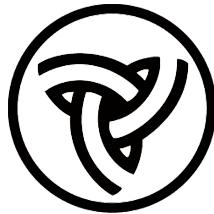




# Illinois Statewide



# ITS Architecture Update Document

*October 2019 FINAL*

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# Document Revision History

<i>Statewide ITS Architecture Issue No.</i>	<i>Statewide ITS Architecture Issue Date</i>	<i>National ITS Architect Version</i>	<i>Software `Version</i>	<i>Comment</i>
1.0	August 2005	5.0	<i>Turbo Architecture® 3.0</i>	Initial release
2.0	June 2019	8.2	RAD-IT Version 8.2	Updated Tool

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# Table of Acronyms

AAMVNET	Association of American Motor Vehicle Administrators Network
AASHTO	American Association of State Highway and Transportation Officials
AFT	Automatic Funds Transfer
AHS	Automated Highway System
APCO	Association of Public Safety Communications Officials
ARC-IT	Architecture Reference for Cooperative and Intelligent Transportation
ASPEN	Commercial vehicle reporting system software
ASTM	American Society for Testing and Materials
ATIS	Advanced Traveler Information System
ATMS	Advanced Traffic Management System
AVI	Automatic Vehicle Identification
AVL	Automatic Vehicle Location
CAA	Clean Air Act
CAD	Computer-Aided Dispatch
CAPRI	Audit inspection software
CMAP	Chicago Metropolitan Agency for Planning
CCTV	Closed-Circuit Television
CAV	Connected and Autonomous Vehicles
CDL	Commercial Driver's License
CDLIS	Commercial Driver's License Information System
CDPD	Cellular Data / Packet Data
CI	Credentialing Interface
CIPT	Central Illinois Public Transit
CMAQ	Congestion Mitigation and Air Quality (Improvement Program)
CMS	Central Management Services
CT	Connect Transit
CTA	Chicago Transit Authority
CUUATS	Champaign-Urbana Urbanized Area Transportation Study
CUMTD	Champaign-Urbana Mass Transit District
CVIEW	Commercial Vehicle Information Exchange Window
CVO	Commercial Vehicle Operations
CVRIA	Connected Vehicle Reference Implementation Architecture
DATS	Danville Area Transportation Study
DMS	Dynamic Message Signs
DMV	Department of Motor Vehicles
DOT	Department of Transportation
DPTS	Decatur Public Transit System
DSRC	Dedicated Short Range Communications
EAS	Emergency Alert System
EFT	Electronic Funds Transfer
EMC	Emergency Management Center

EOSS	Electronic One-Stop Shopping
EPV	Emergency Patrol Vehicle
ESDA	Emergency Services and Disaster Agency
ETC	Electronic Toll Collection
ETP	Emergency Traffic Patrol
ETSA	Emergency Telephone System Act
ETSB	Emergency Telephone System Board
EWGCOG	East-West Gateway Council of Governors
FCC	Federal Communications Commission
FHWA	Federal Highway Administration
FMCSA	Federal Motor Carrier Safety Administration
FTA	Federal Transit Administration
FTP	File Transfer Protocol
GIS	Geographic Information Systems
GPS	Global Positioning System
GTIS	Gateway Traveler Information System
HAR	Highway Advisory Radio
HAZMAT	Hazardous Materials
HOV	High Occupancy Vehicle (lane)
HRI	Highway Railroad Intersection
HTML	Hypertext Markup Language
ICC	Illinois Commerce Commission
ICJIA	Illinois Criminal Justice Information Authority
ICM	Integrated Corridor Management
IDOT	Illinois Department of Transportation
IEEE	Institute of Electrical and Electronics Engineers
IEMA	Illinois Emergency Management Agency
IEPA	Illinois Environmental Protection Agency
IFERN	Interagency Fire Emergency Radio Network
IFTA	International Fuel Tax Agreement
ILAVA	Illinois Autonomous Vehicle Association
ILEAS	Illinois Law Enforcement Alarm System
INDOT	Indiana Department of Transportation
IPS	Itinerary Planning System
IREACH	Illinois Radio Emergency Assistance Channel
IRP	International Registration Plan
ISP	Information Service Provider
ISP	Illinois State Police
ISPERN	Illinois State Police Emergency Radio Network
ISTHA	Illinois State Toll Highway Authority
ITAP	Illinois Technical Assistance Program
ITD	Innovative Technology Deployment
ITE	Institute of Transportation Engineers
ITS	Intelligent Transportation Systems
ITSPO	Intelligent Transportation Systems Program Office
ITTF	Illinois Terrorism Task Force

IWIN	Illinois Wireless Information Network
JCMTD	Jackson County Mass Transit District
JDCT	Jo Daviess County Transit
LEADS	Law Enforcement Agency Data Service
LM	Legacy Modification
LMIGA	Lake Michigan Interstate Gateway Alliance
L RTP	Long Range Transportation Plan
LSI	Legacy System Interface
MABAS	Mutual Aid Box Alarm System
MCR	Mobile Capture & Reporting System
MCT	Madison County Transit
MDT	Mobile Data Terminal
MCMIS	Motor Carrier Management Information System
MMIS	Maintenance Management Information System
MoDOT	Missouri Department of Transportation
MOE	Measures of Effectiveness
MOU	Memorandum of Understanding
MPO	Metropolitan Planning Organization
MYP	Multi Year Plan
NITSA	National ITS Architecture
NCIC	National Crime Information Center
NEMA	National Electronics Manufacturers' Association
NLETS	National Law Enforcement Telecommunications System
NMVTIS	National Motor Vehicle Title Identification System
NTCIP	National Transportation Communications for ITS Protocol
O&M	Operations & Maintenance
OSOW	Oversize-Overweight
Pace	Pace Suburban Bus
PRISM	Performance and Registration Information Systems Management
PSAP	Public Safety Access Point
PTZ	Pan-Tilt-Zoom
RAD-IT	Regional Architecture Development for Intelligent Transportation
RICMMDT	Rock Island County Metropolitan Mass Transit District
RITSA	Regional ITS Architecture
RMTD	Rockford Mass Transit District
RPC	Regional Planning Commission
RTA	Regional Transportation Authority
RVMMTD	River Valley Metro Mass Transit District
RWIS	Road Weather Information Systems
SAE	Society of Automotive Engineers
SAFER	Safety and Fitness Electronic Records
SEOC	State Emergency Operations Center
SET-IT	Systems Engineering Tool for Intelligent Transportation
SCT	South Central Transit
SMART	Southern Most Area Rural Transit
SMTD	Sangamon Mass Transit District

SSRS	Single State Registration System
STIP	Statewide Transportation Improvement Plan
SWS	Safety Warning System
TCIP	Transit Communications Interface Profiles
TCRPC	Tri-County Regional Planning Commission
TIMS	Traffic and Incident Management System
TIP	Transportation Improvement Plan
TMC	Traffic Management Center
TRB	Transportation Research Board
TSC	Traffic Systems Center
UIC	University of Illinois at Chicago
USDOT	United States Department of Transportation
USCG	United States Coast Guard
VMS	Variable Message Signs
WCMTD	West Central Mass Transit District
WIM	Weigh-in-Motion
WisDOT	Wisconsin Department of Transportation
XML	Extensible Markup Language



# 1 INTRODUCTION

ITS Architecture provides the framework to efficiently use technology to solve transportation problems and to make better use of the existing infrastructure and resources. Architectures also bridge the gap between strategic planning for transportation management and operations for the ITS projects that implement those strategies.

The Federal Highway Administration (FHWA) final rule and Federal Transit Administration (FTA) policy on Intelligent Transportation Systems (ITS) Architecture and Standards, issued in 2001, requires ITS projects funded by the Highway Trust Fund and the Mass Transit Account to conform to the National ITS Architecture, as well as to USDOT adopted ITS Standards. In order to ensure federal compliance for the state of Illinois for ITS project development, implementation and funding, IDOT adopted Version 1.0 of the Statewide ITS Architecture and ITS Strategic Plan in 2005.

The Illinois Statewide ITS Architecture and Strategic Plan Update consists of the following components, each provided as a separate document:

- Concept of Operations Update,
- Statewide and Regional ITS Architecture Update,
- Statewide and Regional RAD-IT Architecture® converted and updated databases, and
- Statewide ITS Strategic Plan Update.

The purpose of this Architecture document is to describe the update process, products and outcomes. It is a living document that will evolve throughout the Architecture maintenance process.

In addition to the Statewide ITS Architecture, existing Regional ITS Architectures (RITSAs) were updated and others created for metropolitan areas across the state. Coordination with IDOT's District offices and Metropolitan Planning Organizations (MPOs)/Regional Planning Commissions (RPCs) was essential to achieve sustained planning and integrated deployment of ITS technologies at the regional and local levels, where enabling technologies are installed and implemented. The relevant RITSAs are as follows:

- Springfield
- Champaign
- Peoria
- Kankakee
- Carbondale
- Bloomington-Normal
- Rockford
- DeKalb
- Decatur
- Danville

The sections included in this document describe the approach and tools used to update the Statewide ITS Architecture database. A discussion of the transportation needs identified by stakeholders, the related functions and services and an overview of the updated Concept of Operations are included. Consistent with federal guidelines, a review of ITS Standards, Agreements and Architecture Maintenance are also addressed.

## 2 APPROACH TO UPDATING THE STATEWIDE ITS ARCHITECTURE

After nearly 15 years of technology development, deployment, operations and maintenance experience, Illinois' transportation system has evolved in capabilities and expanded in geography. By maintaining and updating the existing Statewide ITS Architecture, IDOT is able to secure Illinois' status for continued federal compliance for the state's ITS Program.

The existing Statewide ITS Architecture includes more than 700 stakeholders representing various multimodal agencies and an inventory of more than 100 systems. Challenges for stakeholder engagement included lack of familiarity with the existing architecture or the ITS Program and staff discontinuity over time, to name a few. In order to capture ITS updates spanning the time frame since the initial adoption, including comprehensive multimodal representation, an extensive stakeholder outreach program was developed. Combined efforts of MPOs/RPCs, IDOT and consultant staff were utilized to ensure a thorough update with diverse participation.

The Project Team began the process to update the architecture by reviewing the existing inventory of stakeholders, systems and services across the state. Concurrently, a review of changes to the National ITS Architecture (NITSA) tools, related federal requirements and ITS best practices was performed for reference in updating the Statewide ITS Architecture database and related documentation. In addition, a review of the Illinois statewide plans including the Long Range Transportation Plan (LRTP) and Strategic Highway Safety Plan was conducted to capture ITS related planning and funding aspects.

IDOT established a Steering Committee to provide overall project direction and policy level guidance. In addition to the IDOT Project Managers, members include the IDOT Secretary, IDOT Regional Engineers, appropriate IDOT Bureau Chiefs and Office of Planning and Programming and Bureau of Operations staff, appropriate USDOT staff, and the Executive Directors of participating MPOs / RPCs and CVO association.

A Technical Committee was also convened to provide input. This committee consists of representatives from each IDOT District, regional transit operations staff, MPOs involved in ITS planning, and representatives of key local and regional agencies involved in transportation management and operations.

The Architecture update and maintenance process is defined by USDOT guidance as illustrated in Figure 1 below. The approach shown is iterative to facilitate refinement of operational objectives and implementation priorities over time. Collaboration among planners and operators is a critical component of the approach, which supports consensus building for regional operations.



Figure 1 - USDOT Architecture Maintenance Process

## 2.1 OUTREACH

Outreach was conducted utilizing various media and personal methods to engage ITS stakeholders and enable collection of the vast amounts of data required for the Architecture update. The goal and benefits of hosting various interactive sessions for stakeholders throughout the state include the following:

- Engage stakeholders with the IDOT ITS Program Office at a regional and statewide level,
- Identify and support the Regional ITS Architecture Champions, Stakeholders and key leads for architecture development,
- Assess regional needs for technical assistance, training, and support, and
- Demonstrate the process of architecture development and use, along with next steps in regional architecture development and maintenance.

The outreach strategy was designed to inform stakeholders about the project, gather input on needs, projects and data needs, and to present the results to ultimately gain approval on final products. During the workshops, stakeholders discussed current, planned and future ITS projects and initiatives, and identified transportation needs to help prioritize the application of intelligent systems throughout the state of Illinois. The outreach plan incorporated the following methods:

- Steering, Technical and Joint Committee Meetings
- Webinars
- Online Surveys
- Interviews with Key Stakeholders
- Interactive workshops
- A project website: [www.ilitsupdate.net](http://www.ilitsupdate.net)

The initial newsletter was issued in November 2016 as a refresher for stakeholders that were involved in the 2005 Architecture Development and as a primer for project sponsors not originally involved. The initial “ITS Summit” webinar was also held at that time to provide an introduction to the project, an overview of the existing Statewide ITS Architecture and Strategic Plan, and describe the stakeholders’ roles in the statewide effort. Committee meetings and interactive workshops were conducted from November 2016 through February 2017. Statewide ITS Architecture update workshops were held in 2017 with participation by over 90 stakeholders. Additional details on the scope and scheduling of meetings and workshops can be found in Appendix A.

Similarly, a webinar was held in April 2018 to introduce the Regional ITS Architecture purpose and tools, and also to provide an overview of the workshop agenda and desired outcomes. The webinar served as a precursor to the regional workshops that focused on architecture updates and development. Workshops were structured to inform, educate and empower Regional MPO/RPC Champions and local stakeholders. After completing the Regional workshops, the Strategic ITS Plan update workshops were initiated in September 2018 and concluded with the Joint Steering Committee meeting held in November 2018 in Springfield. Table 1 below includes RITSA workshops held across the state between April and June of 2018.

In total, more than 170 stakeholders participated in workshops and interviews that focused on the following discussions topics:

- ITS Architecture Purpose and Overview of existing Statewide ITS Architecture
- Confirmation of Regional Champions and Key Stakeholders
- Review Regional Architecture Template
- Review Existing Architecture database files
- Roles, Tools, Training, Change Control Process, and Architecture Maintenance
- Technology Demonstrations and Benefits discussion

In addition to the workshops, Steering and Technical committee meetings were held to obtain guidance, direction and approval for recommendations. Interviews were also conducted with key stakeholders via phone and in-person to obtain ITS project information, confirm needs, and identify challenges, accomplishments and opportunities. Stakeholders participated in online surveys to rank transportation needs and to provide details on existing and planned ITS projects.

*Table 1: Statewide ITS Architecture and Strategic ITS Plan Update - Meetings & Workshops*

Meeting/Workshop	Location	Date
Project Kick Off Meeting	Springfield	September 21, 2015
Joint Steering / Technical Committee Meeting	Springfield	September 14, 2016
District 1 Statewide ITS Architecture Workshop	Chicago	November 17, 2016
District 4 Statewide ITS Architecture Workshop	Peoria	December 6, 2016
District 6 Statewide ITS Architecture Workshop	Springfield	December 7, 2016
District 8 Statewide ITS Architecture Workshop	East Alton	December 8, 2016
District 9 Statewide ITS Architecture Workshop	Carterville	December 13, 2016
District 7 Statewide ITS Architecture Workshop	Effingham	December 14, 2016
District 5 Statewide ITS Architecture Workshop	Champaign	December 15, 2016

Meeting/Workshop	Location	Date
District 3 Statewide ITS Architecture Workshop	Ottawa	January 31, 2017
District 2 Statewide ITS Architecture Workshop	Rock Falls	February 7, 2017
Technical Committee Meeting	Springfield	May 12, 2017
Champaign Regional ITS Architecture Workshop	Champaign	April 30, 2018
Peoria Regional ITS Architecture Workshop	Peoria	May 1, 2018
Springfield Regional ITS Architecture Workshop	Springfield	May 2, 2018
Kankakee Regional ITS Architecture Workshop	Kankakee	May 10, 2018
Carbondale Regional ITS Architecture Workshop	Carbondale	May 17, 2018
Bloomington Regional ITS Architecture Workshop	Bloomington	May 18, 2018
Rockford Regional ITS Architecture Workshop	Rockford	May 31, 2018
DeKalb Regional ITS Architecture Workshop	DeKalb	June 8, 2018
District 2 Strategic ITS Plan Workshop	Rockford	September 18, 2018
District 3 Strategic ITS Plan Workshop	Ottawa	September 19, 2018
District 1 Strategic ITS Plan Workshop	Chicago	September 20, 2018
District 6 Strategic ITS Plan Workshop	Springfield	October 2, 2018
District 4 Strategic ITS Plan Workshop	Peoria	October 2, 2018
District 7 Strategic ITS Plan Workshop	Effingham	October 3, 2018
District 5 Strategic ITS Plan Workshop	Champaign	October 4, 2018
District 8 Strategic ITS Plan Workshop	East St. Louis	October 30, 2018
District 9 Strategic ITS Plan Workshop	Carterville	October 31, 2018
Joint Steering / Technical Committee Meeting	Springfield	November 1, 2018

## 2.2 Regional ITS Architectures (RITSA)

Regional ITS Architecture (RITSA) provides a foundation for ITS project development and demonstrates effective planning of ITS projects consistent with FHWA-recognized ITS best practices. In coordination with MPOs/RPCs across the state, workshops were structured to review and refine the previously developed RITSAs and to incorporate lessons learned from the original Statewide ITS Architecture project, as well as subsequent changes in industry practices and guidance.

According to FHWA guidance, if stakeholders within a region participated in the development of the Statewide ITS Architecture, and their specific systems and related interfaces in the region are part of it, the Final Rule requirements for that region have been met. These stakeholders must also be part of the Statewide ITS Architecture maintenance process to ensure accurate reflection of their regional systems. If a RITSA exists, those regional elements can be "pulled out" of the statewide ITS architecture and included in the regional documentation. However, there must be consistency between both the statewide and any regional ITS architectures.

The IDOT ITS Program Office staff and their consultant team led interactive regional sessions focused on utilization of architecture tools, the current Transportation Improvement Plans (TIPs) and projects identified during the existing federally compliant planning process established by each MPO/RPC. Alignment of the RITSA development and maintenance process with the established structure for regional planning and operations management affords the regional champions the opportunity to:

- Coordinate planning and deployment of ITS technologies to leverage funding and promote interoperability.
- Provide a working tool for improved planning, scheduling and integration.
- Meet regional needs and support improved operation and management of the transportation system.
- Assist in the development of federally required ITS architectures and projects to guide deployment.

To achieve consistency among regions, some of the common statewide Service Packages were identified for inclusion in the regional architecture template as a guide for workshop discussions and to provide a baseline for newly developed RITSA. They include:

- Traveler Information Systems
- Smart Work Zone
- Construction/Roadwork Management
- Traffic Management - Incident Management
- Infrastructure Security

Based on the status of the RITSAs, they were organized into groupings to identify those that have been maintained, those that have not been maintained and require updates, and regions requiring new architecture development (refer to Table 2 below). The RITSAs for the largest MPO for northeastern Illinois, the Chicago Metropolitan Agency for Planning (CMAP), the Champaign County Regional Planning Commission and St Louis EWGCOG had been updated since the Statewide ITS Architecture was adopted. While the CMAP RITSA is not included in the project scope, a meeting was held to engage NE Illinois stakeholders in the statewide process.

*Table 2: Regional ITS Architectures*

RITSA UPDATES	NEW RITSA DEVELOPMENT
Rockford	Danville - remain in SWITSA
DeKalb	Bloomington-Normal
Champaign - Urbana	Carbondale
Peoria	Decatur
Springfield	Kankakee

For Danville, Decatur, and Kankakee, ITS planning occurs at the MPO level as part of TIP process. These MPOs have some newer staff members with less ITS experience and familiarity. In order to accommodate all stakeholders, Danville and Decatur were included in the Champaign Workshop, with a break out session to gauge realistic expectations and options for developing the respective RITSAs. In addition, coordination was performed for RITSAs of adjacent states that include an Illinois region and/or overlaps in services for Stateline (supported by Wisconsin), Bi-State (supported by Iowa Quad Cities), and East-West Gateway (supported by Missouri).

As of June 2019, technical assistance has been provided to each region in either development or update of their RITSAs. Danville remains included in the Statewide ITS Architecture until a regional ITS project architecture is warranted. The RITSA databases will be maintained by the Regional Champions and the

IDOT ITS Program Office. The ITS Architecture Maintenance Plan Update in Appendix G describes the maintenance process.

### 2.3 National ITS Architecture Tools

The National ITS Architecture has undergone significant improvements. The newest release, ARC-IT, is now in version 8.2. ARC-IT exists as an online, publicly available ITS repository; an extensive set of hyperlinks offered in a user-friendly web browser format.

To create, develop, convert or edit ITS Architecture files, the free software package must be downloaded and installed. As part of the recent ARC-IT overhaul, the software previously used for the Illinois ITS Architecture, entitled Turbo Architecture®, was discontinued and replaced by the release of RAD-IT and SET-IT. Both are available at the ARC-IT website.

ARC-IT Version 8.2 features a user-friendly web interface. It is designed to be easily accessible for all different types of users, providing a wealth of help, explanations and hyperlinks for all use cases. ARC-IT refers to the architecture itself, which is fully accessible online. ARC-IT is not a software tool or a direct replacement for Turbo Architecture. The titles of the previous set of market packages were renamed to be more practical, and the set of service packages now includes connected vehicle capabilities. All Service Packages are detailed online, as part of the ARC-IT interface.

According to ARC-IT, the Regional Architecture Development tool (RAD-IT) is a software application that supports the development of regional and project ITS architectures using ARC-IT as a starting point.

In Figure 2, the general interface between the Traffic Management Center and Transit Management Center is used as an example of how RAD-IT architectures encompass real-world interactions. The left half of the figure shows that interactions occur between the two Management Centers. RAD-IT can be used to model these entities and their interactions in compliance with ARC-IT. The right half of Figure 2 shows an example of how this might be done in RAD-IT.

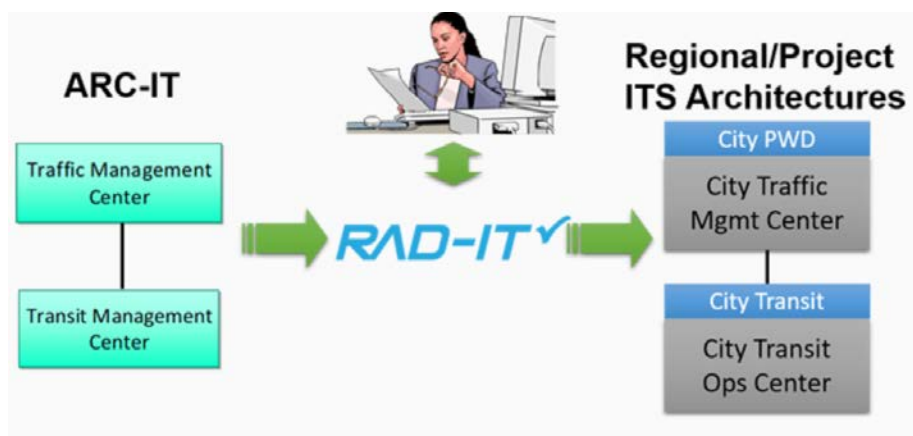


Figure 2: National ITS Architecture Software Tools

# 3 OVERVIEW OF THE ILLINOIS STATEWIDE ITS ARCHITECTURE UPDATE

After nearly 15 year of technology development, deployment, operation and maintenance experience, the transportation industry has evolved through public private partnerships and continues to adapt to meet the changing needs of the traveling public.

The Statewide ITS Architecture enables use of existing transportation assets to provide enhanced services. Using the architecture as a guide, existing transportation infrastructure can be reused or modified to implement new services and expand functionality. The architecture helps identify those systems and the associated interfaces, data flows, and specifications for providing new services.

The Architecture is supported by the Concept of Operations and describes transportation services and associated functions. These services include both statewide and regional applications, such as commercial vehicle operations and signal optimization, respectively. The Statewide Architecture also focuses on rural functions, such as rural paratransit and winter maintenance located outside of a given regional architecture boundaries. These areas can be covered by the Statewide ITS Architecture until a major ITS project is developed to be their regional ITS architecture.

The Architecture defines functions and not technologies. Technologies that implement the functions in the architecture are enabled by individual projects discussed further in the Strategic ITS Plan Update. The architecture shows how functions and systems relate to each other.

All stakeholders will find the ARC-IT Physical viewpoint informative. The Physical viewpoint provides the basis for Service Packages, which are concise, easy to follow diagrams that communicate elements of service delivery, functionality, information exchange and related concerns. The Physical Viewpoint represents physical elements that operate in the field and back at the office, the functionality contained within those elements, the roles in delivering user services, and the connections between those elements. A detailed mapping of the updated statewide architecture connections between service packages and ITS elements can be seen in Appendix C.

The updated Statewide ITS Architecture is based on the current National ITS Architecture (NITSA) and follows the Architecture Reference for Cooperative and Intelligent Transportation (ARC-IT) guidance.

According to the updated NITSA framework, a Physical Object (P-Object) represents a person, place, or thing that participates in ITS. Physical Objects are defined in terms of the applications they support, the processes they include, and their interfaces with other physical objects. The physical objects, categorized as Subsystems and Terminators, interact and exchange information to support the Architecture service packages. Terminators represent the people, systems and general environment that interface to ITS but have no assigned functional requirements. Subsystems are the ITS functional components, such as the Traffic Management Center, the Vehicle Onboard Equipment, and the ITS Roadway Equipment. Physical objects are grouped into five classes: Center, Field, Support, Traveler and Vehicle, as defined below and shown in Figure 3.

- **Center:** An element that provides application, management, administrative, and support functions from a fixed location not in proximity to the road network. The terms "back office" and "center" are



used interchangeably. Center is traditionally a transportation-focused term, evoking management centers to support transportation needs, while back office generally refers to commercial applications.

- **Field:** Infrastructure proximate to the transportation network which performs surveillance (e.g. traffic detectors, cameras), traffic control (e.g. signal controllers), information provision (e.g. Dynamic Message Signs (DMS)) and local transaction (e.g., tolling, parking) functions. Typically governed by transportation management functions running in centers. Field also includes connected vehicle roadside equipment and other non-DSRC wireless communications infrastructure that provides communications between mobile elements and fixed infrastructure.
- **Support:** A center that provides a non-transportation specific service. Typically these are enabling functions, such as communications facilitation, security or management.
- **Traveler:** Equipment used by travelers to access transportation services pre-trip and en-route. This includes equipment owned and operated by the traveler as well as equipment owned by transportation and information providers.
- **Vehicle:** Vehicles, including driver information and safety systems applicable to all vehicle types.
- **Mobile:** All Vehicles, and mobile Traveler p-objects.

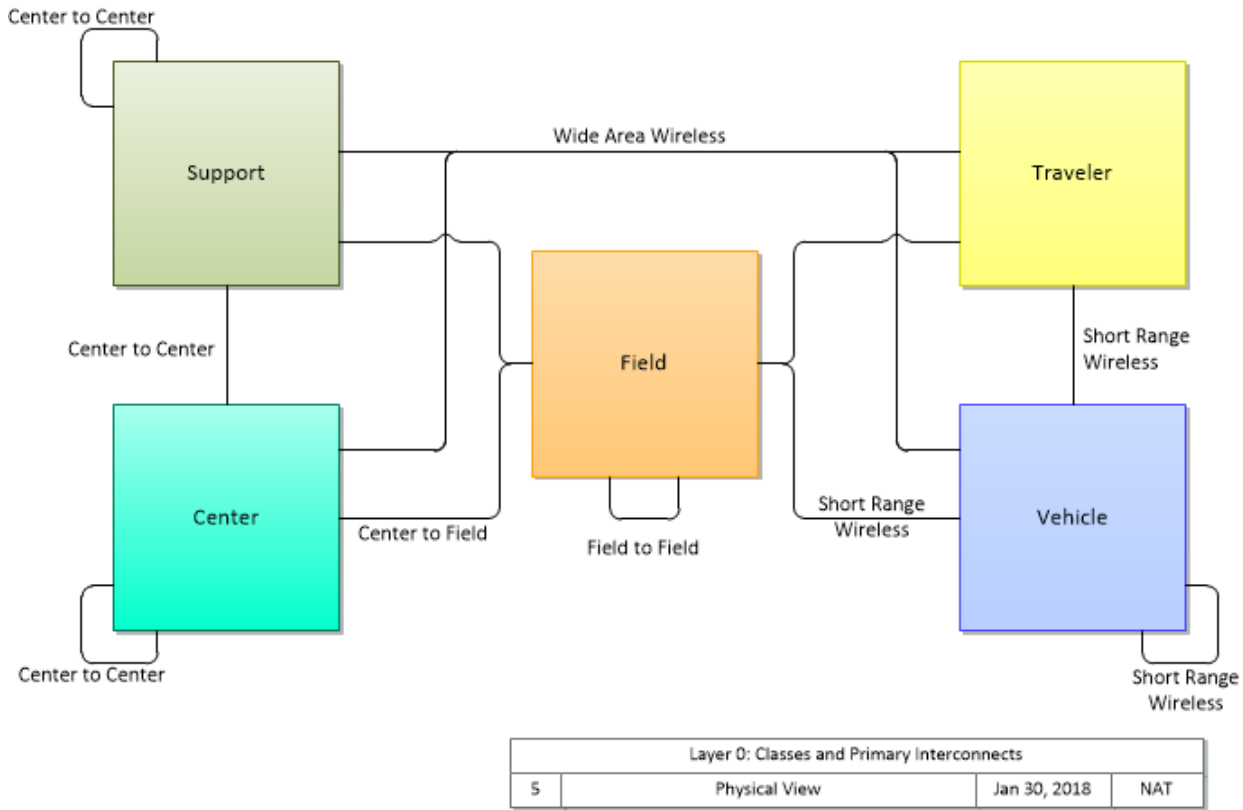


Figure 3 - Physical View

### 3.1 Statewide Concept of Operations Update Overview

IDOT is organized into five regions, which are subdivided into nine districts. Each district consists of between six and sixteen counties. Transportation services and operations are managed at the district level and coordinated where transportation services cross boundaries. The IDOT districts work

collaboratively with the Central Office to provide transportation services to the public. Updating the Concept of Operations began with a review of accomplished functionality, existing capabilities and established communications among the Illinois regional systems.

Figure 4, the Statewide Operational Concept diagram, provides a high level functional view of statewide interfaces based on the various services, functions, requirements and operational environments involved.

For most activities, police, safety officials, and transit organizations operate at a regional level. Information exchange at a statewide level occurs, but the primary interaction is at a regional or district level.

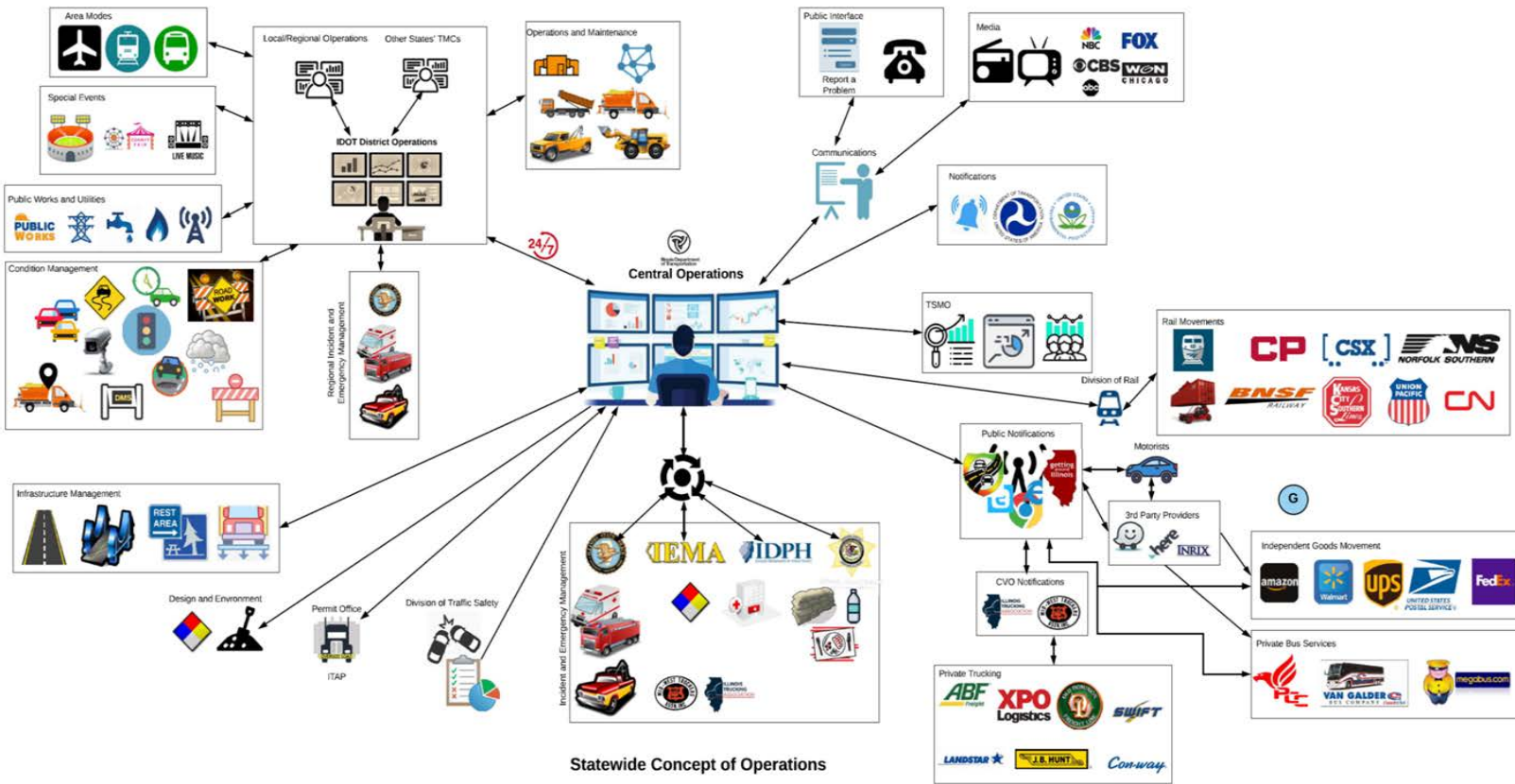


Figure 4: Illinois Statewide ITS Architecture – Statewide Operational Concept

As the state has collectively improved the transportation system, the use of communications including wireless, leased internet, and fiber optic systems has continued to be accomplished using the cost-effective technology selections. While the Chicago and Metro East regions have generally installed fiber optic backbones along the expressway and tollway systems, the adoption of centralized signal systems and the supporting fiber optic infrastructures has become most prevalent in the last 10 years.

Across the state, IDOT and municipalities have coordinated with each other to identify and construct fiber optic connectivity for signal systems, while connecting to neighboring municipalities where possible and affordable. Once in place, the connectivity supports traffic signal control, while also providing the

bandwidth required to support additional data sharing, video sharing, and advanced operational strategies. Figure 5, the Regional Operations Concept diagram, provides a high level functional view of a Regional Center with multimodal interfaces based on the operational environment.

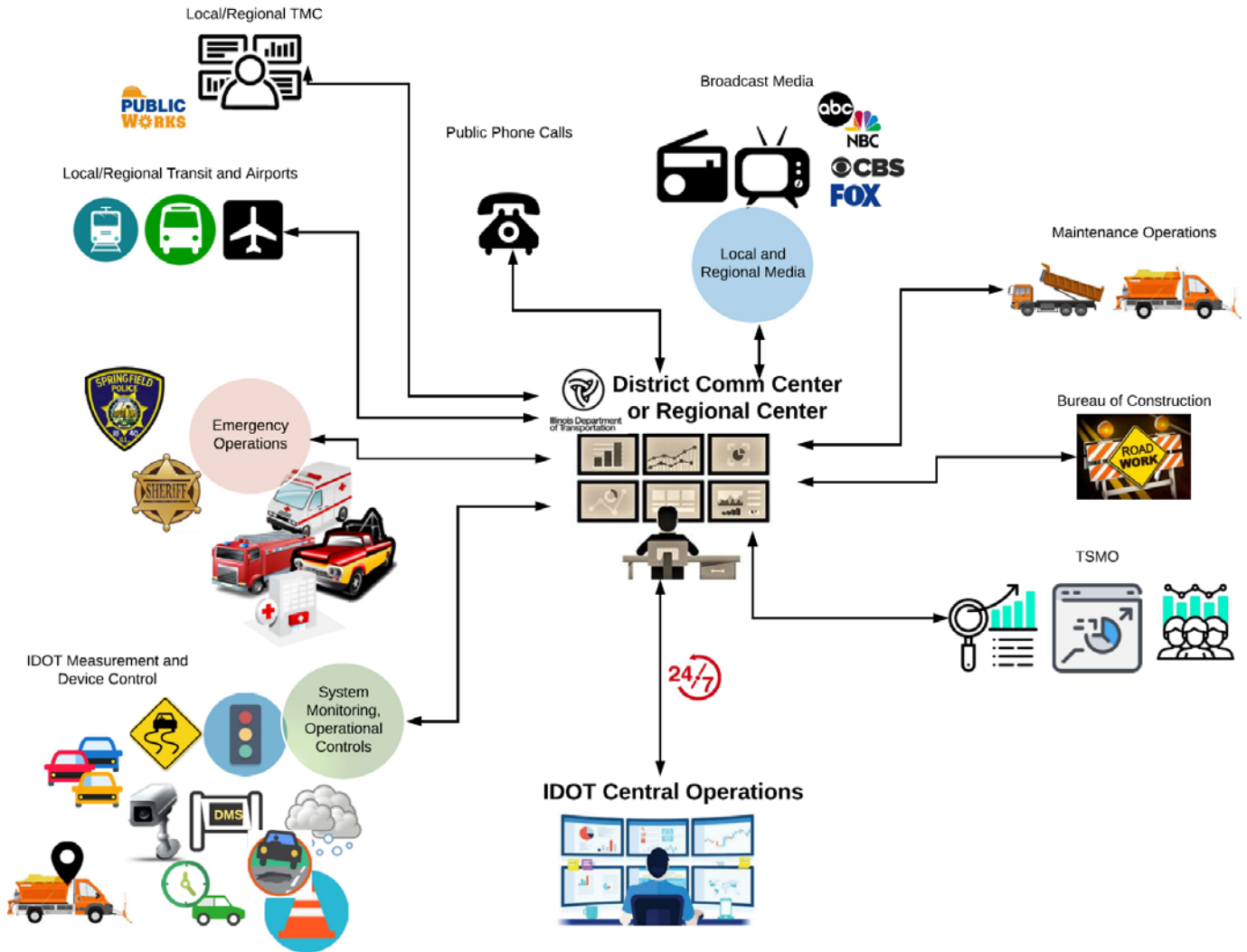


Figure 5: Illinois Statewide ITS Architecture – Regional Operational Concept

### 3.2 Key Stakeholders

The state of Illinois is rich with public agencies, private companies, universities, research centers and national laboratories on the cutting edge of technology research and development. Throughout the evolution of ITS planning and deployment in Illinois, and particularly during the development of the Statewide ITS Architecture, many stakeholders have been involved including:

- Bordering State DOTs
- Bordering State Police
- Cities – Public Works
- Illinois Emergency Management Agency (IEMA)
- Illinois State Police
- Illinois State Toll Highway Authority

- Commercial vehicle operators
- Counties – Public Works
- County Sheriff Offices
- Emergency Service & Disaster Agencies (ESDA)
- Emergency Medical Services
- Federal Highway Administration (FHWA)
- Illinois DOT Central and District Offices
- Local, Regional Transit Agencies
- Local Fire and Law Enforcement Departments
- Metropolitan Planning Organizations (MPO)
- 911 Communication Centers (PSAPs)
- Regional Planning Commissions (RPC)
- Railroad Agencies
- Visitors and Convention Bureaus

As part of the Statewide ITS Architecture update, the architecture team audited the existing set of stakeholders and added to the list as needed. This was facilitated largely through stakeholder outreach, which included webinars, surveys and interactive workshops in each region. Coordination with regional Champions, whom actively maintain their own ITS Architecture such as CMAP in NE Illinois and the EWGCOG in the St. Louis area, was helpful to capture ITS planning activities in a large region and adjacent state. Development of new ITS Architectures in Carbondale, Bloomington–Normal, Kankakee, and Decatur regions not only provided the mechanism for federal compliance, but also presented IDOT with the opportunity to engage new stakeholders.

Where feasible and interest existed, key stakeholders were asked to:

- Encourage participation in workshops held in adjacent Districts
- Review the adjacent region’s architecture(s)
- Identify statewide needs outside of those needs defined to date
- Commit to identifying ITS projects and initiatives, and provide them to the MPO and IDOT for Statewide and Regional Architectures maintenance

This interactive and iterative process of stakeholder engagement and regional architecture revision facilitated the completion of an updated stakeholder list. Stakeholder updates included replacement of CVISN with ITD, changing from Springfield to Sangamon MTD, and the removal of the NE Illinois RTA, among others. The stakeholders involved in the development of the Illinois Statewide Architecture are listed in Table 3. Additional details about the stakeholder groups and their definitions can be found in Appendix E.

*Table 3 - Statewide ITS Architecture Stakeholder List*

Stakeholder Name	Group	Group Members	Stakeholder Description
<b>Amtrak</b>			Nationwide passenger rail organization with regional hub in downtown Chicago.
<b>APCO</b>			Illinois Chapter of the Association of Public Safety Communications Officials
<b>BSRPC</b>			Bi-State Regional Planning Commission (BSRPC)
<b>CIPT</b>			Central Illinois Public Transit (Tuscola)

Table 3 - Statewide ITS Architecture Stakeholder List

Stakeholder Name	Group	Group Members	Stakeholder Description
<b>City Transit Agencies</b>	X	CityLink, Connect Transit, CUMTD, DPTS, MCT, MetroLINK (Quad Cities), RMTD, RVMMTD, SMTD	City transit agencies are transit operators in medium size cities (MSA <sup>1</sup> s with population over 100,000) that connect through district hubs to share information beyond their local spheres of influence.  Includes the transit agencies CityLink, CUMTD, MCT, MetroLINK (Quad Cities), RMTD, RVMMTD and SMTD that are included by name in their respective areas' regional architectures, as well as other transit agencies that are addressed solely in the Statewide Architecture such as Connect Transit and DPTS.
<b>CityLink</b>			Greater Peoria Mass Transit District, which now includes Pekin Municipal Bus (PMB was formerly its own stakeholder).
<b>CMAP</b>			Chicago Metropolitan Agency for Planning. Formerly known as Chicago Area Transportation Study.
<b>Colleges and Universities</b>			Colleges and universities typically host a variety of special events. Some colleges and universities operate transit systems and have a police staff and/or dispatch center on campus.
<b>Connect Transit</b>			Formerly known as Bloomington-Normal Public Transit System
<b>Convention and Tourism Bureau</b>			An organization that maintains up-to-date information on events, attractions and venues in their coverage area.
<b>County Dept. of GIS</b>			County departments of geographic information services (GIS)
<b>County Dept. of Public Works</b>			County departments of public works are those agencies and other non-municipal entities that are primarily responsible for maintenance of the surface transportation network outside the municipal borders. The following counties are specifically addressed in a regional ITS architecture: McHenry, Lake, Cook, Kane, DuPage, Will, Boone, Ogle,

<sup>1</sup> MSA: Metropolitan Statistical Area. Defined by the U.S. Office of Management and Budget (OMB) and used by the Census Bureau and other federal government agencies for statistical purposes. See <https://www.census.gov/programs-surveys/metro-micro.html> for detailed MSA information.

*Table 3 - Statewide ITS Architecture Stakeholder List*

Stakeholder Name	Group	Group Members	Stakeholder Description
			De Kalb, Winnebago, Henry, Mercer, Muscatine, Rock Island, Scott, Peoria, Woodford, Tazewell, Sangamon, Madison, Monroe, St. Clair, Vermillion, Champaign. All remaining counties in the state are addressed in a generic format in the Statewide Architecture.
<b>County Emergency Dispatch</b>			County emergency dispatch agencies include fire and ambulance dispatch and all other first responders who respond to incidents along the surface transportation network.
<b>County ESDA</b>			Illinois County Emergency Services & Disaster Agency (ESDA) coordinators that provide support at the regional or county level.
<b>County Highway Dept.</b>		Cook County HWD DuPage County HWD Will County HWD	County highway departments are those agencies responsible for operation of the surface transportation network and roadside equipment outside the municipal borders.
<b>County Human Services</b>			County human services are those agencies responsible for emergency government operations and the emergency alert system. County human services coordinate closely with IEMA.
<b>CTA</b>			Transit provider in the city of Chicago and beyond to rest of the region, offering both rail and bus services.
<b>CUMTD</b>			Champaign-Urbana Mass Transit District
<b>CUUATS</b>			Champaign Urbana Urbanized Area Transportation Study
<b>DATS</b>			Danville Area Transportation Study
<b>DMT</b>			Danville Mass Transit
<b>DPTS</b>			Decatur Public Transit System
<b>EWGCOG</b>			St. Louis Metropolitan Planning Organization (East-West Gateway Council of Governments)
<b>Emergency Responders</b>			Local responders such as fire and ambulance are represented by this stakeholder.
<b>Enforcement Agencies</b>	X	ISP Commercial Vehicle Enforcement, ISP District Operations, Local Law Enforcement	Enforcement agencies represent the various agencies who are responsible for enforcing traffic codes along the surface transportation network.

*Table 3 - Statewide ITS Architecture Stakeholder List*

Stakeholder Name	Group	Group Members	Stakeholder Description
		Agencies	
<b>EPA</b>			US and Illinois Environmental Protection Agency (EPA) provides hazardous waste transporter permits to carriers as well as is involved with emergency and disaster response situations as necessary. The EPA also monitors air quality levels and determines Ozone Action days.
<b>ESDA</b>	X	County ESDA, Municipal ESDA	Emergency Services & Disaster Agency (ESDA), including both County and Municipal ESDA.
<b>ETSB</b>			Emergency Telephone System Board. A board appointed by the corporate authorities of any county or municipality 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).
<b>FHWA</b>			Federal Highway Administration
<b>FMCSA</b>			Federal Motor Carrier Safety Administration
<b>FTA</b>			Federal Transit Administration
<b>GT</b>			Galesburg Transit (and Galesburg Handivan)
<b>Health Care Providers</b>			This is a pseudo-stakeholder group that represents generically the health care providers who either influence the transportation network or are active participants in emergency/incident response teams.
<b>ICC</b>			Illinois Commerce Commission
<b>ICJIA</b>			Illinois Criminal Justice Information Authority
<b>IDOT</b>	X	IDOT Central Bureau of Information Processing (BIP), IDOT Central Bureau of Operations, IDOT District Bureaus of Construction, IDOT District Bureaus of Design, IDOT District Bureaus	Illinois Department of Transportation (IDOT) offices, bureaus, and units.

Table 3 - Statewide ITS Architecture Stakeholder List

Stakeholder Name	Group	Group Members	Stakeholder Description
		of Electrical Operations, IDOT District Bureaus of Local Roads, IDOT District Bureaus of Traffic Operations, Illinois Department of Innovation and Technology (DoIT), IDOT Division of Traffic Safety, IDOT ITS Program Office	
<b>IDOT Central Bureau of Information Processing (BIP)</b>			Illinois Department of Transportation, Central Bureau of Information Processing (BIP) is responsible for information technology (IT) applications throughout IDOT, including hardware and software procurement and integration.
<b>IDOT Central Bureau of Operations</b>			Illinois Department of Transportation, Central Bureau of Operations provides the statewide IDOT road conditions website and phone line to the public, oversees the Oversize - Overweight (OSOW) permitting process, and provides staffing for Station One, among its other responsibilities.
<b>IDOT District Bureau of Construction</b>			Illinois Department of Transportation, District Bureau of Construction. Project Implementation responsible for the construction and maintenance of the state highway system and the state's local roads and streets.
<b>IDOT District Bureau of Design</b>			Illinois Department of Transportation, District Bureau of Design. Responsible for the design of the state highway system and the state's local roads and streets.
<b>IDOT District Bureau of Electrical Operations</b>			Illinois Department of Transportation, District Bureau of Electrical Operations. Responsible for the design, construction and operations of electrical equipment along the state highway system and the state's local roads and streets. (Traffic signals, detection, and DMS) are not part of responsibilities



*Table 3 - Statewide ITS Architecture Stakeholder List*

Stakeholder Name	Group	Group Members	Stakeholder Description
<b>IDOT District Bureau of Innovation and Technology (DoIT)</b>			IDOT District bureau of DoIT
<b>IDOT District Bureau of Local Roads</b>			Illinois Department of Transportation (IDOT), District Bureau of Local Roads receives communication from villages, townships, cities and counties regarding construction information and project status information for coordination purposes.
<b>IDOT District Bureau of Operations</b>			Illinois Department of Transportation, District Bureau of Operations. Responsible for the design of traffic control equipment and operations along the state highway system and the state's local roads and streets.
<b>IDOT Division of Traffic Safety</b>			Illinois Department of Transportation, Division of Traffic Safety performs audit inspections and collects cash data that is provided to SAFETYNET and the Federal Motor Carrier Safety Administration (FMCSA).
<b>IDOT ITS Program Office</b>			Illinois Dept. of Transportation ITS Program Office
<b>IEMA</b>	X	Regional IEMA Coordinators, Statewide IEMA Coordinators	Illinois Emergency Management Agency at both the regional and Statewide office levels.
<b>IL CMS</b>			Illinois Department of Central Management Services
<b>IL Dept. of Driver Services</b>			Illinois Department of Driver Services (commonly known as the Department of Motor Vehicles)
<b>IL Dept. of Revenue</b>			Illinois Department of Revenue
<b>IL Secretary of State Motor Vehicle Administration</b>			Illinois Secretary of State Motor Vehicle Administration
<b>ISP</b>	X	ISP Central Operations, ISP Commercial Vehicle Enforcement, ISP District Operations	Illinois State Police

*Table 3 - Statewide ITS Architecture Stakeholder List*

Stakeholder Name	Group	Group Members	Stakeholder Description
<b>ISP Central Operations</b>			Illinois State Police (ISP) Central Operations holds the data archives and collects information from around the state from each ISP district and provides statewide information to the various federal agencies that require it. In large scale emergency management operations, ISP Central Operations plays a coordinator role between the local ISP districts affected and other agencies.
<b>ISP Commercial Vehicle Enforcement</b>			Portion of the Illinois State Police that performs the roadside driver/sensor communication screening, roadside operations in general operations and physical inspections regarding commercial vehicles.
<b>ISP District Operations</b>			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.
<b>ISTHA</b>			Illinois State Toll Highway Authority
<b>ITD Stakeholders</b>	X	ICC, IDOT Central Bureau of Operations, IDOT Division of Traffic Safety, IL Dept. of Revenue, IL Secretary of State MV Admin., ISP Commercial Vehicle Enforcement	Now referred to as ITD program, Innovation Technology Deployment. Formerly known as CVISN/EOSS Stakeholders. This stakeholder group includes the ICC, Secretary of State, Departments of Revenue and Transportation and the State Police who are tasked with leading the Illinois CVISN Phase One implementation. Includes the ICC, IDOT Division of Highways, IDOT Division of Traffic Safety, IL Dept. of Revenue, IL Secretary of State Motor Vehicle Administration, and ISP Commercial Vehicle Enforcement.
<b>ITTF</b>			The Illinois Terrorism Task Force is responsible for developing and helping to implement the state's terrorism preparedness strategy as an advisory body to the Governor as established by Executive Order 2003-17. ITTF goals are two-fold. One goal is strengthening the Illinois infrastructure to respond to acts of terrorism. The second goal of the ITTF is

Table 3 - Statewide ITS Architecture Stakeholder List

Stakeholder Name	Group	Group Members	Stakeholder Description
			implementing prevention activities that foster improved communication of intelligence information both horizontally and vertically throughout the state.
<b>IWIN Stakeholders</b>	X	ICJIA, IL CMS, ISP Central Operations, ISP Commercial Vehicle Enforcement, ISP District Operations	This is a stakeholder group that represents all the various law enforcement and other related organizations involved with the Illinois Wireless Information Network communication system. These agencies include ICJIA, IL CMS, and ISP.
<b>JCMTD</b>			Jackson County Mass Transit District (Carbondale)
<b>JDCT</b>			Jo Daviess County Transit (Galena)
<b>LMIGA Corridor (Lake Michigan Interstate Gateway Alliance)</b>	X	WisDOT, INDOT, IDOT, MDOT, ISTHA, Chicago Skyway, Indiana Toll Road	LMIGA is a voluntary organization with participation from the Wisconsin DOT, the Illinois DOT, the Indiana DOT; the Michigan DOT; the Illinois Tollway; the Skyway Concession Company, LLC; and the Indiana Toll Road Concession Company, LLC. The goal of LMIGA is to focus on operations within the region to ensure that traffic moves safely and efficiently.
<b>Local Law Enforcement Agencies</b>			This pseudo-grouping represents all city and county (i.e., non-state police) law enforcement agencies that focus on maintaining a safe and secure surface transportation network in the state of Illinois.
<b>MCT</b>			Madison County Transit (Granite City)
<b>Media Outlets</b>			Newspapers, television stations, radio stations and Internet sites that provide transportation information to the public.
<b>Metra</b>			Major commuter rail service provider of Chicago metropolitan area. Also shared tracks with South Shore Line (NICTD) in Metra Electric District.
<b>Metro Transit</b>			Transit agency for the St. Louis Metro Area (formerly Bi-State Development Agency)
<b>MetroLINK</b>			Quad Cities MetroLINK. Formerly referred to as Rock Island County Metropolitan Mass Transit District.

*Table 3 - Statewide ITS Architecture Stakeholder List*

<b>Stakeholder Name</b>	<b>Group</b>	<b>Group Members</b>	<b>Stakeholder Description</b>
<b>MPO/RPC</b>	X	BSRPC, CMAP, CUUATS, DATS, E-W Gateway Council of Gov.'s RMAP (Rockford), TCRPC	Metropolitan Planning Organizations and/or Regional Planning Commissions who are most often the champion and developers of a region's ITS architecture. This is a stakeholder group that represents all the specific planning organizations, including BSRPC, CATS, CUUATS, DATS, the East-West Gateway Council of Governments, TCRPC, and RATS.
<b>Municipal Dept. of Transportation</b>			These are the municipal agencies responsible for operation of the municipality's surface transportation network and roadside equipment.
<b>Municipal Emergency Dispatch</b>			These are the municipal public safety answering points (PSAPs) responsible for receiving and coordinating information in response to emergency incidents.
<b>Municipal ESDA</b>			Illinois county Emergency Services & Disaster Agency coordinators that provide support within a municipality sphere of influence.
<b>Municipal Public Works</b>			Municipal departments of public works are those agencies and other municipal entities that are primarily responsible for maintenance of the surface transportation network within the municipal borders.
<b>National Weather Service</b>			National Weather Service functions as a weather information service provider and generates severe weather alerts.
<b>National/State Park and Recreation Areas</b>			Park and recreation areas function as regional/special event generators and provide travel information to park users.
<b>Other State DOTs</b>			Other State DOT's include Indiana, Iowa, Kentucky, Missouri, and Wisconsin that border Illinois.
<b>Pace</b>			Pace Suburban Bus. Regional transit agency that supplies Bus service in Chicago Metropolitan Area.
<b>Private HAZMAT Agencies</b>			Regional specialized teams for hazardous materials incident response.
<b>Private Information Service Providers</b>			Private information service providers include private entities that provide traveler information for a fee (E.g., Google, Waze,

*Table 3 - Statewide ITS Architecture Stakeholder List*

Stakeholder Name	Group	Group Members	Stakeholder Description
			HERE, Inrix).
<b>Private Medical Carriers</b>			These are firms that provide non-emergency medical transportation services, usually under sponsorship of public agencies or for private nursing homes. They may be in some cases available for use in regional paratransit coordination.
<b>Private Tow and Recovery Operators</b>			Private tow and recovery operators work with emergency responders to clear incidents from freeways and arterial streets.
<b>Private Trucking Companies</b>			Private trucking companies deliver goods and interact with law enforcement, multi-modal, and CVISN functions.
<b>Private Weather Information Providers</b>			Companies from private industry that augment and/or provide weather information and products to the government sector and other private sector information service providers.
<b>Rail Freight Operators</b>			Rail freight operators oversee freight train operations and coordinate with surface transportation entities.
<b>Rail Transit Operators</b>	X	Metro Transit, CTA	These are agencies that operate urban heavy or light rail transit systems in large metropolitan areas. For both Chicago and St. Louis metropolitan regions, this is actually an operating unit within a single organization (CTA or Metro Transit).
<b>Regional / Special Event Organizations</b>	X	Colleges and Universities, Convention and Tourism Bureau, Natl/State Park and Rec. Areas	Organizations that oversee major special events and tourist centers, including colleges and universities, convention and tourism bureaus, and national/state park and recreation areas.
<b>Regional Airport Authority</b>			Regional airport authorities manage regional airport operations including transportation, security, and travel information.
<b>Regional IEMA Coordinators</b>			Illinois Emergency Management Agency Coordinators at a regional level.
<b>Regional Transit Providers</b>	X	Metro Transit, RTA (CTA, Pace, Metra)	These are multimodal transit agencies in the largest metropolitan areas of Illinois, all offering both bus and rail services (Chicago and IL suburbs of St. Louis).

*Table 3 - Statewide ITS Architecture Stakeholder List*

Stakeholder Name	Group	Group Members	Stakeholder Description
<b>Rides MTD</b>			Rides Mass Transit District (Harrisburg)
<b>RMAP (Rockford)</b>			Rockford-area MPO is now known as Rockford Metropolitan Area for Planning. Formerly known as RATS (Rockford Area Transportation Study)
<b>RMTD</b>			Rockford Mass Transit District
<b>RTA</b>			Regional Transportation Authority (Chicago Area)
<b>Rural Transportation Agencies</b>	X	CIPT, DMT, GT, JCMTD, JDCT, Rides MTD, SCT, SMART, WCMTD	These are transit agencies serving smaller communities, often across regions of the state. These operations typically use smaller vehicles and operate a largely demand responsive service. Agencies in this group include CIPT, DMT, GT, JCMTD, JDCT, Rides MTD, SCT, SMART, and WCMTD.
<b>RVMMTD</b>			River Valley Metro Mass Transit District (Kankakee)
<b>SCT</b>			South Central Transit (Centralia)
<b>SMART</b>			Now known as Southern Most Area Transit District. Formerly known as Shawnee Mass Transit District (Far Southern Illinois). Acronym remains the same.
<b>SMTD</b>			Now known as Sangamon Mass Transit District. Formerly known as Springfield Mass Transit District. Acronym remains the same.
<b>Statewide Emergency Management Incident Command</b>	X	County Dept of Public Works, County Emergency Dispatch, EPA, IDOT Central Bureau of IP, IDOT Central Bureau of Operations, ISP Central Operations, Municipal Dept. of Transportation, Municipal Emergency Dispatch, Statewide IEMA Operations	This group includes County Dept of Public Works, County Emergency Dispatch, IEPA, ESDA, IEMA, IDOT Central Office, IDOT Central Bureau of Operations, IDOT District Operations, ISP Central Operations, Municipal Dept of Transportation, and Municipal Emergency Dispatch

*Table 3 - Statewide ITS Architecture Stakeholder List*

Stakeholder Name	Group	Group Members	Stakeholder Description
<b>Statewide IEMA Operations</b>			Illinois Emergency Management Agency Coordination at an inter-regional / statewide level.
<b>Taxi Operators</b>			These are taxi operators under contract to a transit agency of any size who provide service on demand. Specifically, this applies to taxicabs that accept trips from paratransit dispatch and are required to report back trip completion and any exceptions in a timely fashion. It does not include taxi companies involved in simple voucher based service if the transit operator is not taking the call from the traveler.
<b>TCRPC</b>			Tri-County Regional Planning Commission (Peoria, Tazewell, Woodford Counties)
<b>Telecommunication Providers</b>			Telecommunications providers are those public and private entities that provide infrastructure to support traveler information services. Examples include Motorola and AT&T. Motorola built, owns and operates STARCOM21 - a 700/800 MHz, trunked, digital, voice public safety network.
<b>Traffic Operations Stakeholders</b>	X	County Highway Dept., IDOT District Bureau of Operations, Municipal Dept. of Transportation	This grouping reflects those agencies that have or are likely to install, operate, and maintain field elements or systems to control the flow of traffic or report on the state of traffic flow at that location. These agencies include Municipal Departments of Transportation, County Highway Departments, and IDOT District Operations at a minimum.
<b>Traveler</b>			Generic term that covers the traveling public in and through the state of Illinois.
<b>USCG</b>			US Coast Guard
<b>WCMTD</b>			West Central Mass Transit District (Jacksonville)

# 4 STATEWIDE ITS ARCHITECTURE UPDATES

The most fundamental change to the Architecture guidelines outlined in ARC-IT has been the discontinuation of Market Packages. These were replaced with a set of similar yet refined Service Packages (SPs). The previous Market Packages were audited and either removed, edited, or combined to better reflect the current and future use of ITS services. Service Packages are detailed online, as part of the ARC-IT interface. The new Architecture includes the Connected Vehicle Reference Implementation Architecture (CVRIA) services previously defined in both CVRIA and the National ITS Architecture 7.1. Appendix G provides the side by side comparison from Turbo Market Packages to ARC-IT Service Packages. The list below shows the ITS Service Package Areas and their abbreviations used on the Services tab in RAD-IT:

- Commercial Vehicle Operations (CVO)
- Data Management (DM)
- Maintenance and Construction (MC)
- Parking Management (PM)
- Public Safety (PS)
- Public Transportation (PT)
- Support (SU)
- Sustainable Travel (ST)
- Traffic Management (TM)
- Traveler Information (TI)
- Vehicle Safety (VS)
- Weather (WX)

The Illinois Statewide ITS Architecture is derived from the National ITS Architecture and has been tailored to meet the needs of transportation stakeholders at a statewide level. Figure 6 represents the top level architecture interconnects diagram from the National ITS Architecture, showing all the subsystems and the basic communication channels between those subsystems. In order to take full advantage of this Statewide ITS Architecture Document, it is recommended that ITS stakeholders use the following process in defining and developing their ITS project(s).

1. Identify and document the needs or transportation problems the project will address.
2. Document the proposed Concept of Operations including identification of the roles and responsibilities of participating agencies.
3. Review the existing inventory elements to determine if the existing inventory of systems address the project needs or if a new entity and/or system should be to be added.
4. Select Service Packages based upon the identified needs.
5. Identify the desired functionality associated with the selected Service Packages.
6. Tailor the functions from each Service Package to include the function in the new project and/or delete the function from an existing project.
7. Review Concept of Operations associated with each function to confirm when to include/exclude a requirement, modify a requirement, or incorporate new requirements.
8. Review data associated with the selected functions and requirements.
9. Identify applicable flows based on the data and functions.

By following this process, the ITS stakeholder will have a project level conceptual system design and specifications that is consistent with the Statewide ITS Architecture. This approach provides the foundation for achieving federal funding compliance for ITS projects.



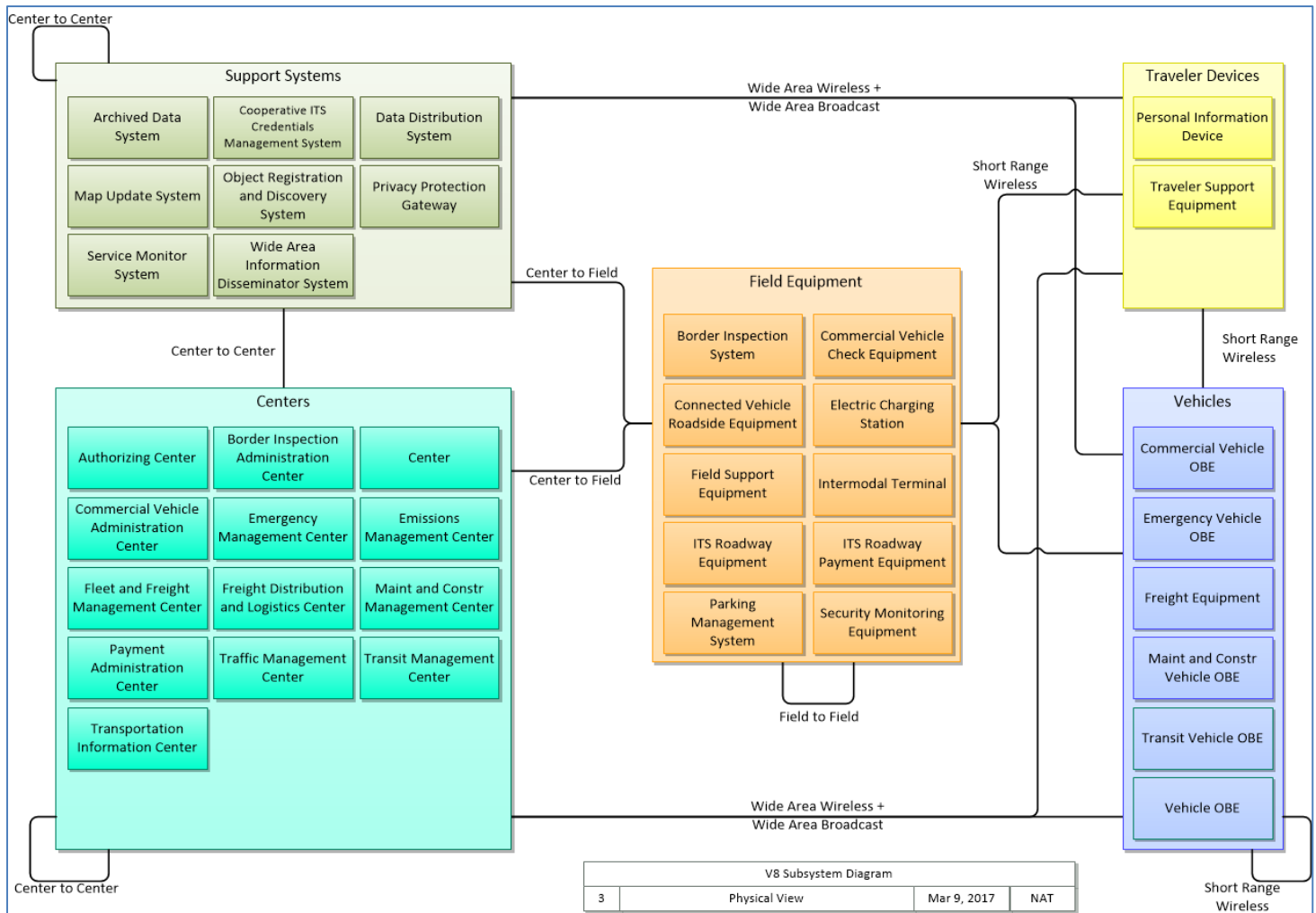


Figure 6: National ITS Architecture Subsystem Interconnect Diagram

### 4.1 Inventory and Needs

The Statewide ITS Architecture documents the needs and existing inventory of ITS elements throughout the state. The outputs can be used to determine if a particular project has similar needs of an existing project and/or if a project needs to interface and communicate with an existing system.

During the Statewide ITS Architecture update process, transportation system needs were discussed in detail during a series of interactive workshops. During the workshops, needs were consolidated into a manageable number for voting purposes. This data was used to inform survey respondents who chose the top three or four priorities from the list for their region. Votes from workshops and surveys were aggregated into an ordered list of needs. Participants received an equal number of votes to distribute over preferred needs, to produce a prioritized list for each region.

The workshop needs lists were consolidated to create the final list of 15 statewide needs. Table 4 lists the updated Transportation Needs Summary. Column 1 lists the various key needs categories, or “program areas,” that were identified. Section 4 of the Statewide ITS Strategic Plan defines these categories in greater detail. Column 2 shows the statewide voting totals from the “dot” exercises where stakeholders prioritized the identified needs. Not all articulated needs received votes, and the identified needs were

not the same across the state. Higher scores represent more pressing needs as identified by stakeholders throughout the state. One of the goals of this process was to look for interregional needs that serve as the focus of the Statewide ITS Architecture. Further details on voting, including the vote totals by location, can be seen in Appendix B.

*Table 4: 2017 Statewide ITS Architecture Workshops – Transportation Needs Summary*

	Stakeholder Needs as Voted on by District	Total Votes	Count by Districts (9 total)
<b>A</b>	Advanced traffic signal systems	47	4
<b>B</b>	Enhanced interagency coordination and data sharing	153	7
<b>C</b>	Expanded communications infrastructure network	58	5
<b>D</b>	Improved and expanded multimodal traveler information	143	8
<b>E</b>	Enhanced data collection and monitoring capabilities for traffic management agencies	66	6
<b>F</b>	Centralized operations for 24/7 traffic management	9	1
<b>G</b>	Enhanced incident management programs	75	7
<b>H</b>	Enhanced transit system coordination and operations	5	2
<b>I</b>	Improved commercial vehicle administration	6	2
<b>J</b>	Additional funding for ITS deployment, operations, and maintenance	117	6
<b>K</b>	Statewide ITS standards and procurement options	9	1
<b>L</b>	Increased capacity of the transportation system	15	1
<b>M</b>	Improved safety through use of ITS	14	1
<b>N</b>	Preparations for connected vehicles	16	2
<b>O</b>	Stronger partnerships with private industry	33	4

ITS needs and transportation issues have evolved and changed over the years. For the updated statewide needs, communications, funding, interagency coordination, transit ITS operations, as well as O&M were major current needs identified by most stakeholders. Transit signal priority (TSP), traffic signal coordination, ITS security systems, work zone management and automated speed enforcement are not as prevalent in the new list. This can be attributed to the ITS accomplishments realized in these areas since the Statewide ITS Architecture was originally adopted. Some issues were identified as new in some areas and are no longer a concern in other districts.

Overall, newly identified needs were consistent across the state and include: ITS Funding; Expanded communications infrastructure; Improved and expanded traveler information; Transit enhancements; Maintenance for existing systems, and preparing for new technologies like Connected Vehicles. Multimodal coordination was also discussed as related to CVO management, Traveler information enhancements and Railway crossing coordination.

The following list summarizes other needs identified during stakeholder engagement:

- For the Chicagoland area, current priorities include enhanced data collection and monitoring capabilities; requirements for real-time data and performance measures reporting; and preparing for connected and autonomous vehicles.
- For the Rock River Valley region, top needs were enhanced interagency coordination, transit enhancements, data sharing; and additional funding for ITS deployment, operations and

maintenance. These needs were consistent with workshop results across the state.

- In the Commerce Corridors, current needs range from expanded communications infrastructure network, and enhanced traffic flow prediction to improved and expanded traveler information.
- Great Rivers Country noted enhanced data collection and monitoring capabilities; enhanced interagency coordination and data sharing; as well as railroad crossing coordination
- University Trails noted enhanced interagency coordination, data sharing, and enhanced incident management.
- The Capital West region had a 3-way tie for interagency coordination, funding, and data collection. TIMS setup and preparations for connected vehicles also noted.
- For Little Wabash, current needs encompassed improved and expanded traveler information; enhanced interagency coordination and data sharing and transit development.
- Metro East noted priorities in the areas of funding for O&M, enhanced interagency coordination and data sharing in support of enhanced traveler information.
- Little Egypt priorities were noted in the areas of advanced traffic signal systems and enhanced incident management programs.

Table 5 below displays the updated Inventory of ITS Elements from the updated Statewide ITS Architecture.

*Table 5 - Illinois Statewide ITS Architecture Inventory*

<b>Inventory Element Name</b>	<b>Element Description</b>
<b>Automatic Anti-Icing System</b>	Several anti-icing systems have been deployed in the state of Illinois. These systems detect pavement temperatures and distribute an anti-icing agent when necessary.
<b>CCTV Camera System (City of Chicago)</b>	Closed circuit television (CCTV) cameras are currently located in various locations in the Chicago Metro area. In the future, additional CCTV for both traffic management and security/safety monitoring are envisioned to be added to the network. Currently these are not shared systems.
<b>CCTV Camera System (IDOT)</b>	IDOT District 1 operates numerous pan-tilt-zoom (PTZ) surveillance cameras throughout the district's freeway system. IDOT District 4 operates 15 PTZ surveillance cameras along the I-74 corridor in downtown Peoria and East Peoria for traffic surveillance. IDOT District 8 operates 24 PTZ surveillance cameras in the East St. Louis Area for traffic surveillance. IDOT District 6 plans to install a limited number of PTZ cameras in the near future.
<b>CCTV Camera System (ISTHA)</b>	Closed circuit television (CCTV) cameras (approx. 1320) are located throughout the Tollway system.
<b>CCTV Camera System (Municipal/County)</b>	Pan-tilt-zoom and fixed video cameras are used by various municipalities/counties in Illinois.
<b>CCTV Camera System (Rest Areas)</b>	Closed circuit television (CCTV) security cameras are placed currently in rest areas along I-27, I-39, I-80, I-90, I-55, I-57, I-74, I-72, I-70, I-64, and I-24 that are operated by the ISP districts.
<b>City Centric District Hub</b>	This template hub has varied data sources and destinations and is meant for those larger metropolitan areas found in Districts 1 and 8 (Chicago and E. St. Louis respectively).
<b>City Transit Agency Dispatch</b>	Medium size city transit management agencies that connect through the district hubs to share information beyond their local sphere of influence.
<b>City Transit Agency Vehicles</b>	Vehicles operated by medium sized city transit agencies.
<b>Community Centric District Hub</b>	This template hub has varied data sources and destinations that pertain to medium sized cities and communities found in Districts 2,3,4,5, and 6.
<b>Community Transit Agency Dispatch</b>	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 metropolitan areas.
<b>Community Transit Vehicles</b>	Vehicles used by community transit operations.
<b>Commuter Rail Operations</b>	Currently, the only ones operating in Illinois are Metra and South Shore (Metra subsidized in IL). In the future, there may be others.

*Table 5 - Illinois Statewide ITS Architecture Inventory*

<b>Inventory Element Name</b>	<b>Element Description</b>
<b>Contract Taxi Operators</b>	These are taxi operators under contract to a transit agency of any size who provide service on demand. Specifically, this applies to taxicabs that accept trips from paratransit dispatch and are required to report back trip completion and any exceptions in a timely fashion. It does not include taxi companies involved in simple voucher based service if the transit operator is not taking the call from the traveler.
<b>County Emergency Dispatch - PSAP</b>	Outside metropolitan and large urban areas, the Public Safety Answering Point or PSAP is likely to be operated by the County as part of their emergency management function. In many of the communities in Illinois, the PSAP dispatches both fire and police when incidents occur along the surface transportation network.
<b>County Maintenance and Construction Dispatch</b>	These systems include mobile data terminals (MDTs), computer-aided dispatch (CAD) systems and radio dispatch communications systems to allow County Highway Departments and other analogous agencies to dispatch and track their fleets for construction and maintenance activities.
<b>County Maintenance and Construction Vehicles</b>	Vehicles equipped for snow removal and to maintain roads outside municipal boundaries. Currently, no plans for AVL in the 10 year horizon but maintenance scheduling software in place.
<b>County Maintenance and Construction Website</b>	As an aid to travelers, websites detailing maintenance and construction activities within a region are available in some portions of Illinois.
<b>Dept. of Driver Services</b>	The Illinois Department of Driver Services (commonly known as the Department of Motor Vehicles).
<b>Detectorization</b>	This is the all-purpose system in the architecture representing network surveillance systems such as loop detectors, radar, acoustic, machine vision, and any other technology that provides data about the flow of travel along the surface transportation network. Areas such as District 1 have a large inventory of such devices already in place, where as other areas of the state such as District 7 or 9 have little to no detectorization.
<b>DMS (IDOT)</b>	Dynamic message signs (DMS) are operated by IDOT in their various districts (60 in District 1, 13 in District 2, 18 in District 3, 7 in District 4, 12 in District 5, 4 in District 6, 6 in District 7, 2 in District 9, 10 in District 8). In the future, more signage may be added.
<b>DMS (ISTHA)</b>	Illinois State Toll Highway Authority (ISTHA) operates more than 43 dynamic message signs (DMS) at various points along I-90, I-88, I-94/294.
<b>DMS (Municipal/County)</b>	Dynamic message signs are currently planned by the City of Chicago are considered future elements for various other municipalities in Illinois.
<b>Driver</b>	The driver represents the human behind the wheel and is a terminator in this architecture.

*Table 5 - Illinois Statewide ITS Architecture Inventory*

<b>Inventory Element Name</b>	<b>Element Description</b>
<b>Dynamic Warning Systems</b>	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.
<b>Emergency Call Boxes</b>	A series of highway call boxes to aid travelers in IDOT District 8 in East St. Louis and at rest stops located throughout the state in each IDOT district (along I-24, I-39, I-55, I-57, I-64, I-70, I-72, I-74, I-80, and I-90).
<b>Emergency Patrol Vehicles</b>	IDOT's Emergency Patrol Vehicles (EPV) provide motorist assistance throughout the Chicagoland and East St. Louis areas and are particularly effective in providing incident information/confirmation to IDOT district traffic management system operations. Also known as Emergency Traffic Patrol (ETP)
<b>Emergency Vehicle Preemption System</b>	These systems provide emergency vehicles with priority along their approach to an intersection.
<b>Emergency Vehicles</b>	Emergency vehicles for local fire/police/emergency responders whether they be city or county are covered by this element.
<b>ETS/911 System</b>	The Emergency Telephone or 911 System that routes emergency calls to emergency dispatch centers. Owned, administered, and maintained by the Emergency Telephone Safety Board (ETSB).
<b>Gateway Guide Website</b>	The Gateway Guide serves the metropolitan St. Louis area, including East St. Louis, with traveler information.
<b>Gateway Travel Information Website</b>	The Gary-Chicago-Milwaukee Gateway Traveler Information website serves Illinois with statewide traveler information.
<b>HAR</b>	Highway Advisory Radio (HAR) is a means of getting up to date information to travelers on road conditions.
<b>HAZMAT Management and Cleanup</b>	Private agencies that specialize in hazardous materials incident cleanup.
<b>HAZMAT Response Vehicle</b>	Specialized emergency response vehicles for hazardous materials incident response and cleanup.
<b>HELP Vehicles</b>	ISTHA's Highway Emergency Lane Patrol (HELP) vehicles provide motorist assistance on the Illinois Tollway and are particularly effective in providing incident information/confirmation to the TIMS.
<b>Highway Rail Information Systems</b>	Advanced highway rail information system for highway rail crossing blockages in East Peoria at IL-116.
<b>Hospitals/ Medical Centers</b>	Regional care facilities.
<b>HRI Quad/Dual Gate Systems</b>	Highway Rail Intersection (HRI) systems include Quad Gate Systems and Dual Gate Systems. Systems with HRI functionality are of particular interest in those areas with large numbers of rail/highway crossings and also in rural areas.

*Table 5 - Illinois Statewide ITS Architecture Inventory*

<b>Inventory Element Name</b>	<b>Element Description</b>
<b>IDOT Bureau of Local Roads Construction Coordination System</b>	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.).
<b>IDOT District Communication Center</b>	Each IDOT District has a central operations center for communicating with the region's various ITS elements. These are located in District 1 (Communication Center at IDOT in Schaumburg and the Traffic Systems Center (TSC) in Oak Park), Communication Center at IDOT in Dixon for District 2, Communication Center at IDOT in Ottawa for District 3, Communication Center at IDOT in Peoria for District 4, Communication Center at IDOT in Paris for District 5, Communication Center in Springfield for District 6, Communication Center at IDOT in Effingham for District 7, Communication Center at IDOT in East St. Louis for District 8, and Communication Center at IDOT in Carbondale for District 9.
<b>IDOT District Construction Website</b>	As an aid to travelers, websites detailing maintenance and construction activities within a district are available in some portions of Illinois such as District 4 with the I-74 reconstruction project and other ongoing transportation efforts.
<b>IDOT District Kiosks</b>	Kiosks are public informational displays supporting various levels of interaction and information access.
<b>IDOT District Maintenance Dispatch</b>	These systems include mobile data terminals (MDTs), computer-aided dispatch (CAD) systems and radio dispatch communications systems to allow IDOT districts that perform maintenance activities to dispatch and track their vehicles. Most districts have GIS systems and scheduling software for routine and corrective maintenance and are capable of distributing information to other agencies at some level (fax, phone, email, on-line, etc.).
<b>IDOT District Maintenance Field Equipment</b>	Illinois Department of Transportation (IDOT) maintenance systems include work zone dynamic message signs (DMS), queue detection and warning systems, and speed warning systems (SWS) to aid IDOT workers in the field by providing information to travelers of upcoming and on-going activities.
<b>IDOT District Maintenance Vehicles</b>	Vehicles equipped for snow removal and to maintain roads; one district has installed AVL with plans to install statewide within the next 5 years.
<b>IDOT Geographic Information Services (GIS)</b>	The Illinois Department of Transportation (IDOT) Geographic Information Services (GIS) acts as the map update provider for all IDOT agencies and is a terminator in this architecture.
<b>IDOT Road Condition Telephone Line</b>	Statewide Winter Road Condition/Construction Telephone Line operated by IDOT as part of the environmental warning system. Provides pre-recorded information at 1-800-452-IDOT (4368).
<b>IDOT RWIS System Display</b>	IDOT provides, on the IDOT website statewide, a display of the RWIS System data for the public. In the future, this data will be made available to more travelers through rest stop kiosks.

Table 5 - Illinois Statewide ITS Architecture Inventory

Inventory Element Name	Element Description
<b>IDOT Statewide Transportation Websites</b>	Road construction, winter road condition and road closure information can be accessed at the IDOT websites. <a href="https://www.gettingaroundillinois.com/">https://www.gettingaroundillinois.com/</a> ; <a href="http://www.idot.illinois.gov/travel-information/roadway-information/Road-Closures/index">http://www.idot.illinois.gov/travel-information/roadway-information/Road-Closures/index</a> ; <a href="https://www.travelmidwest.com/lmiga/home.jsp">https://www.travelmidwest.com/lmiga/home.jsp</a> ; <a href="https://apps.dot.illinois.gov/stl-traffic/">https://apps.dot.illinois.gov/stl-traffic/</a> ; Tollway information is also available at <a href="https://www.illinoistollway.com/projects">https://www.illinoistollway.com/projects</a>
<b>IDOT Traffic Systems Center (TSC)</b>	The Traffic Systems Center is operated by IDOT in Oak Park and provides the surface transportation network flow information in District 1.
<b>IEPA</b>	The mission of the Illinois Environmental Protection Agency (IEPA) is to safeguard environmental quality, consistent with the social and economic needs of the state, so as to protect health, welfare, property and the quality of life.
<b>Illinois Statewide Hub</b>	Statewide collection point for transportation data across the state. The hub supports interagency coordination, data fusion, and supply of transportation data to multimodal traveler information applications.
<b>I-PASS</b>	Automatic vehicle identification/electronic toll collection (AVI/ETC) system operated by the Illinois State Toll Highway Authority (ISTHA).
<b>IREACH</b>	The Illinois Radio Emergency Assistance Channel (155.055 MHz) was designed to serve as a means of interjurisdictional communications between public safety answering points (PSAP) during emergencies. While some PSAPs do use IREACH, the system been used primarily for mobile-to-mobile communications between emergency responders.
<b>ISP Dispatch</b>	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.
<b>ISP Vehicles</b>	Illinois State Police (ISP) vehicles are equipped with computer-aided dispatch (CAD) interfaces to their mobile data terminals (MDTs).
<b>ISP Winter Road Condition Telephone Line</b>	Illinois State Police operates a Winter Road Condition telephone line in each Illinois State Police (ISP) District. This information is also included in the statewide recorded message system for winter road condition and construction information.
<b>ISPERN</b>	The Illinois State Police also have their own statewide communications channel, ISPERN (Illinois State Police Emergency Radio Network). As a means of secondary coordination, law enforcement officials around the state monitor the ISPERN frequency (155.475 MHz) to stay informed of ISP activities.
<b>ISTHA TMC (TIMS)</b>	Traffic and Incident Management System (TIMS) is operated by Illinois State Toll Highway Authority (ISTHA) and shares information and selected control functionality with IDOT District 1 Communication Center.



*Table 5 - Illinois Statewide ITS Architecture Inventory*

Inventory Element Name	Element Description
<b>IWIN</b>	Illinois Wireless Information Network (IWIN) has developed into the primary means of communication between different law enforcement agencies. IWIN is a statewide communications system (CDPD through Verizon Wireless set up by the Illinois State Police, Central Management Services (CMS), and the Illinois Criminal Justice Information Authority (ICJIA). It is linked to statewide/national databases like Law Enforcement Agency Data Service (LEADS), National Crime Information Center (NCIC), National Law Enforcement Telecommunications System (NLETS) and the Illinois Secretary of State databases. It can also be linked to an agency's CAD system or record management system.
<b>Large Bus Transit Agency Dispatch</b>	This is a large bus transit system in a metropolitan area with population over 1 million. It is characterized by the greatest extent of interagency coordination and extensive use of ITS services. This agency operates both fixed route and paratransit operations.
<b>Large Bus Transit Agency Vehicles</b>	This is a large bus transit system in a metropolitan area with population over 1 million. It is characterized by the greatest extent of interagency coordination and extensive use of ITS services. This agency operates both fixed route and paratransit operations.
<b>Local Media</b>	Media who interact with transportation and transit agencies to get information on current delays, as well as planned or emergency reroutes or service interruptions such as radio, television and cable networks.
<b>MABAS</b>	Mutual Aid Box Alarm System (MABAS) allows hundreds of fire and emergency services personnel to coordinate their response to incidents. Recently adopted for fire and EMS Mutual Aid across Illinois, MABAS includes over 25,000 firefighters and emergency response units, including more than 750 fire stations and 600 ambulances. Using a common radio frequency, Interagency Fire Emergency Radio Network (IFERN), MABAS agencies are activated for response through pre designed "run" cards that each participating agency designs and tailors to meet their local risk need. Fire departments, particularly those in the northern part of the state, also utilize these dedicated communication channels to coordinate their operations.
<b>MCR System</b>	Mobile Capture & Reporting (MCR) System provides crash data from law enforcement agencies via the Illinois Wireless Network (IWIN) to an MCR crash database overseen by IDOT Division of Traffic Safety.
<b>Medical Carriers</b>	Medical carriers handle non-emergency medical transportation throughout the state. Often they do this under contract to local government units or to state or federal government human services programs.
<b>MMIS</b>	Maintenance Management Information System (MMIS) is housed in Springfield and keeps track of all IDOT maintenance activities throughout the state. This information is used as a maintenance inventory and to feed the display on the various websites with regards to road construction.
<b>Municipal EMCs</b>	Emergency Management Centers operated by municipalities that serve as command centers for large-scale emergencies.

*Table 5 - Illinois Statewide ITS Architecture Inventory*

<b>Inventory Element Name</b>	<b>Element Description</b>
<b>Municipal Emergency Dispatch - PSAP</b>	Within municipal boundaries, a municipal 911 Center may exist as the Public Safety Answering Point or PSAP is likely to be operated by the City as part of their Emergency Management function. In many of the communities in Illinois, the PSAP dispatches both fire and police when incidents occur along the surface transportation network as well as has connections to the Sub-Regional TMC in that City.
<b>Municipal Maintenance and Construction Dispatch</b>	These systems include mobile data terminals (MDTs), computer-aided dispatch (CAD) systems, and radio dispatch communications systems to allow city departments of public works and other analogous agencies to dispatch and track their fleets for construction and maintenance activities.
<b>Municipal Maintenance Field Equipment</b>	This includes roadside portable message signs and other work zone equipment.
<b>Municipal Maintenance Vehicles</b>	Vehicles equipped for snow removal and to maintain streets; a few municipalities have installed AVL and have maintenance scheduling software in place.
<b>Municipal TMCs</b>	Higher functioning transportation management facilities run by municipalities. Represents a level of TMC below the Sub-Regional TMC (e.g., Peoria, Rockford). May include multi-jurisdictional signal coordination within subareas or corridors that may or may not be contiguous.
<b>Other Rural Transit Agencies</b>	Other rural transit agencies with which Rural Transit Agencies coordinate. This element is a terminator in this architecture.
<b>Other Urban Transit Agencies</b>	Other large or medium size agencies with which City Transit Agencies coordinate. This element is a terminator in this architecture.
<b>Parking Management System</b>	Systems like the RTA/Metra Parking Management Guidance System (PMGS) and rest area commercial vehicle signs that maintain an inventory of open parking spaces and make that available to DMS designed to inform motorists.
<b>Private Carrier Operations</b>	Private Carrier Operations is a generic term for all commercial vehicle operators operating in and through the state of Illinois and the ITS systems they use to operate their fleets.
<b>Private ISPs</b>	Private sector information service providers (ISPs), such as Shadow Traffic, Metro Networks, Traffic.com, etc. that disseminate general and customized transportation information to the traveling public, including commercial vehicles.
<b>Rail Freight Operations</b>	Rail operations centers for private rail firms operating in Illinois.
<b>Rail Passenger Operations</b>	Amtrak intercity passenger rail operations.
<b>Rail Transit Operations</b>	Rail transit centers that operate urban heavy or light rail transit systems in large metropolitan areas. For Chicago, CTA operates rail transit; St. Louis Metro Transit operates MetroLink light rail in IL suburbs.

Table 5 - Illinois Statewide ITS Architecture Inventory

Inventory Element Name	Element Description
<b>Ramp Merge Warning System</b>	Ramp merge warning systems increase safety on highways by alerting drivers of merging traffic. One existing example of such a system is installed at the Belmont entrance ramp in on North Lake Shore Drive in Chicago.
<b>Ramp Meter Systems</b>	Traffic control systems deployed on entrance ramps to limited access roadways to meter the levels of traffic entering the highway. Ramp metering is currently in use in the Chicago area.
<b>Regional Airports</b>	Regional airports that coordinate multi-modal passenger movement with transit agencies.
<b>Roadside Equipment for In-Vehicle Signing</b>	Roadside systems that communicate directly with vehicles to alert motorists of location-specific travel advisories, including crash warning systems.
<b>Rural Centric District Hub</b>	This template hub has a focused set of data sources and destinations and applies to predominately rural transportation needs. This hub is appropriate for Districts 5, 7, and 9.
<b>Rural Transit Agency Dispatch</b>	Rural Transit Agencies service the majority of the state of Illinois geographically. These agencies commonly maintain ties to the nearest medium-sized transit agency(s) for coordination on specific routes through a variety of systems and communications technologies.
<b>Rural Transit Agency Vehicles</b>	Rural transit agency vehicles. These may range from sedans to SUVs to vans to small buses.
<b>RWIS</b>	<i>Updates pending</i>
<b>Security Monitoring Equipment</b>	Sensors that monitor critical infrastructure such as river bridges, tunnels, and interchanges. These systems can include motion sensors, radiological sensors, and object detection.
<b>Statewide Emergency Operations Center</b>	Statewide Emergency Operations Center (SEOC) located in Springfield. The SEOC houses numerous statewide emergency management agencies, and serves as the disaster command center for the state of Illinois.
<b>Statewide Incident Management System</b>	This system ties all Illinois State Police and emergency management agencies electronically to respond and manage incidents and emergencies. This set of systems and application software being implemented throughout the state of Illinois provides a single common set of incident management systems to all incident and emergency services stakeholders.

*Table 5 - Illinois Statewide ITS Architecture Inventory*

<b>Inventory Element Name</b>	<b>Element Description</b>
<b>Station One</b>	Station One was established by IDOT to serve as a universal communications network between all nine IDOT districts. Station One is based at the IDOT Central Office in Springfield, and is operated 24/7. Station One serves two primary purposes: emergency dispatch when the local district office is closed, and maintenance of traveler information, specifically road conditions, across the state. As such, it also acts as a central repository for such information, as collected by IDOT personnel and equipment across the state.
<b>Sub-Regional TMC</b>	This template transportation management center represents those set of systems providing traffic management functionality along with incident management capabilities that exist in a region. These will primarily be found in the larger cities and communities (e.g., Chicago, Collinsville, Peoria, Rockford, etc.) that have a larger number of travelers in their region as compared to the more rural areas of Illinois.
<b>Toll Tag Reader</b>	Transponder reader equipment on or along the roadside for reading toll tag information. Currently used by ISTHA on its toll roads and the Chicago Skyway. Compatible with the I-PASS and E-ZPASS systems.
<b>Traffic Signal Systems</b>	Traffic signal systems owned, operated, and maintained by traffic operations stakeholders, including IDOT, county highway departments, and municipal departments of transportation.
<b>Transit Information Signs</b>	Transit Information Signs are displays at transportation centers, stations, and stops that show when the next vehicle is coming, by route and direction. These may be found in large urban systems as well as small-medium sized transit agencies.
<b>Transit Kiosks</b>	These kiosks may provide basic transit information, and/or access to a trip planner, and/or access to event and attraction information. In the future, all the necessary information will be resident on the transit hub.
<b>Transit Signal Priority Systems</b>	These systems provide transit vehicles with preferential treatment along their approach to an intersection.
<b>Transit Trip Planning Mobile Device Support</b>	These systems support providing personalized transit trip planning information to the traveler.
<b>Traveler</b>	Any individual who uses transportation services. The interfaces to the traveler provide general pre-trip and en-route information supporting trip planning, personal guidance, and requests for assistance in an emergency that are relevant to all transportation system users.
<b>Universal Fare Card</b>	A fare card that can be used at minimum on all transit agencies in a region seamlessly. May also be available for other transportation or non-transportation uses.
<b>User Personal Computing Devices</b>	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.

*Table 5 - Illinois Statewide ITS Architecture Inventory*

<b>Inventory Element Name</b>	<b>Element Description</b>
<b>Vehicle</b>	This subsystem provides the sensory, processing, storage, and communications functions necessary to support efficient, safe, and convenient travel. These functions reside in general vehicles including personal automobiles, commercial vehicles, emergency vehicles, transit vehicles, or other vehicle types.
<b>Violation Enforcement Systems</b>	Violation enforcement systems are used by enforcement agencies to receive violations information for issuing driver fines.
<b>Weather Service Feed</b>	This terminator provides weather, hydrologic, and climate information and warnings of hazardous weather including thunderstorms, flooding, hurricanes, tornadoes, winter weather, tsunamis, and climate events.
<b>Work Zone Photo enforcement System</b>	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.
<b>Yellow Pages Service Provider</b>	This terminator represents the individual organizations that provide any service oriented towards the Traveler. Example services that could be included are gas, food, lodging, vehicle repair, points of interest, and recreation areas.

## 4.2 Service Packages

Service packages group functions and requirements within an ITS architecture to facilitate the addition of project-level ITS deployments to an architecture. Service packages enable transportation planners and decision makers to determine appropriate ITS services that satisfy local and statewide needs. Service packages help project stakeholders organize and plan the implementation of their projects in a manner that helps assure that different technology applications will actually work in concert with one another. Service packages can act as building blocks that can either stand alone or work in combination with other packages.

In the Statewide Concept of Operations document, a set of service packages are described in each functional area as potential candidates for use in the Statewide ITS Architecture development. As an example below, Table 7 shows the Traffic Management (TM) Service Packages applicable to the Illinois Statewide ITS Architecture.

*Table 6 - Traffic Management (TM) - Service Packages*

<b>TM01</b>	Infrastructure-Based Traffic Surveillance
<b>TM02</b>	Vehicle-Based Traffic Surveillance
<b>TM03</b>	Traffic Signal Control
<b>TM04</b>	Connected Vehicle Traffic Signal System
<b>TM05</b>	Traffic Metering

*Table 6 - Traffic Management (TM) - Service Packages*

<b>TM06</b>	Traffic Information Dissemination
<b>TM07</b>	Regional Traffic Management
<b>TM08</b>	Traffic Incident Management System
<b>TM09</b>	Integrated Decision Support and Demand Management
<b>TM10</b>	Electronic Toll Collection
<b>TM11</b>	Road Use Charging
<b>TM12</b>	Dynamic Roadway Warning
<b>TM13</b>	Standard Railroad Grade Crossing
<b>TM14</b>	Advanced Railroad Grade Crossing
<b>TM15</b>	Railroad Operations Coordination
<b>TM16</b>	Reversible Lane Management
<b>TM17</b>	Speed Warning and Enforcement
<b>TM18</b>	Drawbridge Management
<b>TM19</b>	Roadway Closure Management
<b>TM22</b>	Dynamic Lane Management and Shoulder Use

### 4.3 Subsystem Elements & Functionality

Based on the updated needs, inventory, and selection of service packages, the Statewide ITS Architecture can be used to identify subsystem elements required for integration and define functional requirements for your project.

Subsystems are the physical objects that contain functional objects. These are the physical objects that provide the functionality needed to satisfy ARC-IT service package requirements. Example subsystems are the Traffic Management Center, Vehicle Onboard Equipment, and ITS Roadway Equipment. These correspond to the physical world: respectively, traffic operations centers, automobiles, and roadside signal controllers.

Appendix D presents the list of functional requirements from the Statewide ITS Architecture update. Based upon the concept of operations for a new ITS project, implementers may adopt a requirement as shown or modified, delete a requirement if not needed, or add new requirements that do not exist in the current architecture.

It is anticipated that the current IDOT Advanced Traffic Management System (ATMS) Study and related Traffic Management Center (TMC) Coordination Study being undertaken in coordination with NE Illinois counties will assist IDOT to define functional requirements for advanced communications and functions.

### 4.4 Interconnects and Interfaces

Based on subsystem elements and functionality that were selected, RAD-IT can be used to review and confirm the interfaces and associated data within the Statewide ITS Architecture that apply to your project.

For example, Figure 6 illustrates the high level interconnects and interfaces specific to an Archived Data System. Applicable subsystems are depicted as white boxes. Illinois has (or plans to have) instances of each of the architecture subsystems shown in the figure below, as defined by the National ITS Architecture.

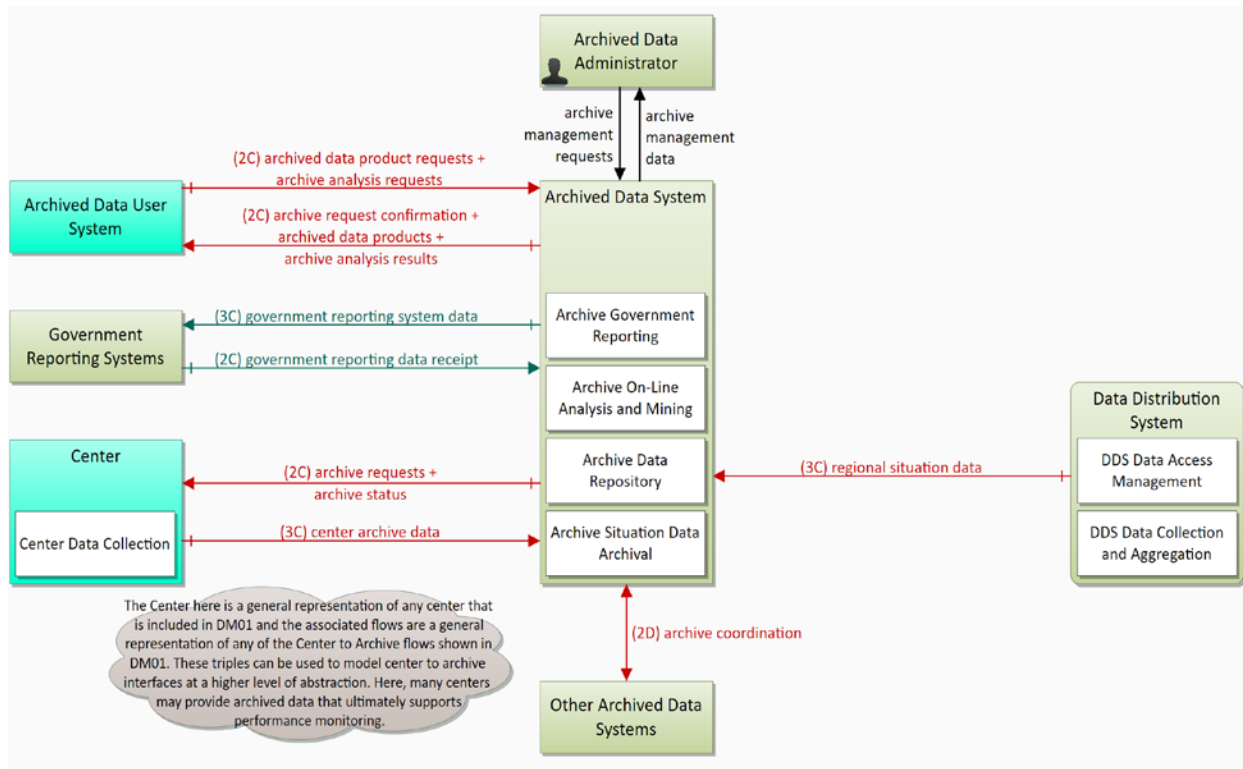


Figure 6: Physical Interconnect Diagram for Archived Data System

Interconnects included in the Statewide Architecture demonstrate the interagency communications that occur from center to center and the links between centers and the field. While the identification of specific communications media involved in these interconnections is outside of the scope of the architecture, it is useful in assessing project communications requirements.

# 5 ITS STANDARDS

The Statewide ITS Architecture follows the National ITS Architecture standards strategy, which helps to advance ITS projects developed under the architecture. The RITSAs also include a mapping to identify the applicable ITS standards for the project. A standards review is performed to determine if:

- The standard is applicable to specific technical elements of the project.
- The standard is commercially available and does not add significant cost to the project.
- The standard is an approved national standard from a recognized national or international standards organization.

Projects being developed in accordance with the Illinois Statewide ITS Architecture update should also perform the following steps to develop a standards plan and determine which standards to use:

1. Document project proposed concept of operations
2. Document project requirements
3. Train selected technical staff in standards, uses, and applications
4. Develop initial high level design
5. Identify technical elements of the project
6. Survey available standards that meet the requirements of the standards strategy of the funding agency
7. Select standards that meet the requirements for use in the project
8. Document selected standards in a Standards Plan
9. Develop Detailed Design
10. Confirm selected standards for use in the project
11. Develop Final Design

A complete listing of the standards applicable to the Illinois Statewide ITS Architecture update can be found in Table 7 below. This table is provided according to the current information listed on USDOT ITS Standards Program website at [www.standards.its.dot.gov/DevelopmentActivities/PublishedStandards](http://www.standards.its.dot.gov/DevelopmentActivities/PublishedStandards) and [www.standards.its.dot.gov/StdsSummary](http://www.standards.its.dot.gov/StdsSummary).



Table 7 - Statewide ITS Architecture Updated Standards List

SDO	Description	Original Number	Changes to Numbers
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 2501, NTCIP 2502	Suspended: NTCIP 1105, NTCIP 1006 Withdrawn: NTCIP 2305, NTCIP 2501, NTCIP 2502 Added: NTCIP 2306
	NTCIP Center-to-Field Standards Group	NTCIP 1101, NTCIP 1102, NTCIP 1103, NTCIP 2101, NTCIP 2102, NTCIP 2103, NTCIP 2104, NTCIP 2201, NTCIP 2202, NTCIP 2301, NTCIP 2302, NTCIP 2303	(No Change)
	Global Object Definitions	NTCIP 1201	(No Change)
	Object Definitions for Actuated Traffic Signal Controller Units	NTCIP 1202	(No Change)
	Object Definitions for Dynamic Message Signs	NTCIP 1203	(No Change)
	Object Definitions for Environmental Sensor Stations & Roadside Weather Information System	NTCIP 1204	(No Change)
	Data Dictionary for Closed Circuit Television (CCTV)	NTCIP 1205	(No Change)
	Data Collection & Monitoring Devices	NTCIP 1206	(No Change)
	Ramp Meter Controller Objects	NTCIP 1207	(No Change)
	Object Definitions for Video Switches	NTCIP 1208	(No Change)
	Transportation System Sensor Objects	NTCIP 1209	(No Change)
	Objects for Signal Systems Master	NTCIP 1210	(No Change)
Objects for Signal Control Priority	NTCIP 1211	(No Change)	
APTA	TCIP - Common Public Transportation (CPT) Business Area Standard	NTCIP 1401	NTCIP 1401 is replaced by APTA TCIP-S-001 4.0.0
	TCIP - Incident Management (IM) Business Area Standard	NTCIP 1402	NTCIP 1402 is replaced by APTA TCIP-S-001 4.0.0
	TCIP - Passenger Information (PI) Business Area Standard	NTCIP 1403	NTCIP 1403 is replaced by APTA TCIP-S-001 4.0.0
	TCIP - Scheduling/Run cutting (SCH) Business Area Standard	NTCIP 1404	NTCIP 1404 is replaced by APTA TCIP-S-001 4.0.0
	TCIP - Spatial Representation (SP) Business Area Standard	NTCIP 1405	NTCIP 1405 is replaced by APTA TCIP-S-001 4.0.0

	TCIP - Onboard (OB) Business Area Standard	NTCIP 1406	NTCIP 1406 is replaced by APTA TCIP-S-001 4.0.0
	TCIP - Control Center (CC) Business Area Standard	NTCIP 1407	NTCIP 1407 is replaced by APTA TCIP-S-001 4.0.0
	TCIP - Fare Collection (FC) Business Area Standard	NTCIP 1408	NTCIP 1408 is replaced by APTA TCIP-S-001 4.0.0
ASTM	Dedicated Short Range Communication at 915 MHz Standards Group	ASTM E2158-01, ASTM PS 105-99	Withdrawn: ASTM E2158-01, ASTM PS 105-99
	Standard Specification for Archiving ITS Generated Traffic Monitoring Data	ASTM E2259-xx	Updated in 2011. Current version: ASTM E2259-03a(2011)
IEEE	Incident Management Standards Group	IEEE 1512.1-2003, IEEE 1512.3-2002, IEEE 1512-2000, IEEE 1512.2	Withdrawn: IEEE 1512.2 Updated in 2006: IEEE 1512.1, IEEE 1512.3, IEEE 1512
	Standard for Message Sets for Vehicle/Roadside Communications	IEEE 1455-1999	Withdrawn: IEEE 1455-1999
ITE	Standard for Functional Level Traffic Management Data Dictionary (TMDD)	ITE TM 1.03	ITE TM 1.03 obsolete/dated; Replaced by ITE TMDD Guide.
	Message Sets for External TMC Communication (MS/ETMCC)	ITE TM 2.01	ITE TM 2.01 obsolete/dated; Replaced by ITE TMDD Guide.
SAE	Advanced Traveler Information Systems (ATIS) Bandwidth Limited Standards Group	SAE J2266, SAE J2354, SAE J2369, SAE J2529, SAE J2540, SAE J2540/1, SAE J2540/2, SAE J2540/3, SAE J2630	Withdrawn: SAE J2529
	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	Withdrawn: SAE J2529
	On-board Vehicle Mayday Standards Group	SAE J2266, SAE J2313, SAE J2354, SAE J2529, SAE J2540, SAE J2540/1, SAE J2540/2, SAE J2540/3, SAE J2630	Withdrawn: SAE J2529
	ITS In-Vehicle Message Priority	SAE J2395	(No Change)
	Measurement of Driver Visual Behavior Using Video Based Methods (Def. & Meas.)	SAE J2396	(No Change)
	Adaptive Cruise Control: Operating Characteristics and User Interface	SAE J2399	(No Change)
	Forward Collision Warning: Operating Characteristics and User Interface	SAE J2400	(No Change)

IEEE/ISO	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	<p>Withdrawn: IEEE 1609.1, IEEE 802.2</p> <p>Updated in 2012: ISO 21210 Updated in 2016: IEEE 1609.2, IEEE 1609.3, IEEE 1609.4, IEEE 802.11</p> <p>Consider: IEEE 1609.0-2013, IEEE 1609.11-2010, IEEE 1609.12-2016, ASTM E2213-03</p>
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# 6 SEQUENCING OF FUNCTIONALITY AND CAPABILITIES

In order to provide the functionality described in the updated Statewide ITS Concept of Operations, a number of initiatives need to occur in a logical sequence. In many cases, these projects will be deployed at the regional level to enable and enhance statewide ITS functions.

While not all systems originally envisioned have been implemented, some core functions and enabling technologies have been achieved. ITS initiatives and projects from the original Statewide ITS plan that either changed direction or were not implemented include:

- 511 Traveler Information was not implemented. User-friendly applications and services such as Google and Waze have met the identified needs for en-route traveler information and route guidance.
- The Illinois CVISN Program is known as Innovative Technology Deployment (ITD).
- The Illinois Transit Hub will not be implemented by the NE Illinois RTA.
- The Illinois Statewide Hub Concept will be revised to support centralized function for Station One and Super Regional Hubs where regions/districts support operations of an adjacent IDOT district/region.

Some examples of achieved functionality and coordination accomplishments include:

- District 1 has installed fiber interconnects for traffic signals that also connect back to a centralized management system such as in Lake County.
- District 3 partners with District 1 for dynamic message sign interoperability and messaging.
- District 4 has integrated computer aided dispatching with local police.
- Providing a tool for improved planning, scheduling and integration, IDOT District 4 has established ATMS connections with other communities and districts facilitated by fiber connectivity to District 6, Bloomington and Galesburg.
- District 6 continues to install fiber around Springfield and will tie in traffic signals to the communications network as it expands.
- The IDOT road weather information system (RWIS) serves to improve the sharing and dissemination of real-time information, providing surface and atmospheric data accessible by a web-based interactive map.
- District 1 has partnered with the Illinois State Toll Highway Authority (ISTHA) to provide real time traveler information on DMS on tollways and highways in NE Illinois.
- IDOT is working with FHWA – Every Day Counts program to meet regional needs and support improved safety, operation and management of the transportation system with Smart Work Zone applications. Pilot projects exist in Districts 1, 8, and 9 for construction and maintenance to support evaluation for statewide deployment.

While this Statewide ITS Architecture is not intended to outline the specific ITS implementations that will be addressed in the Statewide ITS Strategic Plan update, it does describe the desired functionality. For ITS project managers at the regional level, the sequencing of functionality will be important for individual ITS projects that are part of a coordinated regional program and those linked to larger, statewide systems. In order to implement the Illinois Statewide Hub Concept, a sequence of enabling functionality is warranted:

1. Creation of an Illinois Statewide Hub
2. Continued development of Illinois Regional Hubs and Super-Hubs
3. Deployment of a communications backbone between the Statewide and District Hubs
4. Development of policies and protocols to address interfaces between the Statewide and District Hubs
5. Development of operational procedures to address coordination between the Statewide and District Hubs
6. Communications linkages between hubs (both Statewide and District) and partner agencies, which includes other traffic management, maintenance and construction management, incident and emergency management, transit management, and commercial vehicle operations
7. Development of policies and protocols to address interfaces between the hubs (both Statewide and District) and partner agencies
8. Development of operational procedures and agreements to address coordination between the hubs (both Statewide and District) and partner agencies

Some of these elements can and should be deployed simultaneously. The development of district hubs should not await deployment of the Statewide Hub; rather they should be developed as transportation needs in the district dictate.

This may involve the creation and cultivation of district-level linkages with partner agencies that do not depend on links to the Statewide Hub. This way, when the Statewide Hub is brought online and linked to district hubs, the partner agency linkages will be introduced as well.

# 7 AGREEMENTS AND MEMORANDUM OF UNDERSTANDING (MOU)

The existence and use of written agreements positively impacts the ability to secure funding for a project and leverage resources. Interagency cooperation and coordination is documented in written agreements in order to clearly define roles, technical requirements, financial obligations, and operations and maintenance responsibilities, among others. These interagency agreements can take several forms, as described below in Table 8.

As a result of experience since the adoption of the original plan, agreements have been used for regional TSP, data sharing arrangements and for DMS shared construction.

*Table 8: Types of Agreements*

Type of Agreement	Description
<b>Handshake Agreement</b>	<ul style="list-style-type: none"> <li>• Early agreement between one or more partners</li> <li>• Not recommended for long term operations.</li> </ul>
<b>Memorandum of Understanding</b>	<ul style="list-style-type: none"> <li>• Initial agreement used to provide minimal detail and usually demonstrating a general consensus.</li> <li>• Used to expand a more detailed agreement like an Interagency Agreement which may be broad in scope but contains all of the standard contract clauses required by a specific agency.</li> <li>• May serve as a means to modify a much broader Master Funding Agreement, allowing the master agreement to cover various ITS projects throughout the region and the MOUs to specify the scope and differences between the projects.</li> </ul>
<b>Interagency Agreement</b>	<ul style="list-style-type: none"> <li>• Between public agencies (e.g., transit authorities, cities, counties, etc.) for operations, services or funding</li> <li>• Documents responsibility, functions and liability, at a minimum.</li> </ul>
<b>Intergovernmental Agreement</b>	<ul style="list-style-type: none"> <li>• Between governmental agencies (e.g., Agreements between universities and State DOT, MPOs and State DOT, etc.)</li> </ul>
<b>Operational Agreement</b>	<ul style="list-style-type: none"> <li>• Between any agency involved in funding, operating, maintaining or using the right-of-way of another public or private agency.</li> <li>• Identifies respective responsibilities for all activities associated with shared systems being operated and/or maintained.</li> </ul>
<b>Funding Agreement</b>	<ul style="list-style-type: none"> <li>• Documents the funding arrangements for ITS projects (and other projects)</li> <li>• Includes at a minimum standard funding clauses, detailed scope, services to be performed, detailed project budgets, etc.</li> </ul>

<b>Master Agreements</b>	<ul style="list-style-type: none"> <li>• Standard contract and/or legal verbiage for a specific agency and serving as a master agreement by which all business is done. These agreements can be found in the legal department of many public agencies</li> <li>• Allows states, cities, transit agencies, and other public agencies that do business with the same agencies over and over (e.g., cities and counties) to have one Master Agreement that uses smaller agreements (e.g., MOUs, Scope-of-Work and Budget Modifications, Funding Agreements, Project Agreements, etc.) to modify or expand the boundaries of the larger agreement to include more specific language.</li> </ul>
<b>Contract</b>	<ul style="list-style-type: none"> <li>• Standard contract and/or legal verbiage for a specific agency and serving as an agreement by which all business is done. These agreements can be found in the legal department of many public agencies</li> <li>• Single document with changes made through contract amendments</li> </ul>

Stakeholders involved in newly developed projects, should consult the IL Statewide ITS Architecture to determine if interagency agreements are already in place for the related ITS project. Where agreements have not been established, affected stakeholders can reference the examples from the Statewide ITS Architecture and the definitions list herein.

## 8 ARCHITECTURE MAINTENANCE

As ITS projects are implemented, the Statewide ITS Architecture will need to be updated to reflect new ITS priorities and strategies that emerge through the transportation planning process. To account for expansion in ITS scope, and to allow for the evolution and incorporation of new ideas, a maintenance process has been defined for the Illinois Statewide ITS Architecture. This process includes a periodic update to the Statewide ITS Architecture, defined Configuration Management techniques to maintain the architecture, and a specific group – the IDOT ITS Program Office – responsible for maintaining the Statewide ITS Architecture. This maintenance process is described in detail in Appendix F of this report, the Architecture Maintenance Plan Update.

The Statewide ITS Architecture is a living tool that must be revised as deployment plans change; as ITS projects are implemented; and as the ITS needs and services evolve throughout the state. The Statewide ITS architecture must be maintained so that it continues to reflect the current and planned ITS systems, interconnections, and services to provide to the public and associated stakeholders.

To ensure consistency, the RITSAs developed and updated as part of the statewide effort are included and referenced in the accompanying processes for the Maintenance Plan and Nomenclature Plan updates.

For future consideration in Illinois, several states have implemented on-line forms and e-mail links that make it easier for project stakeholders to provide architecture input and feedback. Such a tool could replace the current steps in the architecture maintenance process by allowing the project sponsor to provide relevant information electronically for simultaneous review, in a timely manner.

For example, the Virginia DOT provides an on-line form for architecture comments on their Northern Virginia (NOVA) ITS Architecture website. The web interface allows Project Sponsors to easily notify the NOVA Architecture Team leader of new Project Architectures that should be reflected in the NOVA Architecture. Architecture maintainers can also access programming documents, capital plans, project documentation, and general knowledge and involvement in the region to identify architecture impacts from ITS projects that may not be reported. A screenshot of the web form is provided below for reference in Figure 8.





# References

## Transportation Improvement Plans/Programs

- Illinois Statewide Transportation Improvement Plan, FY 2018-2021 (IDOT)
- Illinois FY 2019 Proposed Highway Improvement Program (IDOT)
- Illinois FY 2018-2023 Proposed Highway Improvement Program (IDOT)

## Strategic Plans/Business Plans

- Illinois Statewide ITS Strategic Plan, 2006
- Illinois Long Range Transportation Plan
- Illinois Strategic Highway Safety Plan, 2017
- Illinois Transit Plan, February, 2018
- Illinois State Freight Plan, IDOT, October, 2017
- 2017 Illinois State Rail Plan Update
- 2018 Highway Safety Plan (IDOT)
- USDOT ITS Strategic Plan 2015-2019

## Reports and Operation Guidance

- Northeastern Illinois Regional ITS Architecture, Version 3.0 (Chicago Metropolitan Area for Planning, CMAP)
- U.S. Government Accountability Office (GAO) Report GAO-16-638  
*INTELLIGENT TRANSPORTATION SYSTEMS: Urban and Rural Transit Providers Reported Benefits but Face Deployment Challenges*

## Websites

- American Association of State Highway and Transportation Officials (AASHTO)  
<https://www.transportation.org/>
- American Public Transportation Association (APTA)  
<https://www.apta.com>
- ARC-IT Architecture Reference for Cooperative and Intelligent Transportation  
<https://local.iteris.com/arc-it/>
- ARC-IT Tools: RAD-IT & SET-IT  
<https://local.iteris.com/arc-it/html/resources/tools.html>
- Chicago Metropolitan Agency for Planning (CMAP)  
<https://www.cmap.illinois.gov>
- Illinois Department of Transportation (IDOT)  
<http://www.idot.illinois.gov>
- Illinois State Toll Highway Authority (ISTHA)  
<https://www.illinoistollway.com>
- Institute of Electrical and Electronics Engineers (IEEE)  
<https://www.ieee.org>
- Institute of Transportation Engineers (ITE)  
<https://www.ite.org/>
- ITS America  
<https://www.itsa.org>
- ITS Midwest

- <http://www.itsmidwest.org>
- National Transportation Communications for Intelligent Transportation System Protocol (NTCIP)  
<https://www.ntcip.org/>
- Regional Transportation Authority (RTA, Chicago Metropolitan Area)  
<https://www.rtachicago.org>
- Society of Automotive Engineers (SAE)  
<https://www.sae.org/>
- Transportation System Management and Operations (TSMO)  
[https://ops.fhwa.dot.gov/plan4ops/focus\\_areas/integrating/transportation\\_sys.htm](https://ops.fhwa.dot.gov/plan4ops/focus_areas/integrating/transportation_sys.htm)
- United States Department of Transportation (USDOT)  
<https://www.transportation.gov/>
- USDOT ITS Joint Program Office - ITS Standards  
<https://www.standards.its.dot.gov/Links>