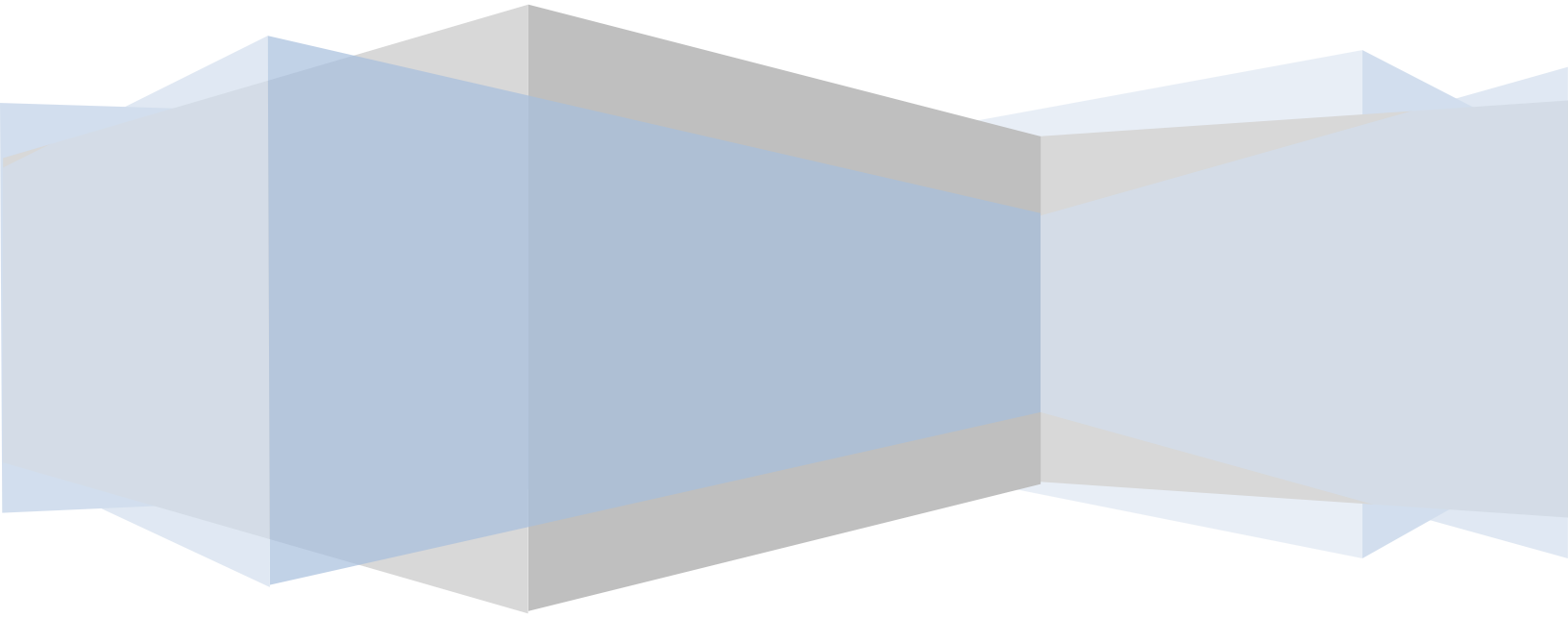
LEXINGTON AREA
Metropolitan Planning Organization

Lexington Area ITS Architecture

RAD-IT Report



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1 Introduction

The Lexington Area Intelligent Transportation Systems (ITS) Architecture is a roadmap for the deployment and integration of ITS in the Lexington Area Metropolitan Planning Organization (MPO) planning area for the next ten years. The Lexington Area MPO planning area, defined as the region in this Architecture, geographically covers Fayette County, Jessamine County, and a very small portion of Scott County in central Kentucky. The Lexington Area ITS Architecture provides a framework for institutional agreements and technical integration of ITS implementation projects in the region. It describes the "big picture" for ITS deployment in terms of individual ITS components that will perform the functions necessary to deliver the desired needs. It supports effective and efficient deployment of transportation and ITS projects that address the transportation problems and needs in the region.
The Lexington Area ITS Architecture is an open and integrated ITS architecture that is compliant with the Federal Highway Administration (FHWA) Final Rule and Federal Transit Administration (FTA) Policy on ITS Architecture and Standards. The Architecture has been developed through a cooperative effort by the transportation, transit, law enforcement, emergency management, commercial vehicle and freight management agencies. It represents a shared vision of how each agency's systems work together by sharing information and resources to enhance transportation safety, efficiency, capacity, mobility, reliability, and security.

2 Architecture Scope

The Lexington Area ITS Architecture is a roadmap for transportation systems integration. The architecture was developed through a cooperative effort by the region's transportation agencies, covering all modes and all roads in the region. It represents a shared vision of how each agency's systems will work together in the future, sharing information and resources to provide a safer, more efficient, and more effective transportation system for travelers in the region.
The architecture provides an overarching framework that spans all of the region's transportation organizations and individual transportation projects. Using the architecture, each transportation project can be viewed as an element of the overall transportation system, providing visibility into the relationship between individual transportation projects and ways to cost-effectively build an integrated transportation system over time. This chapter establishes the scope of the architecture in terms of its geographic breadth, the scope of services that are covered, and the time horizon that is addressed.

Description

The purpose of the Lexington Area ITS Architecture is to illustrate and document the integration of regional ITS systems to allow planning and deployment to occur in an organized and coordinated process. The Architecture helps guide the planning, implementation, and integration of ITS devices deployed and managed by multiple types of agencies that provide transportation services within the region.

Timeframe

2020 -- 2030

Geographic Scope

The Lexington Area ITS Architecture geographically covers Fayette and Jessamine counties, and a very small portion of Scott County in central Kentucky, encompassing local, regional and state transportation agencies and transportation stakeholders.

Service Scope

The Architecture is a roadmap for the deployment and integration of transportation systems in the region over the next 10 years. The architecture has been developed through a cooperative effort by the transportation, transit, law enforcement, emergency management, commercial vehicle and freight management agencies. It represents a shared vision of how each agency's systems work together by sharing information and resources to enhance transportation safety, efficiency, capacity, mobility, reliability, and security.

3 ITS Stakeholders

Identifying stakeholders is an important task in ITS architecture development since effective ITS involves the integration of multiple stakeholders and their transportation systems. This section describes the stakeholders who either participated in the creation of the Lexington Area ITS Architecture or whom the participating stakeholders felt were needed to be included in the architecture. Some stakeholders have been grouped in order to better reflect mutual participation or involvement in transportation services and elements. Every stakeholder in this section is related to one or more of the transportation inventory elements described in the next chapter, either as an individual stakeholder or as a member of a stakeholder group.

Table 1: ITS Stakeholders

Stakeholder Name	Stakeholder Description
Academic / Research Organizations	Academic and research organizations that assist public agencies with transportation planning, research, and studies. Kentucky Transportation Center at the University of Kentucky is the largest transportation research institute in the region, and the research group is employed by KYTC.
American Red Cross, Bluegrass Area Chapter	American Red Cross, Bluegrass Area Chapter: Operator of the WHEELS demand-responsive service in the Lexington-Fayette area that provides demand response transit services in the area.
Bluegrass Community Action Partnership	Rural and small town transit provider (Section 5310) for Jessamine County that provides demand response transit services.
Demand Response Transit Providers	Demand Response Transit Providers operating in the region.
Federal Highway Administration	Federal Highway Administration (FHWA) is a Federal agency with the broad responsibility of ensuring that America's roads and highways continue to be the safest and most technologically up-to-date. FHWA provides financial and technical support to State, local, and tribal governments for constructing, improving, and preserving America's highway system.
Federal Motor Carrier Safety Administration	Federal Motor Carrier Safety Administration, the federal agency responsible for motor carrier safety.
Federal Transit Administration	Federal Transit Administration (FTA) administers public transportation including buses, subways, light rail, commuter rail, monorail, passenger ferries, trolleys, inclined railways, and people movers. FTA provides financial assistance to state and local transit providers for developing new transit systems and improving, maintaining, and operating existing systems. FTA is a sister agency to FHWA.
Federated Transit Services of the Bluegrass (FTSB)	Federated Transportation Services of the Bluegrass, Inc. (FTSB) is a non-profit agency incorporated in 1981. FTSB is a public transportation provider and Medicaid broker for thirteen counties. FTSB provides Medicaid brokerage services for Fayette, Jefferson, Shelby, Spencer, Oldham, Bullitt, Henry, Trimble, Bourbon, Harrison, Nicholas, Madison, Montgomery, Powell, Estill and Clark Counties. FTSB provides public transportation in Bourbon, Harrison, Nicholas and Rowan Counties, and a job transportation route in Lewis County. FTSB also offers an InterCity Bus Service to Lexington for riders in Bourbon, Harrison, and Nicholas Counties as well as riders in Morehead.
Hospital Organizations	Regional Hospital Organizations - Represents hospitals and trauma centers in the region.
Jessamine County	Represents Jessamine County which is south of Fayette County in the Lexington Area Metropolitan Planning Organization.

Stakeholder Name	Stakeholder Description
Kentucky Emergency Management	Kentucky Emergency Management is the state level agency charged with protecting life and property, public peace, health, safety and the environment of the Commonwealth of Kentucky through an all-hazards approach to mitigation, preparedness, response and recovery from disasters and emergencies which a local emergency response agency determines is beyond its capabilities.
Kentucky State Police	Kentucky State Police is the state level law enforcement agency protecting the public. Post 12 covers Fayette County. Post 7 covers Jessamine County.
KYTC Central Office	Kentucky Transportation Cabinet is the state level agency responsible for the planning, designing, building, and maintaining the transportation infrastructure in Kentucky. Central Office is located in Frankfort located in Franklin County which is within District 5 of KYTC.
KYTC District 7	Kentucky Transportation Cabinet is the state level agency responsible for the planning, designing, building, and maintaining the transportation infrastructure in Kentucky. District Seven oversees the construction and maintenance of highways in twelve central Kentucky counties, including Fayette and Jessamine Counties. District staff coordinate all aspects of road building, from planning, design, and right-of-way purchasing to administering construction contracts and ensuring the highways are maintained for travelers including pothole patching and mowing to snow removal.
Lexington and Fayette County Parking Authority (LFCPA)	Parking agency that operates under the authority of the Lexington Fayette Urban County Government. Agency operates public parking facilities within Lexington-Fayette County.
Lexington Area MPO	The Lexington Area Metro Planning Organization (MPO) is the federally designated transportation planning agency for Fayette and Jessamine Counties. The MPO is responsible for the comprehensive, coordinated, and continuous transportation planning process for the region. The MPO monitors present-day transportation needs and trends and coordinates with community partners on transportation issues, plans, projects and programs.
Lextran	Lextran is the Transit Authority of the Lexington-Fayette Urban County Government. Lextran operates a fleet of 73 buses, including a University of Kentucky campus shuttle service, and contracts a door-to door Paratransit service through Red Cross WHEELS.
LFUCG	Lexington-Fayette Urban County Government is the local government units supplying goods and services in support of the transportation infrastructure.
MAASTO	Mid America Association of State Transportation Officials.
Media	Media represents the information systems that provide traffic reports, travel conditions, and other transportation-related news services to the traveling public through radio, TV, and other media.
Neighboring Cities and Counties	Counties and Cities that are adjacent to Fayette and Jessamine Counties.
NOAA	National Oceanic and Atmospheric Administration provides weather, hydrologic, and climate information and warnings of hazardous weather including thunderstorms, flooding, hurricanes, tornadoes, winter weather, tsunamis, and climate events. It provides atmospheric weather observations and forecasts that are collected and derived by the National Weather Service, private sector providers, and various research organizations. The interface provides formatted weather data products suitable for on-line processing and integration with other ITS data products as well as Doppler radar images, satellite images, severe storm warnings, and other products that are formatted for presentation to various ITS users.
Private Fleet and Freight Operators	Private owners of commercial vehicles

Stakeholder Name	Stakeholder Description
Railroad Companies	Railroad Companies
Towing and Recovery Providers	Towing, Recovery, and Cleanup Service Providers. This includes Roberts Heavy Duty Towing Inc.
Travelers	Travelers are the motoring public operating private, commercial, or public conveyances.
Various Owners	Various regional public and private organizations supplying goods and/or services in support of the transportation infrastructure. This group of owners include event promoters, financial institutes, private information service providers, etc.

4 ITS Inventory

An inventory of existing and planned transportation systems is the basis for the Lexington Area ITS Architecture. The transportation system inventory was developed based on input from stakeholders throughout the region. The inventory includes a list of ITS elements and the associated stakeholder responsible for system operation.

This section describes every surface transportation inventory element for the region. A transportation element can be either a center, vehicle, traveler or field equipment. Each transportation element listed below has one or more stakeholders associated with it. In order to reduce the complexity of the architecture, some transportation elements with like functionality have been grouped together. Each transportation inventory element is mapped to at least one Architecture Reference for Cooperative and Intelligent Transportation (ARC-IT) physical object.

Table 2: ITS Inventory

Element Name	Element Description	Stakeholder	Element Status
Academic / Research Organizations	Represents a collection of academic organizations that access transportation data collected by transportation agencies in the region for the purposes of traffic and safety studies.	Academic / Research Organizations	Existing
Basic Vehicle	Represents passenger vehicles traveling throughout the region.	Travelers	Existing
BUS Dispatch Center	BUS Dispatch Center communicates with BUS transit vehicles supporting fixed route and demand response transit service in the region. It also supports emergency/disaster response, recovery and evacuation.	Bluegrass Community Action Partnership	Existing
BUS Facility Surveillance Equipment	Represents surveillance and sensor equipment used to provide enhanced security and safety for BUS's non-public areas. (e.g. maintenance and transit yards).	Bluegrass Community Action Partnership	Existing
BUS Transit Vehicle	Bluegrass Ultra-Transit Service (BUS) provides fixed-route services in Nicholasville (NichTran). It also has intercity services between Nicholasville, Danville, Frankfort, and Lexington.	Bluegrass Community Action Partnership	Existing
BUS Transit Vehicle Operators	Represents operators of BUS transit vehicles that communicate with the BUS dispatch center.	Bluegrass Community Action Partnership	Existing
BUS Transit Website	This website (http://www.bluegrasscommunityaction.org/Pages/bus.html) provides basic transit information to customers.	Bluegrass Community Action Partnership	Existing
BUS Traveler Electronic Fare Cards	Represents electronic fare cards purchased by passengers and used on BUS transit vehicles for payment.	Bluegrass Community Action Partnership	Existing
BUS Vehicle Maintenance Crew	Responsible for monitoring, controlling, and planning the schedules for the maintenance of transit fleets	Bluegrass Community Action Partnership	Existing

Element Name	Element Description	Stakeholder	Element Status
Commercial Vehicle Fleet and Freight Management	Represents various commercial vehicle agencies throughout the region that operate and manage commercial vehicle fleets.	Private Fleet and Freight Operators	Existing
Commercial Vehicles	This ITS element represents commercial vehicles operating within the Lexington region that are equipped with two-way communications devices to facilitate communication with Motor Carrier Fleet and Freight Management systems.	Private Fleet and Freight Operators	Existing
Connected/Automated Vehicles	This element represents connected and automated vehicles that are owned and operated by the general public.	Travelers	Planned
Driver	Represents drivers that operate vehicles on the roadway.	Travelers	Existing
Event Promoters	Event Promoters represent agencies that have knowledge of events that may impact travel on roadways or other modal means. Examples of special event sponsors include sporting events, conventions, motorcades/parades, and public/political events.	Various Owners	Existing
Financial Institution	Represents organizations that handle electronic fund transfer requests to enable the transfer of funds from users of a transportation service (i.e. parking facility) to the provider of the service (LFCPA).	Various Owners	Existing
FTSB Transit Dispatch Centers	FTSB Dispatch Centers communicate with FTSB transit vehicles supporting fixed route and demand response transit service in the region. They also support emergency/disaster response, recovery and evacuation.	Federated Transit Services of the Bluegrass (FTSB)	Existing
FTSB Transit Vehicle Operators	Represents operators of FTSB transit vehicles that communicate with FTSB dispatch centers.	Federated Transit Services of the Bluegrass (FTSB)	Existing
FTSB Transit Vehicles	Represents the FTSB Intercity Bus Route that provides fixed route services to and from Lexington, KY, as well as Human Services Transportation that operates demand response transit service in part of Fayette County.	Federated Transit Services of the Bluegrass (FTSB)	Existing
FTSB Transit Website	This website (http://www.ftsb.org/AboutUs.aspx) provides basic transit information to customers.	Federated Transit Services of the Bluegrass (FTSB)	Existing
Jessamine County - 911 Emergency Services	Represents the Jessamine County 911 Center, answering 911 calls in Jessamine County including the cities of Nicholasville and Wilmore, and dispatching law enforcement, fire, EMS, and Emergency Management.	Jessamine County	Existing
Jessamine County Emergency Vehicles	Represents all types of Jessamine County emergency vehicles, including sheriff's department responsible for roadway enforcement within Jessamine County, as well as emergency services vehicles in the county.	Jessamine County	Existing

Element Name	Element Description	Stakeholder	Element Status
Jessamine County Road Department	The Jessamine County Road Department is responsible for maintaining all county roads, including pothole repairs, road sign replacement, and other road maintenance activities.	Jessamine County	Existing
Jessamine County Road Department Personnel	Represents personnel working for the Jessamine County Road Department in central offices and field locations.	Jessamine County	Existing
Jessamine County Road Department Vehicles	Represents maintenance vehicles operated by the Jessamine County Road Department.	Jessamine County	Existing
Jessamine County Road Department Work Zone Safety Equipment	Represents Work Zone Safety Equipment deployed and maintained by the Jessamine County Road Department.	Jessamine County	Existing
Jessamine County Roadside Equipment	Represents traffic signals and other roadside ITS equipment deployed and maintained by the Jessamine County Road Department.	Jessamine County	Existing
Jessamine County Sheriff Department	Represents Jessamine County sheriff's department responsible for roadway enforcement within Jessamine County.	Jessamine County	Existing
Kentucky Emergency Management	Kentucky Emergency Management is the state level agency charged with protecting life and property, public peace, health, safety and the environment of the Commonwealth of Kentucky through an all-hazards approach to mitigation, preparedness, response and recovery from disasters and emergencies which a local emergency response agency determines is beyond its capabilities.	Kentucky Emergency Management	Existing
Kentucky State Police Post 12	This represents the central dispatch operations that communicate with patrol cars operating within Kentucky State Police Post 12 that covers Fayette County.	Kentucky State Police	Existing
Kentucky State Police Post 12 Patrol Car	This element represents the Kentucky State Police (KSP) patrol cars dispatched from Post 12 (covering Fayette County) to respond to emergencies within jurisdiction of the Kentucky State Police. Emergency response is coordinated with LFUCG as necessary.	Kentucky State Police	Existing
Kentucky State Police Post 7	This represents the central dispatch operations that communicate with patrol cars operating within Kentucky State Police Post 7 that covers Jessamine County.	Kentucky State Police	Existing
Kentucky State Police Post 7 Patrol Car	This element represents the Kentucky State Police (KSP) patrol cars dispatched from Post 7 (covering Jessamine County) to respond to emergencies within jurisdiction of the Kentucky State Police. Emergency response is coordinated with Jessamine County Emergency Services as necessary.	Kentucky State Police	Existing
KYTC District 7 CCTV Cameras	Represents CCTV cameras installed along I-75 within the region. Cameras are accessible via the internet through Kentucky 511 webpage. The video is not recorded or saved in any way. The cameras are used only to monitor traffic conditions.	KYTC District 7	Existing

Element Name	Element Description	Stakeholder	Element Status
KYTC District 7 Dynamic Message Signs	Represents portable and permanent DMS utilized by KYTC for traffic operations and work zone operations.	KYTC District 7	Existing
KYTC District 7 Highway Advisory Radio	Represents Highway Advisory Radio (HAR) equipment controlled by KYTC District 7.	KYTC District 7	Existing
KYTC District 7 Maintenance and Construction Center Personnel	Represents the KYTC maintenance and construction personnel that operate from dispatch offices to vehicles and field locations throughout KYTC District 7.	KYTC District 7	Existing
KYTC District 7 Maintenance and Construction Field Personnel	Represents the people that perform maintenance and construction field activities including vehicle and equipment operators, field supervisory personnel, field crews, and work zone safety personnel.	KYTC District 7	Existing
KYTC District 7 Maintenance and Construction Offices	Represents the offices that dispatch and communicate with KYTC Maintenance and Construction Vehicles in the field.	KYTC District 7	Existing
KYTC District 7 Maintenance and Construction Vehicles	Vehicles perform roadway maintenance operations and snow plow operations on state level roads within the region. AVL equipment is installed on a number of snow plows and will be expanded to additional vehicles to communicate vehicle location information back to KYTC Maintenance and Construction Offices.	KYTC District 7	Existing
KYTC District 7 Office	The Kentucky Department of Highways District Seven office oversees the construction and maintenance of highways in twelve central Kentucky counties. District staff coordinate all aspects of road building, from planning, design, and right-of-way purchasing to administering construction contracts and ensuring the highways are maintained for travelers including pothole patching and mowing to snow removal.	KYTC District 7	Existing
KYTC District 7 Overheight Vehicle Sensors	Represents roadside equipment that detects overheight vehicles and provides a warning to vehicles of low clearance ahead.	KYTC District 7	Existing
KYTC District 7 Ramp Meters	This element represents future ramp meters on I-75.	KYTC District 7	Planned
KYTC District 7 Roadside Traffic Detection Equipment	Represents loop detector equipment installed along Interstates within the region and monitored by the KYTC District 7 Office for the purpose of gathering traffic volume and speed data and disseminating traffic speeds via KYTC 511 website.	KYTC District 7	Existing
KYTC District 7 RWIS Stations	Represents RWIS Stations located on or near the roadway that communicate road and weather information data to KYTC Maintenance and Construction offices.	KYTC District 7	Existing

Element Name	Element Description	Stakeholder	Element Status
KYTC District 7 Safe Patrol Vehicles	The Safety Assistance for Freeway Emergencies (Safe) Patrol is designed to aid motorists and assist with incident management. Patrol operates within the region on Interstate 75 and 64 from 6:00 AM to 10:00 PM, 7 days a week. As part of the Kentucky Office of Highway Safety Division of Incident Management, it is part of a comprehensive incident management initiative to improve safety and reduce delay caused by nonrecurring congestion and improve operations of the freeway system.	KYTC District 7	Existing
KYTC District 7 Traffic Signals	Represents traffic signals in the region that are owned by KYTC Traffic Operations Center. All signals within Fayette County are operated and maintained by the LFUCG.	KYTC District 7	Existing
KYTC District 7 Work Zone Safety Equipment	Represents Work Zone Safety Equipment deployed by District 7 KYTC maintenance personnel. ITS equipment may include work zone travel times detection and information dissemination, work zone queue detection, work zone speed enforcement, errant vehicle detection in work zones, and other systems that can improve worker safety in the work zone.	KYTC District 7	Existing
KYTC District 7 Wrong Way Vehicle Detection System	This element represents KYTC's wrong way vehicle detection and warning system on interstate exit ramps.	KYTC District 7	Planned
KYTC GoKY	Represents the Kentucky 511 website that provides traffic information on Interstate 75 and 64 crossing through Fayette County.	KYTC Central Office	Existing
KYTC MDSS	MDSS is a server- and client-side hardware and software package that provides winter maintenance support. MDSS offers visualizations of the real time maintenance data integrated from many sources (weather forecasts, RWIS, plow positions, materials, spread rates, etc.) and reports actual road conditions to establish appropriate maintenance treatments. It enables weather and roadway conditions predictions and identifies an optimal maintenance plan given user-configurable resources. MDSS also communicates recommendations to the maintenance personnel.	KYTC Central Office	Existing
KYTC Truck Parking Management System	This element represents KYTC's real-time parking availability information system for commercial drivers in order to improve the safety and efficiency of the region's freight network. KYTC has partnered with seven other states to launch a real-time parking availability information system for commercial drivers in order to improve the safety and efficiency of the region's freight network. The Mid America Association of State Transportation Officials (MAASTO) regional Truck Parking Information Management System (TPIMS) will display information to truckers on high-volume roadways – including Interstates 65, 71 and 75 in Kentucky – through dynamic roadside signs. KYTC has implemented such a system in locations outside of the Lexington area.	KYTC Central Office	Planned

Element Name	Element Description	Stakeholder	Element Status
KYTC Truck Parking Website	This element represents the KYTC truck parking availability website at http://www.trimarc.org/site/pages/TruckParking.html.	KYTC Central Office	Planned
Lextran Bus Vehicle Maintenance Crew	Responsible for monitoring, controlling, and planning the schedules for the maintenance of transit fleets	Lextran	Existing
Lextran Facility Surveillance Equipment	Represents the surveillance and sensor equipment used to provide enhanced security and safety for Lextran's non-public areas. (e.g. maintenance and transit yards).	Lextran	Planned
Lextran Next Bus Arrival Display	This includes next bus arrival information to travelers at Lextran stations or transit stops. Real-time information is provided to passengers via electronic signs / audio announcements at transit stops and stations.	Lextran	Existing
Lextran Operations Personnel	Represents center office personnel responsible for dispatching and communicating with Lextran transit vehicles and operators.	Lextran	Existing
Lextran Transit Center Security Cameras	This element supports security and safety monitoring of public areas, specifically the Lextran Transit Center.	Lextran	Existing
Lextran Transit Operations Center	Represents the operations center for the Lexington Transit Authority that houses the transit dispatch functions for fixed route and demand response transit services in the region. Lextran and the operations center also support emergency/disaster response, recovery and evacuation.	Lextran	Existing
Lextran Transit Vehicle	This represents Lextran transit vehicles traveling throughout the region. Vehicles support fixed-route transit services and contain Automated Vehicle Locator (AVL) equipment for monitoring vehicle location in the region. Vehicles also include security monitoring equipment and provide audible announcements to passengers of upcoming stops along fixed routes. Vehicles also include electronic fare payment systems to facilitate quick payments by passengers of transit vehicles. Transit signal priority technology has been considered for deployment in the coming years.	Lextran	Existing
Lextran Transit Vehicle Operator	Represents operators that communicate with the Lextran Transit Operations Center.	Lextran	Existing
Lextran Traveler Electronic Fare Cards	Represents electronic fare cards purchased by passengers and used on Lextran transit vehicles for payment.	Lextran	Existing
Lextran Web Site	This website (http://www.lextran.com/) provides transit information to customers and provides trip planning functions.	Lextran	Existing
Lextran WHEELS Transit Vehicle	WHEELS is a para-transit service operated by Lextran in cooperation with American Red Cross, Bluegrass Area Chapter.	Lextran	Existing

Element Name	Element Description	Stakeholder	Element Status
LFCPA Lexpark Website	This element represents the LFCPA Lexpark Website (lexpark.org). The LEXPARK.org website serves as a resource for residents, businesses, and visitors who want to know more about Lexington's parking facilities, future plans, ordinances, and procedures. It also allows users to reserve garage parking spaces.	Lexington and Fayette County Parking Authority (LFCPA)	Existing
LFCPA Parking Management System	Represents the central offices that communicate with parking equipment installed at LFCPA parking facilities in Lexington and Fayette County. LFCPA plans to expand the amount of facilities that can track parking availability and occupancy within the facilities using loop detectors at entrances. It is planned to make the parking availability data available to the general public and other agencies. Real-time parking occupancy signage is also planned at existing parking facilities.	Lexington and Fayette County Parking Authority (LFCPA)	Existing
LFUCG 911/Emergency Communications Center	Also known as Lexington 911, this center provides dispatching and centralized communications for the Lexington Division of Police and Lexington Division of Fire and Emergency Services, serving more than 300,000 residents. Agency responsible for operating and managing portable dynamic message signs deployed for special events to disseminate traffic information. It is planned to merge the fire and police communications into a central dispatch center to improve communications between agencies. Potential exists for smart street light technology that can be controlled by the combined 911 center to communicate different types of alerts in a specific area by changing the coloring of the streetlights visible to emergency responders and residents in that area. This would require coordination with local agencies responsible for street light operations within their own jurisdictions.	LFUCG	Existing
LFUCG CCTV Cameras	Represents CCTV cameras for monitoring roadways. The video is not recorded or saved in any way. The cameras are used only to monitor traffic conditions.	LFUCG	Existing
LFUCG Connected Vehicle Roadside Equipment	This element represents the future roadside equipment (RSE) in the Lexington area to support connected vehicle operations.	LFUCG	Planned
LFUCG Curve Speed Warning System	This element represents a planned curve speed warning system that will assists drivers in avoiding crashes. The system includes roadside speed detection and warning devices to present warnings to drivers. When the speeds of approaching vehicles are above a certain threshold, the system provides alerts to drivers who are approaching a curve at an unsafe speed. Alerts are based on the location of the vehicle within the curve and the vehicle speed and may also include pavement conditions as a factor in assessing when to provide alerts for unsafe speeds.	LFUCG	Planned

Element Name	Element Description	Stakeholder	Element Status
LFUCG Division of Fire and Emergency Services	The LFUCG Department of Public Safety consists of four divisions: Police, Fire & Emergency Services, Emergency Management/911, and Community Corrections. This element represents the Fire & Emergency Services Division of the LFUCG.	LFUCG	Existing
LFUCG Division of Police	The LFUCG Department of Public Safety consists of four divisions: Police, Fire & Emergency Services, Emergency Management/911, and Community Corrections. This element represents the Police Division. Patrol operates under a chief of police and patrols three sectors of the region (east, central, and west). Additional units of police are trained in various areas, such as hazardous material removal.	LFUCG	Existing
LFUCG Dynamic Message Signs	Represents portable dynamic message signs managed by LFUCG Police for the purpose of disseminating traffic information in the region.	LFUCG	Existing
LFUCG Emergency Operations Center	Represents the central location for emergency operations staff that utilize public safety communications and other technologies to manage emergency operations in the Lexington region. The EOC has capability to communicate remotely with dynamic message signs installed in the Lexington area and can view CCTV cameras installed at locations in the city as well. Backup location is currently established at the E-911 center.	LFUCG	Existing
LFUCG Emergency Vehicles	Represents police and fire vehicles, ambulances, and other EMS vehicles in the LFUCG region that are dispatched by the 911/Emergency Communications Center. Equipment in the emergency vehicles includes MDC, GPS, and AVL. Signal pre-emption is being considered. Police Division also performs commercial vehicle inspections in the region at select locations.	LFUCG	Existing
LFUCG Maintenance and Construction Personnel	LFUCG Maintenance and Construction Field Personnel represents the people that perform maintenance and construction field activities including vehicle and equipment operators, field supervisory personnel, field crews, and work zone safety personnel.	LFUCG	Existing
LFUCG Maintenance and Construction Vehicles	Vehicles support highway maintenance and construction and communicate with dispatchers at LFUCG Streets & Roads Office. Vehicle communicate current location and status information. A wide range of operational status is monitored, measured, and made available, depending on the specific type of vehicle or equipment.	LFUCG	Existing

Element Name	Element Description	Stakeholder	Element Status
LFUCG Multimodal Vehicle Detection System	This represents the current and future multimodal vehicle detection systems at roadway intersections in Lexington. System is able to detect vehicles as well as bicycles, scooters, and pedestrians that enter the range of detection. A video-based detection system has been installed at selected intersections in Lexington. Future system deployments will use the most appropriate technology for vehicle detection in the given conditions. This technology could include video, radar, lidar, thermal, or other forms of detection.	LFUCG	Existing
LFUCG Queue Detection and Warning System	This element represents the queue detection and warning system that are installed along exit ramps from mainline roads to reduce the potential of traffic backup on mainline roads. Queue detection has been installed at two exit ramp locations and will be expanded as needed.	LFUCG	Existing
LFUCG Regional Data Management / Analytics System	This element represents a regional data management / analytics system that is capable of storing, managing and analyzing large data sets from various regional agencies. The system will have tools for regional analysis, including data analytics tools allowing agencies to analyze transportation system performance, identify patterns and trends, and predict the system performance and impacts of events such as incidents.	LFUCG	Planned
LFUCG Reversible Lanes Field Equipment	Represents field equipment associated with the reversible lanes along US 27 (Nicholasville Road) that are operated centrally by the LFUCG Traffic Management Center. The reversible lanes are operated by a time-of-day and day-of week schedule and for special events. Lane signals are controlled and monitored through MaxView central traffic control software.	LFUCG	Existing
LFUCG Roadside Traffic Detection Equipment	Represents loop detector equipment installed and monitored by the LFUCG Traffic Management Center for the purpose of gathering traffic volume and speed data.	LFUCG	Existing
LFUCG RWIS Stations	Represents RWIS Stations located on or near the roadway that communicate road and weather information data to LFUCG Streets and Roads office.	LFUCG	Planned
LFUCG Streets and Roads	Represents the office that dispatches and communicates with LFUCG Maintenance and Construction Vehicles in the field	LFUCG	Existing
LFUCG Traffic Incident Detection System	This represents roadside equipment that detects traffic incidents, combined with a software package that analyzes the incident detection and generates alerts to the LFUCG TMC operators. TMC operators can implement appropriate traffic control strategies and inform incident responders and emergency management agencies for proper and timely responses.	LFUCG	Planned
LFUCG Traffic Information Website	Represents the Lexington TMC website for traffic conditions available at www.lexingtonky.gov.	LFUCG	Existing

Element Name	Element Description	Stakeholder	Element Status
LFUCG Traffic Management Center	LFUCG Traffic Management Center (TMC) monitors and controls traffic and the road network in the Lexington region. MaxView is utilized as a traffic management software package to communicate with traffic signals in the region that are connected through fiber-optic cable. The TMC has access to local police and fire communications. Adaptive signal systems are implemented on some traffic arterials. The TMC implements traffic signal plans during special events in the area and in response to traffic incidents that re-route traffic along arterials. Bluetooth travel time data collection is also performed on arterials to estimate travel times in the region. The TMC also monitors and controls CCTV cameras along roadways. Transit signal priority and emergency vehicle pre-emption technology has been considered.	LFUCG	Existing
LFUCG Traffic Management Center Operators	Represents the personnel that operate from the LFUCG Traffic Management Center. Personnel perform a variety of functions, from data administration to traffic information dissemination to other traffic operations at the facility.	LFUCG	Existing
LFUCG Traffic Signals	Traffic signal system within Fayette County. Will include adaptive traffic signal capabilities (i.e. InSync, SCOOT / SCATS). Future projects that have been considered also include signal pre-emption for fire and police, and signal priority for Lextran transit vehicles.	LFUCG	Existing
LFUCG Variable Speed Limit Signs	Variable speed limit signs	LFUCG	Planned
LFUCG Work Zone Intrusion Devices	Represents work zone intrusion warning devices managed by LFUCG for work zone safety monitoring	LFUCG	Planned
Media	Media represents the information systems that provide traffic reports, travel conditions, and other transportation-related news services to the traveling public through radio, TV, and other media.	Various Owners	Existing
Neighboring County/City 911 Centers	Represent 911 centers in the neighboring cities and counties.	Neighboring Cities and Counties	Existing
NOAA National Weather Service	The National Weather Service provides forecast and weather information to local agencies during dispatch and maintenance operations, including several agencies under the LFUCG and the KYTC.	NOAA	Existing
Other States TPIMS	Truck Parking Information Management Systems of other states participated in the MAASTO TPIMS Initiative.	MAASTO	Planned
Pedestrians and Bike/Scooter Riders	Represents travelers crossing streets at signalized intersections throughout the region.	Travelers	Existing
Private Transportation Information Systems	This element represents the private traveler information providers serving the region. This element includes companies such as WAZE, INRIX, HERE, etc. that can provide information on traffic speeds, traffic incidents, road surface conditions, etc. by on vehicle location information gather from smartphones, vehicle-based sensors, and citizen reports.	Various Owners	Existing

Element Name	Element Description	Stakeholder	Element Status
Rail Operations	Rail Operations represents the operations center for freight railroad operations and maintenance activities. Staff at the operations center coordinate rail operations with traffic management and maintenance operations. Operations center also exchanges incident, incident response, disaster, and / or evacuation information with Emergency Management agencies in the region.	Various Owners	Existing
Surface Transportation Weather Service	Represents Surface Transportation Weather Services that are utilized by KYTC Maintenance and Construction Offices in dispatching and managing snow plow operations.	Various Owners	Existing
Towing and Recovery Dispatch Operations Center	Represents towing and recovery dispatch operations centers that communicate the need for towing and recovery operations throughout the region, such as Roberts Heavy Duty Towing Inc.	Towing and Recovery Providers	Existing
Towing and Recovery Emergency Vehicles	Represents towing and recovery vehicles operated by various providers. Vehicles are used during emergency evacuations as needed and they support disaster response and recovery operations. Vehicles have communications equipment that include GPS and radio communications devices to support two-way communications with dispatch operations centers.	Towing and Recovery Providers	Existing
TPIMS Central Data Repository	This element represents the central data repository for the multi-state truck parking information management systems (TPIMS).	MAASTO	Planned
Traveler	Represents travelers using various modes of transportation in the region.	Travelers	Existing
User Personal Computing Devices	The capability for travelers to receive formatted traffic advisories from their homes, place of work, major trip generation sites, personal portable devices, over multiple types of electronic media.	Travelers	Existing
Vehicle	Represents vehicle-based equipment that would be installed to communicate information to and/or receive information from the planned LFUCG Intersection Warning System. Potential Vehicle-to-Intersection (V-2-I) applications include Intersection Safety Warnings and Intersection Collision Avoidance.	Travelers	Planned
Wayside Equipment	Wayside Equipment represents train interface equipment maintained and operated by the railroad and physically located at or near a grade crossing.	Railroad Companies	Existing

5 ITS Services

ITS services describe what can be done to improve the efficiency, safety, and convenience of the regional transportation system through better information, advanced systems and new technologies. Some services are specific to one primary stakeholder while others require broad stakeholder participation. This section describes the ITS services that meet the transportation needs in the region.

Table 3: ITS Services

Service Package	Service Package Name	Service Package Description	Service Package Status	Service Package Instance	Included Elements
CVO01	Carrier Operations and Fleet Management	This service package manages a fleet of commercial vehicles. The Fleet and Freight Management Center monitors the vehicle fleet and can provide routes using either an in-house capability or an external provider. Routes generated by either approach are constrained by hazardous materials and other restrictions (such as height or weight). A route is electronically sent to the Commercial Vehicle with any appropriate dispatch instructions. The location of the Commercial Vehicle can be monitored by the Fleet and Freight Management Center and routing changes can be made depending on current road network conditions. This service package also supports maintenance of fleet vehicles with on-board monitoring equipment. Records of vehicle mileage, preventative maintenance and repairs are maintained.	Existing	No	Commercial Vehicle Fleet and Freight Management
			Existing	No	Commercial Vehicles
			Existing	No	KYTC GoKY
			Existing	No	LFUCG Traffic Information Website
CVO12	HAZMAT Management	This service package integrates incident management capabilities with commercial vehicle tracking to assure effective treatment of HAZMAT material transport, including response to incidents. HAZMAT tracking is performed by the Fleet and Freight Management Center. The Emergency Management Center is notified by the Commercial Vehicle and the Fleet and Freight Management Center of the HAZMAT vehicle location and information about the HAZMAT load. If an incident occurs, the Emergency Management Center can	Existing	No	Commercial Vehicle Fleet and Freight Management
			Existing	No	Commercial Vehicles
			Existing	No	Jessamine County - 911 Emergency Services
			Existing	No	Jessamine County Sheriff Department
			Existing	No	Kentucky State Police Post 12
			Existing	No	Kentucky State Police Post 7
			Existing	No	LFUCG Division of Police

Service Package	Service Package Name	Service Package Description	Service Package Status	Service Package Instance	Included Elements
		use the information to coordinate the response. The response is tailored based on information that is provided as part of the original incident notification or derived from supplemental information provided by the Fleet and Freight Management Center. The latter information can be provided prior to the beginning of the trip, during the trip, or gathered following the incident depending on the selected policy and implementation.	Existing	No	LFUCG Emergency Operations Center
DM01	ITS Data Warehouse	This service package provides access to transportation data to support transportation planning, condition and performance monitoring, safety analysis, and research. Configurations range from focused repositories that house data collected and owned by a single agency, district, private sector provider, or research institution to broad repositories that contain multimodal, multidimensional data from varied data sources covering a broader region. Both central repositories and physical distributed ITS data repositories are supported. Requests for data that are satisfied by access to a single repository in the ITS Data Warehouse service package may be parsed by the local repository and dynamically translated to requests to other repositories that relay the data necessary to satisfy the request. The repositories could include a data registry capability that allows registration of data identifiers or data definitions for interoperable use throughout a region.	Existing	No	Academic / Research Organizations
			Existing	No	KYTC District 7 Traffic Signals
			Existing	No	Lextran Transit Operations Center
			Existing	No	LFUCG 911/Emergency Communications Center
			Existing	No	LFUCG Roadside Traffic Detection Equipment
			Existing	No	LFUCG RWIS Stations
			Existing	No	LFUCG Traffic Management Center
			Existing	No	LFUCG Traffic Management Center Operators
			Existing	No	LFUCG Traffic Signals
			Planned	No	Academic / Research Organizations
			Planned	No	KYTC District 7 Traffic Signals
			Planned	No	Lextran Transit Operations Center
			Planned	No	LFUCG 911/Emergency Communications Center
			Planned	No	LFUCG Roadside Traffic Detection Equipment
			Planned	No	LFUCG RWIS Stations
			Planned	No	LFUCG Traffic Management Center
			Planned	No	LFUCG Traffic Management Center Operators
			Planned	No	LFUCG Traffic Signals
DM01	ITS Data Warehouse		Planned	Yes	Academic / Research Organizations

Service Package	Service Package Name	Service Package Description	Service Package Status	Service Package Instance	Included Elements
	(Regional Data Management / Analytics System)	--Instance of DM01 for Regional Data Management / Analytics System Project--	Planned	Yes	KYTC District 7 Maintenance and Construction Offices
			Planned	Yes	KYTC District 7 Office
			Planned	Yes	KYTC GoKY
			Planned	Yes	Lextran Transit Operations Center
			Planned	Yes	LFCPA Lexpark Website
			Planned	Yes	LFCPA Parking Management System
			Planned	Yes	LFUCG 911/Emergency Communications Center
			Planned	Yes	LFUCG Division of Police
			Planned	Yes	LFUCG Emergency Operations Center
			Planned	Yes	LFUCG Regional Data Management / Analytics System
			Planned	Yes	LFUCG Streets and Roads
			Planned	Yes	LFUCG Traffic Management Center
			Planned	Yes	Private Transportation Information Systems
DM01	ITS Data Warehouse (Truck Parking Information Management System Expansion)	--Instance of DM01 for Truck Parking Information Management System Expansion--	Planned	Yes	KYTC Truck Parking Management System
			Planned	Yes	KYTC Truck Parking Website
			Planned	Yes	TPIMS Central Data Repository
DM02	Performance Monitoring (Regional Data Management / Analytics System)	--Instance of DM02 for Regional Data Management / Analytics System Project-- The Performance Monitoring service package uses information collected from detectors and sensors, connected vehicles, and operational data feeds from centers to support performance monitoring and other uses of historical data including transportation planning, condition monitoring, safety analyses, and research. The information may be probe data information obtained from vehicles in the network to determine network performance measures such as speed and travel times, or it may be information collected from the vehicles and processed by the infrastructure, e.g.	Planned	Yes	Academic / Research Organizations
			Planned	Yes	KYTC District 7 Maintenance and Construction Offices
			Planned	Yes	KYTC District 7 Office
			Planned	Yes	KYTC GoKY
			Planned	Yes	Lextran Transit Operations Center
			Planned	Yes	LFCPA Lexpark Website
			Planned	Yes	LFUCG 911/Emergency Communications Center
			Planned	Yes	LFUCG Division of Police
			Planned	Yes	LFUCG Emergency Operations Center

Service Package	Service Package Name	Service Package Description	Service Package Status	Service Package Instance	Included Elements
		environmental data and infrastructure conditions monitoring data. Additional data are collected including accident data, road condition data, road closures and other operational decisions to provide context for measured transportation performance and additional safety and mobility-related measures. More complex performance measures may be derived from the collected data.	Planned	Yes	LFUCG Regional Data Management / Analytics System
			Planned	Yes	LFUCG Streets and Roads
			Planned	Yes	LFUCG Traffic Management Center
			Planned	Yes	Private Transportation Information Systems
MC01	Maintenance and Construction Vehicle and Equipment Tracking	This service package tracks the location of maintenance and construction vehicles and other equipment to ascertain the progress of their activities. Checks can include ensuring the correct roads are being plowed and work activity is being performed at the correct locations.	Existing	No	KYTC District 7 Maintenance and Construction Offices
			Existing	No	KYTC District 7 Maintenance and Construction Vehicles
			Existing	No	LFUCG Maintenance and Construction Vehicles
			Existing	No	LFUCG Streets and Roads
MC01	Maintenance and Construction Vehicle and Equipment Tracking (AVL Expansion on Snow Plows)	--Instance of MC01 for AVL Expansion on Snow Plows Project -- This service package tracks the location of maintenance and construction vehicles and other equipment to ascertain the progress of their activities. Checks can include ensuring the correct roads are being plowed and work activity is being performed at the correct locations.	Planned	Yes	KYTC District 7 Maintenance and Construction Center Personnel
			Planned	Yes	KYTC District 7 Maintenance and Construction Offices
			Planned	Yes	KYTC District 7 Maintenance and Construction Vehicles
MC02	Maintenance and Construction Vehicle Maintenance	This service package performs vehicle maintenance scheduling and manages both routine and corrective maintenance activities on vehicles and other maintenance and construction equipment. It includes on-board sensors capable of automatically performing diagnostics for maintenance and construction vehicles, and the systems that collect this diagnostic information and use it to schedule and manage vehicle and equipment maintenance.	Existing	No	KYTC District 7 Maintenance and Construction Offices
			Existing	No	KYTC District 7 Maintenance and Construction Vehicles
			Existing	No	LFUCG Maintenance and Construction Vehicles
			Existing	No	LFUCG Streets and Roads
MC04	Winter Maintenance	This service package supports winter road maintenance including snow plow operations, roadway treatments (e.g., salt spraying and other anti-icing material applications), and other snow and ice control activities. This package monitors environmental conditions and weather forecasts and uses the information to schedule winter	Existing	No	Jessamine County Road Department
			Existing	No	Jessamine County Road Department Personnel
			Existing	No	Jessamine County Road Department Vehicles
			Existing	No	KYTC District 7 Maintenance and Construction Offices

Service Package	Service Package Name	Service Package Description	Service Package Status	Service Package Instance	Included Elements
		maintenance activities, determine the appropriate snow and ice control response, and track and manage response operations.	Existing	No	KYTC District 7 Maintenance and Construction Vehicles
			Existing	No	KYTC MDSS
			Existing	No	LFUCG Maintenance and Construction Personnel
			Existing	No	LFUCG Maintenance and Construction Vehicles
			Existing	No	LFUCG Streets and Roads
			Existing	No	NOAA National Weather Service
MC05	Roadway Maintenance and Construction	This service package supports numerous services for scheduled and unscheduled maintenance and construction on a roadway system or right-of-way. Maintenance services include landscape maintenance, hazard removal (roadway debris, dead animals), routine maintenance activities (roadway cleaning, grass cutting), and repair and maintenance of both ITS and non-ITS equipment on the roadway (e.g., signs, traffic controllers, traffic detectors, dynamic message signs, traffic signals, CCTV, etc.). Environmental conditions information is also received from various weather sources to aid in scheduling maintenance and construction activities.	Existing	No	Jessamine County Road Department
			Existing	No	Jessamine County Road Department Personnel
			Existing	No	KYTC District 7 Maintenance and Construction Field Personnel
			Existing	No	KYTC District 7 Maintenance and Construction Offices
			Existing	No	KYTC District 7 Maintenance and Construction Vehicles
			Existing	No	KYTC District 7 Office
			Existing	No	LFUCG Maintenance and Construction Personnel
			Existing	No	LFUCG Maintenance and Construction Vehicles
			Existing	No	LFUCG Streets and Roads
			Existing	No	LFUCG Traffic Management Center
			Existing	No	NOAA National Weather Service
			Existing	No	Surface Transportation Weather Service
MC06	Work Zone Management	This service package manages work zones, controlling traffic in areas of the roadway where maintenance, construction, and utility work activities are underway. Traffic conditions are monitored using CCTV cameras and controlled using dynamic message signs (DMS), Highway Advisory Radio (HAR), gates and barriers. Work zone	Existing	No	KYTC District 7 Dynamic Message Signs
			Existing	No	KYTC District 7 Maintenance and Construction Offices
			Existing	No	KYTC District 7 Maintenance and Construction Vehicles
			Existing	No	LFUCG CCTV Cameras

Service Package	Service Package Name	Service Package Description	Service Package Status	Service Package Instance	Included Elements
		information is coordinated with other groups (e.g., TIC, traffic management, other maintenance and construction centers). Work zone speeds and delays are provided to the motorist prior to the work zones. This service package provides control of field equipment in all maintenance and construction areas, including fixed, portable, and truck-mounted devices supporting both stationary and mobile work zones.	Existing	No	LFUCG Division of Police
			Existing	No	LFUCG Dynamic Message Signs
			Existing	No	LFUCG Maintenance and Construction Personnel
			Existing	No	LFUCG Maintenance and Construction Vehicles
			Existing	No	LFUCG Streets and Roads
			Existing	No	LFUCG Traffic Management Center
MC06	Work Zone Management (Work Zone ITS Deployment)	--Instance of MC06 for Work Zone ITS Deployment --	Planned	Yes	Driver
			Planned	Yes	KYTC District 7 Maintenance and Construction Offices
			Planned	Yes	KYTC District 7 Office
			Planned	Yes	KYTC District 7 Work Zone Safety Equipment
MC07	Work Zone Safety Monitoring	This service package provides warnings to maintenance personnel within a work zone about potential hazards within the work zone. It enables vehicles or the infrastructure to provide warnings to workers in a work zone when a vehicle is moving in a manner that appears to create an unsafe condition (e.g., moving at high speed or entering the work zone).	Existing	No	Driver
			Existing	No	Jessamine County Road Department
			Existing	No	Jessamine County Road Department Personnel
			Existing	No	Jessamine County Road Department Work Zone Safety Equipment
			Existing	No	KYTC District 7 Maintenance and Construction Field Personnel
			Existing	No	KYTC District 7 Maintenance and Construction Offices
			Existing	No	KYTC District 7 Maintenance and Construction Vehicles
			Existing	No	KYTC District 7 Work Zone Safety Equipment
			Existing	No	LFUCG Maintenance and Construction Personnel
			Existing	No	LFUCG Maintenance and Construction Vehicles
			Existing	No	LFUCG Streets and Roads
			Existing	No	LFUCG Work Zone Intrusion Devices
			Planned	Yes	Driver

Service Package	Service Package Name	Service Package Description	Service Package Status	Service Package Instance	Included Elements
			Planned	Yes	KYTC District 7 Maintenance and Construction Field Personnel
			Planned	Yes	KYTC District 7 Maintenance and Construction Offices
			Planned	Yes	KYTC District 7 Work Zone Safety Equipment
MC08	Maintenance and Construction Activity Coordination	This service package supports the dissemination of maintenance and construction activity to centers that can utilize it as part of their operations, or to Transportation Information Centers who can provide the information to travelers. Center to center coordination of work plans supports adjustments to reduce disruption to regional transportation operations.	Existing	No	Jessamine County Road Department
			Existing	No	KYTC District 7 Maintenance and Construction Offices
			Existing	No	LFUCG Streets and Roads
			Existing	No	LFUCG Traffic Management Center
PM01	Parking Space Management	This service package monitors and manages parking spaces in lots, garages, and other parking areas and facilities. It assists in the management of parking operations by monitoring parking lot ingress and egress, parking space occupancy and availability. Infrastructure-based detectors and/or connected vehicles may be used to monitor parking occupancy. The service package shares collected parking information with local drivers and information providers for broader distribution.	Existing	No	Driver
			Existing	No	LFCPA Parking Management System
PM01	Parking Space Management (Parking Availability Information Sharing with Other Agencies and Third-Party Information Providers)	--Instance of PM01 for Parking Availability Information Sharing with Other Agencies and Third-Party Information Providers Project--	Planned	Yes	LFCPA Lexpark Website
			Planned	Yes	LFCPA Parking Management System
			Planned	Yes	Private Transportation Information Systems
PM01	Parking Space Management (Truck Parking Information Management	--Instance of PM01 for Truck Parking Information Management System Expansion Project-- This service package monitors and manages parking spaces in lots, garages, and other parking areas	Planned	Yes	Driver
			Planned	Yes	KYTC Truck Parking Management System
			Planned	Yes	KYTC Truck Parking Website

Service Package	Service Package Name	Service Package Description	Service Package Status	Service Package Instance	Included Elements
	System Expansion)	and facilities. It assists in the management of parking operations by monitoring parking lot ingress and egress, parking space occupancy and availability. Infrastructure-based detectors and/or connected vehicles may be used to monitor parking occupancy. The service package shares collected parking information with local drivers and information providers for broader distribution.	Planned	Yes	User Personal Computing Devices
PM03	Parking Electronic Payment	This service package supports electronic collection of parking fees. It collects parking fees from in-vehicle equipment, contact or proximity cards, or any smart payment device. User accounts may be established to enhance services offered to frequent customers.	Existing	No	Driver
			Existing	No	Financial Institution
			Existing	No	LFCPA Parking Management System
PM04	Regional Parking Management (Truck Parking Information Management System Expansion)	--Instance of PM04 for Truck Parking Information Management System Expansion Project-- This service package supports communication and coordination between equipped parking facilities and also supports regional coordination between parking facilities and traffic and transit management systems. This service package also shares information with transit management centers and transportation information centers to support multimodal travel planning. Information including current parking availability, system status, and operating strategies are shared to enable local parking facility management that supports regional transportation strategies.	Planned	Yes	KYTC Truck Parking Management System
			Planned	Yes	KYTC Truck Parking Website
PM04	Regional Parking Management (Truck Parking Information Management System Expansion) (Instance 1)	--Instance of PM04 for Truck Parking Information Management System Expansion Project--	Planned	Yes	KYTC Truck Parking Management System
			Planned	Yes	KYTC Truck Parking Website
			Planned	Yes	Other States TPIMS
PM05	Parking Reservations	This service package manages parking reservations, allowing a traveler to reserve parking as part of the trip planning process. Parking reservations may be part of a trip plan provided by a	Existing	No	LFCPA Lexpark Website
			Existing	No	LFCPA Parking Management System
			Existing	No	User Personal Computing Devices

Service Package	Service Package Name	Service Package Description	Service Package Status	Service Package Instance	Included Elements
		Transportation Information Center (TIC) based on parking information provided by one or more parking facilities. This parking plan is provided to the traveler/driver, which includes the option to make a reservation if available. If the parking reservation is selected by the traveler/driver, then the TIC will negotiate the parking reservation with the parking facility and provide a confirmation to the traveler/driver.	Existing	No	Vehicle
PS01	Emergency Call-Taking and Dispatch	This service package provides basic public safety call-taking and dispatch services. It includes emergency vehicle equipment, equipment used to receive and route emergency calls, and wireless communications that enable safe and rapid deployment of appropriate resources to an emergency. Coordination between Emergency Management Centers supports emergency notification between agencies. Wide area wireless communications between the Emergency Management Center and an Emergency Vehicle supports dispatch and provision of information to responding personnel. This service package also provides information to support dynamic routing of emergency vehicles. Traffic information, road conditions, and weather advisories are provided to enhance emergency vehicle routing. The Emergency Management Center provides routing information based on real-time conditions and has the option to request an ingress/egress route from the Traffic Management Center.	Existing	No	Jessamine County - 911 Emergency Services
			Existing	No	Jessamine County Emergency Vehicles
			Existing	No	Jessamine County Sheriff Department
			Existing	No	Kentucky State Police Post 12
			Existing	No	Kentucky State Police Post 12 Patrol Car
			Existing	No	Kentucky State Police Post 7
			Existing	No	Kentucky State Police Post 7 Patrol Car
			Existing	No	LFUCG 911/Emergency Communications Center
			Existing	No	LFUCG Division of Fire and Emergency Services
			Existing	No	LFUCG Division of Police
			Existing	No	LFUCG Emergency Vehicles
			Existing	No	LFUCG Traffic Management Center
			Existing	No	Towing and Recovery Dispatch Operations Center
			Existing	No	Towing and Recovery Emergency Vehicles
PS02	Emergency Response	This service package supports emergency/ incident response by personnel in the field. It includes emergency vehicle equipment used to provide response status as well as video or images from either the vehicle or from emergency personnel in the field. Wide area wireless communications between the Emergency Management	Existing	No	Kentucky State Police Post 12
			Existing	No	Kentucky State Police Post 12 Patrol Car
			Existing	No	Kentucky State Police Post 7
			Existing	No	Kentucky State Police Post 7 Patrol Car
			Existing	No	KYTC District 7 Office

Service Package	Service Package Name	Service Package Description	Service Package Status	Service Package Instance	Included Elements
		Center, Emergency Personnel and Emergency Vehicles supports a sharing of emergency response information. The service package also includes tactical decision support, resource coordination, and communications integration for Incident Commands that are established by first responders at or near the incident scene to support local management of an incident, including the functions and interfaces commonly supported by a mobile command center.	Existing	No	LFUCG Division of Fire and Emergency Services
			Existing	No	LFUCG Division of Police
			Existing	No	LFUCG Emergency Vehicles
			Existing	No	Towing and Recovery Dispatch Operations Center
			Existing	No	Towing and Recovery Emergency Vehicles
PS03	Emergency Vehicle Preemption	This service package provides signal preemption for public safety first responder vehicles. Both traditional signal preemption systems and new systems based on connected vehicle technology are covered. In more advanced systems, movement of public safety vehicles through the intersection can be facilitated by clearing queues and holding conflicting phases. In addition, this SP also covers the transition back to normal traffic signal operations after providing emergency vehicle preemption.	Planned	No	Kentucky State Police Post 12
			Planned	No	Kentucky State Police Post 12 Patrol Car
			Planned	No	Kentucky State Police Post 7
			Planned	No	Kentucky State Police Post 7 Patrol Car
			Planned	No	LFUCG 911/Emergency Communications Center
			Planned	No	LFUCG Emergency Vehicles
			Planned	No	LFUCG Traffic Management Center
			Planned	No	LFUCG Traffic Signals
PS03	Emergency Vehicle Preemption (Emergency Vehicle Pre-emption)	--Instance of PS03 for Emergency Vehicle Pre-emption Project--	Planned	Yes	KYTC District 7 Traffic Signals
			Planned	Yes	LFUCG Emergency Vehicles
			Planned	Yes	LFUCG Traffic Management Center
			Planned	Yes	LFUCG Traffic Signals
PS08	Roadway Service Patrols	This service package supports roadway service patrol vehicles that monitor roads and aid motorists, offering rapid response to minor incidents (flat tire, accidents, out of gas) to minimize disruption to the traffic stream. If problems are detected, the roadway service patrol vehicles will provide assistance to the motorist (e.g., push a vehicle to the shoulder or median). The service package monitors service patrol vehicle locations and supports vehicle dispatch to identified incident locations. Incident information collected by the service patrol is shared with traffic, maintenance and construction, and traveler information systems.	Existing	No	KYTC District 7 Office
			Existing	No	KYTC District 7 Safe Patrol Vehicles

Service Package	Service Package Name	Service Package Description	Service Package Status	Service Package Instance	Included Elements
PS10	Wide-Area Alert	This service package uses ITS driver and traveler information systems to alert the public in emergency situations such as child abductions, severe weather events, civil emergencies, and other situations that pose a threat to life and property. The alert includes information and instructions for transportation system operators and the traveling public, improving public safety and enlisting the public's help in some scenarios. The ITS technologies will supplement and support other emergency and homeland security alert systems such as the Emergency Alert System (EAS). When an emergency situation is reported and verified and the terms and conditions for system activation are satisfied, a designated agency broadcasts emergency information to traffic agencies, transit agencies, information service providers, toll operators, and others that operate ITS systems. The ITS systems, in turn, provide the alert information to transportation system operators and the traveling public using ITS technologies such as dynamic message signs, highway advisory radios, in-vehicle displays, transit displays, 511 traveler information systems, and traveler information websites.	Existing	No	Jessamine County - 911 Emergency Services
			Existing	No	Jessamine County Sheriff Department
			Existing	No	Kentucky Emergency Management
			Existing	No	Kentucky State Police Post 12
			Existing	No	Kentucky State Police Post 7
			Existing	No	Lextran Transit Operations Center
			Existing	No	LFUCG Division of Fire and Emergency Services
			Existing	No	LFUCG Division of Police
			Existing	No	LFUCG Dynamic Message Signs
			Existing	No	LFUCG Emergency Operations Center
			Existing	No	LFUCG Traffic Information Website
			Existing	No	LFUCG Traffic Management Center
			Existing	No	Neighboring County/City 911 Centers
			Existing	No	NOAA National Weather Service
			Existing	No	User Personal Computing Devices
PS11	Early Warning System	This service package monitors and detects potential, looming, and actual disasters including natural disasters (hurricanes, earthquakes, floods, winter storms, tsunamis, etc.) and technological and man-made disasters (hazardous materials incidents, nuclear power plant accidents, and acts of terrorism including nuclear, chemical, biological, and radiological weapons attacks). The service package monitors alerting and advisory systems, ITS sensors and surveillance systems, field reports, and emergency call-taking systems to identify emergencies and notifies all responding agencies of detected emergencies.	Existing	No	BUS Dispatch Center
			Existing	No	FTSB Transit Dispatch Centers
			Existing	No	Jessamine County - 911 Emergency Services
			Existing	No	Jessamine County Sheriff Department
			Existing	No	KYTC District 7 Office
			Existing	No	Lextran Transit Operations Center
			Existing	No	LFUCG Division of Fire and Emergency Services
			Existing	No	LFUCG Division of Police
			Existing	No	LFUCG Emergency Operations Center
			Existing	No	LFUCG Traffic Management Center

Service Package	Service Package Name	Service Package Description	Service Package Status	Service Package Instance	Included Elements
			Existing	No	Neighboring County/City 911 Centers
			Existing	No	NOAA National Weather Service
PS12	Disaster Response and Recovery	This service package enhances the ability of the surface transportation system to respond to and recover from disasters. It addresses the most severe incidents that require an extraordinary response from outside the local community. All types of disasters are addressed including natural disasters (hurricanes, earthquakes, floods, winter storms, tsunamis, etc.) and technological and man-made disasters (hazardous materials incidents, nuclear power plant accidents, and national security emergencies such as nuclear, chemical, biological, and radiological weapons attacks).The service package supports coordination of emergency response plans, including general plans developed before a disaster as well as specific tactical plans with short time horizon that are developed as part of a disaster response. The service package provides enhanced access to the scene for response personnel and resources, provides better information about the transportation system in the vicinity of the disaster, and maintains situation awareness regarding the disaster itself. In addition, this service package tracks and coordinates the transportation resources - the transportation professionals, equipment, and materials	Existing	No	BUS Dispatch Center
			Existing	No	FTSB Transit Dispatch Centers
			Existing	No	Jessamine County - 911 Emergency Services
			Existing	No	Jessamine County Sheriff Department
			Existing	No	Kentucky Emergency Management
			Existing	No	Kentucky State Police Post 12
			Existing	No	Kentucky State Police Post 7
			Existing	No	Lextran Transit Operations Center
			Existing	No	LFUCG 911/Emergency Communications Center
			Existing	No	LFUCG Division of Fire and Emergency Services
			Existing	No	LFUCG Division of Police
			Existing	No	LFUCG Emergency Operations Center
			Existing	No	LFUCG Streets and Roads
			Existing	No	LFUCG Traffic Management Center
			Existing	No	Neighboring County/City 911 Centers

PS12	Disaster Response and Recovery	- that constitute a portion of the disaster response. The service package identifies the key points of integration between transportation systems and the public safety, emergency management, public health, and other allied organizations that form the overall disaster response. In this service package, the Emergency Management Center represents the federal, regional, state, and local Emergency Operations Centers and the Incident Commands that are established to respond to the disaster. The interface between the Emergency Management Center and the other centers provides situation awareness and resource coordination among transportation and other allied response agencies. In its role, traffic management implements special traffic control strategies and detours and restrictions to effectively manage traffic in and around the disaster. Maintenance and construction provides damage assessment of road network facilities and manages service restoration. Transit management provides a similar assessment of status for transit facilities and modifies transit operations to meet the special demands of the disaster. As immediate public safety concerns are addressed and disaster response transitions into recovery, this service package supports transition back to normal transportation system operation, recovering resources, managing on-going transportation facility repair, supporting data collection and revised plan coordination, and other recovery activities. This service package builds on the basic traffic incident response service that is provided by TM08, the Traffic Incident Management service package. This service package addresses the additional complexities and coordination requirements that are associated with the most severe incidents that warrant an extraordinary response from outside the local jurisdictions and require special measures such as the activation of one or more emergency operations centers. Many users of ARC-IT will want to consider both TM08 and this service package since every region is concerned with both day-to-day management of traffic-related incidents and occasional management of disasters that require	Existing	No	Towing and Recovery Dispatch Operations Center

Service Package	Service Package Name	Service Package Description	Service Package Status	Service Package Instance	Included Elements
		extraordinary response. Disaster Response and Recovery is also supported by PS14, the "Disaster Traveler Information" service package that keeps the public informed during a disaster response. See that service package for more information.			
PS13	Evacuation and Reentry Management	This service package supports evacuation of the general public from a disaster area and manages subsequent reentry to the disaster area. The service package addresses evacuations for all types of disasters, including disasters like hurricanes that are anticipated and occur slowly, allowing a well-planned orderly evacuation, as well as disasters like terrorist acts that occur rapidly, without warning, and allow little or no time for preparation or public warning. This service package supports coordination of evacuation plans among the federal, state, and local transportation, emergency, and law enforcement agencies that may be involved in a large-scale evacuation. All affected jurisdictions (e.g., states and counties) at the evacuation origin, evacuation destination, and along the evacuation route are informed of the plan. Information is shared with traffic management agencies to implement special traffic control strategies and to control evacuation traffic, including traffic on local streets and arterials as well as the major evacuation routes. Reversible lanes, shoulder use, closures, special signal control strategies, and	Existing	No	BUS Dispatch Center
			Existing	No	FTSB Transit Dispatch Centers
			Existing	No	Jessamine County - 911 Emergency Services
			Existing	No	Jessamine County Sheriff Department
			Existing	No	Kentucky Emergency Management
			Existing	No	Kentucky State Police Post 12
			Existing	No	Kentucky State Police Post 7
			Existing	No	Lextran Transit Operations Center
			Existing	No	LFUCG 911/Emergency Communications Center
			Existing	No	LFUCG Division of Fire and Emergency Services
			Existing	No	LFUCG Division of Police
			Existing	No	LFUCG Emergency Operations Center
			Existing	No	LFUCG Traffic Management Center
			Existing	No	Neighboring County/City 911 Centers

Service Package	Service Package Name	Service Package Description	Service Package Status	Service Package Instance	Included Elements
		other special strategies may be implemented to maximize capacity along the evacuation routes. Transit resources play an important role in an evacuation, removing many people from an evacuated area while making efficient use of limited capacity. Additional shared transit resources may be added and managed in evacuation scenarios. Resource requirements are forecast based on the evacuation plans, and the necessary resources are located, shared between agencies if necessary, and deployed at the right locations at the appropriate times. Evacuations are also supported by PS14, the "Disaster Traveler Information" service package, which keeps the public informed during evacuations. See that service package for more information.	Existing	No	Towing and Recovery Dispatch Operations Center
PT01	Transit Vehicle Tracking	This service package monitors current transit vehicle location using an Automated Vehicle Location System. The location data may be used to determine real time schedule adherence and update the transit system's schedule in real-time.	Existing	No	BUS Dispatch Center
			Existing	No	BUS Transit Vehicle
			Existing	No	Lextran Transit Operations Center
			Existing	No	Lextran Transit Vehicle
PT01	Transit Vehicle Tracking (Expansion of Real-Time Transit Information at Transit Center and Stations)	--Instance of PT01 for Expansion of Real-Time Transit Information at Transit Center and Stations Project--	Planned	Yes	Lextran Transit Operations Center
			Planned	Yes	Lextran Transit Vehicle
PT01	Transit Vehicle Tracking (Transit System Technology Enhancements)	--Instance of PT01 for Transit System Technology Enhancements Project--	Planned	Yes	Lextran Operations Personnel
			Planned	Yes	Lextran Transit Operations Center
			Planned	Yes	Lextran Transit Vehicle
PT02	Transit Fixed-Route Operations	This service package performs automated dispatch and system monitoring for fixed-route and flexible-route transit services. This service performs scheduling activities including the creation of schedules, blocks and runs, as well as operator assignment. This service monitors the transit vehicle trip performance against the schedule and provides information displays at the Transit Management Center.	Existing	No	BUS Dispatch Center
			Existing	No	BUS Transit Vehicle
			Existing	No	BUS Transit Vehicle Operators
			Existing	No	FTSB Transit Dispatch Centers
			Existing	No	FTSB Transit Vehicle Operators
			Existing	No	FTSB Transit Vehicles
			Existing	No	Lextran Transit Operations Center
			Existing	No	Lextran Transit Vehicle
			Existing	No	Lextran Transit Vehicle Operator

Service Package	Service Package Name	Service Package Description	Service Package Status	Service Package Instance	Included Elements
PT03	Dynamic Transit Operations	The Dynamic Transit Operations service package allows travelers to request trips and obtain itineraries using a personal device such as a smart phone, tablet, or personal computer. The trips and itineraries cover multiple transportation services (public transportation modes, private transportation services, shared-ride, walking and biking). This service package builds on existing technology systems such as computer-aided dispatch/ automated vehicle location (CAD/AVL) systems and automated scheduling software, providing a coordination function within and between transit providers that would dynamically schedule and dispatch or modify the route of an in-service vehicle by matching compatible trips together. TI06 covers other shared use transportation options.	Existing	No	BUS Dispatch Center
			Existing	No	BUS Transit Vehicle
			Existing	No	BUS Transit Vehicle Operators
			Existing	No	FTSB Transit Dispatch Centers
			Existing	No	FTSB Transit Vehicle Operators
			Existing	No	FTSB Transit Vehicles
			Existing	No	Lextran Operations Personnel
			Existing	No	Lextran Transit Operations Center
			Existing	No	Lextran WHEELS Transit Vehicle
PT04	Transit Fare Collection Management	This service package manages transit fare collection on-board transit vehicles and at transit stops using electronic means. It allows transit users to use a traveler card or other electronic payment device such as a smart phone. Readers located either in the infrastructure or on-board the transit vehicles enable electronic fare payment. Data is processed, stored, and displayed on the transit vehicle and communicated as needed to the Transit Management Center.	Existing	No	BUS Dispatch Center
			Existing	No	BUS Transit Vehicle
			Existing	No	Financial Institution
			Existing	No	Lextran Transit Operations Center
			Existing	No	Lextran Transit Vehicle
			Existing	No	Lextran Traveler Electronic Fare Cards
			Existing	No	Traveler
PT04	Transit Fare Collection Management (Transit Electronic Fare Payment System)	--Instance of PT04 for Transit Electronic Fare Payment System Project--	Planned	Yes	BUS Dispatch Center
			Planned	Yes	BUS Transit Vehicle
			Planned	Yes	BUS Traveler Electronic Fare Cards
			Planned	Yes	Financial Institution
			Planned	Yes	Traveler
PT04	Transit Fare Collection Management (Transit System Technology Enhancements)	--Instance of PT04 for Transit System Technology Enhancements Project--	Planned	Yes	Lextran Operations Personnel
			Planned	Yes	Lextran Transit Operations Center
			Planned	Yes	Lextran Transit Vehicle
			Planned	Yes	Lextran Traveler Electronic Fare Cards
PT05	Transit Security	This service package provides for the physical security of transit passengers and transit vehicle operators. On-board equipment performs surveillance and sensor monitoring in order to identify potentially hazardous situations. The	Existing	No	BUS Dispatch Center
			Existing	No	BUS Facility Surveillance Equipment
			Existing	No	BUS Transit Vehicle
			Existing	No	Lextran Facility Surveillance Equipment

Service Package	Service Package Name	Service Package Description	Service Package Status	Service Package Instance	Included Elements
		surveillance equipment includes video (e.g., CCTV cameras), audio systems and/or event recorder systems. The sensor equipment includes threat sensors (e.g., chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors) and object detection sensors (e.g., metal detectors). Transit user or transit vehicle operator activated alarms are provided on-board. Public areas (e.g., transit stops, park and ride lots, stations) are also monitored with similar surveillance and sensor equipment and provided with transit user activated alarms. In addition this service package provides surveillance and sensor monitoring of non-public areas of transit facilities (e.g., transit yards) and transit infrastructure such as bridges, tunnels, and transit railways or bus rapid transit (BRT) guideways. The surveillance equipment includes video and/or audio systems. The sensor equipment includes threat sensors and object detection sensors as described above as well as, intrusion or motion detection sensors and infrastructure integrity monitoring (e.g., rail track continuity checking or bridge structural integrity monitoring).Most of the surveillance and sensor data that is collected by this service package may be monitored by either the Emergency Management Center or the Transit Management Center, providing two possible approaches to implementing this service package. This service package also supports remote transit vehicle disabling and transit vehicle operator authentication by the Transit Management Center.	Existing	No	Lextran Transit Center Security Cameras
			Existing	No	Lextran Transit Operations Center
			Existing	No	Lextran Transit Vehicle
			Existing	No	LFUCG Division of Police
PT06	Transit Fleet Management	This service package supports automatic transit maintenance scheduling and monitoring. On-board condition sensors monitor system status and transmit critical status information to the Transit Management Center. The Transit Management Center processes this data and schedules preventative and	Existing	No	BUS Dispatch Center
			Existing	No	BUS Transit Vehicle
			Existing	No	BUS Vehicle Maintenance Crew
			Existing	No	Lextran Bus Vehicle Maintenance Crew
			Existing	No	Lextran Transit Operations Center

Service Package	Service Package Name	Service Package Description	Service Package Status	Service Package Instance	Included Elements
		corrective maintenance. The service package also supports the day to day management of the transit fleet inventory, including the assignment of specific transit vehicles to blocks and the assignment of transit vehicle operators to runs.	Existing	No	Lextran Transit Vehicle
PT06	Transit Fleet Management (Transit System Technology Enhancements)	--Instance of PT06 for Transit System Technology Enhancements Project--	Planned	Yes	Lextran Operations Personnel
			Planned	Yes	Lextran Transit Operations Center
			Planned	Yes	Lextran Transit Vehicle
PT07	Transit Passenger Counting	This service package counts the number of passengers entering and exiting a transit vehicle using sensors mounted on the vehicle and communicates the collected passenger data back to the management center. The collected data can be used to calculate reliable ridership figures and measure passenger load information at particular stops.	Existing	No	Lextran Operations Personnel
			Existing	No	Lextran Transit Operations Center
			Existing	No	Lextran Transit Vehicle
PT07	Transit Passenger Counting (Transit System Technology Enhancements)	--Instance of PT07 for Transit System Technology Enhancements Project--	Planned	Yes	Lextran Operations Personnel
			Planned	Yes	Lextran Transit Operations Center
			Planned	Yes	Lextran Transit Vehicle
PT08	Transit Traveler Information	This service package provides transit users at transit stops and on-board transit vehicles with ready access to transit information. The information services include transit stop annunciation, imminent arrival signs, and real-time transit schedule displays that are of general interest to transit users. Systems that provide custom transit trip itineraries and other tailored transit information services are also represented by this service package.	Existing	No	Lextran Next Bus Arrival Display
			Existing	No	Lextran Transit Operations Center
			Existing	No	Lextran Transit Vehicle
			Existing	No	Lextran Web Site
			Existing	No	Traveler
PT08	Transit Traveler Information (Bus Rapid Transit (BRT) System)	--Instance of PT08 for Bus Rapid Transit (BRT) System Project--	Planned	Yes	Lextran Next Bus Arrival Display
			Planned	Yes	Lextran Transit Operations Center
			Planned	Yes	Lextran Transit Vehicle
			Planned	Yes	Lextran Web Site
PT09	Transit Signal Priority	The Transit Signal Priority service package uses transit vehicle to infrastructure communications to allow a transit vehicle to request priority at one or a series of intersections. The	Planned	No	Lextran Transit Operations Center
			Planned	No	Lextran Transit Vehicle
			Planned	No	LFUCG Traffic Management Center

Service Package	Service Package Name	Service Package Description	Service Package Status	Service Package Instance	Included Elements
		service package provides feedback to the transit driver indicating whether the signal priority has been granted or not. This service package can contribute to improved operating performance of the transit vehicles by reducing the time spent stopped at a red light.	Planned	No	LFUCG Traffic Signals
PT09	Transit Signal Priority (Bus Rapid Transit (BRT) System)	--Instance of PT09 for Bus Rapid Transit (BRT) System Project--	Planned	Yes	KYTC District 7 Traffic Signals
			Planned	Yes	Lextran Transit Operations Center
			Planned	Yes	Lextran Transit Vehicle
			Planned	Yes	LFUCG Traffic Management Center
			Planned	Yes	LFUCG Traffic Signals
			Planned	Yes	KYTC District 7 Traffic Signals
			Planned	Yes	Lextran Transit Operations Center
			Planned	Yes	Lextran Transit Vehicle
			Planned	Yes	LFUCG Traffic Management Center
			Planned	Yes	LFUCG Traffic Signals
SU03	Data Distribution	This service package manages the distribution of data from data providers to data consumers and protects those data from unauthorized access. It informs data providers of how to provide data, manages data subscriptions, and provides data forwarding capabilities. The service package also maintains a directory of System Users that want data and supports multiple distribution mechanisms including publish-subscribe and directly from data provider to data consumer. It allows data consumers to specify (and change the specification of) data they wish to receive.	Planned	No	KYTC District 7 Office
			Planned	No	Lextran Transit Operations Center
			Planned	No	Lextran Web Site
			Planned	No	LFUCG Traffic Information Website
			Planned	No	LFUCG Traffic Management Center
TI01	Broadcast Traveler Information	This service package provides a digital broadcast service that disseminates traveler information to all equipped travelers within range. It collects traffic conditions, advisories, general public transportation, toll and parking information, incident information, roadway maintenance and construction information, air quality and weather information, and broadcasts the information to travelers using technologies such as FM subcarrier,	Existing	No	BUS Dispatch Center
			Existing	No	BUS Transit Website
			Existing	No	Event Promoters
			Existing	No	FTSB Transit Dispatch Centers
			Existing	No	FTSB Transit Website
			Existing	No	KYTC District 7 Maintenance and Construction Offices
			Existing	No	KYTC District 7 Office
			Existing	No	KYTC GoKY
			Existing	No	KYTC MDSS

Service Package	Service Package Name	Service Package Description	Service Package Status	Service Package Instance	Included Elements
		satellite radio, cellular data broadcasts, and Internet streaming technologies. This service package also provides location-specific or situation-relevant information to travelers in vehicles using Dedicated Short Range Communications (DSRC) infrastructure supporting mobility service packages for connected vehicles. DSRC is used to deliver real-time traveler information including travel times, incident information, road conditions, and emergency traveler information to vehicles as they pass connected vehicle roadside equipment along their route. This service package provides public information that is available to all equipped vehicles in the vicinity of the roadside equipment.	Existing	No	Lextran Transit Operations Center
			Existing	No	Lextran Web Site
			Existing	No	LFCPA Lexpark Website
			Existing	No	LFCPA Parking Management System
			Existing	No	LFUCG Streets and Roads
			Existing	No	LFUCG Traffic Information Website
			Existing	No	LFUCG Traffic Management Center
			Existing	No	Media
			Existing	No	NOAA National Weather Service
			Existing	No	Private Transportation Information Systems
			Existing	No	User Personal Computing Devices
TI01	Broadcast Traveler Information (Alternate Route Traffic Management)	--Instance of TI01 for Alternate Route Traffic Management Project-	Planned	Yes	Kentucky State Police Post 12
			Planned	Yes	Kentucky State Police Post 7
			Planned	Yes	KYTC District 7 Maintenance and Construction Offices
			Planned	Yes	KYTC GoKY
			Planned	Yes	LFUCG 911/Emergency Communications Center
			Planned	Yes	LFUCG Division of Fire and Emergency Services
			Planned	Yes	LFUCG Division of Police
			Planned	Yes	LFUCG Streets and Roads
			Planned	Yes	LFUCG Traffic Information Website
			Planned	Yes	User Personal Computing Devices
TI01	Broadcast Traveler Information (LFUCG Traffic Information Website Enhancements)	--Instance of TI01 for LFUCG Traffic Information Website Enhancements Project--	Planned	Yes	LFUCG Traffic Information Website
			Planned	Yes	LFUCG Traffic Management Center
			Planned	Yes	Private Transportation Information Systems
			Planned	Yes	User Personal Computing Devices
TI01	Broadcast Traveler Information	--Instance of TI01 for Parking Availability Information Sharing with Other Agencies	Planned	Yes	KYTC District 7 Office
			Planned	Yes	Lextran Transit Operations Center

Service Package	Service Package Name	Service Package Description	Service Package Status	Service Package Instance	Included Elements
	(Parking Availability Information Sharing with Other Agencies and Third-Party Information Providers)	and Third-Party Information Providers Project--	Planned	Yes	LFCPA Lexpark Website
			Planned	Yes	LFCPA Parking Management System
			Planned	Yes	LFUCG 911/Emergency Communications Center
			Planned	Yes	LFUCG Division of Police
			Planned	Yes	LFUCG Traffic Management Center
			Planned	Yes	Private Transportation Information Systems
TI01	Broadcast Traveler Information (Truck Parking Information Management System Expansion)	--Instance of TI01 for Truck Parking Information Management System Expansion Project--	Planned	Yes	KYTC Truck Parking Management System
			Planned	Yes	KYTC Truck Parking Website
			Planned	Yes	User Personal Computing Devices
TI02	Personalized Traveler Information	This service package provides tailored information in response to a traveler request. Both real-time interactive request/response systems and information systems that "push" a tailored stream of information to the traveler based on a submitted profile are supported. The traveler can obtain current information regarding traffic conditions, roadway maintenance and construction, transit services, ride share/ride match, parking management, detours and pricing information. Although the Internet is the predominate network used for traveler information dissemination, a range of two-way wide-area wireless and fixed-point to fixed-point communications systems may be used to support the required data communications with the traveler. A variety of interactive devices may be used by the traveler to access information prior to a trip or en route including phone via a 511-like portal and web pages via smart phone, tablet, personal computer, and a variety of in-vehicle devices.	Planned	No	Event Promoters
			Planned	No	KYTC District 7 Maintenance and Construction Offices
			Planned	No	KYTC District 7 Office
			Planned	No	KYTC GoKY
			Planned	No	KYTC MDSS
			Planned	No	LFUCG Streets and Roads
			Planned	No	LFUCG Traffic Information Website
			Planned	No	LFUCG Traffic Management Center
			Planned	No	Media
			Planned	No	NOAA National Weather Service
			Planned	No	User Personal Computing Devices
TI02	Personalized Traveler Information (LFUCG Traffic Information	--Instance of TI02 for LFUCG Traffic Information Website Enhancements Project--	Planned	Yes	LFUCG Traffic Information Website
			Planned	Yes	LFUCG Traffic Management Center
			Planned	Yes	Private Transportation Information Systems

Service Package	Service Package Name	Service Package Description	Service Package Status	Service Package Instance	Included Elements
	Website Enhancements)		Planned	Yes	User Personal Computing Devices
TM01	Infrastructure-Based Traffic Surveillance	This service package includes traffic detectors, other surveillance equipment, the supporting field equipment, and Center to Field communications to transmit the collected data back to the Traffic Management Center. The derived data can be used locally such as when traffic detectors are connected directly to a signal control system or remotely (e.g., when a CCTV system sends data back to the Traffic Management Center). The data generated by this service package enables traffic managers to monitor traffic and road conditions, identify and verify incidents, detect faults in indicator operations, and collect census data for traffic strategy development and long range planning. The collected data can also be analyzed and made available to users and the Traveler Information Center physical object.	Existing	No	KYTC District 7 CCTV Cameras
			Existing	No	KYTC District 7 Office
			Existing	No	KYTC District 7 Roadside Traffic Detection Equipment
			Existing	No	LFUCG CCTV Cameras
			Existing	No	LFUCG Roadside Traffic Detection Equipment
			Existing	No	LFUCG Traffic Management Center
			Existing	No	LFUCG Traffic Management Center Operators
TM01	Infrastructure-Based Traffic Surveillance (Alternate Route Traffic Management)	--Instance of TM01 for Alternate Route Traffic Management Project-	Planned	Yes	KYTC District 7 CCTV Cameras
			Planned	Yes	KYTC District 7 Office
			Planned	Yes	KYTC District 7 Roadside Traffic Detection Equipment
			Planned	Yes	KYTC GoKY
			Planned	Yes	LFUCG CCTV Cameras
			Planned	Yes	LFUCG Roadside Traffic Detection Equipment
			Planned	Yes	LFUCG Traffic Information Website
			Planned	Yes	LFUCG Traffic Management Center
TM01	Infrastructure-Based Traffic Surveillance (ITS Signalization to Improve Safety and Efficiency at Interstate Interchanges)	--Instance of TM01 for ITS Signalization to Improve Safety and Efficiency at Interstate Interchanges Project-	Planned	Yes	KYTC District 7 CCTV Cameras
			Planned	Yes	KYTC District 7 Office
			Planned	Yes	KYTC District 7 Roadside Traffic Detection Equipment
			Planned	Yes	LFUCG CCTV Cameras
			Planned	Yes	LFUCG Roadside Traffic Detection Equipment
			Planned	Yes	LFUCG Traffic Management Center
TM02	Vehicle-Based Traffic Surveillance	This service package uses probe data information obtained from vehicles in the network to support traffic operations, including incident detection	Existing	No	LFUCG Traffic Management Center
			Existing	No	Private Transportation Information Systems

Service Package	Service Package Name	Service Package Description	Service Package Status	Service Package Instance	Included Elements
		and the implementation of localized operational strategies. Since traffic data is collected from vehicles, travel times and other related traffic performance measures are available. This service package includes the capability to collect data from Connected Vehicles so that "probe" data can be collected from all equipped vehicles, providing access to a large vehicle population as penetration increases. Incident detection enables transportation agencies to determine the location of potential incidents so the agencies can respond more quickly to the incident and mitigate any negative impacts to the transportation network. Vehicle data that can be used to detect potential incidents include changes in vehicle speeds indicating the disruption of traffic flow, when a vehicle's safety systems have been activated or deployed, or sudden vehicle turns or deceleration at a specific location (indicating a potential obstacle in the roadway).	Existing	No	Vehicle
TM03	Traffic Signal Control	This service package provides the central control and monitoring equipment, communication links, and the signal control equipment that support traffic control at signalized intersections. A range of traffic signal control systems are represented by this service package ranging from fixed-schedule control systems to fully traffic responsive systems that dynamically adjust control plans and strategies based on current traffic conditions and priority requests. This service package is generally an intra-jurisdictional package. Systems that achieve coordination across jurisdictions by using a common time base or other strategies that do not require real time coordination would also be represented by this package. Coordination of traffic signal systems using real-time communications is covered in the TM07-Regional Traffic Management service package. This service package is consistent with typical traffic signal control systems.	Existing	No	Driver
			Existing	No	Jessamine County Road Department
			Existing	No	Jessamine County Roadside Equipment
			Existing	No	KYTC District 7 Traffic Signals
			Existing	No	LFUCG Traffic Management Center
			Existing	No	LFUCG Traffic Management Center Operators
			Existing	No	LFUCG Traffic Signals
			Existing	No	Pedestrians and Bike/Scooter Riders
TM03	Traffic Signal Control (Alternate Route Traffic Management)	--Instance of TM03 for Alternate Route Traffic Management Project-	Planned	Yes	KYTC District 7 Traffic Signals
			Planned	Yes	LFUCG Traffic Management Center

Service Package	Service Package Name	Service Package Description	Service Package Status	Service Package Instance	Included Elements
			Planned	Yes	LFUCG Traffic Signals
TM03	Traffic Signal Control (ITS Signalization to Improve Safety and Efficiency at Interstate Interchanges)	--Instance of TM03 for ITS Signalization to Improve Safety and Efficiency at Interstate Interchanges Project--	Planned	Yes	Driver
			Planned	Yes	LFUCG Traffic Management Center
			Planned	Yes	LFUCG Traffic Signals
TM03	Traffic Signal Control (LFUCG ATSPM)	--Instance of TM03 for LFUCG ATSPM Project--	Planned	Yes	LFUCG Traffic Management Center
			Planned	Yes	LFUCG Traffic Management Center Operators
			Planned	Yes	LFUCG Traffic Signals
TM03	Traffic Signal Control (Multimodal Vehicle Detection System)	--Instance of TM03 for Multimodal Vehicle Detection System Project --	Existing	Yes	Driver
			Existing	Yes	LFUCG Multimodal Vehicle Detection System
			Existing	Yes	LFUCG Traffic Management Center
			Existing	Yes	LFUCG Traffic Signals
			Existing	Yes	Pedestrians and Bike/Scooter Riders
TM03	Traffic Signal Control (Traffic Signal System Optimization Program)	--Instance of TM03 for Traffic Signal System Optimization Program Project--	Planned	Yes	LFUCG Traffic Management Center
			Planned	Yes	LFUCG Traffic Management Center Operators
			Planned	Yes	LFUCG Traffic Signals
TM05	Traffic Metering	This service package provides central monitoring and control, communications, and field equipment that support metering of traffic. It supports the complete range of metering strategies including ramp, interchange, and mainline metering. This package incorporates the instrumentation included in the TM01 service package (traffic sensors are used to measure traffic flow and queues) to support traffic monitoring so responsive and adaptive metering strategies can be implemented. Also included is configurable field equipment to provide information to drivers approaching a meter, such as advance warning of the meter, its operational status (whether it is currently on or not, how many cars per green are allowed, etc.), lane usage at the meter (including a bypass lane for HOVs) and existing queue at the meter.	Planned	No	Driver
			Planned	No	KYTC District 7 Office
			Planned	No	KYTC District 7 Ramp Meters
			Planned	No	KYTC District 7 Roadside Traffic Detection Equipment
			Planned	No	LFUCG Traffic Management Center
			Planned	No	LFUCG Traffic Management Center Operators
TM05	Traffic Metering (ITS Signalization	--Instance of TM05 for ITS Signalization to Improve Safety and Efficiency at	Planned	Yes	Driver
			Planned	Yes	KYTC District 7 Office

Service Package	Service Package Name	Service Package Description	Service Package Status	Service Package Instance	Included Elements
	to Improve Safety and Efficiency at Interstate Interchanges)	Interstate Interchanges Project-- This service package provides central monitoring and control, communications, and field equipment that support metering of traffic. It supports the complete range of metering strategies including ramp, interchange, and mainline metering. This package incorporates the instrumentation included in the TM01 service package (traffic sensors are used to measure traffic flow and queues) to support traffic monitoring so responsive and adaptive metering strategies can be implemented. Also included is configurable field equipment to provide information to drivers approaching a meter, such as advance warning of the meter, its operational status (whether it is currently on or not, how many cars per green are allowed, etc.), lane usage at the meter (including a bypass lane for HOVs) and existing queue at the meter.	Planned	Yes	KYTC District 7 Ramp Meters
			Planned	Yes	LFUCG Traffic Management Center
TM06	Traffic Information Dissemination	This service package provides driver information using roadway equipment such as dynamic message signs or highway advisory radio. A wide range of information can be disseminated including traffic and road conditions, closure and detour information, travel restrictions, incident information, and emergency alerts and driver advisories. This package provides information to drivers at specific equipped locations on the road network. Careful placement of the roadway equipment provides the information at points in the network where the drivers have recourse and can tailor their routes to account for the new information. This package also covers the equipment and interfaces that provide traffic information from a traffic management center to the media (for instance via a direct tie-in between a	Existing	No	Basic Vehicle
			Existing	No	Driver
			Existing	No	KYTC District 7 Dynamic Message Signs
			Existing	No	KYTC District 7 Highway Advisory Radio
			Existing	No	KYTC District 7 Office
			Existing	No	LFUCG 911/Emergency Communications Center
			Existing	No	LFUCG Division of Police
			Existing	No	LFUCG Dynamic Message Signs
			Existing	No	LFUCG Traffic Information Website
			Existing	No	LFUCG Traffic Management Center
			Existing	No	LFUCG Traffic Management Center Operators

Service Package	Service Package Name	Service Package Description	Service Package Status	Service Package Instance	Included Elements
		traffic management center and radio or television station computer systems), Transit Management, Emergency Management, and Transportation Information Centers. A link to the Maintenance and Construction Management Center allows real time information on road/bridge closures and restrictions due to maintenance and construction activities to be disseminated.	Existing	No	Media
TM06	Traffic Information Dissemination (Alternate Route Traffic Management)	--Instance of TM06 for Alternate Route Traffic Management Project--	Planned	Yes	KYTC District 7 Dynamic Message Signs
			Planned	Yes	KYTC District 7 Office
			Planned	Yes	LFUCG Dynamic Message Signs
			Planned	Yes	LFUCG Traffic Management Center
TM08	Traffic Incident Management System	This service package manages both unexpected incidents and planned events so that the impact to the transportation network and traveler safety is minimized. The service package includes incident detection capabilities through roadside surveillance devices (e.g. CCTV) and through regional coordination with other traffic management, maintenance and construction management and emergency management centers as well as rail operations and event promoters. Information from these diverse sources is collected and correlated by this service package to detect and verify incidents and implement an appropriate response. This service package supports traffic operations personnel in developing an appropriate response in coordination with emergency management, maintenance and construction management, and other incident response personnel to	Existing	No	Event Promoters
			Existing	No	Kentucky State Police Post 12
			Existing	No	Kentucky State Police Post 7
			Existing	No	KYTC District 7 CCTV Cameras
			Existing	No	KYTC District 7 Office
			Existing	No	LFUCG 911/Emergency Communications Center
			Existing	No	LFUCG CCTV Cameras
			Existing	No	LFUCG Division of Fire and Emergency Services
			Existing	No	LFUCG Division of Police
			Existing	No	LFUCG Traffic Incident Detection System
			Existing	No	LFUCG Traffic Information Website
			Existing	No	LFUCG Traffic Management Center
			Existing	No	Media

Service Package	Service Package Name	Service Package Description	Service Package Status	Service Package Instance	Included Elements
		confirmed incidents. The response may include traffic control strategy modifications or resource coordination between centers. Incident response also includes presentation of information to affected travelers using the Traffic Information Dissemination service package and dissemination of incident information to travelers through the Broadcast Traveler Information or Interactive Traveler Information service packages. The roadside equipment used to detect and verify incidents also allows the operator to monitor incident status as the response unfolds. The coordination with emergency management might be through a CAD system or through other communication with emergency personnel. The coordination can also extend to tow trucks and other allied response agencies and field service personnel. This service package is closely related with the Public Safety service packages, which focus on services that support first responders. In particular, local management of the incident using an incident command system is covered by PS02.	Existing	No	Towing and Recovery Dispatch Operations Center
TM08	Traffic Incident Management System (Alternate Route Traffic Management)	--Instance of TM08 for Alternate Route Traffic Management Project--	Planned	Yes	Kentucky State Police Post 12
			Planned	Yes	Kentucky State Police Post 7
			Planned	Yes	KYTC District 7 Maintenance and Construction Offices
			Planned	Yes	KYTC District 7 Office
			Planned	Yes	LFUCG 911/Emergency Communications Center
			Planned	Yes	LFUCG Division of Fire and Emergency Services
			Planned	Yes	LFUCG Division of Police
			Planned	Yes	LFUCG Streets and Roads
			Planned	Yes	LFUCG Traffic Management Center
TM09	Integrated Decision Support	This service package recommends courses of action to transportation operators in a corridor, downtown area,	Planned	No	KYTC District 7 Office
			Planned	No	Lextran Transit Operations Center

Service Package	Service Package Name	Service Package Description	Service Package Status	Service Package Instance	Included Elements
	and Demand Management	or other heavily traveled area. Recommendations are based on an assessment of current and forecast transportation network performance and environmental conditions. Multi-modal transportation operational strategies are created that consider all modes and all roads in the travel area to correct network imbalances and effectively manage available capacity. As part of the operational strategies, this service package may also recommend lane restrictions, transit, parking, and toll strategies to influence traveler route and mode choices to support active demand management programs and policies managing both traffic and the environment. Operational strategies, including demand management recommendations, are coordinated to support operational decisions by each transportation operator that are consistent with the recommended strategy. All recommended operational strategies are based on historical evaluation, real-time assessment, and forecast of the roadway network performance based on predicted travel demand patterns. This service package also collects air quality, parking availability, transit usage, and vehicle occupancy data to support operational strategies that manage and balance capacity and demand.	Planned	No	LFUCG Traffic Management Center
TM12	Dynamic Roadway Warning	This service package includes systems that dynamically warn drivers approaching hazards on a roadway. Such hazards include roadway weather	Existing	No	Driver
			Existing	No	KYTC District 7 Dynamic Message Signs
			Existing	No	KYTC District 7 Office

Service Package	Service Package Name	Service Package Description	Service Package Status	Service Package Instance	Included Elements
		conditions, road surface conditions, traffic conditions including queues, obstacles or animals in the roadway and any other transient event that can be sensed. These dynamic roadway warning systems can alert approaching drivers via warning signs, flashing lights, in-vehicle messages, etc. Such systems can increase the safety of a roadway by reducing the occurrence of incidents. The system can be centrally monitored and controlled by a traffic management center or it can be autonomous. Speed warnings that consider the limitations of a given vehicle for the geometry of the roadway (e.g., rollover risk for tall vehicles) are not included in this service package but are covered by the TM17 – Speed Warning and Enforcement service package. Roadway warning systems, especially queue warning systems are an Active Traffic Management (ATM) strategy and are typically used in conjunction with other ATM strategies (such as TM20-Variable Speed Limits and TM22-Dynamic Lane Management and Shoulder Use).	Existing	No	KYTC District 7 Overheight Vehicle Sensors
TM12	Dynamic Roadway Warning (ITS Signalization to Improve Safety	--Instance of TM12 for ITS Signalization to Improve Safety and Efficiency at Interstate Interchanges Project-- This service package includes systems that	Planned	Yes	Driver
			Planned	Yes	LFUCG Queue Detection and Warning System

Service Package	Service Package Name	Service Package Description	Service Package Status	Service Package Instance	Included Elements
	and Efficiency at Interstate Interchanges)	dynamically warn drivers approaching hazards on a roadway. Such hazards include roadway weather conditions, road surface conditions, traffic conditions including queues, obstacles or animals in the roadway and any other transient event that can be sensed. These dynamic roadway warning systems can alert approaching drivers via warning signs, flashing lights, in-vehicle messages, etc. Such systems can increase the safety of a roadway by reducing the occurrence of incidents. The system can be centrally monitored and controlled by a traffic management center or it can be autonomous. Speed warnings that consider the limitations of a given vehicle for the geometry of the roadway (e.g., rollover risk for tall vehicles) are not included in this service package but are covered by the TM17 – Speed Warning and Enforcement service package. Roadway warning systems, especially queue warning systems are an Active Traffic Management (ATM) strategy and are typically used in conjunction with other ATM strategies (such as TM20-Variable Speed Limits and TM22-Dynamic Lane Management and Shoulder Use).	Planned	Yes	LFUCG Traffic Management Center
TM12	Dynamic Roadway Warning (Wrong Way Vehicle Detection System)	--Instance of TM12 for Wrong Way Vehicle Detection System Project-- This service package includes systems that dynamically warn drivers approaching hazards on a roadway. Such hazards	Planned	Yes	Driver
			Planned	Yes	KYTC District 7 Office
			Planned	Yes	KYTC District 7 Wrong Way Vehicle Detection System

Service Package	Service Package Name	Service Package Description	Service Package Status	Service Package Instance	Included Elements
		include roadway weather conditions, road surface conditions, traffic conditions including queues, obstacles or animals in the roadway and any other transient event that can be sensed. These dynamic roadway warning systems can alert approaching drivers via warning signs, flashing lights, in-vehicle messages, etc. Such systems can increase the safety of a roadway by reducing the occurrence of incidents. The system can be centrally monitored and controlled by a traffic management center or it can be autonomous. Speed warnings that consider the limitations of a given vehicle for the geometry of the roadway (e.g., rollover risk for tall vehicles) are not included in this service package but are covered by the TM17 – Speed Warning and Enforcement service package. Roadway warning systems, especially queue warning systems are an Active Traffic Management (ATM) strategy and are typically used in conjunction with other ATM strategies (such as TM20-Variable Speed Limits and TM22-Dynamic Lane Management and Shoulder Use).	Planned	Yes	LFUCG Traffic Management Center
TM13	Standard Railroad Grade Crossing	This service package manages highway traffic at highway-rail intersections (HRIs) where operational requirements do not dictate more advanced features (e.g., where rail operational speeds are	Existing	No	Driver
			Existing	No	LFUCG Traffic Management Center
			Existing	No	LFUCG Traffic Signals
			Existing	No	Rail Operations

Service Package	Service Package Name	Service Package Description	Service Package Status	Service Package Instance	Included Elements
		less than 80 miles per hour). Both passive (e.g., the crossbuck sign) and active warning systems (e.g., flashing lights and gates) are supported. (Note that passive systems exercise only the single interface between the ITS Roadway Equipment and the Driver in the physical view.) These traditional HRI warning systems may also be augmented with other standard traffic management devices. The warning systems are activated on notification of an approaching train by interfaced wayside equipment. The equipment at the HRI may also be interconnected with adjacent signalized intersections so that local control can be adapted to highway-rail intersection activities. Health monitoring of the HRI equipment and interfaces is performed; detected abnormalities are reported to both highway and railroad officials through wayside interfaces and interfaces to the Traffic Management Center.	Existing	No	Wayside Equipment
TM16	Reversible Lane Management	This service package provides for the management of reversible lane facilities. In addition to standard surveillance capabilities, this service package includes sensory functions that detect wrong-way vehicles and other special surveillance capabilities that mitigate safety hazards associated with reversible lanes. The package includes the field equipment, physical lane access controls, and associated control electronics that manage and control these special lanes. This service package also includes the equipment used to electronically reconfigure intersections and manage right-of-way to address dynamic demand changes and special events.	Existing	No	LFUCG CCTV Cameras
TM16	Reversible Lane Management	This service package provides for the management of reversible lane facilities. In addition to standard surveillance capabilities, this service package includes sensory functions that detect wrong-way vehicles and other special surveillance capabilities that mitigate	Existing	No	LFUCG Reversible Lanes Field Equipment
			Existing	No	LFUCG Traffic Management Center
			Existing	No	LFUCG Traffic Management Center Operators

Service Package	Service Package Name	Service Package Description	Service Package Status	Service Package Instance	Included Elements
		safety hazards associated with reversible lanes. The package includes the field equipment, physical lane access controls, and associated control electronics that manage and control these special lanes. This service package also includes the equipment used to electronically reconfigure intersections and manage right-of-way to address dynamic demand changes and special events.	Existing	No	LFUCG Traffic Signals
TM17	Speed Warning and Enforcement	This service package monitors vehicle speeds and supports warning drivers when their speed is excessive. Also the service includes notifications to an enforcement agency to enforce the speed limit of the roadway. Speed monitoring can be made via spot speed or average speed measurements. Roadside equipment can display the speed of passing vehicles and/or suggest a safe driving speed. Environmental conditions and vehicle characteristics may be monitored and factored into the safe speed advisories that are provided to the motorist. For example, warnings can be generated recognizing the limitations of a given vehicle for the geometry of the roadway such as rollover risk for tall vehicles. This service focuses on monitoring of vehicle speeds and enforcement of the speed limit while the variable speed limits service (covered in TM20-Variable Speed Limits service package) focuses on varying the posted speed limits to create more uniform speeds along a roadway, to promote safer driving during adverse conditions (such as fog) and/or to reduce air pollution.	Existing	No	Driver
			Existing	No	LFUCG Division of Police
			Existing	No	LFUCG Roadside Traffic Detection Equipment
TM17	Speed Warning and Enforcement (Curve Speed Warning System)	--Instance of TM17 for Curve Speed Warning System Project--	Planned	Yes	Driver
			Planned	Yes	LFUCG Curve Speed Warning System
			Planned	Yes	LFUCG Traffic Management Center
TM17	Speed Warning and Enforcement (Work Zone ITS Deployment)	--Instance of TM17 for Work Zone ITS Deployment Project--	Planned	Yes	Driver
			Planned	Yes	Kentucky State Police Post 12
			Planned	Yes	Kentucky State Police Post 7
			Planned	Yes	KYTC District 7 Work Zone Safety Equipment

Service Package	Service Package Name	Service Package Description	Service Package Status	Service Package Instance	Included Elements
			Planned	Yes	LFUCG Division of Police
TM20	Variable Speed Limits	This service package sets variable speed limits along a roadway to create more uniform speeds, to promote safer driving during adverse conditions (such as fog), and/or to reduce air pollution. Also known as speed harmonization, this service monitors traffic and environmental conditions along the roadway. Based on the measured data, the system calculates and sets suitable speed limits, usually by lane. Equipment over and along the roadway displays the speed limits and additional information such as basic safety rules and current traffic information. The system can be centrally monitored and controlled by a traffic management center or it can be autonomous. This service establishes variable speed limits and communicates the speed limits to drivers. Speed warnings and enforcement of speeds limits, including variable speed limits, is covered in the TM17-Speed Warning and Enforcement service package. Variable speed limits are an Active Traffic Management (ATM) strategy and are typically used in conjunction with other ATM strategies (such as TM22-Dynamic Lane Management and Shoulder Use and TM23-Dynamic Roadway Warning).	Planned	No	Driver
			Planned	No	LFUCG Traffic Management Center
			Planned	No	LFUCG Traffic Management Center Operators
			Planned	No	LFUCG Variable Speed Limit Signs
VS03	Situational Awareness (Connected Vehicle Pilot/ Demonstration Projects)	--Instance of VS03 for Connected Vehicle Pilot/ Demonstration Projects-- This service package shares information about potentially hazardous road conditions or road hazards with other vehicles to support enhanced driver	Planned	Yes	Basic Vehicle
			Planned	Yes	Connected/Automated Vehicles
			Planned	Yes	LFUCG Connected Vehicle Roadside Equipment

Service Package	Service Package Name	Service Package Description	Service Package Status	Service Package Instance	Included Elements
		warnings and control automation. Vehicles broadcast relevant road condition information that is collected by the vehicle, such as fog or icy roads. This service package supports the capability for connected vehicles to share situational awareness information even in areas where no roadside communications infrastructure exists. It can be useful to vehicles that are not fully equipped with sensors, or vehicles entering an area with hazardous conditions. Roadside communications infrastructure, if available, can extend the situational awareness range to cover wrong way vehicles where closing rates can require notification beyond DSRC communications range.	Planned	Yes	Basic Vehicle
VS05	Curve Speed Warning (Connected Vehicle Pilot/ Demonstration Projects)	--Instance of VS05 for Connected Vehicle Pilot/ Demonstration Projects-- This service package allows connected vehicles to receive information that it is approaching a curve along with the recommended speed for the curve. This capability allows the vehicle to provide a warning to the driver regarding the curve and its recommended speed. In addition, the vehicle can perform additional warning actions if the actual speed through the curve exceeds the recommended speed.	Planned	Yes	Connected/Automated Vehicles
			Planned	Yes	LFUCG Connected Vehicle Roadside Equipment
			Planned	Yes	LFUCG Curve Speed Warning System
			Planned	Yes	LFUCG RWIS Stations
			Planned	Yes	LFUCG Traffic Management Center
VS07	Road Weather Motorist Alert and Warning (Connected Vehicle Pilot/ Demonstration Projects)	--Instance of VS07 for Connected Vehicle Pilot/ Demonstration Projects-- This service package collects road weather data from connected vehicles and uses that data to develop short term warnings or advisories that can be provided to individual motorists. The	Planned	Yes	Basic Vehicle
			Planned	Yes	Connected/Automated Vehicles
			Planned	Yes	LFUCG Connected Vehicle Roadside Equipment
			Planned	Yes	LFUCG RWIS Stations

Service Package	Service Package Name	Service Package Description	Service Package Status	Service Package Instance	Included Elements
		information may come from either vehicles operated by the general public and commercial entities (including passenger cars and trucks) or specialty vehicles and public fleet vehicles (such as snowplows, maintenance trucks, and other agency pool vehicles). The raw data will be processed in a controlling center to generate road segment-based data outputs. The processing will also include a road weather motorist alerts algorithm to generate short time horizon alerts that will be pushed to user systems and available to commercial service providers. In addition the information collected can be combined with observations and forecasts from other sources to provide medium (next 2-12 hours) or long term (more than 12 hours) advisories through a variety of interfaces including web based and connected vehicle based interfaces.	Planned	Yes	LFUCG Traffic Management Center
VS08	Queue Warning (Connected Vehicle Pilot/ Demonstration Projects)	--Instance of VS08 for Connected Vehicle Pilot/ Demonstration Projects-- This service package utilizes connected vehicle technologies, including vehicle-to-infrastructure (V2I) and vehicle-to-vehicle (V2V) communications, to enable vehicles within the queue event to automatically broadcast their queued status information (e.g., rapid deceleration, disabled status, lane location) to nearby upstream vehicles and to centers (such as the TMC). The infrastructure will broadcast queue warnings to vehicles in order to minimize or prevent rear-end or other secondary collisions. This service package is not intended to operate as a crash avoidance system. In contrast to such systems, this service package will engage well in advance of any potential crash situation, providing messages and information to the driver in order to minimize the likelihood of his needing to take crash avoidance or mitigation actions later. It performs two essential tasks: queue determination (detection and/or prediction) and queue information dissemination using vehicle-based, infrastructure-based, or hybrid solutions.	Planned	Yes	Basic Vehicle
			Planned	Yes	Connected/Automated Vehicles
			Planned	Yes	LFUCG CCTV Cameras
			Planned	Yes	LFUCG Connected Vehicle Roadside Equipment
			Planned	Yes	LFUCG Roadside Traffic Detection Equipment
			Planned	Yes	LFUCG Traffic Management Center
VS09			Planned	Yes	Basic Vehicle

Service Package	Service Package Name	Service Package Description	Service Package Status	Service Package Instance	Included Elements
	Reduced Speed Zone Warning / Lane Closure (Connected Vehicle Pilot/ Demonstration Projects)	--Instance of VS09 for Connected Vehicle Pilot/ Demonstration Projects-- This service package provides connected vehicles that are approaching a reduced speed zone with information on the zone's posted speed limit and/or if the configuration of the roadway is altered (e.g., lane closures, lane shifts). Reduced speed zones include (but are not be limited to) construction/work zones, school zones, pedestrian crossing areas, and incorporated zones (e.g., rural towns). The connected vehicle uses the revised speed limit along with any applicable changed roadside configuration information to determine whether to provide an alert or warning to the driver. Additionally, to provide warnings to non-equipped vehicles, infrastructure equipment measures the speed of the approaching vehicles and if greater than the reduced speed zone posted speed limit will provide warning signage. It will provide an alert to drivers in advance when aggressive braking is required to reduce to the posted speed limit.	Planned	Yes	Connected/Automated Vehicles
			Planned	Yes	LFUCG Connected Vehicle Roadside Equipment
			Planned	Yes	LFUCG Traffic Management Center
VS11	Oversize Vehicle Warning (Overheight Truck Detection Systems)	--Instance of VS11 for Overheight Truck Detection Systems Project-- This service package uses external measurements taken by the roadside infrastructure, and transmitted to the vehicle, to support in-vehicle determination of whether an alert/warning is necessary. Specifically,	Planned	Yes	Driver
			Planned	Yes	KYTC District 7 Dynamic Message Signs
			Planned	Yes	KYTC District 7 Maintenance and Construction Offices
			Planned	Yes	KYTC District 7 Office

Service Package	Service Package Name	Service Package Description	Service Package Status	Service Package Instance	Included Elements
		the infrastructure data equipment detects and measures the approaching vehicle's height and width. The infrastructure component of the service package transmits the vehicle measurements, along with bridge, overpass, or tunnel geometry, to the oversize vehicle. The vehicle application utilizes this data to determine whether the vehicle can clear the bridge or tunnel. If deemed necessary, the driver is alerted to the impending low height and/or narrow horizontal clearance bridge or tunnel prior to a decision point, enabling the vehicle to reroute and avoid a collision. If the driver ignores the alert and continues along the route, the vehicle will generate a warning indicating an impending collision at a point near the bridge or tunnel approach. To support unequipped vehicles the infrastructure will display warning or reroute information when the measurements indicate that a vehicle does not have adequate height or width clearance. This service package can be expanded to consider weight as well as height and width.	Planned	Yes	KYTC District 7 Overheight Vehicle Sensors
VS12	Pedestrian and Cyclist Safety	This service package supports the sensing and warning systems used to interact with pedestrians, cyclists, and other non-motorized users that operate on the main vehicle roadways, or on pathways that intersect the main vehicle	Existing	No	Driver
			Existing	No	LFUCG Multimodal Vehicle Detection System
			Existing	No	LFUCG Traffic Management Center

Service Package	Service Package Name	Service Package Description	Service Package Status	Service Package Instance	Included Elements
		roadways. These systems allow automated warning or active protection for this class of users. It integrates traffic, pedestrian, and cyclist information from roadside or intersection detectors and new forms of data from wirelessly connected, non-motorized traveler-carried mobile devices to request right-of-way or to inform non-motorized travelers when to cross and how to remain aligned with the crosswalk or pathway based on real-time Signal Phase and Timing (SPaT) and MAP information. In some cases, priority will be given to non-motorized travelers, such as persons with disabilities who need additional crossing time, or in special conditions (e.g., weather) where non-motorized travelers may warrant priority or additional crossing time. This service package will enable a service call to be routed to the traffic controller from a mobile device of a registered person with disabilities after confirming the direction and orientation of the roadway that the individual is intending to cross. It also provides warnings to the non-motorized user of possible infringement of the crossing or pathway by approaching vehicles.	Existing	No	Pedestrians and Bike/Scooter Riders
VS12	Pedestrian and Cyclist Safety (Multimodal Vehicle Detection System)	--Instance of VS12 for Multimodal Vehicle Detection System Project-- This service package supports the sensing and warning systems used to interact with pedestrians, cyclists, and other non-motorized users that operate on the main vehicle roadways, or on pathways	Planned	Yes	Driver
			Planned	Yes	LFUCG Multimodal Vehicle Detection System
			Planned	Yes	LFUCG Traffic Management Center
			Planned	Yes	LFUCG Traffic Signals

Service Package	Service Package Name	Service Package Description	Service Package Status	Service Package Instance	Included Elements
		that intersect the main vehicle roadways. These systems allow automated warning or active protection for this class of users. It integrates traffic, pedestrian, and cyclist information from roadside or intersection detectors and new forms of data from wirelessly connected, non-motorized traveler-carried mobile devices to request right-of-way or to inform non-motorized travelers when to cross and how to remain aligned with the crosswalk or pathway based on real-time Signal Phase and Timing (SPaT) and MAP information. In some cases, priority will be given to non-motorized travelers, such as persons with disabilities who need additional crossing time, or in special conditions (e.g., weather) where non-motorized travelers may warrant priority or additional crossing time. This service package will enable a service call to be routed to the traffic controller from a mobile device of a registered person with disabilities after confirming the direction and orientation of the roadway that the individual is intending to cross. It also provides warnings to the non-motorized user of possible infringement of the crossing or pathway by approaching vehicles.	Planned	Yes	Pedestrians and Bike/Scooter Riders
VS13	Intersection Safety Warning and Collision Avoidance	This service package enables a connected vehicle approaching an instrumented signalized intersection to receive information from the infrastructure regarding the signal timing and the geometry of the intersection. The vehicle uses its speed and acceleration profile, along with the signal timing and geometry information to determine if it appears likely that the vehicle will be able to pass safely through the intersection without violating the signal or colliding with other vehicles. If the vehicle determines that proceeding through the intersection is unsafe, a warning is provided to the driver and/or collision avoidance actions are taken, depending on the automation level of the vehicle.	Planned	No	Vehicle
WX01	Weather Data Collection	This service package collects current road and weather conditions using data collected from environmental sensors	Existing	No	KYTC District 7 Maintenance and Construction Offices

Service Package	Service Package Name	Service Package Description	Service Package Status	Service Package Instance	Included Elements
		deployed on and about the roadway. It also collects data from vehicles in the road network that can be used to directly measure or infer current environmental conditions. It leverages vehicle on-board systems that measure temperature, sense current weather conditions (rain and sun sensors) and also can monitor aspects of the vehicle operational status (e.g., use of headlights, wipers, and traction control system) to gather information about local environmental conditions. In addition, environmental sensor systems located on Maintenance and Construction Vehicles are also potential data sources. The collected environmental data is used by the Weather Information Processing and Distribution service package to process the information and make decisions on operations. The collected environmental data may be aggregated, combined with data attributes and sent to meteorological systems for data qualification and further data consolidation. The service package may also request and receive qualified data sets from meteorological systems.	Existing	No	KYTC District 7 Maintenance and Construction Vehicles
			Existing	No	KYTC District 7 RWIS Stations
			Existing	No	LFUCG RWIS Stations
			Existing	No	LFUCG Streets and Roads
			Existing	No	NOAA National Weather Service
			Existing	No	Surface Transportation Weather Service
WX01	Weather Data Collection (Road Weather Information Systems (RWIS) Deployment)	--Instance of WX01 for Road Weather Information Systems (RWIS) Deployment Project-- This service package collects current road and weather conditions using data collected from environmental sensors deployed on and about the roadway. It also collects data from vehicles in the road network that can be used to directly measure or infer current	Planned	Yes	KYTC District 7 Maintenance and Construction Offices
			Planned	Yes	KYTC District 7 Office
			Planned	Yes	KYTC District 7 RWIS Stations
			Planned	Yes	LFUCG RWIS Stations
			Planned	Yes	LFUCG Streets and Roads

Service Package	Service Package Name	Service Package Description	Service Package Status	Service Package Instance	Included Elements
		environmental conditions. It leverages vehicle on-board systems that measure temperature, sense current weather conditions (rain and sun sensors) and also can monitor aspects of the vehicle operational status (e.g., use of headlights, wipers, and traction control system) to gather information about local environmental conditions. In addition, environmental sensor systems located on Maintenance and Construction Vehicles are also potential data sources. The collected environmental data is used by the Weather Information Processing and Distribution service package to process the information and make decisions on operations. The collected environmental data may be aggregated, combined with data attributes and sent to meteorological systems for data qualification and further data consolidation. The service package may also request and receive qualified data sets from meteorological systems.	Planned	Yes	LFUCG Traffic Management Center

6 Operational Concept

The Operational Concept lists the roles and responsibilities that each participating agency must take on to provide the ITS services included in the ITS Architecture. Changing needs may arise that will require an agreement to be formed between all affected parties that defines new or additional roles. Defining the roles and responsibilities of the participating stakeholders in the region and the willingness of agencies to accept their roles and responsibilities is an important step in realizing the common goal of an interoperable ITS system throughout the region.

Table 4: Operational Concept

RR Area Name	Stakeholder	RR Description	RR Status
Commercial Vehicle Operations for Lexington Area ITS Architecture	KYTC District 7	Exchange safety and security information	Existing
	KYTC District 7	Participate in HAZMAT detection	Existing
	KYTC District 7	Participate in roadside commercial vehicle inspection	Existing
	KYTC District 7	Perform electronic screening	Existing
	LFUCG	Exchange safety and security information	Existing
	LFUCG	Participate in HAZMAT detection	Existing
	LFUCG	Participate in roadside commercial vehicle inspection	Existing
	LFUCG	Perform electronic screening	Planned
	Private Fleet and Freight Operators	Exchange safety and security information	Existing
	Private Fleet and Freight Operators	Operate and maintain a dispatch facility	Existing
	Private Fleet and Freight Operators	Operate and maintain a vehicle fleet	Existing
	Private Fleet and Freight Operators	Provide maintenance of the vehicles in its fleet	Existing
Data Management for Lexington Area ITS Architecture	Academic / Research Organizations	Collect transportation data including traffic counts, incident information and other traffic data	Existing
	KYTC District 7	Collect and archive traffic and incident data on KYTC roads	Existing
	KYTC District 7	Collect and archive weather data from RWIS stations	Existing
	Lextran	Collect and archive transit operations data	Existing
	LFUCG	Collect and archive traffic data on LFUCG roads	Existing
	LFUCG	Operate and maintain database of traffic information for access by other agencies	Existing
	LFUCG	Operate and maintain Records Management System (RMS)	Planned
	LFUCG	Collect and archive weather data from RWIS stations	Planned

RR Area Name	Stakeholder	RR Description	RR Status
Emergency Management for Lexington Area ITS Architecture	Bluegrass Community Action Partnership	Operate and maintain ITS devices and traveler information systems to alert the public in emergency situations such as child abductions, severe weather events, civil emergencies, and other situations that pose a threat to life and property	Existing
	Bluegrass Community Action Partnership	Provide transit vehicles for use in evacuation of people from areas impacted by severe weather events or natural disaster areas	Existing
	Bluegrass Community Action Partnership	Support disaster response and recovery, including coordination of emergency response plans and resources, damage assessment, service restoration, and transition back to normal operation	Existing
	Bluegrass Community Action Partnership	Support evacuation of the general public from a disaster area and manage subsequent reentry to the disaster area using transportation resources	Existing
	Federated Transit Services of the Bluegrass (FTSB)	Provide transit vehicles for use in evacuation of people from areas impacted by severe weather events or natural disaster areas	Existing
	Federated Transit Services of the Bluegrass (FTSB)	Support disaster response and recovery, including coordination of emergency response plans and resources, damage assessment, service restoration, and transition back to normal operation	Existing
	Federated Transit Services of the Bluegrass (FTSB)	Support evacuation of the general public from a disaster area and manage subsequent reentry to the disaster area using transportation resources	Existing
	Jessamine County	Receive incident data from an arterial and freeway management agencies	Existing
	Jessamine County	Send incident data to arterial and freeway management agencies	Existing
	Kentucky State Police	Perform Computer Aided Dispatch (CAD) of state patrol vehicles during emergencies	Existing
	KYTC District 7	Receive incident data from an arterial and freeway management agencies	Existing
	KYTC District 7	Send incident data to an arterial and freeway management agencies	Existing
	Lextran	Provide transit vehicles for use in evacuation of people from areas impacted by severe weather events or natural disaster areas	Existing
	LFUCG	Operate and maintain preemption lights for signalized intersections or ramp meters	Planned
	LFUCG	Perform Computer Aided Dispatch (CAD) of emergency vehicles	Existing
	LFUCG	Receive incident data from an arterial, freeway, and transit management agencies	Existing
	LFUCG	Receive incident data from traffic engineering agencies	Existing
	LFUCG	Send incident data to an arterial, freeway, and transit management agencies	Existing

RR Area Name	Stakeholder	RR Description	RR Status
	Towing and Recovery Providers	Support disaster response and recovery, including coordination of emergency response plans and resources, damage assessment, service restoration, and transition back to normal operation	Existing
	Towing and Recovery Providers	Support evacuation of the general public from a disaster area and manage subsequent reentry to the disaster area using transportation resources	Existing
Freeway Management for Lexington Area ITS Architecture	KYTC District 7	Operate and maintain real-time traffic data collection technologies	Existing
	KYTC District 7	Operate and maintain overheight vehicle detection equipment	Existing
	KYTC District 7	Operate and maintain traveler information dissemination devices such as DMS and HAR	Existing
	KYTC District 7	Operate and maintain ramp meters	Planned
	KYTC District 7	Operate and maintain exit ramp queue detection system	Planned
	KYTC District 7	Operate and maintain wrong way detection system	Planned
Incident Management for Lexington Area ITS Architecture	Kentucky State Police	Operate and maintain a dispatch facility	Existing
	Kentucky State Police	Operate and maintain a vehicle fleet	Existing
	Kentucky State Police	Provide maintenance of the vehicles in its fleet	Existing
	KYTC District 7	Operate and maintain Safe Patrol Emergency Vehicles to respond to incidents	Existing
	LFUCG	Operate and maintain a dispatch facility	Existing
	LFUCG	Operate and maintain a vehicle fleet	Existing
	LFUCG	Operate and maintain LFUCG Traffic Incident Detection System	Planned
	LFUCG	Provide maintenance of the vehicles in its fleet	Existing
	LFUCG	Receive information from the National Weather Service	Existing
	Towing and Recovery Providers	Operate and maintain an Automated Vehicle Location (AVL) system	Existing
	Towing and Recovery Providers	Perform Computer Aided Dispatch (CAD) of emergency vehicles	Existing
	Towing and Recovery Providers	Receive incident data from police traffic analysis	Existing
Maintenance and Construction for Lexington Area ITS Architecture	Jessamine County	Operate and maintain a vehicle fleet	Existing
	Jessamine County	Provide and support on-going operations and maintenance activities	Existing
	KYTC Central Office	Operate and maintain MDSS equipment for KYTC maintenance vehicles	Existing
	KYTC District 7	Collect road and weather conditions data from environmental sensors located on or near the roadway	Existing
	KYTC District 7	Manage roadway work zone activities	Existing

RR Area Name	Stakeholder	RR Description	RR Status
	KYTC District 7	Operate and maintain a dispatch facility	Existing
	KYTC District 7	Operate and maintain a vehicle fleet	Existing
	KYTC District 7	Operate and maintain Automated Vehicle Location (AVL) system	Existing
	KYTC District 7	Perform winter maintenance activities	Existing
	KYTC District 7	Provide and support on-going operations and maintenance activities	Existing
	KYTC District 7	Provide maintenance of the vehicles in its fleet	Existing
	KYTC District 7	Provide maintenance services such as landscape maintenance, hazard removal, routine maintenance activities, and repair and maintenance of equipment on the roadway	Existing
	KYTC District 7	Receive information from the National Weather Service	Existing
	KYTC District 7	Receive surface transportation specific weather information from a Value Added Meteorological Service Provider	Existing
	KYTC District 7	Use environmental data or information to detect environmental hazards such as icy road conditions, high winds, or dense fog	Existing
	LFUCG	Manage roadway work zone activities	Existing
	LFUCG	Operate and maintain a vehicle fleet for maintenance of traffic signals and signs	Existing
	LFUCG	Operate and maintain Automated Vehicle Location (AVL) system	Existing
	LFUCG	Provide and support on-going operations and maintenance activities	Existing
	LFUCG	Receive information from the National Weather Service	Existing
Parking Management for Lexington Area ITS Architecture	KYTC Central Office	Operate and maintain KYTC's TPIMS	Existing
	KYTC Central Office	Manage truck parking availability website and other information delivery channels	Existing
	Lexington and Fayette County Parking Authority (LFCPA)	Directly or indirectly provide parking information to the public	Existing
	Lexington and Fayette County Parking Authority (LFCPA)	Provide parking information at parking facilities	Existing
Surface Street Management for Lexington Area ITS Architecture	Jessamine County	Operate and maintain signalized intersections	Existing
	LFUCG	Operate and maintain signalized intersections	Existing
	LFUCG	Detect and verify traffic incidents	Existing
	LFUCG	Monitor highway-rail intersections with video surveillance / detection	Existing
	LFUCG	Operate and maintain Emergency Vehicle Preemption equipment at signals	Planned

RR Area Name	Stakeholder	RR Description	RR Status
	LFUCG	Operate and maintain real-time traffic data collection technologies	Existing
	LFUCG	Operate and maintain signalized intersections that are interconnected with active railroad crossing devices	Existing
	LFUCG	Operate and maintain Transit Signal Priority equipment at signals	Planned
	LFUCG	Operate lane control devices	Existing
	LFUCG	Operate and maintain wrong way detection system on surface streets	Planned
	Railroad Companies	Operate and maintain active railroad crossing devices that are interconnected with highway-rail intersections	Existing
Sustainable Travel for Lexington Area ITS Architecture	LFUCG	Collect and analyze air quality data	Existing
Transit Services for Lexington Area ITS Architecture	Bluegrass Community Action Partnership	Automate vehicle maintenance scheduling and manage both routine and corrective maintenance activities on vehicles	Planned
	Bluegrass Community Action Partnership	Directly or indirectly provide transit information to the public	Existing
	Bluegrass Community Action Partnership	Operate and maintain an Automated Vehicle Location (AVL) system	Existing
	Bluegrass Community Action Partnership	Operate and maintain an Electronic Fare Payment System (smart card, swipe card, credit card, etc.)	Planned
	Bluegrass Community Action Partnership	Operate and maintain security monitoring systems on-board transit vehicles	Planned
	Bluegrass Community Action Partnership	Operate demand response transit services	Existing
	Bluegrass Community Action Partnership	Operate fixed-route transit services	Existing
	Bluegrass Community Action Partnership	Provide maintenance of the transit vehicles	Existing
	Bluegrass Community Action Partnership	Provide transit trip planning	Existing
	Federated Transit Services of the Bluegrass (FTSB)	Directly or indirectly provide transit information to the public	Planned

RR Area Name	Stakeholder	RR Description	RR Status
	Federated Transit Services of the Bluegrass (FTSB)	Operate demand response transit services	Existing
	Federated Transit Services of the Bluegrass (FTSB)	Operate fixed route transit services	Existing
	Federated Transit Services of the Bluegrass (FTSB)	Provide maintenance of the transit vehicles	Existing
	KYTC District 7	Operate ferry transit services	Existing
	Lextran	Provide maintenance of the transit vehicles	Existing
	Lextran	Directly or indirectly provide transit information to the public	Existing
	Lextran	Monitor public areas (e.g. stops, park & ride lots, stations)	Existing
	Lextran	Operate and maintain an Automated Vehicle Location (AVL) system	Existing
	Lextran	Operate and maintain an Electronic Fare Payment System (smart card, swipe card, credit card, etc.)	Existing
	Lextran	Operate and maintain security monitoring systems on-board transit vehicles	Existing
	Lextran	Operate and maintain Transit Signal Priority equipment on buses	Planned
	Lextran	Operate demand response transit services	Existing
	Lextran	Operate fixed-route transit services	Existing
	Lextran	Perform security monitoring of non-public areas (e.g. transit yards or other infrastructure)	Existing
	Lextran	Provide transit information at stops or parking facilities	Existing
	Lextran	Provide transit trip planning	Existing
Traveler Information for Lexington Area ITS Architecture	KYTC Central Office	Operate and maintain traffic and roadway information website (GoKY) for KYTC	Existing
	KYTC District 7	Disseminate traffic or weather condition information via DMS, HAR, GoKY, social media, webpages, and email	Existing
	Lexington and Fayette County Parking Authority (LFCPA)	Disseminate parking status and availability information via DMS, social media and webpages	Existing
	LFUCG	Disseminate traffic or weather condition information via alerts to in-vehicle devices	Planned
	LFUCG	Disseminate traffic or weather condition information via mobile alerts	Planned
	LFUCG	Disseminate traffic or weather condition information via TV/Radio, social media, webpage, and email alerts	Existing

RR Area Name	Stakeholder	RR Description	RR Status
	LFUCG	Operate and maintain traffic information website and phone information system to provide updates on roadway closures	Existing
Vehicle Safety for Lexington Area ITS Architecture	LFUCG	Design, deploy, operate and maintain connected vehicle roadside equipment	Planned
	LFUCG	Develop policy related to connected vehicle operations, including data security and retention	Planned
Weather for Lexington Area ITS Architecture	KYTC District 7	Collect road and weather conditions data from environmental sensors located on or near the roadway	Existing
	KYTC District 7	Receive information from the National Weather Service	Existing
	KYTC District 7	Use environmental data or information to detect environmental hazards such as icy road conditions, high winds, or dense fog	Existing
	LFUCG	Receive information from the National Weather Service	Existing
	LFUCG	Collect road and weather conditions data from environmental sensors located on or near the roadway	Planned
	LFUCG	Use environmental data or information to detect environmental hazards such as icy road conditions, high winds, or dense fog	Planned
	NOAA	Provide weather information to agencies that subscribe to receiving alerts for weather events	Existing

7 Functional Requirements

Each ITS system operated by the stakeholders must perform certain functions to effectively deliver the ITS services desired by the region. The primary functions that each system needs to perform are broadly defined in the Lexington Area ITS Architecture. The high-level requirements are grouped into functional areas that identify requirements associated with each selected ITS service.

Table 5: Functional Requirements

Element Name	Physical Object Name	Functional Object	Functional Object Description
BUS Dispatch Center	Emergency Management Center	Emergency Secure Area Surveillance	'Emergency Secure Area Surveillance' monitors surveillance inputs from secure areas in the transportation system. The surveillance may be of secure areas frequented by travelers (i.e., transit stops, transit stations, rest areas, park and ride lots, modal interchange facilities, on-board a transit vehicle, etc.) or around transportation infrastructure such as bridges, tunnels and transit railways or guideways. It provides both video and audio surveillance information to emergency personnel and automatically alerts emergency personnel of potential incidents.
BUS Dispatch Center	Transit Management Center	Transit Center Fare Management	'Transit Center Fare Management' manages fare collection and passenger load management at the transit center. It provides the back office functions that support transit fare collection, supporting payment reconciliation with links to financial institutions and enforcement agencies for fare violations. It collects data required to determine accurate ridership levels, establish fares, and distribute fare information. It loads fare data into the vehicle prior to the beginning of normal operations and unloads fare collection data from the vehicle at the close out of normal operations.
BUS Dispatch Center	Transit Management Center	Transit Center Fixed-Route Operations	'Transit Center Fixed-Route Operations' manages fixed route transit operations. It supports creation of schedules, blocks and runs for fixed and flexible route transit services. It allows fixed-route and flexible-route transit services to disseminate schedules and automatically updates customer service operator systems with the most current schedule information. It also supports automated dispatch of transit vehicles. Current vehicle schedule adherence and optimum scenarios for schedule adjustment are also provided. It also receives and processes transit vehicle loading data.
BUS Dispatch Center	Transit Management Center	Transit Center Paratransit Operations	'Transit Center Paratransit Operations' manages demand responsive transit services, including paratransit services. It supports planning and scheduling of these services, allowing paratransit and other demand response transit services to plan efficient routes and better estimate arrival times. It also supports automated dispatch of paratransit vehicles and tracks passenger pick-ups and drop-offs. Customer service operator systems are updated with the most current schedule information.

Element Name	Physical Object Name	Functional Object	Functional Object Description
BUS Dispatch Center	Transit Management Center	Transit Center Security	'Transit Center Security' monitors transit vehicle operator or traveler activated alarms received from on-board a transit vehicle. It supports transit vehicle operator authentication and provides the capability to remotely disable a transit vehicle. It also includes the capability to alert operators and police to potential incidents identified by these security features.
BUS Dispatch Center	Transit Management Center	Transit Center Vehicle Assignment	'Transit Center Vehicle Assignment' assigns individual transit vehicles to vehicle blocks and downloads this information to the transit vehicle. It also provides an exception handling process for the vehicle assignment function to generate new, supplemental vehicle assignments when required by changes during the operating day. It provides an inventory management function for the transit facility which stores functional attributes about each of the vehicles owned by the transit operator. These attributes permit the planning and assignment functions to match vehicles with routes based on suitability for the types of service required by the particular routes.
BUS Dispatch Center	Transit Management Center	Transit Center Vehicle Tracking	'Transit Center Vehicle Tracking' monitors transit vehicle location. The location information is collected via a data communication link between the transit vehicles and the transit center. The location information is presented to the transit operator on a digitized map of the transit service area. The location data may be used to determine real time schedule adherence and update the transit system's schedule in real-time. The real-time schedule information is disseminated to other information providers, which furnish the information to travelers.
BUS Dispatch Center	Transit Management Center	Transit Evacuation Support	'Transit Evacuation Support' manages transit resources to support evacuation and subsequent reentry of a population in the vicinity of a disaster or other emergency. It supports coordination of regional evacuation plans, identifying the transit role in a regional evacuation and identifying transit resources that would be used. During an evacuation, it coordinates the use of transit and school bus fleets, supporting evacuation of those with special needs and the general population. Transit service and fare schedules are adjusted and updated service and fare information is made available through traveler information systems.
BUS Dispatch Center	Transit Management Center	Transit Garage Maintenance	'Transit Garage Maintenance' provides advanced maintenance functions for the transit property. It collects operational and maintenance data from transit vehicles, manages vehicle service histories, and monitors operators and vehicles. It collects vehicle mileage data and uses it to automatically generate preventative maintenance schedules for each vehicle by utilizing vehicle tracking data. In addition, it provides information to service personnel to support maintenance activities and records and verifies that maintenance work was performed.

Element Name	Physical Object Name	Functional Object	Functional Object Description
BUS Facility Surveillance Equipment	ITS Object	ITS Management Support	'ITS Management Support' provides management of the ITS Object. This includes management of regulatory information and policies, management of application processes, management of communication system configuration and update management, communications interfaces, protocol-specific techniques to ensure interoperability such as service advertisements, communications congestion management and interference management, local device states and communications information, billing management, fault management, service level and performance monitoring.
BUS Facility Surveillance Equipment	ITS Object	ITS Security Support	'ITS Security Support' provides communications and system security functions to the ITS Object, including privacy protection functions. It may include firewall, intrusion management, authentication, authorization, profile management, identity management, cryptographic key management. It may include a hardware security module and security management information base.
BUS Facility Surveillance Equipment	Security Monitoring Equipment	Field Secure Area Surveillance	'Field Secure Area Surveillance' includes video and audio surveillance equipment that monitors conditions of secure areas including facilities (e.g. transit yards), transportation infrastructure (e.g. as bridges, tunnels, interchanges, and transit railways or guideways), and public areas (e.g., transit stops, transit stations, rest areas, park and ride lots, modal interchange facilities). It provides the surveillance information to the Emergency Management Center for possible threat detection. It also provides local processing of the video or audio information, providing processed or analyzed results to the Emergency Management Center.
BUS Transit Vehicle	Transit Vehicle OBE	Transit Vehicle On-Board Maintenance	'Transit Vehicle On-Board Maintenance' collects and processes transit vehicle maintenance data on-board the vehicle, including mileage and vehicle operating conditions. This maintenance information is provided to the management center and used to schedule future vehicle maintenance and repair.
BUS Transit Vehicle	Transit Vehicle OBE	Transit Vehicle On-Board Paratransit Operations	'Transit Vehicle On-board Paratransit Operations' forwards paratransit and flexible-route dispatch requests to the operator and forwards acknowledgements to the center. It coordinates with and assists the operator in managing multi-stop runs associated with demand responsive transit services including paratransit. It collects transit vehicle passenger data and makes it available to the center.
BUS Transit Vehicle	Transit Vehicle OBE	Transit Vehicle Schedule Management	'Transit Vehicle Schedule Management' monitors schedule performance and identifies corrective actions when a deviation is detected. It provides two-way communication between the transit vehicle and center, enabling the center to communicate with the vehicle operator and monitor on-board systems.

Element Name	Physical Object Name	Functional Object	Functional Object Description
BUS Transit Vehicle	Transit Vehicle OBE	Transit Vehicle Security	'Transit Vehicle Security' provides security and safety functions on-board the transit vehicle. It includes surveillance and sensor systems that monitor the on-board environment, silent alarms that can be activated by transit user or vehicle operator, operator authentication, and a remote vehicle disable function. The surveillance equipment includes video (e.g. CCTV cameras), audio systems and/or event recorder systems. The sensor equipment includes threat sensors (e.g. chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors) and object detection sensors (e.g. metal detectors).
BUS Transit Website	Transportation Information Center	TIC Data Collection	'TIC Data Collection' collects transportation-related data from other centers, performs data quality checks on the collected data and then consolidates, verifies, and refines the data and makes it available in a consistent format to applications that support operational data sharing between centers and deliver traveler information to end-users. A broad range of data is collected including traffic and road conditions, transit data, emergency information and advisories, weather data, special event information, traveler services, parking, multimodal data, and toll/pricing data. It also shares data with other transportation information centers.
BUS Transit Website	Transportation Information Center	TIC Traveler Information Broadcast	'TIC Traveler Information Broadcast' disseminates traveler information including traffic and road conditions, incident information, maintenance and construction information, event information, transit information, parking information, and weather information. The same information is broadcast to all equipped traveler interface systems and vehicles.
Commercial Vehicle Fleet and Freight Management	Fleet and Freight Management Center	Fleet Administration	'Fleet Administration' provides vehicle tracking, dispatch, and reporting capabilities to fleet management personnel. It gathers current road conditions and traffic information, prepares vehicle routes, and provides a fleet interface for toll collection. It also provides route plan information for network performance evaluation. As part of the tracking function, it monitors commercial vehicle location, compares it against the known route and notifies the Emergency Management Center and Fleet-Freight Manager of any deviations, including HAZMAT route restriction violations. It supports carrier participation in wireless roadside inspection programs, monitoring geographic trigger areas and providing current safety data on behalf of the commercial vehicles it manages. It supports pre-hiring checks for potential drivers and monitors the performance of each driver who is hired. It also supports ongoing monitoring of the company's safety performance.

Element Name	Physical Object Name	Functional Object	Functional Object Description
Commercial Vehicle Fleet and Freight Management	Fleet and Freight Management Center	Freight Administration and Management	'Freight Administration and Management' manages the movement of freight from source to destination. It interfaces to intermodal customers to setup and schedule transportation and coordinates with intermodal terminals and freight consolidation stations to coordinate the shipment. It coordinates with the appropriate government agencies to expedite the movement of trucks, their drivers, and their cargo across international borders. The application monitors the status of the freight and freight equipment (container, trailer, or chassis) and monitors freight location and compares it against the planned route.
Commercial Vehicles	Commercial Vehicle OBE	CV On-Board Electronic Screening Support	'CV On-Board Electronic Screening Support' exchanges information with roadside facilities, providing information such as driver, vehicle, and carrier identification to roadside facilities that can be used to support electronic screening. Pass/pull-in messages are received and presented to the commercial vehicle driver and screening events are recorded. Additional information, including trip records (e.g., border clearance information), safety inspection records, cargo information, and driver status information may also be collected, stored, and made available to the roadside facility.
Commercial Vehicles	Commercial Vehicle OBE	CV On-Board Safety and Security	'CV On-Board Safety and Security' collects and processes vehicle and driver safety and security information and provides safety and security information to the Fleet and Freight Management Center. It also supplies this information to the roadside facilities both at mainline speeds and while stopped for inspections. Safety information may also be provided at predetermined trigger areas using wireless communications. The capability to alert the commercial vehicle driver whenever there is a critical safety or security problem or potential emergency is also provided. It also supports on-board driver safety log maintenance and checking.
Commercial Vehicles	Commercial Vehicle OBE	CV On-Board Trip Monitoring	'CV On-Board Trip Monitoring' provides the capabilities to support fleet management with automatic vehicle location and automated mileage and fuel reporting and auditing. In addition, this equipment is used to monitor the planned route and notify the Fleet and Freight Management Center of any deviations. Freight-specific traveler information and restrictions are also collected and reported to the driver to support the trip.

Element Name	Physical Object Name	Functional Object	Functional Object Description
Connected/Automated Vehicles	Vehicle OBE	Vehicle Basic Safety Communication	'Vehicle Basic Safety Communication' exchanges current vehicle location and motion information with other vehicles in the vicinity, uses that information to calculate vehicle paths, and warns the driver when the potential for an impending collision is detected. If available, map data is used to filter and interpret the relative location and motion of vehicles in the vicinity. Information from on-board sensors (e.g., radars and image processing) are also used, if available, in combination with the V2V communications to detect non-equipped vehicles and corroborate connected vehicle data. Vehicle location and motion broadcasts are also received by the infrastructure and used by the infrastructure to support a wide range of roadside safety and mobility applications. This object represents a broad range of implementations ranging from basic Vehicle Awareness Devices that only broadcast vehicle location and motion and provide no driver warnings to advanced integrated safety systems that may, in addition to warning the driver, provide collision warning information to support automated control functions that can support control intervention.
Connected/Automated Vehicles	Vehicle OBE	Vehicle Control Warning	'Vehicle Control Warning' monitors areas around the vehicle and provides warnings to a driver so the driver can take action to recover and maintain safe control of the vehicle. It includes lateral warning systems that warn of lane departures and obstacles or vehicles to the sides of the vehicle and longitudinal warning systems that monitor areas in the vehicle path and provide warnings when headways are insufficient or obstacles are detected in front of or behind the vehicle. It includes on-board sensors, including radars and imaging systems, and the driver information system that provides the visual, audible, and/or haptic warnings to the driver.
Connected/Automated Vehicles	Vehicle OBE	Vehicle Environmental Monitoring	'Vehicle Environmental Monitoring' collects data from on-board sensors and systems related to environmental conditions and sends the collected data to the infrastructure as the vehicle travels. The collected data is a byproduct of vehicle safety and convenience systems and includes ambient air temperature and precipitation measures and status of the wipers, lights, ABS, and traction control systems.
Connected/Automated Vehicles	Vehicle OBE	Vehicle Queue Warning	'Vehicle Queue Warning' detects vehicle queues and reports queues to other vehicles using V2V communications and to the infrastructure using V2I communications. Vehicle-based queue warning builds on the exchange of vehicle location and motion and maneuvers that supports connected vehicle safety applications. This application also receives information about downstream queues using I2V communications. Individualized queue warnings and queue characteristics relevant to the vehicle are provided to the driver.

Element Name	Physical Object Name	Functional Object	Functional Object Description
Connected/Automated Vehicles	Vehicle OBE	Vehicle Roadside Information Reception	'Vehicle Roadside Information Reception' receives advisories, vehicle signage data, and other driver information and presents this information to the driver using in-vehicle equipment. Information presented may include fixed sign information, traffic control device status (e.g., signal phase and timing data), advisory and detour information, warnings of adverse road and weather conditions, travel times, and other driver information.
Connected/Automated Vehicles	Vehicle OBE	Vehicle Speed Management Assist	'Vehicle Speed Management Assist' assists the driver in operating the vehicle within the current speed limit. It monitors current vehicle speed and communicates with the infrastructure to receive current speed limits and associated road configuration change notifications. Driver warnings are issued when unsafe or excessive speeds are detected based on the provided speed limits and current conditions.
FTSB Transit Dispatch Centers	Transit Management Center	Transit Center Fixed-Route Operations	'Transit Center Fixed-Route Operations' manages fixed route transit operations. It supports creation of schedules, blocks and runs for fixed and flexible route transit services. It allows fixed-route and flexible-route transit services to disseminate schedules and automatically updates customer service operator systems with the most current schedule information. It also supports automated dispatch of transit vehicles. Current vehicle schedule adherence and optimum scenarios for schedule adjustment are also provided. It also receives and processes transit vehicle loading data.
FTSB Transit Dispatch Centers	Transit Management Center	Transit Center Paratransit Operations	'Transit Center Paratransit Operations' manages demand responsive transit services, including paratransit services. It supports planning and scheduling of these services, allowing paratransit and other demand response transit services to plan efficient routes and better estimate arrival times. It also supports automated dispatch of paratransit vehicles and tracks passenger pick-ups and drop-offs. Customer service operator systems are updated with the most current schedule information.
FTSB Transit Dispatch Centers	Transit Management Center	Transit Evacuation Support	'Transit Evacuation Support' manages transit resources to support evacuation and subsequent reentry of a population in the vicinity of a disaster or other emergency. It supports coordination of regional evacuation plans, identifying the transit role in a regional evacuation and identifying transit resources that would be used. During an evacuation, it coordinates the use of transit and school bus fleets, supporting evacuation of those with special needs and the general population. Transit service and fare schedules are adjusted and updated service and fare information is made available through traveler information systems.
FTSB Transit Vehicles	Transit Vehicle OBE	Transit Vehicle On-Board Paratransit Operations	'Transit Vehicle On-board Paratransit Operations' forwards paratransit and flexible-route dispatch requests to the operator and forwards acknowledgements to the center. It coordinates with and assists the operator in managing multi-stop runs associated with demand responsive transit services including paratransit. It collects transit vehicle passenger data and makes it available to the center.

Element Name	Physical Object Name	Functional Object	Functional Object Description
FTSB Transit Vehicles	Transit Vehicle OBE	Transit Vehicle Schedule Management	'Transit Vehicle Schedule Management' monitors schedule performance and identifies corrective actions when a deviation is detected. It provides two-way communication between the transit vehicle and center, enabling the center to communicate with the vehicle operator and monitor on-board systems.
FTSB Transit Website	Transportation Information Center	TIC Data Collection	'TIC Data Collection' collects transportation-related data from other centers, performs data quality checks on the collected data and then consolidates, verifies, and refines the data and makes it available in a consistent format to applications that support operational data sharing between centers and deliver traveler information to end-users. A broad range of data is collected including traffic and road conditions, transit data, emergency information and advisories, weather data, special event information, traveler services, parking, multimodal data, and toll/pricing data. It also shares data with other transportation information centers.
FTSB Transit Website	Transportation Information Center	TIC Traveler Information Broadcast	'TIC Traveler Information Broadcast' disseminates traveler information including traffic and road conditions, incident information, maintenance and construction information, event information, transit information, parking information, and weather information. The same information is broadcast to all equipped traveler interface systems and vehicles.
Jessamine County - 911 Emergency Services	Emergency Management Center	Emergency Call-Taking	'Emergency Call-Taking' supports the emergency call-taker, collecting available information about the caller and the reported emergency, and forwarding this information to other objects that formulate and manage the emergency response. It receives 9-1-1, 7-digit local access, and motorist call-box calls and interfaces to other agencies to assist in the verification and assessment of the emergency and to forward the emergency information to the appropriate response agency.
Jessamine County - 911 Emergency Services	Emergency Management Center	Emergency Commercial Vehicle Response	'Emergency Commercial Vehicle Response' identifies and initiates a response to commercial vehicle and freight equipment related emergencies. These emergencies may include incidents involving hazardous materials as well as the detection of non-permitted transport of security sensitive hazmat. It identifies the location of the vehicle, the nature of the incident, the route information, and information concerning the freight itself. The information supports the determination of the response and identifies the responding agencies to notify.
Jessamine County - 911 Emergency Services	Emergency Management Center	Emergency Dispatch	'Emergency Dispatch' tracks the location and status of emergency vehicles and dispatches these vehicles to incidents. Pertinent incident information is gathered from the public and other public safety agencies and relayed to the responding units. Incident status and the status of the responding units is tracked so that additional units can be dispatched and/or unit status can be returned to available when the incident is cleared and closed.

Element Name	Physical Object Name	Functional Object	Functional Object Description
Jessamine County - 911 Emergency Services	Emergency Management Center	Emergency Early Warning System	'Emergency Early Warning System' monitors alerting and advisory systems, information collected by ITS surveillance and sensors, and reports from other agencies and uses this information to identify potential, imminent, or in-progress major incidents or disasters. Notification is provided to initiate the emergency response, including public notification using ITS traveler information systems, where appropriate.
Jessamine County - 911 Emergency Services	Emergency Management Center	Emergency Evacuation Support	'Emergency Evacuation Support' coordinates evacuation plans among allied agencies and manages evacuation and reentry of a population in the vicinity of a disaster or other emergency that poses a risk to public safety. Where appropriate, the affected population is evacuated in shifts, using more than one evacuation route, and including several evacuation destinations to spread demand and thereby expedite the evacuation. All affected jurisdictions (e.g., states and counties) at the evacuation origin, evacuation destination, and along the evacuation route are informed of the plan. The public is provided with real-time evacuation guidance including basic information to assist potential evacuees in determining whether evacuation is necessary. Resource requirements are forecast based on the evacuation plans, and the necessary resources are located, shared between agencies if necessary, and deployed at the right locations at the appropriate times. The evacuation and reentry status are monitored and used to refine the plan and resource allocations during the evacuation and subsequent reentry. It communicates with public health systems to develop evacuation plans and recommended strategies for disasters and evacuation scenarios involving biological or other medical hazards.
Jessamine County - 911 Emergency Services	Emergency Management Center	Emergency Incident Command	'Emergency Incident Command' provides tactical decision support, resource coordination, and communications integration for Incident Commands that are established by first responders at or near the incident scene to support local management of an incident. It supports communications with public safety, emergency management, transportation, and other allied response agency centers, tracks and maintains resource information, action plans, and the incident command organization itself. Information is shared with agency centers including resource deployment status, hazardous material information, traffic, road, and weather conditions, evacuation advice, and other information that enables emergency or maintenance personnel in the field to implement an effective, safe incident response. It supports the functions and interfaces commonly supported by a mobile command center.

Element Name	Physical Object Name	Functional Object	Functional Object Description
Jessamine County - 911 Emergency Services	Emergency Management Center	Emergency Response Management	'Emergency Response Management' provides the strategic emergency response capabilities and broad inter-agency interfaces that are implemented for extraordinary incidents and disasters that require response from outside the local community. It provides the functional capabilities and interfaces commonly associated with Emergency Operations Centers. It develops and stores emergency response plans and manages overall coordinated response to emergencies. It monitors real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information. It tracks the availability of resources and assists in the appropriate allocation of these resources for a particular emergency response. It also provides coordination between multiple allied agencies before and during emergencies to implement emergency response plans and track progress through the incident. It also coordinates with the public through the Emergency Telecommunication Systems (e.g., Reverse 911). It coordinates with public health systems to provide the most appropriate response for emergencies involving biological or other medical hazards.
Jessamine County Emergency Vehicles	Emergency Vehicle OBE	EV On-Board En Route Support	'EV On-Board En Route Support' provides communications functions to responding emergency vehicles that reduce response times and improve safety of responding public safety personnel and the general public. It supports traffic signal preemption via short range communication directly with signal control equipment and sends alert messages to surrounding vehicles.
Jessamine County Emergency Vehicles	Emergency Vehicle OBE	EV Service Patrol Vehicle Operations	'EV Service Patrol Vehicle Operations' provides on-board processing and communications to service patrol vehicles that reduce response times and improve safety of responding personnel. It supports service patrol vehicle dispatch and provides incident information back to the dispatching center.
Jessamine County Road Department	Emergency Management Center	Emergency Incident Scene Safety Management	'Emergency Incident Scene Safety Management' remotely monitors incident scene safety systems that detect vehicle intrusions in designated areas at the incident scene and warns on-scene personnel and drivers of imminent encroachment. Public safety responder movements are also monitored so that the responders can be warned of movement beyond the designated safe zone.
Jessamine County Road Department	Maint and Constr Management Center	MCM Roadway Maintenance	'MCM Roadway Maintenance' provides overall management and support for routine maintenance on a roadway system or right-of-way. Services managed include landscape maintenance, hazard removal (roadway debris, dead animals), routine maintenance activities (roadway cleaning, grass cutting), and repair and maintenance of non-ITS equipment on the roadway (e.g., signs, gantries, cabinets, guard rails, etc.). Environmental conditions information is also received from various weather sources to aid in scheduling routine maintenance activities. See also MCM Field Equipment Maintenance for maintenance of ITS field equipment.

Element Name	Physical Object Name	Functional Object	Functional Object Description
Jessamine County Road Department	Maint and Constr Management Center	MCM Winter Maintenance Management	'MCM Winter Maintenance Management' manages winter road maintenance, tracking and controlling snow plow operations, roadway treatment (e.g., salt spraying and other material applications), and other snow and ice control operations. It monitors environmental conditions and weather forecasts and uses the information to schedule winter maintenance activities, determine the appropriate snow and ice control response, and track and manage response operations.
Jessamine County Road Department	Maint and Constr Management Center	MCM Work Activity Coordination	'MCM Work Activity Coordination' disseminates work activity schedules and current asset restrictions to other agencies. Work schedules are coordinated with operating agencies, factoring in the needs and activities of other agencies and adjacent jurisdictions. Work schedules are also distributed to Transportation Information Centers for dissemination to the traveling public.
Jessamine County Road Department	Maint and Constr Management Center	MCM Work Zone Safety Management	'MCM Work Zone Safety Management' remotely monitors work zone safety systems that detect vehicle intrusions in work zones and warns crew workers and drivers of imminent encroachment. Crew movements are also monitored so that the crew can be warned of movement beyond the designated safe zone.
Jessamine County Road Department	Traffic Management Center	TMC Signal Control	'TMC Signal Control' provides the capability for traffic managers to monitor and manage the traffic flow at signalized intersections. This capability includes analyzing and reducing the collected data from traffic surveillance equipment and developing and implementing control plans for signalized intersections. Control plans may be developed and implemented that coordinate signals at many intersections under the domain of a single Traffic Management Center and are responsive to traffic conditions and adapt to support incidents, preemption and priority requests, pedestrian crossing calls, etc.
Jessamine County Road Department Vehicles	Maint and Constr Vehicle OBE	MCV Winter Maintenance	'MCV Winter Maintenance' supports snow plow operations and other roadway treatments (e.g., salt spraying and other material applications). It supports communications with the center to receive information and instructions that are provided to the vehicle operator and also supports remote control of on-board systems. It tracks operational status of snow and ice control operations and provides this information back to the center.
Jessamine County Road Department Work Zone Safety Equipment	ITS Roadway Equipment	Roadway Work Zone Safety	'Roadway Work Zone Safety' includes field elements that detect vehicle intrusions in work zones and warns crew workers and drivers of imminent encroachment. Crew movements are also monitored so that the crew can be warned of movement beyond the designated safe zone.
Jessamine County Roadside Equipment	ITS Roadway Equipment	Roadway Basic Surveillance	'Roadway Basic Surveillance' monitors traffic conditions using fixed equipment such as loop detectors and CCTV cameras.
Jessamine County Roadside Equipment	ITS Roadway Equipment	Roadway Field Management Station Operation	'Roadway Field Management Station Operation' supports direct communications between field management stations and the local field equipment under their control.

Element Name	Physical Object Name	Functional Object	Functional Object Description
Jessamine County Roadside Equipment	ITS Roadway Equipment	Roadway Signal Control	'Roadway Signal Control' includes the field elements that monitor and control signalized intersections. It includes the traffic signal controllers, detectors, conflict monitors, signal heads, and other ancillary equipment that supports traffic signal control. It also includes field masters, and equipment that supports communications with a central monitoring and/or control system, as applicable. The communications link supports upload and download of signal timings and other parameters and reporting of current intersection status. It represents the field equipment used in all levels of traffic signal control from basic actuated systems that operate on fixed timing plans through adaptive systems. It also supports all signalized intersection configurations, including those that accommodate pedestrians. In advanced, future implementations, environmental data may be monitored and used to support dilemma zone processing and other aspects of signal control that are sensitive to local environmental conditions.
Jessamine County Sheriff Department	Emergency Management Center	Emergency Commercial Vehicle Response	'Emergency Commercial Vehicle Response' identifies and initiates a response to commercial vehicle and freight equipment related emergencies. These emergencies may include incidents involving hazardous materials as well as the detection of non-permitted transport of security sensitive hazmat. It identifies the location of the vehicle, the nature of the incident, the route information, and information concerning the freight itself. The information supports the determination of the response and identifies the responding agencies to notify.
Jessamine County Sheriff Department	Emergency Management Center	Emergency Evacuation Support	'Emergency Evacuation Support' coordinates evacuation plans among allied agencies and manages evacuation and reentry of a population in the vicinity of a disaster or other emergency that poses a risk to public safety. Where appropriate, the affected population is evacuated in shifts, using more than one evacuation route, and including several evacuation destinations to spread demand and thereby expedite the evacuation. All affected jurisdictions (e.g., states and counties) at the evacuation origin, evacuation destination, and along the evacuation route are informed of the plan. The public is provided with real-time evacuation guidance including basic information to assist potential evacuees in determining whether evacuation is necessary. Resource requirements are forecast based on the evacuation plans, and the necessary resources are located, shared between agencies if necessary, and deployed at the right locations at the appropriate times. The evacuation and reentry status are monitored and used to refine the plan and resource allocations during the evacuation and subsequent reentry. It communicates with public health systems to develop evacuation plans and recommended strategies for disasters and evacuation scenarios involving biological or other medical hazards.

Element Name	Physical Object Name	Functional Object	Functional Object Description
Jessamine County Sheriff Department	Emergency Management Center	Emergency Incident Command	'Emergency Incident Command' provides tactical decision support, resource coordination, and communications integration for Incident Commands that are established by first responders at or near the incident scene to support local management of an incident. It supports communications with public safety, emergency management, transportation, and other allied response agency centers, tracks and maintains resource information, action plans, and the incident command organization itself. Information is shared with agency centers including resource deployment status, hazardous material information, traffic, road, and weather conditions, evacuation advice, and other information that enables emergency or maintenance personnel in the field to implement an effective, safe incident response. It supports the functions and interfaces commonly supported by a mobile command center.
Jessamine County Sheriff Department	Emergency Management Center	Emergency Response Management	'Emergency Response Management' provides the strategic emergency response capabilities and broad inter-agency interfaces that are implemented for extraordinary incidents and disasters that require response from outside the local community. It provides the functional capabilities and interfaces commonly associated with Emergency Operations Centers. It develops and stores emergency response plans and manages overall coordinated response to emergencies. It monitors real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information. It tracks the availability of resources and assists in the appropriate allocation of these resources for a particular emergency response. It also provides coordination between multiple allied agencies before and during emergencies to implement emergency response plans and track progress through the incident. It also coordinates with the public through the Emergency Telecommunication Systems (e.g., Reverse 911). It coordinates with public health systems to provide the most appropriate response for emergencies involving biological or other medical hazards.
Kentucky State Police Post 12	Emergency Management Center	Emergency Call-Taking	'Emergency Call-Taking' supports the emergency call-taker, collecting available information about the caller and the reported emergency, and forwarding this information to other objects that formulate and manage the emergency response. It receives 9-1-1, 7-digit local access, and motorist call-box calls and interfaces to other agencies to assist in the verification and assessment of the emergency and to forward the emergency information to the appropriate response agency.

Element Name	Physical Object Name	Functional Object	Functional Object Description
Kentucky State Police Post 12	Emergency Management Center	Emergency Commercial Vehicle Response	'Emergency Commercial Vehicle Response' identifies and initiates a response to commercial vehicle and freight equipment related emergencies. These emergencies may include incidents involving hazardous materials as well as the detection of non-permitted transport of security sensitive hazmat. It identifies the location of the vehicle, the nature of the incident, the route information, and information concerning the freight itself. The information supports the determination of the response and identifies the responding agencies to notify.
Kentucky State Police Post 12	Emergency Management Center	Emergency Dispatch	'Emergency Dispatch' tracks the location and status of emergency vehicles and dispatches these vehicles to incidents. Pertinent incident information is gathered from the public and other public safety agencies and relayed to the responding units. Incident status and the status of the responding units is tracked so that additional units can be dispatched and/or unit status can be returned to available when the incident is cleared and closed.
Kentucky State Police Post 12	Emergency Management Center	Emergency Early Warning System	'Emergency Early Warning System' monitors alerting and advisory systems, information collected by ITS surveillance and sensors, and reports from other agencies and uses this information to identify potential, imminent, or in-progress major incidents or disasters. Notification is provided to initiate the emergency response, including public notification using ITS traveler information systems, where appropriate.
Kentucky State Police Post 12	Emergency Management Center	Emergency Evacuation Support	'Emergency Evacuation Support' coordinates evacuation plans among allied agencies and manages evacuation and reentry of a population in the vicinity of a disaster or other emergency that poses a risk to public safety. Where appropriate, the affected population is evacuated in shifts, using more than one evacuation route, and including several evacuation destinations to spread demand and thereby expedite the evacuation. All affected jurisdictions (e.g., states and counties) at the evacuation origin, evacuation destination, and along the evacuation route are informed of the plan. The public is provided with real-time evacuation guidance including basic information to assist potential evacuees in determining whether evacuation is necessary. Resource requirements are forecast based on the evacuation plans, and the necessary resources are located, shared between agencies if necessary, and deployed at the right locations at the appropriate times. The evacuation and reentry status are monitored and used to refine the plan and resource allocations during the evacuation and subsequent reentry. It communicates with public health systems to develop evacuation plans and recommended strategies for disasters and evacuation scenarios involving biological or other medical hazards.

Element Name	Physical Object Name	Functional Object	Functional Object Description
Kentucky State Police Post 12	Emergency Management Center	Emergency Incident Command	'Emergency Incident Command' provides tactical decision support, resource coordination, and communications integration for Incident Commands that are established by first responders at or near the incident scene to support local management of an incident. It supports communications with public safety, emergency management, transportation, and other allied response agency centers, tracks and maintains resource information, action plans, and the incident command organization itself. Information is shared with agency centers including resource deployment status, hazardous material information, traffic, road, and weather conditions, evacuation advice, and other information that enables emergency or maintenance personnel in the field to implement an effective, safe incident response. It supports the functions and interfaces commonly supported by a mobile command center.
Kentucky State Police Post 12	Emergency Management Center	Emergency Response Management	'Emergency Response Management' provides the strategic emergency response capabilities and broad inter-agency interfaces that are implemented for extraordinary incidents and disasters that require response from outside the local community. It provides the functional capabilities and interfaces commonly associated with Emergency Operations Centers. It develops and stores emergency response plans and manages overall coordinated response to emergencies. It monitors real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information. It tracks the availability of resources and assists in the appropriate allocation of these resources for a particular emergency response. It also provides coordination between multiple allied agencies before and during emergencies to implement emergency response plans and track progress through the incident. It also coordinates with the public through the Emergency Telecommunication Systems (e.g., Reverse 911). It coordinates with public health systems to provide the most appropriate response for emergencies involving biological or other medical hazards.
Kentucky State Police Post 12	Emergency Management Center	Emergency Routing	'Emergency Routing' supports routing of emergency vehicles and enlists support from the Traffic Management Center to facilitate travel along these routes. Routes may be determined based on real-time traffic information and road conditions or routes may be provided by the Traffic Management Center on request. Vehicles are tracked and routes are based on current vehicle location. It may coordinate with the Traffic Management Center to provide preemption or otherwise adapt the traffic control strategy along the selected route.
Kentucky State Police Post 12 Patrol Car	Emergency Vehicle OBE	EV On-Board En Route Support	'EV On-Board En Route Support' provides communications functions to responding emergency vehicles that reduce response times and improve safety of responding public safety personnel and the general public. It supports traffic signal preemption via short range communication directly with signal control equipment and sends alert messages to surrounding vehicles.

Element Name	Physical Object Name	Functional Object	Functional Object Description
Kentucky State Police Post 12 Patrol Car	Emergency Vehicle OBE	EV On-Board Incident Management Communication	'EV On-board Incident Management Communication' provides communications support to first responders. Information about the incident, information on dispatched resources, and ancillary information such as road and weather conditions are provided to emergency personnel. Emergency personnel transmit information about the incident such as identification of vehicles and people involved, the extent of injuries, hazardous material, resources on site, site management strategies in effect, and current clearance status. Emergency personnel may also send in-vehicle signing messages to approaching traffic using short range communications.
Kentucky State Police Post 12 Patrol Car	Emergency Vehicle OBE	EV Service Patrol Vehicle Operations	'EV Service Patrol Vehicle Operations' provides on-board processing and communications to service patrol vehicles that reduce response times and improve safety of responding personnel. It supports service patrol vehicle dispatch and provides incident information back to the dispatching center.
Kentucky State Police Post 7	Emergency Management Center	Emergency Call-Taking	'Emergency Call-Taking' supports the emergency call-taker, collecting available information about the caller and the reported emergency, and forwarding this information to other objects that formulate and manage the emergency response. It receives 9-1-1, 7-digit local access, and motorist call-box calls and interfaces to other agencies to assist in the verification and assessment of the emergency and to forward the emergency information to the appropriate response agency.
Kentucky State Police Post 7	Emergency Management Center	Emergency Commercial Vehicle Response	'Emergency Commercial Vehicle Response' identifies and initiates a response to commercial vehicle and freight equipment related emergencies. These emergencies may include incidents involving hazardous materials as well as the detection of non-permitted transport of security sensitive hazmat. It identifies the location of the vehicle, the nature of the incident, the route information, and information concerning the freight itself. The information supports the determination of the response and identifies the responding agencies to notify.
Kentucky State Police Post 7	Emergency Management Center	Emergency Dispatch	'Emergency Dispatch' tracks the location and status of emergency vehicles and dispatches these vehicles to incidents. Pertinent incident information is gathered from the public and other public safety agencies and relayed to the responding units. Incident status and the status of the responding units is tracked so that additional units can be dispatched and/or unit status can be returned to available when the incident is cleared and closed.
Kentucky State Police Post 7	Emergency Management Center	Emergency Early Warning System	'Emergency Early Warning System' monitors alerting and advisory systems, information collected by ITS surveillance and sensors, and reports from other agencies and uses this information to identify potential, imminent, or in-progress major incidents or disasters. Notification is provided to initiate the emergency response, including public notification using ITS traveler information systems, where appropriate.

Element Name	Physical Object Name	Functional Object	Functional Object Description
Kentucky State Police Post 7	Emergency Management Center	Emergency Evacuation Support	'Emergency Evacuation Support' coordinates evacuation plans among allied agencies and manages evacuation and reentry of a population in the vicinity of a disaster or other emergency that poses a risk to public safety. Where appropriate, the affected population is evacuated in shifts, using more than one evacuation route, and including several evacuation destinations to spread demand and thereby expedite the evacuation. All affected jurisdictions (e.g., states and counties) at the evacuation origin, evacuation destination, and along the evacuation route are informed of the plan. The public is provided with real-time evacuation guidance including basic information to assist potential evacuees in determining whether evacuation is necessary. Resource requirements are forecast based on the evacuation plans, and the necessary resources are located, shared between agencies if necessary, and deployed at the right locations at the appropriate times. The evacuation and reentry status are monitored and used to refine the plan and resource allocations during the evacuation and subsequent reentry. It communicates with public health systems to develop evacuation plans and recommended strategies for disasters and evacuation scenarios involving biological or other medical hazards.
Kentucky State Police Post 7	Emergency Management Center	Emergency Incident Command	'Emergency Incident Command' provides tactical decision support, resource coordination, and communications integration for Incident Commands that are established by first responders at or near the incident scene to support local management of an incident. It supports communications with public safety, emergency management, transportation, and other allied response agency centers, tracks and maintains resource information, action plans, and the incident command organization itself. Information is shared with agency centers including resource deployment status, hazardous material information, traffic, road, and weather conditions, evacuation advice, and other information that enables emergency or maintenance personnel in the field to implement an effective, safe incident response. It supports the functions and interfaces commonly supported by a mobile command center.

Element Name	Physical Object Name	Functional Object	Functional Object Description
Kentucky State Police Post 7	Emergency Management Center	Emergency Response Management	'Emergency Response Management' provides the strategic emergency response capabilities and broad inter-agency interfaces that are implemented for extraordinary incidents and disasters that require response from outside the local community. It provides the functional capabilities and interfaces commonly associated with Emergency Operations Centers. It develops and stores emergency response plans and manages overall coordinated response to emergencies. It monitors real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information. It tracks the availability of resources and assists in the appropriate allocation of these resources for a particular emergency response. It also provides coordination between multiple allied agencies before and during emergencies to implement emergency response plans and track progress through the incident. It also coordinates with the public through the Emergency Telecommunication Systems (e.g., Reverse 911). It coordinates with public health systems to provide the most appropriate response for emergencies involving biological or other medical hazards.
Kentucky State Police Post 7	Emergency Management Center	Emergency Routing	'Emergency Routing' supports routing of emergency vehicles and enlists support from the Traffic Management Center to facilitate travel along these routes. Routes may be determined based on real-time traffic information and road conditions or routes may be provided by the Traffic Management Center on request. Vehicles are tracked and routes are based on current vehicle location. It may coordinate with the Traffic Management Center to provide preemption or otherwise adapt the traffic control strategy along the selected route.
Kentucky State Police Post 7 Patrol Car	Emergency Vehicle OBE	EV On-Board En Route Support	'EV On-Board En Route Support' provides communications functions to responding emergency vehicles that reduce response times and improve safety of responding public safety personnel and the general public. It supports traffic signal preemption via short range communication directly with signal control equipment and sends alert messages to surrounding vehicles.
Kentucky State Police Post 7 Patrol Car	Emergency Vehicle OBE	EV On-Board Incident Management Communication	'EV On-board Incident Management Communication' provides communications support to first responders. Information about the incident, information on dispatched resources, and ancillary information such as road and weather conditions are provided to emergency personnel. Emergency personnel transmit information about the incident such as identification of vehicles and people involved, the extent of injuries, hazardous material, resources on site, site management strategies in effect, and current clearance status. Emergency personnel may also send in-vehicle signing messages to approaching traffic using short range communications.

Element Name	Physical Object Name	Functional Object	Functional Object Description
Kentucky State Police Post 7 Patrol Car	Emergency Vehicle OBE	EV Service Patrol Vehicle Operations	'EV Service Patrol Vehicle Operations' provides on-board processing and communications to service patrol vehicles that reduce response times and improve safety of responding personnel. It supports service patrol vehicle dispatch and provides incident information back to the dispatching center.
KYTC District 7 CCTV Cameras	ITS Roadway Equipment	Roadway Basic Surveillance	'Roadway Basic Surveillance' monitors traffic conditions using fixed equipment such as loop detectors and CCTV cameras.
KYTC District 7 Dynamic Message Signs	ITS Roadway Equipment	Roadway Traffic Information Dissemination	'Roadway Traffic Information Dissemination' includes field elements that provide information to drivers, including dynamic message signs and highway advisory radios.
KYTC District 7 Highway Advisory Radio	ITS Roadway Equipment	Roadway Traffic Information Dissemination	'Roadway Traffic Information Dissemination' includes field elements that provide information to drivers, including dynamic message signs and highway advisory radios.
KYTC District 7 Maintenance and Construction Offices	Emergency Management Center	Emergency Incident Scene Safety Management	'Emergency Incident Scene Safety Management' remotely monitors incident scene safety systems that detect vehicle intrusions in designated areas at the incident scene and warns on-scene personnel and drivers of imminent encroachment. Public safety responder movements are also monitored so that the responders can be warned of movement beyond the designated safe zone.
KYTC District 7 Maintenance and Construction Offices	Maint and Constr Management Center	MCM Data Collection	'MCM Data Collection' collects and stores maintenance and construction information that is collected in the course of operations by the Maintenance and Construction Management Center. This data can be used directly by operations personnel or it can be made available to other data users and archives in the region.
KYTC District 7 Maintenance and Construction Offices	Maint and Constr Management Center	MCM Environmental Information Collection	'MCM Environmental Information Collection' collects current road and weather conditions using data collected from environmental sensors deployed on and about the roadway. In addition to fixed sensor stations at the roadside, this functional object also collects environmental information from sensor systems located on Maintenance and Construction Vehicles. It also collects current and forecast environmental conditions information that is made available by other systems. The functional object aggregates the sensor system data and provides it, along with data attributes to other applications.
KYTC District 7 Maintenance and Construction Offices	Maint and Constr Management Center	MCM Roadway Maintenance	'MCM Roadway Maintenance' provides overall management and support for routine maintenance on a roadway system or right-of-way. Services managed include landscape maintenance, hazard removal (roadway debris, dead animals), routine maintenance activities (roadway cleaning, grass cutting), and repair and maintenance of non-ITS equipment on the roadway (e.g., signs, gantries, cabinets, guard rails, etc.). Environmental conditions information is also received from various weather sources to aid in scheduling routine maintenance activities. See also MCM Field Equipment Maintenance for maintenance of ITS field equipment.

Element Name	Physical Object Name	Functional Object	Functional Object Description
KYTC District 7 Maintenance and Construction Offices	Maint and Constr Management Center	MCM Vehicle Maintenance Management	'MCM Vehicle Maintenance Management' monitors vehicle and equipment condition, tracks maintenance history, and schedules routine and corrective maintenance based on vehicle/equipment utilization and availability schedules.
KYTC District 7 Maintenance and Construction Offices	Maint and Constr Management Center	MCM Vehicle Tracking	'MCM Vehicle Tracking' tracks the location of maintenance and construction vehicles and other equipment. Vehicle/equipment location and associated information is presented to the operator.
KYTC District 7 Maintenance and Construction Offices	Maint and Constr Management Center	MCM Winter Maintenance Management	'MCM Winter Maintenance Management' manages winter road maintenance, tracking and controlling snow plow operations, roadway treatment (e.g., salt spraying and other material applications), and other snow and ice control operations. It monitors environmental conditions and weather forecasts and uses the information to schedule winter maintenance activities, determine the appropriate snow and ice control response, and track and manage response operations.
KYTC District 7 Maintenance and Construction Offices	Maint and Constr Management Center	MCM Work Activity Coordination	'MCM Work Activity Coordination' disseminates work activity schedules and current asset restrictions to other agencies. Work schedules are coordinated with operating agencies, factoring in the needs and activities of other agencies and adjacent jurisdictions. Work schedules are also distributed to Transportation Information Centers for dissemination to the traveling public.
KYTC District 7 Maintenance and Construction Offices	Maint and Constr Management Center	MCM Work Zone Management	'MCM Work Zone Management' remotely monitors and supports work zone activities, controlling traffic through dynamic message signs (DMS), Highway Advisory Radio (HAR), gates and barriers, and informing other groups of activity (e.g., traveler information, traffic management, other maintenance and construction centers) for better coordination management. Work zone speeds, and delays, and closures are provided to the motorist prior to the work zones. This application provides control of field equipment in all maintenance areas, including fixed and portable field equipment supporting both stationary and mobile work zones.
KYTC District 7 Maintenance and Construction Offices	Maint and Constr Management Center	MCM Work Zone Safety Management	'MCM Work Zone Safety Management' remotely monitors work zone safety systems that detect vehicle intrusions in work zones and warns crew workers and drivers of imminent encroachment. Crew movements are also monitored so that the crew can be warned of movement beyond the designated safe zone.
KYTC District 7 Maintenance and Construction Vehicles	Maint and Constr Vehicle OBE	MCV Environmental Monitoring	'MCV Environmental Monitoring' collects current road and surface weather conditions from sensors on-board the maintenance and construction vehicle or by querying fixed sensors on or near the roadway. Environmental information including road surface temperature, air temperature, and wind speed is measured and spatially located and time stamped, and reported back to a center.
KYTC District 7 Maintenance and Construction Vehicles	Maint and Constr Vehicle OBE	MCV Vehicle Location Tracking	'MCV Vehicle Location Tracking' monitors vehicle location and reports the position and timestamp information to the dispatch center.

Element Name	Physical Object Name	Functional Object	Functional Object Description
KYTC District 7 Maintenance and Construction Vehicles	Maint and Constr Vehicle OBE	MCV Vehicle System Monitoring and Diagnostics	'MCV Vehicle System Monitoring and Diagnostics' includes on-board sensors capable of monitoring the condition of each of the vehicle systems and diagnostics that can be used to support vehicle maintenance. The status of the vehicle and ancillary equipment and diagnostic information is provided to the vehicle operator, repair facility, and dispatch center.
KYTC District 7 Maintenance and Construction Vehicles	Maint and Constr Vehicle OBE	MCV Winter Maintenance	'MCV Winter Maintenance' supports snow plow operations and other roadway treatments (e.g., salt spraying and other material applications). It supports communications with the center to receive information and instructions that are provided to the vehicle operator and also supports remote control of on-board systems. It tracks operational status of snow and ice control operations and provides this information back to the center.
KYTC District 7 Office	Center	Center Data Subscription Management	'Center Data Subscription Management' manages data subscriptions for an end user. It provides access to a catalog of available data, manages the necessary user information and rules that govern the data subscriptions, supports communications with data providers to collect data per the subscription rules, and makes the data available to the end user. It provides the local user interface through which a user can specify and manage subscriptions. It supports different mechanisms for collecting subscribed data for the end-user including one-time query-response as well as publish-subscribe services.
KYTC District 7 Office	Maint and Constr Management Center	MCM Data Collection	'MCM Data Collection' collects and stores maintenance and construction information that is collected in the course of operations by the Maintenance and Construction Management Center. This data can be used directly by operations personnel or it can be made available to other data users and archives in the region.
KYTC District 7 Office	Traffic Management Center	TMC Basic Surveillance	'TMC Basic Surveillance' remotely monitors and controls traffic sensor systems and surveillance (e.g., CCTV) equipment, and collects, processes and stores the collected traffic data. Current traffic information and other real-time transportation information is also collected from other centers. The collected information is provided to traffic operations personnel and made available to other centers.
KYTC District 7 Office	Traffic Management Center	TMC Demand Management Coordination	'TMC Demand Management Coordination' provides the capability to gather information on regional toll, parking, and transit usage and request changes to pricing and other mechanisms to manage overall transportation demand.
KYTC District 7 Office	Traffic Management Center	TMC Infrastructure Restriction Warning	'TMC Infrastructure Restriction Warning' controls and monitors RSEs that support Infrastructure Restriction Warnings. It configures the RSEs to define tunnel/bridge geometry and design and temporary size and weight restrictions. Information that is currently being communicated to passing vehicles and the operational status of the field equipment is monitored by this application. The operational status of the field equipment is reported to operations personnel.

Element Name	Physical Object Name	Functional Object	Functional Object Description
KYTC District 7 Office	Traffic Management Center	TMC Regional Traffic Management	'TMC Regional Traffic Management' supports coordination between Traffic Management Centers in order to share traffic information between centers as well as control of traffic management field equipment. This coordination supports wide area optimization and regional coordination that spans jurisdictional boundaries; for example, coordinated signal control in a metropolitan area or coordination between freeway operations and arterial signal control within a corridor.
KYTC District 7 Office	Traffic Management Center	TMC Roadway Equipment Monitoring	'TMC Roadway Equipment Monitoring' monitors the operational status of field equipment and detects failures. It presents field equipment status to Traffic Operations Personnel and reports failures to the Maintenance and Construction Management Center. It tracks the repair or replacement of the failed equipment. The entire range of ITS field equipment may be monitored including sensors (traffic, infrastructure, environmental, security, speed, etc.) and devices (highway advisory radio, dynamic message signs, automated roadway treatment systems, barrier and safeguard systems, cameras, traffic signals and override equipment, ramp meters, beacons, security surveillance equipment, etc.).
KYTC District 7 Office	Traffic Management Center	TMC Service Patrol Management	'TMC Service Patrol Management' supports dispatch and communication with service patrol vehicles that monitor roads to aid motorists, offering rapid response to minor incidents.
KYTC District 7 Office	Traffic Management Center	TMC Traffic Information Dissemination	'TMC Traffic Information Dissemination' disseminates traffic and road conditions, closure and detour information, incident information, driver advisories, and other traffic-related data to other centers, the media, and driver information systems. It monitors and controls driver information system field equipment including dynamic message signs and highway advisory radio, managing dissemination of driver information through these systems.

Element Name	Physical Object Name	Functional Object	Functional Object Description
KYTC District 7 Office	Traffic Management Center	TMC Traffic Management Decision Support	'TMC Traffic Management Decision Support' recommends courses of action to the traffic operator based on current and forecast road and traffic conditions. Traffic incidents, special events, maintenance activities and other events or conditions that impact capacity or demand are monitored. Historical data and models are used to compare the impact of potential courses of action and make recommendations to the operator. Decisions are supported through presentation of filtered and fused network-wide road and traffic conditions that identify network imbalances and recommended courses of action. The recommended actions may include predefined incident response plans, signal timing plan changes, DMS/HAR messages, truck restrictions, lane control strategies, metering strategies, and adjustment of variable speed limits. Multimodal strategies may also be recommended that include suggested transit strategies and suggested route and mode choices for travelers. Once a course of action is selected, traffic operations personnel implement these actions within the Traffic Management Center and coordinate the response with other centers in the region.
KYTC District 7 Office	Traffic Management Center	TMC Traffic Metering	'TMC Traffic Metering' provides center monitoring and control of traffic metering systems including on ramps, through interchanges, and on the mainline roadway. All types of metering are covered including pre-timed/fixed time, time-based, dynamic and adaptive metering strategies and special bypasses. Metering rates can be calculated based upon historical data or current conditions including traffic, air quality, etc.
KYTC District 7 Office	Traffic Management Center	TMC Traffic Network Performance Evaluation	'TMC Traffic Network Performance Evaluation' measures traffic network performance and predicts travel demand patterns to support traffic flow optimization, demand management, and incident management. It collects traffic data from sensors and surveillance equipment as well as input from other Traffic Management Centers, emissions management, transit operations, and event promoters and uses this information to measure traffic network performance. It collects route planning information from transportation information centers and integrates and uses this information to predict future traffic conditions. The planned control strategies can be passed back to the transportation information center so that the intended strategies can be reflected in future route planning.
KYTC District 7 Overheight Vehicle Sensors	ITS Roadway Equipment	Roadway Basic Surveillance	'Roadway Basic Surveillance' monitors traffic conditions using fixed equipment such as loop detectors and CCTV cameras.
KYTC District 7 Overheight Vehicle Sensors	ITS Roadway Equipment	Roadway Restriction Monitoring and Warning	'Roadway Restriction Monitoring and Warning' measures the size and weight of passing vehicles and displays warnings to vehicles if the size exceeds the current infrastructure restrictions. The measured vehicle dimensions are also made available to other applications.

Element Name	Physical Object Name	Functional Object	Functional Object Description
KYTC District 7 Overheight Vehicle Sensors	ITS Roadway Equipment	Roadway Warning	'Roadway Warning' includes the field equipment used to warn drivers approaching hazards on a roadway. Warnings may be generated in response to roadway weather conditions, road surface conditions, traffic conditions including queues, obstacles or animals in the roadway, and any other transient events that can be sensed. The equipment monitors traffic and roadway conditions and may send data to a Traffic Management Center for processing or may process it to determine when a warning should be issued. When it is determined that a warning should be issued, the equipment is used to alert approaching drivers via dynamic warning signs, flashing lights, in-vehicle messages, etc.
KYTC District 7 Ramp Meters	ITS Roadway Equipment	Roadway Traffic Metering	'Roadway Traffic Metering' includes the field equipment used to meter traffic on ramps, through interchanges, and on the mainline roadway. The equipment includes dynamic messages signs to provide guidance and information to drivers at and approaching a meter, including information for any special bypass lanes.
KYTC District 7 Roadside Traffic Detection Equipment	ITS Roadway Equipment	Roadway Basic Surveillance	'Roadway Basic Surveillance' monitors traffic conditions using fixed equipment such as loop detectors and CCTV cameras.
KYTC District 7 RWIS Stations	ITS Roadway Equipment	Roadway Environmental Monitoring	'Roadway Environmental Monitoring' measures environmental conditions and communicates the collected information back to a center where it can be monitored and analyzed or to other field devices to support communications to vehicles. A broad array of general weather and road surface information may be collected. Weather conditions that may be measured include temperature, wind, humidity, precipitation, and visibility. Surface and sub-surface sensors can measure road surface temperature, moisture, icing, salinity, and other measures.
KYTC District 7 Safe Patrol Vehicles	Emergency Vehicle OBE	EV On-Board En Route Support	'EV On-Board En Route Support' provides communications functions to responding emergency vehicles that reduce response times and improve safety of responding public safety personnel and the general public. It supports traffic signal preemption via short range communication directly with signal control equipment and sends alert messages to surrounding vehicles.
KYTC District 7 Safe Patrol Vehicles	Emergency Vehicle OBE	EV On-Board Incident Management Communication	'EV On-board Incident Management Communication' provides communications support to first responders. Information about the incident, information on dispatched resources, and ancillary information such as road and weather conditions are provided to emergency personnel. Emergency personnel transmit information about the incident such as identification of vehicles and people involved, the extent of injuries, hazardous material, resources on site, site management strategies in effect, and current clearance status. Emergency personnel may also send in-vehicle signing messages to approaching traffic using short range communications.

Element Name	Physical Object Name	Functional Object	Functional Object Description
KYTC District 7 Safe Patrol Vehicles	Emergency Vehicle OBE	EV Service Patrol Vehicle Operations	'EV Service Patrol Vehicle Operations' provides on-board processing and communications to service patrol vehicles that reduce response times and improve safety of responding personnel. It supports service patrol vehicle dispatch and provides incident information back to the dispatching center.
KYTC District 7 Traffic Signals	ITS Roadway Equipment	Roadway Field Management Station Operation	'Roadway Field Management Station Operation' supports direct communications between field management stations and the local field equipment under their control.
KYTC District 7 Traffic Signals	ITS Roadway Equipment	Roadway Signal Control	'Roadway Signal Control' includes the field elements that monitor and control signalized intersections. It includes the traffic signal controllers, detectors, conflict monitors, signal heads, and other ancillary equipment that supports traffic signal control. It also includes field masters, and equipment that supports communications with a central monitoring and/or control system, as applicable. The communications link supports upload and download of signal timings and other parameters and reporting of current intersection status. It represents the field equipment used in all levels of traffic signal control from basic actuated systems that operate on fixed timing plans through adaptive systems. It also supports all signalized intersection configurations, including those that accommodate pedestrians. In advanced, future implementations, environmental data may be monitored and used to support dilemma zone processing and other aspects of signal control that are sensitive to local environmental conditions.
KYTC District 7 Work Zone Safety Equipment	ITS Roadway Equipment	Roadway Work Zone Safety	'Roadway Work Zone Safety' includes field elements that detect vehicle intrusions in work zones and warns crew workers and drivers of imminent encroachment. Crew movements are also monitored so that the crew can be warned of movement beyond the designated safe zone.
KYTC District 7 Work Zone Safety Equipment	ITS Roadway Equipment	Roadway Work Zone Traffic Control	'Roadway Work Zone Traffic Control' controls traffic in areas of the roadway where maintenance and construction activities are underway, monitoring and controlling traffic using field equipment such as CCTV cameras, dynamic messages signs, and gates/barriers. Work zone speeds and delays are provided to the motorist prior to the work zones.
KYTC District 7 Wrong Way Vehicle Detection System	ITS Roadway Equipment	Roadway Basic Surveillance	'Roadway Basic Surveillance' monitors traffic conditions using fixed equipment such as loop detectors and CCTV cameras.

Element Name	Physical Object Name	Functional Object	Functional Object Description
KYTC District 7 Wrong Way Vehicle Detection System	ITS Roadway Equipment	Roadway Warning	'Roadway Warning' includes the field equipment used to warn drivers approaching hazards on a roadway. Warnings may be generated in response to roadway weather conditions, road surface conditions, traffic conditions including queues, obstacles or animals in the roadway, and any other transient events that can be sensed. The equipment monitors traffic and roadway conditions and may send data to a Traffic Management Center for processing or may process it to determine when a warning should be issued. When it is determined that a warning should be issued, the equipment is used to alert approaching drivers via dynamic warning signs, flashing lights, in-vehicle messages, etc.
KYTC GoKY	Transportation Information Center	TIC Data Collection	'TIC Data Collection' collects transportation-related data from other centers, performs data quality checks on the collected data and then consolidates, verifies, and refines the data and makes it available in a consistent format to applications that support operational data sharing between centers and deliver traveler information to end-users. A broad range of data is collected including traffic and road conditions, transit data, emergency information and advisories, weather data, special event information, traveler services, parking, multimodal data, and toll/pricing data. It also shares data with other transportation information centers.
KYTC GoKY	Transportation Information Center	TIC Interactive Traveler Information	'TIC Interactive Traveler Information' disseminates personalized traveler information including traffic and road conditions, transit information, parking information, maintenance and construction information, multimodal information, event information, and weather information. Tailored information is provided based on the traveler's request in this interactive service.
KYTC GoKY	Transportation Information Center	TIC Traveler Information Broadcast	'TIC Traveler Information Broadcast' disseminates traveler information including traffic and road conditions, incident information, maintenance and construction information, event information, transit information, parking information, and weather information. The same information is broadcast to all equipped traveler interface systems and vehicles.
KYTC GoKY	Transportation Information Center	TIC Traveler Telephone Information	'TIC Traveler Telephone Information' services voice-based traveler requests for information that supports traveler telephone information systems like 511. It takes requests for traveler information, which could be voice-formatted traveler requests, dual-tone multi-frequency (DTMF)-based requests, or a simple traveler information request, and returns the requested traveler information in the proper format. In addition to servicing requests for traveler information, it also collects and forwards alerts and advisories to traveler telephone information systems.

Element Name	Physical Object Name	Functional Object	Functional Object Description
KYTC MDSS	Maint and Constr Management Center	MCM Maintenance Decision Support	'MCM Maintenance Decision Support' recommends maintenance courses of action based on current and forecast environmental and road conditions and additional application specific information. Decisions are supported through understandable presentation of filtered and fused environmental and road condition information for specific time horizons as well as specific maintenance recommendations that are generated by the system based on this integrated information. The recommended courses of action are supported by information on the anticipated consequences of action or inaction, when available.
KYTC MDSS	Maint and Constr Management Center	MCM Winter Maintenance Management	'MCM Winter Maintenance Management' manages winter road maintenance, tracking and controlling snow plow operations, roadway treatment (e.g., salt spraying and other material applications), and other snow and ice control operations. It monitors environmental conditions and weather forecasts and uses the information to schedule winter maintenance activities, determine the appropriate snow and ice control response, and track and manage response operations.
KYTC Truck Parking Management System	Parking Management System	Parking Data Collection	'Parking Data Collection' collects and stores parking information that is collected in the course of parking system operations. This data can be used directly by operations personnel or it can be made available to other data users and archives in the region.
KYTC Truck Parking Website	Transportation Information Center	TIC Operations Data Collection	'TIC Operations Data Collection' collects and stores information that is collected about the transportation information service including data on the number of clients serviced and the services that were provided. This data can be used directly by operations personnel or it can be made available to other data users and archives in the region.
Lextran Facility Surveillance Equipment	ITS Object	ITS Management Support	'ITS Management Support' provides management of the ITS Object. This includes management of regulatory information and policies, management of application processes, management of communication system configuration and update management, communications interfaces, protocol-specific techniques to ensure interoperability such as service advertisements, communications congestion management and interference management, local device states and communications information, billing management, fault management, service level and performance monitoring.
Lextran Facility Surveillance Equipment	ITS Object	ITS Security Support	'ITS Security Support' provides communications and system security functions to the ITS Object, including privacy protection functions. It may include firewall, intrusion management, authentication, authorization, profile management, identity management, cryptographic key management. It may include a hardware security module and security management information base.

Element Name	Physical Object Name	Functional Object	Functional Object Description
Lextran Facility Surveillance Equipment	Security Monitoring Equipment	Field Secure Area Surveillance	'Field Secure Area Surveillance' includes video and audio surveillance equipment that monitors conditions of secure areas including facilities (e.g. transit yards), transportation infrastructure (e.g. as bridges, tunnels, interchanges, and transit railways or guideways), and public areas (e.g., transit stops, transit stations, rest areas, park and ride lots, modal interchange facilities). It provides the surveillance information to the Emergency Management Center for possible threat detection. It also provides local processing of the video or audio information, providing processed or analyzed results to the Emergency Management Center.
Lextran Next Bus Arrival Display	Traveler Support Equipment	Transit Stop Information Services	'Transit Stop Information Services' furnishes transit users with real-time travel-related information at transit stops, multi-modal transfer points, and other public transportation areas. It provides transit users with information on transit routes, schedules, transfer options, available services, fares, and real-time schedule adherence. In addition to tailored information for individual transit users, it supports general annunciation and/or display of imminent arrival information and other information of general interest to transit users.
Lextran Transit Center Security Cameras	ITS Object	ITS Management Support	'ITS Management Support' provides management of the ITS Object. This includes management of regulatory information and policies, management of application processes, management of communication system configuration and update management, communications interfaces, protocol-specific techniques to ensure interoperability such as service advertisements, communications congestion management and interference management, local device states and communications information, billing management, fault management, service level and performance monitoring.
Lextran Transit Center Security Cameras	ITS Object	ITS Security Support	'ITS Security Support' provides communications and system security functions to the ITS Object, including privacy protection functions. It may include firewall, intrusion management, authentication, authorization, profile management, identity management, cryptographic key management. It may include a hardware security module and security management information base.
Lextran Transit Center Security Cameras	Security Monitoring Equipment	Field Secure Area Surveillance	'Field Secure Area Surveillance' includes video and audio surveillance equipment that monitors conditions of secure areas including facilities (e.g. transit yards), transportation infrastructure (e.g. as bridges, tunnels, interchanges, and transit railways or guideways), and public areas (e.g., transit stops, transit stations, rest areas, park and ride lots, modal interchange facilities). It provides the surveillance information to the Emergency Management Center for possible threat detection. It also provides local processing of the video or audio information, providing processed or analyzed results to the Emergency Management Center.

Element Name	Physical Object Name	Functional Object	Functional Object Description
Lextran Transit Operations Center	Archived Data System	Archive Data Repository	'Archive Data Repository' collects data and data catalogs from one or more data sources and stores the data in a focused repository that is suited to a particular set of ITS data users. It includes capabilities for performing quality checks on the incoming data, error notification, and archive to archive coordination. It includes the capability to define a data registry that allows registration of data identifiers or data definitions for interoperable use throughout a region. It supports a broad range of implementations, ranging from simple data marts that collect a focused set of data and serve a particular user community to large-scale data warehouses that collect, integrate, and summarize transportation data from multiple sources and serve a broad array of users within a region. Repositories may be established to support operations planning, performance monitoring and management, and policy and investment decisions.
Lextran Transit Operations Center	Archived Data System	Archive Government Reporting	'Archive Government Reporting' selects and formats data residing in an ITS archive to facilitate local, state, and federal government data reporting requirements. It provides transportation system statistics and performance measures in required formats to support investment and policy decisions.
Lextran Transit Operations Center	Archived Data System	Archive On-Line Analysis and Mining	'Archive On-Line Analysis and Mining' provides advanced data analysis, summarization, and mining features that facilitate discovery of information, patterns, and correlations in large data sets. Multidimensional analysis, selective summarization and expansion of data details, and many other advanced analysis services may be offered. Complex performance measures that are derived from multiple data sources may also be produced.
Lextran Transit Operations Center	Center	Center Data Subscription Management	'Center Data Subscription Management' manages data subscriptions for an end user. It provides access to a catalog of available data, manages the necessary user information and rules that govern the data subscriptions, supports communications with data providers to collect data per the subscription rules, and makes the data available to the end user. It provides the local user interface through which a user can specify and manage subscriptions. It supports different mechanisms for collecting subscribed data for the end-user including one-time query-response as well as publish-subscribe services.
Lextran Transit Operations Center	Data Distribution System	DDS Data Access Management	'DDS Data Access Management' defines the access mechanisms, structures and restrictions for inbound (from providers) and outbound (to consumers) data.

Element Name	Physical Object Name	Functional Object	Functional Object Description
Lextran Transit Operations Center	Data Distribution System	DDS Data Collection and Aggregation	'DDS Data Collection and Aggregation' collects data 'deposits' from producers including meta data such as the generation location and time. It authenticates and validates the data deposits and logs all associated meta data. Authenticated, valid data is bundled based on information type and location and made available as data products to consumers who are interested in the data. It establishes delivery parameters for data consumers that subscribe based on parameters including content type and geographic region of interest and delivers data to consumers based on these parameters.
Lextran Transit Operations Center	Emergency Management Center	Emergency Secure Area Alarm Support	'Emergency Secure Area Alarm Support' receives traveler or transit vehicle operator alarm messages, notifies the system operator, and provides acknowledgement of alarm receipt back to the originator of the alarm. The alarms received can be generated by silent or audible alarm systems and may originate from public areas (e.g. transit stops, park and ride lots, transit stations, rest areas) or transit vehicles. The nature of the emergency may be determined based on the information in the alarm message as well as other inputs.
Lextran Transit Operations Center	Emergency Management Center	Emergency Secure Area Surveillance	'Emergency Secure Area Surveillance' monitors surveillance inputs from secure areas in the transportation system. The surveillance may be of secure areas frequented by travelers (i.e., transit stops, transit stations, rest areas, park and ride lots, modal interchange facilities, on-board a transit vehicle, etc.) or around transportation infrastructure such as bridges, tunnels and transit railways or guideways. It provides both video and audio surveillance information to emergency personnel and automatically alerts emergency personnel of potential incidents.
Lextran Transit Operations Center	Transit Management Center	Transit Center Data Collection	'Transit Center Data Collection' collects and stores transit information that is collected in the course of transit operations performed by the Transit Management Center. This data can be used directly by operations personnel or it can be made available to other data users and archives in the region.
Lextran Transit Operations Center	Transit Management Center	Transit Center Fare Management	'Transit Center Fare Management' manages fare collection and passenger load management at the transit center. It provides the back office functions that support transit fare collection, supporting payment reconciliation with links to financial institutions and enforcement agencies for fare violations. It collects data required to determine accurate ridership levels, establish fares, and distribute fare information. It loads fare data into the vehicle prior to the beginning of normal operations and unloads fare collection data from the vehicle at the close out of normal operations.

Element Name	Physical Object Name	Functional Object	Functional Object Description
Lextran Transit Operations Center	Transit Management Center	Transit Center Fixed-Route Operations	'Transit Center Fixed-Route Operations' manages fixed route transit operations. It supports creation of schedules, blocks and runs for fixed and flexible route transit services. It allows fixed-route and flexible-route transit services to disseminate schedules and automatically updates customer service operator systems with the most current schedule information. It also supports automated dispatch of transit vehicles. Current vehicle schedule adherence and optimum scenarios for schedule adjustment are also provided. It also receives and processes transit vehicle loading data.
Lextran Transit Operations Center	Transit Management Center	Transit Center Information Services	'Transit Center Information Services' collects the latest available information for a transit service and makes it available to transit customers and to Transportation Information Centers for further distribution. Customers are provided information at transit stops and other public transportation areas before they embark and on-board the transit vehicle once they are en route. Information provided can include the latest available information on transit routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, yellow pages, and special events. In addition to general service information, tailored information (e.g., itineraries) are provided to individual transit users.
Lextran Transit Operations Center	Transit Management Center	Transit Center Multi-Modal Coordination	'Transit Center Multi-Modal Coordination' supports transit service coordination between transit properties and coordinates with other surface and air transportation modes. As part of service coordination, it shares schedule and trip information, as well as transit transfer cluster (a collection of stop points, stations, or terminals where transfers can be made conveniently) and transfer point information between Multimodal Transportation Service Providers, Transit Agencies, and ISPs. An interface to Traffic Management also supports demand management strategies.
Lextran Transit Operations Center	Transit Management Center	Transit Center Operator Assignment	'Transit Center Operator Assignment' automates and supports the assignment of transit vehicle operators to runs. It assigns operators to runs in a fair manner while minimizing labor and overtime services, considering operator preferences and qualifications, and automatically tracking and validating the number of work hours performed by each individual operator. It also provides an exception handling process for the operator assignment function to generate supplemental operator assignments when required by changes during the operating day.
Lextran Transit Operations Center	Transit Management Center	Transit Center Paratransit Operations	'Transit Center Paratransit Operations' manages demand responsive transit services, including paratransit services. It supports planning and scheduling of these services, allowing paratransit and other demand response transit services to plan efficient routes and better estimate arrival times. It also supports automated dispatch of paratransit vehicles and tracks passenger pick-ups and drop-offs. Customer service operator systems are updated with the most current schedule information.

Element Name	Physical Object Name	Functional Object	Functional Object Description
Lextran Transit Operations Center	Transit Management Center	Transit Center Passenger Counting	'Transit Center Passenger Counting' receives and processes transit vehicle loading data using two-way communications from equipped transit vehicles.
Lextran Transit Operations Center	Transit Management Center	Transit Center Priority Management	'Transit Center Priority Management' monitors transit schedule performance and generates requests for transit priority on routes and at certain intersections. It may coordinate with the Traffic Management Center to provide transit priority along the selected route, including allocation of dynamic lanes and granting signal priority. It also coordinates with the Transit Vehicle OBE to monitor and manage local transit signal priority requests at individual intersections.
Lextran Transit Operations Center	Transit Management Center	Transit Center Security	'Transit Center Security' monitors transit vehicle operator or traveler activated alarms received from on-board a transit vehicle. It supports transit vehicle operator authentication and provides the capability to remotely disable a transit vehicle. It also includes the capability to alert operators and police to potential incidents identified by these security features.
Lextran Transit Operations Center	Transit Management Center	Transit Center Vehicle Assignment	'Transit Center Vehicle Assignment' assigns individual transit vehicles to vehicle blocks and downloads this information to the transit vehicle. It also provides an exception handling process for the vehicle assignment function to generate new, supplemental vehicle assignments when required by changes during the operating day. It provides an inventory management function for the transit facility which stores functional attributes about each of the vehicles owned by the transit operator. These attributes permit the planning and assignment functions to match vehicles with routes based on suitability for the types of service required by the particular routes.
Lextran Transit Operations Center	Transit Management Center	Transit Center Vehicle Tracking	'Transit Center Vehicle Tracking' monitors transit vehicle location. The location information is collected via a data communication link between the transit vehicles and the transit center. The location information is presented to the transit operator on a digitized map of the transit service area. The location data may be used to determine real time schedule adherence and update the transit system's schedule in real-time. The real-time schedule information is disseminated to other information providers, which furnish the information to travelers.
Lextran Transit Operations Center	Transit Management Center	Transit Evacuation Support	'Transit Evacuation Support' manages transit resources to support evacuation and subsequent reentry of a population in the vicinity of a disaster or other emergency. It supports coordination of regional evacuation plans, identifying the transit role in a regional evacuation and identifying transit resources that would be used. During an evacuation, it coordinates the use of transit and school bus fleets, supporting evacuation of those with special needs and the general population. Transit service and fare schedules are adjusted and updated service and fare information is made available through traveler information systems.

Element Name	Physical Object Name	Functional Object	Functional Object Description
Lextran Transit Operations Center	Transit Management Center	Transit Garage Maintenance	'Transit Garage Maintenance' provides advanced maintenance functions for the transit property. It collects operational and maintenance data from transit vehicles, manages vehicle service histories, and monitors operators and vehicles. It collects vehicle mileage data and uses it to automatically generate preventative maintenance schedules for each vehicle by utilizing vehicle tracking data. In addition, it provides information to service personnel to support maintenance activities and records and verifies that maintenance work was performed.
Lextran Transit Vehicle	Transit Vehicle OBE	Transit Vehicle On-Board Fare Management	'Transit Vehicle On-board Fare Management' supports fare collection using a standard fare card or other non-monetary fare medium and detects payment violations. Collected fare data are made available to the center.
Lextran Transit Vehicle	Transit Vehicle OBE	Transit Vehicle On-Board Information Services	'Transit Vehicle On-board Information Services' furnishes en route transit users with real-time travel-related information on-board a transit vehicle. Current information that can be provided to transit users includes transit routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, non-motorized transportation services, and special events are provided. In addition to tailored information for individual transit users, it also supports general annunciation and/or display of general schedule information, imminent arrival information, and other information of general interest to transit users.
Lextran Transit Vehicle	Transit Vehicle OBE	Transit Vehicle On-Board Maintenance	'Transit Vehicle On-Board Maintenance' collects and processes transit vehicle maintenance data on-board the vehicle, including mileage and vehicle operating conditions. This maintenance information is provided to the management center and used to schedule future vehicle maintenance and repair.
Lextran Transit Vehicle	Transit Vehicle OBE	Transit Vehicle On-Board Trip Monitoring	'Transit Vehicle On-Board Trip Monitoring' tracks vehicle location, monitors fuel usage, collects operational status (doors opened/closed, running times, etc.) and sends the collected, time stamped data to the Transit Management Center.
Lextran Transit Vehicle	Transit Vehicle OBE	Transit Vehicle Passenger Counting	'Transit Vehicle Passenger Counting' collects transit vehicle loading data and makes it available to the center.
Lextran Transit Vehicle	Transit Vehicle OBE	Transit Vehicle Schedule Management	'Transit Vehicle Schedule Management' monitors schedule performance and identifies corrective actions when a deviation is detected. It provides two-way communication between the transit vehicle and center, enabling the center to communicate with the vehicle operator and monitor on-board systems.

Element Name	Physical Object Name	Functional Object	Functional Object Description
Lextran Transit Vehicle	Transit Vehicle OBE	Transit Vehicle Security	'Transit Vehicle Security' provides security and safety functions on-board the transit vehicle. It includes surveillance and sensor systems that monitor the on-board environment, silent alarms that can be activated by transit user or vehicle operator, operator authentication, and a remote vehicle disable function. The surveillance equipment includes video (e.g. CCTV cameras), audio systems and/or event recorder systems. The sensor equipment includes threat sensors (e.g. chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors) and object detection sensors (e.g. metal detectors).
Lextran Transit Vehicle	Transit Vehicle OBE	Transit Vehicle Signal Priority	'Transit Vehicle Signal Priority' provides the capability for transit vehicles to determine eligibility for priority and request signal priority at signalized intersections, ramps, and interchanges through short range communication with traffic control equipment at the roadside.
Lextran Web Site	Center	Center Data Subscription Management	'Center Data Subscription Management' manages data subscriptions for an end user. It provides access to a catalog of available data, manages the necessary user information and rules that govern the data subscriptions, supports communications with data providers to collect data per the subscription rules, and makes the data available to the end user. It provides the local user interface through which a user can specify and manage subscriptions. It supports different mechanisms for collecting subscribed data for the end-user including one-time query-response as well as publish-subscribe services.
Lextran Web Site	Data Distribution System	DDS Data Access Management	'DDS Data Access Management' defines the access mechanisms, structures and restrictions for inbound (from providers) and outbound (to consumers) data.
Lextran Web Site	Data Distribution System	DDS Data Collection and Aggregation	'DDS Data Collection and Aggregation' collects data 'deposits' from producers including meta data such as the generation location and time. It authenticates and validates the data deposits and logs all associated meta data. Authenticated, valid data is bundled based on information type and location and made available as data products to consumers who are interested in the data. It establishes delivery parameters for data consumers that subscribe based on parameters including content type and geographic region of interest and delivers data to consumers based on these parameters.
Lextran Web Site	Transportation Information Center	TIC Data Collection	'TIC Data Collection' collects transportation-related data from other centers, performs data quality checks on the collected data and then consolidates, verifies, and refines the data and makes it available in a consistent format to applications that support operational data sharing between centers and deliver traveler information to end-users. A broad range of data is collected including traffic and road conditions, transit data, emergency information and advisories, weather data, special event information, traveler services, parking, multimodal data, and toll/pricing data. It also shares data with other transportation information centers.

Element Name	Physical Object Name	Functional Object	Functional Object Description
Lextran Web Site	Transportation Information Center	TIC Traveler Information Broadcast	'TIC Traveler Information Broadcast' disseminates traveler information including traffic and road conditions, incident information, maintenance and construction information, event information, transit information, parking information, and weather information. The same information is broadcast to all equipped traveler interface systems and vehicles.
Lextran Web Site	Transportation Information Center	TIC Trip Planning	'TIC Trip Planning' provides pre-trip and en route trip planning services for travelers. It receives origin, destination, constraints, and preferences and returns trip plan(s) that meet the supplied criteria. Trip plans may be based on current traffic and road conditions, transit schedule information, and other real-time traveler information. Candidate trip plans are multimodal and may include vehicle, transit, and alternate mode segments (e.g., rail, ferry, bicycle routes, and walkways) based on traveler preferences. It also confirms the trip plan for the traveler and supports reservations and advanced payment for portions of the trip. The trip plan includes specific routing information and instructions for each segment of the trip and may also include information and reservations for additional services (e.g., parking) along the route.
Lextran WHEELS Transit Vehicle	Transit Vehicle OBE	Transit Vehicle On-Board Paratransit Operations	'Transit Vehicle On-board Paratransit Operations' forwards paratransit and flexible-route dispatch requests to the operator and forwards acknowledgements to the center. It coordinates with and assists the operator in managing multi-stop runs associated with demand responsive transit services including paratransit. It collects transit vehicle passenger data and makes it available to the center.
LFCPA Lexpark Website	Transportation Information Center	TIC Travel Services Information and Reservation	'TIC Travel Services Information' disseminates information about traveler services such as lodging, restaurants, and service stations. Tailored traveler service information is provided on request that meets the constraints and preferences specified by the traveler. This application also supports reservations and advanced payment for traveler services including parking and loading zone use.
LFCPA Parking Management System	Parking Management System	Parking Coordination	'Parking Coordination' supports communication and coordination between equipped parking facilities and also supports regional coordination between parking facilities and traffic management systems. Coordination with traffic management supports local traffic control coordination in and around the parking facility and broader regional coordination. It also shares information with transit management systems and information providers to support multimodal travel planning, including parking reservations capabilities. Information including current parking availability, system status, and operating strategies are shared to enable local parking facility management that supports regional transportation strategies.

Element Name	Physical Object Name	Functional Object	Functional Object Description
LFCPA Parking Management System	Parking Management System	Parking Electronic Payment	'Parking Electronic Payment' supports electronic payment of parking fees using in-vehicle equipment (e.g., tags) or contact or proximity cards. It includes the field elements that provide the interface to the in-vehicle or card payment device and the back-office functionality that performs the transaction.
LFCPA Parking Management System	Parking Management System	Parking Management	'Parking Management' detects and classifies vehicles at parking facility entrances, exits, and other designated locations within the facility. Current parking availability is monitored and used to inform drivers through dynamic message signs/displays so that vehicles are efficiently routed to available spaces. Parking facility information, including current parking rates and directions to entrances and available exits, is also provided to drivers.
LFUCG 911/Emergency Communications Center	Archived Data System	Archive Data Repository	'Archive Data Repository' collects data and data catalogs from one or more data sources and stores the data in a focused repository that is suited to a particular set of ITS data users. It includes capabilities for performing quality checks on the incoming data, error notification, and archive to archive coordination. It includes the capability to define a data registry that allows registration of data identifiers or data definitions for interoperable use throughout a region. It supports a broad range of implementations, ranging from simple data marts that collect a focused set of data and serve a particular user community to large-scale data warehouses that collect, integrate, and summarize transportation data from multiple sources and serve a broad array of users within a region. Repositories may be established to support operations planning, performance monitoring and management, and policy and investment decisions.
LFUCG 911/Emergency Communications Center	Archived Data System	Archive Government Reporting	'Archive Government Reporting' selects and formats data residing in an ITS archive to facilitate local, state, and federal government data reporting requirements. It provides transportation system statistics and performance measures in required formats to support investment and policy decisions.
LFUCG 911/Emergency Communications Center	Archived Data System	Archive On-Line Analysis and Mining	'Archive On-Line Analysis and Mining' provides advanced data analysis, summarization, and mining features that facilitate discovery of information, patterns, and correlations in large data sets. Multidimensional analysis, selective summarization and expansion of data details, and many other advanced analysis services may be offered. Complex performance measures that are derived from multiple data sources may also be produced.
LFUCG 911/Emergency Communications Center	Emergency Management Center	Emergency Call-Taking	'Emergency Call-Taking' supports the emergency call-taker, collecting available information about the caller and the reported emergency, and forwarding this information to other objects that formulate and manage the emergency response. It receives 9-1-1, 7-digit local access, and motorist call-box calls and interfaces to other agencies to assist in the verification and assessment of the emergency and to forward the emergency information to the appropriate response agency.

Element Name	Physical Object Name	Functional Object	Functional Object Description
LFUCG 911/Emergency Communications Center	Emergency Management Center	Emergency Commercial Vehicle Response	'Emergency Commercial Vehicle Response' identifies and initiates a response to commercial vehicle and freight equipment related emergencies. These emergencies may include incidents involving hazardous materials as well as the detection of non-permitted transport of security sensitive hazmat. It identifies the location of the vehicle, the nature of the incident, the route information, and information concerning the freight itself. The information supports the determination of the response and identifies the responding agencies to notify.
LFUCG 911/Emergency Communications Center	Emergency Management Center	Emergency Data Collection	'Emergency Data Collection' collects and stores emergency information that is collected in the course of operations by the Emergency Management Center. This data can be used directly by operations personnel or it can be made available to other data users and archives in the region.
LFUCG 911/Emergency Communications Center	Emergency Management Center	Emergency Dispatch	'Emergency Dispatch' tracks the location and status of emergency vehicles and dispatches these vehicles to incidents. Pertinent incident information is gathered from the public and other public safety agencies and relayed to the responding units. Incident status and the status of the responding units is tracked so that additional units can be dispatched and/or unit status can be returned to available when the incident is cleared and closed.
LFUCG 911/Emergency Communications Center	Emergency Management Center	Emergency Evacuation Support	'Emergency Evacuation Support' coordinates evacuation plans among allied agencies and manages evacuation and reentry of a population in the vicinity of a disaster or other emergency that poses a risk to public safety. Where appropriate, the affected population is evacuated in shifts, using more than one evacuation route, and including several evacuation destinations to spread demand and thereby expedite the evacuation. All affected jurisdictions (e.g., states and counties) at the evacuation origin, evacuation destination, and along the evacuation route are informed of the plan. The public is provided with real-time evacuation guidance including basic information to assist potential evacuees in determining whether evacuation is necessary. Resource requirements are forecast based on the evacuation plans, and the necessary resources are located, shared between agencies if necessary, and deployed at the right locations at the appropriate times. The evacuation and reentry status are monitored and used to refine the plan and resource allocations during the evacuation and subsequent reentry. It communicates with public health systems to develop evacuation plans and recommended strategies for disasters and evacuation scenarios involving biological or other medical hazards.

Element Name	Physical Object Name	Functional Object	Functional Object Description
LFUCG 911/Emergency Communications Center	Emergency Management Center	Emergency Incident Command	'Emergency Incident Command' provides tactical decision support, resource coordination, and communications integration for Incident Commands that are established by first responders at or near the incident scene to support local management of an incident. It supports communications with public safety, emergency management, transportation, and other allied response agency centers, tracks and maintains resource information, action plans, and the incident command organization itself. Information is shared with agency centers including resource deployment status, hazardous material information, traffic, road, and weather conditions, evacuation advice, and other information that enables emergency or maintenance personnel in the field to implement an effective, safe incident response. It supports the functions and interfaces commonly supported by a mobile command center.
LFUCG 911/Emergency Communications Center	Emergency Management Center	Emergency Response Management	'Emergency Response Management' provides the strategic emergency response capabilities and broad inter-agency interfaces that are implemented for extraordinary incidents and disasters that require response from outside the local community. It provides the functional capabilities and interfaces commonly associated with Emergency Operations Centers. It develops and stores emergency response plans and manages overall coordinated response to emergencies. It monitors real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information. It tracks the availability of resources and assists in the appropriate allocation of these resources for a particular emergency response. It also provides coordination between multiple allied agencies before and during emergencies to implement emergency response plans and track progress through the incident. It also coordinates with the public through the Emergency Telecommunication Systems (e.g., Reverse 911). It coordinates with public health systems to provide the most appropriate response for emergencies involving biological or other medical hazards.
LFUCG 911/Emergency Communications Center	Traffic Management Center	TMC Lighting System Control	'TMC Lighting System Control' provides the capability for traffic managers to monitor and manage the electrical lighting systems along the roadside. This capability includes implementing control plans for lighting systems that may be activated by time-of-day plans or by activating changes to the lighting based on traffic or incidents.
LFUCG 911/Emergency Communications Center	Traffic Management Center	TMC Traffic Information Dissemination	'TMC Traffic Information Dissemination' disseminates traffic and road conditions, closure and detour information, incident information, driver advisories, and other traffic-related data to other centers, the media, and driver information systems. It monitors and controls driver information system field equipment including dynamic message signs and highway advisory radio, managing dissemination of driver information through these systems.

Element Name	Physical Object Name	Functional Object	Functional Object Description
LFUCG CCTV Cameras	ITS Roadway Equipment	Roadway Basic Surveillance	'Roadway Basic Surveillance' monitors traffic conditions using fixed equipment such as loop detectors and CCTV cameras.
LFUCG Connected Vehicle Roadside Equipment	Connected Vehicle Roadside Equipment	RSE Communications Relay	'RSE Communications Relay' provides message relay services that extend effective communications range to improve communications systems performance and robustness. It also supports safety applications such as wrong way vehicle detection and other applications where roadside communication of warnings beyond DSRC range are needed to compensate for high speeds or line of site/RF interference challenges.
LFUCG Connected Vehicle Roadside Equipment	Connected Vehicle Roadside Equipment	RSE Environmental Monitoring	'RSE Environmental Monitoring' collects environmental situation (probe) data from passing vehicles that are equipped with short range communications capability. The collected data includes current environmental conditions as measured by on-board sensors (e.g., ambient temperature and precipitation measures), current status of vehicle systems that can be used to infer environmental conditions (e.g., status of lights, wipers, ABS, and traction control systems), and emissions measures reported by the vehicle. The functional object collects the provided data, aggregates and filters the data based on provided configuration parameters, and sends the collected information back to a center for processing and distribution. This functional object may also process the collected data locally and issue short-term road weather advisories for the road segment using short range communications.
LFUCG Connected Vehicle Roadside Equipment	Connected Vehicle Roadside Equipment	RSE Queue Warning	'RSE Queue Warning' provides V2I communications to support queue warning systems. It monitors connected vehicles to identify and monitor queues in real-time and provides information to vehicles about upcoming queues, including downstream queues that are reported by the Traffic Management Center.
LFUCG Connected Vehicle Roadside Equipment	Connected Vehicle Roadside Equipment	RSE Speed Warning	'RSE Speed Warning' notifies connected vehicles that are approaching a reduced speed zone, providing: (1) the zone's current posted speed limit and (2) any roadway configuration changes associated with the reduced speed zone (e.g., lane closures, lane shifts) if applicable, and (3) associated warning information (i.e., the reason for the reduced speed warning). Configuration parameters that define the applicable speed limit(s), geographic location and extent of the reduced speed zone, and roadway configuration information are received from a center or provided through a local interface. The characteristics of individual vehicles may also be monitored and used to warn vehicles with specific limitations that reduce safe operating speeds, (e.g., rollover risk for tall vehicles). This functional object works in conjunction with the 'Roadway Speed Monitoring and Warning' functional object, which uses traditional ITS field equipment to warn non-equipped vehicles.

Element Name	Physical Object Name	Functional Object	Functional Object Description
LFUCG Connected Vehicle Roadside Equipment	Connected Vehicle Roadside Equipment	RSE Traffic Monitoring	'RSE Traffic Monitoring' monitors the basic safety messages that are shared between connected vehicles and distills this data into traffic flow measures that can be used to manage the network in combination with or in lieu of traffic data collected by infrastructure-based sensors. As connected vehicle penetration rates increase, the measures provided by this application can expand beyond vehicle speeds that are directly reported by vehicles to include estimated volume, occupancy, and other measures. This object also supports incident detection by monitoring for changes in speed and vehicle control events that indicate a potential incident.
LFUCG Curve Speed Warning System	ITS Roadway Equipment	Roadway Speed Monitoring and Warning	'Roadway Speed Monitoring and Warning' includes the field elements that monitor vehicle speeds. If the speed is determined to be excessive, an advisory or warning is displayed. Current environmental conditions and other factors that may reduce safe operating speeds may also be taken into account. The operational status (state of the device, configuration, and fault data) is provided to the center. This application can also provide an enforcement function, reporting speed violations to an enforcement agency.
LFUCG Division of Fire and Emergency Services	Emergency Management Center	Emergency Early Warning System	'Emergency Early Warning System' monitors alerting and advisory systems, information collected by ITS surveillance and sensors, and reports from other agencies and uses this information to identify potential, imminent, or in-progress major incidents or disasters. Notification is provided to initiate the emergency response, including public notification using ITS traveler information systems, where appropriate.
LFUCG Division of Fire and Emergency Services	Emergency Management Center	Emergency Evacuation Support	'Emergency Evacuation Support' coordinates evacuation plans among allied agencies and manages evacuation and reentry of a population in the vicinity of a disaster or other emergency that poses a risk to public safety. Where appropriate, the affected population is evacuated in shifts, using more than one evacuation route, and including several evacuation destinations to spread demand and thereby expedite the evacuation. All affected jurisdictions (e.g., states and counties) at the evacuation origin, evacuation destination, and along the evacuation route are informed of the plan. The public is provided with real-time evacuation guidance including basic information to assist potential evacuees in determining whether evacuation is necessary. Resource requirements are forecast based on the evacuation plans, and the necessary resources are located, shared between agencies if necessary, and deployed at the right locations at the appropriate times. The evacuation and reentry status are monitored and used to refine the plan and resource allocations during the evacuation and subsequent reentry. It communicates with public health systems to develop evacuation plans and recommended strategies for disasters and evacuation scenarios involving biological or other medical hazards.

Element Name	Physical Object Name	Functional Object	Functional Object Description
LFUCG Division of Fire and Emergency Services	Emergency Management Center	Emergency Incident Command	'Emergency Incident Command' provides tactical decision support, resource coordination, and communications integration for Incident Commands that are established by first responders at or near the incident scene to support local management of an incident. It supports communications with public safety, emergency management, transportation, and other allied response agency centers, tracks and maintains resource information, action plans, and the incident command organization itself. Information is shared with agency centers including resource deployment status, hazardous material information, traffic, road, and weather conditions, evacuation advice, and other information that enables emergency or maintenance personnel in the field to implement an effective, safe incident response. It supports the functions and interfaces commonly supported by a mobile command center.
LFUCG Division of Fire and Emergency Services	Emergency Management Center	Emergency Response Management	'Emergency Response Management' provides the strategic emergency response capabilities and broad inter-agency interfaces that are implemented for extraordinary incidents and disasters that require response from outside the local community. It provides the functional capabilities and interfaces commonly associated with Emergency Operations Centers. It develops and stores emergency response plans and manages overall coordinated response to emergencies. It monitors real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information. It tracks the availability of resources and assists in the appropriate allocation of these resources for a particular emergency response. It also provides coordination between multiple allied agencies before and during emergencies to implement emergency response plans and track progress through the incident. It also coordinates with the public through the Emergency Telecommunication Systems (e.g., Reverse 911). It coordinates with public health systems to provide the most appropriate response for emergencies involving biological or other medical hazards.
LFUCG Division of Police	Emergency Management Center	Emergency Commercial Vehicle Response	'Emergency Commercial Vehicle Response' identifies and initiates a response to commercial vehicle and freight equipment related emergencies. These emergencies may include incidents involving hazardous materials as well as the detection of non-permitted transport of security sensitive hazmat. It identifies the location of the vehicle, the nature of the incident, the route information, and information concerning the freight itself. The information supports the determination of the response and identifies the responding agencies to notify.

Element Name	Physical Object Name	Functional Object	Functional Object Description
LFUCG Division of Police	Emergency Management Center	Emergency Early Warning System	'Emergency Early Warning System' monitors alerting and advisory systems, information collected by ITS surveillance and sensors, and reports from other agencies and uses this information to identify potential, imminent, or in-progress major incidents or disasters. Notification is provided to initiate the emergency response, including public notification using ITS traveler information systems, where appropriate.
LFUCG Division of Police	Emergency Management Center	Emergency Evacuation Support	'Emergency Evacuation Support' coordinates evacuation plans among allied agencies and manages evacuation and reentry of a population in the vicinity of a disaster or other emergency that poses a risk to public safety. Where appropriate, the affected population is evacuated in shifts, using more than one evacuation route, and including several evacuation destinations to spread demand and thereby expedite the evacuation. All affected jurisdictions (e.g., states and counties) at the evacuation origin, evacuation destination, and along the evacuation route are informed of the plan. The public is provided with real-time evacuation guidance including basic information to assist potential evacuees in determining whether evacuation is necessary. Resource requirements are forecast based on the evacuation plans, and the necessary resources are located, shared between agencies if necessary, and deployed at the right locations at the appropriate times. The evacuation and reentry status are monitored and used to refine the plan and resource allocations during the evacuation and subsequent reentry. It communicates with public health systems to develop evacuation plans and recommended strategies for disasters and evacuation scenarios involving biological or other medical hazards.
LFUCG Division of Police	Emergency Management Center	Emergency Incident Command	'Emergency Incident Command' provides tactical decision support, resource coordination, and communications integration for Incident Commands that are established by first responders at or near the incident scene to support local management of an incident. It supports communications with public safety, emergency management, transportation, and other allied response agency centers, tracks and maintains resource information, action plans, and the incident command organization itself. Information is shared with agency centers including resource deployment status, hazardous material information, traffic, road, and weather conditions, evacuation advice, and other information that enables emergency or maintenance personnel in the field to implement an effective, safe incident response. It supports the functions and interfaces commonly supported by a mobile command center.

Element Name	Physical Object Name	Functional Object	Functional Object Description
LFUCG Division of Police	Emergency Management Center	Emergency Response Management	'Emergency Response Management' provides the strategic emergency response capabilities and broad inter-agency interfaces that are implemented for extraordinary incidents and disasters that require response from outside the local community. It provides the functional capabilities and interfaces commonly associated with Emergency Operations Centers. It develops and stores emergency response plans and manages overall coordinated response to emergencies. It monitors real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information. It tracks the availability of resources and assists in the appropriate allocation of these resources for a particular emergency response. It also provides coordination between multiple allied agencies before and during emergencies to implement emergency response plans and track progress through the incident. It also coordinates with the public through the Emergency Telecommunication Systems (e.g., Reverse 911). It coordinates with public health systems to provide the most appropriate response for emergencies involving biological or other medical hazards.
LFUCG Division of Police	Traffic Management Center	TMC Evacuation Support	'TMC Evacuation Support' supports development, coordination, and execution of special traffic management strategies during evacuation and subsequent reentry of a population in the vicinity of a disaster or major emergency. A traffic management strategy is developed based on anticipated demand, the capacity of the road network including access to and from the evacuation routes, and existing and forecast conditions. The strategy supports efficient evacuation and also protects and optimizes movement of response vehicles and other resources that are responding to the emergency.
LFUCG Division of Police	Traffic Management Center	TMC Traffic Information Dissemination	'TMC Traffic Information Dissemination' disseminates traffic and road conditions, closure and detour information, incident information, driver advisories, and other traffic-related data to other centers, the media, and driver information systems. It monitors and controls driver information system field equipment including dynamic message signs and highway advisory radio, managing dissemination of driver information through these systems.
LFUCG Division of Police	Traffic Management Center	TMC Work Zone Traffic Management	'TMC Work Zone Traffic Management' coordinates work plans with maintenance systems so that work zones are established that have minimum traffic impact. Traffic control strategies are implemented to further mitigate traffic impacts associated with work zones that are established, providing work zone information to driver information systems such as dynamic message signs.
LFUCG Dynamic Message Signs	ITS Roadway Equipment	Roadway Traffic Information Dissemination	'Roadway Traffic Information Dissemination' includes field elements that provide information to drivers, including dynamic message signs and highway advisory radios.

Element Name	Physical Object Name	Functional Object	Functional Object Description
LFUCG Dynamic Message Signs	ITS Roadway Equipment	Roadway Work Zone Traffic Control	'Roadway Work Zone Traffic Control' controls traffic in areas of the roadway where maintenance and construction activities are underway, monitoring and controlling traffic using field equipment such as CCTV cameras, dynamic messages signs, and gates/barriers. Work zone speeds and delays are provided to the motorist prior to the work zones.
LFUCG Emergency Operations Center	Emergency Management Center	Emergency Commercial Vehicle Response	'Emergency Commercial Vehicle Response' identifies and initiates a response to commercial vehicle and freight equipment related emergencies. These emergencies may include incidents involving hazardous materials as well as the detection of non-permitted transport of security sensitive hazmat. It identifies the location of the vehicle, the nature of the incident, the route information, and information concerning the freight itself. The information supports the determination of the response and identifies the responding agencies to notify.
LFUCG Emergency Operations Center	Emergency Management Center	Emergency Early Warning System	'Emergency Early Warning System' monitors alerting and advisory systems, information collected by ITS surveillance and sensors, and reports from other agencies and uses this information to identify potential, imminent, or in-progress major incidents or disasters. Notification is provided to initiate the emergency response, including public notification using ITS traveler information systems, where appropriate.
LFUCG Emergency Operations Center	Emergency Management Center	Emergency Environmental Monitoring	'Emergency Environmental Monitoring' collects current and forecast road conditions and surface weather information from a variety of sources. The collected environmental information is monitored and presented to the operator and used to more effectively manage incidents.
LFUCG Emergency Operations Center	Emergency Management Center	Emergency Evacuation Support	'Emergency Evacuation Support' coordinates evacuation plans among allied agencies and manages evacuation and reentry of a population in the vicinity of a disaster or other emergency that poses a risk to public safety. Where appropriate, the affected population is evacuated in shifts, using more than one evacuation route, and including several evacuation destinations to spread demand and thereby expedite the evacuation. All affected jurisdictions (e.g., states and counties) at the evacuation origin, evacuation destination, and along the evacuation route are informed of the plan. The public is provided with real-time evacuation guidance including basic information to assist potential evacuees in determining whether evacuation is necessary. Resource requirements are forecast based on the evacuation plans, and the necessary resources are located, shared between agencies if necessary, and deployed at the right locations at the appropriate times. The evacuation and reentry status are monitored and used to refine the plan and resource allocations during the evacuation and subsequent reentry. It communicates with public health systems to develop evacuation plans and recommended strategies for disasters and evacuation scenarios involving biological or other medical hazards.

Element Name	Physical Object Name	Functional Object	Functional Object Description
LFUCG Emergency Operations Center	Emergency Management Center	Emergency Incident Command	'Emergency Incident Command' provides tactical decision support, resource coordination, and communications integration for Incident Commands that are established by first responders at or near the incident scene to support local management of an incident. It supports communications with public safety, emergency management, transportation, and other allied response agency centers, tracks and maintains resource information, action plans, and the incident command organization itself. Information is shared with agency centers including resource deployment status, hazardous material information, traffic, road, and weather conditions, evacuation advice, and other information that enables emergency or maintenance personnel in the field to implement an effective, safe incident response. It supports the functions and interfaces commonly supported by a mobile command center.
LFUCG Emergency Operations Center	Emergency Management Center	Emergency Response Management	'Emergency Response Management' provides the strategic emergency response capabilities and broad inter-agency interfaces that are implemented for extraordinary incidents and disasters that require response from outside the local community. It provides the functional capabilities and interfaces commonly associated with Emergency Operations Centers. It develops and stores emergency response plans and manages overall coordinated response to emergencies. It monitors real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information. It tracks the availability of resources and assists in the appropriate allocation of these resources for a particular emergency response. It also provides coordination between multiple allied agencies before and during emergencies to implement emergency response plans and track progress through the incident. It also coordinates with the public through the Emergency Telecommunication Systems (e.g., Reverse 911). It coordinates with public health systems to provide the most appropriate response for emergencies involving biological or other medical hazards.
LFUCG Emergency Operations Center	Traffic Management Center	TMC Lighting System Control	'TMC Lighting System Control' provides the capability for traffic managers to monitor and manage the electrical lighting systems along the roadside. This capability includes implementing control plans for lighting systems that may be activated by time-of-day plans or by activating changes to the lighting based on traffic or incidents.

Element Name	Physical Object Name	Functional Object	Functional Object Description
LFUCG Emergency Operations Center	Transportation Information Center	TIC Data Collection	'TIC Data Collection' collects transportation-related data from other centers, performs data quality checks on the collected data and then consolidates, verifies, and refines the data and makes it available in a consistent format to applications that support operational data sharing between centers and deliver traveler information to end-users. A broad range of data is collected including traffic and road conditions, transit data, emergency information and advisories, weather data, special event information, traveler services, parking, multimodal data, and toll/pricing data. It also shares data with other transportation information centers.
LFUCG Emergency Operations Center	Transportation Information Center	TIC Emergency Traveler Information	'TIC Emergency Traveler Information' provides emergency information to the public, including wide-area alerts and evacuation information. It provides emergency alerts, information on evacuation zones and evacuation requirements, evacuation destinations and shelter information, available transportation modes, and traffic and road conditions at the origin, destination, and along the evacuation routes. In addition to general evacuation information, personalized information including tailored evacuation routes, service information, and estimated travel times is also provided based on traveler specified origin, destination, and route parameters. Updated information is provided throughout the evacuation and subsequent reentry as status changes and plans are adapted.
LFUCG Emergency Vehicles	Emergency Vehicle OBE	EV On-Board En Route Support	'EV On-Board En Route Support' provides communications functions to responding emergency vehicles that reduce response times and improve safety of responding public safety personnel and the general public. It supports traffic signal preemption via short range communication directly with signal control equipment and sends alert messages to surrounding vehicles.
LFUCG Emergency Vehicles	Emergency Vehicle OBE	EV On-Board Incident Management Communication	'EV On-board Incident Management Communication' provides communications support to first responders. Information about the incident, information on dispatched resources, and ancillary information such as road and weather conditions are provided to emergency personnel. Emergency personnel transmit information about the incident such as identification of vehicles and people involved, the extent of injuries, hazardous material, resources on site, site management strategies in effect, and current clearance status. Emergency personnel may also send in-vehicle signing messages to approaching traffic using short range communications.
LFUCG Emergency Vehicles	Emergency Vehicle OBE	EV Service Patrol Vehicle Operations	'EV Service Patrol Vehicle Operations' provides on-board processing and communications to service patrol vehicles that reduce response times and improve safety of responding personnel. It supports service patrol vehicle dispatch and provides incident information back to the dispatching center.

Element Name	Physical Object Name	Functional Object	Functional Object Description
LFUCG Maintenance and Construction Vehicles	Emergency Vehicle OBE	EV On-Board Safety Monitoring	'EV On-Board Safety Monitoring' detects vehicle intrusions in the vicinity of the vehicle and warns emergency personnel of imminent encroachment. Personnel movements in the vicinity of the vehicle are also monitored so that the personnel can be warned of movement beyond a designated safe zone.
LFUCG Maintenance and Construction Vehicles	Maint and Constr Vehicle OBE	MCV Roadway Maintenance and Construction	'MCV Roadway Maintenance and Construction' includes the on-board systems that support routine non-winter maintenance on a roadway system or right-of-way. Routine maintenance includes landscape maintenance, hazard removal (roadway debris, dead animals), routine maintenance activities (roadway cleaning, grass cutting), and repair and maintenance of both ITS and non-ITS equipment on the roadway (e.g., signs, traffic controllers, traffic detectors, dynamic message signs, traffic signals, etc.).
LFUCG Maintenance and Construction Vehicles	Maint and Constr Vehicle OBE	MCV Vehicle Location Tracking	'MCV Vehicle Location Tracking' monitors vehicle location and reports the position and timestamp information to the dispatch center.
LFUCG Maintenance and Construction Vehicles	Maint and Constr Vehicle OBE	MCV Vehicle Safety Monitoring	'MCV Vehicle Safety Monitoring' detects vehicle intrusions in the vicinity of the vehicle and warns crew workers and drivers of imminent encroachment. Crew movements are also monitored so that the crew can be warned of movement beyond the designated safe zone. It can be used for stationary work zones or in mobile applications where a safe zone is maintained around the moving vehicle.
LFUCG Maintenance and Construction Vehicles	Maint and Constr Vehicle OBE	MCV Vehicle System Monitoring and Diagnostics	'MCV Vehicle System Monitoring and Diagnostics' includes on-board sensors capable of monitoring the condition of each of the vehicle systems and diagnostics that can be used to support vehicle maintenance. The status of the vehicle and ancillary equipment and diagnostic information is provided to the vehicle operator, repair facility, and dispatch center.
LFUCG Maintenance and Construction Vehicles	Maint and Constr Vehicle OBE	MCV Winter Maintenance	'MCV Winter Maintenance' supports snow plow operations and other roadway treatments (e.g., salt spraying and other material applications). It supports communications with the center to receive information and instructions that are provided to the vehicle operator and also supports remote control of on-board systems. It tracks operational status of snow and ice control operations and provides this information back to the center.
LFUCG Multimodal Vehicle Detection System	ITS Roadway Equipment	Roadway Mixed Use Crossing Safety	'Roadway Mixed Use Crossing Safety' is an advanced infrastructure application that detects pedestrians, cyclists, and other non-motorized users and provides active safety warnings to drivers when cross walks or other intersecting mixed use paths are occupied.
LFUCG Queue Detection and Warning System	ITS Roadway Equipment	Roadway Basic Surveillance	'Roadway Basic Surveillance' monitors traffic conditions using fixed equipment such as loop detectors and CCTV cameras.

Element Name	Physical Object Name	Functional Object	Functional Object Description
LFUCG Queue Detection and Warning System	ITS Roadway Equipment	Roadway Warning	'Roadway Warning' includes the field equipment used to warn drivers approaching hazards on a roadway. Warnings may be generated in response to roadway weather conditions, road surface conditions, traffic conditions including queues, obstacles or animals in the roadway, and any other transient events that can be sensed. The equipment monitors traffic and roadway conditions and may send data to a Traffic Management Center for processing or may process it to determine when a warning should be issued. When it is determined that a warning should be issued, the equipment is used to alert approaching drivers via dynamic warning signs, flashing lights, in-vehicle messages, etc.
LFUCG Regional Data Management / Analytics System	Archived Data System	Archive Data Repository	'Archive Data Repository' collects data and data catalogs from one or more data sources and stores the data in a focused repository that is suited to a particular set of ITS data users. It includes capabilities for performing quality checks on the incoming data, error notification, and archive to archive coordination. It includes the capability to define a data registry that allows registration of data identifiers or data definitions for interoperable use throughout a region. It supports a broad range of implementations, ranging from simple data marts that collect a focused set of data and serve a particular user community to large-scale data warehouses that collect, integrate, and summarize transportation data from multiple sources and serve a broad array of users within a region. Repositories may be established to support operations planning, performance monitoring and management, and policy and investment decisions.
LFUCG Regional Data Management / Analytics System	Archived Data System	Archive Government Reporting	'Archive Government Reporting' selects and formats data residing in an ITS archive to facilitate local, state, and federal government data reporting requirements. It provides transportation system statistics and performance measures in required formats to support investment and policy decisions.
LFUCG Regional Data Management / Analytics System	Archived Data System	Archive On-Line Analysis and Mining	'Archive On-Line Analysis and Mining' provides advanced data analysis, summarization, and mining features that facilitate discovery of information, patterns, and correlations in large data sets. Multidimensional analysis, selective summarization and expansion of data details, and many other advanced analysis services may be offered. Complex performance measures that are derived from multiple data sources may also be produced.

Element Name	Physical Object Name	Functional Object	Functional Object Description
LFUCG Regional Data Management / Analytics System	Archived Data System	Archive Situation Data Archival	'Archive Situation Data Archival' collects and archives traffic, roadway, and environmental information for use in off-line planning, research, and analysis. It controls and collects information directly from equipment at the roadside, reflecting the deployment of traffic detectors that are used primarily for traffic monitoring and planning purposes, rather than for traffic management. It also collects situation data from connected vehicles. The data collected, quality checks performed, and aggregation strategies are defined to support transportation system performance monitoring and management.
LFUCG Reversible Lanes Field Equipment	ITS Roadway Equipment	Roadway Basic Surveillance	'Roadway Basic Surveillance' monitors traffic conditions using fixed equipment such as loop detectors and CCTV cameras.
LFUCG Reversible Lanes Field Equipment	ITS Roadway Equipment	Roadway Reversible Lanes	'Roadway Reversible Lanes' includes field elements that monitor and control reversible lane facilities. It includes the traffic sensors, surveillance equipment, lane control signals, physical lane access controls, and other field elements that manage traffic on these facilities. It provides current reversible lane facility status information and accepts requests and control commands from the controlling center.
LFUCG Roadside Traffic Detection Equipment	ITS Roadway Equipment	Roadway Basic Surveillance	'Roadway Basic Surveillance' monitors traffic conditions using fixed equipment such as loop detectors and CCTV cameras.
LFUCG RWIS Stations	ITS Roadway Equipment	Roadway Data Collection	'Roadway Data Collection' collects traffic, road, and environmental conditions information for use in transportation planning, research, and other off-line applications where data quality and completeness take precedence over real-time performance. It includes the sensors, supporting roadside infrastructure, and communications equipment that collects and transfers information to a center for archival.
LFUCG RWIS Stations	ITS Roadway Equipment	Roadway Environmental Monitoring	'Roadway Environmental Monitoring' measures environmental conditions and communicates the collected information back to a center where it can be monitored and analyzed or to other field devices to support communications to vehicles. A broad array of general weather and road surface information may be collected. Weather conditions that may be measured include temperature, wind, humidity, precipitation, and visibility. Surface and sub-surface sensors can measure road surface temperature, moisture, icing, salinity, and other measures.
LFUCG Streets and Roads	Emergency Management Center	Emergency Incident Scene Safety Management	'Emergency Incident Scene Safety Management' remotely monitors incident scene safety systems that detect vehicle intrusions in designated areas at the incident scene and warns on-scene personnel and drivers of imminent encroachment. Public safety responder movements are also monitored so that the responders can be warned of movement beyond the designated safe zone.

Element Name	Physical Object Name	Functional Object	Functional Object Description
LFUCG Streets and Roads	Maint and Constr Management Center	MCM Data Collection	'MCM Data Collection' collects and stores maintenance and construction information that is collected in the course of operations by the Maintenance and Construction Management Center. This data can be used directly by operations personnel or it can be made available to other data users and archives in the region.
LFUCG Streets and Roads	Maint and Constr Management Center	MCM Incident Management	'MCM Incident Management' supports maintenance and construction participation in coordinated incident response. Incident notifications are shared, incident response resources are managed, and the overall incident situation and incident response status is coordinated among allied response organizations.
LFUCG Streets and Roads	Maint and Constr Management Center	MCM Roadway Maintenance	'MCM Roadway Maintenance' provides overall management and support for routine maintenance on a roadway system or right-of-way. Services managed include landscape maintenance, hazard removal (roadway debris, dead animals), routine maintenance activities (roadway cleaning, grass cutting), and repair and maintenance of non-ITS equipment on the roadway (e.g., signs, gantries, cabinets, guard rails, etc.). Environmental conditions information is also received from various weather sources to aid in scheduling routine maintenance activities. See also MCM Field Equipment Maintenance for maintenance of ITS field equipment.
LFUCG Streets and Roads	Maint and Constr Management Center	MCM Vehicle Maintenance Management	'MCM Vehicle Maintenance Management' monitors vehicle and equipment condition, tracks maintenance history, and schedules routine and corrective maintenance based on vehicle/equipment utilization and availability schedules.
LFUCG Streets and Roads	Maint and Constr Management Center	MCM Vehicle Tracking	'MCM Vehicle Tracking' tracks the location of maintenance and construction vehicles and other equipment. Vehicle/equipment location and associated information is presented to the operator.
LFUCG Streets and Roads	Maint and Constr Management Center	MCM Winter Maintenance Management	'MCM Winter Maintenance Management' manages winter road maintenance, tracking and controlling snow plow operations, roadway treatment (e.g., salt spraying and other material applications), and other snow and ice control operations. It monitors environmental conditions and weather forecasts and uses the information to schedule winter maintenance activities, determine the appropriate snow and ice control response, and track and manage response operations.
LFUCG Streets and Roads	Maint and Constr Management Center	MCM Work Activity Coordination	'MCM Work Activity Coordination' disseminates work activity schedules and current asset restrictions to other agencies. Work schedules are coordinated with operating agencies, factoring in the needs and activities of other agencies and adjacent jurisdictions. Work schedules are also distributed to Transportation Information Centers for dissemination to the traveling public.
LFUCG Streets and Roads	Maint and Constr Management Center	MCM Work Zone Safety Management	'MCM Work Zone Safety Management' remotely monitors work zone safety systems that detect vehicle intrusions in work zones and warns crew workers and drivers of imminent encroachment. Crew movements are also monitored so that the crew can be warned of movement beyond the designated safe zone.

Element Name	Physical Object Name	Functional Object	Functional Object Description
LFUCG Traffic Incident Detection System	ITS Roadway Equipment	Roadway Incident Detection	'Roadway Incident Detection' provides incident detection using traffic detectors and surveillance equipment. It monitors for unusual traffic conditions that may indicate an incident or processes surveillance images, watching for potential incidents. It provides potential incident information as well as traffic flow and images to the center for processing and presentation to traffic operations personnel.
LFUCG Traffic Information Website	Center	Center Data Subscription Management	'Center Data Subscription Management' manages data subscriptions for an end user. It provides access to a catalog of available data, manages the necessary user information and rules that govern the data subscriptions, supports communications with data providers to collect data per the subscription rules, and makes the data available to the end user. It provides the local user interface through which a user can specify and manage subscriptions. It supports different mechanisms for collecting subscribed data for the end-user including one-time query-response as well as publish-subscribe services.
LFUCG Traffic Information Website	Data Distribution System	DDS Data Access Management	'DDS Data Access Management' defines the access mechanisms, structures and restrictions for inbound (from providers) and outbound (to consumers) data.
LFUCG Traffic Information Website	Data Distribution System	DDS Data Collection and Aggregation	'DDS Data Collection and Aggregation' collects data 'deposits' from producers including meta data such as the generation location and time. It authenticates and validates the data deposits and logs all associated meta data. Authenticated, valid data is bundled based on information type and location and made available as data products to consumers who are interested in the data. It establishes delivery parameters for data consumers that subscribe based on parameters including content type and geographic region of interest and delivers data to consumers based on these parameters.
LFUCG Traffic Information Website	Transportation Information Center	TIC Data Collection	'TIC Data Collection' collects transportation-related data from other centers, performs data quality checks on the collected data and then consolidates, verifies, and refines the data and makes it available in a consistent format to applications that support operational data sharing between centers and deliver traveler information to end-users. A broad range of data is collected including traffic and road conditions, transit data, emergency information and advisories, weather data, special event information, traveler services, parking, multimodal data, and toll/pricing data. It also shares data with other transportation information centers.

Element Name	Physical Object Name	Functional Object	Functional Object Description
LFUCG Traffic Information Website	Transportation Information Center	TIC Emergency Traveler Information	'TIC Emergency Traveler Information' provides emergency information to the public, including wide-area alerts and evacuation information. It provides emergency alerts, information on evacuation zones and evacuation requirements, evacuation destinations and shelter information, available transportation modes, and traffic and road conditions at the origin, destination, and along the evacuation routes. In addition to general evacuation information, personalized information including tailored evacuation routes, service information, and estimated travel times is also provided based on traveler specified origin, destination, and route parameters. Updated information is provided throughout the evacuation and subsequent reentry as status changes and plans are adapted.
LFUCG Traffic Information Website	Transportation Information Center	TIC Interactive Traveler Information	'TIC Interactive Traveler Information' disseminates personalized traveler information including traffic and road conditions, transit information, parking information, maintenance and construction information, multimodal information, event information, and weather information. Tailored information is provided based on the traveler's request in this interactive service.
LFUCG Traffic Information Website	Transportation Information Center	TIC Traveler Information Broadcast	'TIC Traveler Information Broadcast' disseminates traveler information including traffic and road conditions, incident information, maintenance and construction information, event information, transit information, parking information, and weather information. The same information is broadcast to all equipped traveler interface systems and vehicles.
LFUCG Traffic Management Center	Archived Data System	Archive Data Repository	'Archive Data Repository' collects data and data catalogs from one or more data sources and stores the data in a focused repository that is suited to a particular set of ITS data users. It includes capabilities for performing quality checks on the incoming data, error notification, and archive to archive coordination. It includes the capability to define a data registry that allows registration of data identifiers or data definitions for interoperable use throughout a region. It supports a broad range of implementations, ranging from simple data marts that collect a focused set of data and serve a particular user community to large-scale data warehouses that collect, integrate, and summarize transportation data from multiple sources and serve a broad array of users within a region. Repositories may be established to support operations planning, performance monitoring and management, and policy and investment decisions.
LFUCG Traffic Management Center	Archived Data System	Archive Government Reporting	'Archive Government Reporting' selects and formats data residing in an ITS archive to facilitate local, state, and federal government data reporting requirements. It provides transportation system statistics and performance measures in required formats to support investment and policy decisions.

Element Name	Physical Object Name	Functional Object	Functional Object Description
LFUCG Traffic Management Center	Archived Data System	Archive On-Line Analysis and Mining	'Archive On-Line Analysis and Mining' provides advanced data analysis, summarization, and mining features that facilitate discovery of information, patterns, and correlations in large data sets. Multidimensional analysis, selective summarization and expansion of data details, and many other advanced analysis services may be offered. Complex performance measures that are derived from multiple data sources may also be produced.
LFUCG Traffic Management Center	Archived Data System	Archive Situation Data Archival	'Archive Situation Data Archival' collects and archives traffic, roadway, and environmental information for use in off-line planning, research, and analysis. It controls and collects information directly from equipment at the roadside, reflecting the deployment of traffic detectors that are used primarily for traffic monitoring and planning purposes, rather than for traffic management. It also collects situation data from connected vehicles. The data collected, quality checks performed, and aggregation strategies are defined to support transportation system performance monitoring and management.
LFUCG Traffic Management Center	Center	Center Data Collection	'Center Data Collection' collects and stores information that is created in the course of center operations. This data can be used directly by operations personnel or it can be made available to other data users and archives in the region.
LFUCG Traffic Management Center	Center	Center Data Subscription Management	'Center Data Subscription Management' manages data subscriptions for an end user. It provides access to a catalog of available data, manages the necessary user information and rules that govern the data subscriptions, supports communications with data providers to collect data per the subscription rules, and makes the data available to the end user. It provides the local user interface through which a user can specify and manage subscriptions. It supports different mechanisms for collecting subscribed data for the end-user including one-time query-response as well as publish-subscribe services.
LFUCG Traffic Management Center	Traffic Management Center	TMC Advanced Rail Crossing Management	'TMC Advanced Rail Crossing Management' monitors and controls rail crossing traffic control equipment at advanced crossings that provide additional information on approaching trains, detect and report obstructions on the grade crossing, and communicate directly with equipped vehicles approaching the crossing. It remotely monitors and reports the status of the rail crossing equipment and sends control plan updates to the equipment. It also provides enhanced coordination between rail operations and traffic management centers that supports forecast of closure times and durations that may be applied to advanced traffic control strategies or delivered as enhanced traveler information.
LFUCG Traffic Management Center	Traffic Management Center	TMC Basic Surveillance	'TMC Basic Surveillance' remotely monitors and controls traffic sensor systems and surveillance (e.g., CCTV) equipment, and collects, processes and stores the collected traffic data. Current traffic information and other real-time transportation information is also collected from other centers. The collected information is provided to traffic operations personnel and made available to other centers.

Element Name	Physical Object Name	Functional Object	Functional Object Description
LFUCG Traffic Management Center	Traffic Management Center	TMC Data Collection	'TMC Data Collection' collects and stores information that is created in the course of traffic operations performed by the Traffic Management Center. This data can be used directly by operations personnel or it can be made available to other data users and archives in the region.
LFUCG Traffic Management Center	Traffic Management Center	TMC Demand Management Coordination	'TMC Demand Management Coordination' provides the capability to gather information on regional toll, parking, and transit usage and request changes to pricing and other mechanisms to manage overall transportation demand.
LFUCG Traffic Management Center	Traffic Management Center	TMC Environmental Monitoring	'TMC Environmental Monitoring' assimilates current and forecast road conditions and surface weather information using a combination of weather service provider information, information collected by other centers such as the Maintenance and Construction Management Center, data collected from environmental sensors deployed on and about the roadway, and information collected from connected vehicles. The collected environmental information is monitored and presented to the operator. This information can be used to issue general traveler advisories and support location specific warnings to drivers.
LFUCG Traffic Management Center	Traffic Management Center	TMC Evacuation Support	'TMC Evacuation Support' supports development, coordination, and execution of special traffic management strategies during evacuation and subsequent reentry of a population in the vicinity of a disaster or major emergency. A traffic management strategy is developed based on anticipated demand, the capacity of the road network including access to and from the evacuation routes, and existing and forecast conditions. The strategy supports efficient evacuation and also protects and optimizes movement of response vehicles and other resources that are responding to the emergency.
LFUCG Traffic Management Center	Traffic Management Center	TMC Incident Detection	'TMC Incident Detection' identifies and reports incidents to Traffic Operations Personnel. It remotely monitors and controls traffic sensor and surveillance systems that support incident detection and verification. It analyzes and reduces the collected sensor and surveillance data, external alerting and advisory and incident reporting systems, anticipated demand information from intermodal freight depots, border crossings, special event information, and identifies and reports incidents and hazardous conditions
LFUCG Traffic Management Center	Traffic Management Center	TMC Incident Dispatch Coordination	'TMC Incident Dispatch Coordination' formulates and manages an incident response that takes into account the incident potential, incident impacts, and resources required for incident management. It provides information to support dispatch and routing of emergency response and service vehicles as well as coordination with other cooperating agencies. It provides access to traffic management resources that provide surveillance of the incident, traffic control in the surrounding area, and support for the incident response. It monitors the incident response and collects performance measures such as incident response and clearance times.

Element Name	Physical Object Name	Functional Object	Functional Object Description
LFUCG Traffic Management Center	Traffic Management Center	TMC Intersection Safety	'TMC Intersection Safety' controls and monitors RSEs that support stop sign, red light, and mixed use crossing violations. It configures the RSEs for the current intersection geometry and traffic signal control equipment at the intersection. Information that is currently being communicated to passing vehicles and the operational status of the field equipment is monitored by this application. The operational status of the field equipment is reported to operations personnel.
LFUCG Traffic Management Center	Traffic Management Center	TMC Multi-Modal Coordination	'TMC Multi-Modal Coordination' supports center-to-center coordination between the Traffic Management and Transit Management Centers. It monitors transit operations and provides traffic signal priority for transit vehicles on request from the Transit Management Center.
LFUCG Traffic Management Center	Traffic Management Center	TMC Passive Surveillance	'TMC Passive Surveillance' collects time stamped vehicle identities from different detection zones, correlates the identities, and calculates link travel times and derives other traffic measures.
LFUCG Traffic Management Center	Traffic Management Center	TMC Regional Traffic Management	'TMC Regional Traffic Management' supports coordination between Traffic Management Centers in order to share traffic information between centers as well as control of traffic management field equipment. This coordination supports wide area optimization and regional coordination that spans jurisdictional boundaries; for example, coordinated signal control in a metropolitan area or coordination between freeway operations and arterial signal control within a corridor.
LFUCG Traffic Management Center	Traffic Management Center	TMC Reversible Lane Management	'TMC Reversible Lane Management' remotely monitors and controls reversible lanes. It provides an interface to reversible lane field equipment (traffic sensors, surveillance equipment, lane control signals, physical lane access controls, etc.) and to traffic operations personnel to support central monitoring and control of these facilities.
LFUCG Traffic Management Center	Traffic Management Center	TMC Road Weather Advisories and Warnings	'TMC Road Weather Advisories and Warnings' provides road weather advisories to drivers and other travelers. Advisories are based on environmental information collected from a variety of data sources, including data collected from roadside sensors and connected vehicles.
LFUCG Traffic Management Center	Traffic Management Center	TMC Roadway Equipment Monitoring	'TMC Roadway Equipment Monitoring' monitors the operational status of field equipment and detects failures. It presents field equipment status to Traffic Operations Personnel and reports failures to the Maintenance and Construction Management Center. It tracks the repair or replacement of the failed equipment. The entire range of ITS field equipment may be monitored including sensors (traffic, infrastructure, environmental, security, speed, etc.) and devices (highway advisory radio, dynamic message signs, automated roadway treatment systems, barrier and safeguard systems, cameras, traffic signals and override equipment, ramp meters, beacons, security surveillance equipment, etc.).

Element Name	Physical Object Name	Functional Object	Functional Object Description
LFUCG Traffic Management Center	Traffic Management Center	TMC Roadway Warning	'TMC Roadway Warning' remotely monitors and controls the systems used to warn drivers approaching hazards on a roadway. It monitors data on roadway conditions from sensors in the field and generates warnings in response to roadway weather conditions, road surface conditions, traffic conditions including queues, obstacles or animals in the roadway, and any other transient events that can be sensed.
LFUCG Traffic Management Center	Traffic Management Center	TMC Signal Control	'TMC Signal Control' provides the capability for traffic managers to monitor and manage the traffic flow at signalized intersections. This capability includes analyzing and reducing the collected data from traffic surveillance equipment and developing and implementing control plans for signalized intersections. Control plans may be developed and implemented that coordinate signals at many intersections under the domain of a single Traffic Management Center and are responsive to traffic conditions and adapt to support incidents, preemption and priority requests, pedestrian crossing calls, etc.
LFUCG Traffic Management Center	Traffic Management Center	TMC Situation Data Management	'TMC Situation Data Management' collects, assimilates, and disseminates vehicle probe data collected from roadside short range communications equipment and centers controlling transit vehicles, toll collection points, and route-guided vehicles. It estimates traffic and road conditions based on the aggregated probe data and disseminates this information to other centers.
LFUCG Traffic Management Center	Traffic Management Center	TMC Speed Warning	'TMC Speed Warning' supports remote control and monitoring of reduced speed zone warning roadside equipment. It provides the location and extent of the reduced speed zone, the posted speed limit(s) with information about the applicability of the speed limit(s) (e.g., time of day, day of week, seasonality, relevant vehicle types) and information about associated road configuration changes including lane merges and shifts. It monitors field equipment operation and reports current status to the operator.
LFUCG Traffic Management Center	Traffic Management Center	TMC Standard Rail Crossing Management	'TMC Standard Rail Crossing Management' monitors and controls rail crossing traffic control equipment. This version provides basic support for standard active warning systems at grade crossings. It remotely monitors and reports the status of the rail crossing equipment and sends control plan updates to the equipment.
LFUCG Traffic Management Center	Traffic Management Center	TMC Traffic Information Dissemination	'TMC Traffic Information Dissemination' disseminates traffic and road conditions, closure and detour information, incident information, driver advisories, and other traffic-related data to other centers, the media, and driver information systems. It monitors and controls driver information system field equipment including dynamic message signs and highway advisory radio, managing dissemination of driver information through these systems.

Element Name	Physical Object Name	Functional Object	Functional Object Description
LFUCG Traffic Management Center	Traffic Management Center	TMC Traffic Management Decision Support	'TMC Traffic Management Decision Support' recommends courses of action to the traffic operator based on current and forecast road and traffic conditions. Traffic incidents, special events, maintenance activities and other events or conditions that impact capacity or demand are monitored. Historical data and models are used to compare the impact of potential courses of action and make recommendations to the operator. Decisions are supported through presentation of filtered and fused network-wide road and traffic conditions that identify network imbalances and recommended courses of action. The recommended actions may include predefined incident response plans, signal timing plan changes, DMS/HAR messages, truck restrictions, lane control strategies, metering strategies, and adjustment of variable speed limits. Multimodal strategies may also be recommended that include suggested transit strategies and suggested route and mode choices for travelers. Once a course of action is selected, traffic operations personnel implement these actions within the Traffic Management Center and coordinate the response with other centers in the region.
LFUCG Traffic Management Center	Traffic Management Center	TMC Traffic Metering	'TMC Traffic Metering' provides center monitoring and control of traffic metering systems including on ramps, through interchanges, and on the mainline roadway. All types of metering are covered including pre-timed/fixed time, time-based, dynamic and adaptive metering strategies and special bypasses. Metering rates can be calculated based upon historical data or current conditions including traffic, air quality, etc.
LFUCG Traffic Management Center	Traffic Management Center	TMC Traffic Network Performance Evaluation	'TMC Traffic Network Performance Evaluation' measures traffic network performance and predicts travel demand patterns to support traffic flow optimization, demand management, and incident management. It collects traffic data from sensors and surveillance equipment as well as input from other Traffic Management Centers, emissions management, transit operations, and event promoters and uses this information to measure traffic network performance. It collects route planning information from transportation information centers and integrates and uses this information to predict future traffic conditions. The planned control strategies can be passed back to the transportation information center so that the intended strategies can be reflected in future route planning.
LFUCG Traffic Management Center	Traffic Management Center	TMC Variable Speed Limits	'TMC Variable Speed Limits' provides center monitoring and control of variable speed limits systems. It monitors data on traffic and environmental conditions collected from sensors along the roadway. Based on the measured data, it calculates and sets suitable speed limits usually by lane. It controls equipment that posts the current speed limits and displays additional information such as basic safety rules and current traffic information to drivers.

Element Name	Physical Object Name	Functional Object	Functional Object Description
LFUCG Traffic Management Center	Traffic Management Center	TMC Work Zone Traffic Management	'TMC Work Zone Traffic Management' coordinates work plans with maintenance systems so that work zones are established that have minimum traffic impact. Traffic control strategies are implemented to further mitigate traffic impacts associated with work zones that are established, providing work zone information to driver information systems such as dynamic message signs.
LFUCG Traffic Signals	ITS Roadway Equipment	Roadway Field Management Station Operation	'Roadway Field Management Station Operation' supports direct communications between field management stations and the local field equipment under their control.
LFUCG Traffic Signals	ITS Roadway Equipment	Roadway Signal Control	'Roadway Signal Control' includes the field elements that monitor and control signalized intersections. It includes the traffic signal controllers, detectors, conflict monitors, signal heads, and other ancillary equipment that supports traffic signal control. It also includes field masters, and equipment that supports communications with a central monitoring and/or control system, as applicable. The communications link supports upload and download of signal timings and other parameters and reporting of current intersection status. It represents the field equipment used in all levels of traffic signal control from basic actuated systems that operate on fixed timing plans through adaptive systems. It also supports all signalized intersection configurations, including those that accommodate pedestrians. In advanced, future implementations, environmental data may be monitored and used to support dilemma zone processing and other aspects of signal control that are sensitive to local environmental conditions.
LFUCG Traffic Signals	ITS Roadway Equipment	Roadway Signal Preemption	'Roadway Signal Preemption' includes the field elements that receive signal preemption requests from emergency vehicles approaching a signalized intersection and overrides the current operation of the traffic signals to stop conflicting traffic and grant right-of-way to the approaching vehicle.
LFUCG Traffic Signals	ITS Roadway Equipment	Roadway Standard Rail Crossing	'Roadway Standard Rail Crossing' manages highway traffic at highway-rail intersections (HRIs) where operational requirements do not dictate advanced features (e.g., where rail operational speeds are less than 80 miles per hour). Either passive (e.g., the crossbuck sign) or active warning systems (e.g., flashing lights and gates) are supported depending on the specific requirements for each intersection. These traditional HRI warning systems may also be augmented with other standard traffic management devices. The warning systems are activated on notification of an approaching train by interfaced wayside equipment. The equipment at the HRI may also be interconnected with adjacent signalized intersections so that local control can be adapted to highway-rail intersection activities. Health monitoring of the HRI equipment and interfaces is performed; detected abnormalities are reported through interfaces to the wayside interface equipment and the Traffic Management Center.

Element Name	Physical Object Name	Functional Object	Functional Object Description
LFUCG Variable Speed Limit Signs	ITS Roadway Equipment	Roadway Variable Speed Limits	'Roadway Variable Speed Limits' includes the field equipment, physical overhead lane signs and associated control electronics that are used to manage and control variable speed limits systems. This equipment monitors traffic and environmental conditions along the roadway. The system can be centrally monitored and controlled by a Traffic Management Center or it can be autonomous, calculating and setting suitable speed limits, usually by lane. This application displays the speed limits and additional information such as basic safety rules and current traffic information to drivers.
LFUCG Work Zone Intrusion Devices	ITS Roadway Equipment	Roadway Work Zone Safety	'Roadway Work Zone Safety' includes field elements that detect vehicle intrusions in work zones and warns crew workers and drivers of imminent encroachment. Crew movements are also monitored so that the crew can be warned of movement beyond the designated safe zone.
Towing and Recovery Dispatch Operations Center	Emergency Management Center	Emergency Dispatch	'Emergency Dispatch' tracks the location and status of emergency vehicles and dispatches these vehicles to incidents. Pertinent incident information is gathered from the public and other public safety agencies and relayed to the responding units. Incident status and the status of the responding units is tracked so that additional units can be dispatched and/or unit status can be returned to available when the incident is cleared and closed.
Towing and Recovery Emergency Vehicles	Emergency Vehicle OBE	EV On-Board En Route Support	'EV On-Board En Route Support' provides communications functions to responding emergency vehicles that reduce response times and improve safety of responding public safety personnel and the general public. It supports traffic signal preemption via short range communication directly with signal control equipment and sends alert messages to surrounding vehicles.
Towing and Recovery Emergency Vehicles	Emergency Vehicle OBE	EV On-Board Incident Management Communication	'EV On-board Incident Management Communication' provides communications support to first responders. Information about the incident, information on dispatched resources, and ancillary information such as road and weather conditions are provided to emergency personnel. Emergency personnel transmit information about the incident such as identification of vehicles and people involved, the extent of injuries, hazardous material, resources on site, site management strategies in effect, and current clearance status. Emergency personnel may also send in-vehicle signing messages to approaching traffic using short range communications.
Towing and Recovery Emergency Vehicles	Emergency Vehicle OBE	EV Service Patrol Vehicle Operations	'EV Service Patrol Vehicle Operations' provides on-board processing and communications to service patrol vehicles that reduce response times and improve safety of responding personnel. It supports service patrol vehicle dispatch and provides incident information back to the dispatching center.

Element Name	Physical Object Name	Functional Object	Functional Object Description
TPIMS Central Data Repository	Archived Data System	Archive Data Repository	'Archive Data Repository' collects data and data catalogs from one or more data sources and stores the data in a focused repository that is suited to a particular set of ITS data users. It includes capabilities for performing quality checks on the incoming data, error notification, and archive to archive coordination. It includes the capability to define a data registry that allows registration of data identifiers or data definitions for interoperable use throughout a region. It supports a broad range of implementations, ranging from simple data marts that collect a focused set of data and serve a particular user community to large-scale data warehouses that collect, integrate, and summarize transportation data from multiple sources and serve a broad array of users within a region. Repositories may be established to support operations planning, performance monitoring and management, and policy and investment decisions.
TPIMS Central Data Repository	Archived Data System	Archive Situation Data Archival	'Archive Situation Data Archival' collects and archives traffic, roadway, and environmental information for use in off-line planning, research, and analysis. It controls and collects information directly from equipment at the roadside, reflecting the deployment of traffic detectors that are used primarily for traffic monitoring and planning purposes, rather than for traffic management. It also collects situation data from connected vehicles. The data collected, quality checks performed, and aggregation strategies are defined to support transportation system performance monitoring and management.
User Personal Computing Devices	Personal Information Device	Personal Interactive Traveler Information	'Personal Interactive Traveler Information' provides traffic information, road conditions, transit information, yellow pages (traveler services) information, special event information, and other traveler information that is specifically tailored based on the traveler's request and/or previously submitted traveler profile information. It also supports interactive services that support enrollment, account management, and payments for transportation services. The interactive traveler information capability is provided by personal devices including personal computers and personal portable devices such as smart phones.
User Personal Computing Devices	Personal Information Device	Personal Traveler Information Reception	'Personal Traveler Information Reception' receives formatted traffic advisories, road conditions, traffic regulations, transit information, broadcast alerts, and other general traveler information broadcasts and presents the information to the traveler. The traveler information broadcasts are received by personal devices including personal computers and personal portable devices such as smart phones.

Element Name	Physical Object Name	Functional Object	Functional Object Description
Vehicle	Vehicle OBE	Vehicle Control Automation	'Vehicle Control Automation' provides lateral and/or longitudinal control of a vehicle to allow 'hands off' and/or 'feet off' driving, automating the steering, accelerator, and brake control functions. It builds on the sensors included in 'Vehicle Safety Monitoring' and 'Vehicle Control Warning' and uses the information about the area surrounding the vehicle to safely control the vehicle. It covers the range of incremental control capabilities from driver assistance systems that take over steering or acceleration/deceleration in limited scenarios with direct monitoring by the driver to full automation where all aspects of driving are automated under all roadway and environmental conditions.
Vehicle	Vehicle OBE	Vehicle Intersection Warning	'Vehicle Intersection Warning' uses V2V and V2I communications to monitor other connected vehicles at intersections and support the safe movement of the vehicle through the intersection. Driver warnings are provided and the application may also optionally take control of the vehicle to avoid collisions. The application will also notify the infrastructure and other vehicles if it detects an unsafe infringement on the intersection.
Vehicle	Vehicle OBE	Vehicle Location Determination	'Vehicle Location Determination' receives current location of the vehicle and provides this information to vehicle applications that use the location information to provide ITS services.

8 Interfaces Between Systems

The interfaces of the transportation systems in Lexington Area ITS Architecture are based on the Architecture Reference for Cooperative and Intelligent Transportation (ARC-IT) and tailored to reflect the plan for the region. Architecture diagrams display the transportation systems in the Lexington Area ITS Architecture, and more importantly, how these systems are and will be connected with one another so information can be exchanged and transportation services can be coordinated. Stakeholders may use these diagrams to identify integration opportunities. Each system in the region is represented with two types of diagrams, a context diagram and an architecture flow diagram.

A context diagram shows a particular system and all other systems with which it shares information. Interconnects are represented as single lines and indicate information sharing without specifying the type of information being shared or the direction of the information movement.

Following each interconnect context diagram are a series of architecture flow diagrams showing the information (i.e. architecture flows) movement between the various systems.

Information about the interfaces of the systems in the region is contained in the Regional Architecture Development for Intelligent Transportation (RAD-IT) Architecture database. RAD-IT Architecture can be used to create tailored interconnect and architecture flow diagrams for any system in the database.

All interface diagrams are available on the Lexington Area ITS Architecture website.

Table 6: Interconnects

Element 1	Element 2	Status
Academic / Research Organizations	Lextran Transit Operations Center	Planned
Academic / Research Organizations	LFUCG Regional Data Management / Analytics System	Planned
Academic / Research Organizations	LFUCG Traffic Management Center	Planned
Basic Vehicle	Connected/Automated Vehicles	Planned
Basic Vehicle	KYTC District 7 Dynamic Message Signs	Existing
Basic Vehicle	KYTC District 7 Highway Advisory Radio	Existing
Basic Vehicle	LFUCG Dynamic Message Signs	Existing
Basic Vehicle	Vehicle	Planned
BUS Dispatch Center	BUS Facility Surveillance Equipment	Existing
BUS Dispatch Center	BUS Transit Vehicle	Existing
BUS Dispatch Center	BUS Transit Vehicle Operators	Existing
BUS Dispatch Center	BUS Transit Website	Existing
BUS Dispatch Center	BUS Vehicle Maintenance Crew	Existing
BUS Dispatch Center	Financial Institution	Planned
BUS Dispatch Center	Jessamine County - 911 Emergency Services	Existing
BUS Dispatch Center	LFUCG 911/Emergency Communications Center	Existing
BUS Dispatch Center	LFUCG Emergency Operations Center	Existing
BUS Dispatch Center	NOAA National Weather Service	Existing
BUS Transit Vehicle	BUS Transit Vehicle Operators	Existing
BUS Transit Vehicle	BUS Traveler Electronic Fare Cards	Existing
BUS Transit Website	User Personal Computing Devices	Existing
Commercial Vehicle Fleet and Freight Management	Commercial Vehicles	Existing
Commercial Vehicle Fleet and Freight Management	Jessamine County - 911 Emergency Services	Existing
Commercial Vehicle Fleet and Freight Management	Kentucky State Police Post 12	Existing
Commercial Vehicle Fleet and Freight Management	Kentucky State Police Post 7	Existing
Commercial Vehicle Fleet and Freight Management	LFUCG 911/Emergency Communications Center	Existing
Commercial Vehicle Fleet and Freight Management	LFUCG Division of Police	Existing
Commercial Vehicle Fleet and Freight Management	LFUCG Emergency Operations Center	Existing
Commercial Vehicles	LFUCG Division of Police	Existing
Connected/Automated Vehicles	LFUCG Connected Vehicle Roadside Equipment	Planned

Element 1	Element 2	Status
Driver	Jessamine County Road Department Work Zone Safety Equipment	Existing
Driver	Jessamine County Roadside Equipment	Existing
Driver	KYTC District 7 Dynamic Message Signs	Existing
Driver	KYTC District 7 Highway Advisory Radio	Existing
Driver	KYTC District 7 Ramp Meters	Planned
Driver	KYTC District 7 Traffic Signals	Existing
Driver	KYTC District 7 Work Zone Safety Equipment	Planned
Driver	KYTC District 7 Wrong Way Vehicle Detection System	Planned
Driver	KYTC Truck Parking Management System	Planned
Driver	LFCPA Parking Management System	Existing
Driver	LFUCG Curve Speed Warning System	Planned
Driver	LFUCG Dynamic Message Signs	Existing
Driver	LFUCG Multimodal Vehicle Detection System	Existing
Driver	LFUCG Queue Detection and Warning System	Planned
Driver	LFUCG Reversible Lanes Field Equipment	Existing
Driver	LFUCG Roadside Traffic Detection Equipment	Existing
Driver	LFUCG Traffic Signals	Existing
Driver	LFUCG Variable Speed Limit Signs	Planned
Event Promoters	Jessamine County Road Department	Existing
Event Promoters	KYTC District 7 Office	Existing
Event Promoters	LFUCG Division of Police	Existing
Event Promoters	LFUCG Traffic Management Center	Existing
Financial Institution	Lextran Transit Operations Center	Existing
FTSB Transit Dispatch Centers	FTSB Transit Vehicle Operators	Existing
FTSB Transit Dispatch Centers	FTSB Transit Vehicles	Existing
FTSB Transit Dispatch Centers	FTSB Transit Website	Existing
FTSB Transit Dispatch Centers	Jessamine County - 911 Emergency Services	Existing
FTSB Transit Dispatch Centers	LFUCG 911/Emergency Communications Center	Existing
FTSB Transit Dispatch Centers	LFUCG Emergency Operations Center	Existing
FTSB Transit Vehicle Operators	FTSB Transit Vehicles	Existing
FTSB Transit Website	User Personal Computing Devices	Existing
Jessamine County - 911 Emergency Services	Jessamine County Emergency Vehicles	Existing
Jessamine County - 911 Emergency Services	Jessamine County Sheriff Department	Existing
Jessamine County - 911 Emergency Services	Kentucky Emergency Management	Existing
Jessamine County - 911 Emergency Services	Kentucky State Police Post 7	Existing
Jessamine County - 911 Emergency Services	KYTC District 7 Office	Existing
Jessamine County - 911 Emergency Services	LFUCG 911/Emergency Communications Center	Existing
Jessamine County - 911 Emergency Services	LFUCG Emergency Operations Center	Existing
Jessamine County - 911 Emergency Services	Neighboring County/City 911 Centers	Existing
Jessamine County - 911 Emergency Services	NOAA National Weather Service	Existing
Jessamine County Emergency Vehicles	Jessamine County Sheriff Department	Existing
Jessamine County Road Department	Jessamine County Road Department Personnel	Existing
Jessamine County Road Department	Jessamine County Road Department Vehicles	Existing
Jessamine County Road Department	Jessamine County Roadside Equipment	Existing
Jessamine County Road Department	LFUCG Traffic Management Center	Planned
Jessamine County Road Department Personnel	Jessamine County Road Department Work Zone Safety Equipment	Existing
Jessamine County Roadside Equipment	Pedestrians and Bike/Scooter Riders	Existing
Jessamine County Sheriff Department	Kentucky Emergency Management	Existing
Jessamine County Sheriff Department	Kentucky State Police Post 7	Existing
Jessamine County Sheriff Department	LFUCG Division of Police	Existing

Element 1	Element 2	Status
Jessamine County Sheriff Department	LFUCG Emergency Operations Center	Existing
Jessamine County Sheriff Department	Media	Existing
Jessamine County Sheriff Department	NOAA National Weather Service	Existing
Jessamine County Sheriff Department	Towing and Recovery Dispatch Operations Center	Existing
Kentucky Emergency Management	Kentucky State Police Post 12	Existing
Kentucky Emergency Management	Kentucky State Police Post 7	Existing
Kentucky Emergency Management	LFUCG 911/Emergency Communications Center	Existing
Kentucky Emergency Management	LFUCG Division of Fire and Emergency Services	Existing
Kentucky Emergency Management	LFUCG Division of Police	Existing
Kentucky Emergency Management	LFUCG Emergency Operations Center	Existing
Kentucky State Police Post 12	Kentucky State Police Post 12 Patrol Car	Existing
Kentucky State Police Post 12	Kentucky State Police Post 7	Existing
Kentucky State Police Post 12	KYTC District 7 Maintenance and Construction Offices	Planned
Kentucky State Police Post 12	KYTC District 7 Office	Existing
Kentucky State Police Post 12	KYTC District 7 Work Zone Safety Equipment	Planned
Kentucky State Police Post 12	LFUCG 911/Emergency Communications Center	Existing
Kentucky State Police Post 12	LFUCG Division of Fire and Emergency Services	Existing
Kentucky State Police Post 12	LFUCG Division of Police	Existing
Kentucky State Police Post 12	LFUCG Emergency Operations Center	Existing
Kentucky State Police Post 12	LFUCG Streets and Roads	Planned
Kentucky State Police Post 12	LFUCG Traffic Management Center	Existing
Kentucky State Police Post 12	Media	Existing
Kentucky State Police Post 12	Neighboring County/City 911 Centers	Existing
Kentucky State Police Post 12 Patrol Car	KYTC District 7 Traffic Signals	Planned
Kentucky State Police Post 12 Patrol Car	LFUCG Traffic Signals	Planned
Kentucky State Police Post 7	Kentucky State Police Post 7 Patrol Car	Existing
Kentucky State Police Post 7	KYTC District 7 Maintenance and Construction Offices	Planned
Kentucky State Police Post 7	KYTC District 7 Office	Existing
Kentucky State Police Post 7	KYTC District 7 Work Zone Safety Equipment	Planned
Kentucky State Police Post 7	LFUCG 911/Emergency Communications Center	Planned
Kentucky State Police Post 7	LFUCG Division of Fire and Emergency Services	Planned
Kentucky State Police Post 7	LFUCG Division of Police	Planned
Kentucky State Police Post 7	LFUCG Emergency Operations Center	Existing
Kentucky State Police Post 7	LFUCG Streets and Roads	Planned
Kentucky State Police Post 7	LFUCG Traffic Management Center	Planned
Kentucky State Police Post 7	Media	Existing
Kentucky State Police Post 7	Neighboring County/City 911 Centers	Existing
Kentucky State Police Post 7 Patrol Car	KYTC District 7 Traffic Signals	Planned
KYTC District 7 CCTV Cameras	KYTC District 7 Office	Existing
KYTC District 7 CCTV Cameras	LFUCG Traffic Management Center	Existing
KYTC District 7 Dynamic Message Signs	KYTC District 7 Office	Existing
KYTC District 7 Dynamic Message Signs	KYTC District 7 Overheight Vehicle Sensors	Existing
KYTC District 7 Highway Advisory Radio	KYTC District 7 Office	Existing
KYTC District 7 Maintenance and Construction Center Personnel	KYTC District 7 Maintenance and Construction Offices	Existing
KYTC District 7 Maintenance and Construction Field Personnel	KYTC District 7 Work Zone Safety Equipment	Planned
KYTC District 7 Maintenance and Construction Offices	KYTC District 7 Maintenance and Construction Vehicles	Existing
KYTC District 7 Maintenance and Construction Offices	KYTC District 7 Office	Existing
KYTC District 7 Maintenance and Construction Offices	KYTC District 7 RWIS Stations	Existing
KYTC District 7 Maintenance and Construction Offices	KYTC District 7 Work Zone Safety Equipment	Planned
KYTC District 7 Maintenance and Construction Offices	KYTC GoKY	Planned

Element 1	Element 2	Status
KYTC District 7 Maintenance and Construction Offices	KYTC MDSS	Existing
KYTC District 7 Maintenance and Construction Offices	LFUCG 911/Emergency Communications Center	Planned
KYTC District 7 Maintenance and Construction Offices	LFUCG Division of Fire and Emergency Services	Planned
KYTC District 7 Maintenance and Construction Offices	LFUCG Division of Police	Planned
KYTC District 7 Maintenance and Construction Offices	LFUCG Regional Data Management / Analytics System	Planned
KYTC District 7 Maintenance and Construction Offices	LFUCG Streets and Roads	Planned
KYTC District 7 Maintenance and Construction Offices	LFUCG Traffic Management Center	Planned
KYTC District 7 Maintenance and Construction Offices	NOAA National Weather Service	Existing
KYTC District 7 Maintenance and Construction Offices	Surface Transportation Weather Service	Existing
KYTC District 7 Maintenance and Construction Vehicles	KYTC MDSS	Existing
KYTC District 7 Office	KYTC District 7 Overheight Vehicle Sensors	Existing
KYTC District 7 Office	KYTC District 7 Ramp Meters	Planned
KYTC District 7 Office	KYTC District 7 Roadside Traffic Detection Equipment	Existing
KYTC District 7 Office	KYTC District 7 Safe Patrol Vehicles	Existing
KYTC District 7 Office	KYTC District 7 Traffic Signals	Existing
KYTC District 7 Office	KYTC District 7 Work Zone Safety Equipment	Planned
KYTC District 7 Office	KYTC District 7 Wrong Way Vehicle Detection System	Planned
KYTC District 7 Office	KYTC GoKY	Existing
KYTC District 7 Office	LFCPA Parking Management System	Planned
KYTC District 7 Office	LFUCG 911/Emergency Communications Center	Existing
KYTC District 7 Office	LFUCG Division of Fire and Emergency Services	Planned
KYTC District 7 Office	LFUCG Division of Police	Planned
KYTC District 7 Office	LFUCG Emergency Operations Center	Existing
KYTC District 7 Office	LFUCG Regional Data Management / Analytics System	Planned
KYTC District 7 Office	LFUCG Streets and Roads	Planned
KYTC District 7 Office	LFUCG Traffic Information Website	Planned
KYTC District 7 Office	LFUCG Traffic Management Center	Existing
KYTC District 7 Office	Media	Existing
KYTC District 7 Office	NOAA National Weather Service	Existing
KYTC District 7 Office	Surface Transportation Weather Service	Existing
KYTC District 7 Office	Towing and Recovery Dispatch Operations Center	Existing
KYTC District 7 Ramp Meters	KYTC District 7 Roadside Traffic Detection Equipment	Planned
KYTC District 7 Ramp Meters	LFUCG Traffic Management Center	Planned
KYTC District 7 Roadside Traffic Detection Equipment	LFUCG Traffic Management Center	Planned
KYTC District 7 RWIS Stations	KYTC MDSS	Existing
KYTC District 7 RWIS Stations	LFUCG Streets and Roads	Planned
KYTC District 7 RWIS Stations	LFUCG Traffic Management Center	Planned
KYTC District 7 Traffic Signals	Lextran Transit Vehicle	Planned
KYTC District 7 Traffic Signals	LFUCG Emergency Vehicles	Planned
KYTC District 7 Traffic Signals	LFUCG Traffic Management Center	Existing
KYTC District 7 Work Zone Safety Equipment	LFUCG Division of Police	Planned
KYTC District 7 Wrong Way Vehicle Detection System	LFUCG Traffic Management Center	Planned
KYTC GoKY	LFUCG Regional Data Management / Analytics System	Planned
KYTC GoKY	User Personal Computing Devices	Existing
KYTC MDSS	NOAA National Weather Service	Existing
KYTC Truck Parking Management System	KYTC Truck Parking Website	Planned
KYTC Truck Parking Management System	Other States TPIMS	Planned
KYTC Truck Parking Management System	TPIMS Central Data Repository	Planned
KYTC Truck Parking Website	User Personal Computing Devices	Planned
Lextran Bus Vehicle Maintenance Crew	Lextran Transit Operations Center	Existing
Lextran Facility Surveillance Equipment	Lextran Transit Operations Center	Existing

Element 1	Element 2	Status
Lextran Next Bus Arrival Display	Lextran Transit Operations Center	Existing
Lextran Next Bus Arrival Display	Traveler	Existing
Lextran Operations Personnel	Lextran Transit Operations Center	Existing
Lextran Transit Center Security Cameras	Lextran Transit Operations Center	Existing
Lextran Transit Operations Center	Lextran Transit Vehicle	Existing
Lextran Transit Operations Center	Lextran Transit Vehicle Operator	Existing
Lextran Transit Operations Center	Lextran Web Site	Existing
Lextran Transit Operations Center	Lextran WHEELS Transit Vehicle	Existing
Lextran Transit Operations Center	LFCPA Lexpark Website	Planned
Lextran Transit Operations Center	LFCPA Parking Management System	Planned
Lextran Transit Operations Center	LFUCG 911/Emergency Communications Center	Existing
Lextran Transit Operations Center	LFUCG Emergency Operations Center	Existing
Lextran Transit Operations Center	LFUCG Regional Data Management / Analytics System	Planned
Lextran Transit Operations Center	LFUCG Traffic Management Center	Existing
Lextran Transit Operations Center	NOAA National Weather Service	Existing
Lextran Transit Vehicle	Lextran Transit Vehicle Operator	Existing
Lextran Transit Vehicle	Lextran Traveler Electronic Fare Cards	Existing
Lextran Transit Vehicle	LFUCG Traffic Signals	Planned
Lextran Transit Vehicle Operator	Lextran WHEELS Transit Vehicle	Existing
Lextran Web Site	LFCPA Lexpark Website	Existing
Lextran Web Site	User Personal Computing Devices	Existing
LFCPA Lexpark Website	LFCPA Parking Management System	Existing
LFCPA Lexpark Website	LFUCG Emergency Operations Center	Planned
LFCPA Lexpark Website	LFUCG Regional Data Management / Analytics System	Planned
LFCPA Lexpark Website	Private Transportation Information Systems	Planned
LFCPA Lexpark Website	User Personal Computing Devices	Existing
LFCPA Parking Management System	LFUCG 911/Emergency Communications Center	Planned
LFCPA Parking Management System	LFUCG Division of Police	Planned
LFCPA Parking Management System	LFUCG Regional Data Management / Analytics System	Planned
LFCPA Parking Management System	LFUCG Traffic Information Website	Existing
LFCPA Parking Management System	LFUCG Traffic Management Center	Planned
LFCPA Parking Management System	Private Transportation Information Systems	Planned
LFCPA Parking Management System	Vehicle	Existing
LFUCG 911/Emergency Communications Center	LFUCG CCTV Cameras	Existing
LFUCG 911/Emergency Communications Center	LFUCG Division of Fire and Emergency Services	Existing
LFUCG 911/Emergency Communications Center	LFUCG Division of Police	Existing
LFUCG 911/Emergency Communications Center	LFUCG Emergency Operations Center	Existing
LFUCG 911/Emergency Communications Center	LFUCG Emergency Vehicles	Existing
LFUCG 911/Emergency Communications Center	LFUCG Regional Data Management / Analytics System	Planned
LFUCG 911/Emergency Communications Center	LFUCG Streets and Roads	Planned
LFUCG 911/Emergency Communications Center	LFUCG Traffic Management Center	Existing
LFUCG 911/Emergency Communications Center	Media	Existing
LFUCG 911/Emergency Communications Center	Neighboring County/City 911 Centers	Existing
LFUCG 911/Emergency Communications Center	Towing and Recovery Dispatch Operations Center	Existing
LFUCG CCTV Cameras	LFUCG Division of Police	Existing
LFUCG CCTV Cameras	LFUCG Emergency Operations Center	Existing
LFUCG CCTV Cameras	LFUCG Traffic Management Center	Existing
LFUCG Connected Vehicle Roadside Equipment	LFUCG Curve Speed Warning System	Planned
LFUCG Connected Vehicle Roadside Equipment	LFUCG RWIS Stations	Planned
LFUCG Connected Vehicle Roadside Equipment	LFUCG Traffic Management Center	Planned
LFUCG Curve Speed Warning System	LFUCG Traffic Management Center	Planned
LFUCG Division of Fire and Emergency Services	LFUCG Division of Police	Existing

Element 1	Element 2	Status
LFUCG Division of Fire and Emergency Services	LFUCG Emergency Operations Center	Existing
LFUCG Division of Fire and Emergency Services	LFUCG Emergency Vehicles	Existing
LFUCG Division of Fire and Emergency Services	LFUCG Streets and Roads	Planned
LFUCG Division of Fire and Emergency Services	LFUCG Traffic Management Center	Existing
LFUCG Division of Fire and Emergency Services	Media	Existing
LFUCG Division of Fire and Emergency Services	NOAA National Weather Service	Existing
LFUCG Division of Police	LFUCG Dynamic Message Signs	Existing
LFUCG Division of Police	LFUCG Emergency Operations Center	Existing
LFUCG Division of Police	LFUCG Regional Data Management / Analytics System	Planned
LFUCG Division of Police	LFUCG Roadside Traffic Detection Equipment	Existing
LFUCG Division of Police	LFUCG Streets and Roads	Planned
LFUCG Division of Police	LFUCG Traffic Management Center	Existing
LFUCG Division of Police	Media	Existing
LFUCG Division of Police	Towing and Recovery Dispatch Operations Center	Existing
LFUCG Dynamic Message Signs	LFUCG Traffic Management Center	Existing
LFUCG Emergency Operations Center	LFUCG Regional Data Management / Analytics System	Planned
LFUCG Emergency Operations Center	LFUCG Streets and Roads	Existing
LFUCG Emergency Operations Center	LFUCG Traffic Management Center	Existing
LFUCG Emergency Operations Center	Neighboring County/City 911 Centers	Existing
LFUCG Emergency Operations Center	NOAA National Weather Service	Existing
LFUCG Emergency Operations Center	Rail Operations	Existing
LFUCG Emergency Operations Center	Towing and Recovery Dispatch Operations Center	Existing
LFUCG Emergency Vehicles	LFUCG Traffic Signals	Planned
LFUCG Maintenance and Construction Personnel	LFUCG Work Zone Intrusion Devices	Existing
LFUCG Maintenance and Construction Vehicles	LFUCG Streets and Roads	Existing
LFUCG Multimodal Vehicle Detection System	LFUCG Traffic Management Center	Existing
LFUCG Multimodal Vehicle Detection System	LFUCG Traffic Signals	Existing
LFUCG Multimodal Vehicle Detection System	Pedestrians and Bike/Scooter Riders	Existing
LFUCG Queue Detection and Warning System	LFUCG Traffic Management Center	Planned
LFUCG Regional Data Management / Analytics System	LFUCG Streets and Roads	Planned
LFUCG Regional Data Management / Analytics System	LFUCG Traffic Management Center	Planned
LFUCG Regional Data Management / Analytics System	Private Transportation Information Systems	Planned
LFUCG Reversible Lanes Field Equipment	LFUCG Traffic Management Center	Existing
LFUCG Roadside Traffic Detection Equipment	LFUCG Traffic Management Center	Existing
LFUCG RWIS Stations	LFUCG Streets and Roads	Planned
LFUCG RWIS Stations	LFUCG Traffic Management Center	Planned
LFUCG Streets and Roads	LFUCG Traffic Information Website	Planned
LFUCG Streets and Roads	LFUCG Traffic Management Center	Existing
LFUCG Streets and Roads	LFUCG Work Zone Intrusion Devices	Existing
LFUCG Streets and Roads	NOAA National Weather Service	Existing
LFUCG Streets and Roads	Surface Transportation Weather Service	Existing
LFUCG Traffic Incident Detection System	LFUCG Traffic Management Center	Planned
LFUCG Traffic Information Website	LFUCG Traffic Management Center	Planned
LFUCG Traffic Information Website	Private Transportation Information Systems	Existing
LFUCG Traffic Information Website	User Personal Computing Devices	Existing
LFUCG Traffic Management Center	LFUCG Traffic Management Center Operators	Existing
LFUCG Traffic Management Center	LFUCG Traffic Signals	Existing
LFUCG Traffic Management Center	LFUCG Variable Speed Limit Signs	Planned
LFUCG Traffic Management Center	Media	Existing
LFUCG Traffic Management Center	NOAA National Weather Service	Existing
LFUCG Traffic Management Center	Private Transportation Information Systems	Existing
LFUCG Traffic Management Center	Rail Operations	Existing

Element 1	Element 2	Status
LFUCG Traffic Management Center	Towing and Recovery Dispatch Operations Center	Existing
LFUCG Traffic Signals	Pedestrians and Bike/Scooter Riders	Existing
LFUCG Traffic Signals	Wayside Equipment	Existing
Private Transportation Information Systems	Vehicle	Existing
Towing and Recovery Dispatch Operations Center	Towing and Recovery Emergency Vehicles	Existing
Traveler	User Personal Computing Devices	Existing

9 ITS Standards

Standards are essential to cost-effective integration of ITS throughout the region. ITS standards are fundamental to the establishment of an open ITS environment that achieves the goal of interoperability for ITS. Standards facilitate deployment of interoperable systems at local, regional, and national levels without impeding innovation as technology advances and new approaches evolve.

Establishing standards for exchanging information among ITS systems is important not only from an interoperability point of view; it also provides interchangeability and expandability thereby reducing risk and cost. Since an agency using standardized interfaces can select among multiple vendors for products and applications, competition is maintained and prices are lower in the long term. In addition, physical standards that define the form, fit, and function of individual ITS systems allow interchangeability, vendor independence, and facilitate future interconnections.

Standards Development Organizations (SDO) are developing ITS standards that support interoperability and interchangeability. Many standards overlap in applicability and offer varying features and levels of performance and security. This provides flexibility in the design of ITS systems allowing agencies to choose the most applicable standard for their needs. Before systems are designed, all stakeholders involved in the applicable ITS service(s) should decide upon the standards and their specifics that will be used. Once a decision is made, all future systems should use the agreed upon standards.

Table 7: ITS Standards

SDO	Document ID	Standard Title	Standard Type
AASHTO/ITE	ITE TMDD	Traffic Management Data Dictionary (TMDD) and Message Sets for External Traffic Management Center Communications (MS/ETMCC)	Message/Data
AASHTO/ITE/NEMA	NTCIP 1201	Global Object Definitions	Message/Data
AASHTO/ITE/NEMA	NTCIP 1202	Object Definitions for Actuated Traffic Signal Controller (ASC) Units	Message/Data
AASHTO/ITE/NEMA	NTCIP 1203	Object Definitions for Dynamic Message Signs (DMS)	Message/Data
AASHTO/ITE/NEMA	NTCIP 1204	Object Definitions for Environmental Sensor Stations (ESS)	Message/Data
AASHTO/ITE/NEMA	NTCIP 1205	Object Definitions for Closed Circuit Television (CCTV) Camera Control	Message/Data
AASHTO/ITE/NEMA	NTCIP 1206	Object Definitions for Data Collection and Monitoring (DCM) Devices	Message/Data
AASHTO/ITE/NEMA	NTCIP 1207	Object Definitions for Ramp Meter Control (RMC) Units	Message/Data
AASHTO/ITE/NEMA	NTCIP 1208	Object Definitions for Closed Circuit Television (CCTV) Switching	Message/Data
AASHTO/ITE/NEMA	NTCIP 1209	Data Element Definitions for Transportation Sensor Systems (TSS)	Message/Data
AASHTO/ITE/NEMA	NTCIP 1210	Field Management Stations (FMS) - Part 1: Object Definitions for Signal System Masters	Message/Data
AASHTO/ITE/NEMA	NTCIP 1211	Object Definitions for Signal Control and Prioritization (SCP)	Message/Data
AASHTO/ITE/NEMA	NTCIP 1214	Object Definitions for Conflict Monitor Units (CMU)	Message/Data
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group
AASHTO/ITE/NEMA	NTCIP C2F	NTCIP Center-to-Field Standards Group	Group
APTA	APTA TCIP-S-001 3.0.4	Standard for Transit Communications Interface Profiles	Message/Data
ASTM	ASTM E2468-05	Standard Practice for Metadata to Support Archived Data Management Systems	Other
ASTM	ASTM E2665-08	Standard Specifications for Archiving ITS-Generated Traffic Monitoring Data	Message/Data

SDO	Document ID	Standard Title	Standard Type
ASTM	DSRC 915MHz	Dedicated Short Range Communication at 915 MHz Standards Group	Group
ASTM/IEEE/SAE	DSRC 5GHz	Dedicated Short Range Communication at 5.9 GHz Standards Group	Group
IEEE	IEEE 1455-1999	Standard for Message Sets for Vehicle/Roadside Communications	Message/Data
IEEE	IEEE IM	Incident Management Standards Group	Group
IEEE	IEEE P1609.11	Standard for Wireless Access in Vehicular Environments (WAVE) - Over- the-Air Data Exchange Protocol for Intelligent Transportation Systems (ITS)	Communications Protocol
SAE	ATIS General Use	Advanced Traveler Information Systems (ATIS) General Use Standards Group	Group
SAE	ATIS Low Bandwidth	Advanced Traveler Information Systems (ATIS) Bandwidth Limited Standards Group	Group
SAE	SAE J2735	Dedicated Short Range Communications (DSRC) Message Set Dictionary	Message/Data

10 Agreements

This section identifies the list of existing and future agreements between each of the stakeholder organizations whose ITS systems will be exchanging information was generated prior to implementing relevant projects. This list identifies the agreements that should be established but does not define the agreements themselves.

Table 8: Agreements

Agreement Title	Agreement Status	Description	Lead Stakeholder	Associated Stakeholders
Lextran Agreement with American Red Cross	Existing	Lextran contracts with the American Red Cross, Bluegrass Area Chapter, to provide the demand responsive service (e.g., elderly and disabled) for the Lexington area.	Lextran	American Red Cross, Bluegrass Area Chapter
Lextran Agreement with American Red Cross	Existing	Lextran contracts with the American Red Cross, Bluegrass Area Chapter, to provide the demand responsive service (e.g., elderly and disabled) for the Lexington area.	Lextran	Lextran
Lextran Agreement with Credit Card Providers	Existing	Agreement between Lextran and various credit card providers to allow for credit card payment of transit fares.	Lextran	Lextran
Lextran Agreement with Credit Card Providers	Existing	Agreement between Lextran and various credit card providers to allow for credit card payment of transit fares.	Lextran	Various Owners
Lextran agreement with Google for Trip Planner Capability	Existing	Agreement between Lextran and Google. Lextran provides the route and schedule data to Google. Google provides the trip planning service.	Lextran	Lextran
Lextran agreement with Google for Trip Planner Capability	Existing	Agreement between Lextran and Google. Lextran provides the route and schedule data to Google. Google provides the trip planning service.	Lextran	Various Owners
Lextran Agreement with LFUCG for Fare Payment	Planned	Agreement between Lextran and the Lexington-Fayette Urban County Government to provide automated fare payment capabilities for government employees.	Lextran	Lextran
Lextran Agreement with LFUCG for Fare Payment	Planned	Agreement between Lextran and the Lexington-Fayette Urban County Government to provide automated fare payment capabilities for government employees.	Lextran	LFUCG
Lextran Agreement with LFUCG Police	Existing	Lextran has a contract with the Lexington-Fayette Urban County Government Division of Police to provide transit security. This agreement will come into play (and may need to be modified) as Lexington implements additional automated security features.	Lextran	Lextran
Lextran Agreement with LFUCG Police	Existing	Lextran has a contract with the Lexington-Fayette Urban County Government Division of Police to provide transit security. This agreement will come into play (and may need to be modified) as Lexington implements additional automated security features.	Lextran	LFUCG

Agreement Title	Agreement Status	Description	Lead Stakeholder	Associated Stakeholders
LFUCG Agreements with Local TV Stations	Existing	LFUCG agreements with local TV stations that permit local TV stations to gain access to the traffic surveillance cameras. The agreements will need to be updated and/or dissolved and new LFUCG agreement(s) will need to be adopted to reflect I.P. addressable application when it comes to direct access, by the public, to traffic surveillance cameras.		LFUCG
LFUCG Agreements with Local TV Stations	Existing	LFUCG agreements with local TV stations that permit local TV stations to gain access to the traffic surveillance cameras. The agreements will need to be updated and/or dissolved and new LFUCG agreement(s) will need to be adopted to reflect I.P. addressable application when it comes to direct access, by the public, to traffic surveillance cameras.		Media
LFUCG and KYTC Traffic Signal Operations and Maintenance	Existing	KYTC's agreement for LFUCG to operate and maintain traffic signals on state routes in Fayette County.		KYTC Central Office
LFUCG and KYTC Traffic Signal Operations and Maintenance	Existing	KYTC's agreement for LFUCG to operate and maintain traffic signals on state routes in Fayette County.		KYTC District 7
LFUCG and KYTC Traffic Signal Operations and Maintenance	Existing	KYTC's agreement for LFUCG to operate and maintain traffic signals on state routes in Fayette County.		LFUCG
Mutual Aid Agreements	Existing	Mutual Aid Agreement for Assistance are the standard agreements between local government and other local and state governments for assistance during and after an incident.	Academic / Research Organizations	Jessamine County
Mutual Aid Agreements	Existing	Mutual Aid Agreement for Assistance are the standard agreements between local government and other local and state governments for assistance during and after an incident.	Academic / Research Organizations	Kentucky Emergency Management
Mutual Aid Agreements	Existing	Mutual Aid Agreement for Assistance are the standard agreements between local government and other local and state governments for assistance during and after an incident.	Academic / Research Organizations	Kentucky State Police
Mutual Aid Agreements	Existing	Mutual Aid Agreement for Assistance are the standard agreements between local government and other local and state governments for assistance during and after an incident.	Academic / Research Organizations	KYTC Central Office
Mutual Aid Agreements	Existing	Mutual Aid Agreement for Assistance are the standard agreements between local government and other local and state governments for assistance during and after an incident.	Academic / Research Organizations	KYTC District 7
Mutual Aid Agreements	Existing	Mutual Aid Agreement for Assistance are the standard agreements between local government and other local and state governments for assistance during and after an incident.	Academic / Research Organizations	LFUCG

Agreement Title	Agreement Status	Description	Lead Stakeholder	Associated Stakeholders
Mutual Aid Agreements	Existing	Mutual Aid Agreement for Assistance are the standard agreements between local government and other local and state governments for assistance during and after an incident.	Academic / Research Organizations	Neighboring Cities and Counties

11 ITS Projects

The Lexington Area ITS Architecture is ultimately implemented one ITS project at a time. This chapter lists the projects that have been identified as part of the regional ITS architecture definition. Additional detail for each of these ITS projects is included in the RAD-IT Architecture database.

Table 9: ITS Projects

Name	Description	Status	Timeframe
Alternate Route Traffic Management	The project will include two phases: Phase 1 – develop an alternate route traffic management plan which identifies alternate routes and required sources and defines traffic management strategies, roles and responsibilities, etc. Plans would identify thresholds for when a specific segment of the roadway is considered affected, which alternate route(s) to implement, which agencies should be involved, how they communicate, and their roles and responsibilities in traffic control, timing adjustments, and traveler information. The plan will also define what ITS assets (CCTV, DMS, etc.) should be utilized to monitor the situation and provide en-route traveler information. Phase 2 is implementation of the system. Lead agencies will be LFUCG (Traffic) and KYTC.	Planned	Short to Medium Term (0-6 Years)
AVL Expansion on Snow Plows	This project will facilitate the expansion of AVL equipment on KYTC District 7 snow plows that enables monitoring of vehicle locations and real-time communications with KYTC District 7 Maintenance and Construction Offices. KYTC District 7 currently utilizes Maintenance Decision Support Systems (MDSS) for the real-time communications of recommended roadway treatments based on environmental conditions gathered from roadside weather observation stations and sensors on board the snow plows. Lead agency is KYTC.	Planned	Short Term (0-3 Years)
Bus Rapid Transit (BRT) System	This project represents the implementation of a bus rapid transit (BRT) system in Lexington. The ITS components for the BRT system will include installation of AVL, mobile data terminals, passenger counters, electronic fare payment equipment, security cameras, enunciators, and signal priority emitters on BRT vehicles and information display signs at bus stops / shelters and preferential treatments such as transit signal priority and queue jump lanes at signalized intersections and the entrance and exit at the downtown transit center. Lead agency is Lextran.	Planned	Medium to Long Term (4-10 Years)

Name	Description	Status	Timeframe
Connected Vehicle Pilot/ Demonstration Projects	This project represents several potential Connected Vehicle Pilot / Demonstration projects for the region. One project could use roadside equipment to sense wrong–way drivers and activate the flashing beacons near static Wrong Way signs on an exit ramp. A second project could feature a Curve Speed Warning application to provide alerts to drivers approaching a curve at high speeds. A third system would provide connected vehicles near a reduced speed zone (i.e. school zones or work zones) or closed lane with information on the zone's posted speed limit and/or the configuration of the roadway. A fourth application would communicate messages from a central traffic management software directly to vehicles that inform drivers about roadway traffic incidents, weather conditions specific to a location on the roadway, and upcoming road closures / lane restrictions / work zones. Lead agency will be LFUCG (Traffic/ Public Safety).	Planned	Long Term (7 Years and Beyond)
Curve Speed Warning System	The project will deploy a curve speed warning system that assists drivers in avoiding crashes. The system includes roadside speed detection and warning devices to present warnings to drivers. When the speeds of approaching vehicles are above a certain threshold, the system provides alerts to drivers who are approaching a curve at an unsafe speed. Alerts are based on the location of the vehicle within the curve and the vehicle speed and may also include pavement conditions as a factor in assessing when to provide alerts for unsafe speeds. Lead agency will be LFUCG (Traffic/ Public Safety).	Planned	Short to Medium Term (0-6 Years)
Emergency Vehicle Pre-emption	This project represents the installation of roadside equipment at LFUCG traffic signals that receives requests from emergency vehicles approaching the intersections for signal pre-emption and provides a green light for the approaching phase of the emergency vehicle. Corresponding equipment will be installed on LFUCG emergency vehicles to enable the pre-emption of the signal timing. The same roadside equipment may also be utilized for signal priority for Lextran's buses. It is recommended to perform a feasibility study first. Lead agency will be LFUCG (Traffic/ Public Safety).	Planned	Long Term (7 Years and Beyond)
Expansion of Real-Time Transit Information Dissemination at Transit Stations	This project represents the installation of information displays/signs at the Transit Center and major transit stations. The information displays/signs will display transit arrival / departure information that is estimated based on information from Automated Vehicle Locator (AVL) equipment on Lextran buses. Lead agency is Lextran.	Planned	Short Term (0-3 Years)
Fiber Communications Upgrade and Expansion	This project will upgrade the current fiber communications as well as expand the fiber network to establish redundancy. The upgrade and expansion will improve the use and reliability of fiber network for the communication of transportation data between the LFUCG Traffic Management Center (TMC) and ITS field equipment (i.e. traffic signals, CCTV, etc.). Lead agency will be LFUCG (Traffic).	Planned	Short to Medium Term (0-6 Years)

Name	Description	Status	Timeframe
Freeway Ramp Meters Feasibility Study and Deployment	The first phase of the project will include a study to investigate the feasibility of installing meters on freeway on-ramps to improve traffic flows and safety of interstate highways in the region. The study will provide recommendations on whether ramp metering is a viable traffic management strategy for the region as well as locations for deployment. If deemed feasible, deployment of ramp meters will be carried out in the subsequent phase of the project. Lead Agency is KYTC.	Planned	Long Term (7 Years and Beyond)
Integrated Corridor Management (ICM) System	The project represents a future concept/feasibility study and subsequent deployment of an Integrated Corridor Management (ICM) system in the Lexington metropolitan area. The vision of this project is that transportation networks will realize significant improvements in the efficient movement of people and goods through institutional collaboration and proactive integration of existing infrastructure along major corridors. The ICM system will enable the Lexington TMC to manage the corridor as a multimodal system and make operational decisions for the benefit of the corridor as a whole. Lead agency is LFUCG (Traffic).	Planned	Long Term (7 Years and Beyond)
ITS Signalization to Improve Safety and Efficiency at Interstate Interchanges	The project represents a group of ITS solutions to improve the safety and operational efficiency of signalized intersections of freeway ramps and arterials. ITS solutions will include but not be limited to signal timing adjustments and coordination, advance dynamic warnings on freeway mainlines and/or arterial approaches to freeway ramps, and ramp meters. This will also include queue detection of traffic along exit ramps from mainline roads to reduce the potential of traffic backup on mainline roads. Queue detection has been installed at two exit ramp locations and will be expanded as needed. Lead Agencies are LFUCG (Traffic) and KYTC.	Planned	Short to Medium Term (0-6 Years)
LFUCG Automated Traffic Signal Performance Measures	Automated Traffic Signal Performance Measures (ATSPM) is defined as a suite of performance measures, data collection and data analysis tools to support objectives and performance-based approaches to traffic signal operations, maintenance, management and design of the signal system. The purpose of the application is to improve the overall safety, mobility and efficiency of signalized intersections for all system users. The technology allows for agencies responsible for traffic signal timing updates to use the data provided through ATSPM to determine how best to optimize traffic signal timings based on the collected data. Lead agency will be LFUCG (Traffic).	Planned	Medium to Long Term (4-10 Years)
LFUCG Traffic Information Website Enhancements	This project will upgrade the current LFUCG traffic information website to provide both real-time and static information to the public. Information presented on the website may include: a traffic congestion map, estimated travel time, road conditions, incident information, road construction and closure information, live CCTV camera images, and links to other information websites (e.g. GoKY). Integration with Waze for sending and receiving information on traffic incidents is planned. A component of pushing travel-related information to people who subscribe to the set of desired information could also be implemented. Lead agency is LFUCG (Traffic).	Planned	Short to Medium Term (0-6 Years)

Name	Description	Status	Timeframe
Multimodal Vehicle Detection System	The project represents installation of a multimodal vehicle detection system at additional intersections to improve safety and reduce collisions. System is able to detect vehicles as well as bicycles, scooters, and pedestrians that enter the range of detection. The system provides safer traffic signal operations and help reduce the potential for collisions. A video-based detection system has been installed at selected intersections in Lexington. Future system deployments will use the most appropriate technology for vehicle detection in the given conditions. This technology could include video, radar, lidar, thermal, or other forms of detection. This project will expand the installation of the system and technology to other key locations. Lead Agency is LFUCG (Traffic).	Planned	Short to Medium Term (0-6 Years)
Overheight Truck Detection Systems	This project represents the deployment of an overheight detection system that can provide warnings to trucks of low clearances ahead that could be hit by the trucks. Alternate routes for the trucks could be recommended to trucks so they can alter the travel around the low clearance overpasses. Lead agency will be KYTC.	Planned	Short to Medium Term (0-6 Years)
Parking Availability Information Sharing with Other Agencies and Third-Party Information Providers	This project will implement a live feed of parking space availability information to other agencies in the region for use in corridor management activities during special events. This also includes sharing parking availability information to the third-party traveler information providers such as WAZE. Lead agency will be LFCPA.	Planned	Short Term (0-3 Years)
Regional Data Management / Analytics System	This project represents a regional data management / analytics system that is capable of storing, managing and analyzing large data sets from various regional agencies. The system will have tools for regional analysis, including data analytics tools allowing agencies to analyze transportation system performance, identify patterns and trends, and predict the system performance and impacts of events such as incidents. For example, when and where traffic incidents may be occurring on the roadway and when traffic congestion is expected are among some of the recommendations that could be made. Lead agency will be LFUCG (Traffic/ Public Safety).	Planned	Medium to Long Term (4-10 Years)
Road Weather Information Systems (RWIS) Deployment	This project represents the installation of a Road Weather Information System (RWIS). The system can be operated either by the LFUCG TMC or the LFUCG Streets & Roads office. RWIS Stations will be installed strategically at locations prone with weather issues and/or to provide regional coverage. The current KYTC RWIS station in Lexington can feed information to this system. This system can also be integrated with the current KYTC RWIS. Lead agency is LFUCG (Traffic).	Planned	Short to Medium Term (0-6 Years)

Name	Description	Status	Timeframe
Traffic Incident Detection System	This project represents future deployment of a central software-based system that can use video analytics to detect the occurrence of traffic incidents (i.e. stopped vehicles, slow vehicles, wrong way vehicles on local streets, etc.) in real-time and communicate the incident to the LFUCG Traffic Management Center (or other emergency management agencies) of an incident requiring incident and emergency response. Lead agency is LFUCG (Traffic).	Planned	Short to Medium Term (0-6 Years)
Traffic Signal System Optimization Program	This project represents updates to arterial traffic signal system timings and coordination within and across jurisdictions in the region. Traffic signal timing and coordination improvements can reduce congestion and delays on arterial roads. Lead agency will be LFUCG (Traffic).	Planned	Short to Long Term (0-10 Years)
Transit Electronic Fare Payment System	This project represents the installation of electronic fare collection equipment on transit vehicles operated by the Bluegrass Community Action Partnership (BGCAP). Equipment would be able to read magnetic stripe cards or other transit cards via Radio Frequency ID (RFID) chips installed within the transit card. BGCAP will also install software to communicate with vehicle equipment for the purposes of fare payment collection and analysis. Lead agency is BGCAP.	Planned	Short to Medium Term (0-6 Years)
Transit Signal Priority	This project represents the installation of roadside equipment at traffic signals that receives requests from Lextran Transit Vehicles approaching the intersection for an extension (or side street truncation) of the current signal timing plan. US Route 60 is proposed as an initial corridor for TSP deployment. Green lights will be extended for the approaching transit vehicle, or red lights would be shortened by ending the green phase of the side street. Corresponding equipment will be installed on Lextran buses to enable signal priority requests. Lead agencies are LFUCG (Traffic) and Lextran.	Planned	Short to Medium Term (0-6 Years)
Transit System Technology Enhancements	This project reflects upgrades to the transit technology systems used by Lextran for fixed route and demand response transit operations. Systems include AVL for vehicle monitoring and diagnostics, fare collection systems, and automated passenger counting systems. Lead agency will be Lextran.	Planned	Short to Medium Term (0-6 Years)
Transit Vehicle Security Cameras	This project represents the installation of security cameras on transit vehicles operated by the Bluegrass Community Action Partnership (BGCAP). Security camera recordings can be accessed in real-time provided that cellular communications is enabled with the vehicles, or accessed at the end of the vehicle shift at the transit garage. Lead agency is BGCAP.	Planned	Short Term (0-3 Years)
Truck Parking Space Availability Systems	This project represents the deployment of a truck parking space availability system that can detect space availability at select parking locations for trucks and communicate the available spaces in a lot either via DMS in advance of the parking facility or via internet webpage. Lead agency will be KYTC.	Planned	Short to Medium Term (0-6 Years)

Name	Description	Status	Timeframe
Variable Speed Limit (VSL) Signs	This project represents the installation of Variable Speed Limit (VSL) signs by LFUCG. VSL signs will be operated from the LFUCG Traffic Management Center. Speed limits will either be updated from the TMC based on known traffic conditions or on an automated basis from roadside detection equipment. Legislative statute enabling variable speed limits will need to be further discussed and established prior to design and implementation. Lead agency is LFUCG (Traffic).	Planned	Medium to Long Term (4-10 Years)
Work Zone ITS Deployment	This project represents the deployment of a group of ITS solutions to improve traffic and work zone safety and efficiency in the region. ITS solutions can include work zone travel times detection and information dissemination, work zone queue detection, work zone speed enforcement, errant vehicle detection in work zones, and other systems that can improve worker safety in the work zones. Lead agency will be KYTC.	Planned	Short to Medium Term (0-6 Years)
Wrong Way Vehicle Detection System	This project represents a system that senses a wrong–way driver and then activates the flashing beacons near static Wrong Way signs on an exit ramp of an Interstate Highway. Nearby cameras take timestamped photos of the vehicle going the wrong way to send to law enforcement. Lead agencies will be KYTC and LFUCG (Traffic/ Public Safety).	Planned	Short to Medium Term (0-6 Years)