

Springfield-Sangamon County Regional Intelligent Transportation Systems (ITS) Architecture

FINAL REPORT

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for



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Table of Contents

1.0	Introduction	1
1.1	Geographic Area	1
1.2	Timeframe	1
1.3	Service Scope	1
1.4	Stakeholders	1
2.0	Inventory	5
2.1	Systems	5
2.2	Needs and Services	13
3.0	Concept of Operations	22
3.1	Role and Responsibility Areas	22
4.0	Functional Requirements	28
5.0	Interfaces and Information Flows	34
6.0	Project Sequencing	36
7.0	Agreements	39
8.0	Standards	41
9.0	Use of the Architecture	44
9.1	Planning	44
9.2	Project Development and Implementation	44
10.0	Architecture Maintenance Plan	46
10.1	Who Will Maintain the Architecture?	46
10.2	What Will Be Maintained?	46
10.3	How Will It Be Maintained?	47

List of Tables

Table 1 Architecture Requirements Reference.....	ix
Table 2 Architecture Stakeholder List.....	3
Table 3 Springfield ITS Systems Inventory	6
Table 4 Springfield Market Packages (Transportation Services) Inventory	15
Table 5 Archived Data Management Roles and Responsibilities	22
Table 6 Emergency Management Roles and Responsibilities.....	23
Table 7 Freeway Management Roles and Responsibilities	24
Table 8 Incident Management Roles and Responsibilities.....	24
Table 9 Maintenance and Construction Roles and Responsibilities.....	25
Table 10 Parking Management Roles and Responsibilities	25
Table 11 Surface Street Management Roles and Responsibilities	26
Table 12 Transit Services Roles and Responsibilities.....	26
Table 13 Traveler Information Roles and Responsibilities	26
Table 14 Springfield Equipment Packages (Functional Areas) Inventory	28
Table 15 Springfield ITS Projects Inventory.....	37
Table 16 Springfield ITS Agreements Inventory	40
Table 17 Springfield ITS Standards Inventory.....	42

List of Figures

Figure 1 Architecture Development Process Diagram	x
Figure 2 Sangamon County	2
Figure 3 National ITS Architecture Subsystem Interconnect Diagram.....	6
Figure 4 Network Surveillance Market Package Diagram	14
Figure 5 Springfield Example Interconnect Diagram.....	34
Figure 6 Springfield Subsystem Interconnect Diagram	35
Figure 7 Standard Systems Engineering Diagram.....	45

List of Appendices

- A Project Outreach Summary
- B Stakeholder List
- C Stakeholder Survey Template
- D Telephone Interview Template
- E Interconnect Diagrams

List of Terms

AASHTO	American Association of State Highway and Transportation Officials
ASTM	American Society for Testing and Materials
AVL	Automatic Vehicle Locationing
CCTV	Closed Circuit Television
CMAQ	Congestion Mitigation and Air Quality
DMS	Dynamic Message Signs
DPW	Department of Public Works
EDP	Early Deployment Plan
EMS	Emergency Medical Services
EPA	Environmental Protection Agency
ESDA	Emergency Services and Disaster Agency
ETSD	Emergency Telephone System Department
EV	Emergency Vehicle
FAA	Federal Aviation Administration
FHWA	Federal Highway Administration
FSP	Freeway Service Patrol
FTA	Federal Transit Authority
GIS	Geographic Information Systems
HAR	Highway Advisory Radio
HAZMAT	Hazardous Materials
HRI	Highway Rail Intersection
IEEE	Institute of Electrical and Electronics Engineers
IEMA	Illinois Emergency Management Agency
IDOT	Illinois Department of Transportation
ITSSP	Illinois Department of Transportation ITS Strategic Plan
ISP	Illinois State Police/Information Service Provider
ITE	Institute of Transportation Engineers
ITS	Intelligent Transportation Systems
MCM	Maintenance and Construction Management
MCO	Maintenance and Construction
MCV	Maintenance and Construction Vehicle
MOU	Memorandum of Understanding
MPA	Metropolitan Planning Area
MPO	Metropolitan Planning Organization
NEMA	National Electrical Manufacturer's Association
NTCIP	National Transportation Communications for ITS Protocol
PD	Police Department
RFP	Request for Proposals
RTP	Regional Transportation Plan
RWIS	Road Weather Information Systems
SCS	Sangamon County Sheriff
SAE	Society of Automotive Engineers
SAA	Springfield Airport Authority
SATS	Springfield Area Transportation Study
SFD	Springfield Fire Department
SMTD	Springfield Mass Transit District
SPD	Springfield Police Department
SDO	Standards Development Organization
SSCRPC	Springfield-Sangamon County Regional Planning Commission

STIP	Statewide Transportation Improvement Plan
STP	Surface Transportation Program
TEA-21	Transportation Equity Act for the 21 st Century
TCIP	Transit Communications Interface Profile
TIP	Transportation Improvement Program
TMC	Traffic Management Center
USDOT	United States Department of Transportation

Foreword

Intelligent transportation systems (ITS) are the integrated application of various technologies and management strategies to provide traveler information to increase the safety and efficiency of the surface transportation system. This ITS architecture document represents the next in a series of steps intended to chart a course for ITS in the Springfield area.

A regional ITS architecture is a framework for describing, planning, and implementing intelligent transportation systems. It is intended to promote integration between stakeholders by providing a common framework under which stakeholders in a region can build intelligent transportation systems. Once implemented, these systems can combine to increase the safety and efficiency of the surface transportation system.

As a further incentive for the development of regional ITS architectures, the Federal Highway Administration (FHWA) developed a Rule and the Federal Transit Authority (FTA) developed a parallel Policy to enact Section 5206(e) of the Transportation Equity Act for the 21st Century (TEA-21) in April of 2001. This Rule/Policy states that, in order to receive funding through the Highway Trust Fund, any region in the United States that has deployed or will soon deploy ITS projects must develop a regional ITS architecture. As ITS projects are deployed in the region, such as the Illinois Department of Transportation (IDOT) Dynamic Message Sign Phase I Project along Interstate 55, Springfield certainly falls within this category. Table 1 provides a reference for each of the FHWA/FTA Rule/Policy requirements, and the manner in which they are addressed in this Architecture Document.

The FHWA has provided a number of resources to assist architecture developers around the country with their task. First, the FHWA created the National ITS Architecture as a guide for the development of regional ITS architectures (www.iteris.com/itsarch/). Now in its fifth version, the National ITS Architecture provides architecture developers with a common vocabulary, promoting the integration and interoperability of ITS systems. The FHWA's "Regional ITS Architecture Guidance Document" (Oct. 12, 2001) elaborates on the Rule/Policy, providing recommendations for each stage of architecture development (see Figure 1). In addition, the FHWA developed Turbo Architecture® software as a tool for assembling, organizing, and displaying the information necessary to create and use an ITS architecture.

As the architecture "champions," the Springfield-Sangamon County Regional Planning Commission (SSCRPC) and IDOT District 6 have led the effort to bring stakeholders together to create this Springfield-Sangamon County Regional ITS Architecture, and will be responsible for the ongoing use and maintenance of this architecture. This work has been performed in close coordination with IDOT's concurrent development of the Illinois Statewide ITS Architecture, which serves as a link between the various regional ITS architectures across Illinois.

Overall, this Springfield-Sangamon County Regional ITS Architecture is intended to promote continued improvements in the movement of goods and people throughout the region through the implementation of ITS strategies, technologies, and projects. Most importantly, the deployment of these ITS strategies, technologies, and infrastructure will help to make the metropolitan Springfield transportation system safer, better coordinated, and more efficient. In addition, by taking a cooperative multi-agency approach, the SSCPRC and partner agencies will be able to better integrate ITS related efforts beyond their boundaries, pool funds, and deploy ITS technologies and projects that benefit not only the Springfield region, but the entire State of Illinois.

Table 1 Architecture Requirements Reference

ITS Architecture Requirement	Report Section Addressing Requirement
Architecture Scope and Region Description	The geographic area, timeframe, and service scope of the Springfield Architecture are provided in Sections 1.1 - 1.3 of this document.
Stakeholder Identification	A listing of stakeholders can be found in Section 1.4 and Appendix B of this document.
System Inventory	Section 2.1 contains a complete systems inventory (subsystems and terminators).
Needs and Services	Section 2.2 identifies those needs identified by the stakeholders, as well as a listing of existing and planned services (market packages).
Operational Concept	The operational concept for Springfield is defined in Section 3.0 of this document.
Functional Requirements	The functional requirements of the Springfield Architecture are listed in Section 4.0 of this document.
Interfaces/Information Flows	Interfaces and information flows are described in Section 5.0 of this document. Individual interconnect diagrams are contained in Appendix E.
Project Sequencing	A listing of ITS projects and their anticipated sequence are addressed in Section 6.0 of this document.
Agreements	A listing of existing and planned agreements is included in Section 7.0 of this document.
Standards Identification	Applicable ITS Standards are included in Section 8.0 of this document.
Using the Regional ITS Architecture	Section 9.0 describes the manner in which the Springfield ITS Architecture can be used to plan, design, and deploy ITS projects in the region.
Maintenance Plan	Section 10.0 outlines the tasks associated with maintaining the architecture.

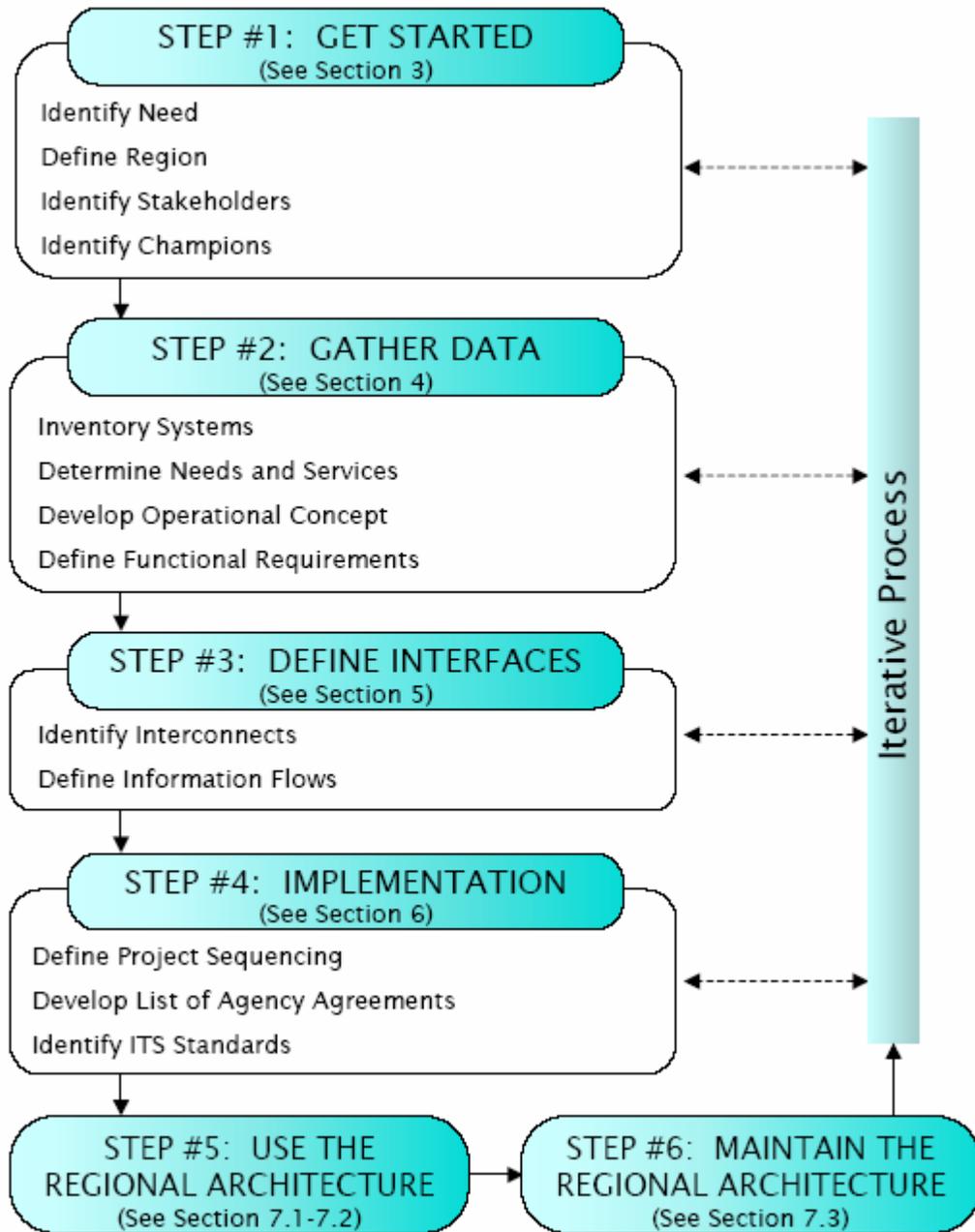


Figure 1 Architecture Development Process Diagram

1.0 Introduction

Before creating an ITS architecture, it is necessary to define the general parameters of the architecture. These parameters include the geographic area, timeframe, service scope, and involved stakeholders of the architecture. Setting these architecture boundaries leads to the tasks in subsequent steps.

1.1 Geographic Area

The Sangamon County area serves as the geographic region for the Springfield regional ITS architecture. This area, depicted in Figure 2, includes the 2000 census urbanized area and the Springfield Area Transportation Study (SATS) urbanized area boundary as well as the rest of Sangamon County.

Sangamon County was chosen to define the ITS architecture boundary for several reasons. The county boundary includes a large stretch of both Interstate 55 and Interstate 72 which are both critical transportation links for the region. The defined area also includes the City of Springfield, SMTD, the Abraham Lincoln Capital Airport, and several communities that coordinate efforts with the SSRPC, county, and state government. The Springfield metropolitan area continues to expand and grow within the county.

1.2 Timeframe

For the purposes of this architecture, the timeframe has been set at ten (10) years from the date of this document, or 2015. Defining an architecture timeframe provides a basis for determining the status of ITS systems, services, and interconnections, as identified in later steps.

1.3 Service Scope

Before delving into the particular ITS services that are found in the greater Springfield area (described in detail in Section 2.0), it should be noted that several statewide ITS services have been excluded from this regional architecture and are instead contained within the Statewide Illinois ITS Architecture. These include commercial vehicle services, and other ITS services that are administered from a single statewide agency, such as the Department of Motor Vehicles, the Environmental Protection Agency, and the Department of Revenue.

1.4 Stakeholders

From the onset of architecture development, every effort was made to include as many ITS stakeholders as possible. This outreach process resulted in a stakeholder group comprised of a comprehensive list of surface transportation agencies and organizations. Below in Table 2 is a listing of these stakeholders with descriptions as designated in the Turbo Architecture® database. Appendix A includes a listing of stakeholders that participated in the architecture workshops.

As shown in Table 2, some stakeholders are explicitly identified in the architecture (e.g., ‘City of Springfield Department of Public Works’), while others are combined within a general stakeholder designation (e.g., ‘Township Road Districts’). This was done to include as many ITS stakeholders as possible while keeping the architecture to a manageable size. The townships within Sangamon County include Auburn, Ball, Buffalo Hart, Cartwright, Chatham, Clear Lake, Cooper, Cotton Hill, Curran, Divernon, Fancy Creek, Gardner, Illiopolis, Island Grove, Lanesville, Loami, Maxwell, Mechanicsburg, New Berlin, Pawnee, Rochester, Springfield Talkington, Williams, and Woodside Townships.

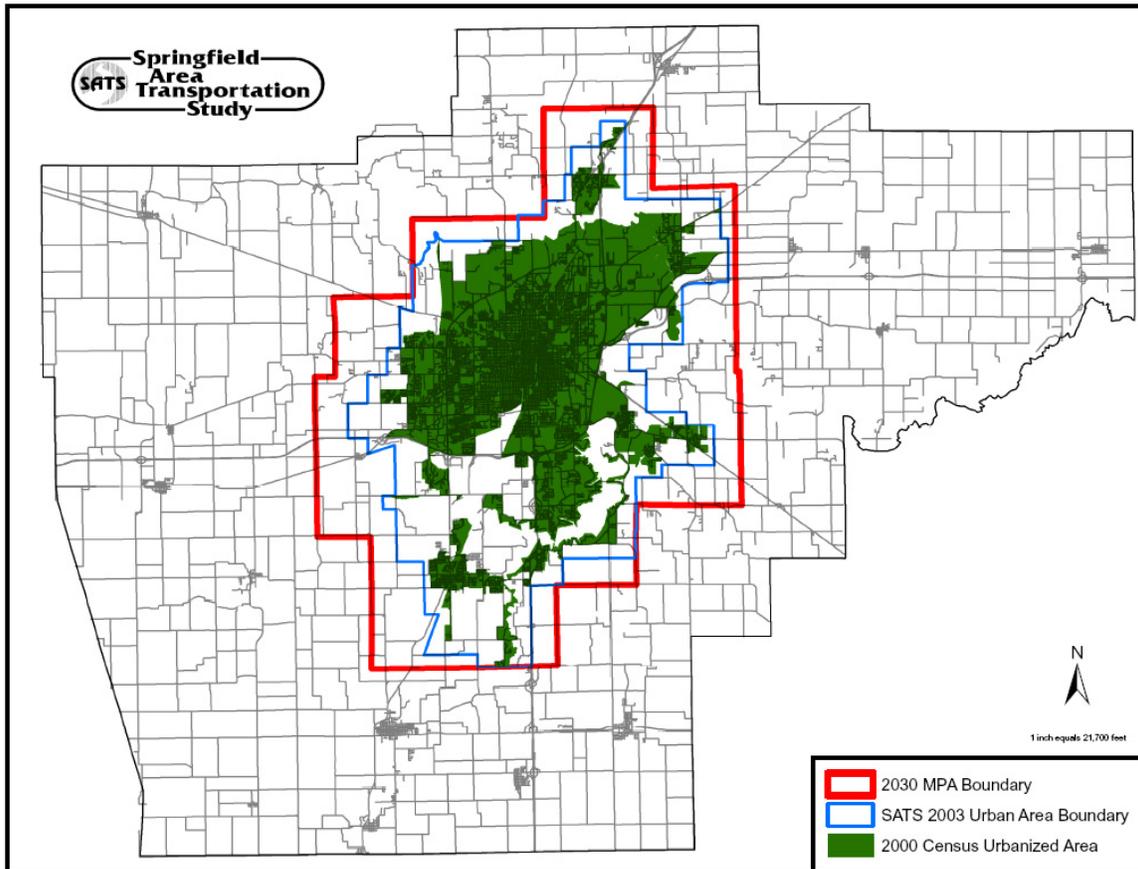


Figure 2 Sangamou County

Table 2 Architecture Stakeholder List

Stakeholder Name	Stakeholder Description
City of Springfield CWLP	City of Springfield City Water, Light, and Power. Responsible for signal maintenance and emergency response for water and power.
City of Springfield Fire/EMS	City of Springfield Fire Department and emergency management services.
City of Springfield Police	City of Springfield Police Department. Includes four separate village police departments encompassed in Springfield.
City of Springfield Public Works	City of Springfield Department of Public Works. Primarily responsible for maintenance of the surface transportation network within the municipal borders.
Community Transit Agencies	These are community based transit systems that may use vans or small buses to provide demand responsive service within a town or township. These are differentiated from rural transit agencies in that these are in communities that are part of a metropolitan area.
Emergency Management Group*	Group of stakeholders for Emergency Management functions. (SMTD, City of Springfield PD, City of Springfield Fire/EMS, ESDA, Sangamon County Sheriff Department, ISP District Operations, Sangamon County ETSD, IEMA, City of Springfield CWLP, Sangamon County OEM)
IDOT District 6 Bureau of Construction	Illinois Department of Transportation, District Bureau of Construction. Project Implementation responsible for the construction of the state highway system and the state’s local roads and streets.
IDOT District 6 Bureau of Local Roads	Illinois Department of Transportation, District Bureau of Local Roads receives communication from villages, townships, cities, and counties regarding construction information and project status information for coordination purposes.
IDOT District 6 Bureau of Operations	Illinois Department of Transportation, District Bureau of Operations. Responsible for the design of traffic control equipment and operations and maintenance along the state highway system and the state’s local roads and streets.
IDOT District 6 Bureau of Program Development	Illinois Department of Transportation, District Bureau of Program Development. Responsible for collecting, analyzing, and distributing traffic data for planning purposes.
IDOT District 6 Communications	IDOT District office for the Springfield region.
IEMA	Illinois Emergency Management Agency at both the Regional and Statewide office levels.
ISP District Operations	Illinois State Police (ISP) District Operations have jurisdiction over the state roads. In the more rural areas of Illinois, the role of first responder is likely to be the ISP.
Media Outlets	Newspapers, television stations, radio stations, and internet sites that provide transportation information to the public.
National Weather Service	National Weather Service functions as a weather information service provider and generates severe weather alerts.
National/State Park and Recreation Areas	Park and Recreation areas function as Regional/Special Event generators and provide travel information to park users.
Parking Lot Operators	Operators of parking lots that operate parking lot signs that indicate available parking locations.
Portable Speed Monitoring System Users*	Group of stakeholders for portable speed monitoring. (City of Springfield PD, Sangamon County Sheriff Department, ISP District Operations)
Rail Freight Operators	Rail Freight Operators oversee freight train operations and coordinate with surface transportation entities.

Stakeholder Name	Stakeholder Description
Sangamon County ETSD	Emergency Telephone System Department (ETSD) appointed by the corporate authorities of Sangamon County that provides for the management and operation of a 9-1-1 system within the scope of such duties and powers as are prescribed by the Emergency Telephone System Act (ETSA).
Sangamon County Highway Department	Sangamon County Highway Department is the County agency that is primarily responsible for maintenance of the surface transportation network outside the municipal borders.
Sangamon County OEM	The mission of the Office of Emergency Management (OEM) is to enhance public safety by providing the citizenry with the necessary information, which it may use to mitigate, prepare for, respond to, and recover from disasters that may threaten Sangamon County. OEM collects information on potential hazards to the County and gives early warning, if possible, when danger is imminent.
Sangamon County Sheriff Department	Law enforcement agency responsible for response in Sangamon County.
Secretary of State	Capital Building Police Force
SMTD	Springfield Mass Transit District
Special Event Organizations*	Organizations that oversee major special events and tourist centers, including colleges and universities, convention and tourism bureaus, and national/state park and recreation areas. This stakeholder group includes Springfield Convention and Visitors Bureau, National/State Park and Recreation Areas, and Colleges and Universities.
Springfield Airport Authority	Springfield Airport Authority manages regional airport operations at the Abraham Lincoln Capital Airport including transportation, security, and travel information.
Springfield Convention and Visitors Bureau	An organization that maintains up-to-date information on events, attractions, and venues in their coverage area.
Springfield-Sangamon County Regional Planning Commission	Regional Planning Commission responsible for developing long range transportation plans and short term transportation improvement programs.
Township Fire Protection Districts	Fire departments for local townships.
Township Road Districts	Twenty-five local townships who maintain non-municipal, non-County, non-State routes in Sangamon County (no signals identified at this time).
Travelers	Generic term that covers the traveling public in and through Sangamon County.
University of Illinois at Springfield	The University of Illinois at Springfield has a police department and dispatch center.

* Turbo Architecture "stakeholder group"

Appendix B provides a comprehensive listing of all of the project stakeholders and primary contacts for each agency/organization.

2.0 Inventory

To build a foundation for the Springfield-Sangamon County Regional ITS Architecture, a research effort was undertaken to collect and analyze the numerous ITS-related documents that have been created to-date. These documents record the progress of ITS planning and deployment in the region.

The documents include the following:

- SATS FY/2006-2008 TIP = Springfield Area Transportation Study FY/2006-2008 Transportation Improvement Program
- Springfield Area Transportation Study 2030 Long Range Plan Transportation Plan
- STIP = Statewide Transportation Improvement Plan (IDOT)
- Illinois Statewide ITS Architecture (Draft version, December 2005)
- Illinois Statewide ITS Strategic Plan (Draft version, December 2005)

These documents, along with the results of the stakeholder outreach process, provide the ITS inventory that serves as the starting point for this ITS architecture.

2.1 Systems

A 'system' can be defined as:

A collection of hardware, software, data, processes, and people that work together to achieve a common goal.

In the realm of ITS, a system corresponds to the resources of a surface transportation agency. In general, these resources can be categorized as centers (e.g., Traffic Management Center), field elements (e.g., freeway surveillance devices), vehicles (e.g., transit vehicles), or devices that interact with travelers (e.g., traveler information website). The National ITS Architecture includes entities ('subsystems' and 'terminators') that correspond to the real-world examples previously given. Figure 3 displays the National ITS Architecture Subsystem Interconnect Diagram, which shows these subsystems and the potential links between them, including the type of communications media that each link would use.

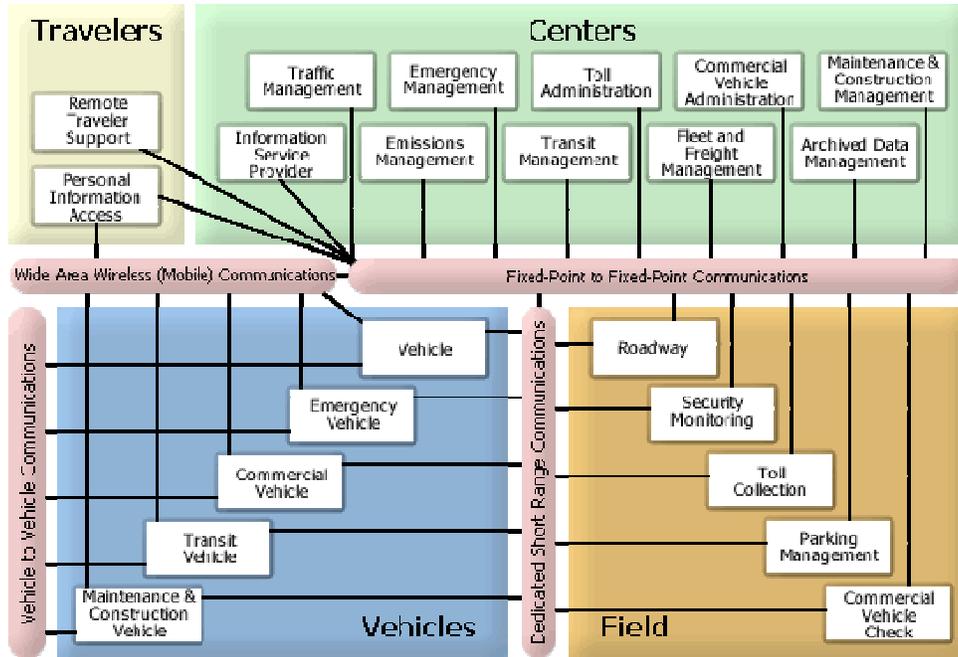


Figure 3 National ITS Architecture Subsystem Interconnect Diagram

Table 3 provides a listing of the systems identified in the Springfield region, along with the associated stakeholder, National ITS Architecture entity, status, and a brief description.

Table 3 Springfield ITS Systems Inventory

System	Associated Stakeholder	Architecture Entity	Element Status	Element Description
Capital Airport	Springfield Airport Authority	Multimodal Transportation Service Provider	Existing	Abraham Lincoln Capital Airport is located in Sangamon County approximately three miles northwest of the city of Springfield, Illinois.
CCTV (IDOT)**	IDOT District 6 Communications	Roadway Subsystem	Planned	Five (5) closed circuit television (CCTV) cameras along I-55. Phase I - 3 locations, Phase II - 2 locations.
City of Springfield Emergency Vehicle Preemption System	City of Springfield Public Works	Roadway Subsystem	Existing	These systems provide emergency vehicle priority be given at an approaching intersection.
City of Springfield Field Equipment	City of Springfield Public Works	Roadway Subsystem	Existing	Video detection and vehicle detection, traffic signals (some on closed loop systems), HRI active warning systems, train arrival prediction systems.

System	Associated Stakeholder	Architecture Entity	Element Status	Element Description
City of Springfield Fire/EMS Emergency Vehicles	City of Springfield Fire/EMS	Emergency Vehicle Subsystem	Existing	Springfield Fire Department and EMS vehicles.
City of Springfield Maintenance and Construction Dispatch	City of Springfield Public Works	Archived Data Management Subsystem / Maintenance and Construction Management / Roadway Subsystem	Existing	This system includes radio dispatch communications systems to allow Springfield Maintenance to dispatch and track their vehicles. This includes capabilities to distributing information to other agencies at some level (fax, phone, e-mail, on-line, etc.).
City of Springfield Maintenance Field Equipment	City of Springfield Public Works	Roadway Subsystem	Existing	This includes roadside de-icing system and portable message signs.
City of Springfield Maintenance Vehicles	City of Springfield Public Works	Maintenance and Construction Vehicle	Existing	Vehicles for snow removal and to maintain streets. No plans for AVL in 10 year horizon, but do have maintenance scheduling software in place.
City of Springfield TMC	City of Springfield Public Works	Archived Data Management Subsystem / Information Service Provider / Traffic Management	Existing	Higher functioning arterial transportation management facility run by the City of Springfield. Controls traffic signal systems in Springfield.
Citywatch Alert Notification System	Emergency Management Group	Alerting and Advisory Systems	Existing	Web-based alert notification system for law enforcement, emergency management, public utilities, and public health agencies.
Community Transit Agency Dispatch	Community Transit Agencies	Transit Management	Existing	These are community based transit systems that may use vans or small buses to provide demand responsive service within a town or township. These are differentiated from rural transit agencies in that these are in communities that are part of a metropolitan area.
Community Transit Agency Transit Vehicles	Community Transit Agencies	Transit Vehicle Subsystem	Existing	Vehicles used by community transit operations.
DMS (IDOT)**	IDOT District 6 Communications	Roadway Subsystem	Planned	Four (4) dynamic message signs (DMS) along I-55. Phase I - 2 locations, Phase II - 2 locations.

System	Associated Stakeholder	Architecture Entity	Element Status	Element Description
Dynamic Warning Systems	Portable Speed Monitoring System Users	Roadway Subsystem / Traffic Management	Existing	Dynamic warning systems monitor vehicle speeds and provide warning to drivers and/or vehicles that are traveling at unsafe speeds. These systems should be deployed at locations where excessive speed is a problem such as in advance of curves and downgrades or where white-out conditions are possible during winter weather. These systems have a variety of levels of technical sophistication as well as level of autonomous operation.
Early Warning System	City of Springfield Fire/EMS	Emergency Management / Roadway Subsystem	Existing	These systems activate early warning devices in the event of an emergency.
Early Warning System Sirens	City of Springfield Fire/EMS	Emergency Management / Roadway Subsystem	Existing	These sirens activate in the event of an emergency.
Event Promoter	Special Event Organizations	Event Promoters	Existing	Organizations that oversee major special events and tourist centers, including colleges and universities, convention and tourism bureaus, and national/state park and recreation areas.
IDOT District 6 Bridge Clearance Information System	IDOT District 6 Bureau of Operations	Archived Data Management Subsystem	Existing	Geographical Information System (GIS) database of bridge clearances
IDOT District 6 Bureau of Local Roads Construction Coordination System	IDOT District 6 Bureau of Local Roads	Maintenance and Construction Management	Existing	Villages, townships, cities, and counties all coordinate the local construction and maintenance with IDOT who then puts the agencies in contact with the appropriate IDOT department (construction, design, central office, etc.)
IDOT District 6 Emergency Vehicle Pre-emption System	IDOT District 6 Bureau of Operations	Roadway Subsystem	Existing	These systems provide emergency vehicle priority be given at an approaching intersection.
IDOT District 6 Field Equipment	IDOT District 6 Communications	Roadway Subsystem	Existing	Video detection, vehicle detection, environmental sensors including high water sensors, traffic signals (some on closed loop systems), HRI intersection equipped, and emergency call boxes.
IDOT District 6 Kiosks	IDOT District 6 Communications	Remote Traveler Support	Planned	Kiosks are public informational displays supporting various levels of interaction and information access.

System	Associated Stakeholder	Architecture Entity	Element Status	Element Description
IDOT District 6 Maintenance and Construction Dispatch (Communication Center)**	IDOT District 6 Communications	Archived Data Management Subsystem / Information Service Provider / Maintenance and Construction Management / Roadway Subsystem / Traffic Management / Emergency Management	Existing	This system includes mobile data terminals (MDT), radio dispatch communications systems to allow IDOT District 6 to dispatch and track their vehicles. Includes GIS system and scheduling software for routine and corrective maintenance and are capable of distributing information to other agencies at some level (fax, phone, e-mail, on-line, etc.). This system will also operate the planned CCTV and DMS deployments.
IDOT District 6 Maintenance Field Equipment	IDOT District 6 Communications	Maintenance and Construction Management / Roadway Subsystem	Existing	Illinois Department of Transportation (IDOT) maintenance systems include Work Zone Dynamic Message Signs (DMS) and speed detection systems to aid IDOT workers while in the field by providing information to travelers of upcoming and on-going activities.
IDOT District 6 Maintenance Vehicles	IDOT District 6 Bureau of Construction	Maintenance and Construction Vehicle	Existing	437 maintenance vehicles equipped for snow removal and to maintain roads; no plans for AVL in 10 year horizon but maintenance scheduling software in-place.
IDOT District 6 Security Monitoring Field Equipment	IDOT District 6 Communications	Security Monitoring Subsystem	Existing	Monitoring and surveillance equipment for security reasons at public areas.
IDOT District 6 Traffic Data Archive	IDOT District 6 Bureau of Program Development	Archived Data Management Subsystem	Existing	Electronic database of traffic data collected by IDOT District 6 and used by the Bureau of Program Development for planning purposes.
IEMA Region 9 Office	IEMA	Emergency Management	Existing	Coordinates resources for regional emergency response and disaster management.

System	Associated Stakeholder	Architecture Entity	Element Status	Element Description
ISP Dispatch**	ISP District Operations	Archived Data Management Subsystem / Emergency Management	Existing	Illinois State Police (ISP) dispatching systems that interface within ISP districts (which are different than IDOT districts and regions) as well as to ISP Central Operations for use in wide area alerts and large scale disaster efforts. These systems can include Computer-Aided Dispatch (CAD) to interface with the mobile data terminals (MDT) found in the ISP vehicles. These systems also provide a means of communication to local law enforcement and first responders.
ISP Emergency Vehicles	ISP District Operations	Emergency Vehicle Subsystem	Existing	Illinois State Police (ISP) vehicles are equipped with computer aided dispatch (CAD) interfaces to their mobile data terminals (MDT).
Local Media	Media Outlets	Media	Existing	The media element represents the information systems that provide traffic reports, travel conditions, and other transportation-related news services to the traveling public through radio, TV, and other media.
Parking Management System	Parking Lot Operators	Parking Management	Future	Systems that maintain an inventory of open parking spaces and make that available to DMS designed to inform motorists.
Rail Operations Center	Rail Freight Operators	Rail Operations	Existing	Centralized control point for a substantial segment of a freight railroad's operations and maintenance activities.
RWIS	IDOT District 6 Communications	Roadway Subsystem	Existing	Roadway Weather Information Systems (RWIS). These systems feed their data in to the IDOT District Communications center currently. In the future data will be fed into the District's specific type of centric hub.
Sangamon County 911 Center - PSAP	Sangamon County ETSD	Emergency Management	Existing	Public safety answering point (PSAP) that dispatches all emergency responders for Sangamon County and the City of Springfield.
Sangamon County Disaster Response Team	Sangamon County OEM	Emergency Management	Existing	A squad of volunteers whose efforts can be coordinated with other public safety providers for responses to emergencies and disasters within the County.

System	Associated Stakeholder	Architecture Entity	Element Status	Element Description
Sangamon County Emergency Vehicles	Sangamon County Sheriff's Department	Emergency Vehicle Subsystem	Existing	Sangamon County Sheriff vehicles are equipped with computer aided dispatch (CAD) interfaces to their mobile data terminals (MDT).
Sangamon County GIS	Sangamon County Highway Department	Archived Data Management Subsystem	Existing	Sangamon County Geographic Information Systems (GIS) services.
Sangamon County Maintenance and Construction Dispatch	Sangamon County Highway Department	Maintenance and Construction Management / Roadway Subsystem	Existing	Includes mobile data terminals (MDTs), computer-aided dispatch (CAD) systems and radio dispatch communications systems to allow the Sangamon County Highway Department to dispatch and track their fleets for construction and maintenance activities.
Sangamon County Maintenance and Construction Website	Sangamon County Highway Department	Archived Data Management Subsystem	Existing	As an aid to travelers, websites detailing maintenance and construction within Sangamon County.
Sangamon County Maintenance Field Equipment	Sangamon County Highway Department	Roadway Subsystem	Existing	Traffic signal locations and contracted portable dynamic message signs.
Sangamon County Maintenance Vehicles	Sangamon County Highway Department	Maintenance and Construction Vehicle Subsystem	Existing	Vehicles equipped for snow removal and to maintain roads outside municipal boundaries; no plans for AVL in 10 year horizon but maintenance scheduling software in place.
Sangamon County Mobile Communication Center	Sangamon County Sheriff Department	Emergency Management / Emergency Vehicle Subsystem	Existing	Portable crisis management unit.
Sangamon County OEM Dispatch	Sangamon County OEM	Emergency Management	Existing	OEM collects information on potential hazards to the County and gives early warning, if possible, when danger is imminent.
Secretary of State Police (Capital)	Secretary of State	Emergency Management	Existing	Provides security for State buildings.
SMTD Dispatch	SMTD	Archived Data Management Subsystem / Information Service Provider / Transit Management	Existing	Dispatching for SMTD fixed route vehicles.
SMTD Intermodal Transfer Center	SMTD	Multimodal Transportation Service Provider	Planned	Facility to bring travel modes together, currently under construction.

System	Associated Stakeholder	Architecture Entity	Element Status	Element Description
SMTD Paratransit Dispatch	SMTD	Transit Management	Existing	Dispatching for SMTD paratransit vehicles.
SMTD Paratransit Vehicles	SMTD	Transit Vehicle Subsystem	Existing	Paratransit Buses
SMTD Security Monitoring Field Equipment	SMTD	Security Monitoring Field Equipment	Existing	Surveillance cameras on SMTD vehicles.
SMTD Transit Vehicles	SMTD	Transit Vehicle Subsystem	Existing	Fixed Route Buses
SMTD Traveler Card	SMTD	Traveler Card	Future	Electronic fare payment card for SMTD vehicles.
SMTD Website	SMTD	Remote Traveler Support	Existing	Transit information website.
SSCRPC Traffic Data Archive	Springfield-Sangamon County Regional Planning Commission	Archived Data Management Subsystem	Planned	Traffic data archive.
Statewide Incident Management System	Emergency Management Group	Emergency Management / Information Service Provider	Planned	Provides ICS, UC, EOC, and NIMS capabilities across the state of Illinois in an automated uniform manner.
Township Fire Protection District Dispatch	Township Fire Protection Districts	Emergency Management	Existing	Dispatch fire apparatus to incident scenes.
Township Fire Protection District Emergency Vehicles	Township Fire Protection Districts	Emergency Management	Existing	Emergency Vehicles
Township Maintenance Vehicles	Township Maintenance and Construction Dispatch	Maintenance and Construction Vehicle	Existing	Vehicles equipped for snow removal and to maintain roads outside municipal boundaries; no plans for AVL in 10 year horizon but maintenance scheduling software in place.
UI at Springfield Police	University of Illinois at Springfield	Emergency Management	Existing	University Police Station and vehicles.
User Personal Computing Devices	Travelers	Personal Information Access	Existing	User Personal Computing Devices refers to equipment an individual owns and can personalize with their choices for information about transportation networks. An Internet-connected PC is an example.

System	Associated Stakeholder	Architecture Entity	Element Status	Element Description
Weather Service Feed	National Weather Service	Weather Service	Existing	This terminator provides weather, hydrologic, and climate information and warnings of hazardous weather including thunderstorms, flooding, hurricanes, tornadoes, winter weather, tsunamis, and climate events.
Work Zone Photo Enforcement System	ISP District Operations	Roadway Subsystem	Planned	These systems include portable traffic control and enforcement equipment that are dynamically positioned in work zones and other locations where excessive speed is an issue. These systems monitor the roadway environment, photograph vehicles when speed conditions for that location are exceeded, and provide this information for speed enforcement.

* 'Existing' describes an element that is in-place, 'planned' describes a system that is funded and scheduled for deployment, 'future' describes a system that is not funded but is expected to be deployed within the next 10 years
 ** Included in the Springfield DMS/CCTV Project

2.2 Needs and Services

In order to determine how the systems in Table 3 can best be applied, a stakeholder workshop held on May 26, 2004, included an ITS needs analysis. The attendees considered a number of critical transportation issues. Each transportation issue was defined, discussed, and compared. After discussion, the identified issues were prioritized through a voting process. The prioritized list of issues is as follows:

1. Coordinate Emergency Management
2. Advanced Traveler Information (ATIS) – Emergency
3. Improve Safety at High Accident Locations
4. ATIS – Construction
5. ATIS – Amber Alert
6. Improve Weather Information Distribution
7. Coordinate HRI Crossings
8. ATIS – Weather
9. Address Communication Coverage “Dead Spots”
10. Make CVO applications attractive to broader trucking interests
11. HRI Crossing Information for Public, Emergency Responders
12. ATIS – Special Events
13. Improved Data Collection
14. ATIS – Passenger Rail/Bus

These prioritized issues serve as the basis for the development of ITS goals and objectives for the region, as well as the identification of ITS services.

Each of the systems listed in Table 3 are applied by their associated stakeholder to provide some service to the traveling public. In terms of transportation, a ‘service’ can be defined as:

Capabilities you put in place to meet transportation needs.

The National ITS Architecture contains 85 “market packages” which correspond to the services provided by various transportation agencies. These market packages demonstrate how the various subsystems and terminators identified in Section 2.1 work together to provide transportation services. As an example, Figure 4 shows the ‘Network Surveillance’ market package (ATMS01), with its associated subsystems (Information Service Provider, Roadway, and Traffic Management Roadway) and terminators (Map Update Provider, Other Roadway, Traffic, and Traffic Operations Personnel). As defined by the National ITS Architecture, the Network Surveillance market package:

Includes traffic detectors, other surveillance equipment, the supporting field equipment, and fixed-point to fixed-point communications to transmit the collected data back to the Traffic Management Subsystem. The derived data can be used locally such as when traffic detectors are connected directly to a signal control system or remotely (e.g., when a CCTV system sends data back to the Traffic Management Subsystem). The data generated by this market package enables traffic managers to monitor traffic and road conditions, identify and verify incidents, detect faults in indicator operations, and collect census data for traffic strategy development and long range planning. The collected data can also be analyzed and made available to users and the Information Service Provider Subsystem.

ATMS01- Network Surveillance

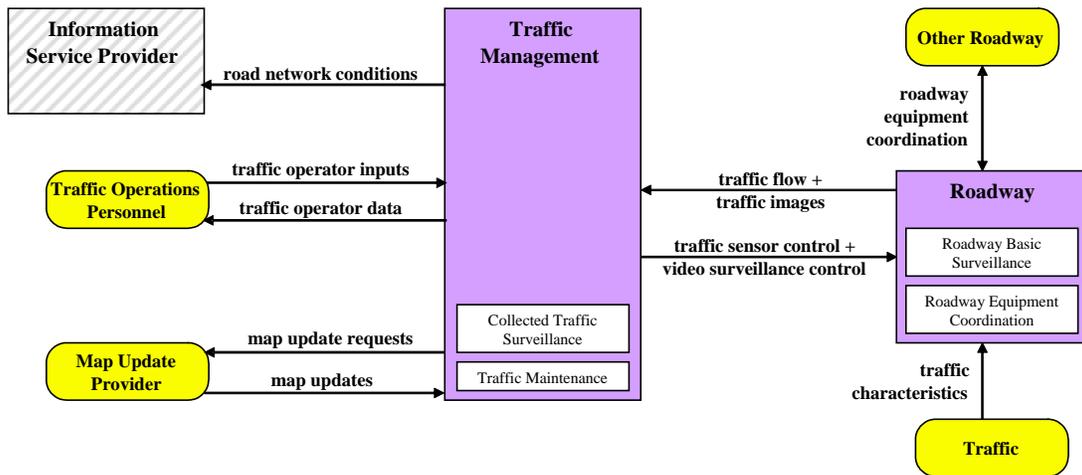


Figure 4 Network Surveillance Market Package Diagram

During the stakeholder workshop, the attendees were invited to help identify the market packages that are appropriate to their agencies. Table 4 provides a listing of the refined list of market packages (38) for the Springfield region, along with the associated element(s) and status.

Table 4 Springfield Market Packages (Transportation Services) Inventory

Market Package	Market Package Name	Status	Element
ATMS03	Surface Street Control	Existing	City of Springfield Emergency Vehicle Preemption
			City of Springfield Field Equipment
			City of Springfield TMC
			IDOT District 6 Emergency Vehicle Preemption
			IDOT District 6 Field Equipment
			Sangamon County Maintenance and Construction Dispatch
ATMS04	Freeway Control*	Existing	Sangamon County Field Equipment
			CCTV (IDOT)
			DMS (IDOT)
			IDOT District 6 Field Equipment
			IDOT District 6 Maintenance and Construction Dispatch
ATMS06	Traffic Information Dissemination*	Existing	IDOT District 6 Security Monitoring Field Equipment
			City of Springfield Field Equipment
			City of Springfield Maintenance and Construction Dispatch
			City of Springfield TMC
			DMS (IDOT)
			IDOT District 6 Maintenance and Construction Dispatch (Communication Center)
			IDOT District 6 Maintenance Field Equipment
			ISP Dispatch
			Local Media
			Sangamon County 911 Center – PSAP
Sangamon County Maintenance and Construction Dispatch			
ATMS07	Regional Traffic Control	Planned	SMTD Dispatch
			City of Springfield Field Equipment
			City of Springfield TMC
			IDOT District 6 Field Equipment
			IDOT District 6 Maintenance and Construction Dispatch (Communication Center)
			Sangamon County Maintenance and Construction Dispatch
ATMS08	Traffic Incident Management System	Planned	Sangamon County Maintenance Field Equipment
			CCTV (IDOT)
			City of Springfield Field Equipment
			City of Springfield Fire/EMS Emergency Vehicles
			City of Springfield Maintenance and Construction Dispatch
			City of Springfield Maintenance Field Equipment
			City of Springfield PD Emergency Vehicles
			City of Springfield TMC
			DMS (IDOT)
			Event Promoter
			IDOT District 6 Field Equipment
IDOT District 6 Maintenance and Construction Dispatch (Communication Center)			
IDOT District 6 Maintenance Field Equipment			

Market Package	Market Package Name	Status	Element
			IDOT District 6 Security Monitoring Field Equipment
			ISP Dispatch
			ISP Emergency Vehicles
			Local Media
			Sangamon County 911 Center – PSAP
			Sangamon County Emergency Vehicles
			Statewide Incident Management System
			SMTD Dispatch
			Township Fire Protection District Dispatch
			Township Fire Protection District Emergency Vehicles
ATMS13	Standard Railroad Grade Crossing	Existing	City of Springfield Field Equipment
			City of Springfield TMC
			IDOT District 6 Field Equipment
			IDOT District 6 Maintenance and Construction Dispatch (Communication Center)
			Sangamon County Maintenance and Construction Dispatch
			Sangamon County Field Equipment
ATMS14	Advanced Railroad Grade Crossing	Future	IDOT District 6 Field Equipment
			IDOT District 6 Maintenance and Construction Dispatch (Communication Center)
			Rail Operations Center
ATMS17	Regional Parking Management	Future	City of Springfield TMC
			Parking Management System
			SMTD Dispatch
ATMS19	Speed Monitoring	Existing	Work Zone Photo Enforcement System
MC01	Maintenance and Construction Vehicle Tracking	Future	City of Springfield Maintenance and Construction Dispatch
			City of Springfield Maintenance Vehicles
			IDOT District 6 Maintenance and Construction Dispatch (Communication Center)
			IDOT District 6 Maintenance Vehicles
			Sangamon County Maintenance and Construction Dispatch
			Sangamon County Maintenance Vehicles
MC02	Maintenance and Construction Vehicle Maintenance	Existing	City of Springfield Maintenance and Construction Dispatch
			City of Springfield Maintenance Vehicles
			IDOT District 6 Maintenance and Construction Dispatch (Communication Center)
			IDOT District 6 Maintenance Vehicles
			Sangamon County Maintenance and Construction Dispatch
			Sangamon County Maintenance Vehicles
			Township Maintenance and Construction Dispatch
			Township Maintenance Vehicles
MC03	Road Weather Data Collection	Existing	City of Springfield Maintenance and Construction Dispatch
			City of Springfield TMC
			IDOT District 6 Maintenance and Construction Dispatch (Communication Center)

Market Package	Market Package Name	Status	Element
			RWIS
			Sangamon County Maintenance and Construction Dispatch
			Township Maintenance and Construction Dispatch
			Weather Service Feed
MC04	Weather Information Processing and Distribution	Existing	City of Springfield Maintenance and Construction Dispatch
			City of Springfield TMC
			IDOT District 6 Maintenance and Construction Dispatch (Communication Center)
			ISP Dispatch
			Sangamon County 911 Center – PSAP
			Sangamon County Maintenance and Construction Dispatch
			SMTD Dispatch
			Weather Service Feed
MC05	Roadway Automated Treatment	Existing	City of Springfield Field Equipment
MC06	Winter Maintenance	Existing	City of Springfield Maintenance and Construction Dispatch
			City of Springfield Maintenance Vehicles
			City of Springfield TMC
			IDOT District 6 Maintenance and Construction Dispatch (Communication Center)
			IDOT District 6 Maintenance Vehicles
			Sangamon County Maintenance and Construction Dispatch
			Sangamon County Maintenance Vehicles
			Township Maintenance and Construction Dispatch
			Township Maintenance Vehicles
			Weather Service Feed
MC07	Roadway and Maintenance Construction	Existing	City of Springfield Maintenance and Construction Dispatch
			City of Springfield Maintenance Field Equipment
			City of Springfield Maintenance Vehicles
			IDOT District 6 Field Equipment
			IDOT District 6 Maintenance and Construction Dispatch (Communication Center)
			IDOT District 6 Maintenance Field Equipment
			IDOT District 6 Maintenance Vehicles
			ISP Dispatch
			Sangamon County Maintenance and Construction Dispatch
			Sangamon County Maintenance Field Equipment
			Sangamon County Maintenance Vehicles
			Weather Service Feed
MC08	Work Zone Management	Existing	CCTV (IDOT)
			DMS (IDOT)
			IDOT District 6 Maintenance and Construction Dispatch (Communication Center)
			IDOT District 6 Maintenance Field Equipment
			IDOT District 6 Maintenance Vehicles
			ISP Dispatch
			Local Media
			Work Zone Photo Enforcement System

Market Package	Market Package Name	Status	Element
			Sangamon County Maintenance and Construction Dispatch
			Sangamon County Maintenance Vehicles
			SMTD Dispatch
MC09	Work Zone Safety Monitoring	Planned	IDOT District 6 Maintenance and Construction Dispatch (Communication Center)
			IDOT District 6 Maintenance Field Equipment
			Work Zone Photo Enforcement Systems
MC10	Maintenance and Construction Coordination	Planned	City of Springfield Maintenance and Construction Dispatch
			City of Springfield TMC
			IDOT Bureau of Local Roads Construction Coordination System
			IDOT District 6 Maintenance and Construction Dispatch (Communication Center)
			ISP Dispatch
			Local Media
			Sangamon County Maintenance and Construction Dispatch
			SMTD Dispatch
APTS1	Transit Vehicle Tracking	Future	SMTD Dispatch
			SMTD Paratransit Dispatch
			SMTD Paratransit Vehicles
			SMTD Transit Vehicles
APTS2	Transit Fixed-Route Operations	Future	SMTD Dispatch
			SMTD Transit Vehicles
APTS3	Demand Response Transit Operations	Existing	Community Transit Agency Dispatch
			Community Transit Agency Transit Vehicles
			SMTD Paratransit Dispatch
			SMTD Paratransit Vehicles
APTS4	Transit Passenger and Fare Management	Future	SMTD Dispatch
			SMTD Transit Vehicles
			SMTD Traveler Card
APTS5	Transit Security	Existing	Sangamon County 911 Center - PSAP
			SMTD Dispatch
			SMTD Security Monitoring Field Equipment
			SMTD Transit Vehicles
APTS7	Multi-modal Coordination	Future	Capitol Airport
			IDOT District 6 Maintenance and Construction Dispatch (Communication Center)
			Sangamon County Maintenance and Construction Dispatch
			SMTD Dispatch
			SMTD Intermodal Transfer Center
			SMTD Paratransit Dispatch
APTS8	Transit Traveler Information	Future	SMTD Dispatch
			SMTD Kiosks
ATIS1	Broadcast Traveler Information	Planned	City of Springfield Maintenance and Construction Dispatch
			City of Springfield TMC
			Event Promoter
			IDOT District 6 Kiosks
			IDOT District 6 Maintenance and Construction Dispatch

Market Package	Market Package Name	Status	Element
			(Communication Center)
			ISP Dispatch
			Local Media
			Sangamon County 911 Center – PSAP
			Sangamon County Maintenance and Construction Dispatch
			SMTD Dispatch
			SMTD Kiosks
			User Personal Computing Devices
			Weather Service Feed
ATIS2	Interactive Traveler Information	Planned	IDOT District 6 Kiosks
			SMTD Kiosks
			SMTD Website
EM01	Emergency Call-Taking and Dispatch	Existing	City of Springfield Fire/EMS Vehicles
			City of Springfield PD Emergency Vehicles
			ISP Dispatch
			ISP Emergency Vehicles
			Sangamon County 911 Center – PSAP
			Sangamon County Disaster Response Team
			Sangamon County Emergency Vehicles
			Township Fire Protection District Dispatch
EM02	Emergency Routing	Future	City of Springfield Emergency Vehicle Preemption System
			City of Springfield Fire/EMS Emergency Vehicles
			City of Springfield PD Emergency Vehicles
			IDOT District 6 Emergency Vehicle Preemption System
			ISP Dispatch
			ISP Emergency Vehicles
			Sangamon County 911 Center – PSAP
			Sangamon County Emergency Vehicles
			Sangamon County OEM Dispatch
EM05	Transportation Infrastructure Protection	Planned	IDOT District 6 Security Monitoring Field Equipment
			ISP Dispatch
			Sangamon County 911 Center – PSAP
			Sangamon County Mobile Communications Center
			Sangamon County OEM Dispatch
			SMTD Dispatch
			SMTD Security Monitoring Field Equipment
EM06	Wide-Area Alert*	Existing	City of Springfield TMC
			Citywatch Alert Notification System
			DMS (IDOT)
			Early Warning System
			Early Warning System Sirens
			ISP Dispatch
			Sangamon County 911 Center – PSAP
			Sangamon County Disaster Response Team
			Sangamon County OEM Dispatch
			SMTD Dispatch
			Statewide Incident Management System
			User Personal Computing Devices
EM07	Early Warning System	Existing	City of Springfield Maintenance and Construction Dispatch
			City of Springfield TMC

Market Package	Market Package Name	Status	Element
			Early Warning System
			IDOT District 6 Maintenance and Construction Dispatch (Communication Center)
			ISP Dispatch
			Sangamon County 911 Center – PSAP
			Sangamon County OEM Dispatch
			SMTD Dispatch
			Weather Service Feed
EM08	Disaster Response and Recovery	Existing	City of Springfield Maintenance and Construction Dispatch
			City of Springfield TMC
			IDOT District 6 Maintenance and Construction Dispatch (Communication Center)
			ISP Dispatch
			Rail Operations Center
			Sangamon County 911 Center – PSAP
			Sangamon County Disaster Response Team
			Sangamon County Maintenance and Construction Dispatch
			Sangamon County Mobile Communication Center
			Sangamon County OEM Dispatch
			SMTD Dispatch
			Statewide Incident Management System
EM09	Evacuation and Reentry Management	Planned	City of Springfield Maintenance and Construction Dispatch
			City of Springfield TMC
			IDOT District 6 Maintenance and Construction Dispatch (Communication Center)
			ISP Dispatch
			Sangamon County 911 Center – PSAP
			Sangamon County Disaster Response Team
			Sangamon County Mobile Communication Center
			Sangamon County OEM Dispatch
			SMTD Dispatch
EM10	Disaster Traveler Information	Future	City of Springfield TMC
			IDOT District 6 Kiosks
			ISP Dispatch
			Local Media
			Sangamon County 911 Center – PSAP
			Sangamon County OEM Dispatch
			SMTD Kiosks
			SMTD Website
			User Personal Computing Devices
			Weather Service Feed
AD1	ITS Data Mart	Existing	City of Springfield Maintenance and Construction Dispatch
			City of Springfield TMC
			IDOT District 6 Bridge Clearance Information System
			IDOT District 6 Maintenance and Construction Dispatch (Communication Center)
			IDOT District 6 Traffic Data Archive
			ISP Dispatch
			SMTD Dispatch

Market Package	Market Package Name	Status	Element
AD2	ITS Data Warehouse	Planned	Sangamon County 911 Center – PSAP
			SSCRPC Traffic Data Archive

* Included in the Springfield DMS/CCTV Project

3.0 Concept of Operations

Before intelligent transportation systems can be effectively deployed, ITS stakeholders should come together to identify goals for ITS deployment. A key component in this process is a Concept of Operations that defines the roles and responsibilities of those agencies that will gather, process, and act upon the information that is collected by the system.

This section defines the vision for ITS in Springfield and what roles and responsibilities each transportation agency must fulfill to effectively deploy ITS in the region.

3.1 Role and Responsibility Areas

To demonstrate how the various regional ITS stakeholders will work together to realize this vision, nine ‘role and responsibility’ areas were developed. Each of these areas is described below in detail using tables that summarize the individual stakeholder roles and responsibilities by area.

3.1.1 Archived Data Management

Archived data management includes the collection, archiving, management, and sharing of data generated from regional ITS sources. As more and more ITS data collection devices (e.g., transit passenger fare counters, environmental monitoring stations, and vehicle detectors) are installed on the surface transportation system in Springfield, the volume of data that they collect will grow. Table 5 shows the stakeholder roles and responsibilities for the efficient collection and use of this data.

Table 5 Archived Data Management Roles and Responsibilities

Stakeholder	Role/Responsibility	Status
City of Springfield Public Works	Analyze traffic data for planning purposes	Existing
	Collect and store traffic data	Existing
	Provide traffic data to requesting agencies	Existing
IDOT District 6 Bureau of Operations	Collect and store bridge clearance data	Existing
	Provide bridge clearance data to bridge clearance website	Existing
IDOT District 6 Bureau of Program Development	Analyze traffic data for planning purposes	Existing
	Collect and store traffic data	Existing
	Provide traffic data to requesting agencies	Existing
ISP District Operations	Collect and store incident reports	Existing
SMTD	Analyze transit data for planning purposes	Existing
	Collect and store transit data	Existing
Springfield-Sangamon County Regional Planning Commission	Analyze traffic and parking data for planning purposes	Existing
	Collect and store traffic and parking data	Future
	Provide traffic data to requesting agencies	Future
	Support traffic data archive	Future

3.1.2 Emergency Management

Emergency management encompasses the detection of, response to, and coordination for regional emergencies and large-scale disasters (including evacuations). Stakeholders involved in this area work together to plan and implement response plans for emergencies that arise on the surface

transportation system. Table 6 defines roles and responsibilities of the various participating stakeholders.

Table 6 Emergency Management Roles and Responsibilities

Stakeholder	Role/Responsibility	Status
City of Springfield CWLP	Respond to emergencies	Existing
City of Springfield Fire/EMS	Provide emergency medical services	Existing
	Respond to emergencies	Existing
City of Springfield Police	Establish emergency command (local routes)	Existing
	Respond to emergencies	Existing
	Support evacuation	Existing
City of Springfield Public Works	Respond to emergencies	Existing
	Support Evacuation	Existing
Emergency Management Group	Distribute emergency notification to other system users	Existing
IDOT District 6 Bureau of Operations	Distribute wide-area alerts	Existing
	Respond to emergencies	Existing
	Support evacuation	Existing
IEMA	Provide emergency resources	Existing
	Respond to emergencies	Existing
ISP District Operations	Receive and process emergency calls	Existing
	Respond to emergencies	Existing
	Establish emergency command	Existing
	Support evacuation	Existing
Media Outlets	Initiate general emergency warnings	Existing
National Weather Service	Initiate weather emergency warnings	Existing
Rail Freight Operators	Coordinate emergency response between agencies	Existing
	Enact emergency plans	Existing
Sangamon County ETSD	Route emergency calls	Existing
Sangamon County Highway Department	Respond to emergencies	Existing
	Support evacuation	Existing
Sangamon County OEM	Respond to emergencies	Existing
	Support evacuation	Existing
Sangamon County Sheriff Department	Establish emergency command (local routes)	Existing
	Receive and process emergency calls	Existing
	Respond to emergencies	Existing
	Support evacuation	Existing
SMTD	Respond to emergencies	Existing
	Support evacuation	Existing
Township Fire Protection Districts	Provide emergency medical services	Existing
	Receive and process emergency calls	Existing
	Respond to emergencies	Existing

3.1.3 Freeway Management

Freeway management includes the monitoring and control of regional freeways. Freeway incident management, including hazardous material incidents, is addressed in the incident management/response areas. In the Springfield region, the Illinois Department of Transportation is responsible for freeway management, as shown in Table 7.

Table 7 Freeway Management Roles and Responsibilities

Stakeholder	Role/Responsibility	Status
IDOT District 6 Bureau of Operations	Monitor freeway system	Existing
	Detect and verify incidents on freeway	Existing
	Install and operate ITS freeway devices to collect and disseminate data	Existing
ISP District Operations	Monitor vehicle speeds (state routes)	Existing

3.1.4 Incident Management

Building on the Emergency Management area, incident management involves on-site response activities for both planned (e.g., construction) and unplanned (e.g., vehicle crashes) regional incidents. Table 8 shows stakeholders roles and responsibilities that apply to this area:

Table 8 Incident Management Roles and Responsibilities

Stakeholder	Role/Responsibility	Status
City of Springfield CWLP	Respond to incidents	Existing
City of Springfield Fire/EMS	Provide emergency medical services at incidents	Existing
	Respond to incidents	Existing
City of Springfield Police	Create incident reports	Existing
	Establish incident command (local routes)	Existing
	Respond to incidents	Existing
City of Springfield Public Works	Coordinate incident site cleanup (local routes)	Existing
	Create incident reports	Existing
	Provide traffic control at incident sites (local routes)	Existing
	Respond to incidents	Existing
Emergency Management Group	Distribute incident notification to other system users	Existing
IDOT District 6 Bureau of Operations	Provide traffic control at incident sites (state routes)	Existing
	Coordinate incident site cleanup (state routes)	Existing
	Create incident reports	Existing
	Provide traffic control at incident sites (state routes)	Existing
	Respond to incidents	Existing
ISP District Operations	Create incident reports	Existing
	Establish incident command	Existing
	Respond to incidents	Existing
Media Outlets	Distribute incident notification to public	Existing
Rail Freight Operators	Develop incident response plans	Existing
Sangamon County Sheriff Department	Create incident reports	Existing
	Establish incident command (local routes)	Existing
	Respond to incidents	Existing
Special Event Organizations	Develop special event traffic plans	Existing
Township Fire Protection Districts	Provide emergency medical services at incidents	Existing
	Respond to incidents	Existing
Township Road Districts	Coordinate incident site cleanup (local routes)	Existing
	Create incident reports	Existing
	Provide traffic control at incident sites (local routes)	Existing
	Respond to incidents	Existing

3.1.5 Maintenance and Construction

Maintenance and construction activities occur on all routes within the regional roadway network.

Table 9 lists the transportation agency roles and responsibilities for the stakeholders.

Table 9 Maintenance and Construction Roles and Responsibilities

Stakeholder	Role/Responsibility	Status
City of Springfield Public Works	Coordinate construction activities with other maintenance and construction agencies	Existing
	Maintain local routes including snow and ice control, pavement maintenance, and ITS devices (including traffic signals)	Existing
IDOT District 6 Bureau of Construction	Coordinate construction activities with other maintenance and construction agencies	Existing
IDOT District 6 Bureau of Operations	Install and operate RWIS sensors to collect road weather data	Existing
	Maintain state routes including snow and ice control, pavement maintenance, and ITS devices (including traffic signals)	Existing
	Provide RWIS information to National Weather Service	Future
IDOT District 6 Bureau of Local Roads	Coordinate construction activities with other maintenance and construction agencies	Existing
Portable Speed Monitoring System Users	Monitor vehicle speeds in workzones	Existing
Sangamon County Highway Department	Coordinate construction activities with other maintenance and construction agencies	Existing
	Maintain local routes including snow and ice control, pavement maintenance, and ITS devices (including traffic signals)	Existing
Township Road Districts	Coordinate construction activities with other maintenance and construction agencies	Existing
	Maintain local routes including snow and ice control, pavement maintenance, and ITS devices (including traffic signals)	Existing

3.1.6 Parking Management

Parking management involves the operation and management of regional parking systems. In the Springfield region, the downtown parking lot operators are responsible for parking management activities as shown in Table 10.

Table 10 Parking Management Roles and Responsibilities

Stakeholder	Role/Responsibility	Status
Parking Lot Operators	Develop special event parking plans	Existing
	Maintain inventory of downtown parking garages	Existing

3.1.7 Surface Street Management

Like the Freeway Management area, surface street management addresses the monitoring and control of state and local non-freeway routes. This includes the operation of traffic signals (including those at highway-rail intersections) and the coordination of signal operations across jurisdictional boundaries. Table 11 shows roles and responsibilities in this area:

Table 11 Surface Street Management Roles and Responsibilities

Stakeholder	Role/Responsibility	Status
City of Springfield Public Works	Install and operate traffic signals (local routes)	Existing
	Monitor surface street system (local routes)	Existing
	Install and operate ITS surface street devices to collect and disseminate data (local routes)	Planned
IDOT District 6 Bureau of Operations	Install and operate traffic signals (state routes)	Existing
	Monitor surface street system (state routes)	Existing
	Install and operate ITS surface street devices to collect and disseminate data (state routes)	Existing
Sangamon County Highway Department	Install and operate traffic signals (county routes)	Existing
	Install and operate ITS surface street devices to collect and disseminate data (county routes)	Planned
	Monitor surface street system (county routes)	Existing

3.1.8 Transit Services

Transit services include the operation and management of regional transit systems, including both fixed-route operations and demand-response transit. Transit service roles and responsibilities are shown in Table 12.

Table 12 Transit Services Roles and Responsibilities

Stakeholder	Role/Responsibility	Status
Community Transit Agencies	Provide fixed route and demand response school bus services for the region	Existing
SMTD	Provide fixed route bus services for the region	Existing
	Provide paratransit service for the region	Existing

3.1.9 Traveler Information

This area addresses the regional dissemination of traveler information through both existing infrastructures (e.g., radio and television) and real-time interactive request/response systems (e.g., Internet or 511). Participating stakeholders are shown in Table 13.

Table 13 Traveler Information Roles and Responsibilities

Stakeholder	Role/Responsibility	Status
City of Springfield Public Works	Disseminate traffic, incident, and maintenance information to emergency management agencies	Existing
	Disseminate traffic, incident, and maintenance information to travelers and the media	Existing
IDOT District 6 Bureau of Operations	Disseminate traffic, incident, and maintenance information to travelers and the media	Existing
	Disseminate traffic, incident, and maintenance information to emergency management agencies	Existing
ISP District Operations	Disseminate traffic, incident, and maintenance information to travelers and the media	Existing
	Disseminate traffic, incident, and maintenance information to traffic management agencies	Existing
Media Outlets	Disseminate traffic information provided by others	Existing

Stakeholder	Role/Responsibility	Status
Sangamon County Highway Department	Disseminate traffic, incident, and maintenance information to travelers and the media	Existing
	Disseminate traffic, incident, and maintenance information to traffic management agencies	Existing
Special Event Organizations	Disseminate special event information to travelers and the media	Existing
Travelers	Report traffic and incident information to emergency services	Existing

4.0 Functional Requirements

After identifying the systems and services of an intelligent transportation system, functional requirements are used to define what the systems must do to perform their services. It is important to note that these functional requirements are, like the architecture itself, independent of specific technologies.

To help identify appropriate functional requirements for the systems of an architecture, the National ITS Architecture contains ‘equipment packages’ that group together similar processes of a subsystem into “implementable” packages. These equipment packages are also tied to the 85 market packages of the National ITS Architecture.

Table 14 provides a listing of the applicable equipment packages for the Springfield region, along with the associated element and architecture entity (subsystem) for each. In addition, there are a number of individual functional requirement statements under each equipment package. Due to the high level of detail inherent to these functional requirements, they should be viewed using the Turbo Architecture® tool.

Table 14 Springfield Equipment Packages (Functional Areas) Inventory

Element	Architecture Entity	Equipment Package
CCTV (IDOT)	Roadway	Roadway Basic Surveillance
		Roadway Work Zone Traffic Control
City of Springfield Emergency Vehicle Signal Preemption System	Roadway	Roadway Signal Priority
City of Springfield Field Equipment	Roadway	Roadway Basic Surveillance
		Roadway Signal Controls
		Standard Rail Crossing
		Roadway Equipment Coordination
City of Springfield Fire/EMS Emergency Vehicles	Emergency Vehicles	On-Board EV En Route Support
		On-Board EV Incident Management Communication
City of Springfield Maintenance and Construction Dispatch	Maintenance and Construction	ITS Data Repository
		Traffic and Roadside Data Archival
		Government Reporting Systems Support
		MCM Vehicle and Equipment Maintenance Management
		MCM Environmental Information Collection
		MCM Environmental Information Processing
		MCM Incident Management
		MCM Maintenance Decision Support
		MCM Winter Maintenance Management
		MCM Roadway Maintenance and Construction
		MCM Work Activity Coordination
City of Springfield Maintenance Field Equipment	Roadway	Roadway Traffic Information Dissemination
		Roadway Incident Detection
		Roadway Equipment Coordination

Element	Architecture Entity	Equipment Package
		Roadway Automated Treatment
		Roadway Infrastructure Monitoring
City of Springfield Maintenance Vehicles	Maintenance Vehicles	MCV Vehicle System Monitoring and Diagnostics
		MCV Winter Maintenance
		MCV Infrastructure Monitoring
		MCV Roadway Maintenance and Construction
City of Springfield Police Emergency Vehicles	Emergency Vehicles	On-board EV En Route Support
		On-board EV Incident Management Communication
City of Springfield TMC	Information Service Provider/Traffic Management	ITS Data Repository
		Traffic and Roadside Data Archival
		Government Reporting Systems Support
		Basic Information Broadcast
		Interactive Infrastructure Information
		Traveler Telephone Information
		ISP Emergency Traveler Information
		ISP Probe Information Collection
		ISP Data Collection
		TMC Probe Information Collection
		TMC Signal Control
		TMC Freeway Management
		TMC Traffic Information Dissemination
		TMC Regional Traffic Control
		TMC Incident Detection
		TMC Incident Dispatch Coordination/Communication
		TMC Evacuation Support
		TMC Environmental Monitoring
		HRI Traffic Management
		Traffic Maintenance
Traffic Data Collection		
Community Transit Agency Dispatch	Transit	Transit Center Fixed-Route Operations
		Transit Center Paratransit Operations
		Transit Garage Operations
		Transit Garage Maintenance
Community Transit Agency Transit Vehicles	Transit Vehicles	On-board Fixed Route Schedule Management
		On-board Paratransit Operations
		On-board Maintenance
DMS (IDOT)	Roadway	Roadway Traffic Information Dissemination
		Roadway Work Zone Traffic Control
Early Warning System	Security Monitoring	Emergency Early Warning System
		Emergency Environmental Monitoring
		Center Secure Area Surveillance
		Center Secure Area Sensor Management
Early Warning System Sirens	Roadway	Roadway Traffic Information Dissemination
IDOT Bureau of Local Roads Construction Coordination System	Maintenance and Construction	MCM Work Activity Coordination
IDOT District 6 Bridge Clearance Information System	Archived Data Management	ITS Data Repository
		Traffic and Roadside Data Archival
		Government Reporting Systems Support

Element	Architecture Entity	Equipment Package
IDOT District 6 Emergency Vehicle Preemption System	Roadway	Roadway Signal Priority
IDOT District 6 Field Equipment	Roadway	Roadway Basic Surveillance
		Roadway Signal Controls
		Roadway Freeway Control
		Roadway Incident Detection
		Standard Rail Crossing
		Roadway Equipment Coordination
		Roadway Infrastructure Monitoring
IDOT District 6 Kiosks	Information Service Provider	Remote Basic Information Reception Remote Interactive Information Reception
IDOT District 6 Maintenance and Construction Dispatch (Communication Center)	Maintenance and Construction/Information Service Provider/Traffic Management	ITS Data Repository
		Traffic and Roadside Data Archival
		Government Reporting Systems Support
		Basic Information Broadcast
		Interactive Infrastructure Information
		Traveler Telephone Information
		ISP Probe Information Collection
		ISP Data Collection
		MCM Vehicle and Equipment Maintenance Management
		MCM Environmental Information Collection
		MCM Environmental Information Processing
		MCM Incident Management
		MCM Maintenance Decision Support
		MCM Winter Maintenance Management
		MCM Roadway Maintenance and Construction
		MCM Work Zone Management
		MCM Work Zone Safety Management
		MCM Work Activity Coordination
		MCM Data Collection
		Collect Traffic Surveillance
		TMC Traffic Information Dissemination
TMC Evacuation Support		
IDOT District 6 Maintenance Field Equipment	Roadway	Roadway Traffic Information Dissemination
		Roadway Incident Detection
		Roadway Equipment Coordination
		Roadway Infrastructure Monitoring
		Roadway Work Zone Traffic Control
		Roadway Work Zone Safety
IDOT District 6 Maintenance Vehicles	Maintenance Vehicles	MCV Vehicle System Monitoring and Diagnostics
		MCV Winter Maintenance
		MCV Infrastructure Monitoring
		MCV Roadway Maintenance and Construction
		MCV Work Zone Support
IDOT District 6 Security Monitoring Field Equipment	Roadway	Roadway Incident Detection
		Roadway Equipment Coordination
		Field Barrier System Control
		Field Safeguard System Control
IDOT District 6 Traffic Data Archive		ITS Data Repository
		Traffic and Roadside Data Archival
		Government Reporting Systems Support

Element	Architecture Entity	Equipment Package
ISP Dispatch	Emergency Management	ITS Data Repository
		Traffic and Roadside Data Archival
		Government Reporting Systems Support
		Emergency Call-Taking
		Emergency Dispatch
		Emergency Early Warning System
		Emergency Response Management
		Incident Command
		Emergency Evacuation Support
		Emergency Environmental Monitoring
		Center Secure Area Surveillance
		Center Secure Area Sensor Management
Emergency Data Collection		
ISP Emergency Vehicles	Emergency Vehicles	On-board EV Incident Management Communication
Mobile Enforcement System	Roadway	Roadway Speed Monitoring
Parking Management System	Parking Management	Parking Management
		Parking Coordination
Portable Speed Monitoring Systems	Roadway	Roadway Equipment Coordination
		Roadway Speed Monitoring
		TMC Speed Monitoring
RWIS	Roadway	Roadway Probe Beacons
		Roadway Environmental Monitoring
		Emergency Call-Taking
Sangamon County 911 Center - PSAP	Emergency Management/Security Monitoring	Emergency Dispatch
		Emergency Routing
		Emergency Early Warning System
		Emergency Response Management
		Incident Command
		Emergency Evacuation Support
		Emergency Environmental Monitoring
		Center Secure Area Surveillance
		Center Secure Area Sensor Management
		Emergency Data Collection
		Emergency Call-Taking
Sangamon County Disaster Response Team	Emergency Management	Emergency Dispatch
		Incident Command
		Emergency Early Warning System
		Emergency Response Management
		Emergency Call-Taking
Sangamon County Emergency Vehicles	Emergency Vehicles	On-board EV Incident Management Communication
Sangamon County Maintenance and Dispatch	Maintenance and Construction	MCM Vehicle Tracking
		MCM Vehicle and Equipment Maintenance Management
		MCM Environmental Information Collection
		MCM Environmental Information Processing
		MCM Maintenance Decision Support
		MCM Winter Maintenance Management
		MCM Roadway Maintenance and Construction
		MCM Work Zone Management
MCM Work Activity Coordination		

Element	Architecture Entity	Equipment Package
Sangamon County Maintenance Field Equipment	Roadway	Roadway Infrastructure Monitoring
Sangamon County Maintenance Vehicles	Maintenance Vehicles	MCV Vehicle Location Tracking
		MCV Vehicle System Monitoring and Diagnostics
		MCV Winter Maintenance
		MCV Infrastructure Monitoring
		MCV Roadway Maintenance and Construction
Sangamon County Mobile Communications Center	Emergency Management/Security Monitoring	MCV Work Zone Support
		Emergency Dispatch
		Emergency Response Management
		Incident Command
		Emergency Evacuation Support
Sangamon County OEM Dispatch	Emergency Management	Center Secure Area Surveillance
		Center Secure Area Sensor Management
		Emergency Dispatch
		Emergency Response Management
		Incident Command
SMTD Dispatch	Transit Management/Information Service Provider	Emergency Evacuation Support
		ITS Data Repository
		Traffic and Roadside Data Archival
		Government Reporting Systems Support
		Basic Information Broadcast
		Interactive Infrastructure Information
		Traveler Telephone Information
		ISP Emergency Traveler Information
		ISP Data Collection
		Transit Center Tracking and Dispatch
		Transit Center Fixed-Route Operations
		Transit Center Paratransit Operations
		Transit Center Fare and Load Management
		Transit Center Security
		Transit Garage Operations
		Transit Garage Maintenance
		Transit Center Information Services
		Transit Environmental Monitoring
		Transit Center Multi-Modal Coordination
Transit Evacuation Support		
Transit Data Collection		
SMTD Kiosks	Information Service Provider	Remote Basic Information Reception
		Remote Interactive Information Reception
		Remote Transit Information Services
SMTD Paratransit Dispatch	Transit Management	Transit Center Paratransit Operations
SMTD Paratransit Vehicles	Transit Vehicles	On-board Paratransit Operations
SMTD Security Monitoring Field Equipment	Security Monitoring	Field Secure Area Sensor Monitoring
		Field Secure Area Surveillance
SMTD Transit Vehicles	Transit Vehicles	On-board Transit Trip Monitoring
		On-board Fixed Route Schedule Management
		On-board Paratransit Operations
		On-board Transit Fare and Load Management

Element	Architecture Entity	Equipment Package
		On-board Transit Security
		On-board Maintenance
SMTD Website	Information Service Provider	Remote Basic Information Reception
		Remote Transit Information Services
SSCRPC Traffic Data Archive	Archived Data Management	ITS Data Repository
		Traffic and Roadside Data Archival
		Government Reporting Systems Support
		On-Line Analysis and Mining
Statewide Incident Management System	Emergency Management/Information Service Provider	Emergency Early Warning System
		Emergency Response Management
		Incident Command
		Traveler Telephone Information
		ISP Emergency Traveler Information
Township Fire Protection District Dispatch	Emergency Management	Emergency Dispatch
		Emergency Response Management
		Incident Command
Township Fire Protection District Emergency Vehicles	Emergency Vehicles	On-board EV Incident Management Communication
Township Maintenance and Construction Dispatch	Maintenance and Construction	MCM Vehicle System Monitoring and Diagnostics
		MCM Environmental Monitoring
		MCM Winter Maintenance
Township Maintenance Vehicles	Maintenance Vehicles	MCV Vehicle System Monitoring and Diagnostics
User Personal Computing Devices	Personal Information Access	Personal Basic Information Reception

5.0 Interfaces and Information Flows

Many of the functional requirements listed in Section 4.0 highlight interactions between the ITS systems of various regional transportation agencies. These interactions emphasize some of the benefits that ITS can provide. While traffic sensors and roadway cameras collect information that is important to a single agency's operations, the sharing of this information often has a greater positive effect on the larger regional transportation system.

As demonstrated in Section 2.2, the National ITS Architecture identifies the interactions that occur between ITS systems to perform services to the traveling public (see Figure 4). The Turbo Architecture® software tool provides the functionality to display these interactions between individual ITS systems in a graphical format. Figure 5, the Parking Management System Interconnect Diagram, provides an example of these diagrams. This example shows how the different subsystems/terminators (with associated stakeholder) are linked. Note that the status (existing, planned, or future) of those interconnections is also described in the diagram. Appendix E contains the 'interconnect diagrams' for each Springfield ITS system. The architecture also defines the individual bits of information, or 'architecture flows,' that are exchanged between these systems. Due to the high level of detail inherent to the architecture flows, they should be viewed using the Turbo Architecture® tool.

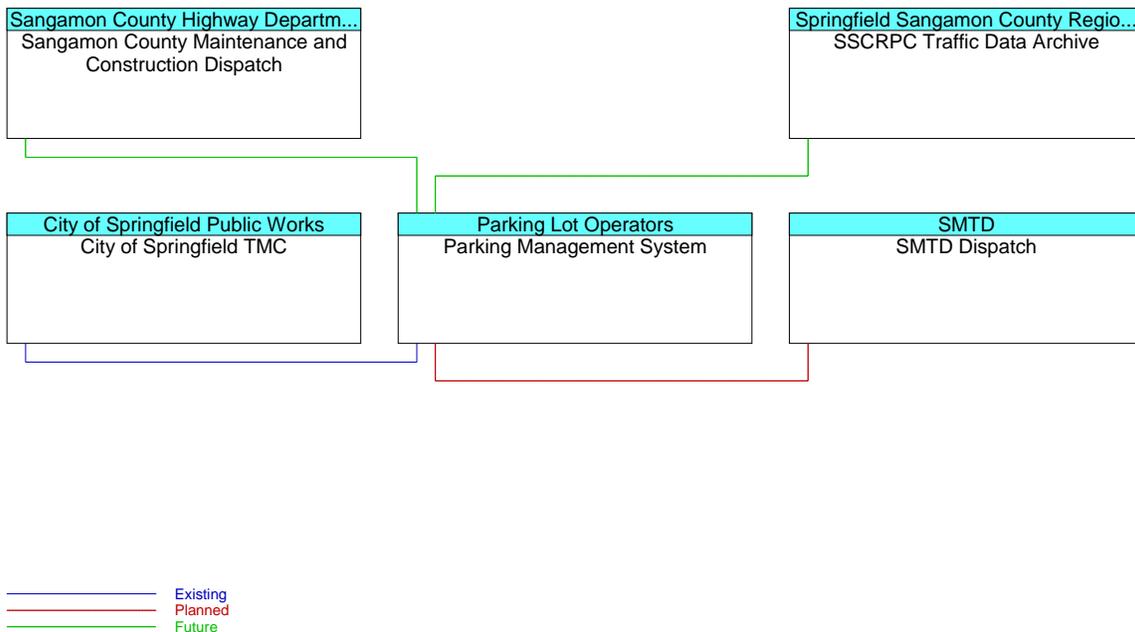


Figure 5 Springfield Example Interconnect Diagram

Figure 6 summarizes the various interconnections between the National ITS Architecture subsystems included in the Springfield-Sangamon County Regional ITS Architecture. As stated in Section 1.3, commercial vehicle operations are addressed in the Illinois Statewide ITS Architecture.

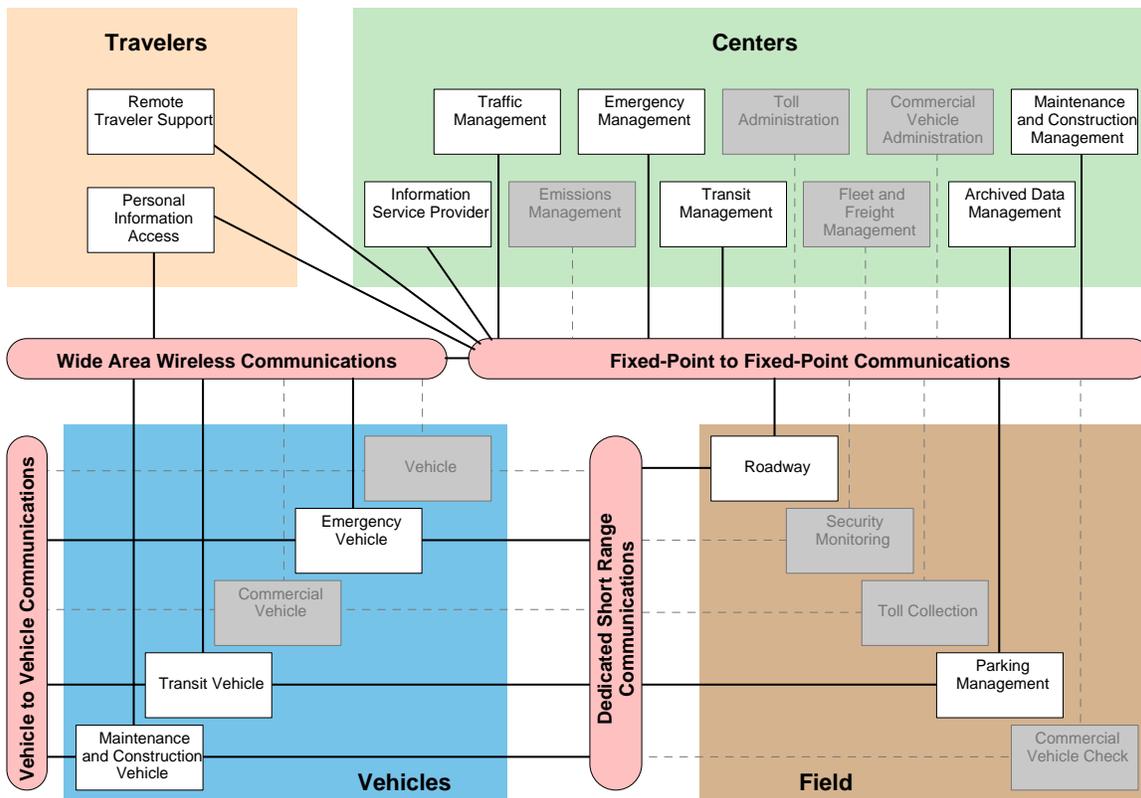


Figure 6 Springfield Subsystem Interconnect Diagram

The subsystems that are not a part of the regional ITS architecture are shown in gray, and include the subsystems related to commercial vehicles (not included in the regional ITS architecture as stated above), emissions management, and tolling collection/administration.

6.0 Project Sequencing

Within the timeframe of this report as outlined in Section 1.2, a variety of ITS projects are planned for deployment and/or implementation in the Springfield region. These projects involve many agencies and funding sources, and are identified in an assortment of regional planning documents.

The purpose of this section of the Springfield Regional Architecture is not to document the projects in detail, but to provide information regarding sequencing and coordination of projects to ensure current/future ITS projects are deployed and implemented in the most effective manner in terms of cost, constructability, and functionality. For most of the projects, details such as in-depth project descriptions and construction cost estimates can be found in the various planning documents.

A listing of current/planned ITS projects in the Springfield region is provided in Table 15. Included in the table is the applicable stakeholder, the funding source, the year of planned deployment, the originating planning document, and the deployment coordination requirements for each project. A description of each column heading in the table is as follows:

- **Stakeholder:** The stakeholder responsible for implementation and maintenance of the project.
- **Project:** A general description of the project.
- **Funding Source:** Project funding source, with acronyms described as follows: STP = Surface Transportation Program, IM/IM\$ = Interstate Maintenance, CMAQ = Congestion Mitigation and Air Quality, 5309 = Federal Transit Section 5309. If column is left blank, funding source is unknown.
- **Agency:** Agency responsible for project funding. If column is left blank, the responsible funding agency is unknown.
- **Timeframe:** Year(s) in which project is expected to be implemented.
- **Source:** Document from which project information was obtained, with acronyms described as follows:
 - SATTIP = Springfield Area Transportation Study Transportation Improvement Plan, 2006-2008
 - Springfield Area Transportation Study 2030 Long Range Plan Transportation Plan
 - STIP = Statewide Transportation Improvement Plan
 - ISITSSP = Illinois Statewide ITS Strategic Plan (Draft version, September 2005)
 - survey = stakeholder survey response
 - interview = stakeholder telephone interview response
- **Deployment Coordination:** Indicates how project is to be coordinated (i.e. coordinate with roadway projects in the vicinity) or if another project needs to be completed beforehand (i.e. vehicle detection must be in place prior to installation of dynamic message signs showing travel times).

Table 15 Springfield ITS Projects Inventory

Stakeholder	Project	Funding Source	Agency	Time-frame	Source	Deployment Coordination
IDOT	CCTV and DMS on Interstate 55 Phase I		IDOT			IDOT
	CCTV and DMS on Interstate 55 Phase II		IDOT			IDOT
	CCTV and DMS on Interstate 55 Phase III		IDOT			IDOT
	Taintor Road - Signals	Surface Transportation Urban Program	IDOT	2006	SATTIP	City of Springfield, Sangamon County
	Wabash Avenue – Signals	Surface Transportation Urban Program	IDOT	2006	SATTIP	City of Springfield, Sangamon County
	Various Intersections (South Grand at MacArthur, Walnut, Spring, and 2 nd ; MacArthur at Iles; and Wabash at Robinhood, Kirkley, east Mall entrance and Drawbridge) – Signal Modifications	Surface Transportation Urban Program	IDOT	2006	SATTIP	City of Springfield, Sangamon County
	I-55 Bus (9 th Street) – Signal Modifications	National Highway System	IDOT	2008	SATTIP	City of Springfield, Sangamon County
	Various Intersections (IL 4 at Panther Creek and Spaulding Orchard; IL 29 at Andrew Road; and IL 97 at Bradfordton) – Signal Modifications	Surface Transportation Urban Program	IDOT	2008	SATTIP	City of Springfield, Sangamon County
SMTD	Intermodal Transfer Center	Section 5309	SMTD	2006 - 2008	SATTIP	IDOT, City of Springfield
City of Springfield	Miscellaneous Traffic Signals	Municipal	City of Springfield	2006-2008	SATTIP	NA
	MacArthur Extension	Grade Crossing Protection Funds	City of Springfield	2006	SATTIP	NA
	Iles - Signals	Municipal	City of Springfield	2007	SATTIP	NA
Sangamon County	Rochester Road (CH 56) – Signals	County	Sangamon County	2006	SATTIP	NA

As indicated in the above table, there are a limited number of ITS projects scheduled for construction over the course of the next several years in the Springfield region. It is imperative that implementation of these projects be coordinated as described in order to for the region to achieve optimal ITS benefits from a cost, constructability, and functionality standpoint.

7.0 Agreements

In the Springfield region, a substantial amount of coordination is required between the various ITS stakeholders to ensure that ITS resources are being utilized in the most efficient possible manner. In many cases, the coordination is governed via an agreement between stakeholders. Agreements allow for each party to obtain a clear understanding of what their responsibilities are, and what they can expect from the other party (or parties) involved. A total of seven ITS stakeholder agreements are currently in place in the region, with an additional two agreements due to be finalized in the near future.

The agreements vary in scope and depth, ranging from informal “handshake” agreements to formal contracts. A wide variety of regional public and private sector ITS stakeholders are participants in the agreements, and a wide variety of ITS activities are addressed.

Table 16 provides a listing of current/planned ITS stakeholder agreements in the Springfield region. Included in the table are the agreement title, type, and description, as well as the stakeholders involved and the status of each Springfield region ITS stakeholder agreement. A description of each column heading in the table is as follows:

- **Number:** The agreement’s assigned number. The number has no significance other than to provide a “placeholder” in the table.
- **Title:** The agreement’s title.
- **Type:** Indicates the type of agreement. Handshake = informal, verbal agreement. MOU = memorandum of understanding (written document providing minimal detail and demonstrating general consensus). Contract = annual written contract stating specific duties and responsibilities of each party. Operational agreement = written document (more specific than an MOU) identifying respective responsibilities for all activities associated with system maintenance and operations. IGA = Intergovernmental Agreement
- **Description:** A brief description of what activities the agreement is intended to govern, and which stakeholders will be involved.
- **Lead Stakeholder:** Stakeholder responsible for initiating the agreement.
- **Associated Stakeholders:** All stakeholders involved in the coordination/execution of the agreement with the lead stakeholder. Stakeholder acronyms are as follows:
 - Springfield DPW = Springfield Department of Public Works
 - IDOT = Illinois Department of Transportation
 - ISP = Illinois State Police
 - SPD = Springfield Police Department
 - SFD = Springfield Fire Department
 - RPC = Springfield-Sangamon County Regional Planning Commission
 - SAA = Springfield Airport Authority
 - SHD = Sangamon County Highway Department
- **Status:** Existing = agreement is currently in place. Planned = agreement is planned for the near future.

Table 16 Springfield ITS Agreements Inventory

No.	Title	Type	Description	Lead Stakeholder	Associated Stakeholders	Status
1	DMS/CCTV Project	MOU	This Memorandum of Understanding lists the key stakeholders and operations roles and responsibilities for Operations of the DMS/CCTV deployment.	IDOT District 6	City of Springfield Public Works, Illinois State Police	Planned
2	City of Springfield/IDOT	MOU	Traffic signal maintenance agreement.	IDOT District 6	City of Springfield Public Works	Existing
3	Sangamon County/IDOT	MOU	Traffic signal maintenance agreement.	IDOT District 6	Sangamon County Highway Department	Existing
4	Sangamon County/Springfield	MOU	Traffic signal maintenance agreement.	Sangamon County	City of Springfield Public Works	Existing
5	Consolidated Public Safety Dispatch Center	IGA	Creation of a consolidated public safety Dispatch Center	Sangamon County ETSD	City of Springfield, Sangamon County	Existing
6	Emergency Response Agreement	IGA	Ensure response to 9-1-1 calls. Agreements are required by Illinois Emergency Telephone System Act Administrative Rules	Sangamon County ETSD	City of Springfield, ISP, Sangamon County Sheriff, Township Fire District	Existing
7	Sangamon County Geographic Information Systems	IGA	Creation and maintenance of a county-wide GIS system.	Sangamon County Highway Department	Sangamon County Departments	Existing

Table 16 is not meant to serve as a “final” list of agreements. As ITS technologies continue to evolve, and as other ITS entities are introduced to the region, new agreements between stakeholders will need to be developed. Also, as new ITS technologies replace older ones, and as stakeholders come and go, certain existing agreements may become obsolete and may need to be either revised or voided.

8.0 Standards

In order to support regional and national interoperability, a system of nationwide ITS standards has been developed. These standards establish a common protocol for agencies that allows them to cost-effectively design, deploy, and maintain ITS systems in a consistent fashion. With ITS technologies continuing to evolve, many ITS standards are still in their infancy, while others are in various stages of development.

The goal of ITS standards is to ensure that the consistency of ITS system implementation resulting from adherence to ITS standards will allow for more efficient data exchange, and will allow for equipment replacement, system upgrades, and system expansion to be more readily accommodated. Also, ITS standards, as a protocol for consistency and uniformity, should provide a more innovative and competitive regional and nationwide market for transportation products and services.

ITS standards are mapped to the architecture flows between ITS architecture subsystems. For instance, ITS standards are mapped to the file transfer protocol for the transmission of roadway network conditions between a metropolitan traffic management center and a suburban traffic management center. A variety of ITS standards are in use in the Springfield region based upon the architecture flows connecting the various regional architecture elements as identified in the Turbo Architecture® software file. A listing of the ITS standards mapped to the architecture flows within the Springfield-Sangamon County Regional ITS architecture is provided in Table 17. Included in the table are the Standards Development Organization(s), the standard name, and the document ID for each standard or group of standards. A description of each column heading in the table is as follows:

- **Lead SDO:** The main standards development organization(s) (SDO) responsible for the development of the listed standard. SDO acronyms are as follows:
 - AASHTO = American Association of State Highway and Transportation Officials
 - ITE = Institute of Transportation Engineers
 - NEMA = National Electrical Manufacturer's Association
 - ASTM = American Society for Testing and Materials
 - IEEE = Institute of Electrical and Electronics Engineers
 - SAE = Society of Automotive Engineers
- **Standard:** The name of the standard or group of standards. For each standards group, the individual standards contained within the group are listed directly below the group identifier. Standard name acronyms not identified in the table are as follows:
 - NTCIP = National Transportation Communications for ITS Protocol
 - TCIP = Transit Communications Interface Profile
- **Document ID:** Indicates the identification of each standard's supporting documentation.

Table 17 Springfield ITS Standards Inventory

Lead SDO	Standard Name	Document ID
AASHTO/ ITE/ NEMA	NTCIP Center to Center Standards Group	NTCIP 1102, NTCIP 1104, NTCIP 1105, NTCIP 1106, NTCIP 2104, NTCIP 2202, NTCIP 2303, NTCIP 2304, NTCIP 2305, NTCIP 2306, NTCIP 2501, NTCIP 2502
	NTCIP Center to Field Standards Group	NTCIP 1102, NTCIP 1104, NTCIP 1105, NTCIP 1106, NTCIP 2104, NTCIP 2202, NTCIP 2303, NTCIP 2304, NTCIP 2305, NTCIP 2306, NTCIP 2501, NTCIP 2502
	Global Object Definitions	NTCIP 1201
	Object Definitions for Actuated Traffic Signal Controller Units	NTCIP 1202
	Object Definitions for Dynamic Message Signs	NTCIP 1203
	Object Definitions for Environmental Sensor Station Interface Standard	NTCIP 1204
	Object Definitions for Closed Circuit Television (CCTV)	NTCIP 1205
	Object Definitions for Data Collection and Monitoring Devices	NTCIP 1206
	Object Definitions for Closed Circuit Television Switching	NTCIP 1208
	Data Element Definitions for Transportation Sensor Systems	NTCIP 1209
	Field Management Stations – Part 1: Object Definitions for Signal System Masters	NTCIP 1210
	Object Definitions for Signal Control and Prioritization	NTCIP 1211
	TCIP Common Public Transportation (CPT) Objects	NTCIP 1401
	TCIP Incident Management (IM) Objects	NTCIP 1402
	TCIP Passenger Information (PI) Objects	NTCIP 1403
	TCIP Scheduling/Runcutting (SCH) Objects	NTCIP 1404
	TCIP Spatial Representation (SP) Objects	NTCIP 1405
	TCIP On-Board (OB) Objects	NTCIP 1406
	TCIP Control Center (CC) Objects	NTCIP 1407
TCIP Fare Collection (FC) Business Area Objects	NTCIP 1408	
ASTM	Dedicated Short Range Communication at 915 MHz Standards Group	ASTM E2158-01, ASTM PS 105-99
	Standard Specification for Metadata to Support Archived Data Management Systems	ASTM E2259-xx
	Standard Specification for Archiving ITS Generated Travel Monitoring Data	ASTM E2259- yy
IEEE	Incident Management Standards Group	IEEE 1512.1-2003, IEEE 1512.3-2002, IEEE 1512-2000, IEEE P1512.2-2004, IEEE P1512.4
ITE	Standard for Functional Level Traffic Management Data Dictionary (TMDD)	ITE TM 1.03
	Message Sets for External TMC Communication (MS/ETMCC)	ITE TM 2.01
SAE	Advanced Traveler Information Systems (ATIS) General Use Standards Group	SAE J2266, SAE J2354, SAE J2529, SAE J2540, SAE J2540-1, SAE J2540-2, SAE J2540-3, SAE J2630

Lead SDO	Standard Name	Document ID
SAE	Advanced Traveler Information Systems (ATIS) Bandwidth Limited Standards Group	SAE J2266, SAE J2354, J2369, SAE J2540, SAE J2540-1, SAE J2540-2, SAE J2540-3
SAE/IEEE	Dedicated Short Range Communication at 5.9 GHz Standards Group	IEEE 1609.1, IEEE 1609.2, IEEE 1609.3, IEEE 1609.4, IEEE 802.11, IEEE 802.2, ISO 21210

As new ITS technologies continue to be implemented within the Springfield region, or as obsolete technologies are phased out, ITS standards may need to be added or subtracted from the ITS standards list as needed.

9.0 Use of the Architecture

As shown in Figure 1, step five of the architecture process is use of the regional architecture. A regional ITS architecture is developed so that it can be used as a tool for region-wide transportation planning, ITS project development, and ITS project implementation. It is important that the regional ITS architecture be used in conjunction with other regional planning documents to ensure that proposed ITS projects are implemented in the most practical, cost-effective, and beneficial manner.

9.1 Planning

From a planning standpoint, the regional ITS architecture should be used as a reference when updating regional transportation plans such as the Springfield Regional Transportation Plan, the Statewide Long Range Transportation Plan, the Springfield Regional Transportation Improvement Program (SRTIP), and the Statewide Transportation Improvement Program (STIP). ITS projects as listed in the Springfield-Sangamon County Regional ITS Architecture add to the pool of potential regional projects to be programmed. The planning agencies responsible for updating the transportation plans will now be able to make a more informed determination of transportation project priority given the information the regional ITS architecture provides concerning ITS projects and their potential effect on other roadway and transit projects.

Another planning document which will play a significant role in the planning process is the Illinois Department of Transportation ITS Strategic Plan. This document, currently in draft form, provides detailed information on planned ITS projects on the IDOT system. The regional ITS architecture, in conjunction with the IDOT ITS Strategic Plan, will work together to provide comprehensive ITS data to be used in determining transportation project priority in the region.

Since ITS technologies are continually evolving, expanding, and changing, regional ITS architectures (including the Springfield-Sangamon County Regional ITS Architecture) are generally developed to a medium-term timeframe of approximately 10 years. Therefore, the regional ITS architecture will be of some benefit in determining medium-term project priority within a long range plan, and will be of substantial benefit in prioritizing projects within the short-term SRTIP and STIP plans.

9.2 Project Development and Implementation

From a project development and implementation standpoint, the regional ITS architecture can aid individual stakeholders in defining the scope and details of an ITS project. Generally, the stakeholder has an idea of the general parameters of a project, but the ITS architecture allows the stakeholder to develop a detailed scope via identification of:

- the appropriate systems or parts of systems that will need to be employed,
- the various interconnections with other systems and/or stakeholders that may be required, and
- what information needs to flow across the interconnections.

Determination of systems to be employed begins with identification of stakeholder roles and responsibilities, which are defined in the regional ITS architecture operational concept. The appropriate interconnections can be partially or completely defined using the regional ITS architecture functional requirements applicable to the project. The requirements for the

information flows across the interconnections can be identified by mapping to the ITS standards within the regional ITS architecture.

The development of an ITS project as outlined above follows the left side of the standard systems engineering approach as illustrated in Figure 7 below.

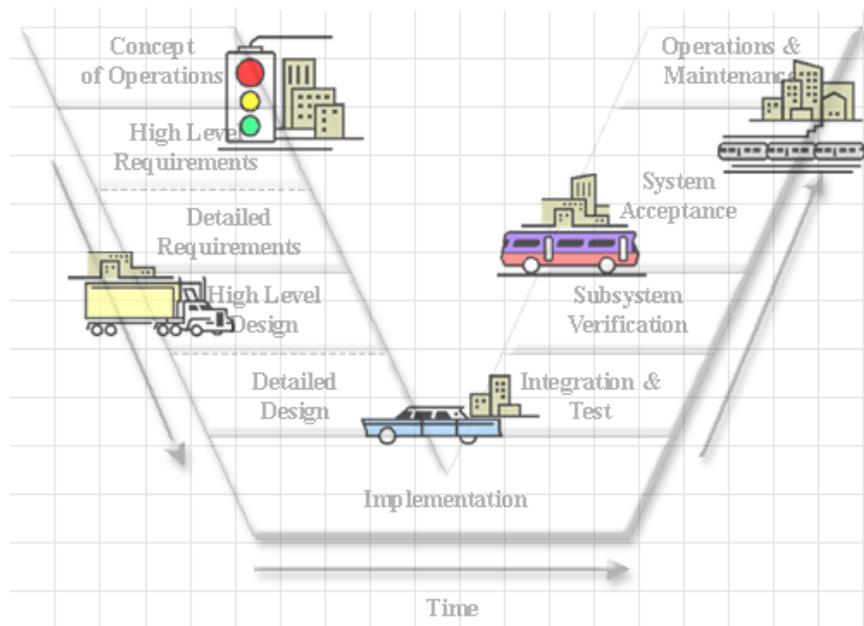


Figure 7 Standard Systems Engineering Diagram

The concept of operations, functional requirements, and standards as defined in the regional ITS architecture allow for the stakeholder to develop the project to the detailed design level, then onward into the implementation stage. The systems engineering approach, which includes the identification of roles and responsibilities, functional requirements, and ITS standards, is also important to follow since it is required by the FHWA/FTA Rule/Policy governing ITS projects funded via the Highway Trust Fund.

Once a project has been defined and funding has been committed, the implementation portion can proceed with the generation of a Request for Proposal (RFP), a common governmental practice for initiating a contract with the private sector to implement the project. The regional ITS architecture can support the RFP generation process by developing the project definition as described above, which forms the basis for the items/equipment to be procured in the contract. Also, mapping the project to the regional ITS architecture allows potential bidders to have a clear understanding of the project scope and the interfaces that need to be developed. After the project has been awarded, the process moves up the right side of the systems engineering diagram shown above via installation of the appropriate systems and devices, testing and integration, acceptance and verification, and then maintenance.

As detailed above, the regional ITS architecture represents a plan for the implementation of ITS systems throughout the Springfield region. It is a valuable tool that can and should be used to support and supplement regional transportation planning and ITS project development/implementation efforts.

10.0 Architecture Maintenance Plan

The sixth and final step in developing a regional architecture is the maintenance of the architecture. The Springfield-Sangamon County Regional ITS Architecture is a dynamic framework for the planning, development, and deployment of ITS in the region. As such, the architecture will need to be periodically updated as ITS projects are implemented and as the ITS needs and services evolve within the region. The FHWA/FTA has emphasized the importance of this step in its Final Rule/Final Policy, stating that “The agencies and other stakeholders participating in the development of the regional ITS architecture shall develop and implement procedures and responsibilities for maintaining it, as needs evolve within the region.”

In order to define these procedures, the following three questions are addressed in this maintenance plan:

- Who will maintain the architecture?
- What will be maintained?
- How will it be maintained?

The following subsections demonstrate how the three primary questions of architecture maintenance will be addressed in the Springfield region.

10.1 Who Will Maintain the Architecture?

The Springfield-Sangamon County Regional Planning Commission, with assistance from the Illinois Department of Transportation (IDOT), will maintain the Springfield Regional ITS Architecture. As the primary transportation planning and coordinating agency within the geographic boundary of the Springfield Regional ITS Architecture, the RPC is well suited to serve this role. In addition, the periodic updating of the Springfield Architecture will coincide with the Springfield RPC’s other transportation planning activities. IDOT’s familiarity with the Turbo Architecture® software tool and broad role in regional transportation matters emphasize the importance of their involvement in architecture maintenance.

In order to facilitate maintenance of the Springfield-Sangamon County Regional ITS Architecture, the Springfield-Sangamon County RPC shall formulate an ITS Working Group. The ITS Working Group shall be responsible for ensuring that the Springfield Regional ITS Architecture is maintained in accordance with the FHWA/FTA Final Rule and Policy.

ITS Working Group voting members shall include, but not be limited to:

- Illinois Department of Transportation, District 6
- Springfield Department of Public Works
- Springfield-Sangamon County Regional Planning Commission
- Sangamon County Highway Department
- Contracted architecture maintenance consultant (as requested at the discretion of the SSCRPC)

10.2 What Will Be Maintained?

The Springfield-Sangamon County Regional ITS Architecture consists of two components: this architecture document and the Turbo Architecture® database. Architecture changes approved by the ITS Working Group should be reflected in both components.

10.3 How Will It Be Maintained?

Maintenance of the architecture is a multi-step process. First, a potential architecture change must be identified by a regional ITS stakeholder (or stakeholders). Next, the change request form (see below) must be submitted by the stakeholder and reviewed by the ITS Working Group to determine if an architecture change is in order. If the change is approved, it is to be documented in the list of changes for the next architecture update and then implemented.

Change Request Identification

Change requests must originate within the ITS Working Group membership using the Change Request Form found at the conclusion of this section. Entries on the form include:

- Change identification,
- Request date,
- Change description,
- Rationale for change,
- Request originator contact information, and
- Administrative fields.

All change request forms will be catalogued by the Springfield-Sangamon County Regional Planning Commission in the Change Database (described below).

Change Request Review

Each requested change will be reviewed by the ITS Working Group to ensure that the request warrants a change in the architecture. The following are examples of circumstances that could lead to an architecture change request:

1. Changes in regional needs
2. Change in description of the region
3. Stakeholders added, deleted, or revised
4. Change in service scope or change to the National ITS Architecture
5. Changes to adjacent or overlapping regional ITS architectures
6. Changes in status of systems or services
7. Changes in ITS standards
8. Interagency agreements added, deleted, or revised
9. Changes in project priority, including new or deleted ITS-related projects
10. Changes to existing regional transportation plans, including the Transportation Improvement Program (TIP), the Long Range Transportation Plan, or the IDOT ITS Strategic Plan

For change requests concerning ITS-related projects, the ITS Working Group will determine if a proposed project is, in fact, an intelligent transportation systems project. Next, the Working Group will determine if the Springfield-Sangamon County Regional ITS Architecture already includes the requested item. If the project is not yet reflected in the architecture, the ITS Working Group will vote to determine if it should be recommended for SSCRPC Technical Committee approval.

Change Request Approval

In order for an architecture change to be recommended by the ITS Working Group, a majority vote (quorum of five members) is required. This vote could be made via an ITS Working Group meeting, or email/telephone. At a minimum, the Working Group should convene on an annual basis to review and/or recommend requested architecture changes.

Once the ITS Working Group has voted to recommend a change to the architecture, the change request will be carried forward to the SSCRPC Technical Committee for their approval. Approval will be granted by those committees in accordance with current MPO procedures. If the change request is rejected by the Working Group, within two weeks the request originator will be informed of the decision (and the reason(s) for the decision) and will be invited to resubmit a change request if deemed appropriate by the maintainer.

Next, the approved change will be documented in the Springfield-Sangamon County Regional ITS Architecture Change Database. Below is a sample Change Database Entry which highlights the information that would be taken from the Change Request forms and entered into the Change Database.

<i>Change Number</i>	<i>Change Description</i>	<i>Request Originator</i>	<i>Change Decision</i>	<i>Decision Date</i>	<i>Decision Comment</i>	<i>Architecture Components Affected</i>	<i>Change Type</i>
XX-YY*	Expanded description of the requested change	Name of request originator	Accept, reject, or defer	Date decision is made	Pertinent details associated with change decision	Listing of affected architecture components	Minor or major

* XX = year and YY = chronological value

Change Implementation

Formal implementation of changes to the Springfield-Sangamon County Regional ITS Architecture will occur every five years, beginning approximately January of 2010 coinciding with the long range transportation plan update. It should be noted that time-sensitive changes may be incorporated to the architecture as needed. The RPC (or its Architecture Maintenance Contractor) will implement the approved changes from the Change Database at that time. The maintainer should ensure that updates are consistent with the most recent version of the National ITS Architecture and Turbo Architecture®. To properly track updates to the Springfield Regional ITS Architecture, the maintainer should update the Document Revision History table at the front of this document and the Change Log in Turbo Architecture®.

Once the architecture update process is complete, the maintainer shall submit the updated architecture document and Turbo Architecture® file to the ITS Working Group for approval. The updated architecture will then undergo the same review and approval process as described above for individual architecture change requests.

Summary

Below is a bulleted chronological summary of the Springfield-Sangamon County Regional ITS Regional Architecture maintenance process:

- Regional ITS Architecture change requested by stakeholder
- Regional ITS Architecture Change Form submitted to RPC by requesting stakeholder
- Change request catalogued in RPC Regional ITS Architecture Change Database
- ITS Working Group meets annually (minimum) to review Regional ITS Architecture change requests
- Changes approved by ITS Working Group are forwarded to SSCRPC Technical Committee for approval
- Changes approved, denied, or deferred by ITS Working Group are indicated as such by RPC in Regional ITS Architecture Change Database

- Regional ITS Architecture revised by Architecture Maintainer every five years concurrent with the long range transportation plan to include all approved Regional ITS Architecture changes since most recent architecture update
- Regional ITS Architecture revision documented by Architecture Maintainer in Architecture Revision History table and Turbo Software® change log.
- Revised Regional ITS Architecture Document and Turbo Software® file submitted to ITS Working Group and SSCRPC Technical Committee for approval

Adherence to the above process will ensure that the Springfield-Sangamon County Regional ITS Architecture is maintained in accordance with the FHWA/FTA Final Rule and policy.

Springfield-Sangamon County Regional ITS Architecture Change Request Form

Change Identification:		Request Date:	
Change Description (describe affected architecture elements):			
Rationale for Change:			
Request Originator Contact Information:	Name:		
	Agency:		
	Address:		
	Telephone:		
	Fax:		
	Email:		
<i>To be filled out by Architecture Maintainer</i>			
Change Number*:			
Change Decision:	Accept	Reject	Defer
Decision Comments:			
Decision Date:			
Architecture Components Affected:			
Change Type:	Minor	Major	

* XX-YY, where XX = year and YY = chronological value, e.g., the first change request of 2006 would be '06-01'