3. PROBLEM IDENTIFICATION AND PRIORITIZATION

3.1 Project Outreach Summary

3.1.1 STAKEHOLDERS AND REGIONS

A wide and diverse group of stakeholders has participated in the Illinois Statewide Intelligent Transportation System (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. More specifically, the following specific or types of organizations were invited to participate to gather information in the development of the statewide ITS architecture:

- Bordering State DOTs
- Bordering State Police
- Cities – Public Works
- Commercial Vehicle Operators
- Counties – Public Works
- County Sheriff Offices
- Emergency Service and Disaster Agencies (ESDA)
- Emergency Medical Services
- Federal Highway Administration (FHWA)
- Federal Transit Administration
- Illinois DOT District Offices
- Illinois DOT Central Office
- Illinois Emergency Management Agency (IEMA)
- Illinois State Police
- Illinois State Toll Highway Authority
- Local, Regional Transit Agencies
- Local Fire and Law Enforcement Departments
- Metropolitan Planning Organizations (MPO)
- 911 Communications Centers (PSAPs)
- Regional Planning Commissions (RPC)
- Railroad Agencies
- Visitors and Convention Bureaus

Not all of the invited agencies and organizations were involved equally, due to a variety of reasons that included the lack of availability of staff and resources. However, every effort was made to keep all identified stakeholders informed and involved. A complete listing of stakeholders invited to participate in the project is included in Appendix A.

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 (at the onset of the project in 2004) and MPO/RPC boundaries. These regions determined the centralized locations where each of the statewide workshops was conducted.
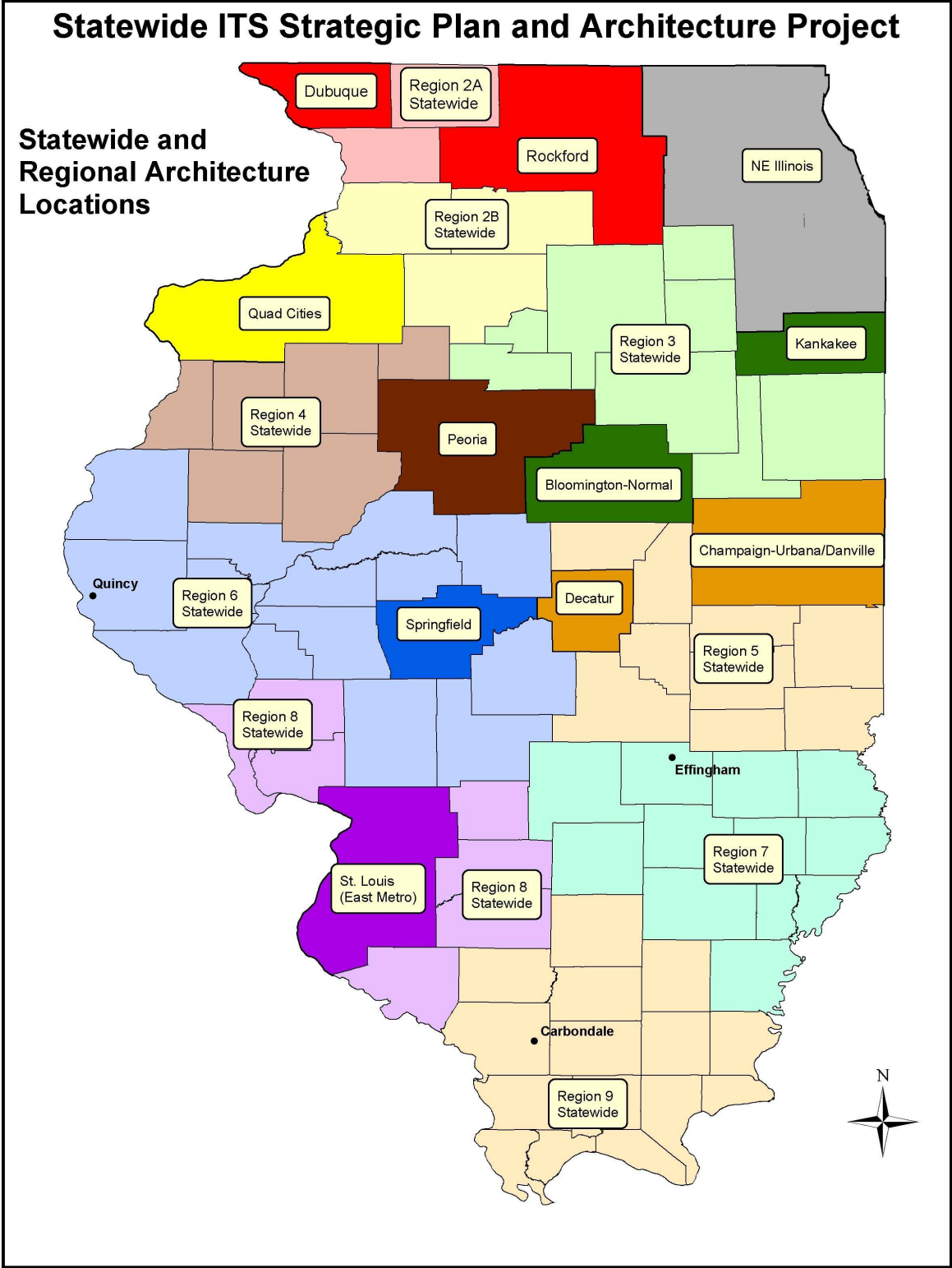
Figure 3-1 - Statewide and Regional Architecture Locations

The FHWA Final Rule on ITS Architecture and Standards Conformity (and parallel FTA Final Policy) require that each region across the U.S. with plans to implement ITS develop a regional ITS architecture by April, 2005, in order to receive federal ITS funding in the future. To meet this requirement, the Illinois Statewide ITS Architecture has acted as a springboard for the development of regional ITS architectures in Rockford, the Quad Cities, Peoria, Champaign-Urbana, Springfield, and St. Louis (East Metro), and future ITS architectures in Bloomington-Normal, Danville, Decatur, DeKalb, and Kankakee. Figure 3-1, Statewide and Regional Architecture Locations, displays the nine statewide ITS regions, as well as the metropolitan areas with existing or future ITS architectures.

It should be noted that the Northeastern Illinois Region has previously developed its Regional ITS Architecture, and that the Illinois Statewide ITS Architecture has been developed in coordination with the Northeastern Illinois Region.

3.1.2 OUTREACH METHODS

All identified stakeholders were invited to help identify and discuss stakeholder ITS needs and requirements for the State of Illinois. 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.

STAKEHOLDER WORKSHOPS

The 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 (Table 3-1). A collective total of 112 attendees provided valuable input and insight on their regional and statewide needs. Attendees of the statewide workshops for each region are identified in Appendix A.

STAKEHOLDER SURVEYS

To provide a framework for developing the Statewide ITS Architecture and the Strategic Plan as the baseline for the future direction of ITS initiatives in Illinois, a survey was prepared and distributed to the identified stakeholders. The actual survey distributed to stakeholders can be found in Appendix B.

The survey sought to gather information concerning perceived issues and needs related to the statewide and local transportation system, top priorities to mitigate these issues and needs, the functions or activities that each agency performs, the systems that each agency currently operates or plans to operate, and the information shared between the agencies. Multiple survey sections were provided to address issues specific to each type of organization or agency that would be receiving them:

- Top Issues/Services
- Your Organization/Agency

- Traveler Information
- Roadway Operations
- Transit Operations
- Incident/Emergency Management
- Commercial Vehicle Operations

A list of stakeholder survey respondents (those with a survey number) can be found in Appendix A. The survey results are discussed in Section 3.2.

INTERVIEWS

To supplement the information collected from the stakeholder workshops and surveys, telephone interview follow-ups were conducted to clarify stakeholder input and responses as well as to address any stakeholder questions. Additional telephone calls were made to key organizations, such as commercial vehicle administrators and ITS program directors in adjacent states. A listing of the follow-up telephone interviewees is located in Appendix A. A sample script for the telephone interviews can be found in Appendix C.

WEBSITE

The project website, www.ilits.org, served as an important coordination and outreach tool during the development of the Strategic Plan and Architecture. The website allowed for dialogue between stakeholders as well as an information clearinghouse of project-related materials. The website included a discussion board, weekly updates, project documents, meeting dates and materials, and links to key resources such as the National ITS Architecture and other project-related websites. The website also provided a central location for the posting of draft documents for the review by the Steering and Technical Committees.

NEWSLETTERS

This project included the preparation and distribution of two newsletters. The first newsletter outlined the study purpose and process and includes information on ITS and specific ITS activities within Illinois. The second newsletter highlighted the recommendations and findings included in the ITS Strategic Plan. The newsletters identify project contact information and encourage input from stakeholders. Both of the newsletters were distributed electronically through the project website.

STEERING COMMITTEE

A strong and effective institutional framework that consists of representatives from partner agencies and other stakeholders is the key to successfully planning, operating and maintaining ITS deployments. The Steering Committee for this project provided multi-agency project support, guidance, and policy-level direction and ensured both participation by a wide variety of stakeholders and coordination with other related work in the state. Membership on the Steering Committee includes a cross-section of directors, managers and other senior staff with oversight responsibilities for ITS and operations. The Steering Committee's responsibilities included reviewing and providing feedback on ITS technologies and design related documents throughout the development of the Statewide ITS Architecture and Strategic Plan. Steering Committee

members are identified in Appendix A, and a listing of committee meeting dates can be found below in Table 3-1.

TECHNICAL COMMITTEE

The Technical Committee for this project also provided multi-agency project support and guidance, as well as technical direction during the ITS Architecture and Strategic Plan development. The committee consisted of those with direct responsibility for ITS within their organizations, including representatives from the IDOT District Offices (ITS Coordinators) and staff from the MPOs, as well as key local and regional agencies identified by the Steering Committee and Project Team. Technical Committee members are identified in Appendix A, and a listing of committee meeting dates are shown in Table 3-1. Some members of the Technical Committee also serve as champions for ITS in their regions, leading the development of regional ITS architectures listed above.

Table 3-1 – Project Meetings and Workshops

Meeting Name	Location	Date
Project Kick Off Meeting	Springfield	April 2nd, 2004
Region 2A Statewide Workshop	Rockford	June 15th, 2004
Region 2B Statewide Workshop	Moline	June 14th, 2004
Region 3 Statewide Workshop	Ottawa	June 17th, 2004
Region 4 Statewide Workshop	Peoria	June 16th, 2004
Region 5 Statewide Workshop	Champaign	June 22nd, 2004
Region 6 Statewide Workshop	Springfield	May 26th, 2004
Regions 7 & 9 Statewide Workshop	Mount Vernon	June 21st, 2004
Region 8 Statewide Workshop	Collinsville	May 27th, 2004
Regional Architecture Development Workshop	Bloomington	October 14th, 2004
Champaign Regional Workshop	Champaign	October 27th, 2004
Peoria Regional Workshop	Peoria	November 16th, 2004
Quad Cities Regional Workshop	Rock Island	October 13th, 2004
Springfield Regional Workshop	Springfield	November 17th, 2004
St. Louis East Regional Workshop	Collinsville	November 10th, 2004
Steering Committee Meeting #1	Springfield	May 20th, 2004
Steering Committee Meeting #2	Springfield	March 10th, 2005
Steering Committee Meeting #3	Springfield	December 13th, 2005
Technical Committee Meeting #1	Springfield	May 19th, 2004
Technical Committee Meeting #2	Springfield	August 11th, 2004
Technical Committee Meeting #3	Springfield	January 5th, 2005
Technical Committee Meeting #4	Olympia Fields	March 3rd, 2005
Technical Committee Meeting #5	Springfield	June 30th, 2005
Technical Committee Meeting #6	Springfield	December 1st, 2005

3.2   Outreach Results

3.2.1 STAKEHOLDER SURVEYS

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 completed surveys were provided by ITS stakeholders across the state.

A transportation system *objective* can be defined as the "benefit derived from satisfying a transportation need." As such, the identified needs were grouped into different objective categories to better identify the applicable ITS user services. The responses to the first two questions in the stakeholder survey are shown in Figure 3-2 and Figure 3-3, which summarize the issues and problems that the stakeholders characterized as their highest priorities.

For Question #1, the highest ranked issues with the local transportation network relate to emergency response, road construction, emergency coordination, weather, and traveler information. Likewise, for Question #2, the top ranked services to be implemented are emergency vehicle management, incident management, traffic control, and incident response.

Since the surveys asked respondents to rank predetermined issues and services and not create and rank their own list, the responses were intended to serve as a starting point for the further discussion of ITS needs and services at the individual stakeholder workshops.

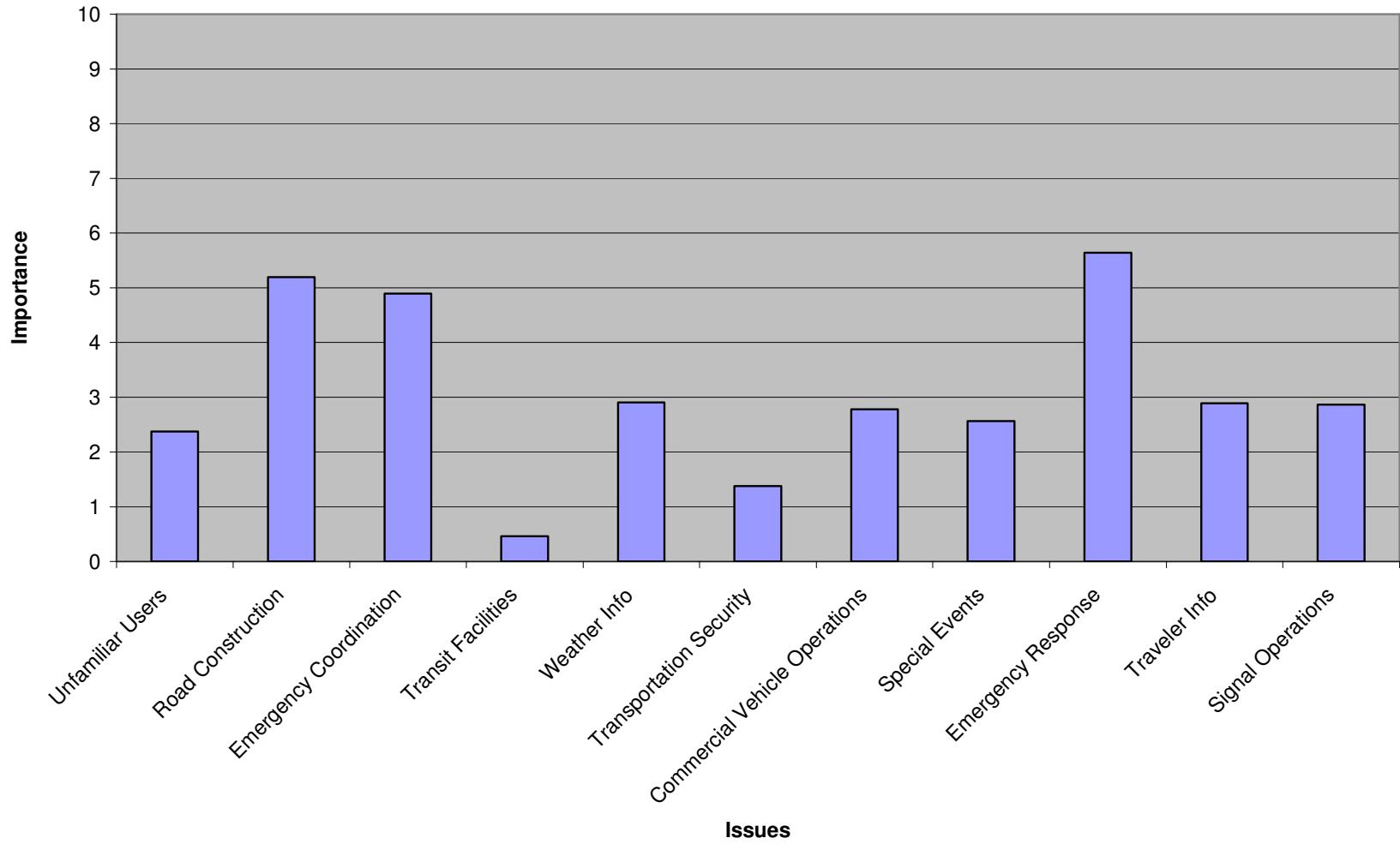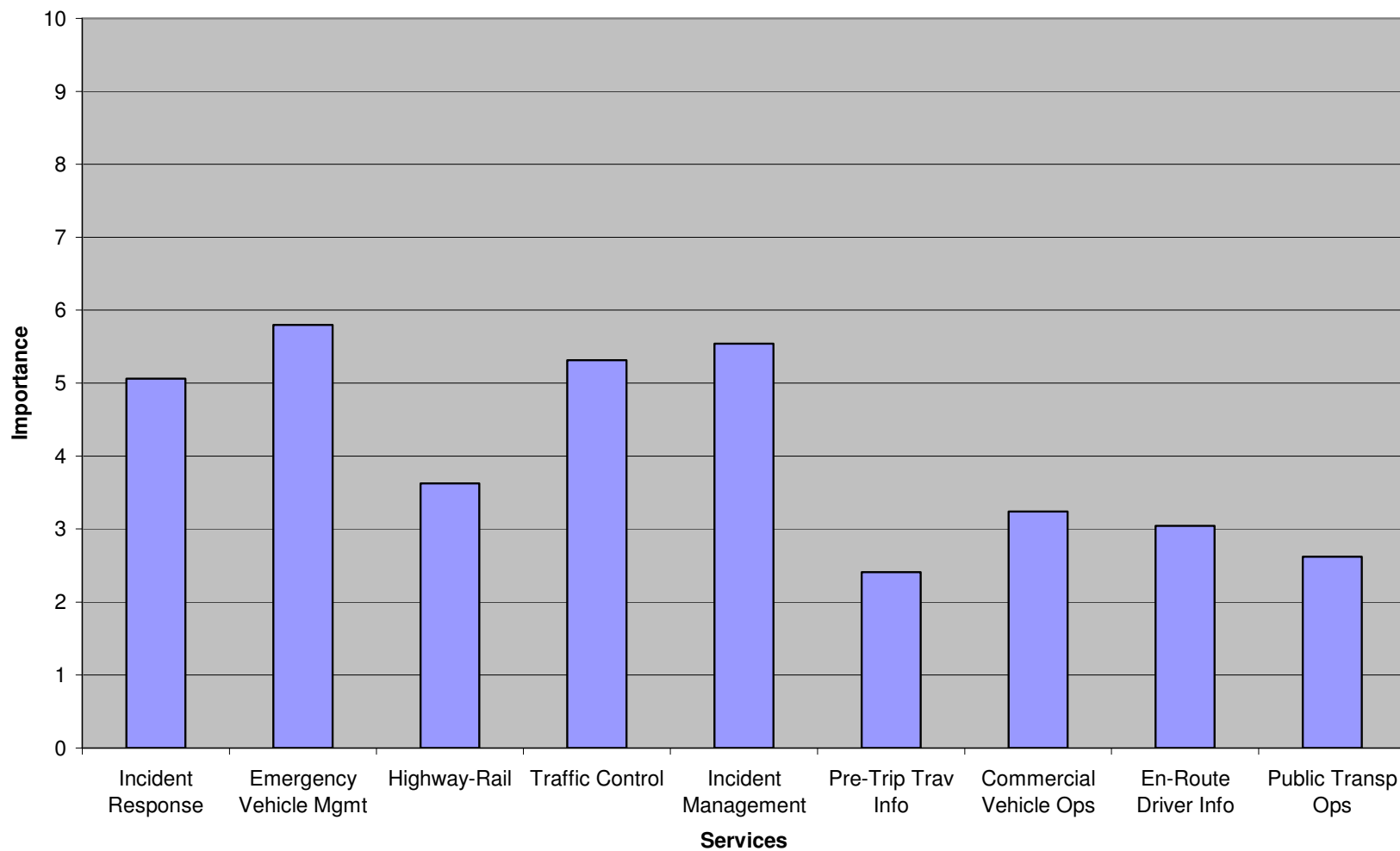Figure 3-2 – Top Local Transportation Network Issues

Figure 3-3 – Top Implementation Services

ITS Strategic Plan - Problem Identification and Prioritization
Illinois Statewide ITS Architecture and ITS Strategic Plan

3-8

3.2.2 STATEWIDE STAKEHOLDER WORKSHOPS

Each of the regions shown in Figure 3-1 participated in a region-wide workshop to identify statewide and inter-regional transportation needs and define existing interagency communications. During the workshop, the Project Team provided project information to the participants, followed by interactive breakout groups. The first breakout session was tasked with identifying top issues and priorities from a statewide perspective. After the breakout sessions, the ideas were compiled and the entire group voted on the top issues and priorities by assigning point values to the identified needs. The results of the voting from each workshop are summarized in Appendix D.

The second breakout session provided a forum for identifying existing communications that takes place between agencies. The information compiled from the second breakout sessions was useful in creating the Statewide Concept of Operations and identifying appropriate interconnections in the Statewide ITS Architecture.

3.2.3 INTERVIEWS

Individual telephone interviews were conducted to collect more detailed information from key stakeholders than was covered during the workshops or through the surveys. The interviews provided a valuable opportunity to clarify how transportation agencies operate and interoperate. The results of the telephone interviews are reflected in the details of the Statewide ITS Architecture, from the identification of individual ITS systems to the interconnections and data flows between them.

3.2.4 IDOT STRATEGIC INITIATIVES

In addition to information gathered during the various forms of stakeholder outreach, additional documentation has provided insight into transportation needs identified by other studies. The Illinois Department of Transportation is continually assessing the surface transportation system and creating initiatives to address the needs they help discover – ITS is just one example of these initiatives.

In recent months, IDOT has published several press releases and reports detailing some of their strategic initiatives. These include the Illinois Comprehensive Highway Safety Plan (CHSP) and the State Transportation Improvement Plan (STIP). Some of the key goals identified are as follows:

- Reduce the number of traffic deaths to 1000 by the year 2008
- Improve 4,518 miles of state operated highways
- Improve safety at highway-railroad grade crossings
- Development of a Crash Information System (CIS)
- Improve the safety of work zones
- Maintain existing state operated highways
- Maintain existing state operated bridges
- Reduce traffic congestion
- Expand roads to increase access for economic development

- Increase the amount of ITS funding for Homeland Security
- Improve the efficiency of paratransit
- "Right-size" IDOT staffing levels

The Illinois Tollway has identified similar goals as part of its long-range planning process, with providing real-time traffic information to drivers and transportation managers as a top need.

These issues demonstrate the direction of IDOT and were taken into consideration in each stage of this study, from the identification of needs and services in this section to the recommendation of projects in Section 7 of this document.

3.3   ITS Program Areas

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." These program areas correlate to some of the 33 ITS user services as defined by the National ITS Architecture. Appendix D shows how the individual issues raised at each stakeholder workshop were grouped into these program areas. Classifying projects in this way will enable an agency to link specific projects back to the Statewide ITS Architecture. This grouping process also enables an agency to focus their attention and resources on the most important needs by designing projects accordingly.

Table 3-2 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. It should be noted that some of the program areas do not correlate directly to a particular ITS user service.   These program areas (Interagency Coordination, Improved Communications, Standards and Standardization, Outreach/Public Education) are more overarching in nature, and highlight the need for integration in the development and deployment of ITS.   Furthermore, they are directly linked to the development and application of the Statewide ITS Architecture.

Table 3-2 – Identified ITS Program Areas

ITS Program Area	Related ITS User Service
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

ITS Program Area	Related ITS User Service
	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	-

A detailed description of each program area follows in subsequent sections.

3.3.1 TRAVELER INFORMATION

This program highlights the need for timely, accurate, and useful information for the traveling public, including commercial vehicle operators, transit riders, motorists, and even cyclists and pedestrians. Such information is useful to travelers before they embark on their trip, allowing them to make modal and routing decisions, during a trip to inform travelers of changing traffic conditions, and near the completion of a trip to help with travel services, like parking information and lodging reservations.

3.3.2 INCIDENT MANAGEMENT

State, county, and municipal agencies routinely handle incidents through their various resources such as police, fire, ambulance, and departments of public works. This program area emphasizes the need for improved incident management tools and techniques and better coordination between incident managers, to bring about reduced emergency detection, assessment, response, and clearance times. For example, video images and weather information can be combined at emergency services dispatch centers to help determine the best response to an incident (i.e., the right people and equipment delivered at the proper times to the exact locations along the best route).

3.3.3 INTERAGENCY COORDINATION

It is very common for one agency to collect and maintain information that would be of use to other agencies (e.g., construction schedules, evacuation plans, weather reports, special event plans). Needs identified in this program area include the integration of interagency information that can result in cost savings, improved access to useful data, and new services. The computer networks, databases, and communication systems commonly used in ITS systems can facilitate much greater coordination between these agencies than ever before, and this can translate into fewer lives lost, reduced crash rates, less delay and higher returns on agency investments. This program area also addresses the need for interagency agreements to make this coordination possible.

3.3.4   CONSTRUCTION & MAINTENANCE

This program area covers problems associated with road and bridge construction as well as maintenance operations. Before roadwork is conducted, maintainers need tools to better track traffic loading so that pavement performance can be optimized. This can keep lane restrictions to a minimum. When work is needed, motorists need to know about problem areas and be able to determine alternative routes. Above all other issues in this program area, safety within the work zone – both for motorists and for workers – is paramount, and should be continually improved and emphasized throughout Illinois.

3.3.5   TRAFFIC MANAGEMENT

Traffic flowing across a network of roads is very complex and dynamic and is affected by many variables such as weather, special events and time of day. Traffic managers need to continually monitor and measure the performance of the surface transportation system. As incidents arise, these managers need to have appropriate countermeasures to preserve the flow of traffic, both on Interstate Highways, state highways, county roads, and local streets.

3.3.6   COMMERCIAL VEHICLE OPERATIONS

The number of trucks using roadway networks is increasing every year with no reduction in sight for the foreseeable future. These vehicles present significant challenges because their size degrades traffic flow, and their weight can accelerate pavement and bridge deterioration rates. This program area emphasizes the need for monitoring commercial vehicle movements, identifying problem vehicles, notifying the carriers of their best options for movement within the metropolitan areas, and for dealing with the special concerns of hazardous cargo and oversize loads. Recent events have also increased the need for heightened security within the commercial vehicle operations program area, especially at border crossings. Needs in this program area also include more efficient vehicle inspection, permitting, and credentialing.

3.3.7   TRANSIT

This program area identifies the need to make transit operations more efficient and safer in both metropolitan and rural areas. Transit managers seek additional tools to plan and track the movement of their vehicles to better maintain their schedules and provide reliable connections. Transit riders desire more information about transit system status.

3.3.8   IMPROVED COMMUNICATIONS

Communications is the common denominator for the exchange of information. This program area emphasizes the need for improved communications, both between management centers (center-to-center, or "C2C") and between centers and their assets (center-to-field, or "C2F"). Transportation managers need more reliable, more efficient, and more integrated means for C2C and C2F communications.

3.3.9   DATA MANAGEMENT

It is easy to see from the amount of data discussed in the other program areas that data management is an important issue. This program area highlights the need for transportation agencies to be able to collect, store, update, purge, and mine the data that it collects so that it can

be turned into useful information and more easily shared. This may involve the combination or linkage of different agency databases.

3.3.10 SYSTEM SECURITY

This program area emphasizes the need to continually improve transportation system security. Typical concerns include training and outfitting for preparedness, evacuation plans, hardening vulnerable targets and public areas, improving network security, and creating diverse communication systems.

3.3.11 TRANSPORTATION SAFETY

Safety is a factor that must be incorporated into all transportation projects. This program area cites the need to improve the safety of travelers, including motorists, transit riders, cyclists, and pedestrians. Transportation managers need ways to identify high accident locations and determine ways to remedy unsafe conditions. Highway-rail intersections in particular provide unique safety challenges. For locations where safety is affected by weather conditions or animal movements, managers may need to dynamically monitor the environment before enacting a response.

3.3.12 STANDARDIZATION

To achieve a high level of integration it is imperative that all parties use compatible equipment and data protocols. This program area emphasizes the need for identifying and applying appropriate standards for use among transportation agencies. This will help to improve data sharing and shared asset control. Many of these standards are already established, and this is the primary reason for all projects to adhere to the Statewide or appropriate regional ITS architecture.

3.3.13 ASSET SHARING & CONTROL

This program area expands upon the Interagency Coordination program area by citing the need for agencies to build common, integrated systems. Instead of just coordinating the interfaces and interaction between neighboring systems, this program area emphasizes the need to combine these systems and then establish the appropriate access rights for each member to access information or control remote devices. This could include shared control of field devices, or a co-located management facility where multiple agencies reside at the same location to encourage coordination. Asset sharing has many advantages including lower costs per agency, instant compatibility, more powerful functions, simpler archiving, and lower maintenance costs.

3.3.14 MULTI-MODAL COORDINATION

The program area highlights the need to coordinate the operation of different, complementary modes of transportation, including buses, light rail, intercity rail, and air. By providing seamless modal choices to the traveling public, transit becomes a more attractive option, thereby increasing the capacity of the transportation system.

3.3.15 OUTREACH/PUBLIC EDUCATION

Intelligent transportation systems offer many benefits to transportation managers and the traveling public. However, in many cases these benefits are not fully realized because potential system users are unaware of the tools at their disposal. This program area cites the need to

emphasize ITS tools in Illinois, such as 511 Traveler Information, transit initiatives, and ITS applications for commercial vehicle fleet managers.

3.4   Program Area Prioritization

The outreach component of the Statewide ITS Architecture and Strategic Plan development is a critical step. A variety of techniques were used to obtain input from a representative cross-section of transportation stakeholders in Illinois, each of which provided valuable information about the issues and needs of the transportation system in the state.

The stakeholder surveys provide the regional or local perspective, while the stakeholder workshops were focused on interregional or statewide issues. As such, the needs identified in the surveys act as guidance for the topics discussed in person during the stakeholder workshops. In some cases, the priorities between the surveys and workshops may not coincide.

Taking into account the variety of outreach methodologies, participating stakeholders, and ensuing results, the overall top statewide priorities are summarized in Table 3-3 below. The prioritization of the program areas is based on the total number of votes received across all stakeholder workshops. Where the totals are equal for a given program area, the total number of workshops where the issue was raised acts as a tiebreaker.

Table 3-3 - 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

In addition to these statewide issues, project outreach results can be applied to each region, resulting in listings of prioritized *regional* program areas. These prioritized regional program areas, presented in Appendix E, are intended for regional ITS champions to help them in determining the ITS priorities for their respective regions.