

## EXECUTIVE SUMMARY

### Introduction

The Illinois Statewide Intelligent Transportation Systems (ITS) Architecture and ITS Strategic Plan consists of four primary components:

- Concept of Operations,
- Statewide ITS Architecture Document,
- Statewide Turbo Architecture<sup>®</sup> databases, and
- Statewide ITS Strategic Plan.

This document presents the Illinois Department of Transportation's (IDOT) Statewide ITS Strategic Plan. This is a living document that will evolve as ITS projects are developed and deployed across the state. The sections of the document are as follows:

- Section 2 – Program Goals and Objectives
- Section 3 – Problem Identification and Prioritization
- Section 4 – System Architecture Overview
- Section 5 – Communications Inventory and Planning
- Section 6 – Alternatives Analysis
- Section 7 – Priority Strategies and Project Proposal Evaluation
- Section 8 – Implementation Plan
- Section 9 – Operations and Maintenance Plan
- Section 10 – Project Funding
- Section 11 – Program Management

This Illinois Statewide ITS Strategic Plan provides a performance-driven direction for the deployment of ITS on a statewide basis. The plan is a mechanism for the identification and prioritization of ITS projects within a single framework to insure maximum benefits from state and federal ITS funding. This document builds upon the groundwork defined by the Statewide Concept of Operations and Statewide ITS Architecture process, as well as numerous studies performed by ITS stakeholders in Illinois.

Intelligent transportation systems can be defined as “the *integrated* application of sensor, computer, electronics, and communications technologies and management strategies to provide traveler information to increase the *safety and efficiency* of the surface transportation system.” Or, simply put,

***People using technology in transportation to save time, lives, and money***

In order for ITS to be most effective, these systems must work together in an integrated manner. This less visible integration component requires various wireline and wireless communications systems to support the exchange of data between management centers, personnel, vehicles, field devices, and the traveling public.

Many groups are involved in the planning and operation of ITS systems. These stakeholders include: public officials, transportation planners, law enforcement, emergency management personnel, public/private transportation providers, civic groups, and the media and other information providers. Appendix A includes a comprehensive listing of ITS stakeholders in Illinois. Each one plays a key role in the collection, processing, and distribution of transportation information to other partner agencies and the traveling public.

There are several proven benefits to the implementation of ITS systems. These benefits are typically measured by an increase in system capacity/throughput, cost savings, increased customer satisfaction, reductions in delay/travel time, reduced energy usage/environmental impacts, and improved safety. ITS projects often provide high return on investment, some with cost-to-benefit ratios of 20:1 or more.

By documenting ITS initiatives across Illinois, this plan serves as a starting point for bringing ITS projects and systems together into an integrated plan. It identifies top-priority ITS projects that can be deployed in the short-term, “enabling” ITS projects that support other initiatives, and mid- and long-term ITS deployments that will build upon those ITS projects that precede them. This plan also documents an implementation strategy for making these projects a reality, which includes the identification of funding sources – both for initial deployment and ongoing operations and maintenance. This document concludes with recommendations for ITS program management that will guide the implementation and continuing planning of ITS in Illinois.

Furthermore, this plan contains recommendations for metropolitan planning organizations and regional planning commissions to create their own regional ITS strategic plans. These may be separate studies conducted at the regional level, or simply portions of regional transportation improvement plans or long-range transportation plans. Areas with an existing regional ITS architecture should be the first to consider developing and implementing these plans.

This plan is intended to provide the maximum benefit to end users by coordinating deployment priorities on a regional and statewide basis, leading to a more efficient, integrated transportation system.

Lastly, this Strategic Plan outlines a recommended program management structure for ITS within IDOT. A multi-agency, multi-disciplinary approach to ITS is needed to lead the planning and deployment of ITS in the state and provide transportation stakeholders with a central source to help define, coordinate, and manage their ITS initiatives.



Above all, this Illinois Statewide ITS Strategic Plan outlines a comprehensive direction for the future of ITS in Illinois. It will allow transportation stakeholders to be more aware of other related or similar initiatives as they plan, deploy, operate and maintain their own ITS projects. This will encourage integrated, interoperable systems and promote the sharing of information, and should also maximize available funding and leverage resources to the benefit of the traveling public in Illinois.

## Program Goals and Objectives

The US DOT has stated that "projects have the greatest chance for success when they promote a shared vision." A long-term view of services and needs to be addressed (and how ITS can improve the surface transportation network) underpins any vision for ITS deployments across the state of Illinois. The information to be gathered and managed includes real-time information on the physical state of the infrastructure; how it is being built, used, maintained, and secured, relevant weather conditions, driver expectations and other information for system operators and users. At the highest level, the statewide vision for ITS in Illinois can be stated simply as ...

### *Informed Choices for Improved Operations*

Inherent in this vision is *the use of technology to provide safe, secure, and seamless services to the traveling public* within a flexible, adaptable, standards-based framework for the integration and coordination of transportation for both systems and operations.

A byproduct of the Statewide ITS Vision is a set of goals and objectives that will allow continued introduction of ITS technologies into the institutional and funding framework of surface transportation in the State of Illinois. The statewide ITS goals and objectives will build on the framework set by current ITS pioneering efforts. These goals and objectives are:

#### Goals

- Deploy an electronic information infrastructure that works in concert with the physical infrastructure to maximize system *efficiency and utility*, and to encourage *modal integration and modal choice*.
- Deploy a *secure system* that can both detect and respond to regional crises maximizing the *efficient use of resources*.
- Improve the *transportation system's safety* by minimizing the occurrence of incidents, traffic deaths, and lowering response times.
- Disseminate information to system operators and users to help contain congestion and *increase the system's effective capacity*, while reducing the need for new construction.
- *Reduce energy consumption and negative environmental impact* through technology, information exchange, and operational practices.

#### Objectives

- Coordinate the planning and deployment of ITS technologies between agencies to *leverage funding and promote interoperability*.

- Provide a working tool for improved *planning, scheduling, and integration* between state and local agencies.
- Improve the *sharing and dissemination of information* between state and local agencies.

Before deploying ITS, various measures of effectiveness (MOE) are defined to evaluate the performance of ITS components. These performance measures often quantify the effect that ITS elements have on the transportation system, rather than the operation of the components themselves. These measures will provide the basis for evaluating the performance of ITS components in the state of Illinois:

- Safety
- Mobility
- Capacity/Throughput
- Customer Satisfaction
- Productivity
- Energy and Environment

### **Problem Identification and Prioritization**

A wide and diverse group of stakeholders has participated in the Illinois Statewide ITS planning process to ensure the coordination of integration opportunities and legitimacy in the outcome of these efforts. Beyond the essential state, city and county transportation agencies, the range of organizations with a potential stake in ITS within the state of Illinois includes incident and emergency responders, transportation system operators, public transit services, commercial vehicle entities, planning organizations, information service providers, and local civic groups. For the purposes of developing the Statewide ITS Architecture and ITS Strategic Plan, this study divided the state of Illinois into nine ITS regions. The regions were based on both IDOT districts (as they existed at the onset of the project) and MPO/RPC boundaries.

All identified stakeholders were invited to help identify and discuss stakeholder ITS needs and requirements for the state. The ITS planning and development process requires coordination with, and the cooperation of, multiple agencies. Several methods were used to gather input from the stakeholders. These methods included stakeholder workshops, stakeholder surveys, interviews, and the formation of both a project Steering Committee and Technical Committee.

Eight statewide ITS architecture workshops provided stakeholders with an introduction to, and an overview of, ITS and generated discussion on transportation needs and interagency communications. Workshops were conducted in Rockford, the Quad Cities, Collinsville, Ottawa, Peoria, Mount Vernon, Springfield, and Champaign-Urbana. To supplement the information collected from the stakeholder workshops and surveys, telephone interviews were conducted to clarify stakeholder responses and to address any stakeholder questions. The project also included the distribution of two newsletters.



Stakeholder surveys were used to document existing infrastructure and identify possible solutions to the issues faced by transportation agencies around Illinois. The surveys were a key source of input for the development of the Statewide ITS Architecture. A total of 114 surveys were completed from stakeholders across Illinois. The top local transportation network issues were emergency response, road construction and emergency coordination. The top implementation services were emergency vehicle management, traffic incident management and response, and traffic control.

***Over 700 stakeholders across Illinois participated in the project***

Each of the regions participated in a region-wide workshop to identify statewide and inter-regional transportation needs and define existing interagency communications. In addition, individual telephone interviews were conducted to collect more detailed information from key stakeholders than was covered during the workshops or through the surveys. IDOT strategic initiatives and priorities were reviewed.

In order to address the specific issues and needs identified by stakeholders during the project outreach, these needs have been organized into logical groups, or “program areas.” Table 1 shows the program areas that were identified as being the most critical for Illinois based on the needs the stakeholders identified, as well as the particular ITS user services that relate to each.

Table 1 – Identified ITS Program Areas

<b>ITS Program Area</b>	<b>Related ITS User Service</b>
Traveler Information	Pre-Trip Travel Information, En-route Driver Information, Route Guidance, Traveler Services Information
Incident Management	Incident Management, Hazardous Materials Security and Incident Response, Emergency Vehicle Management, Disaster Response and Evacuation
Interagency Coordination	-
Construction & Maintenance	Maintenance and Construction Operations
Traffic Management	Traffic Control, Highway Rail Intersection
Commercial Vehicle Operations	Commercial Vehicle Electronic Clearance, Automated Roadside Safety Inspection, On-board Safety and Security Monitoring, Commercial Vehicle Administrative Processes, Hazardous Materials Security and Incident Response, Freight Mobility
Transit	Public Transportation Management, En-route Transit Information, Personalized Public Transit
Improved Communications	-
Data Management	Archived Data
System Security	Public Travel Security, Emergency Notification and Personal Security, Hazardous Materials Security and Incident Response
Transportation Safety	Traffic Control, Public Transportation Management, On-board Safety and Security Monitoring
Standards and Standardization	-
Asset Sharing & Control	Traffic Control
Multi-Modal Coordination	Public Transportation Management
Outreach/Public Education	-

The outreach component of the project was a critical step. A variety of techniques were used to obtain input from a representative cross-section of transportation stakeholders in Illinois. The stakeholder surveys provide the regional or local perspective, while the stakeholder workshops focused on interregional or statewide issues. Table 2 summarizes the overall top statewide priorities.

Table 2 - Top Statewide Transportation Needs by Program Area (all regions combined)

Program Area	Votes Received	Workshop Instances*	Rank
Traveler Information	455	8	1
Traffic Management	278	6	2
Incident Management	275	8	3
Interagency Coordination	186	6	4
Improved Communications	111	6	5
Data Management	109	7	6
Commercial Vehicle Operations (CVO)	96	6	7
Transportation Safety	95	6	8
Construction & Maintenance	85	3	9
Transit	83	5	10
Standardization	54	4	11
System Security	51	4	12
Outreach/Public Education	43	3	13
Multi-modal Coordination	43	2	14
Asset Sharing and Control	31	2	15

\* Out of eight regional workshops

## System Architecture Overview

The Illinois Statewide Intelligent Transportation Systems (ITS) Strategic Plan uses the Statewide ITS Concept of Operations, the Statewide ITS Architecture, and regional ITS architectures to provide a roadmap for deployment and operations of enhanced transportation services across the state. The Concept of Operations reflects the current and anticipated transportation services from transportation stakeholders and identifies the organizational responsibilities of IDOT. The Statewide ITS Architecture identifies the current and planned technical framework for providing the transportation services described in the Concept of Operations.

The Statewide ITS Concept of Operations leverages off the existing ITS infrastructure throughout the state. The Gary-Chicago-Milwaukee (GCM) Gateway Hub operates along the GCM Corridor and shares information with Wisconsin and Indiana. The Illinois Statewide hub coordinates information and activities among the regions of the state. In addition to supporting the cooperating regions, the Illinois Statewide Hub supports both 511 for traveler information across the state and commercial vehicle operations via CVO/CVISN.

IDOT is currently active in the planning, programming and deployment of ITS initiatives throughout Illinois, as it has been for many years. This includes both IDOT initiatives and those

at the local level, in addition to coordination with bordering states. Figure 1 is a context diagram illustrating the Statewide ITS Concept of Operations at the highest level of information exchange potentially for the state of Illinois. This “Level 0” diagram is intended to focus on the concept that each region and district will gather information locally about the surface transportation network and share information between and among the various state and local agencies as warranted and as necessary.

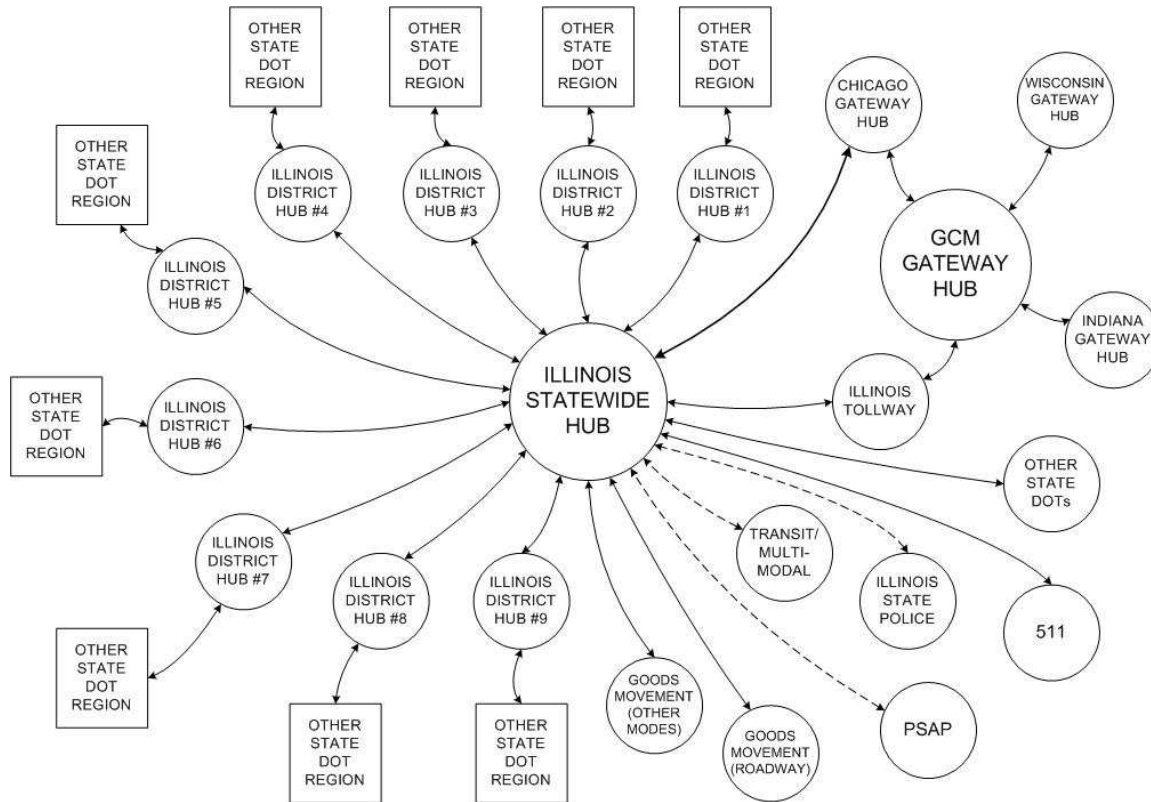


Figure 1 – Statewide ITS Architecture Level 0 Diagram

In this context diagram, each circle represents an entity, along with its services, functions, and requirements. A solid line between circles represents explicit protocols and procedures that the two entities use in performing operations in general. A dashed line represents information exchange or other communications that can *support* operations, but which do not perform a *primary* or *direct* operational function or service.

***Each region will gather transportation information locally and share it among various agencies across the state***

At a statewide level, the Illinois Statewide Hub performs operations for traveler information (via 511), Commercial Vehicle Operations (for movement of goods), and coordination of statewide operations with District Hubs, the Illinois Tollway Authority, and neighboring State Departments of Transportation.

The Statewide ITS Architecture has three levels of entities are modeled in the statewide ITS architecture. One is a Metropolitan template corresponding to major population centers like Chicago and East St. Louis. Another is a Medium Community or City template corresponding to the Rockford, Peoria, Springfield, Quad Cities, Champaign-Urbana, and other communities of similar size and transportation complexities. Lastly, there is a template that is rural in nature covering small communities and large areas of the state where the population is dispersed and the transportation infrastructure needs are less complex. Whether it be transit, corridor traffic and incident management, emergency management, or traveler information, these three models provide a framework that all areas of the state and all ITS projects can fit into.

As demand for transportation services continues to evolve, the Concept of Operations and Statewide ITS Architecture should be updated to assure better integration and deployment.

### Communications Inventory and Planning

Section 5 is focused on two aspects of Illinois ITS communications: a partial inventory of current communications systems and a vision of a statewide communications network that would support ITS requirements between districts and across the state. The Statewide Communications Network is a wide-area telecommunications network used to transfer video and information across the Illinois. The primary focus is linking IDOT operations centers using the Center-to-Center protocols of the National Transportation Communications for ITS Protocols (NTCIP). It is envisioned that this network will extend the local area networks and metropolitan area networks of the IDOT districts and regions to provide a network that covers all of Illinois.

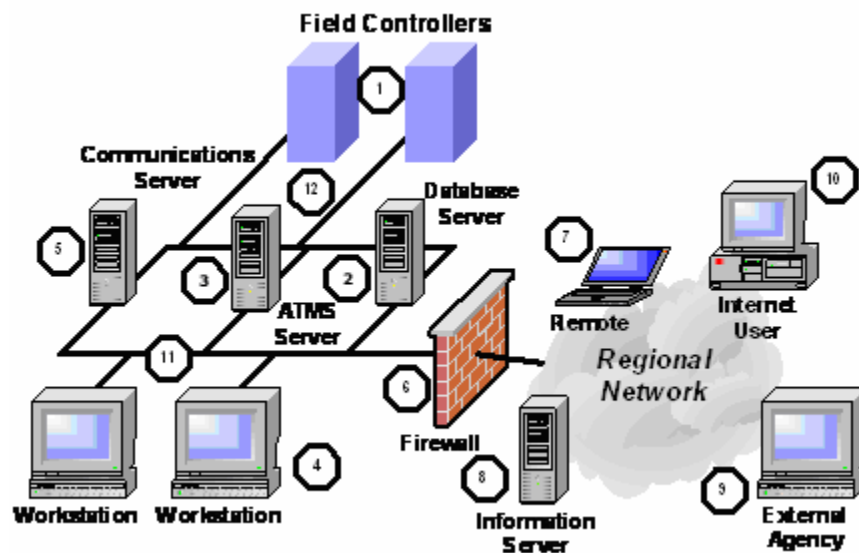


Figure 2 – Intra-district Communications

It is anticipated that the primary users of the statewide communications system will be the nine IDOT districts, the Central Office, and the Illinois Gateway. The network will be used by these agencies to share near real-time traffic information. A second use will be to share operations



between regional centers (see Figure 2). In addition to the IDOT districts, the statewide communications system can be used to help share video and information between other agencies. Different requirements exist between day-to-day operations and network operations under stressed or emergency operations. The network should be designed to provide its highest reliability under stressed conditions.

Statewide ITS communication networks will allow partner agencies to better share important traffic and ITS information, particularly in times of emergencies. Specific requirements may vary from district to district. Information flows consist of both video and data, both into and out of a district. Information flows for a particular district may be symmetrical but in most cases will be asymmetrical. Requirements were developed to form a baseline for a statewide communications network.

The envisioned statewide ITS communications network should use Gigabit Ethernet technology and consist of a network of smaller networks. Each district would be responsible for maintaining a local district network interconnecting local agencies and municipalities. A larger statewide network would provide robust inter-district communications. New connections between IDOT districts can be established by several methods. If IDOT-owned or IDOT-accessible communications is within the vicinity, the district may choose to connect directly to the existing infrastructure. Access to the existing infrastructure may require the installation of additional conduit and fiber optic cable. If IDOT-owned infrastructure is not accessible to a district, the district may connect to the statewide communication network using the Illinois Century Network (ICN). If neither IDOT-owned nor accessible communication infrastructure or an ICN POP is in the vicinity, the district may connect to the communication network using a public network.

An overall vision of the statewide ITS communication network is shown in Figure 3.

## **Alternatives Analysis**

When addressing the needs identified by transportation stakeholders in Illinois, it is important to look at many different potential solutions to ensure an efficient and coordinated use of resources. While some solutions can be used to address a single identified area of need, other solutions can be used to address multiple needs, which can lead to significant cost savings. A thorough analysis of different alternatives helps to identify the solutions that provide the most benefit while addressing the highest priority problems.

For the purposes of this analysis, the following criteria were considered:

- What potential solutions can address the identified needs?
- How will these solutions address the identified needs?
- Can some solutions address multiple needs?
- What are the potential benefits to the public as a result of implementing these solutions?
- What are the implementation and ongoing operations and maintenance costs associated with these solutions?
- What is the geographic scope of the solution?

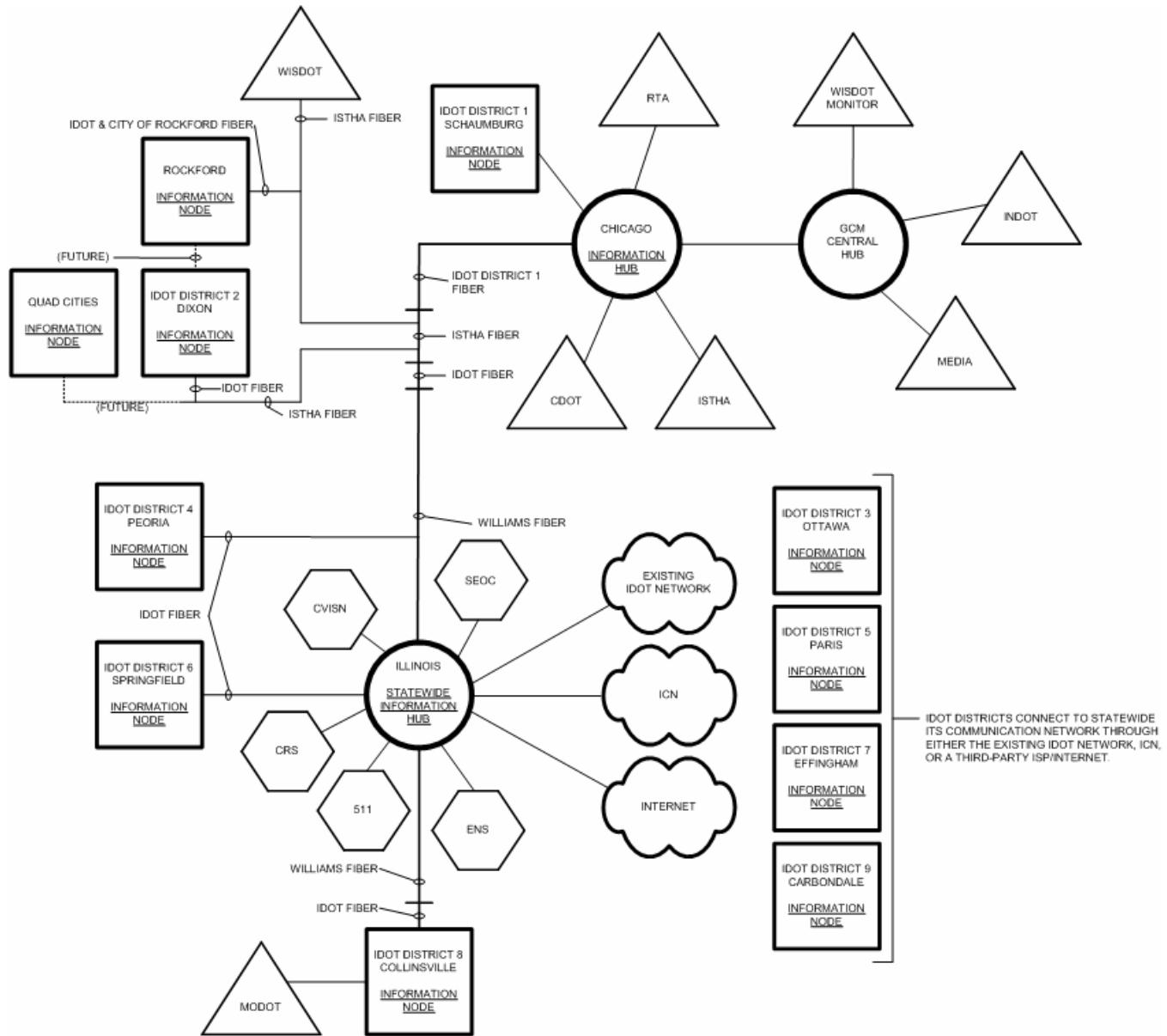


Figure 3 – Illinois Statewide ITS Communications Network

Applying these criteria ensures that Illinois ITS deployments are an efficient use of the state's resources and will provide a substantial benefit to travelers and residents at a reasonable cost. All of the alternatives that were reviewed are applicable on a statewide level, but often rely on ITS initiatives deployed at the local level to provide their benefit. The needs identified in Section 3 have been viewed on two geographic levels:

- § Statewide: needs that are general throughout the state (including in rural areas), prioritized based on input from stakeholders on a statewide basis
- § Regional: needs prioritized for different metropolitan regions with their own MPO or RPC

Based on the needs brought forward by stakeholders, potential ITS solutions were identified and examined to address those needs. Some solutions address multiple needs, and the analysis examined where the solutions can be applied. Individual agencies responsible for implementing the solutions through ITS projects will need to determine the specific function(s) of the implemented solution. And while a single solution might address different needs, it might not address them equally. Solutions can also be used to address needs differently in a statewide or regional level. Based on the program areas identified during outreach, potential solutions were identified as potential ways to address stakeholder needs on a statewide or interregional level.

In addition, a listing of potential regional solutions is also provided in Appendix G to serve as a starting point for ITS stakeholders in the regions in addressing their ITS needs.

In addition to coordinating activities within the state of Illinois, IDOT should also continue to coordinate with neighboring states on statewide initiatives or projects near borders. Illinois and neighboring states (Indiana, Wisconsin, Missouri, Iowa, and Kentucky) share priorities and are already working on similar projects.



Descriptions of the potential ITS solutions that can be deployed in Illinois to address identified needs have been prepared, including potential benefits, estimated costs, the needs that each solution would address, and the geographic scope where each solution could be applied. These solutions have been found to typically provide a positive return on investment in deployments in other states. Specific projects can be developed based on the solution concept to address the specific needs of a specific area.

## Priority Strategies and Project Proposal Evaluation

After generating a list of potential ITS solutions for Illinois in the alternatives analysis, these solutions were examined to determine whether they were statewide or regional in scope and effect. For the purposes of this Plan, 'statewide' ITS solutions are those ITS initiatives that are

applied throughout the state, or between at least two regions, to provide statewide ITS functions. These statewide ITS solutions involve projects that support the exchange of transportation information between different regional nodes, as well as to a centralized statewide hub. In addition, ITS initiatives deployed on Interstate Highways are considered ‘statewide’ in that they would generally be applied across the state to provide interstate ITS functions.

Some ITS solutions could be applied at both the statewide and regional level, addressing identified needs and providing benefits at both levels. ITS projects like work zone enhancements, ITS infrastructure, and security surveillance can be applied on Interstate Highways as well as arterial routes. Regional ITS solutions are those that are applied at the local or regional level to address a local or regional need(s). While a given regional project may be applied in multiple regions in a similar fashion, its application would be focused on providing benefit at that local level. Regional ITS solutions will focus on the surface transportation system in each region, apart from the Interstate Highway system. While a given ITS solution may address statewide goals or initiatives, they are considered regional if:

- The lead agencies for deployment and operations are local stakeholders,
- Any data from the solutions is not used on a statewide level, or
- The statewide use of a local project’s data is accomplished through another statewide solution or project.

Projects that serve multiple jurisdictions have a better chance of being affordable, have historically been more likely to receive grant funding and lessen the risk for any one agency, and are often better received by the public. As such, this Plan focuses on recommended projects that would be deployed on a statewide level or would provide statewide benefits. After solutions were selected, they were prioritized to determine which ones had the most impact on the highest priority needs. Prioritization allows agencies to identify and implement those ITS solutions which can bring about the greatest benefit(s) with the limited resources that transportation agencies have available. By applying the prioritization criteria to all identified ITS solutions, a prioritized list of potential solutions was developed.

***This plan focuses on statewide ITS projects. Potential regional ITS solutions are also provided to serve as a starting point for regional ITS stakeholders***

Within the statewide ITS solution categories specified, nearly one hundred project ideas were developed. Some solutions contained a single project, other solutions involved several potential ITS projects. Projects were only developed for solutions that were determined to have a statewide or interregional scope. While some projects are dependant on others and serve more of a supportive role than providing an end result, each project has a defined output that would accomplish or help accomplish the solution strategy.

Also, as ITS technologies are improved and combined with other emerging technological advances, additional project concepts will be developed. These include in-vehicle applications that are currently being tested by auto manufacturers, hardware/software vendors, academia, and other organizations focused on technology advances. Many of these systems are part of the

USDOT’s “Major Initiatives” for the future of ITS. This Plan is a “living document” and should be continually updated as these emerging ITS technologies work their way into the mainstream.

In order to determine which specific projects should be deployed first, a prioritization ranking was performed. The projects were analyzed by the following criteria to determine their priority:

- Integration opportunity
- Financial integrity
- Perception and public awareness
- Operational efficiencies

Acknowledging that some of the criteria are more critical than others, each was also weighted to emphasize high-priority issues. The scores for each project were tabulated, and the resulting rankings were then normalized by dividing the cumulative point score by the number of criteria used to rank the project (since some criteria did not apply to certain projects).

The prioritized listing of statewide ITS projects can be found in Appendix I. Three tiers of projects are defined in the table: high priority, medium priority, and low priority. The high priority projects are those that provide the highest benefit to travelers, are the foundation for subsequent ITS projects (medium and low priority), and best coincide with the current direction of ITS in Illinois. The 24 “High Priority” statewide ITS projects presented in Table 3 are:

- Work Zone Training
- Satellite Radio Traffic Information Service
- Illinois Statewide Information Hub
- Implement Commercial Vehicle Information Exchange Window (CVIEW)
- IDOT Central Office - Chicago Fiber Link
- Statewide Dynamic Message Signs (DMS) Deployment
- Chicago Information Hub
- Special Event Training
- Rockford Fiber Link
- IDOT Station One Upgrade
- Configuration Management Guidelines
- Develop Statewide Data Exchange Standards
- Electronic One-Stop Shopping (EOSS) for Commercial Vehicle Interstate Credentials
- Peoria Fiber Link
- Work Zone Best Practices Study and Pilot
- Single State Registration System (SSRS) Credentialing Automation
- Automated Oversize/Overweight (OS/OW) Permitting
- Statewide CCTV Camera Deployment
- River Bridge Surveillance
- Collinsville Information Node
- Peoria Information Node
- Springfield Information Node
- ITS Planning Integration Training
- Quad Cities Link

These high priority projects will be considered for deployment over the immediate-term (0-2 years), short-term (3-4 years), and mid-term (5-year) timeframes. The remaining 37 medium and 28 low priority ITS projects outlined in Section 7 would be considered for deployment in the 5-10 year timeframe and beyond. These projects represent an ITS “toolbox” that can be applied as funding becomes available, related projects are completed, and deployment priorities are updated.

To complement the listing of proposed ITS projects, Appendix J identifies ITS projects that are already ‘underway.’ These underway projects have been included in this ITS Strategic Plan because they relate directly to projects proposed in the plan, and help to underscore the ongoing nature of ITS planning and implementation. However, because the proposed projects are being prioritized to help identify the direction for ITS funding, the proposed projects are not ranked against these ‘underway’ ITS projects that have already secured funding.

## **Implementation Plan**

An implementation plan has been prepared that provides a strategy for implementing statewide, regional, and local ITS projects, and defines a sequencing plan for the coordinated deployment of the statewide ITS projects that have been defined. Before deploying ITS projects, it is important to define roles and responsibilities of the transportation agencies involved and how these projects should be brought into the planning and programming process. The Implementation Strategy involves three critical geographic and governmental areas for ITS deployment:

- The state of Illinois as a whole,
- The IDOT regions, and
- Local government agencies.

The three major areas are critical to the overall implementation of intelligent transportation systems. Each area includes key implementation responsibilities that contribute to effectiveness of the ITS as a whole. The Statewide Concept of Operations and Statewide ITS Architecture are useful references for operational responsibilities, ITS services, and interfaces between agencies. This Implementation Strategy focuses on responsibilities related to the actual implementation of projects, or project management.

The general roles and responsibilities of IDOT and other partner agencies were identified for delivering ITS solutions to transportation system users. These roles are defined in three areas: 1) Statewide Programs; 2) Regional Programs; and 3) Local Programs. Each project area has specific guidelines on roles and responsibilities to promote the deployment of coordinated ITS systems in Illinois.

The identified ITS projects are focused on providing benefits at a statewide level, but they will also improve transportation operations at the regional and local level. These projects, while statewide in nature, will also involve varying degrees of deployment at the regional and local level. As such, it is important to identify ways to integrate ITS into the statewide, regional, and local transportation planning and programming process.

Table 3 – High Priority ITS Project Deployment Schedule

Project	Estimated Deployment Costs (thousands)*				
	Year 1	Year 2	Year 3	Year 4	Year 5
Work Zone Training**	\$26				
Satellite Radio Traffic Information Service			\$75		
Illinois Statewide Information Hub		\$600			
Implement CVIEW	\$700				
EOSS for Comm. Vehicle Interstate Credentials	\$370				
IDOT Central Office - Chicago Fiber Link	\$715				
Statewide DMS Deployment (Stages 1 & 2)		\$1,800		\$2,800	
Chicago Information Hub		\$200			
Special Event Training		\$27			
Rockford Fiber Link	\$355				
IDOT Station One Upgrade		\$380			
Configuration Management Guidelines	\$60				
Develop Statewide Data Exchange Standards	\$60				
Peoria Fiber Link	\$385				
Work Zone Best Practices Study and Pilot**		\$100		\$350	
SSRS Credentialing Automation			\$480		
Automated OS/OW Permitting			\$450		
Statewide CCTV Camera Deployment (Stg. 1 & 2)			\$2,100		\$4,500
River Bridge Surveillance Pilot		\$180			
Collinsville Information Node		\$100			
Peoria Information Node		\$100			
Springfield Information Node		\$100			
ITS Planning Integration Training	\$27				
Quad Cities Link (Stage 1)	\$5				

<b>Totals:</b>	<b>\$2,703</b>	<b>\$3,587</b>	<b>\$3,105</b>	<b>\$3,150</b>	<b>\$4,500</b>
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\* 2006 dollars

\*\* Work zone enhancement projects to be addressed by the Bureau of Safety Engineering

The Statewide ITS Architecture (and the various regional ITS architectures) provides a starting point for defining the functionality and scope of a given ITS project. As individual ITS projects take shape, the architecture should be reviewed to ensure that an ITS project's functionality is included within the framework of the architecture. Once this is confirmed, the ITS architecture can be used to obtain project funding and to introduce the project into the appropriate Transportation Improvement Plan. ITS can be deployed as part of a larger improvement project

(e.g., installation of vehicle detection as part of a roadway reconstruction project), or as a separate standalone project (e.g., transit smart card program).

Intelligent transportation systems should be considered as a potential application in all highway improvement projects. Typically, the earlier that ITS is considered in the development of a transportation improvement project, the greater the benefits ITS will provide. By defining the ITS design component early in the project's development, it becomes part of the overall highway improvement. This is referred to as "mainstreaming" ITS and is encouraged by the USDOT. The IDOT project development process follows a phased approach. Phase I encompasses the planning or preliminary design stage. ITS should be considered beginning in the early stages of Phase I of improvement projects. Recommendations to how best to accommodate ITS in Phase II and Phase III activities have been developed. The Implementation Strategy is intended to serve as a guide for ITS project managers to help them deploy successful, integrated ITS projects.

Building upon the guidelines set forth in the Implementation Strategy, a sequence of deployment for the statewide ITS projects was developed. Many of the statewide ITS projects are dependent on other current and planned projects. In addition, the amount of available funding for ITS projects is a key factor in sequencing. Most of the 24 high priority projects could begin within twelve months, and some within six months. However, deployment of all of these projects in that timeframe is not plausible under current ITS funding options. As such, a phased deployment schedule was developed to spell out those statewide ITS projects that are recommended for deployment in each of the first five years of ITS deployment.

- Year One – "Building the Enabling Infrastructure" (\$2.7 million)
- Year Two – "Building the 'Infostructure'" (\$3.6 million)
- Year Three – "Management and CVISN" (\$3.1 million)
- Year Four – "DMS Deployment" (\$3.2 million)
- Year Five – "CCTV Deployment" (\$4.5 million)

All ITS deployments should be coordinated with IDOT's letting schedule, as appropriate.

## **Operations and Maintenance Plan**

Operations and maintenance (O&M) planning is a critical component to any transportation system, especially in the case of ITS where new and complex technologies are being deployed. To promote the successful use of these technologies, consideration needs to be made for operations and maintenance aspects of ITS during the planning and implementation of projects. With an operations and maintenance plan, an organization has in-place a process to help ensure that installed ITS elements are properly operated and maintained. Proper operation and routine maintenance can provide early detection of equipment problems and may lower repair and replacement costs. More importantly, it may also help prevent equipment malfunctions and minimize system downtime.



An O&M plan is also helpful in developing the long-term resource requirements for an ITS project, including the total cost and required man-hours. A typical operations plan contains information on the proper operation of ITS systems and equipment. A typical maintenance plan contains information on the proper maintenance of ITS systems and equipment.

O&M costs consist of two components: 1) equipment maintenance costs [such as equipment replacements, upgrades, etc.], and 2) man-hour costs. Section 9 provides more detail about the specific skill sets that are necessary for ITS operations and maintenance. O&M costs were estimated for each of the 24 high priority projects. Table 4 summarizes the O&M costs and resource requirements for the high priority projects. These O&M costs are in 2006 dollars and reflect the total cost to operate and maintain a particular project. Note that the O&M costs repeat every year after the initial deployment of the project and continue as long as the system or equipment is in operation.

## Project Funding

The 2005 Surface Transportation Reauthorization Act, known as the “Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users” (SAFETEA-LU), provides the largest amount of federal funding for highways, highway safety, and public transportation in the nation’s history. SAFETEA-LU replaced the Transportation Equity Act for the 21<sup>st</sup> Century (TEA-21), authorized in 1998. This act has made a significant impact on the resources available for ground transportation in general, and ITS in particular.

***SAFETEA-LU encourages the “mainstreaming” of ITS into other agency initiatives***

There were changes in the act regarding the use of funding for ITS projects. One of the most significant changes is the discontinuation of dedicated funds for ITS deployment. After Fiscal Year 2005, there will be no money set aside for deploying ITS projects. However, money for highway construction or enhancements, such as from the National Highway System (NHS) Program, can now be used to deploy ITS equipment as long as it addresses the goals of the funding program, such as reducing congestion or improving operations. While this eliminates the assurance of funding specifically set aside for ITS deployment, it creates the opportunity to access a greater amount of funding, can help tie ITS to other projects the state is pursuing, and helps mainstream ITS with other state and agency initiatives. The ITS Research program was retained, as were several other programs that can be used to fund ITS solutions.

Funding is the major concern Illinois faces in pursuing the projects suggested in this Statewide ITS Strategic Plan. Illinois recognizes the realities of the current and anticipated future ITS funding environment. SAFETEA-LU will be the largest source of funding for transportation projects over the next five years and will significantly influence both federal and state funding availability. The following is an overview of potential funding sources:

- Federal and State Funds
- Transportation Security Funds
- Federal Earmarks
- Federal Transportation Programs
- Federal Grants
- Public/Private Partnerships

Table 4 - High Priority ITS Project Operations & Maintenance Costs

Project	Estimated FTE	Estimated O & M Costs (thousands)*					Total
		Year 1	Year 2	Year 3	Year 4	Year 5	
Work Zone Training**	0.1		\$18	\$18	\$18	\$18	\$72
Satellite Radio Traffic Information Service	0.1				\$8	\$8	\$16
Illinois Statewide Information Hub	0.5			\$60	\$60	\$60	\$180
Implement CVIEW	0.5		\$85	\$85	\$85	\$85	\$340
EOSS for Comm. Vehicle Interstate Credentials	0.5		\$50	\$50	\$50	\$50	\$200
IDOT Central Office - Chicago Fiber Link	0.25		\$30	\$30	\$30	\$30	\$120
Statewide DMS Deployment (Stages 1 & 2)	0.3 (0.7)			\$44	\$108	\$108	\$260
Chicago Information Hub	0.25			\$30	\$30	\$30	\$90
Special Event Training	0.1			\$20	\$20	\$20	\$60
Rockford Fiber Link	0.1		\$15	\$15	\$15	\$15	\$60
IDOT Station One Upgrade	0.5			\$65	\$65	\$65	\$195
Configuration Management Guidelines	0.1		\$8	\$8	\$8	\$8	\$32
Develop Statewide Data Exchange Standards	0.1		\$8	\$8	\$8	\$8	\$32
Peoria Fiber Link	0.1		\$15	\$15	\$15	\$15	\$60
Work Zone Best Practices Study and Pilot**	0.1			\$10	\$10	\$10	\$30
SSRS Credentialing Automation	0.1				\$80	\$80	\$160
Automated OS/OW Permitting	0.1				\$75	\$75	\$150
Statewide CCTV Camera Deployment (Stages 1 & 2)	1 (3)				\$40	\$260	\$300
River Bridge Surveillance Pilot	0.1			\$28	\$28	\$28	\$84
Collinsville Information Node	0.1			\$15	\$15	\$15	\$45
Peoria Information Node	0.1			\$15	\$15	\$15	\$45
Springfield Information Node	0.1			\$15	\$15	\$15	\$45
ITS Planning Integration Training	0.1		\$12	\$12	\$12	\$12	\$48
Quad Cities Link (Stage 1)	0.1		\$50	\$50	\$50	\$50	\$200
<b>Totals:</b>	<b>5.4 (7.8)</b>	<b>\$0</b>	<b>\$291</b>	<b>\$593</b>	<b>\$860</b>	<b>\$1,080</b>	

\* 2006 dollars

\*\* Work zone enhancement projects to be addressed by the Bureau of Safety Engineering

## Program Management

ITS program management represents the administrative functions associated with the planning, design, deployment, operations, and maintenance of ITS. ITS program management services are provided on three levels: Policy, Program Planning, and Deployment. Each of the three levels is critical to providing successful ITS solutions. Program management can be provided entirely by the public sector, entirely by the private sector, or through a combination of the public and private sectors.

To be successful, the program manager needs to play a key role in all aspects: planning, design, deployment, operations and maintenance. They should also participate in key strategic decisions made by top management at IDOT and have the authority required to carry out their goals.

Historically, some IDOT ITS program management functions resided in the ITS Program Office within the Office of Planning & Programming. IDOT has recently created an ITS Oversight Committee and there has been some shifting of responsibilities. In addition, many transportation agencies and stakeholders throughout Illinois and in the Gary-Chicago-Milwaukee (GCM) ITS Priority Corridor are involved in providing some ITS program management services.

IDOT should ensure that ITS program management is woven into the fabric of its entire project development process, not just the planning and programming unit. The Department also should institutionalize the role of ITS in operations and maintenance, beyond that of filling potholes and plowing snow, and provide the necessary long-term resources. IDOT also should be very proactive in working as a partner with metropolitan planning organizations (MPO) throughout the state to address regional and statewide ITS needs in the development of the Statewide TIP.

A number of transportation agencies and organizations, both within and outside of IDOT, have a stake in ITS. Many of them have been actively involved in the development of this Statewide ITS Strategic Plan. Some of these groups are focused on specific ITS applications, such as transit or commercial vehicle operations, while some groups concentrate their efforts on specific geographic locations, such as corridor action teams and metropolitan planning organizations.

To coordinate the efforts of these groups, Section 11 describes a recommended program management structure for ITS at IDOT. This structure involves ITS groups at the statewide, regional, and local levels that need to work together to identify transportation issues and develop appropriate ITS solutions. These stakeholders would be involved through one or more of the following groups:

- ITS Oversight Committee
- ITS Program Manager
- ITS Planning & Programming Team
- ITS Operations Team
- ISTIN Users Group
- Regional ITS Committees
- Corridor Action Teams
- CVISN Team (Electronic One-Stop Shop Steering Committee)
- Other organizations