



**LAWRENCE-DOUGLAS COUNTY REGIONAL ITS ARCHITECTURE  
TECHNICAL MEMORANDUM #1  
ITS VISION AND INVENTORY**

DRAFT

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Submitted to

**Lawrence-Douglas County Metropolitan Planning Organization**

Submitted by



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# Lawrence-Douglas County Regional ITS Architecture Update

## Technical Memorandum #1 – ITS Inventory

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### GLOSSARY

Acronym	Description
ADA	Americans with Disabilities Act
ADMS	Archival Data Management System – refers to technologies designed to collect and store roadway related data for planning and/or for sharing with other agencies.
ATIS	Advanced Traveler Information Systems – provide travelers with information from various sources through one user interface such as the phone (511) or the Internet.
ATMS	Advanced Traffic Management Systems - to enhance mobility on roadways by incorporating the latest technological advancements such as Variable Message Signs (VMS)
AVL	Automatic Vehicle Location – used for real time tracking of emergency vehicles, transit vehicles and school buses.
BNSF	Burlington Northern Santa Fe Railroad
CAD	Computer Aided Dispatching – used for emergency and fleet dispatching.
CCTV	Closed Circuit Television - cameras placed to observe traffic conditions. These are only used for observation and have no automatic speed enforcement capabilities, for example.
CVAS	Commercial Vehicle Administrative Systems – a subpart of the Commercial Vehicle Information System, see CVISN.
DMS	Dynamic Message Signs – electronic message signs used to provide real-time traffic warnings and Amber Alert messages. Other names are Variable Message Signs (VMS) and Changeable Message Signs (CMS).
EM	Emergency Management, or Emergency Managers – Douglas County has an emergency management agency.
EOC	Emergency Operations Center
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
GIS	Geographic Information System – used to provide information tied to specific physical locations, such as road segments.
HRI	Highway-Rail Intersection – refers to technologies designed to make at-grade highway/rail crossing safer.
ISP	Information Service Provider – usually the radio or television or other private organization that provide road conditions or other information for travelers.
ITS	Intelligent Transportation Systems



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Acronym	Description
KANROAD	KDOT GIS-based traveler information system.
KDOT	Kansas Department of Transportation
KHP	Kansas Highway Patrol
KTA	Kansas Turnpike Authority
L-DC FM	Lawrence-Douglas County Fire-Medical
L-DC MPO	Lawrence-Douglas County Metropolitan Planning Organization
LPD	Lawrence Police Department
MCO	Maintenance and Construction Operations – refers to ITS solutions designed to make highway maintenance and construction safer for travelers and more efficient for highway agencies.
MDT	Mobile Data Terminal
MPA	Metropolitan Planning Area
MTP	Metropolitan Transportation Plan – The L-DC Regional Transportation Plan – currently the Transportation 2040 Plan (T2040) with a horizon of 2040.
NWS	National Weather Service
OS/OW	Oversize, Overweight pertaining to commercial vehicles using public highways.
PD	Police Department
PW	Public Works
RWIS	Road-Weather Information Systems, also called environmental sensors. Used to measure pavement temperature (potential for icing), wind, and other weather-related conditions. RWIS is also used to support highly accurate weather forecasting systems.
SDP	Strategic Deployment Plan
TMC	Traffic Management Center
TOC	Traffic Operations Center
TOMC	Traffic Operations and Management Center
UPRR	Union Pacific Railroad



# Lawrence-Douglas County Regional ITS Architecture Update

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### 1. Project Overview

The Lawrence-Douglas County Metropolitan Planning Organization (L-DC MPO) is updating the Intelligent Transportation System (ITS) Architecture for the Lawrence and Douglas County Metropolitan Region. The Architecture is a framework for defining the Region's ITS plans and how future projects will integrate and interoperate with existing and new systems.

The goal of the Update Project is ***to develop a framework for the planning and development of Intelligent Transportation Systems that improve the safety and efficiency of travel in the Lawrence-Douglas County Region.*** The goal will be achieved through the following objectives:

- Meet all federal and state architecture requirements.
- Engage the stakeholders in defining the Region's needs and ITS goals.
- Provide a comprehensive strategy that integrates ITS planning into the Region's transportation planning.
- Plan ITS solutions that complement and are consistent with the Region's other plans.
- Update the Regional ITS Architecture and plan with the Region's transportation professionals' support and understanding in order to ensure that the architecture and plan are user-friendly and easy to use and maintain by the Region's stakeholders.

Throughout the Update Project, the stakeholders will be involved and will identify needs that can be addressed using ITS. The Update Project will map those needs to ITS User Services and, ultimately, to ITS projects that may be new, expansions of existing systems, or new utilizations of existing systems. The project will develop a Regional ITS Architecture and a corresponding Strategic Deployment Plan (SDP).

The Regional ITS Architecture will describe existing and planned ITS in terms of:

- Projects
- Stakeholders
- ITS Elements
- User Services
- Functional Requirements
- Information Flows
- Roles and Responsibilities
- Needed Project Agreements
- Applicable Operating Standards

The ITS Strategic Deployment Plan (SDP) will provide more specific details about how the ITS described in the Architecture will be deployed, including:

- Project Scopes
- Estimated Project Costs and Project Sequencing
- Strategies for Deployment and Funding



## Lawrence-Douglas County Regional ITS Architecture Update Technical Memorandum #1 – ITS Inventory

The L-DC Regional ITS Architecture Update began in November, 2014 and will be completed in May, 2015.

### 1.1 Description of Project Process and this Document

The L-DC Regional ITS Architecture Update is being completed through eight tasks. The tasks are:

1. **Project Management** including management of communications, progress reporting, quality control and assurance, and the development of a Project Management Plan that describes key concepts of how the project will be completed.
2. **ITS Inventory and Regional Data** including a review of the 2008 architecture, interviews with regional stakeholders, and a review of other regional transportation planning documents that identify the region's goals, objectives and plan for transportation improvements.
3. **Stakeholder Consultation and ITS Vision** that identify the region's transportation stakeholders and engages them in identifying the Region's transportation needs through a workshop, surveys and interviews.
4. **Key Regional ITS Strategies** that determine the priority of stakeholder needs and define how ITS can address the Region's needs in a manner consistent with the Region's transportation goals and plans. This task includes defining ITS services, projects and the roles and responsibilities of stakeholders in deploying and operating ITS.
5. **Regional ITS Architecture and Web Site** will include a physical representation of the architecture in the software program Turbo Architecture. The architecture will be presented to the public through an interactive web site that includes all elements of the architecture.
6. **Maintenance Strategy** will describe how the architecture will be maintained to stay current with the region's other planning and current status of ITS projects.
7. **Strategic Deployment Plan** will describe how the region's ITS projects can be planned, procured and deployed in a manner consistent with the region's objectives.
8. **Presentations and Workshop** will provide executive and detailed PowerPoint slide presentations of the architecture process, the resulting projects and how they will benefit the region. This task will include a second workshop for stakeholders to discuss how their needs have been addressed through the architecture.

This document, Technical Memorandum #1, summarizes the findings of Task 2, including identifying the ITS Stakeholders and defining the existing ITS inventory through a document review and discussions with Stakeholders.

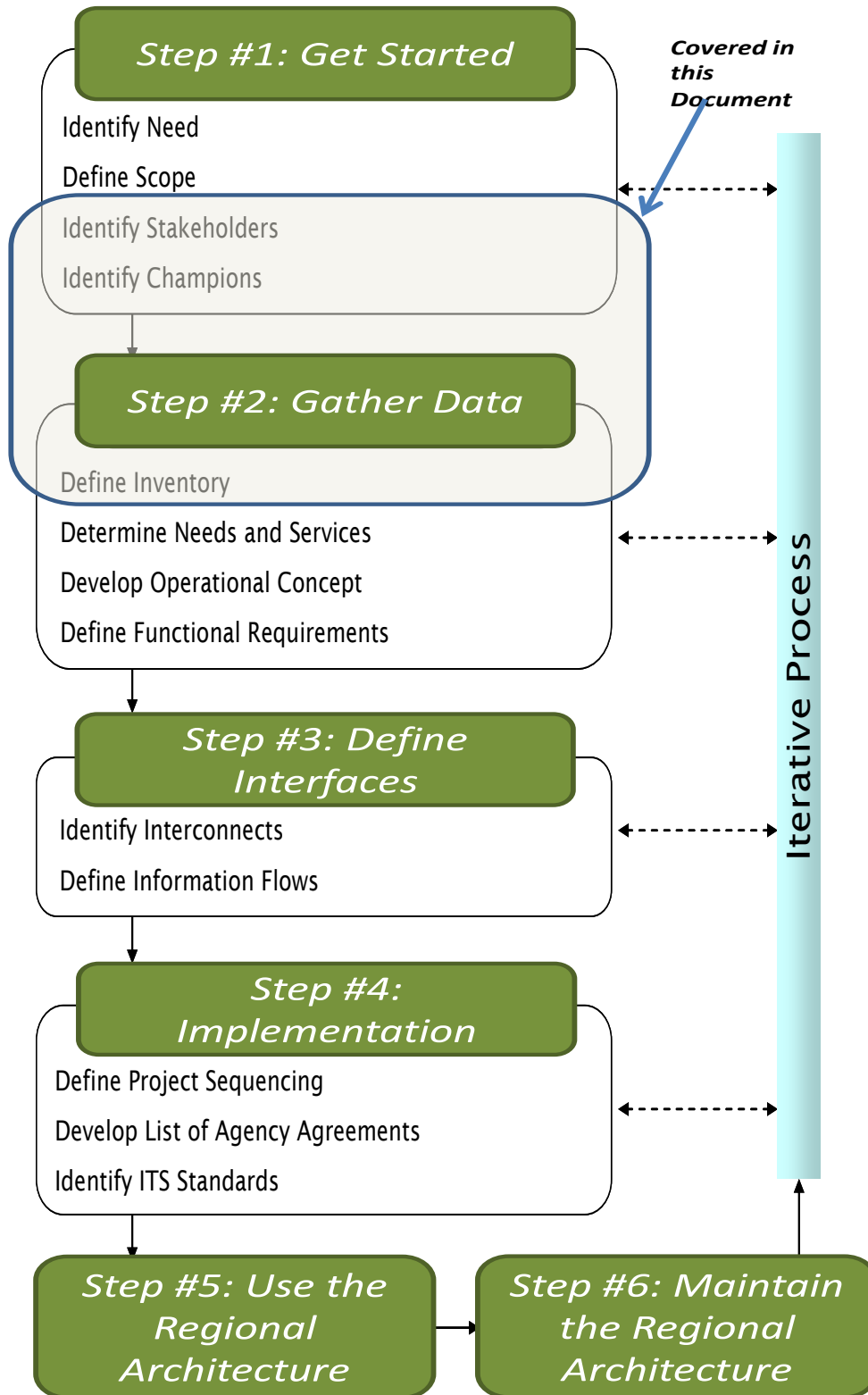
**Figure 1** shows the process for developing, using and maintaining a Regional ITS Architecture in accordance with Federal Highway Administration (FHWA) guidance<sup>1</sup>. The L-DC Regional ITS Architecture Project covers the development process, which is represented by Steps #1 through #4. The Project also provides guidance for Steps #5 and #6, which are the use and maintenance of the Regional Architecture. The area highlighted in gray that covers parts of Step #1 and Step #2 represent the part of the process addressed by this Technical Memorandum. The information contained in this document is used throughout the subsequent steps of the Regional ITS Architecture development.

<sup>1</sup> Regional ITS Architecture Guidance, <http://ops.fhwa.dot.gov/publications/regitsarchguide/>



## Lawrence-Douglas County Regional ITS Architecture Update Technical Memorandum #1 – ITS Inventory

Figure 1: Regional ITS Architecture Development, Use and Maintenance Process from FHWA







The L-DC Regional ITS Architecture has established boundaries for transportation services, geographic region and timeframe. This section describes each of the boundaries.

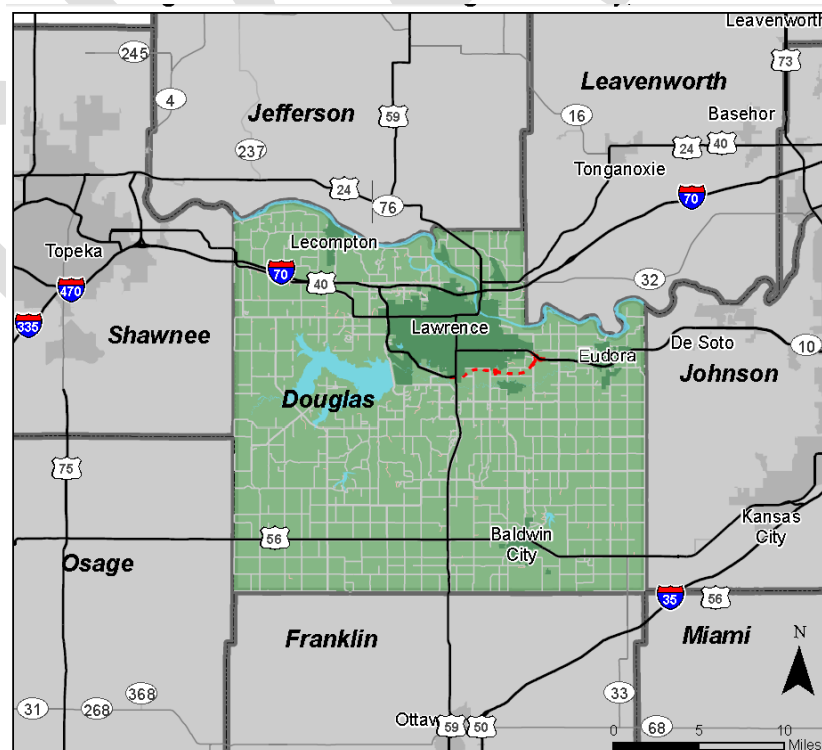
The L-DC Regional ITS Architecture examines transportation services in the following categories:

1. Arterial Traffic Management
2. Freeway Traffic Management
3. Traveler Information
4. Transit Management and Information
5. Commercial Vehicle Operations
6. Emergency Management
7. Maintenance and Construction

### 1.2.2 Geographic Boundaries

The L-DC Regional ITS Architecture will cover the L-DC MPO Metropolitan Planning Area (MPA) planning boundaries, as shown in **Figure 2**. The boundary encompasses all of Douglas County including the four cities in the MPA (Baldwin City, Eudora, Lawrence, and Leocompton).

**Figure 2: Geographic Boundaries for the L-DC Regional ITS Architecture**





#### 1.2.3 Timeframe

The L-DC Regional ITS Architecture complements the region's Metropolitan Transportation Plan (MTP), *Transportation 2040*. The MTP provides a vision of the region's transportation services through the year 2040. A Regional ITS Architecture typically does not plan as far forward as a MTP, but needs to be consistent with the MTP over a shorter timeframe. The L-DC Regional ITS Architecture will have a ten-year horizon, looking forward to 2025, and to be updated in coordination with the MTP.

Projects in the L-DC Regional ITS Architecture are placed in three timeframes. They are:

1. **Near-term** – Near-term projects are needed in the next three years (2018), and align with fiscally-constrained projects in the MTP and the Region's Transportation Improvement Program (TIP). These projects address the Region's highest-priority needs using realistic and mature technologies.
2. **Medium-term** – Medium-term projects should be deployed within the next six years (2021). Medium-term projects address needs in the region that may not be as critical as those in the near-term. A project may also be programmed for the medium-term if its deployment is dependent upon other projects not yet deployed, or if funding opportunities for the project are not known.
3. **Long-term** – Long-term projects should be deployed in the next ten years (2025). These projects address Regional needs that are typically not high priorities but can be addressed through ITS. They may also be considered long-term because their deployment depends on other projects planned in the near- and medium-term, are unfunded, or are dependent upon technologies that are still evolving.



## **2. L-DC Regional ITS Vision and Goals**

The ITS Vision and Goals have been defined by the Project Team. They describe the guiding principles for how ITS should be planned, developed and implemented in the Region. They have been established to be consistent with, and complement, the goals of the MTP<sup>2</sup>.

### **2.1 Transportation 2040 Goals**

Transportation 2040 is the L-DC MTP. It provides a long-range vision of the Region's transportation strategies for all modes. The Regional ITS Architecture must stay consistent with the MTP in order to help achieve the Region's transportation goals.

The MTP for the L-DC Region identifies four goals that are consistent with federal planning guidelines. They are:

1. Improve Safety and Security.
2. Focus on System Preservation and Economic Efficiency.
3. Maximize Accessibility and Mobility.
4. Consider the Environment and Quality of Life.

### **2.2 L-DC Regional ITS Vision**

The ITS Vision is the guiding principle for the development of the Regional ITS Architecture and Strategic Deployment Plan and ITS investment in the region. The Vision has been developed based on input from the Project Team.

#### **Lawrence-Douglas County Regional ITS Vision**

*The Lawrence-Douglas County Region will use Intelligent Transportation Systems to provide cost-effective and practical technologies that enhance the safety, capacity, operations and evaluation of the area's modes of transportation.*

<sup>2</sup> L-DC MPO MTP, <http://www.lawrenceks.org/mpo/t2040>



## 2.3 L-DC Regional ITS Goals

The ITS Goals describe how the region will achieve its vision of improved transportation through ITS. **Table 1** lists the ITS goals as developed by the Project Team. Each ITS goal is mapped to the related Region's MTP goals.

**Table 1: L-DC Regional ITS Goals**

ITS Goal	Related MTP Goals
1. Integrate efficient and effective ITS into regional transportation planning and project development.	1, 2, 3, 4
2. Improve information sharing among the region's transportation agencies and with the public.	1, 2, 3
3. Increase the safety and security of all modes of transportation through improved infrastructure monitoring and emergency management.	1
4. Improve the utilization of existing facilities and infrastructure.	2, 4
5. Improve the ability to evaluate and measure the performance of the transportation network through the effective use of technology.	2, 3



### 3. Regional ITS Stakeholders

The success and accuracy of the L-DC Regional ITS Architecture depends upon the input and support of the Region's stakeholders. Because this is an update of the L-DC Regional ITS Architecture, the Project Manager and Consultant viewed the stakeholder list from the 2008 Architecture as a first step toward identifying a set of potential stakeholders representing the region's transportation network. The list of candidates was reviewed by the Project Team and expanded to include additional stakeholders that have become active in the Region.

**Table 2** is a summary of the types of groups and examples of key stakeholders that have been invited to participate in this ITS planning effort. Stakeholders were identified as either Core or Community Stakeholders. Core stakeholders are those who materially participate in the programming, deployment and operation of ITS in the L-DC Region. Examples of Core Stakeholders are Cities, KDOT, Douglas County and federal agencies. Community Stakeholders are organizations and individuals with an interest in the Region's transportation network and who have defined their need for improved transportation safety and efficiency. Examples of Core Stakeholders are the advisory and advocacy groups who represent users for the Region's transportation agencies.

**Appendix B** provides a more detailed list of individuals who were identified as stakeholders for the Project.

**Table 2: L-DC Regional ITS Architecture Stakeholder Candidates**

Stakeholder Group	L-DC Candidates
Federal Transportation Agencies	<ul style="list-style-type: none"><li>- Federal Highway Administration (FHWA)</li><li>- Federal Transit Administration (FTA)</li></ul>
State, County, and City Street, Highway and Traffic Agencies	<ul style="list-style-type: none"><li>- Kansas Department of Transportation (KDOT)</li><li>- Baldwin City</li><li>- City of Eudora</li><li>- City of Lawrence</li><li>- City of Lecompton</li><li>- Douglas County</li></ul>
Public and Private Transportation Providers	<ul style="list-style-type: none"><li>- Lawrence Transit</li><li>- KU on Wheels (Kansas University)</li><li>- Cottonwood, Inc</li><li>- Independence, Inc.</li><li>- Kansas Motor Carrier Association</li><li>- Major regional goods movement companies</li></ul>



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Stakeholder Group	L-DC Candidates
State, County, and City Public Safety Agencies and Emergency Service Providers	<ul style="list-style-type: none"><li>- Kansas Highway Patrol (KHP)</li><li>- Kansas Department of Emergency Management (KDEM)</li><li>- Douglas County Emergency Communications</li><li>- Douglas County Emergency Management</li><li>- Douglas County Sheriff's Office</li><li>- KU Public Safety</li><li>- Lawrence-Douglas County Fire Medical</li><li>- Lawrence Police</li><li>- Baldwin City</li><li>- City of Eudora</li><li>- City of Lecompton</li></ul>
Universities, Colleges and Schools	<ul style="list-style-type: none"><li>- Kansas University (KU)</li><li>- Haskell Indian Nations University</li><li>- Lawrence Public Schools, USD497</li><li>- Baldwin Public Schools, USD348</li><li>- Eudora Public Schools, USD491</li><li>- Lecompton Public Schools, USD343</li></ul>
Media and Information Service Providers	<ul style="list-style-type: none"><li>- WOW Broadband Service Provider</li><li>- AT&amp;T Telecommunication</li><li>- iNet Interactive</li></ul>
Advisory and Advocacy Groups	<ul style="list-style-type: none"><li>- Horizon 2020</li><li>- Technical Advisory Committee – MPO</li><li>- Regional Transit Advisory Committee - MPO</li><li>- Bicycle Advisory Committee</li><li>- Lawrence Pedestrian Coalition</li><li>- Lawrence Sustainability Advisory Committee</li><li>- Lawrence Traffic Safety Committee</li><li>- Lawrence Transit Advisory Committee</li><li>- LiveWell Lawrence</li></ul>

### 3.1 Stakeholder Involvement

Core and Community Stakeholders were invited to participate in the L-DC Regional ITS Architecture Update Project through the following means:

1. Project web site that contains project information, deliverables and announcements. The site is located at <https://secure.iteris.com/share/LDC>.
2. Online survey that allows stakeholders to identify their travel behavior and their perceived needs. The online survey is accessible through the project web site.
3. Stakeholder workshops where stakeholders interacted and defined Regional needs and potential project ideas. The first workshop was held in Lawrence in December 2014. The second is planned for April 2015.



4. Stakeholder interviews conducted in-person and by telephone with key stakeholders. The interviews followed the workshop and were designed to gain a better understanding of the plans, operations and needs of key stakeholders.

In addition to the Consultant contacting stakeholder candidates, the Project Team identified and invited and engaged additional stakeholders the Project Team members felt could provide insight for this Update Project.

### 3.2 L-DC Regional ITS Architecture Stakeholders

**Table 3** lists the Core L-DC Regional ITS Architecture Stakeholders and indicates the categories in which they currently, or in the future materially participate in the region's ITS. The Architecture Stakeholders represent agencies who will program, develop, deploy and/or operate ITS.

As previously discussed, Core Stakeholders do not include advisory and advocacy groups who support the planning process. This in no way is meant to diminish the contribution or importance of advisory and advocacy groups. Instead, the Core Stakeholders represent those who will be depicted in the Architecture as having an ownership role in ITS. Note that as this project moves forward, additional stakeholders may be identified, and the categories in which they participate may change.



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### Technical Memorandum #1 – ITS Inventory

Table 3: Core L-DC Region ITS Stakeholders

Stakeholder	Transportation Services Category(ies)	Stakeholder Description
City of Lawrence Planning	<ul style="list-style-type: none"><li>Regional Planning</li></ul>	The City of Lawrence Planning Department provides planning oversight for the region's transportation system and supports funding and implementation efforts.
City of Lawrence Public Works	<ul style="list-style-type: none"><li>Maintenance and Construction</li><li>Parking Management</li><li>Surface Street Management</li></ul>	The City of Lawrence Public Works develops, builds, operates and maintains the transportation network owned by the City. They operate the City Traffic Operations Center (TOC).
City of Lawrence Police Department	<ul style="list-style-type: none"><li>Emergency Management</li></ul>	The City of Lawrence Police Department provides emergency and law enforcement services within the City.
Douglas County Public Works	<ul style="list-style-type: none"><li>Maintenance and Construction</li><li>Surface Street Management</li></ul>	Douglas County develops, builds, operates and maintains the transportation network owned by Douglas County.
Douglas County Emergency Communications	<ul style="list-style-type: none"><li>Emergency Management</li></ul>	Douglas County Emergency Communications serves the citizens of Douglas County by providing enhanced 911 telephone services for the entire county (except the University of Kansas Campus), radio dispatching personnel and equipment for the law enforcement, fire, and medical response agencies Region.
Douglas County Emergency Management	<ul style="list-style-type: none"><li>Emergency Management</li></ul>	Douglas County Emergency Management provides 24 hour service to the Region. It protects citizens from various hazards by providing and coordinating resources, expertise, leadership, and advocacy through risk-based emergency preparedness programs involving mitigation, management, response, and recovery.
Douglas County Sheriff's Office	<ul style="list-style-type: none"><li>Emergency Management</li></ul>	The Douglas County Sheriff's Office provides public safety services for Douglas County.





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Stakeholder	Transportation Services Category(ies)	Stakeholder Description
Federal Highway Administration (FHWA – Region 7)	<ul style="list-style-type: none"><li>Regional Planning</li></ul>	The FHWA assists states, local governments, and tribal/federally owned lands in the design, construction, and maintenance of the Nation's highway system. The Kansas division of the FHWA provides leadership, guidance, and direction in the planning, construction, and maintenance of Kansas' transportation projects.
Federal Transit Administration (FTA – Region 7)	<ul style="list-style-type: none"><li>Regional Planning</li></ul>	The FTA provides financial and technical assistance to local public transit systems. Currently the State of Kansas (and the L-DC Region) falls under Region 7 of the FTA.
Google	<ul style="list-style-type: none"><li>Traveler Information</li></ul>	Google provides real-time traffic information and transit information in the L-DC Region through its web site.
Kansas Department of Emergency Management	<ul style="list-style-type: none"><li>Emergency Management</li></ul>	The Kansas Department of Emergency Management is a subgroup of the Kansas Adjutant General's Department. The main goal of the Kansas Department of Emergency Management is to create sustainable capabilities across all phases of Emergency Management in Kansas. The Kansas Department of Emergency Management works with local Kansas communities to assist one another in times of disaster response, and to ensure proper disaster agencies and proper Emergency Operation Plans are in effect in all Kansas counties.
Kansas Highway Patrol (Troop B)	<ul style="list-style-type: none"><li>Emergency Management</li></ul>	The Kansas Highway Patrol (Troop B) has the primary responsibility of maintaining the safety of the State, Federal, and Interstate highways within the Region.
Kansas Turnpike Authority (KTA)	<ul style="list-style-type: none"><li>Electronic Toll Collection</li><li>Freeway Management</li><li>Maintenance and Construction</li><li>Traveler Information</li></ul>	The Kansas Turnpike Authority (KTA) provides highway transportation services for all turnpike users. KTA is responsible for all repairs and upgrades for the roadway, and for toll collection on the Turnpike. KTA is part of the Kansas Department of Transportation (KDOT).



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Stakeholder	Transportation Services Category(ies)	Stakeholder Description
Kansas Department of Transportation (KDOT)	<ul style="list-style-type: none"><li>Commercial Vehicle Operations</li><li>Freeway Management</li><li>Maintenance and Construction</li><li>Traveler Information</li></ul>	KDOT is a state government organization responsible for the maintenance of Kansas public roadways. Currently KDOT District 1 is the district that is responsible for the L-DC Region.
KTA Highway Patrol (Troop G)	<ul style="list-style-type: none"><li>Emergency Management</li></ul>	The KTA Highway Patrol [Troop G] is responsible for the patrolling of the Kansas Turnpike. The Kansas Turnpike Highway Patrol is headquartered in Wichita, Kansas and operates 24/7. Other responsibilities of the Kansas Turnpike Highway Patrol include providing security at interchange and service areas, managing unpaid tolls, and performing special projects when contracted out.
University of Kansas (KU)	<ul style="list-style-type: none"><li>Parking Management</li><li>Surface Street Management</li></ul>	KU manages parking and traffic on the KU campus.
KU Public Safety	<ul style="list-style-type: none"><li>Emergency Management</li></ul>	KU Public Safety provides law enforcement services on the KU campus and coordinates with other regional agencies for event management.
Kansas University Transit (KU on Wheels)	<ul style="list-style-type: none"><li>Transit Services</li></ul>	KU On Wheels (KUOW) provides fixed-route and demand-response bus service for the KU community.
Lawrence-Douglas County Fire Medical	<ul style="list-style-type: none"><li>Emergency Management</li></ul>	Lawrence-Douglas County Fire Medical provides fire suppression services to the City of Lawrence and emergency medical services to all of Douglas County, Kansas.
Lawrence Transit	<ul style="list-style-type: none"><li>Transit Services</li><li>Traveler Information</li></ul>	Lawrence Transit (the T) provides fixed-route and demand-response bus service within Lawrence.



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Stakeholder	Transportation Services Category(ies)	Stakeholder Description
Local Cities Emergency Services	<ul style="list-style-type: none"><li>• Emergency Management</li></ul>	Local city emergency response agencies providing fire and police services in Baldwin City, the City of Eudora and the City of Lecompton.
Local Cities Public Works	<ul style="list-style-type: none"><li>• Maintenance and Construction</li><li>• Surface Street Management</li></ul>	Local Cities Public Works develop, build, operate and maintain the transportation network owned by Baldwin City, the City of Eudora and the City of Lecompton.
Local Transit	<ul style="list-style-type: none"><li>• Transit Services</li></ul>	Local transit providers, such as Independence Inc., provide demand-response transit (shuttle) services to the Region's residents.
Media	<ul style="list-style-type: none"><li>• Information Services</li></ul>	The media includes private parties that provide information to the Region, including broadband, cable, wireless, television and print journalism.
National Weather Service (NWS)	<ul style="list-style-type: none"><li>• Weather Information</li></ul>	NWS provides current and forecasted weather condition information for the Region and nation.
Railroads	<ul style="list-style-type: none"><li>• Surface Street Management</li></ul>	UPRR and BNSF rail companies with grade crossings within the L-DC Region.
Schools	<ul style="list-style-type: none"><li>• Transit Services</li></ul>	Schools represent the Region's school districts and other schools who transportation services for students.
Traveling Public	<ul style="list-style-type: none"><li>• Electronic Toll Collection</li><li>• Traveler Information</li></ul>	The traveling public in the L-DC Region.



### 4. Existing L-DC Region ITS Inventory

ITS Architecture inventory defines the physical entities of the L-DC Region's ITS. As defined in the FHWA Regional ITS Architecture Rule<sup>3</sup>, an ITS inventory is a list of systems/elements and the elements that interface with them. An element is defined as the name used by the Region's stakeholders to describe a transportation technology system or piece of a system.

A system in the L-DC Region ITS inventory may be used throughout the Region and be interconnected to many stakeholders, such as the Douglas County Dispatch Center, which dispatches vehicles for multiple emergency responders. Or, a system may be connected to only one stakeholder, such as KDOT's maintenance vehicles.

Because the L-DC Regional ITS Architecture defines information exchanges, the inventory only includes systems that are able to send and receive information to/from other systems. For example, standalone systems, such as a flashing stop light that is not connected to other signals or a center, are not part of the inventory. However, traffic signals that can communicate with other signals, a traffic management center or any other system are included.

#### 4.1 Collection Methodology

The methodology used to compile the existing ITS inventory for the L-DC Region consisted of document review, meetings, telephone interviews and e-mail exchanges.

##### **Previous Studies, Reports, and ITS Architectures**

The process of creating an inventory of ITS systems in the L-DC Region started with a review of the previous (2008) L-DC Regional ITS Architecture, the region's MTP and the stakeholders' plans for traffic, emergency, public transportation and other activities. In addition, other architectures in the state of Kansas were reviewed for overlap and to ensure consistency in naming conventions. However, it should be noted that the Kansas Statewide Architecture is more than five years old and does not accurately reflect the current State and Regional ITS inventory.

The MTP was reviewed to identify projects that are planned and funded for the region, and that contain ITS elements. An example of a project identified in the MTP is improved signal coordination on specific corridors, which requires traffic signals connected controllers with that capability.

Other plans from the Region were also reviewed to identify existing and planned ITS. These include plans such as the Region's commuter transit and pedestrian facilities and KDOT's plans for freeway ITS elements. Many of the ITS elements found in these plans are not identified as existing and are, therefore, not documented here. However, those planned elements will be incorporated into the Regional ITS Architecture as future elements in later tasks.

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<sup>3</sup> FHWA Rule / FTA Policy on Regional ITS Architecture, [http://ops.fhwa.dot.gov/its\\_arch\\_imp/policy.htm](http://ops.fhwa.dot.gov/its_arch_imp/policy.htm)



## Lawrence-Douglas County Regional ITS Architecture Update Technical Memorandum #1 – ITS Inventory

### Stakeholder Interaction

Core Stakeholders who are known to operate ITS in the Region have been invited to participate in the project and many were also contacted by the Consultant and interviewed about their operations. The Interaction with stakeholders took place through in-person meetings, teleconferences and e-mail exchanges. For example, the Consultant met with, among others, Lawrence Transit, KU on Wheels and their contracted service provider, the Region's cities, the County and KDOT.

The Core Stakeholders provided summaries of their ITS devices, including locations and quantities, where applicable. The stakeholders also identified upcoming, funded plans that will be completed by the completion of the ITS Architecture Update project.

### 4.2 Turbo Architecture

Turbo Architecture<sup>4</sup> (Turbo) is an interactive software application that assists ITS planners and system integrators, both in the public and private sectors, in developing regional and project architectures. Turbo is provided by FHWA to architecture developers. Turbo uses the National ITS Architecture as a starting point to support developing architectures that are consistent with federal requirements.

Turbo was specifically designed to support development of ITS inventories. Turbo was functionally designed to identify connections between ITS systems or elements in the inventory that support selected services. Although the software tool identifies all potential connections between ITS systems based on the National ITS Architecture, it will pre-select those connections required to support the desired services. The inputs to Turbo are based on the systems inventory. The existing inventory and services were entered into Turbo based on the responses to the document review and surveys. The outputs of Turbo are saved in Microsoft Access-compatible data files.

Turbo is being used to develop the L-DC Regional ITS Architecture. The stakeholders and inventory in this report have been entered into Turbo to support the further development of services and functions that utilize the inventory. The Turbo output matches the inventory described in **Section 4.4**. That output is posted to the project web site.

### 4.3 Inventory Element Types

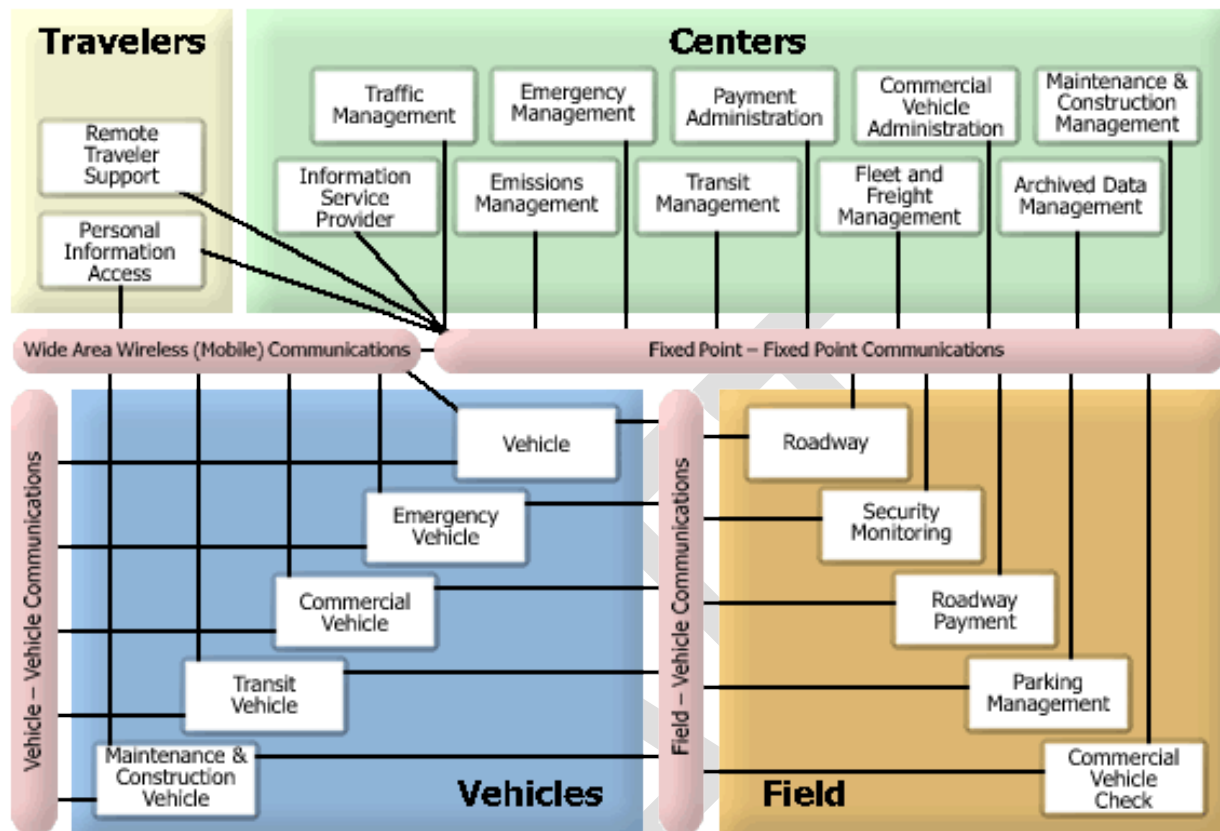
ITS Architecture inventory defines the physical entities of the region's ITS. **Figure 3** provides a high-level view of the National ITS Architecture.

<sup>4</sup> Turbo Architecture Software Tool, <http://www.iteris.com/itsarch/html/turbo/turbomain.htm>



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Figure 3: National ITS Architecture Physical Entities



As **Figure 4** shows, there are four types of entities: Centers, Field, Travelers and Vehicles. Following are definitions of each type. The Region's existing elements do not encompass all types of entities shown in the diagram; however, all of the region's elements are contained within National ITS Architecture. For example, the Region does not include or interact with any emissions management systems, but it does include transit management for Lawrence Transit and KU on Wheels, and maintenance and construction management through KDOT and the Region's Public Works offices.

**Centers** provide management, administrative, and support functions for the transportation system. A center represents a collection of functionality and not necessarily a physical facility. Examples of centers in the L-DC Region are the City of Lawrence Traffic Operations Center and Douglas County Emergency Communications.

**Field** entities are connected infrastructure along the transportation network that perform surveillance, information provision, and plan execution control functions. A field entity's operation is typically governed by a center subsystem. They may also directly interface to vehicles. Field elements examples in the L-DC Region are City of Lawrence Traffic Signals and KTA Dynamic Message Signs (DMS).

**Travelers** refer to the devices used by travelers to access ITS services to plan a trip and during a trip. This includes devices owned and operated by travelers, as well as devices owned by transportation and



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information providers. Examples of traveler-owned devices are smart phones and personal computers. Examples of a device owned by a transportation system operator may be an information kiosk.

**Vehicles** refer to ITS related elements on vehicles and include general driver information and safety systems applicable to all vehicle types. These may include the vehicle radio, navigation system or other onboard computer system. There are four fleet vehicle subsystems (Transit, Emergency, Commercial and Maintenance and Construction Vehicles) with each having unique capabilities defined in the Architecture. Examples of vehicles in the L-DC Region include passenger vehicles, buses, maintenance vehicles, commercial vehicles and police and fire vehicles.

For all types, entities are not defined by their size or physical presence, but by their functionality. For example, a traffic management center may be a large facility with a video wall, multiple workstations and other amenities where an agency controls its devices and monitors traffic conditions. A traffic management center may also be a single laptop that remotely exchanges information with field devices, disseminates traffic information and controls signs and signals. A single ITS element may also function as multiple types of centers. For example, a city may have a single system to manage both traffic and emergency response, making it both a traffic management center and emergency management center.

The L-DC Region's existing ITS inventory is listed in **Section 4.4**. Each element description includes its type and whether it is a subsystem or terminator in the Region. Subsystems and Terminators are described in more detail in **Section 5**.

#### **4.4 L-DC Region Existing ITS Inventory**

The L-DC Region ITS Inventory is a summary of known existing ITS in the region that currently, or have the capability to, exchange information outside of their operating agency. The inventory is intentionally broad and includes devices that may not physically be in the Region, but with which Regional ITS elements may interact. The inclusion of many devices is to insure that the L-DC Regional ITS Architecture is able to accurately identify all opportunities to use ITS to improve the Region's transportation system.

Although every regional inventory varies based on specific needs, there are several general "best practices" guidelines that have been applied during the development of the L-DC region inventory. They are:

##### **Appropriate Level of Detail**

The inventory is managed to provide the appropriate level of detail while identifying key integration opportunities in the region. Grouping was used to simplify the inventory. For example, instead of listing each individual signals owned and operated by the City of Lawrence, the L-DC Regional ITS Architecture inventory reflects one regional ITS element identified as "City of Lawrence Traffic Signals."

##### **Elements Outside the Region**

The L-DC Regional ITS Architecture inventory includes element(s) representing operations centers in areas outside the Region wherever there are important interfaces from the Region to these operations



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centers. These include inventory such as the Kansas Highway Patrol dispatch center in Salina and the Kansas Department of Transportation's 511 traveler information system based in Topeka.

The inter-regional interfaces should be coordinated across Regional ITS Architectures in Kansas to avoid duplicate and/or conflicting definitions of the same interface.

**Table 4** lists the existing L-DC Region ITS inventory. Each inventory item is listed by the stakeholder who owns it.

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Table 4: L-DC Existing ITS Inventory

Stakeholder	Element	Description	Element Type
City of Lawrence Public Works	City of Lawrence CCTV Cameras	Closed circuit television cameras operated by the City of Lawrence for traffic condition monitoring and management of incidents.	Roadway Subsystem
	City of Lawrence Maintenance Center	Maintenance center used to track and dispatch maintenance vehicles, to manage maintenance and construction projects, and to share maintenance and construction information.	Maintenance and Construction Management Subsystem
	City of Lawrence Maintenance Vehicles	Maintenance vehicles used in maintenance operations and snow removal that are owned and operated by the City of Lawrence. Vehicles have automated vehicle location (AVL).	Maintenance and Construction Vehicle Subsystem
	City of Lawrence Traffic Operations Center	Lawrence Traffic Operations Center (TOC) is responsible for the operation of the signal system, CCTV cameras and any other City ITS deployments.	Traffic Management Subsystem
	City of Lawrence Traffic Field Equipment	Equipment used to monitor traffic and road conditions, identify incidents, and collect data for long range planning within the City of Lawrence.	Roadway Subsystem
	City of Lawrence Traffic Signals	Traffic signal system operated by the City of Lawrence.	Roadway Subsystem
	City of Lawrence Website	Transportation information website for the City of Lawrence.	Information Service Provider Subsystem
City of Lawrence Police Department	City of Lawrence Police Center	Center used for police operations, monitoring vehicles, incidents and traffic cameras.	Emergency Management Subsystem
	City of Lawrence Police Vehicles	Patrol vehicles owned and operated by the City of Lawrence Police Department. Vehicles have automated vehicle location (AVL) and mobile data terminals (MDT).	Emergency Vehicle Subsystem
Douglas County Public Works	Douglas County Maintenance Center	Maintenance center used to track and dispatch maintenance vehicles, to manage maintenance and construction projects, and to share maintenance and construction information.	Maintenance and Construction Management Subsystem
	Douglas County Maintenance Vehicles	Maintenance vehicles used in maintenance operations and snow removal that are owned and operated by Douglas County. Vehicles have automated vehicle location (AVL).	Maintenance and Construction Vehicle Subsystem
	Douglas County Website	Website for Douglas County.	Information Service Provider Subsystem



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Stakeholder	Element	Description	Element Type
Douglas County Emergency Communications	Douglas County 911 Dispatch Center	Answers all 911 calls made from within the county, except calls made from the KU campus, and dispatches appropriate emergency response. The 911 Dispatch center serves as primary dispatch for the City of Lawrence, Eudora, Baldwin City, and Leocompton.	Emergency Management Subsystem
Douglas County Emergency Management	Douglas County Emergency Operations Center (EOC)	Emergency Operations Center (EOC) for Douglas County. Responsible for communications and coordination of local resources during a disaster or large scale incident.	Emergency Management Subsystem
Douglas County Sheriff's Office	Douglas County Sheriff Vehicles	Patrol vehicles owned and operated by the Douglas County Sheriff's Department.	Emergency Vehicle Subsystem
Google	Google Transit	Web site operated by Google.com that provides transit information in the Region, including Lawrence Transit route and schedule information.	Information Service Provider Subsystem
Kansas Department of Emergency Management	KDEM Virtual Emergency Operation Center	Kansas Department of Emergency Management (KDEM) virtual EOC provides statewide function for emergency response and management.	Emergency Management Subsystem
Kansas Highway Patrol	KHP Communications Center	Statewide center for KHP communications for Highway Patrol operations.	Emergency Management Subsystem
	KTA Communications Center	Center for communications for KTA Highway Patrol operations.	Emergency Management Subsystem
	KHP Troop G Vehicles	Vehicles used by the KHP Troop G (KTA). Includes patrol cars and service patrol vehicles.	Emergency Vehicle Subsystem
	KHP Troop B Vehicles	Vehicles used by the KHP Troop B.	Emergency Vehicle Subsystem
Kansas Turnpike Authority (KTA)	KTA Dynamic Message Signs	Dynamic Message Signs (DMS) operated by KTA for traffic information dissemination.	Roadway Subsystem
	KTA Maintenance Center	KTA center responsible for managing maintenance and construction on the Turnpike.	Maintenance and Construction Management Subsystem



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Stakeholder	Element	Description	Element Type
	KTA Maintenance Vehicles	Maintenance vehicles used in maintenance operations and snow removal that are owned and operated by KTA.	Maintenance and Construction Vehicle Subsystem
	KTA Payment Management	KTA management of toll payments.	Payment Administration Subsystem
	KTA Toll Plazas	Toll collection locations used by KTA.	Roadway Payment Subsystem
	KTA Traffic Cameras	Cameras operated by KTA used for traffic surveillance, incident management, and toll enforcement.	Roadway Subsystem
	KTA Traffic Field Equipment	Equipment operated by KTA that measures the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure.	Roadway Subsystem
	KTA Traffic Operations Center	KTA TOC is responsible for the daily operations of the turnpike.	Traffic Management Subsystem
	KTA Traveler Advisory Radio	Highway Advisory Radio (HAR) system operated by KTA to provide current weather and traffic information along the Kansas Turnpike.	Roadway Subsystem
	KTA Website	Website operated by KTA for the dissemination of traveler information.	Information Service Provider Subsystem
Kansas Department of Transportation (KDOT)	KC Scout	Traffic management center for Kansas City, Kansas and Kansas City, Missouri. Responsible for operations of the traffic signal system, CCTV cameras, and DMS. The center is a joint effort between KDOT and Missouri DOT.	Traffic Management Subsystem
	KDOT 511 Traveler Information	511 telephone system and web site that provide up-to-date traveler information about road conditions, construction detours and weather information.	Information Service Provider Subsystem
	KDOT District 1 Maintenance Center	KDOT center responsible for managing maintenance and construction on state-maintained highways in KDOT District 1.	Maintenance and Construction Management Subsystem
	KDOT District 1 Maintenance Vehicles	Maintenance vehicles used in maintenance operations and snow removal that are owned and operated by KDOT.	Maintenance and Construction Vehicle Subsystem
	KDOT Road Weather Information Systems	Data collection equipment that gathers environmental conditions in the field, such as roadway temperature, ambient temperature, and moisture levels.	Roadway Subsystem



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Stakeholder	Element	Description	Element Type
University of Kansas (KU)	KU Maintenance Center	Function at the KU Maintenance Department responsible for construction and maintenance on the KU campus, including roads.	Maintenance and Construction Management Subsystem
	KU Parking Management System	Monitors parking <del>availability usage</del> in lots <del>on the KU campus and provides real-time parking information to patrons and collects fees for parking usage. Includes the ability for people to pay using their smart phone.</del>	Parking Management Subsystem
	<u>KU Parking Vehicles</u>	<u>Vehicles used for parking enforcement that include License Plate Readers to identify vehicles parked on campus.</u>	<u>Vehicle Subsystem and Parking Management</u>
	KU <u>Parking and Transit</u> Website	Website for the University of Kansas.	Information Service Provider Subsystem
KU Public Safety	KU Dispatch	Dispatch center that answers all 911 calls made from the KU campus and dispatches KU Police and City of Lawrence Fire/EMS as appropriate. The dispatch center serves as the backup center for Douglas County 911 Dispatch.	Emergency Management Subsystem
	KU Police Vehicles	Patrol vehicles owned and operated by KU police.	Emergency Vehicle Subsystem
Kansas University Transit (KU on Wheels)	KU on Wheels Vehicles	Fixed route and demand-response transit vehicles providing KU on Wheels service. Include AVL and on-board security cameras.	Transit Vehicle Subsystem
	KU on Wheels Website	Website for KU on Wheels with information about fares and schedules.	Information Service Provider Subsystem
Lawrence-Douglas County Fire Medical	Fire Medical Center	Center used for fire and medical operations, monitoring vehicles and incidents.	Emergency Management Subsystem
	Fire Medical EMS Vehicles	Fire and EMS vehicles owned and operated by the Lawrence-Douglas County Fire Department.	Emergency Vehicle Subsystem
Lawrence Transit	Lawrence Transit Dispatch Center	Transit dispatch center responsible for the tracking, scheduling, and dispatching of fixed route and demand-response vehicles operated by Lawrence Transit and KU on Wheels.	Transit Management Subsystem
	Lawrence Transit Vehicles	Fixed and flex route and demand-response transit vehicles operated by Lawrence Transit. Include AVL and on-board security cameras.	Transit Vehicle Subsystem
	Lawrence Transit System Website	Website operated by Lawrence Transit with information about fares and schedules. Currently static information only.	Information Service Provider Subsystem



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Stakeholder	Element	Description	Element Type
Local Cities Emergency Services	Local Cities Emergency Vehicles	Local law enforcement, fire, and EMS vehicles not specifically called out in the Regional ITS Architecture.	Emergency Vehicle Subsystem
Local Cities	Local Cities Maintenance Centers	Function at the local cities responsible for construction and maintenance in the local cities.	Maintenance and Construction Management Subsystem
	Local Cities Maintenance Vehicles	Public works departments responsible for the maintenance of roadways in municipalities not specifically called out in the Regional ITS Architecture.	Maintenance and Construction Vehicle Subsystem
	Local Cities Website	Local city websites not specifically called out in the Regional ITS Architecture.	Information Service Provider Subsystem
Local Transit	Local Transit Vehicles	The vehicles of other transit providers in the Region not specifically identified in the Regional ITS Architecture. Provide demand-response service.	Transit Vehicle Subsystem
	Local Transit Centers	The operation centers of other transit providers in the Region not specifically identified in the Regional ITS Architecture. Manage demand-response service.	Transit Management Subsystem
Media	Local Print and Broadcast Media	Local media that provides traffic or incident information to the public.	Information Service Provider Terminator
National Weather Service (NWS)	National Weather Service	Service that provides official US weather, marine, fire and aviation forecasts and warnings.	Information Service Provider Terminator
Railroads	Rail Operator Wayside Equipment	Equipment owned by rail operators that is located along the tracks including railroad crossing gates, bells, and lights as well as the interface to the traffic signal controller indicating the presence of a train.	Roadway Subsystem
Schools	School Buses	Local school buses in L-DC Region.	Transit Vehicle Subsystem
	Unified School District	School districts that represent elementary, secondary, and high schools in the Region.	Transit Management Subsystem
Traveling Public	Commercial Vehicles	Privately owned commercial vehicles that travel throughout the Region.	Commercial Vehicle Terminator



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Stakeholder	Element	Description	Element Type
	Personal Computing Devices	Computing devices that travelers use to access public information in the Region.	Remote Traveler Support Terminator
	Private Vehicles	Vehicles operated by a private individual in the Region.	Vehicle Terminator

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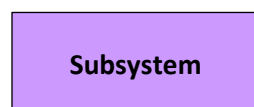
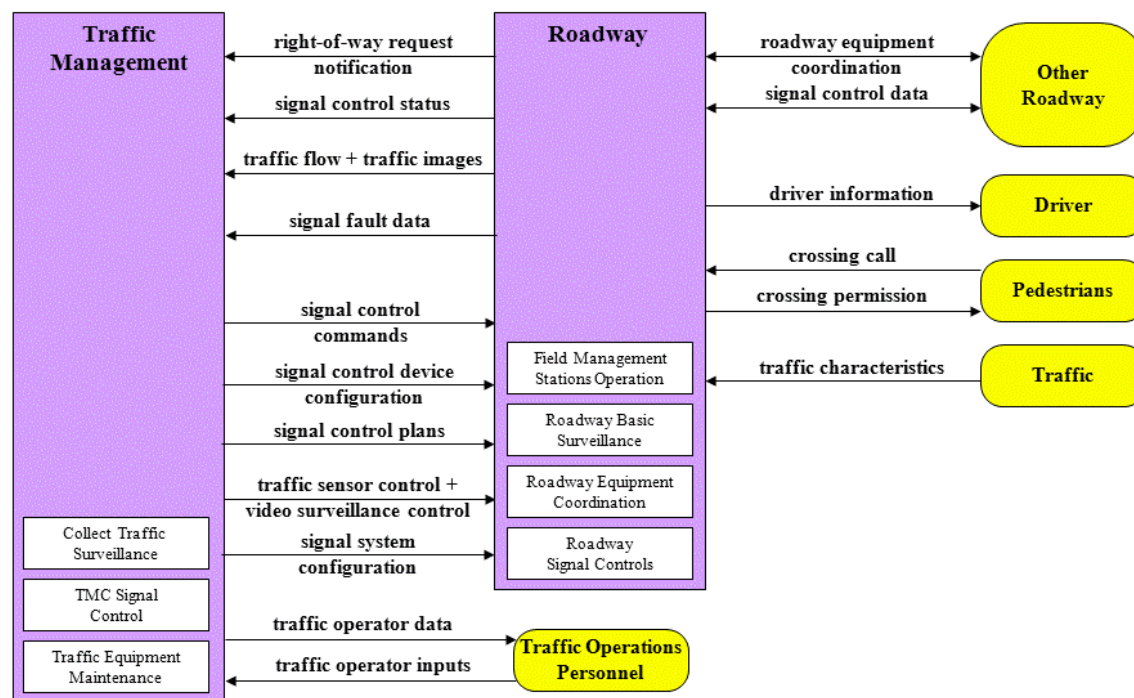
## 5. L-DC Region ITS Services

ITS User Services describe what functions ITS should perform from the user's perspective. The National ITS Architecture defines 97 Service Packages that "bundle" ITS elements to address specific services, such as surface street control or traveler information.

An ITS service package does not always directly translate to an ITS project. Instead, Service Packages are the "building blocks" of ITS, and a specific ITS project may include several service packages that provide multiple related functions. For example, a transit ITS project designed to improve service efficiency may include Service Packages for vehicle tracking, fixed-route management and automated passenger counting.

**Figure 4** is an example of a National ITS Service Package. Following the diagram is a description of each element in the package.

**Figure 4: Service Package ATMS03: Traffic Signal Control**



**Subsystems** are defined functionally, not physically. As discussed previously, they are grouped into four classes: Centers, Field, Vehicles, and Travelers. The subsystems in **Figure 4** are the Traffic Management Subsystem and the Roadway Subsystem. These correspond to the physical world: respectively traffic





## Lawrence-Douglas County Regional ITS Architecture Update Technical Memorandum #1 – ITS Inventory

operations centers and roadside signal controllers.

Subsystems, as defined by the National ITS Architecture, are typically related to transportation management or information processing.

### Terminator

**Terminators** define the boundaries of an ITS Architecture. They represent the people, systems, and general environment that interface to ITS, and often perform a function. The interfaces between terminators and subsystems are defined, but the region's ITS Architecture generally does not define the functionality of the terminators. Examples of terminators could include a Driver, or more specifically, the means with which the drivers may exchange information from roadway devices. A Terminator example is also Other Roadway, which may be devices on the roadway that exchange information with other systems but whose functionality is not defined by the architecture. These may include devices such as signals for school crossings that provide information to a traffic management center, but are not controlled by or coordinated with the center.

→ **Information Flows** are the information and data exchange between and among various subsystems and terminators. Information Flows allow for coordinated system operation by using predefined interfaces between ITS elements that may be owned and operated by different stakeholders. A key component of ITS Architecture development is identifying existing open, non-proprietary standards for these information flows wherever possible to maximize interoperability. Examples of information flows are Signal Control Data that starts at the Traffic Management Subsystem (traffic operations center) and flows to the Roadway Subsystem (the traffic signal controller in the field). Signal Control Data is the information used to configure and control traffic signal systems, such as phases and timing.

## 5.1 National ITS Service Packages

**Table 5** lists all ITS Service Areas and Service Packages in the National ITS Architecture Version 7.0. The 97 service packages listed represent the entire spectrum of ITS services that are defined by the National ITS Architecture. Only a small portion of these Service Packages are currently deployed in the L-DC Region.

In the electronic version of this document, each service package is hyperlinked to detailed descriptions and diagrams. They may also be accessed at the National ITS Architecture Web Site<sup>5</sup>.

<sup>5</sup> <http://www.iteris.com/itsarch/html/mp/mpindex.htm>





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Table 5: National ITS Architecture Service Packages

Service Package ID	Service Package Name
<b>Service Area: Archived Data Management</b> provides ITS historical data for relevant ITS data and will incorporate the planning, safety, operations, and research communities into ITS. It will provide the data collection, manipulation, and dissemination functions of these groups, as they relate to data generated by ITS.	
AD1	<a href="#">ITS Data Mart</a>
AD2	<a href="#">ITS Data Warehouse</a>
AD3	<a href="#">ITS Virtual Data Warehouse</a>
<b>Service Area: Public Transportation</b> provides services for the management, security, maintenance and operation of public transportation systems, such as bus and rail.	
APTS01	<a href="#">Transit Vehicle Tracking</a>
APTS02	<a href="#">Transit Fixed-Route Operations</a>
APTS03	<a href="#">Demand Response Transit Operations</a>
APTS04	<a href="#">Transit Fare Collection Management</a>
APTS05	<a href="#">Transit Security</a>
APTS06	<a href="#">Transit Fleet Management</a>
APTS07	<a href="#">Multi-modal Coordination</a>
APTS08	<a href="#">Transit Traveler Information</a>
APTS09	<a href="#">Transit Signal Priority</a>
APTS10	<a href="#">Transit Passenger Counting</a>
APTS11	<a href="#">Multimodal Connection Protection</a>



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Service Package ID	Service Package Name
<b>Service Area: Traveler Information</b> provides information to travelers pre-trip and en-route concerning traffic and weather conditions.	
ATIS01	<a href="#">Broadcast Traveler Information</a>
ATIS02	<a href="#">Interactive Traveler Information</a>
ATIS03	<a href="#">Autonomous Route Guidance</a>
ATIS04	<a href="#">Dynamic Route Guidance</a>
ATIS05	<a href="#">ISP Based Trip Planning and Route Guidance</a>
ATIS06	<a href="#">Transportation Operations Data Sharing</a>
ATIS07	<a href="#">Travel Services Information and Reservation</a>
ATIS08	<a href="#">Dynamic Ridesharing</a>
ATIS09	<a href="#">In Vehicle Signing</a>
ATIS10	<a href="#">Short Range Communications Traveler Information</a>
<b>Service Area: Traffic Management</b> provides for the surveillance and maintenance and operation of traffic control devices in order to improve efficiency and safety of traffic flow.	
ATMS01	<a href="#">Network Surveillance</a>
ATMS02	<a href="#">Traffic Probe Surveillance</a>
ATMS03	<a href="#">Traffic Signal Control</a>
ATMS04	<a href="#">Traffic Metering</a>
ATMS05	<a href="#">HOV Lane Management</a>
ATMS06	<a href="#">Traffic Information Dissemination</a>



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Service Package ID	Service Package Name
ATMS07	<a href="#">Regional Traffic Management</a>
ATMS08	<a href="#">Traffic Incident Management System</a>
ATMS09	<a href="#">Transportation Decision Support and Demand Management</a>
ATMS10	<a href="#">Electronic Toll Collection</a>
ATMS11	<a href="#">Emissions Monitoring and Management</a>
ATMS12	<a href="#">Roadside Lighting System Control</a>
ATMS13	<a href="#">Standard Railroad Grade Crossing</a>
ATMS14	<a href="#">Advanced Railroad Grade Crossing</a>
ATMS15	<a href="#">Railroad Operations Coordination</a>
ATMS16	<a href="#">Parking Facility Management</a>
ATMS17	<a href="#">Regional Parking Management</a>
ATMS18	<a href="#">Reversible Lane Management</a>
ATMS19	<a href="#">Speed Warning and Enforcement</a>
ATMS20	<a href="#">Drawbridge Management</a>
ATMS21	<a href="#">Roadway Closure Management</a>
ATMS22	<a href="#">Variable Speed Limits</a>
ATMS23	<a href="#">Dynamic Lane Management and Shoulder Use</a>
ATMS24	<a href="#">Dynamic Roadway Warning</a>
ATMS25	<a href="#">VMT Road User Payment</a>



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Service Package ID	Service Package Name
ATMS26	<a href="#">Mixed Use Warning Systems</a>
<b>Service Area: Vehicle Safety</b> provides advanced safety and warning systems for vehicles to alert drivers and reduce the risk of crashes.	
AVSS01	<a href="#">Vehicle Safety Monitoring</a>
AVSS02	<a href="#">Driver Safety Monitoring</a>
AVSS03	<a href="#">Longitudinal Safety Warning</a>
AVSS04	<a href="#">Lateral Safety Warning</a>
AVSS05	<a href="#">Intersection Safety Warning</a>
AVSS06	<a href="#">Pre-Crash Restraint Deployment</a>
AVSS07	<a href="#">Driver Visibility Improvement</a>
AVSS08	<a href="#">Advanced Vehicle Longitudinal Control</a>
AVSS09	<a href="#">Advanced Vehicle Lateral Control</a>
AVSS10	<a href="#">Intersection Collision Avoidance</a>
AVSS11	<a href="#">Automated Vehicle Operations</a>
AVSS12	<a href="#">Cooperative Vehicle Safety Systems</a>
<b>Service Area: Commercial Vehicle Operations</b> provides services for commercial vehicle fleet management, administrative functions, advanced screening and inspection and goods movement security.	
CVO01	<a href="#">Carrier Operations and Fleet Management</a>
CVO02	<a href="#">Freight Administration</a>



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Service Package ID	Service Package Name
CVO03	<a href="#">Electronic Clearance</a>
CVO04	<a href="#">CV Administrative Processes</a>
CVO05	<a href="#">International Border Electronic Clearance</a>
CVO06	<a href="#">Weigh-In-Motion</a>
CVO07	<a href="#">Roadside CVO Safety</a>
CVO08	<a href="#">On-board CVO Safety</a>
CVO09	<a href="#">CVO Fleet Maintenance</a>
CVO10	<a href="#">HAZMAT Management</a>
CVO11	<a href="#">Roadside HAZMAT Security Detection and Mitigation</a>
CVO12	<a href="#">CV Driver Security Authentication</a>
CVO13	<a href="#">Freight Assignment Tracking</a>
<b>Service Area: Emergency Management</b> provides services to manage emergency detection and response and improve coordination among transportation entities and emergency responders.	
EM01	<a href="#">Emergency Call-Taking and Dispatch</a>
EM02	<a href="#">Emergency Routing</a>
EM03	<a href="#">Mayday and Alarms Support</a>
EM04	<a href="#">Roadway Service Patrols</a>
EM05	<a href="#">Transportation Infrastructure Protection</a>
EM06	<a href="#">Wide-Area Alert</a>



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Service Package ID	Service Package Name
EM07	<a href="#">Early Warning System</a>
EM08	<a href="#">Disaster Response and Recovery</a>
EM09	<a href="#">Evacuation and Reentry Management</a>
EM10	<a href="#">Disaster Traveler Information</a>
<b>Service Area: Maintenance and Construction Management</b> provides services to manage maintenance and construction, including managing weather, incident response and work zones.	
MC01	<a href="#">Maintenance and Construction Vehicle and Equipment Tracking</a>
MC02	<a href="#">Maintenance and Construction Vehicle Maintenance</a>
MC03	<a href="#">Road Weather Data Collection</a>
MC04	<a href="#">Weather Information Processing and Distribution</a>
MC05	<a href="#">Roadway Automated Treatment</a>
MC06	<a href="#">Winter Maintenance</a>
MC07	<a href="#">Roadway Maintenance and Construction</a>
MC08	<a href="#">Work Zone Management</a>
MC09	<a href="#">Work Zone Safety Monitoring</a>
MC10	<a href="#">Maintenance and Construction Activity Coordination</a>
MC11	<a href="#">Environmental Probe Surveillance</a>
MC12	<a href="#">Infrastructure Monitoring</a>



### 5.2 L-DC Region Existing ITS Services

The L-DC has not and will not deploy all of the National ITS Services Packages. **Table 6** identifies the existing ITS Service Packages in the Region. The existing Service Packages have been derived from the current services provided by the Region's Stakeholders, and from the inventory documented in **Section 4**. Note that not all of the stakeholders listed as owning the Region's ITS inventory are represented in Table 6. This is because some stakeholders own ITS elements with the potential to be integrated into ITS, but they currently are not.

**Table 6: L-DC Region Existing ITS Service Packages**

Existing Service Package	Stakeholders
APTS01: Transit Vehicle Tracking	<ul style="list-style-type: none"><li>Lawrence Transit</li><li>KU on Wheels</li></ul>
APTS02: Transit Fixed-Route Operations	<ul style="list-style-type: none"><li>Lawrence Transit</li><li>KU on Wheels</li></ul>
APTS03: Demand Response Transit Operations	<ul style="list-style-type: none"><li>Lawrence Transit</li><li>KU on Wheels</li></ul>
APTS04: Transit Fare Collection Management	<ul style="list-style-type: none"><li>Lawrence Transit</li><li>KU on Wheels</li></ul>
APTS05: Transit Security	<ul style="list-style-type: none"><li>Lawrence Transit</li><li>KU on Wheels</li></ul>
ATIS01: Broadcast Traveler Information	<ul style="list-style-type: none"><li>KDOT</li><li>KTA</li><li>Travelers</li></ul>
ATMS01: Network Surveillance	<ul style="list-style-type: none"><li>City of Lawrence Public Works</li><li>KDOT</li></ul>
ATMS03: Traffic Signal Control	<ul style="list-style-type: none"><li>City of Lawrence Public Works</li></ul>
ATMS06: Traffic Information Dissemination	<ul style="list-style-type: none"><li>KTA</li></ul>
ATMS10: Electronic Toll Collection	<ul style="list-style-type: none"><li>KTA</li></ul>
ATMS13: Standard Railroad Grade Crossing	<ul style="list-style-type: none"><li>City of Lawrence Public Works</li><li>Douglas County</li><li>Railroads</li></ul>
ATMS16: Parking Facility Management	<ul style="list-style-type: none"><li>KU</li></ul>



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Existing Service Package	Stakeholders
EM01: Emergency Call-Taking and Dispatch	<ul style="list-style-type: none"><li>▪ Douglas County Emergency Communications</li><li>▪ KHP</li><li>▪ KU Public Safety</li></ul>
EM02: Emergency Routing	<ul style="list-style-type: none"><li>▪ City of Lawrence Police</li><li>▪ Douglas County</li><li>▪ Lawrence-Douglas County Fire Medical</li></ul>
EM04: Roadway Service Patrols	<ul style="list-style-type: none"><li>▪ KTA</li></ul>
EM08: Disaster Response and Recovery	<ul style="list-style-type: none"><li>▪ Douglas County Emergency Management</li><li>▪ Kansas Department of Emergency Management</li></ul>
EM09: Evacuation and Reentry Management	<ul style="list-style-type: none"><li>▪ Douglas County Emergency Management</li><li>▪ Kansas Department of Emergency Management</li></ul>
EM10: Disaster Traveler Information	<ul style="list-style-type: none"><li>▪ KDOT</li><li>▪ KTA</li></ul>
MC01: Maintenance and Construction Vehicle and Equipment Tracking	<ul style="list-style-type: none"><li>▪ City of Lawrence Public Works</li><li>▪ Douglas County</li></ul>
MC03: Road Weather Data Collection	<ul style="list-style-type: none"><li>▪ KDOT</li><li>▪ KTA</li></ul>
MC04: Weather Information Processing and Distribution	<ul style="list-style-type: none"><li>▪ KDOT</li><li>▪ KTA</li></ul>
MC06: Winter Maintenance	<ul style="list-style-type: none"><li>▪ City of Lawrence Public Works</li><li>▪ Douglas County</li><li>▪ KDOT</li><li>▪ KTA</li></ul>





### 6. Project Next Steps

Documenting and understanding the existing ITS Stakeholders, inventory and services in the L-DC Region is a key step in the architecture development process.

The next steps in the development of the L-DC Regional ITS Architecture are to identify and prioritize the Region's needs that are not addressed by the existing ITS, and then map those needs to show new ITS services. Combined with the needs, the inventory in Technical Memorandum #1 will be used to determine:

- Feasible ITS User Services that can build upon and interact with existing regional systems.
- ITS Services that can address multiple needs. The result may be projects that address both high and low priorities.
- Sequencing of the implementation of ITS Services that may be dependent upon, or complement, other existing or planned ITS Services.
- Likely stakeholders and system owners for new ITS.

The next project report, Technical Memorandum #2, will:

- Prioritize the Region's ITS needs.
- Map the prioritized needs to ITS User Services.
- Define and sequence projects that provide the identified ITS User Services.
- Define each stakeholder's roles and responsibilities in providing ITS Services in the region.
- Define information flows and ITS functional requirements.



## Lawrence-Douglas County Regional ITS Architecture Update Technical Memorandum #1 – ITS Inventory

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