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16. Abstract

Seven Key ITS Application Goals emerged from the document review, key contact interviews and input from attendees at ITS committee meetings. They were to use the ITS applications to improve the overall safety of the transportation network, to improve traffic management, to reduce non-recurring congestion, to more effectively disseminate traffic information to the traveling public, to promote more efficient modal utilization and to improve administrative efficiencies and operational safety

The study identified ITS initiatives ($71,486,165) already in place, programmed or planned, developed a package of recommended improvement projects and established priorities based on the availabilty of funds and developed a strategy for addressing ITS needs.

On going process to address future integration needs will be conducted by the ITS advisory council which was recommended by the committee.

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Louisiana ITS Business Plan

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Louisiana ITS Steering Committee

and

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LTRC State Project No. 736-99-0688

Conducted for:

LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
LOUISIANA TRANSPORTATION RESEARCH CENTER

March 2000

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Executive Summary

Plan Overview

Louisiana's ITS Business Plan provides a long-term strategic vision and program of projects to assist the state in integrating ITS applications into its surface transportation planning, operation and management activities. The Plan identifies the state's role in coordinating, planning, integrating, funding and deploying a statewide program of Intelligent Transportation Systems (ITS) initiatives to improve the safety and efficiency of the state's existing and planned transportation network, and highlights a series of ITS initiatives to be undertaken by the state.

The Plan is the result of a cooperative effort between state transportation and emergency service providers and the Metropolitan Planning Organizations (MPOs) of Baton Rouge, New Orleans and Shreveport / Bossier City. The Plan recognizes that resolution of urban and corridor-wide freeway management issues requires ongoing coordination, cooperation and systems integration among state and local transportation agencies.

Louisiana's ITS Business Plan has been developed to address state transportation needs, meet the requirements and objectives of the National ITS Program, and to leverage opportunities presented by the national, regional and local investments. The statewide ITS Plan: 1) builds upon and integrates local planning and deployment efforts to maximize the regional benefit of locally developed / funded projects; 2) clearly identifies the state's role in planning, funding, and deploying ITS projects; 3) ensures that statewide transportation interests / needs are adequately addressed in the ITS Plan.

Program Overview

Louisiana's ITS program includes process-based and technology-based initiatives to improve the operation and management of the state's surface transportation system. Key components of the ITS construction program outlined in the Plan include:

1. Provision of regional traffic and incident management systems by developing basic ITS traffic and incident management functions in all DOTD District offices, linked to a centralized Louisiana State Police (LSP) / Department of Transportation and Development (DOTD) ITS Center in Baton Rouge.
2. Improved urban traffic and incident management systems by developing Traffic Management Centers (TMCs) in Baton Rouge, New Orleans, Shreveport and Lafayette, with DOTD operation of the New Orleans and Shreveport TMCs and a DOTD seat in / interface with the locally operated Baton Rouge and Lafayette TMCs.
3. Improved incident management capabilities statewide through continuation of the ongoing motorist assistance patrols (MAPs), development of incident

response plans and utilizing portable ITS applications in construction work zones.

4. Installation of site-specific safety warning systems and road weather information systems (RWIS) and associated dynamic message signs (DMS) and variable speed limit signs (VSLS) at key high-accident and fog-prone locations along interstate corridors.
5. Development of an Advanced Traveler Information System to provide real-time traffic, incident and alternative route data via DMS, displays at rest stops and other sites, and a DOTD web site.
6. Implementation of the state's ITS / CVO program, including installation of weigh in motion scales (WIMs) at interstate port locations.
7. Planning and implementation of a statewide fiber optic and wireless communications backbone system to provide for data, video and voice communications among traffic, incident and emergency management systems, devices, controllers and centers.

The Plan also recommends an integrated program of organizational, operational and institutional initiatives to support development, integration and funding of ITS solutions to surface transportation problems. These initiatives include:

1. Development of an ITS Unit within the DOTD to oversee ITS program and project planning and implementation.
2. Creation of an ongoing ITS Advisory Council to ensure integration and interoperability among systems.
3. Development of a Statewide ITS implementation Plan.
4. Development of policy direction for coordinated control among state and locally owned signal systems within jurisdictional / travel-shed boundaries.
5. Development of policy direction for emergency response protocols among multiple jurisdictions.
6. Promotion of interjurisdictional / interagency information sharing and regional technology agreements to ensure interoperability among systems.
7. Preparation of Corridor Plans to identify specific project needs and guide deployment of ITS installations within the I-49, I-12 and I-20 corridors.
8. Preparation and implementation of an ITS Emergency Management / Emergency Evacuation Plan to identify integration needs among existing and planned field devices, systems, controllers and centers and OEP centers / systems.

1.0 Introduction

1.1 Purpose

With the passage of the Intermodal Surface Transportation Efficiency Act (ISTEA) in the early 1990's, the US Congress and the Federal Highway Administration directed state departments of transportation to change the way they do business. ISTEA required states to improve the safety and efficiency of existing facilities prior to attempting to solve transportation problems with physical additions to roadway capacity. One way to increase the efficiency and safety of the existing transportation system is to take advantage of new technologies which can help states and local governments better manage congestion, incident and emergency response, commercial vehicle operations, and public transit operations.

The recently passed Transportation Equity Act for the 21st Century (TEA 21) provides more than $1.2 billion in Intelligent Transportation Systems (ITS) funding through FY 2003 to assist states in investing in technology to better manage the existing surface transportation system. The State of Louisiana has developed this coordinated Intelligent Transportation Systems (ITS) Business Plan in cooperation with the Baton Rouge, New Orleans and Northwest Louisiana Metropolitan Planning Organizations (MPOs) to provide a roadmap for integration of ITS solutions in the state's routine transportation infrastructure planning and deployment processes. The ITS Business Plan provides a strategic vision and implementation program for deploying and integrating organizational, operational and technological change to support more efficient operation and management of the state's surface transportation system.

To focus state resources on improved traffic management and to ensure appropriate, coordinated technology deployment throughout the state, the Louisiana Department of Transportation and Development (DOTD) must take a leadership role in planning, deployment and integration of ITS solutions to problems of regional and statewide significance. The Plan identifies the state's role in coordinating, planning, integrating, funding and deploying a statewide program of ITS initiatives to improve the safety and efficiency of the state's existing and planned transportation network, and highlights a series of ITS initiatives to be undertaken by the state.

The Plan is the result of a cooperative effort of state transportation and emergency service providers and the Metropolitan Planning Organizations (MPOs) of Baton Rouge, New Orleans and Shreveport / Bossier City. The Plan recognizes that resolution of urban freeway management issues requires ongoing coordination, cooperation and systems integration among state and local transportation agencies.

1.0 Introduction

1.2 Program Overview

Louisiana's ITS program includes process-based and technology-based initiatives to improve the operation and management of the state's surface transportation system. These initiatives fall into five general categories, as follows:

1. ***Organizational improvements*** – Organizational improvements include developing the organizational infrastructure required to position the state to capitalize on opportunities brought about by the technological change associated with ITS.
2. ***Operational improvements*** – Operational improvements include such initiatives as policy direction for coordinated control among state and locally owned signal systems within jurisdictional / travel-shed boundaries; policy direction for emergency response protocols among multiple jurisdictions, etc. The Plan identifies the need for such operational improvements and outlines an action plan for their design and implementation.
3. ***Interjurisdictional / interagency information sharing*** – One of the key benefits of ITS is the ability to share information collected by one device, system, agency or service provider with other users. For example, real time traffic data collected by one transportation management agency for use in signal timing or incident management, could be relayed and used by another agency up the road in an advanced traveler information system to warn traffic of upcoming congestion and recommend alternative travel routes. The Plan identifies current and potential future information sharing needs among agencies / jurisdictions and defines the regional architecture, backbone communications systems and regional technology agreements required to accommodate these needs.
4. ***Support for local ITS initiatives*** – Louisiana's three-largest metropolitan areas are developing or planning to develop traffic management centers to assist in management and operation of their urban freeway and arterial systems. Other urban areas may elect to develop similar centers in the future. Urban and rural transit providers within the state are considering implementation of a variety of ITS initiatives to assist in improving transit operations and management. A variety of other local ITS initiatives are planned or underway. The Plan outlines the state's role in supporting and, in some cases, participating in, planning, development, funding, management and operation of these local initiatives.
5. ***Specific ITS initiatives to address identified needs*** – Early deployment studies along the I-10 Corridor, other state and local transportation plans and a series of key contact interviews identified specific safety problems and other transportation needs of statewide significance which lend themselves to ITS solutions. The Plan identifies a series of specific ITS projects to address these needs.

1.3 Deployment Context

The deployment context, or external environment in which Louisiana's ITS Plan will be implemented, includes two primary influences – the National ITS Program and local planning and deployment efforts. The National ITS Program provides a framework for ensuring consistent, integrated deployment at the regional level. The National ITS Program encourages states and local governments to use technology such as information processing, sensors, electronics and communications to collect, manage and disseminate information about its transportation system and the associated movement of people and goods to better manage that system.

A key component of the National Program is to provide a mechanism and framework for sharing information among a wide array of transportation system managers, transportation and emergency service providers, and transportation system users to improve the safety and efficiency of the existing transportation system and functionally maximize its capacity. Systems integration and system interoperability are thus critical to the success of any regional ITS effort. The state can play a major role in providing the institutional and physical infrastructure required to ensure system interoperability and appropriate systems integration, communication and data exchange among systems under the control of various jurisdictions.

At the local level, "Early Deployment Studies" – advance planning studies for ITS applications – have been undertaken for New Orleans, Baton Rouge and the I-10 Corridor. Other local transportation management organizations are preparing to undertake ITS planning studies in the near future. The state has prepared and adopted an ITS Business Plan for Commercial Vehicle Operations. A key requirement of the Louisiana ITS Business Plan is to define the state's role in implementation, management and integration of the various ITS programs outlined in these other plans.

Louisiana's ITS Business Plan has been developed to address state transportation needs, meet the requirements and objectives of the National ITS Program, and to leverage opportunities presented by the national, regional and local investments. The Statewide ITS Plan: 1) builds upon and integrates local planning and deployment efforts to maximize the regional benefit of locally developed / funded projects; 2) clearly identifies the state's role in planning, funding, and deploying ITS projects; 3) ensures that statewide transportation interests / needs are adequately addressed in the ITS Plan.

1.3.1 National ITS Program Areas

The National ITS Program includes four subprogram areas: the Metropolitan Program, Rural Program, Commercial Vehicle Operations (CVO) and the Intelligent

1.0 Introduction

Vehicle Initiative (IVI). The general purpose of each subprogram area is summarized below:

- ***Metropolitan Program*** – This program is designed to reduce the extent and duration of recurring and non-recurring congestion, improve emergency response and incident management capabilities and improve mobility for people and goods in urban areas.
- ***Rural Program*** – The Rural Program has the same basic objectives as the metropolitan program, but recognizes that the nature of the response must reflect the rural versus urban nature of the operating environment.
- ***CVO Program*** – The ITS / CVO Program is designed to improve the efficiency and effectiveness of commercial vehicle safety assurance processes; administrative processes including carrier, vehicle and driver licensing and registration, tax filing, oversize / overweight permitting and hazardous material permitting; screening vehicles for compliance with size, weight, tax and registration requirements; and carrier operations, including freight mobility and hazardous materials incident response.
- ***IVI Program*** – The Intelligent Vehicle Initiative aims to accelerate the development and availability of advanced safety and information systems applied to all types of vehicles. The goal is to integrate driver assistance and motorist information functions so that vehicles operate more safely and effectively.

This Plan focuses on development of the first two subprograms – metropolitan and rural applications. Louisiana completed an ITS Business Plan for Commercial Vehicle Operations in 1998. The ITS / CVO Business Plan is incorporated by reference here, and its program of projects is augmented by additional work completed in the I-10 Corridor Early Deployment Study and summarized in Section 4.0.

The IVI program is viewed more as a national research effort, with deployment in the hands of manufacturers and purchasers rather than state government. Accordingly, the Louisiana Plan does not address IVI.

1.3.2 National ITS Architecture

State and local transportation providers throughout the country are beginning to include technology-based or ITS solutions in their repertoire of programs to address surface transportation needs. If ITS technologies and services are implemented as independent projects by individual agencies, a patchwork of unrelated systems can result, making interagency information exchange difficult, time-consuming and expensive. To help states, regions and local jurisdictions cost-effectively realize the full benefits of ITS, the Federal Highway Administration (FHWA) has developed a

unified framework for integration – a National Architecture – to guide the coordinated deployment of ITS by public and private stakeholders.

The National ITS Architecture provides a framework to assist regions in defining the functions performed by ITS applications and the various ways in which those applications can be linked. Specific technologies and institutional arrangements associated with particular deployments are left to the discretion of the individual agencies implementing those projects. The purpose of the National Architecture is to provide a uniform framework and set of building blocks that state, regional and local agencies can use to promote compatibility among technologies and systems, while meeting individual agency / organization needs. The National Architecture provided the starting point for development of Louisiana's Statewide Architecture.

1.4 Need for a Statewide ITS Business Plan

Just as the National Architecture was developed to guide coordinated deployment of ITS nationally, the Louisiana ITS Business Plan has been developed to ensure coordinated deployment of ITS at the state level. Individual ITS applications can significantly improve the safety and efficiency of people and goods movements. However, the greatest benefits of ITS applications are realized when these projects are implemented within a broad regional context that supports operation and management of the transportation system statewide by enabling information sharing among transportation management organizations, transportation and emergency service providers and transportation system users.

Louisiana's ITS planning process provided the opportunity to:

- Engage a broad range of stakeholders in needs identification and identification / evaluation of alternative ITS solutions to assist in meeting those needs;
- Define a regional architecture to serve as a high-level template for ITS project development and design;
- Define a coordinated program of ITS initiatives to assist in meeting regional mobility and safety needs, while minimizing the need for new capacity additions; and
- Leverage individual jurisdictional / agency investments to assist in meeting regional / statewide objectives.

1.5 Louisiana's ITS Planning Process

Louisiana's ITS Business Plan seeks to provide guidance for the planning and deployment of ITS applications within the state. The Plan was developed in seven stages as described below:

1. Establish an ITS Steering Committee.
2. Develop a preliminary ITS Strategic Plan.

3. Identify and analyze needs that can be addressed by ITS.
4. Identify existing and planned ITS enhancements.
5. Identify and evaluate alternatives for addressing unmet needs.
6. Define statewide architecture.
7. Prepare Plan.

Each of these stages is summarized below.

1.5.1 ITS Steering Committee

The Statewide ITS Plan was developed by an ITS Steering Committee which included representatives from DOTD, Louisiana Department of Public Safety and Corrections (DPSC), Louisiana Office of Emergency Preparedness (OEP), FHWA, the New Orleans, Baton Rouge, and Northwest Louisiana MPOs, and various private sector and other stakeholder interests. The Steering Committee's role in the planning process was fourfold:

- To develop a strategic vision for the state's role in planning for, deploying, and integrating ITS applications in Louisiana;
- To identify the technological, institutional and resource requirements to successfully implement that vision;
- To evaluate implementation alternatives in terms of specific state and other stakeholder resources and needs; and
- To define an implementation program and architectural framework that addresses stakeholder needs within anticipated financial and organizational limitations and opportunities.

Appendix A includes a listing of ITS Steering Committee members.

1.5.2 Preliminary ITS Strategic Plan

The ITS Steering Committee includes subcommittees focused on Commercial Vehicle Operations (CVO) and electronic payment; public transportation and emergency management; and traffic and travel management. In 1997, the Steering Committee and its subcommittees established goals and objectives for ITS deployment in Louisiana, as well as for each of the three primary focus areas. The subcommittees completed a needs assessment process and identified a series of ITS-related initiatives to reduce congestion; improve incident response and decrease related traffic delays; improve the efficiency and effectiveness of CVO credentialing, clearance and safety assurance processes; automate toll and transit fare collection processes; improve mobility for transit and fleet vehicles; and increase critical corridor throughput for emergency evacuations.

The preliminary Strategic Plan also included a short-term action plan which recommended 1) establishing a DOTD ITS section to provide leadership in ITS planning, deployment and integration and to ensure that ITS applications are fully considered in all DOTD operations decisions; and 2) development of an ITS Business Plan to more fully define implementation activities required to meet state needs, associated deployment and operating resource requirements, and deployment and funding strategies.

This ITS Business Plan was developed to respond to the recommendations of the Strategic Plan. It builds upon and expands the needs analysis, ITS deployment recommendations and policy recommendations contained in the preliminary Strategic Plan.

1.5.3 Identify and Analyze Needs that Can be Addressed by ITS Applications

Louisiana's ITS Plan is a needs-based plan. The ITS Steering Committee met regularly in 1997 during the Strategic Plan development phase. The Committee also met at regular intervals during the January, 1999 to June, 1999 ITS Business Plan development phase. These meetings provided a forum for engaging a broad range of stakeholders in defining the state's role in ITS planning, deployment, and integration and identifying statewide needs that can be addressed by ITS.

To augment the needs analysis conducted by the Steering Committee, current state transportation plans and local ITS plans were reviewed to ensure that the needs, goals and objectives already defined by other state and local transportation planning processes were fully reflected in the ITS Plan. The Plan review was supplemented by a series of key contact interviews with representatives of local transportation planning / provider organizations, emergency service providers, providers of public safety services and users of the transportation system.

1.5.4 Identify Existing and Planned ITS Enhancements

A sound understanding of existing and committed ITS projects is required prior to development of plans for additional ITS applications and ITS systems integration. To ensure that the Plan builds upon and leverages ITS investments already in place or programmed, all ITS plans previously prepared by localities and the state were reviewed. The key contact interviews conducted as part of the needs assessment also identified planned and programmed ITS improvements.

1.5.5 Identify and Evaluate Alternatives for Addressing Unmet Needs

From June through August, 1999, the Steering Committee evaluated a series of policy actions and ITS deployment alternatives in relation to the goals, objectives, guiding principals and needs defined earlier in the planning process. The Steering

Committee developed the preferred program of deployment activities to achieve the state's needs.

As part of the alternatives identification and evaluation process, the Committee defined associated operating requirements including stakeholder roles and responsibilities in project deployment and operation, funding requirements, deployment phasing, need for technology agreements and other issues associated with successful implementation of the preferred program.

1.5.6 Define Statewide Architecture

Based on the National ITS Architecture, a regional architecture was developed to serve as a high level template for ITS project development, design and integration. The regional architecture was developed with input from the DOTD, MPOs, LTRC, local governments, DPSC, and others.

1.5.7 Plan Preparation

A draft Plan was prepared for Steering Committee review and comment in September of 1999. The draft Plan was also provided for review to several stakeholder groups not represented on the Committee. The document was revised based on the comments of the Committee and other stakeholder reviewers and was subsequently reviewed and endorsed by the Secretaries of the DOTD, DPSC and by the New Orleans, Baton Rouge and Northwest Louisiana MPOs.

The state views the Plan as a living document. The Plan will be amended over time to reflect changing needs and opportunities.

1.6 Business Plan Organization

Louisiana's ITS Business Plan is organized in five sections as follows:

Executive Summary – Provides an overview of the business plan purpose, planning process, goals, objectives, guiding principals, implementation program, scheduling and funding requirements.

1.0 Introduction – Provides background on the Plan purpose, national planning and deployment context, planning process and Plan contents.

2.0 Role of the State in ITS Planning, Deployment and Integration – Provides an overview of the state's role in ITS planning, deployment and systems integration.

3.0 Transportation Needs – Summarizes the needs identification process, overviews the needs that can be addressed by ITS, identifies existing and planned ITS enhancements and prioritizes needs.

4.0 Strategy for Addressing ITS Needs – Identifies the preferred program of projects and policy initiatives and outlines the purpose, requirements, responsibilities, estimated cost and implementation schedule for each Plan initiative.

5.0 Statewide Architecture – Defines the regional architecture that will serve as a high level template for ITS project design, development and integration.

1.0 Introduction

2.0 Role of the State in ITS Planning and Deployment

The DOTD is responsible for planning, development, operation and maintenance of almost 895 miles of Interstate highways and approximately 15,800 miles of state roads. Metropolitan Planning Organizations (MPOs) may also conduct planning for some urban interstate and state highway segments, but the DOTD is typically responsible for programming planned improvements to these facilities in the State Transportation Improvement Plan (STIP) and funding, constructing and operating these improvements.

The DOTD has developed operating agreements with some local jurisdictions related to traffic operations on state arterial roads in urban areas. These operating agreements identify a local traffic management organization with primary responsibility for traffic signal operation and maintenance on urban arterials and collectors which are also state roads. Local jurisdictions are typically responsible for planning, construction, maintenance and operation of all other (non-state) surface transportation facilities.

The state's role in ITS project planning and implementation follows from and builds upon its current responsibilities and authority in general transportation planning and operations, as described below. The DOTD is responsible for:

- Implementing organizational change within the DOTD to position the state and local traffic management organizations to capitalize on opportunities provided by integration of ITS technologies in state and local project planning, implementation and operations.
- Identifying and implementing operational changes which promote uniformity and more efficient operation of shared state / local systems.
- Providing leadership, information, expertise and infrastructure required to ensure appropriate interjurisdictional information-sharing.
- Taking the lead role in all ITS freeway management programs, whether these programs are urban or rural.
- Providing appropriate financial, informational and other support for locally-sponsored urban ITS initiatives. What constitutes "appropriate" support will be defined on a case by case basis, dependent upon the nature and magnitude of the problem under consideration, the roadway types involved, the type and cost of the proposed solution, and the relative priority of the project given other needs statewide.
- Taking the lead role in identifying transportation needs and designing, deploying and operating related ITS projects in rural areas, including rural interstate and principal / minor arterial highways.

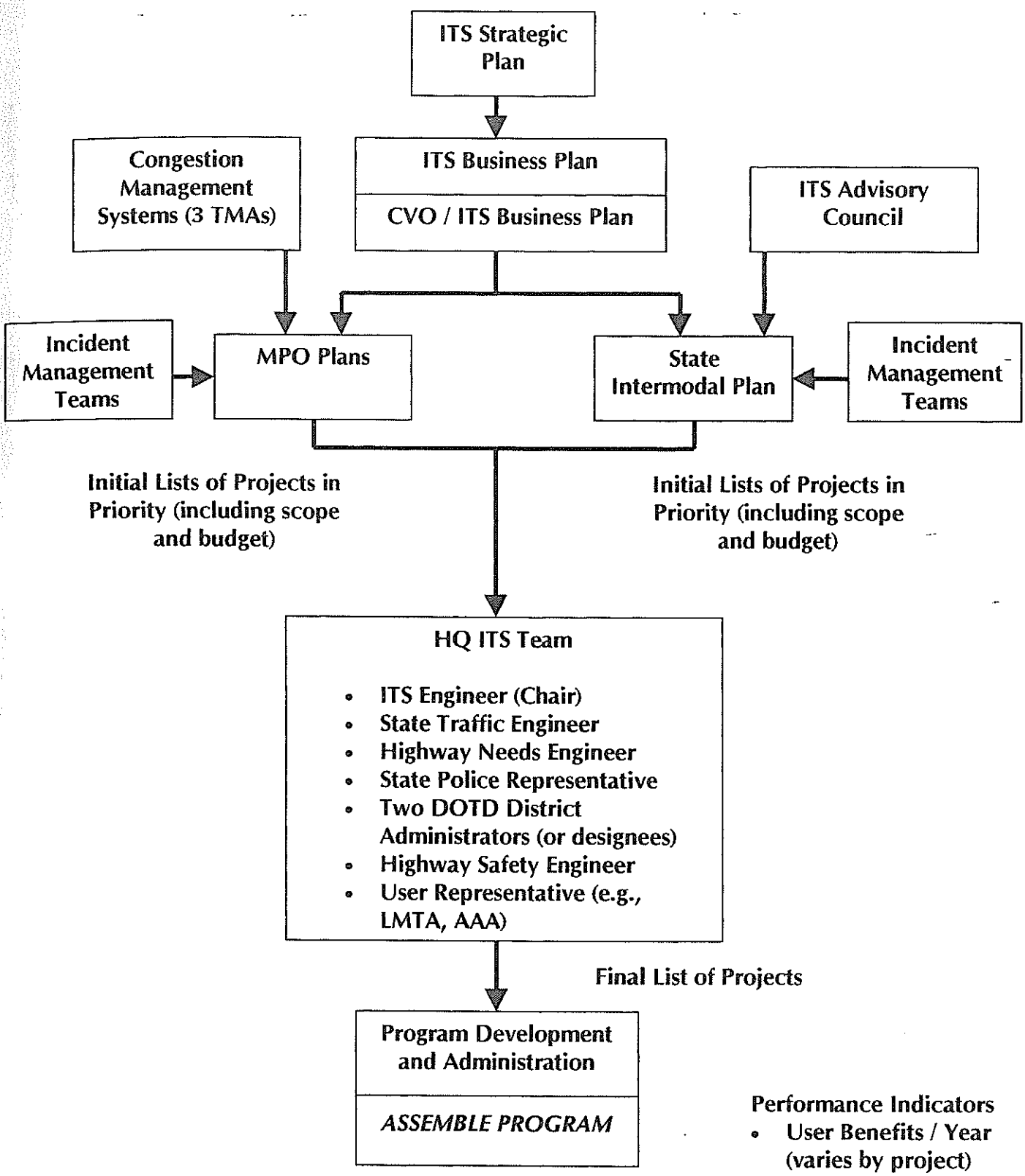
2.0 Role of the State in ITS Planning and Deployment

In carrying out these responsibilities, the DOTD will:

- Establish traffic management functions in each DOTD District Office. Basic functionality at each installation might include, for example, the ability to monitor the highway network and gather and disseminate information based on local needs. More extended functionality would be provided at some District offices based on the functionality and extensiveness of field devices and systems within the region. For example, some District offices may also provide incident detection and management capabilities, ability to monitor local weather, monitor freeways, control local streets, and control ITS devices in the field, such as dynamic message signs, etc. District traffic management functions may be as complex as a large multi-agency traffic management center as planned in New Orleans and Shreveport, or as simple as a networked workstation.
- Provide planning, design, deployment funding and operational support for ITS freeway management initiatives undertaken by MPOs in urban areas;
- Fund and operate one or more state seats in all urban traffic management centers (TMCs);
- Design, deploy and operate incident detection systems in rural areas with links to DOTD District traffic management systems;
- Develop and operate a web site providing real-time traveler information supported by DOTD District traffic management systems.

The state's role in funding ITS projects is outlined in the Recommended Highway Project Selection Process prepared by the Task Force on Highway Project Identification and Prioritization. The recommended process is summarized in Exhibit 1 on the following page.

Exhibit 2-1. Selection Process for ITS Projects



2.0 Role of the State in ITS Planning and Deployment

3.0 Transportation Needs

3.1 Needs Assessment Process

The Louisiana ITS Plan is a needs-based plan. Recommended improvements are based on documented, demonstrable transportation system needs as articulated in the state's annual Statewide Transportation Improvement Plan (STIP) planning process, state and local transportation plans previously completed and key contact interviews with transportation system users, providers and emergency service providers. The needs outlined below were compiled from a review of the following transportation plans, augmented by interviews with the individuals and agencies listed:

Transportation Plans Reviewed:
ITS Strategic Plan for Metropolitan New Orleans, 1997
I-10 Corridor Early Deployment Study, November, 1998
Implementation Plan for Intelligent Transportation Systems for the Baton Rouge Transportation Management Area, January 1999
Louisiana ITS Strategic Plan, April, 1998
Statewide Intermodal Transportation Plan, March 1996
November, 1998 Public comment summary sheets from the 1999 STIP cycle

Key Contact Interviews were conducted during the April to August, 1999 period with the individuals listed in Exhibit 3-1.

Exhibit 3-1. Key Contact Interviews

Name	Title	Agency
Steve Jiles	District 07 Traffic Operations Engineer	Louisiana DOTD
Mike Hollier	Planning Manager	Lafayette Consolidated Governments
Huey Dugas	Chief of Planning	Capitol Region Planning Commission
Conrad Rein	Senior Transportation Planner	New Orleans Regional Planning Commission
Chris Petro	Transportation Planner	Northwest Louisiana Council of Governments
Major Mark Oxley	Regional Commander, LSP	Louisiana Department of Public Safety and Corrections

3.0 Transportation Needs

Name	Title	Agency
Matt Farlow	Manager, Operations Division	Louisiana Office of Emergency Preparedness
Peter Allain	State Traffic Engineer	Louisiana DOTD
Mostafa Khosravanipour	DOTD Telecommunications Director	Louisiana DOTD
Eric Kalivoda	Deputy Assistant Secretary	Louisiana DOTD
Steve Strength	District 02 Traffic Operations Engineer	Louisiana DOTD

In addition to the document reviews and key contact interviews, a series of open ITS Committee meetings were conducted during 1998 and 1999 to gather input for the Plan. These meetings were routinely attended by 20 to 30 individuals representing the DOTD, DPSC, OEP, MPOs, FHWA (both Federal Aid and the Office of Motor Carrier Highway Safety (OMCHS), the Louisiana Transportation Research Center (LTRC), various local parishes, Louisiana State University and local consultants involved in both traditional and ITS transportation planning at the state and local level.

The needs assessment process included two other critical steps. The first was to map the identified needs to user services as described in Section 3.3. This was done to ensure that stakeholders were not overlooking specific user services which might hold value for application in Louisiana.

Finally, existing programmed and planned ITS applications in Louisiana were identified to ensure that the program of projects put forth in the ITS Plan builds upon and leverages existing and planned state and local ITS investments. Results of this analysis are described in Section 3.4.

3.2 Goals and Objectives

Seven key ITS applications goals emerged from the document reviews, key contact interviews and input from attendees at ITS Committee meetings as described below.

- Use ITS applications to improve the overall safety of the transportation network.
- Use ITS applications to improve traffic management.
- Use ITS applications to reduce non-recurring congestion.
- Use ITS applications to more effectively disseminate traffic information to the traveling public to support improved traffic management, congestion reduction and improved safety.
- Use ITS applications to promote more efficient modal utilization.

- Improve administrative efficiencies and operational safety / productivity of Commercial Vehicle Operations.

Specific objectives associated with each goal area are highlighted below.

1. **Use ITS applications to improve the overall safety of the transportation network. Specific objectives include:**
   - Reduce crash rates
   - Reduce fatality and injury rates
   - Reduce traffic congestion (and related lane weaving / sudden stops)
   - Signal control / preemption at highway / rail grade crossings
   - Reduce high incidence of commercial vehicle accidents near bridge crossings and marine port access points (problem is particularly critical on steep bridge approaches with mixed traffic entrance / exit ramps)
   - Reduce speed differentials between cars and trucks, particularly in inclement weather, on elevated roadway segments

2. **Use ITS applications to improve traffic management.** Specific Objectives include:
   - Improve travel times
   - Promote smooth traffic flow
   - Reduce recurring traffic congestion on a cost effective basis
   - Provide priorities to HOVs
   - Improved roadway access to marine ports, including reducing congestion on marine port approaches
   - Reduce construction-related congestion / delay

3. **Use ITS applications to reduce non-recurring congestion.** Specific objectives include:
   - Respond quickly and professionally to emergencies and incidents
   - Decrease delay due to incidents
   - Special-event traffic management

4. **Use ITS applications to more effectively disseminate traffic information to the traveling public to support improved traffic management, reductions in non-recurring congestion and improved safety.** Specific objectives include:
   - Improve communications to users
   - Provide dependable information to the traveling public
   - Provide advance knowledge of hazardous weather, primarily fog, to assist drivers in managing trips / using caution when approaching affected areas
   - Improve signage directing commercial drivers to marine ports

3.0 Transportation Needs

- Improve pre-trip and en-route real-time information dissemination regarding traffic conditions and lane blocking accidents
- Improve pre-trip and en-route information dissemination regarding hazardous materials spills
- Link urban traffic management centers for information sharing
- Provide real time traffic data on the Internet
- Advance warning systems for slow moving traffic, particularly at high hazard locations (steep grades, entrances to marine ports)
- Advance warning of height and bridge limitations along marine port access roads for commercial vehicles
- Advance warning for flood conditions, possibly tied to flood sensors
- Make travel information such as construction information (with alternative routing suggestions provided), posted roads and bridges, incidents (and location), real-time speeds, congestion (and location), etc., available to commercial vehicle operators and other travelers en route and at rest areas, truck stops and other locations.

5. **Use ITS applications to improve emergency management. Specific objectives include:**
   - Link regional traffic management systems with the state emergency preparedness offices
   - Enable traffic to use opposing lanes along Louisiana's elevated spillway crossings in the event of extended emergencies / evacuations
   - Reduce emergency response time

6. **Use ITS applications to promote more efficient modal utilization. Specific objectives include:**
   - Provide priorities to HOVs and transit vehicles in high volume transit / HOV corridors
   - Increase efficiency in providing transit service
   - Improve communications / dispatch capabilities for rural and specialized transit agencies
   - Improve access to intermodal facilities and the efficiency of intermodal transfers
   - Improve service and fare collection through use of smart card or swipe / storage cards
   - Provide transit information via signage proximate to park-n-rides
   - Disseminate public transit availability, routing, stop and scheduling information
7. **Improve administrative efficiencies and operational safety / productivity of Commercial Vehicle Operations.** Specific objectives are discussed in detail in the Louisiana CVO/ITS Business Plan adopted in June, 1999.

A set of guiding principles was developed by the ITS Steering Committee to guide development of the statewide ITS program. Guiding principles include:

1. The approach to plan development will balance organizational change, "low-tech" and "no-tech" solutions with appropriate ITS applications to achieve Plan goals and objectives.
2. Identify needs, *then* evaluate and select the most appropriate solutions.
3. Focus resources and implementation efforts on the most significant problems first; as the implementation program progresses, monitor results and expand the program to address other priorities.
4. Address both mid- and near-term needs and implementation requirements, focusing on lower cost / higher return activities in the short-term, with higher-cost / high return activities phased in over the longer term.
5. Employ proven technologies.
6. Provide for standardization of message sets, technologies, communications protocols, etc. as stipulated by the national architecture and national ITS program requirements and ensure system interoperability where appropriate.
7. Ensure conformity with the national ITS architecture.
8. The ITS Plan should provide for the ongoing integration of the ITS planning and implementation process into parallel, traditional transportation planning and implementation processes, including the TIP and STIP processes.
9. Focus on implementation alternatives with multiple benefits / applications.
10. Develop a Plan and ongoing planning process that leverages existing or planned ITS installations / enhancements and other planned and programmed capital improvements.
11. Leverage other states' activities, knowledge, mistakes and successes.
12. Monitor results.

3.3 Mapping Transportation Needs to User Services

Identified transportation needs were mapped to specific user services defined by the national architecture. This was done to ensure that stakeholders were not overlooking specific user services which might hold value for application in Louisiana, and to simplify the process of identifying specific market and equipment packages to address identified needs.

Exhibit 3-2. Transportation Needs Mapped to User Service Area

User Service	Need(s) Addressed by User Service
Travel and Traffic Management User Service Bundle	
1.1 Pre-Trip Travel Information	• Reduce construction-related congestion / delay • Reduce congestion • Improve travel times • Provide dependable information to traveling public • Advance knowledge of hazardous weather conditions • Information dissemination re: traffic conditions/lane blocking incidents • Real time traffic data on the Internet • Advance warning for flood conditions • Advance warning of height and bridge limitations • Improve notification capabilities for hazardous materials incidents • Improve communications to users • Special event traffic management
1.2 En-route Driver Information	• Reduce construction-related congestion / delay • Reduce congestion • Improve travel times • Provide dependable information to traveling public • Advance knowledge of hazardous weather conditions • Information dissemination re: traffic conditions/lane blocking incidents • Real time traffic data on the Internet • Advance warning for flood conditions • Advance warning of height and bridge limitations • Advance warning systems re: slow moving traffic • Make travel information available to commercial vehicle operators and others at rest areas, truck stops, other locations • Improve notification capabilities for hazardous materials incidents • Improve communications to users • Special event traffic management
1.3 Route Guidance	• Provide alternative route information with construction / incident data • Improved directional signage for marine port access
1.4 Ride Matching and Reservation	
1.5 Traveler Services Information	

User Service	Need(s) Addressed by User Service
1.6 Traffic Control	• Improve travel times • Promote smooth traffic flow • Reduce traffic congestion on a cost effective basis • Reduce capital investment in new construction
1.7 Incident Management	• Respond quickly and professionally to emergencies and incidents • Decrease incident-related delay
1.8 Travel Demand Management	
1.9 Emissions Testing and Mitigation	
1.10 Highway-rail Intersection	• Warning systems at highway / rail grade crossings
Public Transportation Management	
2.1 Public Transportation Management	• Where appropriate, use technology to improve communication and dispatch in rural and elderly / handicapped transit programs
2.2 En-route transit information	• Increase awareness of transit availability via signage near park-n-rides • Disseminate public transit availability, routing, stop and scheduling information
2.3 Personalized Public Transit	Where appropriate, use technology to improve communication and dispatch in rural and elderly / handicapped transit programs
2.4 Public Travel Security	
Electronic Payment	
3.1 Electronic Payment Services	• Consider use of smart cards for transit fare payment • Transponders or toll tags for toll payments
Commercial Vehicle Operations	
4.1 Electronic Screening	See ITS / CVO Business Plan
4.2 Automated Safety Inspection	See ITS / CVO Business Plan
4.3 On-Board Safety Monitoring	See ITS / CVO Business Plan
4.4 Commercial Vehicle Administrative	See ITS / CVO Business Plan

3.0 Transportation Needs

User Service	Need(s) Addressed by User Service
Processes	
4.5 Hazardous Material Incident Response	• Improve detection / notification capabilities
4.6 Commercial Fleet Management	• Provide real-time traffic data to support commercial fleet management
Emergency Management	
5.1 Emergency Notification and Personal Security	• Improve hurricane and incident-related evacuation capabilities
5.2 Emergency Vehicle Management	• Improve incident response time for emergency vehicles
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 Pre-crash Restraint Deployment	
6.6 Automated Vehicle Operation	
Archived Data	
7.1 Baseline Data Archive	• Special event traffic management • Improve hurricane and incident-related evacuation capabilities • Reduce congestion • Improve travel times • Improve planning capabilities
Additional Rural Transportation Systems User Services	
Portable Traffic Management	• Advance knowledge of hazardous weather conditions • Advance warning for flood conditions • Advance warning of height and bridge limitations

User Service	Need(s) Addressed by User Service
	• Advance warning systems re: slow moving traffic
Road Maintenance and Management	
Seasonal Harvesting	
Economic Development (Business Viability)	
Economic Development (Tourism)	
ITS Planning and Marketing Data	

Appendix B describes the reasons why specific user service areas were not selected for implementation under this Plan.

3.4 ITS Initiatives Already in-Place, Programmed or Planned

The final component of the needs assessment is a high level review of existing, programmed or planned ITS installations throughout the state. One of the guiding principals of Louisiana's ITS Plan is to build upon and leverage existing and planned state and local ITS investments. Toward that end, the Steering Committee conducted a high level review of existing ITS projects already in place and/or planned for near-term implementation. This review was not intended to identify each individual ITS project and its exact location. Rather, the review was meant to provide high level input to assist the Committee in:

- Establishing priorities for state-initiated projects;
- Identifying potential needs for interjurisdictional interfaces between types of systems / operations;
- Identifying needs for regional technology agreements; and
- Defining long-term planning processes to encourage ongoing synergistic project planning, funding and infrastructure sharing among state and local agencies.

Exhibit 3-3 lists ITS projects already programmed in the Statewide Transportation Improvement Plan (STIP).

Exhibit 3-3. ITS Projects Programmed in the Louisiana DOTD STIP, as of 12/99.

Funding Category	Parish	Urban Area	Project Name	Total	Federal	State	Let Date
NHS	Caddo	Shreveport	Greenwood Scale Upgrade WIM Installation	$360,000	$288,000	$72,000	NP
ITS	Regionwide	Shreveport	Shreveport Regional ITS Deployment	$2,000,000	$1,000,000	$1,000,000	NP
CMAQ	Calcasieu	Lake Charles	Prien Lake Road Computerized Signals	$275,000	$220,000	$55,000	Feb-01
CMAQ	Calcasieu	Lake Charles	Roadway Incident Management Patrol	$794,000	$635,200	$158,800	FY 1999
CMAQ	Calcasieu	Lake Charles	Ryan Street Signalization	$2,415,000	$2,415,000	$0	May-01
NHS	Calcasieu	Lake Charles	Toomey Scale Upgrade WIM Installation	$1,400,000	$1,120,000	$280,000	NP
CMAQ	East Baton Rouge	Baton Rouge	ATM-EOC	$3,000,000	$2,400,000	$0	Sep-99
DEMO	East Baton Rouge	Baton Rouge	ATM-EOC	$5,400,000	$5,400,000	$0	Sep-99
LOCAL	East Baton Rouge	Baton Rouge	ATM-EOC	$1,600,000	$0	$0	Sep-99
CMAQ	East Baton Rouge	Baton Rouge	B.R. Computerized Signal Project, Phase III-B	$3,300,000	$2,640,000	$660,000	Jul-00
DEMO	East Baton Rouge	Baton Rouge	B.R. Computerized Signal Project, Phase IV	$3,000,000	$3,000,000	$0	Dec-01
DEMO	East Baton Rouge	Baton Rouge	B.R. Computerized Signal Project, Phase V	$1,100,000	$1,100,000	$0	Oct-01
CMAQ	East Baton Rouge	Baton Rouge	ITS System & Equipment, Phase I	$2,000,000	$1,600,000	$400,000	FY 1999

Funding Category	Parish	Urban Area	Project Name	Total	Federal	State	Let Date
CMAQ	East Baton Rouge	Baton Rouge	ITS System & Equipment, Phase II	$3,000,000	$2,400,000	$600,000	FY 2000
CMAQ	East Baton Rouge	Baton Rouge	ITS System & Equipment, Phase III	$2,000,000	$1,600,000	$400,000	FY 2001
CMAQ	East Baton Rouge	Baton Rouge	ITS System & Equipment, Phase IV	$1,000,000	$800,000	$200,000	FY 2002
STPFLEX	Jefferson	New Orleans	Airline/Interstate Signal Improvements	$695,000	$695,000	$0	Mar-00
STPFLEX	Jefferson	New Orleans	Avondale/Barataria Signal Improvements	$550,000	$440,000	$110,000	Nov-01
STP>200K	Jefferson	New Orleans	Gretna/Metairie Signals	$685,000	$548,000	$137,000	Nov-01
STPFLEX	Jefferson	New Orleans	Jefferson/Belle Chasse Signals	$675,000	$675,000	$0	May-00
STPFLEX	Jefferson	New Orleans	Metro Signal System Expansion	$675,000	$540,000	$135,000	Nov-02
STPFLEX	Jefferson	New Orleans	Terry Parkway Signal Improvements	$300,000	$240,000	$60,000	Sep-01
NHS	Madison	Monroe	Delta Scale Upgrade WIM Installation	$360,000	$288,000	$72,000	NP
STP>200K	Orleans	New Orleans	Claiborne/Carrollton/Tulane Signal Project	$3,386,000	$2,708,800	$677,200	Nov-01
STP>200K	Orleans	New Orleans	Incident Management Plan	$200,000	$160,000	$40,000	NP
STPFLEX	Orleans	New Orleans	Kenner/River Ridge Signals	$685,000	$685,000	$0	Jan-02
STP>200K	Orleans	New Orleans	N.O. Computerized Signal Project, Phase IV	$2,710,000	$2,168,000	$542,000	Nov-02

Funding Category	Parish	Urban Area	Project Name	Total	Federal	State	Let Date
STP>200K	Orleans	New Orleans	Traffic Management Center	$1,750,000	$1,400,000	$350,000	Nov-01
DEMO	Regionwide	New Orleans	New Orleans Regional ITS Deployment	$6,875,000	$5,500,000	$1,375,000	NP
ITS	Regionwide	New Orleans	Northshore Deployment/Integration	$6,331,756	$3,165,878	$3,165,878	NP
ITS	Regionwide	New Orleans	New Orleans ITS Integration	$2,374,409	$1,187,204	$1,187,204	NP
NHS	Ouachita	Monroe	Computerized Traffic Signal System	$2,640,000	$2,112,000	$528,000	Jan-02
NHS	St. Martin	Lafayette	Breaux Bridge Scale Upgrade Electronic Clear.	$1,200,000	$960,000	$240,000	NP
STP<200K	St. Tammany	Slidell	Gausse Boulevard Improvements, Signals	$1,750,000	$1,400,000	$350,000	Dec-99
ITS	Regionwide	Houma	Houma Regional ITS Deployment	$2,000,000	$1,000,000	$1,000,000	NP
IM, STPHAZ	Regionwide	Statewide	Reduced Visibility Enhancement	$3,000,000	$2,700,000	$300,000	May-00
			TOTAL	$71,486,165	$55,191,082	$14,095,082	

Exhibit 3-4 provides summary text information for projects in the planning / near-term implementation phase.

Exhibit 3-4. Existing, Programmed, Planned ITS Installations

Implementation Type / General Capabilities	Need for Info Sharing	State Role (as identified by local jurisdiction)
Baton Rouge		
Advanced Traffic Management and Emergency Operations Center: Will house fire, police and EMS dispatch; OEP; US Coast Guard and Traffic Management Center (TMC). Central computers will be linked to roadside systems including DMS, traffic flow monitoring, traffic classification, HAR, roadway weather station, weather monitoring, lane control, etc. Roadside systems for freeway and incident management will include CCTV cameras and controllers, traffic detection devices and controllers, fixed and variable location dynamic message signs and controllers, , ramp meters and controllers, HAR transmission stations, communication HUB site equipment Roadside systems for surface arterials include: closed loop signal synchronization, cabinet and traffic controllers, traffic detection devices, communications equipment All applications will be consistent with the national architecture Ongoing Motorist Assistance Patrol	Co-located agencies to be linked via LAN or Ethernet Potential need for future interfaces to other Louisiana and out-of-state TMCs to exchange data including weather information, traffic volume, flow data and incident notification, route guidance	State seat in TOC; state role in funding, design, installation of devices, communications systems, controls, etc.

Implementation Type / General Capabilities	Need for Info Sharing	State Role (as identified by local jurisdiction)
Office of Emergency Preparedness		
Emergency Operation Center (OEC) has seats for 20 state agencies and five federal agencies. DOTD, DPSC and Department of Social Services (DSS) each have their own separate emergency command centers. During emergency, Parishes call with request for service, notifications, etc. Requests are manually logged into the EM 2000 system; agencies with seats in center then have access to request data. Want to expand the vision of OEC into state police, DOTD and DSS command centers with a mini server in each command post; so that disasters requiring multiple agency response can be better coordinated. In the future, OEP would like to interface with TMCs for real time traffic volume, speed data, traffic signal timing to help with evacuation planning / routing and return planning / routing. Also should have interface with DMS for evacuation routing instructions, directional lane messages, etc. Also need interface with RWIS, flood sensors	OEP, parishes, DOTD, DPSC, DSS, TMCs	Assist in designing, deploying, maintaining required interfaces
Rural Interstate Locations		
Emergency motorist aid call boxes are located on some Interstate segments, providing motorists in remote areas with a direct connection to Louisiana State Police Dispatch. The LSP also operates a toll free statewide cellular emergency service which can be accessed by dialing *LSP. Permanent DMS installations are planned along the I-10 Corridor at fog-prone locations including Atchafalaya, Bonne Carre, Twin Spans, and at I-310 at La Branche and I-55 at Manchac. Three weather stations, nine DMS, 48 dynamic speed limit signs and associated communications will be installed in May of 2000 to reduce the potential for accidents resulting from fog-related visibility reductions.		

Implementation Type / General Capabilities	Need for Info Sharing	State Role (as identified by local jurisdiction)
Commercial Vehicle Operations		
The DOTD is installing weigh-in-motion (WIM) scales at the Baptist and Greenwood Ports of Entry, on I-12 and I-20, respectively. WIM scales are also programmed for the Delta port on I-20 and the Toomey port on I-10. WIM scales and AVI readers, enabling port officers to electronically verify credential and safety status, are being installed at the Breaux Bridge Port on I-10. Other planned ITS/CVO initiatives are described in detail in the Louisiana CVO/ITS Business Plan. Additional projects identified since completion of ITS/CVO Plan are described in Section 4.0		DOTD to install, operate WIMs and associated AVI.

4.0 Strategy for Addressing ITS Needs

This Chapter defines the program of projects that was developed to address Louisiana's ITS needs. The basic program components are described in Section 4.1. Each of the program elements is then described in more detail in Sections 4.2 through 4.6. Sections 4.2 through 4.6 include a summary of the project background and purpose, time frame, equipment needs, cost estimates, and benefits summary. The lead and supporting agencies are also identified.

4.1 Program Framework

Louisiana's ITS program includes process-based and technology-based initiatives to improve the operations and management of the state's surface transportation system. These initiatives fall into five general program area categories, designed to meet specific needs identified through plan reviews, stakeholder interviews and ITS Steering Committee input. The program areas are as follows:

- ***Organizational improvements*** – Organizational improvements include developing the organizational infrastructure required to position the state to capitalize on opportunities brought about by the technological change associated with ITS.
- ***Operational improvements*** – Operational improvements include such initiatives as policy direction for coordinated control among state and locally owned signal systems within jurisdictional / travel-shed boundaries; policy direction for emergency response protocols among multiple jurisdictions, etc. The Plan identifies the need for such operational improvements and outlines an action plan for their design and implementation.
- ***Interjurisdictional / interagency information sharing*** – One of the key benefits of ITS is the ability to share information collected by one device, system, agency or service provider with other users. For example, real time traffic data collected by one transportation management agency for use in signal timing or incident management, could be relayed and used by another agency up the road in an advanced traveler information system to warn traffic of upcoming congestion and recommend alternative travel routes. The Plan identifies current and potential future information sharing needs among agencies / jurisdictions and defines the regional architecture, backbone communications systems and regional technology agreements required to accommodate these needs.
- ***Support for local ITS initiatives*** – New Orleans, Baton Rouge, Lafayette and Shreveport are developing or planning to develop traffic management centers to assist in management and operation of their urban freeway and arterial systems. Other urban areas may elect to develop similar centers in the future. Urban and rural transit providers within the state are considering implementation of a variety of ITS initiatives to assist in improving transit operations and management. A variety of other local ITS initiatives are planned or underway.

4.0 Strategy for Addressing ITS Needs

The Plan outlines the state's role in supporting and, in some cases, participating in, planning, development, funding, management and operation of these local initiatives.

- ***Specific ITS initiatives to address identified needs*** – Early deployment studies along the I-10 Corridor, other state and local transportation plans and a series of key contact interviews identified specific safety problems and other transportation needs of statewide significance which lend themselves to ITS solutions. The Plan identifies a series of specific ITS projects to address these needs.

A package of Recommended Improvement Projects, or RIPs, was developed to implement each of the program areas. Exhibit 4.1, below, presents the RIPs, their component projects and the priority ranking of the projects. Priority rankings were established by taking into account funding opportunities, projected timing and funding availability for related projects being implemented outside of the purview of the state ITS Plan, and needs expressed by stakeholders.

Exhibit 4-1. Recommended Improvement Packages

Recommended Improvement Package / Component Projects	Rank
1. 0 Organizational Improvements	
1.1 Create ITS Unit within DOTD	1
1.2 Create an Ongoing ITS Advisory Council	1
1.3 Develop a Statewide ITS Implementation Plan	1
2. 0 Operational Improvements	
2.1 Coordinated signal control	1
2.2 Emergency response protocols	2
2.3 Conduct corridor studies similar to the I-10 Corridor Early Deployment Study for I-49, I-12 and I-20	2
3.0 Promote Appropriate Interjurisdictional / Interagency Information Sharing	
3.1 Develop statewide architecture to guide system integration	1
3.2 Develop ongoing process for addressing future integration needs	1
3.3 Develop the backbone communications system and wide	1

Recommended Improvement Package / Component Projects	Rank
area network required to link TMCs, DMS, incident management systems, OEP, etc.	
3.4 Regional Technology Agreements	1
4. 0 Support for Local ITS Initiatives	
4.1 Define state role in local TMCs	1
4.2 Provide logistical and, in some circumstances, financial, support for local initiatives that foster state goals toward encouraging use / supporting operation of alternative modes of transportation	2
5. 0 Specific ITS Deployment Projects to Address Identified Needs	
5.1 Incident Management	
5.1.1 Motorist Assistance Patrols (MAPs)	1
5.1.2 Incident Response Plans	1
5.1.3 Construction Work Zone Traffic and Incident Management	1
5.1.3 Deploy Traffic and Incident Management Systems in Urban Areas	2
5.1.4 Regional Traffic and Incident Management Systems	1
5.2 Site-Specific Safety Warning Systems Using ITS	
5.2.1 Install Safety Warning Systems at the Following Locations: • I-10 at Calcasieu River (Lake Charles) • Ponchartrain Expressway at Tchoupitoulas St. (New Orleans) • I-10 at Inner Harbour Navigation Canal (New Orleans)	1
5.3 Road Weather Information Systems (RWIS)	
5.3.1 Fog Warning Systems along the Atchafalaya Spillway, Bonne Carre Spillway and New Orleans Twin Span Over Lake Ponchartrain	1
5.3.2 Flood Warning Systems at Key Locations	2

Recommended Improvement Package / Component Projects	Rank
5.4 Corridor-wide Advanced Traveler Information Systems	
5.4.1 Regional Advanced Traveler Information Systems	3
5.5 Application of ITS Technologies to Emergency Management / Emergency Evacuation Functions	
5.5.1 ITS Emergency Management / Emergency Evacuation Plan	1
5.5.2 ITS Emergency Management / Emergency Evacuation Plan Implementation	2

Each of the Recommended Improvement Packages is described in more detail below. Each of the project descriptions includes an assessment of:

- *Background and project purpose* - Describing the project, the need for the project and the expected outcome;
- *Time frame* - Indicating whether the project is near-term (0-5 years) or mid-term (5-10 years);
- *Implementation requirements* – Actions needed to deploy the project.
- *Responsibilities* - Identifying the lead agency with implementation, maintenance and operating responsibilities. In some cases, the lead agency for deployment may differ from the agency with operations and maintenance responsibilities.
- *Equipment* – Indicating the types of equipment required to deploy the project.
- *Project phasing* – For multi-phase projects, provides overview of implementation time-frame and outlines dependencies among phases / projects.
- *Project cost* – Provides an estimate of project funding requirements, where such requirements can currently be assessed. Proposed funding sources are identified in Exhibit 4-1.
- *Project benefits* – Defines nature of benefits expected as a result of project implementation.
- *User services and market packages* – Identifies the user services addressed by each project and the market packages that may be employed in project implementation.

4.2 Organizational Improvements

4.2.1 Create ITS Unit within DOTD

Background / Purpose: A number of states have established ITS or transportation technology groups within the state DOT structure. Typically, these groups are responsible for a variety of traffic management activities such as the state's rural ITS

program; freeway management in major metropolitan areas; and installation, operation and maintenance of variable message signs, road weather information systems and advanced traveler information systems in urban and rural areas. Typically, these units were established to ensure that traffic operations and traffic management are given on a high priority within the DOT organization. By establishing a specific ITS or transportation technology unit, states also ensure that a core group of DOT employees is tasked with developing and maintaining the knowledge and expertise required to appropriately integrate ITS technologies into state and local transportation improvement efforts on a coordinated, routine basis.

Louisiana is proposing to develop an ITS Unit within the DOTD. The purpose of this effort is consistent with the rationale provided by other states who have undertaken similar efforts, as described below:

- To direct DOTD resources toward operational issues and ensure that safe and efficient traffic operations – a very high priority with transportation system users – is a key consideration in DOTD policy and program development / implementation decisions;
- To ensure that ITS is consistently integrated into DOTD planning and project development efforts;
- To manage and oversee interagency / interjurisdictional systems and applications integration;
- To provide information, guidance, coordination, financial and other support to state and local ITS planning and deployment efforts;
- To provide a coordinated liaison with OEP, DPSC, local traffic management organizations and other service providers in order to effectively manage interagency partnerships and projects;
- To maximize the potential to leverage state and local resources through ITS-related information and infrastructure sharing;
- To task a core group of DOTD employees with developing an ongoing awareness and understanding of ITS applications nationally, coupled with an ongoing evaluation of their applicability to specific problems and issues in Louisiana;

- To identify and track ITS projects throughout Louisiana and neighboring states to maximize opportunities to leverage existing and planned investments;
- To ensure that state and local ITS efforts comply with the national architecture and standards; and
- To work with DOTD District offices and local traffic management organizations to identify the appropriate state role in TMCs and other locally-sponsored ITS projects as they are designed and deployed.

Time Frame: Near term.

Implementation Requirements: Formation of an ITS Unit requires:

- DOTD management approval and funding of this new section.

It is recommended that the section initially include four positions. The ITS Engineer manager is already onboard at the DOTD. A System Design Engineer ad two ITS Technicians have been requested for the July 2000 budget cycle. Other positions will be requested as additional projects are brought online.

Responsibilities: DOTD.

Equipment: N/A.

Equipment Locations: N/A.

Phasing: Initially, this unit will include one staff person, with expansion to three full-time staff in July of 2000. Additional staffing needs will be addressed as additional projects are brought online.

Project Cost: Costs to add the System Design Engineer and two technicians are estimated at $200,000. Cost to expand the ITS Unit further will be determined as the Unit and its responsibilities evolve.

Project Benefits: Development of a distinct ITS Unit within the DOTD will improve the DOTD's ability to effectively manage urban and rural traffic operations; ensure that state and local ITS resources are leveraged to the maximum extent possible by

managing and integrating deployments undertaken by a variety of transportation service providers; and help the state meet federal mandates regarding architectural consistency among ITS applications.

User Services: Potentially supports all User Services.

Market Packages: Potentially supports all Market Packages.

4.2.2 Establish an Ongoing Advisory Council

Background / Purpose: This Plan identifies a number of projects that will require development of operating agreements, technology agreements, etc. The Plan also stipulates that the ITS Unit will track state and local ITS projects, identify and accommodate future ITS system and application integration needs and undertake a variety of other activities which require routine coordination with a broad base of stakeholders. This project will establish an ongoing ITS Committee, made up of appropriate state agencies such as DOTD, DPSC, OEP and others, MPOs, local transportation management organizations, emergency service providers, marine ports, toll authorities, the Causeway Commission, LMTA and other stakeholders.

The ITS Working Group will provide a multi-agency forum for discussion and resolution of ITS planning and implementation issues. The role of the Working Group is to bring together affected agencies and other stakeholders on a routine basis to maximize opportunities for cost sharing, infrastructure sharing, information sharing, coordinated implementation and to ensure that the needs of multiple stakeholders are considered in all implementation activities.

To assist in planning for and deploying the state's ITS program, a series of subcommittees will be appointed to address specialized needs such as development of regional technology agreements, operating agreements for signal coordination, emergency response communications protocols, etc.

Time Frame: Near term

Implementation Requirements: Identify stakeholders who should be involved in the ongoing coordination and obtain commitments for participation.

Responsibilities: The DOTD's ITS Unit will lead formation and management of the ITS Advisory Council.

Equipment: N/A.

Equipment Locations: N/A.

Phasing: The ITS Advisory Council is an ongoing activity, to be initiated in the near term, as part of the tasks listed under Program Area 2 in Exhibit 4-1 (which can be found at the end of this section).

Project Cost: This is a low cost undertaking, consisting primarily of Advisory Council staff time.

Project Benefits: Ongoing coordination of deployment activities; encourages interoperability among systems and applications; maximizes potential to leverage state and local resources.

User Services: Potentially supports all User Services.

Market Packages: Potentially supports all Market Packages.

4.2.3 Develop Statewide ITS Implementation Plan

Background / Purpose: The ITS Business Plan identifies a series of ITS projects to be undertaken by the state. The ITS Implementation Plan will document strategies, methods and agreements by which the Business Plan will be implemented.

Time Frame: Near term

Implementation Requirements:

- Identify Implementation Plan requirements.
- Develop Implementation Plan RFP.
- Procure consultant services for Implementation Plan

Responsibilities: The DOTD's ITS Unit will lead the Implementation Planning Process.

Equipment: N/A.

Equipment Locations: N/A.

Phasing: The Plan will be undertaken in FY 2000.

Project Cost: Costs of preparing and finalizing the Plan are estimated at $300,000.

Project Benefits: Ensure coordinated, integrated deployment of the projects outlined in the ITS Business Plan.

User Services: Potentially supports all User Services.

Market Packages: Potentially supports all Market Packages.

4.3 Operational Improvements

4.3.1 Coordinated Signal Control

Background / Purpose: Freeway systems in some urban areas such as New Orleans consist of routes crossing multiple jurisdictions with a variety of arterial signal control systems. This situation presents significant problems in providing traffic control and traffic control information. This can present problems during any congested period, but is particularly problematic in the event of a freeway incident requiring rerouting of traffic to arterials.

This project would create a working group among the affected jurisdictions and DOTD to develop and implement an acceptable process for coordinated arterial signal control across jurisdictional boundaries and in the event of a freeway incident requiring rerouting of traffic to arterials.

Time Frame: Near term.

Implementation Requirements: This project requires:

- Identification of affected traffic management agencies

- Establishment of an ITS Advisory Council Signal Coordination Subcommittee
- Establishment of appropriate formal arrangements to share traffic control information
- Establishment of a formal process for coordinated control of traffic signal operations across jurisdictions (this process may vary from jurisdiction to jurisdiction, depending on institutional factors)
- Development of appropriate timing plans

A second phase of this project, not addressed here, would include implementation of the agreements developed through the working group. Depending upon the various agreements reached, traffic signal timing patterns may be executed in response to pre-established time-of-day, special events or incident-based plans, based on historical traffic conditions, or may be executed in response to real-time traffic conditions using traffic-adaptive algorithms. Further, signal timing plans may be implemented by the local traffic management organization or by a central control authority such as the DOTD.

Responsibilities: The DOTD will lead the coordinated signal control effort, with the support of affected local traffic management organizations through the ITS Advisory Council.

Equipment: To be determined based on operating agreements to be developed in Phase 1 of this initiative.

Equipment Locations: To be determined based on operating agreements to be developed in Phase 1 of this initiative.

Phasing: Phase 1 will be initiated in FY 2000. Phase 2, implementation, will be initiated following development of operating agreements.

Project Cost: Phase 1 costs will be low and will consist primarily of staff time to develop agreements. Phase 2 costs will depend upon the hardware and software modifications required to implement the agreements.

Project Benefits: Coordination of signal timing across jurisdictional boundaries would provide significant improvement in time-

of-day and event-related traffic management capabilities, and would improve incident response time for emergency service providers. Over time, assuming the state and local jurisdictions migrate toward incorporation of traffic-adaptive algorithms and automated signal timing adjustments, later phases of the project could result in decreased potential for freeway and arterial congestion under any conditions.

User Services:

- Traffic Control
- Incident Management
- Demand Management and Operations

Market Packages: To be determined upon completion of Phase 1.

4.3.2 Emergency Response Protocols

Background / Purpose: In metropolitan and some rural areas, calls for emergency assistance may initially come in to one agency, when another agency is actually the appropriate service provider. Uniform protocols for identifying the appropriate response agency and directing the request for service to that agency do not presently exist. This project would form a working group with responsibility for developing coordinated emergency response protocols, resulting in formal operating agreements / implementation recommendations.

Phase 2 of this project, not addressed here, would include implementation of the recommended protocols.

Time Frame: Near term.

Implementation Requirements: This project requires formation of a working group of associations representing law enforcement and other types of emergency service providers at the parish and local level. The OEP and Louisiana State Police already have such protocols in place. It is recommended that the working group pattern its protocols on the successful models already in place at the state level.

Responsibilities: The Louisiana State Police (LSP) would lead this effort, with support from associations representing local law enforcement and other emergency service providers.

Equipment: To be determined based on requirements of protocols developed.

Equipment Locations: N/A.

Phasing: Phase 1 will be undertaken in the near term, In FY 2001, as part of the Initial tasks outlined under Program Area 1 in Exhibit 4-1. Phase 2, implementation, will be initiated after development of the coordinated protocols as part of the Programmed tasks listed under Program Area 2 in Exhibit 4-1.

Project Cost: Phase 1 is a low cost undertaking, consisting primarily of staff time of working group members. The costs of Phase 2 are dependent upon the protocols developed and the hardware and software required to implement these protocols.

Project Benefits: Project benefits include improving emergency response time and improving coordination among emergency service providers.

User Services: - Emergency Vehicle Management

Market Packages: - Emergency Response

4.3.3 Corridor Studies / Early Deployment Plans

Background / Purpose: The recently completed I-10 Corridor ITS Early Deployment Study provides a detailed analyses of ITS user needs within the I-10 Corridor from New Orleans to San Antonio, Texas. The study identifies location-specific ITS projects designed to address specific safety problems, congestion problems and related general and CVO traffic information needs. The study used a highly successful research approach including:

- Literature review;
- Interviews with government and industry officials from agencies involved in transportation and freight movement within the corridor;
- Interviews with commercial vehicle drivers and dispatchers operating in the I-10 Corridor;
- Corridor safety analysis.

The DOTD will undertake similar studies for the I-49, I-12 / I-10 east of New Orleans, and I-20 corridors, potentially in association with neighboring states such as Texas and Mississippi. The studies will identify location-specific problems which limit the safety and / or efficiency of people and goods movement within the corridor and identify appropriate ITS solutions to improve highway safety and reduce congestion and congestion-related delay.

Time Frame: Mid-term.

Requirements: Development of the corridor studies will require:

- Working with the states of Texas and Mississippi to determine the level of interest in funding one or more joint projects.
- Develop appropriate management and funding agreements among participating states.
- Define project boundaries for each corridor.
- Determine the priority order for undertaking the corridor studies.
- Define special needs within each corridor which may require a different approach from that used in the I-10 study.
- Develop management team / steering committee for each corridor.
- Procure consultant services for study.

Responsibilities: The DOTD ITS Unit will lead Louisiana's participation in the corridor analysis effort.

Equipment: N/A.

Equipment Locations: N/A

Phasing: The corridor studies / Early Deployment Plans would be undertaken as part of the state's CVO / CVISN deployment planning efforts, beginning in FY 2003.

Project Cost: Total project cost - $900,000; each study is estimated to cost $250,000 to $300,000. Louisiana's share of total project cost will depend on the nature and extent of other

states' participation, but could range from $300,000 to $600,000.

Project Benefits: The I-10 Corridor Study provided a very cost effective means of identifying significant safety and congestion-cost problems at specific I-10 locations, and defining low and moderate cost ITS solutions to address these problems.

User Services: Corridor study recommendations will potentially support a variety of user services.

Market Packages: Corridor study recommendations will potentially support a variety of market packages.

4.4 Interjurisdictional / Interagency Information Sharing

4.4.1 Statewide Architecture

The statewide architecture, developed to be consistent with the national ITS architecture, is detailed in Section 5 of this report.

4.4.2 Ongoing Process to Address Future Integration Needs

Background / Purpose: ITS systems are most successful when integrated to allow information sharing between appropriate jurisdictions, applications and systems. This Plan identifies and accommodates specific integration needs based on current needs and existing and planned ITS applications. However, the ITS Steering Committee recognizes that needs will change over time, and systems, technologies and applications will evolve, requiring a process and institutional framework that allows for ongoing evaluation of integration needs and refinement / expansion of system and application interfaces. This project will define and institutionalize that process.

Time Frame: Near term

Implementation Requirements: The ITS Advisory Council will define a routine and / or event-driven meeting schedule to discuss integration needs, reporting requirements to ensure that the group is aware of upcoming ITS implementation activities at both the state and local level, an evaluation process for defining new

integration / interface needs and an implementation process.

Responsibilities: The DOTD ITS Unit will lead this effort.

Equipment: Hardware and software requirements to achieve identified integration needs will be determined on an on-going basis.

Equipment Locations: N/A.

Phasing: This effort will be initiated in the near-term as part of Program Area 3, Operations and Maintenance as defined in Exhibit 4-1.

Project Cost: System integration costs for the New Orleans and Baton Rouge centers are estimated at $2 and $3 million, respectively. Integration costs associated with other local, DOTD District, OEP, and other installations are included under Program Area 4, Future Tasks, in Exhibit 4-1.

Project Benefits: This project maximizes the potential for appropriate information sharing among agencies, systems and jurisdictions. Electronic data exchange provides opportunities for multiple agencies, jurisdictions and systems to utilize information for improved traffic management, transit management, emergency response, and traveler information services.

User Services: Potentially supports all User Services.

Market Packages: Potentially supports all Market Packages.

4.4.3 Communications Backbone

Background / Purpose: Information exchange between devices, systems, jurisdictions and agencies, requires a combination of communication technologies. Fiber optics will be utilized as the baseline truck medium for voice, data and video communications along major portions of the interstate system, connecting all DOTD district offices and TMCs, and may ultimately be installed on some major arterials. A 75 MHz wireless system is proposed for the communications backup.

	The state is negotiating with private sector providers to install the fiber optic at the provider's cost, trading the value of the right of way for dedicated capacity on the fiber optic system. Four franchise agreements are in place. Three additional agreements are required for full interstate coverage.
Time Frame:	Near term, with expansions over mid and long-term.
Implementation Requirements:	- Develop a Communications Plan to guide installation of fiber, and identify associated equipment needs - Oversee installation of fiber, empty and spare conduit as negotiated - Negotiate contract and contract for installation for three additional interstate segments to provide full coverage - Design statewide network and local networks
Responsibilities:	DOTD's communication section will manage design, installation and maintenance of the communications system, with ongoing input from the ITS Unit, TMC management organizations and others who will tie into the system.
Equipment:	The communications backbone will consist of empty conduit, spare conduit and eight dark fibers. Associated equipment required to establish ITS communications will be provided as part of specific deployment projects.
Equipment Locations:	Existing franchise agreements cover 110 miles of I-20 from Shreveport to Monroe, the 200 mile I-49 corridor from Lafayette to Shreveport, and 220 miles along I-10 from Lake Charles to New Orleans. Additional agreements are being developed to provide full coverage for the I-10 corridor and other major interstate corridors in the state.
Phasing:	The telecommunications system design will be initiated in FY 2000.
Project Cost:	Costs of the telecommunications system design are estimated at $200,000. Costs to light the dark fiber to meet

the state's initial communications requirements are estimated at $3.5 million.

Project Benefits: The fiber optics backbone provides long-haul voice, video and data connectivity among DOTD District offices and between District offices ITS centers such as TMCs.

User Services: Potentially supports all User Services.

Market Packages: Potentially supports all Market Packages.

4.4.4 Regional Technology Agreements

Background / Purpose: Regional Technology Agreements provide a mechanism for ensuring consistency among technologies, standards and deployment choices with regional significance such as communications infrastructure, electronic fare media, etc. This project will develop an ongoing process to identify the need for and implement such agreements among regional stakeholders.

Time Frame: Near term.

Implementation Requirements: The Advisory Council's Integration Working Group will be responsible for development and implementation of Regional Technology Agreements.

Responsibilities: The DOTD's ITS Unit and the Integration Working Group, will implement this project.

Equipment: N/A.

Equipment Locations: N/A.

Phasing: The need for Regional Technology Agreements will be a topic of discussion at scheduled ITS Advisory Council meetings. Implementation of Regional Technology Agreements may require hardware or software acquisitions or modifications which will be undertaken according to the requirements of the negotiated agreements.

Project Cost: Development of the agreements is a low cost initiative, consisting primarily of staff time of Integration Working Group members. Implementation costs will vary based on specific requirements, and are included under Program Area 3 – Operations and Maintenance, in Exhibit 4-1.

Project Benefits: Regional Technology Agreements for key shared infrastructure components ensure interoperability among systems, applications and jurisdictions.

User Services: Potentially supports all User Services.

Market Packages: Potentially supports all Market Packages.

4.5 Support for Local ITS Initiatives

4.5.1 Define State Role in Urban TMCs

Background / Purpose: Traditionally, the DOTD has been responsible for freeway closures and restrictions. With the development of urban traffic management or traffic operations centers, local governments may take a more active role in urban freeway traffic management. This two-phase project would clearly define the state's role in urban freeway management and urban TMCs, on a case-by-case basis.

It is anticipated that the City Parish will operate the Baton Rouge and planned Lafayette TMCs and DOTD District offices will house the New Orleans and Shreveport TMCs.

Time Frame: Near term.

Implementation Requirements: Develop operating agreements among the agencies participating in the Baton Rouge and New Orleans TMCs, spelling out ownership, management, operations and maintenance responsibilities, policies and procedures for the various TMC systems and applications. These agreements will serve as models for other TMCs throughout the state.

As additional TMCs are deployed in other urban areas, such as Shreveport and Lafayette, develop similar operating agreements with the involved agencies.

Responsibilities: DOTD's ITS Unit will lead this effort.

Equipment: N/A.

Equipment Locations: N/A.

Phasing: The first phase of this project will involve working with the agencies participating in development and implementation of the New Orleans and Baton Rouge TMCs to develop clear operating agreements to serve as models for future installations.

The second phase would involve working with agencies participating in the development of other TMCs, signal control systems throughout the state to develop similar agreements.

Project Cost: This is a low cost undertaking, consisting primarily of agency staff time.

Project Benefits: These agreements will clearly spell out each agencies' responsibilities and the systems / activities under their control.

User Services: Potentially supports all Travel and Traffic Management User Service areas.

Market Packages: Potentially supports all Advanced Traffic Management System (ATMS) market packages.

4.5.2 Support Operation of Alternative Transportation Modes

Background / Purpose: Promote more efficient modal utilization by providing logistical support, coordination of multi-agency efforts and, potentially, financial support for local transit-related initiatives such as:

- Signal priorities for HOVs and transit vehicles in high volume transit HOV corridors.

- Improved communications / dispatch capabilities for rural and specialized transit agencies.
- Use of smart cards or swipe/storage cards to improve transit service and transit fare collection.
- Provision of real-time transit information via signage proximate to park-n-rides.
- Information dissemination re: transit availability, routing, stop and scheduling information.
- Use of GIS and AVI/AVL technologies to enhance communication and dispatch.

Time Frame: Mid term

Implementation Requirements: As local transit agencies evaluate the costs and benefits of undertaking these types of efforts, the DOTD's ITS Unit will provide a project management team representative to provide advice, guidance and evaluate agency and / or consultant studies and recommendations. The DOTD's ITS Unit will also determine the appropriate state role, if any, in implementing or funding these initiatives according to the process defined in RIP 4.5.2.

Responsibilities: DOTD's ITS Unit, working with local transit providers.

Equipment: N/A

Equipment Locations: N/A

Phasing: As requested by transit providers.

Project Cost: Advice and guidance are low cost efforts, consisting primarily of ITS Unit staff time. State investment in capital costs would be determined on a case by case basis.

Project Benefits: Encourage use of alternative travel modes and enhance rural mobility.

User Services:
- Public Transportation Management
- En-route Transit Information
- Electronic Payment Services

Market Packages:
- Transit Vehicle tracking
- Transit Passenger and Fare Management
- Multi-modal Coordination
- Transit traveler Information
- HOV lane Management

4.6 Specific ITS Technology Deployment Projects

4.6.1 Incident Management

Three specific incident management projects are recommended for implementation as detailed below.

4.6.1.1 Motorist Assistance Patrols (MAPS)

Background / Purpose: The DOTD is currently funding operation of motorist assistance patrols in urban interstate construction areas to reduce congestion and delays related to minor traffic incidents, stalled vehicles, etc. This project would continue and expand these operations.

Time Frame: Near term

Implementation Requirements: Implementation of this project will require the following:
- Identify interstate segments with significant peak-hour congestion
- Develop prioritization criteria and prioritize high volume interstate corridors statewide
- Prepare implementation plan including hours of operation, expenditures, sources of funds for project implementation
- Program in STIP and MPO Transportation Improvement Program(s) (TIPs) for permanent continuation of MAPs throughout the state

Responsibilities: The DOTD ITS Unit will manage this project, including planning and implementation.

Equipment: Contract operators will be required for each MAPs location.

Equipment Locations: High volume / highly congested urban interstate segments. Specific locations to be identified in the MAPs Implementation Plan.

Phasing: Develop implementation plan in FY 2000.

Project Cost: Approximately $37,000 per mile for a one-year program period, assuming the MAP runs 12 hours per day, five days per week.

Project Benefits: Significantly reduces congestion, improves safety in construction zones and during peak traffic periods in areas of recurring congestion.

User Services: Supports Incident Management

Market Packages: Supports incident Management System, although does not necessarily rely on associated equipment packages.

4.6.1.2 Incident Response Plans

Background / Purpose: Much of the non-recurring congestion on Louisiana highways is incident-related. Even minor incidents can cause major traffic delays, significantly reducing the efficiency of people and goods movements and increasing transportation costs. In addition, delay-related congestion can significantly compromise traffic safety and lead to additional accidents.

This project will result in development of coordinated incident response and management plans intended to reduce the extent and duration of incident-related congestion and resulting delay. In addition, this project will focus on developing incident response plans specifically for CVO incidents.

Time Frame: Near term

Implementation Requirements:

- Analyze accident and volume data for urban and rural interstate corridors to develop recommendations regarding candidate corridors for incident response plan implementation
- Analyze corridor land use data to identify corridor segments with potential high risk for hazardous materials-related incidents

- Prioritize high accident / high volume / high risk locations for incident response plan development
- Establish incident management subcommittee of ITS Advisory Council
- Consider consultant assistance to prepare incident response and detour plans
- Prepare plans to address issues such as procedures, jurisdictional issues, authority, coordination, agencies of first response, alternate routes and other details
- Develop plans to build upon and integrate with existing incident management activities

Responsibilities: The DOTD's ITS Unit and State Police will manage development of the incident response plans, working closely with the Incident Response subcommittee of the ITS Advisory Council.

Equipment: N/A

Equipment Locations: N/A

Phasing: Plans would be completed based on priority ranking.

Project Cost: Relatively low cost undertaking, consisting primarily of staff time.

Project Benefits: Reduce incident response time, thereby reducing incident-related congestion and safety hazards.

User Services: Incident Management

Market Packages: ITS Planning

4.6.1.3 Construction Work Zone Traffic and Incident Management

Background / Purpose: Construction work zones can present conditions which both increase the potential for incidents to occur and compound the incident management challenge. Construction work zones may result in limited travel lanes, less than optional merge conditions, low travel speeds and other factors which can increase congestion and reduce safety. The purpose of this project is to develop a deployment plan for utilizing portable ITS devices and

	communications to minimize congestion and improve traveler safety in and approaching construction work zones.
Time Frame:	Near term
Implementation Requirements:	- Identify requirements for effective Work Zone Incident Management Plan. - Develop RFP. - Procure consultant services for Plan development
Responsibilities:	The DOTD's ITS Unit and State Police will manage development of the Construction Work Zone incident response plan, working closely with the Incident Response subcommittee of the ITS Advisory Council.
Equipment:	The Plan will identify a set of equipment required to deploy more effective incident management activities in construction zones, potentially including CCTV cameras and dynamic message signs.
Equipment Locations:	N/A
Phasing:	Plans would be completed based on priority ranking.
Project Cost:	Relatively low cost undertaking, consisting primarily of staff time.
Project Benefits:	Reduce incident response time, thereby reducing incident-related congestion and safety hazards.
User Services:	Incident Management
Market Packages:	ITS Planning

4.6.1.4 Deploy Traffic and Incident Management Systems in Urban Areas

Background / Purpose:	By deploying automated traffic and incident management systems in urban areas, these areas will be able to build upon the incident detection and response capabilities already in place via motorist assistance patrols and incident response protocols established in the previous projects.

systems designed take into account the lessons learned from previous applications.

Responsibilities: DOTD's ITS Unit will lead this effort.

Equipment: To be determined on a case-by-case basis, but could include surveillance cameras, service patrols, free cellular phone to a dedicated number, communications linkages to provide real-time incident information to enforcement officers and emergency service providers in the field, potential for advanced CCTVs with built-in accident detection algorithms, in-lane detectors, DMS and closed loop signal synchronization.

Equipment Locations: To be determined on a case-by-case basis.

Phasing: Near term for Baton Rouge and New Orleans Centers. Mid to long-term as other metropolitan areas begin TMC planning.

Project Cost: The costs associated with traffic and incident management capabilities in New Orleans, Baton Rouge and other locations are detailed in Exhibit 4-1.

Project Benefits: Traffic and incident management systems have the potential to significantly reduce the extent and duration of recurring and non-recurring congestion and associated safety hazards.

User Services: Incident Management

Market Packages: Incident Management System

4.6.1.5 Regional Traffic and Incident Management Capabilities

Background / Purpose: Louisiana's interstates carry heavy through-traffic volumes. Interstate traffic safety and through-traffic mobility may benefit significantly by providing incident detection and incident / traffic management capabilities and related traveler information services on a regional basis.

Such systems could include:

- Providing DOTD District offices with capabilities to exchange information among existing traffic and

incident management systems as well as with agencies who do not have automated traffic / incident management capabilities in place, and with potential private sector partners such as incident clearing services.

- Sensors and cameras in key high accident segments of rural interstates, linked to existing TMCs, DOTD District offices and local emergency service provider workstations.
- Upgraded 911 systems, potentially including computer aided dispatch to the LSP's cellular 911 service.
- The ability to exchange information with the traveling public, to provide advance notification of congestion, lane-blocking incidents, related traffic data, information on alternate routes, expected duration of congestion, etc.

This project would consist of a planning project to ascertain the costs and benefits of implementing traffic and incident management systems on a regional or corridor-wide basis. The second phase would include implementation of the study results.

Time Frame: Near term for planning study. Mid term for implementation.

Implementation Requirements: The I-10 Corridor study outlines a detailed implementation plan for such a system within the I-10 corridor. Similar needs may exist along other Louisiana interstate corridors and will be evaluated in the course of conducting corridor studies for I-49, I-10 east of New Orleans / I-12, and I-20. Development of this project requires:

- Discussion with potential Texas, Mississippi partners to define level of interest in funding and managing a multi-state regional incident management system(s) feasibility study.
- Development of interstate MOUs for planning study .
- Obtain funding for regional traffic and incident management planning.

- Complete Plan, which would include an assessment of existing and planned resources and systems, stakeholder needs assessment, short and long-term strategies for meeting stakeholder needs; recommendations for implementation, including costs and responsibilities.
- Upon acceptance of Plan, draft MOUs among participating agencies outlining responsibilities, control processes, etc.
- Obtain project funding.
- Program projects and comply with TIP/STIP requirements

Responsibilities: The DOTD's ITS Unit will lead Louisiana's participation in project planning and will lead planning, design, implementation, operations and maintenance for implementation of this project, with the input of local incident management agencies, TMC operators, etc.

Equipment:

- Networked common data interface consisting of computer work stations, regional servers, hardware software interfaces to allow interfaces among centers / application / devices / systems; dedicated wide-area-network (WAN) between existing incident management systems
- CAD upgrades to the 911 system
- Cellular 911
- Dynamic message signs
- Highway Advisory Radio (HAR)
- Web sites displaying real-time traffic information

Equipment Locations: To be determined based on results of additional corridor analyses.

Phasing: FY 2003 – planning study. FY 2004-2005 – implementation.

Project Cost: Cost of the planning study is estimated at $150,000 per corridor, with costs shared among the participating states. Costs are included within the CVO/CVISN planning and deployment projects under Program Area 4 – Future Tasks in Exhibit 4-1.

Implementation costs will be estimated based on results of the feasibility study, but would likely exceed $1 million per corridor (Louisiana capital share only) for computer aided dispatch and DMS. The communications systems to link existing traffic and incident management could serve a variety of functions – incident management, emergency evacuation management, traffic control, etc. and is thus included in the basic integration costs included in Program Areas 2, 3 and 4 in Exhibit 4-1.

Project Benefits: Potential to significantly improve the productivity of people and goods movements and improve highway safety by reducing the time needed for incident response and traffic congestion clearance and providing advance notice to travelers of incidents, detour plans, estimated clear time, etc.

User Services:
- Incident Management
- Pre-Trip ravel Information
- En-route Driver Information

Market Packages:
- Incident Management System
- Regional traffic Control
- Freeway Control
- Network Surveillance
- Traffic Information Dissemination
- Interactive traveler Information

4.6.2 Site-Specific Safety Warning Systems

Background / Purpose: This project is designed to reduce accidents at specific I-10 locations caused by speed differential problems between commercial vehicles and passenger cars. The I-10 Corridor Study identified corridor locations with abnormally high accident characteristics involving commercial vehicles. Most of these accidents could be attributed to the significantly slower operating speed of trucks compared to other vehicles in the traffic stream. Other contributing factors included: sharp curves, steep grades on bridges, insufficient ramp length; level of traffic congestion; and large volumes of passenger cars in the stream.

Advance warning systems are recommended for implementation at three specific locations along I-10. Each site will incorporate traffic surveillance and monitoring capabilities, ramp metering for traffic control, dynamic message signs and highway advisory radio warning of slow moving traffic ahead and / or posting safe travel speed advisories and incident management capabilities. The purpose of this project is both to reduce the potential for accidents and to better manage incident response for those accidents that do occur.

Time Frame: FY 2003-2005.

Implementation Requirements:

- Obtain funding for site-specific analysis to conduct preliminary planning and conceptual design
- Develop conceptual plans and cost estimates detailing device location, system of sensors activating the DMS, standard DMS message sets, and detail links to area TMCs
- Coordinate with applicable TMCs to add specific high accident locations to those already monitored by the local TMC and to include segment in area incident management program.
- Obtain implementation funding
- Program in TIP/STIP
- Let projects

Responsibilities: DOTD's ITS Unit would manage project planning and deployment.

Equipment:
CCTV
Ramp metering
DMS
HAR
Associated communications, work stations

Equipment Locations:

- I-10 at Calcasieu River (Lake Charles)
- Ponchartrain Expressway at Tchoupitoulas St. (New Orleans)
- I-10 at Inner Harbor Navigation Canal (New Orleans)

Phasing: FY 2003 – analysis. FY 2005 – implementation.

Project Cost: $1.8 million, planning and implementation.

Project Benefits: Reduce accident rates, improve incident response time and incident-related congestion.

User Services:
- En-route Driver Information
- Traffic Control
- Incident Management

Market Packages:
- Network Surveillance
- Freeway Control
- Regional Traffic Control
- Traffic Information Dissemination
- Incident management

4.6.3 Fog-warning Systems

Background / Purpose: Fog is the primary weather-related issue affecting driving ability in Louisiana. Often, motorists traveling at freeway speeds find themselves moving from clear to foggy conditions with no advance warning. Rear-end accidents under these conditions are problematic. The portions of the state most affected by fog are located along the Atchafalaya Spillway, Bonnet Carre Spillway and New Orleans Twin Span over Lake Ponchartrain. Officials and drivers surveyed for the I-10 study indicated that advance knowledge of bad weather would better allow them to manage their trips and encourage them to be more cautious when approaching fog-bound areas.

The system uses visibility sensors and weather instrument stations to determine fog conditions. Loop detectors are installed in the highway to determine vehicle speeds. Data are transmitted to a local traffic control unit for processing. The system can function in an automatic or semi-automatic mode, with appropriate messages displayed on the associated DMS automatically or with operator input. Changeable speed limit signs also can be used to advise motorists of the suggested safe speeds ahead.

The intent is that the systems will dial up and can be controlled remotely from Baton Rouge, New Orleans or other locations as additional TMCs come on line..

Time Frame: Near term; systems scheduled for installation in FY 2000.

Implementation Requirements:
- Develop operating agreements with local agencies
- Complete installation

Responsibilities: DOTD's ITS Unit and the LSP will lead this effort.

Equipment: This project includes a total of 9 DMS installations, 3 weather stations and 48 dynamic speed advisory signs and communication links with existing TMCs.

Equipment Locations:
- I-10 at Atchafalaya Spillway
- I-10 at Bonne Carre Spillway
- I-10 at New Orleans Twin Span over Lake Ponchartrain
- I-55 at Manchac
- I-310 at La Branch

Phasing: Near term

Project Cost: $3.0 million, already programmed.

Project Benefits: Improved highway safety – advance knowledge of fog will allow travelers to better manage trips and use more caution when approaching affected areas, reducing crash rates in fog conditions.

User Services:
- Pre-trip Travel Information
- En-route Driver Information

Market Packages:
- Road Weather Information System
- Traffic Information Dissemination

4.6.4 Flood Warning Systems

Background / Purpose: Much of Louisiana's coastal area includes low-lying areas subject to flooding. When flooded, these areas present potential safety hazards. During evacuation efforts, advance knowledge of flooded roadway segments would assist emergency planners in directing traffic to alternate

routes, potentially saving lives and minimizing evacuation delays associated with out of direction travel and ad hoc rerouting.

This project would involve identification of key flood-prone locations along important evacuation routes, development of preliminary engineering for flood warning system installation, in association with DMS, HAR and communication links back to area TMCs and the state's Emergency Management Center, and implementation of the flood warning systems and associated project elements.

Time Frame: Near to mid term.

Implementation Requirements:

- Identify flood-prone locations on key evacuation routes.
- Develop a project steering committee with OEP, other hurricane emergency service providers and local TMC operating agency.
- Identify user requirements for flood warning system and associated communications to be used in hurricane evacuation management.
- Obtain funding for preliminary engineering.
- Conduct preliminary engineering to identify specific flood warning system locations, appropriate DMS locations, series of DMS message sets, requirements for linkages to TMCs, OEP's EMC, etc.
- Obtain funds for implementation.
- Let project.

Responsibilities: DOTD's ITS Unit, in association with the state's OEP would lead this effort.

Equipment: Flood sensors, DMS, HAR, associated communications.

Equipment Locations: To be determined in preliminary engineering.

Phasing: Study – near term. Implementation – near to mid term, as funding is available.

Project Cost: Depends on number of installations.

Project Benefits: This project could increase traveler safety during hurricane or other emergency evacuations, could reduce delay and out of direction travel during emergency evacuations and can help OEP in tracking / describing cross-winds.

User Services:
- Pre-Trip Travel Information
- En-route Driver Information
- Route Guidance
- Traffic Control

Market Packages:
- Road Weather Information Systems
- Traffic Information Dissemination
- ISP Route Guidance

4.6.5 Regional Advanced Traveler Information Systems

Background / Purpose: Louisiana's interstate users and local traffic management organizations have consistently expressed a need for advance information on highway congestion, lane blocking incidents, posted roads and bridges, real-time urban traffic information and other kinds of travel information. The I-10 Corridor Study resulted in a recommendation for deployment of this type of system along I-10, with a commercial driver and dispatcher Internet web site, displays at rest areas / truck stops and a traveler information center consisting of a Windows NT work station with a dedicated T1 Internet connection supporting the previous two elements. The work station would be developed with connectivity to relevant sources of traffic and incident information on a 24-hour basis.

This project would also evaluate recommendations of the I-20, I-49 and I-10 east/ I-12 corridor studies to determine if similar needs are identified in those corridors. Based on the needs and priorities identified, a regional advanced traveler information system will be designed and deployed.

Time Frame: Mid to long-term.

Implementation Requirements: This project requires the following actions:
- Evaluate results of other corridor studies
- If regional ATIS is deemed appropriate:
  - Identify funding for preliminary engineering

- Identify key participants – who will supply the information and who will use it
- Identify operating and maintenance requirements as related to local traffic management organizations, other states, private sector business sites, etc.
- Identify and explore potential for private sector participation. This could include businesses willing to allow installation of CCTV displays at their place of business and could extend to businesses willing to pay for installation and maintenance of displays at their place of business, and / or businesses, such as wreckers or repair services, who may be willing to share in installation and maintenance costs in return for display and / or web site advertising
- Develop operating agreements among stakeholders (public and private sector partners)
- Conduct preliminary engineering to identify locations for display installation, communications requirements for display and web site real-time traffic information
- Identify implementation funding
- Program project as required in TIP(s)/STIP
- Develop final designs and cost estimates and Let project

Responsibilities: DOTD's ITS Unit will lead this effort

Equipment: To be determined in preliminary and final design.

Equipment Locations: To be determined in preliminary and final design.

Phasing: Web-site development in conjunction with Baton Rouge, New Orleans and other near-term traffic and incident management system installations.
DMS, displays - mid term

Project Cost: Development costs for a web site to display real time traffic information are minimal, assuming the associated devices and communications are in place. O&M for the web site and displaying real time traffic information and associated information relay could require one FTE. Costs for installation of displays and associated communications is

- dependent upon the type of device used and the participation of the private sector in the initiative.

Project Benefits: Expected benefits include: increased commercial freight mobility, improved highway safety and decreased congestion and congestion-related incidents.

User Services:
- Pre-Trip Travel Information
- En-route Driver Information
- Route Guidance
- Traffic Control

Market Packages:
- Interactive traveler Information

4.6.6 Application of ITS Technologies to Emergency Services

4.6.6.1 ITS Emergency Management / Emergency Evacuation Plan

Background / Purpose: The Office of Emergency Preparedness (OEP) is the state organization responsible for coordinating and leading the state's emergency planning, evacuation and return efforts in association with hurricanes and other natural disasters. The OEP operates an Emergency Management Center (EMC) with seats for more than 20 state and federal agencies with related authority for delivery of emergency services.

The ITS Emergency Management / Emergency Evacuation Plan will identify opportunities to utilize ITS applications to improve planning for and coordination of emergency evacuation and return efforts. The Plan will identify the need for interfaces between the OEP's EMC and urban TMCs. It would also define requirements for information exchange and connectivity to provide OEP access to real-time traffic data to assist in timing decisions for opening/closing evacuation routes, staging evacuations and returns; DMS control protocols during hurricane or other emergency evacuations; and emergency traffic management efforts including signal control, reversible lane management and other functions.

Time Frame: Near term

Implementation Requirements:

- Obtain funding for investigating the feasibility of ITS applications in the emergency preparedness arena.
- Develop an ITS Emergency preparedness subcommittee within the ITS Advisory Council.
- Identify opportunities for applying ITS technologies to emergency preparedness efforts.
- Conduct a feasibility study / preliminary engineering or hire a consultant to conduct a feasibility study / preliminary engineering that explores the benefits, costs and outcomes of similar applications in other states, identifies system requirements, specialized back-up systems required to ensure functionality during high winds and flood conditions
- Develop recommendations for deployment, including recommended deployment locations, functionality, costs, etc. as part of preliminary engineering

Responsibilities: The DOTD's ITS Unit and the OEP will jointly manage this effort.

Equipment: N/A.

Equipment Locations: N/A.

Phasing: Near-term.

Project Cost: Study estimated at $250,000.

Project Benefits: ITS applications have the potential to significantly improve emergency preparedness functions by delivering real time traffic and RWIS information to the EMC and providing capabilities for the EMC to accomplish real time traffic control via DMS and other means. This study will enable the DOTD and OEP to define the types and locations of ITS applications which can be most cost-effectively integrated to improve emergency management activities.

User Services: Potentially supports multiple user services, including:

- Pre-trip Travel Information
- En-route Driver Information
- Route Guidance

- Traveler Services Information
- Traffic Control
- Incident Management
- Emergency Vehicle Management

Market Packages: - ITS Planning

4.6.6.1 ITS Emergency Management / Emergency Evacuation Plan Implementation

Background / Purpose: Implementation the program of projects outlined in the ITS Emergency Management Plan.

Time Frame: Mid to Long-term

Implementation Requirements:

- Develop operating agreements as required
- Obtain deployment funding
- Develop final designs and let contracts for deployment

Responsibilities: The DOTD's ITS Unit and the OEP will jointly manage this effort.

Equipment: To be determined based on study recommendations.

Equipment Locations: To be determined based on study recommendations.

Phasing: Study should be undertaken in the near-term. Implementation in the mid to long-term.

Project Cost: Study estimated at $250,000. Implementation estimated at $1 million or less, assuming that the effort is primarily related to integrating existing devices / systems (or devices systems to be installed as parts of other projects), rather than installing significant additional equipment.

Project Benefits: Expected result is improved evacuation and reentry procedures, ultimately increasing hourly throughput, decreasing the number of travelers who cannot evacuate and are forced to seek shelter.

User Services:

- Pre-trip Travel Information
- En-route Driver Information
- Route Guidance
- Traveler Services Information

- Traffic Control
- Incident Management
- Emergency Vehicle Management

Market Packages:

- ITS Planning
- Traffic Information Dissemination
- Regional Traffic Control
- Incident Management
- Road Weather Information System
- Interactive traveler Information
- ISP Based Route Guidance
- Multi-modal Coordination

5.0 Statewide ITS Architecture

5.1 Overview

In October 1998, the U.S. Department of Transportation issued the *Interim Guidance on Conformity with the National ITS Architecture and ITS Standards*[1]. This *Interim Guidance* is provided to assist agencies with meeting Section 5206 (e) of the Transportation Equity Act for the 21st Century (TEA-21). This section requires that Intelligent Transportation Systems (ITS) projects carried out using funds made available by the Highway Trust Fund conform to the National ITS Architecture, applicable or provisional standards, and protocols. Included with the *Interim Guidance* is a recommended approach to ensure that ITS projects meet the legislative intent.

The approach includes the development of a "regional" ITS architecture. The ITS Architecture provides a framework for ITS project development and design. The ITS architecture should be tailored to address specific statewide needs. For this effort, the interests of DOTD for the entire state are considered in the development of the statewide ITS architecture.

The statewide ITS architecture builds from the previous activities in the development of the Louisiana ITS Plan. The architecture is based upon the identification of user services, identified transportation needs and the existing and planned ITS enhancements. Using the National ITS Architecture as a tool, the statewide ITS architecture was developed to serve as a high-level template for ITS project development and design. The ITS architecture includes subsystems, terminators, and information flows relevant to the state. These elements are defined as[2]:

- **Subsystem** - A physical entity within ITS architecture within which ITS functions reside. Subsystems are typically associated with one or more transportation agencies or stakeholders. Examples of subsystems from the National ITS Architecture include traffic management, transit management, fleet and freight management, toll administration, emergency management, information service provider, roadway, remote traveler support, and vehicle.
- **Terminators** define the boundary of the National ITS Architecture. The terminators represent the people, systems, and general environment that interface to ITS. The interfaces between terminators and the subsystems and processes within the National ITS Architecture is defined, but no functional requirements are allocated to terminators.

[1] U.S. Department of Transportation, "Interim Guidance on Conformity with the National ITS Architecture and Standards", October 22, 1998.
[2] ibid.

- **Information (Architecture) Flow** - A representation of data that originates at one subsystem (or external system) and ends at another within the National ITS Architecture or a regional ITS architecture, depicting the information exchanges planned between specific agencies. The National ITS Architecture documentation refers to these information flows as physical architecture flows.

This section describes the process that was employed to develop the statewide ITS architecture for Louisiana, presents the architecture, and identifies technical and operational issues for consideration during the detailed planning and design of ITS applications.

5.2 Development Approach

The National ITS Architecture provides multiple paths for the development of an ITS architecture. One common approach is to map transportation needs to user services. The results of mapping needs to user services is documented in Section 3 of the plan. The National ITS Architecture then provides the tools to trace the user services to the required subsystems and architecture flows.

To provide a comprehensive crosscheck, a second approach to developing the statewide ITS architecture was used. This involves reviewing market packages to determine what types of services should be provided. Market packages provide a deployment-oriented perspective to the National Architecture. They are tailored to fit real world transportation problems and needs. Market packages identify the pieces of the physical architecture that are required to implement a particular transportation service and the architecture flows that connect them and other important external systems[3]. A workshop with the ITS Steering Committee was conducted to determine which of the 64 market packages was most appropriate for deployment by the DOTD. The results of this review are shown in the following table:

Exhibit 5-1. Market Packages Review Results

Market Package Label	Market Package Name	LA ITS Plan	DOTD Role
AD1	ITS Data Mart	No	None
AD2	ITS Data Warehouse	Future	Lead
AD3	ITS Virtual Data Warehouse	Future	Lead
APTS1	Transit Vehicle Tracking	Advisory	Advisory
APTS2	Transit Fixed-Route Operations	Advisory	Advisory

[3] U.S. DOT, National ITS Architecture, Version 2.3, September, 1999, http://www.odetics.com/itsarch/

Market Package Label	Market Package Name	LA ITS Plan	DOTD Role
APTS3	Demand Response Transit Operations	Advisory	Advisory
APTS4	Transit Passenger and Fare Management	Advisory	Advisory
APTS5	Transit Security	Advisory	Advisory
APTS6	Transit Maintenance	Advisory	Advisory
APTS7	Multi-modal Coordination	Yes	Coordination
APTS8	Transit Traveler Information	Advisory	Advisory
ATIS1	Broadcast Traveler Information	Yes	Lead on State Network
ATIS2	Interactive Traveler Information	Yes	Lead on public kiosks
ATIS3	Autonomous Route Guidance	No	Private sector lead
ATIS4	Dynamic Route Guidance	No	Private sector lead
ATIS5	ISP Based Route Guidance	No	Private sector lead
ATIS6	Integrated Transportation Management/Route Guidance	No	Private sector lead
ATIS7	Yellow Pages and Reservation	No	Private sector lead
ATIS8	Dynamic Ridesharing	No	Not DOTD responsibility
ATIS9	In Vehicle Signing	No	Private sector lead
ATMS01	Network Surveillance	Yes	Lead on State Network
ATMS02	Probe Surveillance	No	
ATMS03	Surface Street Control	Yes	Lead on State Network
ATMS04	Freeway Control	Yes	Lead
ATMS05	HOV Lane Management	Future	Lead as appropriate
ATMS06	Traffic Information Dissemination	Yes	Lead on State Network
ATMS07	Regional Traffic Control	Yes	Cooperative
ATMS08	Incident Management System	Yes	Cooperative
ATMS09	Traffic Forecast and Demand Management	Future	Cooperative
ATMS10	Electronic Toll Collection	Yes	Cooperative
ATMS11	Emissions Monitoring and Management	No	Not DOTD responsibility
ATMS12	Virtual TMC and Smart Probe Data	Yes	Cooperative, but no probe
ATMS13	Standard Railroad Grade Crossing	Future	Cooperative
ATMS14	Advanced Railroad Grade Crossing	Future	Cooperative

Market Package Label	Market Package Name	LA ITS Plan	DOTD Role
ATMS15	Railroad Operations Coordination	Future	Cooperative
ATMS16	Parking Facility Management	No	Not DOTD responsibility
ATMS17	Reversible Lane Management	Yes	Lead on State Network
ATMS18	Road Weather Information System	Yes	Cooperative
ATMS19	Regional Parking Management	No	Not DOTD responsibility
AVSS01	Vehicle Safety Monitoring	No	Wait for automotive industry
AVSS02	Driver Safety Monitoring	No	Wait for automotive industry
AVSS03	Longitudinal Safety Warning	No	Wait for automotive industry
AVSS04	Lateral Safety Warning	No	Wait for automotive industry
AVSS05	Intersection Safety Warning	No	Wait for automotive industry
AVSS06	Pre-Crash Restraint Deployment	No	Wait for automotive industry
AVSS07	Driver Visibility Improvement	No	Wait for automotive industry
AVSS08	Advanced Vehicle Longitudinal Control	No	Wait for automotive industry
AVSS09	Advanced Vehicle Lateral Control	No	Wait for automotive industry
AVSS10	Intersection Collision Avoidance	No	Wait for automotive industry
AVSS11	Automated Highway System	No	Wait for automotive industry
CVO01	Fleet Administration	In CVISN Plan	Cooperative
CVO02	Freight Administration	In CVISN Plan	Cooperative
CVO03	Electronic Clearance	In CVISN Plan	Cooperative
CVO04	CV Administrative Processes	In CVISN Plan	Cooperative
CVO05	International Border Electronic Clearance	In CVISN Plan	Cooperative

Market Package Label	Market Package Name	LA ITS Plan	DOTD Role
CVO06	Weigh-In-Motion	In CVISN Plan	Cooperative
CVO07	Roadside CVO Safety	In CVISN Plan	Cooperative
CVO08	On-board CVO Safety	In CVISN Plan	Cooperative
CVO09	CVO Fleet Maintenance	In CVISN Plan	Cooperative
CVO10	HAZMAT Management	In CVISN Plan	Cooperative
EM1	Emergency Response	Yes	Cooperative
EM2	Emergency Routing	Yes	Cooperative
EM3	Mayday Support	No	Private sector lead

The National ITS Architecture again provides the tools to link the desired market packages to subsystems and architecture flows. The results of both approaches were combined to determine the statewide ITS architecture.

5.3 Subsystems and Linkages

The first result of the analysis is the determination of which subsystems should be included in the statewide ITS architecture. Exhibit 5-2 on the next page illustrates the selected subsystems in what is commonly referred to as the ITS architecture "sausage" diagram. Key features of this diagram include:

- Commercial Vehicle Operations: Four of the subsystems – Commercial Vehicle Administration, Fleet and Freight Management, Commercial Vehicle Check and Commercial Vehicle – will be addressed by the state's CVISN program. They are included here for completeness and to show recommended links to other subsystems.
- Travelers Subsystems: The DOTD has expressed interest in providing both remote travel support and personal information access subsystems as a source of general traveler information. The former would most likely take the form of displays at port of entries and rest stops. The later would most likely be an Internet web site with general traveler information on traffic flow, construction projects and incidents.

) Center Subsystems: DOTD has a primary interest in providing traffic ement capabilities at each district office and that close coordination with jurisdictions should occur in urban areas. DOTD has a strong interest in ing and / or coordinating with emergency management centers throughout ate. To enable the two travelers subsystems noted above, DOTD would to become an Information Service Provider (ISP). Further, the Department d work with private ISP's as appropriate. In the future, the development of te level archived data management subsystem is recommended for cting and storing historical traveler information. These four subsystems will re active development effort by the Department.

dinated Center Subsystems: DOTD will share transportation system mation with local transit management and toll administrative subsystems. Department's ITS program would not have an active role in the lopment of these two types of subsystems. However, they would be ble to provide technical assistance as appropriate.

uded Center Subsystems: Emissions management was excluded because this tion is not the direct responsibility of DOTD.

dside Subsystems: DOTD has a primary responsibility for deployment and ration of ITS devices along the state highway network. This would also lude connections to flood and other environmental sensors deployed by other ncies. The Department also has an interest in information connections to toll lection. Parking management was excluded because it is not the direct ponsibility of DOTD.

hicle Subsystems: DOTD interest will focus on the means of communication ween the vehicle and roadside subsystems using the short-range wireless mmunication protocols. The Department's effort would not include activity olving in-vehicle systems.

mmunications: The communication links among the subsystems are varied d will depend upon selected applications. The shared resources ecommunication projects in the state can provide a means to deploy the quired communication network to support ITS applications. At this time, the epartment would not be concerned with vehicle to vehicle communications cause of its focus on the other three categories of subsystems.

bit 5-3 shows the information linkages connections among the various stems. The archived data management subsystem (ADMS) is not shown on the am in an effort to reduce the complexity of the figure. ADMS is linked to st every other subsystem.

5.3 Architecture Flows

The next step in the analysis was to determine which architecture flows were required to support the user services and market packages of interest to DOTD. Each of the 458 flows was examined based upon user service requirements and market packages selected by DOTD. Primary considerations included connections among the selected subsystems and relevance to statewide transportation needs. Links among the four commercial vehicle operations subsystems are not included. The CVO related flows would be developed as part of the CVISN deployment activities. Appendix B lists the selected architecture flows to be considered in the design and deployment of future ITS applications throughout the state. Several key points should be noted:

- Traffic Management (TMS) and Roadway Subsystems (RS): The primary focus of DOTD activities will be in the design and deployment of ITS applications along the state highway network. Extensive cooperation with cities and parishes is desired to foster coordinated traffic control and cost-effective investments. Linking existing and future traffic management control systems could enable the exchange of information on traffic conditions and incidents and provide the ability to share control of ITS devices. These center to center interfaces should be accommodated during the deployment and upgrading of traffic management systems.
- Traveler Information: The progressive deployment of freeway and surface street surveillance and traffic control will generate a wealth of information concerning traffic flow, construction, and incidents. This information could then be made available for dissemination through a wide range of public and private mechanisms. Again the ability to share these travel conditions should be considered during the deployment of ITS applications. The identified architecture flows among the traffic management, information service provider, and traveler subsystems identifies the base line needs.
- Emergency Management: DOTD has expressed a strong desire to link traffic management and emergency management subsystems. The recommended architecture flows identify the types of information that should be shared. A direct link between roadway subsystem elements that collect environmental condition data to emergency management centers was added to foster the cooperative sharing of this information among agencies. DOTD would not be involved in direct linkages between emergency management centers and emergency vehicles because these linkages are not the direct responsibility of the Department.
- Transit Management Subsystems (TRMS): DOTD does not have direct responsibility for the management and operation of transit agencies in the state. Their proposed role would be to provide technical assistance as requested in the development and deployment of ITS applications. However, the analysis reveals

the need to share traffic information with transit management control centers and support transit priority at traffic signals. Direct architecture flows between TRMS and other traffic management centers were added to accommodate these local requirements.

- Commercial Vehicle Operations: Again, the interactions among the CVO subsystems will be fully defined during the CVISN deployment process and are not addressed here.

The recommended architecture flows for the following subsystems are illustrated in the set of figures in Appendix C.

1. Traffic Management (TMS)
2. Roadway Subsystem (RS)
3. Information Service Provider (ISP)
4. Emergency Management (EM)
5. Personal Information Access (PIAS)
6. Remote Traveler Support (RTS)
7. Toll Administration (TAS)
8. Toll Collection (TCS)
9. Transit Management (TRMS)
10. Archived Data Management Subsystem (ADMS)

This subsystem connections and architecture flows should be used as starting points in the design of future ITS systems. They provide an excellent checklist for the determination of detailed information requirements and for system to system connections.

5.4 Operational Issues

The architecture analysis also reveals a series of operational issues that should be considered by the Department during the organization of the internal ITS function and as part of the design and deployment of ITS applications. These include:

- Network Surveillance Coverage: The deployment of equipment to monitor the highway network is expensive. The prioritization of critical locations and cost sharing with local and parish jurisdictions can reduce the overall cost of deployment.
- Center to Center Linkages: A host of operational issues will need to be addressed during the linking of the transportation management centers of DOTD District and local jurisdictions. These include procedures for data sharing, data dissemination, device control, coordinated incident management, security, staffing, etc.

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