locations along the Barnett Reservoir roadway and dam. CCTV images could be transmitted not only to the City, but also to MDOT District 6 as well as Emergency Operations Centers.	Medium Term	Stand Alone

Project	Description	Timeframe*	Dependency
City of Jackson Red Light Running Program	This project includes all components necessary to implement a traffic signal red light running enforcement program, including cameras, signage, etc.	Medium Term	Stand Alone
Rankin County CCTV System	This project includes the deployment of a CCTV system for license plate recognition in key locations.	Medium Term	Stand Alone
City of Jackson CCTV System	This project includes the deployment of a CCTV system for license plate recognition in key intersections.	Medium Term	Stand Alone
JATRAN Transit System DMS	Bus rider schedule information at bus stations.	Medium Term	Stand Alone
Rankin County AVL System	This project will facilitate installation of an Automated Vehicle Location system on maintenance vehicles.	Medium Term	Stand Alone
MDOT Communication Backbone	This project will establish a more permanent approach for the primary communication links between MDOT Central Office and the District 6 TMC.	Medium Term	Stand Alone
MDOT DMS Project	Provide nine DMS signs for in-bound traffic into Jackson to include both fiber optic and leased communications on future Airport Parkway (toll road) A future project will provide an unknown number of outbound signs	Inbound DMS signs installed summer '08, outbound signs Medium to Long Term	CMPDD
Rankin County Fiber Optic Cable	Install additional fiber optic network to facilitate communication.	Medium Term	Stand Alone
City of Jackson Fiber Optic Ring	Install additional fiber optic network to add to existing network to facilitate communication between City TOC and signals.	Medium Term	Stand Alone
Ridgeland TOC Fiber Optic Cable	Provide communication between the Ridgeland TOC and the MDOT network.	Medium Term	MDOT Statewide TMC
City of Jackson Surveillance	Enable 911 Center to access City of Jackson TOC CCTV at intersections for surveillance.	Medium Term	Jackson TOC
MDOT Highway Advisory Radio	This project will include an installation of HAR on high accident routes and in the vicinity of major attractions, airports, and parking facilities in the Central region.	Medium Term	Stand Alone

Project	Description	Timeframe*	Dependency
MDOT Regional Incident Management	This project will define agency roles, responsibilities, operations, and procedures for interurban incident management. Methods of incident detection, verification, motorist information, response, site management and clearance will be covered. The project may include the deployment of such devices as CCTV and vehicle detection.	Medium Term	MDOT Statewide& MDOT Communication Backbone
MDOT Cellular Phone System for Incident Reporting	This project enables motorists to report incidents to the MDOT TMC using a cellular phone number such as *999. When used statewide, these systems could allow users to contact the local law enforcement, towing companies, ambulance services and local transportation organizations highway helper vehicles.	Medium Term	Stand Alone
MDOT Weather Sensors	Weather sensors to collect pavement, surface, and ambient temperature, wind speed and direction, pavement wet/dry, precipitation and relative humidity could be deployed. Communication links with MDOT sensors in rural areas will be installed.	Medium Term	Stand Alone
MDOT Railroad Crossing Control	The deployment of integrated train detection and traffic control is considered a cost effective, near-term deployment because of the ability to deploy individual systems in select areas, and the commercial availability of such systems.	Long Term	Stand Alone
City of Jackson Railroad Crossing Control	Integrated train detection and traffic control is desired for surface streets near the vicinity of the Jackson Zoo.	Long Term	Stand Alone
MDOT/Rail Operators Railroad Operations Coordination	This project will provide coordination between rail operations and traffic management centers. Rail operators should include: Kansas City Southern and Canadian National / Illinois Central, CSC, BNSF, Norfolk Southern Railroads.	Long Term	Stand Alone
County and City Smart Parking Management Systems	Smart parking systems will include transit information signs, information kiosks during parking facility/garage construction.	Long Term	Stand Alone
Airport Parkway	A Private venture to provide a toll facility between downtown Jackson and the Jackson-Evers International Airport.	Medium Term	MDOT

10. AGREEMENTS

The Central Region ITS Architecture provides both a technical and institutional framework for the deployment of ITS in the Central Mississippi region. Institutional integration involves coordination between various agencies and jurisdictions to achieve seamless operations and interoperability.

The previous sections of the report identified the stakeholder roles and responsibilities, key market packages, and ITS deployment activities that would require establishment of an electronic link between organizations. From an institutional integration perspective, these electronic links or interfaces may require the establishment of some form of agreement to define the roles and responsibilities of each party.

There are several types of arrangements associated with the interfaces identified in the Central Region ITS Architecture. Information sharing and exchanges between systems require knowledge of the transmission protocol and data formats to ensure compatibility. Coordinating field device operations owned by different agencies requires defined procedures for submitting message requests and rules governing when such requests can be honored. Such coordination may be done with informal arrangements such as a Memorandum of Understanding (MOU). Sharing control of field devices operated by different agencies could involve more liability issues, which may require agreements that are more formal. Coordinated incident response may also require formal agreements, but also requires group training of personnel from various agencies. Agreements may be obtained for data sharing, procedure, operation, maintenance, and training.

Some common types of agreements are listed in Table 10-1. The agreement process may begin with something as simple as a handshake agreement. However, once interconnections and integration of systems begin, agencies may want to have something more substantial in place. A documented agreement will aid agencies in planning their operational costs, understanding their respective roles and responsibilities and build trust for future projects. Formal agreements may be necessary where funding or financial arrangements are defined or participation in large regionally significant projects is required.

Table 10-2 provides a list of the potential agreements identified in the stakeholder survey.

Table 10-3 presents a list of potential agreements that would be required for the implementation and operations of an integrated ITS system in the Central Mississippi region.

Table 10-1. Types of Agreements

Type of Agreement	Description
Handshake Agreement	<ul style="list-style-type: none"> ▪ Early agreement between one or more partners ▪ Not recommended for long term operations
Memorandum of Understanding (MOU)	<ul style="list-style-type: none"> ▪ Initial agreement used to provide minimal detail and usually demonstrating a consensus. ▪ Used to expand a more detailed agreement like an Interagency Agreement that may be broad in scope but contains all of the standard contract clauses required by a specific agency. ▪ May serve as a means to modify a much broader Master Funding Agreement, allowing the master agreement to cover various ITS projects throughout the region and the MOUs to specify the scope and differences between the projects.
Interagency Agreement	<ul style="list-style-type: none"> ▪ Between public agencies (i.e., transit authorities, cities, counties, etc.) for operations, services or funding. ▪ Documents responsibility, functions and liability at a minimum.
Intergovernmental Agreement	<ul style="list-style-type: none"> ▪ Between governmental agencies (i.e., Agreements between universities and State DOT, MPOs and State DOT, etc.).
Operational Agreement	<ul style="list-style-type: none"> ▪ Between any agency involved in funding, operating, maintaining or using the right of way of another public or private agency. ▪ Identifies respective responsibilities for all activities associated with shared systems being operated and / or maintained.
Funding Agreement	<ul style="list-style-type: none"> ▪ Documents the funding arrangements for ITS projects (and other projects). ▪ Includes at a minimum standard funding clauses, detailed scope, services to be performed, detailed project budgets, etc.
Master Agreements	<ul style="list-style-type: none"> ▪ Standard business contract and/or legal verbiage for a specific agency. These agreements can be found in the legal department of many public agencies. ▪ Allows states, cities, transit agencies and other public agencies that do business with the same agencies over and over (i.e., cities and counties) to have one Master Agreement that uses smaller agreements (i.e., MOUs, Scope of Work and Budget Modifications, Funding Agreements, Project Agreements, etc.) to modify or expand the boundaries of the larger agreement to include more specific language.

Table 10-2. Potential Agreements from Surveys

Type of Agreement	Description	Associated Stakeholder
Fiber Optic Cable Usage Standards	City of Jackson seeks an agreement with MDOT to allow each agency to share access to each other's CCTV and Fiber Optic Cable installations.	City of Jackson and MDOT
Regional Design Standards	City of Jackson seeks an agreement on design standards with MDOT on roads in both jurisdictions.	City of Jackson and MDOT

Table 10-3. Central Region ITS Architecture Potential Agreements

Agreement	Description	Associated Stakeholder
Inter-Agency Data Sharing Agreement	Formal agreements are required to cover the exchange of data between different agencies in different regions. However, informally, the exchange of information may occur on an as-needed basis. Data may include traffic flow, video images, road weather, road conditions, etc.	MDOT, MHP, County and City Traffic Management Agencies, County and City Public Safety Agencies, Media Outlets, Private Information Service Providers
Inter-Agency Operations Agreement	Address equipment operation coordination, equipment maintenance, operational information exchange and other issues. Equipment may include traffic signal systems, DMS, CCTV, etc.	MDOT, MHP, County and City Traffic Management Agencies, County and City Public Safety Agencies
Multi-Agency Communication Infrastructure Sharing Agreement	There are multiple examples and opportunities for the sharing of communications infrastructure throughout the regions. A regional plan and subsequent agreements that define responsibilities could result in the communications network required to link the various ITS applications together.	MDOT, County and City
Inter-Agency Road Maintenance/Snow Removal Agreement	Define roles and responsibilities for roadway maintenance as well as snow removal.	MDOT, County and City Maintenance Agencies
Multi-Agency EMS Communications Integration Agreement	Integrated EMS communications allows for quickly sharing of current incident response status between allied response agencies and creates a flow of information that reduces or eliminates delay due to a lag in communications.	County and City Public Safety Agencies
Multi-Agency Incident Response Coordination Agreement	Support incident information exchange, incident response coordination, resource coordination, etc. among multiple agencies in different regions.	MDOT, MHP, County and City Public Safety Agencies, County and City Traffic Management and Maintenance Agencies, other agencies

Agreement	Description	Associated Stakeholder
Multi-Agency Disaster Response Coordination Agreement	Define roles, responsibilities, and functions for disaster response, recovery and evacuation and reentry management.	Mississippi Public Safety Division, MEMA, MDOT, MHP, County and City Public Safety Agencies, County and City Traffic Management and Maintenance Agencies, Transit Agencies, other agencies
Multi-Agency Disaster Information Coordination Agreement	Define roles, responsibilities and functions for accessing and disseminating disaster information.	Mississippi Public Safety Division, MHP, MDOT, MEMA, County and City Public Safety Agencies
Multi-Agency Limited Liability Agreements	Agreements will be developed to address the varying levels of liability limitation associated with the various agencies that would need to work together to enable coordinated, multi-agency transportation and emergency management strategies.	Agencies involved in transportation and emergency management.
Transit Electronic Payment Agreement	Support transit electronic payment systems. Agreements may define roles and responsibilities of transit agencies and financial institution to share information such as revenue from smart cards, etc.	Transit Agencies, Parking Operators, Financial Institutions
Transit Bus Signal Priority Agreement	Allow transit vehicles to activate signal priority at signalized intersections.	Transit Agencies, MDOT, County and City Traffic Management Agencies
Emergency Vehicle Signal Preemption Agreement	Define roles, responsibilities and functions for emergency vehicle preemption at signalized intersections	County and City Public Safety Agencies, MDOT, MHP, County and City Traffic Management Agencies
Railroad Crossing Management Agreement	Define roles, responsibilities and functions for rail grade crossing coordination and optimization at signalize intersections.	Railroad Companies, MDOT, County and City Traffic Management Agencies
Private Public Partnership	Agreement between a private vendor who will be running the toll operations on the Airport Parkway and MDOT.	Private Partnership Toll Facility Operations, MDOT

11. IMPLEMENTATION AND INTEGRATION STRATEGY

A crucial part of developing an ITS Architecture is establishing an approach to using it. A Regional ITS Architecture provides guidance for planning ITS projects within that region. It also provides information that can be used in the initial stages of project definition and development. This section of the report presents the approach for integrating the Central Region ITS Architecture into the transportation planning process and leveraging the ITS Architecture in project definition. In addition, opportunities and considerations for integrating ITS projects and systems at the regional and statewide levels, especially for systems providing traffic management, incident management, and traveler information functions, are discussed.

11.1 Using ITS Architecture in Planning and Project Definition

The Central Region ITS Architecture represents a detailed plan for the evolution of the ITS systems in the Central Mississippi Region and can be used to support transportation planning efforts and ITS project development efforts at state and regional levels.

Support Transportation Planning Process

Once an ITS Architecture has been created, it can be used as a key reference in the transportation planning process. This will ensure all proposed ITS projects are consistent with the ITS Architecture and additional integration opportunities are considered, leading to more efficient implementations. The following sections describe three aspects of the transportation planning process.

Long Range Transportation Plan

One of the principal planning documents is the 2030 Jackson Urbanized Area Transportation Plan (JUATP). The JUATP is a long-range transportation plan that provides a vision for transportation projects to be constructed out to the year 2030. The JUATP is a fiscally constrained, staged improvement program for the Central Mississippi region. The Central Region goals and objectives are defined in Chapter 1 of this report. The CMPDD is responsible for the development of the JUATP.

The Central Region ITS Architecture can serve as an input to the JUATP. The ITS Services and projects identified in the ITS Architecture can support the development of long-range and short-range strategies/actions during the regional transportation planning process that leads to an integrated, efficient inter-modal transportation system. The descriptions of the goals and attributes of the systems and services included in the Central Region ITS Architecture can support measurement assessment during the regional transportation planning process. The Project Sequencing from the Central Region ITS Architecture can assist the development of prioritized projects and address the consistency of proposed transportation investments in the financial plan. In addition, the Central Region ITS Architecture provides a framework for analyzing how ITS elements are related and identifying areas for potential coordination and cooperation among agencies. This can promote both systems and inter-jurisdictional integration during the transportation planning process.

The Central Region ITS Architecture can also serve as an input to the Statewide ITS Architecture that then serves as an input to Mississippi's Unified Long-Range Transportation Infrastructure Plan (MULTIPLAN). MULTIPLAN addresses the needs of the transportation system at local, regional, and state levels and how those needs can achieve economic development objectives, contribute to environmental stewardship ideals, and improve the quality of life for Mississippi citizens. The plan is reviewed approximately every five years to reflect changing situations. MDOT is responsible for developing and maintaining the MULTIPLAN.

ITS Strategic Plans

MULTIPLAN incorporates the objectives of the Mississippi's ITS Strategic Plan into its overall framework. The ITS Strategic Plan is a consensus based approach that provides the framework for ITS planning and project development within the State of Mississippi. The plan is dynamic in nature and can be altered to reflect changes in policy considerations, state financial conditions, newly identified transportation needs, and new advances in technology. The ITS Strategic Plan also features a strategy for implementing projects in the short-term (<5 years), medium-term (5 to 10 years), and long-term (>10 years) and makes recommendations for taking appropriate steps for successful ITS development. The Central Region ITS Architecture can support what has been developed in the ITS Strategic Plan and assist in the prioritization of ITS projects.

Other Planning Activities

The Central Region ITS Architecture can also support other planning activities. The state's Comprehensive Emergency Transportation Response Plan (CETRP) identifies emergency policies, responsibilities, and procedures for the use of highways and highway facilities throughout the state. The plan is implemented under the following conditions: 1) upon the declaration of a national emergency by the President of the United States, 2) by concurrent resolution of the Congress, 3) by order of the Chief Executive of the State of Mississippi, or 4) in the absence of such specific direction and upon occurrence of a state or national emergency due to a natural, man-made or technological event.

Support Programming and Budgeting

In addition to supporting the transportation planning process, the Central Region ITS Architecture can assist in the development of the Transportation Improvement Program (TIP) and in the budgeting for planning projects.

Transportation Improvement Program

The Transportation Improvement Program (TIP) is a primary transportation planning output that can be supported by the Central Region ITS Architecture. The TIP is developed and approved by the CMPDD and is included, without modification, in the Statewide Transportation Improvement Program (STIP). Federal funding is made available through the Surface Transportation Program (STP) and is transferred to MDOT and allocated through the MPO for eligible transportation projects. The TIP is a three-year listing of projects within the region proposed for federal-aid funding under Title 23 (Federal Highway Funding) and Title 49 (Federal Transit Assistance) of the United States Code. The TIP is updated every two years and may be amended every six months. The TIP should be consistent with the JUATP long-range plan.

As part of the TIP preparation, a project prioritization and selection process is conducted, where the Central Region ITS Architecture can play a role. The project sequencing output from this ITS Architecture can be an input to prioritization. Integration opportunities identified in the

Central Region ITS Architecture can be used to better define the benefits of ITS projects. In addition, some of the project description information might be available from the outputs of the Central Region ITS Architecture, especially the Project Sequencing output.

In addition to the JUATP and TIP planning, the Central Region ITS Architecture can be considered to support other transportation planning activities or services associated with ITS projects or projects with ITS elements in the region.

Capital Budgeting

The Central Region ITS Architecture will define existing and planned ITS elements for stakeholders at all levels and how they interface with other existing or planned ITS elements in the region. The results of this process can be used by all stakeholders and organizations to define ITS projects and use that information in their budgeting process.

Support ITS Project Development

The Central Region ITS Architecture can be used for support in the ITS project development cycle. A typical ITS project development cycle begins with project definition, followed by Request for Proposal (RFP) generation, which leads to project implementation. Information in the Central Region ITS Architecture can assist in all three of these areas of project development.

Project Definition

Project Definition may occur at several levels of detail. Early in the planning process, a project may be defined only in terms of the transportation services it will provide, or by the major system pieces, it contains. Prior to the beginning of implementation, the details of the project must be developed. This could include further system definition and interface definition including exactly what systems or parts of systems will make up the project, what interconnections the project entails, or what information needs to flow across the system interconnections. Requirement definition may go through similar levels of detail, starting with very high-level description of project functions and moving toward system specifications. By identifying the portions of the Central Region ITS Architecture that define the project, the architecture outputs can be used to create aspects of the project definition.

The areas that an ITS Architecture can assist in project definition are:

- The identification of agency roles and responsibilities (including any inter-agency cooperation) can come from the operational concept developed as part of the ITS Architecture. This operational concept can either serve as a starting point for a more detailed definition, or possibly provide all of the needed information.
- Requirements definition can be completely or partly defined by using the ITS Architecture functional requirements applicable to the project.
- The ITS Architecture includes a map to ITS standards, and the project mapping to the Central Region ITS Architecture can extract the applicable ITS standards for the project.

RFP Generation

Once a project is defined and funding is committed, the implementation process can commence with the generation of an RFP, which is the common governmental practice for initiating a contract with the private sector to implement the project. Once a contract is in place, project implementation begins and moves through design, development, integration, and testing.

The Central Region ITS Architecture, and the products produced during its development, can support this RFP generation. First, the project definition described above forms the basis for what is being procured. Mapping the project to the Central Region ITS Architecture allows bidders to have a clear understanding of the scope of the project and of the interfaces that need to be developed. The functional requirements created as part of the Central Region ITS Architecture can be used to describe the functional requirements for the project. In addition, a subset of the ITS Standards identified as part of the Central Region ITS Architecture development can be specified in the RFP.

Project Implementation

Because ITS projects involve systems and their interconnections, it is very important to follow a system engineering approach to designing and implementing the project. While the exact process followed is at the discretion of the local agency, Final Rule 940 and FTA Policy lay out a

set of required systems engineering analyses for ITS projects funded through the highway trust fund. The required systems engineering analysis steps are:

- Identification of portions of the ITS Architecture being implemented;
- Identification of participating agencies’ roles and responsibilities;
- Requirements definitions;
- Analysis of alternative system configurations and technology options to meet requirements;
- Procurement options;
- Identification of applicable ITS standards and testing procedures; and
- Procedures and resources necessary for operations and management of the system.

The ITS Architecture can provide inputs to a number of these steps as shown in Table 11-1.

Table 11-1. Systems Engineering Requirements Supported by ITS Architecture

Systems Engineering Requirements	ITS Architecture Output
Identification of portions of the ITS Architecture being implemented	Mapping the project to the elements and interfaces of the ITS Architecture
Identification of participating agencies’ roles and responsibilities	Using Operational Concept as a starting point
Requirements definitions	Using Functional Requirements as a starting point
Identification of applicable ITS standards and testing procedures	Using architecture standards outputs as a starting point for the standards definition

11.2 Integration Strategy

The overall objective of an ITS Architecture is to support the effective and efficient deployment of ITS projects that address the transportation problems and needs of the region. The ITS Architecture focuses on the integration of systems to gain the maximum benefit of each system’s information and capabilities across the transportation network. The integration strategy provides the process connection between the ITS projects that are deployed within the region. The ITS Architecture defines what needs to be put in place to address the needs and requirements of the region. The transportation planning process can leverage the ITS Architecture as a roadmap to

project sequencing and interdependency to achieve an integrated transportation system that addresses those strategic objectives.

The most challenging issue of integrating the ITS Architecture into the planning process is the fact that there is more than one planning process. Coordination is important between the MDOT, the CMPDD and other Planning and Development Districts throughout the region for ITS projects in their respective plans. Integration opportunities can be taken advantage of within the region as well as with other regions. This is the primary intent of the ITS Architecture compliance where federal funding is involved.

Another difficult issue to address is coordination of ITS project planning between the federally funded projects and non-federally funded projects. Generally, non-federally funded projects are not part of the Long Range Planning Process or the Transportation Improvement Program. The ITS Architecture can provide a bridge between federally and non-federally funded projects and systems. Coordinating all of these projects requires an understanding by all existing and potential ITS stakeholders within the entire region. The Central Region ITS Architecture provides a common reference point for all stakeholders to gain insight into the integration of various ITS systems.

12. ARCHITECTURE MAINTENANCE PLAN

12.1 Introduction

The Central Region ITS Architecture has been created as a consensus view of stakeholders within the Central Mississippi region of ITS systems they have implemented and systems they plan to implement in the future. By its nature, the architecture is not a static set of outputs. The architecture should be modified as plans and priorities change, ITS projects are implemented, and the ITS needs and services evolve in the region. There are many actions that may dictate necessary updates to the architecture, including:

- **Changes in Project Definition.** When actually defined, a project may add, subtract or modify elements, interfaces, or information flows of the Central Region ITS Architecture. Because the architecture is meant to describe not only planned ITS, but also current ITS implementations, it should be updated to correctly reflect the deployed projects.
- **Changes due to Project Addition/Deletion.** Occasionally a project will be added, deleted or modified during the planning process. When this occurs, corresponding aspects of the Central Region ITS Architecture should also be added, deleted or modified.
- **Changes in Project Status.** As projects are deployed, the status of the architecture elements, services and flows that are part of the projects must be updated. Elements, services and flows should be changed from planned to existing when they are substantially complete.
- **Changes in Project Priority.** Due to funding constraints, technological changes or other considerations, a planned project may be delayed or accelerated. Such changes should be reflected in the Central Region ITS Architecture.
- **Changes in Regional/Local Needs.** Transportation planning is done to address both regional and local transportation needs. Over time these needs change and the corresponding aspects of the ITS Architecture should be updated.
- **Changes in Participating Stakeholders.** Stakeholder involvement can also change over time. The Central Region ITS Architecture should be updated to reflect the participating stakeholder roles in the statewide view of ITS elements, interfaces, and information flows.

- **Changes in Other Architectures.** The Central Region ITS Architecture includes not only elements and interfaces within the MPO's own region, but also interfaces to elements in adjoining regions or states. Changes in the ITS Architecture in adjoining regions or states may necessitate changes in the Central Region ITS Architecture to maintain consistency. The Central Region ITS Architecture may also overlap with the Statewide ITS Architecture and a change in either architecture may necessitate a change in the other.
- **Changes in National ITS Architecture.** The National ITS Architecture may be expanded and evolved from time to time to include new user services or refine existing services. These changes should be considered as the ITS Architecture is updated.

The Central Region ITS Architecture will be maintained in accordance with the provisions contained in the Code of Federal Regulation, 23 CFR 940.9(f). The following sections define the key aspects of the process for the maintenance of the Central Region ITS Architecture:

- Who is responsible for architecture maintenance?
- What will be maintained?
- How will it be maintained (i.e. What configuration control process will be used?)?

12.2 Who Is Responsible for Architecture Maintenance?

Responsibility for maintaining the Central Region ITS Architecture will lie with the CMPDD. The CMPDD will create a core group that reviews proposed changes to the architecture. This group may be called the Central Region ITS Architecture Maintenance Committee, and they will be responsible for reviewing proposed changes. The Committee should be given an opportunity to review all proposed changes before any are accepted and the architecture is updated. It is proposed that the Committee meet on an annual basis, or more frequently as necessary, to review any proposed changes to the architecture.

The Chair of the Committee should serve as the Maintenance Manager responsible for overseeing and guiding the maintenance effort. The Maintenance Manager should coordinate the activities of the architecture maintenance, including calling the meetings, making arrangements, assembling an agenda, leading the meetings, and approving minutes.

12.3 What Will Be Maintained?

Several different components make up the Central Region ITS Architecture. Some may require more frequent updates than others may, but the entire architecture will need periodic review to ensure that it is consistent with regional and statewide goals. This version of the Central Region ITS Architecture shall be the baseline architecture upon which future revisions are conducted as necessary. The maintenance timeframe identified in this document will become effective upon completion of this Central Region ITS Architecture.

The Central Region ITS Architecture was established using Turbo Architecture Software Version 3.1 and stored in an electronic Turbo Architecture database. The architecture is represented through a set of outputs including various reports and diagrams. Collectively these outputs can be used to develop a general ITS architecture document. The architecture will be maintained through updates in the electronic database using Turbo Architecture.

The following may be reviewed and updated at regular intervals:

- Description of the region;
- Participating agencies and other stakeholders, including key contact information;
- Inventory of existing and planned ITS systems in the region;
- Operational concept that identifies the roles and responsibilities of participating agencies and stakeholders in the operation and implementation of the systems;
- Agreements for operations and interoperability;
- System functional requirements;
- Interface requirements and information exchanges with planned and existing systems and subsystems;
- Applicable ITS standards supporting regional and national interoperability; and
- Sequence of projects for implementation.

Outputs such as interconnect and architecture flow diagrams, inventory lists, stakeholders lists and other diagrams and reports can be produced from the Turbo Architecture software, so they are by-products of the architecture database. These outputs can be updated as necessary for meetings or outreach activities.

To aid architecture version document control, it is recommended that the filename of the database should contain the version number and/or date on which the architecture was updated. In addition, the version number and date should be included in the Turbo Architecture database.

12.4 How Will It Be Maintained?

Once the architecture baseline is defined, the process for making changes to this baseline must be established. The configuration control (change management) process specifies how changes are identified, how often changes are made, and how the changes will be reviewed, implemented, and released.

How Changes are Identified

Changes to the Central Region ITS Architecture may be identified by two channels. One is that MDOT or the CMPDD proposes changes to the architecture according to the ITS projects or projects with ITS components within the region. Another channel is that any stakeholders identified as a participant in the Central Region ITS Architecture may propose potential changes. If the proposed change is to add a new stakeholder, their ITS elements and interfaces, then that agency should submit the change request. All change requests should be sent to the Maintenance Manager.

Stakeholders should use the Change Request Form to propose changes. A Change Request form is shown on page 116. The changes to the architecture, the reasons for the proposed modifications and the stakeholder contact should be clearly defined in the request. Upon receiving a Change Request form, the Maintenance Manager will perform an initial assessment of the proposed change for the impact to the Central Region ITS Architecture and/or the affected document. If the proposed change has an impact on other stakeholders, the Maintenance Manager should contact the stakeholders to confirm their agreement with the proposed modification.

How Often Changes are Made

A comprehensive, formal update of the Central Region ITS Architecture Baseline should be performed annually. This maintenance schedule will ensure that the architecture accurately

represent statewide and regional goals. Minor, informal modifications may be made at the discretion of the Maintenance Manager, given the modifications are approved by the Architecture Maintenance Committee.

Change Review, Implementation, and Release

The general steps in the process of change review, implementation and release are:

- Stakeholders define and propose changes per the recommendations given above.
- The Maintenance Manager, in coordination with the stakeholders affected by the proposed changes, evaluates the changes and determines what impact they may have on the architecture and/or associated documentation.
- The Architecture Maintenance Committee reviews the proposed changes and offers comments.
- Upon its review, the Committee makes decisions to accept the change, reject it, or ask for additional information.
- The Maintenance Manager implements the decisions. If the decision is to accept the change, then the appropriate portions of the architecture baseline are updated (per the schedule discussed above) and an updated architecture baseline is defined.
- Upon modification of the Central Region ITS Architecture, the stakeholders are notified by the Maintenance Manager of architecture updates and informed of the procedure to obtain the latest version.

The time required to perform this configuration control process will be a direct function of the number of changes suggested to the architecture, which will be driven by how much the architecture is being used. It is suggested that this process be reviewed periodically and appropriately fine-tuned to address the level of change that has occurred.

Mississippi Central Region ITS Architecture Change Request Form

Originator Name:		Date Submitted:
Originator Agency:		
Originator Telephone:	Originator Fax:	Originator E-Mail:
Agency Authorized Signature:		Signature Date:

Description of Proposed Change:		
Rationale for Proposed Change:		
Impacted Agency:	Authorized Signature:	Signature Date:
Impacted Agency:	Authorized Signature:	Signature Date:
Impacted Agency:	Authorized Signature:	Signature Date:
List of Attachments:		
Baseline Document(s) Impacted:		
<input type="checkbox"/> Turbo Architecture <input type="checkbox"/> Architecture Report <input type="checkbox"/> Other (describe)		

To Be Completed By Maintenance Manager		
Change Request No.:	Date Received:	Date Logged:
Date Initially Discussed:	Disposition: <input type="checkbox"/> Accepted <input type="checkbox"/> Rejected <input type="checkbox"/> More Info	Comments:
Data Discussed:	Disposition: <input type="checkbox"/> Accepted <input type="checkbox"/> Rejected <input type="checkbox"/> More Info	Comments:
Data Discussed:	Disposition: <input type="checkbox"/> Accepted <input type="checkbox"/> Rejected <input type="checkbox"/> More Info	Comments:
Date of Committee Approval (If Applicable):		
Baseline Documents Impacted/Version Implemented:		
<input type="checkbox"/> Turbo Architecture	Date: _____	Version: _____
<input type="checkbox"/> Architecture Report	Date: _____	Version: _____
<input type="checkbox"/> _____	Date: _____	Version: _____

Appendix A: Stakeholder Survey Questionnaire

Before completing this survey, please provide the following information:

Name: _____

Title: _____

Agency: _____

Division: _____

Phone: _____

Fax: _____

E-mail: _____

QUESTIONNAIRE

The questionnaire is organized by the following sections:

- General Questions
- User Needs and Services
- Data Management and Archiving
- Roadway Operations – including freeway and arterial management and operations
- Roadway Maintenance – including general roadway maintenance, winter maintenance, and work zone activities
- Transportation Security
- Incident & Emergency Management
- Transit Operations
- Commercial Vehicle Operations

Instructions

You are not required to fill out the entire survey questionnaire. To save your time, a matrix shown below is developed to instruct which sections of the questionnaire you should complete. Please fill out the sections of the questionnaire that are applicable to you. You are certainly welcome to fill out other sections and provide additional information. Feel free to skip any questions that you do not consider relevant to your agency.

Type of Agency	Section								
	A	B	C	D	E	F	G	H	I
Transportation Operations and Maintenance Agency (District Office, Project Office, Maintenance Office, Traffic and Safety Office, Public Works Department, Engineers Office, etc.)	X	X	X	X	X	X			
Roadway Service Patrol	X	X	X			X	X		
DOT Office of Enforcement, Law Enforcement and Emergency Management Agency (Sheriff Department, Police Department, Fire Department, Emergency Management Agency, Emergency Medical Services, etc.)	X	X	X			X	X		X
Planning	X	X	X	X	X	X	X	X	X
Public Transportation Agency	X	X	X					X	
Data Archives/Data Management Agency	X	X	X						
Others	X	X	X						

General Questions

1. Is your agency planning any ITS projects, including but not limited to traffic management centers, dispatch centers, transit vehicles, communications infrastructure, etc.

YES NO

If YES, please describe the project(s) and/or provide project name(s) and available documentation source(s).

2. Does your agency exchange voice or data information (including by telephone or fax) with any of the following types of organizations/agencies? Please select all that apply and list the appropriate organizations/agencies by name.

Incident/Emergency _____

Freeway _____

Arterial or Non-Freeway _____

Maintenance and Construction _____

Public Transportation _____

Commercial Vehicle Operations/Inspection_____

3. What specific types of information do you share with these organizations/agencies?

Incident/Emergency_____

Freeway_____

Arterial or Non-Freeway _____

Maintenance and Construction_____

Public Transportation_____

Commercial Vehicle Operations/Inspection_____

4. Please indicate what communications technologies are available within your agency that might be used to exchange information with other agencies.

- Center-to-Center Communications EXISTING PLANNED
- Internet System Access and Browsing EXISTING PLANNED
- Agency Radio Network EXISTING PLANNED
- Telephone EXISTING PLANNED
- Fax EXISTING PLANNED
- Pager EXISTING PLANNED
- E-mail EXISTING PLANNED
- Scheduled Mailings EXISTING PLANNED
- Other _____

5. What existing communicating infrastructure (for transportation or other uses) is controlled/owned by your organization or agency?

- Radio EXISTING PLANNED
- Cobber Cable EXISTING PLANNED
- Fiber Cable EXISTING PLANNED
- Wireless EXISTING PLANNED
- Other _____

6. Does your agency disseminate (or plan to disseminate) traffic or weather condition information to the public in any of the following ways?

- Dynamic Message Signs (DMS) (permanent or portable) EXISTING PLANNED
- Highway Advisory Radio (HAR) EXISTING PLANNED
- In-Vehicle Navigation Systems EXISTING PLANNED
- TV/Radio EXISTING PLANNED
- Internet EXISTING PLANNED
- Kiosks EXISTING PLANNED
- E-mail EXISTING PLANNED
- 511 or Other Telephone Services EXISTING PLANNED
- Pager or Personal Data Assistants (PDAs) EXISTING PLANNED
- DMS controlling parking access EXISTING PLANNED

• Other _____

7. Does your agency receive (or plan to receive) information from the National Weather Service?

EXISTING PLANNED NO

8. Does your agency receive (or plan to receive) surface transportation specific weather information from a value-added sector specific meteorological service provider?

EXISTING PLANNED NO

9. Does your agency have (or plan to have) the capability to provide any of the following information?

a. Broadcast of Static or Real-Time Traffic, Transit, or Maintenance and Construction Information. EXISTING PLANNED NO

b. Personalized provision of Traffic, Transit, or Maintenance and Construction Information to users. EXISTING PLANNED NO

c. Route Guidance (either pre-trip or enroute). EXISTING PLANNED NO

d. Yellow Pages Information or Reservation. EXISTING PLANNED NO

10. Please list any current agreements or memoranda of understanding that your agency has in place with any other organizations/agencies (e.g., maintenance of traffic signals, media agreements).

Additional Information / Comments

A. User Needs and Services

1. What are the major transportation problems and issues in your jurisdictional area?

2. Please identify and rank the top 10 user needs and services (across all service areas) for mitigating critical transportation problems and issues in your jurisdiction. Use the numbers from 1 to 10 with 1 being the most critical user needs and services.

Travel and Traffic Management

- | | |
|--|---|
| <input type="checkbox"/> Pre-trip Travel Information | <input type="checkbox"/> Traffic Control |
| <input type="checkbox"/> En-route Driver Information | <input type="checkbox"/> Incident Management |
| <input type="checkbox"/> Route Guidance | <input type="checkbox"/> Travel Demand Management |
| <input type="checkbox"/> Ride Matching and Reservation | <input type="checkbox"/> Emissions Testing and Mitigation |
| <input type="checkbox"/> Traveler Services Information | <input type="checkbox"/> Highway Rail Intersection |

Public Transportation Management

- | | |
|---|--|
| <input type="checkbox"/> Public Transportation Management | <input type="checkbox"/> Personalized Public Transit |
| <input type="checkbox"/> En-route Transit Information | <input type="checkbox"/> Public Travel Security |

Electronic Payment

- Electronic Payment Services

Commercial Vehicle Operations

- | | |
|--|---|
| <input type="checkbox"/> Commercial Vehicle Electronic Clearance | <input type="checkbox"/> Commercial Vehicle Administrative Processes |
| <input type="checkbox"/> Automated Roadside Safety Inspection | <input type="checkbox"/> Hazardous Materials Security and Incident Response |
| <input type="checkbox"/> On-board Safety and Security Monitoring | <input type="checkbox"/> Freight Mobility |

Emergency Management

- | | |
|---|---|
| <input type="checkbox"/> Emergency Notification and Personal Security | <input type="checkbox"/> Emergency Vehicle Management |
| | <input type="checkbox"/> Disaster Response and Evacuation |

Advanced Vehicle Safety Systems

- ___ Longitudinal Collision Avoidance
- ___ Lateral Collision Avoidance
- ___ Intersection Collision Avoidance
- ___ Vision Enhancement for Crash Avoidance

- ___ Safety Readiness
- ___ Pre-crash Restraint Deployment
- ___ Automated Vehicle Operation

Information Management

- ___ Archived Data

Maintenance and Construction Management

- ___ Maintenance and Construction Operations

3. Based on your understanding of ITS technology in transportation, what opportunities do you see in the future for the application of ITS technologies in your area? (Please check all applied)

- CCTV Surveillance
- Integrated Statewide Emergency Response
- Coordinated Signal Systems
- Integrated Regional Incident Management
- Advanced Highway/Rail Grade Crossing Control
- Variable/Dynamic Message Signs
- Pre-planned Detour/Evacuation Routes
- Highway Advisory Radio (HAR)
- Transit/Parking Smart Card Payment System
- Traffic Signal Priority for transit vehicles
- Traffic Signal Priority for emergency vehicles
- Internet Traveler Information Website
- Telephone Traveler Information
- Aerial Detection
- Road Weather Systems
- Advanced Work Zone Management
- AVL/In-vehicle Navigation System for Emergency or Maintenance Vehicles
- Transit Location/ Information System
- Cell number for incident detection (e.g. *999)
- Cable TV Traveler Information

- Highway Service Patrol
- Hazardous Materials Response

Others:

Additional Information / Comments

Data Management and Archiving

1. Does your agency collect and store (or plan to collect and store) data (data archiving)?

- YES NO

If YES, please select all that apply and list the appropriate data types (traffic volume, speed, incident, condition assessment, video, ridership, etc.), data sources (organizations/agencies, systems, equipment, etc.) and data formats (electronic database, paper files, etc.)

- Traffic Data EXISTING PLANNED

Data Types: _____

Data Sources: _____

Data Formats: _____

- Emergency/Accident Data EXISTING PLANNED

Data Types: _____

Data Sources: _____

Data Formats: _____

- Maintenance and Construction Data EXISTING PLANNED

Data Types: _____

Data Sources: _____

Data Formats: _____

- Public Transportation Data EXISTING PLANNED

Data Types: _____

Data Sources: _____

Data Formats: _____

- Commercial Vehicle Data EXISTING PLANNED

Data Types: _____

Data Sources: _____

Data Formats: _____

- Emission Data EXISTING PLANNED

Data Types: _____

Data Sources: _____

Data Formats: _____

- Parking Data EXISTING PLANNED

Data Types: _____

Data Sources: _____

Data Formats: _____

- Other _____

2. Does your archived data management system provide general query and report functionality?

- EXISTING PLANNED NO

3. Does your archived data management system provide advanced features such as data analysis, summarization, and data mining to facilitate discovery of information, patterns, and correlations in large data sets?

- EXISTING PLANNED NO

4. Does your organization or agency use Geographic Information Systems (GIS)?

- EXISTING PLANNED NO

If EXISTING or PLANNED, for what types of information is GIS used?

Additional Information / Comments

Roadway Operations

1. Does your agency use (or plan to use) any of the following real-time traffic data collection technologies?

- Loop Detectors that provide volume and speed data at midblock locations (this **excludes** actuators on intersection approaches)

EXISTING PLANNED

- CCTV Cameras EXISTING PLANNED

- Vehicle Probe Readers to estimate travel times on arterials

EXISTING PLANNED

- Road Weather Information System EXISTING PLANNED

- Overheight Vehicle Detection EXISTING PLANNED

- Other _____

2. Does your agency detect and verify (or plan to detect and verify) traffic incidents using sensors and surveillance equipment?

EXISTING PLANNED NO

3. Does your agency operate (or plan to add) lane control devices (e.g., changeable overhead directional arrows)?

EXISTING PLANNED NO

4. Does your agency manage (or plan to manage) automatic or remotely controlled gates or barriers that control access to roadway segments including ramps and traffic lanes?

EXISTING PLANNED NO

5. Does your agency operate (or plan to add) ramp meters on freeway entrances?

YES NO

If YES, please indicate what is (or will be) used:

- Pre-emption for emergency vehicles EXISTING PLANNED
- Priority for transit vehicles EXISTING PLANNED

6. Does your agency control (or plan to control) any signalized intersections?

YES NO

If NO, skip to Section E.

If YES, do any of your signalized intersections have (or plan to have):

- Closed Loop or Centralized Control EXISTING PLANNED
- Real-Time traffic adaptive control
such as SCOOT/SCATS or similar EXISTING PLANNED
- Signal Preemption for emergency vehicles EXISTING PLANNED
- Signal Priority for Transit Vehicles EXISTING PLANNED
- Wireless Communications EXISTING PLANNED
- Other _____

7. Does your agency have (or plan to have) any signalized intersections that are interconnected with active railroad crossing devices?

EXISTING PLANNED NO

8. Does your agency monitor highway-rail intersections with any of the following technologies?

- Vehicle Detectors EXISTING PLANNED
- Video Surveillance/Detection EXISTING PLANNED
- Train Arrival Prediction
(Predict Train Arrival Electronically) EXISTING PLANNED
- Electronic Traffic Violator Devices EXISTING PLANNED
- Other _____

Additional Information / Comments

Roadway Maintenance

1. Does your agency provide or support (or plan to provide or support) on-going operations and maintenance activities?

- EXISTING PLANNED NO

2. Does your agency have (or plan to have) a maintenance and construction vehicle fleet?

- EXISTING PLANNED NO

If NO, skip to question #7.

3. Does your agency operate or maintain (or plan to operate or maintain) a dispatch facility?

- EXISTING PLANNED NO

If EXISTING or PLANNED, how do your dispatchers communicate with the vehicle operators?

4. Does your agency use (or plan to use) an Automated Vehicle Location (AVL) system?
- EXISTING PLANNED NO
5. Does your agency provide (or plan to provide) maintenance of the vehicles in your fleet?
- EXISTING PLANNED NO
6. Does your agency have (or plan to have) the capability to automate vehicle maintenance scheduling and manage both routine and corrective maintenance activities on vehicles?
- EXISTING PLANNED NO
7. Does your agency collect (or plan to collect) road and weather conditions data from environmental sensors located on or near the roadway?
- EXISTING PLANNED NO
8. Does your agency use (or plan to use) environmental data or information to detect environmental hazards such as icy road conditions, high winds, or dense fog?
- EXISTING PLANNED NO
9. Does your agency have (or plan to have) any roadway deicing systems?
- EXISTING PLANNED NO
10. Does your agency provide (or plan to provide) maintenance services such as landscape maintenance, hazard removal (roadway debris, dead animals), routine maintenance activities (roadway cleaning, grass cutting), or repair and maintenance of equipment (both ITS and non-ITS) on the roadway?
- EXISTING PLANNED NO
11. Does your agency perform (or plan to perform) winter maintenance activities?
- EXISTING PLANNED NO
12. Does your agency manage roadway work zone activities?
- YES NO

If YES, please identify below the devices or systems currently deployed or planned for work zone monitoring.

- Dynamic Message Signs (DMS) EXISTING PLANNED

- Closed Circuit Television (CCTV) EXISTING PLANNED
- Vehicle Speed Monitoring using Remote Devices (i.e. Sensors/Detectors)
 - EXISTING PLANNED
- Work Zone Intrusions (Detection system on/near the roadway or on-board of maintenance vehicles) EXISTING PLANNED
- Other _____

Additional Information / Comments

B. Transportation Security

1. Does your agency monitor (or plan to monitor) the transportation infrastructure (e.g., bridges, tunnels, and management centers) for potential threats using sensors and surveillance equipment?
 - EXISTING PLANNED NO

2. Does your agency remotely control (or plan to remotely control) barrier and safeguard systems to preclude an incident, control access during and after an incident or mitigate the impact of an incident?
 - EXISTING PLANNED NO

3. Does your agency monitor (or plan to monitor) public travel-related areas such as transit stations, transit stops, rest stops, and kiosk locations for potential threats using sensors and surveillance equipment?
 - EXISTING PLANNED NO

4. Does your agency use (or plan to use) ITS devices and traveler information systems (such as dynamic message signs, highway advisory radio, 511 or other telephone services, TV/radios, Internet, e-mail, and kiosks) to alert the public in emergency situations such as child abductions, severe weather events, civil emergencies, and other situations that pose a threat to life and property?

EXISTING PLANNED NO

5. Does your agency use (or plan to use) sensors and surveillance equipment to monitor and detect potential, looming, and actual disasters including natural disasters and technological and man-made disasters (hazardous materials incidents, nuclear, chemical, biological, and radiological attacks) and notify all responding agencies of detected emergencies?

EXISTING PLANNED NO

6. Does your agency support (or plan to support) disaster response and recovery, including coordination of emergency response plans and resources, damage assessment, service restoration, and transition back to normal operation?

EXISTING PLANNED NO

7. Does your agency support (or plan to support) evacuation of the general public from a disaster area and manage subsequent reentry to the disaster area using transportation resources?

EXISTING PLANNED NO

8. Does your agency provide (or plan to provide) disaster-related traveler information to the general public, regarding evacuation and reentry information and other information concerning the operation and availability of the transportation system during a disaster?

EXISTING PLANNED NO

Additional Information / Comments

Incident/Emergency Management

1. Does your agency currently perform (or plan to perform) Computer Aided Dispatch (CAD) of emergency vehicles?

EXISTING PLANNED NO

2. Does your agency use (or plan to use) an Automated Vehicle Location (AVL) system?

EXISTING PLANNED NO

3. Does your agency receive (or plan to receive) incident data from an arterial, freeway, transit, or other emergency management agencies?

Arterial Management: EXISTING PLANNED NO

Freeway Management: EXISTING PLANNED NO

Maintenance and Construction: EXISTING PLANNED NO

Transit Agency(ies): EXISTING PLANNED NO

Other Emergency Management: EXISTING PLANNED NO

Other _____

4. Does your agency send (or plan to send) incident data to an arterial, freeway, transit, or other emergency management agencies?

Arterial Management: EXISTING PLANNED NO

Freeway Management: EXISTING PLANNED NO

Maintenance and Construction: EXISTING PLANNED NO

Transit Agency(ies): EXISTING PLANNED NO

Other Emergency Management: EXISTING PLANNED NO

Other _____

5. Does your agency have (or plan to have) preemption lights for signalized intersections or ramp meters?

EXISTING PLANNED NO

6. Does your agency receive (or plan to receive) real-time traffic information and conditions from transportation agencies to support and enhance emergency vehicle routing?

EXISTING PLANNED NO

If EXISTING or PLANNED, from which agency(ies):

Additional Information / Comments

Transit Operations

1. What types of transit services does your agency operate (or plan to operate)?

- Fixed Route EXISTING PLANNED
- Demand Responsive (Paratransit) EXISTING PLANNED
- Rail EXISTING PLANNED
- Ferries EXISTING PLANNED
- Other _____

2. Does your agency provide (or plan to provide) maintenance of the transit vehicles?

- EXISTING PLANNED NO

3. Does your agency have (or plan to have) the capability to automate vehicle maintenance scheduling and manage both routine and corrective maintenance activities on vehicles?

- EXISTING PLANNED NO

4. Does your agency use (or plan to use) an Automated Vehicle Location (AVL) system?

- EXISTING PLANNED NO

5. Does your agency have (or plan to have) security monitoring systems on-board transit vehicles?

EXISTING PLANNED NO

6. Does your agency monitor (or plan to monitor) public areas (e.g. stops, park & ride lots, stations) using sensors and surveillance equipment?

EXISTING PLANNED NO

7. Does your agency use sensors and surveillance equipment to perform security monitoring (or plan to monitor) non-public areas (e.g. transit yards or other infrastructure)?

EXISTING PLANNED NO

8. Does your agency directly or indirectly (i.e. thru another agency) provide (or plan to provide) transit information to the public?

YES NO

If YES, please identify below the method(s) currently used or planned to provide transit information:

- Internet Web Page EXISTING PLANNED
- Pagers or Personal Data Assistants EXISTING PLANNED
- Kiosks EXISTING PLANNED
- Display/Audio in Transit Vehicles EXISTING PLANNED
- E-mail or other direct PC communications EXISTING PLANNED
- Electronic Displays/Audio Announcements at Transit Stops and Stations (includes video monitors) EXISTING PLANNED
- TV (interactive or dedicated Cable) EXISTING PLANNED
- Other _____

9. Does your agency provide (or plan to provide) real-time transit information (i.e., latest available information on transit routes, schedules, transfer options, bicycle accessibility, fares, real-time schedule adherence, etc.) at stops or parking facilities?

EXISTING PLANNED NO

10. Does your agency provide transit trip planning?

YES NO

If YES, please identify below the method(s) currently used or planned for provide the trip planning information:

- Internet EXISTING PLANNED
- E-mail or other direct PC communications EXISTING PLANNED
- Kiosks EXISTING PLANNED
- Other _____

11. Does your agency have (or plan to have) an Electronic Fare Payment System (smart card, swipe card, credit card, etc.)?

EXISTING PLANNED NO

12. Does your transit vehicles have (or plan to have) the capability to receive priority lights at signalized intersections?

EXISTING PLANNED NO

Additional Information / Comments

Commercial Vehicle Operations

1. Does your agency perform (or plan to perform) electronic credential administrative services for commercial vehicles?

EXISTING PLANNED NO

2. Does your agency participate (or plan to participate) in roadside commercial vehicle inspection?

EXISTING PLANNED NO

If NO, no further responses are required in this section.

3. Does your agency perform (or plan to perform) electronic screening?

EXISTING PLANNED NO

4. Does your agency exchange (or plan to exchange) safety and/or security information?

EXISTING PLANNED NO

5. Does your agency perform (or plan to perform) a high speed weigh-in-motion service?

EXISTING PLANNED NO

6. Does your agency participate (or plan to participate) in HAZMAT detection?

EXISTING PLANNED NO

If EXISTING or PLANNED, please list any handheld or roadside equipment for detection and classification of security sensitive HAZMAT on commercial vehicles, and for accessing credentials information on driver verification.

Additional Information / Comments

Please complete and return this questionnaire by [Date] and send to:

[Name & Address]

Thank You!

Appendix B: Functional Requirements

Functional Requirements

Central Region ITS Architecture (Region)

10/29/2008 2:14:34PM



Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element: Aiprort Parkway Toll Center</i>	
<i>Entity: Toll Collection</i>	
<i>Functional Area: Toll Plaza Toll Collection</i>	
Roadside collection of tolls from vehicle toll tags and violation identification.	
<i>Requirement:</i>	
1 The field element shall read data from vehicle toll tags to support toll payment transactions.	Planned
<i>Requirement:</i>	
3 The field element shall update the toll tag value after debiting the toll amount and send a record of the transaction to a center.	Planned
<i>Requirement:</i>	
4 The field element shall read the credit identity on the toll tag and send that identity and the amount to be debited to a center.	Planned
<i>Requirement:</i>	
7 The field element shall control roadside displays indicating success or failure of the toll transaction to the driver.	Planned
<i>Requirement:</i>	
10 The field element shall forward wide-area alert information to the Toll Operator.	Planned
<i>Element: Airport Parkway Toll Operations</i>	
<i>Entity: Toll Administration</i>	
<i>Functional Area: Toll Administration</i>	
Management of toll collection for private and commercial vehicles, dynamic pricing, payment reconciliation with financial institutions, and violation notification to enforcement agencies.	
<i>Requirement:</i>	
1 The center shall manage toll transactions, including maintaining a log of all transactions and toll pricing structure information.	Planned
<i>Requirement:</i>	
2 The center shall dynamically price tolls based on current traffic condition information.	Planned
<i>Requirement:</i>	
5 The center shall manage the details of toll payment violations based on tag information from the toll plaza, vehicle registration information from the Department of Motor Vehicles, invalid tag information from a Financial Institution, and previous violation information stored locally, and report such violations to appropriate law enforcement agencies.	Planned
<i>Requirement:</i>	
10 The center shall support wide-area alerts from emergency centers by passing on the information to its toll plazas and the Toll Administrator.	Planned

NOTE: The two Entities above are the only two new items in the Functional Requirements. They have been shown here, as well as in Appendix E. The following items did not change since Version 1.0 and have been reprinted. The remaining items did not change since Version 1.0 and have not been reprinted.

Functional Requirements

Central Region ITS Architecture (Region)

10/16/2007 2:31:34PM



Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:</i> CMPDD MPO Databases	
<i>Entity:</i> Archived Data Management Subsystem	
<i>Functional Area:</i> ITS Data Repository	
<i>Requirement:</i>	
1 The center shall collect data to be archived from one or more data sources.	Existing
<i>Requirement:</i>	
2 The center shall collect data catalogs from one or more data sources. A catalog describes the data contained in the collection of archived data and may include descriptions of the schema or structure of the data, a description of the contents of the data; e.g., time range of entries, number of entries; or a sample of the data (e. g. a thumbnail).	Planned
<i>Requirement:</i>	
3 The center shall store the archived data in a focused repository that is suited to a particular set of ITS data users.	Planned
<i>Requirement:</i>	
4 The center shall include capabilities for performing quality checks on the incoming archived data.	Planned
<i>Requirement:</i>	
5 The center shall include capabilities for error notification on the incoming archived data.	Planned
<i>Requirement:</i>	
6 The center shall include capabilities for archive to archive coordination.	Planned
<i>Requirement:</i>	
7 The center shall support a broad range of archived data management implementations, ranging from simple data marts that collect a focused set of data and serve a particular user community to large-scale data warehouses that collect, integrate, and summarize transportation data from multiple sources and serve a broad array of users within a region.	Planned
<i>Requirement:</i>	
8 The center shall perform quality checks on received data.	Planned
<i>Requirement:</i>	
9 The center shall provide the capability to execute methods on the incoming data such as cleansing, summarizations, aggregations, or transformations applied to the data before it is stored in the archive.	Planned
<i>Requirement:</i>	
10 The center shall respond to requests from the administrator interface function to maintain the archive data.	Planned
<i>Requirement:</i>	
11 When data or a catalog of data is received from the archive, the center shall generate the requested data product for the users systems.	Planned
<i>Requirement:</i>	
12 For archive data requiring financial payment, the center shall process the financial requests and manage an interface to a Financial Institution.	Planned
<i>Functional Area:</i> Government Reporting Systems Support	
<i>Requirement:</i>	
1 The center shall provide data from an ITS archive to federal, state, or local government reporting systems.	Planned
<i>Requirement:</i>	
2 The center shall provide the capability to select data from an ITS archive for use in government reports.	Planned

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element: CMPDD MPO Databases</i>	
<i>Entity: Archived Data Management Subsystem</i>	
<i>Functional Area: Government Reporting Systems Support</i>	
<i>Requirement:</i>	3 The center shall provide the capability to format data from an ITS archive suitable for input into government reports. Planned
<i>Requirement:</i>	4 The center shall support requests for ITS archived data from Government Reporting Systems. Planned
<i>Requirement:</i>	5 The center shall provide the applicable meta-data for any ITS archived data to satisfy government reporting system requests. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data. Planned
<i>Functional Area: On-Line Analysis and Mining</i>	
<i>Requirement:</i>	1 The center shall support the interface with Archive Data User Systems for requests for analysis of the archive data. Planned
<i>Requirement:</i>	2 The center shall provide the capability to perform activities such as data mining, data fusion, summarizations, aggregations, and recreation from archive data. This may include multidimensional analysis, selective summarization and expansion of data details, and many other advanced analysis services. Planned
<i>Requirement:</i>	3 The center shall receive the user's systems requests and develop the request to retrieve the data from the archive. Planned
<i>Requirement:</i>	4 The center shall respond to user's systems requests for a catalog of the archived data analysis products available. Planned
<i>Requirement:</i>	5 For archive analysis and data mining products requiring financial payment, the center shall process the financial requests and manage an interface to a Financial Institution. Planned
<i>Element: County Emergency Operations Centers</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Early Warning System</i>	
<i>Requirement:</i>	1 The center shall monitor information from Alerting and Advisory Systems such as the Information Sharing and Analysis Centers (ISACs), the National Infrastructure Protection Center (NIPC), the Homeland Security Advisory System (HSAS), etc. The information may include assessments (general incident and vulnerability awareness information), advisories (identification of threats or recommendations to increase preparedness levels), or alerts (information on imminent or in-progress emergencies). Existing
<i>Requirement:</i>	2 The center shall provide the capability to correlate alerts and advisories, incident information, and security sensor and surveillance data. Existing
<i>Requirement:</i>	3 The center shall broadcast wide-area alerts and advisories to traffic management centers for emergencies such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property. Existing

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:County Emergency Operations Centers</i>	
<i>Entity:Emergency Management</i>	
<i>Functional Area: Emergency Early Warning System</i>	
<i>Requirement:</i> 4 The center shall broadcast wide-area alerts and advisories to transit management centers for emergencies such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 6 The center shall broadcast wide-area alerts and advisories to traveler information service providers for emergencies such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 7 The center shall broadcast wide-area alerts and advisories to maintenance centers for emergencies such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 8 The center shall broadcast wide-area alerts and advisories to other emergency management centers for emergencies such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 9 The center shall process status information from each of the centers that have been sent the wide-area alert.	Existing
<i>Requirement:</i> 10 The center shall coordinate the broadcast of wide-area alerts and advisories with other emergency management centers.	Existing
<i>Requirement:</i> 11 The center shall receive incident information from other transportation management centers to support the early warning system.	Existing
<i>Requirement:</i> 12 The center shall present the alert and advisory information and the status of the actions taken in response to the alert by the other centers to the emergency system operator as received from other system inputs.	Existing
<i>Requirement:</i> 13 The center shall support the entry of alert and advisory information directly from the emergency system operator.	Existing
<i>Functional Area: Emergency Response Management</i>	
<i>Requirement:</i> 1 The center shall provide strategic emergency response capabilities such as that of an Emergency Operations Center for large-scale incidents and disasters.	Existing
<i>Requirement:</i> 2 The center shall manage coordinated inter-agency responses to and recovery from large-scale emergencies. Such agencies include traffic management, transit, maintenance and construction management, rail operations, and other emergency management agencies.	Existing
<i>Requirement:</i> 3 The center shall provide the capability to implement response plans and track progress through the incident by exchanging incident information and distributing response status to allied agencies.	Existing

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:County Emergency Operations Centers</i>	
<i>Entity:Emergency Management</i>	
<i>Functional Area: Emergency Response Management</i>	
<i>Requirement:</i>	
4 The center shall develop, coordinate with other agencies, and store emergency response plans.	Existing
<i>Requirement:</i>	
5 The center shall track the availability of resources (including vehicles, roadway cleanup, etc.), request additional resources from traffic, maintenance, or other emergency centers if needed.	Existing
<i>Requirement:</i>	
6 The center shall allocate the appropriate emergency services, resources, and vehicle (s) to respond to incidents, and shall provide the capability to override the current allocation to suit the special needs of a current incident.	Existing
<i>Requirement:</i>	
7 The center shall receive event scheduling information from Event Promoters.	Existing
<i>Requirement:</i>	
8 The center shall support remote control of field equipment normally under control of the traffic management center including traffic signals, dynamic message signs, gates, and barriers.	Planned
<i>Requirement:</i>	
9 The center shall provide the capability to remotely control and monitor CCTV systems normally operated by a traffic management center.	Planned
<i>Requirement:</i>	
10 The center shall provide the capability to request transit resource availability from transit centers for use during disaster and evacuation operations.	Existing
<i>Requirement:</i>	
11 The center shall assimilate the status of the transit, traffic, rail, maintenance, and other emergency center services and systems to create an overall transportation system status, and disseminate to each of these centers and the traveling public via traveler information providers.	Existing
<i>Requirement:</i>	
12 The center shall provide information to the media concerning the status of an emergency response.	Existing
<i>Requirement:</i>	
13 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	Existing
<i>Requirement:</i>	
14 The center shall provide the capability for center personnel to provide inputs to the management of incidents, disasters and evacuations.	Existing
<i>Functional Area: Emergency Evacuation Support</i>	
<i>Requirement:</i>	
1 The center shall manage inter-agency coordination of evacuation operations, from initial planning through the evacuation process and reentry.	Existing
<i>Requirement:</i>	
2 The center shall develop and exchange evacuation plans with allied agencies prior to the occurrence of a disaster.	Existing
<i>Requirement:</i>	
3 The center shall provide an interface to the emergency system operator to enter evacuation plans and procedures and present the operator with other agencies' plans.	Existing
<i>Requirement:</i>	
4 The center shall coordinate evacuation destinations and shelter needs with shelter providers (e.g., the American Red Cross) in the region.	Existing

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:County Emergency Operations Centers</i>	
<i>Entity:Emergency Management</i>	
<i>Functional Area: Emergency Evacuation Support</i>	
<i>Requirement:</i> 5 The center shall provide evacuation information to traffic, transit, maintenance and construction, rail operations, and other emergency management centers as needed.	Existing
<i>Requirement:</i> 6 The center shall request resources from transit agencies as needed to support the evacuation.	Existing
<i>Requirement:</i> 7 The center shall request traffic management agencies to implement special traffic control strategies and to control evacuation traffic, including traffic on local streets and arterials as well as the major evacuation routes.	Existing
<i>Requirement:</i> 8 The center shall provide traveler information systems with evacuation guidance including basic information to assist potential evacuees in determining whether evacuation is necessary and when it is safe to return.	Existing
<i>Requirement:</i> 9 The center shall monitor the progress or status of the evacuation once it begins and exchange tactical plans, prepared during the incident, with allied agencies.	Existing
<i>Requirement:</i> 10 The center shall monitor the progress of the reentry process.	Existing
<i>Functional Area: Emergency Environmental Monitoring</i>	
<i>Requirement:</i> 1 The center shall collect current and forecast road and weather information from weather service providers (such as the National Weather Service and value-added sector specific meteorological services).	Existing
<i>Requirement:</i> 3 The center shall collect current road and weather information from roadway maintenance operations.	Planned
<i>Requirement:</i> 4 The center shall assimilate current and forecast road conditions and surface weather information to support incident management.	Planned
<i>Requirement:</i> 5 The center shall present the current and forecast road and weather information to the emergency system operator.	Planned
<i>Requirement:</i> 6 The center shall provide aggregated or processed environmental probe information from its fleet of emergency vehicles to traffic management and maintenance centers.	Planned
<i>Functional Area: Emergency Data Collection</i>	
<i>Requirement:</i> 1 The center shall collect emergency service data, emergency vehicle management data, emergency vehicle data, sensor and surveillance data, threat data, and incident data.	Existing
<i>Entity:Information Service Provider</i>	
<i>Functional Area: ISP Emergency Traveler Information</i>	
<i>Requirement:</i> 1 The center shall collect and provide to the traveler interface systems emergency evacuation information, including evacuation zones, shelter information, available transportation modes, road closures and detours, changes to transit services, and traffic and road conditions at the origin, destination, and along the evacuation routes.	Existing

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:County Emergency Operations Centers</i>	
<i>Entity:Information Service Provider</i>	
<i>Functional Area: ISP Emergency Traveler Information</i>	
<i>Requirement:</i>	2 The center shall provide evacuation information to shelter providers. Existing
<i>Requirement:</i>	3 The center shall collect and provide wide-area alert information to the traveler interface system with region-specific data, including major emergencies such as a natural or fabricated disaster, civil emergency, child abductions, severe weather watches and warnings, military activities, and law enforcement warnings. Existing
<i>Requirement:</i>	4 The center shall provide the capability for a system operator to control the type and update frequency of emergency and wide-area alert information distributed to travelers. Existing
<i>Element:Emergency Response Performance Information</i>	
<i>Entity:Archived Data Management Subsystem</i>	
<i>Functional Area: ITS Data Repository</i>	
<i>Requirement:</i>	1 The center shall collect data to be archived from one or more data sources. Existing
<i>Requirement:</i>	2 The center shall collect data catalogs from one or more data sources. A catalog describes the data contained in the collection of archived data and may include descriptions of the schema or structure of the data, a description of the contents of the data; e.g., time range of entries, number of entries; or a sample of the data (e. g. a thumbnail). Existing
<i>Requirement:</i>	3 The center shall store the archived data in a focused repository that is suited to a particular set of ITS data users. Existing
<i>Requirement:</i>	4 The center shall include capabilities for performing quality checks on the incoming archived data. Existing
<i>Requirement:</i>	5 The center shall include capabilities for error notification on the incoming archived data. Existing
<i>Requirement:</i>	9 The center shall provide the capability to execute methods on the incoming data such as cleansing, summarizations, aggregations, or transformations applied to the data before it is stored in the archive. Existing
<i>Requirement:</i>	10 The center shall respond to requests from the administrator interface function to maintain the archive data. Existing
<i>Element:JATRAN</i>	
<i>Entity:Transit Management</i>	
<i>Functional Area: Transit Center Vehicle Tracking</i>	
<i>Requirement:</i>	1 The center shall monitor the locations of all transit vehicles within its network. Existing
<i>Requirement:</i>	2 The center shall determine adherence of transit vehicles to their assigned schedule. Existing

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:</i> JATRA	
<i>Entity:</i> Transit Management	
<i>Functional Area:</i> Transit Center Vehicle Tracking	
<i>Requirement:</i>	3 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for transit tracking and dispatch. Existing
<i>Requirement:</i>	4 The center shall provide transit operational data to traveler information service providers. Existing
<i>Functional Area:</i> Transit Center Fixed-Route Operations	
<i>Requirement:</i>	1 The center shall generate transit routes and schedules based on such factors as parameters input by the system operator, road network conditions, operational data on current routes and schedules, and digitized map data. Existing
<i>Requirement:</i>	2 The center shall provide the interface to the system operator to control the generation of new routes and schedules (transit services) including the ability to review and update the parameters used by the routes and schedules generation processes and to initiate these processes Existing
<i>Requirement:</i>	3 The center shall be able to generate special routes and schedules to support an incident, disaster, evacuation, or other emergency. Existing
<i>Requirement:</i>	4 The center shall dispatch fixed route or flexible route transit vehicles Existing
<i>Requirement:</i>	5 The center shall collect transit operational data for use in the generation of routes and schedules. Existing
<i>Requirement:</i>	6 The center shall provide instructions or corrective actions to the transit vehicle operators based upon operational needs. Existing
<i>Requirement:</i>	7 The center shall manage large deviations of individual transit vehicles, deviations in rural areas, and deviations of large numbers of vehicles. Existing
<i>Requirement:</i>	8 The center shall generate the necessary corrective actions that may involve more than the vehicles concerned and more far reaching action, such as, the introduction of extra vehicles, wide area signal priority by traffic management, the premature termination of some services, etc. Existing
<i>Requirement:</i>	9 The center shall exchange information with Maintenance and Construction Operations concerning work zones, roadway conditions, asset restrictions, work plans, etc. Existing
<i>Requirement:</i>	10 The center shall disseminate up-to-date schedules and route information to other centers for fixed and flexible route services. Existing
<i>Functional Area:</i> Transit Center Paratransit Operations	
<i>Requirement:</i>	1 The center shall process trip requests for demand responsive transit services, i.e. paratransit. Sources of the requests may include traveler information service providers. Existing
<i>Requirement:</i>	2 The center shall monitor the operational status of the demand response vehicles including status of passenger pick-up and drop-off. Existing

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:</i> JATRAN	
<i>Entity:</i> Transit Management	
<i>Functional Area:</i> Transit Center Paratransit Operations	
<i>Requirement:</i>	3 The center shall generate demand response transit (including paratransit) routes and schedules based on such factors as parameters input by the system operator, what other demand responsive transit schedules have been planned, the availability and location of vehicles, the relevance of any fixed transit routes and schedules, and road network information. Existing
<i>Requirement:</i>	4 The center shall dispatch demand response (paratransit) transit vehicles. Existing
<i>Requirement:</i>	5 The center shall exchange information with Maintenance and Construction Operations concerning work zones, roadway conditions, asset restrictions, work plans, etc. Existing
<i>Requirement:</i>	6 The center shall disseminate up-to-date schedules and route information to other centers for demand responsive transit services (paratransit). Existing
<i>Functional Area:</i> Transit Center Fare and Load Management	
<i>Requirement:</i>	1 The center shall manage the actual value of transit fares for each segment of each regular transit route, including the transmission of the information to transit vehicles and transit stops or stations. Existing
<i>Requirement:</i>	2 The center shall provide the capability for a system operator to manage the transit fares and control the exchange of transit fare information. Existing
<i>Requirement:</i>	4 The center shall support the payment of transit fare transactions using data provided by the traveler cards / payment instruments. Existing
<i>Requirement:</i>	6 The center shall process requests for transit fares to be paid in advance. Existing
<i>Requirement:</i>	8 The center shall be capable of establishing emergency fare structures to override all other fares during disasters, states of emergency, or evacuations. Existing
<i>Requirement:</i>	10 The center shall collect passenger loading and fare statistics data to implement variable and flexible fare structures. Existing
<i>Requirement:</i>	11 The center shall exchange fare and load information with other transit management centers, including potential Centralized Payments facilities. Existing
<i>Requirement:</i>	12 The center shall provide transit fare information to other centers, including traveler information providers upon request. Existing
<i>Functional Area:</i> Transit Center Security	
<i>Requirement:</i>	1 The center shall monitor transit vehicle operational data to determine if the transit vehicle is off-route and assess whether a security incident is occurring. Existing
<i>Requirement:</i>	2 The center shall receive reports of emergencies on-board transit vehicles entered directly by the transit vehicle operator or from a traveler through interfaces such as panic buttons or alarm switches. Existing
<i>Requirement:</i>	3 The center shall support the back-office portion of functionality to authenticate transit vehicle operators. Existing

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:</i> JATRAN	
<i>Entity:</i> Transit Management	
<i>Functional Area:</i> Transit Center Security	
<i>Requirement:</i>	4 The center shall exchange transit incident information along with other service data with other transit agencies. Existing
<i>Requirement:</i>	5 The center shall receive information pertaining to a wide-area alert such as weather alerts, disaster situations, or child abductions. This information may come from Emergency Management or from other Alerting and Advisory Systems. Existing
<i>Requirement:</i>	6 The center shall send wide-area alert information to travelers (on-board transit vehicles or at stations/stops) and transit vehicle operators. Existing
<i>Requirement:</i>	7 The center shall coordinate the response to security incidents involving transit with other agencies including Emergency Management, other transit agencies, media, traffic management, and traveler information service providers. Existing
<i>Requirement:</i>	8 The center shall receive threat information and status on the integrity of the transit infrastructure. Existing
<i>Requirement:</i>	9 The center shall provide support to remotely disable (or reset the disabling of) a transit vehicle in service. Planned
<i>Functional Area:</i> Transit Vehicle Operator Scheduling	
<i>Requirement:</i>	1 The center shall maintain records of a transit vehicle operator's performance. This may be done utilizing standardized performance evaluation criteria set forth by governmental regulations and transit operating company policies, assessing the transit vehicle operator's driving history, and assessing comments from the transit vehicle operator's supervisor(s) as well as noting any moving violations or accidents, supervisor comments, government regulations, and company policies. Existing
<i>Requirement:</i>	2 The center shall assess the transit vehicle operator's availability based on previous work assignments, accumulated hours, plus health and vacation commitments. Existing
<i>Requirement:</i>	3 The center shall assign transit vehicle operators to transit schedules based on their eligibility, route preferences, seniority, and transit vehicle availability. Existing
<i>Requirement:</i>	4 The center shall provide an interface through which the transit vehicle operator information can be maintained - either from the transit vehicle operator, a transit system operator (i.e. center personnel), or other functions. Existing
<i>Functional Area:</i> Transit Garage Maintenance	
<i>Requirement:</i>	1 The center shall collect operational and maintenance data from transit vehicles. Existing
<i>Requirement:</i>	2 The center shall monitor the condition of a transit vehicle to analyze brake, drive train, sensors, fuel, steering, tire, processor, communications equipment, and transit vehicle mileage to identify mileage based maintenance, out-of-specification or imminent failure conditions. Existing

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:</i> JATRAN	
<i>Entity:</i> Transit Management	
<i>Functional Area:</i> Transit Garage Maintenance	
<i>Requirement:</i>	3 The center shall generate transit vehicle maintenance schedules, includes what and when the maintenance or repair is performed. Existing
<i>Requirement:</i>	4 The center shall generate transit vehicle availability listings, current and forecast, to support transit vehicle assignment planning based, in part, on the transit vehicle maintenance schedule. Existing
<i>Requirement:</i>	5 The center shall assign technicians to a transit vehicle maintenance schedule, based upon such factors as personnel eligibility, work assignments, preferences and seniority. Existing
<i>Requirement:</i>	6 The center shall verify that the transit vehicle maintenance activities were performed correctly, using the transit vehicle's status, the maintenance personnel's work assignment, and the transit maintenance schedules. Existing
<i>Requirement:</i>	7 The center shall generate a time-stamped maintenance log of all maintenance activities performed on a transit vehicle. Existing
<i>Requirement:</i>	8 The center shall provide the transit system operator with the capability to update transit vehicle maintenance information and receive reports on all transit vehicle operations data. Existing
<i>Functional Area:</i> Transit Center Information Services	
<i>Requirement:</i>	1 The center shall provide travelers using public transportation with traffic and advisory information upon request. Such information may include transit routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, and special events. Existing
<i>Requirement:</i>	2 The center shall provide transit information to the media including details of deviations from schedule of regular transit services. Existing
<i>Requirement:</i>	3 The center shall exchange transit schedules, real-time arrival information, fare schedules, and general transit service information with other transit organizations to support transit traveler information systems. Existing
<i>Requirement:</i>	4 The center shall provide transit service information to traveler information service providers including routes, schedules, schedule adherence, and fare information as well as transit service information during evacuation. Existing
<i>Requirement:</i>	6 The center shall broadcast transit advisory data, including alerts and advisories pertaining to major emergencies, or man made disasters. Existing
<i>Functional Area:</i> Transit Evacuation Support	
<i>Requirement:</i>	1 The center shall manage the use of transit resources to support evacuation and subsequent reentry of a population in the vicinity of a disaster or other emergency. Existing
<i>Requirement:</i>	2 The center shall coordinate regional evacuation plans with Emergency Management - identifying the transit role in an evacuation and the transit resources that would be used. Existing

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:</i> JATRAN	
<i>Entity:</i> Transit Management	
<i>Functional Area:</i> Transit Evacuation Support	
<i>Requirement:</i>	3 The center shall coordinate the use of transit and school bus fleets during an evacuation, supporting evacuation of those with special needs and the general population. Existing
<i>Requirement:</i>	4 The center shall adjust and update transit service and fare schedules and provide that information to other agencies as they coordinate evacuations. Existing
<i>Functional Area:</i> Transit Data Collection	
<i>Requirement:</i>	1 The center shall collect transit management data such as transit fares and passenger use, transit services, paratransit operations, transit vehicle maintenance data, etc. Existing
<i>Element:</i> JATRAN Transit Systems Kiosks	
<i>Entity:</i> Remote Traveler Support	
<i>Functional Area:</i> Remote Transit Information Services	
<i>Requirement:</i>	1 The public interface for travelers shall collect and provide real-time travel-related information at transit stops, multi-modal transfer points, and other public transportation areas. Existing
<i>Requirement:</i>	2 The public interface for travelers shall collect and present to the transit traveler information on transit routes, schedules, and real-time schedule adherence. Existing
<i>Requirement:</i>	3 The public interface for travelers shall provide support for general annunciation and/or display of imminent arrival information and other information of general interest to transit users. Existing
<i>Requirement:</i>	4 The public interface for travelers shall present information to the traveler in a form suitable for travelers with physical disabilities. Existing
<i>Functional Area:</i> Remote Transit Fare Management	
<i>Requirement:</i>	1 The public interface for travelers shall accept and process current transit passenger fare collection information. Existing
<i>Requirement:</i>	2 The public interface for travelers shall calculate a fare based on the origin and destination provided by the traveler, in conjunction with transit routing, transit fare category, and transit user history. Existing
<i>Requirement:</i>	3 The public interface for travelers shall provide an interface to a transit user traveler card in support of payment for transit fares, tolls, and/or parking lot charges. The stored credit value data from the card shall be collected and updated based on the fare or other charges, or the credit identity shall be collected. Existing
<i>Requirement:</i>	4 The public interface for travelers shall provide information to the center for financial authorization and transaction processing. Existing
<i>Requirement:</i>	6 The public interface for travelers shall determine the routing based on the traveler's destination and the location of the closest transit stop from which a route request is being made. Existing
<i>Requirement:</i>	7 The public interface for travelers shall create passenger loading and fare statistics data based upon data collected at a transit stop. Existing

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:</i> JATRAN Transit Systems Kiosks	
<i>Entity:</i> Remote Traveler Support	
<i>Functional Area:</i> Remote Transit Fare Management	
<i>Requirement:</i> 8 The public interface for travelers shall present information to the traveler in a form suitable for travelers with physical disabilities.	Existing
<i>Element:</i> JATRAN Transit Vehicles	
<i>Entity:</i> Transit Vehicle Subsystem	
<i>Functional Area:</i> On-board Transit Trip Monitoring	
<i>Requirement:</i> 1 The transit vehicle shall compute the location of the transit vehicle based on inputs from a vehicle location determination function.	Planned
<i>Requirement:</i> 2 The transit vehicle shall support the computation of the location of a transit vehicle using on-board sensors to augment the location determination function. This may include proximity to the transit stops or other known reference points as well as recording trip length.	Planned
<i>Requirement:</i> 3 The transit vehicle shall record transit trip monitoring data including vehicle mileage and fuel usage.	Planned
<i>Requirement:</i> 4 The transit vehicle shall record transit trip monitoring data including operational status information such as doors open/closed, passenger loading, running times, etc.	Planned
<i>Requirement:</i> 5 The transit vehicle shall send the transit vehicle trip monitoring data to center-based trip monitoring functions.	Planned
<i>Functional Area:</i> On-board Fixed Route Schedule Management	
<i>Requirement:</i> 1 The transit vehicle shall receive transit route information for its assigned route including transit service instructions, traffic information, road conditions, and other information for the operator.	Existing
<i>Requirement:</i> 2 The transit vehicle shall use the route information and its current location to determine the deviation from the predetermined schedule.	Existing
<i>Requirement:</i> 3 The transit vehicle shall calculate the estimated times of arrival (ETA) at transit stops.	Existing
<i>Requirement:</i> 4 The transit vehicle shall determine scenarios to correct the schedule deviation.	Planned
<i>Requirement:</i> 5 The transit vehicle shall provide the schedule deviations and instructions for schedule corrections to the transit vehicle operator if the deviation is small, or the transit vehicle is operating in an urban area.	Planned
<i>Requirement:</i> 6 The transit vehicle shall send the schedule deviation and estimated arrival time information to the center.	Existing
<i>Requirement:</i> 7 The transit vehicle shall support the operations of a flexible route service. This may include requests for route deviations that would then lead to schedule corrective actions.	Existing
<i>Functional Area:</i> On-board Paratransit Operations	

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:</i> JATTRAN Transit Vehicles	
<i>Entity:</i> Transit Vehicle Subsystem	
<i>Functional Area:</i> On-board Paratransit Operations	
<i>Requirement:</i>	1 The transit vehicle shall manage data input to sensor(s) on-board a transit vehicle to determine the vehicle's availability for use in demand responsive and flexible-route transit services based on identity, type, and passenger capacity. Existing
<i>Requirement:</i>	2 The transit vehicle shall receive the status of demand responsive or flexible-route transit schedules and passenger loading from the transit vehicle operator. Existing
<i>Requirement:</i>	3 The transit vehicle shall provide the transit vehicle operator instructions about the demand responsive or flexible-route transit schedule that has been confirmed from the center. Existing
<i>Functional Area:</i> On-board Transit Fare and Load Management	
<i>Requirement:</i>	1 The transit vehicle shall detect embarking travelers on-board a transit vehicle and read data from the traveler card / payment instrument that they are carrying. Existing
<i>Requirement:</i>	3 The transit vehicle shall determine the traveler's travel routing based on the transit vehicle's current location and the traveler's destination. Existing
<i>Requirement:</i>	4 The transit vehicle shall calculate the traveler's fare based on the origin and destination provided by the traveler as well as factors such as the transit routing, transit fare category, traveler history, and route-specific information. Existing
<i>Requirement:</i>	5 The transit vehicle shall have access to the complete range of transit services (routes and schedules) that are available to the traveler. Existing
<i>Requirement:</i>	6 The transit vehicle shall provide a transit fare payment interface that is suitable for travelers with physical disabilities. Existing
<i>Requirement:</i>	7 The transit vehicle shall include a database on-board the transit vehicle for use in fare processing from which the fares for all possible trips within the transit operational network can be determined. Existing
<i>Requirement:</i>	8 The transit vehicle shall support an emergency fare structure overriding all other fares that can be activated during disasters, states of emergency or evacuations. Existing
<i>Requirement:</i>	10 The transit vehicle shall provide passenger loading and fare statistics data to the center. Existing
<i>Functional Area:</i> On-board Transit Security	
<i>Requirement:</i>	1 The transit vehicle shall perform video and audio surveillance inside of transit vehicles and output raw video or audio data for either local monitoring (for processing or direct output to the transit vehicle operator), remote monitoring or for local storage (e.g., in an event recorder). Planned
<i>Requirement:</i>	2 The transit vehicle shall perform local monitoring of video or audio surveillance data collected inside of transit vehicles, and identify potential incidents or threats based on received processing parameters. Planned

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:</i> JATTRAN Transit Vehicles	
<i>Entity:</i> Transit Vehicle Subsystem	
<i>Functional Area:</i> On-board Transit Security	
<i>Requirement:</i>	3 The transit vehicle shall output an indication of potential incidents or threats and the processed video or audio information to the center along with the vehicle's current location. Planned
<i>Requirement:</i>	8 The transit vehicle shall monitor and output surveillance and sensor equipment status and fault indications. Planned
<i>Requirement:</i>	9 The transit vehicle shall accept emergency inputs from either the transit vehicle operator or a traveler through such interfaces as panic buttons, silent or audible alarms, etc. Planned
<i>Requirement:</i>	10 The transit vehicle shall output reported emergencies to the center. Planned
<i>Requirement:</i>	11 The transit vehicle shall receive acknowledgments of the emergency request from the center and output this acknowledgment to the transit vehicle operator or to the travelers. Planned
<i>Requirement:</i>	12 The transit vehicle shall be capable of receiving an emergency message for broadcast to the travelers or to the transit vehicle operator. Planned
<i>Requirement:</i>	13 The transit vehicle shall be capable of disabling or enabling the transit vehicle based on commands from the center or authentic inputs from the transit vehicle operator. Planned
<i>Requirement:</i>	14 The transit vehicle shall perform authentication of the transit vehicle operator. Planned
<i>Functional Area:</i> On-board Maintenance	
<i>Requirement:</i>	1 The transit vehicle shall collect and process vehicle mileage data available to sensors on-board. Planned
<i>Requirement:</i>	2 The transit vehicle shall collect and process the transit vehicle's operating conditions such as engine temperature, oil pressure, brake wear, internal lighting, environmental controls, etc. Planned
<i>Requirement:</i>	3 The transit vehicle shall transmit vehicle maintenance data to the center to be used for scheduling future vehicle maintenance. Planned
<i>Functional Area:</i> On-board Transit Signal Priority	
<i>Requirement:</i>	1 The transit vehicle shall determine the schedule deviation and estimated times of arrival (ETA) at transit stops. Planned
<i>Requirement:</i>	2 The transit vehicle shall send priority requests to traffic signal controllers at intersections, pedestrian crossings, and multimodal crossings on the roads (surface streets) and freeway (ramp controls) network that enable a transit vehicle schedule deviation to be corrected. Planned
<i>Requirement:</i>	3 The transit vehicle shall send the schedule deviation data and status of priority requests to the transit vehicle operator. Planned
<i>Functional Area:</i> On-board Transit Information Services	

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:</i> JATTRAN Transit Vehicles	
<i>Entity:</i> Transit Vehicle Subsystem	
<i>Functional Area:</i> On-board Transit Information Services	
<i>Requirement:</i>	1 The transit vehicle shall enable traffic and travel advisory information to be requested and output to the traveler. Such information may include transit routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, and special events. Planned
<i>Requirement:</i>	3 The transit vehicle shall broadcast advisories about the imminent arrival of the transit vehicle at the next stop via an on-board automated annunciation system. Planned
<i>Requirement:</i>	4 The transit vehicle shall support input and output forms that are suitable for travelers with physical disabilities. Planned
<i>Requirement:</i>	5 The transit vehicle shall gather transit advisory data, including alerts and advisories pertaining to major emergencies, or man made disasters. Planned
<i>Requirement:</i>	6 The transit vehicle shall tailor the output of the request traveler information based on the current location of the transit vehicle. Planned
<i>Entity:</i> Vehicle	
<i>Functional Area:</i> Vehicle Location Determination	
<i>Requirement:</i>	1 The vehicle shall provide the vehicle's current location to other in-vehicle functions. Existing
<i>Requirement:</i>	2 The vehicle shall calculate the location from one or more sources of position data. These location referencing systems include position systems such as GPS, DGPS, odometer and differential odometers. Existing
<i>Requirement:</i>	3 The vehicle shall refine its calculations as required by other in-vehicle functions. Existing
<i>Element:</i> JATTRAN Traveler Information Systems	
<i>Entity:</i> Information Service Provider	
<i>Functional Area:</i> ISP Traveler Data Collection	
<i>Requirement:</i>	3 The center shall collect, process, and store transit routes and schedules, transit transfer options, transit fares, and real-time schedule adherence information. Existing
<i>Functional Area:</i> Basic Information Broadcast	
<i>Requirement:</i>	3 The center shall collect, process, store, and disseminate transit routes and schedules, transit transfer options, transit fares, and real-time schedule adherence information to travelers. Existing
<i>Requirement:</i>	10 The center shall provide the capability for a system operator to control the type and update frequency of broadcast traveler information. Existing
<i>Element:</i> Local City/County Databases	
<i>Entity:</i> Archived Data Management Subsystem	
<i>Functional Area:</i> ITS Data Repository	
<i>Requirement:</i>	1 The center shall collect data to be archived from one or more data sources. Existing

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element: Local City/County Databases</i>	
<i>Entity: Archived Data Management Subsystem</i>	
<i>Functional Area: ITS Data Repository</i>	
<i>Requirement:</i> 2	The center shall collect data catalogs from one or more data sources. A catalog describes the data contained in the collection of archived data and may include descriptions of the schema or structure of the data, a description of the contents of the data; e.g., time range of entries, number of entries; or a sample of the data (e. g. a thumbnail). Existing
<i>Requirement:</i> 3	The center shall store the archived data in a focused repository that is suited to a particular set of ITS data users. Existing
<i>Requirement:</i> 4	The center shall include capabilities for performing quality checks on the incoming archived data. Existing
<i>Requirement:</i> 5	The center shall include capabilities for error notification on the incoming archived data. Existing
<i>Requirement:</i> 6	The center shall include capabilities for archive to archive coordination. Existing
<i>Requirement:</i> 7	The center shall support a broad range of archived data management implementations, ranging from simple data marts that collect a focused set of data and serve a particular user community to large-scale data warehouses that collect, integrate, and summarize transportation data from multiple sources and serve a broad array of users within a region. Existing
<i>Requirement:</i> 8	The center shall perform quality checks on received data. Existing
<i>Requirement:</i> 9	The center shall provide the capability to execute methods on the incoming data such as cleansing, summarizations, aggregations, or transformations applied to the data before it is stored in the archive. Existing
<i>Requirement:</i> 10	The center shall respond to requests from the administrator interface function to maintain the archive data. Existing
<i>Requirement:</i> 11	When data or a catalog of data is received from the archive, the center shall generate the requested data product for the users systems. Existing
<i>Requirement:</i> 12	For archive data requiring financial payment, the center shall process the financial requests and manage an interface to a Financial Institution. Existing
<i>Functional Area: Traffic and Roadside Data Archival</i>	
<i>Requirement:</i> 1	The center shall manage the collection of archive data directly from collection equipment located at the roadside. Existing
<i>Requirement:</i> 2	The center shall collect traffic sensor information from roadside devices. Existing
<i>Requirement:</i> 4	The center shall respond to requests from the Archive Data Administer to input the parameters that control the collection process. Existing
<i>Requirement:</i> 5	The center shall send the request for data and control parameters to the field equipment where the information is collected and returned. Existing

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element: Local City/County Databases</i>	
<i>Entity: Archived Data Management Subsystem</i>	
<i>Functional Area: Traffic and Roadside Data Archival</i>	
<i>Requirement:</i>	6 The center shall record the status about the imported traffic and roadside data. Existing
<i>Requirement:</i>	7 The center shall use the status information to adjust the collection of traffic and roadside data. Existing
<i>Functional Area: Government Reporting Systems Support</i>	
<i>Requirement:</i>	1 The center shall provide data from an ITS archive to federal, state, or local government reporting systems. Planned
<i>Requirement:</i>	2 The center shall provide the capability to select data from an ITS archive for use in government reports. Planned
<i>Requirement:</i>	3 The center shall provide the capability to format data from an ITS archive suitable for input into government reports. Planned
<i>Requirement:</i>	4 The center shall support requests for ITS archived data from Government Reporting Systems. Planned
<i>Requirement:</i>	5 The center shall provide the applicable meta-data for any ITS archived data to satisfy government reporting system requests. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data. Planned
<i>Functional Area: On-Line Analysis and Mining</i>	
<i>Requirement:</i>	1 The center shall support the interface with Archive Data User Systems for requests for analysis of the archive data. Planned
<i>Requirement:</i>	2 The center shall provide the capability to perform activities such as data mining, data fusion, summarizations, aggregations, and recreation from archive data. This may include multidimensional analysis, selective summarization and expansion of data details, and many other advanced analysis services. Planned
<i>Requirement:</i>	3 The center shall receive the user's systems requests and develop the request to retrieve the data from the archive. Planned
<i>Requirement:</i>	4 The center shall respond to user's systems requests for a catalog of the archived data analysis products available. Planned
<i>Requirement:</i>	5 For archive analysis and data mining products requiring financial payment, the center shall process the financial requests and manage an interface to a Financial Institution. Planned
<i>Element: Local City/County Emergency Vehicles</i>	
<i>Entity: Emergency Vehicle Subsystem</i>	
<i>Functional Area: On-board EV En Route Support</i>	
<i>Requirement:</i>	1 The emergency vehicle, including roadway service patrols, shall compute the location of the emergency vehicle based on inputs from a vehicle location determination function. Existing
<i>Requirement:</i>	2 The emergency vehicle, including roadway service patrols, shall send the vehicle's location and operational data to the center for emergency management and dispatch. Existing

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:Local City/County Emergency Vehicles</i>	
<i>Entity:Emergency Vehicle Subsystem</i>	
<i>Functional Area: On-board EV En Route Support</i>	
<i>Requirement:</i> 3 The emergency vehicle, including roadway service patrols, shall receive incident details and a suggested route when dispatched to a scene.	Existing
<i>Requirement:</i> 4 The emergency vehicle shall send the current en route status (including estimated time of arrival) and requests for emergency dispatch updates.	Existing
<i>Requirement:</i> 5 The emergency vehicle shall send requests to traffic signal control equipment at the roadside to preempt the signal.	Existing
<i>Requirement:</i> 6 The emergency vehicle shall provide the personnel on-board with dispatch information, including incident type and location, and forward an acknowledgment from personnel to the center that the vehicle is on its way to the incident scene.	Existing
<i>Requirement:</i> 7 The emergency vehicle shall send patient status information to the care facility along with a request for further information.	Existing
<i>Requirement:</i> 8 The emergency vehicle shall forward care facility status information to emergency vehicle personnel, including the location, specialized services, quality of care, waiting time, number of rooms available, and emergency room status of hospitals or emergency care providers.	Existing
<i>Functional Area: On-board EV Incident Management Communication</i>	
<i>Requirement:</i> 1 The emergency vehicle shall receive dispatch instructions sufficient to enable emergency personnel in the field to implement an effective incident response. It includes local traffic, road, and weather conditions, hazardous material information, and the status of resources allocated to an incident.	Existing
<i>Requirement:</i> 2 The emergency vehicle shall provide an interface to the center for emergency personnel to transmit information about the incident site such as the extent of injuries, identification of vehicles and people involved, hazardous material, etc.	Existing
<i>Requirement:</i> 3 The emergency vehicle shall provide an interface to the center for emergency personnel to transmit information about the current incident response status such as the identification of the resources on site, site management strategies in effect, and current clearance status.	Existing
<i>Element:Local City/County TMCs</i>	
<i>Entity:Traffic Management</i>	
<i>Functional Area: Collect Traffic Surveillance</i>	
<i>Requirement:</i> 1 The center shall monitor, analyze, and store traffic sensor data (speed, volume, occupancy) collected from field elements under remote control of the center.	Existing
<i>Requirement:</i> 2 The center shall monitor, analyze, and distribute traffic images from CCTV systems under remote control of the center.	Planned

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element: Local City/County TMCs</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: Collect Traffic Surveillance</i>	
<i>Requirement:</i> 4 The center shall distribute road network conditions data (raw or processed) based on collected and analyzed traffic sensor and surveillance data to other centers.	Existing
<i>Requirement:</i> 5 The center shall respond to control data from center personnel regarding sensor and surveillance data collection, analysis, storage, and distribution.	Existing
<i>Requirement:</i> 6 The center shall maintain a database of surveillance and sensors and the freeways, surface street and rural roadways, e.g. where they are located, to which part(s) of the network their data applies, the type of data, and the ownership of each link (that is, the agency or entity responsible for collecting and storing surveillance of the link) in the network.	Existing
<i>Requirement:</i> 7 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic data.	Existing
<i>Functional Area: TMC Signal Control</i>	
<i>Requirement:</i> 1 The center shall remotely control traffic signal controllers.	Existing
<i>Requirement:</i> 2 The center shall accept notifications of right-of-way requests from pedestrians.	Existing
<i>Requirement:</i> 3 The center shall collect traffic signal controller operational status and compare against the control information sent by the center.	Existing
<i>Requirement:</i> 4 The center shall collect traffic signal controller fault data from the field.	Existing
<i>Requirement:</i> 5 The center shall implement control plans to coordinate signalized intersections, under control of center personnel, based on data from sensors and surveillance monitoring traffic conditions, incidents, emergency vehicle preemptions, the passage of commercial vehicles with unusual loads, equipment faults, pedestrian crossings, etc.	Existing
<i>Functional Area: TMC Traffic Information Dissemination</i>	
<i>Requirement:</i> 1 The center shall remotely control dynamic messages signs for dissemination of traffic and other information to drivers.	Planned
<i>Requirement:</i> 2 The center shall remotely control driver information systems that communicate directly from a center to the vehicle radio (such as Highway Advisory Radios) for dissemination of traffic and other information to drivers.	Planned
<i>Requirement:</i> 3 The center shall collect operational status for the driver information systems equipment (DMS, HAR, etc.).	Planned
<i>Requirement:</i> 4 The center shall collect fault data for the driver information systems equipment (DMS, HAR, etc.) for repair.	Planned

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element: Local City/County TMCs</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: TMC Traffic Information Dissemination</i>	
<i>Requirement:</i> 5 The center shall retrieve locally stored traffic information, including current and forecasted traffic information, road and weather conditions, traffic incident information, information on diversions and alternate routes, closures, and special traffic restrictions (lane/shoulder use, weight restrictions, width restrictions, and HOV requirements), etc.	Planned
<i>Requirement:</i> 6 The center shall distribute traffic data to maintenance and construction centers, transit centers, emergency management centers, and traveler information providers.	Planned
<i>Requirement:</i> 7 The center shall distribute traffic data to the media upon request; the capability to provide the information in both data stream and graphical display shall be supported.	Planned
<i>Requirement:</i> 8 The center shall provide the capability for center personnel to control the nature of the data that is available to non-traffic operations centers and the media.	Planned
<i>Functional Area: TMC Regional Traffic Control</i>	
<i>Requirement:</i> 1 The center shall exchange traffic information with other traffic management centers, includes incident information, congestion data, traffic data, signal timing plans, and real-time signal control information.	Planned
<i>Requirement:</i> 2 The center shall exchange traffic control information with other traffic management centers, includes remote monitoring and control of traffic management devices (e.g. signs, sensors, signals, cameras, etc.).	Planned
<i>Functional Area: TMC Incident Detection</i>	
<i>Requirement:</i> 1 The center shall receive inputs from the Alerting and Advisory System concerning the possibility or occurrence of severe weather, terrorist activity, or other major emergency, including information provided by the Emergency Alert System.	Existing
<i>Requirement:</i> 2 The center shall collect and store traffic flow and image data from the field equipment to detect and verify incidents.	Existing
<i>Requirement:</i> 3 The center shall receive inputs concerning upcoming events that would affect the traffic network from event promoters, traveler information service providers, and intermodal freight depots.	Existing
<i>Requirement:</i> 4 The center shall exchange incident and threat information with emergency management centers as well as maintenance and construction centers; including notification of existence of incident and expected severity, location, time and nature of incident.	Planned
<i>Requirement:</i> 5 The center shall support requests from emergency management centers to remotely control sensor and surveillance equipment located in the field.	Planned
<i>Requirement:</i> 6 The center shall provide road network conditions and traffic images to emergency management centers to support the detection, verification, and classification of incidents.	Planned

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element: Local City/County TMCs</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: TMC Incident Detection</i>	
<i>Requirement:</i> 7 The center shall provide video and traffic sensor control commands to the field equipment to detect and verify incidents.	Planned
<i>Functional Area: TMC Incident Dispatch Coordination/Communication</i>	
<i>Requirement:</i> 1 The center shall exchange alert information and status with emergency management centers. The information includes notification of a major emergency such as a natural or fabricated disaster, civil emergency, or child abduction for distribution to the public. The information may include the alert originator, the nature of the emergency, the geographic area affected by the emergency, the effective time period, and information and instructions necessary for the public to respond to the alert. This may also identify specific information that should not be released to the public.	Existing
<i>Requirement:</i> 2 The center shall coordinate planning for incidents with emergency management centers - including pre-planning activities for disaster response, evacuation, and recovery operations.	Existing
<i>Requirement:</i> 3 The center shall support requests from emergency management centers to remotely control sensor and surveillance equipment located in the field, provide special routing for emergency vehicles, and to provide responding emergency vehicles with signal preemption.	Planned
<i>Requirement:</i> 4 The center shall exchange incident and threat information with emergency management centers as well as maintenance and construction centers; including notification of existence of incident and expected severity, location, time and nature of incident.	Existing
<i>Requirement:</i> 5 The center shall respond to requests from emergency management to provide traffic management resources to implement special traffic control measures, assist in clean up, verify an incident, etc. This may also involve coordination with maintenance centers.	Existing
<i>Requirement:</i> 6 The center shall receive inputs concerning upcoming events that would affect the traffic network from event promoters, traveler information service providers, media, and rail operations centers.	Existing
<i>Requirement:</i> 7 The center shall provide road network conditions and traffic images to emergency management centers, maintenance and construction centers, and traveler information service providers.	Planned
<i>Requirement:</i> 8 The center shall exchange road network status assessment information with emergency management and maintenance centers including an assessment of damage sustained by the road network including location and extent of the damage, estimate of remaining capacity, required closures, alternate routes, necessary restrictions, and time frame for repair and recovery.	Planned
<i>Requirement:</i> 9 The center shall coordinate information and controls with other traffic management centers.	Planned

Architecture	Status	
Central Region ITS Architecture (Region)	(Region)	
<i>Element: Local City/County TMCs</i>		
<i>Entity: Traffic Management</i>		
<i>Functional Area: TMC Incident Dispatch Coordination/Communication</i>		
<i>Requirement:</i> 10	The center shall receive inputs from emergency management and transit management centers to develop an overall status of the transportation system including emergency transit schedules in effect and status and condition of the transportation infrastructure.	Planned
<i>Requirement:</i> 11	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic incident management.	Planned
<i>Functional Area: TMC Evacuation Support</i>		
<i>Requirement:</i> 1	The center shall coordinate planning for evacuation with emergency management centers - including pre-planning activities such as establishing routes, areas to be evacuated, timing, etc.	Existing
<i>Requirement:</i> 2	The center shall support requests from emergency management centers to preempt the current traffic control strategy, activate traffic control and closure systems such as gates and barriers, activate safeguard systems, or use driver information systems to support evacuation traffic control plans.	Existing
<i>Requirement:</i> 3	The center shall coordinate information and controls with other traffic management centers.	Existing
<i>Requirement:</i> 4	The center shall coordinate execution of evacuation strategies with emergency management centers - including activities such as setting closures and detours, establishing routes, updating areas to be evacuated, timing the process, etc.	Existing
<i>Functional Area: HRI Traffic Management</i>		
<i>Requirement:</i> 1	The center shall remotely control highway-rail intersection (HRI) equipment located in the field.	Existing
<i>Requirement:</i> 2	The center shall accept collect highway-rail intersection (HRI) advisory or alert data from rail operations centers.	Existing
<i>Requirement:</i> 3	The center shall collect highway-rail intersection (HRI) equipment operational status and compare against the control information sent by the center.	Existing
<i>Requirement:</i> 4	The center shall provide the highway-rail intersection (HRI) equipment operational status to rail operations centers.	Existing
<i>Requirement:</i> 5	The center shall collect incident information related to a highway-rail intersection (HRI), such as intersection blockages or crashes or equipment malfunctions.	Existing
<i>Requirement:</i> 6	The center shall implement control plans to coordinate signalized intersections around highway-rail intersections (HRI), under control of center personnel, based on data from sensors and surveillance monitoring traffic conditions, incidents, equipment faults, pedestrian crossings, etc.	Existing
<i>Functional Area: Traffic Maintenance</i>		

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:Local City/County TMCs</i>	
<i>Entity:Traffic Management</i>	
<i>Functional Area: Traffic Maintenance</i>	
<i>Requirement:</i>	1 The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) operational status. Existing
<i>Requirement:</i>	2 The center shall collect and store CCTV surveillance system (traffic, pedestrian) operational status. Planned
<i>Requirement:</i>	3 The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) fault data and send to the maintenance center for repair. Existing
<i>Requirement:</i>	4 The center shall collect and store CCTV surveillance system (traffic, pedestrian) fault data send to the maintenance center for repair. Planned
<i>Requirement:</i>	7 The center shall exchange data with maintenance centers concerning the reporting of faulty equipment and the schedule/status of their repair. Information exchanged includes details of new equipment faults, and clearances when the faults are cleared. Existing
<i>Requirement:</i>	8 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic maintenance data. Planned
<i>Functional Area: Traffic Data Collection</i>	
<i>Requirement:</i>	1 The center shall collect traffic management data such as operational data, event logs, etc. Existing
<i>Requirement:</i>	2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data. Planned
<i>Requirement:</i>	3 The center shall receive and respond to requests from ITS Archives either for a catalog of the traffic data or for the data itself. Planned
<i>Requirement:</i>	4 The center shall be able to produce sample products of the data available. Planned
<i>Element:MDOT Accident Database</i>	
<i>Entity:Archived Data Management Subsystem</i>	
<i>Functional Area: ITS Data Repository</i>	
<i>Requirement:</i>	1 The center shall collect data to be archived from one or more data sources. Existing
<i>Requirement:</i>	2 The center shall collect data catalogs from one or more data sources. A catalog describes the data contained in the collection of archived data and may include descriptions of the schema or structure of the data, a description of the contents of the data; e.g., time range of entries, number of entries; or a sample of the data (e. g. a thumbnail). Existing
<i>Requirement:</i>	3 The center shall store the archived data in a focused repository that is suited to a particular set of ITS data users. Existing

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:MDOT Accident Database</i>	
<i>Entity:Archived Data Management Subsystem</i>	
<i>Functional Area: ITS Data Repository</i>	
<i>Requirement:</i>	4 The center shall include capabilities for performing quality checks on the incoming archived data. Existing
<i>Requirement:</i>	5 The center shall include capabilities for error notification on the incoming archived data. Existing
<i>Requirement:</i>	6 The center shall include capabilities for archive to archive coordination. Existing
<i>Requirement:</i>	7 The center shall support a broad range of archived data management implementations, ranging from simple data marts that collect a focused set of data and serve a particular user community to large-scale data warehouses that collect, integrate, and summarize transportation data from multiple sources and serve a broad array of users within a region. Existing
<i>Requirement:</i>	8 The center shall perform quality checks on received data. Existing
<i>Requirement:</i>	9 The center shall provide the capability to execute methods on the incoming data such as cleansing, summarizations, aggregations, or transformations applied to the data before it is stored in the archive. Existing
<i>Requirement:</i>	10 The center shall respond to requests from the administrator interface function to maintain the archive data. Existing
<i>Requirement:</i>	11 When data or a catalog of data is received from the archive, the center shall generate the requested data product for the users systems. Existing
<i>Functional Area: Government Reporting Systems Support</i>	
<i>Requirement:</i>	1 The center shall provide data from an ITS archive to federal, state, or local government reporting systems. Planned
<i>Requirement:</i>	2 The center shall provide the capability to select data from an ITS archive for use in government reports. Planned
<i>Requirement:</i>	3 The center shall provide the capability to format data from an ITS archive suitable for input into government reports. Planned
<i>Requirement:</i>	4 The center shall support requests for ITS archived data from Government Reporting Systems. Planned
<i>Requirement:</i>	5 The center shall provide the applicable meta-data for any ITS archived data to satisfy government reporting system requests. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data. Planned
<i>Functional Area: On-Line Analysis and Mining</i>	
<i>Requirement:</i>	1 The center shall support the interface with Archive Data User Systems for requests for analysis of the archive data. Planned
<i>Requirement:</i>	2 The center shall provide the capability to perform activities such as data mining, data fusion, summarizations, aggregations, and recreation from archive data. This may include multidimensional analysis, selective summarization and expansion of data details, and many other advanced analysis services. Planned

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:MDOT Accident Database</i>	
<i>Entity:Archived Data Management Subsystem</i>	
<i>Functional Area: On-Line Analysis and Mining</i>	
<i>Requirement:</i>	3 The center shall receive the user's systems requests and develop the request to retrieve the data from the archive. Planned
<i>Requirement:</i>	4 The center shall respond to user's systems requests for a catalog of the archived data analysis products available. Planned
<i>Element:MDOT Commercial Vehicle Traveler Information Network</i>	
<i>Entity:Information Service Provider</i>	
<i>Functional Area: ISP Traveler Data Collection</i>	
<i>Requirement:</i>	1 The center shall collect, process, and store traffic and highway condition information, including incident information, detours and road closures, event information, recommended routes, and current speeds on specific routes. Planned
<i>Requirement:</i>	2 The center shall collect, process, and store maintenance and construction information, including scheduled maintenance and construction work activities and work zone activities. Planned
<i>Requirement:</i>	6 The center shall collect, process, and store weather information. Planned
<i>Functional Area: Basic Information Broadcast</i>	
<i>Requirement:</i>	1 The center shall collect, process, store, and disseminate traffic and highway condition information to travelers, including incident information, detours and road closures, event information, recommended routes, and current speeds on specific routes. Planned
<i>Requirement:</i>	2 The center shall collect, process, store, and disseminate maintenance and construction information to travelers, including scheduled maintenance and construction work activities and work zone activities. Planned
<i>Requirement:</i>	6 The center shall collect, process, store, and disseminate weather information to travelers. Planned
<i>Requirement:</i>	10 The center shall provide the capability for a system operator to control the type and update frequency of broadcast traveler information. Planned
<i>Functional Area: ISP Emergency Traveler Information</i>	
<i>Requirement:</i>	1 The center shall collect and provide to the traveler interface systems emergency evacuation information, including evacuation zones, shelter information, available transportation modes, road closures and detours, changes to transit services, and traffic and road conditions at the origin, destination, and along the evacuation routes. Planned
<i>Element:MDOT CVISN Credentialing Infrastructure System</i>	
<i>Entity:Archived Data Management Subsystem</i>	
<i>Functional Area: ITS Data Repository</i>	
<i>Requirement:</i>	1 The center shall collect data to be archived from one or more data sources. Existing

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:MDOT CVISN Credentialing Infrastructure System</i>	
<i>Entity:Archived Data Management Subsystem</i>	
<i>Functional Area: ITS Data Repository</i>	
<i>Requirement:</i>	
2 The center shall collect data catalogs from one or more data sources. A catalog describes the data contained in the collection of archived data and may include descriptions of the schema or structure of the data, a description of the contents of the data; e.g., time range of entries, number of entries; or a sample of the data (e. g. a thumbnail).	Existing
<i>Requirement:</i>	
3 The center shall store the archived data in a focused repository that is suited to a particular set of ITS data users.	Existing
<i>Requirement:</i>	
4 The center shall include capabilities for performing quality checks on the incoming archived data.	Existing
<i>Requirement:</i>	
5 The center shall include capabilities for error notification on the incoming archived data.	Existing
<i>Requirement:</i>	
6 The center shall include capabilities for archive to archive coordination.	Existing
<i>Requirement:</i>	
7 The center shall support a broad range of archived data management implementations, ranging from simple data marts that collect a focused set of data and serve a particular user community to large-scale data warehouses that collect, integrate, and summarize transportation data from multiple sources and serve a broad array of users within a region.	Existing
<i>Requirement:</i>	
8 The center shall perform quality checks on received data.	Existing
<i>Requirement:</i>	
9 The center shall provide the capability to execute methods on the incoming data such as cleansing, summarizations, aggregations, or transformations applied to the data before it is stored in the archive.	Existing
<i>Requirement:</i>	
10 The center shall respond to requests from the administrator interface function to maintain the archive data.	Existing
<i>Requirement:</i>	
11 When data or a catalog of data is received from the archive, the center shall generate the requested data product for the users systems.	Existing
<i>Requirement:</i>	
12 For archive data requiring financial payment, the center shall process the financial requests and manage an interface to a Financial Institution.	Existing
<i>Entity:Commercial Vehicle Administration</i>	
<i>Functional Area: Credentials and Taxes Administration</i>	
<i>Requirement:</i>	
1 The center shall manage electronic credentials filing and processing for commercial vehicles.	Existing
<i>Requirement:</i>	
2 The center shall manage the filing of appropriate taxes for the operation of commercial vehicles.	Existing
<i>Requirement:</i>	
3 The center shall process requests for payments of electronic credentials, tax filing, and maintain an interface to a Financial Institution.	Existing
<i>Requirement:</i>	
4 The center shall exchange credentials and tax information with other commercial vehicle administration centers in either other states or the federal government.	Existing

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:</i> MDOT CVISN Credentialing Infrastructure System	
<i>Entity:</i> Commercial Vehicle Administration	
<i>Functional Area:</i> Credentials and Taxes Administration	
<i>Requirement:</i>	Existing
5 The center shall provide route restrictions information, including hazmat restrictions, to other centers and agencies for distribution to commercial vehicle operators. These centers and agencies may include commercial fleet and freight management operators, traveler information centers, digital map update providers, and other commercial vehicle administration centers.	
<i>Requirement:</i>	Existing
6 The center shall use information on asset restrictions received from maintenance centers to develop the commercial vehicle route restrictions and process credentials applications.	
<i>Requirement:</i>	Existing
7 The center shall provide an interface with commercial vehicle fleet and freight management centers to exchange audit and compliance review reports.	
<i>Requirement:</i>	Existing
8 The center shall provide credentials information about commercial vehicle operators and carriers to authorized requestors such as insurance agencies.	
<i>Requirement:</i>	Existing
9 The center shall receive and store information on commercial vehicle violations from enforcement agencies as part of the processing of credentials applications.	
<i>Functional Area:</i> CV Safety Administration	
<i>Requirement:</i>	Existing
1 The center shall provide commercial vehicle safety data to roadside check facilities.	
<i>Requirement:</i>	Existing
2 The center shall collect and review safety inspection reports and violations from the roadside check facilities and pass on appropriate portions to other commercial vehicle administrative centers and commercial vehicle fleet operators.	
<i>Requirement:</i>	Existing
3 The center shall notify enforcement agencies of commercial vehicle safety violations by individual commercial vehicles, drivers, or carriers.	
<i>Functional Area:</i> CV Information Exchange	
<i>Requirement:</i>	Existing
1 The center shall exchange information with roadside check facilities, including credentials and credentials status information, safety status information, daily site activity data, and citations.	
<i>Requirement:</i>	Existing
2 The center shall exchange safety and credentials data among other commercial vehicle administration centers; includes border clearance status, credentials information, credentials status information, and safety status information.	
<i>Requirement:</i>	Existing
3 The center shall package data concerning commercial vehicle safety and credentials into snapshots (top-level summary and critical status information).	
<i>Requirement:</i>	Existing
4 The center shall package data concerning commercial vehicle safety and credentials into profiles (detailed and historical data).	
<i>Requirement:</i>	Existing
5 The center shall provide commercial vehicle accident reports and citations to enforcement agencies.	

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:MDOT CVISN Credentialing Infrastructure System</i>	
<i>Entity:Commercial Vehicle Administration</i>	
<i>Functional Area: CV Information Exchange</i>	
<i>Requirement:</i>	6 The center shall provide commercial vehicle credentials and safety status information to authorized requestors such as insurance agencies. Existing
<i>Requirement:</i>	7 The center shall provide reports to the commercial vehicle fleet manager regarding fleet activity through roadside facilities including accident reports, citations, credentials status information, and safety status information. Existing
<i>Functional Area: CV Data Collection</i>	
<i>Requirement:</i>	1 The center shall receive operational data from the roadside check systems as well as administration and credentials data. Existing
<i>Requirement:</i>	2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data. Existing
<i>Requirement:</i>	3 The center shall receive and respond to requests from ITS Archives either for a catalog of the commercial vehicle operations data or for the data itself. Existing
<i>Requirement:</i>	4 The center shall be able to produce sample products of the data available. Existing
<i>Element:MDOT District Closed Loop Signal System</i>	
<i>Entity:Roadway Subsystem</i>	
<i>Functional Area: Roadway Signal Controls</i>	
<i>Requirement:</i>	1 The field element shall control traffic signals at intersections and on main highways for urban and rural areas, under center control. Existing
<i>Requirement:</i>	2 The field element shall collect pedestrian images and pedestrian sensor data, and respond to pedestrian crossing requests via display, audio signal, or other manner. Existing
<i>Requirement:</i>	3 The field element shall provide the capability to notify the traffic management center that a pedestrian has requested right-of-way and when the request was or will be granted (request for right-of-way). Existing
<i>Requirement:</i>	4 The field element shall monitor operation of traffic signal controllers and report to the center any instances in which the indicator response does not match that expected from the indicator control information. Existing
<i>Requirement:</i>	5 The field element shall monitor operation of traffic signal controllers and report to the center any instances in which the indicator response does not match that expected from known indicator preemptions. Existing
<i>Requirement:</i>	6 The field element shall return traffic signal controller operational status to the controlling center. Existing
<i>Requirement:</i>	7 The field element shall return traffic signal controller fault data to the maintenance center for repair. Existing

Architecture		Status
Central Region ITS Architecture (Region)		(Region)
<i>Element:</i> MDOT District Closed Loop Signal System		
<i>Entity:</i> Roadway Subsystem		
<i>Functional Area:</i> Roadway Signal Priority		
<i>Requirement:</i>	1 The field element shall respond to requests for indicator (e.g., signal) preemption requests from emergency vehicles at intersections, pedestrian crossings, and multimodal crossings.	Existing
<i>Requirement:</i>	2 The field element shall respond to requests for indicator (e.g., signal) priority requests from transit vehicles at intersections, pedestrian crossings, and multimodal crossings.	Planned
<i>Requirement:</i>	3 The field element shall notify controlling traffic management center and maintenance center that the signal timing has changed based on a signal preemption/priority request to help those centers determine whether a fault detected at the signal is a true malfunction or due to a signal override.	Existing
<i>Functional Area:</i> Standard Rail Crossing		
<i>Requirement:</i>	1 The field element shall collect and process, traffic sensor data in the vicinity of a highway-rail intersection (HRI).	Existing
<i>Requirement:</i>	2 The field element shall monitor the status of the highway-rail intersection (HRI) equipment, including both the current state and mode of operation and the current equipment condition, to be forwarded on to the traffic management center.	Existing
<i>Requirement:</i>	3 The field element shall monitor the status of the highway-rail intersection (HRI) equipment, including both the current state and mode of operation and the current equipment condition, to be forwarded on to the rail wayside equipment.	Existing
<i>Requirement:</i>	4 The field element shall receive track status from the rail wayside equipment that can be passed on to the traffic management center. Current status and approaching trains may be included.	Existing
<i>Requirement:</i>	8 The field element shall support the integrated control of adjacent traffic signals to clear an area in advance of an approaching train and to manage traffic around the intersection.	Existing
<i>Functional Area:</i> Roadway Equipment Coordination		
<i>Requirement:</i>	1 The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.	Existing
<i>Requirement:</i>	2 The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.	Existing
<i>Requirement:</i>	3 The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.	Existing

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:MDOT District Closed Loop Signal System</i>	
<i>Entity:Roadway Subsystem</i>	
<i>Functional Area: Roadway Equipment Coordination</i>	
<i>Requirement:</i> 4 The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.	Existing
<i>Element:MDOT District Dynamic Message Signs</i>	
<i>Entity:Roadway Subsystem</i>	
<i>Functional Area: Roadway Traffic Information Dissemination</i>	
<i>Requirement:</i> 1 The field element shall include dynamic messages signs for dissemination of traffic and other information to drivers, under center control; the DMS may be either those that display variable text messages, or those that have fixed format display(s) (e.g. vehicle restrictions, or lane open/close).	Planned
<i>Requirement:</i> 2 The field element shall include driver information systems that communicate directly from a center to the vehicle radio (such as Highway Advisory Radios) for dissemination of traffic and other information to drivers, under center control.	Planned
<i>Requirement:</i> 4 The field element shall provide operational status for the driver information systems equipment (DMS, HAR, etc.) to the center.	Planned
<i>Requirement:</i> 5 The field element shall provide fault data for the driver information systems equipment (DMS, HAR, etc.) to the center for repair.	Planned
<i>Element:MDOT District Dynamic Speed Zone Signs</i>	
<i>Entity:Roadway Subsystem</i>	
<i>Functional Area: Roadway Traffic Information Dissemination</i>	
<i>Requirement:</i> 1 The field element shall include dynamic messages signs for dissemination of traffic and other information to drivers, under center control; the DMS may be either those that display variable text messages, or those that have fixed format display(s) (e.g. vehicle restrictions, or lane open/close).	Planned
<i>Requirement:</i> 4 The field element shall provide operational status for the driver information systems equipment (DMS, HAR, etc.) to the center.	Planned
<i>Requirement:</i> 5 The field element shall provide fault data for the driver information systems equipment (DMS, HAR, etc.) to the center for repair.	Planned
<i>Functional Area: Roadway Equipment Coordination</i>	
<i>Requirement:</i> 1 The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.	Planned

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:MDOT District Dynamic Speed Zone Signs</i>	
<i>Entity:Roadway Subsystem</i>	
<i>Functional Area: Roadway Equipment Coordination</i>	
<i>Requirement:</i> 2 The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.	Planned
<i>Requirement:</i> 3 The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.	Planned
<i>Requirement:</i> 4 The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.	Planned
<i>Element:MDOT District Highway Service Patrol Vehicles</i>	
<i>Entity:Emergency Vehicle Subsystem</i>	
<i>Functional Area: On-board EV En Route Support</i>	
<i>Requirement:</i> 1 The emergency vehicle, including roadway service patrols, shall compute the location of the emergency vehicle based on inputs from a vehicle location determination function.	Planned
<i>Requirement:</i> 2 The emergency vehicle, including roadway service patrols, shall send the vehicle's location and operational data to the center for emergency management and dispatch.	Planned
<i>Requirement:</i> 3 The emergency vehicle, including roadway service patrols, shall receive incident details and a suggested route when dispatched to a scene.	Planned
<i>Requirement:</i> 6 The emergency vehicle shall provide the personnel on-board with dispatch information, including incident type and location, and forward an acknowledgment from personnel to the center that the vehicle is on its way to the incident scene.	Planned
<i>Functional Area: On-board EV Incident Management Communication</i>	
<i>Requirement:</i> 1 The emergency vehicle shall receive dispatch instructions sufficient to enable emergency personnel in the field to implement an effective incident response. It includes local traffic, road, and weather conditions, hazardous material information, and the current status of resources that have been allocated to an incident.	Planned
<i>Requirement:</i> 2 The emergency vehicle shall provide an interface to the center for emergency personnel to transmit information about the incident site such as the extent of injuries, identification of vehicles and people involved, hazardous material, etc.	Planned

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:MDOT District Highway Service Patrol Vehicles</i>	
<i>Entity:Emergency Vehicle Subsystem</i>	
<i>Functional Area: On-board EV Incident Management Communication</i>	
<i>Requirement:</i>	3 The emergency vehicle shall provide an interface to the center for emergency personnel to transmit information about the current incident response status such as the identification of the resources on site, site management strategies in effect, and current clearance status.
	Planned
<i>Element:MDOT District Maintenance and Construction Field Devices</i>	
<i>Entity:Roadway Subsystem</i>	
<i>Functional Area: Roadway Work Zone Traffic Control</i>	
<i>Requirement:</i>	1 The field element shall collect, process, and send work zone images to the center for further analysis and distribution, under center control.
	Planned
<i>Requirement:</i>	2 Under traffic and maintenance center control, the field element shall include driver information systems (such as dynamic messages signs and highway advisory radios) that advise drivers of activity around the work zone through which they are currently passing.
	Planned
<i>Requirement:</i>	3 Under the control of field personnel within maintenance vehicles, the field element shall include driver information systems (such as dynamic messages signs and highway advisory radios) that advise drivers of activity around a work zone through which they are currently passing.
	Planned
<i>Requirement:</i>	5 The field element shall provide operational status for the surveillance (e.g. CCTV), driver information systems, and gates/barriers in work zones to the maintenance center.
	Planned
<i>Requirement:</i>	6 The field element shall provide fault data for the surveillance (e.g. CCTV), driver information systems, and gates/barriers in work zones to the maintenance center for repair.
	Planned
<i>Element:MDOT District Maintenance and Construction Offices</i>	
<i>Entity:Maintenance and Construction Management</i>	
<i>Functional Area: MCM Vehicle Tracking</i>	
<i>Requirement:</i>	1 The center shall monitor the locations of all maintenance and construction vehicles and other equipment under its jurisdiction.
	Planned
<i>Requirement:</i>	2 The center shall present location data to center personnel for the fleet of maintenance and construction vehicles and other equipment.
	Planned
<i>Requirement:</i>	3 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for maintenance and construction vehicle tracking.
	Planned
<i>Functional Area: MCM Vehicle and Equipment Maintenance Management</i>	
<i>Requirement:</i>	1 The center shall collect and analyze vehicle diagnostics information from maintenance and construction vehicles. The information includes engine temperature, mileage, tire wear, brake wear, belt wear, and any warnings or alarms concerning the operational condition of the vehicle and ancillary equipment.
	Existing

Architecture	Status	
Central Region ITS Architecture (Region)	(Region)	
<i>Element:</i> MDOT District Maintenance and Construction Offices		
<i>Entity:</i> Maintenance and Construction Management		
<i>Functional Area:</i> MCM Vehicle and Equipment Maintenance Management		
<i>Requirement:</i>	2 The center shall exchange information with equipment repair facilities including status and history of repairs concerning maintenance and construction vehicles. This information includes vehicle status and diagnostic information, vehicle utilization, and coordination of when vehicles will be available for preventative and corrective maintenance.	Existing
<i>Requirement:</i>	3 The center shall schedule preventive and corrective vehicle maintenance with the equipment repair facility based on fleet health reports, maintenance records, vehicle utilization and vehicle availability schedules.	Existing
<i>Functional Area:</i> MCM Environmental Information Collection		
<i>Requirement:</i>	1 The center shall remotely control environmental sensors that measure road surface temperature, moisture, icing, salinity, and other measures.	Planned
<i>Requirement:</i>	2 The center shall remotely control environmental sensors that measure weather conditions including temperature, wind, humidity, precipitation, and visibility.	Planned
<i>Requirement:</i>	4 The center shall assimilate current and forecast road conditions and surface weather information using a combination of weather service provider information (such as the National Weather Service and value-added sector specific meteorological services), data from traffic, emergency, and transit management, traveler information providers, and environmental data collected from sensors deployed on and about the roadway as well as the fleet of maintenance and construction vehicles.	Planned
<i>Requirement:</i>	5 The center shall provide weather and road condition information to weather service providers and center personnel.	Planned
<i>Requirement:</i>	6 The center shall respond to control data from center personnel regarding environmental sensor control and weather data collection and processing.	Planned
<i>Requirement:</i>	7 The center shall collect operational status for the roadside and vehicle-based environmental sensor equipment.	Planned
<i>Requirement:</i>	8 The center shall collect fault data for the roadside and vehicle-based environmental sensor equipment for repair.	Planned
<i>Functional Area:</i> MCM Environmental Information Processing		
<i>Requirement:</i>	1 The center shall respond to control data from center personnel regarding environmental sensor control and weather data collection and processing.	Planned
<i>Requirement:</i>	2 The center shall assimilate current and forecast road conditions and surface weather information using a combination of weather service provider information (such as the National Weather Service and value-added sector specific meteorological services) and local environmental sensor data.	Planned
<i>Requirement:</i>	3 The center shall use the various data inputs of environmental sensors and road weather data to develop a view of current and predicted road weather and road conditions.	Planned

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:</i> MDOT District Maintenance and Construction Offices	
<i>Entity:</i> Maintenance and Construction Management	
<i>Functional Area:</i> MCM Environmental Information Processing	
<i>Requirement:</i>	
4 The center shall disseminate current and forecasted road weather and road condition information to weather service providers (such as the National Weather Service and value-added sector specific meteorological services) as well as other agencies including traffic, emergency, and transit management, traveler information providers, rail operations centers, media, and other maintenance management centers.	Planned
<i>Requirement:</i>	
5 The center shall provide value-added sector specific meteorological services with information on basic road facility and treatment information that supports forecasts for road conditions.	Planned
<i>Functional Area:</i> MCM Incident Management	
<i>Requirement:</i>	
1 The center shall receive inputs from the Alerting and Advisory System concerning the possibility or occurrence of severe weather, terrorist activity, or other major emergency, including information provided by the Emergency Alert System.	Existing
<i>Requirement:</i>	
2 The center shall exchange alert information and status with emergency management centers. The information includes notification of a major emergency such as a natural or man-made disaster, civil emergency, or child abduction. The information may include the alert originator, the nature of the emergency, the geographic area affected by the emergency, the effective time period, etc.	Existing
<i>Requirement:</i>	
3 The center shall exchange incident and threat information with emergency management centers as well as traffic management centers; including notification of existence of incident and expected severity, location, time and nature of incident.	Existing
<i>Requirement:</i>	
4 The center shall coordinate planning for incidents with emergency management centers - including pre-planning activities for disaster response, evacuation, and recovery operations.	Existing
<i>Requirement:</i>	
5 The center shall respond to requests from emergency management to provide maintenance and construction resources to implement response plans, assist in clean up, verify an incident, etc. This may also involve coordination with traffic management centers and other maintenance centers.	Existing
<i>Requirement:</i>	
6 The center shall exchange road network status assessment information with emergency management and traffic management centers including an assessment of damage sustained by the road network including location and extent of the damage, estimate of remaining capacity, required closures, alternate routes, necessary restrictions, and time frame for repair and recovery.	Existing

Architecture	Status	
Central Region ITS Architecture (Region)	(Region)	
<i>Element:</i> MDOT District Maintenance and Construction Offices		
<i>Entity:</i> Maintenance and Construction Management		
<i>Functional Area:</i> MCM Incident Management		
<i>Requirement:</i>	7 The center shall provide work zone activities affecting the road network including the nature of the maintenance or construction activity, location, impact to the roadway, expected time(s) and duration of impact, anticipated delays, alternate routes, and suggested speed limits. This information may be augmented with images that provide a visual indication of current work zone status and traffic impacts.	Existing
<i>Requirement:</i>	8 The center shall receive information indicating the damage sustained by transportation assets, derived from aerial surveillance, field reports, inspections, tests, and analyses to support incident management.	Existing
<i>Functional Area:</i> MCM Maintenance Decision Support		
<i>Requirement:</i>	1 The center shall provide the center personnel with tailored external information, including weather or road condition observations, forecasted weather information or road conditions, current usage of treatments and materials, available resources, equipment and vehicle availability, road network information, and source reliability information.	Planned
<i>Requirement:</i>	3 The center shall provide an interface to the center personnel to input control parameters for the decision support process and receive decisions or information presentation.	Planned
<i>Requirement:</i>	4 The center shall provide dispatch information to maintenance and construction vehicles based on the outputs of the decision support system, including recommended roadway treatment actions.	Planned
<i>Functional Area:</i> MCM Winter Maintenance Management		
<i>Requirement:</i>	1 The center shall respond to requests from emergency management and traffic management centers for hazard removal, field equipment repair, and other winter roadway maintenance.	Existing
<i>Requirement:</i>	2 The center shall exchange information with administrative systems to support the planning and scheduling of winter maintenance activities. This information includes: equipment and consumables resupply purchase request status, personnel qualifications including training and special certifications, environmental regulations and rules that may impact maintenance activities, and requests and project requirements from contract administration.	Existing
<i>Requirement:</i>	3 The center shall provide status information about scheduled winter maintenance activities including anticipated closures and impact to the roadway, alternate routes, anticipated delays, closure times, and durations. The information is provided to other management centers such as traffic, emergency, transit, traveler information providers, other maintenance centers, and the media.	Existing
<i>Requirement:</i>	4 The center shall receive equipment availability and materials storage status information from storage facilities to support the scheduling of winter maintenance activities.	Existing

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:</i> MDOT District Maintenance and Construction Offices	
<i>Entity:</i> Maintenance and Construction Management	
<i>Functional Area:</i> MCM Winter Maintenance Management	
<i>Requirement:</i>	
5 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for the scheduling of winter maintenance activities.	Existing
<i>Requirement:</i>	
6 The center shall collect current and forecast traffic and weather information from traffic management centers and weather service providers (such as the National Weather Service and value-added sector specific meteorological services).	Existing
<i>Requirement:</i>	
7 The center shall dispatch and route winter maintenance vehicle drivers and support them with route- specific environmental, incident, advisory, threat, alert, and traffic congestion information.	Existing
<i>Requirement:</i>	
8 The center shall determine the need for roadway treatment based on current and forecasted weather information, current usage of treatments and materials, available resources, requests for action from other agencies, and recommendations from the Maintenance Decision Support system, specifically under winter conditions. This supports winter maintenance such as plowing, treating, anti-icing, etc.	Existing
<i>Requirement:</i>	
9 The center shall provide dispatch instructions for vehicle operators based on input parameters from center personnel, specifically for winter conditions. This could include a treatment route, treatment application rates, start and end times, and other treatment instructions.	Existing
<i>Requirement:</i>	
11 The center shall assess the current status of all winter maintenance activities, including actual work activities performed, current locations and operational conditions of vehicles, materials and equipment inventories, field equipment status, environmental information, etc.	Existing
<i>Functional Area:</i> MCM Roadway Maintenance and Construction	
<i>Requirement:</i>	
1 The center shall maintain an interface with asset management systems to track the inventory, restrictions, repair needs and status updates of transportation assets (pavement, bridges, signs, etc.) including location, installation and materials information, vendor/contractor, current maintenance status, standard height, width, and weight restrictions.	Existing
<i>Requirement:</i>	
2 The center shall respond to requests from emergency management and traffic management centers for hazard removal, field equipment repair, and other roadway maintenance.	Existing
<i>Requirement:</i>	
3 The center shall exchange information with administrative systems to support the planning and scheduling of maintenance activities. This information includes: equipment and consumables resupply purchase request status, personnel qualifications including training and special certifications, environmental regulations and rules that may impact maintenance activities, and requests and project requirements from contract administration.	Existing

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:</i> MDOT District Maintenance and Construction Offices	
<i>Entity:</i> Maintenance and Construction Management	
<i>Functional Area:</i> MCM Roadway Maintenance and Construction	
<i>Requirement:</i>	
4 The center shall provide emergency management and traffic management centers with information about scheduled maintenance and construction work activities including anticipated closures and impact to the roadway, alternate routes, anticipated delays, closure times, and durations.	Existing
<i>Requirement:</i>	
6 The center shall collect the status and fault data from traffic management centers, including data for traffic, infrastructure, and environmental sensors, highway advisory radio and dynamic message signs, automated roadway treatment systems, barrier and safeguard systems, cameras, traffic signals and override equipment, ramp meters, beacons, security sensors and surveillance equipment, etc., and provide a cohesive view of equipment repair needs.	Existing
<i>Requirement:</i>	
8 The center shall receive equipment availability and materials storage status information from storage facilities to support the scheduling of roadway maintenance and construction activities.	Existing
<i>Requirement:</i>	
9 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for the scheduling of roadway maintenance and construction activities.	Existing
<i>Requirement:</i>	
10 The center shall collect current and forecast traffic and weather information from traffic management centers and weather service providers (such as the National Weather Service and value-added sector specific meteorological services).	Existing
<i>Requirement:</i>	
11 The center shall dispatch and route maintenance and construction vehicle drivers and support them with route- specific environmental, incident, advisory, threat, alert, and traffic congestion information.	Existing
<i>Requirement:</i>	
12 The center shall manage an interface with center personnel to accept vehicle systems control information and remotely control maintenance and construction vehicle on-board equipment.	Existing
<i>Requirement:</i>	
13 The center shall track the status of roadway maintenance and construction activities by monitoring collected data from the dispatched vehicles and equipment.	Planned
<i>Functional Area:</i> MCM Work Zone Management	
<i>Requirement:</i>	
1 The center shall generate new work zone activity schedules for use by maintenance and construction vehicles, maintenance and construction operators, and for information coordination purposes.	Existing
<i>Requirement:</i>	
2 The center shall control the collection of work zone status information including video images from cameras located in or near the work zone.	Existing
<i>Requirement:</i>	
3 The center shall disseminate work zone information to other agencies and centers including traffic, transit, emergency management centers, other maintenance centers, traveler information providers, and the media.	Existing

Architecture	Status	
Central Region ITS Architecture (Region)	(Region)	
<i>Element:</i> MDOT District Maintenance and Construction Offices		
<i>Entity:</i> Maintenance and Construction Management		
<i>Functional Area:</i> MCM Work Zone Management		
<i>Requirement:</i>	4 The center shall control traffic in work zones by providing remote control of dynamic message signs, highway advisory radio systems, gates, and barriers located in or near the work zone.	Planned
<i>Requirement:</i>	5 The center shall exchange information with administrative systems to support the planning and scheduling of work zone activities. This information includes: equipment and consumables resupply purchase request status, personnel qualifications including training and special certifications, environmental regulations and rules that may impact maintenance activities, and requests and project requirements from contract administration.	Existing
<i>Functional Area:</i> MCM Work Activity Coordination		
<i>Requirement:</i>	1 The center shall provide work zone activities affecting the road network including the nature of the maintenance or construction activity, location, impact to the roadway, expected time(s) and duration of impact, anticipated delays, alternate routes, and suggested speed limits. This information may be augmented with images that provide a visual indication of current work zone status and traffic impacts.	Existing
<i>Requirement:</i>	2 The center shall provide status information about scheduled maintenance and construction activities including anticipated closures and impact to the roadway, alternate routes, anticipated delays, closure times, and durations. The information is provided to other management centers such as traffic, emergency, transit, traveler information providers, other maintenance centers, multimodal transportation providers, rail operations, and the media.	Existing
<i>Requirement:</i>	3 The center shall collect and respond to feedback concerning scheduled maintenance and construction activities with other management centers such as traffic, emergency, transit, and rail operations.	Existing
<i>Requirement:</i>	5 The center shall exchange information with administrative systems to support the planning and scheduling of maintenance and construction activities. This information includes: equipment and consumables resupply purchase request status, personnel qualifications including training and special certifications, environmental regulations and rules that may impact maintenance activities, and requests and project requirements from contract administration.	Existing
<i>Requirement:</i>	6 The center shall exchange rail schedules and work plans with rail operations centers.	Existing
<i>Functional Area:</i> MCM Data Collection		
<i>Requirement:</i>	1 The center shall collect maintenance and construction data (such as field equipment status, infrastructure status, maintenance and construction activity data) gathered from roadway, traffic, and other maintenance and construction sources.	Existing

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:MDOT District Maintenance and Construction Offices</i>	
<i>Entity:Maintenance and Construction Management</i>	
<i>Functional Area: MCM Data Collection</i>	
<i>Requirement:</i> 5 The center shall provide data to Asset Management to be used in updating the status of assets in the inventory.	Existing
<i>Element:MDOT District Maintenance Vehicles</i>	
<i>Entity:Maintenance and Construction Vehicle</i>	
<i>Functional Area: MCV Vehicle Location Tracking</i>	
<i>Requirement:</i> 1 The maintenance and construction vehicle shall compute the location of the vehicle based on inputs from a vehicle location determination function.	Planned
<i>Requirement:</i> 2 The maintenance and construction vehicle shall send the timestamped vehicle location to the controlling center.	Planned
<i>Functional Area: MCV Vehicle System Monitoring and Diagnostics</i>	
<i>Requirement:</i> 1 The maintenance and construction vehicle shall collect vehicle diagnostics and operating status data from the maintenance vehicle platform including engine temperature, mileage, tire wear, brake wear, belt wear, and other operational status measures as well as the status of maintenance and construction-specific systems on the vehicle.	Planned
<i>Requirement:</i> 2 The maintenance and construction vehicle shall use the diagnostic and status information to support scheduling vehicle maintenance, monitoring safety status, and informing the vehicle operator of the conditions.	Planned
<i>Requirement:</i> 3 The maintenance and construction vehicle shall the vehicle diagnostic and safety information to an equipment repair facility.	Planned
<i>Requirement:</i> 4 The maintenance and construction vehicle shall send the vehicle diagnostic and safety information to the controlling maintenance center.	Planned
<i>Functional Area: MCV Winter Maintenance</i>	
<i>Requirement:</i> 1 The maintenance and construction vehicle shall track the location and status of safety systems on-board the vehicle.	Planned
<i>Requirement:</i> 3 The maintenance and construction vehicle shall monitor materials information including remaining quantity and current application rate of materials on the vehicle.	Planned
<i>Requirement:</i> 4 The maintenance and construction vehicle shall respond to dispatch information from the center, presented to the vehicle operator for acknowledgement and returning status.	Planned
<i>Requirement:</i> 5 The maintenance and construction vehicle shall send operational data to the center including the operational state of the maintenance equipment (e.g., blade up/down, spreader pattern), types and quantities of materials used for construction and maintenance activities, and a record of the actual work performed.	Planned
<i>Functional Area: MCV Roadway Maintenance and Construction</i>	
<i>Requirement:</i> 1 The maintenance and construction vehicle shall track the location and status of safety systems on-board the vehicle.	Planned

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:MDOT District Maintenance Vehicles</i>	
<i>Entity:Maintenance and Construction Vehicle</i>	
<i>Functional Area: MCV Roadway Maintenance and Construction</i>	
<i>Requirement:</i>	3 The maintenance and construction vehicle shall monitor materials information including remaining quantity and current application rate of materials on the vehicle. Planned
<i>Requirement:</i>	4 The maintenance and construction vehicle shall respond to dispatch information from the center, presented to the vehicle operator for acknowledgement and returning status. Planned
<i>Requirement:</i>	5 The maintenance and construction vehicle shall send operational data to the center including the operational state of the maintenance equipment (e.g., blade up/down, spreader pattern), types and quantities of materials used for construction and maintenance activities, and a record of the actual work performed. Planned
<i>Entity:Vehicle</i>	
<i>Functional Area: Vehicle Location Determination</i>	
<i>Requirement:</i>	1 The vehicle shall provide the vehicle's current location to other in-vehicle functions. Planned
<i>Requirement:</i>	2 The vehicle shall calculate the location from one or more sources of position data. These location referencing systems include position systems such as GPS, DGPS, odometer and differential odometers. Planned
<i>Requirement:</i>	3 The vehicle shall refine its calculations as required by other in-vehicle functions. Planned
<i>Element:MDOT District Portable Dynamic Message Signs</i>	
<i>Entity:Roadway Subsystem</i>	
<i>Functional Area: Roadway Traffic Information Dissemination</i>	
<i>Requirement:</i>	1 The field element shall include dynamic messages signs for dissemination of traffic and other information to drivers, under center control; the DMS may be either those that display variable text messages, or those that have fixed format display(s) (e.g. vehicle restrictions, or lane open/close). Planned
<i>Requirement:</i>	4 The field element shall provide operational status for the driver information systems equipment (DMS, HAR, etc.) to the center. Planned
<i>Requirement:</i>	5 The field element shall provide fault data for the driver information systems equipment (DMS, HAR, etc.) to the center for repair. Planned
<i>Element:MDOT District Railroad Crossing Control</i>	
<i>Entity:Roadway Subsystem</i>	
<i>Functional Area: Advanced Rail Crossing</i>	
<i>Requirement:</i>	1 The field element shall collect and process, traffic sensor data in the vicinity of a highway-rail intersection (HRI). Planned
<i>Requirement:</i>	2 The field element shall determine whether the highway-rail intersection (HRI) is blocked by traffic in the roadway or some other obstruction. Planned

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:MDOT District Railroad Crossing Control</i>	
<i>Entity:Roadway Subsystem</i>	
<i>Functional Area: Advanced Rail Crossing</i>	
<i>Requirement:</i>	
3 The field element shall notify the traffic management center and the rail wayside equipment of any intersection blockages, including trapped vehicles or other obstructions.	Planned
<i>Requirement:</i>	
4 The field element shall monitor the status of the highway-rail intersection (HRI) equipment, including both the current state and mode of operation and the current equipment condition, to be forwarded on to the traffic management center.	Planned
<i>Requirement:</i>	
5 The field element shall monitor the status of the highway-rail intersection (HRI) equipment, including both the current state and mode of operation and the current equipment condition, to be forwarded on to the rail wayside equipment.	Planned
<i>Requirement:</i>	
6 The field element shall receive track status and arriving train information from the rail wayside equipment that can be passed on to the traffic management center. This may include the current status of the tracks and when a train is expected and/or how long the crossing will be closed.	Planned
<i>Requirement:</i>	
7 The field element shall collect pedestrian images and pedestrian sensor data, and respond to pedestrian crossing requests via display, audio signal, or other manner.	Planned
<i>Requirement:</i>	
8 The field element shall control the dynamic message signs (DMS) in the vicinity of a highway-rail intersection (HRI) to advise drivers, cyclists, and pedestrians of approaching trains.	Planned
<i>Requirement:</i>	
9 The field element shall close the highway-rail intersection (HRI) when a train is approaching with enough time for traffic to safely clear the crossing using gates, lights/signs, barriers, and traffic control signals.	Planned
<i>Requirement:</i>	
10 The field element shall support the integrated control of adjacent traffic signals to clear an area in advance of an approaching train and to manage traffic around the intersection.	Planned
<i>Requirement:</i>	
11 The field element shall forward rail traffic advisories received from the Wayside Equipment to the traffic management center.	Planned
<i>Element:MDOT District Speed Warning System</i>	
<i>Entity:Roadway Subsystem</i>	
<i>Functional Area: Roadway Traffic Information Dissemination</i>	
<i>Requirement:</i>	
1 The field element shall include dynamic messages signs for dissemination of traffic and other information to drivers, under center control; the DMS may be either those that display variable text messages, or those that have fixed format display(s) (e.g. vehicle restrictions, or lane open/close).	Planned
<i>Requirement:</i>	
4 The field element shall provide operational status for the driver information systems equipment (DMS, HAR, etc.) to the center.	Planned
<i>Requirement:</i>	
5 The field element shall provide fault data for the driver information systems equipment (DMS, HAR, etc.) to the center for repair.	Planned
<i>Functional Area: Roadway Equipment Coordination</i>	

Architecture	Status	
Central Region ITS Architecture (Region)	(Region)	
<i>Element:MDOT District Speed Warning System</i>		
<i>Entity:Roadway Subsystem</i>		
<i>Functional Area: Roadway Equipment Coordination</i>		
<i>Requirement:</i>	1 The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.	Planned
<i>Requirement:</i>	2 The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.	Planned
<i>Requirement:</i>	3 The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.	Planned
<i>Requirement:</i>	4 The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.	Planned
<i>Functional Area: Roadway Speed Monitoring</i>		
<i>Requirement:</i>	1 The field element shall include sensors to detect vehicle speeds, under traffic or maintenance center control.	Planned
<i>Requirement:</i>	3 If the speed detected by vehicle speed sensors is determined to be excessive, the field element shall provide a safe speed advisory to passing drivers via a driver information system (such as portable message signs, etc.).	Planned
<i>Requirement:</i>	4 The field element shall base speed advisories to passing drivers on environmental conditions.	Planned
<i>Requirement:</i>	5 The field element shall monitor notify an enforcement agency when a speed violation is detected.	Planned
<i>Requirement:</i>	6 The field element shall return operational status for the vehicle speed sensors to the controlling traffic or maintenance center; including measured speeds, warning messages displayed, and violation records.	Planned
<i>Requirement:</i>	8 The field element shall return fault data for the vehicle speed sensors to the controlling center for repair.	Planned
<i>Element:MDOT District Traffic Management Centers</i>		
<i>Entity:Emergency Management</i>		
<i>Functional Area: Service Patrol Management</i>		
<i>Requirement:</i>	1 The center shall dispatch roadway service patrol vehicles to identified incident locations.	Planned

Architecture	Status	
Central Region ITS Architecture (Region)	(Region)	
<i>Element:</i> MDOT District Traffic Management Centers		
<i>Entity:</i> Emergency Management		
<i>Functional Area:</i> Service Patrol Management		
<i>Requirement:</i>	2 The center shall store the current status of all service patrol vehicles available for dispatch and those that have been dispatched.	Planned
<i>Requirement:</i>	3 The center shall share incident information collected by the service patrol with traffic, maintenance and construction, and traveler information centers for incident management, incident notification to travelers, and incident cleanup.	Planned
<i>Requirement:</i>	4 The center shall track the location and status of service patrol vehicles.	Planned
<i>Entity:</i> Maintenance and Construction Management		
<i>Functional Area:</i> MCM Vehicle Tracking		
<i>Requirement:</i>	1 The center shall monitor the locations of all maintenance and construction vehicles and other equipment under its jurisdiction.	Planned
<i>Requirement:</i>	2 The center shall present location data to center personnel for the fleet of maintenance and construction vehicles and other equipment.	Planned
<i>Requirement:</i>	3 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for maintenance and construction vehicle tracking.	Planned
<i>Entity:</i> Traffic Management		
<i>Functional Area:</i> Collect Traffic Surveillance		
<i>Requirement:</i>	1 The center shall monitor, analyze, and store traffic sensor data (speed, volume, occupancy) collected from field elements under remote control of the center.	Existing
<i>Requirement:</i>	2 The center shall monitor, analyze, and distribute traffic images from CCTV systems under remote control of the center.	Existing
<i>Requirement:</i>	4 The center shall distribute road network conditions data (raw or processed) based on collected and analyzed traffic sensor and surveillance data to other centers.	Existing
<i>Requirement:</i>	5 The center shall respond to control data from center personnel regarding sensor and surveillance data collection, analysis, storage, and distribution.	Existing
<i>Requirement:</i>	6 The center shall maintain a database of surveillance and sensors and the freeways, surface street and rural roadways, e.g. where they are located, to which part(s) of the network their data applies, the type of data, and the ownership of each link (that is, the agency or entity responsible for collecting and storing surveillance of the link) in the network.	Existing
<i>Requirement:</i>	7 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic data.	Existing
<i>Functional Area:</i> TMC Signal Control		

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:</i> MDOT District Traffic Management Centers	
<i>Entity:</i> Traffic Management	
<i>Functional Area:</i> TMC Signal Control	
<i>Requirement:</i>	1 The center shall remotely control traffic signal controllers. Existing
<i>Requirement:</i>	2 The center shall accept notifications of right-of-way requests from pedestrians. Existing
<i>Requirement:</i>	3 The center shall collect traffic signal controller operational status and compare against the control information sent by the center. Existing
<i>Requirement:</i>	4 The center shall collect traffic signal controller fault data from the field. Existing
<i>Requirement:</i>	5 The center shall implement control plans to coordinate signalized intersections, under control of center personnel, based on data from sensors and surveillance monitoring traffic conditions, incidents, emergency vehicle preemptions, the passage of commercial vehicles with unusual loads, equipment faults, pedestrian crossings, etc. Existing
<i>Functional Area:</i> TMC Freeway Management	
<i>Requirement:</i>	1 The center shall remotely control systems to manage use of the freeways, including ramp meters, mainline metering, and lane controls. Planned
<i>Requirement:</i>	2 The center shall collect operational status from ramp meters, mainline metering, and lane controls and compare against the control information sent by the center. Planned
<i>Requirement:</i>	3 The center shall collect fault data from ramp meters, mainline metering, and lane controls. Planned
<i>Requirement:</i>	4 The center shall implement control strategies, under control of center personnel, on some or all of the freeway network devices (e.g. ramp meters, mainline metering, and lane controls), based on data from sensors monitoring traffic conditions upstream, downstream, and queue data on the ramps themselves. Planned
<i>Functional Area:</i> TMC Traffic Information Dissemination	
<i>Requirement:</i>	1 The center shall remotely control dynamic messages signs for dissemination of traffic and other information to drivers. Existing
<i>Requirement:</i>	2 The center shall remotely control driver information systems that communicate directly from a center to the vehicle radio (such as Highway Advisory Radios) for dissemination of traffic and other information to drivers. Planned
<i>Requirement:</i>	3 The center shall collect operational status for the driver information systems equipment (DMS, HAR, etc.). Existing
<i>Requirement:</i>	4 The center shall collect fault data for the driver information systems equipment (DMS, HAR, etc.) for repair. Existing
<i>Requirement:</i>	5 The center shall retrieve locally stored traffic information, including current and forecasted traffic information, road and weather conditions, traffic incident information, information on diversions and alternate routes, closures, and special traffic restrictions (lane/shoulder use, weight restrictions, width restrictions, HOV requirements), etc. Planned

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:MDOT District Traffic Management Centers</i>	
<i>Entity:Traffic Management</i>	
<i>Functional Area: TMC Traffic Information Dissemination</i>	
<i>Requirement:</i> 6	The center shall distribute traffic data to maintenance and construction centers, transit centers, emergency management centers, and traveler information providers. Planned
<i>Requirement:</i> 7	The center shall distribute traffic data to the media upon request; the capability to provide the information in both data stream and graphical display shall be supported. Planned
<i>Requirement:</i> 8	The center shall provide the capability for center personnel to control the nature of the data that is available to non-traffic operations centers and the media. Planned
<i>Functional Area: TMC Regional Traffic Control</i>	
<i>Requirement:</i> 1	The center shall exchange traffic information with other traffic management centers, includes incident information, congestion data, traffic data, signal timing plans, and real-time signal control information. Existing
<i>Requirement:</i> 2	The center shall exchange traffic control information with other traffic management centers, includes remote monitoring and control of traffic management devices (e.g. signs, sensors, signals, cameras, etc.). Existing
<i>Functional Area: TMC Incident Detection</i>	
<i>Requirement:</i> 1	The center shall receive inputs from the Alerting and Advisory System concerning the possibility or occurrence of severe weather, terrorist activity, or other major emergency, including information provided by the Emergency Alert System. Existing
<i>Requirement:</i> 2	The center shall collect and store traffic flow and image data from the field equipment to detect and verify incidents. Existing
<i>Requirement:</i> 3	The center shall receive inputs concerning upcoming events that would effect the traffic network from event promoters, traveler information service providers, and intermodal freight depots. Existing
<i>Requirement:</i> 4	The center shall exchange incident and threat information with emergency management centers as well as maintenance and construction centers; including notification of existence of incident and expected severity, location, time and nature of incident. Existing
<i>Requirement:</i> 6	The center shall provide road network conditions and traffic images to emergency management centers to support the detection, verification, and classification of incidents. Existing
<i>Requirement:</i> 7	The center shall provide video and traffic sensor control commands to the field equipment to detect and verify incidents. Existing
<i>Functional Area: TMC Incident Dispatch Coordination/Communication</i>	

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:MDOT District Traffic Management Centers</i>	
<i>Entity:Traffic Management</i>	
<i>Functional Area: TMC Incident Dispatch Coordination/Communication</i>	
<i>Requirement:</i>	Existing
1 The center shall exchange alert information and status with emergency management centers. The information includes notification of a major emergency such as a natural or man-made disaster, civil emergency, or child abduction for distribution to the public. The information may include the alert originator, the nature of the emergency, the geographic area affected by the emergency, the effective time period, and information and instructions necessary for the public to respond to the alert. This may also identify specific information that should not be released to the public.	
<i>Requirement:</i>	Existing
2 The center shall coordinate planning for incidents with emergency management centers - including pre-planning activities for disaster response, evacuation, and recovery operations.	
<i>Requirement:</i>	Existing
4 The center shall exchange incident and threat information with emergency management centers as well as maintenance and construction centers; including notification of existence of incident and expected severity, location, time and nature of incident.	
<i>Requirement:</i>	Existing
5 The center shall respond to requests from emergency management to provide traffic management resources to implement special traffic control measures, assist in clean up, verify an incident, etc. This may also involve coordination with maintenance centers.	
<i>Requirement:</i>	Existing
6 The center shall receive inputs concerning upcoming events that would effect the traffic network from event promoters, traveler information service providers, media, and rail operations centers.	
<i>Requirement:</i>	Existing
7 The center shall provide road network conditions and traffic images to emergency management centers, maintenance and construction centers, and traveler information service providers.	
<i>Requirement:</i>	Existing
8 The center shall exchange road network status assessment information with emergency management and maintenance centers including an assessment of damage sustained by the road network including location and extent of the damage, estimate of remaining capacity, required closures, alternate routes, necessary restrictions, and time frame for repair and recovery.	
<i>Requirement:</i>	Existing
9 The center shall coordinate information and controls with other traffic management centers.	
<i>Requirement:</i>	Existing
10 The center shall receive inputs from emergency management and transit management centers to develop an overall status of the transportation system including emergency transit schedules in effect and current status and condition of the transportation infrastructure.	
<i>Requirement:</i>	Existing
11 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic incident management.	

Functional Area: TMC Evacuation Support

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:</i> MDOT District Traffic Management Centers	
<i>Entity:</i> Traffic Management	
<i>Functional Area:</i> TMC Evacuation Support	
<i>Requirement:</i>	1 The center shall coordinate planning for evacuation with emergency management centers - including pre-planning activities such as establishing routes, areas to be evacuated, timing, etc. Existing
<i>Requirement:</i>	2 The center shall support requests from emergency management centers to preempt the current traffic control strategy, activate traffic control and closure systems such as gates and barriers, activate safeguard systems, or use driver information systems to support evacuation traffic control plans. Existing
<i>Requirement:</i>	3 The center shall coordinate information and controls with other traffic management centers. Existing
<i>Requirement:</i>	4 The center shall coordinate execution of evacuation strategies with emergency management centers - including activities such as setting closures and detours, establishing routes, updating areas to be evacuated, timing the process, etc. Existing
<i>Functional Area:</i> HRI Traffic Management	
<i>Requirement:</i>	1 The center shall remotely control highway-rail intersection (HRI) equipment located in the field. Existing
<i>Requirement:</i>	2 The center shall accept collect highway-rail intersection (HRI) advisory or alert data from rail operations centers. Existing
<i>Requirement:</i>	3 The center shall collect highway-rail intersection (HRI) equipment operational status and compare against the control information sent by the center. Existing
<i>Requirement:</i>	4 The center shall provide the highway-rail intersection (HRI) equipment operational status to rail operations centers. Existing
<i>Requirement:</i>	5 The center shall collect incident information related to a highway-rail intersection (HRI), such as intersection blockages or crashes or equipment malfunctions. Existing
<i>Requirement:</i>	6 The center shall implement control plans to coordinate signalized intersections around highway-rail intersections (HRI), under control of center personnel, based on data from sensors and surveillance monitoring traffic conditions, incidents, equipment faults, pedestrian crossings, etc. Existing
<i>Functional Area:</i> TMC Reversible Lane Management	
<i>Requirement:</i>	1 The center shall remotely control devices to detect traffic in reversible lanes, including wrong-way vehicles. Planned
<i>Requirement:</i>	2 The center shall monitor the use of reversible lanes and detect wrong-way vehicles in reversible lanes using sensor and surveillance information, and the current lane control status (which direction the lane is currently operating). Planned
<i>Requirement:</i>	3 The center shall remotely control automated reversible lane equipment and driver information systems (such as lane control signals) that control traffic in reversible lanes on surface streets. Planned

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:MDOT District Traffic Management Centers</i>	
<i>Entity:Traffic Management</i>	
<i>Functional Area: TMC Reversible Lane Management</i>	
<i>Requirement:</i>	4 The center shall remotely control automated reversible lane equipment and driver information systems (such as lane control signals) that control traffic in reversible lanes on freeways. Planned
<i>Requirement:</i>	5 The center shall collect operational status for the reversible lane field equipment. Planned
<i>Requirement:</i>	6 The center shall collect fault data for the reversible lane field equipment and send to the maintenance center for repair. Planned
<i>Requirement:</i>	7 The center shall provide the capability for center personnel to control access and management of reversible lane facilities, including the direction of traffic flow changes during the day, especially between the peak hours and dedication of more lanes to the congestion direction during special events. Planned
<i>Functional Area: Traffic Maintenance</i>	
<i>Requirement:</i>	1 The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) operational status. Existing
<i>Requirement:</i>	2 The center shall collect and store CCTV surveillance system (traffic, pedestrian) operational status. Existing
<i>Requirement:</i>	3 The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) fault data and send to the maintenance center for repair. Existing
<i>Requirement:</i>	4 The center shall collect and store CCTV surveillance system (traffic, pedestrian) fault data send to the maintenance center for repair. Existing
<i>Requirement:</i>	5 The center shall collect environmental sensor operational status. Existing
<i>Requirement:</i>	6 The center shall collect environmental sensor equipment fault data and send to the maintenance center for repair. Existing
<i>Requirement:</i>	7 The center shall exchange data with maintenance centers concerning the reporting of faulty equipment and the schedule/status of their repair. Information exchanged includes details of new equipment faults, and clearances when the faults are cleared. Existing
<i>Requirement:</i>	8 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic maintenance data. Existing
<i>Functional Area: Traffic Data Collection</i>	
<i>Requirement:</i>	1 The center shall collect traffic management data such as operational data, event logs, etc. Existing
<i>Element:MDOT District Traffic Sensors</i>	
<i>Entity:Roadway Subsystem</i>	
<i>Functional Area: Roadway Basic Surveillance</i>	
<i>Requirement:</i>	1 The field element shall collect, process, digitize, and send traffic sensor data (speed, volume, and occupancy) to the center for further analysis and storage, under center control. Existing

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:MDOT District Traffic Sensors</i>	
<i>Entity:Roadway Subsystem</i>	
<i>Functional Area: Roadway Basic Surveillance</i>	
<i>Requirement:</i>	4 The field element shall return sensor and CCTV system operational status to the controlling center. Existing
<i>Requirement:</i>	5 The field element shall return sensor and CCTV system fault data to the controlling center for repair. Existing
<i>Functional Area: Roadway Data Collection</i>	
<i>Requirement:</i>	1 The field element shall collect traffic, road, and environmental conditions information. Existing
<i>Requirement:</i>	2 The field element shall include the sensors and supporting roadside devices that sense, collect, and send traffic, road, and environmental conditions information to a center for archival. Existing
<i>Requirement:</i>	3 The field element shall collect sensor status and sensor faults from roadside equipment and send it along with the recorded data to a center for archival. Existing
<i>Element:MDOT District Traffic Surveillance Equipment</i>	
<i>Entity:Roadway Subsystem</i>	
<i>Functional Area: Roadway Basic Surveillance</i>	
<i>Requirement:</i>	2 The field element shall collect, process, and send traffic images to the center for further analysis and distribution. Existing
<i>Requirement:</i>	4 The field element shall return sensor and CCTV system operational status to the controlling center. Existing
<i>Requirement:</i>	5 The field element shall return sensor and CCTV system fault data to the controlling center for repair. Existing
<i>Functional Area: Roadway Incident Detection</i>	
<i>Requirement:</i>	1 The field element shall collect, process, and send traffic images to the center for further analysis and distribution. Existing
<i>Requirement:</i>	3 The field element's video devices shall be remotely controlled by a traffic management center. Existing
<i>Requirement:</i>	4 The field element shall provide operational status and fault data for the incident detection devices to the traffic management center. Existing
<i>Element:MDOT District Weather Sensors</i>	
<i>Entity:Roadway Subsystem</i>	
<i>Functional Area: Roadway Environmental Monitoring</i>	
<i>Requirement:</i>	1 The field element shall include surface and sub-surface environmental sensors that measure road surface temperature, moisture, icing, salinity, and other measures. Planned
<i>Requirement:</i>	2 The field element shall include environmental sensors that measure weather conditions including temperature, wind, humidity, precipitation, and visibility. Planned
<i>Requirement:</i>	3 The field element's environmental sensors shall be remotely controlled by a maintenance center. Planned

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:MDOT District Weather Sensors</i>	
<i>Entity:Roadway Subsystem</i>	
<i>Functional Area: Roadway Environmental Monitoring</i>	
<i>Requirement:</i>	
4 The field element's environmental sensors shall be remotely controlled by a traffic management center.	Planned
<i>Requirement:</i>	
5 The field element's environmental sensors shall be remotely controlled by weather service providers such as the National Weather Service or value-added sector specific meteorological services.	Planned
<i>Requirement:</i>	
7 The field element shall provide environmental sensor equipment operational status to the controlling center or maintenance vehicle.	Planned
<i>Requirement:</i>	
8 The field element shall provide environmental sensor equipment fault indication to the controlling center or maintenance vehicle.	Planned
<i>Requirement:</i>	
9 The field element shall remotely aggregate environmental sensor data with environmental data collected from maintenance and construction vehicles.	Planned
<i>Requirement:</i>	
10 The field element shall provide weather and road surface condition data to centers.	Planned
<i>Functional Area: Roadway Data Collection</i>	
<i>Requirement:</i>	
1 The field element shall collect traffic, road, and environmental conditions information.	Planned
<i>Requirement:</i>	
2 The field element shall include the sensors and supporting roadside devices that sense, collect, and send traffic, road, and environmental conditions information to a center for archival.	Planned
<i>Requirement:</i>	
3 The field element shall collect sensor status and sensor faults from roadside equipment and send it along with the recorded data to a center for archival.	Planned
<i>Element:MDOT District Weigh-in-Motion Stations</i>	
<i>Entity:Commercial Vehicle Check</i>	
<i>Functional Area: Roadside WIM</i>	
<i>Requirement:</i>	
1 The roadside check facility equipment shall detect the presence of commercial vehicles and freight equipment approaching a facility. Sensors can differentiate between different types of vehicles and determine the number of axles, gross vehicle weight, weight per axle, and the identification of the vehicle and its cargo.	Existing
<i>Requirement:</i>	
2 The roadside check facility equipment shall request and input electronic screening data from the commercial vehicle's electronic tag data.	Existing
<i>Requirement:</i>	
3 The roadside check facility equipment shall send a pass/pull-in notification to the commercial vehicle and its driver based on the information received from the vehicle and the measurements taken. The message may be sent to the on-board equipment in the commercial vehicle or transmitted to the driver using equipment such as dynamic message signs, red-green lights, flashing signs, etc.	Existing
<i>Functional Area: Roadside HAZMAT Detection</i>	

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:MDOT District Weigh-in-Motion Stations</i>	
<i>Entity:Commercial Vehicle Check</i>	
<i>Functional Area: Roadside HAZMAT Detection</i>	
<i>Requirement:</i>	
1 The roadside check facility equipment shall detect the presence of commercial vehicles and freight equipment approaching a facility. Sensors can differentiate between different types of vehicles and determine the number of axles, gross vehicle weight, presence of security sensitive hazardous materials, and the identification of the vehicle and its cargo.	Planned
<i>Requirement:</i>	
2 The roadside check facility equipment shall detect the presence of security sensitive substance, e.g. detection of radiation or ammonia compounds, carried on-board commercial vehicles and freight equipment approaching a facility. This data is acquired by roadside sensors from the freight equipment electronically, optically, or manually.	Planned
<i>Requirement:</i>	
3 The roadside check facility equipment shall receive the credential information (e.g. snapshots) from the commercial vehicle administration center to maintain an up to date list of which vehicles with hazardous materials shipments have been cleared (enrolled).	Planned
<i>Requirement:</i>	
4 The roadside check facility equipment shall send a pass/pull-in notification to the commercial vehicle and its driver based on the hazmat information received from the vehicle, the freight equipment, or the administration center. The message may be sent to the on-board equipment in the commercial vehicle or transmitted to the driver using equipment such as dynamic message signs, red-green lights, flashing signs, etc.	Planned
<i>Requirement:</i>	
5 The roadside check facility equipment shall raise and forward an alarm to the appropriate emergency management center if the hazmat-carrying commercial vehicle does not stop, or in the case of a positive identification of an unpermitted security sensitive hazmat cargo, to coordinate a traffic stop or some other action with respect to the offending commercial vehicle. The alarm will include information concerning the security sensitive hazmat detected at the roadside including the location, appropriate identifiers, route deviation, or assignment mismatches between the driver, commercial vehicle, or the freight equipment.	Planned
<i>Element:MDOT ExpressPass Permitting System</i>	
<i>Entity:Commercial Vehicle Administration</i>	
<i>Functional Area: Credentials and Taxes Administration</i>	
<i>Requirement:</i>	
1 The center shall manage electronic credentials filing and processing for commercial vehicles.	Existing
<i>Requirement:</i>	
2 The center shall manage the filing of appropriate taxes for the operation of commercial vehicles.	Existing
<i>Requirement:</i>	
3 The center shall process requests for payments of electronic credentials and tax filing and maintain an interface to a Financial Institution.	Existing
<i>Requirement:</i>	
4 The center shall exchange credentials and tax information with other commercial vehicle administration centers - either in other states or the federal government.	Existing

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:MDOT ExpressPass Permitting System</i>	
<i>Entity:Commercial Vehicle Administration</i>	
<i>Functional Area: Credentials and Taxes Administration</i>	
<i>Requirement:</i> 5 The center shall provide route restrictions information, including hazmat restrictions, to other centers and agencies for distribution to commercial vehicle operators. These centers and agencies may include commercial fleet and freight management operators, traveler information centers, digital map update providers, and other commercial vehicle administration centers.	Existing
<i>Requirement:</i> 6 The center shall use information on asset restrictions received from maintenance centers to develop the commercial vehicle route restrictions and process credentials applications.	Existing
<i>Requirement:</i> 7 The center shall provide an interface with commercial vehicle fleet and freight management centers to exchange audit and compliance review reports.	Existing
<i>Requirement:</i> 8 The center shall provide credentials information about commercial vehicle operators and carriers to authorized requestors such as insurance agencies.	Existing
<i>Requirement:</i> 9 The center shall receive and store information on commercial vehicle violations from enforcement agencies as part of the processing of credentials applications.	Existing
<i>Functional Area: CV Information Exchange</i>	
<i>Requirement:</i> 1 The center shall exchange information with roadside check facilities, including credentials and credentials status information, safety status information, daily site activity data, and citations.	Existing
<i>Requirement:</i> 2 The center shall exchange safety and credentials data among other commercial vehicle administration centers; includes border clearance status, credentials information, credentials status information, and safety status information.	Existing
<i>Requirement:</i> 3 The center shall package data concerning commercial vehicle safety and credentials into snapshots (top-level summary and critical status information).	Existing
<i>Requirement:</i> 4 The center shall package data concerning commercial vehicle safety and credentials into profiles (detailed and historical data).	Existing
<i>Requirement:</i> 5 The center shall provide commercial vehicle accident reports and citations to enforcement agencies.	Existing
<i>Requirement:</i> 6 The center shall provide commercial vehicle credentials and safety status information to authorized requestors such as insurance agencies.	Existing
<i>Requirement:</i> 7 The center shall provide reports to the commercial vehicle fleet manager regarding fleet activity through roadside facilities including accident reports, citations, credentials status information, and safety status information.	Existing
<i>Element:MDOT Highway Advisory Radio</i>	
<i>Entity:Roadway Subsystem</i>	
<i>Functional Area: Roadway Traffic Information Dissemination</i>	

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:MDOT Highway Advisory Radio</i>	
<i>Entity:Roadway Subsystem</i>	
<i>Functional Area: Roadway Traffic Information Dissemination</i>	
<i>Requirement:</i> 2 The field element shall include driver information systems that communicate directly from a center to the vehicle radio (such as Highway Advisory Radios) for dissemination of traffic and other information to drivers, under center control.	Planned
<i>Requirement:</i> 4 The field element shall provide operational status for the driver information systems equipment (DMS, HAR, etc.) to the center.	Planned
<i>Requirement:</i> 5 The field element shall provide fault data for the driver information systems equipment (DMS, HAR, etc.) to the center for repair.	Planned
<i>Element:MDOT Highway Performance Monitoring System (HPMS)</i>	
<i>Entity:Archived Data Management Subsystem</i>	
<i>Functional Area: ITS Data Repository</i>	
<i>Requirement:</i> 1 The center shall collect data to be archived from one or more data sources.	Existing
<i>Requirement:</i> 2 The center shall collect data catalogs from one or more data sources. A catalog describes the data contained in the collection of archived data and may include descriptions of the schema or structure of the data, a description of the contents of the data; e.g., time range of entries, number of entries; or a sample of the data (e. g. a thumbnail).	Existing
<i>Requirement:</i> 3 The center shall store the archived data in a focused repository that is suited to a particular set of ITS data users.	Existing
<i>Requirement:</i> 4 The center shall include capabilities for performing quality checks on the incoming archived data.	Existing
<i>Requirement:</i> 5 The center shall include capabilities for error notification on the incoming archived data.	Existing
<i>Requirement:</i> 6 The center shall include capabilities for archive to archive coordination.	Existing
<i>Requirement:</i> 7 The center shall support a broad range of archived data management implementations, ranging from simple data marts that collect a focused set of data and serve a particular user community to large-scale data warehouses that collect, integrate, and summarize transportation data from multiple sources and serve a broad array of users within a region.	Existing
<i>Requirement:</i> 8 The center shall perform quality checks on received data.	Existing
<i>Requirement:</i> 9 The center shall provide the capability to execute methods on the incoming data such as cleansing, summarizations, aggregations, or transformations applied to the data before it is stored in the archive.	Existing
<i>Requirement:</i> 10 The center shall respond to requests from the administrator interface function to maintain the archive data.	Existing
<i>Requirement:</i> 11 When data or a catalog of data is received from the archive, the center shall generate the requested data product for the users systems.	Existing

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:</i> MDOT Highway Performance Monitoring System (HPMS)	
<i>Entity:</i> Archived Data Management Subsystem	
<i>Functional Area:</i> ITS Data Repository	
<i>Requirement:</i> 12 For archive data requiring financial payment, the center shall process the financial requests and manage an interface to a Financial Institution.	Existing
<i>Functional Area:</i> Traffic and Roadside Data Archival	
<i>Requirement:</i> 1 The center shall manage the collection of archive data directly from collection equipment located at the roadside.	Existing
<i>Requirement:</i> 2 The center shall collect traffic sensor information from roadside devices.	Existing
<i>Requirement:</i> 4 The center shall respond to requests from the Archive Data Administer to input the parameters that control the collection process.	Existing
<i>Requirement:</i> 5 The center shall send the request for data and control parameters to the field equipment where the information is collected and returned.	Existing
<i>Requirement:</i> 6 The center shall record the status about the imported traffic and roadside data.	Existing
<i>Requirement:</i> 7 The center shall use the status information to adjust the collection of traffic and roadside data.	Existing
<i>Functional Area:</i> Government Reporting Systems Support	
<i>Requirement:</i> 1 The center shall provide data from an ITS archive to federal, state, or local government reporting systems.	Existing
<i>Requirement:</i> 2 The center shall provide the capability to select data from an ITS archive for use in government reports.	Existing
<i>Requirement:</i> 3 The center shall provide the capability to format data from an ITS archive suitable for input into government reports.	Existing
<i>Requirement:</i> 4 The center shall support requests for ITS archived data from Government Reporting Systems.	Existing
<i>Requirement:</i> 5 The center shall provide the applicable meta-data for any ITS archived data to satisfy government reporting system requests. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	Existing
<i>Functional Area:</i> On-Line Analysis and Mining	
<i>Requirement:</i> 1 The center shall support the interface with Archive Data User Systems for requests for analysis of the archive data.	Existing
<i>Requirement:</i> 2 The center shall provide the capability to perform activities such as data mining, data fusion, summarizations, aggregations, and recreation from archive data. This may include multidimensional analysis, selective summarization and expansion of data details, and many other advanced analysis services.	Existing
<i>Requirement:</i> 3 The center shall receive the user's systems requests and develop the request to retrieve the data from the archive.	Existing

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:MDOT Highway Performance Monitoring System (HPMS)</i>	
<i>Entity:Archived Data Management Subsystem</i>	
<i>Functional Area: On-Line Analysis and Mining</i>	
<i>Requirement:</i> 4 The center shall respond to users systems requests for a catalog of the archived data analysis products available.	Existing
<i>Element:MDOT MSTraffic.com</i>	
<i>Entity:Information Service Provider</i>	
<i>Functional Area: ISP Traveler Data Collection</i>	
<i>Requirement:</i> 1 The center shall collect, process, and store traffic and highway condition information, including incident information, detours and road closures, event information, recommended routes, and current speeds on specific routes.	Existing
<i>Requirement:</i> 2 The center shall collect, process, and store maintenance and construction information, including scheduled maintenance and construction work activities and work zone activities.	Existing
<i>Requirement:</i> 6 The center shall collect, process, and store weather information.	Existing
<i>Functional Area: Basic Information Broadcast</i>	
<i>Requirement:</i> 1 The center shall collect, process, store, and disseminate traffic and highway condition information to travelers, including incident information, detours and road closures, event information, recommended routes, and current speeds on specific routes.	Existing
<i>Requirement:</i> 2 The center shall collect, process, store, and disseminate maintenance and construction information to travelers, including scheduled maintenance and construction work activities and work zone activities.	Existing
<i>Requirement:</i> 6 The center shall collect, process, store, and disseminate weather information to travelers.	Existing
<i>Requirement:</i> 10 The center shall provide the capability for a system operator to control the type and update frequency of broadcast traveler information.	Existing
<i>Functional Area: ISP Emergency Traveler Information</i>	
<i>Requirement:</i> 1 The center shall collect and provide to the traveler interface systems emergency evacuation information, including evacuation zones, shelter information, available transportation modes, road closures and detours, changes to transit services, and traffic and road conditions at the origin, destination, and along the evacuation routes.	Planned
<i>Requirement:</i> 2 The center shall provide evacuation information to shelter providers.	Planned
<i>Requirement:</i> 3 The center shall collect and provide wide-area alert information to the traveler interface system with region-specific data, including major emergencies such as a natural or man-made disaster, civil emergency, child abductions, severe weather watches and warnings, military activities, and law enforcement warnings.	Planned

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:MDOT MSTraffic.com</i>	
<i>Entity:Information Service Provider</i>	
<i>Functional Area: ISP Emergency Traveler Information</i>	
<i>Requirement:</i> 4 The center shall provide the capability for a system operator to control the type and update frequency of emergency and wide-area alert information distributed to travelers.	Planned
<i>Element:MDOT PrePass System</i>	
<i>Entity:Commercial Vehicle Check</i>	
<i>Functional Area: Roadside Electronic Screening</i>	
<i>Requirement:</i> 1 The roadside check facility equipment shall detect the presence of commercial vehicles and freight equipment approaching a facility. Sensors can differentiate between different types of vehicles and determine the number of axles, gross vehicle weight, and the identification of the vehicle and its cargo.	Existing
<i>Requirement:</i> 2 The roadside check facility equipment shall receive the credential and credentials status information (e.g. snapshots) from the commercial vehicle administration center to maintain an up to date list of which vehicles have been cleared (enrolled) to potentially pass through without stopping.	Existing
<i>Requirement:</i> 3 The roadside check facility equipment shall receive violation records from appropriate law enforcement agencies pertaining to commercial vehicles.	Existing
<i>Requirement:</i> 4 The roadside check facility equipment shall provide an interface to inspectors in the field to allow them to monitor and if necessary override the pull-in decisions made by the system.	Existing
<i>Requirement:</i> 5 The roadside check facility equipment shall request and input electronic screening data from the commercial vehicle's electronic tag data.	Existing
<i>Requirement:</i> 6 The roadside check facility equipment shall send a pass/pull-in notification to the commercial vehicle and its driver based on the information received from the vehicle, the administration center, enforcement agencies, and the inspector. The message may be sent to the on-board equipment in the commercial vehicle or transmitted to the driver using equipment such as dynamic message signs, red-green lights, flashing signs, etc.	Existing
<i>Requirement:</i> 7 The roadside check facility equipment shall send a record of daily activities at the facility including summaries of screening events and inspections to the commercial vehicle administration center.	Existing
<i>Functional Area: Roadside Safety and Security Inspection</i>	
<i>Requirement:</i> 1 The roadside check facility equipment shall receive information concerning commercial vehicles and freight equipment approaching a facility that are being pulled in for safety inspections.	Existing
<i>Requirement:</i> 2 The roadside check facility equipment shall receive the safety inspection and status information from the commercial vehicle administration center to include information such as safety ratings, inspection summaries, and violation summaries. Corresponds to the safety portion of CVISN "snapshots."	Existing

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:</i> MDOT PrePass System	
<i>Entity:</i> Commercial Vehicle Check	
<i>Functional Area:</i> Roadside Safety and Security Inspection	
<i>Requirement:</i>	3 The roadside check facility equipment shall provide an interface to inspectors in the field to allow them to safety inspection data including overrides to the pull-in decisions made by the system. Existing
<i>Requirement:</i>	4 The roadside check facility equipment shall request and input electronic safety data from the commercial vehicle's electronic tag data. This includes driver logs, on-board safety data, safety inspection records, commercial vehicle breach information, as well as freight equipment information. Existing
<i>Requirement:</i>	5 The roadside check facility equipment shall send a pass/pull-in notification to the commercial vehicle and its driver based on the information received from the vehicle, the administration center, and the inspector. The message may be sent to the on-board equipment in the commercial vehicle or transmitted to the driver using equipment such as dynamic message signs, red-green lights, flashing signs, etc. Existing
<i>Requirement:</i>	6 The roadside check facility equipment shall receive information about a breach or tamper event on a commercial vehicle or its attached freight equipment which includes identity, type of breach, location, and time. Existing
<i>Requirement:</i>	7 The roadside check facility equipment shall forward results of the roadside safety inspections to the commercial vehicle administration center. Existing
<i>Functional Area:</i> Citation and Accident Electronic Recording	
<i>Requirement:</i>	1 The roadside check facility equipment shall record the results of roadside inspections carried using an inspector's hand held terminal interface. Existing
<i>Requirement:</i>	2 The roadside check facility equipment shall provide an interface for an inspector to add comments to the inspection results. Existing
<i>Requirement:</i>	3 The roadside check facility equipment shall forward results of the roadside inspections to the commercial vehicle administration center either as needed or on a periodic (e.g. basis). These reports include accident reports, violation notifications, citations, and daily site activity logs. Existing
<i>Functional Area:</i> Roadside HAZMAT Detection	
<i>Requirement:</i>	1 The roadside check facility equipment shall detect the presence of commercial vehicles and freight equipment approaching a facility. Sensors can differentiate between different types of vehicles and determine the number of axles, gross vehicle weight, presence of security sensitive hazardous materials, and the identification of the vehicle and its cargo. Planned
<i>Requirement:</i>	2 The roadside check facility equipment shall detect the presence of security sensitive substance, e.g. detection of radiation or ammonia compounds, carried on-board commercial vehicles and freight equipment approaching a facility. This data is acquired by roadside sensors from the freight equipment electronically, optically, or manually. Planned

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:MDOT PrePass System</i>	
<i>Entity:Commercial Vehicle Check</i>	
<i>Functional Area: Roadside HAZMAT Detection</i>	
<i>Requirement:</i>	3 The roadside check facility equipment shall receive the credential information (e.g. snapshots) from the commercial vehicle administration center to maintain an up to date list of which vehicles with hazardous materials shipments have been cleared (enrolled). Planned
<i>Requirement:</i>	4 The roadside check facility equipment shall send a pass/pull-in notification to the commercial vehicle and its driver based on the hazmat information received from the vehicle, the freight equipment, or the administration center. The message may be sent to the on-board equipment in the commercial vehicle or transmitted to the driver using equipment such as dynamic message signs, red-green lights, flashing signs, etc. Planned
<i>Requirement:</i>	5 The roadside check facility equipment shall raise and forward an alarm to the appropriate emergency management center if the hazmat-carrying commercial vehicle does not stop, or in the case of a positive identification of an unpermitted security sensitive hazmat cargo, to coordinate a traffic stop or some other action with respect to the offending commercial vehicle. The alarm will include information concerning the security sensitive hazmat detected at the roadside including the location, appropriate identifiers, route deviation, or assignment mismatches between the driver, commercial vehicle, or the freight equipment. Planned
<i>Element:MDOT Statewide 511 System</i>	
<i>Entity:Information Service Provider</i>	
<i>Functional Area: ISP Traveler Data Collection</i>	
<i>Requirement:</i>	1 The center shall collect, process, and store traffic and highway condition information, including incident information, detours and road closures, event information, recommended routes, and current speeds on specific routes. Planned
<i>Requirement:</i>	2 The center shall collect, process, and store maintenance and construction information, including scheduled maintenance and construction work activities and work zone activities. Planned
<i>Requirement:</i>	3 The center shall collect, process, and store transit routes and schedules, transit transfer options, transit fares, and real-time schedule adherence information. Planned
<i>Functional Area: Traveler Telephone Information</i>	
<i>Requirement:</i>	1 The center shall provide the capability to process voice-formatted requests for traveler information from a traveler telephone information system, and return the information in the requested format. Planned
<i>Requirement:</i>	2 The center shall provide the capability to process dual-tone multifrequency (DTMF)-based requests (touch-tone) for traveler information from a traveler telephone information system. Planned
<i>Requirement:</i>	3 The center shall provide the capability to process traveler information requests from a traveler telephone information system. Planned

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:MDOT Statewide 511 System</i>	
<i>Entity:Information Service Provider</i>	
<i>Functional Area: Traveler Telephone Information</i>	
<i>Requirement:</i>	4 The center shall collect and provide information on traffic conditions in the requested voice format and for the requested location. Planned
<i>Requirement:</i>	5 The center shall collect and provide work zone and roadway maintenance information in the requested voice format and for the requested location. Planned
<i>Requirement:</i>	8 The center shall collect and provide transit service information in the requested voice format and for the requested location. Planned
<i>Requirement:</i>	11 The center shall provide the capability to support both specific caller requests as well as bulk upload of regional traveler information. Planned
<i>Requirement:</i>	12 The center shall receive and forward region-specific wide-area alert and advisory information to the traveler telephone information system, including major emergencies such as a natural or man-made disaster, civil emergency, child abductions, severe weather watches and warnings, military activities, and law enforcement warnings. Planned
<i>Functional Area: ISP Emergency Traveler Information</i>	
<i>Requirement:</i>	1 The center shall collect and provide to the traveler interface systems emergency evacuation information, including evacuation zones, shelter information, available transportation modes, road closures and detours, changes to transit services, and traffic and road conditions at the origin, destination, and along the evacuation routes. Planned
<i>Requirement:</i>	3 The center shall collect and provide wide-area alert information to the traveler interface system with region-specific data, including major emergencies such as a natural or man-made disaster, civil emergency, child abductions, severe weather watches and warnings, military activities, and law enforcement warnings. Planned
<i>Requirement:</i>	4 The center shall provide the capability for a system operator to control the type and update frequency of emergency and wide-area alert information distributed to travelers. Planned
<i>Element:MDOT Statewide TMC Kiosks</i>	
<i>Entity:Remote Traveler Support</i>	
<i>Functional Area: Remote Basic Information Reception</i>	
<i>Requirement:</i>	1 The public interface for travelers shall receive traffic information from a center and present it to the traveler. Existing
<i>Requirement:</i>	3 The public interface for travelers shall receive event information from a center and present it to the traveler. Existing
<i>Requirement:</i>	4 This public interface for travelers shall receive evacuation information from a center and present it to the traveler. Existing
<i>Requirement:</i>	5 The public interface for travelers shall receive wide-area alerts and present it to the traveler. Existing

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:MDOT Statewide TMC Kiosks</i>	
<i>Entity:Remote Traveler Support</i>	
<i>Functional Area: Remote Basic Information Reception</i>	
<i>Requirement:</i> 7 The public interface for travelers shall support traveler input in audio or manual form.	Existing
<i>Requirement:</i> 8 The public interface for travelers shall present information to the traveler in audible or visual forms consistent with a kiosk, including those that are suitable for travelers with hearing or vision physical disabilities.	Existing
<i>Requirement:</i> 9 The public interface for travelers shall be able to store frequently requested data.	Existing
<i>Element:MDOT StatewideTMC</i>	
<i>Entity:Emergency Management</i>	
<i>Functional Area: Service Patrol Management</i>	
<i>Requirement:</i> 1 The center shall dispatch roadway service patrol vehicles to identified incident locations.	Planned
<i>Requirement:</i> 2 The center shall store the current status of all service patrol vehicles available for dispatch and those that have been dispatched.	Planned
<i>Requirement:</i> 3 The center shall share incident information collected by the service patrol with traffic, maintenance and construction, and traveler information centers for incident management, incident notification to travelers, and incident cleanup.	Planned
<i>Requirement:</i> 4 The center shall track the location and status of service patrol vehicles.	Planned
<i>Entity:Information Service Provider</i>	
<i>Functional Area: ISP Traveler Data Collection</i>	
<i>Requirement:</i> 1 The center shall collect, process, and store traffic and highway condition information, including incident information, detours and road closures, event information, recommended routes, and current speeds on specific routes.	Existing
<i>Requirement:</i> 2 The center shall collect, process, and store maintenance and construction information, including scheduled maintenance and construction work activities and work zone activities.	Existing
<i>Requirement:</i> 6 The center shall collect, process, and store weather information.	Existing
<i>Requirement:</i> 7 The center shall collect, process, and store event information.	Existing
<i>Functional Area: Basic Information Broadcast</i>	
<i>Requirement:</i> 1 The center shall collect, process, store, and disseminate traffic and highway condition information to travelers, including incident information, detours and road closures, event information, recommended routes, and current speeds on specific routes.	Existing
<i>Requirement:</i> 2 The center shall collect, process, store, and disseminate maintenance and construction information to travelers, including scheduled maintenance and construction work activities and work zone activities.	Existing

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:MDOT StatewideTMC</i>	
<i>Entity:Information Service Provider</i>	
<i>Functional Area: Basic Information Broadcast</i>	
<i>Requirement:</i>	6 The center shall collect, process, store, and disseminate weather information to travelers. Existing
<i>Requirement:</i>	7 The center shall collect, process, store, and disseminate event information to travelers. Existing
<i>Requirement:</i>	10 The center shall provide the capability for a system operator to control the type and update frequency of broadcast traveler information. Existing
<i>Entity:Maintenance and Construction Management</i>	
<i>Functional Area: MCM Vehicle Tracking</i>	
<i>Requirement:</i>	1 The center shall monitor the locations of all maintenance and construction vehicles and other equipment under its jurisdiction. Planned
<i>Requirement:</i>	2 The center shall present location data to center personnel for the fleet of maintenance and construction vehicles and other equipment. Planned
<i>Requirement:</i>	3 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for maintenance and construction vehicle tracking. Planned
<i>Entity:Traffic Management</i>	
<i>Functional Area: Collect Traffic Surveillance</i>	
<i>Requirement:</i>	1 The center shall monitor, analyze, and store traffic sensor data (speed, volume, occupancy) collected from field elements under remote control of the center. Existing
<i>Requirement:</i>	2 The center shall monitor, analyze, and distribute traffic images from CCTV systems under remote control of the center. Existing
<i>Requirement:</i>	4 The center shall distribute road network conditions data (raw or processed) based on collected and analyzed traffic sensor and surveillance data to other centers. Existing
<i>Requirement:</i>	5 The center shall respond to control data from center personnel regarding sensor and surveillance data collection, analysis, storage, and distribution. Existing
<i>Requirement:</i>	6 The center shall maintain a database of surveillance and sensors and the freeways, surface street and rural roadways, e.g. where they are located, to which part(s) of the network their data applies, the type of data, and the ownership of each link (that is, the agency or entity responsible for collecting and storing surveillance of the link) in the network. Existing
<i>Requirement:</i>	7 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic data. Existing
<i>Functional Area: TMC Signal Control</i>	
<i>Requirement:</i>	1 The center shall remotely control traffic signal controllers. Existing

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:</i> MDOT Statewide TMC	
<i>Entity:</i> Traffic Management	
<i>Functional Area:</i> TMC Signal Control	
<i>Requirement:</i>	Existing
2 The center shall accept notifications of right-of-way requests from pedestrians.	
<i>Requirement:</i>	Existing
3 The center shall collect traffic signal controller operational status and compare against the control information sent by the center.	
<i>Requirement:</i>	Existing
4 The center shall collect traffic signal controller fault data from the field.	
<i>Requirement:</i>	Existing
5 The center shall implement control plans to coordinate signalized intersections, under control of center personnel, based on data from sensors and surveillance monitoring traffic conditions, incidents, emergency vehicle preemptions, the passage of commercial vehicles with unusual loads, equipment faults, pedestrian crossings, etc.	
<i>Functional Area:</i> TMC Freeway Management	
<i>Requirement:</i>	Planned
1 The center shall remotely control systems to manage use of the freeways, including ramp meters, mainline metering, and lane controls.	
<i>Requirement:</i>	Planned
2 The center shall collect operational status from ramp meters, mainline metering, and lane controls and compare against the control information sent by the center.	
<i>Requirement:</i>	Planned
3 The center shall collect fault data from ramp meters, mainline metering, and lane controls.	
<i>Requirement:</i>	Planned
4 The center shall implement control strategies, under control of center personnel, on some or all of the freeway network devices (e.g. ramp meters, mainline metering, and lane controls), based on data from sensors monitoring traffic conditions upstream, downstream, and queue data on the ramps themselves.	
<i>Functional Area:</i> TMC Traffic Information Dissemination	
<i>Requirement:</i>	Planned
1 The center shall remotely control dynamic messages signs for dissemination of traffic and other information to drivers.	
<i>Requirement:</i>	Planned
2 The center shall remotely control driver information systems that communicate directly from a center to the vehicle radio (such as Highway Advisory Radios) for dissemination of traffic and other information to drivers.	
<i>Requirement:</i>	Planned
3 The center shall collect operational status for the driver information systems equipment (DMS, HAR, etc.).	
<i>Requirement:</i>	Planned
4 The center shall collect fault data for the driver information systems equipment (DMS, HAR, etc.) for repair.	
<i>Requirement:</i>	Planned
5 The center shall retrieve locally stored traffic information, including current and forecasted traffic information, road and weather conditions, traffic incident information, information on diversions and alternate routes, closures, and special traffic restrictions (lane/shoulder use, weight restrictions, width restrictions, HOV requirements), etc.	

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:MDOT StatewideTMC</i>	
<i>Entity:Traffic Management</i>	
<i>Functional Area: TMC Traffic Information Dissemination</i>	
<i>Requirement:</i> 6	The center shall distribute traffic data to maintenance and construction centers, transit centers, emergency management centers, and traveler information providers. Planned
<i>Requirement:</i> 7	The center shall distribute traffic data to the media upon request; the capability to provide the information in both data stream and graphical display shall be supported. Planned
<i>Requirement:</i> 8	The center shall provide the capability for center personnel to control the nature of the data that is available to non-traffic operations centers and the media. Planned
<i>Functional Area: TMC Regional Traffic Control</i>	
<i>Requirement:</i> 1	The center shall exchange traffic information with other traffic management centers, includes incident information, congestion data, traffic data, signal timing plans, and real-time signal control information. Existing
<i>Requirement:</i> 2	The center shall exchange traffic control information with other traffic management centers, includes remote monitoring and control of traffic management devices (e.g. signs, sensors, signals, cameras, etc.). Existing
<i>Functional Area: TMC Incident Detection</i>	
<i>Requirement:</i> 1	The center shall receive inputs from the Alerting and Advisory System concerning the possibility or occurrence of severe weather, terrorist activity, or other major emergency, including information provided by the Emergency Alert System. Existing
<i>Requirement:</i> 2	The center shall collect and store traffic flow and image data from the field equipment to detect and verify incidents. Existing
<i>Requirement:</i> 3	The center shall receive inputs concerning upcoming events that would effect the traffic network from event promoters, traveler information service providers, and intermodal freight depots. Existing
<i>Requirement:</i> 4	The center shall exchange incident and threat information with emergency management centers as well as maintenance and construction centers; including notification of existence of incident and expected severity, location, time and nature of incident. Existing
<i>Requirement:</i> 6	The center shall provide road network conditions and traffic images to emergency management centers to support the detection, verification, and classification of incidents. Existing
<i>Requirement:</i> 7	The center shall provide video and traffic sensor control commands to the field equipment to detect and verify incidents. Existing
<i>Functional Area: TMC Incident Dispatch Coordination/Communication</i>	

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:MDOT StatewideTMC</i>	
<i>Entity:Traffic Management</i>	
<i>Functional Area: TMC Incident Dispatch Coordination/Communication</i>	
<i>Requirement:</i>	Existing
1 The center shall exchange alert information and status with emergency management centers. The information includes notification of a major emergency such as a natural or man-made disaster, civil emergency, or child abduction for distribution to the public. The information may include the alert originator, the nature of the emergency, the geographic area affected by the emergency, the effective time period, and information and instructions necessary for the public to respond to the alert. This may also identify specific information that should not be released to the public.	
<i>Requirement:</i>	Existing
2 The center shall coordinate planning for incidents with emergency management centers - including pre-planning activities for disaster response, evacuation, and recovery operations.	
<i>Requirement:</i>	Existing
4 The center shall exchange incident and threat information with emergency management centers as well as maintenance and construction centers; including notification of existence of incident and expected severity, location, time and nature of incident.	
<i>Requirement:</i>	Existing
5 The center shall respond to requests from emergency management to provide traffic management resources to implement special traffic control measures, assist in clean up, verify an incident, etc. This may also involve coordination with maintenance centers.	
<i>Requirement:</i>	Existing
6 The center shall receive inputs concerning upcoming events that would effect the traffic network from event promoters, traveler information service providers, media, and rail operations centers.	
<i>Requirement:</i>	Existing
7 The center shall provide road network conditions and traffic images to emergency management centers, maintenance and construction centers, and traveler information service providers.	
<i>Requirement:</i>	Existing
8 The center shall exchange road network status assessment information with emergency management and maintenance centers including an assessment of damage sustained by the road network including location and extent of the damage, estimate of remaining capacity, required closures, alternate routes, necessary restrictions, and time frame for repair and recovery.	
<i>Requirement:</i>	Existing
9 The center shall coordinate information and controls with other traffic management centers.	
<i>Requirement:</i>	Existing
10 The center shall receive inputs from emergency management and transit management centers to develop an overall status of the transportation system including emergency transit schedules in effect and current status and condition of the transportation infrastructure.	
<i>Requirement:</i>	Existing
11 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic incident management.	

Functional Area: TMC Evacuation Support

Architecture	Status	
Central Region ITS Architecture (Region)	(Region)	
<i>Element:</i> MDOT Statewide TMC		
<i>Entity:</i> Traffic Management		
<i>Functional Area:</i> TMC Evacuation Support		
<i>Requirement:</i>	1 The center shall coordinate planning for evacuation with emergency management centers - including pre-planning activities such as establishing routes, areas to be evacuated, timing, etc.	Existing
<i>Requirement:</i>	2 The center shall support requests from emergency management centers to preempt the current traffic control strategy, activate traffic control and closure systems such as gates and barriers, activate safeguard systems, or use driver information systems to support evacuation traffic control plans.	Existing
<i>Requirement:</i>	3 The center shall coordinate information and controls with other traffic management centers.	Existing
<i>Requirement:</i>	4 The center shall coordinate execution of evacuation strategies with emergency management centers - including activities such as setting closures and detours, establishing routes, updating areas to be evacuated, timing the process, etc.	Existing
<i>Functional Area:</i> HRI Traffic Management		
<i>Requirement:</i>	1 The center shall remotely control highway-rail intersection (HRI) equipment located in the field.	Existing
<i>Requirement:</i>	2 The center shall accept collect highway-rail intersection (HRI) advisory or alert data from rail operations centers.	Existing
<i>Requirement:</i>	3 The center shall collect highway-rail intersection (HRI) equipment operational status and compare against the control information sent by the center.	Existing
<i>Requirement:</i>	4 The center shall provide the highway-rail intersection (HRI) equipment operational status to rail operations centers.	Existing
<i>Requirement:</i>	5 The center shall collect incident information related to a highway-rail intersection (HRI), such as intersection blockages or crashes or equipment malfunctions.	Existing
<i>Requirement:</i>	6 The center shall implement control plans to coordinate signalized intersections around highway-rail intersections (HRI), under control of center personnel, based on data from sensors and surveillance monitoring traffic conditions, incidents, equipment faults, pedestrian crossings, etc.	Existing
<i>Functional Area:</i> TMC Reversible Lane Management		
<i>Requirement:</i>	1 The center shall remotely control devices to detect traffic in reversible lanes, including wrong-way vehicles.	Planned
<i>Requirement:</i>	2 The center shall monitor the use of reversible lanes and detect wrong-way vehicles in reversible lanes using sensor and surveillance information, and the current lane control status (which direction the lane is currently operating).	Planned
<i>Requirement:</i>	3 The center shall remotely control automated reversible lane equipment and driver information systems (such as lane control signals) that control traffic in reversible lanes on surface streets.	Planned

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:MDOT StatewideTMC</i>	
<i>Entity:Traffic Management</i>	
<i>Functional Area: TMC Reversible Lane Management</i>	
<i>Requirement:</i> 4 The center shall remotely control automated reversible lane equipment and driver information systems (such as lane control signals) that control traffic in reversible lanes on freeways.	Planned
<i>Requirement:</i> 5 The center shall collect operational status for the reversible lane field equipment.	Planned
<i>Requirement:</i> 6 The center shall collect fault data for the reversible lane field equipment and send to the maintenance center for repair.	Planned
<i>Requirement:</i> 7 The center shall provide the capability for center personnel to control access and management of reversible lane facilities, including the direction of traffic flow changes during the day, especially between the peak hours and dedication of more lanes to the congestion direction during special events.	Planned
<i>Functional Area: Barrier System Management</i>	
<i>Requirement:</i> 1 The center shall remotely control barrier systems for transportation facilities and infrastructure. Barrier systems include automated or remotely controlled gates, barriers and other systems that manage entry to roadways.	Planned
<i>Requirement:</i> 2 The center shall collect barrier system operational status.	Planned
<i>Requirement:</i> 3 The center shall collect barrier system fault data and send to the maintenance center for repair.	Planned
<i>Requirement:</i> 4 The center shall accept requests for barrier system activation from other centers and from center personnel to support emergency response and detours.	Planned
<i>Functional Area: Traffic Maintenance</i>	
<i>Requirement:</i> 1 The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) operational status.	Existing
<i>Requirement:</i> 2 The center shall collect and store CCTV surveillance system (traffic, pedestrian) operational status.	Existing
<i>Requirement:</i> 3 The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) fault data and send to the maintenance center for repair.	Existing
<i>Requirement:</i> 4 The center shall collect and store CCTV surveillance system (traffic, pedestrian) fault data send to the maintenance center for repair.	Existing
<i>Requirement:</i> 5 The center shall collect environmental sensor operational status.	Planned
<i>Requirement:</i> 6 The center shall collect environmental sensor equipment fault data and send to the maintenance center for repair.	Planned
<i>Requirement:</i> 7 The center shall exchange data with maintenance centers concerning the reporting of faulty equipment and the schedule/status of their repair. Information exchanged includes details of new equipment faults, and clearances when the faults are cleared.	Existing

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:MDOT StatewideTMC</i>	
<i>Entity:Traffic Management</i>	
<i>Functional Area: Traffic Maintenance</i>	
<i>Requirement:</i>	8 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic maintenance data. Existing
<i>Functional Area: TMC Multimodal Coordination</i>	
<i>Requirement:</i>	1 The center shall respond to requests from transit management centers for signal priority at one or more intersections along a particular transit route. Planned
<i>Requirement:</i>	2 The center shall exchange information with transit management centers including details current transit routes, the level of service on each route, and the progress of individual vehicles along their routes. Planned
<i>Element:MDOT Truck Stop Kiosks</i>	
<i>Entity:Remote Traveler Support</i>	
<i>Functional Area: Remote Basic Information Reception</i>	
<i>Requirement:</i>	1 The public interface for travelers shall receive traffic information from a center and present it to the traveler. Planned
<i>Requirement:</i>	3 The public interface for travelers shall receive event information from a center and present it to the traveler. Planned
<i>Requirement:</i>	4 This public interface for travelers shall receive evacuation information from a center and present it to the traveler. Planned
<i>Requirement:</i>	5 The public interface for travelers shall receive wide-area alerts and present it to the traveler. Planned
<i>Requirement:</i>	7 The public interface for travelers shall support traveler input in audio or manual form. Planned
<i>Requirement:</i>	8 The public interface for travelers shall present information to the traveler in audible or visual forms consistent with a kiosk, including those that are suitable for travelers with hearing or vision physical disabilities. Planned
<i>Requirement:</i>	9 The public interface for travelers shall be able to store frequently requested data. Planned
<i>Element:MDOT Variable Trailblazer Signs</i>	
<i>Entity:Roadway Subsystem</i>	
<i>Functional Area: Roadway Traffic Information Dissemination</i>	
<i>Requirement:</i>	1 The field element shall include dynamic messages signs for dissemination of traffic and other information to drivers, under center control; the DMS may be either those that display variable text messages, or those that have fixed format display(s) (e.g. vehicle restrictions, or lane open/close). Planned
<i>Requirement:</i>	4 The field element shall provide operational status for the driver information systems equipment (DMS, HAR, etc.) to the center. Planned
<i>Requirement:</i>	5 The field element shall provide fault data for the driver information systems equipment (DMS, HAR, etc.) to the center for repair. Planned

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:MDOT Variable Trailblazer Signs</i>	
<i>Entity:Roadway Subsystem</i>	
<i>Element:MEMA Emergency Operations Center</i>	
<i>Entity:Emergency Management</i>	
<i>Functional Area: Incident Command</i>	
<i>Requirement:</i>	Existing
1 The center shall provide tactical decision support, resource coordination, and communications integration for Incident Commands that are established by first responders to support local management of an incident.	
<i>Requirement:</i>	Existing
2 The center shall provide incident command communications with public safety, emergency management, transportation, and other allied response agency centers.	
<i>Requirement:</i>	Existing
3 The center shall track and maintain resource information and action plans pertaining to the incident command.	
<i>Requirement:</i>	Existing
4 The center shall share incident command information with other public safety agencies including resource deployment status, hazardous material information, rail incident information, evacuation advice as well as traffic, road, and weather conditions.	
<i>Requirement:</i>	Existing
5 The center shall assess the status of responding emergency vehicles as part of an incident command.	
<i>Functional Area: Emergency Early Warning System</i>	
<i>Requirement:</i>	Existing
1 The center shall monitor information from Alerting and Advisory Systems such as the Information Sharing and Analysis Centers (ISACs), the National Infrastructure Protection Center (NIPC), the Homeland Security Advisory System (HSAS), etc. The information may include assessments (general incident and vulnerability awareness information), advisories (identification of threats or recommendations to increase preparedness levels), or alerts (information on imminent or in-progress emergencies).	
<i>Requirement:</i>	Existing
2 The center shall provide the capability to correlate alerts and advisories, incident information, and security sensor and surveillance data.	
<i>Requirement:</i>	Existing
3 The center shall broadcast wide-area alerts and advisories to traffic management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	
<i>Requirement:</i>	Existing
4 The center shall broadcast wide-area alerts and advisories to transit management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	
<i>Requirement:</i>	Existing
5 The center shall broadcast wide-area alerts and advisories to toll administration centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element: MEMA Emergency Operations Center</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Early Warning System</i>	
<i>Requirement:</i> 6 The center shall broadcast wide-area alerts and advisories to traveler information service providers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 7 The center shall broadcast wide-area alerts and advisories to maintenance centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 8 The center shall broadcast wide-area alerts and advisories to other emergency management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 9 The center shall process status information from each of the centers that have been sent the wide-area alert.	Existing
<i>Requirement:</i> 10 The center shall coordinate the broadcast of wide-area alerts and advisories with other emergency management centers.	Existing
<i>Requirement:</i> 11 The center shall receive incident information from other transportation management centers to support the early warning system.	Existing
<i>Requirement:</i> 12 The center shall present the alert and advisory information and the status of the actions taken in response to the alert by the other centers to the emergency system operator as received from other system inputs.	Existing
<i>Requirement:</i> 13 The center shall support the entry of alert and advisory information directly from the emergency system operator.	Existing
<i>Functional Area: Emergency Response Management</i>	
<i>Requirement:</i> 1 The center shall provide strategic emergency response capabilities such as that of an Emergency Operations Center for large-scale incidents and disasters.	Existing
<i>Requirement:</i> 2 The center shall manage coordinated inter-agency responses to and recovery from large-scale emergencies. Such agencies include traffic management, transit, maintenance and construction management, rail operations, and other emergency management agencies.	Existing
<i>Requirement:</i> 3 The center shall provide the capability to implement response plans and track progress through the incident by exchanging incident information and distributing response status to allied agencies.	Existing
<i>Requirement:</i> 4 The center shall develop, coordinate with other agencies, and store emergency response plans.	Existing
<i>Requirement:</i> 5 The center shall track the availability of resources (including vehicles, roadway cleanup, etc.), request additional resources from traffic, maintenance, or other emergency centers if needed.	Existing

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:</i> MEMA Emergency Operations Center	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Response Management	
<i>Requirement:</i>	
6 The center shall allocate the appropriate emergency services, resources, and vehicle (s) to respond to incidents, and shall provide the capability to override the current allocation to suit the special needs of a current incident.	Existing
<i>Requirement:</i>	
7 The center shall receive event scheduling information from Event Promoters.	Existing
<i>Requirement:</i>	
8 The center shall support remote control of field equipment normally under control of the traffic management center including traffic signals, dynamic message signs, gates, and barriers.	Planned
<i>Requirement:</i>	
9 The center shall provide the capability to remotely control and monitor CCTV systems normally operated by a traffic management center.	Planned
<i>Requirement:</i>	
10 The center shall provide the capability to request transit resource availability from transit centers for use during disaster and evacuation operations.	Existing
<i>Requirement:</i>	
11 The center shall assimilate the status of the transit, traffic, rail, maintenance, and other emergency center services and systems to create an overall transportation system status, and disseminate to each of these centers and the traveling public via traveler information providers.	Existing
<i>Requirement:</i>	
12 The center shall provide information to the media concerning the status of an emergency response.	Existing
<i>Requirement:</i>	
13 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	Existing
<i>Requirement:</i>	
14 The center shall provide the capability for center personnel to provide inputs to the management of incidents, disasters and evacuations.	Existing
<i>Functional Area:</i> Emergency Evacuation Support	
<i>Requirement:</i>	
1 The center shall manage inter-agency coordination of evacuation operations, from initial planning through the evacuation process and reentry.	Existing
<i>Requirement:</i>	
2 The center shall develop and exchange evacuation plans with allied agencies prior to the occurrence of a disaster.	Existing
<i>Requirement:</i>	
3 The center shall provide an interface to the emergency system operator to enter evacuation plans and procedures and present the operator with other agencies' plans.	Existing
<i>Requirement:</i>	
4 The center shall coordinate evacuation destinations and shelter needs with shelter providers (e.g., the American Red Cross) in the region.	Existing
<i>Requirement:</i>	
5 The center shall provide evacuation information to traffic, transit, maintenance and construction, rail operations, and other emergency management centers as needed.	Existing

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element: MEMA Emergency Operations Center</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Evacuation Support</i>	
<i>Requirement:</i> 6 The center shall request resources from transit agencies as needed to support the evacuation.	Existing
<i>Requirement:</i> 7 The center shall request traffic management agencies to implement special traffic control strategies and to control evacuation traffic, including traffic on local streets and arterials as well as the major evacuation routes.	Existing
<i>Requirement:</i> 8 The center shall provide traveler information systems with evacuation guidance including basic information to assist potential evacuees in determining whether evacuation is necessary and when it is safe to return.	Existing
<i>Requirement:</i> 9 The center shall monitor the progress or status of the evacuation once it begins and exchange tactical plans, prepared during the incident, with allied agencies.	Existing
<i>Requirement:</i> 10 The center shall monitor the progress of the reentry process.	Existing
<i>Functional Area: Emergency Environmental Monitoring</i>	
<i>Requirement:</i> 1 The center shall collect current and forecast road and weather information from weather service providers (such as the National Weather Service and value-added sector specific meteorological services).	Existing
<i>Requirement:</i> 3 The center shall collect current road and weather information from roadway maintenance operations.	Planned
<i>Requirement:</i> 4 The center shall assimilate current and forecast road conditions and surface weather information to support incident management.	Existing
<i>Requirement:</i> 5 The center shall present the current and forecast road and weather information to the emergency system operator.	Existing
<i>Element: MHP Dispatch Center</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Call-Taking</i>	
<i>Requirement:</i> 1 The center shall support the interface to the Emergency Telecommunications System (e.g. 911 or 7-digit call routing) to receive emergency notification information and provide it to the emergency system operator.	Existing
<i>Requirement:</i> 2 The center shall receive emergency call information from 911 services and present the possible incident information to the emergency system operator.	Existing
<i>Requirement:</i> 3 The center shall receive emergency call information from motorist call-boxes and present the possible incident information to the emergency system operator.	Existing
<i>Requirement:</i> 4 The center shall receive emergency call information from mayday service providers and present the possible incident information to the emergency system operator.	Existing
<i>Requirement:</i> 5 The center shall receive emergency notification information from other public safety agencies and present the possible incident information to the emergency system operator.	Existing

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:</i> MHP Dispatch Center	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Call-Taking	
<i>Requirement:</i>	Existing
7 The center shall coordinate, correlate, and verify all emergency inputs, including those identified based on external calls and internal analysis of security sensor and surveillance data, and assign each a level of confidence.	
<i>Requirement:</i>	Existing
9 The center shall forward the verified emergency information to the responding agency based on the location and nature of the emergency.	
<i>Requirement:</i>	Existing
10 The center shall update the incident information log once the emergency system operator has verified the incident.	
<i>Requirement:</i>	Existing
11 The center shall provide the capability for digitized map data to act as the background to the emergency information presented to the emergency system operator.	
<i>Functional Area:</i> Emergency Dispatch	
<i>Requirement:</i>	Existing
1 The center shall dispatch emergency vehicles to respond to verified emergencies under center personnel control.	
<i>Requirement:</i>	Existing
2 The center shall store the current status of all emergency vehicles available for dispatch and those that have been dispatched.	
<i>Requirement:</i>	Existing
3 The center shall relay location and incident details to the responding vehicles.	
<i>Requirement:</i>	Existing
4 The center shall track the location and status of emergency vehicles responding to an emergency based on information from the emergency vehicle.	
<i>Requirement:</i>	Existing
5 The center shall store and maintain the emergency service responses in an action log.	
<i>Requirement:</i>	Existing
6 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	
<i>Requirement:</i>	Existing
7 The center shall receive traffic images to support dispatch of emergency vehicles.	
<i>Requirement:</i>	Existing
9 The center shall coordinate response to incidents with other Emergency Management centers to ensure appropriate resources are dispatched and utilized.	
<i>Functional Area:</i> Incident Command	
<i>Requirement:</i>	Existing
1 The center shall provide tactical decision support, resource coordination, and communications integration for Incident Commands that are established by first responders to support local management of an incident.	
<i>Requirement:</i>	Existing
2 The center shall provide incident command communications with public safety, emergency management, transportation, and other allied response agency centers.	
<i>Requirement:</i>	Existing
3 The center shall track and maintain resource information and action plans pertaining to the incident command.	

Architecture	Status	
Central Region ITS Architecture (Region)	(Region)	
<i>Element:</i> MHP Dispatch Center		
<i>Entity:</i> Emergency Management		
<i>Functional Area:</i> Incident Command		
<i>Requirement:</i> 4	The center shall share incident command information with other public safety agencies including resource deployment status, hazardous material information, rail incident information, evacuation advice as well as traffic, road, and weather conditions.	Existing
<i>Requirement:</i> 5	The center shall assess the status of responding emergency vehicles as part of an incident command.	Existing
<i>Functional Area:</i> Emergency Early Warning System		
<i>Requirement:</i> 1	The center shall monitor information from Alerting and Advisory Systems such as the Information Sharing and Analysis Centers (ISACs), the National Infrastructure Protection Center (NIPC), the Homeland Security Advisory System (HSAS), etc. The information may include assessments (general incident and vulnerability awareness information), advisories (identification of threats or recommendations to increase preparedness levels), or alerts (information on imminent or in-progress emergencies).	Existing
<i>Requirement:</i> 2	The center shall provide the capability to correlate alerts and advisories, incident information, and security sensor and surveillance data.	Existing
<i>Requirement:</i> 3	The center shall broadcast wide-area alerts and advisories to traffic management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 4	The center shall broadcast wide-area alerts and advisories to transit management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 5	The center shall broadcast wide-area alerts and advisories to toll administration centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 6	The center shall broadcast wide-area alerts and advisories to traveler information service providers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 7	The center shall broadcast wide-area alerts and advisories to maintenance centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing

Architecture	Status	
Central Region ITS Architecture (Region)	(Region)	
<i>Element:</i> MHP Dispatch Center		
<i>Entity:</i> Emergency Management		
<i>Functional Area:</i> Emergency Early Warning System		
<i>Requirement:</i>	8 The center shall broadcast wide-area alerts and advisories to other emergency management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i>	9 The center shall process status information from each of the centers that have been sent the wide-area alert.	Existing
<i>Requirement:</i>	10 The center shall coordinate the broadcast of wide-area alerts and advisories with other emergency management centers.	Existing
<i>Requirement:</i>	11 The center shall receive incident information from other transportation management centers to support the early warning system.	Existing
<i>Requirement:</i>	12 The center shall present the alert and advisory information and the status of the actions taken in response to the alert by the other centers to the emergency system operator as received from other system inputs.	Existing
<i>Requirement:</i>	13 The center shall support the entry of alert and advisory information directly from the emergency system operator.	Existing
<i>Functional Area:</i> Emergency Response Management		
<i>Requirement:</i>	1 The center shall provide strategic emergency response capabilities such as that of an Emergency Operations Center for large-scale incidents and disasters.	Existing
<i>Requirement:</i>	2 The center shall manage coordinated inter-agency responses to and recovery from large-scale emergencies. Such agencies include traffic management, transit, maintenance and construction management, rail operations, and other emergency management agencies.	Existing
<i>Requirement:</i>	3 The center shall provide the capability to implement response plans and track progress through the incident by exchanging incident information and distributing response status to allied agencies.	Existing
<i>Requirement:</i>	4 The center shall develop, coordinate with other agencies, and store emergency response plans.	Existing
<i>Requirement:</i>	5 The center shall track the availability of resources (including vehicles, roadway cleanup, etc.), request additional resources from traffic, maintenance, or other emergency centers if needed.	Existing
<i>Requirement:</i>	6 The center shall allocate the appropriate emergency services, resources, and vehicle (s) to respond to incidents, and shall provide the capability to override the current allocation to suit the special needs of a current incident.	Existing
<i>Requirement:</i>	7 The center shall receive event scheduling information from Event Promoters.	Existing
<i>Requirement:</i>	14 The center shall provide the capability for center personnel to provide inputs to the management of incidents, disasters and evacuations.	Existing

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:</i> MHP Dispatch Center	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Evacuation Support	
<i>Requirement:</i>	Existing
1 The center shall manage inter-agency coordination of evacuation operations, from initial planning through the evacuation process and reentry.	
<i>Requirement:</i>	Existing
2 The center shall develop and exchange evacuation plans with allied agencies prior to the occurrence of a disaster.	
<i>Requirement:</i>	Existing
3 The center shall provide an interface to the emergency system operator to enter evacuation plans and procedures and present the operator with other agencies' plans.	
<i>Requirement:</i>	Existing
6 The center shall request resources from transit agencies as needed to support the evacuation.	
<i>Requirement:</i>	Existing
7 The center shall request traffic management agencies to implement special traffic control strategies and to control evacuation traffic, including traffic on local streets and arterials as well as the major evacuation routes.	
<i>Requirement:</i>	Existing
8 The center shall provide traveler information systems with evacuation guidance including basic information to assist potential evacuees in determining whether evacuation is necessary and when it is safe to return.	
<i>Requirement:</i>	Existing
9 The center shall monitor the progress or status of the evacuation once it begins and exchange tactical plans, prepared during the incident, with allied agencies.	
<i>Requirement:</i>	Existing
10 The center shall monitor the progress of the reentry process.	
<i>Requirement:</i>	Existing
11 The center shall submit evacuation information to toll administration centers along with requests for changes in the toll services or fee collection during an evacuation.	
<i>Functional Area:</i> Emergency Environmental Monitoring	
<i>Requirement:</i>	Existing
1 The center shall collect current and forecast road and weather information from weather service providers (such as the National Weather Service and value-added sector specific meteorological services).	
<i>Requirement:</i>	Planned
3 The center shall collect current road and weather information from roadway maintenance operations.	
<i>Requirement:</i>	Existing
4 The center shall assimilate current and forecast road conditions and surface weather information to support incident management.	
<i>Requirement:</i>	Existing
5 The center shall present the current and forecast road and weather information to the emergency system operator.	
<i>Functional Area:</i> Emergency Data Collection	
<i>Requirement:</i>	Existing
1 The center shall collect emergency service data, emergency vehicle management data, emergency vehicle data, sensor and surveillance data, threat data, and incident data.	

Element: **MHP District 1 Office**

Entity: **Emergency Management**

Functional Area: **Emergency Early Warning System**

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:</i> MHP District 1 Office	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Early Warning System	
<i>Requirement:</i>	Existing
1 The center shall monitor information from Alerting and Advisory Systems such as the Information Sharing and Analysis Centers (ISACs), the National Infrastructure Protection Center (NIPC), the Homeland Security Advisory System (HSAS), etc. The information may include assessments (general incident and vulnerability awareness information), advisories (identification of threats or recommendations to increase preparedness levels), or alerts (information on imminent or in-progress emergencies).	
<i>Requirement:</i>	Existing
2 The center shall provide the capability to correlate alerts and advisories, incident information, and security sensor and surveillance data.	
<i>Requirement:</i>	Existing
3 The center shall broadcast wide-area alerts and advisories to traffic management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	
<i>Requirement:</i>	Existing
4 The center shall broadcast wide-area alerts and advisories to transit management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	
<i>Requirement:</i>	Existing
5 The center shall broadcast wide-area alerts and advisories to toll administration centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	
<i>Requirement:</i>	Existing
6 The center shall broadcast wide-area alerts and advisories to traveler information service providers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	
<i>Requirement:</i>	Existing
7 The center shall broadcast wide-area alerts and advisories to maintenance centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	
<i>Requirement:</i>	Existing
8 The center shall broadcast wide-area alerts and advisories to other emergency management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	
<i>Requirement:</i>	Existing
9 The center shall process status information from each of the centers that have been sent the wide-area alert.	
<i>Requirement:</i>	Existing
10 The center shall coordinate the broadcast of wide-area alerts and advisories with other emergency management centers.	
<i>Requirement:</i>	Existing
11 The center shall receive incident information from other transportation management centers to support the early warning system.	

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:</i> MHP District 1 Office	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Early Warning System	
<i>Requirement:</i> 12 The center shall present the alert and advisory information and the status of the actions taken in response to the alert by the other centers to the emergency system operator as received from other system inputs.	Existing
<i>Requirement:</i> 13 The center shall support the entry of alert and advisory information directly from the emergency system operator.	Existing
<i>Functional Area:</i> Emergency Response Management	
<i>Requirement:</i> 3 The center shall provide the capability to implement response plans and track progress through the incident by exchanging incident information and distributing response status to allied agencies.	Existing
<i>Requirement:</i> 4 The center shall develop, coordinate with other agencies, and store emergency response plans.	Existing
<i>Requirement:</i> 5 The center shall track the availability of resources (including vehicles, roadway cleanup, etc.), request additional resources from traffic, maintenance, or other emergency centers if needed.	Existing
<i>Requirement:</i> 6 The center shall allocate the appropriate emergency services, resources, and vehicle (s) to respond to incidents, and shall provide the capability to override the current allocation to suit the special needs of a current incident.	Existing
<i>Requirement:</i> 7 The center shall receive event scheduling information from Event Promoters.	Existing
<i>Requirement:</i> 14 The center shall provide the capability for center personnel to provide inputs to the management of incidents, disasters and evacuations.	Existing
<i>Functional Area:</i> Emergency Data Collection	
<i>Requirement:</i> 1 The center shall collect emergency service data, emergency vehicle management data, emergency vehicle data, sensor and surveillance data, threat data, and incident data.	Existing
<i>Element:</i> MHP Emergency Vehicles	
<i>Entity:</i> Emergency Vehicle Subsystem	
<i>Functional Area:</i> On-board EV En Route Support	
<i>Requirement:</i> 1 The emergency vehicle, including roadway service patrols, shall compute the location of the emergency vehicle based on inputs from a vehicle location determination function.	Planned
<i>Requirement:</i> 2 The emergency vehicle, including roadway service patrols, shall send the vehicle's location and operational data to the center for emergency management and dispatch.	Planned
<i>Requirement:</i> 3 The emergency vehicle, including roadway service patrols, shall receive incident details and a suggested route when dispatched to a scene.	Existing
<i>Requirement:</i> 4 The emergency vehicle shall send the current en route status (including estimated time of arrival) and requests for emergency dispatch updates.	Existing

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:</i> MHP Emergency Vehicles	
<i>Entity:</i> Emergency Vehicle Subsystem	
<i>Functional Area:</i> On-board EV En Route Support	
<i>Requirement:</i>	5 The emergency vehicle shall send requests to traffic signal control equipment at the roadside to preempt the signal. Planned
<i>Requirement:</i>	6 The emergency vehicle shall provide the personnel on-board with dispatch information, including incident type and location, and forward an acknowledgment from personnel to the center that the vehicle is on its way to the incident scene. Existing
<i>Functional Area:</i> On-board EV Incident Management Communication	
<i>Requirement:</i>	1 The emergency vehicle shall receive dispatch instructions sufficient to enable emergency personnel in the field to implement an effective incident response. It includes local traffic, road, and weather conditions, hazardous material information, and the current status of resources that have been allocated to an incident. Existing
<i>Requirement:</i>	2 The emergency vehicle shall provide an interface to the center for emergency personnel to transmit information about the incident site such as the extent of injuries, identification of vehicles and people involved, hazardous material, etc. Existing
<i>Requirement:</i>	3 The emergency vehicle shall provide an interface to the center for emergency personnel to transmit information about the current incident response status such as the identification of the resources on site, site management strategies in effect, and current clearance status. Existing
<i>Entity:</i> Vehicle	
<i>Functional Area:</i> Vehicle Location Determination	
<i>Requirement:</i>	1 The vehicle shall provide the vehicle's current location to other in-vehicle functions. Planned
<i>Requirement:</i>	2 The vehicle shall calculate the location from one or more sources of position data. These location referencing systems include position systems such as GPS, DGPS, odometer and differential odometers. Planned
<i>Requirement:</i>	3 The vehicle shall refine its calculations as required by other in-vehicle functions. Planned
<i>Element:</i> Mississippi Bureau of Investigation	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Early Warning System	
<i>Requirement:</i>	1 The center shall monitor information from Alerting and Advisory Systems such as the Information Sharing and Analysis Centers (ISACs), the National Infrastructure Protection Center (NIPC), the Homeland Security Advisory System (HSAS), etc. The information may include assessments (general incident and vulnerability awareness information), advisories (identification of threats or recommendations to increase preparedness levels), or alerts (information on imminent or in-progress emergencies). Existing

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element: Mississippi Bureau of Investigation</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Early Warning System</i>	
<i>Requirement:</i> 2 The center shall provide the capability to correlate alerts and advisories, incident information, and security sensor and surveillance data.	Existing
<i>Requirement:</i> 3 The center shall broadcast wide-area alerts and advisories to traffic management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 4 The center shall broadcast wide-area alerts and advisories to transit management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 6 The center shall broadcast wide-area alerts and advisories to traveler information service providers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 7 The center shall broadcast wide-area alerts and advisories to maintenance centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 8 The center shall broadcast wide-area alerts and advisories to other emergency management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 9 The center shall process status information from each of the centers that have been sent the wide-area alert.	Existing
<i>Requirement:</i> 10 The center shall coordinate the broadcast of wide-area alerts and advisories with other emergency management centers.	Existing
<i>Requirement:</i> 11 The center shall receive incident information from other transportation management centers to support the early warning system.	Existing
<i>Requirement:</i> 12 The center shall present the alert and advisory information and the status of the actions taken in response to the alert by the other centers to the emergency system operator as received from other system inputs.	Existing
<i>Requirement:</i> 13 The center shall support the entry of alert and advisory information directly from the emergency system operator.	Existing
<i>Element: Mississippi Department of Environmental Quality</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Commercial Vehicle Response</i>	

Architecture	Status	
Central Region ITS Architecture (Region)	(Region)	
<i>Element: Mississippi Department of Environmental Quality</i>		
<i>Entity: Emergency Management</i>		
<i>Functional Area: Emergency Commercial Vehicle Response</i>		
<i>Requirement:</i>	1 The center shall receive emergency notification information from commercial vehicles, commercial vehicle check stations, or commercial fleet operators and present the possible incident information to the emergency system operator. This may include detection of non-permitted transport of security sensitive hazmat, hazardous cargo spills, etc.	Planned
<i>Requirement:</i>	2 The center shall receive details of the cargo being carried by commercial vehicles from their commercial fleet manager for incidents involving potential hazardous materials.	Planned
<i>Requirement:</i>	3 The center shall forward the verified emergency information to the responding agency based on the location and nature of the emergency.	Planned
<i>Requirement:</i>	4 The center shall provide the capability to request Fleet and Freight Management to disable a specific vehicle in their fleet.	Planned
<i>Element: Mississippi Emergency Management Agency</i>		
<i>Entity: Emergency Management</i>		
<i>Functional Area: Incident Command</i>		
<i>Requirement:</i>	1 The center shall provide tactical decision support, resource coordination, and communications integration for Incident Commands that are established by first responders to support local management of an incident.	Existing
<i>Requirement:</i>	2 The center shall provide incident command communications with public safety, emergency management, transportation, and other allied response agency centers.	Existing
<i>Requirement:</i>	3 The center shall track and maintain resource information and action plans pertaining to the incident command.	Existing
<i>Requirement:</i>	4 The center shall share incident command information with other public safety agencies including resource deployment status, hazardous material information, rail incident information, evacuation advice as well as traffic, road, and weather conditions.	Existing
<i>Requirement:</i>	5 The center shall assess the status of responding emergency vehicles as part of an incident command.	Existing
<i>Functional Area: Emergency Early Warning System</i>		
<i>Requirement:</i>	1 The center shall monitor information from Alerting and Advisory Systems such as the Information Sharing and Analysis Centers (ISACs), the National Infrastructure Protection Center (NIPC), the Homeland Security Advisory System (HSAS), etc. The information may include assessments (general incident and vulnerability awareness information), advisories (identification of threats or recommendations to increase preparedness levels), or alerts (information on imminent or in-progress emergencies).	Existing
<i>Requirement:</i>	2 The center shall provide the capability to correlate alerts and advisories, incident information, and security sensor and surveillance data.	Existing

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element: Mississippi Emergency Management Agency</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Early Warning System</i>	
<i>Requirement:</i>	
3 The center shall broadcast wide-area alerts and advisories to traffic management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i>	
4 The center shall broadcast wide-area alerts and advisories to transit management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i>	
6 The center shall broadcast wide-area alerts and advisories to traveler information service providers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i>	
7 The center shall broadcast wide-area alerts and advisories to maintenance centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i>	
8 The center shall broadcast wide-area alerts and advisories to other emergency management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i>	
9 The center shall process status information from each of the centers that have been sent the wide-area alert.	Existing
<i>Requirement:</i>	
10 The center shall coordinate the broadcast of wide-area alerts and advisories with other emergency management centers.	Existing
<i>Requirement:</i>	
11 The center shall receive incident information from other transportation management centers to support the early warning system.	Existing
<i>Requirement:</i>	
12 The center shall present the alert and advisory information and the status of the actions taken in response to the alert by the other centers to the emergency system operator as received from other system inputs.	Existing
<i>Requirement:</i>	
13 The center shall support the entry of alert and advisory information directly from the emergency system operator.	Existing
<i>Functional Area: Emergency Response Management</i>	
<i>Requirement:</i>	
1 The center shall provide strategic emergency response capabilities such as that of an Emergency Operations Center for large-scale incidents and disasters.	Existing
<i>Requirement:</i>	
2 The center shall manage coordinated inter-agency responses to and recovery from large-scale emergencies. Such agencies include traffic management, transit, maintenance and construction management, rail operations, and other emergency management agencies.	Existing

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:</i> Mississippi Emergency Management Agency	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Response Management	
<i>Requirement:</i>	
3 The center shall provide the capability to implement response plans and track progress through the incident by exchanging incident information and distributing response status to allied agencies.	Existing
<i>Requirement:</i>	
4 The center shall develop, coordinate with other agencies, and store emergency response plans.	Existing
<i>Requirement:</i>	
5 The center shall track the availability of resources (including vehicles, roadway cleanup, etc.), request additional resources from traffic, maintenance, or other emergency centers if needed.	Existing
<i>Requirement:</i>	
6 The center shall allocate the appropriate emergency services, resources, and vehicle (s) to respond to incidents, and shall provide the capability to override the current allocation to suit the special needs of a current incident.	Existing
<i>Requirement:</i>	
10 The center shall provide the capability to request transit resource availability from transit centers for use during disaster and evacuation operations.	Existing
<i>Requirement:</i>	
11 The center shall assimilate the status of the transit, traffic, rail, maintenance, and other emergency center services and systems to create an overall transportation system status, and disseminate to each of these centers and the traveling public via traveler information providers.	Existing
<i>Requirement:</i>	
12 The center shall provide information to the media concerning the status of an emergency response.	Existing
<i>Requirement:</i>	
13 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	Existing
<i>Requirement:</i>	
14 The center shall provide the capability for center personnel to provide inputs to the management of incidents, disasters and evacuations.	Existing
<i>Functional Area:</i> Emergency Evacuation Support	
<i>Requirement:</i>	
1 The center shall manage inter-agency coordination of evacuation operations, from initial planning through the evacuation process and reentry.	Existing
<i>Requirement:</i>	
2 The center shall develop and exchange evacuation plans with allied agencies prior to the occurrence of a disaster.	Existing
<i>Requirement:</i>	
3 The center shall provide an interface to the emergency system operator to enter evacuation plans and procedures and present the operator with other agencies' plans.	Existing
<i>Requirement:</i>	
4 The center shall coordinate evacuation destinations and shelter needs with shelter providers (e.g., the American Red Cross) in the region.	Existing
<i>Requirement:</i>	
5 The center shall provide evacuation information to traffic, transit, maintenance and construction, rail operations, and other emergency management centers as needed.	Existing

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element: Mississippi Emergency Management Agency</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Evacuation Support</i>	
<i>Requirement:</i>	
6 The center shall request resources from transit agencies as needed to support the evacuation.	Existing
<i>Requirement:</i>	
7 The center shall request traffic management agencies to implement special traffic control strategies and to control evacuation traffic, including traffic on local streets and arterials as well as the major evacuation routes.	Existing
<i>Requirement:</i>	
8 The center shall provide traveler information systems with evacuation guidance including basic information to assist potential evacuees in determining whether evacuation is necessary and when it is safe to return.	Existing
<i>Requirement:</i>	
9 The center shall monitor the progress or status of the evacuation once it begins and exchange tactical plans, prepared during the incident, with allied agencies.	Existing
<i>Requirement:</i>	
10 The center shall monitor the progress of the reentry process.	Existing
<i>Requirement:</i>	
11 The center shall submit evacuation information to toll administration centers along with requests for changes in the toll services or fee collection during an evacuation.	Existing
<i>Entity: Information Service Provider</i>	
<i>Functional Area: ISP Emergency Traveler Information</i>	
<i>Requirement:</i>	
1 The center shall collect and provide to the traveler interface systems emergency evacuation information, including evacuation zones, shelter information, available transportation modes, road closures and detours, changes to transit services, and traffic and road conditions at the origin, destination, and along the evacuation routes.	Existing
<i>Requirement:</i>	
2 The center shall provide evacuation information to shelter providers.	Existing
<i>Requirement:</i>	
3 The center shall collect and provide wide-area alert information to the traveler interface system with region-specific data, including major emergencies such as a natural or man-made disaster, civil emergency, child abductions, severe weather watches and warnings, military activities, and law enforcement warnings.	Existing
<i>Requirement:</i>	
4 The center shall provide the capability for a system operator to control the type and update frequency of emergency and wide-area alert information distributed to travelers.	Existing
<i>Element: Mississippi Office of Homeland Security</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Early Warning System</i>	

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:</i> Mississippi Office of Homeland Security	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Early Warning System	
<i>Requirement:</i>	Existing
1 The center shall monitor information from Alerting and Advisory Systems such as the Information Sharing and Analysis Centers (ISACs), the National Infrastructure Protection Center (NIPC), the Homeland Security Advisory System (HSAS), etc. The information may include assessments (general incident and vulnerability awareness information), advisories (identification of threats or recommendations to increase preparedness levels), or alerts (information on imminent or in-progress emergencies).	
<i>Requirement:</i>	Existing
2 The center shall provide the capability to correlate alerts and advisories, incident information, and security sensor and surveillance data.	
<i>Requirement:</i>	Existing
8 The center shall broadcast wide-area alerts and advisories to other emergency management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	
<i>Requirement:</i>	Existing
9 The center shall process status information from each of the centers that have been sent the wide-area alert.	
<i>Requirement:</i>	Existing
10 The center shall coordinate the broadcast of wide-area alerts and advisories with other emergency management centers.	
<i>Requirement:</i>	Existing
11 The center shall receive incident information from other transportation management centers to support the early warning system.	
<i>Requirement:</i>	Existing
12 The center shall present the alert and advisory information and the status of the actions taken in response to the alert by the other centers to the emergency system operator as received from other system inputs.	
<i>Requirement:</i>	Existing
13 The center shall support the entry of alert and advisory information directly from the emergency system operator.	
<i>Functional Area:</i> Emergency Response Management	
<i>Requirement:</i>	Existing
1 The center shall provide strategic emergency response capabilities such as that of an Emergency Operations Center for large-scale incidents and disasters.	
<i>Requirement:</i>	Existing
2 The center shall manage coordinated inter-agency responses to and recovery from large-scale emergencies. Such agencies include traffic management, transit, maintenance and construction management, rail operations, and other emergency management agencies.	
<i>Requirement:</i>	Existing
3 The center shall provide the capability to implement response plans and track progress through the incident by exchanging incident information and distributing response status to allied agencies.	
<i>Requirement:</i>	Existing
4 The center shall develop, coordinate with other agencies, and store emergency response plans.	
<i>Requirement:</i>	Existing
5 The center shall track the availability of resources (including vehicles, roadway cleanup, etc.), request additional resources from traffic, maintenance, or other emergency centers if needed.	

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:</i> Mississippi Office of Homeland Security	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Response Management	
<i>Requirement:</i>	Existing
6 The center shall allocate the appropriate emergency services, resources, and vehicle (s) to respond to incidents, and shall provide the capability to override the current allocation to suit the special needs of a current incident.	
<i>Requirement:</i>	Existing
10 The center shall provide the capability to request transit resource availability from transit centers for use during disaster and evacuation operations.	
<i>Requirement:</i>	Existing
11 The center shall assimilate the status of the transit, traffic, rail, maintenance, and other emergency center services and systems to create an overall transportation system status, and disseminate to each of these centers and the traveling public via traveler information providers.	
<i>Requirement:</i>	Existing
12 The center shall provide information to the media concerning the status of an emergency response.	
<i>Requirement:</i>	Existing
13 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	
<i>Requirement:</i>	Existing
14 The center shall provide the capability for center personnel to provide inputs to the management of incidents, disasters and evacuations.	
<i>Functional Area:</i> Emergency Evacuation Support	
<i>Requirement:</i>	Existing
1 The center shall manage inter-agency coordination of evacuation operations, from initial planning through the evacuation process and reentry.	
<i>Requirement:</i>	Existing
2 The center shall develop and exchange evacuation plans with allied agencies prior to the occurrence of a disaster.	
<i>Requirement:</i>	Existing
3 The center shall provide an interface to the emergency system operator to enter evacuation plans and procedures and present the operator with other agencies' plans.	
<i>Requirement:</i>	Existing
4 The center shall coordinate evacuation destinations and shelter needs with shelter providers (e.g., the American Red Cross) in the region.	
<i>Requirement:</i>	Existing
5 The center shall provide evacuation information to traffic, transit, maintenance and construction, rail operations, and other emergency management centers as needed.	
<i>Requirement:</i>	Existing
6 The center shall request resources from transit agencies as needed to support the evacuation.	
<i>Requirement:</i>	Existing
7 The center shall request traffic management agencies to implement special traffic control strategies and to control evacuation traffic, including traffic on local streets and arterials as well as the major evacuation routes.	
<i>Requirement:</i>	Existing
8 The center shall provide traveler information systems with evacuation guidance including basic information to assist potential evacuees in determining whether evacuation is necessary and when it is safe to return.	

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element: Mississippi Office of Homeland Security</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Evacuation Support</i>	
<i>Requirement:</i> 9 The center shall monitor the progress or status of the evacuation once it begins and exchange tactical plans, prepared during the incident, with allied agencies.	Existing
<i>Requirement:</i> 10 The center shall monitor the progress of the reentry process.	Existing
<i>Entity: Information Service Provider</i>	
<i>Functional Area: ISP Emergency Traveler Information</i>	
<i>Requirement:</i> 3 The center shall collect and provide wide-area alert information to the traveler interface system with region-specific data, including major emergencies such as a natural or man-made disaster, civil emergency, child abductions, severe weather watches and warnings, military activities, and law enforcement warnings.	Existing
<i>Requirement:</i> 4 The center shall provide the capability for a system operator to control the type and update frequency of emergency and wide-area alert information distributed to travelers.	Existing
<i>Element: Mississippi Public Service Commission SAFETYNET</i>	
<i>Entity: Archived Data Management Subsystem</i>	
<i>Functional Area: ITS Data Repository</i>	
<i>Requirement:</i> 1 The center shall collect data to be archived from one or more data sources.	Existing
<i>Requirement:</i> 2 The center shall collect data catalogs from one or more data sources. A catalog describes the data contained in the collection of archived data and may include descriptions of the schema or structure of the data, a description of the contents of the data; e.g., time range of entries, number of entries; or a sample of the data (e. g. a thumbnail).	Existing
<i>Requirement:</i> 3 The center shall store the archived data in a focused repository that is suited to a particular set of ITS data users.	Existing
<i>Requirement:</i> 4 The center shall include capabilities for performing quality checks on the incoming archived data.	Existing
<i>Requirement:</i> 5 The center shall include capabilities for error notification on the incoming archived data.	Existing
<i>Requirement:</i> 6 The center shall include capabilities for archive to archive coordination.	Existing
<i>Requirement:</i> 7 The center shall support a broad range of archived data management implementations, ranging from simple data marts that collect a focused set of data and serve a particular user community to large-scale data warehouses that collect, integrate, and summarize transportation data from multiple sources and serve a broad array of users within a region.	Existing
<i>Requirement:</i> 8 The center shall perform quality checks on received data.	Existing
<i>Requirement:</i> 9 The center shall provide the capability to execute methods on the incoming data such as cleansing, summarizations, aggregations, or transformations applied to the data before it is stored in the archive.	Existing

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:</i> Mississippi Public Service Commission SAFETYNET	
<i>Entity:</i> Archived Data Management Subsystem	
<i>Functional Area:</i> ITS Data Repository	
<i>Requirement:</i>	
10 The center shall respond to requests from the administrator interface function to maintain the archive data.	Existing
<i>Requirement:</i>	
11 When data or a catalog of data is received from the archive, the center shall generate the requested data product for the users systems.	Existing
<i>Requirement:</i>	
12 For archive data requiring financial payment, the center shall process the financial requests and manage an interface to a Financial Institution.	Existing
<i>Functional Area:</i> Government Reporting Systems Support	
<i>Requirement:</i>	
1 The center shall provide data from an ITS archive to federal, state, or local government reporting systems.	Existing
<i>Requirement:</i>	
2 The center shall provide the capability to select data from an ITS archive for use in government reports.	Existing
<i>Requirement:</i>	
3 The center shall provide the capability to format data from an ITS archive suitable for input into government reports.	Existing
<i>Requirement:</i>	
4 The center shall support requests for ITS archived data from Government Reporting Systems.	Existing
<i>Requirement:</i>	
5 The center shall provide the applicable meta-data for any ITS archived data to satisfy government reporting system requests. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	Existing
<i>Entity:</i> Commercial Vehicle Administration	
<i>Functional Area:</i> Credentials and Taxes Administration	
<i>Requirement:</i>	
1 The center shall manage electronic credentials filing and processing for commercial vehicles.	Existing
<i>Requirement:</i>	
2 The center shall manage the filing of appropriate taxes for the operation of commercial vehicles.	Existing
<i>Requirement:</i>	
3 The center shall process requests for payments of electronic credentials and tax filing and maintain an interface to a Financial Institution.	Existing
<i>Requirement:</i>	
4 The center shall exchange credentials and tax information with other commercial vehicle administration centers - either in other states or the federal government.	Existing
<i>Requirement:</i>	
7 The center shall provide an interface with commercial vehicle fleet and freight management centers to exchange audit and compliance review reports.	Existing
<i>Functional Area:</i> CV Information Exchange	
<i>Requirement:</i>	
2 The center shall exchange safety and credentials data among other commercial vehicle administration centers; includes border clearance status, credentials information, credentials status information, and safety status information.	Existing

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:</i> Mississippi Public Service Commission SAFETYNET	
<i>Entity:</i> Commercial Vehicle Administration	
<i>Functional Area:</i> CV Information Exchange	
<i>Requirement:</i>	3 The center shall package data concerning commercial vehicle safety and credentials into snapshots (top-level summary and critical status information). Existing
<i>Requirement:</i>	4 The center shall package data concerning commercial vehicle safety and credentials into profiles (detailed and historical data). Existing
<i>Requirement:</i>	6 The center shall provide commercial vehicle credentials and safety status information to authorized requestors such as insurance agencies. Existing
<i>Requirement:</i>	7 The center shall provide reports to the commercial vehicle fleet manager regarding fleet activity through roadside facilities including accident reports, citations, credentials status information, and safety status information. Existing
<i>Functional Area:</i> CV Data Collection	
<i>Requirement:</i>	1 The center shall receive operational data from the roadside check systems as well as administration and credentials data. Existing
<i>Requirement:</i>	2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data. Existing
<i>Requirement:</i>	3 The center shall receive and respond to requests from ITS Archives for either a catalog of the commercial vehicle operations data or for the data itself. Existing
<i>Requirement:</i>	4 The center shall be able to produce sample products of the data available. Existing
<i>Element:</i> Mississippi Road/Weather Conditions Website	
<i>Entity:</i> Information Service Provider	
<i>Functional Area:</i> ISP Traveler Data Collection	
<i>Requirement:</i>	1 The center shall collect, process, and store traffic and highway condition information, including incident information, detours and road closures, event information, recommended routes, and current speeds on specific routes. Existing
<i>Requirement:</i>	6 The center shall collect, process, and store weather information. Existing
<i>Functional Area:</i> Basic Information Broadcast	
<i>Requirement:</i>	1 The center shall collect, process, store, and disseminate traffic and highway condition information to travelers, including incident information, detours and road closures, event information, recommended routes, and current speeds on specific routes. Existing
<i>Requirement:</i>	2 The center shall collect, process, store, and disseminate maintenance and construction information to travelers, including scheduled maintenance and construction work activities and work zone activities. Existing
<i>Requirement:</i>	6 The center shall collect, process, store, and disseminate weather information to travelers. Existing

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:</i> Mississippi Road/Weather Conditions Website	
<i>Entity:</i> Information Service Provider	
<i>Functional Area:</i> Basic Information Broadcast	
<i>Requirement:</i> 10	The center shall provide the capability for a system operator to control the type and update frequency of broadcast traveler information.
	Existing
<i>Functional Area:</i> ISP Emergency Traveler Information	
<i>Requirement:</i> 3	The center shall collect and provide wide-area alert information to the traveler interface system with region-specific data, including major emergencies such as a natural or man-made disaster, civil emergency, child abductions, severe weather watches and warnings, military activities, and law enforcement warnings.
	Existing
<i>Requirement:</i> 4	The center shall provide the capability for a system operator to control the type and update frequency of emergency and wide-area alert information distributed to travelers.
	Existing
<i>Element:</i> Mississippi State Tax Commission CV Databases	
<i>Entity:</i> Archived Data Management Subsystem	
<i>Functional Area:</i> ITS Data Repository	
<i>Requirement:</i> 1	The center shall collect data to be archived from one or more data sources.
	Existing
<i>Requirement:</i> 2	The center shall collect data catalogs from one or more data sources. A catalog describes the data contained in the collection of archived data and may include descriptions of the schema or structure of the data, a description of the contents of the data; e.g., time range of entries, number of entries; or a sample of the data (e. g. a thumbnail).
	Existing
<i>Requirement:</i> 3	The center shall store the archived data in a focused repository that is suited to a particular set of ITS data users.
	Existing
<i>Requirement:</i> 4	The center shall include capabilities for performing quality checks on the incoming archived data.
	Existing
<i>Requirement:</i> 5	The center shall include capabilities for error notification on the incoming archived data.
	Existing
<i>Requirement:</i> 6	The center shall include capabilities for archive to archive coordination.
	Existing
<i>Requirement:</i> 7	The center shall support a broad range of archived data management implementations, ranging from simple data marts that collect a focused set of data and serve a particular user community to large-scale data warehouses that collect, integrate, and summarize transportation data from multiple sources and serve a broad array of users within a region.
	Existing
<i>Requirement:</i> 8	The center shall perform quality checks on received data.
	Existing
<i>Requirement:</i> 9	The center shall provide the capability to execute methods on the incoming data such as cleansing, summarizations, aggregations, or transformations applied to the data before it is stored in the archive.
	Existing
<i>Requirement:</i> 10	The center shall respond to requests from the administrator interface function to maintain the archive data.
	Existing

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:</i> Mississippi State Tax Commission CV Databases	
<i>Entity:</i> Archived Data Management Subsystem	
<i>Functional Area:</i> ITS Data Repository	
<i>Requirement:</i>	
11 When data or a catalog of data is received from the archive, the center shall generate the requested data product for the users systems.	Existing
<i>Requirement:</i>	
12 For archive data requiring financial payment, the center shall process the financial requests and manage an interface to a Financial Institution.	Existing
<i>Entity:</i> Commercial Vehicle Administration	
<i>Functional Area:</i> Credentials and Taxes Administration	
<i>Requirement:</i>	
1 The center shall manage electronic credentials filing and processing for commercial vehicles.	Existing
<i>Requirement:</i>	
2 The center shall manage the filing of appropriate taxes for the operation of commercial vehicles.	Existing
<i>Requirement:</i>	
3 The center shall process requests for payments of electronic credentials and tax filing and maintain an interface to a Financial Institution.	Existing
<i>Requirement:</i>	
4 The center shall exchange credentials and tax information with other commercial vehicle administration centers - either in other states or the federal government.	Existing
<i>Requirement:</i>	
7 The center shall provide an interface with commercial vehicle fleet and freight management centers to exchange audit and compliance review reports.	Existing
<i>Requirement:</i>	
8 The center shall provide credentials information about commercial vehicle operators and carriers to authorized requestors such as insurance agencies.	Existing
<i>Requirement:</i>	
9 The center shall receive and store information on commercial vehicle violations from enforcement agencies as part of the processing of credentials applications.	Existing
<i>Functional Area:</i> CV Information Exchange	
<i>Requirement:</i>	
1 The center shall exchange information with roadside check facilities, including credentials and credentials status information, safety status information, daily site activity data, and citations.	Existing
<i>Requirement:</i>	
2 The center shall exchange safety and credentials data among other commercial vehicle administration centers; includes border clearance status, credentials information, credentials status information, and safety status information.	Existing
<i>Requirement:</i>	
3 The center shall package data concerning commercial vehicle safety and credentials into snapshots (top-level summary and critical status information).	Existing
<i>Requirement:</i>	
4 The center shall package data concerning commercial vehicle safety and credentials into profiles (detailed and historical data).	Existing
<i>Requirement:</i>	
6 The center shall provide commercial vehicle credentials and safety status information to authorized requestors such as insurance agencies.	Existing

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element: Mississippi State Tax Commission CV Databases</i>	
<i>Entity: Commercial Vehicle Administration</i>	
<i>Functional Area: CV Data Collection</i>	
<i>Requirement:</i>	1 The center shall receive operational data from the roadside check systems as well as administration and credentials data. Existing
<i>Requirement:</i>	2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data. Existing
<i>Requirement:</i>	3 The center shall receive and respond to requests from ITS Archives for either a catalog of the commercial vehicle operations data or for the data itself. Existing
<i>Requirement:</i>	4 The center shall be able to produce sample products of the data available. Existing
<i>Element: Multimodal Transit Centers</i>	
<i>Entity: Information Service Provider</i>	
<i>Functional Area: ISP Traveler Data Collection</i>	
<i>Requirement:</i>	1 The center shall collect, process, and store traffic and highway condition information, including incident information, detours and road closures, event information, recommended routes, and current speeds on specific routes. Planned
<i>Requirement:</i>	3 The center shall collect, process, and store transit routes and schedules, transit transfer options, transit fares, and real-time schedule adherence information. Planned
<i>Requirement:</i>	4 The center shall collect, process, and store parking information, including location, availability, and fees. Planned
<i>Requirement:</i>	6 The center shall collect, process, and store weather information. Planned
<i>Requirement:</i>	7 The center shall collect, process, and store event information. Planned
<i>Functional Area: Infrastructure Provided Trip Planning</i>	
<i>Requirement:</i>	1 The center shall provide the capability to provide specific pre-trip and enroute directions to travelers (and drivers), including costs, arrival times, and transfer points. Planned
<i>Requirement:</i>	3 The center shall support on-line route guidance for travelers using personal devices (such as PDAs). Planned
<i>Requirement:</i>	7 The center shall generate route plans based on transit services, including fares, schedules, and requirements for travelers with special needs. Planned
<i>Requirement:</i>	9 The center shall generate route plans based on current or forecasted weather. Planned
<i>Requirement:</i>	10 The center shall generate route plans based on ferry, rail, air, or other multimodal transportation data. Planned
<i>Requirement:</i>	11 The center shall exchange route segment information with other centers outside the area served by the local center. Planned
<i>Requirement:</i>	12 The center shall generate trips based on the use of more than one mode of transport. Planned

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element: Multimodal Transit Centers</i>	
<i>Entity: Information Service Provider</i>	
<i>Functional Area: Infrastructure Provided Trip Planning</i>	
<i>Requirement:</i> 13	The center shall use the preferences and constraints specified by the traveler in the trip request to select the most appropriate mode of transport. Planned
<i>Requirement:</i> 14	The center shall provide the capability for the traveler to confirm the proposed trip plan. Planned
<i>Requirement:</i> 16	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used to determine vehicle and non-vehicle routes, trip planning, and on-line vehicle guidance. Planned
<i>Requirement:</i> 17	The center shall provide the capability for center personnel to control route calculation parameters. Planned
<i>Functional Area: ISP Emergency Traveler Information</i>	
<i>Requirement:</i> 1	The center shall collect and provide to the traveler interface systems emergency evacuation information, including evacuation zones, shelter information, available transportation modes, road closures and detours, changes to transit services, and traffic and road conditions at the origin, destination, and along the evacuation routes. Planned
<i>Requirement:</i> 3	The center shall collect and provide wide-area alert information to the traveler interface system with region-specific data, including major emergencies such as a natural or man-made disaster, civil emergency, child abductions, severe weather watches and warnings, military activities, and law enforcement warnings. Planned
<i>Requirement:</i> 4	The center shall provide the capability for a system operator to control the type and update frequency of emergency and wide-area alert information distributed to travelers. Planned
<i>Entity: Transit Management</i>	
<i>Functional Area: Transit Center Vehicle Tracking</i>	
<i>Requirement:</i> 1	The center shall monitor the locations of all transit vehicles within its network. Planned
<i>Requirement:</i> 2	The center shall determine adherence of transit vehicles to their assigned schedule. Planned
<i>Requirement:</i> 3	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for transit tracking and dispatch. Planned
<i>Requirement:</i> 4	The center shall provide transit operational data to traveler information service providers. Planned
<i>Functional Area: Transit Center Fixed-Route Operations</i>	
<i>Requirement:</i> 1	The center shall generate transit routes and schedules based on such factors as parameters input by the system operator, road network conditions, operational data on current routes and schedules, and digitized map data. Planned

Architecture	Status	
Central Region ITS Architecture (Region)	(Region)	
<i>Element:</i> Multimodal Transit Centers		
<i>Entity:</i> Transit Management		
<i>Functional Area:</i> Transit Center Fixed-Route Operations		
<i>Requirement:</i>	2 The center shall provide the interface to the system operator to control the generation of new routes and schedules (transit services) including the ability to review and update the parameters used by the routes and schedules generation processes and to initiate these processes	Planned
<i>Requirement:</i>	3 The center shall be able to generate special routes and schedules to support an incident, disaster, evacuation, or other emergency.	Planned
<i>Requirement:</i>	4 The center shall dispatch fixed route or flexible route transit vehicles	Planned
<i>Requirement:</i>	5 The center shall collect transit operational data for use in the generation of routes and schedules.	Planned
<i>Requirement:</i>	6 The center shall provide instructions or corrective actions to the transit vehicle operators based upon operational needs.	Planned
<i>Requirement:</i>	7 The center shall manage large deviations of individual transit vehicles, deviations in rural areas, and deviations of large numbers of vehicles.	Planned
<i>Requirement:</i>	8 The center shall generate the necessary corrective actions which may involve more than the vehicles concerned and more far reaching action, such as, the introduction of extra vehicles, wide area signal priority by traffic management, the premature termination of some services, etc.	Planned
<i>Requirement:</i>	9 The center shall exchange information with Maintenance and Construction Operations concerning work zones, roadway conditions, asset restrictions, work plans, etc.	Planned
<i>Requirement:</i>	10 The center shall disseminate up-to-date schedules and route information to other centers for fixed and flexible route services.	Planned
<i>Functional Area:</i> Transit Center Fare and Load Management		
<i>Requirement:</i>	1 The center shall manage the actual value of transit fares for each segment of each regular transit route, including the transmission of the information to transit vehicles and transit stops or stations.	Planned
<i>Requirement:</i>	2 The center shall provide the capability for a system operator to manage the transit fares and control the exchange of transit fare information.	Planned
<i>Requirement:</i>	4 The center shall support the payment of transit fare transactions using data provided by the traveler cards / payment instruments.	Planned
<i>Requirement:</i>	6 The center shall process requests for transit fares to be paid in advance.	Planned
<i>Requirement:</i>	8 The center shall be capable of establishing emergency fare structures to override all other fares during disasters, states of emergency, or evacuations.	Planned
<i>Requirement:</i>	10 The center shall collect passenger loading and fare statistics data to implement variable and flexible fare structures.	Planned
<i>Requirement:</i>	11 The center shall exchange fare and load information with other transit management centers, including potential Centralized Payments facilities.	Planned

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:</i> Multimodal Transit Centers	
<i>Entity:</i> Transit Management	
<i>Functional Area:</i> Transit Center Fare and Load Management	
<i>Requirement:</i> 12	The center shall provide transit fare information to other centers, including traveler information providers upon request. Planned
<i>Functional Area:</i> Transit Center Security	
<i>Requirement:</i> 1	The center shall monitor transit vehicle operational data to determine if the transit vehicle is off-route and assess whether a security incident is occurring. Planned
<i>Requirement:</i> 2	The center shall receive reports of emergencies on-board transit vehicles entered directly by the transit vehicle operator or from a traveler through interfaces such as panic buttons or alarm switches. Planned
<i>Requirement:</i> 3	The center shall support the back-office portion of functionality to authenticate transit vehicle operators. Planned
<i>Requirement:</i> 4	The center shall exchange transit incident information along with other service data with other transit agencies. Planned
<i>Requirement:</i> 5	The center shall receive information pertaining to a wide-area alert such as weather alerts, disaster situations, or child abductions. This information may come from Emergency Management or from other Alerting and Advisory Systems. Planned
<i>Requirement:</i> 6	The center shall send wide-area alert information to travelers (on-board transit vehicles or at stations/stops) and transit vehicle operators. Planned
<i>Requirement:</i> 7	The center shall coordinate the response to security incidents involving transit with other agencies including Emergency Management, other transit agencies, media, traffic management, and traveler information service providers. Planned
<i>Requirement:</i> 8	The center shall receive threat information and status on the integrity of the transit infrastructure. Planned
<i>Functional Area:</i> Transit Vehicle Operator Scheduling	
<i>Requirement:</i> 1	The center shall maintain records of a transit vehicle operator's performance. This may be done utilizing standardized performance evaluation criteria set forth by governmental regulations and transit operating company policies, assessing the transit vehicle operator's driving history, and assessing comments from the transit vehicle operator's supervisor(s) as well as noting any moving violations or accidents, supervisor comments, government regulations, and company policies. Planned
<i>Requirement:</i> 2	The center shall assess the transit vehicle operator's availability based on previous work assignments, accumulated hours, plus health and vacation commitments. Planned
<i>Requirement:</i> 3	The center shall assign transit vehicle operators to transit schedules based on their eligibility, route preferences, seniority, and transit vehicle availability. Planned
<i>Requirement:</i> 4	The center shall provide an interface through which the transit vehicle operator information can be maintained - either from the transit vehicle operator, a transit system operator (i.e. center personnel), or other functions. Planned

Architecture	Status	
Central Region ITS Architecture (Region)	(Region)	
<i>Element:</i> Multimodal Transit Centers		
<i>Entity:</i> Transit Management		
<i>Functional Area:</i> Transit Center Information Services		
<i>Requirement:</i>	1 The center shall provide travelers using public transportation with traffic and advisory information upon request. Such information may include transit routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, and special events.	Planned
<i>Requirement:</i>	2 The center shall provide transit information to the media including details of deviations from schedule of regular transit services.	Planned
<i>Requirement:</i>	3 The center shall exchange transit schedules, real-time arrival information, fare schedules, and general transit service information with other transit organizations to support transit traveler information systems.	Planned
<i>Requirement:</i>	4 The center shall provide transit service information to traveler information service providers including routes, schedules, schedule adherence, and fare information as well as transit service information during evacuation.	Planned
<i>Requirement:</i>	5 The center shall enable yellow pages (including non-motorized transportation) information to be output to the traveler.	Planned
<i>Requirement:</i>	6 The center shall broadcast transit advisory data, including alerts and advisories pertaining to major emergencies, or man made disasters.	Planned
<i>Functional Area:</i> Transit Center Multi-Modal Coordination		
<i>Requirement:</i>	1 The center shall analyze transit vehicle schedule performance to determine the need for priority along certain routes or at certain intersections.	Planned
<i>Requirement:</i>	3 The center shall coordinate schedules and services between transit agencies, traffic management, maintenance and construction operations, parking management, and other surface or air transportation modes.	Planned
<i>Requirement:</i>	4 The center shall share transfer cluster and transfer point information with multimodal transportation service providers, other transit agencies, and traveler information service providers. A transfer cluster is a collection of stops, stations, or terminals where transfers can be made conveniently.	Planned
<i>Requirement:</i>	5 The center shall accept requests from traffic management to change routes and schedules as part of the implementation of demand management strategies.	Planned
<i>Functional Area:</i> Transit Evacuation Support		
<i>Requirement:</i>	1 The center shall manage the use of transit resources to support evacuation and subsequent reentry of a population in the vicinity of a disaster or other emergency.	Planned
<i>Requirement:</i>	2 The center shall coordinate regional evacuation plans with Emergency Management - identifying the transit role in an evacuation and the transit resources that would be used.	Planned

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:</i> Multimodal Transit Centers	
<i>Entity:</i> Transit Management	
<i>Functional Area:</i> Transit Evacuation Support	
<i>Requirement:</i>	3 The center shall coordinate the use of transit and school bus fleets during an evacuation, supporting evacuation of those with special needs and the general population. Planned
<i>Requirement:</i>	4 The center shall adjust and update transit service and fare schedules and provide that information to other agencies as they coordinate evacuations. Planned
<i>Functional Area:</i> Transit Data Collection	
<i>Requirement:</i>	1 The center shall collect transit management data such as transit fares and passenger use, transit services, paratransit operations, transit vehicle maintenance data, etc. Planned
<i>Element:</i> Multimodal Transit Centers Kiosks	
<i>Entity:</i> Remote Traveler Support	
<i>Functional Area:</i> Remote Basic Information Reception	
<i>Requirement:</i>	1 The public interface for travelers shall receive traffic information from a center and present it to the traveler. Planned
<i>Requirement:</i>	2 The public interface for travelers shall receive transit information from a center and present it to the traveler. Planned
<i>Requirement:</i>	3 The public interface for travelers shall receive event information from a center and present it to the traveler. Planned
<i>Requirement:</i>	4 This public interface for travelers shall receive evacuation information from a center and present it to the traveler. Planned
<i>Requirement:</i>	5 The public interface for travelers shall receive wide-area alerts and present it to the traveler. Planned
<i>Requirement:</i>	6 The public interface for travelers shall provide the capability for digitized map data to act as the background to the information presented to the traveler. Planned
<i>Requirement:</i>	7 The public interface for travelers shall support traveler input in audio or manual form. Planned
<i>Requirement:</i>	8 The public interface for travelers shall present information to the traveler in audible or visual forms consistent with a kiosk, including those that are suitable for travelers with hearing or vision physical disabilities. Planned
<i>Requirement:</i>	9 The public interface for travelers shall be able to store frequently requested data. Planned
<i>Functional Area:</i> Remote Interactive Information Reception	
<i>Requirement:</i>	1 The public interface for travelers shall receive traffic information from a center and present it to the traveler upon request. Planned
<i>Requirement:</i>	2 The public interface for travelers shall receive transit information from a center and present it to the traveler upon request. Planned
<i>Requirement:</i>	3 The public interface for travelers shall receive yellow pages information (such as lodging, restaurants, theaters, bicycle facilities, and other tourist activities) from a center and present it to the traveler upon request. Planned

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:</i> Multimodal Transit Centers Kiosks	
<i>Entity:</i> Remote Traveler Support	
<i>Functional Area:</i> Remote Interactive Information Reception	
<i>Requirement:</i>	
4 The public interface for travelers shall receive event information from a center and present it to the traveler upon request.	Planned
<i>Requirement:</i>	
5 The public interface for travelers shall receive evacuation information from a center and present it to the traveler.	Planned
<i>Requirement:</i>	
6 The public interface for travelers shall receive wide-area alerts and present it to the traveler.	Planned
<i>Requirement:</i>	
7 The public interface for travelers shall accept reservations for confirmed trip plans.	Planned
<i>Requirement:</i>	
8 The public interface for travelers shall support payment for services, such as confirmed trip plans, confirmed yellow pages services, tolls, transit fares, parking lot charges, and advanced payment for tolls.	Planned
<i>Requirement:</i>	
9 The public interface for travelers shall provide an interface through which credit identities and stored credit values may be collected from tags, traveler cards, or payment instruments used by travelers.	Planned
<i>Requirement:</i>	
10 The public interface for travelers shall base requests from the traveler on the traveler's current location or a specific location identified by the traveler, and filter the provided information accordingly.	Planned
<i>Requirement:</i>	
11 The public interface for travelers shall provide digitized map data to act as the background to the information presented to the traveler.	Planned
<i>Requirement:</i>	
12 The public interface for travelers shall support traveler input in audio or manual form.	Planned
<i>Requirement:</i>	
13 The public interface for travelers shall present information to the traveler in audible or visual forms consistent with a kiosk, including those that are suitable for travelers with hearing or vision physical disabilities.	Planned
<i>Requirement:</i>	
14 The public interface for travelers shall be able to store frequently requested data.	Planned
<i>Functional Area:</i> Remote Transit Information Services	
<i>Requirement:</i>	
1 The public interface for travelers shall collect and provide real-time travel-related information at transit stops, multi-modal transfer points, and other public transportation areas.	Planned
<i>Requirement:</i>	
2 The public interface for travelers shall collect and present to the transit traveler information on transit routes, schedules, and real-time schedule adherence.	Planned
<i>Requirement:</i>	
3 The public interface for travelers shall provide support for general annunciation and/or display of imminent arrival information and other information of general interest to transit users.	Planned
<i>Requirement:</i>	
4 The public interface for travelers shall present information to the traveler in a form suitable for travelers with physical disabilities.	Planned
<i>Functional Area:</i> Remote Transit Fare Management	

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:</i> Multimodal Transit Centers Kiosks	
<i>Entity:</i> Remote Traveler Support	
<i>Functional Area:</i> Remote Transit Fare Management	
<i>Requirement:</i>	
1 The public interface for travelers shall accept and process current transit passenger fare collection information.	Planned
<i>Requirement:</i>	
2 The public interface for travelers shall calculate a fare based on the origin and destination provided by the traveler, in conjunction with transit routing, transit fare category, and transit user history.	Planned
<i>Requirement:</i>	
3 The public interface for travelers shall provide an interface to a transit user traveler card in support of payment for transit fares, tolls, and/or parking lot charges. The stored credit value data from the card shall be collected and updated based on the fare or other charges, or the credit identity shall be collected.	Planned
<i>Requirement:</i>	
4 The public interface for travelers shall provide information to the center for financial authorization and transaction processing.	Planned
<i>Requirement:</i>	
6 The public interface for travelers shall determine the routing based on the traveler's destination and the location of the closest transit stop from which a route request is being made.	Planned
<i>Requirement:</i>	
7 The public interface for travelers shall create passenger loading and fare statistics data based upon data collected at a transit stop.	Planned
<i>Requirement:</i>	
8 The public interface for travelers shall present information to the traveler in a form suitable for travelers with physical disabilities.	Planned
<i>Element:</i> National Park Service Center Natchez Trace Parkway	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Incident Command	
<i>Requirement:</i>	
1 The center shall provide tactical decision support, resource coordination, and communications integration for Incident Commands that are established by first responders to support local management of an incident.	Existing
<i>Requirement:</i>	
2 The center shall provide incident command communications with public safety, emergency management, transportation, and other allied response agency centers.	Existing
<i>Requirement:</i>	
4 The center shall share incident command information with other public safety agencies including resource deployment status, hazardous material information, rail incident information, evacuation advice as well as traffic, road, and weather conditions.	Existing
<i>Entity:</i> Traffic Management	
<i>Functional Area:</i> TMC Incident Dispatch Coordination/Communication	

Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:</i> National Park Service Center Natchez Trace Parkway	
<i>Entity:</i> Traffic Management	
<i>Functional Area:</i> TMC Incident Dispatch Coordination/Communication	
<i>Requirement:</i>	Existing
1 The center shall exchange alert information and status with emergency management centers. The information includes notification of a major emergency such as a natural or man-made disaster, civil emergency, or child abduction for distribution to the public. The information may include the alert originator, the nature of the emergency, the geographic area affected by the emergency, the effective time period, and information and instructions necessary for the public to respond to the alert. This may also identify specific information that should not be released to the public.	
<i>Requirement:</i>	Existing
4 The center shall exchange incident and threat information with emergency management centers as well as maintenance and construction centers; including notification of existence of incident and expected severity, location, time and nature of incident.	
<i>Element:</i> Private Trucking Companies	
<i>Entity:</i> Fleet and Freight Management	
<i>Functional Area:</i> Fleet Administration	
<i>Requirement:</i>	Existing
1 The center shall send data concerning enrollment of commercial vehicles for electronic clearance and tax filing to the appropriate commercial vehicle administration center. The data may include driver and vehicle identification, safety inspections/status, carrier credentials, related citations, and accident information.	
<i>Requirement:</i>	Existing
2 The center shall obtain and manage commercial vehicle routes for its fleet of vehicles, taking into account route restrictions, advance payment of tolls, HAZMAT restrictions, and current traffic and road conditions provided by traveler information systems.	
<i>Requirement:</i>	Existing
4 The center shall monitor the locations and progress of commercial vehicles against their planned routes and raise appropriate warnings based on route monitoring parameters.	
<i>Requirement:</i>	Existing
5 The center shall coordinate the response to security incidents and the sharing of security threat information involving commercial vehicles with other agencies including emergency management centers and alerting/advisory systems.	
<i>Functional Area:</i> Fleet Credentials and Taxes Management and Reporting	
<i>Requirement:</i>	Existing
1 The center shall send data concerning enrollment and purchase of commercial vehicles credentials and tax filing to the appropriate commercial vehicle administration center.	
<i>Requirement:</i>	Existing
2 The center shall receive compliance review reports from the appropriate commercial vehicle administration centers concerning the operations of the commercial vehicle fleet, including concomitant out-of-service notifications, and carrier warnings/notifications.	
<i>Requirement:</i>	Existing
3 The center shall provide audit data to the appropriate commercial vehicle administration center to support tax audits.	

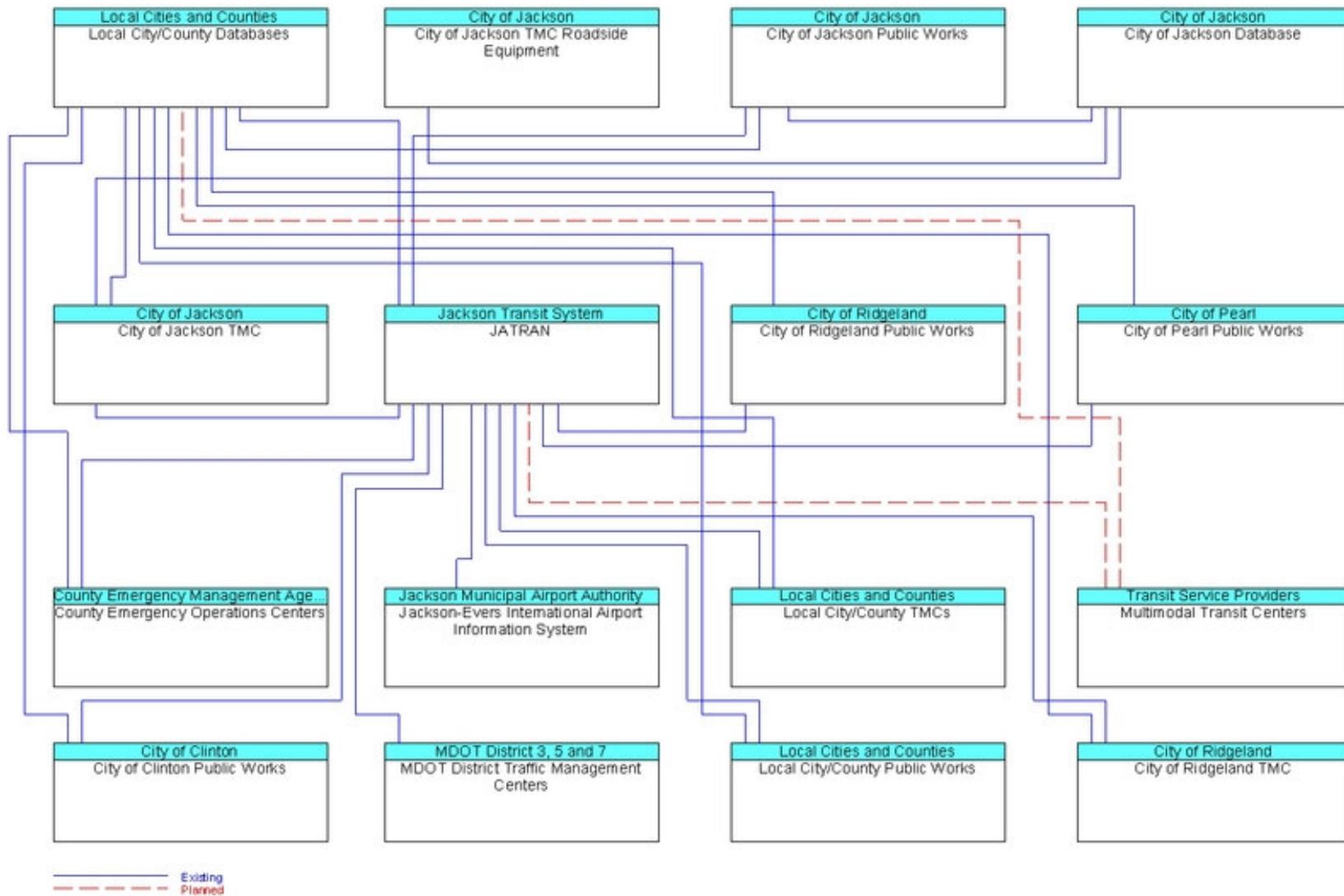
Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element: Private Trucking Companies</i>	
<i>Entity: Fleet and Freight Management</i>	
<i>Functional Area: Fleet Credentials and Taxes Management and Reporting</i>	
<i>Requirement:</i>	Existing
4 The center shall support an interface with a commercial vehicle driver that is acting in the role of a commercial vehicle fleet manager for the purposes of obtaining credentials, filing taxes and audit data, and receiving compliance reports and status information.	
<i>Element: Private Trucking Companies Commercial Vehicles</i>	
<i>Entity: Commercial Vehicle Subsystem</i>	
<i>Functional Area: On-board CV Electronic Data</i>	
<i>Requirement:</i>	Existing
1 The commercial vehicle shall receive pass/pull-in messages from the roadside check facilities and present them to the driver in either audible or visual forms.	
<i>Requirement:</i>	Existing
2 The commercial vehicle shall respond to requests to provide data accumulated on-board the vehicle to roadside check facilities for inspection including driver logs, electronic identifiers, credentials, border clearance data, and other screening data such as cargo status, hazmat identifiers, out of service status, vehicle axle weight, vehicle weight, and time.	
<i>Requirement:</i>	Existing
3 The commercial vehicle shall respond to requests to provide the identity, status and other information from the electronic cargo lock tag, if so equipped, to roadside check facilities, including border crossings.	
<i>Requirement:</i>	Existing
4 The commercial vehicle shall support an interface to a commercial vehicle driver that is also acting in the role of a commercial vehicle fleet manager to set up routes, pay necessary taxes, obtain proper credentials, and write the identifiers to the electronic tag for the driver, vehicle, and carrier.	
<i>Element: User Personal Computing Devices</i>	
<i>Entity: Personal Information Access</i>	
<i>Functional Area: Personal Basic Information Reception</i>	
<i>Requirement:</i>	Existing
1 The personal traveler interface shall receive traffic information from a center and present it to the traveler.	
<i>Requirement:</i>	Existing
2 The personal traveler interface shall receive transit information from a center and present it to the traveler.	
<i>Requirement:</i>	Existing
4 The personal traveler interface shall receive evacuation information from a center and present it to the traveler.	
<i>Requirement:</i>	Existing
5 The personal traveler interface shall receive wide-area alerts and present it to the traveler.	
<i>Requirement:</i>	Existing
6 The personal traveler interface shall provide the capability for digitized map data to act as the background to the information presented to the traveler.	
<i>Requirement:</i>	Existing
7 The personal traveler interface shall support traveler input in audio or manual form.	
<i>Requirement:</i>	Existing
8 The personal traveler interface shall present information to the traveler in audible or visual forms, consistent with a personal device.	

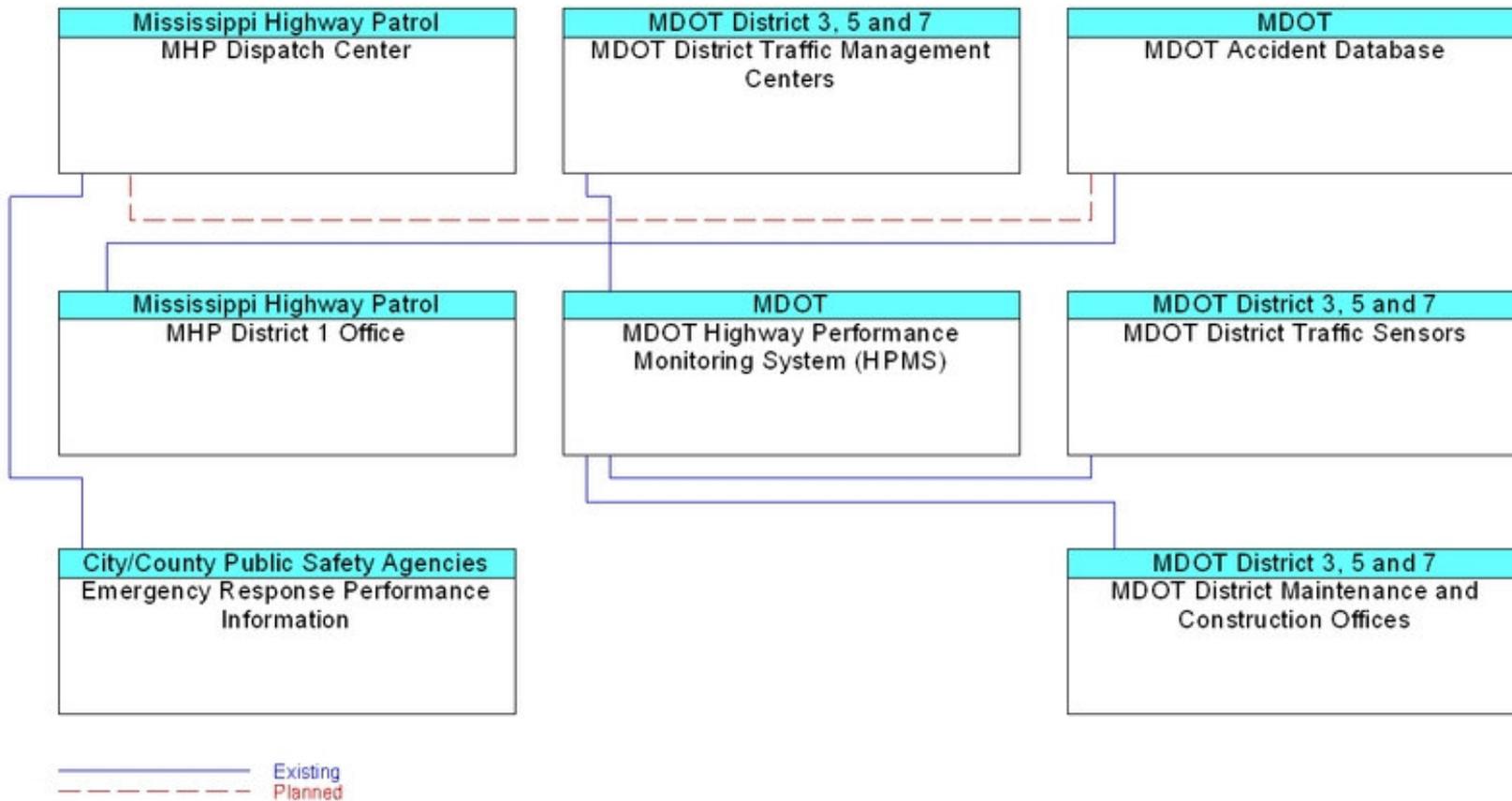
Architecture	Status
Central Region ITS Architecture (Region)	(Region)
<i>Element:</i> User Personal Computing Devices	
<i>Entity:</i> Personal Information Access	
<i>Functional Area:</i> Personal Interactive Information Reception	
<i>Requirement:</i> 1	The personal traveler interface shall receive traffic information from a center and present it to the traveler upon request. Planned
<i>Requirement:</i> 2	The personal traveler interface shall receive transit information from a center and present it to the traveler upon request. Planned
<i>Requirement:</i> 4	The personal traveler interface shall receive event information from a center and present it to the traveler upon request. Planned
<i>Requirement:</i> 5	The personal traveler interface shall receive evacuation information from a center and present it to the traveler. Planned
<i>Requirement:</i> 6	The personal traveler interface shall receive wide-area alerts and present it to the traveler. Planned
<i>Requirement:</i> 10	The personal traveler interface shall base requests from the traveler on the traveler's current location or a specific location identified by the traveler, and filter the provided information accordingly. Planned
<i>Requirement:</i> 11	The personal traveler interface shall provide digitized map data to act as the background to the information presented to the traveler. Planned
<i>Requirement:</i> 12	The personal traveler interface shall support traveler input in audio or manual form. Planned
<i>Requirement:</i> 13	The personal traveler interface shall present information to the traveler in audible or visual forms consistent with a personal device, and suitable for travelers with hearing and vision physical disabilities. Planned
<i>Requirement:</i> 14	The personal traveler interface shall be able to store frequently requested or used data, including the traveler's identity, home and work locations, etc. Planned

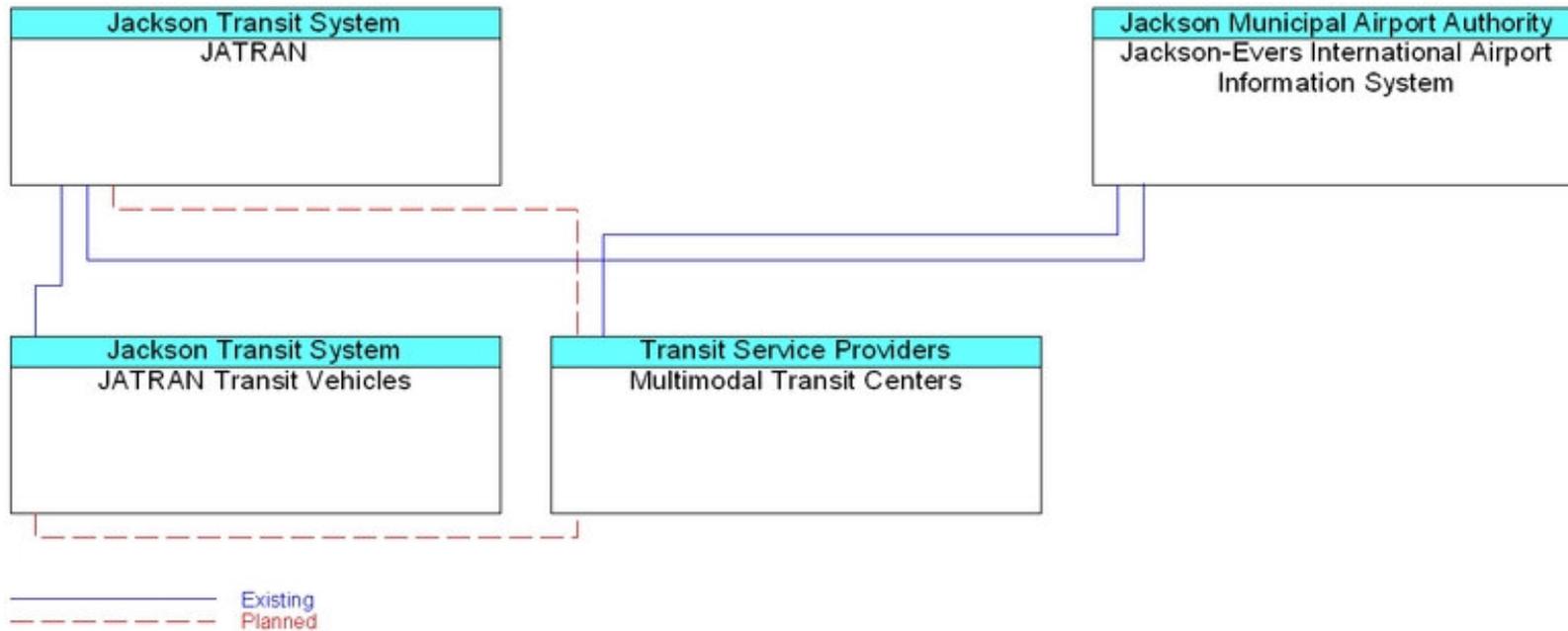
Appendix C: Architecture Interconnect Diagrams

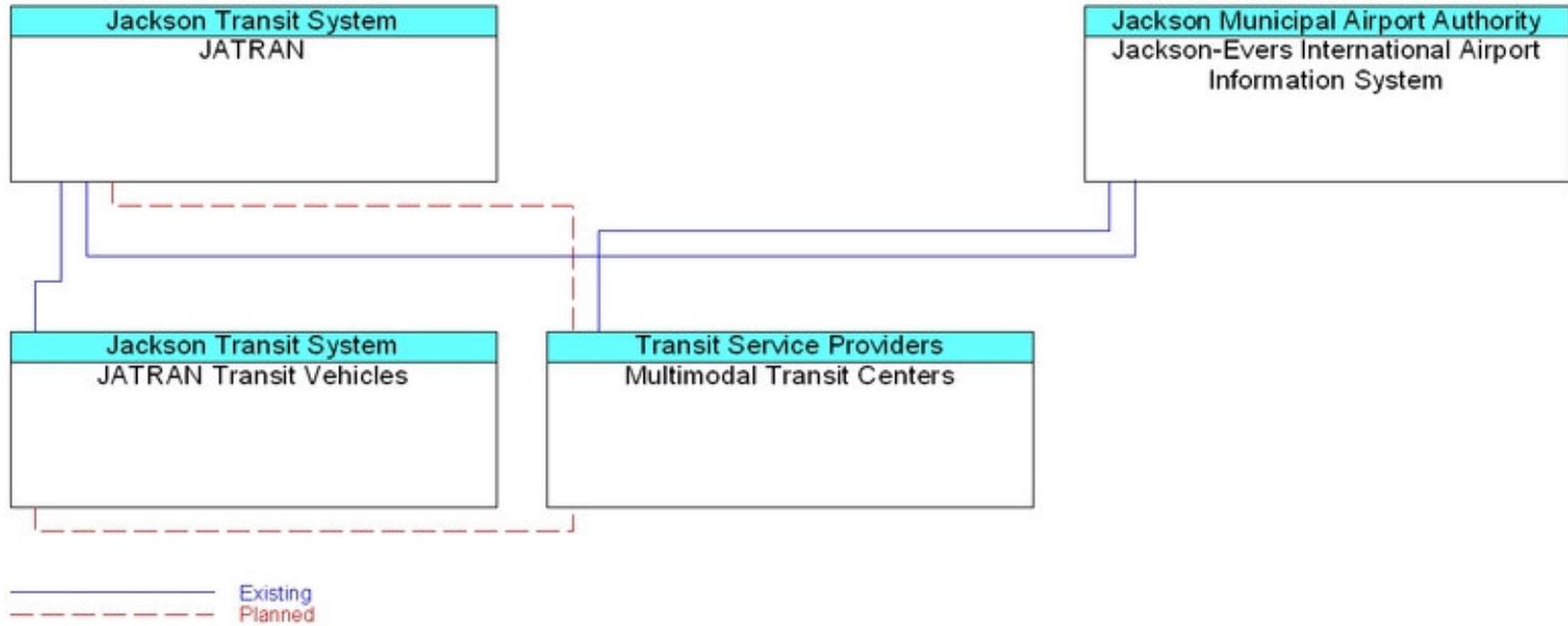
NOTE: Because of the large amount of data that can flow between different elements, many of the diagrams generated by Turbo Architecture are illegible. Detailed information on these diagrams can be found in the "Interconnects" section of the "Interfaces" tab within Turbo. It is here that interconnects can be seen between origin and destination elements.

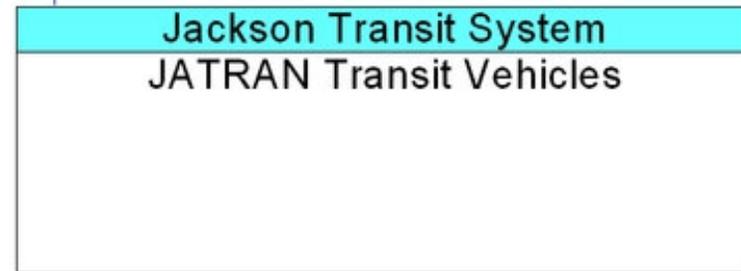
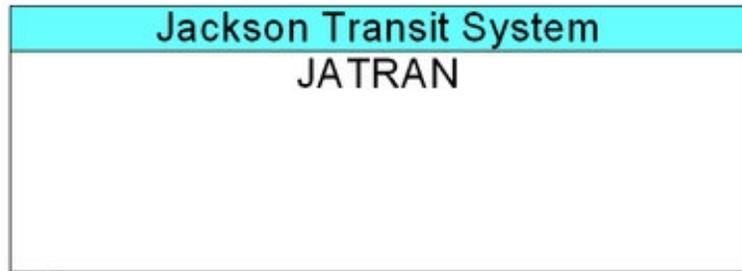
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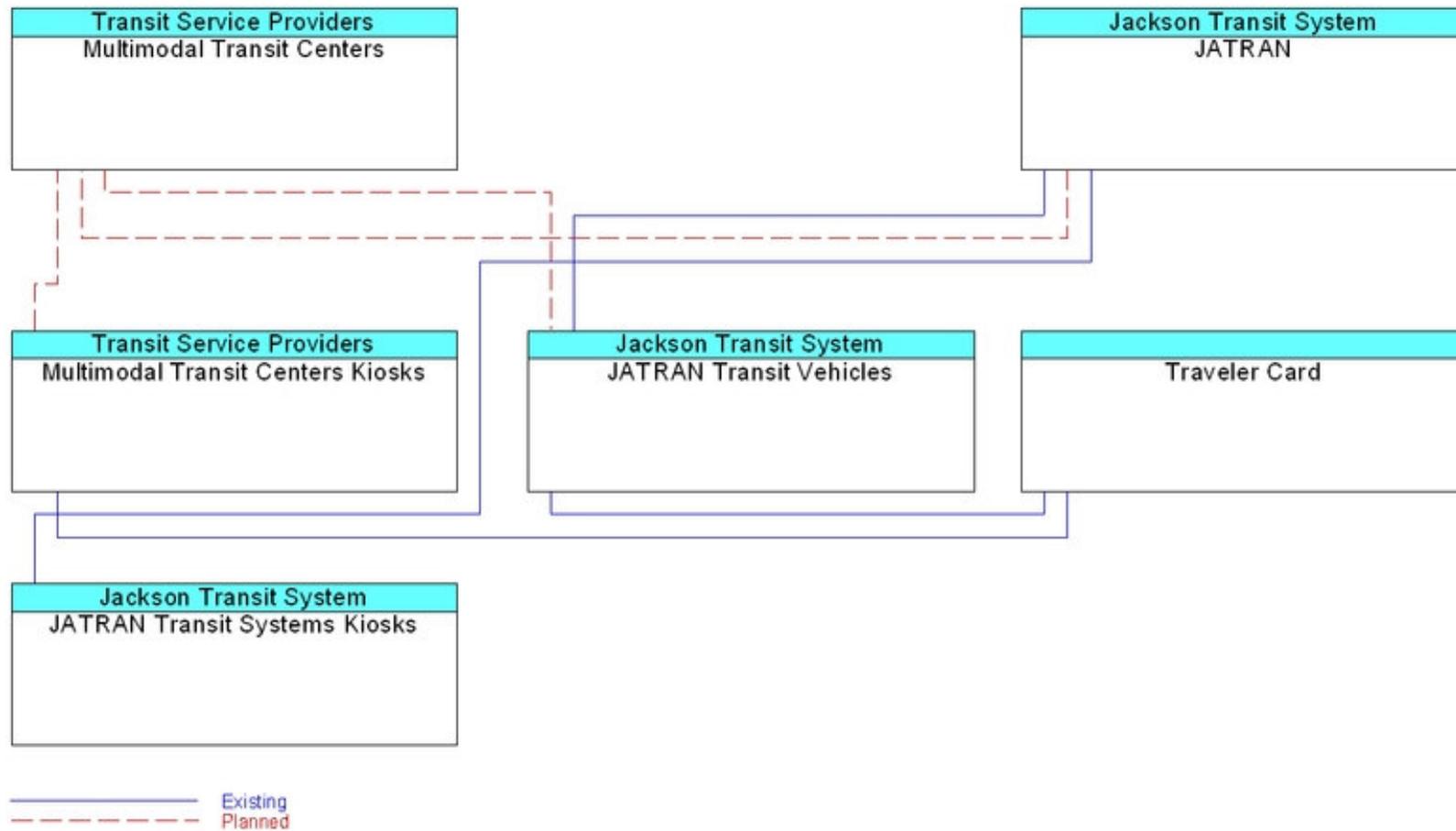


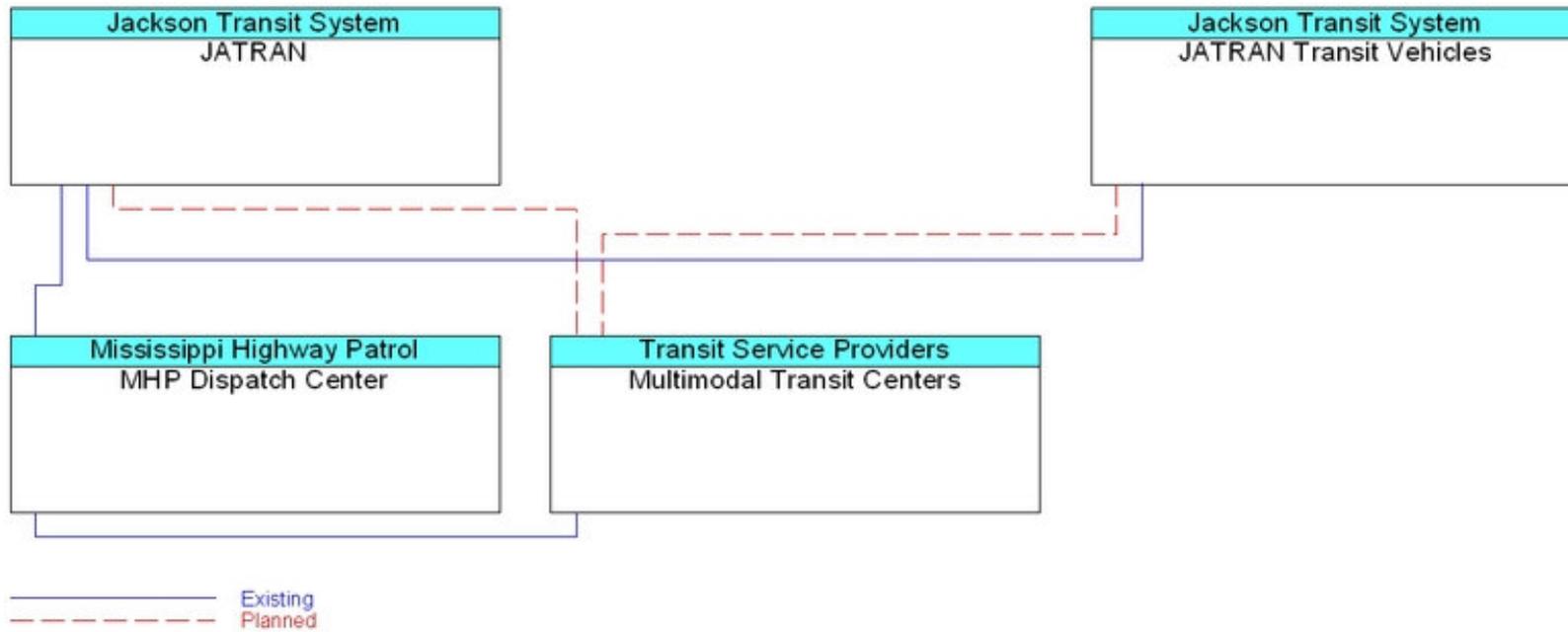


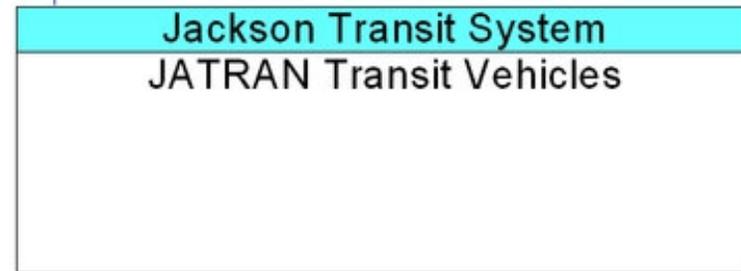
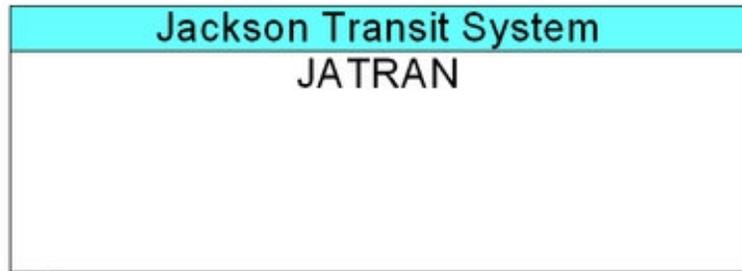




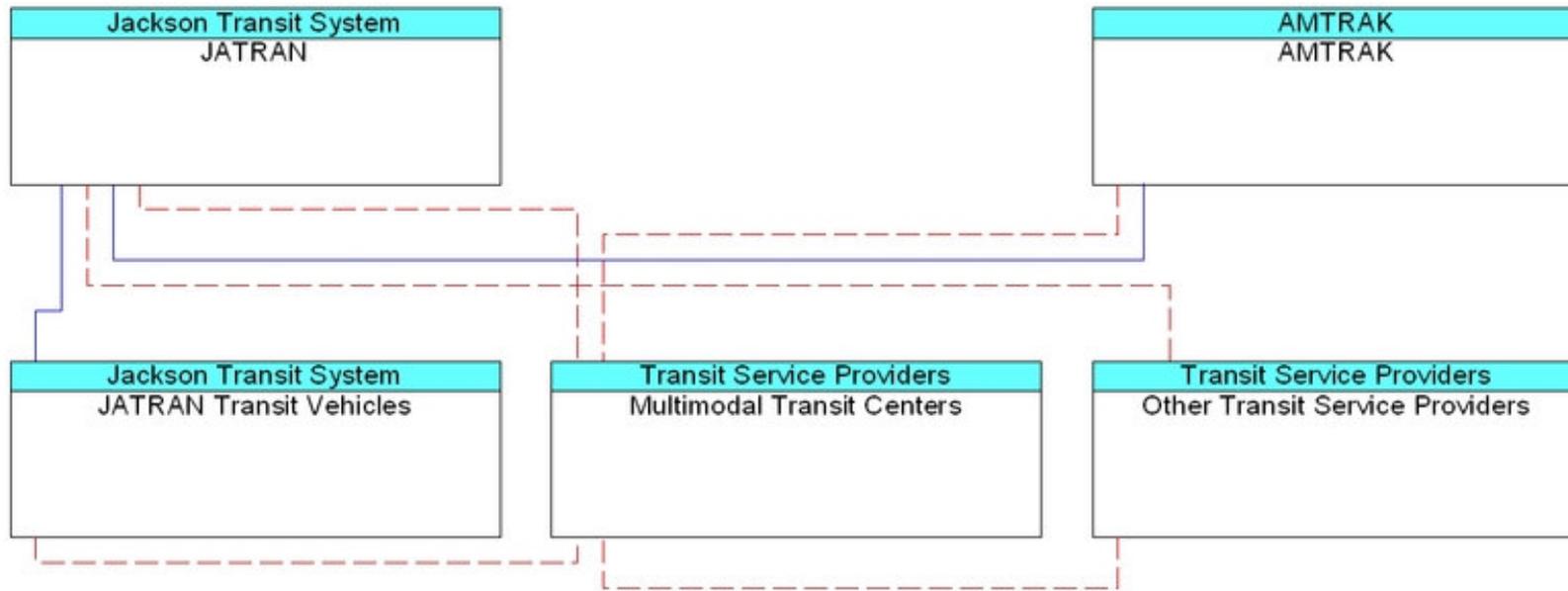
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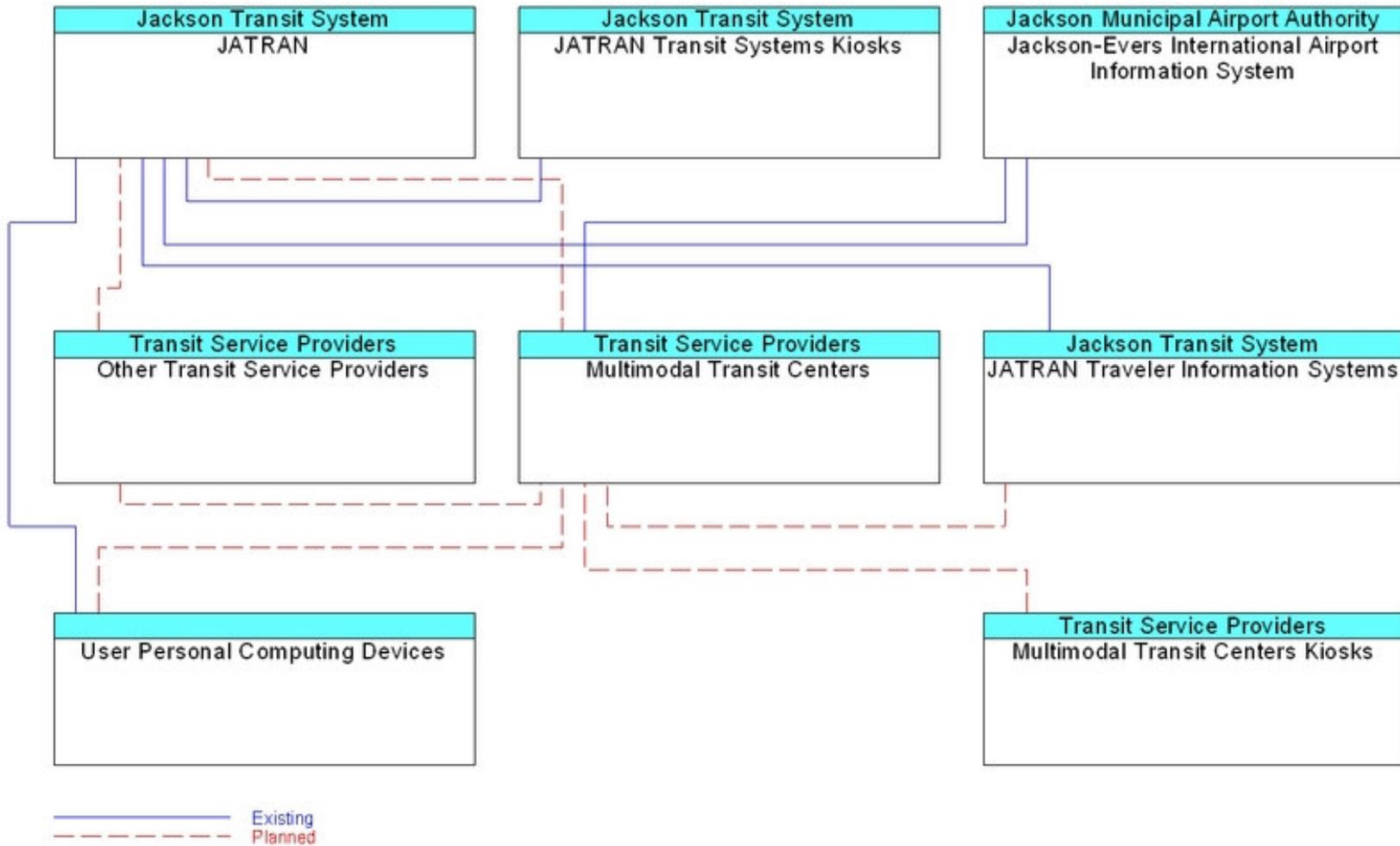


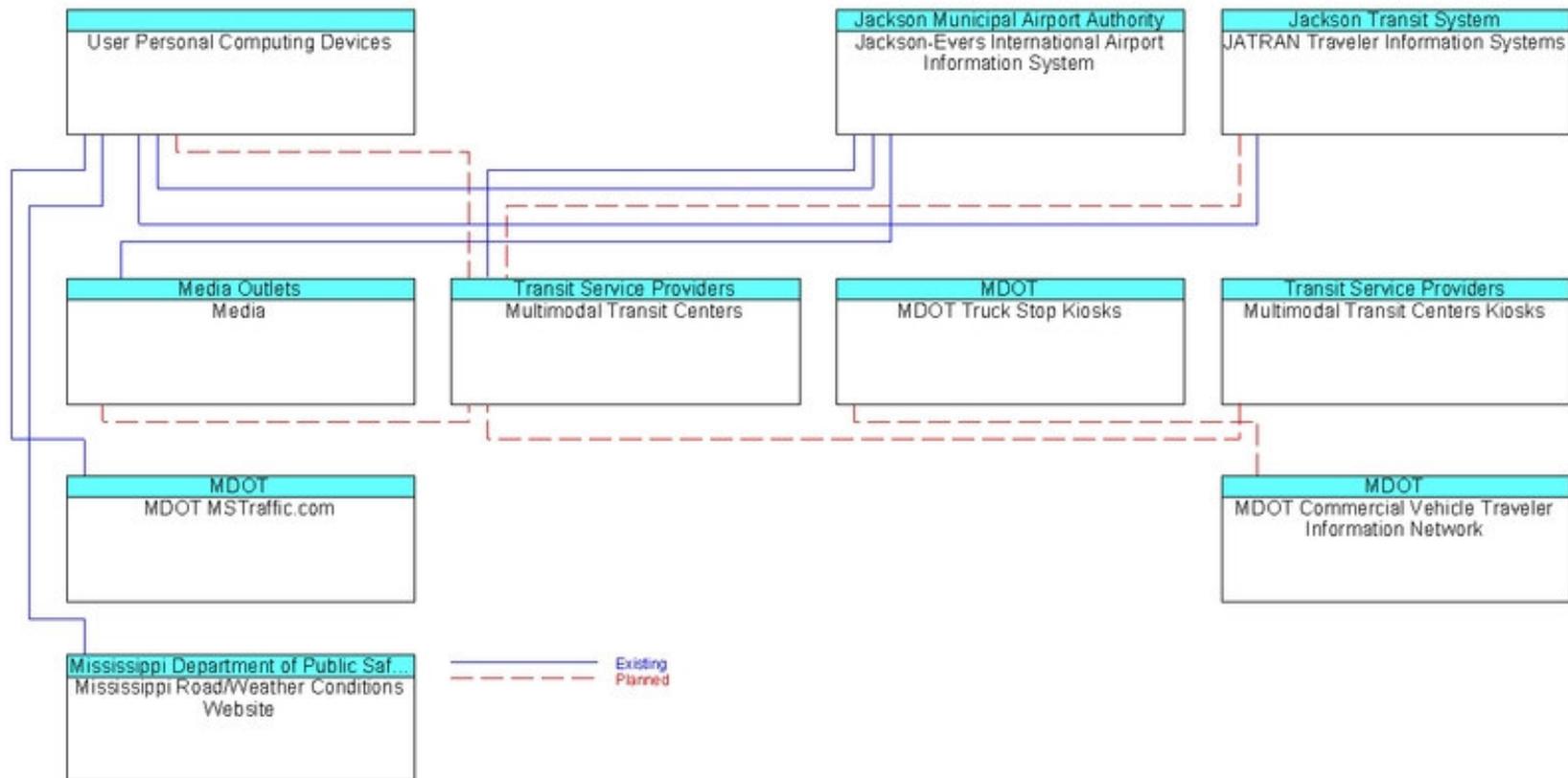


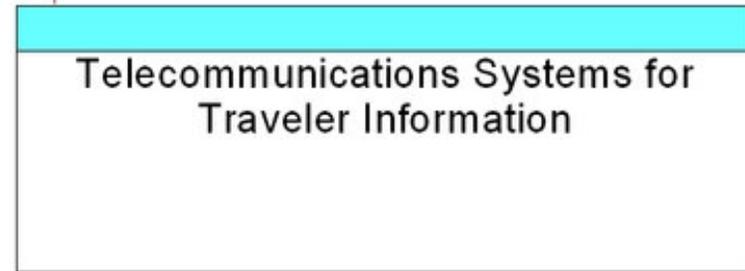
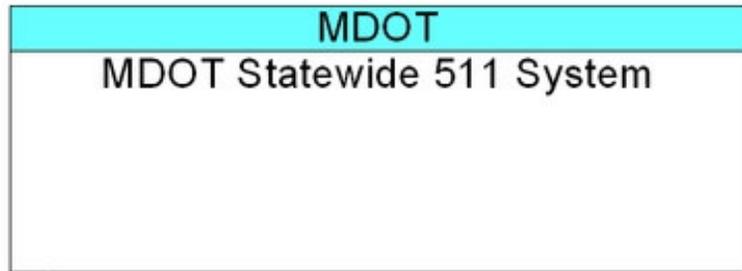
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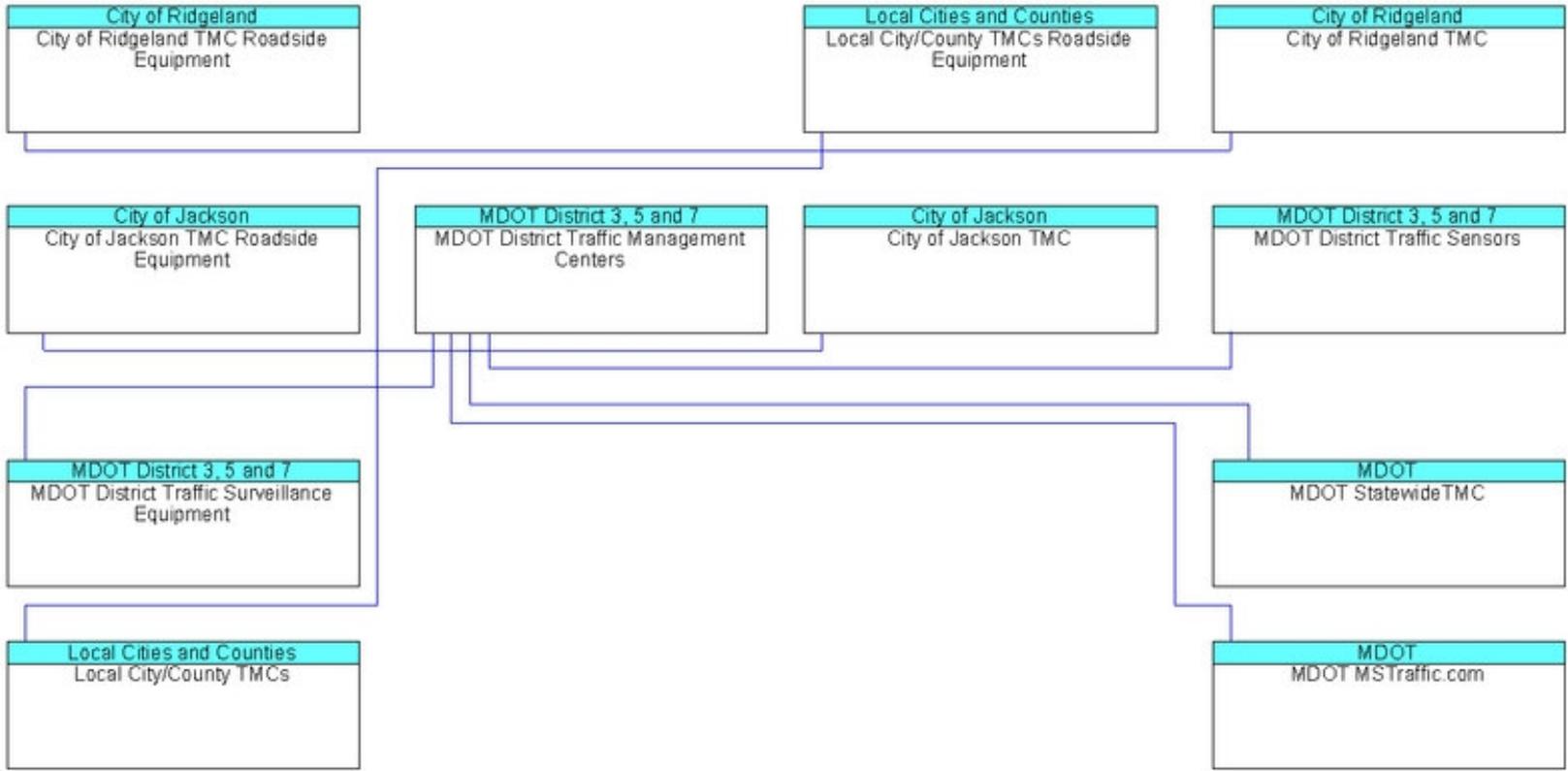
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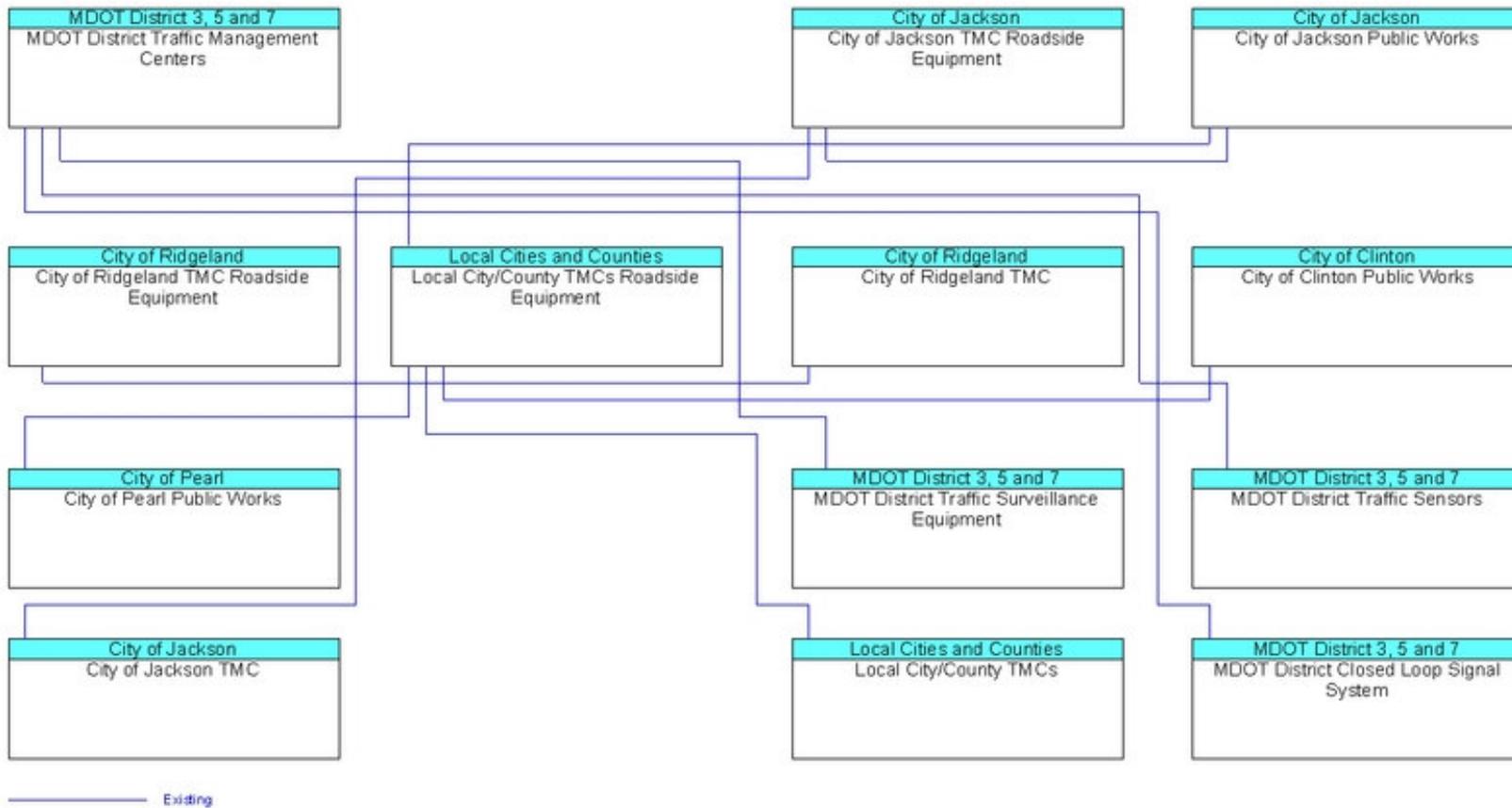


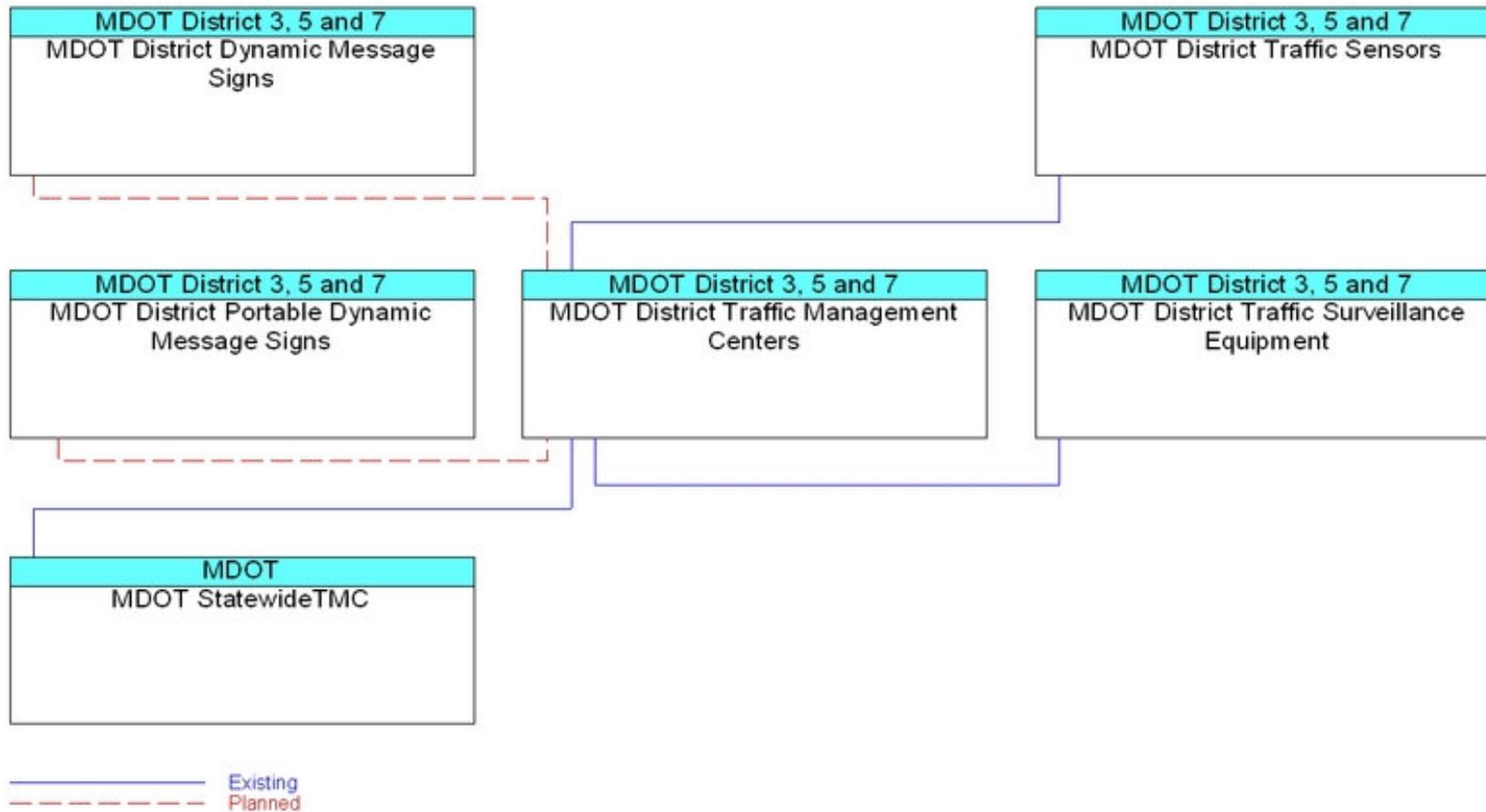


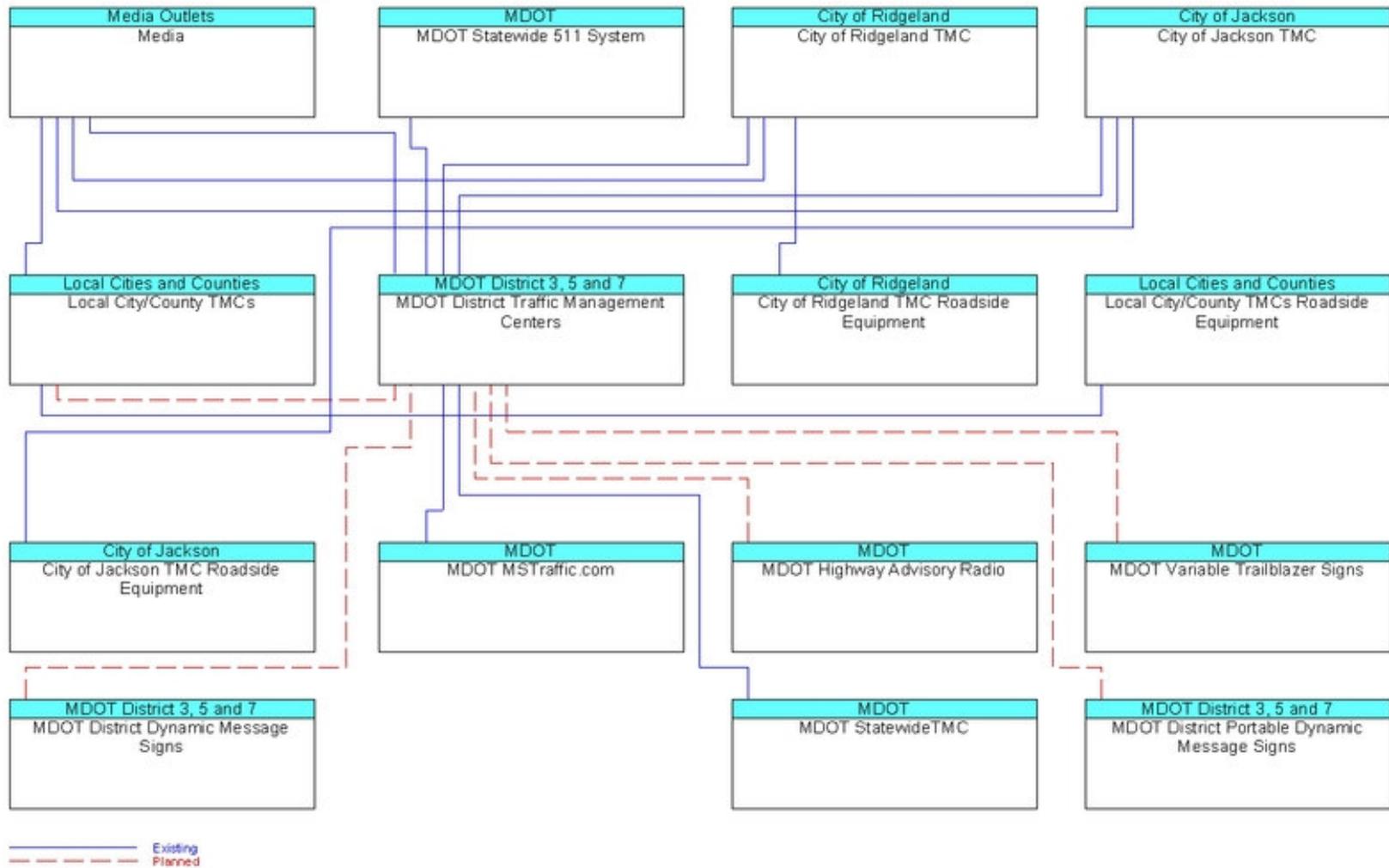
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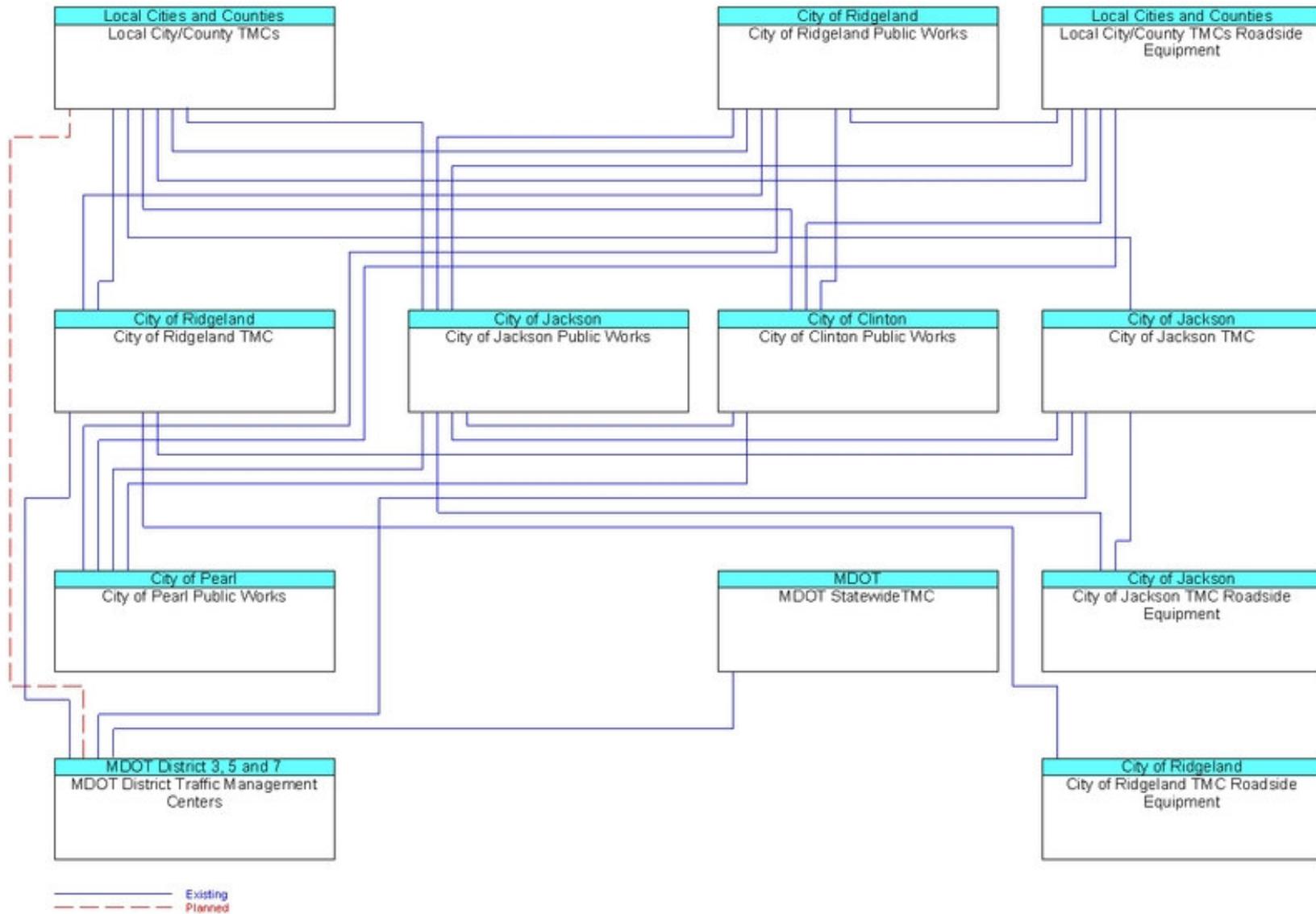


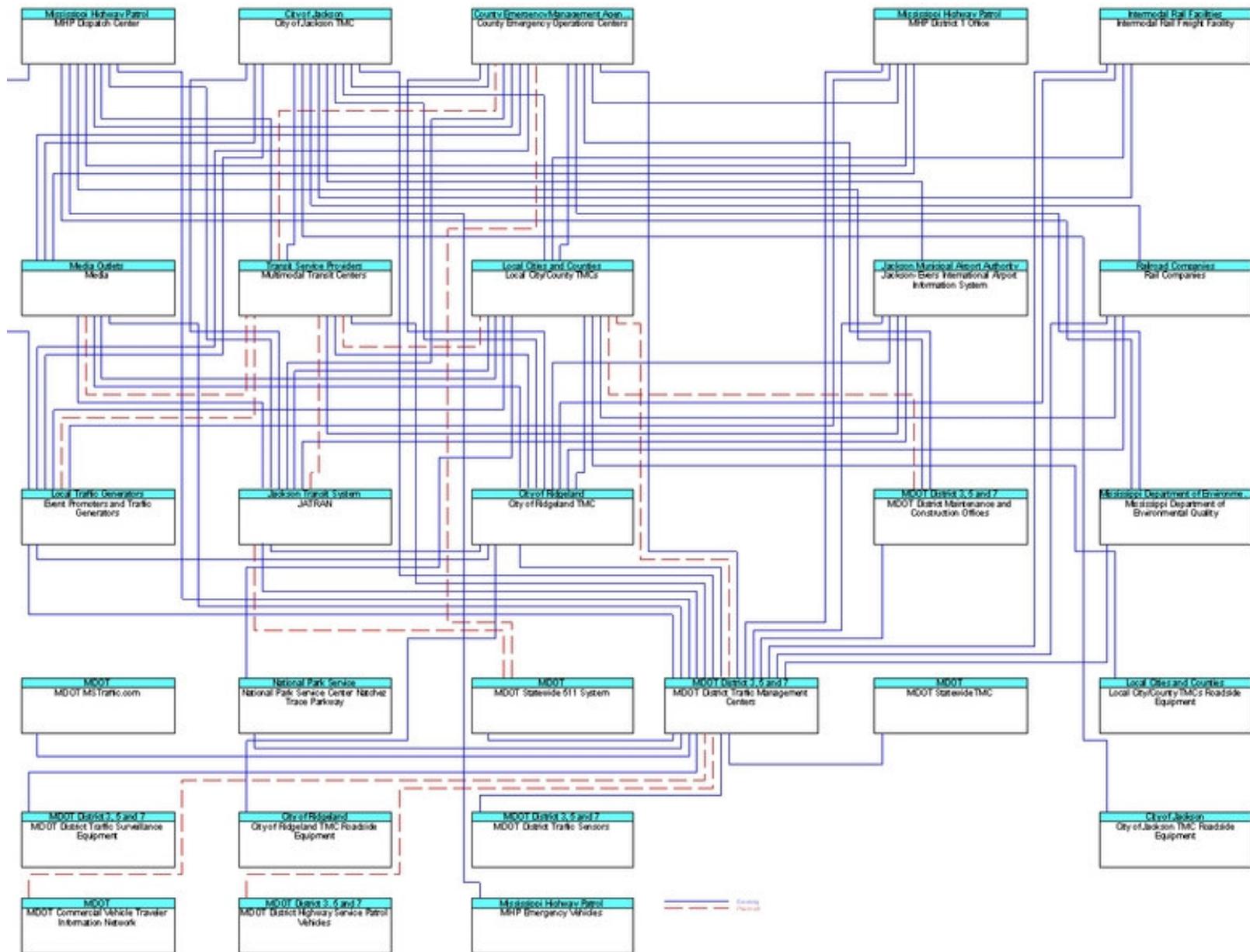
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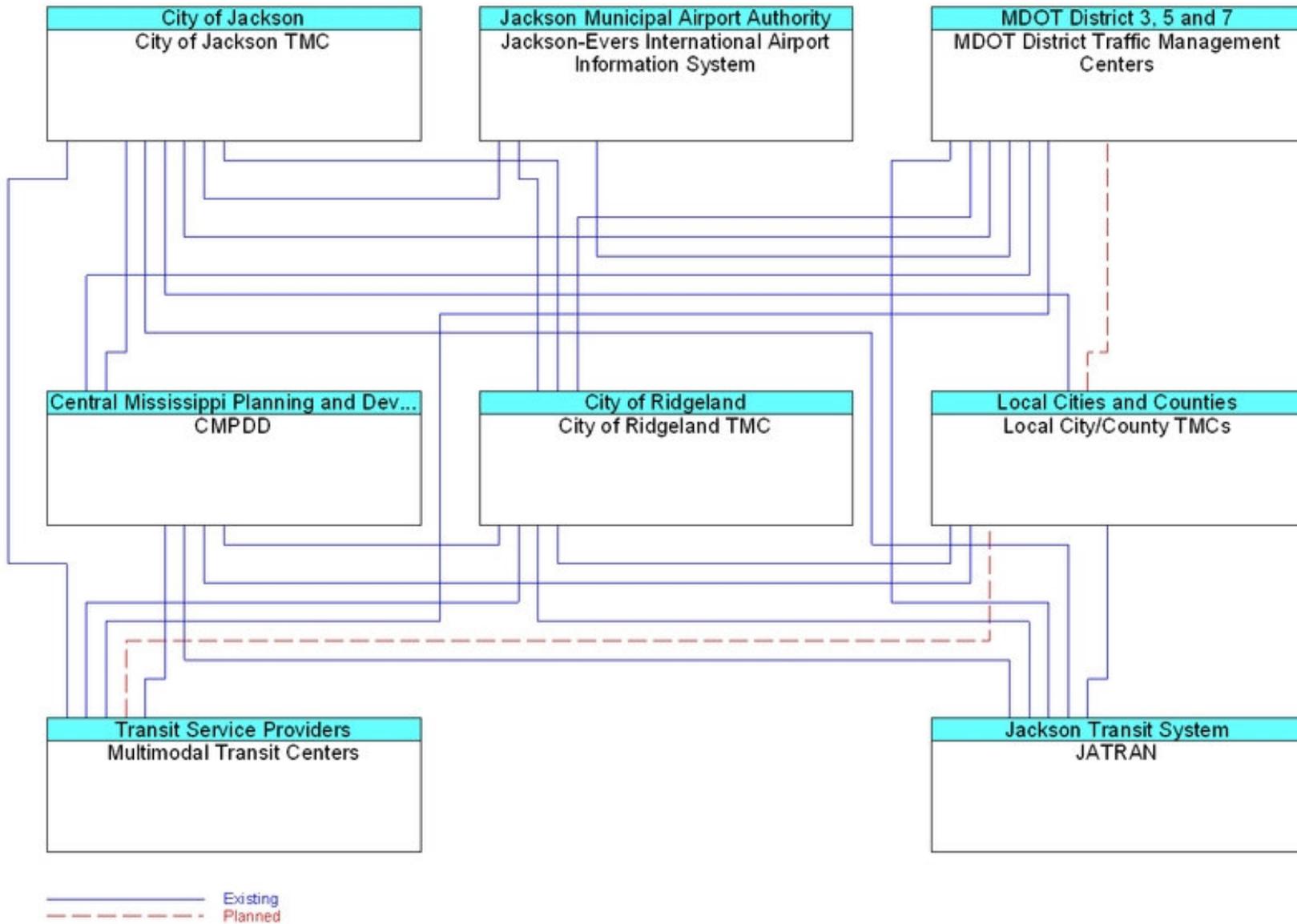


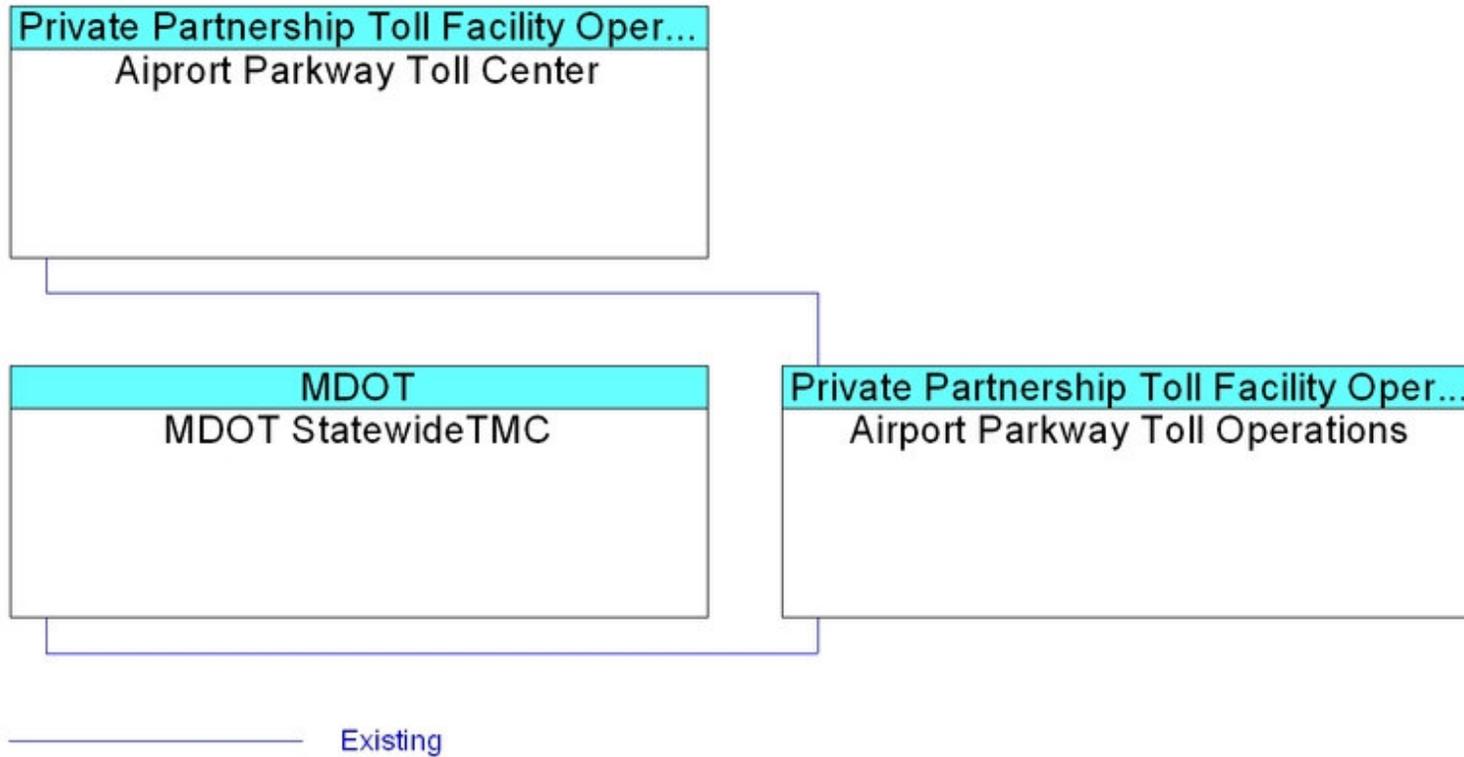




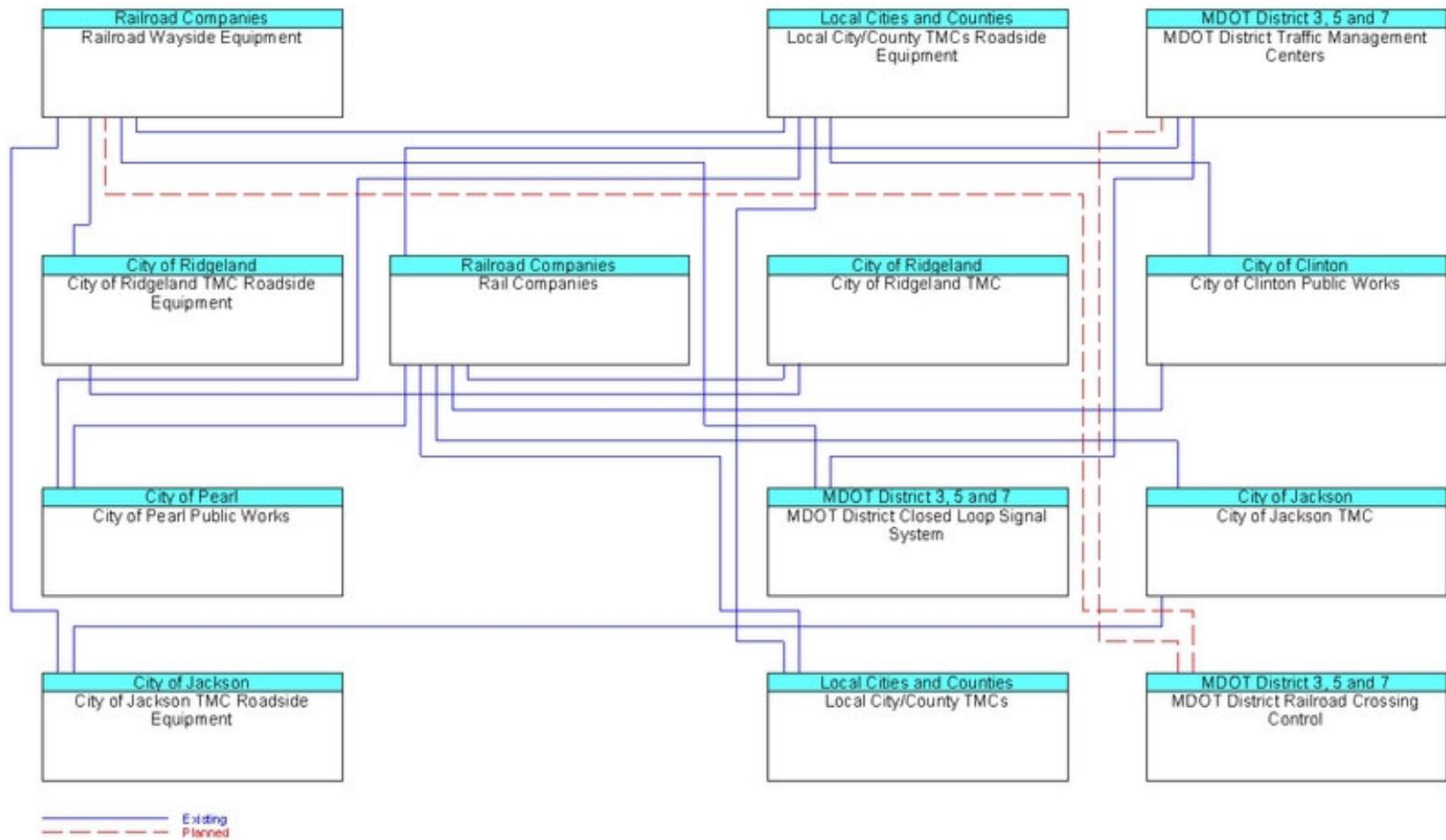


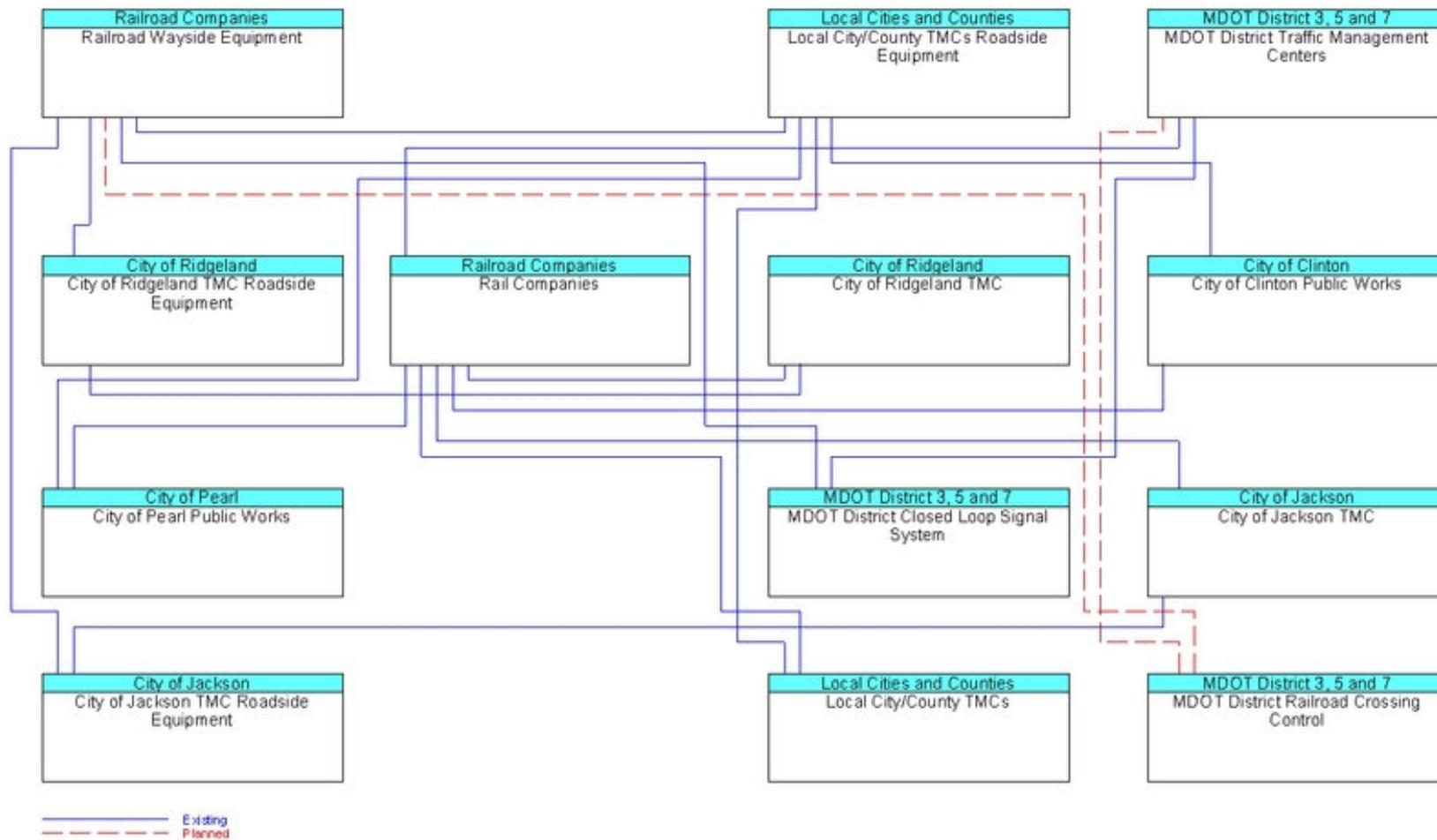


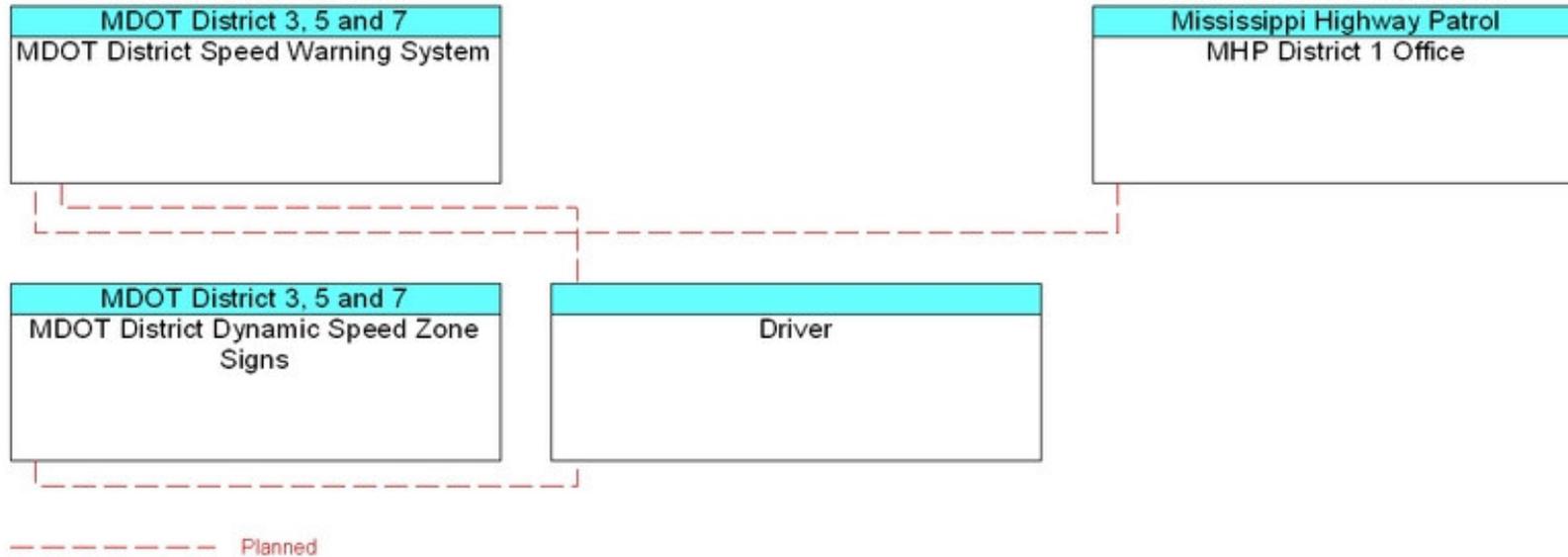


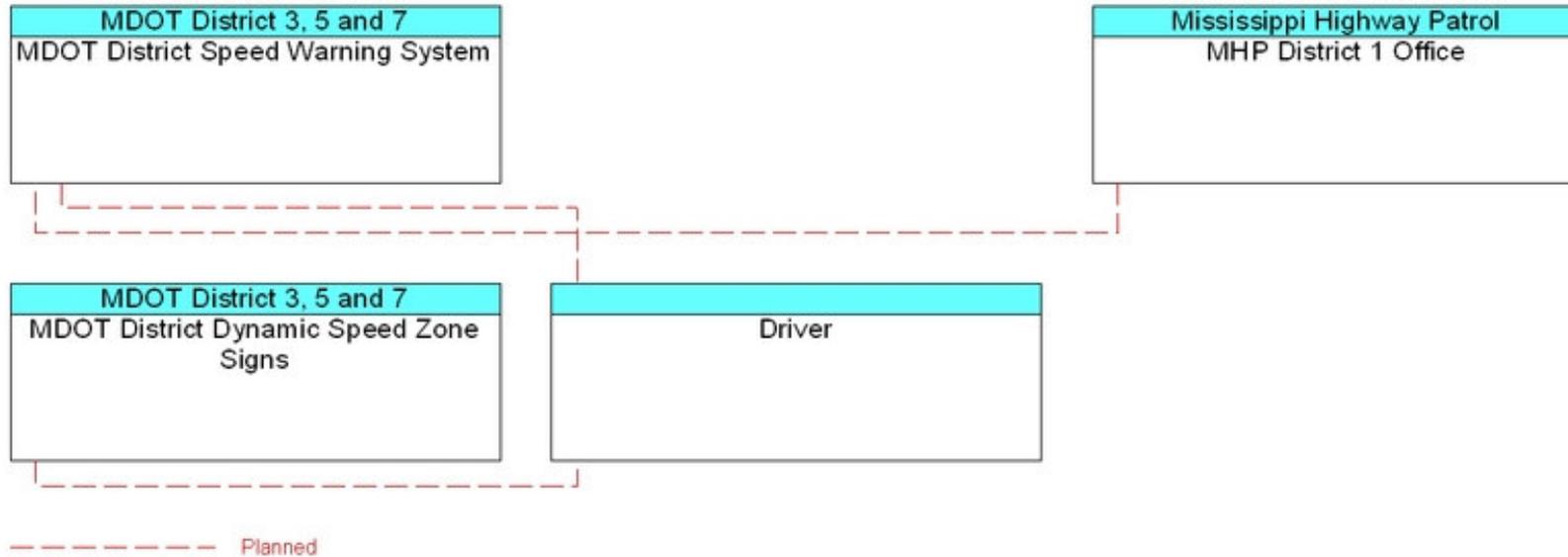


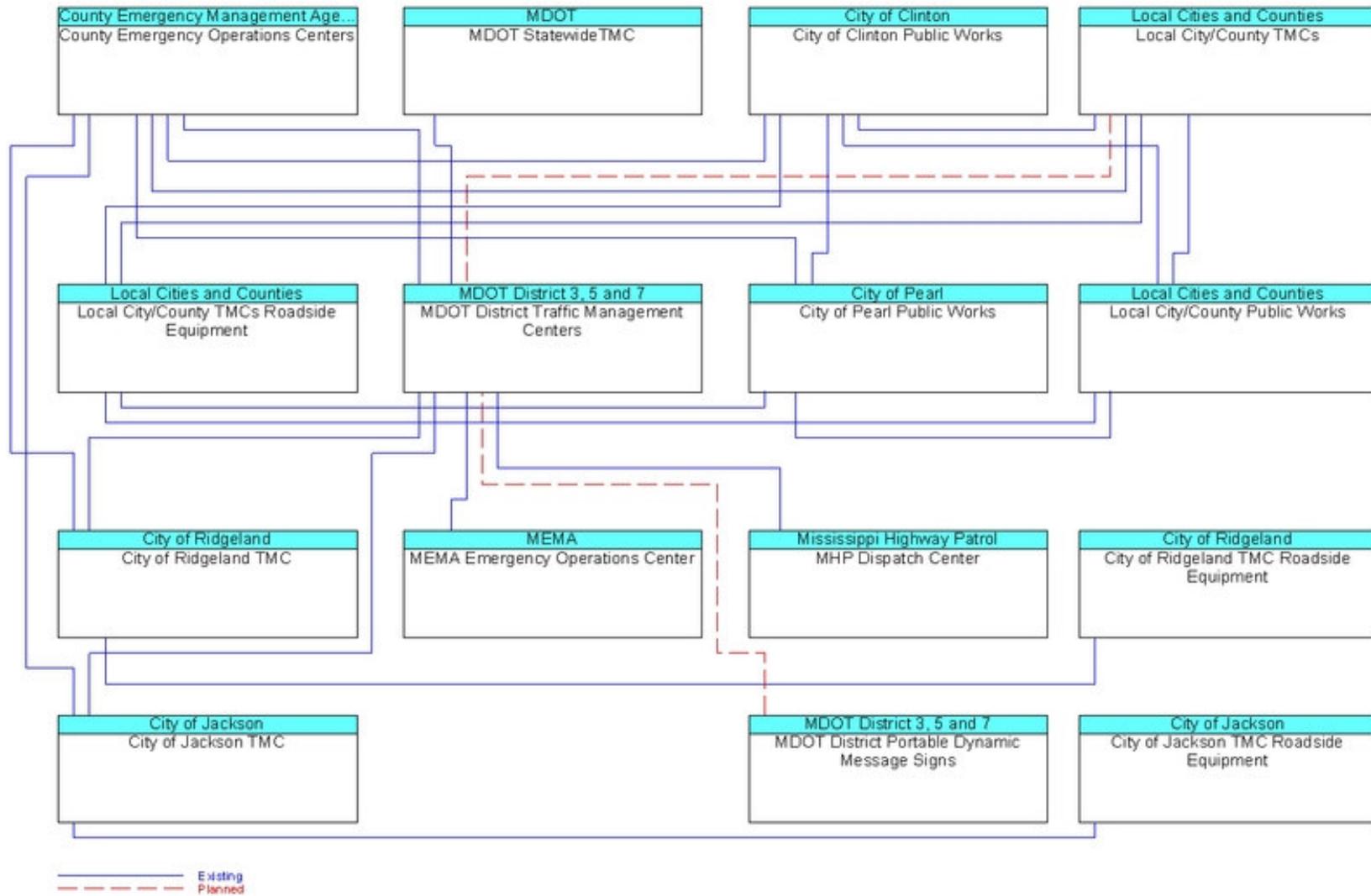
NOTE: This Interconnect Diagram is new to this revision of the Architecture Document.

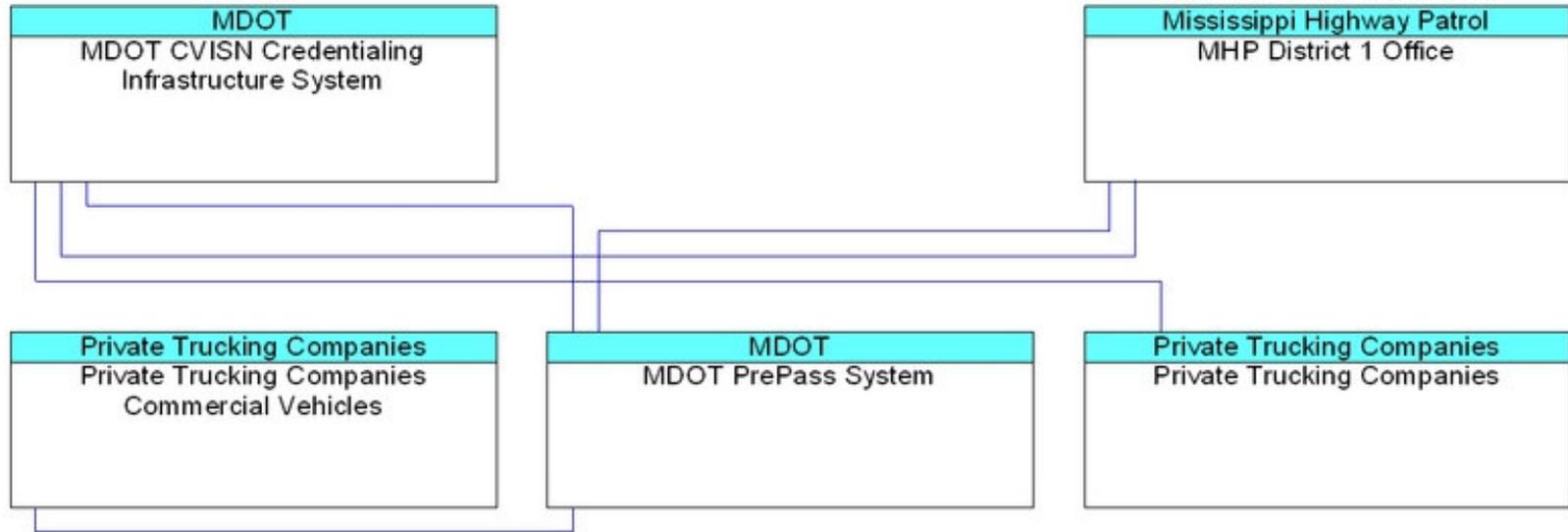




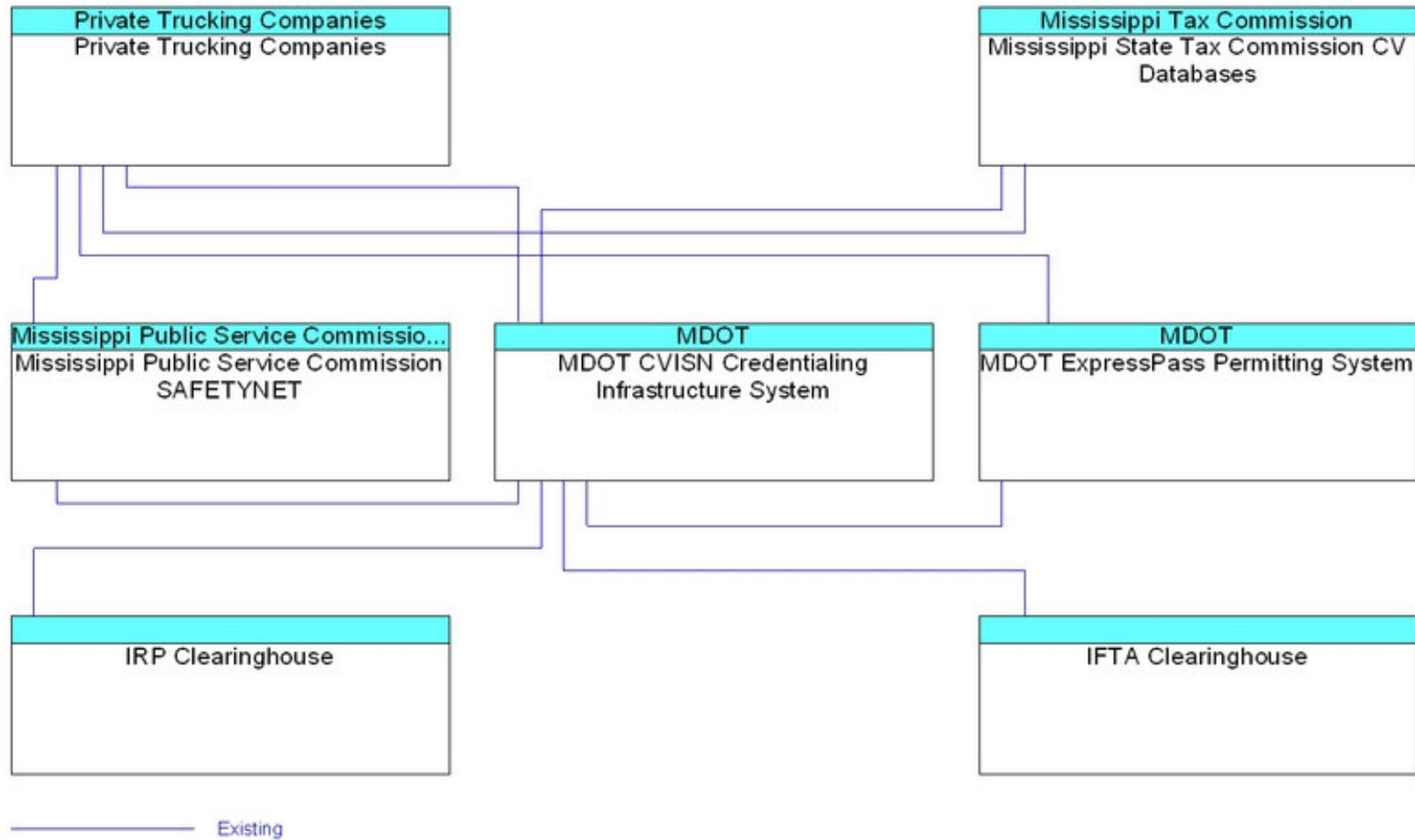








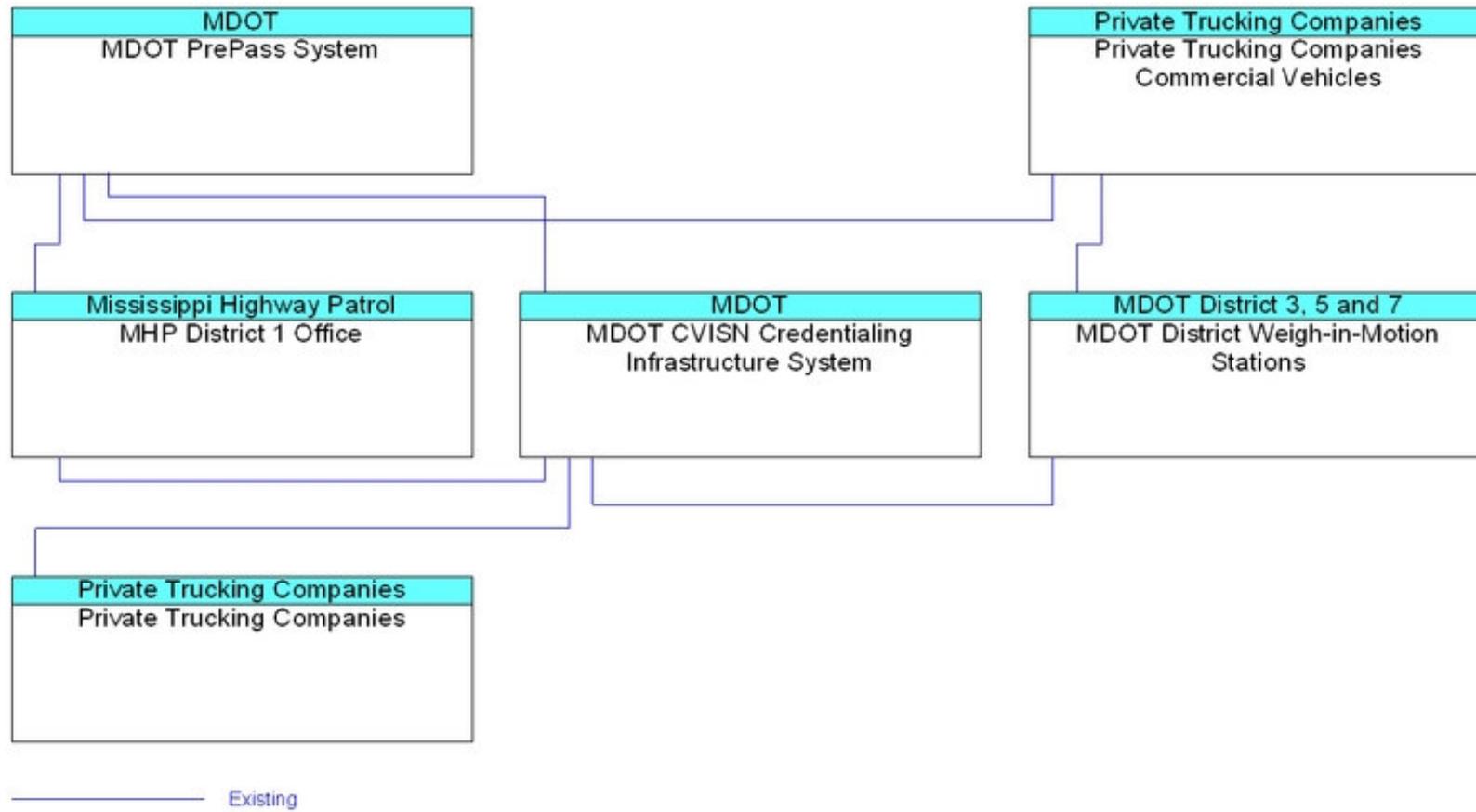
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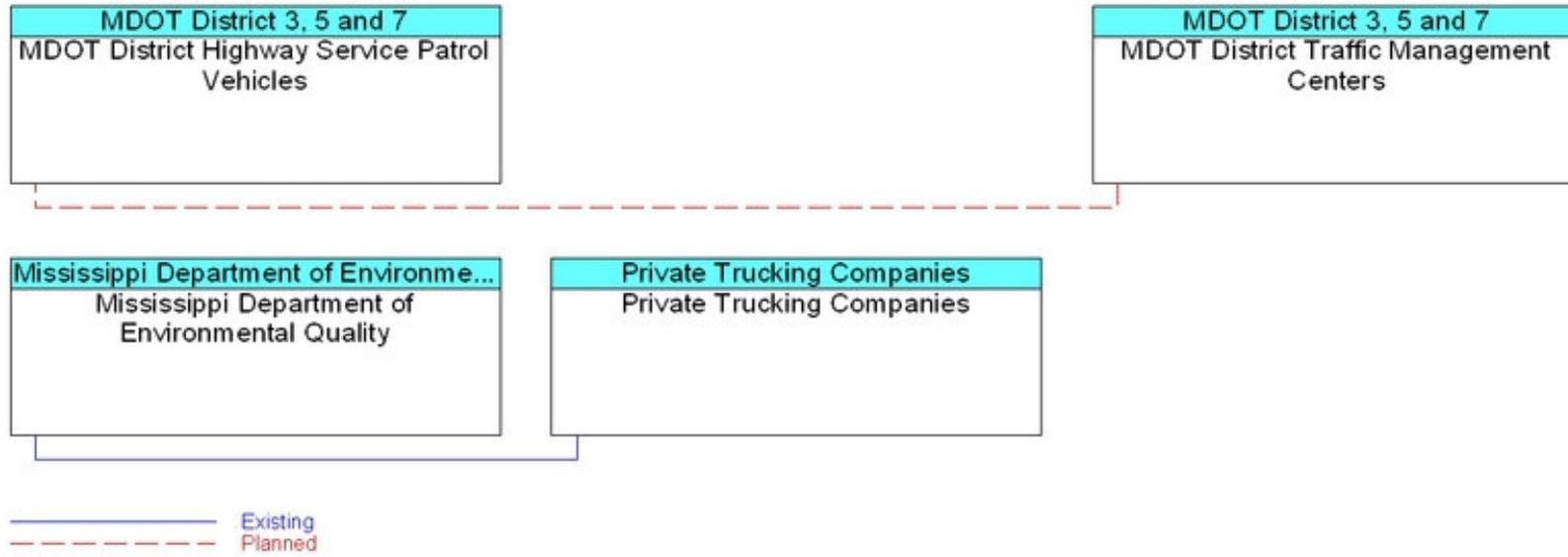


MDOT District 3, 5 and 7
MDOT District Weigh-in-Motion
Stations

Private Trucking Companies
Private Trucking Companies
Commercial Vehicles

Existing





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OFFENDING COMMAND: ~

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